

Form 3160-3  
(June 2015)FORM APPROVED  
OMB No. 1004-0137  
Expires: January 31, 2018UNITED 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			5. Lease Serial No. <b>NMLC062376</b>
1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other			6. If Indian, Allottee or Tribe Name
1c. Type of Completion: <input type="checkbox"/> Hydraulic Fracturing <input checked="" type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone			7. If Unit or CA Agreement, Name and No.
2. Name of Operator <b>NOVO OIL AND GAS NORTHERN DELAWARE LLC</b>			8. Lease Name and Well No. <b>TICKETY BOO 2109 FED COM</b> <b>122H</b>
3a. Address <b>300 N MARIENFIELD STREET SUITE 1000, MIDLAND, TX</b>		3b. Phone No. (include area code) <b>(432) 695-4222</b>	9. API Well No. <b>30-015-55368</b>
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface <b>SENW / 1576 FNL / 1878 FWL / LAT 32.6488146 / LONG -103.9794657</b> At proposed prod. zone <b>NENW / 10 FNL / 1320 FWL / LAT 32.6821201 / LONG -103.981261</b>			10. Field and Pool, or Exploratory <b>HACKBERRY/BONE SPRING, NW</b>
14. Distance in miles and direction from nearest town or post office* <b>12 miles</b>			11. Sec., T. R. M. or Blk. and Survey or Area <b>SEC 21/T19S/R30E/NMP</b>
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) <b>762 feet</b>		16. No of acres in lease	12. County or Parish <b>EDDY</b>
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. <b>20 feet</b>		17. Spacing Unit dedicated to this well <b>720.0</b>	13. State <b>NM</b>
19. Proposed Depth <b>8267 feet / 20503 feet</b>		20. BLM/BIA Bond No. in file <b>FED:</b>	
21. Elevations (Show whether DF, KDB, RT, GL, etc.) <b>3314 feet</b>		22. Approximate date work will start* <b>02/01/2024</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.   | 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above). |
| 2. A Drilling Plan.  | 5. Operator certification.  |
| 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). | 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: (432) 695-4222</b>	Date <b>06/05/2023</b>
Title <b>Permitting Agent</b>		
Approved by (Signature) (Electronic Submission)	Name (Printed/Typed) <b>CODY LAYTON / Ph: (575) 234-5959</b>	Date <b>03/22/2024</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 collects this information to allow 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: SENW / 1576 FNL / 1878 FWL / TWSP: 19S / RANGE: 30E / SECTION: 21 / LAT: 32.6488146 / LONG: -103.9794657 ( TVD: 0 feet, MD: 0 feet )

PPP: SESW / 0 FNL / 1320 FWL / TWSP: 19S / RANGE: 30E / SECTION: 9 / LAT: 32.6676509 / LONG: -103.9812687 ( TVD: 8304 feet, MD: 15242 feet )

PPP: SESW / 0 FNL / 1320 FWL / TWSP: 19S / RANGE: 30E / SECTION: 16 / LAT: 32.6531461 / LONG: -103.9812763 ( TVD: 8341 feet, MD: 9975 feet )

PPP: NENW / 1220 FNL / 1320 FWL / TWSP: 19S / RANGE: 30E / SECTION: 21 / LAT: 32.6497935 / LONG: -103.981278 ( TVD: 8350 feet, MD: 8739 feet )

BHL: NENW / 10 FNL / 1320 FWL / TWSP: 19S / RANGE: 30E / SECTION: 9 / LAT: 32.6821201 / LONG: -103.981261 ( TVD: 8267 feet, MD: 20503 feet )

### BLM Point of Contact

Name: TENILLE C MOLINA

Title: Land Law Examiner

Phone: (575) 234-2224

Email: TCMOLINA@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  
Phone: (575) 393-6161 Fax: (575) 393-0720  
District II  
811 S. First St., Artesia, NM 88210  
Phone: (505) 748-1283 Fax: (575) 748-9720  
District III  
1000 Rio Brazos Road, Aztec, NM 87410  
Phone: (505) 334-6178 Fax: (505) 334-6170  
District IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505  
Phone: (505) 476-3460 Fax: (505) 476-3462

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

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

## WELL LOCATION AND ACREAGE DEDICATION PLAT

<sup>1</sup> API Number <b>30-015-55368</b>		<sup>2</sup> Pool Code <b>97020</b>		<sup>3</sup> Pool Name <b>HACKBERRY; BONE SPRING, NW</b>	
<sup>4</sup> Property Code <b>335711</b>		<sup>5</sup> Property Name <b>TICKETY BOO 2109 FED COM</b>			<sup>6</sup> Well Number <b>122H</b>
<sup>7</sup> OGRID No. <b>372920</b>		<sup>8</sup> Operator Name <b>NOVO OIL &amp; GAS NORTHERN DELAWARE, LLC</b>			<sup>9</sup> Elevation <b>3314.1</b>

<sup>10</sup> Surface Location

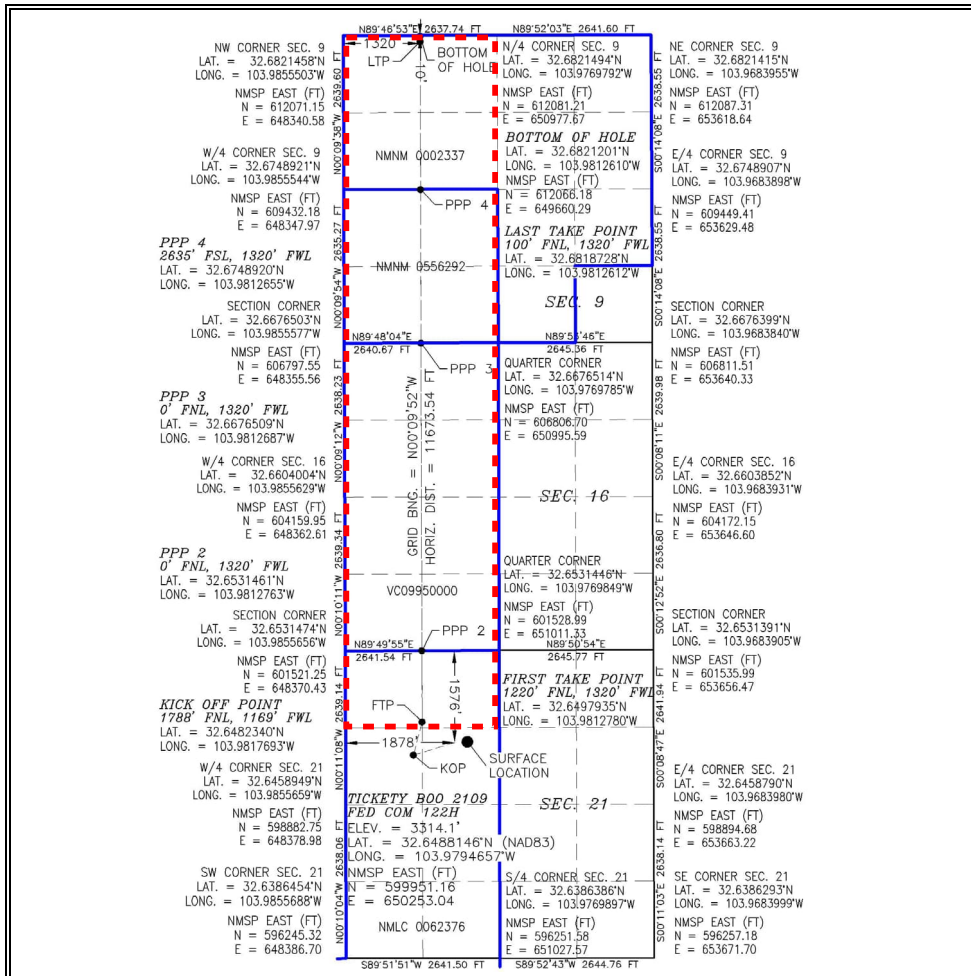
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
<b>F</b>	<b>21</b>	<b>19 S</b>	<b>30 E</b>		<b>1576</b>	<b>NORTH</b>	<b>1878</b>	<b>WEST</b>	<b>EDDY</b>

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

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
<b>C</b>	<b>9</b>	<b>19 S</b>	<b>30 E</b>		<b>10</b>	<b>NORTH</b>	<b>1320</b>	<b>WEST</b>	<b>EDDY</b>

<sup>12</sup> Dedicated Acres <b>720</b>	<sup>13</sup> Joint or Infill	<sup>14</sup> Consolidation Code	<sup>15</sup> Order No.
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No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

<sup>17</sup> OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature: *Cory Walk* Date: **05-03-2023**

Printed Name: **Cory Walk**

E-mail Address: **cory@permitswest.com**

<sup>18</sup> SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

MARCH 29, 2023  
Date of Survey

Signature and Seal of Professional Surveyor:

Certificate Number: **ELI MONTE F. JARAMILLO-P.S. 12797**

NOVO OIL & GAS NORTHERN DELAWARE, LLC  
NO. 9541A

**State of New Mexico**  
**Energy, Minerals and Natural Resources Department**

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

## NATURAL GAS MANAGEMENT PLAN

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

### Section 1 – Plan Description Effective May 25, 2021

**I. Operator:** NOVO Oil & Gas Northern Delaware, LLC OGRID: 372920 **Date:** 3/12/2024

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

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

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

Well Name	API	ULSTR	Footages	Anticipated Oil	Anticipated Gas	Anticipated Prod Water
Tickety Boo 2109 Fed Com 131H		F-21-T19S-R30E	1649' FNL - 1705' FWL	1600 BOPD	1900 MCFD	4700 BWPD
Tickety Boo 2109 Fed Com 132H		F-21-T19S-R30E	1677' FNL - 1733' FWL	1600 BOPD	1900 MCFD	4700 BWPD
Tickety Boo 2109 Fed Com 133H		F-21-T19S-R30E	1706' FNL – 1760' FWL	1600 BOPD	1900 MCFD	4700 BWPD

SEE ATTACHMENT

**IV. Central Delivery Point Name:** Tickety Boo CTB [See 19.15.27.9(D)(1) NMAC]

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

Well Name	API	Spud Date	TD Reached Date	Completion Commencement Date	Initial Flow Back Date	First Production Date
Tickety Boo 2109 Fed Com 131H		6/11/2025	6/30/2025	8/1/2025	10/1/2025	10/1/2025
Tickety Boo 2109 Fed Com 132H		6/11/2025	6/30/2025	8/1/2025	10/1/2025	10/1/2025
Tickety Boo 2109 Fed Com 133H		6/11/2025	6/30/2025	8/1/2025	10/1/2025	10/1/2025

SEE ATTACHMENT

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

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

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

WELL NAME & NUMBER	API	UL/SECT/T/R	FOOTAGES	ANTICIPATED OIL BBL/D	ANTICIPATED GAS MCF/D	ANTICIPATED WATER BBL/D
Tickety Boo 2109 Fed Com 121H				1400	1900	4700
Tickety Boo 2109 Fed Com 122H				1400	1900	4700
Tickety Boo 2109 Fed Com 123H				1400	1900	4700
Tickety Boo 2109 Fed Com 111H				1400	1900	4700
Tickety Boo 2109 Fed Com 112H				1400	1900	4700
Tickety Boo 2109 Fed Com 113H				1400	1900	4700
WELL NAME & NUMBER	API	SPUD	TD	COMPLETION DATE	FLOWBACK DATE	FIRST PRODUCTION
Tickety Boo 2109 Fed Com 121H		6/11/2025	6/30/2025	8/1/2025	10/1/2025	10/1/2025
Tickety Boo 2109 Fed Com 122H		6/11/2025	6/30/2025	8/1/2025	10/1/2025	10/1/2025
Tickety Boo 2109 Fed Com 123H		6/11/2025	6/30/2025	8/1/2025	10/1/2025	10/1/2025
Tickety Boo 2109 Fed Com 111H		6/11/2025	6/30/2025	8/1/2025	10/1/2025	10/1/2025
Tickety Boo 2109 Fed Com 112H		6/11/2025	6/30/2025	8/1/2025	10/1/2025	10/1/2025
Tickety Boo 2109 Fed Com 113H		6/11/2025	6/30/2025	8/1/2025	10/1/2025	10/1/2025

**Section 2 – Enhanced Plan**  
**Effective April 1, 2022**

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

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

**IX. Anticipated Natural Gas Production:**

Well Name	API	Anticipated Average Natural Gas Rate	Anticipated Volume of Natural Gas for the First Year

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

Operator	System	ULSTR of Tie-in	Anticipated Gathering Start Date	Available Volume of Natural Gas for the First Year

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

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

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

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

### **Section 3 – Certifications**

**Effective May 25, 2021**

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

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

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

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

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

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

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

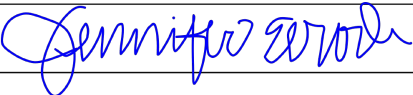
### **Section 4 – Notices**

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

- (a) Operator becomes aware that the natural gas gathering system it planned to connect the well(s) to has become unavailable or will not have capacity to transport one hundred percent of the production from the well(s), no later than 20 days after becoming aware of such information, Operator shall submit for OCD's approval a new or revised venting and flaring plan containing the information specified in Paragraph (5) of Subsection D of 19.15.27.9 NMAC; or
- (b) Operator becomes aware that it has, cumulatively for the year, become out of compliance with its baseline natural gas capture rate or natural gas capture requirement, not later than 20 days after becoming aware of such information, Operator shall submit for OCD's approval a new or revised Natural Gas Management Plan for each well it plans to spud during the next 90 days containing the information specified in Paragraph (2) of Subsection D of 19.15.27.9 NMAC, and shall file and update for each Natural Gas Management Plan until the Operator is back in compliance with its baseline natural gas capture rate or natural gas capture requirement.
- (c) OCD may deny or conditionally approve and APD if Operator does not make a certification, fails to submit an adequate venting and flaring plan which includes alternative beneficial uses for the anticipated volume of natural gas produced, or if OCD determines that Operator will not have adequate natural gas takeaway capacity at the time a well will be spud.

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

Signature:



Printed Name:

JENNIFER ELROD

Title:

SR. REGULATORY ANALYST

E-mail Address:

jennifer.elrod@permres.com

Date:

3/14/2024

Phone:

(940)452-6214

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

Approved By:

Title:

Approval Date:

Conditions of Approval:

Permian Resources Operating, LLC (372165)  
NOVO Oil & Gas Northern Delaware, LLC

## Natural Gas Management Plan Descriptions

### VI. Separation Equipment:

Permian Resources Operating, LLC (Permian) utilizes a production forecast from our Reservoir Engineering team to appropriately size each permanent, 3-phase separator and heater treater utilized for production operations. Our goal is to maintain 5 minutes of retention time in the test vessel and 20 minutes in the heater treater at peak production rates. The gas produced is routed from the separator to the gas sales line.

### VII. Operational Practices:

#### *Drilling*

During Permian's drilling operations it is uncommon for venting or flaring to occur. If flaring is needed due to safety concerns, gas will be routed to a flare and volumes will be estimated.

#### *Flowback*

During completion/recompletion flowback operations, after separation flowback begins and as soon as it is technically feasible, Permian routes gas through a permanent separator and the controlled facility where the gas is either sold or flared through a high-pressure flare if needed.

#### *Production*

Per 19.15.27.8.D, Permian's facilities are designed to minimize waste. Our produced gas will only be vented or flared in an emergency or malfunction situation, except as allowed for normal operations noted in 19.15.27.8.D(2) & (4). All gas that is flared is metered. All gas that may be vented will be estimated.

#### *Performance Standards*

Permian utilizes a production forecast from our Reservoir Engineering team to appropriately size each permanent, 3-phase separator and heater treater utilized for production operations.

All of Permian's permanent storage tanks associated with production operations which are routed to a flare or control device are equipped with an automatic gauging system.

All of Permian's flare stacks, both currently installed and for future installation, are:

- 1) Appropriately sized and designed to ensure proper combustion efficiency.
- 2) Equipped with an automatic ignitor or continuous pilot.
- 3) Anchored and located at least 100 feet from the well and storage tanks.

Permian's field operations and HSE teams have implemented an AVO inspection schedule that adheres to the requirements of 19.15.27.8.E(5).

All of our operations and facilities are designed to minimize waste. We routinely employ the following methods and practices:

- Closed-loop systems
- Enclosed and properly sized tanks



Permian Resources Operating, LLC (372165)  
NOVO Oil & Gas Northern Delaware, LLC

- Vapor recovery units to maximize recovery of low-pressure gas streams and potential unauthorized emissions
- Low-emitting or electric engines whenever practical
- Combustors and flare stacks in the event of a malfunction or emergency
- Routine facility inspections to identify leaking components, functioning control devices, such as flares and combustors, and repair / replacement of malfunctioning components where applicable

*Measurement or estimation*

Permian measures or estimates the volumes of natural gas vented, flared and/or beneficially used for all of our drilling, completing and producing wells. We utilize accepted industry standards and methodology which can be independently verified. Annual GOR testing is completed on our wells and will be submitted as required by the OCD. None of our equipment is designed to allow diversion around metering elements except during inspection, maintenance and repair operations.

**VIII. Best Management Practices:**

Permian Resources utilizes the following BMPs to minimize venting during active and planned maintenance activities:

- Use a closed-loop process wherever possible during planned maintenance activities, such as blowdowns, liquid removal, and work over operations.
- Employ low-emitting or electric engines for equipment, such as compressors
- Adhere to a strict preventative maintenance program which includes routine facility inspections, identification of component malfunctions, and repairing or replacing components such as hatches, seals, valves, etc. where applicable
- Utilize vapor recovery units (VRU's) to maximize recovery of volumes of low-pressure gas streams and potential unauthorized emissions
- Route low pressure gas and emissions streams to a combustion device to prevent venting where necessary

**Enhanced Natural Gas Management Plan****Operator's Plan to Manage Production in Response to Increased Line Pressure**

Permian Resources Operating, LLC (Permian) anticipates that its existing wells connected to the same portion of the natural gas gathering system will continue to meet anticipated increases in line pressure caused by the new wells. Permian will actively monitor line pressure throughout the field and will make necessary adjustments to existing production separators' pressures to send gas to sales. Permian also plans to implement automated alarms on all flare meters to alert of flaring events as they occur. The alarms will send notifications to field operations and engineering staff via text message and email at every occurrence of flaring. In addition, Permian plans to implement automated alarms on all flare meters to alert of any continuous flaring event that has continued for at least 4 hours. The alarms will send notifications to field operations and engineering management. Permian personnel will promptly respond to these alarms, communicate with midstream partners, and take the appropriate action to reduce flaring caused by high line pressure from new well production.

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: TICKETY BOO 2109 FED COMWell Number: 122H

will be on site when testing the BOP.

**Testing Procedure:** All casing strings will be tested in accordance with 43 CFR 3172. The BOP system will be isolated with a test plug and tested by an independent tester to 250 psi low and 5,000 psi high for 10 minutes. The 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 (.22 psi x Shoe TVD, which is equivalent to 660 psi OR 1,500 psi, whichever is higher) for 30 minutes

**Choke Diagram Attachment:**

Choke\_5M\_v2\_20230816102114.pdf

**BOP Diagram Attachment:**

BOP\_5M\_20230511085421.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	215	0	215	3314	3099	215	J-55	54.5	BUTT	9.31	25.43	DRY	60.2	DRY	64.1
2	INTERMEDIATE	12.25	10.75	NEW	NON API	N	0	2015	0	2015	3311	1299	2015	HCL-80	45.53	OTHER - BTC SPL CC	3.79	7.45	DRY	11.34	DRY	11.59
3	INTERMEDIATE	9.875	8.625	NEW	NON API	N	0	4175	0	4175	3314	-861	4175	OTHER	32	OTHER - MO-FXL	3.26	2.35	DRY	5.64	DRY	3.9
4	PRODUCTION	7.875	5.5	NEW	NON API	N	0	20502	0	8350	3311	-5036	20502	P-110	20	OTHER - GB CD	2.69	3.84	DRY	3.84	DRY	3.85

Casing Attachments

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: TICKETY BOO 2109 FED COMWell Number: 122H

Casing Attachments

Casing ID: 1StringSURFACE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Tickety\_Boo\_Fed\_Com\_2109\_122H\_CASING\_CALCULATOR\_20231213120945.pdf

Casing ID: 2StringINTERMEDIATE

Inspection Document:

Spec Document:

cid2907AACC\_F198\_48B7\_9704\_F3D6BE2363B6\_20231213121324.pdf

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Tickety\_Boo\_Fed\_Com\_2109\_122H\_APD\_20231213121439.pdf

Casing ID: 3StringINTERMEDIATE

Inspection Document:

Spec Document:

CDS\_FXL\_8\_625\_32\_BMP\_L80EHC\_Feb04\_2022\_20231213123449.pdf

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Tickety\_Boo\_Fed\_Com\_2109\_122H\_CASING\_CALCULATOR\_20231213123544.pdf

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: TICKETY BOO 2109 FED COMWell Number: 122H

Casing Attachments

Casing ID: 4StringPRODUCTION

Inspection Document:

Spec Document:  
550\_20\_HCP110\_125k\_Min\_GBCD\_Butt\_6.300\_20231213121056.pdf

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):  
Tickety\_Boo\_Fed\_Com\_2109\_122H\_CASING\_CALCULATOR\_20231213121127.pdf

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	265	210	1.34	14.8	281	50	CLASS C	FLUID LOSS, DISPERCENT, RETARDER
INTERMEDIATE	Lead		0	1515	220	2	12.7	440	50	Class C	Fluid Loss, Retarder, LCM, Possibly Beads
INTERMEDIATE	Tail		1515	2015	110	1.34	14.8	147	50	Class C	Fluid Loss, Retarder, LCM
INTERMEDIATE	Lead	2070	0	1570	100	3.24	10.3	324	50	CLASS C	FLUID LOSS, DISPERCENT, RETARDER
INTERMEDIATE	Tail		1570	2070	80	1.34	14.8	107	50	CLASS C	FLUID LOSS, DISPERCENT, RETARDER
INTERMEDIATE	Lead	2070	2070	3675	110	2	12.5	220	50	CLASS C	FLUID LOSS, DISPERCENT, RETARDER
INTERMEDIATE	Tail		3675	4175	60	1.35	14.8	81	50	CLASS C	FLUID LOSS, DISPERCENT, RETARDER
PRODUCTION	Lead		1619	7834	580	2.34	12.5	1357	40	Class H	Fluid Loss, Retarder, LCM
PRODUCTION	Tail		7834	2050	1600	1.86	13.4	2976	35	Class H	Fluid Loss, Retarder, LCM

**Operator Name:** NOVO OIL AND GAS NORTHERN DELAWARE LLC**Well Name:** TICKETY BOO 2109 FED COM**Well Number:** 122H

## 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
4175	2050 2	OIL-BASED MUD	9	9.5							VIS: 45-65
0	215	SPUD MUD	8.6	8.8							VIS: 28-34
215	2015	OTHER : Saturated Brine	9.8	10.2							VIS: 28-34
2015	4175	OTHER : FRESHWATER	8.4	8.6							VIS: 28-34

## 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,DIRECTIONAL SURVEY,

**Coring operation description for the well:**

No core or drill stem test is planned.

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

**Well Name:** TICKETY BOO 2109 FED COM

**Well Number:** 122H

## Section 7 - Pressure

**Anticipated Bottom Hole Pressure:** 5679

**Anticipated Surface Pressure:** 3841

**Anticipated Bottom Hole Temperature(F):** 215

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

**Describe:**

**Contingency Plans geohazards description:**

**Contingency Plans geohazards**

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

**Hydrogen sulfide drilling operations**

TB\_H2S\_Plan\_v2\_20230816102204.pdf

## Section 8 - Other Information

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

TB\_122H\_Directional\_Plan\_20230511085726.pdf

**Other proposed operations facets description:**

**Other proposed operations facets attachment:**

CoFlex\_Certs\_RDC\_20230511085819.pdf

TB\_122H\_Anticollision\_Report\_20230511085844.pdf

Speedhead\_Specs\_3string\_20230511085947.pdf

Alternative\_Casing\_Spec\_Request\_20230511090011.pdf

Tickety\_Boo\_Fed\_Com\_2109\_122H\_APD\_20231213131529.pdf

**Other Variance attachment:**

Casing\_Cement\_Variance\_20230511090021.pdf





NOVO OIL &amp; GAS, LLC

Date

7/15/2019

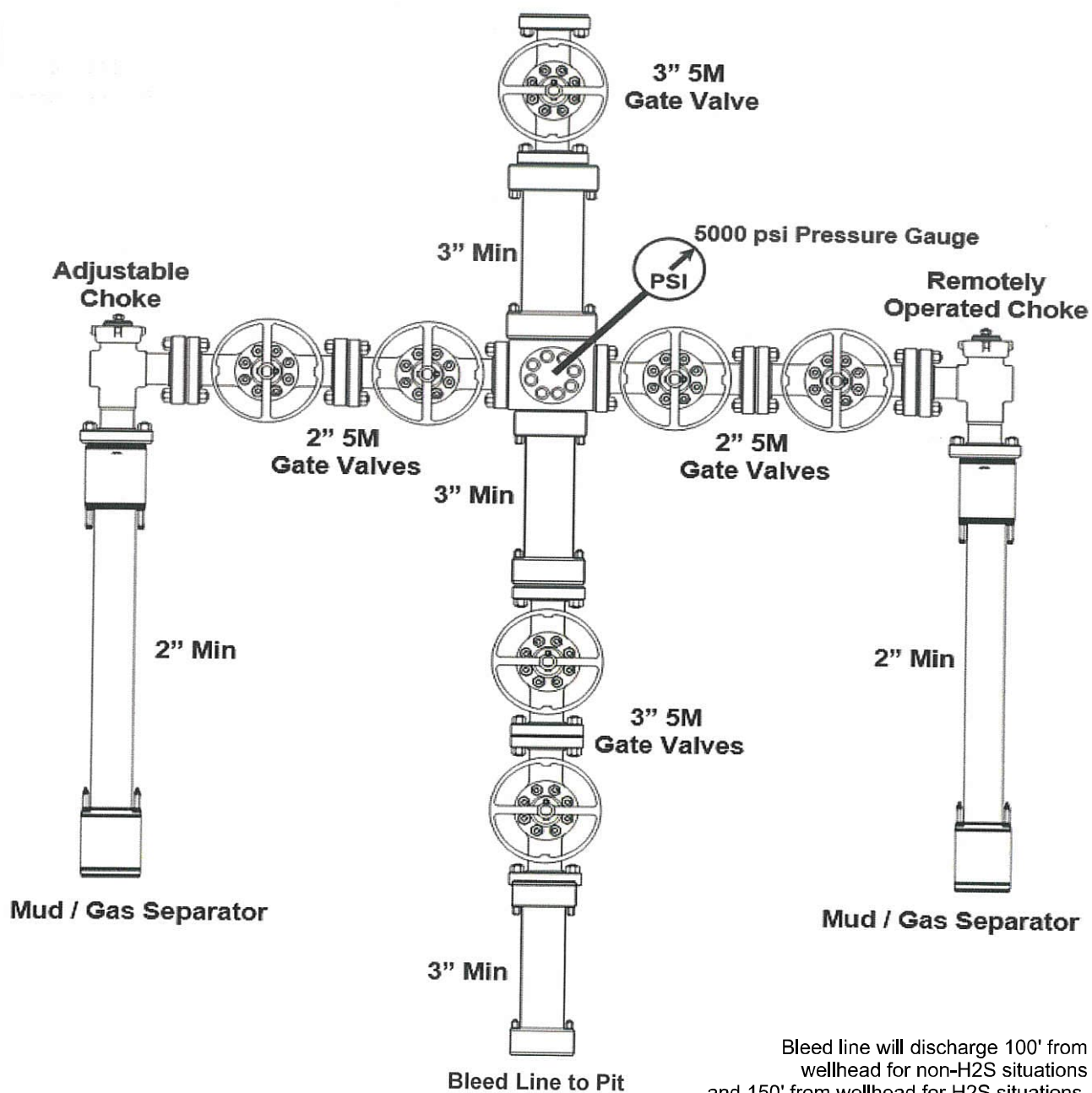
1001 West Wilshire Boulevard, Suite 206  
Oklahoma City, Oklahoma 73116

Page No.

1 of 1

## 5M CHOKE MANIFOLD SCHEMATIC

ITEM	SIZE	PRESSURE	DESCRIPTION





## NOVO OIL &amp; GAS, LLC

Date

2/21/2019

1001 West Wilshire Boulevard, Suite 206  
Oklahoma City, Oklahoma 73116

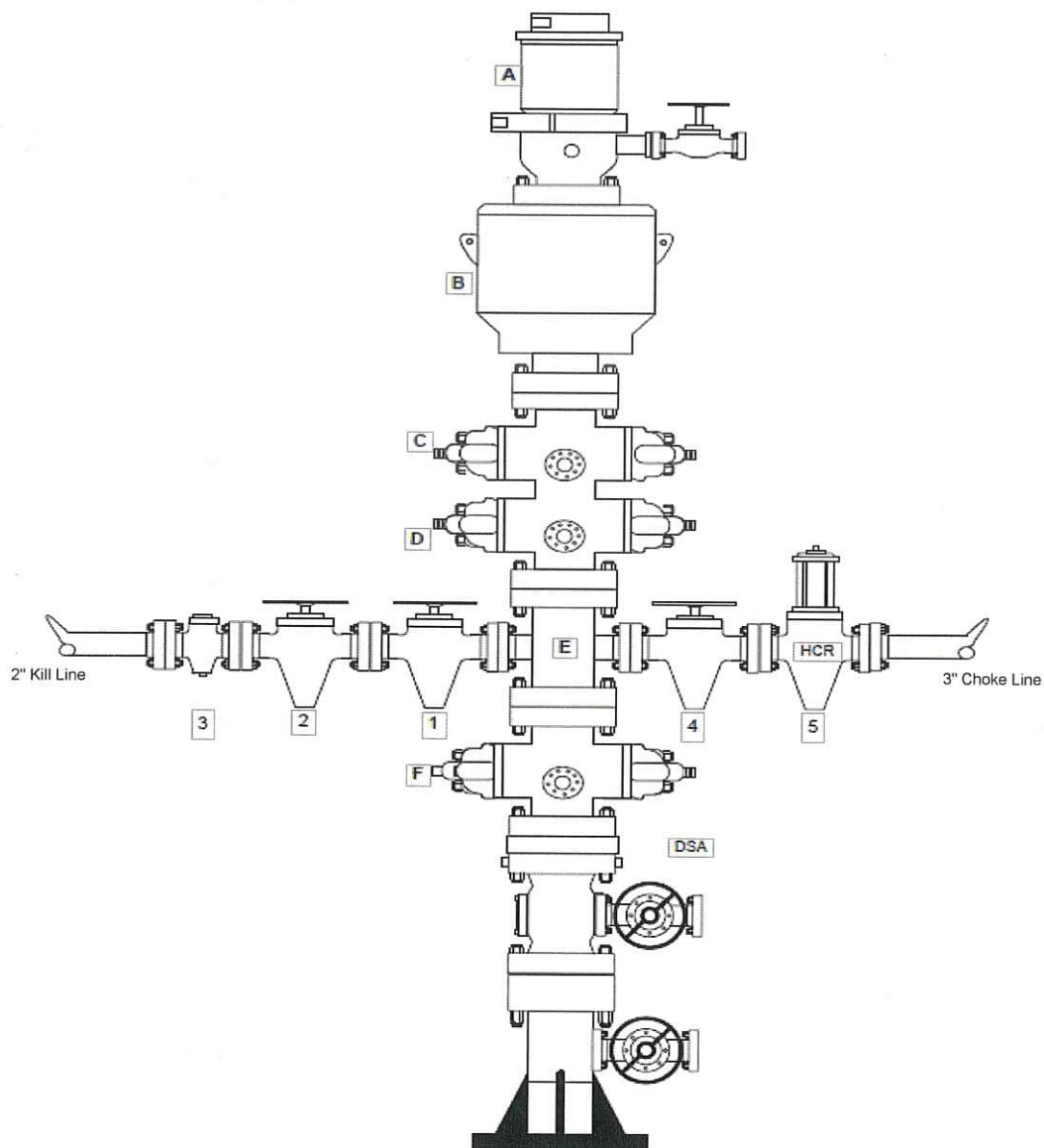
Page No.

1 of 1

## 5M BLOWOUT PREVENTER SCHEMATIC

## BLOWOUT PREVENTOR COMPONENTS

ITEM	SIZE	PRESSURE	DESCRIPTION
A	13-5/8"	1,500 psi	Rotating Head + Valve
B	13-5/8"	5,000 psi	Annular Preventer
C	13-5/8"	5,000 psi	Pipe Rams
D	13-5/8"	5,000 psi	Blind Rams
E	13-5/8"	5,000 psi	Mud Cross
F	13-5/8"	5,000 psi	Pipe Rams



## KILL LINE

ITEM	SIZE	PRESSURE	DESCRIPTION
1	2"	5,000 psi	Gate Valve
2	2"	5,000 psi	Gate Valve
3	2"	5,000 psi	Check Valve

## CHOKE LINE

ITEM	SIZE	PRESSURE	DESCRIPTION
4	3"	5,000 psi	Gate Valve
5	3"	5,000 psi	HCR Valve

<div>Metal One Corp.</div> <div>Metal One</div>	<div>MO-FXL</div> <div>Pipe Body: BMP L80 EHC MinYS 82.5ksi *1</div> <div>Connection Data Sheet</div>	CDS#	MO-FXL 8-5/8 32.0	
			L80EHC	
		Date	MinYS82.5ksi	
			4-Feb-22	

MO-FXL

Geometry

Imperial

S.I.

Pipe Body

Grade *1	L80 EHC		L80 EHC	
Min YS *1	82.5	ksi	125	ksi
Pipe OD ( D )	8 5/8	in	219.08	mm
Weight	32.00	lb/ft	47.68	kg/m
Actual weight	31.10		46.34	kg/m
Wall Thickness ( t )	0.352	in	8.94	mm
Pipe ID ( d )	7.921	in	201.19	mm
Pipe body cross section	9.144	in <sup>2</sup>	5,899	mm <sup>2</sup>
Drift Dia.	7.796	in	198.02	mm
-	-	-	-	-

Connection

Box OD ( W )	8.625	in	219.08	mm
PIN ID	7.921	in	201.19	mm
Make up Loss	3.847	in	97.71	mm
Box Critical Area	5.853	in <sup>2</sup>	3686	mm <sup>2</sup>
Joint load efficiency	69	%	69	%
Thread Taper	1 / 10 ( 1.2" per ft )			
Number of Threads	5 TPI			

Performance

Performance Properties for Pipe Body

S.M.Y.S. *1	754	kips	3,355	kN
M.I.Y.P. *1	5,890	psi	40.62	MPa
Collapse Strength *1	4,100	psi	28.28	MPa

Note S.M.Y.S.= Specified Minimum YIELD Strength of Pipe body  
M.I.Y.P. = Minimum Internal Yield Pressure of Pipe body  
\*1: BMP L80 EHC grade (Min YS= 82.5ksi), Collapse Strength 4,100psi

Performance Properties for Connection

Tensile Yield load	521 kips ( 69% of S.M.Y.S. )
Min. Compression Yield	521 kips ( 69% of S.M.Y.S. )
Internal Pressure	4,120 psi ( 70% of M.I.Y.P. )
External Pressure	100% of Collapse Strength
Max. DLS ( deg. /100ft)	19

Recommended Torque

Min.	10,000	ft-lb	13,500	N-m
Opti.	11,100	ft-lb	15,000	N-m
Max.	12,200	ft-lb	16,500	N-m
Operational Max.	20,300	ft-lb	27,500	N-m

Note : Operational Max. torque can be applied for high torque application

<



GB Connection Performance Properties Sheet

Rev. 0 (08/06/2018)

ENGINEERING THE RIGHT CONNECTIONS

Casing: 5.5 OD, 20 ppf  
Casing Grade\*: HP P-110

Connection: GB CD Butt 6.300  
Coupling Grade: API 125 ksi

PIPE BODY GEOMETRY					
Nominal OD (in.)	5	1/2	Wall Thickness (in.)	0.361	Drift Diameter (in.)
Nominal Weight (ppf)		20.00	Nominal ID (in.)	4.778	API Alternate Drift Dia. (in.)
Plain End Weight (ppf)		19.83	Plain End Area (in. <sup>2</sup> )	5.828	N/A

PIPE BODY PERFORMANCE**					
Material Specification	HP P-110	Min. Yield Str. (psi)	125,000	Min. Ultimate Str. (psi)	125,000
Collapse	API (psi)	Tension		Pressure	
		Pl. End Yield Str. (kips)	729	Min. Int. Yield Press. (psi)	14,360
High Collapse (psi)		Torque		Bending	
		Yield Torque (ft-lbs)	84,570	Build Rate to Yield (°/100 ft)	104.2

GB CD Butt 6.300 COUPLING GEOMETRY			
Coupling OD (in.)	6.300	Makeup Loss (in.)	4.2500
Coupling Length (in.)	8.500	Critical Cross-Sect. (in. <sup>2</sup> )	8.527

GB CD Butt 6.300 CONNECTION PERFORMANCE RATINGS/EFFICIENCIES					
Material Specification	API 125 ksi	Min. Yield Str. (psi)	125,000	Min. Ultimate Str. (psi)	135,000
Tension	Thread Str. (kips)	Efficiency		Bending	
		Internal Pressure (%)	100%	Build Rate to Yield (°/100 ft)	90.9
Min. Tension Yield (kips)	1,013	External Pressure (%)	100%	Yield Torque	
Min. Tension Ult. (kips)	1,094	Tension (%)	100%	Yield Torque (ft-lbs)	35,440
Joint Str. (kips)	685	Compression (%)	100%		
		Ratio of Areas (Cplg/Pipe)	1.46		

MAKEUP TORQUE			
Min. MU Tq. (ft-lbs)	10,000	Max. MU Tq. (ft-lbs)	20,000
		Running Tq. (ft-lbs)	See GBT RP
		Max. Operating Tq. (ft-lbs)*	33,660

Units: US Customary (lbm, in., °F, lbf)  
1 kip = 1,000 lbs

\* See Running Procedure for description and limitations.

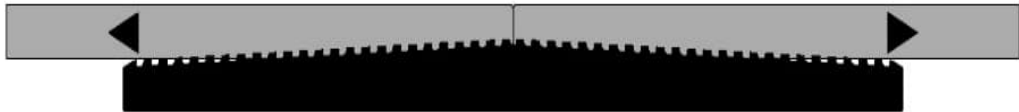
See attached: Notes for GB Connection Performance Properties.

GBC Running Procedure (GBC RP): [www.gbconnections.com/pdf/RP-GB-DWC-Connections.pdf](http://www.gbconnections.com/pdf/RP-GB-DWC-Connections.pdf)

Blanking Dimensions: [www.gbconnections.com/pdf/GB-DWC-Blanking-Dimensions.pdf](http://www.gbconnections.com/pdf/GB-DWC-Blanking-Dimensions.pdf)

Connection yield torque rating based on physical testing or extrapolation therefrom

\*\* Casing properties applicable to HP P-110 grade with min. yield 125 ksi







## Notes for GB Connections Performance Properties

Rev. 1 (May, 2018)

### ENGINEERING THE RIGHT CONNECTIONS™


1. All dimensions shown are nominal. Plain end weight is calculated in accordance with API TR 5C3. Performance properties are empirical, based on nominal dimensions, minimum material yield and ultimate strengths, and calculated in general accordance with industry standard formula(s) assuming uniaxial loading. All properties are calculated on the basis of materials at room temperature. NOTE: Material properties change with temperature.
2. Joint strength is the lesser of pipe thread strength and minimum coupling tension as calculated in accordance with API TR 5C3. Tensile efficiency is calculated using coupling strength based on ultimate material strength per API TR 5C3 divided by plain end yield strength of the casing. Minimum Coupling Tension based on material yield strength is provided for information only. Performance values presented for tension do not account for failure by pull-out (which can occur with heavy wall casing), effects of internal and external pressure, thermally induced axial loads, casing curvature (bending), and/or other static and dynamic loads that may occur singularly or in combination during downhole deployment and with subsequent well operations.
3. Drift diameters are based on Standard and Alternate drift sizes per API 5CT. Drift diameters are not specified for API 5L pipe. Drift diameters shown on GB Connection Performance Property Sheets represent the diameter of the drift mandrel used for end-drifting after coupling buck on. When shown, the alternate drift diameter is used for end drifting. Drift testing is performed in accordance with currently applicable API Specifications.
4. Minimum Internal Yield Pressure Performance values for Casing (API 5CT), Line Pipe (API 5L), and mill casing proprietary grades are based on API TR 5C3 formulas and assume 87.5% minimum wall thicknesses. Minimum Internal Yield Pressure efficiency for GB Connections is the lesser of the Minimum Internal Yield Pressure of the coupling and Leak Resistance divided by pipe body Minimum Internal Yield Pressure (all based on API TR 5C3 formulas). GB Connections typically demonstrate pressure resistance exceeding the mating pipe body unless otherwise noted with a pressure efficiency < 100%. Pressure efficiency can only be achieved when connections are properly assembled in strict accordance with GB Connections' Running Procedures ([www.gbconnections.com/pdf/RP-GB-DWC-Connections.pdf](http://www.gbconnections.com/pdf/RP-GB-DWC-Connections.pdf)).
5. Compression efficiency of the Casing/Connection combinations does not consider the axial load that causes pipe buckling. The compressive load that causes buckling is usually less than the pipe body compressive yield strength and is dependent on a number of factors including, but not limited to, string length (or slenderness ratio; L/D), thermally induced axial loads, and annular clearance that may (or may not) lend side support to the casing string.
6. Bending values assume a constant radius of curvature where the casing is in uniformly intimate contact with the wall of the wellbore (i.e. when the upset at the coupling OD is small compared with wellbore wall irregularities). When the radius of curvature is not constant due to large wellbore wall irregularities, varying trajectory, micro doglegs, wash-outs, rock ledges, and other downhole conditions, unpredictable excessive bending stresses can occur that may be detrimental to casing and connection performance.
7. Fatigue failures are a function of material properties, stress range, and number of stress reversal cycles. API 5CT, API 5L, and mill proprietary casing/coupling materials have a finite fatigue life. Higher stress ranges yield lower fatigue life. So as a general rule of thumb, casing should never be rotated at higher RPMs than needed for task accomplishment. For the same stress range, casing rotated at 25 RPMs will generally last 4 times longer (more rotating hours) than casing rotated at 100 RPMs. However with fatigue, there are opportunities for unexpected higher stress reversal levels associated with vibration, thermally induced axial loads, and bending (see above) in addition to all other stress reversals imparted during running, rotating, reciprocating, pressure testing, pumping, etc. The extent and quality of the cement job is also a factor. Under aggressive, high-volume, multi-stage hydraulic fracturing operations, the casing string (including the connections) is severely taxed such that local stress range(s) and actual number of applied cycles cannot be precisely determined without full string instrumentation.
8. External pressure efficiency (expressed in percent) is the ratio of the lesser of Minimum Internal Yield Pressure and Leak Resistance for coupling (calculated per API TR 5C3) divided by the API collapse rating of the casing. External pressure efficiency has not been verified by testing and does not consider other applied loads. External pressure efficiency does not account for any high collapse rating that may be shown on GB Connection Performance Property Sheets.
9. Maximum Makeup Torque is provided for guidance only. This value is not the same as the Connection Yield Torque shown. Connection Yield Torque is the lesser of yield torque rating for the critical cross-section of pipe body, connector body, and pin nose and the threadform load flank bearing area. Connection Yield Torque does not consider radial buckling of the pipe or connection due to excessive jaw pressure during torque application. Torque in connections can increase or decrease over that applied at makeup (connection tightening/loosening) with rotating and stimulation operations due to slip-stick, shock loads, bending, tight spots, vibration(s), temperature, and other downhole factors that may occur individually or in combination. Due to circumstances beyond the control of GB Connections, User accepts all risks associated with casing and connection related issues that occur during and after rotating operations.
10. **Every** GB Connection requires the proper amount and distribution of thread compound to all pin and coupling threads and careful field make up in strict accordance with GB Connections' Running Procedures to provide expected levels of performance in service.
11. Reactions among water, drilling muds and other fluids, and chemicals introduced by User with downhole formation fluids may result in an environment detrimental to casing and connection performance. User should carefully consider all aspects of the string design including material compatibility with respect to possible corrosion, sour conditions, and other factors that may result in unexpected casing and/or connection failure at or below published ratings.
12. Performance Properties are subject to change without notice. User is advised to obtain the current GB Connection Performance Property Sheet for each application. Please visit [www.gbconnections.com](http://www.gbconnections.com) to download.

#### Limitations

Data presented in GB Performance Property Sheets and Running Procedures ("GB Information") is provided for informational purposes only and intended to be supplemented by the professional judgment of qualified personnel during design, field handling, deployment, and all subsequent well operations. The use of GB Information is at the User's sole risk.

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	<b>Running Procedure for Casing with GB Drilling with Casing Connections</b>	October 29, 2007
		Rev. 13 (05/16/2018)

## OVERVIEW

This field running procedure applies to makeup of **GB Drilling with Casing** (GB DwC) Connections which include GB CD, GB CDE, GB RDB, AND GB RDB WS Connections with GB Butt (Buttress), GB 4P, and GB 3P thread forms. All of these connections are suitable for **Running** (standard casing applications), **Rotating** (to aid string advancement), **Drilling** (Drilling with Casing/Drilling with Liners) and **Driving**. This procedure also applies to the legacy GB Connections known as GB Butt and GB 3P.

Numerous factors impact the makeup torque of Buttress (GB Butt) and Modified Buttress Threads (such as GB 4P and GB 3P). Some of these factors include but are not limited to: allowable threading tolerances, joint characteristics (OD, straightness, hooked ends, and weight), vertical alignment (derrick, top drive, and elevator alignment relative to rotary table), thread compound (amount and distribution), snub line (location and orientation), distance between tongs and backups, temperature/weather, equipment type, efficiencies (electrical, hydraulic and mechanical), grips/dies (type, condition, orientation, location, contact area, and grip distribution), measurement equipment, gauge calibration, personnel, etc. The nature of these types of connections makes it impossible to provide makeup torque values that will yield proper power tight makeup on every rig under all circumstances with the wide variety of existing connection makeup equipment.

This procedure has been designed to determine the **Running Torque** required for proper power tight makeup of GB Connections under the circumstances and with the actual equipment, set up conditions, weather, etc. that exist at the time of running. With proper execution of this procedure, GB Connections will be properly and consistently assembled.


## LIMITATIONS

This GB Running Procedure provides the basic recommended practices and is intended to be supplemented by the professional judgment of qualified personnel based on observation of actual makeups throughout the casing run. GB DwC Connections require the proper amount and distribution of thread compound to all pin and coupling threads and careful field makeup in strict accordance with GB Connections' Running Procedures to provide expected levels of performance in service.

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## DEFINITIONS

1. **Minimum Makeup (MU) Torque:** Connections must have at least this amount of torque applied.
2. **Shoulder Torque:** MU torque required to achieve shoulder engagement.
3. **Running Torque:** Developed at start of casing run per GB Running Procedure and once established, used for the rest of the joints in the string. Using data established with progression of the casing run. The **Running Torque** may be adjusted as needed to stay within parameters defined here. The **Running Torque** will likely vary with each job due to the factors listed in the Overview section.
4. **Delta Torque:** Difference between **Shoulder Torque** and final makeup torque.
5. **Maximum Makeup (MU) Torque:** Assembly torque shall not exceed the **Maximum MU Torque** shown on size, weight, and grade-specific GB Performance Property Sheets at the beginning of a casing run when

	<p align="center"><b>Running Procedure for Casing with GB Drilling with Casing Connections</b></p>	October 29, 2007
		Rev. 13 (05/16/2018)

establishing the **Running Torque**. In the unlikely event that **Running Torque** determined by the procedure meets or exceeds the **Maximum MU Torque**, call GB Connections for assistance.


6. **Yield Torque:** Torque that causes yielding in the connection (usually yielding of the pin nose). **Yield Torque** rating does **NOT** consider the torque that may radially buckle the pipe body at the grip points. **Yield Torque** values for the pipe body and connection which are based on nominal dimensions and minimum material yield strength.
7. **Maximum Operating Torque:** The **Maximum Operating Torque** shown on the GB Connections Performance Property Sheets includes a 5% safety factor on **Yield Torque**. As such, it represents the limiting torque **spike** that can be applied to the connection during rotating operations. The **Maximum Operating Torque** is **NOT** the **Maximum MU Torque** and is **NOT** a sustainable rotating torque. Operating at the **Maximum Operating Torque** for any length of time may damage connections due to likely random, unexpected torque spikes that occur during rotating operations. USER should carefully consider this value to determine if a higher Safety Factor on **Yield Torque** is more suitable for the project-specific application.

## KEY INFORMATION

- Thread Compound:** Best-O-Life 2000, Best-O-Life 2000 Arctic Grade (AG), API Modified, API Modified Hi-Pressure, or any industry recognized equivalent to these products. Thread compound may also be referred to as “dope”. User should avoid products that include Metal Free (MF) in the product name. Tool joint compounds are expressly forbidden for makeup of GB DwC Connections. Apply thread compound to all pin and box threads as described here is required per this procedure.
- Torque Values:** **Minimum and Maximum MU Torque** values are provided on individual GB Connections Performance Property Sheets available at the following link:  
[http://www.gbconnections.com/connection\\_selector.php](http://www.gbconnections.com/connection_selector.php).
- Continuous Makeup:** Makeup of GB Connections **SHALL START AND CONTINUE WITHOUT STOPPING** until full power tight makeup is achieved.
- Makeup Speed:** Use of high gear at no more than 20 RPMs is permissible once proper starting thread engagement has occurred. **THE FINAL TWO (2) TURNS, AT A MINIMUM, SHALL BE COMPLETED IN LOW GEAR AT LESS THAN 6 RPMS.**
- Pin Nose Engagement:** Pin nose engagement is indicated by a spike on an analog torque gauge or a sharp vertical spike on a torque vs. turn plot. As a secondary check, proper power tight makeup is achieved when the coupling covers approximately half of the API Triangle Stamp on the pin. The triangle will be stamped on the pin member as indicated by a white locator stripe.
- Acceptance Criteria:** All GB Connections must exhibit shoulder engagement (achieve pin-to-pin or pin-to-shoulder engagement) with a: (1) **Delta Torque** ranging between 10% and 50% of majority of the **Shoulder Torque** and (2) final torque not exceeding the **Running Torque** as established in this procedure. Outlier joints that require additional attention would be an exception to **Maximum MU Torque** limit as discussed under Comments, Troubleshooting.

It is imperative that the following procedure be executed carefully at the beginning of every casing run to determine the **Running Torque** (torque to be used for the rest of the string). Torque values established on an individual casing run are never transferrable to other runs. The procedure should be fully executed for each and every casing run.



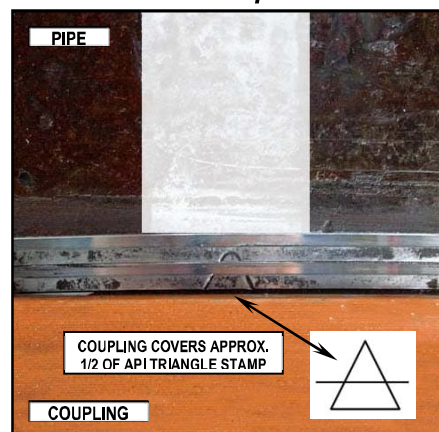
	<p align="center"><b>Running Procedure for Casing with GB Drilling with Casing Connections</b></p>	October 29, 2007
		Rev. 13 (05/16/2018)

The **Running Torque** is determined while running the first 10 joints after joints assembled with threadlocking compounds are made up. Sometimes more than the first 10 joints will be needed to establish the **Running Torque** due to erratic results and/or other run-specific conditions. The **Running Torque** may have to be re-established or adjusted during the casing run under certain conditions<sup>1</sup> and observations. Use the size-specific GB Connections Performance Property Sheets ([http://www.gbconnections.com/connection\\_selector.php](http://www.gbconnections.com/connection_selector.php)) for physical properties for the **Minimum** and **Maximum MU Torque** values.


Connections shall be made up until shoulder engagement with **Delta Torque**  $\geq$  10% of the **Shoulder Torque** (not to exceed the **Maximum MU Torque**, see procedure below) using the **Running Torque** value established in this procedure. The **Maximum MU Torque** at the beginning of the casing run for establishing the **Running Torque** shall be limited to the value shown on the applicable GB Connections Performance Property Sheet. The **Running Torque** shall be used thereafter and throughout the run as the limiting makeup torque value. The **Maximum MU Torque** on the GBC Performance Property Sheet value is given as a practical limit for avoidance of thread galling, connection damage, and possible tube damage due to excessive jaw pressure that can occur with application of extreme makeup torque. Contact GB Connections if more than the **Maximum MU Torque** value is required for shoulder engagement and/or final makeup, or if torque exceeding the **Maximum Operating Torque** value is required for the intended service.

## PROCEDURE FOR ESTABLISHING **RUNNING TORQUE**

1. Remove coupling thread protectors only after casing is set in V-Door.
2. **Always apply fresh thread compound to coupling threads and internal shoulder (where applicable).** See Comment No. 1 (below) for discussion on proper amount of thread compound.
3. Remove pin thread protectors only after joint is raised in the derrick. Visually inspect pin threads for sufficient thread compound as described in Comment No. 1; **add fresh compound to pin threads and pin nose.**
4. Fresh thread compound should **NEVER** be added on top of dope contaminated with dust, dirt, and/or debris. Threads observed to have contaminated thread compound shall be thoroughly cleaned and dried before applying fresh thread compound.
5. Stab the pin carefully into the coupling of the joint hanging in the rotary table. A stabbing guide is recommended to protect the pin nose and leading thread from physical damage that may contribute to thread galling. Make up each connection until shoulder engagement plus **Delta Torque** between 10% and 50% of the **Shoulder Torque** without exceeding the **Maximum MU Torque**. Record the **Shoulder Torque** observed for the first 10 joints (excluding threadlocked accessory joints). The **Running Torque** is (a) the **Minimum MU Torque** shown on the GB Connections Performance Property Sheets **or** (b) the **Maximum Shoulder Torque** recorded from the first 10 makeups + 10%, **whichever is higher** (rounded to the next highest 500 ft.-lbs.) When making up the initial joints for establishing the **Running Torque** carefully watch the torque gauge for the **Shoulder Torque** and try to manually shut down the tongs before reaching **Maximum MU Torque** shown on the GB Connections Performance Property Sheets. Alternately, the dump valve should be set to the **Maximum MU Torque** during this initial process.
6. After the first 10 makeups (more if necessary due to conditions at the time of the run), use the "**Running Torque**" established in Step 5 for the remainder of the string. A dump valve is strongly recommended to stop makeup once the established **Running Torque** is achieved.



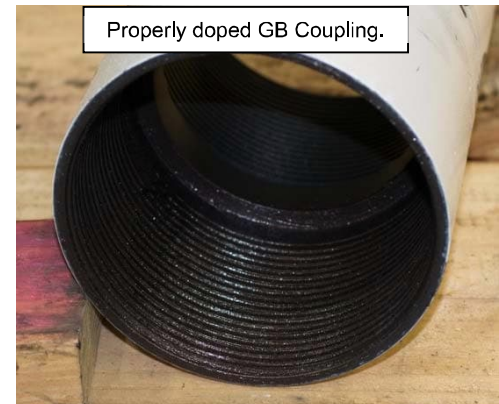
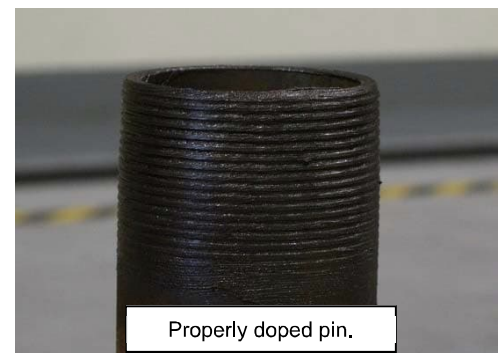
<sup>1</sup> Examples include but are not limited to more than an occasional low or high **Delta Torque**, string of mixed mills, equipment change, large temperature change, and wobbling or noticeable vibration when joint is turning.

	<b>Running Procedure for Casing with GB Drilling with Casing Connections</b>	October 29, 2007 Rev. 13 (05/16/2018)
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7. All connections made up with the established **Running Torque** should achieve shoulder engagement with the minimum amount of **Delta Torque**. Carefully watch for the spike on the torque gauge during each make up to verify shoulder engagement. As a **secondary** verification, randomly check the makeup position relative to the API Triangle Stamp during the run. Proper power tight makeup position is achieved when the coupling covers approximately half of the API Triangle Stamp on the pin (see accompanying photo).
8. All connections should achieve shoulder engagement with at least 10% **Delta Torque** before the **Maximum MU Torque** is achieved.


## COMMENTS, TROUBLESHOOTING

1. GB Connections are thread compound friendly. Thread compounds shall be handled, mixed, and applied in strict accordance with the manufacturer's instructions. **THREAD COMPOUND SHALL BE APPLIED TO BOTH PIN AND COUPLING THREADS AND OPPOSING PIN NOSE OR SHOULDER AREA OF EVERY CONNECTION.** Sufficient thread compound has been applied when all threads (pin and coupling), pin nose, and coupling ID surfaces are completely covered **WITH NO GAPS OR BARE SPOTS.** The thread form should be discernible beneath the compound; i.e. when the thread valleys appear half full. Be generous with the thread compound; but avoid over-doping to the point where **excessive** amounts are squeezed out during assembly. Use of a mustache brush is the preferred method for applying and distributing thread compounds to GB Connections.
2. If threads are cleaned on racks, new dope shall be applied in a light, even coat to both pin and coupling threads. See Comment No. 1 above for description of sufficient thread compound. Clean thread protectors shall be re-applied to freshly doped pin and coupling threads unless the casing run is imminent (no more than a few hours) to avoid contaminating exposed thread compound.
3. All connections should achieve shoulder engagement before reaching the "**Running Torque**" value determined by this procedure. Any connection that does not achieve shoulder engagement at the established "**Running Torque**" value shall be visually inspected for position relative to the API Triangle Stamp.



- a) If the coupling is shy of the API Triangle Stamp Base, the connection shall be broken out, cleaned and inspected visually for thread damage, re-doped, and made-up again (or laid down if threads are damaged). Connections that have not achieved shoulder engagement **SHALL NEVER** be backed up a couple of turns and remade. They shall be completely broken out, cleaned and inspected as described above.
- b) If the coupling covers the API Triangle base but does not cover approximately half of the Triangle Stamp, add additional torque to achieve shouldering and finish the makeup. It is common to see high torque (possibly exceeding the **Maximum MU Torque**) to initiate connection turning. This is acceptable as long as the torque drops off once movement starts and then spikes with shoulder engagement. If acceptable makeup doesn't occur with one additional torque application, the connection shall be broken out (as described in 3a above). With an additional attempt, it is OK for the final torque to exceed the **Running Torque** but it should not exceed the **Maximum MU Torque** (except to initiate additional turning).
- c) Any connection not properly assembled (i.e. not meeting the acceptance criteria) in two (2) attempts (provided threads pass a visual inspection each time) is reject and shall be laid down.



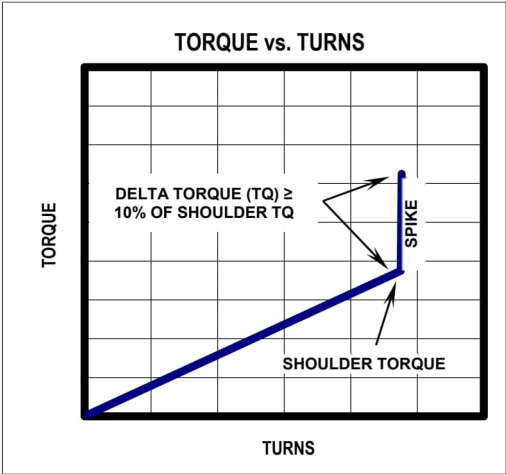
	<b>Running Procedure for Casing with GB Drilling with Casing Connections</b>	October 29, 2007
		Rev. 13 (05/16/2018)

4. At the established **Running Torque**, the connections will generally shoulder with **Delta Torque** between 10% and 50%. High interference connections will tend to have a higher **Shoulder Torque** and less **Delta Torque** (at least 10% of the **Shoulder Torque** is required). Low interference connections will tend to have lower **Shoulder Torque** and more **Delta Torque**. In general, the GB Connections makeup consistently but will vary due to any of the factors enumerated in the second paragraph of the Overview section of this procedure. However, wide variability on more than a few joints should be investigated for a root cause and, if necessary, a new **Running Torque** should be adjusted as described below.

If a connection appears to have shouldered but doesn't have at least 10% **Delta Torque**, the position relative to the API Triangle Stamp should be checked. In just about every instance, the position will have covered the triangle base, so additional torque can be added to complete the makeup as discussed in 3.b) above. Expect an instantaneous spike with showing more than 30% **Delta Torque** with application of additional torque. Under this condition, this makeup is acceptable.

Similarly, random connections here and there with more than 30% **Delta Torque** is generally not cause for concern. However, if overshooting the 30% maximum **Delta Torque** target occurs frequently, then the established **Running Torque** value should be walked down in 500 ft-lbs. to 1,000 ft-lbs. increments until connection makeup routinely falls in line with the stated acceptance criteria.


5. **Torque vs. Turn monitoring systems are recommended for field makeup of GB Connections.** While Torque vs. Turn plots provide good information about makeup, they **SHALL NOT BE SUBSTITUTED FOR DIRECT VISUAL OBSERVATION OF THE CONNECTION DURING ASSEMBLY.** There is no second chance to watch field assembly of a connection. Torque vs. Turn plots can always be viewed for verification purposes once a makeup is finished. When available, torque vs. turn plots shall finish with a clearly defined spike as shown in the graphic to the right. The general character of torque vs. turn plots for good makeups will become evident after the first ten (10) makeups (again, more may be necessary due to rig-and/or equipment-specific conditions). Any makeup that results in a plot that is "out-of-character"<sup>2</sup> when compared with the majority of plots from previous good makeups should be checked carefully.



When using Torque vs. Turn monitoring equipment, GB recommends setting a reference torque value of 500 ft.-lbs. or 10% of the minimum makeup torque (whichever is lower) to normalize the resulting plots. Plot scales should be set so data spans at least 2/3 of the turns scale on each plot (15 turns will usually be sufficient at the start and can be reduced based on data from the first few joints). **UNDER NO CIRCUMSTANCE SHOULD MAKEUP BE STARTED UNTIL THE MONITORING SYSTEM IS READY TO RECORD DATA.**

6. Occasionally the mill side of a GB Connection may turn during field makeup. When observed, the makeup should continue without stopping per this procedure. It may be helpful to scribe a vertical line across the coupling-pipe interface to aid estimation of mill side turning if it is observed with some frequency. The amount of mill side turn should be carefully observed and estimated. If the mill side turns less than 1/2 turn and all other aspects of the makeup are good, the connection is acceptable. If the mill side turns more than 1/2 turn trouble- shooting should be initiated paying particular attention to amount and distribution of thread compound, vertical alignment, weight of joint, hooked end on pipe, and other possible factors that may contribute to possible high torque during field makeup. Counting turns can help to estimate if coupling will need to be stopped to avoid over rotation. It should

<sup>2</sup> An "out-of-character" plot may initiate with a high torque, show significantly steeper slope from the start of makeup, wide torque undulations as makeup progresses, no clearly defined spike, insufficient/inconsistent turns, etc.

	<b>Running Procedure for Casing with GB Drilling with Casing Connections</b>	October 29, 2007
		Rev. 13 (05/16/2018)

be noted that mill side turning during field makeup occurs occasionally and should not be concerning. Frequent or persistent mill side turning is a symptom that needs troubleshooting and appropriate corrective action.

7. A double wrap of the pick-up sling should be used when raising casing into the derrick when lifting subs, single joint, side-door, or slip elevators are not being used.
8. Higher torque may be required to achieve shoulder engagement when threadlock compounds are applied. User is advised to carefully follow the manufacturer's instructions with respect to mixing, application, temperature, and time. Torque ranges with threadlock compounds cannot be estimated due to many variables including but not limited to temperature, time, connection tolerances, and surface finish. In these cases, carefully monitor makeup to be sure shouldering occurs. The only exception to the shouldering requirement is with float equipment (float shoe and float collar) that will be assembled with a threadlocking compound. In this case, makeup to a position that covers the base of API Triangle Stamp is considered satisfactory.
9. Manual and automated dump valves can miss the established **Running Torque** due to several factors. Slightly overshooting the **Running Torque** is not cause for concern as long as the final "dump" torque is not excessive, and the equipment used is generally consistent joint-to-joint. Overshooting the **Running Torque** with a final makeup speed greater than 10 RPMs is risky and potentially harmful to the connection as discussed below.
10. Attached is a "Worksheet for determining GB Connections **Running Torque** at the beginning of a Casing Run" for use at the start of any casing run using GB Connections. GB recommends that this worksheet be filled out and maintained with the casing run records.

## MAKEUP SPEED


To reiterate: Use of high gear at no more than 20 RPMs is permissible once proper starting thread engagement has occurred. **THE FINAL TWO (2) TURNS, AT A MINIMUM, SHALL BE COMPLETED IN LOW GEAR AT LESS THAN 6 RPMS.**

Making up connections at RPM exceeding those listed above may result in unsatisfactory connection performance downhole. Risks associated with excessive makeup RPMs are common for any connection with internal pin nose engagement. High speed makeup can:

1. Impart an unnecessary impulse load at nose contact. Certain materials are more susceptible to cracking under sudden or instantaneously applied loads.
2. Inhibit efficient movement of and trap thread compound under high pressure causing additional and unquantifiable high hoop stresses in the connection.
3. Result in significant overshoot of established dump torque value due to equipment latency between signal and equipment shut down resulting in higher but unknown actual final torque value. Excessive overshoot can result in pin nose yielding.

## PROCEDURE SUMMARY

1. Remove coupling protectors after casing is set in V-Door and apply fresh thread compound to coupling threads.
2. Raise joint in derrick, remove pin protectors, and apply fresh thread compound to pin threads and pin nose.
3. Carefully stab pin into coupling and makeup to pin nose engagement. Try to stop makeup without exceeding the **Maximum MU Torque** (shown on GB Connections Performance Property Sheets). Carefully watch for and note the **Shoulder Torque**.
4. Record **Shoulder Torque** and Final Torque values, and position relative to API Triangle Stamp for first ten (10) connections, more if necessary due to run/rig-specific conditions.

	<b>Running Procedure for Casing with GB Drilling with Casing Connections</b>	October 29, 2007 Rev. 13 (05/16/2018)
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5. The **Running Torque** is (a) the **Maximum MU Torque** shown on the GB Connections Performance Property Sheet or (b) the maximum torque required for shoulder engagement + 10% **Delta Torque** determined from the first 10 makeups, **whichever is higher**. Use the attached Worksheet to record this data and determine the **Running Torque**.
6. Make up the rest of the string at the **Running Torque** determined in the previous step verifying each connection has shouldered with between 10% and 30% **Delta Torque**.

#### **NOTES:**

- This summary is provided for quick reference and is not a substitute for the comprehensive procedure provided above.
- Does not apply to threadlock connections.

#### **DO's and DONT's**

1. **DO** check vertical alignment.
2. **DO** apply thread compound to all pin and coupling threads, pin nose and coupling shoulder area.
3. **DO** establish the **Running Torque** in accordance with GB Procedures.
4. **DO** make adjustments to **Running Torque** if indicated by inconsistent makeups during the casing run.
5. **DO** check every makeup for a clear indication of shouldering with a minimum **Delta Torque**  $\geq 10\%$  of the **Shoulder Torque**.
6. **DO** reject any coupling that is not properly made up after two (2) attempts.
7. **DO** carefully stab pins into coupling (use a stabbing guide for casing smaller than 9 5/8" OD).
8. **DO** finish the makeup with at least two (2) full turns in low gear at 6 RPMs or less.
9. **DO** make up every connection continuously to pin nose engagement without stopping.
10. **DO** make note of anything that occurs with any connection makeup such as backup grips slipped, connection inspected and remade, etc.
11. **Do** check out every connection that appears out of character relative to the population. An example would be a connection that is completed in significant fewer turns than most others. Check the triangle stamp and record position and take corrective action if needed.
12. **DO** add torque to any connection that appears to achieve pin nose engagement but not 10% delta torque.
13. **DO** adjust the **Running Torque** up or down in increments to achieve consistent **Delta Torque** between 10% and 30%.
14. **Do** make note of any anomaly during any connection makeup, such as backups slipped, mill side turned, etc.
15. **DO NOT** over dope.
16. **DO NOT** exceed the **Maximum MU Torque** as shown on the GB Connections Performance Property Sheets during assembly.

	<b>Running Procedure for Casing with GB Drilling with Casing Connections</b>	October 29, 2007
		Rev. 13 (05/16/2018)

17. **DO NOT** make up any misaligned connection.
18. **DO NOT** exceed 20 RPMs in high gear and 6 RPMs in low gear for the final two (2) full turns.
19. **DO NOT** remove pin thread protectors until pipe is hanging in the derrick.
20. **DO NOT** ever back a connection up a couple of turns and remake. Any connection requiring this type of attention **SHALL** be broken out completely, cleaned, visually inspected, and if OK, re-doped and remade.
21. **DO NOT** hesitate to contact GB Connections with questions before and during any casing run.

#### RECOMMENDED EQUIPMENT

- Stabbing Guide
- Mustache Brush
- Torque vs. Turn Monitoring Equipment or Dump Valve



## Worksheet for determining GB Connection Running Torque at the beginning of a Casing Run

Ignore joints that are assembled with threadlock compounds. See "Addendum Procedure for GB Connections Assembled with Threadlocking Compounds" available at [www.gbconnections.com](http://www.gbconnections.com).

**Pertinent Excerpt from GB Running Procedure**

5. Stab the pin carefully into the coupling of the joint hanging in the rotary table. A stabbing guide is recommended to protect the pin nose and leading thread from physical damage that may contribute to thread galling. Make up each connection until shoulder engagement plus delta torque  $\geq 10\%$  of the shoulder torque without exceeding the Maximum Makeup Torque. Record the shoulder torque observed for the first 10 joints (excluding threadlocked accessory joints). The Running Torque is (a) the Minimum Makeup Torque shown on the GB Connection Performance Property Sheets or (b) the Maximum Shoulder Torque recorded from the first 10 makeups + 10%, whichever is higher (rounded to the next highest 500 ft.-lbs.) When making up the initial joints for establishing the Running Torque carefully watch the torque gauge for the shoulder torque and try to manually shut down the tongs before reaching Maximum Makeup Torque shown on the GB Connection Performance Property Sheets. Alternately, the dump valve should be set to the Maximum Makeup Torque during this initial process.
6. After the first 10 makeups (more if necessary due to conditions at the time of the run), use the "Running Torque" established in Step 5 for the remainder of the string. A dump valve is strongly recommended to stop makeup once the established Running Torque is achieved.

Casing Data		Comment
OD (in)		See GBC Performance Property Sheet
Weight (ppf)		See GBC Performance Property Sheet
Grade		See GBC Performance Property Sheet
Min MU Torque (ft-lbs)		See GBC Performance Property Sheet
Max MU Torque (ft-lbs)		See GBC Performance Property Sheet
Max Operating Torque (ft-lbs)		The Maximum Operating Torque is <b>NOT</b> the Maximum Makeup Torque and is <b>NOT</b> a sustainable rotating torque. Operating at the Maximum Operating Torque for any length of time will likely damage the connection.

Notes	Joint No.	Shoulder Torque (ft-lbs)	Final Torque (ft-lbs)	Triangle Stamp Position Sketch ( $\triangle$ )
Required	1			
Required	2			
Required	3			
Required	4			
Required	5			
Required	6			
Required	7			
Required	8			
Required	9			
Required	10			
Optional	11			
Optional	12			
Optional	13			
Optional	14			
Optional	15			
Max. Shoulder Torque				
A Max. Shoulder Torque + 10%				
B Min. Makeup Torque (from GB Conn. Data Sheet)				
<b>Running Torque (ft-lbs)</b>		-	<b>A or B, whichever is greater.</b>	

Optional joints should be added if there is wide variability in shoulder torques recorded during the initial 10 joints. Judgement should be used to determine if more than 10 joints are needed for the purpose of establishing the Running Torque and, if so, how many more should be added.

Wide variations in Shoulder Torque during the first ten (10) joints suggest other issues requiring attention such as poor alignment, improper amount and distribution of thread compound, etc. Refer to 2nd paragraph of GB Running Procedure for possible contributing factors to aid troubleshooting.

**GB Connections**

950 Threadneedle, Suite 130  
Houston TX 77079  
Toll Free: 1-888-245-3848  
Main: 713-465-3585  
Fax: 713-984-1529

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## API 5CT 10.750" 45.50lb/ft HCL80 Casing Performance Data Sheet

Manufactured to specifications of API 5CT 9th edition and bears the API monogram.

Grade	HCL80
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### Pipe Body Mechanical Properties

Minimum Yield Strength	80,000 psi
Maximum Yield Strength	95,000 psi
Minimum Tensile Strength	95,000 psi
Maximum Hardness	23.0 HRC

### Sizes

OD	10 3/4
Nominal Wall Thickness	.400 in
Nominal Weight, T&C	45.50 lb/ft
Nominal Weight, PE	44.26 lb/ft
Nominal ID	9.950 in
Standard Drift	9.794 in
Alternate Drift	9.875 in

### Coupling Special Clearance

### Size

OD	11.25 in
Min. Length	10.625 in
Diameter of Counter Bore	10.890 in
Width of bearing face	.375 in

### Minimum Performance

Collapse Pressure	2,940 psi
Internal Pressure Yield	5,210 psi
Pipe body Tension Yield	1,040,000 lbs
Joint Strength STC	692,000 lbs
Joint Strength LTC	N/A
Joint Strength BTC	1,063,000 lbs

### Inspection and Testing

Visual	OD Longitudinal and independent 3rd party SEA
NDT	Independent 3rd party full body EMI and End Area Inspection after hydrotest Calibration notch sensitivity: 10% of specified wall thickness

### Color code

Pipe ends	One red, one brown and one blue band
Couplings	Red with one brown band

## NOVO OIL &amp; GAS NORTHERN DELAWARE, LLC - Tickety Boo Fed Com 2109 122H

## 1. Geologic Formations

TVD of target	8,350' EOL	Kick Off Depth	7,834'
MD at TD:	20,502'	Deepest expected fresh water:	115'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	239	Water	
Top of Salt	339	Salt	
Yates	1564	Salt	
Capitan Reef	2119	Water	
Cherry Canyon	4099	Oil/Gas	
Brushy Canyon	4969	Oil/Gas	
Top BSPG Lime	5914	Oil/Gas	
1st BSPG Ss	7274	Oil/Gas	
2nd BSPG Carb	7624	Oil/Gas	
2nd BSPG Ss	8189	Target Oil/Gas	

## 2. Casing Program

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Body Tension	SF Joint Tension
	From	To								
17.5"	0	265	13.375"	54.5	J55	BTC	9.31	25.43	60.2	64.1
12.25"	0	2015	10.75"	45.5	HCL80	BTC Spl CC	3.79	7.45	11.34	11.59
9.875"	0	4175	8.625"	32	L80 EHC	MO-FXL	3.26	2.35	5.64	3.90
7.875"	0	20,502	5.5"	20	P110	GBCD	2.69	3.84	3.84	3.84
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet	1.6 Dry 1.8 Wet

Intermediate casing will be kept at least 1/3 full while running casing to mitigate collapse. Intermediate burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface.

All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

## NOVO OIL &amp; GAS NORTHERN DELAWARE, LLC - Tickety Boo Fed Com 2109 122H

## 1. Geologic Formations

TVD of target	8,350' EOL	Kick Off Depth	7,834'
MD at TD:	20,502'	Deepest expected fresh water:	115'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	239	Water	
Top of Salt	339	Salt	
Yates	1564	Salt	
Capitan Reef	2119	Water	
Cherry Canyon	4099	Oil/Gas	
Brushy Canyon	4969	Oil/Gas	
Top BSPG Lime	5914	Oil/Gas	
1st BSPG Ss	7274	Oil/Gas	
2nd BSPG Carb	7624	Oil/Gas	
2nd BSPG Ss	8189	Target Oil/Gas	

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Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Body Tension	SF Joint Tension
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17.5"	0	265	13.375"	54.5	J55	BTC	9.31	25.43	60.2	64.1
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7.875"	0	20,502	5.5"	20	P110	GBCD	2.69	3.84	3.84	3.84
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet	1.6 Dry 1.8 Wet

Intermediate casing will be kept at least 1/3 full while running casing to mitigate collapse. Intermediate burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface.

All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

**NOVO OIL & GAS NORTHERN DELAWARE, LLC - Tickety Boo Fed Com 2109 122H****1. Geologic Formations**

TVD of target	8,350' EOL	Kick Off Depth	7,834'
MD at TD:	20,502'	Deepest expected fresh water:	115'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	239	Water	
Top of Salt	339	Salt	
Yates	1564	Salt	
Capitan Reef	2119	Water	
Cherry Canyon	4099	Oil/Gas	
Brushy Canyon	4969	Oil/Gas	
Top BSPG Lime	5914	Oil/Gas	
1st BSPG Ss	7274	Oil/Gas	
2nd BSPG Carb	7624	Oil/Gas	
2nd BSPG Ss	8189	Target Oil/Gas	

**2. Casing Program**

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Body Tension	SF Joint Tension
	From	To								
17.5"	0	265	13.375"	54.5	J55	BTC	9.31	25.43	60.2	64.1
12.25"	0	2015	10.75"	45.5	HCL80	BTC Spl CC	3.79	7.45	11.34	11.59
9.875"	0	4175	8.625"	32	L80 EHC	MO-FXL	3.26	2.35	5.64	3.90
7.875"	0	20,502	5.5"	20	P110	GBCD	2.69	3.84	3.84	3.84
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet	1.6 Dry 1.8 Wet

Intermediate casing will be kept at least 1/3 full while running casing to mitigate collapse. Intermediate burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface.

All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

## NOVO OIL &amp; GAS NORTHERN DELAWARE, LLC - Tickety Boo Fed Com 2109 122H

## 1. Geologic Formations

TVD of target	8,350' EOL	Kick Off Depth	7,834'
MD at TD:	20,502'	Deepest expected fresh water:	115'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	239	Water	
Top of Salt	339	Salt	
Yates	1564	Salt	
Capitan Reef	2119	Water	
Cherry Canyon	4099	Oil/Gas	
Brushy Canyon	4969	Oil/Gas	
Top BSPG Lime	5914	Oil/Gas	
1st BSPG Ss	7274	Oil/Gas	
2nd BSPG Carb	7624	Oil/Gas	
2nd BSPG Ss	8189	Target Oil/Gas	

## 2. Casing Program

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Body Tension	SF Joint Tension
	From	To								
17.5"	0	265	13.375"	54.5	J55	BTC	9.31	25.43	60.2	64.1
12.25"	0	2015	10.75"	45.5	HCL80	BTC Spl CC	3.79	7.45	11.34	11.59
9.875"	0	4175	8.625"	32	L80 EHC	MO-FXL	3.26	2.35	5.64	3.90
7.875"	0	20,502	5.5"	20	P110	GBCD	2.69	3.84	3.84	3.84
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet	1.6 Dry 1.8 Wet

Intermediate casing will be kept at least 1/3 full while running casing to mitigate collapse. Intermediate burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface.

All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

## NOVO OIL &amp; GAS NORTHERN DELAWARE, LLC - Tickety Boo Fed Com 2109 122H

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Does casing meet API specifications? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	Y
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification (loading assumptions, casing design criteria).	Y
Will the intermediate pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	Y
If yes, does production casing cement tie back a minimum of 50' above the Reef?	Y
Is well within the designated 4 string boundary?	Y
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3 <sup>rd</sup> string cement tied back 500' into previous casing?	
Is well located in R-111-P and SOPA?	Y
If yes, are the first three strings cemented to surface?	Y
Is 2 <sup>nd</sup> string set 100' to 600' below the base of salt?	Y
Is well located in high Cave/Karst?	N
If yes, are there two strings cemented to surface?	
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	

## NOVO OIL &amp; GAS NORTHERN DELAWARE, LLC - Tickety Boo Fed Com 2109 122H

## 3. Cementing Program

Casing	# Sk	Wt. lb/ gal	Yld ft3/ sack	H <sub>2</sub> O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	210	14.8	1.34	6.34	6	Tail: Class C + 2% CaCl <sub>2</sub>
Inter. 1	220	12.7	2.0	9.6	8	Lead: 35:65:6 C Blend
	110	14.8	1.34	6.34	6	Tail: Class C + 2% CaCl
Inter. 2, Stage 1	100	10.3	3.24	16.4	12	Lead: 35:65:6 C Blend
	80	14.8	1.34	6.34	6	Tail: Class C + 2% CaCl
DV/ECP @ 2070						
Inter. 2, Stage 2	110	12.5	2.0	10.6	12	Lead: Class C + 4% Gel + 1% CaCl <sub>2</sub>
	60	14.8	1.35	6.34	6	Tail: Class C + 2% CaCl
5.5 Prod	580	12.5	2.34	19	72	Lead: 50:50:10 H Blend
	1600	13.4	1.86	5.7	19	Tail: 50:50:2 Class H Blend

Volumes Subject to Observed Hole Conditions and/or Fluid Caliper Results

Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

Casing String	TOC Lead	TOC Tail	% Excess
Surface	0'	0'	50%
1 <sup>st</sup> Intermediate	0'	1,515	50%
2nd Intermediate	0'	3,675	50%
Production	1,619	7,834	35% OH in Lateral (KOP to EOL) – 40% OH in Vertical



## NOVO OIL &amp; GAS NORTHERN DELAWARE, LLC - Tickety Boo Fed Com 2109 122H

## 4. Pressure Control Equipment

N	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.
---	---

BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	x	Tested to:
12.25	13-5/8"	2M	Annular	x	1500 psi
			Blind Ram	x	2M
			Pipe Ram	x	
			Double Ram		
			Other*		
9.875	13-5/8"	2M	Annular	x	1500 psi
			Blind Ram	x	2M
			Pipe Ram	x	
			Double Ram		
			Other*		
7-7/8"	13-5/8"	3M	Annular	x	2500 psi
			Blind Ram	x	3M
			Pipe Ram	x	
			Double Ram		
			Other*		

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold. See attached schematics.

X	Formation integrity test will be performed per Onshore Order #2.  On Exploratory wells or 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. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.
Y	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
N	Are anchors required by manufacturer?
Y	A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested.

## NOVO OIL &amp; GAS NORTHERN DELAWARE, LLC - Tickety Boo Fed Com 2109 122H

## 5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. Shoe	FW Gel	8.6 - 8.8	28-34	N/C
Surf. Shoe	10-3/4" Shoe	Saturated Brine	9.8 - 10.2	28-34	N/C
10-3/4" Shoe	8-5/8" Int shoe	Fresh Water	8.4 - 8.6	28-34	N/C
8-5/8" Int shoe	Lateral TD	OBM	9 - 9.5	45 - 65	N/C

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times.

What will be used to monitor the loss or gain of fluid?	PVT/Pason/Visual Monitoring
---	-----------------------------

## 6. Logging and Testing Procedures

Logging, Coring and Testing.	
Y	Will run GR/CNL from TD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
Y	No Logs are planned based on well control or offset log information.
N	Drill stem test? If yes, explain.
N	Coring? If yes, explain.

Additional logs planned		Interval
N	Resistivity	Pilot Hole TD to ICP
N	Density	Pilot Hole TD to ICP
Y	CBL	Production casing (If cement not circulated to surface)
Y	Mud log	Intermediate shoe to TD
N	PEX	

**NOVO OIL & GAS NORTHERN DELAWARE, LLC - Tickety Boo Fed Com 2109 122H****7. Drilling Conditions**

Condition	Specify what type and where?
BH Pressure at deepest TVD	4125 psi at 8350' TVD
Abnormal Temperature	NO 145 Deg. F.

No abnormal pressure or temperature conditions are anticipated. Sufficient mud materials to maintain mud properties and weight increase requirements will be kept on location at all times.

Sufficient supplies of Paper/LCM for periodic sweeps to control seepage and losses will be maintained on location.

Hydrogen Sulfide (H<sub>2</sub>S) monitors will be installed prior to drilling out the surface shoe. If H<sub>2</sub>S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.

N H<sub>2</sub>S is present

Y H<sub>2</sub>S Plan attached

**8. Other Facets of Operation**

Y	Is it a walking operation?
Y	Is casing pre-set?

x	H <sub>2</sub> S Plan.
x	BOP & Choke Schematics.
x	Directional Plan



## **NOVO Oil & Gas**

**EDDY CO., NM (NAD83)**

**SEC 21-T19S-30E**

**TICKETY-BOO-2109-FED-COM-122H**

**Wellbore #1**

**Plan: Plan 1**

## **Standard Planning Report**

**20 February, 2023**





Database:	1 - EDM Production	Local Co-ordinate Reference:	Well TICKETY-BOO-2109-FED-COM-122H
Company:	NOVO Oil & Gas	TVD Reference:	RKB 25' + 3314.1' @ 3339.10usft
Project:	EDDY CO., NM (NAD83)	MD Reference:	RKB 25' + 3314.1' @ 3339.10usft
Site:	SEC 21-T19S-30E	North Reference:	Grid
Well:	TICKETY-BOO-2109-FED-COM-122H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan 1		

Project	EDDY CO., NM (NAD83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	SEC 21-T19S-30E		
Site Position:		Northing:	599,863.70 usft
From:	Map	Easting:	650,094.43 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32.64857569
		Longitude:	-103.97998202

Well		TICKETY-BOO-2109-FED-COM-122H				
Well Position	+N-S	0.00 usft	Northing:	599,951.59 usft	Latitude:	32.64881581
	+E-W	0.00 usft	Easting:	650,253.04 usft	Longitude:	-103.97946575
Position Uncertainty		0.50 usft	Wellhead Elevation:	usft	Ground Level:	3,314.10 usft
Grid Convergence:		0.19 °				

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	User Defined	10/24/2022	6.93	60.31	47,619.20000000

Design	Plan 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	0.00

Plan Survey Tool Program	Date	10/25/2022		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	20,502.76 Plan 1 (Wellbore #1)	MWD+HRGM	
			OWSG MWD + HRGM	



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Project:	EDDY CO., NM (NAD83)	MD Reference:	RKB 25' + 3314.1' @ 3339.10usft
Site:	SEC 21-T19S-30E	North Reference:	Grid
Well:	TICKETY-BOO-2109-FED-COM-122H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan 1		

Plan Sections										
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	0.00	
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,963.27	9.27	253.19	1,961.25	-10.81	-35.78	2.00	2.00	0.00	253.19	
6,094.67	9.27	253.19	6,038.75	-203.21	-672.53	0.00	0.00	0.00	0.00	
6,557.93	0.00	0.00	6,500.00	-214.02	-708.31	2.00	-2.00	0.00	180.00	
7,834.99	0.00	0.00	7,777.06	-214.02	-708.31	0.00	0.00	0.00	0.00	
8,738.99	90.40	10.20	8,350.00	353.82	-606.14	10.00	10.00	0.00	10.20	
9,257.10	90.40	359.84	8,346.36	869.22	-560.88	2.00	0.00	-2.00	-89.94	
20,502.78	90.40	359.84	8,267.00	12,114.58	-592.75	0.00	0.00	0.00	0.00	





Database:	1 - EDM Production	Local Co-ordinate Reference:	Well TICKETY-BOO-2109-FED-COM-122H
Company:	NOVO Oil & Gas	TVD Reference:	RKB 25' + 3314.1' @ 3339.10usft
Project:	EDDY CO., NM (NAD83)	MD Reference:	RKB 25' + 3314.1' @ 3339.10usft
Site:	SEC 21-T19S-30E	North Reference:	Grid
Well:	TICKETY-BOO-2109-FED-COM-122H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan 1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	2.00	253.19	1,599.98	-0.50	-1.67	-0.50	2.00	2.00	0.00
1,700.00	4.00	253.19	1,699.84	-2.02	-6.68	-2.02	2.00	2.00	0.00
1,800.00	6.00	253.19	1,799.45	-4.54	-15.02	-4.54	2.00	2.00	0.00
1,900.00	8.00	253.19	1,898.70	-8.06	-26.69	-8.06	2.00	2.00	0.00
1,963.27	9.27	253.19	1,961.25	-10.81	-35.78	-10.81	2.00	2.00	0.00
2,000.00	9.27	253.19	1,997.50	-12.52	-41.44	-12.52	0.00	0.00	0.00
2,100.00	9.27	253.19	2,096.20	-17.18	-56.85	-17.18	0.00	0.00	0.00
2,200.00	9.27	253.19	2,194.89	-21.84	-72.27	-21.84	0.00	0.00	0.00
2,300.00	9.27	253.19	2,293.59	-26.49	-87.68	-26.49	0.00	0.00	0.00
2,400.00	9.27	253.19	2,392.29	-31.15	-103.09	-31.15	0.00	0.00	0.00
2,500.00	9.27	253.19	2,490.98	-35.81	-118.50	-35.81	0.00	0.00	0.00
2,600.00	9.27	253.19	2,589.68	-40.46	-133.92	-40.46	0.00	0.00	0.00
2,700.00	9.27	253.19	2,688.37	-45.12	-149.33	-45.12	0.00	0.00	0.00
2,800.00	9.27	253.19	2,787.07	-49.78	-164.74	-49.78	0.00	0.00	0.00
2,900.00	9.27	253.19	2,885.76	-54.43	-180.15	-54.43	0.00	0.00	0.00
3,000.00	9.27	253.19	2,984.46	-59.09	-195.57	-59.09	0.00	0.00	0.00
3,100.00	9.27	253.19	3,083.15	-63.75	-210.98	-63.75	0.00	0.00	0.00
3,200.00	9.27	253.19	3,181.85	-68.41	-226.39	-68.41	0.00	0.00	0.00
3,300.00	9.27	253.19	3,280.54	-73.06	-241.80	-73.06	0.00	0.00	0.00
3,400.00	9.27	253.19	3,379.24	-77.72	-257.22	-77.72	0.00	0.00	0.00
3,500.00	9.27	253.19	3,477.93	-82.38	-272.63	-82.38	0.00	0.00	0.00
3,600.00	9.27	253.19	3,576.63	-87.03	-288.04	-87.03	0.00	0.00	0.00
3,700.00	9.27	253.19	3,675.32	-91.69	-303.45	-91.69	0.00	0.00	0.00
3,800.00	9.27	253.19	3,774.02	-96.35	-318.87	-96.35	0.00	0.00	0.00
3,900.00	9.27	253.19	3,872.72	-101.00	-334.28	-101.00	0.00	0.00	0.00
4,000.00	9.27	253.19	3,971.41	-105.66	-349.69	-105.66	0.00	0.00	0.00
4,100.00	9.27	253.19	4,070.11	-110.32	-365.10	-110.32	0.00	0.00	0.00
4,200.00	9.27	253.19	4,168.80	-114.97	-380.52	-114.97	0.00	0.00	0.00
4,300.00	9.27	253.19	4,267.50	-119.63	-395.93	-119.63	0.00	0.00	0.00
4,400.00	9.27	253.19	4,366.19	-124.29	-411.34	-124.29	0.00	0.00	0.00
4,500.00	9.27	253.19	4,464.89	-128.95	-426.75	-128.95	0.00	0.00	0.00
4,600.00	9.27	253.19	4,563.58	-133.60	-442.17	-133.60	0.00	0.00	0.00
4,700.00	9.27	253.19	4,662.28	-138.26	-457.58	-138.26	0.00	0.00	0.00
4,800.00	9.27	253.19	4,760.97	-142.92	-472.99	-142.92	0.00	0.00	0.00
4,900.00	9.27	253.19	4,859.67	-147.57	-488.40	-147.57	0.00	0.00	0.00
5,000.00	9.27	253.19	4,958.36	-152.23	-503.82	-152.23	0.00	0.00	0.00
5,100.00	9.27	253.19	5,057.06	-156.89	-519.23	-156.89	0.00	0.00	0.00
5,200.00	9.27	253.19	5,155.75	-161.54	-534.64	-161.54	0.00	0.00	0.00

Released to Imaging: 8/28/2024 2:23:04 PM



Database:	1 - EDM Production	Local Co-ordinate Reference:	Well TICKETY-BOO-2109-FED-COM-122H
Company:	NOVO Oil & Gas	TVD Reference:	RKB 25' + 3314.1' @ 3339.10usft
Project:	EDDY CO., NM (NAD83)	MD Reference:	RKB 25' + 3314.1' @ 3339.10usft
Site:	SEC 21-T19S-30E	North Reference:	Grid
Well:	TICKETY-BOO-2109-FED-COM-122H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan 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)
5,300.00	9.27	253.19	5,254.45	-166.20	-550.05	-166.20	0.00	0.00	0.00
5,400.00	9.27	253.19	5,353.15	-170.86	-565.47	-170.86	0.00	0.00	0.00
5,500.00	9.27	253.19	5,451.84	-175.52	-580.88	-175.52	0.00	0.00	0.00
5,600.00	9.27	253.19	5,550.54	-180.17	-596.29	-180.17	0.00	0.00	0.00
5,700.00	9.27	253.19	5,649.23	-184.83	-611.70	-184.83	0.00	0.00	0.00
5,800.00	9.27	253.19	5,747.93	-189.49	-627.12	-189.49	0.00	0.00	0.00
5,900.00	9.27	253.19	5,846.62	-194.14	-642.53	-194.14	0.00	0.00	0.00
6,000.00	9.27	253.19	5,945.32	-198.80	-657.94	-198.80	0.00	0.00	0.00
6,094.67	9.27	253.19	6,038.75	-203.21	-672.53	-203.21	0.00	0.00	0.00
6,100.00	9.16	253.19	6,044.01	-203.46	-673.35	-203.46	2.00	-2.00	0.00
6,200.00	7.16	253.19	6,143.00	-207.56	-686.93	-207.56	2.00	-2.00	0.00
6,300.00	5.16	253.19	6,242.41	-210.66	-697.20	-210.66	2.00	-2.00	0.00
6,400.00	3.16	253.19	6,342.15	-212.76	-704.14	-212.76	2.00	-2.00	0.00
6,500.00	1.16	253.19	6,442.07	-213.85	-707.75	-213.85	2.00	-2.00	0.00
6,557.93	0.00	0.00	6,500.00	-214.02	-708.31	-214.02	2.00	-2.00	0.00
6,600.00	0.00	0.00	6,542.07	-214.02	-708.31	-214.02	0.00	0.00	0.00
6,700.00	0.00	0.00	6,642.07	-214.02	-708.31	-214.02	0.00	0.00	0.00
6,800.00	0.00	0.00	6,742.07	-214.02	-708.31	-214.02	0.00	0.00	0.00
6,900.00	0.00	0.00	6,842.07	-214.02	-708.31	-214.02	0.00	0.00	0.00
7,000.00	0.00	0.00	6,942.07	-214.02	-708.31	-214.02	0.00	0.00	0.00
7,100.00	0.00	0.00	7,042.07	-214.02	-708.31	-214.02	0.00	0.00	0.00
7,200.00	0.00	0.00	7,142.07	-214.02	-708.31	-214.02	0.00	0.00	0.00
7,300.00	0.00	0.00	7,242.07	-214.02	-708.31	-214.02	0.00	0.00	0.00
7,400.00	0.00	0.00	7,342.07	-214.02	-708.31	-214.02	0.00	0.00	0.00
7,500.00	0.00	0.00	7,442.07	-214.02	-708.31	-214.02	0.00	0.00	0.00
7,600.00	0.00	0.00	7,542.07	-214.02	-708.31	-214.02	0.00	0.00	0.00
7,700.00	0.00	0.00	7,642.07	-214.02	-708.31	-214.02	0.00	0.00	0.00
7,800.00	0.00	0.00	7,742.07	-214.02	-708.31	-214.02	0.00	0.00	0.00
7,834.99	0.00	0.00	7,777.06	-214.02	-708.31	-214.02	0.00	0.00	0.00
7,850.00	1.50	10.20	7,792.06	-213.83	-708.28	-213.83	10.00	10.00	0.00
7,900.00	6.50	10.20	7,841.93	-210.39	-707.66	-210.39	10.00	10.00	0.00
7,950.00	11.50	10.20	7,891.30	-202.70	-706.27	-202.70	10.00	10.00	0.00
8,000.00	16.50	10.20	7,939.79	-190.80	-704.13	-190.80	10.00	10.00	0.00
8,050.00	21.50	10.20	7,987.06	-174.78	-701.25	-174.78	10.00	10.00	0.00
8,100.00	26.50	10.20	8,032.72	-154.77	-697.65	-154.77	10.00	10.00	0.00
8,150.00	31.50	10.20	8,076.43	-130.92	-693.36	-130.92	10.00	10.00	0.00
8,200.00	36.50	10.20	8,117.87	-103.41	-688.41	-103.41	10.00	10.00	0.00
8,250.00	41.50	10.20	8,156.72	-72.45	-682.84	-72.45	10.00	10.00	0.00
8,300.00	46.50	10.20	8,192.67	-38.28	-676.69	-38.28	10.00	10.00	0.00
8,350.00	51.50	10.20	8,225.47	-1.15	-670.01	-1.15	10.00	10.00	0.00
8,400.00	56.50	10.20	8,254.84	38.65	-662.85	38.65	10.00	10.00	0.00
8,450.00	61.50	10.20	8,280.59	80.82	-655.26	80.82	10.00	10.00	0.00
8,500.00	66.50	10.20	8,302.50	125.03	-647.30	125.03	10.00	10.00	0.00
8,550.00	71.50	10.20	8,320.41	170.96	-639.04	170.96	10.00	10.00	0.00
8,600.00	76.50	10.20	8,334.19	218.25	-630.53	218.25	10.00	10.00	0.00
8,650.00	81.50	10.20	8,343.73	266.54	-621.84	266.54	10.00	10.00	0.00
8,700.00	86.50	10.20	8,348.95	315.46	-613.04	315.46	10.00	10.00	0.00
8,738.99	90.40	10.20	8,350.00	353.82	-606.14	353.82	10.00	10.00	0.00
8,800.00	90.40	8.98	8,349.58	413.97	-595.98	413.97	2.00	0.00	-2.00
8,900.00	90.40	6.98	8,348.88	512.99	-582.10	512.99	2.00	0.00	-2.00
9,000.00	90.40	4.98	8,348.17	612.44	-571.68	612.44	2.00	0.00	-2.00
9,100.00	90.40	2.98	8,347.47	712.19	-564.74	712.19	2.00	0.00	-2.00
9,200.00	90.40	0.98	8,346.76	812.13	-561.28	812.13	2.00	0.00	-2.00
9,257.10	90.40	359.84	8,346.36	869.22	-560.86	869.22	0.00	0.00	-2.00

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Database:	1 - EDM Production	Local Co-ordinate Reference:	Well TICKETY-BOO-2109-FED-COM-122H
Company:	NOVO Oil & Gas	TVD Reference:	RKB 25' + 3314.1' @ 3339.10usft
Project:	EDDY CO., NM (NAD83)	MD Reference:	RKB 25' + 3314.1' @ 3339.10usft
Site:	SEC 21-T19S-30E	North Reference:	Grid
Well:	TICKETY-BOO-2109-FED-COM-122H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan 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)	
9,300.00	90.40	359.84	8,346.05	912.12	-561.00	912.12	0.00	0.00	0.00	
9,400.00	90.40	359.84	8,345.35	1,012.12	-561.28	1,012.12	0.00	0.00	0.00	
9,500.00	90.40	359.84	8,344.64	1,112.12	-561.57	1,112.12	0.00	0.00	0.00	
9,600.00	90.40	359.84	8,343.94	1,212.11	-561.85	1,212.11	0.00	0.00	0.00	
9,700.00	90.40	359.84	8,343.23	1,312.11	-562.13	1,312.11	0.00	0.00	0.00	
9,800.00	90.40	359.84	8,342.53	1,412.11	-562.42	1,412.11	0.00	0.00	0.00	
9,900.00	90.40	359.84	8,341.82	1,512.10	-562.70	1,512.10	0.00	0.00	0.00	
10,000.00	90.40	359.84	8,341.12	1,612.10	-562.98	1,612.10	0.00	0.00	0.00	
10,100.00	90.40	359.84	8,340.41	1,712.10	-563.27	1,712.10	0.00	0.00	0.00	
10,200.00	90.40	359.84	8,339.70	1,812.10	-563.55	1,812.10	0.00	0.00	0.00	
10,300.00	90.40	359.84	8,339.00	1,912.09	-563.83	1,912.09	0.00	0.00	0.00	
10,400.00	90.40	359.84	8,338.29	2,012.09	-564.12	2,012.09	0.00	0.00	0.00	
10,500.00	90.40	359.84	8,337.59	2,112.09	-564.40	2,112.09	0.00	0.00	0.00	
10,600.00	90.40	359.84	8,336.88	2,212.08	-564.68	2,212.08	0.00	0.00	0.00	
10,700.00	90.40	359.84	8,336.18	2,312.08	-564.97	2,312.08	0.00	0.00	0.00	
10,800.00	90.40	359.84	8,335.47	2,412.08	-565.25	2,412.08	0.00	0.00	0.00	
10,900.00	90.40	359.84	8,334.76	2,512.08	-565.53	2,512.08	0.00	0.00	0.00	
11,000.00	90.40	359.84	8,334.06	2,612.07	-565.82	2,612.07	0.00	0.00	0.00	
11,100.00	90.40	359.84	8,333.35	2,712.07	-566.10	2,712.07	0.00	0.00	0.00	
11,200.00	90.40	359.84	8,332.65	2,812.07	-566.38	2,812.07	0.00	0.00	0.00	
11,300.00	90.40	359.84	8,331.94	2,912.06	-566.67	2,912.06	0.00	0.00	0.00	
11,400.00	90.40	359.84	8,331.24	3,012.06	-566.95	3,012.06	0.00	0.00	0.00	
11,500.00	90.40	359.84	8,330.53	3,112.06	-567.23	3,112.06	0.00	0.00	0.00	
11,600.00	90.40	359.84	8,329.82	3,212.05	-567.52	3,212.05	0.00	0.00	0.00	
11,700.00	90.40	359.84	8,329.12	3,312.05	-567.80	3,312.05	0.00	0.00	0.00	
11,800.00	90.40	359.84	8,328.41	3,412.05	-568.08	3,412.05	0.00	0.00	0.00	
11,900.00	90.40	359.84	8,327.71	3,512.05	-568.37	3,512.05	0.00	0.00	0.00	
12,000.00	90.40	359.84	8,327.00	3,612.04	-568.65	3,612.04	0.00	0.00	0.00	
12,100.00	90.40	359.84	8,326.30	3,712.04	-568.93	3,712.04	0.00	0.00	0.00	
12,200.00	90.40	359.84	8,325.59	3,812.04	-569.22	3,812.04	0.00	0.00	0.00	
12,300.00	90.40	359.84	8,324.88	3,912.03	-569.50	3,912.03	0.00	0.00	0.00	
12,400.00	90.40	359.84	8,324.18	4,012.03	-569.78	4,012.03	0.00	0.00	0.00	
12,500.00	90.40	359.84	8,323.47	4,112.03	-570.07	4,112.03	0.00	0.00	0.00	
12,600.00	90.40	359.84	8,322.77	4,212.03	-570.35	4,212.03	0.00	0.00	0.00	
12,700.00	90.40	359.84	8,322.06	4,312.02	-570.64	4,312.02	0.00	0.00	0.00	
12,800.00	90.40	359.84	8,321.36	4,412.02	-570.92	4,412.02	0.00	0.00	0.00	
12,900.00	90.40	359.84	8,320.65	4,512.02	-571.20	4,512.02	0.00	0.00	0.00	
13,000.00	90.40	359.84	8,319.95	4,612.01	-571.49	4,612.01	0.00	0.00	0.00	
13,100.00	90.40	359.84	8,319.24	4,712.01	-571.77	4,712.01	0.00	0.00	0.00	
13,200.00	90.40	359.84	8,318.53	4,812.01	-572.05	4,812.01	0.00	0.00	0.00	
13,300.00	90.40	359.84	8,317.83	4,912.01	-572.34	4,912.01	0.00	0.00	0.00	
13,400.00	90.40	359.84	8,317.12	5,012.00	-572.62	5,012.00	0.00	0.00	0.00	
13,500.00	90.40	359.84	8,316.42	5,112.00	-572.90	5,112.00	0.00	0.00	0.00	
13,600.00	90.40	359.84	8,315.71	5,212.00	-573.19	5,212.00	0.00	0.00	0.00	
13,700.00	90.40	359.84	8,315.01	5,311.99	-573.47	5,311.99	0.00	0.00	0.00	
13,800.00	90.40	359.84	8,314.30	5,411.99	-573.75	5,411.99	0.00	0.00	0.00	
13,900.00	90.40	359.84	8,313.59	5,511.99	-574.04	5,511.99	0.00	0.00	0.00	
14,000.00	90.40	359.84	8,312.89	5,611.99	-574.32	5,611.99	0.00	0.00	0.00	
14,100.00	90.40	359.84	8,312.18	5,711.98	-574.60	5,711.98	0.00	0.00	0.00	
14,200.00	90.40	359.84	8,311.48	5,811.98	-574.89	5,811.98	0.00	0.00	0.00	
14,300.00	90.40	359.84	8,310.77	5,911.98	-575.17	5,911.98	0.00	0.00	0.00	
14,400.00	90.40	359.84	8,310.07	6,011.97	-575.45	6,011.97	0.00	0.00	0.00	
14,500.00	90.40	359.84	8,309.36	6,111.97	-575.74	6,111.97	0.00	0.00	0.00	
14,600.00	90.40	359.84	8,308.65	6,211.97						

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Database:	1 - EDM Production	Local Co-ordinate Reference:	Well TICKETY-BOO-2109-FED-COM-122H
Company:	NOVO Oil & Gas	TVD Reference:	RKB 25' + 3314.1' @ 3339.10usft
Project:	EDDY CO., NM (NAD83)	MD Reference:	RKB 25' + 3314.1' @ 3339.10usft
Site:	SEC 21-T19S-30E	North Reference:	Grid
Well:	TICKETY-BOO-2109-FED-COM-122H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan 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)
14,700.00	90.40	359.84	8,307.95	6,311.97	-576.30	6,311.97	0.00	0.00	0.00
14,800.00	90.40	359.84	8,307.24	6,411.96	-576.59	6,411.96	0.00	0.00	0.00
14,900.00	90.40	359.84	8,306.54	6,511.96	-576.87	6,511.96	0.00	0.00	0.00
15,000.00	90.40	359.84	8,305.83	6,611.96	-577.15	6,611.96	0.00	0.00	0.00
15,100.00	90.40	359.84	8,305.13	6,711.95	-577.44	6,711.95	0.00	0.00	0.00
15,200.00	90.40	359.84	8,304.42	6,811.95	-577.72	6,811.95	0.00	0.00	0.00
15,300.00	90.40	359.84	8,303.71	6,911.95	-578.00	6,911.95	0.00	0.00	0.00
15,400.00	90.40	359.84	8,303.01	7,011.95	-578.29	7,011.95	0.00	0.00	0.00
15,500.00	90.40	359.84	8,302.30	7,111.94	-578.57	7,111.94	0.00	0.00	0.00
15,600.00	90.40	359.84	8,301.60	7,211.94	-578.85	7,211.94	0.00	0.00	0.00
15,700.00	90.40	359.84	8,300.89	7,311.94	-579.14	7,311.94	0.00	0.00	0.00
15,800.00	90.40	359.84	8,300.19	7,411.93	-579.42	7,411.93	0.00	0.00	0.00
15,900.00	90.40	359.84	8,299.48	7,511.93	-579.70	7,511.93	0.00	0.00	0.00
16,000.00	90.40	359.84	8,298.77	7,611.93	-579.99	7,611.93	0.00	0.00	0.00
16,100.00	90.40	359.84	8,298.07	7,711.92	-580.27	7,711.92	0.00	0.00	0.00
16,200.00	90.40	359.84	8,297.36	7,811.92	-580.55	7,811.92	0.00	0.00	0.00
16,300.00	90.40	359.84	8,296.66	7,911.92	-580.84	7,911.92	0.00	0.00	0.00
16,400.00	90.40	359.84	8,295.95	8,011.92	-581.12	8,011.92	0.00	0.00	0.00
16,500.00	90.40	359.84	8,295.25	8,111.91	-581.41	8,111.91	0.00	0.00	0.00
16,600.00	90.40	359.84	8,294.54	8,211.91	-581.69	8,211.91	0.00	0.00	0.00
16,700.00	90.40	359.84	8,293.84	8,311.91	-581.97	8,311.91	0.00	0.00	0.00
16,800.00	90.40	359.84	8,293.13	8,411.90	-582.26	8,411.90	0.00	0.00	0.00
16,900.00	90.40	359.84	8,292.42	8,511.90	-582.54	8,511.90	0.00	0.00	0.00
17,000.00	90.40	359.84	8,291.72	8,611.90	-582.82	8,611.90	0.00	0.00	0.00
17,100.00	90.40	359.84	8,291.01	8,711.90	-583.11	8,711.90	0.00	0.00	0.00
17,200.00	90.40	359.84	8,290.31	8,811.89	-583.39	8,811.89	0.00	0.00	0.00
17,300.00	90.40	359.84	8,289.60	8,911.89	-583.67	8,911.89	0.00	0.00	0.00
17,400.00	90.40	359.84	8,288.90	9,011.89	-583.96	9,011.89	0.00	0.00	0.00
17,500.00	90.40	359.84	8,288.19	9,111.88	-584.24	9,111.88	0.00	0.00	0.00
17,600.00	90.40	359.84	8,287.48	9,211.88	-584.52	9,211.88	0.00	0.00	0.00
17,700.00	90.40	359.84	8,286.78	9,311.88	-584.81	9,311.88	0.00	0.00	0.00
17,800.00	90.40	359.84	8,286.07	9,411.88	-585.09	9,411.88	0.00	0.00	0.00
17,900.00	90.40	359.84	8,285.37	9,511.87	-585.37	9,511.87	0.00	0.00	0.00
18,000.00	90.40	359.84	8,284.66	9,611.87	-585.66	9,611.87	0.00	0.00	0.00
18,100.00	90.40	359.84	8,283.96	9,711.87	-585.94	9,711.87	0.00	0.00	0.00
18,200.00	90.40	359.84	8,283.25	9,811.86	-586.22	9,811.86	0.00	0.00	0.00
18,300.00	90.40	359.84	8,282.54	9,911.86	-586.51	9,911.86	0.00	0.00	0.00
18,400.00	90.40	359.84	8,281.84	10,011.86	-586.79	10,011.86	0.00	0.00	0.00
18,500.00	90.40	359.84	8,281.13	10,111.86	-587.07	10,111.86	0.00	0.00	0.00
18,600.00	90.40	359.84	8,280.43	10,211.85	-587.36	10,211.85	0.00	0.00	0.00
18,700.00	90.40	359.84	8,279.72	10,311.85	-587.64	10,311.85	0.00	0.00	0.00
18,800.00	90.40	359.84	8,279.02	10,411.85	-587.92	10,411.85	0.00	0.00	0.00
18,900.00	90.40	359.84	8,278.31	10,511.84	-588.21	10,511.84	0.00	0.00	0.00
19,000.00	90.40	359.84	8,277.60	10,611.84	-588.49	10,611.84	0.00	0.00	0.00
19,100.00	90.40	359.84	8,276.90	10,711.84	-588.77	10,711.84	0.00	0.00	0.00
19,200.00	90.40	359.84	8,276.19	10,811.84	-589.06	10,811.84	0.00	0.00	0.00
19,300.00	90.40	359.84	8,275.49	10,911.83	-589.34	10,911.83	0.00	0.00	0.00
19,400.00	90.40	359.84	8,274.78	11,011.83	-589.62	11,011.83	0.00	0.00	0.00
19,500.00	90.40	359.84	8,274.08	11,111.83	-589.91	11,111.83	0.00	0.00	0.00
19,600.00	90.40	359.84	8,273.37	11,211.82	-590.19	11,211.82	0.00	0.00	0.00
19,700.00	90.40	359.84	8,272.67	11,311.82	-590.47	11,311.82	0.00	0.00	0.00
19,800.00	90.40	359.84	8,271.96	11,411.82	-590.76	11,411.82	0.00	0.00	0.00
19,900.00	90.40	359.84	8,271.25	11,511.82	-591.04	11,511.82	0.00	0.00	0.00
20,000.00	90.40	359.84	8,270.55	11,611.81	-591.32	11,611.81	0.00	0.00	0.00

Released to Imaging: 8/28/2024 2:23:04 PM

<b>Database:</b>	1 - EDM Production	<b>Local Co-ordinate Reference:</b>	Well TICKETY-BOO-2109-FED-COM-122H
<b>Company:</b>	NOVO Oil & Gas	<b>TVD Reference:</b>	RKB 25' + 3314.1' @ 3339.10usft
<b>Project:</b>	EDDY CO., NM (NAD83)	<b>MD Reference:</b>	RKB 25' + 3314.1' @ 3339.10usft
<b>Site:</b>	SEC 21-T19S-30E	<b>North Reference:</b>	Grid
<b>Well:</b>	TICKETY-BOO-2109-FED-COM-122H	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan 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)
20,100.00	90.40	359.84	8,269.84	11,711.81	-591.61	11,711.81	0.00	0.00	0.00
20,200.00	90.40	359.84	8,269.14	11,811.81	-591.89	11,811.81	0.00	0.00	0.00
20,300.00	90.40	359.84	8,268.43	11,911.80	-592.18	11,911.80	0.00	0.00	0.00
20,400.00	90.40	359.84	8,267.73	12,011.80	-592.46	12,011.80	0.00	0.00	0.00
20,502.78	90.40	359.84	8,267.00	12,114.58	-592.75	12,114.58	0.00	0.00	0.00

Design Targets									
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
TB 122H FTP(1220' FNL - plan misses target center by 661.55usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	353.84	-558.97	600,305.43	649,694.08	32.64979350	-103.98127800
TB 122H LTP(100' FNL - plan misses target center by 8267.43usft at 20471.15usft MD (8267.22 TVD, 12082.95 N, -592.66 E) - Point	0.00	0.00	0.00	12,024.61	-592.50	611,976.20	649,660.54	32.68187280	-103.98126120
TB 122H PBHL(10' FNL - plan misses target center by 8267.00usft at 20502.78usft MD (8267.00 TVD, 12114.58 N, -592.75 E) - Point	0.00	0.00	0.00	12,114.59	-592.75	612,066.18	649,660.29	32.68212015	-103.98126103

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
20,533.70		20" Casing	20	24	

PECOS DISTRICT  
SURFACE USE  
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Novo Oil & Gas Northern Delaware, LLC.
LEASE NO.:	NMLC062376
COUNTY:	Eddy

**Wells:**

Tickety Boo 2109 Fed Com 111H  
Surface Hole Location: 1663' FNL & 1719' FWL, Section 21, T. 19 S., R. 30 E.  
Bottom Hole Location: 10' FNL & 330' FWL, Section 9, T. 19 S, R 30 E.

Tickety Boo 2109 Fed Com 112H  
Surface Hole Location: 1692' FNL & 1746' FWL, Section 21, T. 19 S., R. 30 E.  
Bottom Hole Location: 10' FNL & 1320' FWL, Section 9, T. 19 S, R 30 E.

Tickety Boo 2109 Fed Com 113H  
Surface Hole Location: 1721' FNL & 1774' FWL, Section 21, T. 19 S., R. 30 E.  
Bottom Hole Location: 10' FNL & 2310' FWL, Section 9, T. 19 S, R 30 E.

Tickety Boo 2109 Fed Com 121H  
Surface Hole Location: 1561' FNL & 1864' FWL, Section 21, T. 19 S., R. 30 E.  
Bottom Hole Location: 10' FNL & 330' FWL, Section 9, T. 19 S, R 30 E.

Tickety Boo 2109 Fed Com 122H  
Surface Hole Location: 1576' FNL & 1878' FWL, Section 21, T. 19 S., R. 30 E.  
Bottom Hole Location: 10' FSL & 1320' FWL, Section 9, T. 19 S, R 30 E.

Tickety Boo 2109 Fed Com 123H  
Surface Hole Location: 1590' FNL & 1892' FWL, Section 21, T. 19 S., R. 30 E.  
Bottom Hole Location: 10' FNL & 2310' FWL, Section 9, T. 19 S, R 30 E.

Tickety Boo 2109 Fed Com 131H  
Surface Hole Location: 1649' FNL & 1705' FWL, Section 21, T. 19 S., R. 30 E.  
Bottom Hole Location: 10' FNL & 330' FWL, Section 9, T. 19 S, R 30 E.

Tickety Boo 2109 Fed Com 132H  
Surface Hole Location: 1677' FNL & 1733' FWL, Section 21, T. 19 S., R. 30 E.  
Bottom Hole Location: 10' FNL & 1320' FEL, Section 9, T. 19 S, R 30 E.

Tickety Boo 2109 Fed Com 133H  
Surface Hole Location: 1706' FNL & 1760' FWL, Section 21, T. 19 S., R. 30 E.  
Bottom Hole Location: 10' FNL & 2310' FWL, Section 9, T. 19 S, R 30 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**
  - Watershed
  - Cave/Karst
  - Range
  - VRM IV
  - Potash
  - Texas Hornshell Mussel
- ☐ **Construction**
  - Notification
  - Topsoil
  - Closed Loop System
  - Federal Mineral Material Pits
  - Well Pads
  - Roads
- ☐ **Road Section Diagram**
- ☒ **Production (Post Drilling)**
  - Well Structures & Facilities
  - Pipelines
  - Electric Lines
- ☐ **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 resource (historic or prehistoric site or object) discovered by the holder, or any person working on the holder's behalf, on public or Federal land shall be immediately reported to the Authorized Officer. The holder 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 will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to the proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

OR

If the entire project is covered under the Permian Basin Programmatic Agreement (cultural resources only):

The proponent has contributed funds commensurate to the undertaking into an account for offsite mitigation. Participation in the PA serves as mitigation for the effects of this project on cultural resources. If any human skeletal remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered at any time during construction, all construction activities shall halt and the BLM will be notified as soon as possible within 24 hours. Work shall not resume until a Notice to Proceed is issued by the BLM. See information below discussing NAGPRA.

If the proposed project is split between a Class III inventory and a Permian Basin Programmatic Agreement contribution, the portion of the project covered under Class III inventory should default to the first paragraph stipulations.

The holder is hereby obligated to comply with procedures established in the Native American Graves Protection and Repatriation Act (NAGPRA) to protect such cultural items as human remains, associated funerary objects, sacred objects, and objects of cultural patrimony discovered inadvertently during the course of project implementation. In the event that any of the cultural items listed above are discovered during the course of project work, the proponent shall immediately halt the disturbance and contact the BLM within 24 hours for instructions. The proponent or initiator of any project shall be held responsible for protecting, evaluating, reporting, excavating, treating, and disposing of these cultural items according to the procedures established by the BLM in consultation with Indian Tribes."

Any paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on the holder's behalf, on public or Federal land shall be immediately reported to the Authorized Officer. The holder 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 will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to the proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

#### **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)**

##### **Watershed:**

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 topsoil 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:**

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.

##### **BURIED/SURFACE LINE(S):**

When crossing ephemeral drainages the pipeline(s) will be buried to a minimum depth of 48 inches from the top of pipe to ground level. Erosion control methods such as gabions and/or rock aprons should be placed on both up and downstream sides of the pipeline crossing. In addition, curled (weed free) wood/straw fiber wattles/logs and/or silt fences should be placed on the downstream side for sediment control during construction and maintained until soils and vegetation have stabilized. Water bars should be placed within the ROW to divert and dissipate surface runoff. A pipeline access road is not permitted to cross these ephemeral drainages. Traffic should be diverted to a preexisting route. Additional seeding may be required in floodplains and drainages to restore energy dissipating vegetation.

Prior to pipeline installation/construction a leak detection plan will be developed. The method(s) could incorporate gauges to detect pressure drops, situating valves and lines so they can be visually inspected periodically or installing electronic sensors to alarm when a leak is present.

The leak detection plan will incorporate an automatic shut off system that will be installed for proposed pipelines to minimize the effects of an undesirable event.

### **Cave/Karst:**

#### **Construction Mitigation**

In order to mitigate the impacts from construction activities on cave and karst resources, the following Conditions of Approval will apply to this APD or project:

#### **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.

#### **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.

**Drilling Mitigation**

Federal regulations and standard Conditions of Approval applied to all APDs require that adequate measures are taken to prevent contamination to the environment. Due to the extreme sensitivity of the cave and karst resources in this project area, the following additional Conditions of Approval will be added to this APD.

To prevent cave and karst resource contamination the following will be required:

- Closed loop system using steel tanks - all fluids and cuttings will be hauled off-site and disposed of properly at an authorized site
- Rotary drilling with fresh water where cave or karst features are expected to prevent contamination of freshwater aquifers.
- Directional drilling is only allowed at depths greater than 100 feet below the cave occurrence zone to prevent additional impacts resulting from directional drilling.
- Lost circulation zones will be logged and reported in the drilling report so BLM can assess the situation and work with the operator on corrective actions.
- Additional drilling, casing, and cementing procedures to protect cave zones and fresh water aquifers. See drilling COAs.

**Production Mitigation**

In order to mitigate the impacts from production activities and due to the nature of karst terrane, the following Conditions of Approval will apply to this APD:

- Tank battery locations and facilities will be bermed and lined with a 20 mil thick permanent liner that has 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.
- Development and implementation of a leak detection system to provide an early alert to operators when a leak has occurred.
- 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.

**Residual and Cumulative Mitigation**

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 taken to correct the problem to the BLM's approval.

**Plugging and Abandonment Mitigation**

Upon well abandonment in high cave karst areas additional plugging conditions of approval may be required. The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore.

**Range:****Cattleguards**

Where a permanent cattlegaurd is approved, an appropriately sized cattleguard(s) sufficient to carry out the project shall be installed and maintained at fence crossing(s). Any existing cattleguard(s) on the access road 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 cattleguard(s) that are in place and are utilized during lease operations. A gate shall be constructed on one side of the cattleguard and fastened securely to H-braces.

**Fence Requirement**

Where entry granted across a fence line, the fence must be braced and tied off on both sides of the passageway prior to cutting. Once the work is completed, the fence will be restored to its prior condition, or better. The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fence(s).

**Livestock Watering Requirement**

Any damage to structures that provide water to livestock throughout the life of the well, caused by operations from the well site, must be immediately corrected by the operator. The operator must notify the BLM office (575-234-5972) and the private surface landowner or the grazing allotment holder if any damage occurs to structures that provide water to livestock.

**VRM IV:**

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

Short-term mitigation measures include painting all above-ground structures that are not subject to safety requirements (including meter housing) Shale Green, which is a flat non-reflective paint color listed in the BLM Standard Environmental Color Chart (CC-001: June 2013). Long-term mitigation measures include the removal of wells and associated infrastructure following abandonment (end of cost-effective production). Previously impacted areas will be reclaimed by removing structures and caliche pads, returning disturbed areas to natural grade, and revegetating with an approved BLM seed mixture; thereby eliminating visual impacts.

**Texas Hornshell Mussel**

Oil and Gas Zone D - CCA Boundary requirements.

- Implement erosion control measures in accordance with the Reasonable and Prudent Practices for Stabilization ("RAPPS")
- Comply with SPCC requirements in accordance with 40 CFR Part 112;
- Comply with the United States Army Corp of Engineers (USACE) Nationwide 12 General Permit, where applicable;
- Utilize technologies (like underground borings for pipelines), where feasible;
- Educate personnel, agents, contractors, and subcontractors about the requirements of conservation measures, COAs, Stips and provide direction in accordance with the Permit.

**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 Batwing Drill Island within the Tickety Boo Development Area.

The Batwing Drill Island is designated for Shallow APDs(All Formations above the base of the Second Bone Spring Sandstone Only). No wells on this drill island are acceptable below 8,526 feet.

## **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 enclosure fencing design, refer to BLM's Oil and Gas Gold Book, Enclosure 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 outsloping 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.

6" Berm on Down Slope Side

1' Minimum Depth

Natural Ground Level

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

400 foot road with 4% road slope:  $\frac{400'}{4\%} + 100' = 200'$  lead-off ditch interval

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.

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 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

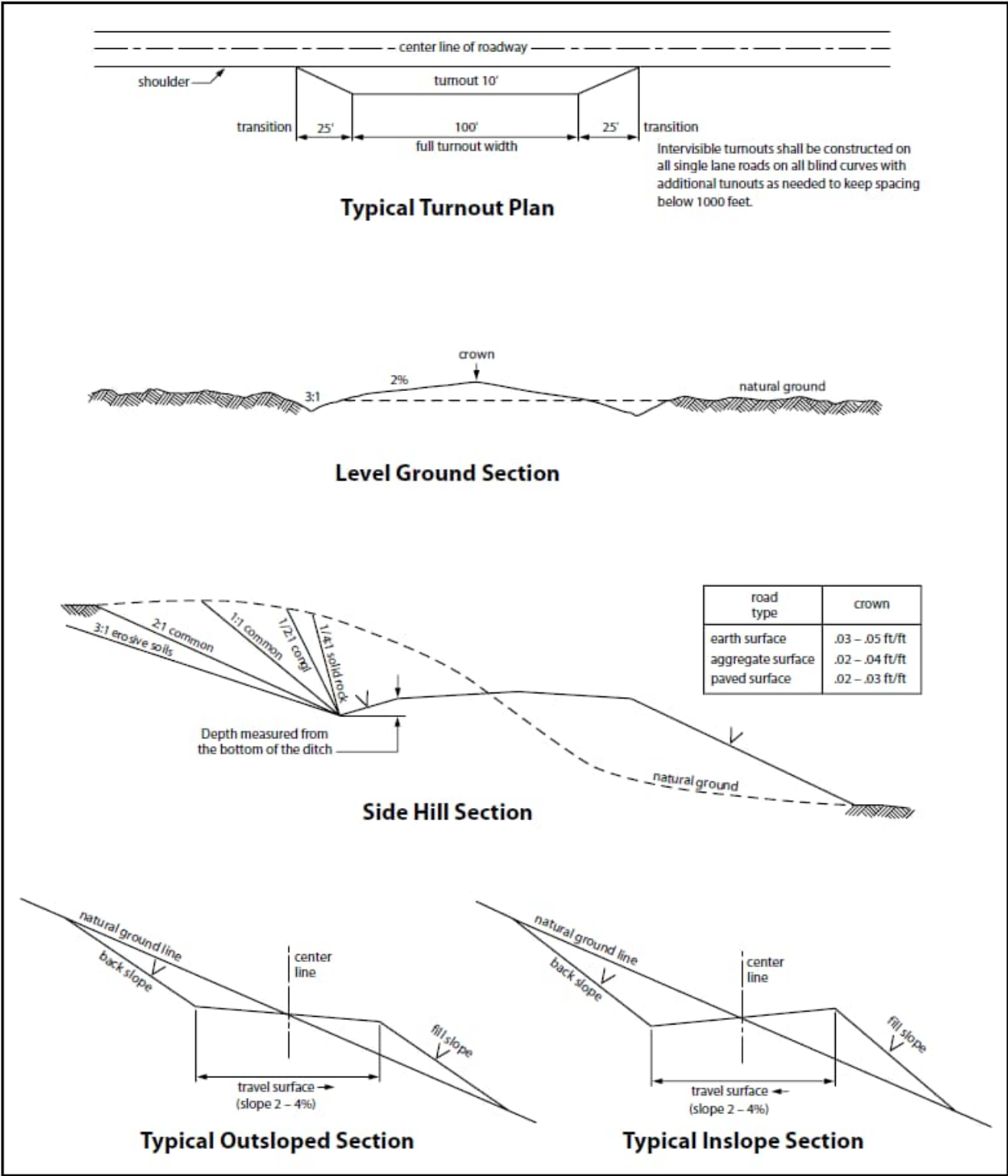


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

## 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).

**B. PIPELINES**

- The BLM, Carlsbad Field Office, will be informed immediately if any subsurface drainage channels, passages, or voids are intersected by trenching, and no pipe will be laid in the trench at that point until clearance has been issued by the Authorized Officer.
- If a void is encountered alignments may be rerouted to avoid the karst feature and lessen; the potential of subsidence or collapse of karst features, buildup of toxic or combustible gas, or other possible impacts to cave and karst resources from the buried pipeline.
- Special restoration stipulations or realignment may be required at such intersections, if any.
- A leak detection plan **will be submitted to the BLM Carlsbad Field Office for approval** prior to pipeline installation. The method could incorporate gauges to detect pressure drops, siting valves and lines so they can be visually inspected periodically or installing electronic sensors to alarm when a leak is present. The leak detection plan will incorporate an automatic shut off system that will be installed for proposed pipelines to minimize the effects of an undesirable event.
- Regular monitoring is required to quickly identify leaks for their immediate and proper treatment.
- All spills or leaks will be reported to the BLM immediately for their immediate and proper treatment.

**BURIED PIPELINE STIPULATIONS**

A copy of the application (Grant, APD, or Sundry Notice) and attachments, including conditions of approval, survey plat and/or map, will be on location during construction. BLM personnel may request to you a copy of your permit during construction to ensure compliance with all stipulations.

Holder agrees to comply with the following stipulations to the satisfaction of the Authorized Officer:

1. The Holder shall indemnify the United States against any liability for damage to life or property arising from the occupancy or use of public lands under this grant.
2. The Holder shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder shall comply with the Toxic Substances Control Act of 1976 as amended, 15 USC 2601 et seq. (1982) with regards to any toxic substances that are used, generated by or stored on the right-of-way or on facilities authorized under this right-of-way grant. (See 40 CFR Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act, section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the authorized officer concurrent with the filing of the reports to the involved Federal agency or State government.
3. The holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the



Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601, et seq. or the Resource Conservation and Recovery Act, 42 U.S.C.6901, et seq.) on the Right-of-Way (unless the release or threatened release is wholly unrelated to the Right-of-Way holder's activity on the Right-of-Way), or resulting from the activity of the Right-of-Way holder on the Right-of-Way. This agreement applies without regard to whether a release is caused by the holder, its agent, or unrelated third parties.

4. If, during any phase of the construction, operation, maintenance, or termination of the pipeline, any oil or other pollutant should be discharged from the pipeline system, impacting Federal lands, the control and total removal, disposal, and cleaning up of such oil or other pollutant, wherever found, shall be the responsibility of holder, regardless of fault. Upon failure of holder to control, dispose of, or clean up such discharge on or affecting Federal lands, or to repair all damages resulting therefrom, on the Federal lands, the Authorized Officer may take such measures as he deems necessary to control and clean up the discharge and restore the area, including where appropriate, the aquatic environment and fish and wildlife habitats, at the full expense of the holder. Such action by the Authorized Officer shall not relieve holder of any responsibility as provided herein.

5. All construction and maintenance activity will be confined to the authorized right-of-way.

6. The pipeline will be buried with a minimum cover of 36 inches between the top of the pipe and ground level.

7. The maximum allowable disturbance for construction in this right-of-way will be 30 feet:

- Blading of vegetation within the right-of-way will be allowed: maximum width of blading operations will not exceed 20 feet. The trench is included in this area. (*Blading is defined as the complete removal of brush and ground vegetation.*)
- Clearing of brush species within the right-of-way will be allowed: maximum width of clearing operations will not exceed 30 feet. The trench and bladed area are included in this area. (*Clearing is defined as the removal of brush while leaving ground vegetation (grasses, weeds, etc.) intact. Clearing is best accomplished by holding the blade 4 to 6 inches above the ground surface.*)
- The remaining area of the right-of-way (if any) shall only be disturbed by compressing the vegetation. (*Compressing can be caused by vehicle tires, placement of equipment, etc.*)

8. The holder shall stockpile an adequate amount of topsoil where blading is allowed. The topsoil to be stripped is approximately 6 inches in depth. The topsoil will be segregated from other spoil piles from trench construction. The topsoil will be evenly distributed over the bladed area for the preparation of seeding.

9. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair improvements to at least their former state. Functional use of these improvements will be maintained at all times. The holder will contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. No permanent gates will be allowed unless approved by the Authorized Officer.



10. Vegetation, soil, and rocks left as a result of construction or maintenance activity will be randomly scattered on this right-of-way and will not be left in rows, piles, or berms, unless otherwise approved by the Authorized Officer. The entire right-of-way shall be recontoured to match the surrounding landscape. The backfilled soil shall be compacted and a 6 inch berm will be left over the ditch line to allow for settling back to grade.

11. In those areas where erosion control structures are required to stabilize soil conditions, the holder will install such structures as are suitable for the specific soil conditions being encountered and which are in accordance with sound resource management practices.

12. The holder will reseed all disturbed areas. Seeding will be done according to the attached seeding requirements, using the following seed mix.

☐ Seed Mixture 1

☒ Seed Mixture 2

☐ Seed Mixture 2/LPC

☐ Seed Mixture 3

☐ Seed Mixture 4

☐ Seed Mixture Aplomado Falcon Mixture

13. All above-ground structures not subject to safety requirements shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be color which simulates "Standard Environmental Colors" – **Shale Green**, Munsell Soil Color No. 5Y 4/2.

14. The pipeline will be identified by signs at the point of origin and completion of the right-of-way and at all road crossings. At a minimum, signs will state the holder's name, BLM serial number, and the product being transported. All signs and information thereon will be posted in a permanent, conspicuous manner, and will be maintained in a legible condition for the life of the pipeline.

15. The holder shall not use the pipeline route as a road for purposes other than routine maintenance as determined necessary by the Authorized Officer in consultation with the holder before maintenance begins. The holder will take whatever steps are necessary to ensure that the pipeline route is not used as a roadway. As determined necessary during the life of the pipeline, the Authorized Officer may ask the holder to construct temporary deterrence structures.

16. Any cultural resource (historic or prehistoric site or object) discovered by the holder, or any person working on the holder's behalf, on public or Federal land shall be immediately reported to the Authorized Officer. The holder 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 will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to the proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

OR

If the entire project is covered under the Permian Basin Programmatic Agreement (cultural resources only):

The proponent has contributed funds commensurate to the undertaking into an account for offsite mitigation. Participation in the PA serves as mitigation for the effects of this project on cultural resources. If any human skeletal remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered at any time during construction, all construction activities shall halt and the BLM will be notified as soon as possible within 24 hours. Work shall not resume until a Notice to Proceed is issued by the BLM. See Stipulation 17 for more information.

If the proposed project is split between a Class III inventory and a Permian Basin Programmatic Agreement contribution, the portion of the project covered under Class III inventory should default to the first paragraph stipulations.

17. The holder is hereby obligated to comply with procedures established in the Native American Graves Protection and Repatriation Act (NAGPRA) to protect such cultural items as human remains, associated funerary objects, sacred objects, and objects of cultural patrimony discovered inadvertently during the course of project implementation. In the event that any of the cultural items listed above are discovered during the course of project work, the proponent shall immediately halt the disturbance and contact the BLM within 24 hours for instructions. The proponent or initiator of any project shall be held responsible for protecting, evaluating, reporting, excavating, treating, and disposing of these cultural items according to the procedures established by the BLM in consultation with Indian Tribes."

18. Any paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on the holder's behalf, on public or Federal land shall be immediately reported to the Authorized Officer. The holder 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 will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to the proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

19. 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 associated roads, 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.

20. Escape Ramps - The operator will construct and maintain pipeline/utility trenches [that are not otherwise fenced, screened, or netted] to prevent livestock, wildlife, and humans from becoming entrapped. At a minimum, the operator will construct and maintain escape ramps, ladders, or other methods of avian and terrestrial wildlife escape in the trenches according to the following criteria:

- a. Any trench left open for eight (8) hours or less is not required to have escape ramps; however, before the trench is backfilled, the contractor/operator shall inspect the trench for wildlife, remove all trapped wildlife, and release them at least 100 yards from the trench.

- b. For trenches left open for eight (8) hours or more, earthen escape ramps (built at no more than a 30 degree slope and spaced no more than 500 feet apart) shall be placed in the trench.

21. Special Stipulations:

**Karst:**

- The BLM, Carlsbad Field Office, will be informed immediately if any subsurface drainage channels, passages, or voids are intersected by trenching, and no pipe will be laid in the trench at that point until clearance has been issued by the Authorized Officer.
- If a void is encountered alignments may be rerouted to avoid the karst feature and lessen; the potential of subsidence or collapse of karst features, buildup of toxic or combustible gas, or other possible impacts to cave and karst resources from the buried pipeline.
- Special restoration stipulations or realignment may be required at such intersections, if any.
- A leak detection plan **will be submitted to the BLM Carlsbad Field Office for approval** prior to pipeline installation. The method could incorporate gauges to detect pressure drops, siting values and lines so they can be visually inspected periodically or installing electronic sensors to alarm when a leak is present. The leak detection plan will incorporate an automatic shut off system that will be installed for proposed pipelines to minimize the effects of an undesirable event.
- Regular monitoring is required to quickly identify leaks for their immediate and proper treatment.
- All spills or leaks will be reported to the BLM immediately for their immediate and proper treatment.

**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).

Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well.

### **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

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

\*Pounds of pure live seed:

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

## PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

<b>OPERATOR'S NAME:</b>	NOVO Oil & Gas Northern Delaware
<b>WELL NAME &amp; NO.:</b>	Tickety Boo 2109 Fed Com 122H
<b>LOCATION:</b>	Sec 21-19S-30E-NMP
<b>COUNTY:</b>	Eddy County, New Mexico

COA

<b>H<sub>2</sub>S</b>	<input checked="" type="radio"/> No	<input type="radio"/> Yes		
<b>Potash / WIPP</b>	<input type="radio"/> None	<input type="radio"/> Secretary	<input checked="" type="radio"/> R-111-P	<input type="radio"/> WIPP
<b>Cave / Karst</b>	<input type="radio"/> Low	<input type="radio"/> Medium	<input checked="" type="radio"/> High	<input type="radio"/> Critical
<b>Wellhead</b>	<input type="radio"/> Conventional	<input checked="" type="radio"/> Multibowl	<input type="radio"/> Both	<input type="radio"/> Diverter
<b>Cementing</b>	<input type="radio"/> Primary Squeeze	<input type="radio"/> Cont. Squeeze	<input type="radio"/> EchoMeter	<input type="radio"/> DV Tool
<b>Special Req</b>	<input type="radio"/> Break Testing	<input type="radio"/> Water Disposal	<input checked="" type="radio"/> COM	<input type="radio"/> Unit
<b>Variance</b>	<input checked="" type="radio"/> Flex Hose	<input type="radio"/> Casing Clearance	<input type="radio"/> Pilot Hole	<input checked="" type="radio"/> Capitan Reef
<b>Variance</b>	<input checked="" type="radio"/> Four-String	<input type="radio"/> Offline Cementing	<input type="radio"/> Fluid-Filled	<input type="radio"/> Open Annulus
<input type="checkbox"/> Batch APD / Sundry				

**Gamma ray and neutron logs are required for this area from the deepest well on each pad from surface to TVD. Data density is extremely low and there are no good correlation wells to use. Picks are only from Petra contours and are subject to change with better information.**

### A. HYDROGEN SULFIDE

Hydrogen Sulfide (H<sub>2</sub>S) monitors shall be installed prior to drilling out the surface shoe. If H<sub>2</sub>S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall meet 43 CFR 3176 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 **400 feet** (a minimum of 70 feet (Eddy County) into the Rustler Anhydrite, above the salt, and below usable fresh water) and cemented to the surface. **Set depth adjusted per BLM geologist.**
  - 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 minimum required fill of cement behind the **10-3/4** inch intermediate casing (**set at 2,014 ft per BLM geologist**) is:
- Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst, Capitan Reef, or potash.**
  - ❖ In R111 Potash Areas if cement does not circulate to surface on the first two salt protection casing strings, the cement on the 3rd casing salt string must come to surface.
  - ❖ **Special Capitan Reef requirements.** If lost circulation (50% or greater) occurs below the Base of the Salt, the operator shall do the following:
    - Switch to freshwater mud to protect the Capitan Reef and use freshwater mud until setting the intermediate casing. The appropriate BLM office is to be notified for a PET to witness the switch to fresh water.
    - Daily drilling reports from the Base of the Salt to the setting of the intermediate casing are to be submitted to the BLM CFO engineering staff via e-mail by 0800 hours each morning. Any lost circulation encountered is to be recorded on these drilling reports. The daily drilling report should show mud volume per shift/tour. Failure to submit these reports will result in an Incidence of Non-Compliance being issued for failure to comply with the Conditions of Approval. If not already planned, the operator shall run a caliper survey for the intermediate well bore and submit to the appropriate BLM office.
3. The minimum required fill of cement behind the **8-5/8** inch intermediate casing (**set at 3,700 ft per BLM geologist**) is:

The operator has proposed to set the DV tool at **2070'**. This is below the Salado and is an acceptable set point. Operator may adjust depth of DV tool if it remains below the Salado and cement volumes are adjusted accordingly. The DV tool may be cancelled if cement circulates to surface on the first stage.

- a. First stage to DV tool: Cement to circulate. If cement does not circulate off the DV tool, contact the appropriate BLM office before proceeding with second stage cement job.



- b. Second stage above DV tool:
  - Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst, Capitan Reef, or potash.**
4. The minimum required fill of cement behind the **5-1/2** inch production casing is:
  - Cement should tie-back at least **50 feet** on top of Capitan Reef top or **500 feet** into the previous casing, whichever is greater. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst, Capitan Reef, or potash.**

### 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. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M)** psi.
  - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
  - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
  - c. Manufacturer representative shall install the test plug for the initial BOP test.
  - d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
  - e. Whenever any seal subject to test pressure is broken, all the tests in 43 CFR 3172 must be followed.

### D. SPECIAL REQUIREMENT (S)

#### Communitization Agreement

- The operator will submit a Communitization Agreement to the Santa Fe Office, 301 Dinosaur Trail Santa Fe, New Mexico 87508, at least 90 days before the anticipated date of first production from a well subject to a spacing order issued by the New Mexico Oil Conservation Division. The Communitization Agreement will include the signatures of all working interest owners in all Federal and Indian leases subject to the Communitization Agreement (i.e., operating rights owners and lessees of record), or certification that the operator has obtained the written signatures of all such owners and will make those signatures available to the BLM immediately upon request.
- The operator will submit an as-drilled survey well plat of the well completion, but are not limited to, those specified in 43 CFR 3171 and 3172.



- If the operator does not comply with this condition of approval, the BLM may take enforcement actions that include, but are not limited to, those specified in 43 CFR 3163.1.
- In addition, the well sign shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

## 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 (API No. / US Well No. contains 30-015-#####)**

Email or call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220,  
BLM\_NM\_CFO\_DrillingNotifications@blm.gov; (575) 361-2822

### **Lea County (API No. / US Well No. contains 30-025-#####)**

Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240; (575) 689-5981

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 **43 CFR part 3170 Subpart 3172** 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 **43 CFR part 3170 Subpart 3172** and **API STD 53 Sec. 5.3**.
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 **43 CFR part 3170 Subpart 3172** 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 cement), 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 cement plug. The BOPE test can be initiated after bumping the cement plug with the casing valve open. (only applies to single stage cement jobs, prior to the cement setting up.)

- c. The tests shall be done by an independent service company utilizing a test plug not a cup or J-packer and can be initiated immediately with the casing valve open. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to **43 CFR part 3170 Subpart 3172** 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 **43 CFR part 3170 Subpart 3172**.

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.



### 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) 706-2779

On-Call (Eddy County)    (575) 361-2822

On-Call (Lea County)    (575) 689-5981

National Response Center    (800) 424-8802

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

(214) 665-6444

Residents within 2 miles: 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

*TICKETY BOO 2109*  
*FED COM 111H*  
ELEV. = 3310.5'  
LAT. = 32.6485757°N (NAD83)  
LONG. = 103.9799820°W  
NMSP EAST (FT)  
N = 599863.70  
E = 60094.43

N/4 CORNER  
SECTION 21  
N30°07'29"E  
1594.46 FT

flare line (straight)  
& flare >150'  
from well head

secondary exit  
safety briefing area  
>150' from wellhead

V-door

wind socks on  
rig floor & at  
mud tanks

PRIMARY safety  
briefing area  
>150' from wellhead

PRIMARY egress  
(exit)

highest  
ground

prevailing wind  
blows from South

warning sign  
& windsock



(A) TICKETY BOO 2109  
 FED COM 121H  
 (B) TICKETY BOO 2109  
 FED COM 122H  
 (C) TICKETY BOO 2109  
 FED COM 123H  
 (D) TICKETY BOO 2109  
 FED COM 131H  
 (E) TICKETY BOO 2109  
 FED COM 111H  
 (F) TICKETY BOO 2109  
 FED COM 132H

(G) TICKETY BOO 2109  
 FED COM 112H  
 (H) TICKETY BOO 2109  
 FED COM 133H  
 (I) TICKETY BOO 2109  
 FED COM 113H

highest ground to S

### DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF ST. ROAD 360 (BLUESTEM) & CR. 235 (CURRY COMB), GO NORTH ON ST. ROAD 360 APPROX. 3.7 MILES TO A 2-TRACK ROAD AND ROAD SURVEY ON LEFT (WEST), TURN RIGHT AND FOLLOW 2-TRACK ROAD AND ROAD SURVEY WEST APPROX. 1.3 MILES, TURN LEFT (SOUTH) AND CONTINUE FOLLOWING 2-TRACK ROAD AND ROAD SURVEY SOUTH APPROX. 0.4 MILES, TURN RIGHT (WEST) AND FOLLOW ROAD SURVEY APPROX. 679' TO THE SOUTHEAST CORNER FOR THIS LOCATION.

I, FILIPON P. JARAMILA, A NEW MEXICO LICENSED PROFESSIONAL SURVEYOR CERTIFICATE NO. 10000, AM RESPONSIBLE FOR THIS SURVEY. I HAVE BEEN TRAINED AND EDUCATED TO THE BEST OF MY KNOWLEDGE AND BELIEF AND I RESERVE AND PLAT MEET THE MINIMUM REQUIREMENTS FOR SURVEY IN NEW MEXICO.

FILIMON E. JARAMILLO ID: 12797

NOVO OIL & GAS NORTHERN DELAWARE, LLC  
**TICKETY BOO 2109 FED COM 111H**  
 LOCATED 1663 FT. FROM THE NORTH LINE  
 AND 1719 FT. FROM THE WEST LINE OF  
 SECTION 21, TOWNSHIP 19 SOUTH,  
 RANGE 30 EAST, N.M.P.M.  
 EDDY COUNTY, STATE OF NEW MEXICO

MARCH 29, 2023

*SURVEY NO. 9544A*

**MADRON SURVEYING, INC.**

301 SOUTH CANAL  
(575) 234-3341

*CARLSBAD, NEW MEXICO*

PERMIAN RESOURCES, LLC plans to operate a Closed Loop System.



APD ID: 10400092240

Submission Date: 06/05/2023

Highlighted data  
reflects the most  
recent changes

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: TICKETY BOO 2109 FED COM

Well Number: 122H

Well Type: OIL WELL

Well Work Type: Drill

[Show Final Text](#)

## Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical	Measured Depth	Lithologies	Mineral Resources	Producing Formatio
13132437	QUATERNARY	3314	0	0	OTHER : None	USEABLE WATER	N
13132438	RUSTLER ANHYDRITE	3075	239	239	ANHYDRITE	NONE	N
13132439	TOP SALT	2975	339	339	SALT	NONE	N
13132440	YATES	1750	1564	1564	SANDSTONE, SHALE	NONE	N
13132441	CAPITAN REEF	1195	2119	2119	DOLOMITE, LIMESTONE	NONE	N
13132442	CHERRY CANYON	-785	4099	4099	SANDSTONE, SHALE, SILTSTONE	NATURAL GAS, OIL	N
13132443	BRUSHY CANYON	-1655	4969	4969	SANDSTONE, SHALE, SILTSTONE	NATURAL GAS, OIL	N
13132444	BONE SPRING LIME	-2600	5914	5914	LIMESTONE, SHALE	NATURAL GAS, OIL	N
13132446	BONE SPRING 1ST	-3960	7274	7274	SANDSTONE, SHALE, SILTSTONE	NATURAL GAS, OIL	N
13132435	BONE SPRING 2ND	-4310	7624	7624	LIMESTONE, SHALE	NATURAL GAS, OIL	N
13132436	BONE SPRING 2ND	-4875	8189	8189	SANDSTONE, SHALE, SILTSTONE	NATURAL GAS, OIL	Y

Released to Imag

## Section 2 - Blowout Prevention

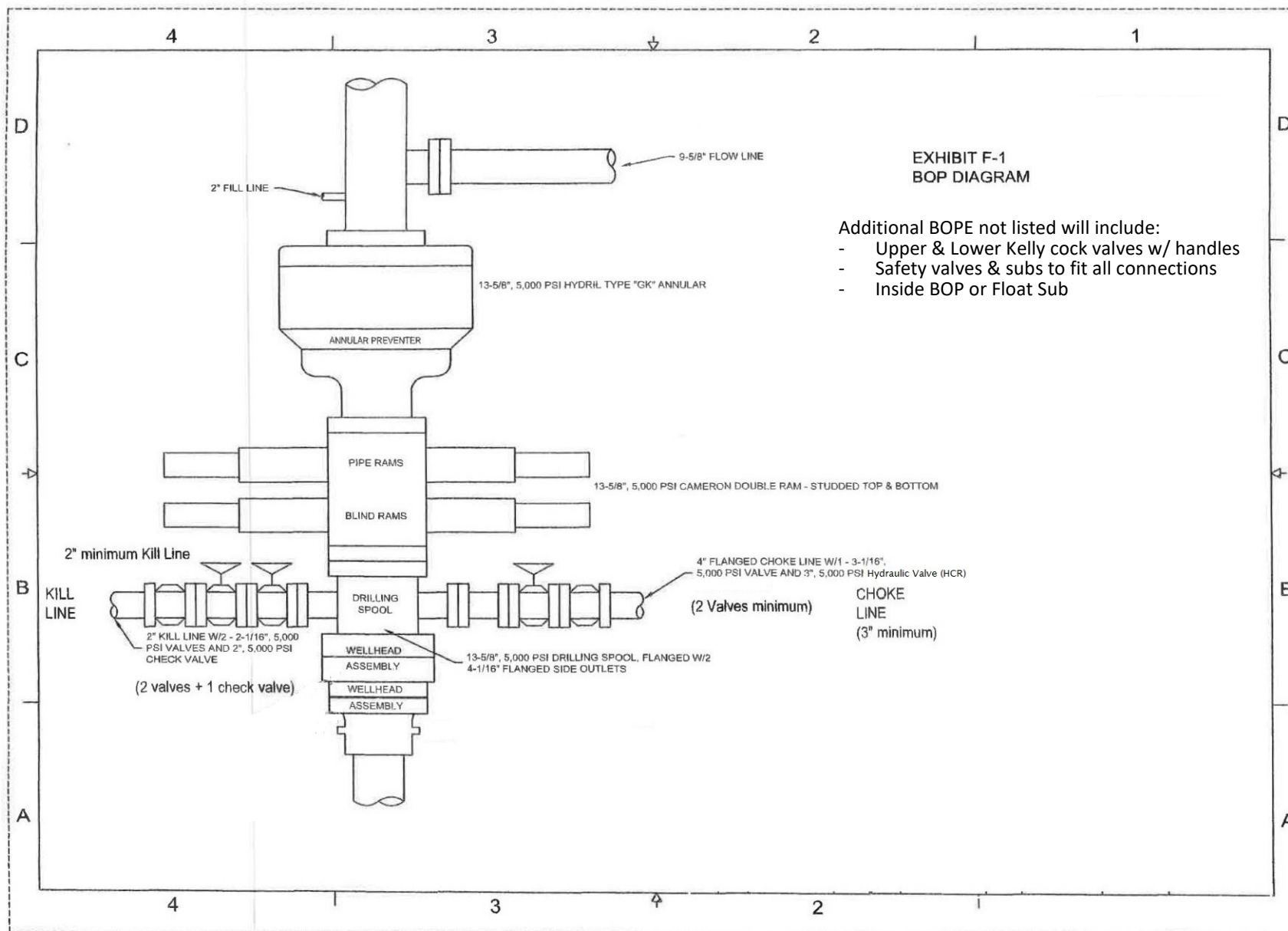
Pressure Rating (PSI): 5M

Rating Depth: 15000

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

Requesting Variance? YES

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



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

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

CONDITIONS  
  
Action 370794

CONDITIONS

Operator: NOVO OIL & GAS NORTHERN DELAWARE, LLC 300 N. Marienfeld St Ste 1000 Midland, TX 79701	OGRID: 372920
	Action Number: 370794
	Action Type: [C-101] BLM - Federal/Indian Land Lease (Form 3160-3)

CONDITIONS

Created By	Condition	Condition Date
ward.rikala	Notify OCD 24 hours prior to casing & cement	8/28/2024
ward.rikala	Will require a File As Drilled C-102 and a Directional Survey with the C-104	8/28/2024
ward.rikala	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	8/28/2024
ward.rikala	Cement is required to circulate on both surface and intermediate1 strings of casing	8/28/2024
ward.rikala	If cement does not circulate on any string, a CBL is required for that string of casing	8/28/2024
ward.rikala	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	8/28/2024
ward.rikala	Operator must comply will all requirements of R-111-Q.	8/28/2024
ward.rikala	May require NSL/NSP	8/28/2024