

State of New Mexico  
Energy, Minerals and Natural Resources Department

**Susana Martinez**  
Governor

**Ken McQueen**  
Cabinet Secretary

**Matthias Sayer**  
Deputy Cabinet Secretary

**Heather Riley**, Division Director  
Oil Conservation Division



New Mexico Oil Conservation Division approval and conditions listed below are made in accordance with OCD Rule 19.15.7.11 and are in addition to the actions approved by BLM on the following 3160-4 or 3160-5 form.

Operator Signature Date: 10/1/18

Well information:

API WELL #	Well Name	Well #	Operator Name	Type	Stat	County	Surf_Owner	UL	Sec	Twp	N/S	Rng	W/E
30-039-27533-00-00	LYBROOK YARD WDW	001	DJR OPERATING, LLC	S	A	Rio Arriba	F	B	14	23	N	7	W

Application Type:

P&A     Drilling/Casing Change     Location Change

**Recomplete/DHC** (For hydraulic fracturing operations review EPA Underground injection control Guidance #84; Submit Gas Capture Plan form prior to spudding or initiating recompletion operations)

**Other: Step rate test**

Conditions of Approval:

- Notify NMOCD 24 Hours prior to commencing activities
- There must be two steps below 950psi at 1.2 barrels per minute as this appears to be the prior fracturing pressure for the well. Or provide sufficient information to demonstrate that 950 psi at 1.2 barrels per minute is not formation fracturing pressure.
- Perform 30-minute steps due to prior fracking with sand which may cause a poor response.
- Provide the last 5 years of average injection pressure with the results of the Step rate test.
- See attached step rate test guidelines.

\_\_\_\_\_  
NMOCD Approved by Signature

10/9/2018  
Date

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

FORM APPROVED  
OMB No. 1004-0137  
Expires: January 31, 2018

**SUNDRY NOTICES AND REPORTS ON WELLS**  
*Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.*

5. Lease Serial No. NMSF -078360

6. If Indian, Allottee or Tribe Name  
N/A

**SUBMIT IN TRIPLICATE - Other instructions on page 2**

1. Type of Well  
 Oil Well  Gas Well  Other

7. If Unit of CA/Agreement, Name and/or No.  
N/A

8. Well Name and No. Lybrook Yard WDW #001

2. Name of Operator DJR Operating, LLC

9. API Well No. 30-039-27533

3a. Address 1 Road 3263 Aztec, NM 87410-9521

3b. Phone No. (include area code)  
(505) 632-3476

10. Field and Pool or Exploratory Area  
SWD; Mesa Verde

4. Location of Well (Footage, Sec., T.,R.,M., or Survey Description)  
988' FNL X 2035' FEL "B" - Section 14-T23N-R07W

11. Country or Parish, State  
San Juan County, NM

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
<input checked="" type="checkbox"/> Notice of Intent	<input type="checkbox"/> Acidize	<input type="checkbox"/> Deepen	<input type="checkbox"/> Production (Start/Resume)	<input type="checkbox"/> Water Shut-Off
<input type="checkbox"/> Subsequent Report	<input type="checkbox"/> Alter Casing	<input type="checkbox"/> Hydraulic Fracturing	<input type="checkbox"/> Reclamation	<input type="checkbox"/> Well Integrity
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Casing Repair	<input type="checkbox"/> New Construction	<input type="checkbox"/> Recomplete	<input checked="" type="checkbox"/> Other
	<input type="checkbox"/> Change Plans	<input type="checkbox"/> Plug and Abandon	<input type="checkbox"/> Temporarily Abandon	
	<input type="checkbox"/> Convert to Injection	<input type="checkbox"/> Plug Back	<input type="checkbox"/> Water Disposal	

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.)

DJR Operating requests permission to perform a "step rate test" per the attached procedure.

ACCEPTED FOR RECORD

NMOCB

OCT 01 2018

DISTRICT III

OCT 01 2018

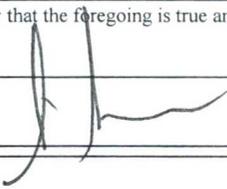
FARMINGTON FIELD OFFICE

By: 

14. I hereby certify that the foregoing is true and correct. Name (Printed/Typed)

Amy Archuleta

Title Regulatory

Signature 

Date

10/01/2018

THE SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by

Title

Date

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office

Title 18 U.S.C Section 1001 and Title 43 U.S.C Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on page 2)

NMOCB 



**Step-Rate Test Procedure**  
**Lybrook Yard WDW No. 1**  
NE/4 Section 14, T23N-R7W  
Rio Arriba County, NM  
API 30-039-27533

**RE: Lybrook Yard WDW #1: Administrative Order SWD-907 maximum injection pressure increase:**

DJR Operating, LLC (OGRID #371838) is operator of the Lybrook Yard WDW No. 1, API No. 30-039-27533. Current allowable injection pressure is 915 psi. In anticipation of applying for an increase to that maximum, we plan to conduct a step-rate test according to the following procedure:

1. Notify NMOCD of step-rate time and date.
2. Shut well in for 24 hours prior to running step-rate tests.
3. MI and begin filling 3-500 bbl frac tanks with produced water. Total water on location 1500 bbls.
4. Record SICP, SITP, BH pressures.
5. MIRU Tefteller. RIH and hang tandem recording bombs (gauges) capable of measuring pressures from 0 psi to 5,000 psi.
  - a. Program bombs to record data every 5 seconds throughout the test.
  - b. RIH with Tefteller slickline and hang bombs below 3 1/2" tubing near top perforation 4382'.
  - c. Slickline will remain in hole during test with packoff / slickline lubricator.
  - d. Record exact time that the gauge is set.
6. MIRU pump truck and recording equipment. Set up to record surface rate and pressure.
7. Casing and bradenhead pressures are to be monitored during test.
8. Pressure test surface lines to 3000 psi.
9. Pump step-rate test via 3-1/2" tubing using produced water as follows:

<u>Step</u>	<u>Time (Min)</u>	<u>Injection (BPM)</u>	<u>Rate (BWPD)</u>	<u>Inj Vol (BW)</u>	<u>Cum Inj Vol (BW)</u>
1	15	0.5	720	7.5	7.5
2	15	1.0	1440	15.0	22.5
3	15	1.5	2160	22.5	45.0
4	15	2.0	2880	30.0	75.0
5	15	2.5	3600	37.5	112.5
6	15	3.0	4320	45.0	157.5
7	15	3.5	5040	52.5	210.0
8	15	4.0	5760	60.0	270.0
9	15	4.5	6480	67.5	337.5
10	15	5.0	7200	75.0	412.5
11	15	5.5	7920	82.5	495.0
12	15	6.0	8640	90.0	585.0
13	15	6.5	9360	97.5	682.5
14	15	7.0	10080	105.0	787.5

**Elapsed time: 210 min.**

**Total = 787.5 bbls**

- Continuously monitor surface injection pressure and rate in a digital format.
- It is critical to maintain the set time steps. Do not shorten or lengthen the time steps.
- Once an injection rate has been established at or near the requested rate, the rate must be kept constant.

10. Shut down and record ISIP, and 5, 10, and 15 minute SI pressures.
11. Wait for SI pressure to decrease to a manageable level.
12. POOH with pressure gauges, and RD Tefteller. Process recorded data.
13. Return well to injection.



## Pertinent Data Sheet

**Well Name:** Lybrook Yard WDW 1  
**Footage:** 988' FNL and 2035' FEL  
**Location:** Section 14, T23N, R7W  
**County:** Rio Arriba County, NM  
**API#:** 30-039-27533  
**Lease:** NMSF 078360

**Project Summary:** Step Rate Test

**Field:** Mesaverde  
**Spud Date:** 5/7/05  
**Completion Date:** 5/1/06

**Elevation:** 7080' GL  
**TD:** 4930' KB  
**PBTD:** 4878' KB

### Casing Record:

Hole Size	Casing Size	Wt.	Grade	Depth Set	Cement
12-1/4"	9-5/8"	36#	J-55	415'	245 sx (Circ. to Surface)
8-3/4"	7"	23#	J-55	4921'	635 sx (Circ. to Surface)

**tubing Record:** Bottom of tools at 4338'. 3-1/2" WL entry guide, 3-1/2"x2.75" R bottom No-Go (2.697" ID), SS SN (1.08'). 3-1/2" EUE N-80 nickel plated tubing sub (6.23'). Nickel plated mill out extension x-over to 3-1/2" EUE (0.64'). Nickel plated mill out extension (4.46'; 4.375" ID). 7"x4" nickel plated mill out extension packer bottom. (0.68'). 7"x4" Arrowdrill seal bore production packer (2.63'). Packer set at 4321.84'. 7"x4" locater seal assembly with 5 seal units and nickel plated 1/2 muleshoe guide (6.05'; 2.992" ID). 3-1/2"x2.81" SS SN. 140 jts. 3-1/2" plastic coated N-80 tubing.

**Logging Record:** SD, Ind, CBL

### Formation Tops:

Nacimiento Surface  
Ojo Alamo 1416'  
Pictured Cliffs 2011'  
Lewis 2057'  
Cliff House 3562'  
Menefee 3632'  
Point Lookout 4357'  
Mancos 4616'

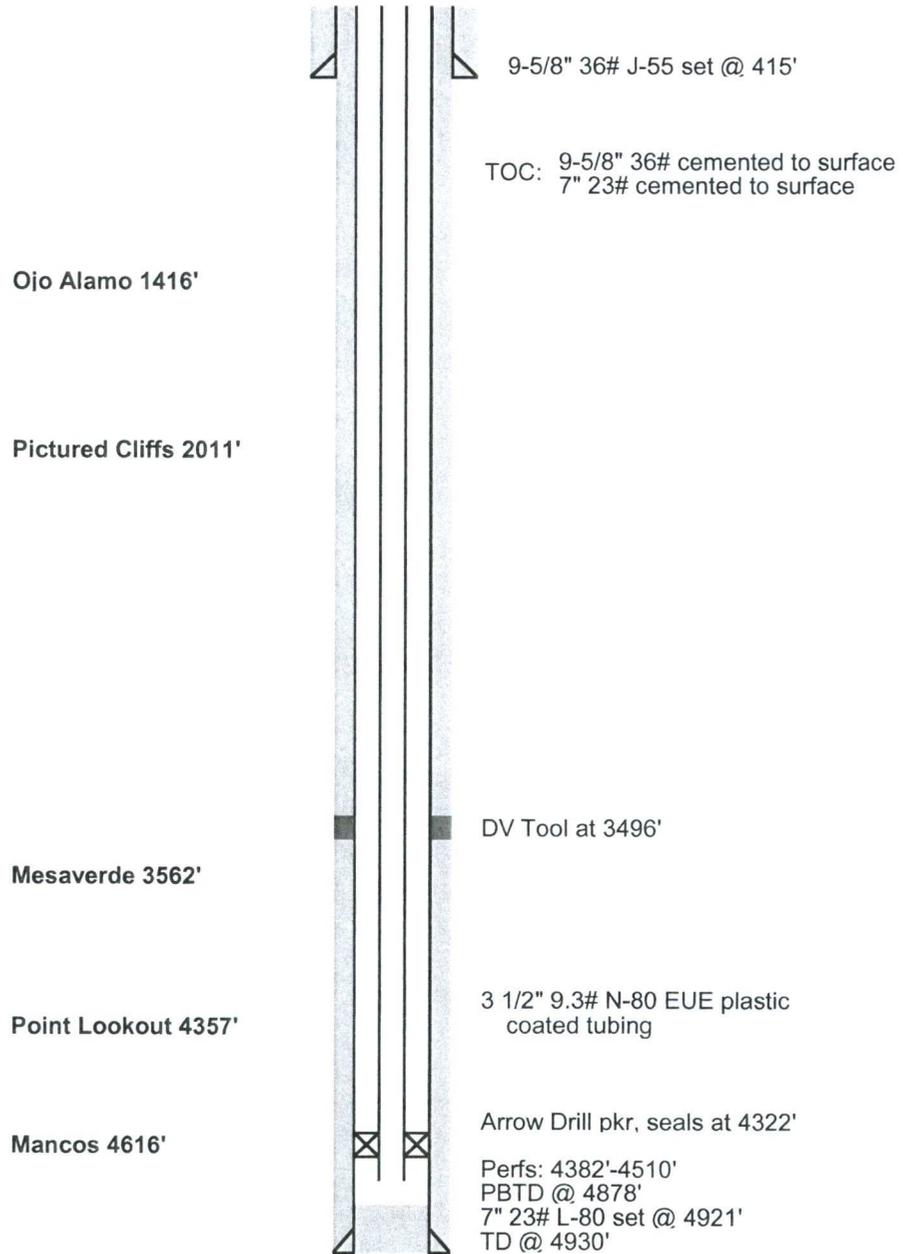
**Perforation Record:** 4382-4388, 4390-4394, 4406-4420, 4436-48', 4466-70', 4486-4494, 4506-10' (0.38"x208)

### Completion Record:

Isolated perfs from 4486-4510'. Acidized with 925 gals. 7-1/2% MCA HCl acid with Musol. Formation broke at 2250 psi at 1.5 BPM. Max rate 8.8 BPM at 2100 psi. ISIP 850 psi. Isolated perfs from 4436-4470'. Acidized with 1232 gals. 7-1/2% MCA HCl acid with Musol. Formation broke at 950 psi at 1.2 BPM. Max rate 11.7 BPM at 1850 psi. ISIP 952 psi.

RU Stinger. Fraced with 114,531 gals of 18 cp silver LT frac fluid and 143,900 lbs. 20/40 ottawa sand.  
ATP: 1432 psi. AIR: 42 BPM. Delta 200. All sand coated with Expedite. ISIP 1017 psi. 5 min: 1179 psi.  
10 min: 1153 psi. 15 min: 1120 psi.  
Well acidized with 1000 gal 15% HCl12-12-2017.

Wellbore Diagram  
 Lybrook Yard WDW 1  
 NW/4, Sec 14, T23N, R7W  
 Rio Arriba, County, NM  
 API: 30-039-27533



Site: LYBROOK YARD WDW		SWD SUMMARY			
Period: July-18					
Run	Meter	Run	Injected	Tubing	
Day	Reading	Hrs	BBLs	Prs	Comments
0	0				
1	0	24:00	0	0	
2	0	24:00	0	0	
3	0	24:00	0	0	
4	280	24:00	280	680	
5	240	24:00	240	680	
6	0	24:00	0	0	
7	0	24:00	0	0	
8	0	24:00	0	0	
9	0	24:00	0	0	
10	140	24:00	140	680	
11	0	24:00	0	0	
12	174	24:00	174	660	
13	0	24:00	0	0	
14	0	24:00	0	0	
15	0	24:00	0	0	
16	0	24:00	0	0	
17	258	24:00	258	680	
18	202	24:00	202	680	
19	0	24:00	0	0	
20	0	24:00	0	0	
21	235	24:00	235	680	
22	235	24:00	235	0	
23	128	24:00	128	680	
24	0	24:00	0	0	
25	151	24:00	151	680	
26	133	24:00	133	680	
27	0	24:00	0	0	
28	0	24:00	0	0	
29	0	24:00	0	0	
30	0	24:00	0	0	
31	224	24:00	224	680	
<b>TOTAL INJECTED</b>			<b>2,400</b>	<b>7,460</b>	



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Oil Conservation Division  
UIC Program Guidance

**Guidance for Conducting a Step-Rate Test**

1. The operator must submit Division Form C-103 to the OCD District office with the description of the procedure for the SRT. The procedure will include the following information:
  - A description of the equipment for measurement and data recording (manufacturer and model) Note: the pressure gauge and recorder must have an appropriate range for use during the test.
  - Summary of injection volumes for last five years with average injection pressure.
  - Summary of well treatments and pressures especially any historical Instantaneous Shut-in Pressure (ISIP).
2. Once the operator has an approved Sundry Notice, the operator shall notify the appropriate OCD District office at least 72 hours prior to the scheduled SRT so that OCD personnel may be present to witness the test.
3. A bradenhead test (if required by the District) and mechanical integrity test (MIT) will be performed before the SRT. If the subject well fails either test, then the SRT will be suspended until the mechanical integrity issue(s) has been remediated. The mechanical integrity testing may be modified at the discretion of the District Supervisor.
4. The casing and bradenhead pressures will be monitored during the test. All wellhead equipment must be rated for the anticipated pressures.
5. Bottomhole pressure measurements will be required for wells deeper than 1000 feet (ft) and injection rates greater than one (1) barrel per minute (BPM).
6. Wells currently injecting must be shut-in at least 48 hours before the test unless the shut-in pressures indicate that the well has not adequately stabilized and a longer time is required for the permitted interval to approximate pre-injection conditions.
7. Selection of rates for the SRT will be developed by the operator based on the proposed operation and the historical information of the well. Suggested rates for the test are 5%, 10%, 20%, 40%, 60%, 80% and 100% of the proposed maximum daily injection rate at the corresponding pressure. The intent is to complete a SRT with at least three (3) steps below the 0.5 psi/ft gradient and three (3) steps above the fracture parting pressure (breakdown pressure). Starting pump rates and pressures must be lower than the current rates and pressures if the well is currently injecting. It may be necessary to backflow the well to reduce initial SRT pressures.
8. Each step shall be at least 30 minutes in duration unless otherwise determined by the OCD. Longer step intervals of 60 minutes shall be required for low permeability injection intervals (less than 0.5 millidarcies) and for open-hole intervals greater than 500 feet in length. The operator may request, in the submission of the Sundry Notice of



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Intent, a modification of the time length for the step intervals with an explanation for the modification. The goal is for increments with equal time and rate and allow for downhole stabilization of pressure for each step.

9. The duration of the step intervals for the SRT must not change during the test or the test results will not be deemed adequate for determining an accurate fracture parting pressure.
10. Pumping equipment must be able to pump at the rates and pressures needed for the test. Rate changes will be 0.5 BPM or smaller unless the OCD witness determines that bigger rate changes are necessary due to small incremental increases in pressure.
11. The operator shall ensure that there is enough water to conduct the entire test.
12. The completed SRT results are to be submitted to the Engineering Bureau in Santa Fe and should include the following information:
  - Administrative application checklist (available on OCD website under Unnumbered Forms on Form webpage).
  - Cover letter with contact information, general description of test and pressure increase being proposed.
  - Complete data summary including injection rates, duration of each step, pressure measurements (surface and bottom hole) and the ISIP.
  - SRT-specific information: location of pressure gauges (depth); initial bottomhole pressure; injection fluid type and specific gravity.
  - Graph summary of pressure versus injection rate with interpretation.
  - Current well completion diagram.
  - Copy of the order authorizing the injection into the well.
13. If a pressure increase is granted, it shall be limited for use in the well with the same tubing, size, length, and type of interior coating as present for the SRT. If these components are changed, the operator must ask the Engineering Bureau to recalculate the surface pressure limit, which may require another SRT.

**Additional Sources:**

Martin Felsenthal, Step-rate Test Determine Safe Injection Pressures in Floods in The Oil and Gas Journal, October 28, 1974.

US Environmental Protection Agency, Step-Rate Test Procedure, Region VIII; January 12, 1999.