

Form 3160-3  
(June 2015)FORM APPROVED  
OMB No. 1004-0137  
Expires: January 31, 2018

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
**APPLICATION FOR PERMIT TO DRILL OR REENTER**

1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER 1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other 1c. Type of Completion: <input type="checkbox"/> Hydraulic Fracturing <input checked="" type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone		5. Lease Serial No. <b>NMNM91078</b> 6. If Indian, Allottee or Tribe Name  7. If Unit or CA Agreement, Name and No.  8. Lease Name and Well No.  <b>RANA SALADA FED 01</b>  <b>131H</b> 9. API Well No.  <b>30 015 48582</b>
2. Name of Operator <b>NOVO OIL AND GAS NORTHERN DELAWARE LLC</b> 3a. Address <b>1001 West Wilshire Boulevard Suite 206, Oklahoma City, OK</b> 3b. Phone No. (include area code) <b>(405) 404-0414</b>		10. Field and Pool, or Exploratory <b>CULEBRA BLUFF; BONE SPRING, SOUTH</b> 11. Sec., T. R. M. or Blk. and Survey or Area <b>SEC 1/T23S/R28E/NMP</b>
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface <b>LOT 4 / 144 FNL / 393 FWL / LAT 32.3416162 / LONG -104.047969</b> At proposed prod. zone <b>LOT 1 / 726 FNL / 10 FEL / LAT 32.3400526 / LONG -104.0319896</b>		12. County or Parish <b>EDDY</b> 13. State <b>NM</b>
14. Distance in miles and direction from nearest town or post office* <b>5 miles</b>		15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) <b>144 feet</b>
16. No of acres in lease  17. Spacing Unit dedicated to this well <b>158.88</b>		18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. <b>20 feet</b>
19. Proposed Depth <b>9629 feet / 15310 feet</b>		20. BLM/BIA Bond No. in file <b>FED: NMB001536</b>
21. Elevations (Show whether DF, KDB, RT, GL, etc.) <b>3064 feet</b>		22. Approximate date work will start* <b>11/01/2020</b>
23. Estimated duration <b>90 days</b>		24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

- |   |   |
|---|---|
| 1. Well plat certified by a registered surveyor.<br>2. A Drilling Plan.<br>3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office). | 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).<br>5. Operator certification.<br>6. Such other site specific information and/or plans as may be requested by the BLM. |
|---|---|

25. Signature (Electronic Submission)  Title <b>President</b>	Name (Printed/Typed) <b>BRIAN WOOD / Ph: (405) 404-0414</b>	Date <b>08/12/2020</b>
Approved by (Signature) (Electronic Submission)  Title <b>Assistant Field Manager Lands &amp; Minerals</b>	Name (Printed/Typed) <b>Cody Layton / Ph: (575) 234-5959</b>	Date <b>06/04/2021</b>
Office <b>Carlsbad Field Office</b>		

Application approval 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.  
Conditions of approval, if any, are attached.

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.

(Continued on page 2)

\*(Instructions on page 2)



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 Road, Aztec, NM 87410  
Phone: (505) 334-6178 Fax: (505) 334-6170  
District IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505  
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico  
Energy, Minerals & Natural Resources Department  
OIL CONSERVATION DIVISION  
1220 South St. Francis Dr.  
Santa Fe, NM 87505

Form C-102  
Revised August 1, 2011  
Submit one copy to appropriate  
District Office  
☐ AMENDED REPORT

## WELL LOCATION AND ACREAGE DEDICATION PLAT

<sup>1</sup> API Number <b>30-015- 48582</b>	<sup>2</sup> Pool Code <b>15011</b>	<sup>3</sup> Pool Name <b>CULEBRA BLUFF; BONE SPRING, SOUTH</b>
<sup>4</sup> Property Code <b>330695</b>	<sup>5</sup> Property Name <b>RANA SALADA FED 01</b>	<sup>6</sup> Well Number <b>131H</b>
<sup>7</sup> OGRID No. <b>372920</b>	<sup>8</sup> Operator Name <b>NOVO OIL &amp; GAS NORTHERN DELAWARE, LLC</b>	<sup>9</sup> Elevation <b>3064.4</b>

<sup>10</sup> Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
<b>4</b>	<b>1</b>	<b>23 S</b>	<b>28 E</b>		<b>144</b>	<b>NORTH</b>	<b>393</b>	<b>WEST</b>	<b>EDDY</b>

<sup>11</sup> Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
<b>1</b>	<b>1</b>	<b>23 S</b>	<b>28 E</b>		<b>726</b>	<b>NORTH</b>	<b>10</b>	<b>EAST</b>	<b>EDDY</b>

<sup>12</sup> Dedicated Acres <b>158.88</b>	<sup>13</sup> Joint or Infill	<sup>14</sup> Consolidation Code	<sup>15</sup> Order No.
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No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

		<p><b><sup>17</sup> OPERATOR CERTIFICATION</b></p> <p>I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p><i>[Signature]</i> <b>8-7-20</b></p> <p>Signature <b>BRIAN WOOD</b> Date</p> <p>Printed Name <b>brian@permitswest.com</b></p> <p>E-mail Address <b>(505) 466-8120</b></p>
<p><b><sup>18</sup> SURVEYOR CERTIFICATION</b></p> <p>I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.</p> <p>APRIL 21, 2020</p> <p>Date of Survey</p> <p><i>[Signature]</i></p> <p>Signature and Seal of Professional Surveyor: <b>MON F. JARAMILLO</b></p> <p>Certificate Number: <b>12797</b></p> <p>PROFESSIONAL SURVEYOR</p> <p>NO. 8100A</p>		

State of New Mexico  
Energy, Minerals and Natural Resources Department

Submit Electronically  
Via E-permitting

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

## NATURAL GAS MANAGEMENT PLAN

This Natural Gas Management Plan must be submitted with each Application for Permit to Drill (APD) for a new or recompleted well.

### Section 1 – Plan Description

Effective May 25, 2021

**I. Operator:** \_Novo Oil & Gas Northern Delaware, LLC\_ **OGRID:** \_372920\_ **Date:** \_06\_ / \_14\_ / \_21\_

**II. Type:** ☒ Original ☐ Amendment due to ☐ 19.15.27.9.D(6)(a) NMAC ☐ 19.15.27.9.D(6)(b) NMAC ☐ Other.

If Other, please describe: \_\_\_\_\_

**III. Well(s):** Provide the following information for each new or recompleted well or set of wells proposed to be drilled or proposed to be recompleted from a single well pad or connected to a central delivery point.

Well Name	API	ULSTR	Footages	Anticipated Oil BBL/D	Anticipated Gas MCF/D	Anticipated Produced Water BBL/D
Rana Salada Fed 01 131H		D-1-23S-28E	144 FNL & 393 FWL	700	5200	2300
Rana Salada Fed 01 211H		D-1-23S-28E	104 FNL & 393 FWL	700	5200	2300
Rana Salada Fed 01 221H		D-1-23S-28E	124 FNL & 393 FWL	700	5200	2300
Rana Salada Fed 01 231H		D-1-23S-28E	144 FNL & 243 FWL	700	5200	2300

**IV. Central Delivery Point Name:** \_CTB Name: Rana Salada 0106 CTB 2\_ [See 19.15.27.9(D)(1) NMAC]

**V. Anticipated Schedule:** Provide the following information for each new or recompleted well or set of wells proposed to be drilled or proposed to be recompleted from a single well pad or connected to a central delivery point.

Well Name	API	Spud Date	TD Reached Date	Completion Commencement Date	Initial Flow Back Date	First Production Date
Rana Salada Fed 01 131H		8/1/22	8/15/22	10/25/22	11/12/22	12/1/22
Rana Salada Fed 01 211H		8/16/22	9/13/22	10/25/22	11/12/22	12/1/22
Rana Salada Fed 01 221H		9/15/22	9/29/22	10/25/22	11/12/22	12/1/22
Rana Salada Fed 01 231H		9/30/22	10/14/22	10/25/22	11/12/22	12/1/22

**VI. Separation Equipment:** ☒ Attach a complete description of how Operator will size separation equipment to optimize gas capture.

**VII. Operational Practices:** ☒ Attach a complete description of the actions Operator will take to comply with the requirements of Subsection A through F of 19.15.27.8 NMAC.

**VIII. Best Management Practices:** ☒ Attach a complete description of Operator's best management practices to minimize venting during active and planned maintenance.

## **Section 2 – Enhanced Plan**

### **EFFECTIVE APRIL 1, 2022**

Beginning April 1, 2022, an operator that is not in compliance with its statewide natural gas capture requirement for the applicable reporting area must complete this section.

☐ Operator certifies that it is not required to complete this section because Operator is in compliance with its statewide natural gas capture requirement for the applicable reporting area.

#### **IX. Anticipated Natural Gas Production:**

Well	API	Anticipated Average Natural Gas Rate MCF/D	Anticipated Volume of Natural Gas for the First Year MCF

#### **X. Natural Gas Gathering System (NGGS):**

Operator	System	ULSTR of Tie-in	Anticipated Gathering Start Date	Available Maximum Daily Capacity of System Segment Tie-in

**XI. Map.** ☐ Attach an accurate and legible map depicting the location of the well(s), the anticipated pipeline route(s) connecting the production operations to the existing or planned interconnect of the natural gas gathering system(s), and the maximum daily capacity of the segment or portion of the natural gas gathering system(s) to which the well(s) will be connected.

**XII. Line Capacity.** The natural gas gathering system ☐ will ☐ will not have capacity to gather 100% of the anticipated natural gas production volume from the well prior to the date of first production.

**XIII. Line Pressure.** Operator ☐ does ☐ does not anticipate that its existing well(s) connected to the same segment, or portion, of the natural gas gathering system(s) described above will continue to meet anticipated increases in line pressure caused by the new well(s).

☐ Attach Operator's plan to manage production in response to the increased line pressure.

**XIV. Confidentiality:** ☐ Operator asserts confidentiality pursuant to Section 71-2-8 NMSA 1978 for the information provided in Section 2 as provided in Paragraph (2) of Subsection D of 19.15.27.9 NMAC, and attaches a full description of the specific information for which confidentiality is asserted and the basis for such assertion.



**Section 3 - Certifications****Effective May 25, 2021**

Operator certifies that, after reasonable inquiry and based on the available information at the time of submittal:

☒ Operator will be able to connect the well(s) to a natural gas gathering system in the general area with sufficient capacity to transport one hundred percent of the anticipated volume of natural gas produced from the well(s) commencing on the date of first production, taking into account the current and anticipated volumes of produced natural gas from other wells connected to the pipeline gathering system; or

☐ Operator will not be able to connect to a natural gas gathering system in the general area with sufficient capacity to transport one hundred percent of the anticipated volume of natural gas produced from the well(s) commencing on the date of first production, taking into account the current and anticipated volumes of produced natural gas from other wells connected to the pipeline gathering system.

*If Operator checks this box, Operator will select one of the following:*

**Well Shut-In.** ☐ Operator will shut-in and not produce the well until it submits the certification required by Paragraph (4) of Subsection D of 19.15.27.9 NMAC; or

**Venting and Flaring Plan.** ☒ Operator has attached a venting and flaring plan that evaluates and selects one or more of the potential alternative beneficial uses for the natural gas until a natural gas gathering system is available, including:

- (a) power generation on lease;
- (b) power generation for grid;
- (c) compression on lease;
- (d) liquids removal on lease;
- (e) reinjection for underground storage;
- (f) reinjection for temporary storage;
- (g) reinjection for enhanced oil recovery;
- (h) fuel cell production; and
- (i) other alternative beneficial uses approved by the division.

**Section 4 - Notices**


1. If, at any time after Operator submits this Natural Gas Management Plan and before the well is spud:

(a) Operator becomes aware that the natural gas gathering system it planned to connect the well(s) to has become unavailable or will not have capacity to transport one hundred percent of the production from the well(s), no later than 20 days after becoming aware of such information, Operator shall submit for OCD's approval a new or revised venting and flaring plan containing the information specified in Paragraph (5) of Subsection D of 19.15.27.9 NMAC; or

(b) Operator becomes aware that it has, cumulatively for the year, become out of compliance with its baseline natural gas capture rate or natural gas capture requirement, no later than 20 days after becoming aware of such information, Operator shall submit for OCD's approval a new or revised Natural Gas Management Plan for each well it plans to spud during the next 90 days containing the information specified in Paragraph (2) of Subsection D of 19.15.27.9 NMAC, and shall file an update for each Natural Gas Management Plan until Operator is back in compliance with its baseline natural gas capture rate or natural gas capture requirement.

2. OCD may deny or conditionally approve an APD if Operator does not make a certification, fails to submit an adequate venting and flaring plan which includes alternative beneficial uses for the anticipated volume of natural gas produced, or if OCD determines that Operator will not have adequate natural gas takeaway capacity at the time a well will be spud.

I certify that, after reasonable inquiry, the statements in and attached to this Natural Gas Management Plan are true and correct to the best of my knowledge and acknowledge that a false statement may be subject to civil and criminal penalties under the Oil and Gas Act.

Signature:	
Printed Name:	Justin Carter
Title:	Landman
E-mail Address:	jcarler@novooil.com
Date:	6/15/2021
Phone:	405.286.3375

**OIL CONSERVATION DIVISION**  
(Only applicable when submitted as a standalone form)

Approved By:
Title:
Approval Date:
Conditions of Approval:

## APPENDIX A



## **Separation Equipment**

Novo Oil & Gas Northern Delaware, LLC (Novo) has pulled representative pressurized samples from wells in the same producing formation. Novo has utilized these samples in process simulations to determine the amount of gas anticipated in each stage of the process and utilized this information with a safety factor to size the equipment listed below:

- Separation equipment will be set as follows:
  - Individual 3 Phase separators will be set for each individual well.
    - The separators will be sized based on the anticipated volume of the well and the pressure of the lines utilized for oil, gas, and water takeaway.
  - Individual Heater treaters will be set for each individual well.
    - The heater treaters are sized based on the anticipated combined volume of oil and water predicted to come from the initial 3 phase separator.
    - Oil will be separated from the water and water will be sent to its respective tanks
    - The combined oil and natural gas stream is routed to the Vapor Recovery Tower.
  - The oil and water tanks utilize a closed vent capture system to ensure all breathing, working and flashing losses are routed to the Vapor Recovery Tower (VRT) and Vapor Recovery Unit (VRU)
  - The Vapor Recovery Tower has been sized, based on the anticipated volume of gas from the heater treater and oil and water tanks. A VRU is then utilized to push the recovered gas into the sales pipeline.
    - The VRU will be sized based on the anticipated gas volume and the gas pressure for the line utilized for takeaway.

All equipment has been sized based on the modeled projected need and a safety factor of at least 10%. This is ensuring that the capture of methane gas and VOC will minimize flaring below 50mcf/d per facility.



## **Operational Practices**

### ***19.15.27.8 (A) Venting and Flaring of Natural Gas***

Novo Oil & Gas Northern Delaware, LLC (Novo) understands the requirements of NMAC 19.15.27.8 which states that the venting and flaring of natural gas during drilling, completion or production that constitutes waste as defined in 19.15.2 are prohibited.

### ***19.15.27.8 (B) Venting and flaring during drilling operations***

1. Novo shall capture or combust natural gas if technically feasible during drilling operations using best industry practices.
2. A flare stack with a 100 percent capacity for expected volumes will be set on location of the CTB at least 100 feet from the nearest surface hole location, well heads, and storage tanks.
3. In the event of an emergency, Novo will vent natural gas in order to avoid substantial impact. Novo shall report the vented or flared gas to the NMOCD.

### ***19.15.27.8 (C) Venting and flaring during completion or recompletion***

During completion operations, Novo utilizes the following:

1. Novo facilities are built and ready from day 1 of flowback
2. Individual well test separators will be set to properly separate gas and liquids. Temporary test separator will be utilized initially to process volumes. In addition, separators will be tied into flowback tanks which will be tied into the gas processing equipment for sales down a pipeline. See **Appendix A** for details on Separation Equipment used by Novo.
3. Should the facility not yet be capable of processing gas, or the gas does not meet quality standards, then storage tanks will be set that are tied into gas busters or a temporary flare to manage all natural gas. This flare would meet the following requirements:
  - a) An appropriately sized flare stack with an automatic igniter
  - b) Novo analyzes the natural gas samples twice per week



- c) Novo routes the natural gas into a gathering pipeline as soon as the pipeline specifications are met
- d) Novo provides the NMOCD with pipeline specifications and natural gas data.

**19.15.27.8 (D) Venting and flaring during production operations.**

Novo will not vent or flare natural gas except under the following circumstances:

1. During an emergency or malfunction
2. To unload or clean-up liquid holdup in a well to atmospheric pressure, provided
  - a) Novo does not vent after the well achieves a stabilized rate and pressure
  - b) Novo will remain present on-site during liquids unloaded by manual purging and takes all reasonable actions to achieve a stabilized rate and pressure at the earliest practical time
  - c) Novo will optimize the system to minimize natural gas venting on any well equipped with a plunger lift or auto control system
  - d) Best management practices will be used during downhole well maintenance.
3. During the first year of production from an exploratory well provided
  - a) Novo receives approval from the NMOCD
  - b) Novo remains in compliance with NM gas capture requirements
  - c) Novo submits an updated C-129 from to the NMOCD.
4. During the following activities unless prohibited
  - a) Gauging or sampling a storage tank or low-pressure production vessel
  - b) Loading out liquids from a storage tank
  - c) Repair and maintenance
  - d) Normal operation of a gas-activated pneumatic controller or pump
  - e) Normal operation of a storage tank but not including venting from a thief hatch
  - f) Normal operation of dehydration units
  - g) Normal operations of compressors, compressor engines, turbines, valves, flanges, and connectors
  - h) During a bradenhead, packer leakage test, or production test lasting less than 24 hours
  - i) When natural gas does not meet the gathering pipeline specifications
  - j) Commissioning of pipelines, equipment, or facilities only for as long as necessary to purge introduced impurities.

In order to comply with these laws, see **Appendix B** for details on Novo Venting and Flaring.

**19.15.27.8 (E) Performance standards**

1. Novo has utilized process simulations with a safety factor to design all separation and storage equipment. The equipment is routed to a vapor recovery system and utilizes as a flare as back up for periods of startup, shutdown, maintenance or malfunction of the VRU system.
2. Novo will install a flare that designed to handle the full volume of vapors from the facility in case of VRU failure and it is designed with an auto-ignition system.
3. Flare stacks will be appropriately sized and designed to ensure proper combustion efficiency
  - a) Flare stacks installed or replaced will be equipped with an automatic ignitor or continuous pilot
  - b) Previously installed flare stacks will be retrofitted with an automatic ignitor, continuous pilot , or technology that alerts Novo of flare malfunction within 18 months after May 25, 2021.
  - c) Flare stacks replaced after May 25, 2021 will be equipped with an automatic ignitor or continuous pilot if located at a well or facility with an average daily production of 60,000 cubic feet of natural gas or less.
  - d) Flare stacks will be located at least 100 feet from well and storage tanks and securely anchored
4. Novo will conduct an AVO inspection on all components for leaks and defects at least weekly.
5. Novo will make and keep records of AVO inspections available to the NMOCD for at least 5 years.
6. Novo may use a remote or automated monitoring technology to detect leaks and releases in lieu of AVO inspections with prior NMOCD approval.
7. Facilities will be designed to minimize waste.
8. Novo will resolve emergencies as promptly as possible.

**19.15.27.8 (F) Measurement or estimation of vented and flared natural gas**

1. Novo will have meters on both the low pressure and high pressure sides of the flares and the volumes are recorded in the SCADA system.
2. Novo will install equipment to measure the volume of flared natural gas that has an average daily production of 60,000 cubic feet or greater of natural gas.
3. Novo's measuring equipment will conform to an industry standards.
4. The measurement system is designed such that it cannot be bypassed except for inspections and servicing the meters.
5. Novo will estimate the volume of vented or flared natural gas using a methodology that can be independently verified if metering is not practicable due to low flow rate or pressure.

6. Novo will estimate the volume of vented and flared natural gas based on the results of an annual GOR test for wells that do not require measuring equipment reported on form C-116.
7. Novo will install measuring equipment whenever the NMOCD determines that metering is necessary.

## APPENDIX A



## Separation Equipment

Novo Oil & Gas Northern Delaware, LLC (Novo) has pulled representative pressurized samples from wells in the same producing formation. Novo has utilized these samples in process simulations to determine the amount of gas anticipated in each stage of the process and utilized this information with a safety factor to size the equipment listed below:

- Separation equipment will be set as follows:
  - Individual 3 Phase separators will be set for each individual well.
    - The separators will be sized based on the anticipated volume of the well and the pressure of the lines utilized for oil, gas, and water takeaway.
  - Individual Heater treaters will be set for each individual well.
    - The heater treaters are sized based on the anticipated combined volume of oil and water predicted to come from the initial 3 phase separator.
    - Oil will be separated from the water and water will be sent to its respective tanks
    - The combined oil and natural gas stream is routed to the Vapor Recovery Tower.
  - The oil and water tanks utilize a closed vent capture system to ensure all breathing, working and flashing losses are routed to the Vapor Recovery Tower (VRT) and Vapor Recovery Unit (VRU)
  - The Vapor Recovery Tower has been sized, based on the anticipated volume of gas from the heater treater and oil and water tanks. A VRU is then utilized to push the recovered gas into the sales pipeline.
    - The VRU will be sized based on the anticipated gas volume and the gas pressure for the line utilized for takeaway.

All equipment has been sized based on the modeled projected need and a safety factor of at least 10%. This is ensuring that the capture of methane gas and VOC will minimize flaring below 50mcf/d per facility.



## APPENDIX B



## **Venting and Flaring**

Novo Oil & Gas Northern Delaware, LLC (Novo) has a natural gas system available prior to startup of completion operations. Novo utilizes a VRU system and sells all gas except during periods of startup, shutdown, maintenance, or malfunction for the gas capturing equipment, including the VRT, VRU, storage tanks, and pipelines.

Currently, Novo utilizes the following from list A-I of Section 3 for its operations to minimize flaring:

- a) Novo Oil & Gas utilizes Natural Gas (NG) powered generators to power it's leases where grid power isn't available.
- b) When electrical grid power is unavailable, NG generators will be used for major equipment onsite.
- c) Novo Oil & Gas compression in service will be NG powered.
- d) Should liquids removal – such as dehydration – be required, units will be powered by NG.

Additionally, Novo Oil & Gas will only flare gas during the following times:

- Scheduled maintenance for gas capturing equipment including:
  - VRT
  - VRU
  - Storage tanks
  - Pipelines
- Emergency flaring



## **Best Management Practices**

Novo Oil & Gas Northern Delaware, LLC (Novo) utilizes the following best management practices to minimize venting during active and planned maintenance.

Novo has a closed vent capture system to route emissions from the heater treater, tanks and vapor recovery to the VRU with a flare for backup. The system is designed such that if the VRU is taken out of service for any reason, the vapors will be routed to the flare for combustion.

Novo will isolate and attempt to route all vapors to the VRU or flare prior to opening any lines for maintenance to minimize venting from the equipment. Not limited to:



U.S. Department of the Interior  
BUREAU OF LAND MANAGEMENT

# Drilling Plan Data Report

06/04/2021

APD ID: 10400060175

Submission Date: 08/12/2020

Highlighted data  
reflects the most  
recent changes

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED 01

Well Number: 131H

[Show Final Text](#)

Well Type: OIL WELL

Well Work Type: Drill

## Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
816312	QUATERNARY	3064	0	0	OTHER : None	USEABLE WATER	N
816313	RUSTLER ANHYDRITE	2855	209	209	ANHYDRITE	NONE	N
816314	CASTILE	1164	1900	1901	SALT	NONE	N
816315	LAMAR	339	2725	2752	LIMESTONE	NONE	N
816316	BELL CANYON	305	2759	2774	SANDSTONE	NATURAL GAS, OIL	N
816317	CHERRY CANYON	-715	3779	3823	SANDSTONE	NATURAL GAS, OIL	N
816318	BRUSHY CANYON	-2165	5229	5314	SANDSTONE	NATURAL GAS, OIL	N
816319	BONE SPRING	-3235	6299	6415	LIMESTONE	NATURAL GAS, OIL	N
816320	AVALON SAND	-3915	6979	7102	SHALE	NATURAL GAS, OIL	N
816321	BONE SPRING 1ST	-4335	7399	7522	SANDSTONE	NATURAL GAS, OIL	N
816322	BONE SPRING 2ND	-4585	7649	7772	OTHER : Carbonate	NATURAL GAS, OIL	N
816323	BONE SPRING 2ND	-5040	8104	8227	SANDSTONE	NATURAL GAS, OIL	N
816324	BONE SPRING 3RD	-5405	8469	8592	OTHER : Carbonate	NATURAL GAS, OIL	N
816325	BONE SPRING 3RD	-6285	9349	9487	SANDSTONE	NATURAL GAS, OIL	Y

## Section 2 - Blowout Prevention

**Operator Name:** NOVO OIL AND GAS NORTHERN DELAWARE LLC**Well Name:** RANA SALADA FED 01**Well Number:** 131H**Pressure Rating (PSI):** 5M**Rating Depth:** 10000

**Equipment:** A 13.625" 5,000-psi BOP system will be installed on a multi-bowl (speed head) wellhead with a 13.625" flanged casing spool. Top flange of casing spool will be set in a cellar below ground level. BOP system will consist of a single pipe ram on the bottom, mud cross, double pipe ram with blind rams on bottom and pipe rams on top, and annular preventer. Blowout preventer will be installed on top of the 13.375" surface casing and will remain installed to TD of the well. Wellhead, blowout preventer, and choke manifold diagram are included.

**Requesting Variance?** YES

**Variance request:** Variance is requested to use a co-flex hose between the BOP system and choke manifold. A typical co-flex pressure test certificate is attached. An equipment specific co-flex pressure test certificate will be on site when testing the BOP.

**Testing Procedure:** BOP system will be isolated with a test plug and tested by an independent tester to 250-psi low and 5000-psi high for 10 minutes. Surface casing will be pressure tested to 250-psi low and 1500-psi high. Intermediate casing will be pressure tested to 250-psi low and (0.22 psi x shoe TVD which is equivalent to 1964.38 psi) high for 30 minutes. All casing strings will be tested in accordance with Onshore Order 2 III.B.1.h.

**Choke Diagram Attachment:**

RS\_01\_131H\_Choke\_20200811141435.pdf

**BOP Diagram Attachment:**

RS\_01\_131H\_BOP\_20200811141441.pdf

### Section 3 - Casing

Casing ID	String Type	Hole Size	Csg Size	Condition	Standard	Tapered String	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Top Set MSL	Bottom Set MSL	Calculated casing length MD	Grade	Weight	Joint Type	Collapse SF	Burst SF	Joint SF Type	Joint SF	Body SF Type	Body SF
1	SURFACE	17.5	13.375	NEW	API	N	0	400	0	400	3064	2664	400	J-55	54.5	BUTT	1.125	1.125	DRY	1.6	DRY	1.6
2	INTERMEDIATE	9.875	8.625	NEW	NON API	N	0	8929	0	8806	3064	-5742	8929	OTHER	32	OTHER - TLW	1.125	1.125	DRY	1.6	DRY	1.6
3	PRODUCTION	7.875	5.5	NEW	NON API	N	0	15310	0	9629	3064	-6565	15310	OTHER	20	OTHER - DWC/C-IS Plus	1.125	1.125	DRY	1.6	DRY	1.6

### Casing Attachments



**Operator Name:** NOVO OIL AND GAS NORTHERN DELAWARE LLC**Well Name:** RANA SALADA FED 01**Well Number:** 131H**Casing Attachments**

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**Casing ID:** 1      **String Type:** SURFACE**Inspection Document:****Spec Document:****Tapered String Spec:****Casing Design Assumptions and Worksheet(s):**RS\_01\_131H\_Casing\_Design\_Assumptions\_20200811141935.pdf

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**Casing ID:** 2      **String Type:** INTERMEDIATE**Inspection Document:****Spec Document:**

8.625in\_P\_110\_HSCY\_20200812111334.pdf

**Tapered String Spec:****Casing Design Assumptions and Worksheet(s):**RS\_01\_131H\_Casing\_Design\_Assumptions\_20200811142056.pdf

---

**Casing ID:** 3      **String Type:** PRODUCTION**Inspection Document:****Spec Document:**

5.5in\_P\_110\_EC\_20200811142200.pdf

**Tapered String Spec:****Casing Design Assumptions and Worksheet(s):**RS\_01\_131H\_Casing\_Design\_Assumptions\_20200811142217.pdf

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**Section 4 - Cement**

**Operator Name:** NOVO OIL AND GAS NORTHERN DELAWARE LLC**Well Name:** RANA SALADA FED 01**Well Number:** 131H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	0	0	0	0	0	0	None	None
SURFACE	Tail		0	400	343	1.62	13.8	555	100	Class C	Gel + accelerator + LCM
PRODUCTION	Lead		0	0	0	0	0	0	0	None	None
PRODUCTION	Tail		8249	15310	781	1.89	13	1476	20	Class H	Fluid loss + retarder + LCM
INTERMEDIATE	Lead		0	8929	483	2.69	10.5	1299	20	Class C or H	Fluid loss + retarder + LCM + possibly beads for compressive strength
INTERMEDIATE	Tail		0	8929	130	1.34	14.8	174	20	Class C or H	Fluid loss + retarder + LCM

### Section 5 - Circulating Medium

**Mud System Type:** Closed**Will an air or gas system be Used?** NO**Description of the equipment for the circulating system in accordance with Onshore Order #2:****Diagram of the equipment for the circulating system in accordance with Onshore Order #2:**

**Describe what will be on location to control well or mitigate other conditions:** All necessary mud products (barite, bentonite, LCM) to control weight and fluid loss will be on site at all times. Mud program may change due to hole conditions.

**Describe the mud monitoring system utilized:** An electronic PVT mud system will monitor flow rate, pump pressure, stroke rate, and volume.

### Circulating Medium Table

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
0	400	OTHER : Fresh water spud	8.3	8.3							
400	8929	OTHER : Brine Diesel Emulsion	8.8	9.4							

**Operator Name:** NOVO OIL AND GAS NORTHERN DELAWARE LLC**Well Name:** RANA SALADA FED 01**Well Number:** 131H

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
8929	15529	OIL-BASED MUD	11	13.5							

### Section 6 - Test, Logging, Coring

**List of production tests including testing procedures, equipment and safety measures:**

A 2-person mud logging program will be used from 3000' to TD. GR log will be acquired by MWD tools from the intermediate casing to TD.

**List of open and cased hole logs run in the well:**

MUD LOG/GEOLOGICAL LITHOLOGY LOG,GAMMA RAY LOG,

**Coring operation description for the well:**

No core or drill stem test is planned.

### Section 7 - Pressure

**Anticipated Bottom Hole Pressure:** 6740

**Anticipated Surface Pressure:** 4621

**Anticipated Bottom Hole Temperature(F):** 165

**Anticipated abnormal pressures, temperatures, or potential geologic hazards?** NO

**Describe:**

**Contingency Plans geohazards description:**

**Contingency Plans geohazards attachment:**

**Hydrogen Sulfide drilling operations plan required?** YES

**Hydrogen sulfide drilling operations plan:**

RS\_01\_131H\_H2S\_Plan\_20200811142726.pdf

**Operator Name:** NOVO OIL AND GAS NORTHERN DELAWARE LLC

**Well Name:** RANA SALADA FED 01

**Well Number:** 131H

## Section 8 - Other Information

**Proposed horizontal/directional/multi-lateral plan submission:**

RS\_01\_131H\_Horizontal\_Plan\_20200811142744.pdf

**Other proposed operations facets description:**

**Other proposed operations facets attachment:**

CoFlex\_Certs\_20200811142758.pdf

RS\_01\_131H\_Anti\_Collision\_Report\_20200811142805.pdf

RS\_01\_131H\_Speedhead\_Specs\_20200811142812.pdf

RS\_01\_131H\_Drill\_Plan\_20200812074617.pdf

**Other Variance attachment:**

RS\_01\_131H\_Casing\_Cement\_Variance\_20200811142824.pdf

Alternative\_Casing\_\_Spec\_Request\_20200811142830.pdf





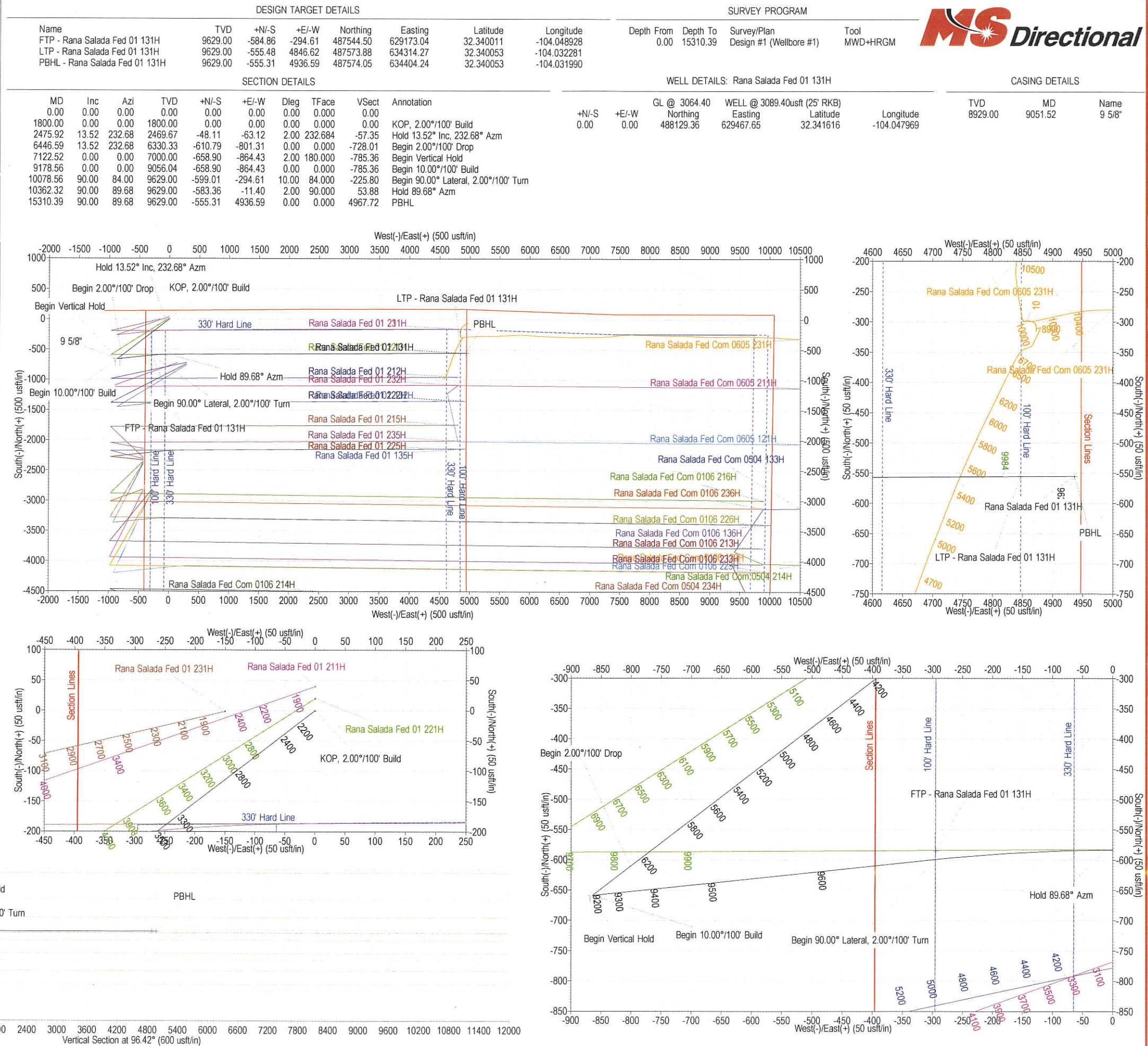
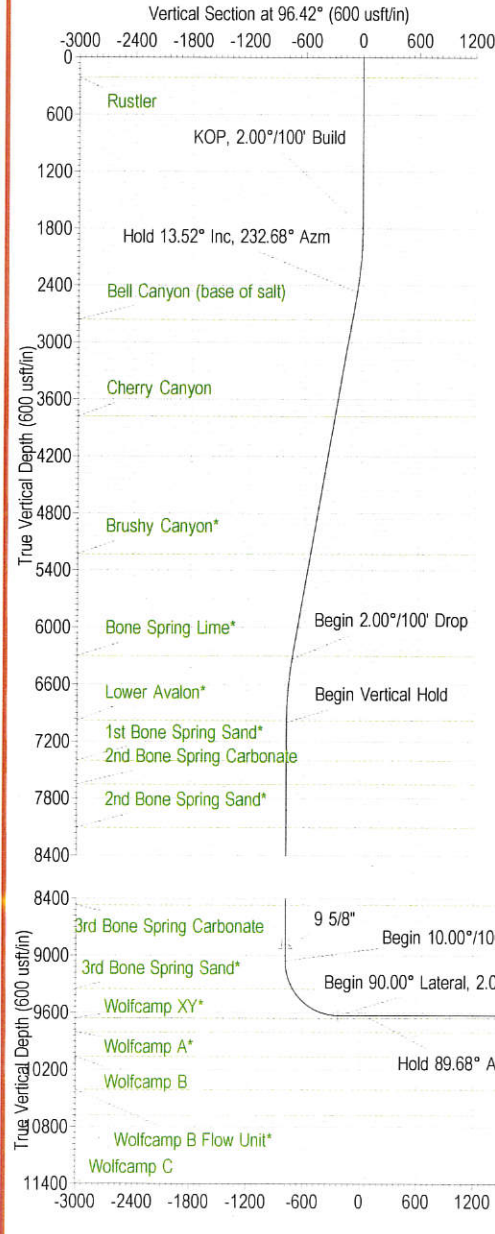
Company: Novo Oil & Gas, LLC  
Well: Rana Salada Fed 01 131H  
County: Eddy County, New Mexico (NAD 83)  
Rig: 25' RKB  
Wellbore: Wellbore #1  
Design: Design #1  
Created By: MEB  
Date: 13:23, April 15 2020

Geodetic System: US State Plane 1983  
Datum: North American Datum 1983  
Ellipsoid: GRS 1980  
Zone: New Mexico Eastern Zone  
System Datum: Mean Sea Level



Azimuths to Grid North  
True North: -0.15°  
Magnetic North: 6.85°  
  
Magnetic Field  
Strength: 47830.1nT  
Dip Angle: 60.07°  
Date: 5/1/2020  
Model: HDGM2020

To convert a Magnetic Direction to a Grid Direction, Add 6.847°  
To convert a Magnetic Direction to a True Direction, Add 7.000° East  
To convert a True Direction to a Grid Direction, Subtract 0.153°







# MS Directional Planning Report



Database:	EDM 5000.15 Conroe DB	Local Co-ordinate Reference:	Well Rana Salada Fed 01 131H
Company:	Novo Oil & Gas, LLC	TVD Reference:	WELL @ 3089.40usft (25' RKB)
Project:	Eddy County, New Mexico (NAD 83)	MD Reference:	WELL @ 3089.40usft (25' RKB)
Site:	Rana Salada Fed 01 - J Pad	North Reference:	Grid
Well:	Rana Salada Fed 01 131H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Project	Eddy County, New Mexico (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site		Rana Salada Fed 01 - J Pad			
Site Position:		Northing:	488,169.35 usft	Latitude:	32.341726
From:	Map	Easting:	629,467.76 usft	Longitude:	-104.047969
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.153

Well	Rana Salada Fed 01 131H					
Well Position	+N/-S	-39.99 usft	Northing:	488,129.36 usft	Latitude:	32.341616
	+E/-W	-0.11 usft	Easting:	629,467.65 usft	Longitude:	-104.047969
Position Uncertainty	0.00 usft	Wellhead Elevation:		Ground Level:		3,064.40 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM2020	5/1/2020	7.000	60.067	47,830.10

Design	Design #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	96.42

Plan Survey Tool Program	Date 4/8/2020			
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	15,310.39	Design #1 (Wellbore #1)	MWD+HRGM OWSG MWD + HRGM

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.000	
2,475.92	13.52	232.68	2,469.67	-48.11	-63.12	2.00	2.00	0.00	232.684	
6,446.59	13.52	232.68	6,330.33	-610.79	-801.31	0.00	0.00	0.00	0.000	
7,122.52	0.00	0.00	7,000.00	-658.90	-864.43	2.00	-2.00	0.00	180.000	
9,178.56	0.00	0.00	9,056.04	-658.90	-864.43	0.00	0.00	0.00	0.000	
10,078.56	90.00	84.00	9,629.00	-599.01	-294.61	10.00	10.00	0.00	84.000	
10,362.32	90.00	89.68	9,629.00	-583.36	-11.40	2.00	0.00	2.00	90.000	
15,310.39	90.00	89.68	9,629.00	-555.31	4,936.59	0.00	0.00	0.00	0.000	PBHL - Rana Salad





# MS Directional Planning Report



Database:	EDM 5000.15 Conroe DB	Local Co-ordinate Reference:	Well Rana Salada Fed 01 131H
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Project:	Eddy County, New Mexico (NAD 83)	MD Reference:	WELL @ 3089.40usft (25' RKB)
Site:	Rana Salada Fed 01 - J Pad	North Reference:	Grid
Well:	Rana Salada Fed 01 131H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

## Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
209.40	0.00	0.00	209.40	0.00	0.00	0.00	0.00	0.00	0.00
<b>Rustler</b>									
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>KOP, 2.00°/100' Build</b>									
1,900.00	2.00	232.68	1,899.98	-1.06	-1.39	-1.26	2.00	2.00	0.00
2,000.00	4.00	232.68	1,999.84	-4.23	-5.55	-5.04	2.00	2.00	0.00
2,100.00	6.00	232.68	2,099.45	-9.51	-12.48	-11.34	2.00	2.00	0.00
2,200.00	8.00	232.68	2,198.70	-16.90	-22.17	-20.14	2.00	2.00	0.00
2,300.00	10.00	232.68	2,297.47	-26.38	-34.61	-31.45	2.00	2.00	0.00
2,400.00	12.00	232.68	2,395.62	-37.95	-49.79	-45.23	2.00	2.00	0.00
2,475.92	13.52	232.68	2,469.67	-48.11	-63.12	-57.35	2.00	2.00	0.00
<b>Hold 13.52° Inc, 232.68° Azm</b>									
2,500.00	13.52	232.68	2,493.08	-51.53	-67.60	-61.42	0.00	0.00	0.00
2,600.00	13.52	232.68	2,590.31	-65.70	-86.19	-78.31	0.00	0.00	0.00
2,700.00	13.52	232.68	2,687.54	-79.87	-104.78	-95.20	0.00	0.00	0.00
2,773.91	13.52	232.68	2,759.40	-90.34	-118.52	-107.68	0.00	0.00	0.00
<b>Bell Canyon (base of salt)</b>									
2,800.00	13.52	232.68	2,784.77	-94.04	-123.37	-112.09	0.00	0.00	0.00
2,900.00	13.52	232.68	2,882.00	-108.21	-141.96	-128.98	0.00	0.00	0.00
3,000.00	13.52	232.68	2,979.23	-122.38	-160.55	-145.87	0.00	0.00	0.00
3,100.00	13.52	232.68	3,076.46	-136.55	-179.14	-162.76	0.00	0.00	0.00
3,200.00	13.52	232.68	3,173.69	-150.72	-197.74	-179.65	0.00	0.00	0.00
3,300.00	13.52	232.68	3,270.91	-164.89	-216.33	-196.54	0.00	0.00	0.00
3,400.00	13.52	232.68	3,368.14	-179.06	-234.92	-213.43	0.00	0.00	0.00
3,500.00	13.52	232.68	3,465.37	-193.23	-253.51	-230.32	0.00	0.00	0.00
3,600.00	13.52	232.68	3,562.60	-207.40	-272.10	-247.21	0.00	0.00	0.00
3,700.00	13.52	232.68	3,659.83	-221.57	-290.69	-264.10	0.00	0.00	0.00
3,800.00	13.52	232.68	3,757.06	-235.75	-309.28	-280.99	0.00	0.00	0.00
3,822.97	13.52	232.68	3,779.40	-239.00	-313.55	-284.87	0.00	0.00	0.00
<b>Cherry Canyon</b>									
3,900.00	13.52	232.68	3,854.29	-249.92	-327.87	-297.88	0.00	0.00	0.00
4,000.00	13.52	232.68	3,951.52	-264.09	-346.46	-314.77	0.00	0.00	0.00
4,100.00	13.52	232.68	4,048.75	-278.26	-365.05	-331.66	0.00	0.00	0.00
4,200.00	13.52	232.68	4,145.98	-292.43	-383.64	-348.55	0.00	0.00	0.00
4,300.00	13.52	232.68	4,243.21	-306.60	-402.24	-365.44	0.00	0.00	0.00





# MS Directional Planning Report



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Project: Eddy County, New Mexico (NAD 83)  
Site: Rana Salada Fed 01 - J Pad  
Well: Rana Salada Fed 01 131H  
Wellbore: Wellbore #1  
Design: Design #1

Local Co-ordinate Reference: Well Rana Salada Fed 01 131H  
TVD Reference: WELL @ 3089.40usft (25' RKB)  
MD Reference: WELL @ 3089.40usft (25' RKB)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature

## Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,400.00	13.52	232.68	4,340.44	-320.77	-420.83	-382.33	0.00	0.00	0.00
4,500.00	13.52	232.68	4,437.67	-334.94	-439.42	-399.22	0.00	0.00	0.00
4,600.00	13.52	232.68	4,534.90	-349.11	-458.01	-416.11	0.00	0.00	0.00
4,700.00	13.52	232.68	4,632.13	-363.28	-476.60	-433.00	0.00	0.00	0.00
4,800.00	13.52	232.68	4,729.36	-377.45	-495.19	-449.89	0.00	0.00	0.00
4,900.00	13.52	232.68	4,826.59	-391.62	-513.78	-466.78	0.00	0.00	0.00
5,000.00	13.52	232.68	4,923.82	-405.79	-532.37	-483.67	0.00	0.00	0.00
5,100.00	13.52	232.68	5,021.05	-419.96	-550.96	-500.56	0.00	0.00	0.00
5,200.00	13.52	232.68	5,118.28	-434.13	-569.55	-517.45	0.00	0.00	0.00
5,300.00	13.52	232.68	5,215.50	-448.31	-588.14	-534.34	0.00	0.00	0.00
5,314.29	13.52	232.68	5,229.40	-450.33	-590.80	-536.76	0.00	0.00	0.00
<b>Brushy Canyon*</b>									
5,400.00	13.52	232.68	5,312.73	-462.48	-606.73	-551.24	0.00	0.00	0.00
5,500.00	13.52	232.68	5,409.96	-476.65	-625.33	-568.13	0.00	0.00	0.00
5,600.00	13.52	232.68	5,507.19	-490.82	-643.92	-585.02	0.00	0.00	0.00
5,700.00	13.52	232.68	5,604.42	-504.99	-662.51	-601.91	0.00	0.00	0.00
5,800.00	13.52	232.68	5,701.65	-519.16	-681.10	-618.80	0.00	0.00	0.00
5,900.00	13.52	232.68	5,798.88	-533.33	-699.69	-635.69	0.00	0.00	0.00
6,000.00	13.52	232.68	5,896.11	-547.50	-718.28	-652.58	0.00	0.00	0.00
6,100.00	13.52	232.68	5,993.34	-561.67	-736.87	-669.47	0.00	0.00	0.00
6,200.00	13.52	232.68	6,090.57	-575.84	-755.46	-686.36	0.00	0.00	0.00
6,300.00	13.52	232.68	6,187.80	-590.01	-774.05	-703.25	0.00	0.00	0.00
6,400.00	13.52	232.68	6,285.03	-604.18	-792.64	-720.14	0.00	0.00	0.00
6,414.78	13.52	232.68	6,299.40	-606.28	-795.39	-722.63	0.00	0.00	0.00
<b>Bone Spring Lime*</b>									
6,446.59	13.52	232.68	6,330.33	-610.79	-801.31	-728.01	0.00	0.00	0.00
<b>Begin 2.00°/100' Drop</b>									
6,500.00	12.45	232.68	6,382.37	-618.06	-810.85	-736.68	2.00	-2.00	0.00
6,600.00	10.45	232.68	6,480.38	-630.09	-826.64	-751.02	2.00	-2.00	0.00
6,700.00	8.45	232.68	6,579.01	-640.05	-839.69	-762.88	2.00	-2.00	0.00
6,800.00	6.45	232.68	6,678.16	-647.91	-850.01	-772.25	2.00	-2.00	0.00
6,900.00	4.45	232.68	6,777.71	-653.66	-857.56	-779.12	2.00	-2.00	0.00
7,000.00	2.45	232.68	6,877.52	-657.31	-862.35	-783.46	2.00	-2.00	0.00
7,100.00	0.45	232.68	6,977.48	-658.85	-864.36	-785.29	2.00	-2.00	0.00
7,101.92	0.41	232.68	6,979.40	-658.86	-864.37	-785.30	2.00	-2.00	0.00
<b>Lower Avalon*</b>									
7,122.52	0.00	0.00	7,000.00	-658.90	-864.43	-785.36	2.00	-2.00	0.00
<b>Begin Vertical Hold</b>									
7,200.00	0.00	0.00	7,077.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
7,300.00	0.00	0.00	7,177.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
7,400.00	0.00	0.00	7,277.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
7,500.00	0.00	0.00	7,377.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
7,521.92	0.00	0.00	7,399.40	-658.90	-864.43	-785.36	0.00	0.00	0.00
<b>1st Bone Spring Sand*</b>									
7,600.00	0.00	0.00	7,477.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
7,700.00	0.00	0.00	7,577.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
7,771.92	0.00	0.00	7,649.40	-658.90	-864.43	-785.36	0.00	0.00	0.00
<b>2nd Bone Spring Carbonate</b>									
7,800.00	0.00	0.00	7,677.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
7,900.00	0.00	0.00	7,777.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
8,000.00	0.00	0.00	7,877.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
8,100.00	0.00	0.00	7,977.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
8,200.00	0.00	0.00	8,077.48	-658.90	-864.43	-785.36	0.00	0.00	0.00





# MS Directional Planning Report



Database: EDM 5000.15 Conroe DB  
Company: Novo Oil & Gas, LLC  
Project: Eddy County, New Mexico (NAD 83)  
Site: Rana Salada Fed 01 - J Pad  
Well: Rana Salada Fed 01 131H  
Wellbore: Wellbore #1  
Design: Design #1

Local Co-ordinate Reference: Well Rana Salada Fed 01 131H  
TVD Reference: WELL @ 3089.40usft (25' RKB)  
MD Reference: WELL @ 3089.40usft (25' RKB)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature

## Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,226.92	0.00	0.00	8,104.40	-658.90	-864.43	-785.36	0.00	0.00	0.00
<b>2nd Bone Spring Sand*</b>									
8,300.00	0.00	0.00	8,177.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
8,400.00	0.00	0.00	8,277.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
8,500.00	0.00	0.00	8,377.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
8,591.92	0.00	0.00	8,469.40	-658.90	-864.43	-785.36	0.00	0.00	0.00
<b>3rd Bone Spring Carbonate</b>									
8,600.00	0.00	0.00	8,477.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
8,700.00	0.00	0.00	8,577.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
8,800.00	0.00	0.00	8,677.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
8,900.00	0.00	0.00	8,777.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
9,000.00	0.00	0.00	8,877.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
9,051.52	0.00	0.00	8,929.00	-658.90	-864.43	-785.36	0.00	0.00	0.00
<b>9 5/8"</b>									
9,100.00	0.00	0.00	8,977.48	-658.90	-864.43	-785.36	0.00	0.00	0.00
9,178.56	0.00	0.00	9,056.04	-658.90	-864.43	-785.36	0.00	0.00	0.00
<b>Begin 10.00°/100' Build</b>									
9,200.00	2.14		9,077.48	-658.86	-864.03	-784.97	10.00	10.00	0.00
9,300.00	12.14	84.00	9,176.58	-657.56	-851.68	-772.84	10.00	10.00	0.00
9,400.00	22.14	84.00	9,272.01	-654.48	-822.40	-744.08	10.00	10.00	0.00
9,486.53	30.80	84.00	9,349.40	-650.45	-784.07	-706.45	10.00	10.00	0.00
<b>3rd Bone Spring Sand*</b>									
9,500.00	32.14	84.00	9,360.89	-649.72	-777.08	-699.58	10.00	10.00	0.00
9,600.00	42.14	84.00	9,440.50	-643.42	-717.11	-640.69	10.00	10.00	0.00
9,700.00	52.14	84.00	9,508.43	-635.76	-644.29	-569.19	10.00	10.00	0.00
9,800.00	62.14	84.00	9,562.61	-626.99	-560.86	-487.25	10.00	10.00	0.00
9,900.00	72.14	84.00	9,601.40	-617.37	-469.33	-397.38	10.00	10.00	0.00
10,000.00	82.14	84.00	9,623.62	-607.20	-372.49	-302.28	10.00	10.00	0.00
10,078.56	90.00	84.00	9,629.00	-599.01	-294.61	-225.80	10.00	10.00	0.00
<b>Begin 90.00° Lateral, 2.00°/100' Turn</b>									
10,100.00	90.00	84.43	9,629.00	-596.85	-273.28	-204.85	2.00	0.00	2.00
10,200.00	90.00	86.43	9,629.00	-588.88	-173.60	-106.69	2.00	0.00	2.00
10,300.00	90.00	88.43	9,629.00	-584.39	-73.71	-7.92	2.00	0.00	2.00
10,362.32	90.00	89.68	9,629.00	-583.36	-11.40	53.88	2.00	0.00	2.00
<b>Hold 89.68° Azm</b>									
10,400.00	90.00	89.68	9,629.00	-583.15	26.28	91.30	0.00	0.00	0.00
10,500.00	90.00	89.68	9,629.00	-582.58	126.28	190.61	0.00	0.00	0.00
10,600.00	90.00	89.68	9,629.00	-582.01	226.28	289.92	0.00	0.00	0.00
10,700.00	90.00	89.68	9,629.00	-581.45	326.28	389.23	0.00	0.00	0.00
10,800.00	90.00	89.68	9,629.00	-580.88	426.28	488.54	0.00	0.00	0.00
10,900.00	90.00	89.68	9,629.00	-580.31	526.28	587.85	0.00	0.00	0.00
11,000.00	90.00	89.68	9,629.00	-579.75	626.27	687.15	0.00	0.00	0.00
11,100.00	90.00	89.68	9,629.00	-579.18	726.27	786.46	0.00	0.00	0.00
11,200.00	90.00	89.68	9,629.00	-578.61	826.27	885.77	0.00	0.00	0.00
11,300.00	90.00	89.68	9,629.00	-578.05	926.27	985.08	0.00	0.00	0.00
11,400.00	90.00	89.68	9,629.00	-577.48	1,026.27	1,084.39	0.00	0.00	0.00
11,500.00	90.00	89.68	9,629.00	-576.91	1,126.27	1,183.70	0.00	0.00	0.00
11,600.00	90.00	89.68	9,629.00	-576.35	1,226.26	1,283.00	0.00	0.00	0.00
11,700.00	90.00	89.68	9,629.00	-575.78	1,326.26	1,382.31	0.00	0.00	0.00
11,800.00	90.00	89.68	9,629.00	-575.21	1,426.26	1,481.62	0.00	0.00	0.00
11,900.00	90.00	89.68	9,629.00	-574.64	1,526.26	1,580.93	0.00	0.00	0.00
12,000.00	90.00	89.68	9,629.00	-574.08	1,626.26	1,680.24	0.00	0.00	0.00
12,100.00	90.00	89.68	9,629.00	-573.51	1,726.26	1,779.55	0.00	0.00	0.00





# MS Directional Planning Report



Database:	EDM 5000.15 Conroe DB	Local Co-ordinate Reference:	Well Rana Salada Fed 01 131H
Company:	Novo Oil & Gas, LLC	TVD Reference:	WELL @ 3089.40usft (25' RKB)
Project:	Eddy County, New Mexico (NAD 83)	MD Reference:	WELL @ 3089.40usft (25' RKB)
Site:	Rana Salada Fed 01 - J Pad	North Reference:	Grid
Well:	Rana Salada Fed 01 131H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
12,200.00	90.00	89.68	9,629.00	-572.94	1,826.25	1,878.85	0.00	0.00	0.00	
12,300.00	90.00	89.68	9,629.00	-572.38	1,926.25	1,978.16	0.00	0.00	0.00	
12,400.00	90.00	89.68	9,629.00	-571.81	2,026.25	2,077.47	0.00	0.00	0.00	
12,500.00	90.00	89.68	9,629.00	-571.24	2,126.25	2,176.78	0.00	0.00	0.00	
12,600.00	90.00	89.68	9,629.00	-570.68	2,226.25	2,276.09	0.00	0.00	0.00	
12,700.00	90.00	89.68	9,629.00	-570.11	2,326.25	2,375.40	0.00	0.00	0.00	
12,800.00	90.00	89.68	9,629.00	-569.54	2,426.24	2,474.70	0.00	0.00	0.00	
12,900.00	90.00	89.68	9,629.00	-568.98	2,526.24	2,574.01	0.00	0.00	0.00	
13,000.00	90.00	89.68	9,629.00	-568.41	2,626.24	2,673.32	0.00	0.00	0.00	
13,100.00	90.00	89.68	9,629.00	-567.84	2,726.24	2,772.63	0.00	0.00	0.00	
13,200.00	90.00	89.68	9,629.00	-567.27	2,826.24	2,871.94	0.00	0.00	0.00	
13,300.00	90.00	89.68	9,629.00	-566.71	2,926.24	2,971.25	0.00	0.00	0.00	
13,400.00	90.00	89.68	9,629.00	-566.14	3,026.24	3,070.55	0.00	0.00	0.00	
13,500.00	90.00	89.68	9,629.00	-565.57	3,126.23	3,169.86	0.00	0.00	0.00	
13,600.00	90.00	89.68	9,629.00	-565.01	3,226.23	3,269.17	0.00	0.00	0.00	
13,700.00	90.00	89.68	9,629.00	-564.44	3,326.23	3,368.48	0.00	0.00	0.00	
13,800.00	90.00	89.68	9,629.00	-563.87	3,426.23	3,467.79	0.00	0.00	0.00	
13,900.00	90.00	89.68	9,629.00	-563.31	3,526.23	3,567.10	0.00	0.00	0.00	
14,000.00	90.00	89.68	9,629.00	-562.74	3,626.23	3,666.40	0.00	0.00	0.00	
14,100.00	90.00	89.68	9,629.00	-562.17	3,726.22	3,765.71	0.00	0.00	0.00	
14,200.00	90.00	89.68	9,629.00	-561.61	3,826.22	3,865.02	0.00	0.00	0.00	
14,300.00	90.00	89.68	9,629.00	-561.04	3,926.22	3,964.33	0.00	0.00	0.00	
14,400.00	90.00	89.68	9,629.00	-560.47	4,026.22	4,063.64	0.00	0.00	0.00	
14,500.00	90.00	89.68	9,629.00	-559.90	4,126.22	4,162.94	0.00	0.00	0.00	
14,600.00	90.00	89.68	9,629.00	-559.34	4,226.22	4,262.25	0.00	0.00	0.00	
14,700.00	90.00	89.68	9,629.00	-558.77	4,326.21	4,361.56	0.00	0.00	0.00	
14,800.00	90.00	89.68	9,629.00	-558.20	4,426.21	4,460.87	0.00	0.00	0.00	
14,900.00	90.00	89.68	9,629.00	-557.64	4,526.21	4,560.18	0.00	0.00	0.00	
15,000.00	90.00	89.68	9,629.00	-557.07	4,626.21	4,659.49	0.00	0.00	0.00	
15,100.00	90.00	89.68	9,629.00	-556.50	4,726.21	4,758.79	0.00	0.00	0.00	
15,200.00	90.00	89.68	9,629.00	-555.94	4,826.21	4,858.10	0.00	0.00	0.00	
15,300.00	90.00	89.68	9,629.00	-555.37	4,926.20	4,957.41	0.00	0.00	0.00	
15,310.39	90.00	89.68	9,629.00	-555.31	4,936.59	4,967.72	0.00	0.00	0.00	
PBHL										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
LTP - Rana Salada Fe - hit/miss target - Shape	0.00	0.00	9,629.00	-555.48	4,846.62	487,573.88	634,314.28	32.340053	-104.032281	
- plan misses target center by 0.34usft at 15220.42usft MD (9629.00 TVD, -555.82 N, 4846.63 E)										
- Point										
FTP - Rana Salada Fe - hit/miss target - Shape	0.00	0.00	9,629.00	-584.86	-294.61	487,544.50	629,173.04	32.340011	-104.048928	
- plan misses target center by 14.07usft at 10079.98usft MD (9629.00 TVD, -598.86 N, -293.19 E)										
- Point										
PBHL - Rana Salada   - hit/miss target - Shape	0.00	0.00	9,629.00	-555.31	4,936.59	487,574.05	634,404.24	32.340053	-104.031990	
- plan hits target center										
- Point										





# MS Directional Planning Report



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Company:	Novo Oil & Gas, LLC	TVD Reference:	WELL @ 3089.40usft (25' RKB)
Project:	Eddy County, New Mexico (NAD 83)	MD Reference:	WELL @ 3089.40usft (25' RKB)
Site:	Rana Salada Fed 01 - J Pad	North Reference:	Grid
Well:	Rana Salada Fed 01 131H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

## Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
9,051.52	8,929.00	9 5/8"	9-5/8	12-1/4

## Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
209.40	209.40	Rustler			
2,773.91	2,759.40	Bell Canyon (base of salt)			
3,822.97	3,779.40	Cherry Canyon			
5,314.29	5,229.40	Brushy Canyon*			
6,414.78	6,299.40	Bone Spring Lime*			
7,101.92	6,979.40	Lower Avalon*			
7,521.92	7,399.40	1st Bone Spring Sand*			
7,771.92	7,649.40	2nd Bone Spring Carbonate			
8,226.92	8,104.40	2nd Bone Spring Sand*			
8,591.92	8,469.40	3rd Bone Spring Carbonate			
9,486.53	9,349.40	3rd Bone Spring Sand*			

## Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,800.00	1,800.00	0.00	0.00	KOP, 2.00°/100' Build
2,475.92	2,469.67	-48.11	-63.12	Hold 13.52° Inc, 232.68° Azm
6,446.59	6,330.33	-610.79	-801.31	Begin 2.00°/100' Drop
7,122.52	7,000.00	-658.90	-864.43	Begin Vertical Hold
9,178.56	9,056.04	-658.90	-864.43	Begin 10.00°/100' Build
10,078.56	9,629.00	-599.01	-294.61	Begin 90.00° Lateral, 2.00°/100' Turn
10,362.32	9,629.00	-583.36	-11.40	Hold 89.68° Azm
15,310.39	9,629.00	-555.31	4,936.59	PBHL



**PECOS DISTRICT  
SURFACE USE  
CONDITIONS OF APPROVAL**

**OPERATOR'S NAME: Novo Oil & Gas Delaware, LLC  
LEASE NO.: NMNM 091078  
LOCATION: Section 1, T. 23 S., R. 28 E.  
COUNTY: Eddy County, New Mexico**

**RANA SALADA FED COM 0605 135H**

**Surface Hole Location: 2449' FNL & 210' FEL, Section 1, T. 23 S., R. 28 E.  
Bottom Hole Location: 2310' FNL & 10' FEL, Section 5, T. 23 S, R 29 E.**

**RANA SALADA FED COM 0605 145H**

**Surface Hole Location: 2440' FNL & 230' FEL, Section 1, T. 23 S., R. 28 E.  
Bottom Hole Location: 2178' FNL & 10' FEL, Section 5, T. 23 S, R 29 E.**

**RANA SALADA FED COM 0605 215H**

**Surface Hole Location: 2440' FNL & 250' FEL, Section 1, T. 23 S., R. 28 E.  
Bottom Hole Location: 1914' FNL & 130' FEL, Section 5, T. 23 S, R 29 E.**

**RANA SALADA FED COM 0605 225H**

**Surface Hole Location: 2440' FNL & 290' FEL, Section 1, T. 23 S., R. 28 E.  
Bottom Hole Location: 2310' FSL & 130' FEL, Section 5, T. 23 S, R 29 E.**

**RANA SALADA FED COM 0605 235H**

**Surface Hole Location: 2440' FNL & 270' FEL, Section 1, T. 23 S., R. 28 E.  
Bottom Hole Location: 2178' FNL & 130' FEL, Section 5, T. 23 S, R 29 E.**

## TABLE OF CONTENTS

Standard Conditions of Approval (COA) apply to this APD. If any deviations to these standards exist or special COAs are required, the section with the deviation or requirement will be checked below.

- ☐ **General Provisions**
- ☐ **Permit Expiration**
- ☐ **Archaeology, Paleontology, and Historical Sites**
- ☐ **Noxious Weeds**
- ☒ **Special Requirements**
  - Hydrology
  - Potash Resources
  - Cave/Karst
- ☐ **Construction**
  - Notification
  - Topsoil
  - Closed Loop System
  - Federal Mineral Material Pits
  - Well Pads
  - Roads
- ☐ **Road Section Diagram**
- ☐ **Production (Post Drilling)**
  - Well Structures & Facilities
- ☐ **Interim Reclamation**
- ☐ **Final Abandonment & Reclamation**

## GENERAL PROVISIONS

The approval of the Application For Permit To Drill (APD) is in compliance with all applicable laws and regulations: 43 Code of Federal Regulations 3160, the lease terms, Onshore Oil and Gas Orders, Notices To Lessees, New Mexico Oil Conservation Division (NMOCD) Rules, National Historical Preservation Act As Amended, and instructions and orders of the Authorized Officer. Any request for a variance shall be submitted to the Authorized Officer on Form 3160-5, Sundry Notices and Report on Wells.

### I. PERMIT EXPIRATION

If the permit terminates prior to drilling and drilling cannot be commenced within 60 days after expiration, an operator is required to submit Form 3160-5, Sundry Notices and Reports on Wells, requesting surface reclamation requirements for any surface disturbance. However, if the operator will be able to initiate drilling within 60 days after the expiration of the permit, the operator must have set the conductor pipe in order to allow for an extension of 60 days beyond the

expiration date of the APD. (Filing of a Sundry Notice is required for this 60 day extension.)

## **II. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES**

Any cultural and/or paleontological resource discovered by the operator or by any person working on the operator's behalf shall immediately report such findings to the Authorized Officer. The operator is fully accountable for the actions of their contractors and subcontractors. The operator shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery shall be made by the Authorized Officer to determine the appropriate actions that shall be required to prevent the loss of significant cultural or scientific values of the discovery. The operator shall be held responsible for the cost of the proper mitigation measures that the Authorized Officer assesses after consultation with the operator on the evaluation and decisions of the discovery. Any unauthorized collection or disturbance of cultural or paleontological resources may result in a shutdown order by the Authorized Officer.

## **III. NOXIOUS WEEDS**

The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, pads, associated pipeline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

## **IV. SPECIAL REQUIREMENT(S)**

### **Hydrology:**

The entire well pad(s) will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad. The compacted berm shall be constructed at a minimum of 12 inches with impermeable mineral material (e.g. caliche). Topsoil shall not be used to construct the berm. No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad. The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed. Any water erosion that may occur due to the construction of the well pad during the life of the well will be quickly corrected and proper measures will be taken to prevent future erosion. Stockpiling of topsoil is required. The top soil shall be stockpiled in an appropriate location to prevent loss of soil due to water or wind erosion and not used for berming or erosion control. If fluid collects within

the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.

Tank battery locations will be lined and bermed. A 20 mil permanent liner will be installed with a 4 oz. felt backing to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank or 24 hour production, whichever is greater. Automatic shut off, check valves, or similar systems will be installed for tanks to minimize the effects of catastrophic line failures used in production or drilling.

Any water erosion that may occur due to the construction of overhead electric line and during the life of the power line will be quickly corrected and proper measures will be taken to prevent future erosion. A power pole should not be placed in drainages, playas, or floodplains and must span across the features at a distance away that would not promote further erosion.

#### **Potash Resources:**

Lessees must comply with the 2012 Secretarial Potash Order. The Order is designed to manage the efficient development of oil, gas, and potash resources. Section 6 of the Order provides general provisions which must be followed to minimize conflict between the industries and ensure the safety of operations.

To minimize impacts to potash resources, the proposed well is confined within the boundaries of the established Rana Salada 01 Drill Island.

#### **Cave/Karst:**

#### **Construction:**

##### **General Construction:**

- No blasting
- The BLM, Carlsbad Field Office, will be informed immediately if any subsurface drainage channels, cave passages, or voids are penetrated during construction, and no additional construction shall occur until clearance has been issued by the Authorized Officer.
- All linear surface disturbance activities will avoid sinkholes and other karst features to lessen the possibility of encountering near surface voids during construction, minimize changes to runoff, and prevent untimely leaks and spills from entering the karst drainage system.
- All spills or leaks will be reported to the BLM immediately for their immediate and proper treatment.

##### **Pad Construction:**

- The pad will be constructed and leveled by adding the necessary fill and caliche – no blasting.

- The entire perimeter of the well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad.
- The compacted berm shall be constructed at a minimum of 12 inches high with impermeable mineral material (e.g., caliche).
- No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad.
- The topsoil stockpile shall be located outside the bermed well pad.
- Topsoil, either from the well pad or surrounding area, shall not be used to construct the berm.
- No storm drains, tubing or openings shall be placed in the berm.
- If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.
- The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed.
- Any access road entering the well pad shall be constructed so that the integrity of the berm height surrounding the well pad is not compromised (i.e. an access road crossing the berm cannot be lower than the berm height).
- Following a rain event, all fluids will vacuumed off of the pad and hauled off-site and disposed at a proper disposal facility.

**Tank Battery Construction:**

- The pad will be constructed and leveled by adding the necessary fill and caliche – no blasting.
- All tank battery locations and facilities will be lined and bermed.
- The liner should be at least 20 mil in thickness and installed with a 4 oz. felt backing, or equivalent, to prevent tears or punctures.
- Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank.

**Road Construction:**

- Turnout ditches and drainage leadoffs will not be constructed in such a manner as to alter the natural flow of water into or out of cave or karst features.
- Special restoration stipulations or realignment may be required if subsurface features are discovered during construction.

**Leak Detection System:**

- A method of detecting leaks is required. The method could incorporate gauges to measure loss, siting valves and lines so they can be visually inspected, or installing electronic sensors to alarm when a leak is present.

- A leak detection plan will be submitted to BLM that incorporates an automatic shut off system (see below) to minimize the effects of an undesirable event that could negatively sensitive cave/karst resources.
- Well heads, pipelines (surface and buried), storage tanks, and all supporting equipment should be monitored regularly after installation to promptly identify and fix leaks.

**Automatic Shut-off Systems:**

- Automatic shut off, check valves, or similar systems will be installed for pipelines and tanks to minimize the effects of catastrophic line failures used in production or drilling.

**Cave/Karst Subsurface Mitigation**

The following stipulations will be applied to protect cave/karst and groundwater concerns:

**Closed Loop System:**

- A closed loop system using steel tanks will be utilized during drilling – no pits
- All fluids and cuttings will be hauled off-site and disposed of properly at an authorized site

**Rotary Drilling with Fresh Water:**

- Fresh water will be used as a circulating medium in zones where caves or karst features are expected. SEE ALSO: Drilling COAs for this well.

**Directional Drilling:**

- The kick off point for directional drilling will occur at least 100 feet below the bottom of the cave occurrence zone. SEE ALSO: Drilling COAs for this well.

**Lost Circulation:**

- ALL lost circulation zones between surface and the base of the cave occurrence zone will be logged and reported in the drilling report.
- If a void of four feet or more and circulation losses greater than 70 percent occur simultaneously while drilling in any cave-bearing zone, regardless of the type of drilling machinery used, the BLM will be notified immediately by the operator. The BLM will assess the situation and work with the operator on corrective actions to resolve the problem.

**Abandonment Cementing:**

- Additional plugging conditions of approval may be required upon well abandonment in high and medium karst potential occurrence zones.
- The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore.

**Pressure Testing:**

- The operator will perform annual pressure monitoring on all casing annuli and reported in a sundry notice.
- If the test results indicated a casing failure has occurred, remedial action will be undertaken to correct the problem to the BLM's approval.

**V. CONSTRUCTION****A. NOTIFICATION**

The BLM shall administer compliance and monitor construction of the access road and well pad. Notify the Carlsbad Field Office at (575) 234-5909 at least 3 working days prior to commencing construction of the access road and/or well pad.

When construction operations are being conducted on this well, the operator shall have the approved APD and Conditions of Approval (COA) on the well site and they shall be made available upon request by the Authorized Officer.

**B. TOPSOIL**

The operator shall strip the top portion of the soil (root zone) from the entire well pad area and stockpile the topsoil along the edge of the well pad as depicted in the APD. The root zone is typically six (6) inches in depth. All the stockpiled topsoil will be redistributed over the interim reclamation areas. Topsoil shall not be used for berming the pad or facilities. For final reclamation, the topsoil shall be spread over the entire pad area for seeding preparation.

Other subsoil (below six inches) stockpiles must be completely segregated from the topsoil stockpile. Large rocks or subsoil clods (not evident in the surrounding terrain) must be buried within the approved area for interim and final reclamation.

**C. CLOSED LOOP SYSTEM**

Tanks are required for drilling operations: No Pits.

The operator shall properly dispose of drilling contents at an authorized disposal site.

**D. FEDERAL MINERAL MATERIALS PIT**

Payment shall be made to the BLM prior to removal of any federal mineral materials. Call the Carlsbad Field Office at (575) 234-5972.



**E. WELL PAD SURFACING**

Surfacing of the well pad is not required.

If the operator elects to surface the well pad, the surfacing material may be required to be removed at the time of reclamation. The well pad shall be constructed in a manner which creates the smallest possible surface disturbance, consistent with safety and operational needs.

**F. EXCLOSURE FENCING (CELLARS & PITS)****Exclosure Fencing**

The operator will install and maintain exclosure fencing for all open well cellars to prevent access to public, livestock, and large forms of wildlife before and after drilling operations until the pit is free of fluids and the operator initiates backfilling. (For examples of exclosure fencing design, refer to BLM's Oil and Gas Gold Book, Exclosure Fence Illustrations, Figure 1, Page 18.)

**G. ON LEASE ACCESS ROADS****Road Width**

The access road shall have a driving surface that creates the smallest possible surface disturbance and does not exceed fourteen (14) feet in width. The maximum width of surface disturbance, when constructing the access road, shall not exceed twenty-five (25) feet.

**Surfacing**

Surfacing material is not required on the new access road driving surface. If the operator elects to surface the new access road or pad, the surfacing material may be required to be removed at the time of reclamation.

Where possible, no improvements should be made on the unsurfaced access road other than to remove vegetation as necessary, road irregularities, safety issues, or to fill low areas that may sustain standing water.

The Authorized Officer reserves the right to require surfacing of any portion of the access road at any time deemed necessary. Surfacing may be required in the event the road deteriorates, erodes, road traffic increases, or it is determined to be beneficial for future field development. The surfacing depth and type of material will be determined at the time of notification.

**Crowning**

Crowning shall be done on the access road driving surface. The road crown shall have a grade of approximately 2% (i.e., a 1" crown on a 14' wide road). The road shall conform to Figure 1; cross section and plans for typical road construction.

## Ditching

Ditching shall be required on both sides of the road.

## Turnouts

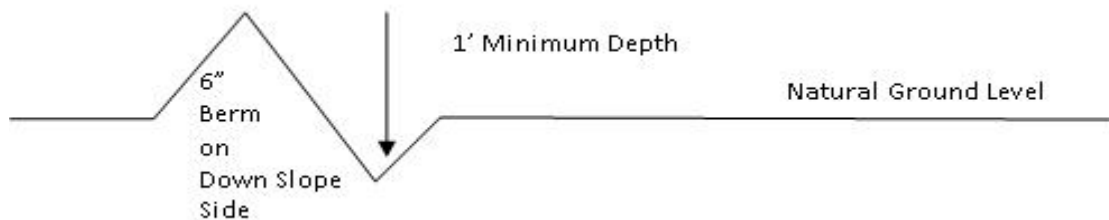
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

## Drainage

Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill outslowing and inslaping, lead-off ditches, culvert installation, and low water crossings).

A typical lead-off ditch has a minimum depth of 1 foot below and a berm of 6 inches above natural ground level. The berm shall be on the down-slope side of the lead-off ditch.

**Cross Section of a Typical Lead-off Ditch**



All lead-off ditches shall be graded to drain water with a 1 percent minimum to 3 percent maximum ditch slope. The spacing interval are variable for lead-off ditches and shall be determined according to the formula for spacing intervals of lead-off ditches, but may be amended depending upon existing soil types and centerline road slope (in %);

### Formula for Spacing Interval of Lead-off Ditches

Example - On a 4% road slope that is 400 feet long, the water flow shall drain water into a lead-off ditch. Spacing interval shall be determined by the following formula:

## Cattle guards

An appropriately sized cattle guard sufficient to carry out the project shall be installed and maintained at fence/road crossings. Any existing cattle guards on the access road route shall be repaired or replaced if they are damaged or have

deteriorated beyond practical use. The operator shall be responsible for the condition of the existing cattle guards that are in place and are utilized during lease operations.

**Fence Requirement**

Where entry is granted across a fence line, the fence shall be braced and tied off on both sides of the passageway prior to cutting. The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fences.

**Public Access**

Public access on this road shall not be restricted by the operator without specific written approval granted by the Authorized Officer.

**Construction Steps**

1. Salvage topsoil
2. Construct road

3. Redistribute topsoil
4. Revegetate slopes

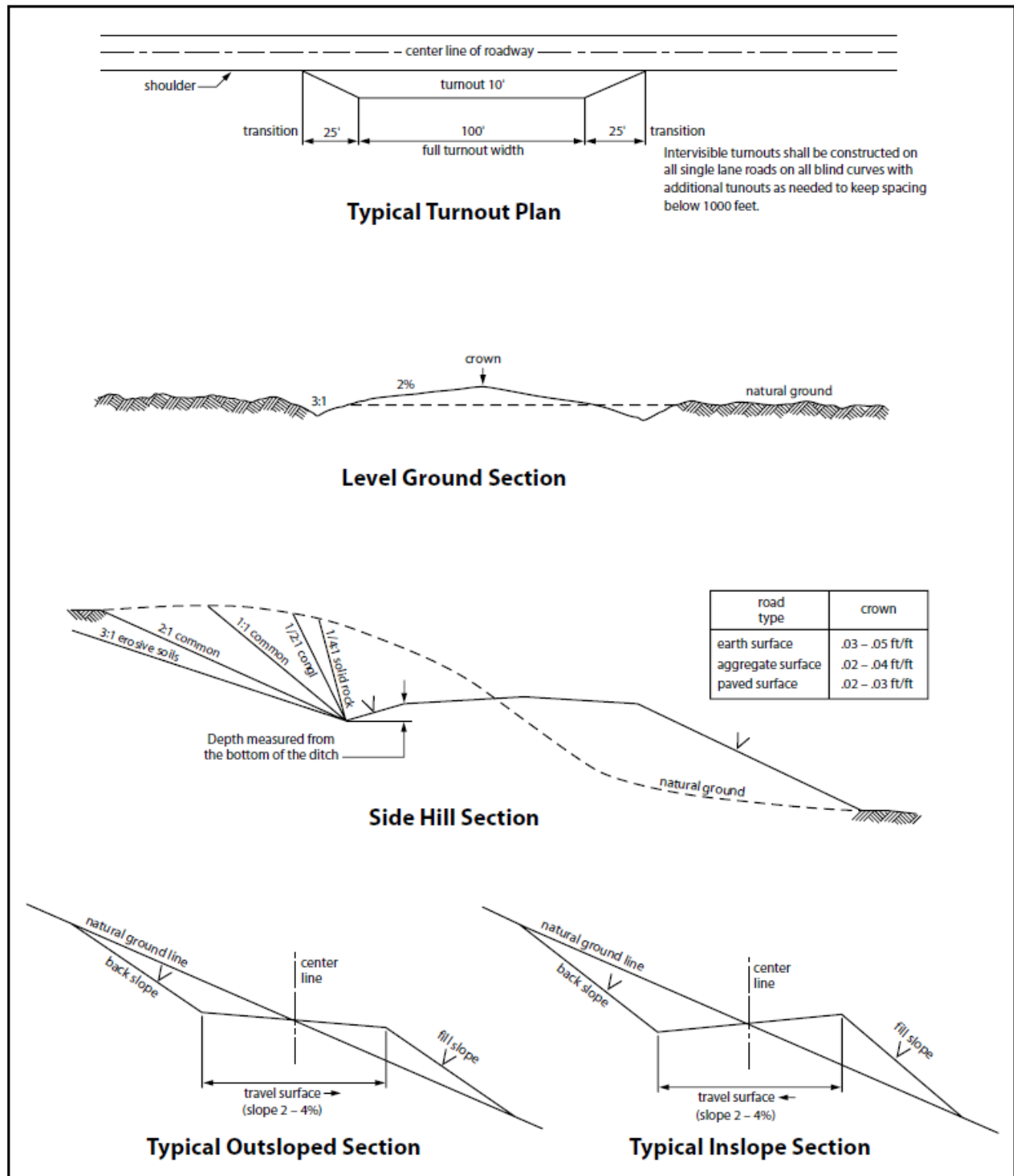


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

## VI. PRODUCTION (POST DRILLING)

### A. WELL STRUCTURES & FACILITIES

#### **Placement of Production Facilities**

Production facilities should be placed on the well pad to allow for maximum interim recontouring and revegetation of the well location.

#### **Exclosure Netting (Open-top Tanks)**

Immediately following active drilling or completion operations, the operator will take actions necessary to prevent wildlife and livestock access, including avian wildlife, to all open-topped tanks that contain or have the potential to contain salinity sufficient to cause harm to wildlife or livestock, hydrocarbons, or Resource Conservation and Recovery Act of 1976-exempt hazardous substances. At a minimum, the operator will net, screen, or cover open-topped tanks to exclude wildlife and livestock and prevent mortality. If the operator uses netting, the operator will cover and secure the open portion of the tank to prevent wildlife entry. The operator will net, screen, or cover the tanks until the operator removes the tanks from the location or the tanks no longer contain substances that could be harmful to wildlife or livestock. Use a maximum netting mesh size of 1 ½ inches. The netting must not be in contact with fluids and must not have holes or gaps.

#### **Chemical and Fuel Secondary Containment and Exclosure Screening**

The operator will prevent all hazardous, poisonous, flammable, and toxic substances from coming into contact with soil and water. At a minimum, the operator will install and maintain an impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks, and anticipated precipitation. The operator will dispose of fluids within the containment system that do not meet applicable state or U. S. Environmental Protection Agency livestock water standards in accordance with state law; the operator must not drain the fluids to the soil or ground. The operator will design, construct, and maintain all secondary containment systems to prevent wildlife and livestock exposure to harmful substances. At a minimum, the operator will install effective wildlife and livestock exclosure systems such as fencing, netting, expanded metal mesh, lids, and grate covers. Use a maximum netting mesh size of 1 ½ inches.

#### **Open-Vent Exhaust Stack Exclosures**

The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. (*Recommended exclosure structures on open-vent exhaust stacks are in the shape of a cone.*) Production

equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, in-line units, and compressor mufflers.

### **Containment Structures**

Proposed production facilities such as storage tanks and other vessels will have a secondary containment structure that is constructed to hold the capacity of 1.5 times the largest tank, plus freeboard to account for precipitation, unless more stringent protective requirements are deemed necessary.

### **Painting Requirement**

All above-ground structures including meter housing that are not subject to safety requirements shall be painted a flat non-reflective paint color, **Shale Green** from the BLM Standard Environmental Color Chart (CC-001: June 2008).

## **VII. INTERIM RECLAMATION**

During the life of the development, all disturbed areas not needed for active support of production operations should undergo interim reclamation in order to minimize the environmental impacts of development on other resources and uses.

Within six (6) months of well completion, operators should work with BLM surface management specialists (Jim Amos: 575-234-5909) to devise the best strategies to reduce the size of the location. Interim reclamation should allow for remedial well operations, as well as safe and efficient removal of oil and gas.

During reclamation, the removal of caliche is important to increasing the success of revegetating the site. Removed caliche that is free of contaminants may be used for road repairs, fire walls or for building other roads and locations. In order to operate the well or complete workover operations, it may be necessary to drive, park and operate on restored interim vegetation within the previously disturbed area. Disturbing revegetated areas for production or workover operations will be allowed. If there is significant disturbance and loss of vegetation, the area will need to be revegetated. Communicate with the appropriate BLM office for any exceptions/exemptions if needed.

All disturbed areas after they have been satisfactorily prepared need to be reseeded with the seed mixture provided below.

Upon completion of interim reclamation, the operator shall submit a Sundry Notices and Reports on Wells, Subsequent Report of Reclamation (Form 3160-5).

## **VIII. FINAL ABANDONMENT & RECLAMATION**

At final abandonment, well locations, production facilities, and access roads must undergo "final" reclamation so that the character and productivity of the land are restored.

Earthwork for final reclamation must be completed within six (6) months of well plugging. All pads, pits, facility locations and roads must be reclaimed to a satisfactory revegetated, safe, and stable condition, unless an agreement is made with the landowner or BLM to keep the road and/or pad intact.

After all disturbed areas have been satisfactorily prepared, these areas need to be revegetated with the seed mixture provided below. Seeding should be accomplished by drilling on the contour whenever practical or by other approved methods. Seeding may need to be repeated until revegetation is successful, as determined by the BLM.

Operators shall contact a BLM surface protection specialist prior to surface abandonment operations for site specific objectives (Jim Amos: 575-234-5909).



### Seed Mixture 2, for Sandy Sites

The holder shall seed all disturbed areas with the seed mixture listed below. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS)\* per acre. There shall be no primary or secondary noxious weeds in the seed mixture. Seed will be tested and the viability testing of seed will be done in accordance with State law (s) and within nine (9) months prior to purchase. Commercial seed will be either certified or registered seed. The seed container will be tagged in accordance with State law(s) and available for inspection by the authorized officer.

Seed will be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture will be evenly and uniformly planted over the disturbed area (smaller/heavier seeds have a tendency to drop the bottom of the drill and are planted first). The holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed will be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer. Evaluation of growth will not be made before completion of at least one full growing season after seeding.

Species to be planted in pounds of pure live seed\* per acre:

<u>Species</u>	<u>lb/acre</u>
Sand dropseed ( <i>Sporobolus cryptandrus</i> )	1.0
Sand love grass ( <i>Eragrostis trichodes</i> )	1.0
Plains bristlegrass ( <i>Setaria macrostachya</i> )	2.0

\*Pounds of pure live seed:

Pounds of seed x percent purity x percent germination = pounds pure live seed

## PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

<b>OPERATOR'S NAME:</b>	<b>RANA SALADA FED 01 131H</b>
<b>LEASE NO.:</b>	<b>NMNM91078</b>
<b>WELL NAME &amp; NO.:</b>	<b>RANA SALADA 01 Fed 131H</b>
<b>SURFACE HOLE FOOTAGE:</b>	<b>144'/N &amp; 393'/W</b>
<b>BOTTOM HOLE FOOTAGE:</b>	<b>726'/N &amp; 10'/E</b>
<b>LOCATION:</b>	<b>Section 1, T.23 S., R.28 E., NMPM</b>
<b>COUNTY:</b>	<b>Eddy County, New Mexico</b>

COA

H2S	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Potash	<input type="radio"/> None	<input checked="" type="radio"/> Secretary	<input type="radio"/> R-111-P
Cave/Karst Potential	<input type="radio"/> Low	<input type="radio"/> Medium	<input checked="" type="radio"/> High
Cave/Karst Potential	<input type="radio"/> Critical		
Variance	<input type="radio"/> None	<input checked="" type="radio"/> Flex Hose	<input type="radio"/> Other
Wellhead	<input type="radio"/> Conventional	<input checked="" type="radio"/> Multibowl	<input type="radio"/> Both
Other	<input type="checkbox"/> 4 String Area	<input type="checkbox"/> Capitan Reef	<input type="checkbox"/> WIPP
Other	<input type="checkbox"/> Fluid Filled	<input type="checkbox"/> Cement Squeeze	<input type="checkbox"/> Pilot Hole
Special Requirements	<input type="checkbox"/> Water Disposal	<input type="checkbox"/> COM	<input type="checkbox"/> Unit

### A. HYDROGEN SULFIDE

Hydrogen Sulfide (H2S) monitors shall be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.

### B. CASING

1. The **13-3/8** inch surface casing shall be set at approximately **350** feet (a minimum of **70 feet (Eddy County)** into the Rustler Anhydrite and above the salt) and cemented to the surface.
  - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
  - b. Wait on cement (WOC) time for a primary cement job will be a minimum of

**24 hours in the Potash Area** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)

- c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
  - d. If cement falls back, remedial cementing will be done prior to drilling out that string.
2. The **8-5/8** inch surface casing shall be set at approximately **2700** feet. The minimum required fill of cement behind the **8-5/8** inch intermediate casing is:
- Cement to surface. If cement does not circulate see B.1.a, c-d above.
  - ❖ In High Cave/Karst Areas if cement does not circulate to surface on the first two casing strings, the cement on the 3rd casing string must come to surface.
  - ❖ In Secretary Potash Areas if cement does not circulate to surface on the first two casing strings, the cement on the 3rd casing string must come to surface.

**Alternate Production casing has been reviewed and approved.**

3. The minimum required fill of cement behind the **5-1/2** inch production casing is:
- Cement should tie-back at least **500 feet** into previous casing string. Operator shall provide method of verification. **Additional cement will be required.**

## **C. PRESSURE CONTROL**

1. Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).'
2. Operator has proposed a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M)** psi.
  - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
  - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
  - c. Manufacturer representative shall install the test plug for the initial BOP test.

- d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
- e. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.

## GENERAL REQUIREMENTS

The BLM is to be notified in advance for a representative to witness:

- a. Spudding well (minimum of 24 hours)
- b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
- c. BOPE tests (minimum of 4 hours)

☒ Eddy County

Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220,  
(575) 361-2822

☒ Lea County

Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240, (575)  
393-3612

1. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
  - a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
  - b. When the operator proposes to set surface casing with Spudder Rig
    - Notify the BLM when moving in and removing the Spudder Rig.
    - Notify the BLM when moving in the 2<sup>nd</sup> Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
    - BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.
2. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.

3. The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.

A. CASING

1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.
2. Wait on cement (WOC) for Potash Areas: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
3. Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.
5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.
6. On that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.
7. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a

larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

#### B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.
3. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.
4. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:
  - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
  - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
  - c. Manufacturer representative shall install the test plug for the initial BOP test.
  - d. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.
  - e. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
  - a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been

done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

- b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time, except the casing pressure test can be initiated immediately after bumping the plug (only applies to single stage cement jobs).
- c. The tests shall be done by an independent service company utilizing a test plug not a cup or J-packer. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).
- d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.
- e. The results of the test shall be reported to the appropriate BLM office.
- f. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.
- g. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.
- h. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test



does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

C. DRILLING MUD

Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the Wolfcamp formation, and shall be used until production casing is run and cemented.

D. WASTE MATERIAL AND FLUIDS

All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

**JJP03232021**



### H<sub>2</sub>S Drilling Operations Plan

- a. All personnel will be trained in H<sub>2</sub>S working conditions as required by Onshore Order 6 before drilling out of the surface casing.
- b. Two briefing areas will be established. Each will be at least 150' from the wellhead, perpendicular from one another, and easily entered and exited. See H<sub>2</sub>S page 5 for more details.
- c. H<sub>2</sub>S Safety Equipment/Systems:
  - i. Well Control Equipment
    - Flare line will be  $\geq 150'$  from the wellhead and ignited by a pilot light.
    - Beware of SO<sub>2</sub> created by flaring.
    - Choke manifold will include a remotely operated choke.
    - Mud gas separator
  - ii. Protective Equipment for Essential Personnel
    - Every person on site will be required to wear a personal H<sub>2</sub>S and SO<sub>2</sub> monitor at all times while on site. Monitors will not be worn on hard hats. Monitors will be worn on the front of the chest.
    - One self-contained breathing apparatus (SCBA) 30-minute rescue pack will be at each briefing area. Two 30-minute SCBA packs will be stored in the safety trailer.
    - Four work/escape packs will be on the rig floor. Each pack will have a long enough hose to allow unimpaired work activity.
    - Four emergency escape packs will be in the doghouse for emergency evacuation.
    - Hand signals will be used when wearing protective breathing apparatus.
    - Stokes litter or stretcher
    - Two full OSHA compliant body harnesses
    - A 100-foot long x 5/8" OSHA compliant rope
    - One 20-pound ABC fire extinguisher

iii. H<sub>2</sub>S Detection & Monitoring Equipment

- Every person on site will be required to wear a personal H<sub>2</sub>S and SO<sub>2</sub> monitor at all times while on site. Monitors will not be worn on hard hats. Monitors will be worn on the front of the chest.
- A stationary detector with three sensors will be in the doghouse.
- Sensors will be installed on the rig floor, bell nipple, and at the end of the flow line or where drilling fluids are discharged.
- Visual alarm will be triggered at 10 ppm.
- Audible alarm will be triggered at 10 ppm.
- Calibration will occur at least every 30 days. Gas sample tubes will be kept in the safety trailer.

## iv. Visual Warning System

- Color-coded H<sub>2</sub>S condition sign will be set at the entrance to the pad.
- Color-coded condition flag will be installed to indicate current H<sub>2</sub>S conditions.
- Two wind socks will be installed that will be visible from all sides.

## v. Mud Program

- A water based mud with a pH of  $\geq 10$  will be maintained to control corrosion, H<sub>2</sub>S gas returns to the surface, and minimize sulfide stress cracking and embrittlement.
- Drilling mud containing H<sub>2</sub>S gas will be degassed at an optimum location for the rig configuration.
- This gas will be piped into the flare system.
- Enough mud additives will be on location to scavenge and/or neutralize H<sub>2</sub>S where formation pressures are unknown.

## vi. Metallurgy

- All equipment that has the potential to be exposed to H<sub>2</sub>S will be suitable for H<sub>2</sub>S service.
- Equipment that will meet these metallurgical standards include the drill string, casing, wellhead, BOP assembly, casing head and spool, rotating head, kill lines, choke, choke manifold and lines, valves, mud-gas separators, DST tools, test units, tubing, flanges, and other related equipment (elastomer packings and seals).

## vii. Communication from well site

- Cell phones and/or two-way radios will be used to communicate from the well site.

d. A remote-controlled choke, mud-gas separator, and a rotating head will be installed before drilling or testing any formation expected to contain H<sub>2</sub>S.

Company Personnel to be Notified

Kurt Shipley, Vice-President - Operations                      Office: (405) 609-1596

Local & County Agencies

Loving Fire Department    911 or (575) 745-3600

Eddy County Sheriff (Carlsbad)                                      911 (575) 887-7551

Eddy County Emergency Management (Carlsbad)              (575) 887-9511

Carlsbad Medical Center Hospital                                  (575) 887-4100

Eddy County South Road Department (Carlsbad)              (575) 885-4835

State Agencies

NM State Police (Carlsbad)    (575) 885-3138

NM Oil Conservation (Artesia)                                      (575) 748-1283

NM Oil Conservation (Santa Fe)                                    (505) 476-3440

NM Dept. of Transportation (Roswell)                              (575) 637-7201

Federal Agencies

BLM Carlsbad Field Office    (575) 234-5972

National Response Center    (800) 424-8802

US EPA Region 6 (Dallas)    (800) 887-6063

(214) 665-6444

Residents within 3/4 mile

none

Air Evacuation

Med Flight Air Ambulance (Albuquerque) (800) 842-4431

Lifeguard (Albuquerque) (888) 866-7256

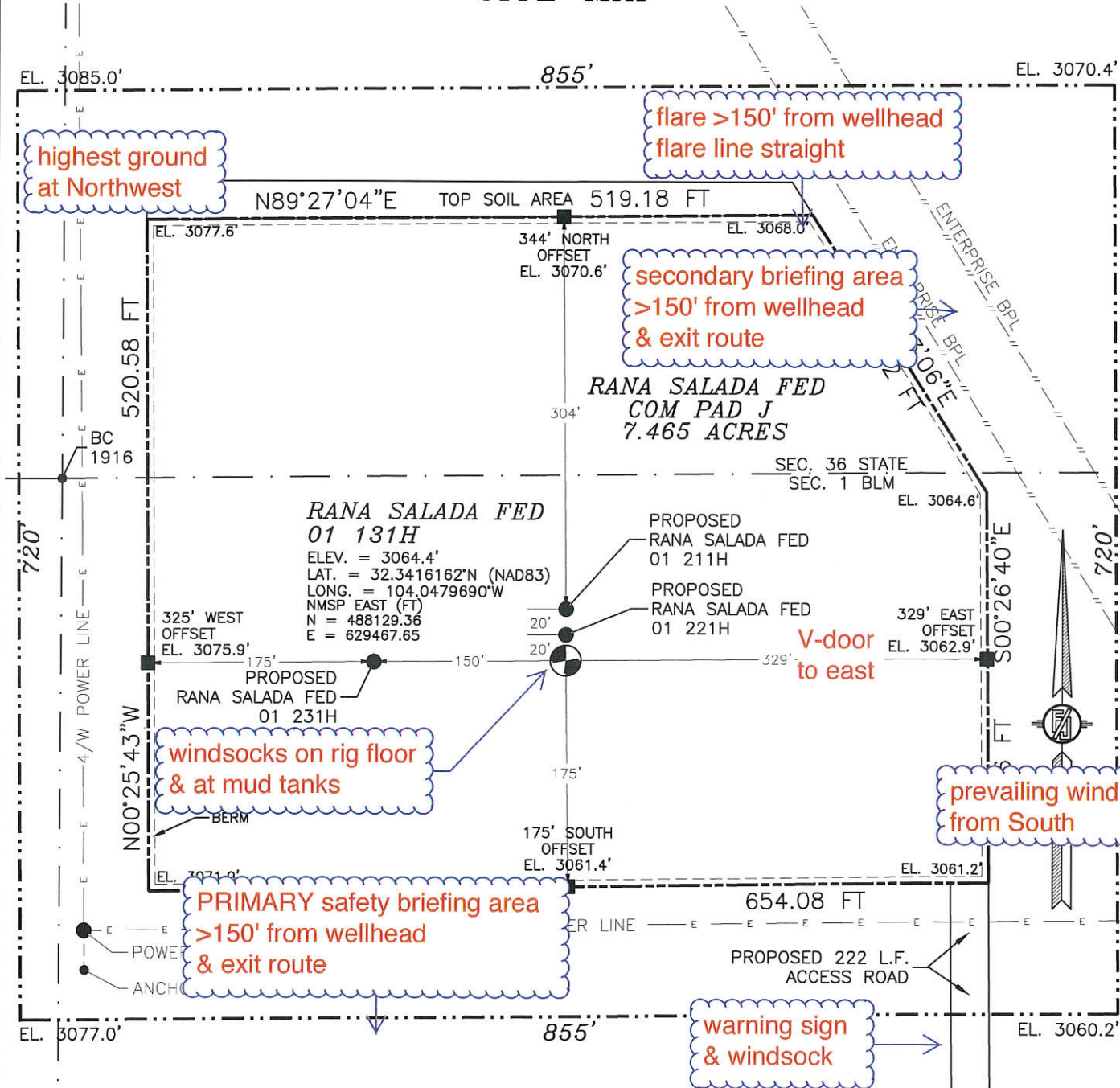
Veterinarians

Desert Willow Veterinary Services (Carlsbad) (575) 885-3399

Animal Care Center (Carlsbad) (575) 885-5352



SECTION 1, TOWNSHIP 23 SOUTH, RANGE 28 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO  
SITE MAP



012 60 120 240

SCALE 1" = 120'

DIRECTIONS TO LOCATION

FROM ST. HWY. 31 AND CR. 605 (REFINERY ROAD) GO NORTHWEST ON REFINERY ROAD 1.6 MILES, TURN RIGHT ON CALICHE LEASE ROAD AND GO NORTH 815'. BEND RIGHT AND GO EAST-NORTHEAST 365' TO A ROAD SURVEY AND FOLLOW PLASS NORTH 222' TO THE SOUTHEAST PAD CORNER FOR THIS LOCATION.

I, FILMON C. JARAMILLO, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFICATE NO. 1097, DO HEREBY CERTIFY THAT FOR THIS SURVEY I HAVE BEEN FULLY QUALIFIED AND TO THE BEST OF MY KNOWLEDGE AND BELIEF I HAVE SURVEYED AND PLAT THE WINDING, ENTERPRISE BPL, AND SURVEYED NEW MEXICO.

FILMON C. JARAMILLO 1097

MADRON PROFESSIONAL SURVEYING, INC.

301 SOUTH CANAL  
(575) 234-3341

CARLSBAD, NEW MEXICO

NOVO OIL & GAS NORTHERN DELAWARE, LLC  
RANA SALADA FED 01 131H  
LOCATED 144 FT. FROM THE NORTH LINE  
AND 393 FT. FROM THE WEST LINE OF  
SECTION 1, TOWNSHIP 23 SOUTH,  
RANGE 28 EAST, N.M.P.M.  
EDDY COUNTY, STATE OF NEW MEXICO

APRIL 21, 2020

SURVEY NO. 8100A



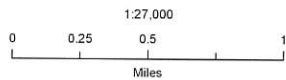
# Novo Oil and Gas Northern Delaware

Rana Salada Fed 01  
Pad J1  
H<sub>2</sub>S Contingency Plan:  
Radius Map

Section 1, Township 23S, Range 28E  
Eddy County, New Mexico



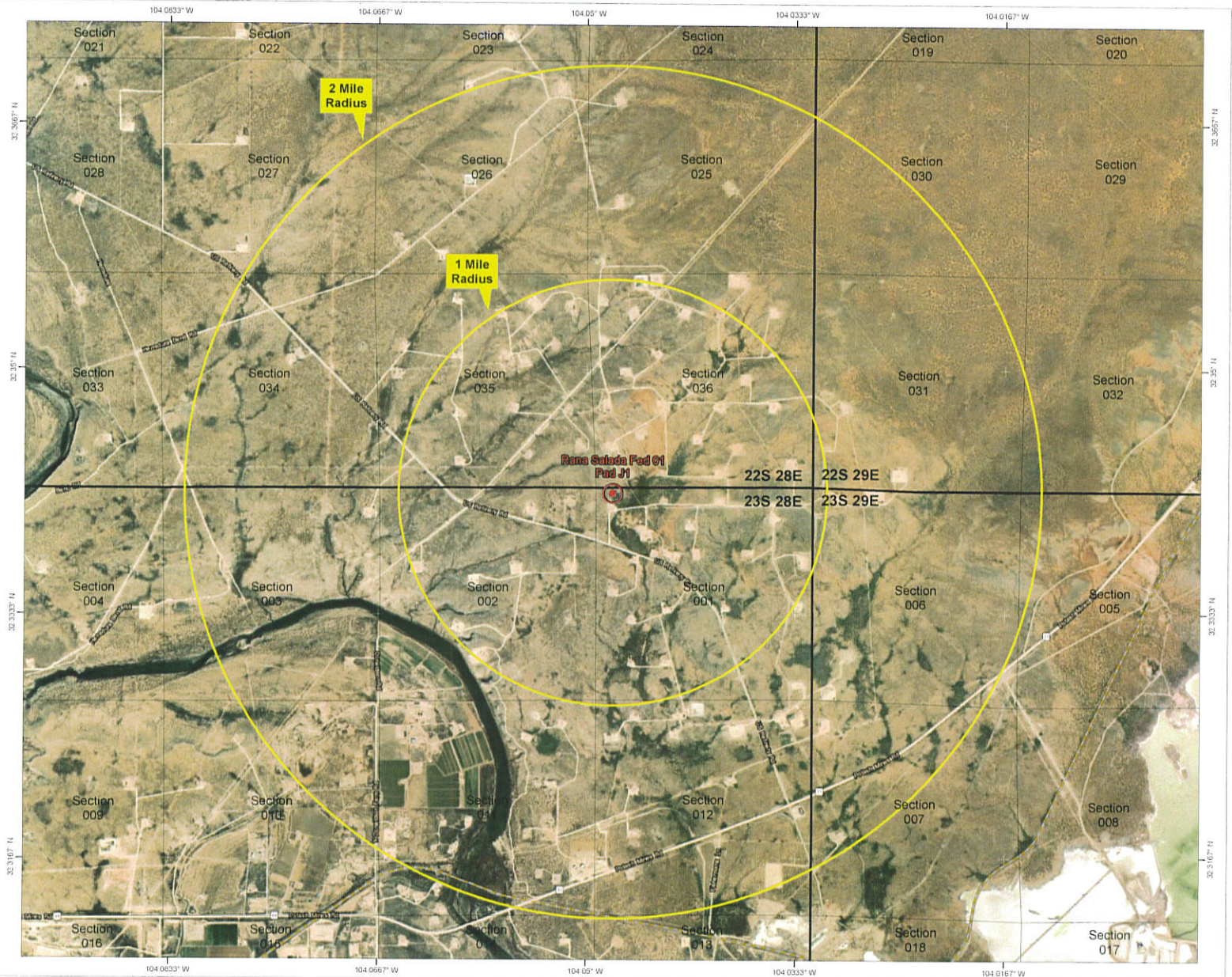
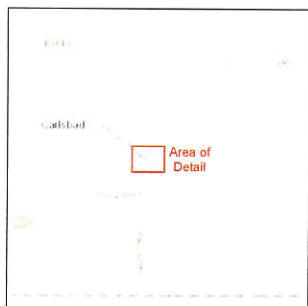
Well Pad Location



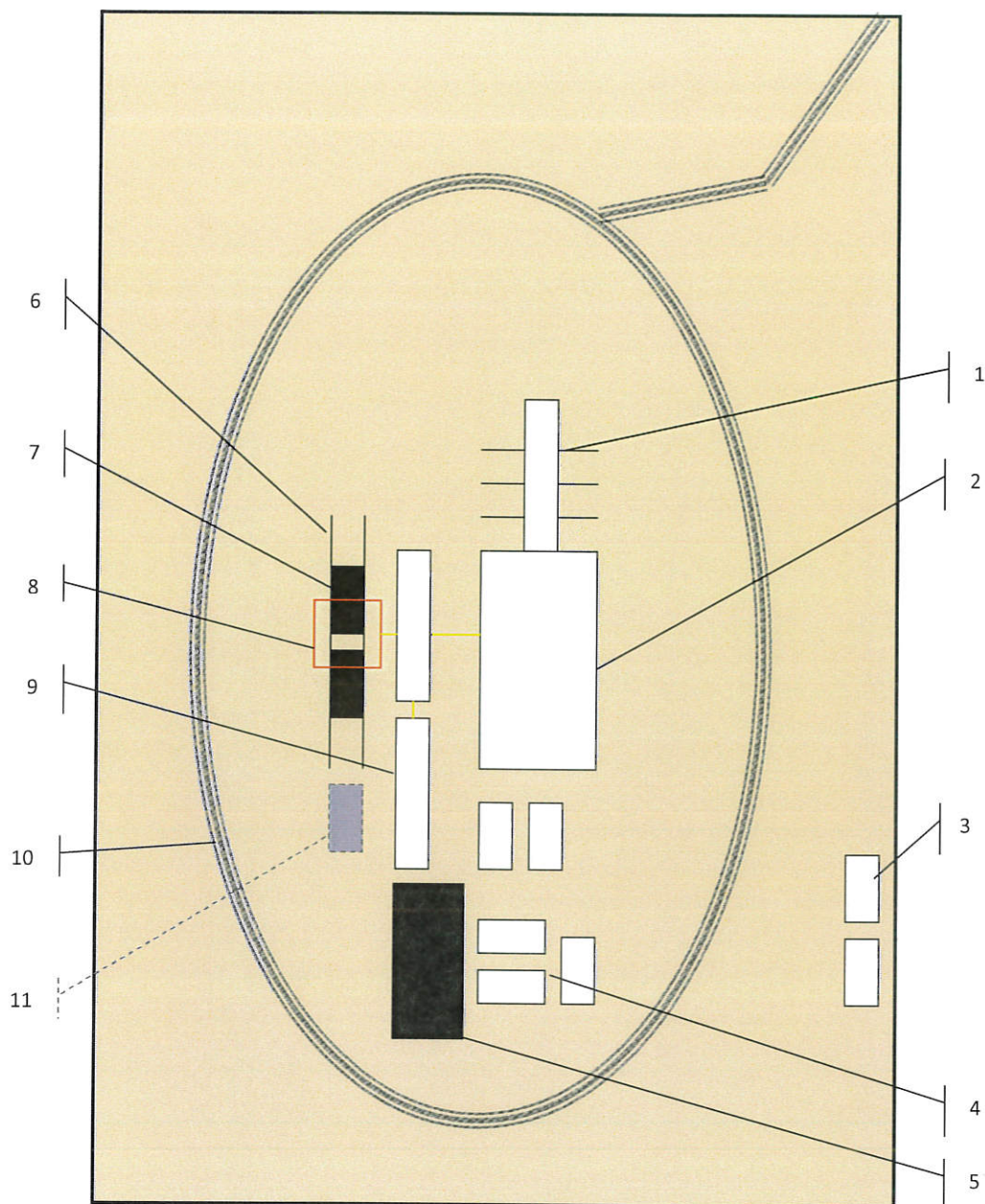
NAD 1983 New Mexico State Plane East  
FIPS 3001 Feet



Prepared by Permits West, Inc., July 20, 2020  
for Novo Oil and Gas Northern Delaware, LLC







Schematic Closed Loop Drilling Rig\*

1. Pipe Rack
2. Drill Rig
3. House Trailers/ Offices
4. Generator/Fuel/Storage
5. Overflow-Frac Tank
6. Skids
7. Roll Offs
8. Hopper or Centrifuge
9. Mud Tanks
10. Loop Drive
11. Generator (only for use with centrifuge)

\*Not drawn to scale: Closed loop system requires at least 30 feet beyond mud tanks. Ideally 60 feet would be available

**PERMITS WEST, INC.**  
 PROVIDING PERMITS for LAND USERS  
 37Verano Loop, Santa Fe, New Mexico 87508 (505) 466-8120



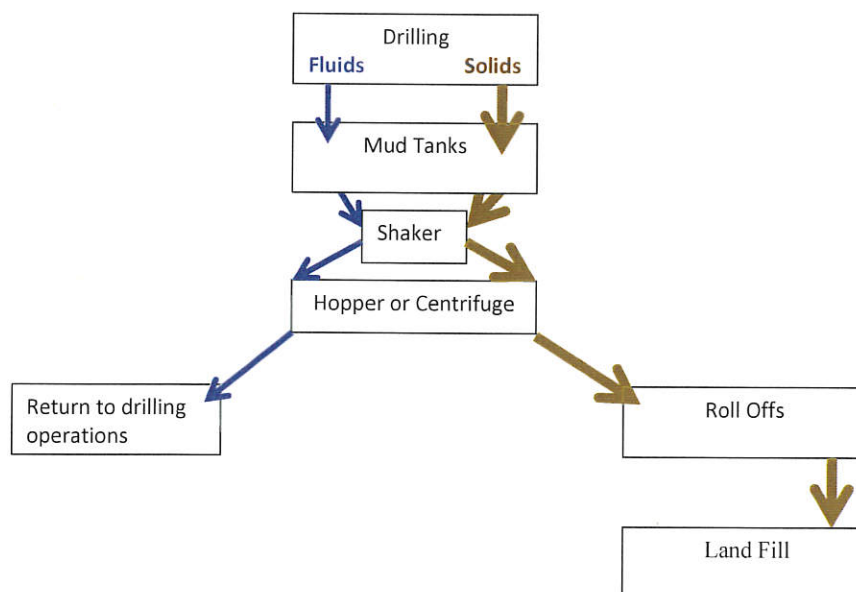
Above: Centrifugal Closed Loop System





Closed Loop Drilling System: Mud tanks to right (1)  
 Hopper in air to settle out solids (2)  
 Water return pipe (3)  
 Shaker between hopper and mud tanks (4)  
 Roll offs on skids (5)

#### Flow Chart for Drilling Fluids and Solids



Photos Courtesy of Gandy Corporation Oil  
 Field Service

**PERMITS WEST**, INC.  
 PROVIDING PERMITS for LAND USERS  
 37Verano Loop, Santa Fe, New Mexico 87508 (505) 466-8120

**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**

COMMENTS  
  
Action 32132

COMMENTS

Operator: NOVO OIL & GAS NORTHERN DELAWARE, LLC 1001 West Wilshire Blvd Oklahoma City, OK 73116	OGRID: 372920
	Action Number: 32132
	Action Type: [C-101] BLM - Federal/Indian Land Lease (Form 3160-3)

COMMENTS

Created By	Comment	Comment Date
kpickford	KP GEO Review 6/18/2021	6/18/2021

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**CONDITIONS**

Created By	Condition	Condition Date
kpickford	Notify OCD 24 hours prior to casing & cement	6/18/2021
kpickford	Will require a File As Drilled C-102 and a Directional Survey with the C-104	6/18/2021
kpickford	Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string	6/18/2021
kpickford	Cement is required to circulate on both surface and intermediate1 strings of casing	6/18/2021
kpickford	Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system	6/18/2021