Additional Information

Mack Energy
Manitoba SWD-2610
9-17-2024
(Response to E-mail questions and updated C-108)

From: Deana Weaver
To: Harris, Anthony, EMNRD; Jerry Sherrell
Cc: Goetze, Phillip, EMNRD; Gebremichael, Million, EMNRD; Sandoval, Stacy, EMNRD; Chavez, Carl, EMNRD
Subject: [EXTERNAL] RE: Mack Energy - Manitoba SWD#1: Additional Information required
Date: Tuesday, September 17, 2024 9:41:17 AM
Attachments: Additional Information.pdf

CAUTION: This email originated outside of our organization. Exercise caution prior to clicking on links or opening attachments.

Anthony- Attached is the additional information requested below.

Thank you

Deana Weaver
Regulatory Technician II
Mack Energy Corporation
575-748-1288

From: Harris, Anthony, EMNRD <Anthony.Harris@emnrd.nm.gov>
Sent: Thursday, September 05, 2024 11:58 AM
To: Jerry Sherrell <jerrys@mec.com>; Deana Weaver <dweaver@mec.com>
Cc: Goetze, Phillip, EMNRD <phillip.goetze@emnrd.nm.gov>; Gebremichael, Million, EMNRD <Million.Gebremichael@emnrd.nm.gov>; Sandoval, Stacy, EMNRD <Stacy.Sandoval@emnrd.nm.gov>; Chavez, Carl, EMNRD <Carlj.Chavez@emnrd.nm.gov>
Subject: Mack Energy - Manitoba SWD#1: Additional Information required

EXTERNAL EMAIL - Verify the sender and use caution before opening attachments or clicking links

Good Morning, Jerry and Deana

Below is a list of deficiencies noted with your application. Please compile the requested information in a pdf document and send it by return e-mail.

C-108 Deficiencies:

1. Section VII.5:
    1. Please attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies or nearby wells).
2. Section VIII:
    1. Provide the geologic name and depth to bottom of all USDW overlying and underlying the injection interval as applicable.
        i. Your application states “no USDW exist” but there is no rationale or hydro-geologic evidence provided to support that statement
        ii. Please re-evaluate and update the application accordingly.
3. Section XIV: Proof of Notice - Only one Operator (Bam Permian Operating) was provided

notice. By comparison, the adjacent well (Labrador SWD#1) included "Proof of Notice for multiple Operators and Agencies.

1. Please provide a map showing the surface owner
2. Please provide "proof of notice" that the surface owner was notified
3. Please provide a 1 mile AOR map showing all leasehold operators
4. Please provide "proof of notice" that each leasehold operator within one-mile of the well have been notified.
5. Please provide "Proof of Publication" of the legal advertisement published in the County in which the well is located
6. Please provide an "Affidavit of publication" from the publisher

4. General Comment – Proximity to Karst
    1. The proposed well is in proximity to a known Karst area. Please provide an assessment of the following parameters:
        i. Potential for encountering karst based upon offset well data and geologic mapping in the area
        ii. Document any issues encountered with loss circulation during drilling, or achieving cement to surface based on offset well data
        iii. Contingency plans for loss circulation, drilling mud program (fresh vs brine based), casing setting depth(s), and cementing program to ensure protection of USDW in the proposed Manitoba well.

Induced Seismicity Potential (Minimum requirements)

The well is proposed for disposal into the Devonian. Considering the ongoing seismic activity in the southern region of New Mexico, OCD requests an assessment of the Induced Seismicity potential. Below is an outline of the minimum requirements

Minimum Requirements (for shallow injection wells)

1. General Information / overview:
    a. Operator to provide a brief narrative on the location of the proposed SWD well (Section, township, range, County etc)
    b. Geologic description (ie. Interbedded carbonate, limestones, siltstones, sandstones etc) of the proposed injection interval
    c. Proposed formation and the depth of the injection interval
    d. Statement on potential for communication with the Precambrian via faulting or other geologic features
    e. Statement on potential for communication with USDW.
2. Seismic Risk assessment based on USGS data
    a. Statement on the Historical seismicity in the area of the proposed SWD
        i. Number of earthquakes above 2.5 magnitude within 10 miles of the proposed well
        ii. Location and depth of nearest earthquake and the distance to the proposed well.
    b. Subsurface Conditions / Faulting

i. Distance and depth to the nearest basement-penetrating fault(s)
ii. Narrative on the maximum stress direction, the stress regime and potential for communication with basement-penetrating faults.

Deep Injection – Minimum requirements Provide all items listed for Shallow injection, in addition to the following:

1. 1-mile AOR required for all Devonian-Silurian injection wells
2. Include a structural contour map of the Precambrian basement
    a. Highlight basement-penetrating faults on the map as applicable
    b. Include a 2 Mile radius around the proposed well showing proximity to basement-penetrating faults if applicable
3. If basement penetrating faults are identified, include an analysis of Fault Slip Potential utilizing Stanford-Zoback model which should include the following:
    a. Construction of a hydrologic model to simulate the impact of injection from the proposed well (and nearby injection wells) over a 30 year period to estimate the Fault-slip potential associated with injection.
        i. Simulate injection scenarios based on maximum proposed injection rate for the well, and offset wells if applicable
        ii. An example of parameters to be utilized in the model are included in Table 8,9 & 10 below
    b. Identification of subsurface faults and a description of the faults (strike direction, type of fault – normal, extensional, etc)
    c. Include a record of all USGS documented seismic events of magnitude 2.5 or greater within a 10 mile radius, including details on the depth (focus) and epicenter
    d. A narrative on whether injection in the vicinity the faults will result in an elevated risk for injection-induced fault slip

Table 8. Input parameters and source material for FSP simulations

Modeled Parameter	Input Value	Variability (+/-)	UOM	Source
Stress				
Vertical Stress Gradient	1.05	0.105	psi ft^{-1}	Nearby well estimate
Max Horizontal Stress Direction	N75E	5	Deg.	Lund Snee & Zoback, 2018
Reference Depth	7,000	100	ft	Nearby well evaluation
Initial Res. Pressure Gradient	0.43	0.043	psi ft^{-1}	Lund Snee & Zoback, 2018
A_ϕ Parameter	0.6	0.06	-	Lund Snee & Zoback, 2018
Reference Friction Coefficient (μ)	0.6	0.06	-	Standard Value
Hydrologic				
Aquifer Thickness	1170	100	ft	Nearby well evaluation
Porosity	4	0.5	%	Nearby well evaluation
Permeability	25	2.5	mD	Nearby well evaluation
Material properties				
Density (Water)	1040	20	kg m^{-3}	Standard Value
Dynamic Viscosity (Water)	0.0008	0.0001	Pa.s	Standard Value
Fluid Compressibility (water)	3.6×10^{-10}	0	Pa^{-1}	Standard Value
Rock Compressibility	1.08×10^{-9}	0	Pa^{-1}	Standard Value

Table 9. Location and characteristics of injection wells simulated in FSP assessment

Well #	API	Well Name	Lat. (NAD83)	Long. (NAD83)	Vol. (bbls/day)	Start	End
1	30-025-[redacted]	[redacted] SWD #012	[redacted]	-103.[redacted]	7,000	2022	2052
2	30-025-[redacted]	[redacted] SWD #026	[redacted]	-103.[redacted]	5,000	2022	2052
3	30-025-[redacted]	[redacted] SWD #002	[redacted]	-103.[redacted]	20,000	2022	2052
4	N/A	[redacted] SWD #1	[redacted]	-103.[redacted]	15,000	2022	2052

Table 10. Summary of model simulation results showing the required pore pressure change to induced fault slip, actual change in pressure (as predicted by the FSP model), and probability of fault slip at the end of the simulated injection scenario.

Fault Segment #	ΔPressure Necessary to Induce Fault Slip	Actual ΔPressure at fault midpoint in 2052	Fault Slip Potential in 2052
1	2842	156	0.00
2	1956	157	0.00
3	2859	156	0.00
4	1764	151	0.00
5	531	166	0.02
6	832	152	0.00
7	496	137	0.03
8	446	116	0.03
9	1840	141	0.00
10	2515	152	0.00
11	894	166	0.00
12	1769	180	0.00

Conclusion – Induced Seismicity potential:

Operator representative(s), with skills and competencies suitable to assess the risk of induced seismicity, to provide an affirmative statement / summary on the potential for Induced seismicity based upon the parameter listed above. Example wording included below

1. "After examination of publicly available / Operator's geologic and engineering data, there (is / is not) evidence of open faults or other hydrologic connections between the proposed

disposal zone and any USDW.

2. “After examination of publicly available / Operator data, it is concluded that there is (low/high) risk for induced seismicity based upon the following parameters”:
    i. Vertical separation between the proposedinjection zone and the pre-cambrian
    ii. Narrative on the existance of basement-penetrating faults in the area of the proposed SWD
    iii. Distance from proposed well to the nearest known basement-penetrating fault(s)
    iv. Distance from the closest historic earthquake
    v. Summary of Fault Slip potential based on Stanford-Zoback model.
    vi. Other items as applicable..

Regards
Tony Harris
Petroleum Specialist
Anthony.harris@emnrd.nm.gov
505 549 8131.

Revised March 23, 2017

RECEIVED:	REVIEWER:	TYPE:	APP NO:

ABOVE THIS TABLE FOR OCD DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION
- Geological & Engineering Bureau –
1220 South St. Francis Drive, Santa Fe, NM 87505

ADMINISTRATIVE APPLICATION CHECKLIST

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

Applicant: _____ **OGRID Number:** _____
Well Name: _____ **API:** _____
Pool: _____ **Pool Code:** _____

SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED BELOW

1) **TYPE OF APPLICATION:** Check those which apply for [A]
A. Location – Spacing Unit – Simultaneous Dedication
☐ NSL ☐ NSP(PROJECT AREA) ☐ NSP(PRORATION UNIT) ☐ SD

B. Check one only for [I] or [II]
[I] Commingling – Storage – Measurement
☐ DHC ☐ CTB ☐ PLC ☐ PC ☐ OLS ☐ OLM
[II] Injection – Disposal – Pressure Increase – Enhanced Oil Recovery
☐ WFX ☐ PMX ☐ SWD ☐ IPI ☐ EOR ☐ PPR

FOR OCD ONLY
☐ Notice Complete
☐ Application Content Complete

2) **NOTIFICATION REQUIRED TO:** Check those which apply.
A. ☐ Offset operators or lease holders
B. ☐ Royalty, overriding royalty owners, revenue owners
C. ☐ Application requires published notice
D. ☐ Notification and/or concurrent approval by SLO
E. ☐ Notification and/or concurrent approval by BLM
F. ☐ Surface owner
G. ☐ For all of the above, proof of notification or publication is attached, and/or,
H. ☐ No notice required

3) **CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is **accurate** and **complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

_____ Date

_____ Print or Type Name

_____ Phone Number

Deana Weaver
_____ Signature

_____ e-mail Address

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

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

FORM C-108
Revised June 10, 2003

APPLICATION FOR AUTHORIZATION TO INJECT

I. PURPOSE: _____Secondary Recovery _____Pressure Maintenance XXX Disposal _____Storage
Application qualifies for administrative approval? XXX Yes _____No

II. OPERATOR: Mack Energy Corporation

ADDRESS: P.O. Box 960 Artesia, NM 88210

CONTACT PARTY: Deana Weaver PHONE: 575-748-1288

III. WELL DATA: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.

IV. Is this an expansion of an existing project? _____Yes XXX No
If yes, give the Division order number authorizing the project: _____

V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.

VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.

VII. Attach data on the proposed operation, including:

1. Proposed average and maximum daily rate and volume of fluids to be injected;
2. Whether the system is open or closed;
3. Proposed average and maximum injection pressure;
4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and,
5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).

*VIII. Attach appropriate geologic data on the injection zone including appropriate lithologic detail, geologic name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such sources known to be immediately underlying the injection interval.

IX. Describe the proposed stimulation program, if any.

*X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted).

*XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.

XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water.

XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.

XIV. Certification: I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

NAME: Deana Weaver TITLE: Regulatory Tech II

SIGNATURE: Deana Weaver

E-MAIL ADDRESS: dweaver@mec.com DATE: 2/28/2024

* If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be resubmitted. Please show the date and circumstances of the earlier submittal: _____

DISTRIBUTION: Original and one copy to Santa Fe with one copy to the appropriate District Office

Side 2

III. WELL DATA

A. The following well data must be submitted for each injection well covered by this application. The data must be both in tabular and schematic form and shall include:

(1) Lease name; Well No.; Location by Section, Township and Range; and footage location within the section.

(2) Each casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.

(3) A description of the tubing to be used including its size, lining material, and setting depth.

(4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Division District Offices have supplies of Well Data Sheets which may be used or which may be used as models for this purpose. Applicants for several identical wells may submit a "typical data sheet" rather than submitting the data for each well.

B. The following must be submitted for each injection well covered by this application. All items must be addressed for the initial well. Responses for additional wells need be shown only when different. Information shown on schematics need not be repeated.

(1) The name of the injection formation and, if applicable, the field or pool name.

(2) The injection interval and whether it is perforated or open-hole.

(3) State if the well was drilled for injection or, if not, the original purpose of the well.

(4) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.

(5) Give the depth to and the name of the next higher and next lower oil or gas zone in the area of the well, if any.

XIV. PROOF OF NOTICE

All applicants must furnish proof that a copy of the application has been furnished, by certified or registered mail, to the owner of the surface of the land on which the well is to be located and to each leasehold operator within one-half mile of the well location.

Where an application is subject to administrative approval, a proof of publication must be submitted. Such proof shall consist of a copy of the legal advertisement which was published in the county in which the well is located. The contents of such advertisement must include:

(1) The name, address, phone number, and contact party for the applicant;

(2) The intended purpose of the injection well; with the exact location of single wells or the Section, Township, and Range location of multiple wells;

(3) The formation name and depth with expected maximum injection rates and pressures; and,

(4) A notation that interested parties must file objections or requests for hearing with the Oil Conservation Division, 1220 South St. Francis Dr., Santa Fe, New Mexico 87505, within 15 days.

NO ACTION WILL BE TAKEN ON THE APPLICATION UNTIL PROPER PROOF OF NOTICE HAS BEEN SUBMITTED.

NOTICE: Surface owners or offset operators must file any objections or requests for hearing of administrative applications within 15 days from the date this application was mailed to them.

Side 1

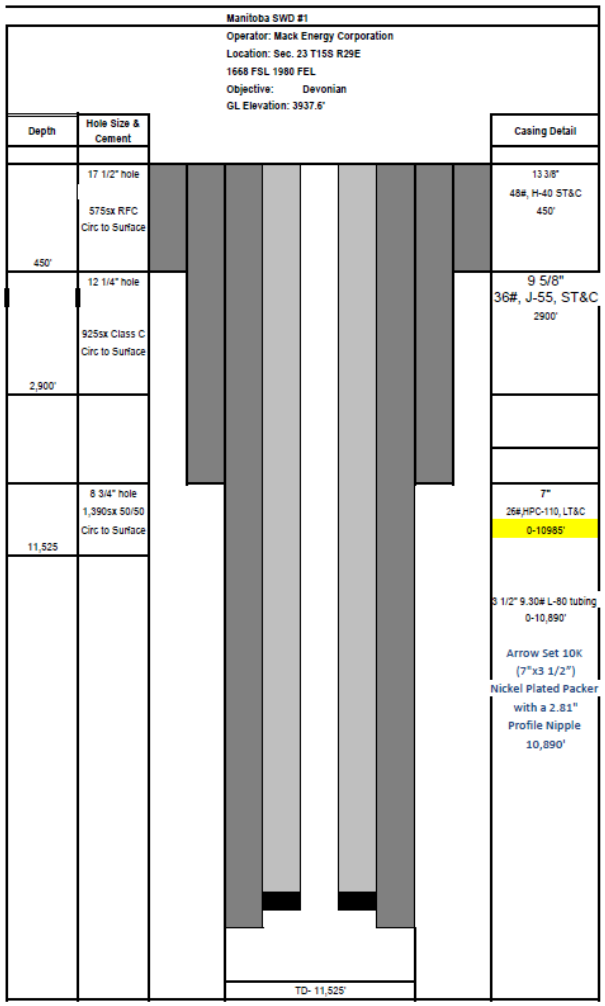
INJECTION WELL DATA SHEET

OPERATOR: Mack Energy Corporation

WELL NAME & NUMBER: Manitoba SWD #1

WELL LOCATION:	1668 FSL 1980 FEL	J	23	15S	29E
	FOOTAGE LOCATION	UNIT LETTER	SECTION	TOWNSHIP	RANGE

WELLBORE SCHEMATIC



WELL CONSTRUCTION DATA

Surface Casing

Hole Size: 17 1/2" Casing Size: 13 3/8"

Cemented with: 575 sx. ***or*** _____ ft^3

Top of Cement: 0 Method Determined: Circ

Intermediate Casing

Hole Size: 12 1/4" Casing Size: 9 5/8"

Cemented with: 925 sx. ***or*** _____ ft^3

Top of Cement: 0 Method Determined: Circ

Production Casing

Hole Size: 8 3/4" Casing Size: 7" @ 10,985'

Cemented with: 1390 sx. ***or*** _____ ft^3

Top of Cement: 0 Method Determined: Circ

Total Depth: 11,525' TD

Injection Interval

10,985' feet to 11,525' Open Hole

(Perforated or Open Hole; indicate which)

Side 2

INJECTION WELL DATA SHEET

Tubing Size: 3 1/2" 9.30# L-80 Lining Material: IPC Coating is 1850.

Type of Packer: Arrow Set 10K (7"x 3 1/2") Nickel Plated Packer with a 2.81" Profile Nipple

Packer Setting Depth: 10,890'

Other Type of Tubing/Casing Seal (if applicable): _____

Additional Data

1. Is this a new well drilled for injection? xxx Yes _____ No

   If no, for what purpose was the well originally drilled? _____

2. Name of the Injection Formation: Devonian

3. Name of Field or Pool (if applicable): SWD; Devonian

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail, i.e. sacks of cement or plug(s) used. N/A

5. Give the name and depths of any oil or gas zones underlying or overlying the proposed injection zone in this area: L. Miss 10,435' Devonian 10,985', Montoya 11,525' Simpson 11,725'

General Comment – Proximity to Karst

1. The proposed well is in proximity to a known Karst area. Please provide an assessment of the following parameters:
    i. Potential for encountering karst based upon offset well data and geologic mapping in the area
    ii. Document any issues encountered with loss circulation during drilling, or achieving cement to surface based on offset well data
    iii. Contingency plans for loss circulation, drilling mud program (fresh vs brine based), casing setting depth(s), and cementing program to ensure protection of USDW in the proposed Manitoba well.

We don't anticipate having any issue with Karst. I researched the Maple River Federal #1H, Camrose Federal Com #1H, Powell River Federal Com #1H and it did not have any losses while drilling or cementing. If losses are encountered while drilling, we will continue to dry drill while pumping LCM Pills. If we are unable to circulate cement to surface, then a CBL will be ran and cement plugs will be pumped till cement is circulated.

VII. DATA SHEET: PROPOSED OPERATIONS

1. Proposed average and maximum daily rate and volume of fluids to be injected;
Respectively, 15,000 BWPD and 20,000 BWPD
2. The system is closed or open;
Closed
3. Proposed average and maximum injection pressure;
1,000psi average-2,030psi maximum
4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than re-injected produced water;
We will be re-injecting produced water

5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water;

N/A-no sample is available from offset wells, together with a commitment to collect the data via swab test during the drilling/completion operations.

VIII. GEOLOGICAL DATA

6. List of Aquifers-Underground Sources of Drinking Water- Artesian (see POD Attached) POD # RA 12232POD1
7. Well Procedures- See Attached

1. Lithologic Detail; **Dolomite**
2. Geological Name; **Devonian**
3. Thickness; **540'**
4. Depth; **11,525' (open hole 10,985-11,525')**

IX. PROPOSED STIMULATION PROGRAM

5. To be treated with 10000 gallons 15% acid

X. LOGS AND TEST DATA

8. Well data will be filed with the OCD.

XI. ANALYSIS OF FRESHWATER WELLS

See attached
Additional Information
Waters Injected: San Andres

XII. AFFIRMATIVE STATEMENT

RE: Manitoba SWD #1

We have examined the available geologic and engineering data and find no evidence of open faults or any other hydraulic connection between the disposal zone and any underground source of drinking water.

Mack Energy Corporation

Date: 2/15/24

Charles Sadler, Geologist

Received by OCD: 10/23/2024 10:08:38 AM

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

(R=POD has been replaced and no longer serves this file, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest) (NAD83 UTM in meters)

(acre ft per annum)

WR File Nbr	Sub basin	Use	Diversion	Owner	County	POD Number	Well Tag	Code	Grant	Source	q q q 64 16 4	Sec	Twn	Rng	X	Y
RA 12232	RA	STK	3	DAVIS SPEAR RANCH	CH	RA 12232 POD1					2 2 4	35	15S	29E	594226	3648634

Record Count: 1

PLSS Search:

Section(s): 35 **Township:** 15S **Range:** 29E

Sorted by: File Number

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

Released to Imaging: 10/23/2024 10:11:27 AM

New Mexico Office of the State Engineer
Water Right Summary

get image list

WR File Number: RA 12232 **Subbasin:** RA **Cross Reference:** -

Primary Purpose: STK 72-12-1 LIVESTOCK WATERING

Primary Status: PMT PERMIT

Total Acres: **Subfile:** - **Header:** -

Total Diversion: 3 **Cause/Case:** -

Agent: DAVIS SPEAR RANCH

Contact: TOM DAVIS

Documents on File

	Trn #	Doc	File/Act	Status 1	Status 2	Transaction Desc.	From/ To	Acres	Diversion	Consumptive
get images	564211	72121	2015-03-03	PMT	APR	RA 12232 POD1	T		3	

Current Points of Diversion

(NAD83 UTM in meters)

POD Number	Well Tag	Source	Q 64	Q16	Q4	Sec	Tws	Rng	X	Y	Other Location Desc
RA 12232 POD1			2	2	4	35	15S	29E	594226	3648634	

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

Received by OCD: 10/23/2024 10:08:38 AM

New Mexico Office of the State Engineer
Transaction Summary

72121 All Applications Under Statute 72-12-1

Transaction Number: 564211 **Transaction Desc:** RA 12232 POD1 **File Date:** 02/25/2015

Primary Status: PMT Permit
Secondary Status: APR Approved
Person Assigned: *******
Applicant: DAVIS SPEAR RANCH
Contact: TOM DAVIS

Events

	Date	Type	Description	Comment	Processed By
get images	02/25/2015	APP	Application Received	*	*******
	03/03/2015	FIN	Final Action on application		*******
	03/03/2015	WAP	General Approval Letter		*******
	03/17/2015	SAR	Set Application Received		*******
	03/18/2015	QAT	Quality Assurance Completed	DATA	*******
	04/20/2015	QAT	Quality Assurance Completed	IMAGE	*******

Change To:

WR File Nbr	Acres	Diversion	Consumptive	Purpose of Use
RA 12232		3		STK 72-12-1 LIVESTOCK WATERING
**Point of Diversion				
RA 12232 POD1		594226	3648634	

Remarks

null

Conditions

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

10 Total diversion from all wells under this permit number shall not exceed 3 acre-feet per annum.

14 This permit authorizes the diversion of water for watering livestock. The total diversion of water under this permit shall not exceed 3 acre-feet per year.

Action of the State Engineer

SEE ALL GENERAL CONDITIONS OF APPROVAL

**** See Image For Any Additional Conditions of Approval ****

Approval Code: A - Approved
Action Date: 03/03/2015
Log Due Date: 03/02/2016
State Engineer: Tom Blaine, P.E.

Released to Imaging: 10/23/2024 10:11:27 AM

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

2/20/24 2:34 PM

TRANSACTION
SUMMARY

F o. RA-12232

NEW MEXICO OFFICE OF THE STATE ENGINEER

APPLICATION FOR PERMIT TO USE UNDERGROUND WATERS IN ACCORDANCE WITH SECTIONS 72-12-1.1, 72-12-1.2, OR 72-12-1.3 NEW MEXICO STATUTES

For fees, see State Engineer website: http://www.ose.state.nm.us/ 2-356000

1. APPLICANT(S)

Name: Davis Spear Ranch	Name:
Contact or Agent: check here if Agent ☑ John Davis	Contact or Agent: check here if Agent ☐
Mailing Address: 188 NM 467	Mailing Address:
City: Portales	City:
State: N. Mex. Zip Code: 88130	State: Zip Code:
Phone: ☐ Home ☑ Cell Phone (Work): 575-760-6612	Phone: ☐ Home ☐ Cell Phone (Work):
E-mail (optional):	E-mail (optional):

2. WELL LOCATION Required: Coordinate location must be New Mexico State Plane (NAD 83), UTM (NAD 83), or Lat/Long (WGS84). District II (Roswell) and District VII (Cimarron) customers, provide a PLSS location in addition to above.

NM State Plane (NAD83) - In feet	NM West Zone ☐ NM Central Zone ☐ NM East Zone ☒	X (in feet): 646,122 Y (in feet): 717,524				
UTM (NAD83) - In meters	UTM Zone 13N ☐ UTM Zone 12N ☐	Easting (in meters): Northing (in meters):				
Lat/Long (WGS84) - To 1/10th of second	Latitude: 32	deg	58	min	19.2	sec
	Longitude: 103	deg	59	min	30.0	sec

Other Location Information (complete the below, if applicable):

PLSS Quarters or Halves: NE · NE · SE Section: 35 Township: 15S Range: 29E

County: Chaves

Land Grant Name (if applicable): non

Lot No: Block No: Unit/Tract: Subdivision:

Hydrographic Survey: Map: Tract:

Other description relating point of diversion to common landmarks, streets, or other:

Point of Diversion is on Land Owned by (Required): Applicant -

STATE ENGINEER OFFICE ROSWELL, NEW MEXICO 2015 FEB 25 AM 8:07

FOR OSE INTERNAL USE Application for Permit, Form wr-01, Rev 6/14/12

File No.: RA-12232	Trn No.: 564211	Receipt No.: 2-356000
Sub-basin: RA	POD No.: 1 Livestock	Log Due Date: March 2, 2016

3. PURPOSE OF USE

- ☐ Domestic use for one household
- ☒ Livestock watering
- ☐ Domestic use for more than one household. Number of households _____
- ☐ Drinking and sanitary uses that are incidental to the operations of a governmental, commercial, or non-profit facility
- ☐ Prospecting, mining or drilling operations to discover or develop natural resources
- ☐ Construction of public works, highways and roads
- ☐ Domestic use for one household and livestock watering
- ☐ Domestic use for multiple households and livestock watering
- ☐ Domestic well to accompany a house or other dwelling unit constructed for sale

4. WELL INFORMATION

File Information: (If existing well, provide OSE no. & indicate below if well is to be replacement, repaired or deepened, or supplemental. If new well, leave blank, as OSE must assign no.)

OSE Well No.(If Existing)	New Well No. (provided by OSE)
Driller Name: L & J Drilling	**Driller License Number:**
Approximate Depth of Well (feet):	Outside Diameter of Well Casing (inches):

☐ Replacement well (List all existing wells if more than one):	☐ Repair or Deepen: ☐ Clean out well to original depth ☐ Deepen well from _____ to _____ ft. ☐ Other (Explain):	☐ Supplemental well (List OSE No. for all wells this will supplement):

5. ADDITIONAL STATEMENTS OR EXPLANATIONS

ACKNOWLEDGEMENT

I, We (name of applicant(s)), Tom Davis
Print Name(s)

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

Applicant Signature

Applicant Signature

STATE ENGINEER OFFICE
ROSWELL, NEW MEXICO
2015 FEB 25 AM 8:07

ACTION OF THE STATE ENGINEER (FOR OSE USE ONLY)

This application is approved subject to the attached general and specific conditions of approval.

Witness my hand and seal this 3rd day of March 20 15, for the State Engineer,

By: Claudia K Guiller
Signature Print

FOR OSE INTERNAL USE Application for Permit, Form wr-01, Rev 6/14/12

File No.: RA-12232	Trn No.: 564211	Receipt No.: 2-35600
Sub-basin: RA	POD No.: 1	Log Due Date: March 2, 2016.

NEW MEXICO STATE ENGINEER OFFICE
APPLICATION FOR PERMIT TO USE UNDERGROUND WATERS
IN ACCORDANCE WITH SECTION 72-12-1 NEW MEXICO STATUTES

GENERAL CONDITIONS OF APPROVAL (A thru P)

06-A The maximum amount of water that may be appropriated under this permit is 3.000 acre-feet in any year.

06-B The well shall be drilled by a driller licensed in the State of New Mexico in accordance with Section 72-12-12 New Mexico Statutes Annotated. A licensed driller shall not be required for the construction of a driven well; provided that the casing shall not exceed two and three-eighths (2 3/8) inches outside diameter (Section 72-12-12).

06-C Driller's well record must be filed with the State Engineer within 20 days after the well is drilled or driven. Well record forms will be provided by the State Engineer upon request.

06-D The casing shall not exceed 7 inches outside diameter except under specific conditions in which reasons satisfactory to the State Engineer are shown.

06-E To request a change to the use of water authorized under this permit, the permittee shall file an application with the State Engineer.

06-F An application for a new 72-12-1.1 domestic well permit where the proposed point of diversion is to be located on the same legal lot of record as an operational 72-12-1.1 domestic well shall be treated as an application for a supplemental well.

06-G If artesian water is encountered, all rules and regulations pertaining to the drilling and casing of artesian wells shall be complied with.

06-H The drilling of the well and amount and uses of water permitted are subject to such limitations as may be imposed by a court or by lawful municipal or county ordinance which are more restrictive than the conditions of this permit and applicable State Engineer regulations.

06-I The permittee shall utilize the highest and best technology available to ensure conservation of water to the maximum extent practical.

Trn Desc: RA 12232 POD1 File Number: RA 12232
Log Due Date: 03/02/2016 Trn Number: 564211
Form: wr-01 page: 1

NEW MEXICO STATE ENGINEER OFFICE
APPLICATION FOR PERMIT TO USE UNDERGROUND WATERS
IN ACCORDANCE WITH SECTION 72-12-1 NEW MEXICO STATUTES

GENERAL CONDITIONS OF APPROVAL (Continued)

06-J The well shall be set back a minimum of 50 ft. from an existing well of other ownership unless a variance has been granted by the State Engineer. The State Engineer may grant a variance for a replacement well or to allow for maximum spacing of the well from a source of groundwater contamination. The well shall be set back from potential sources of contamination in accordance with rules and regulations of the NM Environment Department.

06-K Pursuant to section 72-8-1 NMSA, the permittee shall allow the State Engineer and his representatives entry upon private property for the performance of their respective duties, including access to the well for meter reading and water level measurement.

06-L The permit is subject to cancellation for non-compliance with the conditions of approval or if otherwise not exercised in accordance with the terms of the permit.

06-M The right to divert water under this permit is subject to curtailment by priority administration as implemented by the State Engineer or a court.

06-N In the event of any change of ownership to this permit the new owner shall file a change of ownership form with the State Engineer in accordance with Section 72-1-2.1 NMSA.

06-O This well permit shall automatically expire unless the well is completed and the well record is filed with the State Engineer within one year of the date of issuance of the permit. It is the responsibility of the permit holder to ensure that the well record has been properly filed with the State Engineer.

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

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

SPECIFIC CONDITIONS OF APPROVAL

06-1A Depth of the well shall not exceed the thickness of the valley fill.

Trn Desc: RA 12232 POD1 File Number: RA 12232
Log Due Date: 03/02/2016 Trn Number: 564211
Form: wr-01 page: 2

NEW MEXICO STATE ENGINEER OFFICE
APPLICATION FOR PERMIT TO USE UNDERGROUND WATERS
IN ACCORDANCE WITH SECTION 72-12-1 NEW MEXICO STATUTES

SPECIFIC CONDITIONS OF APPROVAL (Continued)

06-10 Total diversion from all wells under this permit number shall not exceed 3.000 acre-feet per annum.

06-14 This permit authorizes the diversion of water for watering livestock. The total diversion of water under this permit shall not exceed 3.000 acre-feet per year.

LOG This permit will automatically expire unless the well RA 12232 POD1 is completed and the well record filed on or before 03/02/2016.

SEE ALL GENERAL CONDITIONS OF APPROVAL

ACTION OF STATE ENGINEER

This application is approved for the use indicated, subject to all general conditions and to specific conditions listed above.

Witness my hand and seal this 03 day of Mar A.D., 2015

Tom Blaine, P.E., State Engineer

By: Claudia K Guillen
CLAUDIA GUILLEN

Trn Desc: RA 12232 POD1 File Number: RA 12232
Log Due Date: 03/02/2016 Trn Number: 564211
Form: wr-01 page: 3

Locator Tool Report

General Information:

Application ID:29 Date: 03-03-2015 Time: 10:42:25

WR File Number: RA- 12232
Purpose: POINT OF DIVERSION

Applicant First Name: DAVIS SPEAR RANCH
Applicant Last Name: TOM DAVIS

GW Basin: ROSWELL ARTESIAN
County: CHAVES

Critical Management Area Name(s): NONE
Special Condition Area Name(s): NONE
Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

NW 1/4 of NE 1/4 of NE 1/4 of SE 1/4 of Section 35, Township 15S, Range 29E.

Coordinate System Details:

Geographic Coordinates:

Latitude:	32 Degrees	58 Minutes	19.2 Seconds	N
Longitude:	103 Degrees	59 Minutes	30.0 Seconds	W

Universal Transverse Mercator Zone: 13N

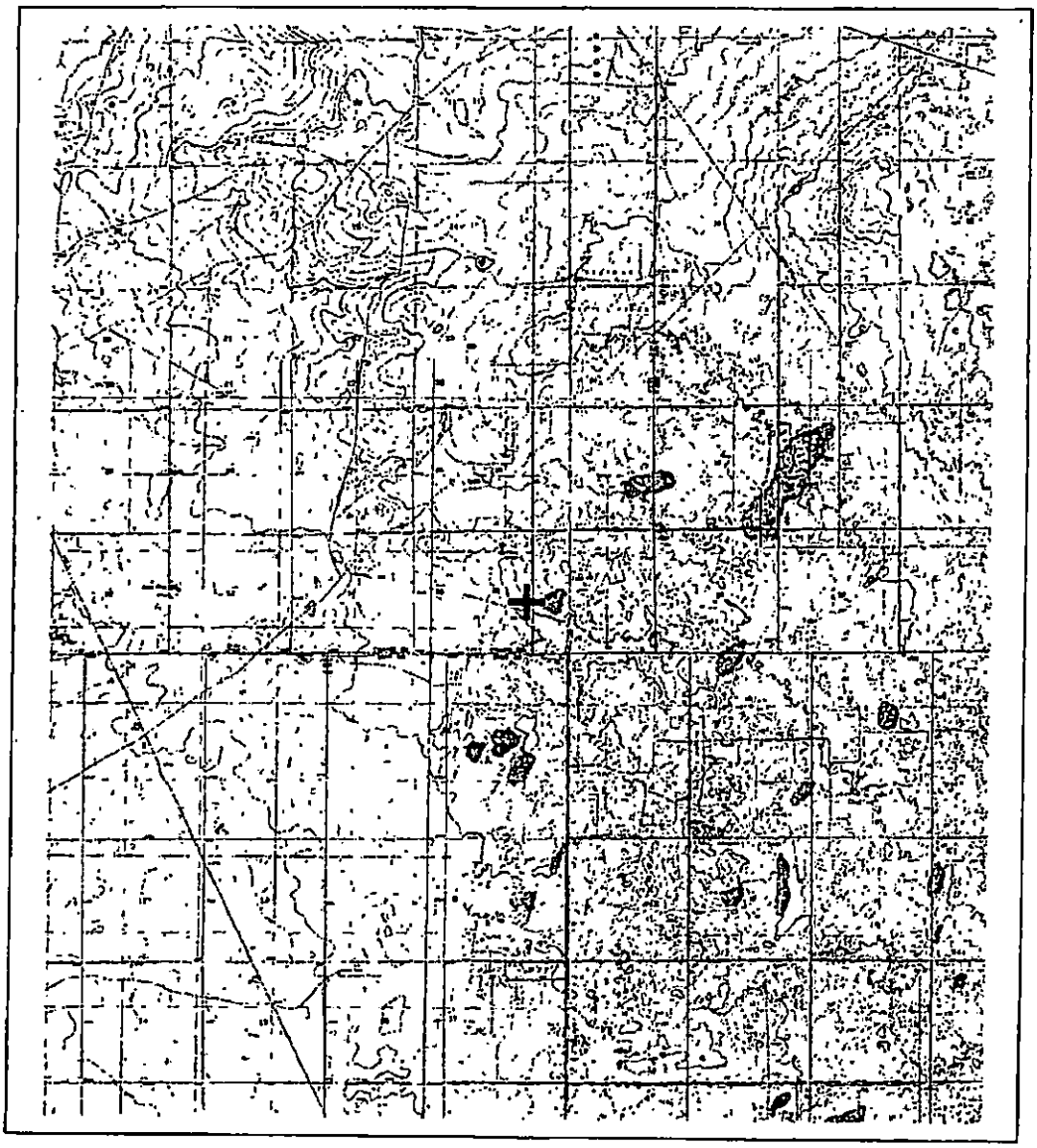
NAD 1983(92) (Meters)	N: 3,648,635	E: 594,227
NAD 1983(92) (Survey Feet)	N: 11,970,565	E: 1,949,561
NAD 1927 (Meters)	N: 3,648,432	E: 594,277
NAD 1927 (Survey Feet)	N: 11,969,898	E: 1,949,724

State Plane Coordinate System Zone: New Mexico East

NAD 1983(92) (Meters)	N: 218,702	E: 196,939
NAD 1983(92) (Survey Feet)	N: 717,524	E: 646,122
NAD 1927 (Meters)	N: 218,682	E: 184,387
NAD 1927 (Survey Feet)	N: 717,460	E: 604,943

NEW MEXICO OFFICE OF STATE ENGINEER

Locator Tool Report



WR File Number: RA Scale: 1:94,202

Northing/Easting: UTM83(92) (Meter): N: 3,648,635 E: 594,227

Northing/Easting: SPCS83(92) (Feet): N: 717,524 E: 646,122

GW Basin: Roswell Artesian

Print Date: 03/03/2015

Tom Blaine, P.E.
State Engineer

Roswell Office
1900 WEST SECOND STREET
ROSWELL, NM 88201

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER

Trn Nbr: 564211
File Nbr: RA 12232

Mar. 03, 2015

TOM DAVIS
DAVIS SPEAR RANCH
188 NM 467
PORTALES, NM 88130

Greetings:

Enclosed is your copy of the above numbered permit that has been approved in accordance with NM Statute Section 72-12-1 subject to the conditions set forth on the approval page.

Please review the conditions for any required submittals. If submittals are not made by the date(s) indicated in the conditions, your rights under this permit shall expire by the date indicated on your permit.

Appropriate forms can be downloaded from the OSE website www.ose.state.nm.us or will be mailed upon request.

Sincerely,

Claudia Guillen
(575)622-6521

Enclosure

wr_01app

OSE POD Locations Map

3/17/2022, 11:27:45 AM

Override 1

OSE District Boundary

New Mexico State Trust Lands

Subsurface Estate

Both Estates

SiteBoundaries

1:72,224

0 0.5 1 2 mi

0 1 2 4 km

Esri, HERE, Garmin, Esri, HERE, Earthstar Geographics, U.S. Department of Energy Office of Legacy Management

Unofficial Online Map

These maps are distributed "as is" without warranty of any kind.

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

No PODs found.

PLSS Search:

Section(s): 25 **Township:** 15S **Range:** 29E

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

No PODs found.

PLSS Search:

Section(s): 26 **Township:** 15S **Range:** 29E

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

CATALYST
Oilfield Services

Catalyst Oilfield Services
11999 E Hwy 158
Gardendale, TX 79758
(432) 563-0727
Fax: (432) 224-1038

Water Analysis Report

Customer:	Mack Energy Corporation	Sample #:	118208
Area:	Artesia	Analysis ID #:	107555
Lease:	Montreal		
Location:	1H 0		
Sample Point:	Wellhead		

Sampling Date:	2/13/2020
Analysis Date:	3/4/2020
Analyst:	Catalyst
TDS (mg/l or g/m3):	172020.9
Density (g/cm3):	1.116
Hydrogen Sulfide:	7.4
Carbon Dioxide:	102
Comments:	

Anions	mg/l	meq/l
Chloride:	101615.8	2866.21
Bicarbonate:	197.6	3.24
Carbonate:		
Sulfate:	3400.0	70.79
Borate*:	110.4	0.7
Phosphate*		

***Calculated based on measured elemental boron and phosphorus.**

pH at time of sampling:	7.14
pH at time of analysis:	
pH used in Calculation:	**7.14**
Temperature @ lab conditions (F):	**75**

Cations	mg/l	meq/l
Sodium:	62440.0	2715.99
Magnesium:	965.3	79.41
Calcium:	2569.0	128.19
Potassium:	660.8	16.9
Strontium:	57.8	1.32
Barium:	3.4	0.05
Iron:	0.2	0.01
Manganese:	0.550	0.02

Conductivity (micro-mhos/cm):	199270
Resistivity (ohm meter):	.0502

Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl

Temp	Calcite $CaCO_3$		Gypsum $CaSO_4 * 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$	
°F	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount
80	0.58	8.60	-0.09	0.00	-0.08	0.00	-0.05	0.00	1.83	1.78
100	0.59	10.08	-0.16	0.00	-0.08	0.00	-0.08	0.00	1.63	1.78
120	0.60	11.86	-0.23	0.00	-0.07	0.00	-0.10	0.00	1.45	1.78
140	0.61	13.93	-0.28	0.00	-0.03	0.00	-0.10	0.00	1.30	1.78
160	0.63	16.01	-0.32	0.00	0.03	69.97	-0.10	0.00	1.16	1.78
180	0.65	18.38	-0.36	0.00	0.11	226.51	-0.10	0.00	1.05	1.78
200	0.68	21.05	-0.39	0.00	0.19	391.65	-0.09	0.00	0.95	1.48
220	0.73	24.01	-0.42	0.00	0.29	555.31	-0.08	0.00	0.87	1.48

Catalyst Oilfield Services
11999 E Hwy 158
Gardendale, TX 79758
(432) 563-0727
Fax: (432) 224-1038

Water Analysis Report

Customer:	Mack Energy Corporation	Sample #:	100487
Area:	Drilling	Analysis ID #:	94751
Lease:	Maple Ridge		
Location:	Fed #1 0		
Sample Point:	Wellhead		

Sampling Date:	7/29/2019
Analysis Date:	8/8/2019
Analyst:	Catalyst
TDS (mg/l or g/m3):	144232
Density (g/cm3):	1.097
Hydrogen Sulfide:	14
Carbon Dioxide:	162.8
Comments:	

Anions	mg/l	meq/l
Chloride:	84902.3	2394.79
Bicarbonate:	241.6	3.96
Carbonate:		
Sulfate:	3300.0	68.71
Borate*:	173.9	1.1
Phosphate*		

*Calculated based on measured elemental boron and phosphorus.

pH at time of sampling:	6.41
pH at time of analysis:	
pH used in Calculation:	6.41
Temperature @ lab conditions (F):	75

Cations	mg/l	meq/l
Sodium:	51250.0	2229.25
Magnesium:	1177.0	96.82
Calcium:	2566.0	128.04
Potassium:	564.2	14.43
Strontium:	53.5	1.22
Barium:	1.5	0.02
Iron:	1.5	0.05
Manganese:	0.460	0.02

Conductivity (micro-mhos/cm):	194536
Resistivity (ohm meter):	.0514

Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl

Temp	Calcite $CaCO_3$		Gypsum $CaSO_4 * 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$	
°F	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount
80	-0.09	0.00	-0.09	0.00	-0.09	0.00	-0.04	0.00	1.52	0.91
100	0.01	0.30	-0.15	0.00	-0.08	0.00	-0.06	0.00	1.33	0.91
120	0.10	3.96	-0.20	0.00	-0.06	0.00	-0.08	0.00	1.15	0.61
140	0.21	8.22	-0.25	0.00	-0.01	0.00	-0.08	0.00	1.00	0.61
160	0.31	12.48	-0.28	0.00	0.06	131.82	-0.08	0.00	0.87	0.61
180	0.41	17.35	-0.31	0.00	0.14	299.86	-0.07	0.00	0.76	0.61
200	0.51	21.92	-0.33	0.00	0.24	471.86	-0.06	0.00	0.67	0.61
220	0.61	26.79	-0.35	0.00	0.35	637.46	-0.04	0.00	0.60	0.61

Released to Imaging: 10/23/2024 10:11:27 AM

CATALYST Oilfield Services

Catalyst Oilfield Services
11999 E Hwy 158
Gardendale, TX 79758
(432) 563-0727
Fax: (432) 224-1038

Water Analysis Report

Customer:	Mack Energy Corporation	Sample #:	55880
Area:	Artesia	Analysis ID #:	53988
Lease:	White Rock		
Location:	Federal #1H 0		
Sample Point:	Wellhead		

Sampling Date:	12/21/2017
Analysis Date:	1/6/2018
Analyst:	Catalyst
TDS (mg/l or g/m3):	161820.5
Density (g/cm3):	1.107
Hydrogen Sulfide:	11
Carbon Dioxide:	242
Comments:	

Anions	mg/l	meq/l
Chloride:	93901.4	2648.62
Bicarbonate:	241.6	3.96
Carbonate:		
Sulfate:	5000.0	104.1
Borate*:	229.5	1.45
Phosphate*		

***Calculated based on measured elemental boron and phosphorus.**

pH at time of sampling:	6.9
pH at time of analysis:	
pH used in Calculation:	**6.9**
Temperature @ lab conditions (F):	**75**

Cations	mg/l	meq/l
Sodium:	58100.0	2527.21
Magnesium:	969.6	79.76
Calcium:	2737.0	136.58
Potassium:	571.6	14.62
Strontium:	66.0	1.51
Barium:	0.0	0.
Iron:	3.8	0.14
Manganese:	0.000	0.

Conductivity (micro-ohms/cm):	**176042**
Resistivity (ohm meter):	**.0568**

Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl

Temp	Calcite $CaCO_3$		Gypsum $CaSO_4*2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$	
°F	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount
80	0.43	9.88	0.10	359.72	0.11	305.55	0.18	14.96	0.00	0.00
100	0.49	12.27	0.03	111.03	0.10	296.88	0.16	13.17	0.00	0.00
120	0.55	14.96	-0.03	0.00	0.13	355.53	0.14	11.97	0.00	0.00
140	0.60	17.96	-0.08	0.00	0.17	467.16	0.13	11.67	0.00	0.00
160	0.64	20.95	-0.12	0.00	0.23	615.30	0.14	11.67	0.00	0.00
180	0.69	24.54	-0.15	0.00	0.31	784.69	0.14	12.27	0.00	0.00
200	0.75	28.13	-0.18	0.00	0.40	962.15	0.15	12.87	0.00	0.00
220	0.80	31.72	-0.20	0.00	0.51	1137.23	0.17	13.77	0.00	0.00

Received by OCD: 10/23/2024 10:08:38 AM

Catalyst Oilfield Services
11999 E Hwy 158
Gardendale, TX 79758
(432) 563-0727
Fax: (432) 224-1038

Water Analysis Report

Customer:	Mack Energy Corporation	Sample #:	81463
Area:	Artesia	Analysis ID #:	80383
Lease:	Prince Rupert		
Location:	Fed #4H 0		
Sample Point:	Wellhead		

Sampling Date:	1/10/2019
Analysis Date:	1/22/2019
Analyst:	Catalyst
TDS (mg/l or g/m3):	150968.6
Density (g/cm3):	1.102
Hydrogen Sulfide:	5
Carbon Dioxide:	97
Comments:	

Anions	mg/l	meq/l
Chloride:	**89383.7**	**2521.19**
Bicarbonate:	**175.7**	**2.88**
Carbonate:		
Sulfate:	**2800.0**	**58.3**
Borate*:	**190.4**	**1.2**
Phosphate*		

***Calculated based on measured elemental boron and phosphorus.**

pH at time of sampling:	6.65
pH at time of analysis:	
pH used in Calculation:	**6.65**
Temperature @ lab conditions (F):	**75**

Cations	mg/l	meq/l
Sodium:	**53970.0**	**2347.56**
Magnesium:	**1013.0**	**83.33**
Calcium:	**2725.0**	**135.98**
Potassium:	**644.4**	**16.48**
Strontium:	**55.6**	**1.27**
Barium:	**0.9**	**0.01**
Iron:	**9.0**	**0.32**
Manganese:	**0.857**	**0.03**

Conductivity (micro-ohms/cm):	**200079**
Resistivity (ohm meter):	**.0500**

Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl

Temp	Calcite $CaCO_3$		Gypsum $CaSO_4 * 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$	
°F	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount
80	0.05	0.91	-0.13	0.00	-0.13	0.00	-0.11	0.00	1.22	0.60
100	0.13	2.72	-0.20	0.00	-0.13	0.00	-0.13	0.00	1.02	0.30
120	0.22	4.84	-0.26	0.00	-0.11	0.00	-0.15	0.00	0.84	0.30
140	0.30	7.26	-0.30	0.00	-0.06	0.00	-0.15	0.00	0.69	0.30
160	0.37	9.68	-0.34	0.00	0.00	6.96	-0.15	0.00	0.56	0.30
180	0.45	12.70	-0.37	0.00	0.08	166.07	-0.14	0.00	0.45	0.30
200	0.52	15.73	-0.40	0.00	0.18	328.81	-0.13	0.00	0.36	0.30
220	0.60	18.75	-0.42	0.00	0.28	485.19	-0.11	0.00	0.28	0.30

Catalyst Oilfield Services
11999 E Hwy 158
Gardendale, TX 79758
(432) 563-0727
Fax: (432) 224-1038

Water Analysis Report

Customer:	Mack Energy Corporation	Sample #:	78595
Area:	Artesia	Analysis ID #:	76096
Lease:	Chilliwack		
Location:	Fed Com 1H 0		
Sample Point:	Wellhead		

Sampling Date:	11/28/2018
Analysis Date:	12/3/2018
Analyst:	Catalyst
TDS (mg/l or g/m3):	175963.5
Density (g/cm3):	1.118
Hydrogen Sulfide:	4
Carbon Dioxide:	108
Comments:	

Anions	mg/l	meq/l
Chloride:	**104292.8**	**2941.72**
Bicarbonate:	**131.8**	**2.16**
Carbonate:		
Sulfate:	**3200.0**	**66.62**
Borate*:	**108.1**	**0.68**
Phosphate*		

***Calculated based on measured elemental boron and phosphorus.**

pH at time of sampling:	6.95
pH at time of analysis:	
pH used in Calculation:	**6.95**
Temperature @ lab conditions (F):	**75**

Cations	mg/l	meq/l
Sodium:	**63550.0**	**2764.27**
Magnesium:	**1027.0**	**84.49**
Calcium:	**2882.0**	**143.81**
Potassium:	**707.0**	**18.08**
Strontium:	**63.7**	**1.45**
Barium:	**0.8**	**0.01**
Iron:	**0.1**	**0.**
Manganese:	**0.189**	**0.01**

Conductivity (micro-ohms/cm):	**200381**
Resistivity (ohm meter):	**.0499**

Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl

Temp	Calcite $CaCO_3$		Gypsum $CaSO_4*2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$	
°F	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount
80	0.28	2.95	-0.07	0.00	-0.05	0.00	-0.04	0.00	1.17	0.30
100	0.32	3.84	-0.14	0.00	-0.06	0.00	-0.07	0.00	0.97	0.30
120	0.36	5.02	-0.21	0.00	-0.05	0.00	-0.09	0.00	0.79	0.30
140	0.39	6.20	-0.26	0.00	-0.01	0.00	-0.10	0.00	0.63	0.30
160	0.43	7.38	-0.31	0.00	0.05	111.64	-0.10	0.00	0.50	0.30
180	0.46	9.16	-0.34	0.00	0.12	261.08	-0.09	0.00	0.38	0.30
200	0.50	10.93	-0.38	0.00	0.21	418.50	-0.08	0.00	0.29	0.30
220	0.55	12.99	-0.41	0.00	0.31	573.26	-0.07	0.00	0.21	0.30

Water Sample- San Andres

CATALYST Oilfield Services

Catalyst Oilfield Services
11999 E Hwy 158
Gardendale, TX 79758
(432) 563-0727
Fax: (432) 224-1038

Water Analysis Report

Customer:	Mack Energy Corporation	Sample #:	81533
Area:	Artesia	Analysis ID #:	80615
Lease:	Saskatoon		
Location:	Fed Com 1H 0		
Sample Point:	Wellhead		

Sampling Date:	1/10/2019
Analysis Date:	1/23/2019
Analyst:	Catalyst
TDS (mg/l or g/m3):	151377.2
Density (g/cm3):	1.105
Hydrogen Sulfide:	4
Carbon Dioxide:	90
Comments:	

Anions	mg/l	meq/l
Chloride:	**91681.1**	**2585.99**
Bicarbonate:	**153.7**	**2.52**
Carbonate:		
Sulfate:	**700.0**	**14.57**
Borate*:	**144.3**	**0.91**
Phosphate*		

***Calculated based on measured elemental boron and phosphorus.**

pH at time of sampling:	7.23
pH at time of analysis:	
pH used in Calculation:	**7.23**
Temperature @ lab conditions (F):	**75**

Cations	mg/l	meq/l
Sodium:	**54050.0**	**2351.04**
Magnesium:	**1173.0**	**96.5**
Calcium:	**2767.0**	**138.07**
Potassium:	**647.0**	**16.55**
Strontium:	**60.1**	**1.37**
Barium:	**0.6**	**0.01**
Iron:	**0.0**	**0.**
Manganese:	**0.416**	**0.02**

Conductivity (micro-ohms/cm):	**197210**
Resistivity (ohm meter):	**.0507**

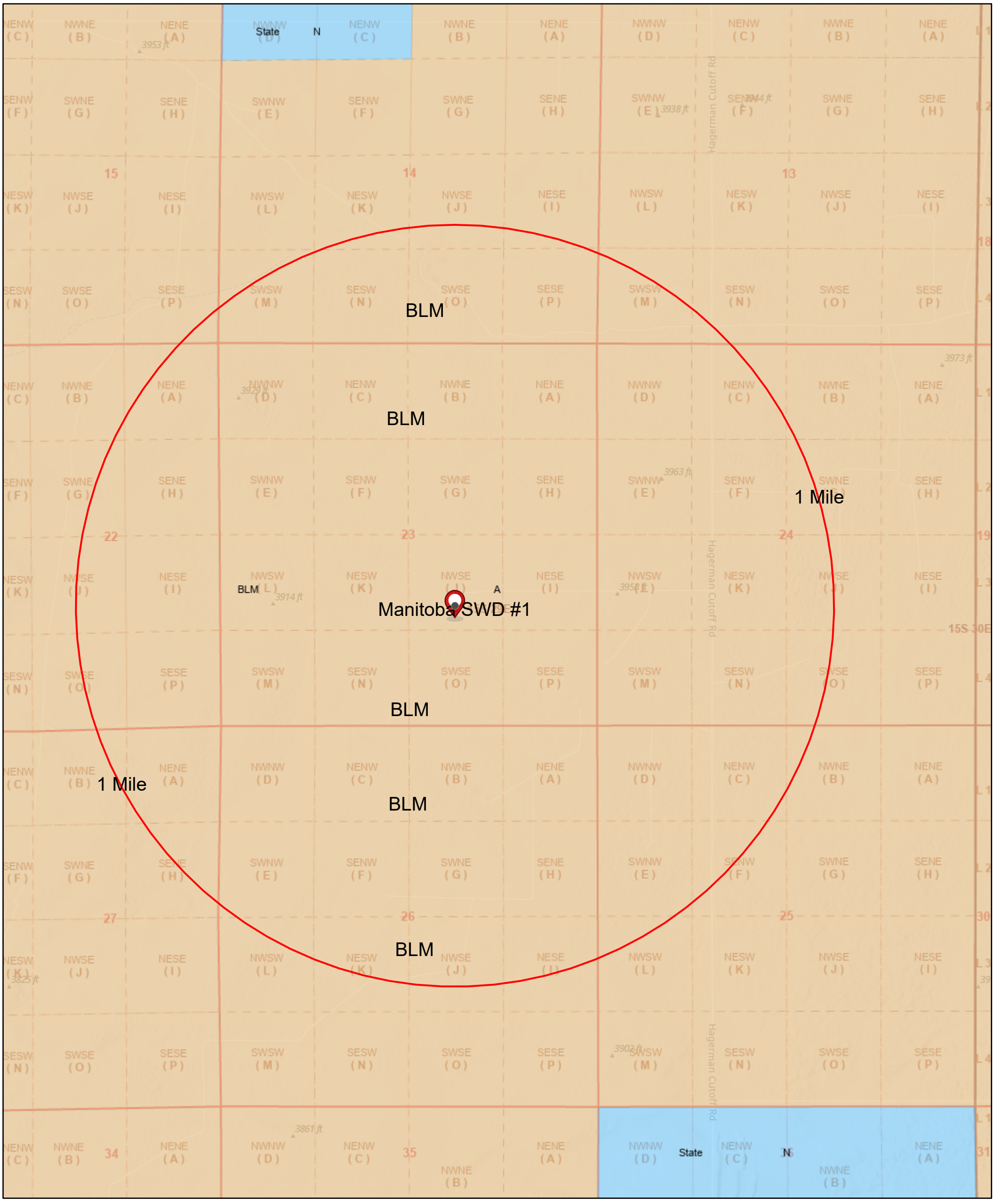
Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl

Temp	Calcite $CaCO_3$		Gypsum $CaSO_4*2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$	
°F	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount
80	0.57	6.35	-0.72	0.00	-0.71	0.00	-0.66	0.00	0.45	0.30
100	0.57	7.26	-0.79	0.00	-0.72	0.00	-0.69	0.00	0.25	0.00
120	0.58	8.77	-0.84	0.00	-0.69	0.00	-0.70	0.00	0.07	0.00
140	0.59	10.28	-0.89	0.00	-0.65	0.00	-0.71	0.00	-0.08	0.00
160	0.60	12.10	-0.93	0.00	-0.59	0.00	-0.70	0.00	-0.21	0.00
180	0.63	13.91	-0.96	0.00	-0.51	0.00	-0.70	0.00	-0.32	0.00
200	0.66	16.03	-0.99	0.00	-0.41	0.00	-0.69	0.00	-0.42	0.00
220	0.71	18.45	-1.01	0.00	-0.31	0.00	-0.67	0.00	-0.49	0.00

Received by OCD: 10/23/2024 10:08:38 AM

Released to Imaging: 10/23/2024 10:11:27 AM

1 mile Surface Owner Map



9/6/2024, 8:24:51 AM

Mineral Ownership

A-All minerals are owned by U.S.

N-No minerals are owned by the U.S.

Land Ownership

BLM

S

PLSS Second Division

PLSS First Division

PLSS Townships

1:18,056

0 0.17 0.35 0.7 mi

0 0.28 0.55 1.1 km

U.S. BLM, Esri, NASA, NGA, USGS, FEMA, OCD, Esri Community Maps Contributors, New Mexico State University, Texas Parks & Wildlife, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS, BLM

New Mexico Oil Conservation Division

Received by OCD: 10/23/2024 7:47:38 AM

Legal Notice

Publish February 23rd, 2024

Legal Notice

Mack Energy Corporation, Post Office Box 960, Artesia, NM 88211-1370, has filed an Application with the New Mexico Oil Conservation Division seeking authorization to inject produced water into the Manitoba SWD #1 1668 FSL 1980 FEL of Section 23, T15S, R29E, NMPM, Chaves County, New Mexico. The water will be injected into the Devonian at a disposal depth of 10,985-11,525'. Water will be injected at a maximum surface pressure of 2,030# and a maximum injection rate of 10,000-15,000 BWPD. Any interest party with questions or comments may contact Deana Weaver at Mack Energy Corporation, Post Office Box 960, Artesia, NM 88211-1370 or call 575-748-1288. Objections to this application or requests for hearing must be filed with the Oil Conservation Division, 1220 South Saint Francis Drive, Santa Fe, New Mexico 87505, within fifteen days of the date of publication of this notice.

Released to Imaging: 10/23/2024 10:11:

Legal Notice

Mack Energy Corporation, Post Office Box 960, Artesia, NM 88211-1370, has filed an Application with the New Mexico Oil Conservation Division seeking authorization to inject produced water into the Manitoba SWD #1 1668 FSL 1980 FEL of Section 23, T15S, R29E, NMPM, Chaves County, New Mexico. The water will be injected into the Devonian at a disposal depth of 10,985-11,525'. Water will be injected at a maximum surface pressure of 2,030# and a maximum injection rate of 10,000-15,000 BWPD. Any interest party with questions or comments may contact Deana Weaver at Mack Energy Corporation, Post Office Box 960, Artesia, NM 88211-1370 or call 575-748-1288. Objections to this application or requests for hearing must be filed with the Oil Conservation Division, 1220 South Saint Francis Drive, Santa Fe, New Mexico 87505, within fifteen days of the date of publication of this notice.

AFFIDAVIT OF PUBLICATION
STATE OF NEW MEXICO

I, Merle Alexander
Legals Clerk

Of the Roswell Daily Record, a daily newspaper published at Roswell, New Mexico do solemnly swear that the clipping hereto attached was published in the regular and entire issue of said paper and not in a supplement thereof for a period of:

One time with the issue dated

February 23rd, 2024

Clerk

Sworn and subscribed to before me

this 6th day of March, 2024

Notary Public

CLAUDIA MARTINEZ
NOTARY PUBLIC
COMM # 1095094
EXPIRES 5-13-2026
STATE OF NEW MEXICO

Legal Notice...

Publish February 23rd, 2024

Legal Notice

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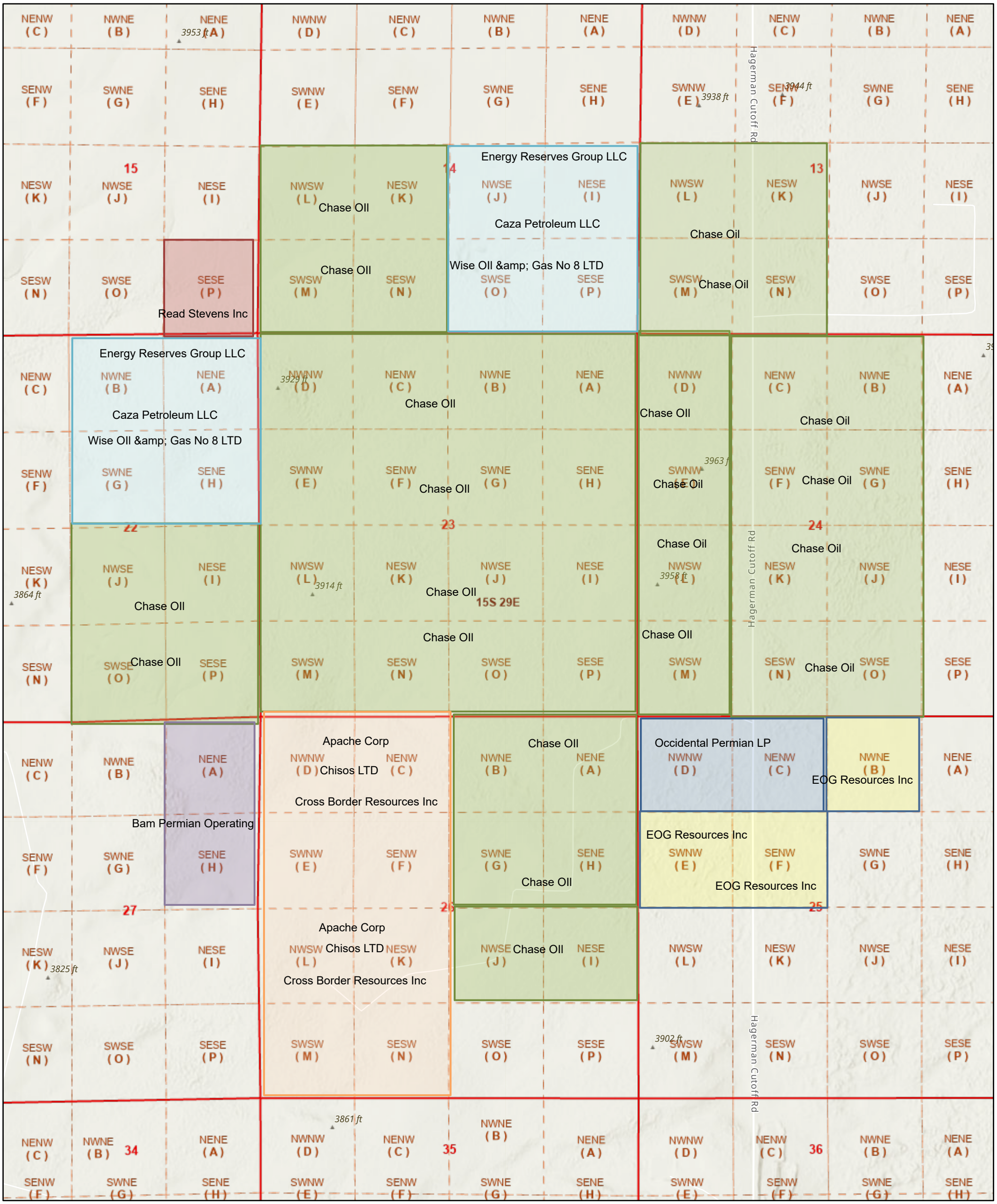
OCD Well Locations



10/16/2023, 9:37:56 AM

Areas

- Override 1
- Override 2
- Override 3
- Override 4
- Override 5
- Override 6
- Override 7
- Override 8
- PLSS Second Division
- PLSS First Division
- PLSS Townships

1:18,056

0 0.17 0.35 0.7 mi

0 0.28 0.55 1.1 km

Esri Community Maps Contributors, New Mexico State University, Texas Parks & Wildlife, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Esri, NASA, NGA,

New Mexico Oil Conservation Division

Name	Address	City	State	Zip	Certified Mail Id
Cross Border Resources Inc.	14282 Gillis Rd	Farmers	TX	75244-3715	9589 0710 5270 0130 1876 85
Chisos LTD	1331 Lamar St. Ste 1077	Houston	TX	77010-3135	9589 0710 5270 0130 1876 92
Apache Corporation	2000 Post Oak Blvd Ste 100	Houston	TX	77056-4400	9589 0710 5270 0130 1877 08
Bureau of Land Management	2909 W. 2nd St	Roswell	NM	88201-1287	9589 0710 5270 0130 1876 78
Chase Oil Corporation	11352 Lovington HWY	Artesia	NM	88210	
Energy Reserves Group LLC	333 Clay St Ste 4400	Houston	TX	77002-4105	9589 0710 5270 0130 1877 15
Caza Petroleum LLC	16945 NorthChase Dr Ste 1430	Houston	TX	77060-2133	9589 0710 5270 0130 1877 22
Wise Oil & Gas No 8 LTD	6851 NE Loop 820 Ste 200	North Richland Hills	TX	76181-6641	9589 0710 5270 0130 1877 39
Read & Stevens Inc	400 N. Pennsylvania Ste 1000	Roswell	NM	88201	9589 0710 5270 0130 1877 46
Bam Permian Operating LLC	4418 Briarwood Ave Ste 110	Midland	TX	87508	9589 0710 5270 0130 1877 53
	PMB 53				
Occidental Permian LP	5 Greenway Plz Ste 110	Houston	TX	77046-0521	7019 1120 0000 0728 4844
EOG Resources INC	105 S 4th St	Artesia	NM	88210-2177	9589 0710 5270 0175 5638 71
Oxy Y-1 Co	5 Greenway Plz Ste 110	Houston	TX	77046-0521	9589 0710 5270 0175 5638 88

MACK Energy Corporation

P.O. Box 960
Artesia, NM 88211-0960
Office (575) 748-1288
Fax (575) 746-9539

February 28, 2024

Via Certified Mail 9589 0710 5270 0130 1876 78
Return Receipt Requested

Bureau of Land Management
2909 W. 2nd St.
Roswell, NM 88201-1287

To all Interest Owners:

Enclosed for your review is a copy of Mack Energy Corporation's application for a Devonian SWD well. Produced water will be injected at a proposed depth of 10,985-11,525'. The Manitoba SWD #1 located 1668 FSL & 1980 FEL, Sec. 23 T15S R29E, Chaves County.

The letter will serve as a notice that Mack Energy Corporation has requested administrative approval from the NMOCD to drill this well as a water disposal. If you have any objections, you must notify the Oil Conservation Division in Santa Fe in writing at 1220 South St. Francis Drive, Santa Fe, NM 87505 within fifteen (15) days of receiving this letter.

Sincerely,

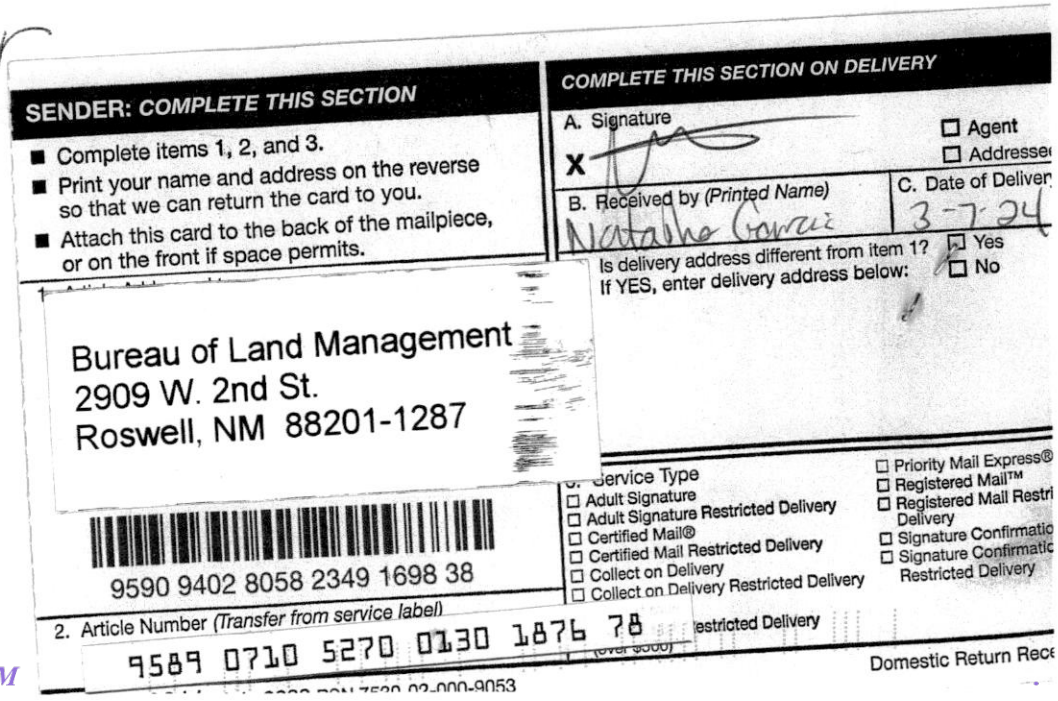
Mack Energy Corporation

Deana Weaver

Deana Weaver
Regulatory Technician II

DW/

Attachments



MACK Energy Corporation

P.O. Box 960
Artesia, NM 88211-0960
Office (575) 748-1288
Fax (575) 746-9539

February 28, 2024

Via Certified Mail 9589 0710 5270 0130 1876 85
Return Receipt Requested

Cross Border Resources Inc.
14282 Gillis Rd.
Farmers, TX 75244-3715

To all Interest Owners:

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Regulatory Technician II

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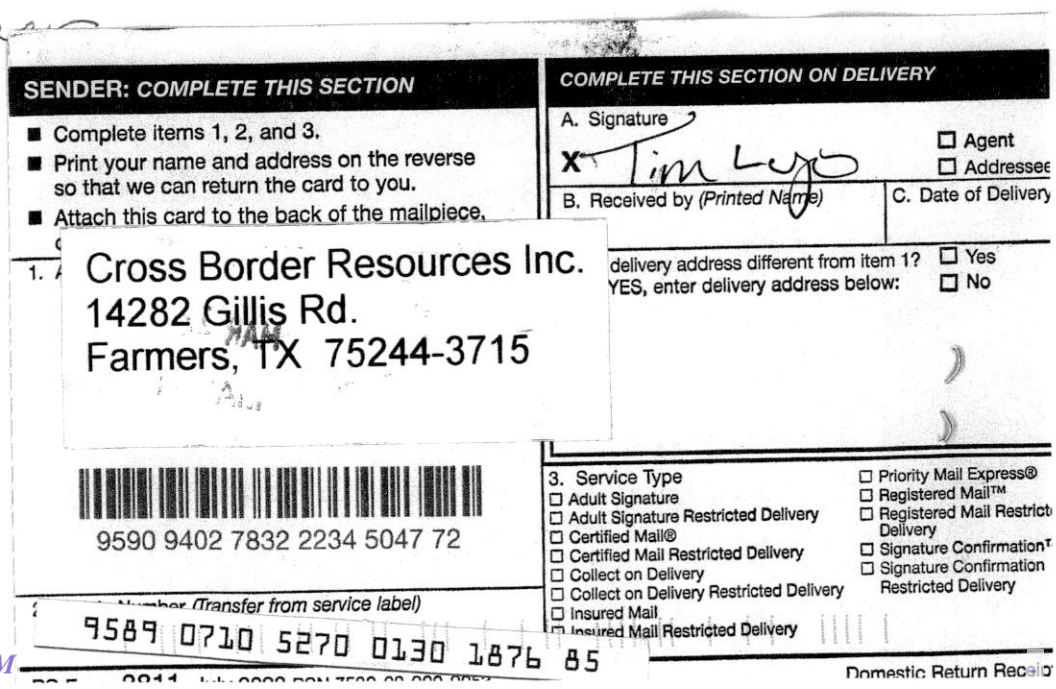

MACK Energy Corporation

P.O. Box 960
Artesia, NM 88211-0960
Office (575) 748-1288
Fax (575) 746-9539

February 28, 2024

Via Certified Mail 9589 0710 5270 0130 1876 92
Return Receipt Requested

Chisos LTD
1331 Lamar St. Ste. 1077
Houston, TX 77010-3135

To all Interest Owners:

Enclosed for your review is a copy of Mack Energy Corporation's application for a Devonian SWD well. Produced water will be injected at a proposed depth of 10,985-11,525'. The Manitoba SWD #1 located 1668 FSL & 1980 FEL, Sec. 23 T15S R29E, Chaves County.

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Deana Weaver
Regulatory Technician II

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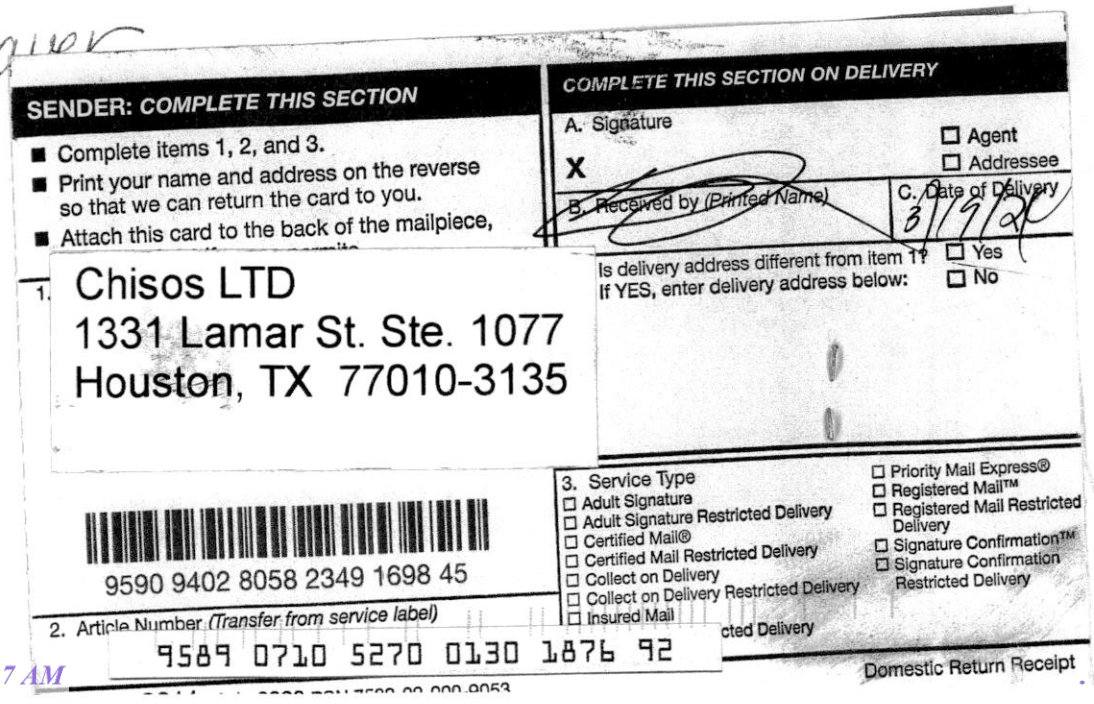
Attachments


SENDER: COMPLETE THIS SECTION
■ Complete items 1, 2, and 3.
■ Print your name and address on the reverse so that we can return the card to you.
■ Attach this card to the back of the mailpiece,

COMPLETE THIS SECTION ON DELIVERY
A. Signature
X
☐ Agent
☐ Addressee
B. Received by (Printed Name)
C. Date of Delivery
3/19/24
Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

Chisos LTD
1331 Lamar St. Ste. 1077
Houston, TX 77010-3135

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

9590 9402 8058 2349 1698 45

2. Article Number (Transfer from service label)
9589 0710 5270 0130 1876 92

Domestic Return Receipt

MACK Energy Corporation

P.O. Box 960
Artesia, NM 88211-0960
Office (575) 748-1288
Fax (575) 746-9539

February 28, 2024

Via Certified Mail 9589 0710 5270 0130 1877 08
Return Receipt Requested

Apache Corporation
2000 Post Oak Blvd Ste 100
Houston, TX 77056-4400

To all Interest Owners:

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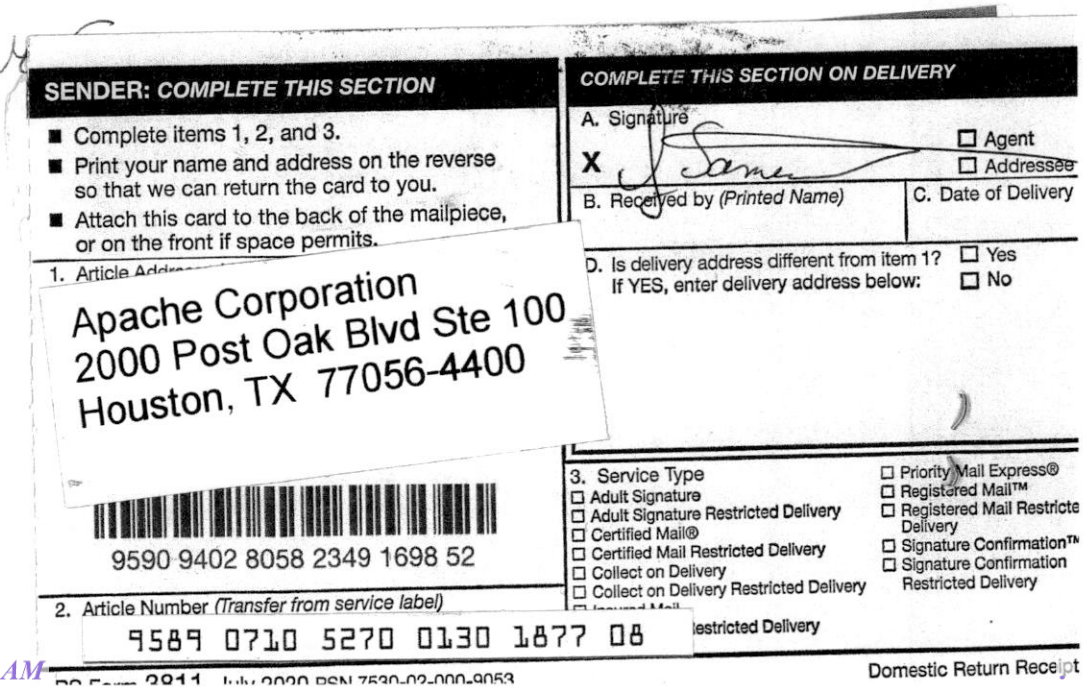
Deana Weaver

Deana Weaver
Regulatory Technician II

DW/

Attachments



MACK Energy Corporation

P.O. Box 960
Artesia, NM 88211-0960
Office (575) 748-1288
Fax (575) 746-9539

February 28, 2024

Via Certified Mail 9589 0710 5270 0130 1877 15
Return Receipt Requested

Energy Reserves Group LLC
333 Clay St Ste 4400
Houston, TX 77002-4105

To all Interest Owners:

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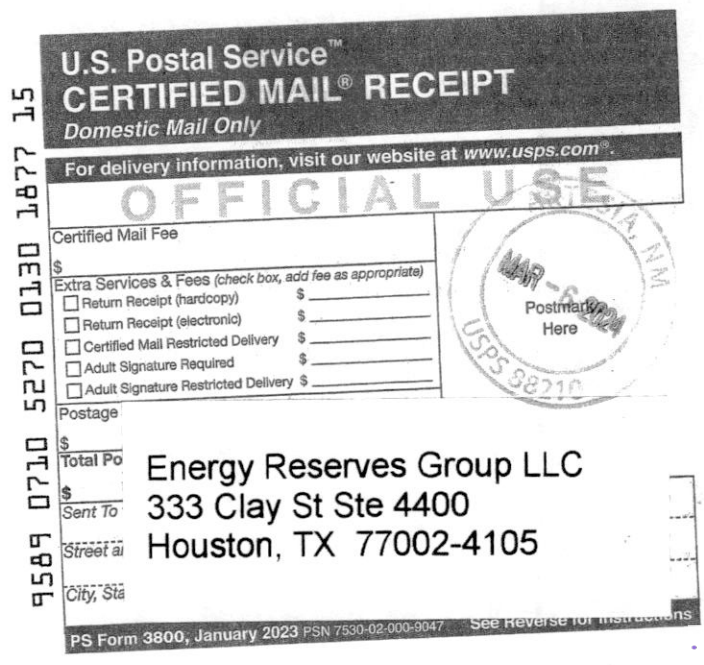
Mack Energy Corporation

Deana Weaver

Deana Weaver
Regulatory Technician II

DW/

Attachments



MACK Energy Corporation

P.O. Box 960
Artesia, NM 88211-0960
Office (575) 748-1288
Fax (575) 746-9539

February 28, 2024

Via Certified Mail 9589 0710 5270 0130 1877 22
Return Receipt Requested

Caza Petroleum LLC
16945 NorthChase Dr. Ste 1430
Houston, TX 77060-2133

To all Interest Owners:

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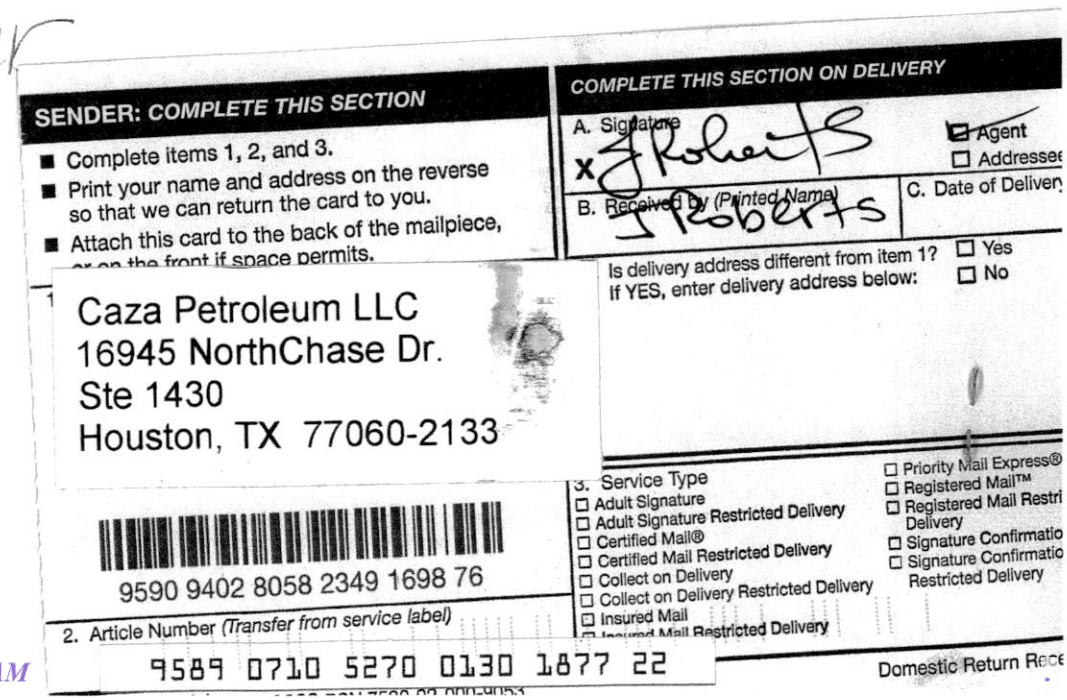
Mack Energy Corporation

Deana Weaver

Deana Weaver
Regulatory Technician II

DW/

Attachments



MACK Energy Corporation

P.O. Box 960
Artesia, NM 88211-0960
Office (575) 748-1288
Fax (575) 746-9539

February 28, 2024

Via Certified Mail 9589 0710 5270 0130 1877 39
Return Receipt Requested

Wise Oil & Gas No 8 LTD
6851 NE Loop 820 Ste 200
North Richardland Hills, TX 76181-6641

To all Interest Owners:

Enclosed for your review is a copy of Mack Energy Corporation's application for a Devonian SWD well. Produced water will be injected at a proposed depth of 10,985-11,525'. The Manitoba SWD #1 located 1668 FSL & 1980 FEL, Sec. 23 T15S R29E, Chaves County.

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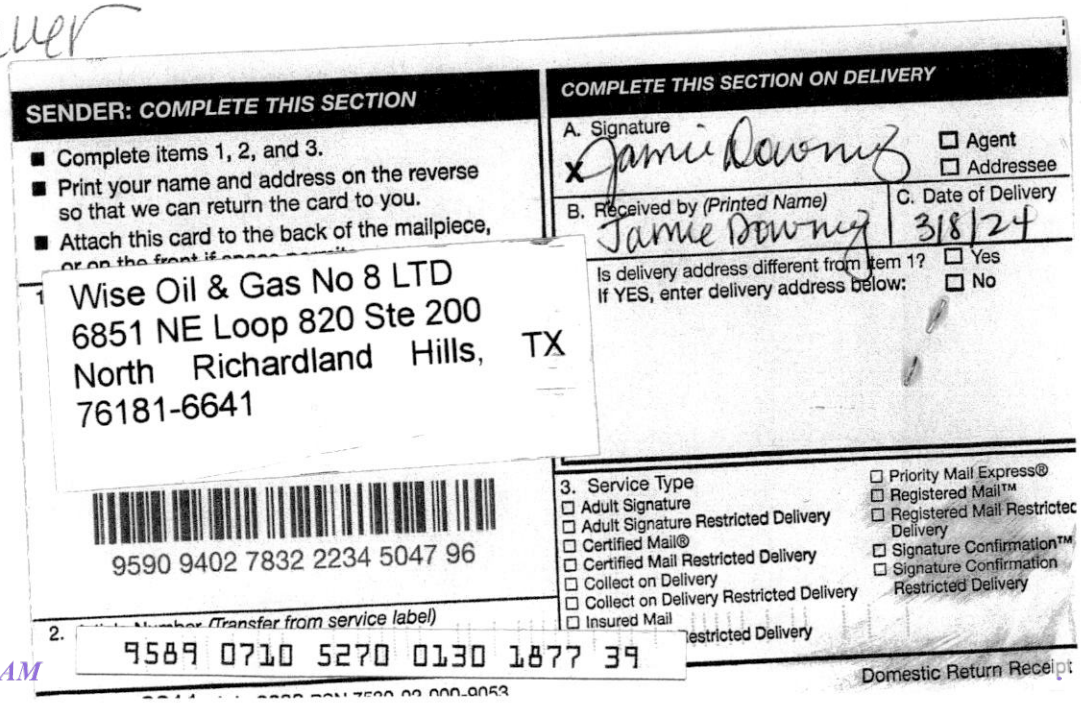
Mack Energy Corporation
Deana Weaver

Deana Weaver
Regulatory Technician II

DW/

Attachments


SENDER: COMPLETE THIS SECTION
■ Complete items 1, 2, and 3.
■ Print your name and address on the reverse so that we can return the card to you.
■ Attach this card to the back of the mailpiece,

COMPLETE THIS SECTION ON DELIVERY
A. Signature
X Jamie Downey
☐ Agent
☐ Addressee
B. Received by (Printed Name) Jamie Downey
C. Date of Delivery 3/8/24
Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

Wise Oil & Gas No 8 LTD
6851 NE Loop 820 Ste 200
North Richardland Hills, TX
76181-6641

9590 9402 7832 2234 5047 96

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

2. (Transfer from service label) 9589 0710 5270 0130 1877 39

Domestic Return Receipt

MACK Energy Corporation

P.O. Box 960
Artesia, NM 88211-0960
Office (575) 748-1288
Fax (575) 746-9539

February 28, 2024

Via Certified Mail 9589 0710 5270 0130 1877 46
Return Receipt Requested

Read & Stevens Inc
400 N. Pennsylvania Ste 1000
Roswell, NM 88201

To all Interest Owners:

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Sincerely,

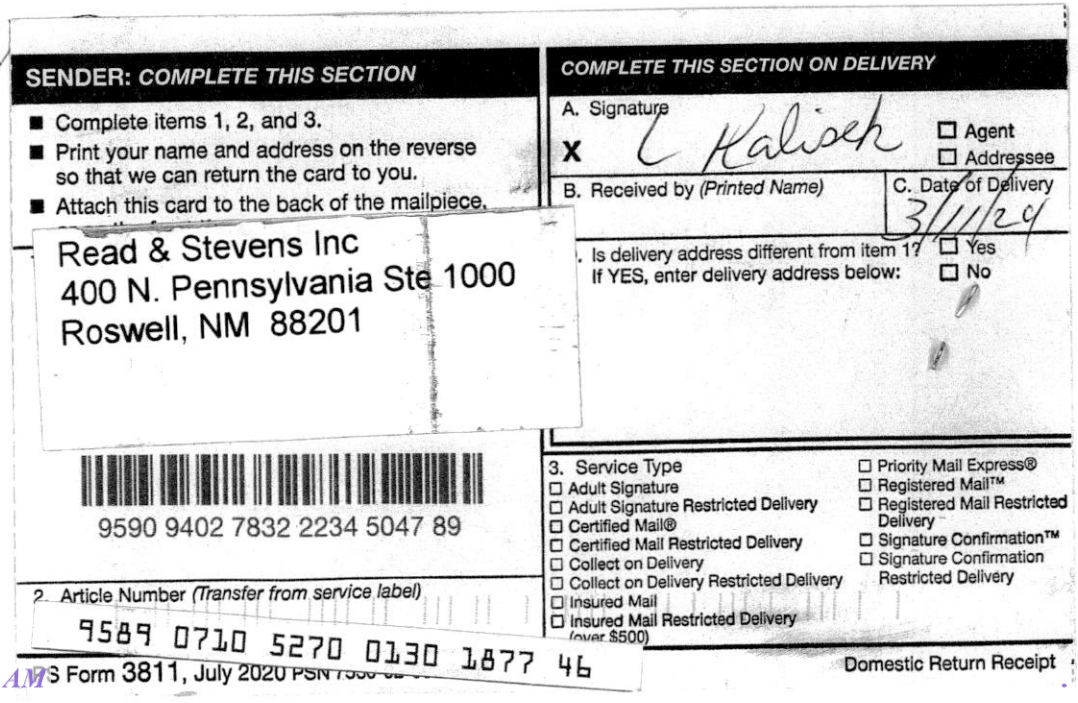
Mack Energy Corporation

Deana Weaver

Deana Weaver
Regulatory Technician II

DW/

Attachments


SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece,

Read & Stevens Inc
400 N. Pennsylvania Ste 1000
Roswell, NM 88201

9590 9402 7832 2234 5047 89

2. Article Number (Transfer from service label)
9589 0710 5270 0130 1877 46

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X C Kalisek ☐ Agent ☐ Addressee

B. Received by (Printed Name) C. Date of Delivery 3/11/24

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2020 PSN 7530-02-

Domestic Return Receipt

MACK Energy Corporation

P.O. Box 960
Artesia, NM 88211-0960
Office (575) 748-1288
Fax (575) 746-9539

February 28, 2024

Via Certified Mail 9589 0710 5270 0130 1877 53
Return Receipt Requested

Bam Permian Operating LLC
4418 Briarwood Ave Ste 110 PMB 53
Midland, TX 87508

To all Interest Owners:

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The letter will serve as a notice that Mack Energy Corporation has requested administrative approval from the NMOCD to drill this well as a water disposal. If you have any objections, you must notify the Oil Conservation Division in Santa Fe in writing at 1220 South St. Francis Drive, Santa Fe, NM 87505 within fifteen (15) days of receiving this letter.

Sincerely,

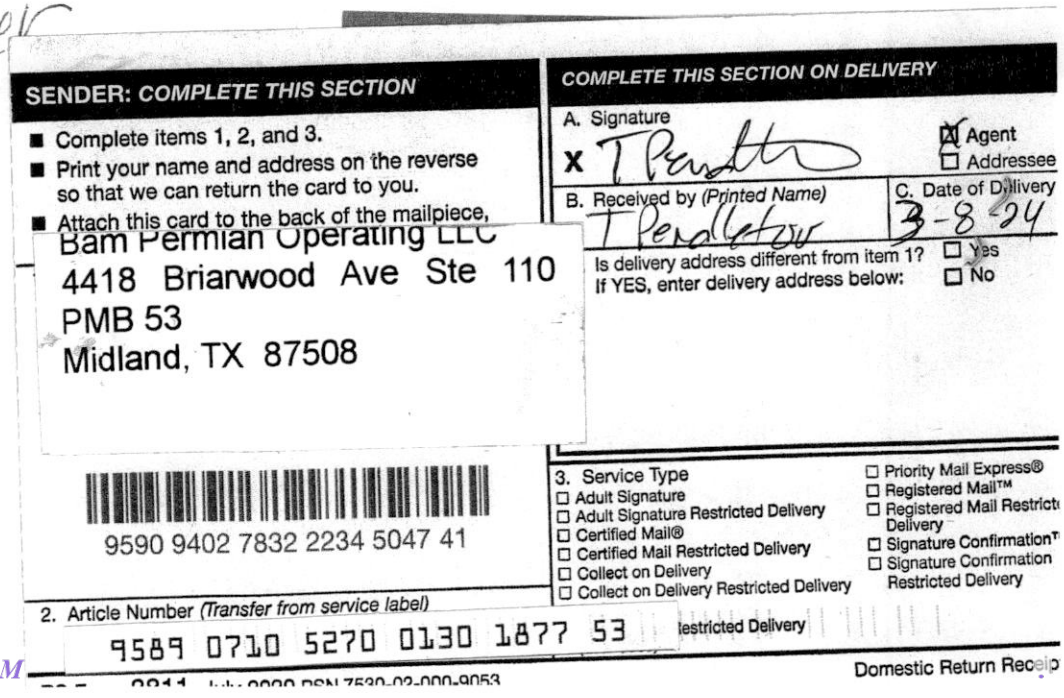
Mack Energy Corporation

Deana Weaver

Deana Weaver
Regulatory Technician II

DW/

Attachments


SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece,

Bam Permian Operating LLC
4418 Briarwood Ave Ste 110
PMB 53
Midland, TX 87508

9590 9402 7832 2234 5047 41

2. Article Number (Transfer from service label)
9589 0710 5270 0130 1877 53

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X T Pendleton
☒ Agent
☐ Addressee

B. Received by (Printed Name) T Pendleton
C. Date of Delivery 3-8-24

Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Restricted Delivery

Domestic Return Receipt

MACK Energy Corporation

P.O. Box 960
Artesia, NM 88211-0960
Office (575) 748-1288
Fax (575) 746-9539

February 28, 2024

Via Certified Mail 7019 1120 0000 0728 4844
Return Receipt Requested

Occidental Permian LP
5 Greenway Plz Ste 110
Houston, TX 77046-0521

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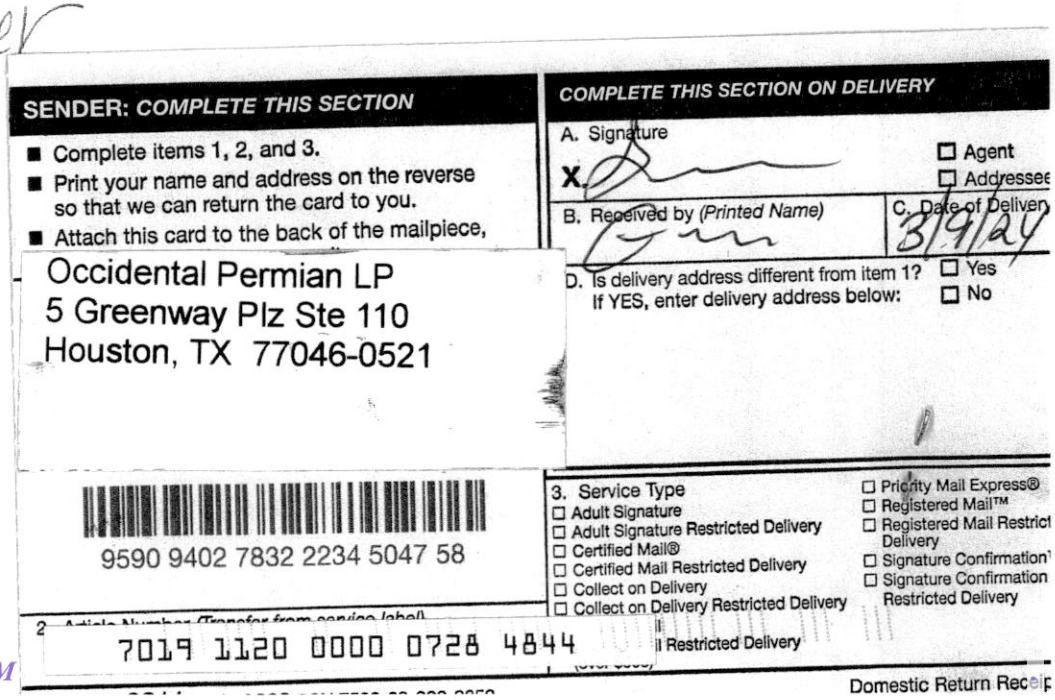
SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece,

Occidental Permian LP
5 Greenway Plz Ste 110
Houston, TX 77046-0521

9590 9402 7832 2234 5047 58

7019 1120 0000 0728 4844

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☐ Addressee

B. Received by (Printed Name)

C. Date of Delivery
3/4/24

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

MACK Energy Corporation

P.O. Box 960
Artesia, NM 88211-0960
Office (575) 748-1288
Fax (575) 746-9539

February 28, 2024

Via Certified Mail 9589 0710 5270 0175 5638 71
Return Receipt Requested

EOG Resources INC
105 S. 4th Street
Artesia, NM 88210-2177

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Mack Energy Corporation

Deana Weaver

Deana Weaver
Regulatory Technician II

DW/

Attachments

MACK Energy Corporation

P.O. Box 960
Artesia, NM 88211-0960
Office (575) 748-1288
Fax (575) 746-9539

February 28, 2024

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Return Receipt Requested

Oxy Y-1 Co
5 Greenway Plz Ste 110
Houston, TX 77046-0521

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Sincerely,

Mack Energy Corporation

Deana Weaver

Deana Weaver
Regulatory Technician II

DW/

Attachments

MACK Energy Corporation

P.O. Box 960
Artesia, NM 88211-0960
Office (575) 748-1288
Fax (575) 748-7374

March 23, 2022

Mr. Dean McClure
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

RE: **Mack Energy Corporation & Chase Affiliates**

Dear Mr. McClure:

Mack Energy Corporation is a Chase Family owned entity. The following Chase individuals or companies are all affiliates of Mack Energy Corporation and usually own an interest in wells drilled and/or operated by Mack Energy Corporation.

- Mack C. Chase Trust
- Robert C. Chase or RDC Minerals LLC
- Richard L. Chase or Ventana Minerals LLC
- Gerene Dianne Chase Ferguson or DiaKan Minerals LLC
- Broken Arrow Royalties LLC
- Chase Oil Corporation
- Sendero Energy LLC
- Katz Resources LLC
- M Squared Energy LLC

All of these family members and companies all office in the same building so notifications can be hand delivered; therefore we request that the certified mail process be waived when these parties are involved.

If you have any questions or need additional information please do not hesitate to contact me. Your assistance is greatly appreciated.

Sincerely,
Mack Energy Corporation

Staci Sanders
Land Manager

/ss

Re: Application of Mack Energy Corporation for administrative approval for Central Tank Battery and Off Lease Measurement of oil and gas production at a CTB Facility located in Section 28, Township 15S Range 29E, NMPM, Chaves County, New Mexico.

List of Affected Parties

Sendero Energy LLC

Katz Resources LLC

M Squared Energy LLC

Chase Oil Corp

Robert G Chase

Broken Arrow Royalties LLC

Ventana Minerals LLC

DiaKan Minerals LLC

Bureau of Land Management

ALL CONSULTING
GOVERNMENT RELATIONS · ENERGY · PLANNING · TECHNOLOGY
ENGINEERING · ENVIRONMENTAL

March 14, 2024

PN 1904.SEIS.00

Mr. Phillip Goetze, P.G.
NM EMNRD – Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505

Subject: **Mack Energy Corporation**
Manitoba SWD #1 - Seismic Potential Letter

Dear Mr. Goetze,

At the request of Mack Energy Corporation (Mack Energy), ALL Consulting, LLC (ALL) has assessed the potential injection-induced seismicity risks in the vicinity of Mack Energy's Manitoba SWD #1 (Subject SWD), a proposed saltwater disposal (SWD) facility in Eddy County, New Mexico, and summarized the findings in this letter. This assessment used publicly available data to identify the proximity and characteristics of seismic events and known faults to evaluate the potential for the operation of the Manitoba SWD #1 to contribute to seismic activity in the area.

Geologic Evaluation

The Subject SWD is requesting a permit to inject into the Devonian Formation at a depth of 10,985-11,525 feet below ground surface (bgs). The Devonian Formation consists of cherty limestone and dolomites and is overlain by approximately 80 feet of low porosity and permeability Woodford Shale, which would prevent the upward migration of injection fluid and serve as the upper confining layer (see **Attachment 1**). Additionally, the Devonian Formation is underlain by various low porosity and permeability zones within the Middle Silurian, Fusselman, and Montoya Group, which consist of limestones, dolomites, and interbedded shale zones. No geophysical logs penetrating the Middle Silurian, Fusselman, and Montoya Group were available within 10 miles of the Subject SWD. A stratigraphic chart depicting the geologic setting is included as **Figure 1**.[1]

Seismic Events and Fault Data

A review of United States Geological Survey (USGS) and New Mexico Tech Seismological Observatory (NMTSO) earthquake catalogues determined that one (1) seismic event has been recorded within a 100 square mile area [9.08-kilometer (km) radius] around the Subject SWD.

[1] Yang, K.-M., & Dorobek, S. L. (1995). The Permian Basin of west Texas and New Mexico: Tectonic history of a "composite" Foreland Basin and its effects on stratigraphic development. *Stratigraphic Evolution of Foreland Basins*, 149–174. https://doi.org/10.2110/pec.95.52.0149

Mack Energy Corporation
Manitoba SWD #1 Seismic Information
March 14, 2024

The closest recorded seismic event was a M0.68 that occurred on April 12, 2018, and was located approximately 5.63 miles east of the Subject SWD (see **Attachment 2**).

Fault data from United States Geological Survey (USGS) and the Texas Bureau of Economic Geology (BEG)[2] indicates that the closest known fault is located approximately 3.62 miles east of the Subject Well (see **Attachment 2**). This identified fault is within the Precambrian basement, which is approximately 2,475 feet below the proposed injection interval.[3] A map of the seismic events and faults within 9.08 km of the Subject SWD is included as **Attachment 2.**

Figure 1 – Delaware Basin Stratigraphic Chart (Adapted from Yang and Dorobek 1995)

SYSTEM	SERIES/ STAGE	CENTRAL BASIN PLATFORM	DELAWARE BASIN
PERMIAN	OCHOAN	DEWEY LAKE RUSTLER SALADO	DEWEY LAKE RUSTLER SALADO CASTILE
	GUADALUPIAN	TANSILL YATES SEVEN RIVERS QUEEN GRAYBURG SAN ANDRES GLORIETA	DELAWARE MT GROUP BELL CANYON CHERRY CANYON BRUSHY CANYON
	LEONARDIAN	CLEAR FORK WICHITA	BONE SPRING
	WOLFCAMPIAN	WOLFCAMP	WOLFCAMP
PENNSYLVANIAN	VIRGILIAN	CISCO	CISCO
	MISSOURIAN	CANYON	CANYON
	DESMOINESIAN	STRAWN	STRAWN
	ATOKAN	ATOKA — BEND	ATOKA — BEND
	MORROWAN	(ABSENT)	MORROW
MISSISSIPPIAN	CHESTERIAN MERAMECIAN OSAGEAN KINDERHOOKIAN	CHESTER MERAMEC OSAGE "BARNETT"	CHESTER MERAMEC OSAGE "BARNETT"
		KINDERHOOK	KINDERHOOK
DEVONIAN		WOODFORD DEVONIAN	WOODFORD DEVONIAN
SILURIAN		SILURIAN SHALE FUSSELMAN	MIDDLE SILURIAN FUSSELMAN
ORDOVICIAN	UPPER	MONTOYA	SYLVAN MONTOYA
	MIDDLE	SIMPSON	SIMPSON
	LOWER	ELLENBURGER	ELLENBURGER
CAMBRIAN	UPPER	CAMBRIAN	CAMBRIAN
PRECAMBRIAN			

Seismic Potential Evaluation

Experience in evaluating induced seismic events indicates that most injection-induced seismicity throughout the U.S. (e.g., Oklahoma, Ohio, Texas, New Mexico, and Colorado) occurs as a result of injection into Precambrian basement rock, into overlying formations that are in hydraulic communication with the Precambrian basement rock, or as a result of injection near critically stressed and optimally oriented faults. Seismicity at basement depths occurs because critically stressed faults generally originate in crystalline basement rock and may also extend into overlying sedimentary formations. [4]

Injection into either the Precambrian basement rock or its overlying formations that are hydraulically connected to the basement rock through faulting or fracture networks can increase the pore pressure and may lead to the fault slipping, resulting in a seismic event.[4] As such, the vertical distance between the injection formation and Precambrian basement rock and the presence or lack of faulting within the injection interval are major considerations when determining the risk of injection-induced seismicity.

Geophysical data from nearby well records, aeromagnetic surveys, and gravity surveys indicates the top of the Precambrian basement to be approximately 14,000 feet bgs at the Subject SWD, or

---

[2] Horne E. A. Hennings P. H., and Zahm C. K. 2021. Basement structure of the Delaware Basin, in The Geologic Basement of Texas: A Volume in Honor of Peter Flawn, Callahan O. A., and Eichubl P., The University of Texas at Austin, Bureau of Economic Geology.

[3] G. Randy Keller, J. M. Hills &; Rabah Djeddi, A regional geological and geophysical study of the Delaware Basin, New Mexico and West Texas, Trans Pecos Region (West Texas) (1980).

[4] Ground Water Protection Council and Interstate Oil and Gas Compact Commission. *Potential Injection-Induced Seismicity Associated with Oil & Gas Development: A Primer on Technical and Regulatory Considerations Informing Risk Management and Mitigation.* 2015. 141 pages.

approximately 2,475 feet below the proposed injection interval.[3] In addition, publicly available fault data does not indicate any transmissive faulting is present above the Precambrian basement around the Subject SWD.

Class II SWDs in New Mexico are administratively permitted with a maximum pressure gradient of 0.2 psi/ft. Review of New Mexico Oil Conservation Division (OCD) Order IP-537 from the Mack Energy Round Tank SWD #1, which is located approximately 4.24 miles west of the Subject SWD, determined the fracture gradient of the Devonian Formation in the region is 0.41 psi/ft from an approved step-rate test. Typical SWD permitting standards in New Mexico would indicate that formation parting pressure would not be exceeded by the Subject SWD.

Fault Slip Potential Modeling

Due to the presence of mapped Precambrian basement faults within the 100 square mile area of review for the Subject SWD, a Fault Slip Potential (FSP) model was prepared to indicate the likelihood that operation of the Subject SWD would result in a seismic event based on the proximity and characteristics of known injection rates, faults, and subsurface conditions. A map of the FSP area, model parameters, nearby deep SWD parameters, and model run results are included as **Attachment 3**.

The FSP modeling results through 25 years, with injection rates that are likely overestimated, resulted in FSP values of 0.00 on all mapped faults within 100 square miles of the Subject SWD indicating the area presents little to no risk for injection induced seismicity.

Conclusion

As an expert on the issue of induced seismicity, seismic monitoring, and mitigation, it is my opinion that the potential for the Subject SWD to cause injection-induced seismicity is expected to be minimal, at best. This conclusion assumes the Subject SWD will be operated below formation parting pressure and is based on (1) the presence of numerous confining layers above and below the injection interval, (2) the significant vertical distance between the injection zone and Precambrian basement rock in which the nearest fault has been identified, and (3) Fault Slip Potential modeling results which indicate no potential slip on mapped faults near the Subject SWD.

Sincerely,
ALL Consulting

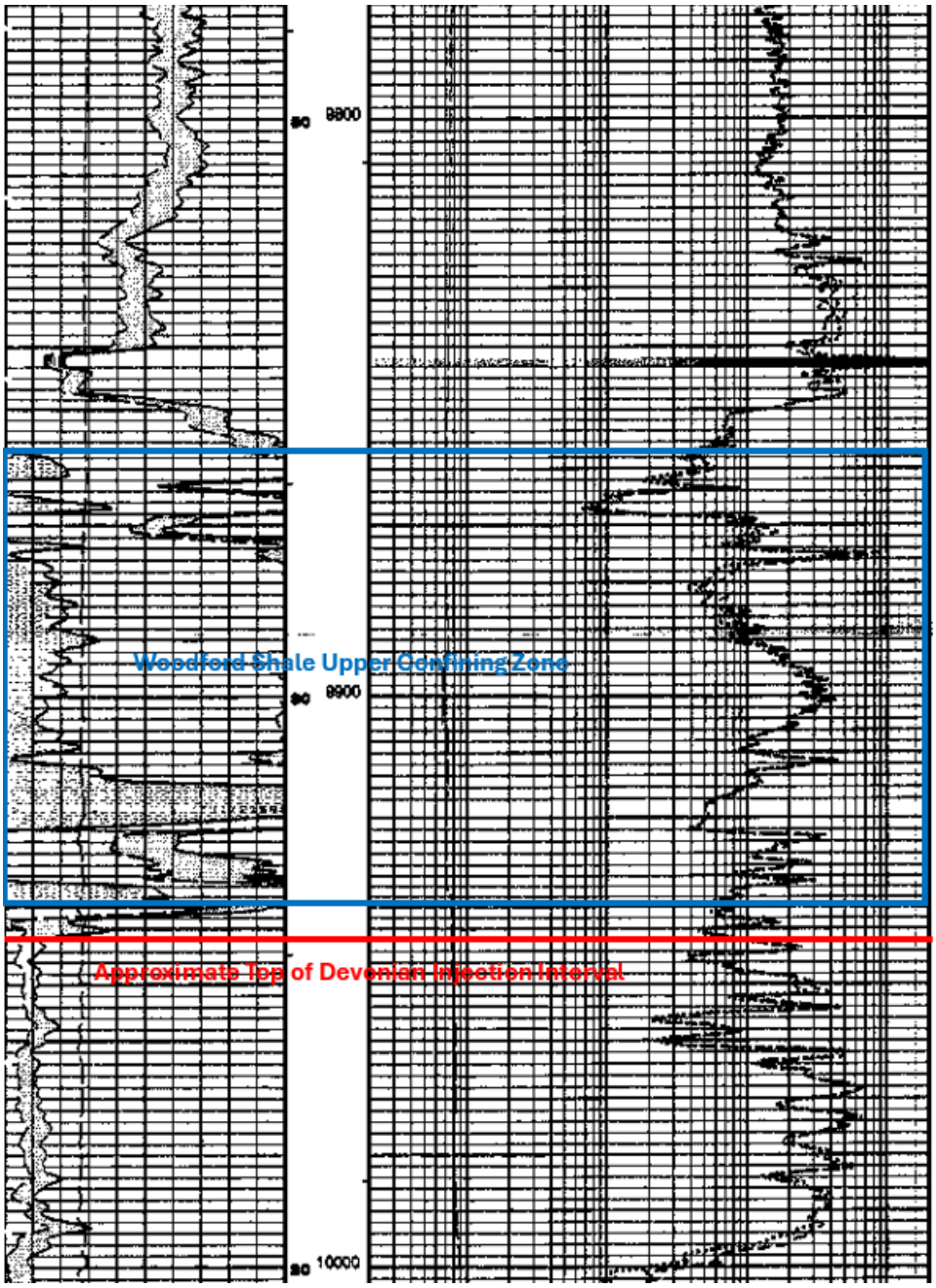
Reed Davis
Geophysicist

Mack Energy Corporation
Manitoba SWD #1 Seismic Information
March 14, 2024

Attachment 1
Woodford Shale Upper Confining Zone

Mack Energy Corporation
Manitoba SWD #1 Seismic Information
March 14, 2024

Woodford Shale Upper Confining Zone from API No. 015-32444



Mack Energy Corporation
Manitoba SWD #1 Seismic Information
March 14, 2024

Attachment 2
Seismic Event Map

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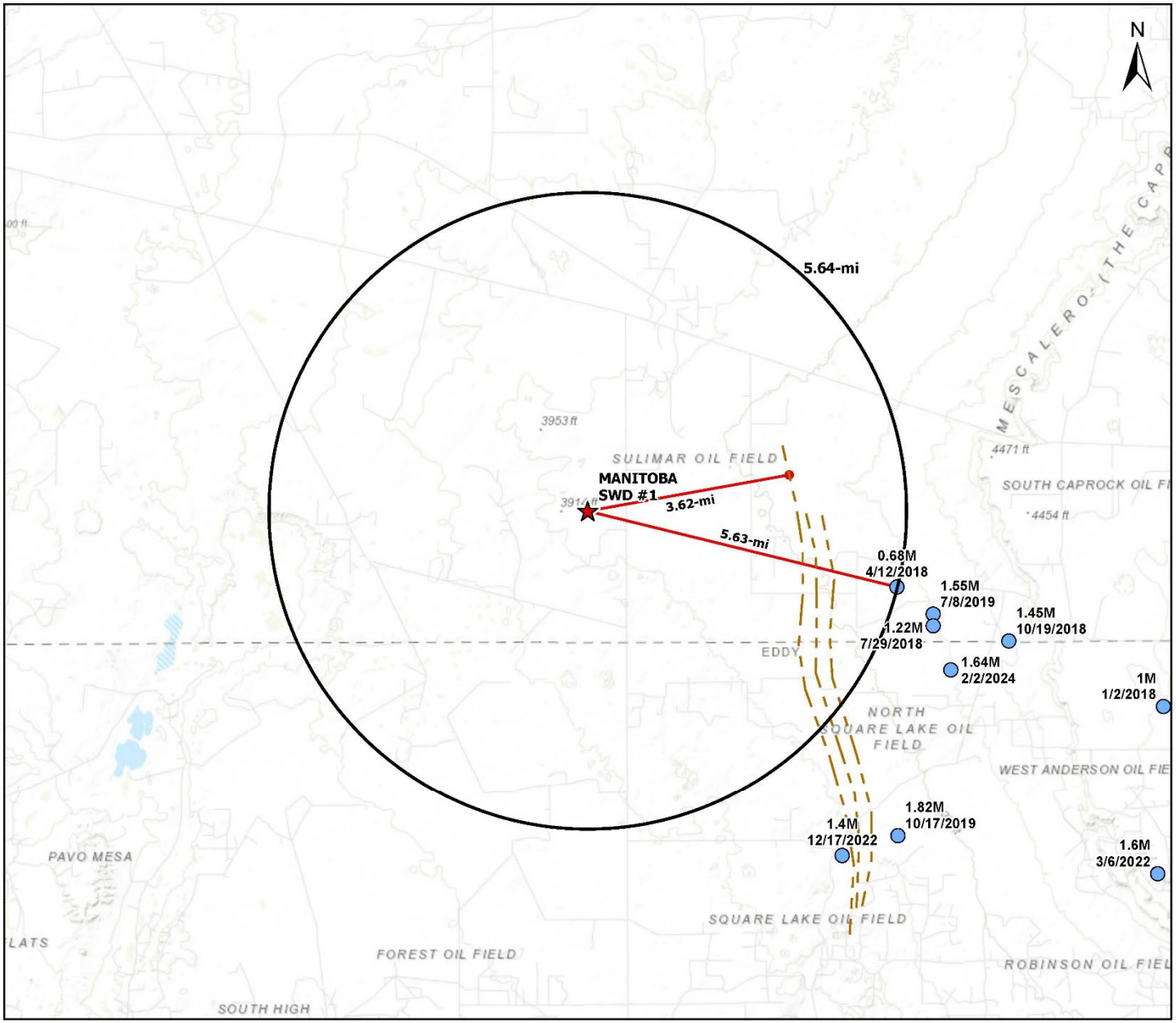
Received by OCD: 10/23/2024 10:08:38 AM

Mack Energy Corporation
Manitoba SWD #1 Seismic Information
March 14, 2024

Manitoba SWD #1 Nearby Seismic Events and Faults



Legend

- Proposed SWD (1)
- NMTSO Seismic Events - 2/16/24 (9)
- Deep Faults (3)

Service Layer Credits: Topographic: Bureau of Land Management, Texas Parks & Wildlife, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA

Seismic Analysis Map		
MANITOBA SWD #1 CHAVES COUNTY, NEW MEXICO		
Proj Mgr: Oliver Seekins	February 19, 2024	Mapped by: Ben Bockelmann
Prepared for: MACK Energy Corporation		Prepared by: ALL CONSULTING

Mack Energy Corporation
Manitoba SWD #1 Seismic Information
March 14, 2024

Attachment 3
FSP Area Map, Parameters, and Results

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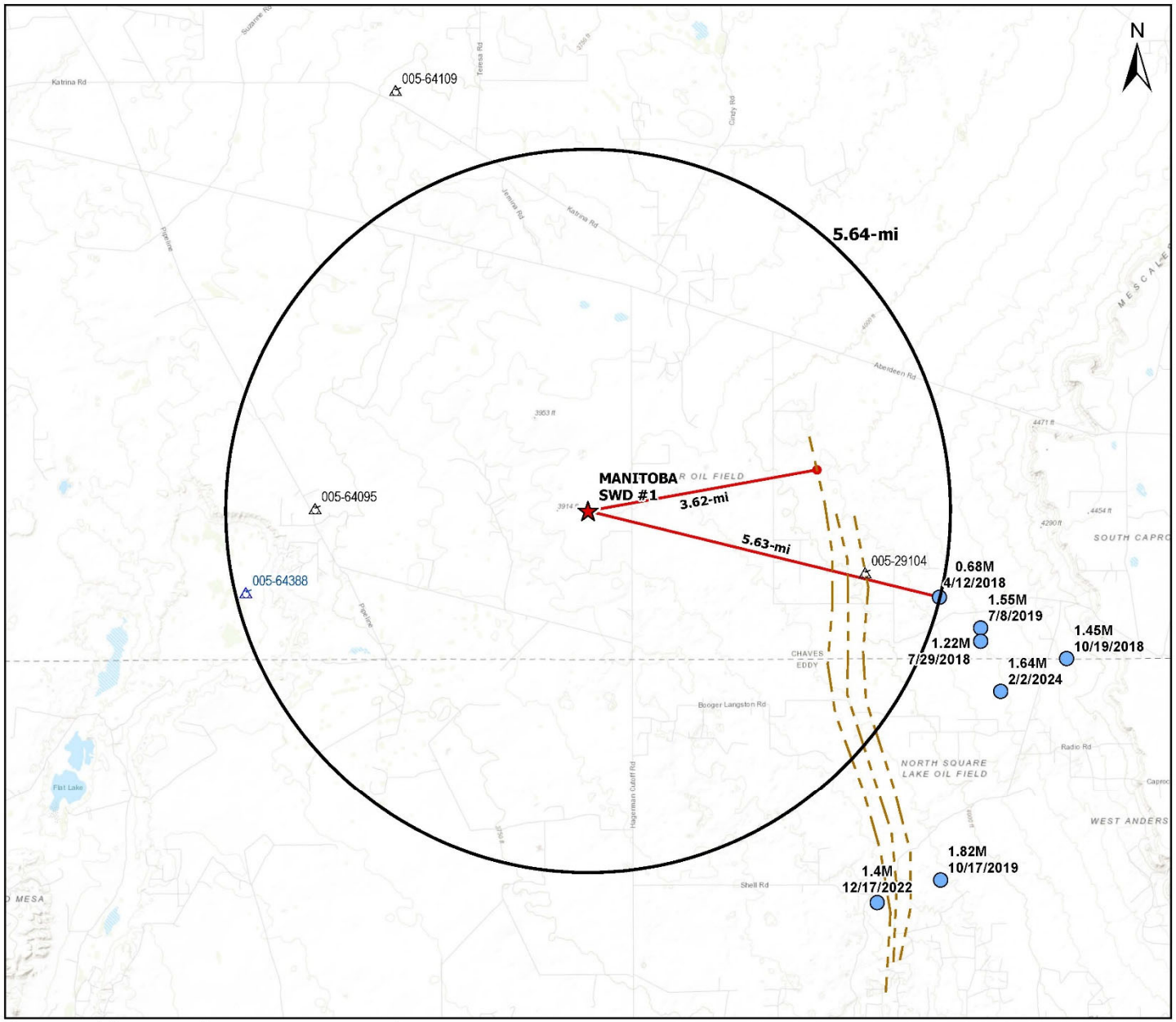
Received by OCD: 10/23/2024 10:08:38 AM

Mack Energy Corporation
Manitoba SWD #1 Seismic Information
March 14, 2024

Manitoba SWD #1 FSP Area Map



Service Layer Credits: Topographic: Bureau of Land Management, Texas Parks & Wildlife, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS

Legend

- Proposed SWD
- NMTSO Seismic Events - 2/16/24 (7)
- Deep Faults

Deep SWDs

- Salt Water Disposal, Active (3)
- Salt Water Disposal, New (1)

FSP Area Map		
MANITOBA SWD #1 CHAVES COUNTY, NEW MEXICO		
Proj Mgr: Oliver Seekins	March 13, 2024	Mapped by: Ben Bockelmann
Prepared for: MACK Energy Corporation		Prepared by: ALL CONSULTING

Released to Imaging: 10/23/2024 10:11:27 AM
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Manitoba SWD #1 FSP Parameters

Parameter	Value	Source
Vertical Stress Gradient (psi/ft)	1.05	ALL Research / Standard Value (2024)
Horizontal Stress Direction (degrees azimuth)	35	Lund Snee (2020)[5]
Reference Depth (ft)	10,985	Mack Energy (2024)
Initial Reservoir Pressure Gradient (psi/ft)	0.43	ALL Research / Standard Value (2024)
A-Phi Parameter	0.52	Lund Snee (2020)
Friction Coefficient	0.6	Lund Snee (2020)
Injection Interval Thickness (ft)	540	Mack Energy (2024)
Porosity (%)	5	Nearby Geophysical Logs (2024)
Permeability (mD)	35	Nearby Geophysical Logs (2024)
Fault Strike (degrees)	Varies	BEG Fault Data (2024)
Fault Dip	60	BEG Fault Data (2024)
Fluid Density (kg/m^3)	1040	ALL Research and Reynolds (2019)[6]
Dynamic Viscosity (Pa*s)	0.0003	ALL Research and Reynolds (2019)
Fluid Compressibility (Pa^-1)	4.70E-10	ALL Research and Reynolds (2019)
Rock Compressibility (Pa^-1)	8.70E-10	ALL Research and Reynolds (2019)

[5] Lund Snee, Jens-Erik, 2020, State of Stress in North America: Seismicity, Tectonics, and Unconventional Energy Development [Ph.D. thesis]: Stanford University, 254p.
[6] Renolds, Todd. 2019. “FSP Analysis (Fault Slip Potential) Exhibits.” New Mexico Oil Conservation Division Case No. 20313, Case No, 20314, and Case No. 20472.

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Mack Energy Corporation
Manitoba SWD #1 Seismic Information
March 14, 2024

Manitoba SWD #1 Deep SWD Parameters

SWD Name (API)	SWD Status	Injection Rate (BWPD)	Modeled Time Period
Manitoba SWD #1	Pending	15,000	2024 - 2049
Sam Federal SWD #3 (05-29104)	Active	1,267	2024 – 2049
Fraser SWD #1H (05-64388)	Pending	15,000*	2024 – 2049
Round Tank SWD #1 (05-64095)	Active	7,900	2024 - 2049

Notes:

Pending SWDs modeled at maximum permitted or requested injection rate when available.

Active SWDs modeled at permitted injection rate when available, or maximum monthly reported volume when permitted rate unavailable.

*Permitted / requested rate unavailable. Modeled at 15,000 BWPD based on Subject SWD.

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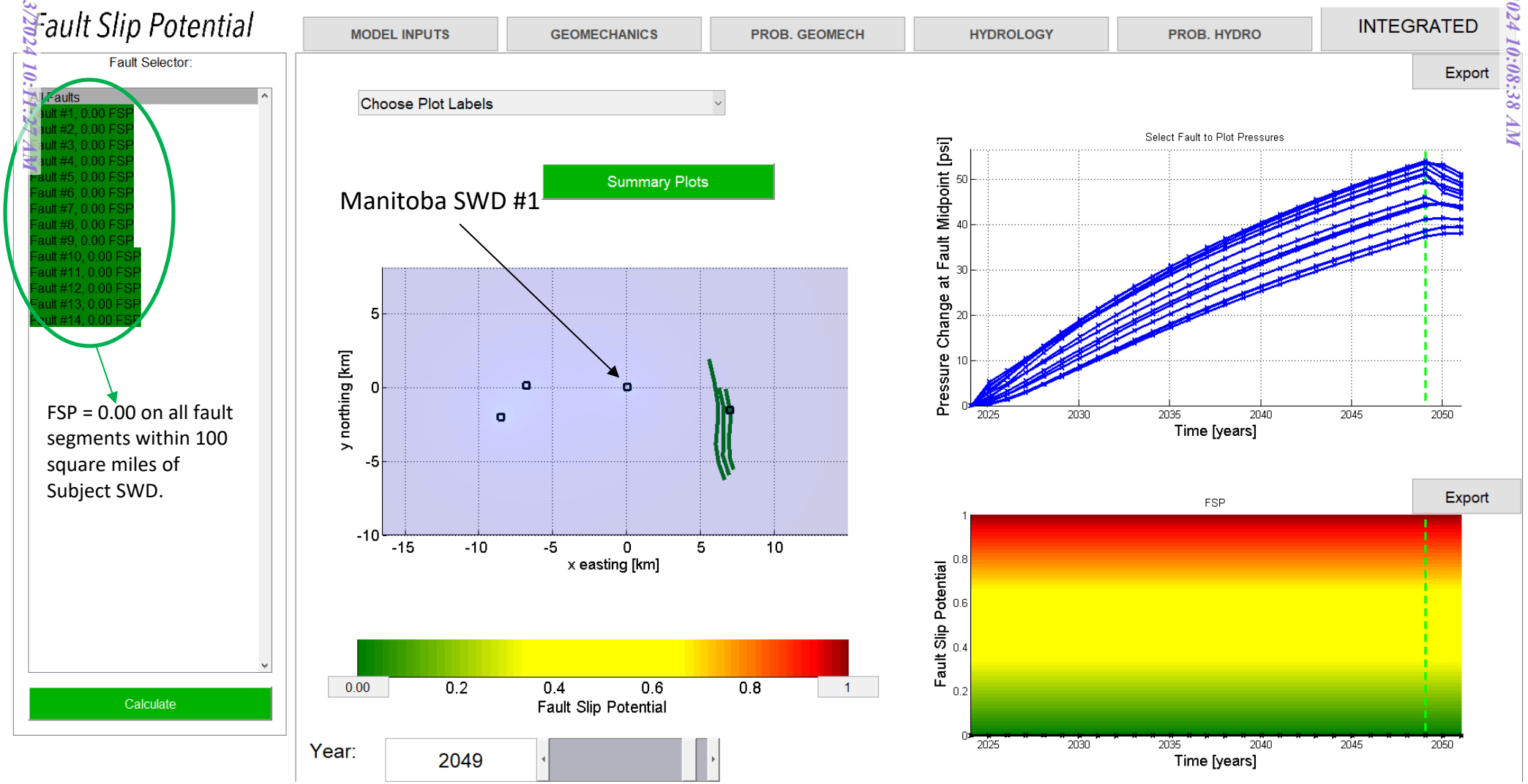
Mack Energy Corporation
Manitoba SWD #1 Seismic Information
March 14, 2024

Manitoba SWD #1 FSP Results



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

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

CONDITIONS

Action 395035

CONDITIONS

Operator: MACK ENERGY CORP P.O. Box 960 Artesia, NM 882110960	OGRID: 13837
	Action Number: 395035
	Action Type: [IM-SD] Admin Order Support Doc (ENG) (IM-AAO)

CONDITIONS

Created By	Condition	Condition Date
anthony.harris	None	10/23/2024