

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 type="checkbox"/> Oil Well <input checked="" 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>235H</b>
2. Name of Operator <b>NOVO OIL AND GAS NORTHERN DELAWARE LLC</b>		9. API Well No. <b>30 015 48223</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>PURPLE SAGE WOLFCAMP</b>
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface <b>SENE / 2281 FNL / 25 FEL / LAT 32.3357355 / LONG -104.0493606</b> At proposed prod. zone <b>SENE / 2178 FNL / 130 FEL / LAT 32.3360625 / LONG -104.0324027</b>		11. Sec., T. R. M. or Blk. and Survey or Area <b>SEC 2/T23S/R28E/NMP</b>
14. Distance in miles and direction from nearest town or post office* <b>5 miles</b>		12. County or Parish <b>EDDY</b>
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) <b>25 feet</b>		16. No of acres in lease  17. Spacing Unit dedicated to this well <b>318.88</b>
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. <b>150 feet</b>		19. Proposed Depth <b>10625 feet / 16224 feet</b>
20. BLM/BIA Bond No. in file <b>FED: NMB001536</b>		21. Elevations (Show whether DF, KDB, RT, GL, etc.) <b>3084 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)	Name (Printed/Typed) <b>BRIAN WOOD / Ph: (405) 404-0414</b>	Date <b>08/24/2020</b>
Title <b>President</b>		
Approved by (Signature) (Electronic Submission)	Name (Printed/Typed) <b>Cody Layton / Ph: (575) 234-5959</b>	Date <b>04/12/2021</b>
Title <b>Assistant Field Manager Lands &amp; Minerals</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)



## INSTRUCTIONS

**GENERAL:** This form is designed for submitting proposals to perform certain well operations, as indicated on Federal and Indian lands and leases for action by appropriate Federal agencies, pursuant to applicable Federal laws and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local, area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from local Federal offices.

**ITEM I:** If the proposal is to redrill to the same reservoir at a different subsurface location or to a new reservoir, use this form with appropriate notations. Consult applicable Federal regulations concerning subsequent work proposals or reports on the well.

**ITEM 4:** Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local Federal offices for specific instructions.

**ITEM 14:** Needed only when location of well cannot readily be found by road from the land or lease description. A plat, or plats, separate or on the reverse side, showing the roads to, and the surveyed location of, the well, and any other required information, should be furnished when required by Federal agency offices.

**ITEMS 15 AND 18:** If well is to be, or has been directionally drilled, give distances for subsurface location of hole in any present or objective productive zone.

**ITEM 22:** Consult applicable Federal regulations, or appropriate officials, concerning approval of the proposal before operations are started.

**ITEM 24:** If the proposal will involve hydraulic fracturing operations, you must comply with 43 CFR 3162.3-3, including providing information about the protection of usable water. Operators should provide the best available information about all formations containing water and their depths. This information could include data and interpretation of resistivity logs run on nearby wells. Information may also be obtained from state or tribal regulatory agencies and from local BLM offices.

## NOTICES

The Privacy Act of 1974 and regulation in 43 CFR 2.48( d) provide that you be furnished the following information in connection with information required by this application.

**AUTHORITY:** 30 U.S.C. 181 et seq., 25 U.S.C. 396; 43 CFR 3160

**PRINCIPAL PURPOSES:** The information will be used to: (1) process and evaluate your application for a permit to drill a new oil, gas, or service well or to reenter a plugged and abandoned well; and (2) document, for administrative use, information for the management, disposal and use of National Resource Lands and resources including (a) analyzing your proposal to discover and extract the Federal or Indian resources encountered; (b) reviewing procedures and equipment and the projected impact on the land involved; and (c) evaluating the effects of the proposed operation on the surface and subsurface water and other environmental impacts.

**ROUTINE USE:** Information from the record and/or the record will be transferred to appropriate Federal, State, and local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecution, in connection with congressional inquiries and for regulatory responsibilities.

**EFFECT OF NOT PROVIDING INFORMATION:** Filing of this application and disclosure of the information is mandatory only if you elect to initiate a drilling or reentry operation on an oil and gas lease.

The Paperwork Reduction Act of 1995 requires us to inform you that:

The BLM connects this information to an evaluation of the technical, safety, and environmental factors involved with drilling for oil and/or gas on Federal and Indian oil and gas leases. This information will be used to analyze and approve applications. Response to this request is mandatory only if the operator elects to initiate drilling or reentry operations on an oil and gas lease. The BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

**BURDEN HOURS STATEMENT:** Public reporting burden for this form is estimated to average 8 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0137), Bureau Information Connection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

## Additional Operator Remarks

### Location of Well

0. SHL: SENE / 2281 FNL / 25 FEL / TWSP: 23S / RANGE: 28E / SECTION: 2 / LAT: 32.3357355 / LONG: -104.0493606 ( TVD: 0 feet, MD: 0 feet )

PPP: SENE / 2180 FNL / 572 FEL / TWSP: 23S / RANGE: 28E / SECTION: 2 / LAT: 32.336012 / LONG: -104.0511309 ( TVD: 10084 feet, MD: 10144 feet )

BHL: SENE / 2178 FNL / 130 FEL / TWSP: 23S / RANGE: 28E / SECTION: 1 / LAT: 32.3360625 / LONG: -104.0324027 ( TVD: 10625 feet, MD: 16224 feet )

### BLM Point of Contact

Name: Deborah Ham

Title: Legal Landlaw Examiner

Phone: (575) 234-5965

Email: dham@blm.gov

### **Review and Appeal Rights**

A person contesting a decision shall request a State Director review. This request must be filed within 20 working days of receipt of the Notice with the appropriate State Director (see 43 CFR 3165.3). The State Director review decision may be appealed to the Interior Board of Land Appeals, 801 North Quincy Street, Suite 300, Arlington, VA 22203 (see 43 CFR 3165.4). Contact the above listed Bureau of Land Management office for further information.





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

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

Submit Original  
to Appropriate  
District Office

### GAS CAPTURE PLAN

Date: 8/18/2020

X Original Operator & OGRID No.: Novo Oil & Gas Northern Delaware, LLC (372920)

☐ Amended - Reason for Amendment: \_\_\_\_\_

This Gas Capture Plan outlines actions to be taken by the Operator to reduce well/production facility flaring/venting for new completion (new drill, recomple to new zone, re-frac) activity.

*Note: A C-129 must be submitted and approved prior to exceeding 60 days allowed by Rule 19.15.18.12.A*

#### Well(s)/Production Facility – Name of facility

The well(s) that will be located at the production facility are shown in the table below.

Well	API	SHL (ULSTR)	SHL Footages	Expected MCF/D	Flared or Vented	Comments
Rana Salada Fed 01 135H	30-015-	H-2-23S-28E	2451 FNL & 25 FEL	750	30 days	Time depends on well clean up
Rana Salada Fed 01 215H	30-015-	H-2-23S-28E	2431 FNL & 25 FEL	3500	30 days	Time depends on well clean up
Rana Salada Fed 01 225H	30-015-	H-2-23S-28E	2471 sFNL & 25 FEL	3500	30 days	Time depends on well clean up
Rana Salada Fed 01 235H	30-015-	H-2-23S-28E	2281 FNL & 25 FEL	3500	30 days	Time depends on well clean up
Rana Salada Fed Com 0106 136H	30-015-	H-2-23S-28E	2531 FNL & 25 FEL	750	30 days	Time depends on well clean up
Rana Salada Fed Com 0106 216H	30-015-	H-2-23S-28E	2491 FNL & 25 FEL	3500	30 days	Time depends on well clean up
Rana Salada Fed Com 0106 226H	30-015-	H-2-23S-28E	2511 FNL & 25 FEL	3500	30 days	Time depends on well clean up

#### Gathering System and Pipeline Notification

Well(s) will be connected to a production facility after flowback operations are complete, if gas transporter system is in place. Gas from the pad will be piped southeast ≈2 miles to an existing Enterprise Field Services L. L. C. (151618) line in SESE 6-23s-29e. Final route depends on archaeology and botany inspection results. Novo Oil & Gas Northern Delaware, LLC will provide (periodically) to its Gas Transporter a drilling, completion and estimated first production date for wells that are scheduled to be drilled in the foreseeable future. In addition, Novo Oil & Gas Northern Delaware, LLC and its Gas Transporter have periodic conference calls to discuss changes to drilling and completion schedules. Gas from these wells will be processed at an as yet undetermined Gas Transporter Processing Plant located in Eddy County, New Mexico. The actual flow of the gas will be based on compression operating parameters and gathering system pressures.

#### Flowback Strategy

After the fracture treatment/completion operations, well(s) will be produced to temporary production tanks and gas will be flared or vented. During flowback, the fluids and sand content will be monitored. When the produced fluids contain minimal sand, the wells will be turned to production facilities. Gas sales should start as soon as the wells start flowing through the production facilities, unless there are operational issues on its Gas Transporter system at that time. Based on current information, it is Novo Oil & Gas Northern Delaware, LLC's belief an existing or new system can take this gas upon completion of the well(s). Safety requirements during cleanout operations from using underbalanced air cleanout systems may necessitate that sand and non-pipeline quality gas be vented and/or flared rather than sold on a temporary basis.



Alternatives to Reduce Flaring

Below are alternatives considered from a conceptual standpoint to reduce the amount of gas flared.

- Power Generation – On lease
  - Only a portion of gas is consumed operating the generator, remainder of gas will be flared
- Compressed Natural Gas – On lease
  - Gas flared would be minimal, but might be uneconomical to operate when gas volume declines
- NGL Removal – On lease
  - Plants are expensive, residue gas is still flared, and uneconomical to operate when gas volume declines



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

# Drilling Plan Data Report

04/12/2021

APD ID: 10400060785

Submission Date: 08/24/2020

Highlighted data  
reflects the most  
recent changes

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED 01

Well Number: 235H

[Show Final Text](#)

Well Type: CONVENTIONAL GAS WELL

Well Work Type: Drill

## Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
834689	QUATERNARY	3084	0	0	OTHER : None	USEABLE WATER	N
834690	RUSTLER ANHYDRITE	2855	229	229	ANHYDRITE	NONE	N
834691	CASTILE	1189	1895	1896	SALT	NONE	N
834692	LAMAR	329	2755	2778	LIMESTONE	NONE	N
834693	BELL CANYON	305	2779	2803	SANDSTONE	NATURAL GAS, OIL	N
834694	CHERRY CANYON	-715	3799	3852	SANDSTONE	NATURAL GAS, OIL	N
834695	BRUSHY CANYON	-2165	5249	5309	SANDSTONE	NATURAL GAS, OIL	N
834696	BONE SPRING	-3235	6319	6379	LIMESTONE	NATURAL GAS, OIL	N
834697	AVALON SAND	-3915	6999	7059	SHALE	NATURAL GAS, OIL	N
834698	BONE SPRING 1ST	-4335	7419	7479	SANDSTONE	NATURAL GAS, OIL	N
834699	BONE SPRING 2ND	-4585	7669	7729	OTHER : Carbonate	NATURAL GAS, OIL	N
834700	BONE SPRING 2ND	-5040	8124	8184	SANDSTONE	NATURAL GAS, OIL	N
834701	BONE SPRING 3RD	-5405	8489	8549	OTHER : Carbonate	NATURAL GAS, OIL	N
834702	BONE SPRING 3RD	-6285	9369	9429	SANDSTONE	NATURAL GAS, OIL	N
834703	WOLFCAMP	-6595	9679	9739	OTHER : XY Carbonate	NATURAL GAS, OIL	N
834688	WOLFCAMP	-6740	9824	9884	OTHER : A Carbonate	NATURAL GAS, OIL	N
834704	WOLFCAMP	-7000	10084	10144	OTHER : B Carbonate	NATURAL GAS, OIL	N
834705	WOLFCAMP	-7345	10429	10523	OTHER : B flow unit	NATURAL GAS, OIL	Y

**Operator Name:** NOVO OIL AND GAS NORTHERN DELAWARE LLC**Well Name:** RANA SALADA FED 01**Well Number:** 235H**Section 2 - Blowout Prevention****Pressure Rating (PSI):** 10M**Rating Depth:** 15000

**Equipment:** A 13.625 10,000-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 diagrams 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 10,000-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 2183.5 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\_235H\_Choke\_20210113132022.pdf

**BOP Diagram Attachment:**

RS\_01\_235H\_BOP\_20200823155000.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	3084	2684	400	J-55	54.5	BUTT	1.125	1.125	DRY	1.6	DRY	1.6
2	INTERMEDIATE	9.875	8.625	NEW	API	N	0	9925	0	9869	3079	-6785	9925	OTHER	32	OTHER - TLW	1.125	1.125	DRY	1.6	DRY	1.6
3	PRODUCTION	7.875	5.5	NEW	API	N	0	16224	0	10625	3079	-7541	16224	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:** 235H**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\_235H\_Casing\_Design\_Assumptions\_20200824070649.pdf

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**Casing ID:** 2      **String Type:** INTERMEDIATE**Inspection Document:****Spec Document:****Tapered String Spec:****Casing Design Assumptions and Worksheet(s):**

RS\_01\_235H\_Casing\_Design\_Assumptions\_20200824070721.pdf

8.625\_P\_110\_HSCY\_20200824070727.pdf

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**Casing ID:** 3      **String Type:** PRODUCTION**Inspection Document:****Spec Document:****Tapered String Spec:****Casing Design Assumptions and Worksheet(s):**

RS\_01\_235H\_Casing\_Design\_Assumptions\_20200824070822.pdf

5.5in\_P\_110\_EC\_20200824070828.pdf

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**Operator Name:** NOVO OIL AND GAS NORTHERN DELAWARE LLC**Well Name:** RANA SALADA FED 01**Well Number:** 235H**Section 4 - Cement**

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		9425	16224	781	1.89	13	1476	20	Class H	Fluid loss + retarder + LCM
INTERMEDIATE	Lead		0	9925	539	2.69	10.5	1449	20	Class C or H	Fluid loss + retarder + LCM + possibly beads for compressive strength
INTERMEDIATE	Tail		0	9925	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							

**Operator Name:** NOVO OIL AND GAS NORTHERN DELAWARE LLC**Well Name:** RANA SALADA FED 01**Well Number:** 235H

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
400	9925	OTHER : Brine diesel emulsion	8.8	9.4							
9925	16224	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:**

GAMMA RAY LOG, MUD LOG/GEOLOGICAL LITHOLOGY LOG,

**Coring operation description for the well:**

No core or drill stem test is planned.

### Section 7 - Pressure

**Anticipated Bottom Hole Pressure:** 7437

**Anticipated Surface Pressure:** 5099

**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\_235H\_H2S\_Plan\_20200824071100.pdf



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

**Well Name:** RANA SALADA FED 01

**Well Number:** 235H

## Section 8 - Other Information

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

RS\_01\_235H\_Horizontal\_Plan\_20200824071148.pdf

**Other proposed operations facets description:**

**Other proposed operations facets attachment:**

RS\_01\_235H\_Drill\_Plan\_20200824071217.pdf

CoFlex\_Certs\_20200824071238.pdf

RS\_01\_235H\_Anti\_Collision\_Report\_20200824071247.pdf

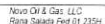
RS\_01\_235H\_Speedhead\_Specs\_20200824071258.pdf

**Other Variance attachment:**

Alternative\_Casing\_\_Spec\_Request\_20200824071311.pdf

RS\_01\_235H\_Casing\_Cement\_Variance\_20200824071316.pdf



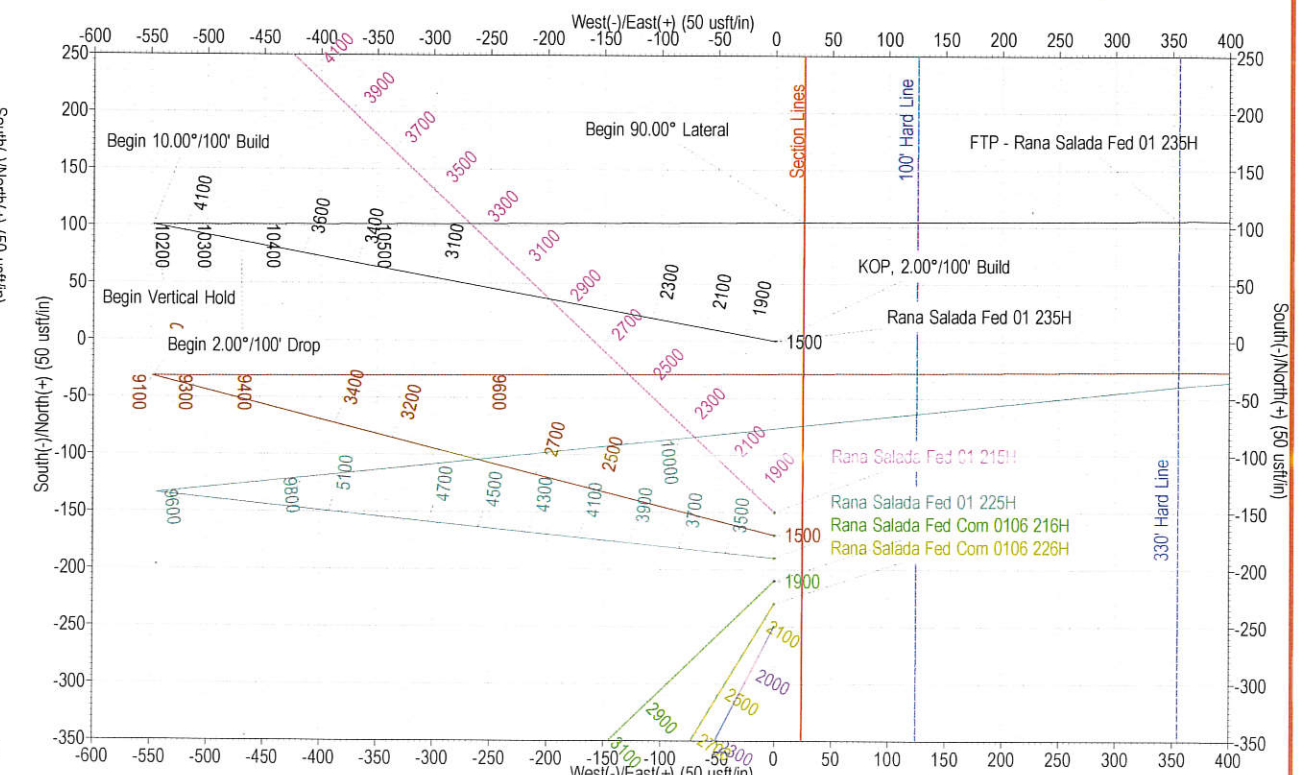
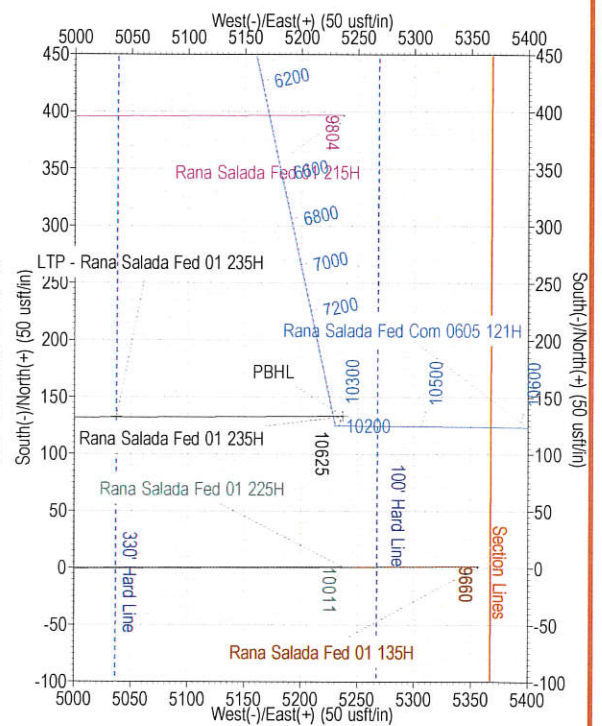


Depth From	Depth To	Survey/Plan	Tool
0.00	16223.80	Design #1 (Wellbore #1)	MWD+HRGM



### CASING DETAILS

	GL @ 3084.30	WELL @ 3109.30usft (25' RKB)		TVD	MD	Name
+E/-W	Northing	Easting	Latitude			
0.00	485988.90	629043.54	32.335736	9925.00	9984.59	9 5/8"
			-104.049361			



Novo Oil & Gas LLC  
Rara Salada Fed 01 235H





# MS Directional Planning Report



Database:	EDM 5000.14 Conroe DB	Local Co-ordinate Reference:	Well Rana Salada Fed 01 235H
Company:	Novo Oil & Gas, LLC	TVD Reference:	WELL @ 3109.30usft (25' RKB)
Project:	Eddy County, New Mexico (NAD 83)	MD Reference:	WELL @ 3109.30usft (25' RKB)
Site:	Rana Salada Fed 01 - K Pad	North Reference:	Grid
Well:	Rana Salada Fed 01 235H	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 - K Pad			
Site Position:		Northing:	485,838.92 usft	Latitude: 32.335323
From: Map		Easting:	629,043.11 usft	Longitude: -104.049364
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence: 0.152 °

Well	Rana Salada Fed 01 235H			
Well Position	+N/-S	149.98 usft	Northing:	485,988.90 usft
	+E/-W	0.43 usft	Easting:	629,043.54 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:		Ground Level: 3,084.30 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM2020	5/1/2020	7.000	60.050	47,827.80

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	88.54

Plan Survey Tool Program	Date 4/7/2020			
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	16,223.80	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	
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.000	
2,174.27	13.49	280.40	2,168.07	14.26	-77.69	2.00	2.00	0.00	280.404	
3,885.32	13.49	280.40	3,831.93	86.32	-470.14	0.00	0.00	0.00	0.000	
4,559.59	0.00	0.00	4,500.00	100.59	-547.83	2.00	-2.00	0.00	180.000	
10,111.63	0.00	0.00	10,052.04	100.59	-547.83	0.00	0.00	0.00	0.000	
11,011.63	90.00	89.68	10,625.00	103.82	25.12	10.00	10.00	0.00	89.677	
16,223.80	90.00	89.68	10,625.00	133.24	5,237.21	0.00	0.00	0.00	0.000	PBHL - Rana Salad





# MS Directional Planning Report



Database: EDM 5000.14 Conroe DB  
Company: Novo Oil & Gas, LLC  
Project: Eddy County, New Mexico (NAD 83)  
Site: Rana Salada Fed 01 - K Pad  
Well: Rana Salada Fed 01 235H  
Wellbore: Wellbore #1  
Design: Design #1

Local Co-ordinate Reference: Well Rana Salada Fed 01 235H  
TVD Reference: WELL @ 3109.30usft (25' RKB)  
MD Reference: WELL @ 3109.30usft (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)
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
229.30	0.00	0.00	229.30	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
<b>KOP, 2.00°/100' Build</b>									
1,600.00	2.00	280.40	1,599.98	0.32	-1.72	-1.71	2.00	2.00	0.00
1,700.00	4.00	280.40	1,699.84	1.26	-6.86	-6.83	2.00	2.00	0.00
1,800.00	6.00	280.40	1,799.45	2.83	-15.44	-15.36	2.00	2.00	0.00
1,900.00	8.00	280.40	1,898.70	5.03	-27.42	-27.28	2.00	2.00	0.00
2,000.00	10.00	280.40	1,997.47	7.86	-42.81	-42.59	2.00	2.00	0.00
2,100.00	12.00	280.40	2,095.62	11.31	-61.57	-61.27	2.00	2.00	0.00
2,174.27	13.49	280.40	2,168.07	14.26	-77.69	-77.30	2.00	2.00	0.00
<b>Hold 13.49° Inc, 280.40° Azm</b>									
2,200.00	13.49	280.40	2,193.08	15.35	-83.59	-83.17	0.00	0.00	0.00
2,300.00	13.49	280.40	2,290.33	19.56	-106.52	-105.99	0.00	0.00	0.00
2,400.00	13.49	280.40	2,387.57	23.77	-129.46	-128.81	0.00	0.00	0.00
2,500.00	13.49	280.40	2,484.81	27.98	-152.40	-151.64	0.00	0.00	0.00
2,600.00	13.49	280.40	2,582.05	32.19	-175.33	-174.46	0.00	0.00	0.00
2,700.00	13.49	280.40	2,679.30	36.40	-198.27	-197.28	0.00	0.00	0.00
2,800.00	13.49	280.40	2,776.54	40.62	-221.21	-220.10	0.00	0.00	0.00
2,802.84	13.49	280.40	2,779.30	40.74	-221.86	-220.75	0.00	0.00	0.00
<b>Bell Canyon (base of salt)</b>									
2,900.00	13.49	280.40	2,873.78	44.83	-244.14	-242.92	0.00	0.00	0.00
3,000.00	13.49	280.40	2,971.03	49.04	-267.08	-265.75	0.00	0.00	0.00
3,100.00	13.49	280.40	3,068.27	53.25	-290.02	-288.57	0.00	0.00	0.00
3,200.00	13.49	280.40	3,165.51	57.46	-312.95	-311.39	0.00	0.00	0.00
3,300.00	13.49	280.40	3,262.75	61.67	-335.89	-334.21	0.00	0.00	0.00
3,400.00	13.49	280.40	3,360.00	65.88	-358.82	-357.03	0.00	0.00	0.00
3,500.00	13.49	280.40	3,457.24	70.09	-381.76	-379.85	0.00	0.00	0.00
3,600.00	13.49	280.40	3,554.48	74.31	-404.70	-402.68	0.00	0.00	0.00
3,700.00	13.49	280.40	3,651.73	78.52	-427.63	-425.50	0.00	0.00	0.00
3,800.00	13.49	280.40	3,748.97	82.73	-450.57	-448.32	0.00	0.00	0.00
3,851.76	13.49	280.40	3,799.30	84.91	-462.44	-460.13	0.00	0.00	0.00
<b>Cherry Canyon</b>									
3,885.32	13.49	280.40	3,831.93	86.32	-470.14	-467.79	0.00	0.00	0.00
<b>Begin 2.00°/100' Drop</b>									
3,900.00	13.19	280.40	3,846.22	86.93	-473.47	-471.11	2.00	-2.00	0.00
4,000.00	11.19	280.40	3,943.96	90.75	-494.24	-491.77	2.00	-2.00	0.00
4,100.00	9.19	280.40	4,042.38	93.94	-511.64	-509.09	2.00	-2.00	0.00





# MS Directional Planning Report



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Site: Rana Salada Fed 01 - K Pad  
Well: Rana Salada Fed 01 235H  
Wellbore: Wellbore #1  
Design: Design #1

Local Co-ordinate Reference: Well Rana Salada Fed 01 235H  
TVD Reference: WELL @ 3109.30usft (25' RKB)  
MD Reference: WELL @ 3109.30usft (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)
4,200.00	7.19	280.40	4,141.35	96.52	-525.66	-523.03	2.00	-2.00	0.00
4,300.00	5.19	280.40	4,240.76	98.46	-536.27	-533.59	2.00	-2.00	0.00
4,400.00	3.19	280.40	4,340.49	99.78	-543.45	-540.74	2.00	-2.00	0.00
4,500.00	1.19	280.40	4,440.41	100.47	-547.22	-544.48	2.00	-2.00	0.00
4,559.59	0.00	0.00	4,500.00	100.59	-547.83	-545.09	2.00	-2.00	0.00
<b>Begin Vertical Hold</b>									
4,600.00	0.00	0.00	4,540.41	100.59	-547.83	-545.09	0.00	0.00	0.00
4,700.00	0.00	0.00	4,640.41	100.59	-547.83	-545.09	0.00	0.00	0.00
4,800.00	0.00	0.00	4,740.41	100.59	-547.83	-545.09	0.00	0.00	0.00
4,900.00	0.00	0.00	4,840.41	100.59	-547.83	-545.09	0.00	0.00	0.00
5,000.00	0.00	0.00	4,940.41	100.59	-547.83	-545.09	0.00	0.00	0.00
5,100.00	0.00	0.00	5,040.41	100.59	-547.83	-545.09	0.00	0.00	0.00
5,200.00	0.00	0.00	5,140.41	100.59	-547.83	-545.09	0.00	0.00	0.00
5,300.00	0.00	0.00	5,240.41	100.59	-547.83	-545.09	0.00	0.00	0.00
5,308.89	0.00	0.00	5,249.30	100.59	-547.83	-545.09	0.00	0.00	0.00
<b>Brushy Canyon*</b>									
5,400.00	0.00	0.00	5,340.41	100.59	-547.83	-545.09	0.00	0.00	0.00
5,500.00	0.00	0.00	5,440.41	100.59	-547.83	-545.09	0.00	0.00	0.00
5,600.00	0.00	0.00	5,540.41	100.59	-547.83	-545.09	0.00	0.00	0.00
5,700.00	0.00	0.00	5,640.41	100.59	-547.83	-545.09	0.00	0.00	0.00
5,800.00	0.00	0.00	5,740.41	100.59	-547.83	-545.09	0.00	0.00	0.00
5,900.00	0.00	0.00	5,840.41	100.59	-547.83	-545.09	0.00	0.00	0.00
6,000.00	0.00	0.00	5,940.41	100.59	-547.83	-545.09	0.00	0.00	0.00
6,100.00	0.00	0.00	6,040.41	100.59	-547.83	-545.09	0.00	0.00	0.00
6,200.00	0.00	0.00	6,140.41	100.59	-547.83	-545.09	0.00	0.00	0.00
6,300.00	0.00	0.00	6,240.41	100.59	-547.83	-545.09	0.00	0.00	0.00
6,378.89	0.00	0.00	6,319.30	100.59	-547.83	-545.09	0.00	0.00	0.00
<b>Bone Spring Lime*</b>									
6,400.00	0.00	0.00	6,340.41	100.59	-547.83	-545.09	0.00	0.00	0.00
6,500.00	0.00	0.00	6,440.41	100.59	-547.83	-545.09	0.00	0.00	0.00
6,600.00	0.00	0.00	6,540.41	100.59	-547.83	-545.09	0.00	0.00	0.00
6,700.00	0.00	0.00	6,640.41	100.59	-547.83	-545.09	0.00	0.00	0.00
6,800.00	0.00	0.00	6,740.41	100.59	-547.83	-545.09	0.00	0.00	0.00
6,900.00	0.00	0.00	6,840.41	100.59	-547.83	-545.09	0.00	0.00	0.00
7,000.00	0.00	0.00	6,940.41	100.59	-547.83	-545.09	0.00	0.00	0.00
7,058.89	0.00	0.00	6,999.30	100.59	-547.83	-545.09	0.00	0.00	0.00
<b>Lower Avalon*</b>									
7,100.00	0.00	0.00	7,040.41	100.59	-547.83	-545.09	0.00	0.00	0.00
7,200.00	0.00	0.00	7,140.41	100.59	-547.83	-545.09	0.00	0.00	0.00
7,300.00	0.00	0.00	7,240.41	100.59	-547.83	-545.09	0.00	0.00	0.00
7,400.00	0.00	0.00	7,340.41	100.59	-547.83	-545.09	0.00	0.00	0.00
7,478.89	0.00	0.00	7,419.30	100.59	-547.83	-545.09	0.00	0.00	0.00
<b>1st Bone Spring Sand*</b>									
7,500.00	0.00	0.00	7,440.41	100.59	-547.83	-545.09	0.00	0.00	0.00
7,600.00	0.00	0.00	7,540.41	100.59	-547.83	-545.09	0.00	0.00	0.00
7,700.00	0.00	0.00	7,640.41	100.59	-547.83	-545.09	0.00	0.00	0.00
7,728.89	0.00	0.00	7,669.30	100.59	-547.83	-545.09	0.00	0.00	0.00
<b>2nd Bone Spring Carbonate</b>									
7,800.00	0.00	0.00	7,740.41	100.59	-547.83	-545.09	0.00	0.00	0.00
7,900.00	0.00	0.00	7,840.41	100.59	-547.83	-545.09	0.00	0.00	0.00
8,000.00	0.00	0.00	7,940.41	100.59	-547.83	-545.09	0.00	0.00	0.00
8,100.00	0.00	0.00	8,040.41	100.59	-547.83	-545.09	0.00	0.00	0.00
8,183.89	0.00	0.00	8,124.30	100.59	-547.83	-545.09	0.00	0.00	0.00





# MS Directional Planning Report



Database:	EDM 5000.14 Conroe DB	Local Co-ordinate Reference:	Well Rana Salada Fed 01 235H
Company:	Novo Oil & Gas, LLC	TVD Reference:	WELL @ 3109.30usft (25' RKB)
Project:	Eddy County, New Mexico (NAD 83)	MD Reference:	WELL @ 3109.30usft (25' RKB)
Site:	Rana Salada Fed 01 - K Pad	North Reference:	Grid
Well:	Rana Salada Fed 01 235H	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)
<b>2nd Bone Spring Sand*</b>									
8,200.00	0.00	0.00	8,140.41	100.59	-547.83	-545.09	0.00	0.00	0.00
8,300.00	0.00	0.00	8,240.41	100.59	-547.83	-545.09	0.00	0.00	0.00
8,400.00	0.00	0.00	8,340.41	100.59	-547.83	-545.09	0.00	0.00	0.00
8,500.00	0.00	0.00	8,440.41	100.59	-547.83	-545.09	0.00	0.00	0.00
8,548.89	0.00	0.00	8,489.30	100.59	-547.83	-545.09	0.00	0.00	0.00
<b>3rd Bone Spring Carbonate</b>									
8,600.00	0.00	0.00	8,540.41	100.59	-547.83	-545.09	0.00	0.00	0.00
8,700.00	0.00	0.00	8,640.41	100.59	-547.83	-545.09	0.00	0.00	0.00
8,800.00	0.00	0.00	8,740.41	100.59	-547.83	-545.09	0.00	0.00	0.00
8,900.00	0.00	0.00	8,840.41	100.59	-547.83	-545.09	0.00	0.00	0.00
9,000.00	0.00	0.00	8,940.41	100.59	-547.83	-545.09	0.00	0.00	0.00
9,100.00	0.00	0.00	9,040.41	100.59	-547.83	-545.09	0.00	0.00	0.00
9,200.00	0.00	0.00	9,140.41	100.59	-547.83	-545.09	0.00	0.00	0.00
9,300.00	0.00	0.00	9,240.41	100.59	-547.83	-545.09	0.00	0.00	0.00
9,400.00	0.00	0.00	9,340.41	100.59	-547.83	-545.09	0.00	0.00	0.00
9,428.89	0.00	0.00	9,369.30	100.59	-547.83	-545.09	0.00	0.00	0.00
<b>3rd Bone Spring Sand*</b>									
9,500.00	0.00	0.00	9,440.41	100.59	-547.83	-545.09	0.00	0.00	0.00
9,600.00	0.00	0.00	9,540.41	100.59	-547.83	-545.09	0.00	0.00	0.00
9,700.00	0.00	0.00	9,640.41	100.59	-547.83	-545.09	0.00	0.00	0.00
9,738.89	0.00	0.00	9,679.30	100.59	-547.83	-545.09	0.00	0.00	0.00
<b>Wolfcamp XY*</b>									
9,800.00	0.00	0.00	9,740.41	100.59	-547.83	-545.09	0.00	0.00	0.00
9,883.89	0.00	0.00	9,824.30	100.59	-547.83	-545.09	0.00	0.00	0.00
<b>Wolfcamp A*</b>									
9,900.00	0.00	0.00	9,840.41	100.59	-547.83	-545.09	0.00	0.00	0.00
9,984.59	0.00	0.00	9,925.00	100.59	-547.83	-545.09	0.00	0.00	0.00
<b>9 5/8"</b>									
10,000.00	0.00	0.00	9,940.41	100.59	-547.83	-545.09	0.00	0.00	0.00
10,100.00	0.00	0.00	10,040.41	100.59	-547.83	-545.09	0.00	0.00	0.00
10,111.63	0.00	0.00	10,052.04	100.59	-547.83	-545.09	0.00	0.00	0.00
<b>Begin 10.00°/100' Build</b>									
10,143.91	3.23	89.68	10,084.30	100.59	-546.92	-544.18	10.00	10.00	0.00
<b>Wolfcamp B</b>									
10,150.00	3.84	89.68	10,090.38	100.59	-546.54	-543.81	10.00	10.00	0.00
10,200.00	8.84	89.68	10,140.06	100.62	-541.02	-538.29	10.00	10.00	0.00
10,250.00	13.84	89.68	10,189.07	100.68	-531.20	-528.47	10.00	10.00	0.00
10,300.00	18.84	89.68	10,237.03	100.76	-517.14	-514.41	10.00	10.00	0.00
10,350.00	23.84	89.68	10,283.59	100.86	-498.95	-496.23	10.00	10.00	0.00
10,400.00	28.84	89.68	10,328.39	100.99	-476.78	-474.06	10.00	10.00	0.00
10,450.00	33.84	89.68	10,371.08	101.13	-450.78	-448.07	10.00	10.00	0.00
10,500.00	38.84	89.68	10,411.35	101.30	-421.17	-418.46	10.00	10.00	0.00
10,523.44	41.18	89.68	10,429.30	101.39	-406.10	-403.39	10.00	10.00	0.00
<b>Wolfcamp B Flow Unit*</b>									
10,550.00	43.84	89.68	10,448.88	101.49	-388.16	-385.45	10.00	10.00	0.00
10,600.00	48.84	89.68	10,483.39	101.69	-352.00	-349.30	10.00	10.00	0.00
10,650.00	53.84	89.68	10,514.61	101.91	-312.97	-310.28	10.00	10.00	0.00
10,700.00	58.84	89.68	10,542.32	102.15	-271.37	-268.68	10.00	10.00	0.00
10,750.00	63.84	89.68	10,566.30	102.39	-227.51	-224.83	10.00	10.00	0.00
10,800.00	68.84	89.68	10,586.36	102.65	-181.73	-179.06	10.00	10.00	0.00
10,850.00	73.84	89.68	10,602.35	102.92	-134.37	-131.71	10.00	10.00	0.00
10,900.00	78.84	89.68	10,614.16	103.19	-85.80	-83.15	10.00	10.00	0.00





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## 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)
10,950.00	83.84	89.68	10,621.69	103.47	-36.39	-33.75	10.00	10.00	0.00
11,000.00	88.84	89.68	10,624.88	103.75	13.49	16.12	10.00	10.00	0.00
11,011.63	90.00	89.68	10,625.00	103.82	25.12	27.76	10.00	10.00	0.00
Begin 90.00° Lateral									
11,100.00	90.00	89.68	10,625.00	104.32	113.49	116.10	0.00	0.00	0.00
11,200.00	90.00	89.68	10,625.00	104.88	213.49	216.08	0.00	0.00	0.00
11,300.00	90.00	89.68	10,625.00	105.45	313.48	316.06	0.00	0.00	0.00
11,400.00	90.00	89.68	10,625.00	106.01	413.48	416.05	0.00	0.00	0.00
11,500.00	90.00	89.68	10,625.00	106.58	513.48	516.03	0.00	0.00	0.00
11,600.00	90.00	89.68	10,625.00	107.14	613.48	616.01	0.00	0.00	0.00
11,700.00	90.00	89.68	10,625.00	107.71	713.48	715.99	0.00	0.00	0.00
11,800.00	90.00	89.68	10,625.00	108.27	813.48	815.97	0.00	0.00	0.00
11,900.00	90.00	89.68	10,625.00	108.83	913.48	915.95	0.00	0.00	0.00
12,000.00	90.00	89.68	10,625.00	109.40	1,013.47	1,015.93	0.00	0.00	0.00
12,100.00	90.00	89.68	10,625.00	109.96	1,113.47	1,115.91	0.00	0.00	0.00
12,200.00	90.00	89.68	10,625.00	110.53	1,213.47	1,215.89	0.00	0.00	0.00
12,300.00	90.00	89.68	10,625.00	111.09	1,313.47	1,315.87	0.00	0.00	0.00
12,400.00	90.00	89.68	10,625.00	111.66	1,413.47	1,415.85	0.00	0.00	0.00
12,500.00	90.00	89.68	10,625.00	112.22	1,513.47	1,515.83	0.00	0.00	0.00
12,600.00	90.00	89.68	10,625.00	112.79	1,613.46	1,615.81	0.00	0.00	0.00
12,700.00	90.00	89.68	10,625.00	113.35	1,713.46	1,715.79	0.00	0.00	0.00
12,800.00	90.00	89.68	10,625.00	113.91	1,813.46	1,815.77	0.00	0.00	0.00
12,900.00	90.00	89.68	10,625.00	114.48	1,913.46	1,915.75	0.00	0.00	0.00
13,000.00	90.00	89.68	10,625.00	115.04	2,013.46	2,015.73	0.00	0.00	0.00
13,100.00	90.00	89.68	10,625.00	115.61	2,113.46	2,115.71	0.00	0.00	0.00
13,200.00	90.00	89.68	10,625.00	116.17	2,213.45	2,215.69	0.00	0.00	0.00
13,300.00	90.00	89.68	10,625.00	116.74	2,313.45	2,315.67	0.00	0.00	0.00
13,400.00	90.00	89.68	10,625.00	117.30	2,413.45	2,415.65	0.00	0.00	0.00
13,500.00	90.00	89.68	10,625.00	117.87	2,513.45	2,515.63	0.00	0.00	0.00
13,600.00	90.00	89.68	10,625.00	118.43	2,613.45	2,615.61	0.00	0.00	0.00
13,700.00	90.00	89.68	10,625.00	118.99	2,713.45	2,715.60	0.00	0.00	0.00
13,800.00	90.00	89.68	10,625.00	119.56	2,813.44	2,815.58	0.00	0.00	0.00
13,900.00	90.00	89.68	10,625.00	120.12	2,913.44	2,915.56	0.00	0.00	0.00
14,000.00	90.00	89.68	10,625.00	120.69	3,013.44	3,015.54	0.00	0.00	0.00
14,100.00	90.00	89.68	10,625.00	121.25	3,113.44	3,115.52	0.00	0.00	0.00
14,200.00	90.00	89.68	10,625.00	121.82	3,213.44	3,215.50	0.00	0.00	0.00
14,300.00	90.00	89.68	10,625.00	122.38	3,313.44	3,315.48	0.00	0.00	0.00
14,400.00	90.00	89.68	10,625.00	122.95	3,413.44	3,415.46	0.00	0.00	0.00
14,500.00	90.00	89.68	10,625.00	123.51	3,513.43	3,515.44	0.00	0.00	0.00
14,600.00	90.00	89.68	10,625.00	124.07	3,613.43	3,615.42	0.00	0.00	0.00
14,700.00	90.00	89.68	10,625.00	124.64	3,713.43	3,715.40	0.00	0.00	0.00
14,800.00	90.00	89.68	10,625.00	125.20	3,813.43	3,815.38	0.00	0.00	0.00
14,900.00	90.00	89.68	10,625.00	125.77	3,913.43	3,915.36	0.00	0.00	0.00
15,000.00	90.00	89.68	10,625.00	126.33	4,013.43	4,015.34	0.00	0.00	0.00
15,100.00	90.00	89.68	10,625.00	126.90	4,113.42	4,115.32	0.00	0.00	0.00
15,200.00	90.00	89.68	10,625.00	127.46	4,213.42	4,215.30	0.00	0.00	0.00
15,300.00	90.00	89.68	10,625.00	128.03	4,313.42	4,315.28	0.00	0.00	0.00
15,400.00	90.00	89.68	10,625.00	128.59	4,413.42	4,415.26	0.00	0.00	0.00
15,500.00	90.00	89.68	10,625.00	129.15	4,513.42	4,515.24	0.00	0.00	0.00
15,600.00	90.00	89.68	10,625.00	129.72	4,613.42	4,615.22	0.00	0.00	0.00
15,700.00	90.00	89.68	10,625.00	130.28	4,713.41	4,715.20	0.00	0.00	0.00
15,800.00	90.00	89.68	10,625.00	130.85	4,813.41	4,815.18	0.00	0.00	0.00
15,900.00	90.00	89.68	10,625.00	131.41	4,913.41	4,915.16	0.00	0.00	0.00





# MS Directional Planning Report



Database:	EDM 5000.14 Conroe DB	Local Co-ordinate Reference:	Well Rana Salada Fed 01 235H
Company:	Novo Oil & Gas, LLC	TVD Reference:	WELL @ 3109.30usft (25' RKB)
Project:	Eddy County, New Mexico (NAD 83)	MD Reference:	WELL @ 3109.30usft (25' RKB)
Site:	Rana Salada Fed 01 - K Pad	North Reference:	Grid
Well:	Rana Salada Fed 01 235H	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)
16,000.00	90.00	89.68	10,625.00	131.98	5,013.41	5,015.14	0.00	0.00	0.00
16,100.00	90.00	89.68	10,625.00	132.54	5,113.41	5,115.13	0.00	0.00	0.00
16,200.00	90.00	89.68	10,625.00	133.11	5,213.41	5,215.11	0.00	0.00	0.00
16,223.80	90.00	89.68	10,625.00	133.24	5,237.21	5,238.90	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
FTP - Rana Salada Fed 01 - hit/miss target - Shape - Point	0.00	0.01	10,625.00	105.68	355.12	486,094.58	629,398.66	32.336024	-104.048210
PBHL - Rana Salada Fed 01 - plan hits target center - Point	0.00	0.00	10,625.00	133.24	5,237.21	486,122.14	634,280.75	32.336063	-104.032403
LTP - Rana Salada Fed 01 - plan misses target center by 0.75usft at 16023.84usft MD (10625.00 TVD, 132.11 N, 5037.25 E) - Point	0.00	0.00	10,625.00	132.86	5,037.24	486,121.76	634,080.79	32.336063	-104.033050

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
9,984.59	9,925.00	9 5/8"	9-5/8	12-1/4	

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
229.30	229.30	Rustler				
2,802.84	2,779.30	Bell Canyon (base of salt)				
3,851.76	3,799.30	Cherry Canyon				
5,308.89	5,249.30	Brushy Canyon*				
6,378.89	6,319.30	Bone Spring Lime*				
7,058.89	6,999.30	Lower Avalon*				
7,478.89	7,419.30	1st Bone Spring Sand*				
7,728.89	7,669.30	2nd Bone Spring Carbonate				
8,183.89	8,124.30	2nd Bone Spring Sand*				
8,548.89	8,489.30	3rd Bone Spring Carbonate				
9,428.89	9,369.30	3rd Bone Spring Sand*				
9,738.89	9,679.30	Wolfcamp XY*				
9,883.89	9,824.30	Wolfcamp A*				
10,143.91	10,084.30	Wolfcamp B				
10,523.44	10,429.30	Wolfcamp B Flow Unit*				





# MS Directional Planning Report



Database: EDM 5000.14 Conroe DB  
 Company: Novo Oil & Gas, LLC  
 Project: Eddy County, New Mexico (NAD 83)  
 Site: Rana Salada Fed 01 - K Pad  
 Well: Rana Salada Fed 01 235H  
 Wellbore: Wellbore #1  
 Design: Design #1

Local Co-ordinate Reference: Well Rana Salada Fed 01 235H  
 TVD Reference: WELL @ 3109.30usft (25' RKB)  
 MD Reference: WELL @ 3109.30usft (25' RKB)  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature

## Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,500.00	1,500.00	0.00	0.00	KOP, 2.00°/100' Build
2,174.27	2,168.07	14.26	-77.69	Hold 13.49° Inc, 280.40° Azm
3,885.32	3,831.93	86.32	-470.14	Begin 2.00°/100' Drop
4,559.59	4,500.00	100.59	-547.83	Begin Vertical Hold
10,111.63	10,052.04	100.59	-547.83	Begin 10.00°/100' Build
11,011.63	10,625.00	103.82	25.12	Begin 90.00° Lateral
16,223.80	10,625.00	133.24	5,237.21	PBHL

## **PECOS DISTRICT SURFACE USE CONDITIONS OF APPROVAL**

**OPERATOR'S NAME:** Novo Oil & Gas Northern Delaware, LLC  
**LEASE NO.:** NMNM 091078  
**LOCATION:** Section 2, T.23 S., R.28 E., NMPM  
**COUNTY:** Eddy County, New Mexico

**Rana Salada Fed Com 0106 136H**

**Surface Hole Location:** 2531 ft. FNL and 25 ft. FEL; Section 2, T. 23 S., R. 28 E.  
**Bottom Hole Location:** 1914 ft. FSL and 10 ft. FEL; Section 6, T. 23 S., R. 29 E.

**Rana Salada Fed Com 0106 216H**

**Surface Hole Location:** 2491 ft. FNL and 25 ft. FEL; Section 2, T. 23 S., R. 28 E.  
**Bottom Hole Location:** 2310 ft. FSL and 130 ft. FEL; Section 6, T. 23 S., R. 29 E.

**Rana Salada Fed Com 0106 226H**

**Surface Hole Location:** 2511 ft. FNL and 25 ft. FEL; Section 2, T. 23 S., R. 28 E.  
**Bottom Hole Location:** 1914 ft. FSL and 130 ft. FEL; Section 6, T. 23 S., R. 29 E.

**Rana Salada Fed Com 01 135H**

**Surface Hole Location:** 2451 ft. FNL and 25 ft. FEL; Section 2, T. 23 S., R. 28 E.  
**Bottom Hole Location:** 2310 ft. FNL and 10 ft. FEL; Section 1, T. 23 S., R. 28 E.

**Rana Salada Fed Com 01 215H**

**Surface Hole Location:** 2431 ft. FNL and 25 ft. FEL; Section 2, T. 23 S., R. 28 E.  
**Bottom Hole Location:** 1914 ft. FNL and 130 ft. FEL; Section 1, T. 23 S., R. 28 E.

**Rana Salada Fed Com 01 225H**

**Surface Hole Location:** 2471 ft. FNL and 25 ft. FEL; Section 2, T. 23 S., R. 28 E.  
**Bottom Hole Location:** 2310 ft. FNL and 130 ft. FEL; Section 1, T. 23 S., R. 28 E.

**Rana Salada Fed Com 01 235H**

**Surface Hole Location:** 2281 ft. FNL and 25 ft. FEL; Section 2, T. 23 S., R. 28 E.  
**Bottom Hole Location:** 2178 ft. FNL and 130 ft. FEL; Section 1, T. 23 S., R. 28 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**
  - Cave/Karst
  - Hydrology
  - Potash Resources
- ☐ **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**

## **I. 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.

## **II. 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.)

## **III. 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.

## **IV. 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.

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

### **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.

### **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.

### **Cave/Karst Surface Mitigation**

The following stipulations will be applied to minimize impacts during construction, drilling and production:

### **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.

**Buried Pipeline/Cable Construction:**

- Rerouting of the buried line(s) may be required if a subsurface void is encountered during construction to minimize the potential subsidence/collapse of the feature(s) as well as the possibility of leaks/spills entering the karst drainage system.

**Powerline Construction:**

- Smaller powerlines will be routed around sinkholes and other karst features to avoid or lessen the possibility of encountering near surface voids and to minimize changes to runoff or possible leaks and spills from entering karst systems.
- Larger powerlines will adjust their pole spacing to avoid cave and karst features.
- Special restoration stipulations or realignment may be required if subsurface voids are encountered.

**Surface Flowlines Installation:**

- Flowlines will be routed around sinkholes and other karst features to minimize the possibility of leaks/spills from entering the karst drainage system.

**Leak Detection System:**

- A method of detecting leaks is required. The method could incorporate gauges to measure loss, situating 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.

**VI. 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**

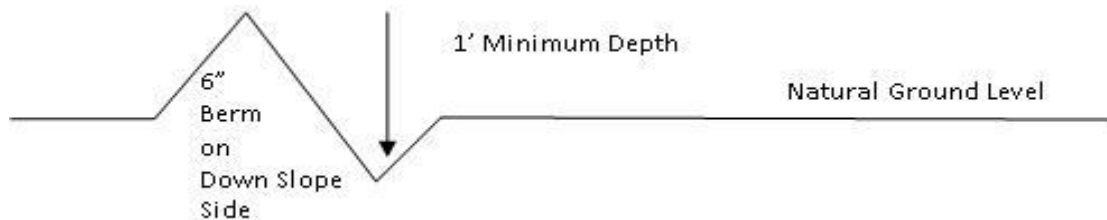
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

## Drainage

Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill outslowing and insloping, 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

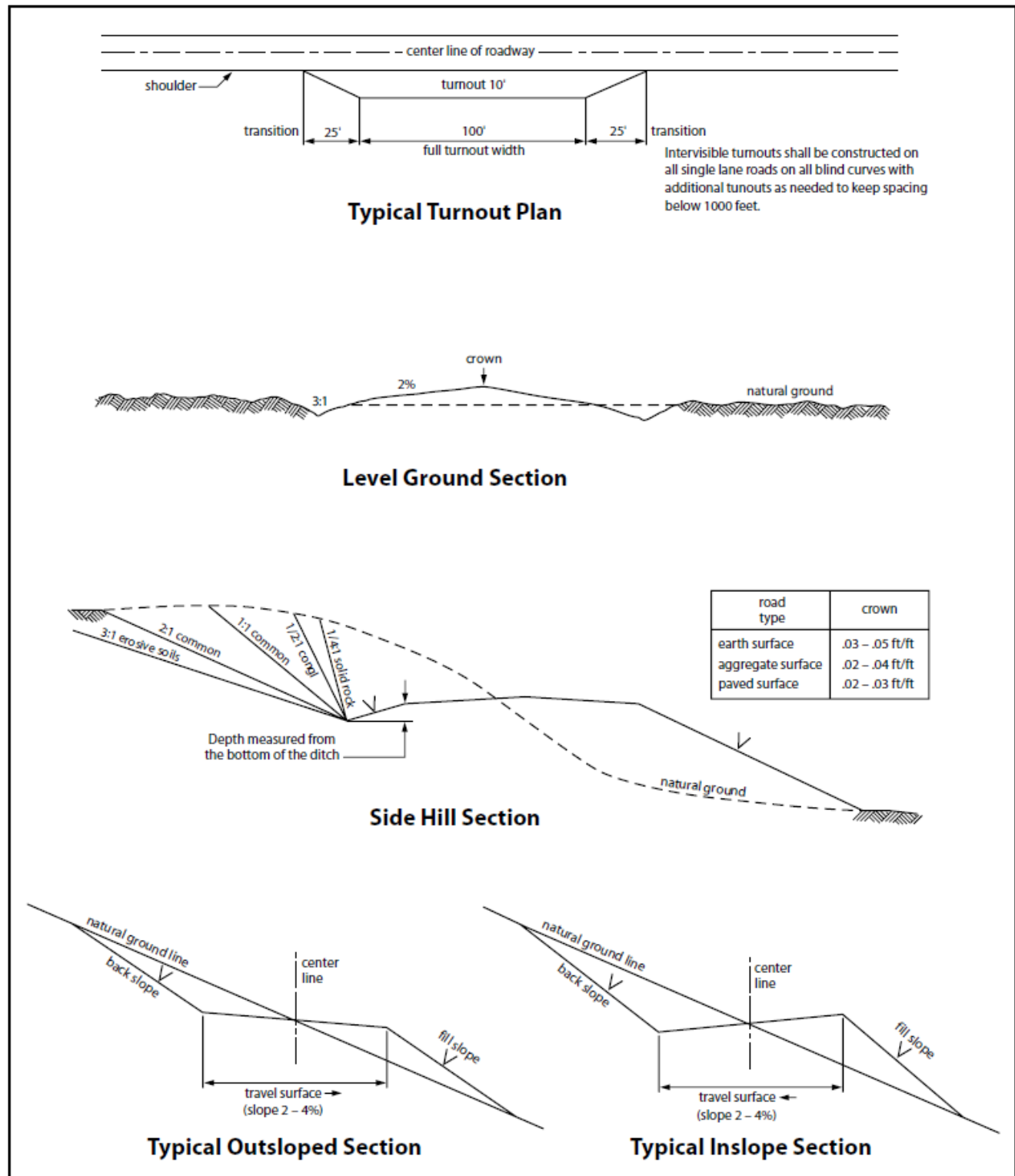


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

## VII. 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).

## **VIII. 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).

## **IX. 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:

Species	lb/acre
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>NOVO OIL &amp; GAS</b>
<b>LEASE NO.:</b>	<b>NMNM091078</b>
<b>WELL NAME &amp; NO.:</b>	<b>RANA SALADA 01 Fed 235H</b>
<b>SURFACE HOLE FOOTAGE:</b>	<b>2281'/N &amp; 25'/E</b>
<b>BOTTOM HOLE FOOTAGE:</b>	<b>2178'/N &amp; 130'/E</b>
<b>LOCATION:</b>	<b>Section 2, 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 **2,700** 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 **10,000 (10M) psi. Variance is approved to use a 5000 (5M) Annular which shall be tested to 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.

**JJP04092021**

 Justin Carter <jcarter@novoog.com>  
Wed 4/7/2021 8:36 AM  
To: Porter, Jeremy J  
Cc: Alex Bourland <abourland@novoog.com>

 RSF 01 235H_10M Well Contr... 671 KB	 RSFC 0106 233H_10M Well C... 673 KB
 RSFC 0106 234H_10M Well C... 673 KB	 RSFC 0106 236H_10M Well C... 672 KB
 RSF 01 231H_10M Well Contr... 671 KB	 RSF 01 232H_10M Well Contr... 671 KB

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Jeromy,

Please find attached the Well Control Plans for the Rana Salada Fed 01 and 0106 wells.

Thanks for the help.

Justin Carter  
Landman

Novo Oil & Gas, LLC  
1001 West Wilshire Blvd, Suite 206  
Oklahoma City, OK 73116  
405.286.3375 O  
405.406.0737 C

Rana Salada Fed 01 235H

### 10,000 PSI BOP Annular Variance Request

NOVO Oil & Gas request a variance to use a 5000 psi annular BOP with a 10,000 psi BOP stack. The component and compatibility tables along with the general well control plans demonstrate how the 5000 psi annular BOP will be protected from pressures that exceed its rated working pressure (RWP). The Annular will be tested to 100% of the RWP of 5,000 psi.

#### 1. Component and Preventer Compatibility Tables

The tables below outlines the tubulars and the compatible preventers in use. This table, combined with the drilling fluid, documents that two barriers to flow will be maintained at all times.

12-1/4" Intermediate Hole Section (R-111-P/4-string design only) 10M psi requirement					
Component	OD	Primary Preventer	RWP	Alternate Preventer(s)	RWP
Drillpipe	5.000"	Annular	5M	Upper 3.5 - 5.5" VBR Lower 3.5 - 5.5" VBR	10M 10M
HWDP	5.000"	Annular	5M	Upper 3.5 - 5.5" VBR Lower 3.5 - 5.5" VBR	10M 10M

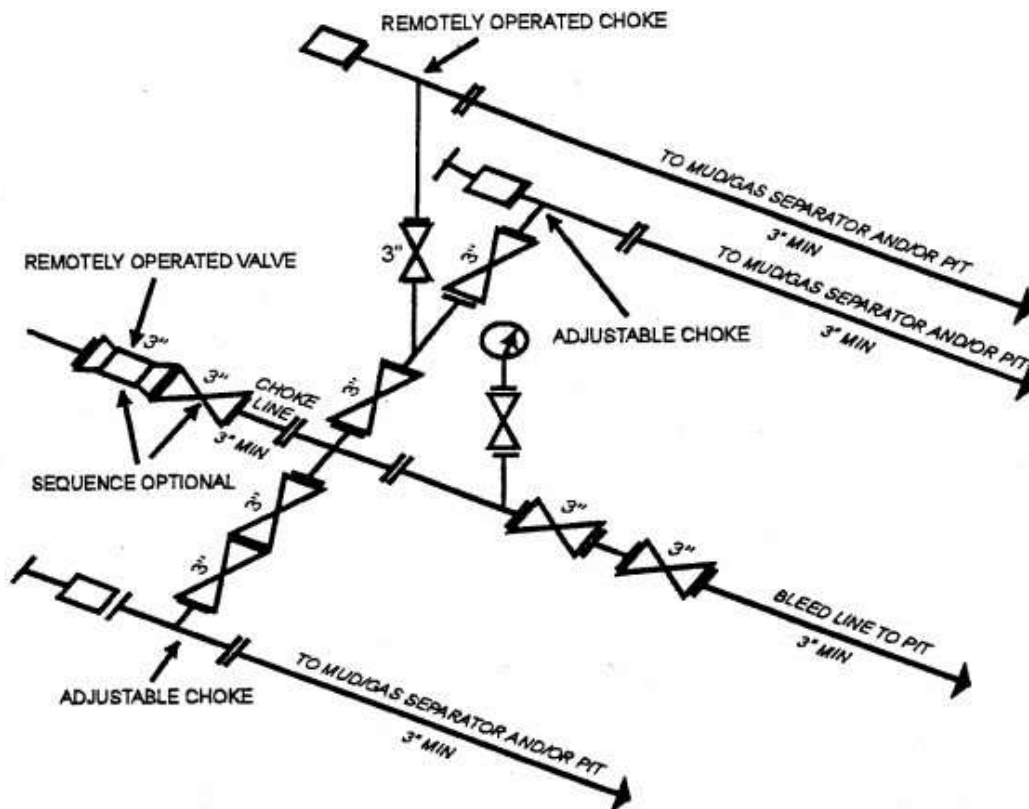
9-7/8" Intermediate Hole Section 10M psi requirement					
Component	OD	Primary Preventer	RWP	Alternate Preventer(s)	RWP
Drillpipe	5.000"	Annular	5M	Upper 3.5 - 5.5" VBR Lower 3.5 - 5.5" VBR	10M 10M
HWDP	5.000"	Annular	5M	Upper 3.5 - 5.5" VBR Lower 3.5 - 5.5" VBR	10M 10M
Jars	6.500"	Annular	5M	-	-
DCs and MWD tools	8.000"	Annular	5M	-	-
Mud Motor	8.000"	Annular	5M	-	-
2 <sup>nd</sup> Intermediate casing	8.625"	Annular	5M	-	-
Open-hole	-	Blind Rams	10M	-	-

Jars	6.500"	Annular	5M	-	-
DCs and MWD tools	6.500" - 8.000"	Annular	5M	-	-
Mud Motor	8.000" - 9.625"	Annular	5M	-	-
1 <sup>st</sup> Intermediate casing	10.750"	Annular	5M	-	-
Open-hole	-	Blind Rams	10M	-	-
<b>7-7/8" Production Hole Section 10M psi requirement</b>					
<b>Component</b>	<b>OD</b>	<b>Primary Preventer</b>	<b>RWP</b>	<b>Alternate Preventer(s)</b>	<b>RWP</b>
Drillpipe	5.000"	Annular	5M	Upper 3.5 - 5.5" VBR Lower 3.5 - 5.5" VBR	10M 10M
HWDP	5.000"	Annular	5M	Upper 3.5 - 5.5" VBR Lower 3.5 - 5.5" VBR	10M 10M
DCs and MWD tools	6.500"	Annular	5M	-	-
Mud Motor	6.500"	Annular	5M	-	-
Mud Motor	6.500"	Annular	5M	-	-
Production casing	5.500"	Annular	5M	Upper 3.5 - 5.5" VBR Lower 3.5 - 5.5" VBR	10M 10M
Open-hole	-	Blind Rams	10M	-	-

VBR = Variable Bore

Ram 10M

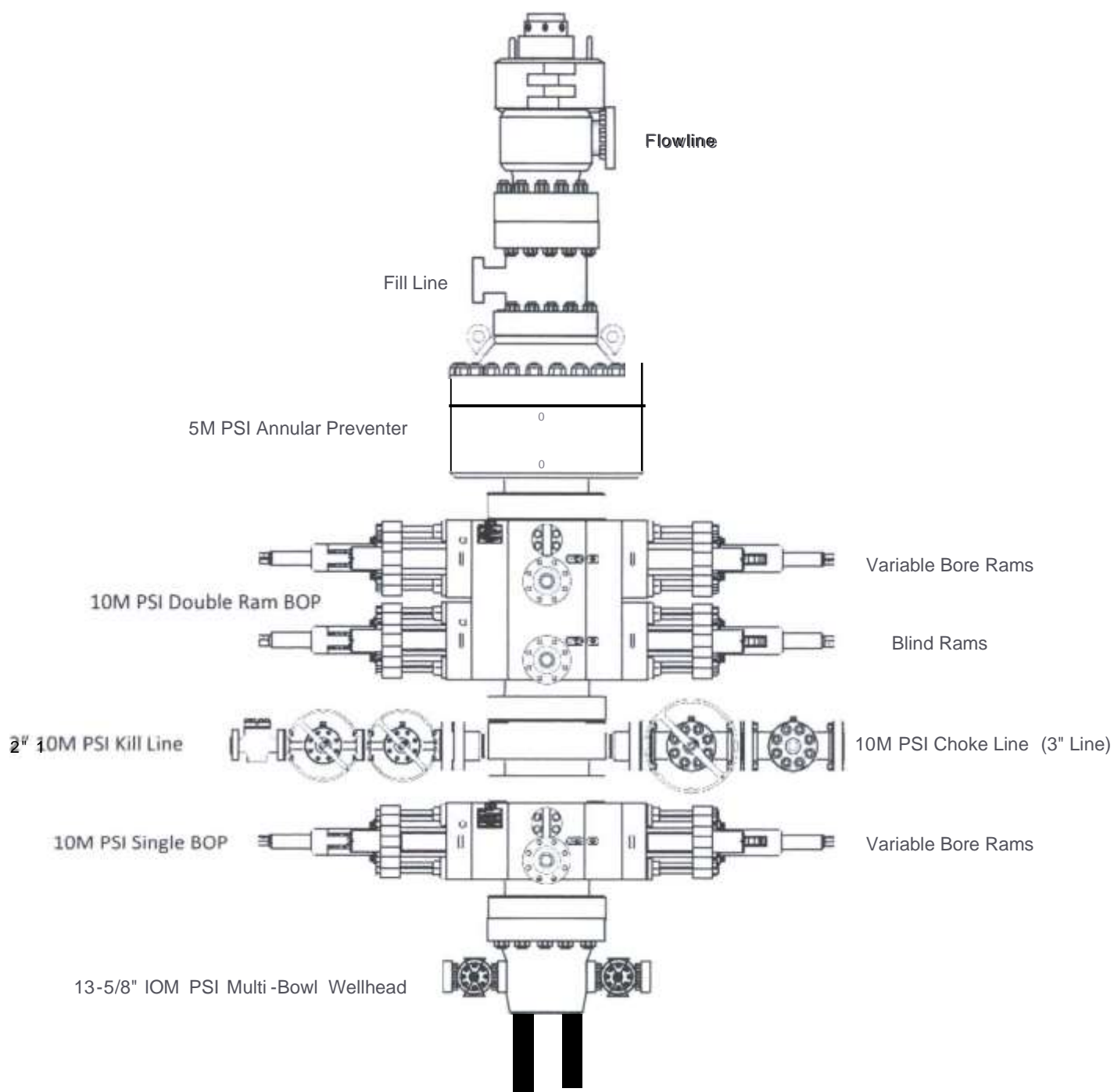
Choke Manifold



10M AND 15M CHOKE MANIFOLD EQUIPMENT - CONFIGURATION OF CHOKES MAY VARY  
[53 FR 49661, Dec. 9, 1988 and 54 FR 39528, Sept. 27, 1989]



# **Novo Oil & Gas** **13-5/8" 10M PSI BOP** **Stack**



## 2. Well Control Procedures

Below are the minimal high-level tasks prescribed to assure a proper shut-in while drilling, tripping , running casing, pipe out of the hole (open hole), and moving the BHA through the BOPs. At least one well control drill will be performed weekly per crew to demonstrate compliance with the procedure and well control plan. The well control drill will be recorded in the daily drilling log. The type of drill will be determined by the ongoing operations, but reasonable attempts will be made to vary the type of drill conducted (pit, trip, open hole, choke, etc.). This well control plan will be available for review by rig personnel in the NOVO drilling supervisor' s office on location, and on the rig floor. All BOP equipment will be tested as per Onshore O&G Order No. 2 with the exception including the 5000 psi annular which will be tested to 100% of its RWP.

### General Procedure While Drilling

1. Sound alarm (alert crew)
2. Space out drill string
3. Shut down pumps (stop pumps and rotary)
4. Shut-in Well (uppermost applicable BOP, typically annular preventer first. HCR and choke will already be in the closed position.)
5. Confirm shut-in
6. Notify tool pusher/company representative
7. Read and record the following:
  - a. SIDPP and SICP
  - b. Pit gain
  - c. Time
8. Regroup and identify forward plan
9. If pressure has built or is anticipated during the kill to reach 70% or greater of the RWP of the annular preventer, confirm spacing and close the upper variable bore rams.

### General Procedure While Tripping

1. Sound alarm (alert crew)
2. Stab full opening safety valve and close
3. Space out drill string
4. Shut-in (uppermost applicable BOP, typically annular preventer first. HCR and choke will already be in the closed position .)
5. Confirm shut-in
6. Notify tool pusher/company representative
7. Read and record the following:
  - a. SIDPP and SICP
  - b. Pit gain
  - c. Time
8. Regroup and identify forward plan
9. If pressure has built or is anticipated during the kill to reach 70% or greater of the RWP of the annular preventer, confirm spacing and close the upper variable bore rams .

### General Procedure While Running Production Casing

- I. Sound alarm (alert crew) 2. Stab crossover and full opening safety valve and close 3. Space out string

4. Shut-in (uppermost applicable BOP, typically annular preventer first. HCR and choke will already be in the closed position.)
5. Confirm shut-in
6. Notify tool pusher/company representative
7. Read and record the following:
  - a. SIDPP and SICP
  - b. Pit gain
  - c. Time
8. Regroup and identify forward plan
9. If pressure has built or is anticipated during the kill to reach 70% or greater of the RWP of the annular preventer, confirm spacing and close the upper variable bore rams.

#### General Procedure With No Pipe In Hole (Open Hole)

1. Sound alarm (alert crew)
2. Shut-in with blind rams. (HCR and choke will already be in the closed position.)
3. Confirm shut-in
4. Notify tool pusher/company representative
5. Read and record the following:
  - a. SICP
  - b. Pit gain
  - c. Time
6. Regroup and identify forward plan

#### General Procedures While Pulling BHA thru Stack

1. PRIOR to pulling last joint of drillpipe thru the stack.
  - a. Perform flowcheck , if flowing :
  - b. Sound alarm (alert crew)
  - c. Stab full opening safety valve and close
  - d. Space out drill string with tool joint just beneath the upper variable bore rams .
  - e. Shut-in using upper variable bore rams . (HCR and choke will already be in the closed position.)
  - f. Confirm shut-in
  - g. Notify toolpusher/company representative
  - h. Read and record the following:
    - i. SIDPP and SICP
    - ii . Pit gain
    - iii. Time
1. Regroup and identify forward plan
2. With BHA in the stack and compatible ram preventer and pipe combo immediately available.
  - a. Sound alarm (alert crew)
  - b. Stab crossover and full opening safety valve and close
  - c. Space out drill string with upset just beneath the upper variable bore rams.
  - d. Shut-in using upper variable bore rams. (HCR and choke will already be in the closed position.)
  - e. Confirm shut-in
  - f. Notify toolpusher/company representative
  - g. Read and record the following:
    - i. SIDPP and SICP

- ii. Pit gain
    - iii. Time
  - h. Regroup and identify forward plan
- 3. With BHA in the stack and NO compatible ram preventer and pipe combo immediately available .
  - a. Sound alarm (alert crew)
  - b. If possible to pick up high enough, pull string clear of the stack and follow "Open Hole" scenario.
  - c. If impossible to pick up high enough to pull the string clear of the stack:
  - d. Stab crossover, make up one joint/stand of drillpipe, and full opening safety valve and close
  - e. Space out drill string with tooljoint just beneath the upper variable bore ram.
  - f. Shut-in using upper variable bore ram. (HCR and choke will already be in the closed position.)
  - g. Confirm shut-in
  - h. Notify tool pusher/company representative
  - 1. Read and record the following:
    - i. SIDPP and SICP
    - ii. Pit gain
    - iii. Time
  - J. Regroup and identify forward plan



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

highest ground  
at Northwest

flare >150' from wellhead  
flare line straight

windsocks on rig floor  
& at mud tanks

prevailing wind  
from South

secondary briefing area  
>150' from wellhead  
& exit route

PRIMARY safety briefing area  
>150' from wellhead  
& exit route

warning sign  
& windsock

- (A) RANA SALADA FED 01 235H
- (B) RANA SALADA FED 01 215H
- (C) RANA SALADA FED 01 135H
- (D) RANA SALADA FED 01 225H
- (E) RANA SALADA FED COM 0106 216H
- (F) RANA SALADA FED COM 0106 226H
- (G) RANA SALADA FED COM 0106 136H

RANA SALADA FED  
01 235H  
ELEV. = 3084.3'  
LAT. = 32.3357355°N (NAD83)  
LONG. = 104.0493606°W  
NMSP EAST (FT)  
N = 485988.90  
E = 629043.54

RANA SALADA FED  
01 235H PAD K  
7.429± ACRES

1/4 CORNER  
3/8" REBAR

PROPOSED 391 L.F.  
ACCESS ROAD

015 75 150 300

SCALE 1" = 150'

DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF ST. HWY. 31 (POTASH MINES RD.) & CR. 605 (REFINERY ROAD) GO NORTH-NORTHWEST ON CR. 605 APPROX. 1.44 MILES, TURN LEFT ON CALICHE ROAD AND GO SOUTH APPROX. 0.15 MILES, ROAD BOUNDS LEFT 60° SOUTHWEST APPROX. 0.1 MILES TO A ROAD SURVEY ON RIGHT FOLLOW ROAD SURVEY SOUTHWEST AND WEST 391' TO THE SOUTHEAST PAD CORNER FOR THIS LOCATION.

I, FILMON R. JARAMILA, A NEW MEXICO LICENSED PROFESSIONAL SURVEYOR CERTIFICATE NO. 1797, DO HEREBY CERTIFY THAT FOR THIS SURVEY I HAVE USED THE BEST OF MY KNOWLEDGE, SKILL AND CARE AND THAT THE SURVEY WAS CONDUCTED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE BOARD OF LAND SURVEYORS OF THE STATE OF NEW MEXICO.

FILMON R. JARAMILA 1797

MADRON SURVEYING, INC.

301 SOUTH CANAL  
(575) 234-3341

CARLSBAD, NEW MEXICO

APRIL 21, 2020

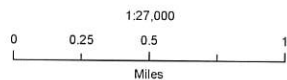
SURVEY NO. 7306A



# **Novo Oil and Gas Northern Delaware**

Rana Salada Fed 01/0106  
Pad K  
H<sub>2</sub>S Contingency Plan:  
Radius Map

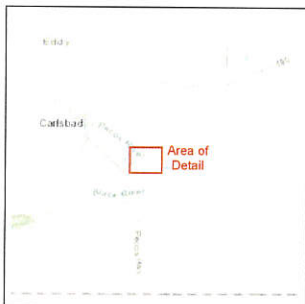
Section 2, Township 23S, Range 28E  
Eddy County, New Mexico



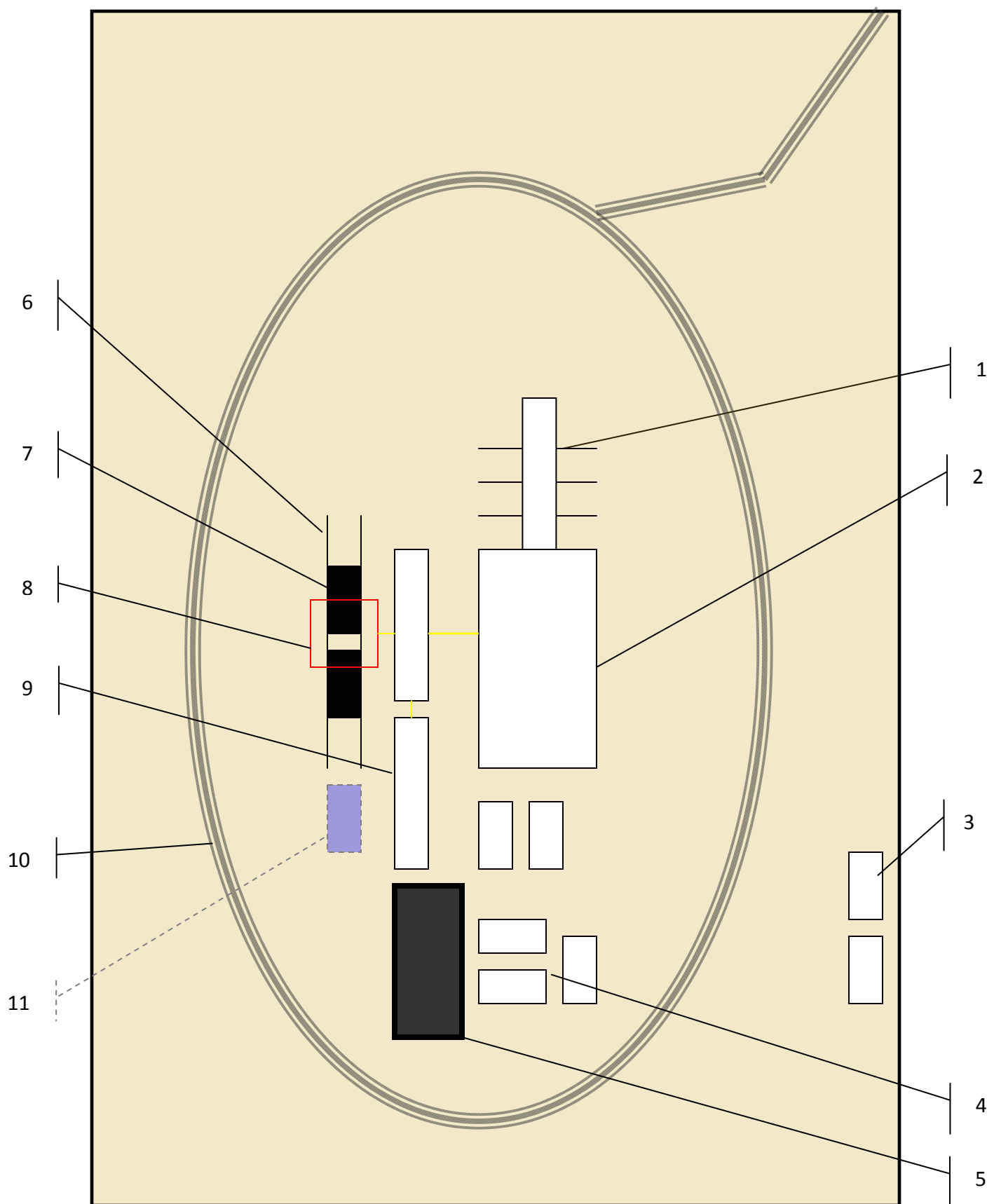
NAD 1983 New Mexico State Plane East  
FIPS 3001 Feet



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**



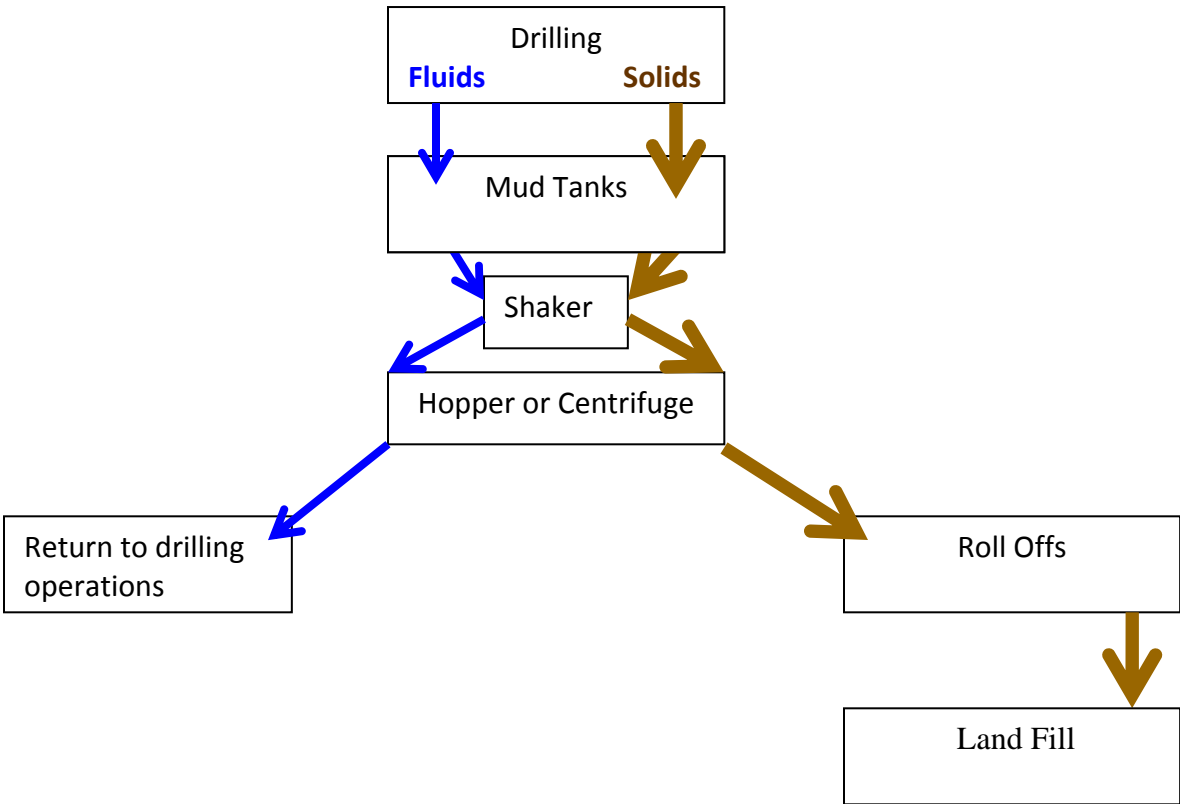
**Above: Centrifugal Closed Loop System**





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

**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 23894

**COMMENTS**

Operator:		OGRID:	Action Number:	Action Type:
NOVO OIL & GAS NORTHERN DELAWA	1001 West Wilshire Blvd	372920	23894	FORM 3160-3
Suite 206	Oklahoma City, OK73116			

Created By	Comment	Comment Date
kpickford	KP GEO Review 4/17/2021	04/17/2021

**District I**

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**District IV**

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Phone:(505) 476-3470 Fax:(505) 476-3462

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

CONDITIONS

Action 23894

**CONDITIONS OF APPROVAL**

Operator:	NOVO OIL & GAS NORTHERN DELAWA	1001 West Wilshire Blvd	OGRID:	372920	Action Number:	23894	Action Type:	FORM 3160-3
	Suite 206	Oklahoma City, OK73116						

OCD Reviewer	Condition
kpickford	Notify OCD 24 hours prior to casing & cement
kpickford	Will require a File As Drilled C-102 and a Directional Survey with the C-104
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
kpickford	Cement is required to circulate on both surface and intermediate1 strings of casing
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