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DISTRICT II-ARTESIA O.C.D.

Form 3160-3
(June 2015)

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM018038

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other

1c. Type of Completion: ☐ Hydraulic Fracturing ☑ Single Zone ☐ Multiple Zone

7. If Unit or CA Agreement, Name and No.

8. Lease Name and Well No.
GOONCH FED COM 04
132H 326517

2. Name of Operator
NOVO OIL AND GAS NORTHERN DELAWARE LLC

9. API Well No.
30-015-46517

3a. Address	3b. Phone No. *(include area code)*	10. Field and Pool, or Exploratory
1001 West Wilshire Boulevard Suite 206 Oklahoma City O	(405)404-0414	CULEBRA BLUFF / BONE SPRING SOU

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*

At surface SWSW / 1140 FSL / 1180 FWL / LAT 32.3302712 / LONG -104.0971364

At proposed prod. zone LOT 4 / 10 FNL / 1122 FWL / LAT 32.3418966 / LONG -104.0968359

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 4 / T23S / R28E / NMP

14. Distance in miles and direction from nearest town or post office*	12. County or Parish	13. State
3 miles	EDDY	NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)	16. No of acres in lease	17. Spacing Unit dedicated to this well
1080 feet	280.21	160

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.	19. Proposed Depth	20. BLM/BIA Bond No. in file
20 feet	9340 feet / 14499 feet	FED: NMB001536

21. Elevations (Show whether DF, KDB, RT, GL, etc.)	22. Approximate date work will start*	23. Estimated duration
3415 feet	11/01/2019	90 days

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

25. Signature	Name *(Printed/Typed)*	Date
(Electronic Submission)	Brian Wood / Ph: (505)466-8120	08/02/2019

Title
President

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Christopher Walls / Ph: (575)234-2234	11/20/2019

Title	Office
Petroleum Engineer	CARLSBAD

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.

APPROVED WITH CONDITIONS

Approval Date: 11/20/2019

(Continued on page 2)

*(Instructions on page 2)

RMP 12-20-19

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 wen, 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 directionany 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 wen 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 win 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 conects this information to anow 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 Conection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

(Continued on page 3)

Additional Operator Remarks

Location of Well

1. SHL: SWSW / 1140 FSL / 1180 FWL / TWSP: 23S / RANGE: 28E / SECTION: 4 / LAT: 32.3302712 / LONG: -104.0971364 (TVD: 0 feet, MD: 0 feet)
   PPP: SWSW / 136 FSL / 1163 FWL / TWSP: 23S / RANGE: 28E / SECTION: 4 / LAT: 32.3275222 / LONG: -104.0971914 (TVD: 9017 feet, MD: 9124 feet)
   PPP: SWNW / 2640 FSL / 1035 FWL / TWSP: 23S / RANGE: 28E / SECTION: 4 / LAT: 32.3346329 / LONG: -104.097139 (TVD: 9340 feet, MD: 11869 feet)
   BHL: LOT 4 / 10 FNL / 1122 FWL / TWSP: 23S / RANGE: 28E / SECTION: 4 / LAT: 32.3418966 / LONG: -104.0968359 (TVD: 9340 feet, MD: 14499 feet)

BLM Point of Contact

Name:

Title:

Phone:

Email:

Approval Date: 11/20/2019

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.

PECOS DISTRICT
DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**NOVO OIL AND GAS**
LEASE NO.:	**NMNM018038**
LOCATION:	**Section 4, T.23 S., R.28 E., NMPM**
COUNTY:	**Eddy County, New Mexico**

WELL NAME & NO.:	**Goonch FED COM 04 132H**
SURFACE HOLE FOOTAGE:	**1140'/S & 1180'/W**
BOTTOM HOLE FOOTAGE	**10'/N & 1122'/W**

COA

H2S	◉ Yes	○ No	
Potash	◉ None	○ Secretary	○ R-111-P
Cave/Karst Potential	○ Low	◉ Medium	○ High
Cave/Karst Potential	○ Critical		
Variance	○ None	◉ Flex Hose	○ Other
Wellhead	○ Conventional	◉ Multibowl	○ Both
Other	☐ 4 String Area	☐ Capitan Reef	☐ WIPP
Other	☐ Fluid Filled	☐ Cement Squeeze	☐ Pilot Hole
Special Requirements	☐ Water Disposal	☑ COM	☐ Unit

A. HYDROGEN SULFIDE

A Hydrogen Sulfide (H2S) Drilling Plan shall be activated 500 feet prior to drilling into the **North East Loving** formation. As a result, the Hydrogen Sulfide area must meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, please provide measured values and formations to the BLM.

B. CASING

1. The **13-3/8** inch surface casing shall be set at approximately **239** feet (a minimum of **70 feet (Eddy County)** into the Rustler Anhydrite and above the salt) and cemented to the surface.

    a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.

b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8 hours** 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 **9 5/8** inch intermediate casing shall be set at approxiamately **5,900** feet. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:

- Cement to surface. If cement does not circulate see B.1.a, c-d above. **Excess cement calculates to 18%, additional cement might be required. Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.**

❖ In Medium Cave/Karst Areas if cement does not circulate to surface on the first two casing strings, the cement on the 3rd casing string must come to surface.

3. The minimum required fill of cement behind the **5-1/2** inch production casing is:

- Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.

C. PRESSURE CONTROL

1. Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).'

2. Operator has proposed a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M)** psi.

a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
c. Manufacturer representative shall install the test plug for the initial BOP test.
d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.

e. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.

D. SPECIAL REQUIREMENT (S)

Communitization Agreement

- The operator will submit a Communitization Agreement to the Carlsbad Field Office, 620 E Greene St. Carlsbad, New Mexico 88220, 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.
- 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.

JJP10162019

GENERAL REQUIREMENTS

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

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

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

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

1. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.

   a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after

installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).

b. When the operator proposes to set surface casing with Spudder Rig
   - Notify the BLM when moving in and removing the Spudder Rig.
   - Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
   - BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.

2. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.

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

A. CASING

1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.

2. Wait on cement (WOC) for Potash Areas: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log. The casing intergrity 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 intergrity test can be done (prior to the cement setting up) immediately after bumping the plug.

4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.

5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

6. On that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.

7. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.
8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.

2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.

3. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.

4. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:

a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
c. Manufacturer representative shall install the test plug for the initial BOP test.
d. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.
e. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.

5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.

a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time, except the casing pressure test can be initiated immediately after bumping the plug (only applies to single stage cement jobs).

c. The tests shall be done by an independent service company utilizing a test plug not a cup or J-packer. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).

d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.

e. The results of the test shall be reported to the appropriate BLM office.

f. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.

g. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.

h. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

C. DRILLING MUD

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

D. WASTE MATERIAL AND FLUIDS

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

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

AFMSS

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

Operator Certification Data Report

11/21/2019

Operator Certification

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements.

NAME: Brian Wood **Signed on:** 08/02/2019

Title: President

Street Address:

City: **State:** **Zip:**

Phone: (505)466-8120

Email address: afmss@permitswest.com

Field Representative

Representative Name:

Street Address:

City: **State:** **Zip:**

Phone:

Email address:

AFMSS

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

Application Data Report

11/21/2019

APD ID: 10400045287 **Submission Date:** 08/02/2019

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

Well Type: OIL WELL **Well Work Type:** Drill

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - General

APD ID: 10400045287 **Tie to previous NOS?** N **Submission Date:** 08/02/2019

BLM Office: CARLSBAD **User:** Brian Wood **Title:** President

Federal/Indian APD: FED **Is the first lease penetrated for production Federal or Indian?** FED

Lease number: NMNM018038 **Lease Acres:** 280.21

Surface access agreement in place? **Allotted?** **Reservation:**

Agreement in place? NO **Federal or Indian agreement:**

Agreement number:

Agreement name:

Keep application confidential? N

Permitting Agent? YES **APD Operator:** NOVO OIL AND GAS NORTHERN DELAWARE LLC

Operator letter of designation:

Operator Info

Operator Organization Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Operator Address: 1001 West Wilshire Boulevard Suite 206

Zip: 73116

Operator PO Box:

Operator City: Oklahoma City **State:** OK

Operator Phone: (405)404-0414

Operator Internet Address:

Section 2 - Well Information

Well in Master Development Plan? NO **Master Development Plan name:**

Well in Master SUPO? NO **Master SUPO name:**

Well in Master Drilling Plan? NO **Master Drilling Plan name:**

Well Name: GOONCH FED COM 04 **Well Number:** 132H **Well API Number:**

Field/Pool or Exploratory? Field and Pool **Field Name:** CULEBRA BLUFF **Pool Name:** BONE SPRING SOUTH

Is the proposed well in an area containing other mineral resources? USEABLE WATER NATURAL GAS OIL

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

Is the proposed well in an area containing other mineral resources? USEABLE WATER,NATURAL GAS,OIL

Is the proposed well in a Helium production area? N **Use Existing Well Pad?** N **New surface disturbance?**

Type of Well Pad: MULTIPLE WELL **Multiple Well Pad Name:** Gnooch Fed Com 04 **Number:** 131H (Pad G)

Well Class: HORIZONTAL **Number of Legs:** 1

Well Work Type: Drill

Well Type: OIL WELL

Describe Well Type:

Well sub-Type: INFILL

Describe sub-type:

Distance to town: 3 Miles **Distance to nearest well:** 20 FT **Distance to lease line:** 1080 FT

Reservoir well spacing assigned acres Measurement: 160 Acres

Well plat: Goonch_04_132H_Plat_GasCap_Plan_20190802131529.pdf

Well work start Date: 11/01/2019 **Duration:** 90 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83 **Vertical Datum:** NAVD88

Survey number: 12797 **Reference Datum:** GROUND LEVEL

Wellbore	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD	Will this well produce
SHL Leg #1	1140	FSL	1180	FWL	23S	28E	4	Aliquot SWSW	32.3302712	-104.0971364	EDDY	NEW MEXICO	NEW MEXICO	F	FEE	3415	0	0	Y
KOP Leg #1	110	FSL	1162	FWL	23S	28E	4	Aliquot SWSW	32.327451	-104.0971947	EDDY	NEW MEXICO	NEW MEXICO	F	FEE	-5448	8966	8863	Y
PPP Leg	2640	FSL	1035	FWL	23S	28E	4	Aliquot SWN	32.3346329	-104.0971	EDDY	NEW MEXI	NEW MEXI	F	NMNM 018038	-592	11869	9340	Y

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

Wellbore	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD	Will this well produce
PPP Leg #1-2	136	FSL	1163	FWL	23S	28E	4	Aliquot SWSW	32.3275222	-104.0971914	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 018038	-5602	9124	9017	Y
EXIT Leg #1	10	FNL	1122	FWL	23S	28E	4	Lot 4	32.3418966	-104.0968359	EDDY	NEW MEXICO	FIRST PRIN	F	NMNM 032636	-5925	14499	9340	Y
BHL Leg #1	10	FNL	1122	FWL	23S	28E	4	Lot 4	32.3418966	-104.0968359	EDDY	NEW MEXICO	FIRST PRIN	F	NMNM 032636	-5925	14499	9340	Y

AFMSS

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

Drilling Plan Data Report

11/21/2019

APD ID: 10400045287 **Submission Date:** 08/02/2019

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

Well Type: OIL WELL **Well Work Type:** Drill

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
1	QUATERNARY	3015	0	0	OTHER : None	USEABLE WATER	N
2	RUSTLER ANHYDRITE	2915	100	100	ANHYDRITE	NATURAL GAS,OIL	N
3	CASTILE	2045	970	970	GYPSUM	NONE	N
4	LAMAR	541	2474	2477	LIMESTONE	NONE	N
5	BELL CANYON	475	2540	2543	SANDSTONE	NATURAL GAS,OIL	N
6	CHERRY CANYON	-600	3615	3642	SANDSTONE	NATURAL GAS,OIL	N
7	BRUSHY CANYON	-1613	4628	4678	SANDSTONE	NATURAL GAS,OIL	N
8	BONE SPRING	-3056	6071	6153	LIMESTONE	NATURAL GAS,OIL	N
9	AVALON SAND	-3564	6579	6672	OTHER : Shale	NATURAL GAS,OIL	N
10	BONE SPRING 1ST	-4023	7038	7140	SANDSTONE	NATURAL GAS,OIL	N
11	BONE SPRING 2ND	-4236	7251	7355	OTHER : Carbonate	NATURAL GAS,OIL	N
12	BONE SPRING 2ND	-4771	7786	7890	SANDSTONE	NATURAL GAS,OIL	N
13	BONE SPRING 3RD	-5068	8083	8187	OTHER : Carbonate	NATURAL GAS,OIL	N
14	BONE SPRING 3RD	-6002	9017	9124	SANDSTONE	NATURAL GAS,OIL	Y

Section 2 - Blowout Prevention

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

Pressure Rating (PSI): 5M **Rating Depth:** 13000

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

Requesting Variance? NO

Variance request:

Testing Procedure: BOP system will be isolated with a test plug and tested by an independent tester to 250-psi low and 5000-psi high for 10 minutes. Variance is requested to use a co-flex hose between the BOP system and choke manifold. A typical co-flex pressure test certificate is attached. An equipment specific co-flex pressure test certificate will be on site when testing the BOP. All casing strings will be tested in accordance with Onshore Order 2 III.B.1.h.

Choke Diagram Attachment:

Gnooch_04_131H_Choke_Revised_20190930100903.pdf

BOP Diagram Attachment:

Goonch_04_132H_BOP_20190802131410.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	595	0	595	3415	2820	595	J-55	54.5	BUTT	1.125	1.125	DRY	1.6	DRY	1.6
2	INTERMEDIATE	12.25	9.625	NEW	API	N	0	5900	0	5824	3415	-2409	5900	HCL-80	43.5	BUTT	1.125	1.125	DRY	1.6	DRY	1.6
3	PRODUCTION	8.5	5.5	NEW	API	N	0	14499	0	9340	3415	-5925	14499	P-110	20	OTHER - TMK DQX	1.125	1.125	DRY	1.6	DRY	1.6

Casing Attachments

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

Casing Attachments

Casing ID: 1 **String Type:** SURFACE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Goonch_04_132H_Casing_Design_Assumptions_20190802131438.pdf

Casing ID: 2 **String Type:** INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Goonch_04_132H_Casing_Design_Assumptions_20190802131451.pdf

Casing ID: 3 **String Type:** PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Goonch_04_132H_Casing_Design_Assumptions_20190802131504.pdf

5.5in_TMK_Casing_Spec_20190930121245.pdf

Section 4 - Cement

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	0	0	0	0	0	0	None	None
SURFACE	Tail		0	595	510	1.62	13.8	826	100	Class C	gel + accelerator + LCM
PRODUCTION	Lead		0	0	0	0	0	0	0	None	None
PRODUCTION	Tail		5400	14499	1942	1.42	13.2	2757		Class H	fluid loss + retarder + LCM
INTERMEDIATE	Lead		0	5900	855	2.27	11.9	1949	20	Class C	gel + extender + LCM
INTERMEDIATE	Tail		0	5900	200	1.34	14.8	268	20	Class C	gel + retarder + LCM

Section 5 - Circulating Medium

Mud System Type: Closed

Will an air or gas system be Used? NO

Description of the equipment for the circulating system in accordance with Onshore Order #2:

Diagram of the equipment for the circulating system in accordance with Onshore Order #2:

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

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

Circulating Medium Table

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
0	595	OTHER : Fresh water spud	8.3	8.3							
595	5900	OTHER : Brine or cut brine	9.8	10.2							
5900	14499	OIL-BASED	8.5	10							

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

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,

Coring operation description for the well:

No core or drill stem test is planned.

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 4642 **Anticipated Surface Pressure:** 2587

Anticipated Bottom Hole Temperature(F): 150

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

Describe:

Contingency Plans geoharzards description:

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

Gnooch_04_132H_H2S_Plan_20190802130459.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Goonch_04_132H_Horizontal_Plan_20190802131255.pdf

Other proposed operations facets description:

Other proposed operations facets attachment:

Goonch_04_132H_Speedhead_Specs_20190802131324.pdf
Goonch_04_132H_Anti_Collision_Report_20190802131338.pdf
Goonch_04_132H_Drill_Plan_Revised_20190930101006.pdf
Goonch_04_132H_CoFlex_Certs_Revised_20190930101014.pdf

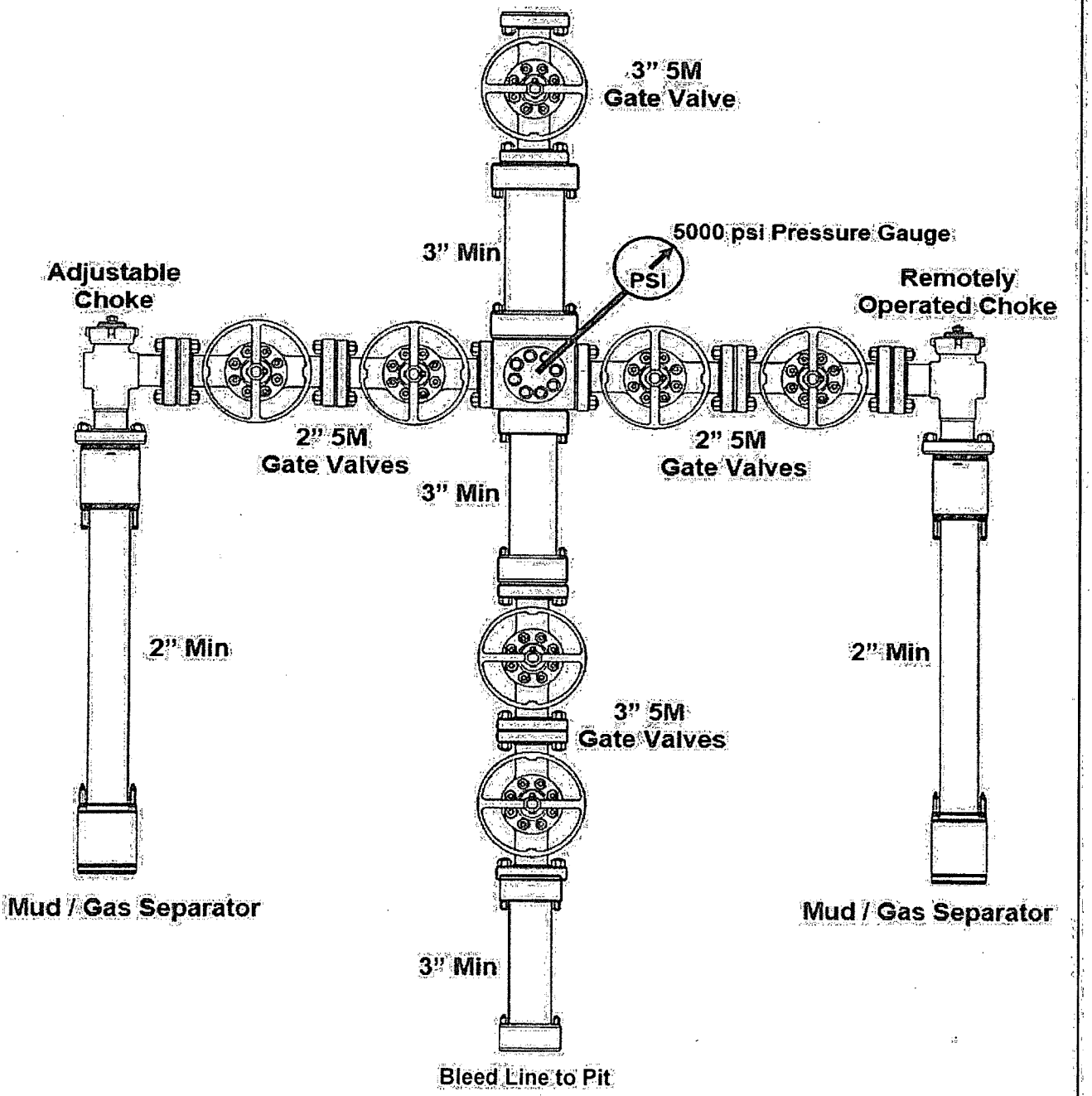
Other Variance attachment:

Goonch_04_132H_Casing_Variance_Request_20190802131239.pdf
Goonch_04_132H_Alternative_Casing_Spec_Request_20190930101140.pdf

NOVO	NOVO OIL & 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

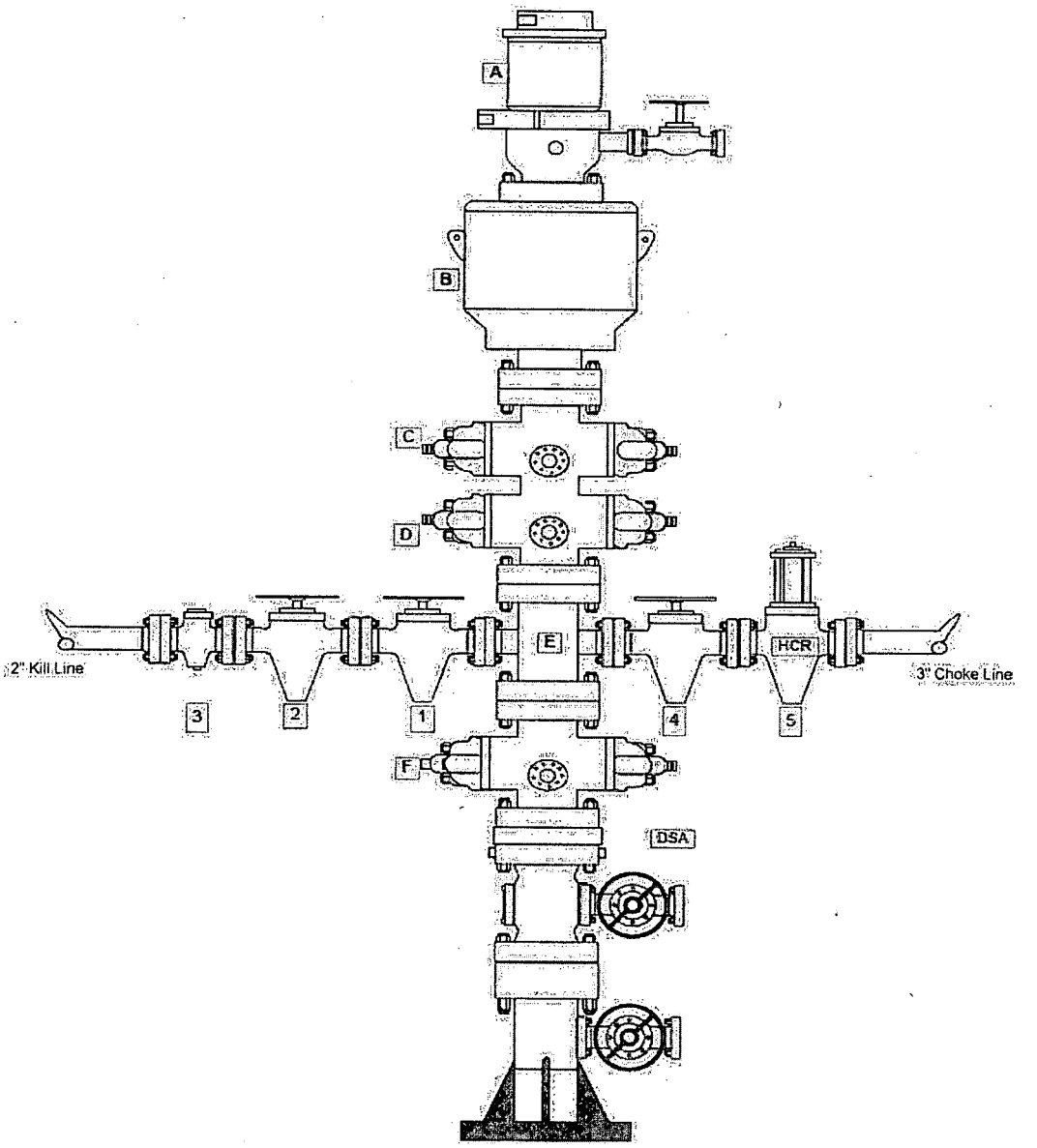
ITEM	SIZE	PRESSURE	DESCRIPTION



NOVO	NOVO OIL & 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

Goonch Fed Com 04 132H 3-string Casing Design Assumptions

Surface Casing

Collapse: $DF_C = 1.125$

a. Full internal Evacuation: Collapse force is equal to mud gradient (0.433 psi/ft) in which the casing will be run and internal evacuation of casing.
b. Cementing: Collapse force is equal net force of the planned cement slurry gradient (0.718 psi/ft) in which the casing will be run and internal force equivalent to fresh water displacement gradient (0.433 psi/ft).

Burst: $DF_B = 1.125$

a. Casing Pressure Test: According to BLM Onshore Order No. 2 with 0.22 psi/ft or 1500 psi, whichever is greater but not to exceed 70% of the minimum internal yield.

Tensile: $DF_T = 1.60$

a. Overpull: A tensile force of 100,000 lbs over string weight with a buoyancy factor of 0.8727 in water (8.33 ppg).

Intermediate Casing

Collapse: $DF_C = 1.125$

a. Full Internal Evacuation: Collapse force is equal to mud gradient (0.531 psi/ft) in which the casing will be run and internal evacuation of casing.
b. Cementing: Collapse force is equal net force of the planned cement slurry gradient (0.626 psi/ft) in which the casing will be run and internal force equivalent to the displacement of fluid gradient.

Burst: $DF_B = 1.125$

a. Casing Pressure Test: According to BLM Onshore Order No. 2 with 0.22 psi/ft or 1500 psi, whichever is greater but to exceed 70% of the minimum internal yield.
b. Gas Kick: Internal burst load of a 50 bbl gas kick at the casing with drill pipe in the hole. External force will be 10.2 ppg brine water gradient (0.531 psi/ft) and internal force will be with 10.0 ppg brine water gradient (0.521 psi/ft) with gas kick.

Tensile: $DF_T = 1.60$

a. Overpull: A tensile force of 100,000 lbs over string weight with a buoyancy factor of 0.8441 in brine water (10.2 ppg).

Production Casing

Collapse: $DF_C = 1.125$

a. Full Internal Evacuation: Collapse force is equal to mud gradient (0.531 psi/ft) in which the casing will be run and internal evacuation of casing.
b. Cementing: Collapse force is equal net force of the planned cement slurry gradient (0.688 psi/ft) in which the casing will be run and internal force equivalent to fresh water displacement gradient (0.433 psi/ft).

Burst: $DF_B = 1.125$

a. Pressure Test: Pressure test will be to 80% of Internal Yield Pressure of casing intended for fracture stimulation.

Tensile: $DF_T = 1.60$

a. Overpull: A tensile force of 100,000 lbs over string weight with a buoyancy factor of 0.8472 in oil-based mud (10.0 ppg).

Goonch Fed Com 04 132H 3-string Casing Design Assumptions

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Goonch Fed Com 04 132H 3-string Casing Design Assumptions

Surface Casing

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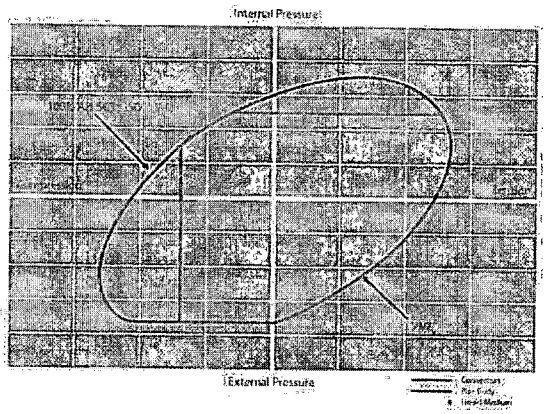
TECHNICAL DATA SHEET TMK UP TMK UP™ DQX 5.5 X 20 P110

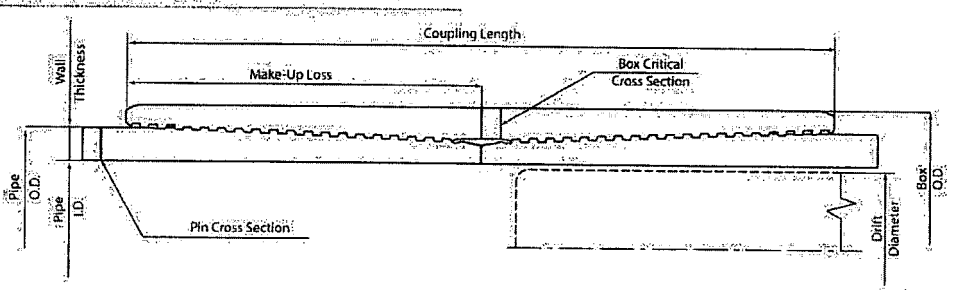
TUBULAR PARAMETERS	
Nominal OD, (inch)	5.500
Wall Thickness, (inch)	0.361
Pipe Grade	P110
Coupling	Regular
Coupling Grade	P110
Drift	Standard

CONNECTION PARAMETERS	
Connection OD (inch)	6.050
Connection ID, (inch)	4.778
Make-Up Loss, (inch)	4.122
Connection Critical Area, (sq inch)	8.722
Yield Strength in Tension, (klbs)	641
Yeld Strength in Compression, (klbs)	641
Tension Efficiency	100%
Compression Efficiency	100%
Min. Internal Yield Pressure, (psi)	12 640
Collapse Pressure, (psi)	11 110
Uniaxial Bending (deg/100ft)	92.0

MAKE-UP TORQUES	
Minimum Make-Up Torque, (ft-lb)	11 600
Optimum Make-Up Torque, (ft-lb)	12 900
Maximum Make-Up Torque, (ft-lb)	14 100
Operating Torque, (ft-lb)	17 500
Yield Torque, (ft-lb)	20 600

PIPE BODY PROPERTIES	
PE Weight, (lbs/ft)	19.81
Nominal Weight, (lbs/ft)	20.00
Nominal ID, (inch)	4.778
Drift Diameter, (inch)	4.653
Nominal Pipe Body Area, (sq inch)	5.828
Yield Strength in Tension, (klbs)	641
Min. Internal Yield Pressure, (psi)	12 640
Collapse Pressure, (psi)	11 110
Minimum Yield Strength, (psi)	110 000
Minimum Tensile Strength, (psi)	125 000





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NOVO

H_2S Drilling Operations Plan

a. All personnel will be trained in H_2S 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_2S page 5 for more details.

c. H_2S Safety Equipment/Systems:

i. Well Control Equipment

- Flare line will be ≥150' from the wellhead and ignited by a pilot light.
- Beware of SO_2 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_2S and SO_2 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_2S Detection & Monitoring Equipment

- Every person on site will be required to wear a personal H_2S and SO_2 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_2S condition sign will be set at the entrance to the pad.
- Color-coded condition flag will be installed to indicate current H_2S 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_2S gas returns to the surface, and minimize sulfide stress cracking and embrittlement.
- Drilling mud containing H_2S 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_2S where formation pressures are unknown.

vi. Metallurgy

- All equipment that has the potential to be exposed to H_2S will be suitable for H_2S 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_2S.

Company Personnel to be Notified

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

Local & County Agencies

Loving Fire Department	911 or (575) 745-3600
Eddy County Sheriff (Carlsbad)	911 (575) 887-7551
Eddy County Emergency Management (Carlsbad)	(575) 887-9511
Carlsbad Medical Center Hospital	(575) 887-4100
Eddy County South Road Department (Carlsbad)	(575) 885-4835

State Agencies

NM State Police (Carlsbad)	(575) 885-3138
NM Oil Conservation (Artesia)	(575) 748-1283
NM Oil Conservation (Santa Fe)	(505) 476-3440
NM Dept. of Transportation (Roswell)	(575) 637-7201

Federal Agencies

BLM Carlsbad Field Office	(575) 234-5972
National Response Center	(800) 424-8802
US EPA Region 6 (Dallas)	(800) 887-6063
	(214) 665-6444

Residents within 3/4 mile

none

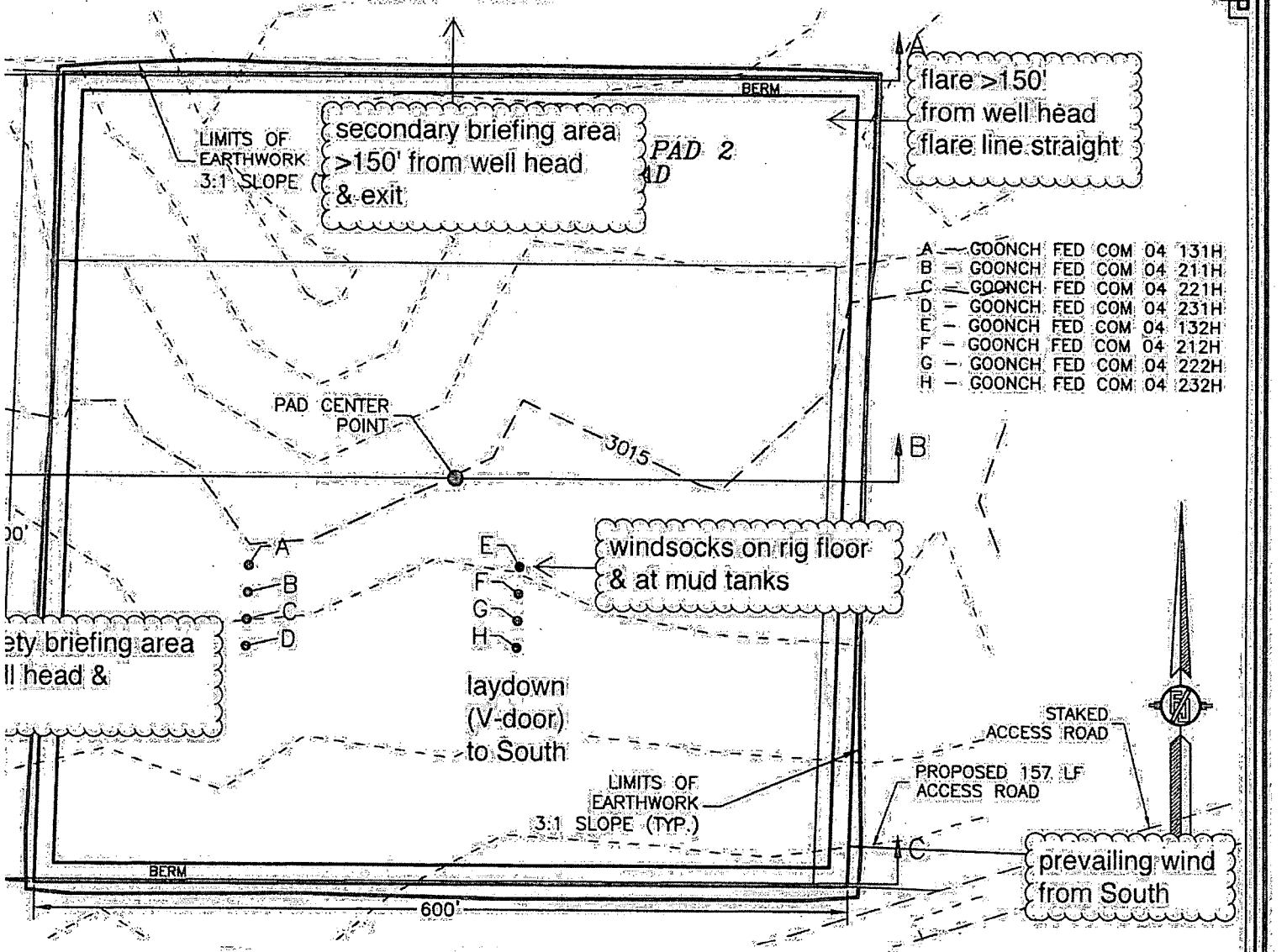
Air Evacuation

Med Flight Air Ambulance (Albuquerque)	(800) 842-4431
Lifeguard (Albuquerque)	(888) 866-7256

Veterinarians

Desert Willow Veterinary Services (Carlsbad)	(575) 885-3399
Animal Care Center (Carlsbad)	(575) 885-5352

PLAN VIEW



FILL	NET
11692 CU. YD	3331 CU. YD. (FILL)

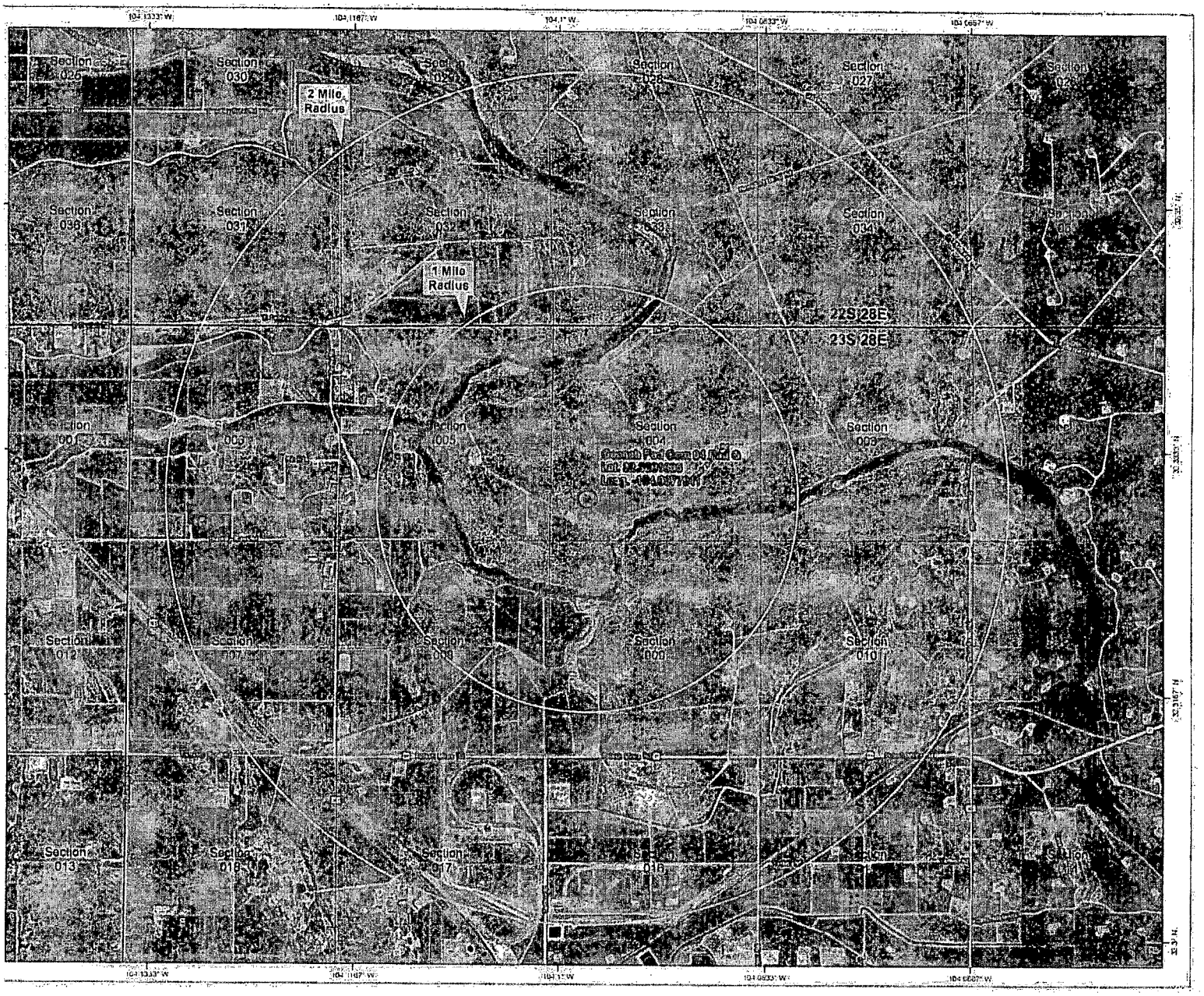
RK QUANTITIES ARE ESTIMATED

NOVO OIL & GAS NORTHERN DELAWARE, LLC
GRADING PLAN AND CROSS SECTIONS
FOR GOONCH FED COM 04 232H
SECTION 4, TOWNSHIP 23 SOUTH,
RANGE 28 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

APRIL 3, 2019

RON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 *CARLSBAD, NEW MEXICO*

SHEET 1-2
SURVEY NO. 7134


2 Mile Radius
1 Mile Radius
22S 28E
23S 28E
Section 025
Section 030
Section 029
Section 028
Section 027
Section 026
Section 031
Section 032
Section 033
Section 034
Section 035
Section 036
Section 001
Section 006
Section 005
Section 004
Section 003
Section 002
Section 012
Section 007
Section 008
Section 009
Section 010
Section 011
Section 013
Section 018
Section 017
Section 016
Section 015
Section 014

Novo Oil & Gas, LLC

HAWKEYE DIRECTIONAL, LLC

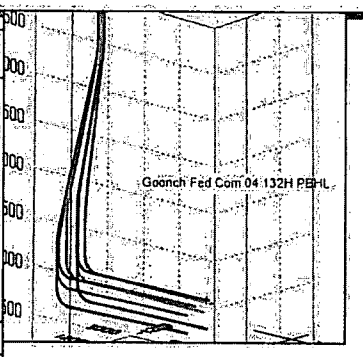
PROJECT DETAILS: Eddy County, NM

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Eastern Zone
North Reference: Grid
System Datum: Mean Sea Level
To convert a True Direction to a Grid Direction, Subtract 0.13°
To convert a Magnetic Direction to a True Direction, Add 6.99° East
To convert a Magnetic Direction to a Grid Direction, Add 6.87°

WELL DETAILS: Goonch Fed Com 04 132H

GL 3014.5' + 25' KB @ 3039.50usft

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	483965.20	614292.14	32° 19' 48.976 N	104° 5' 49.691 W

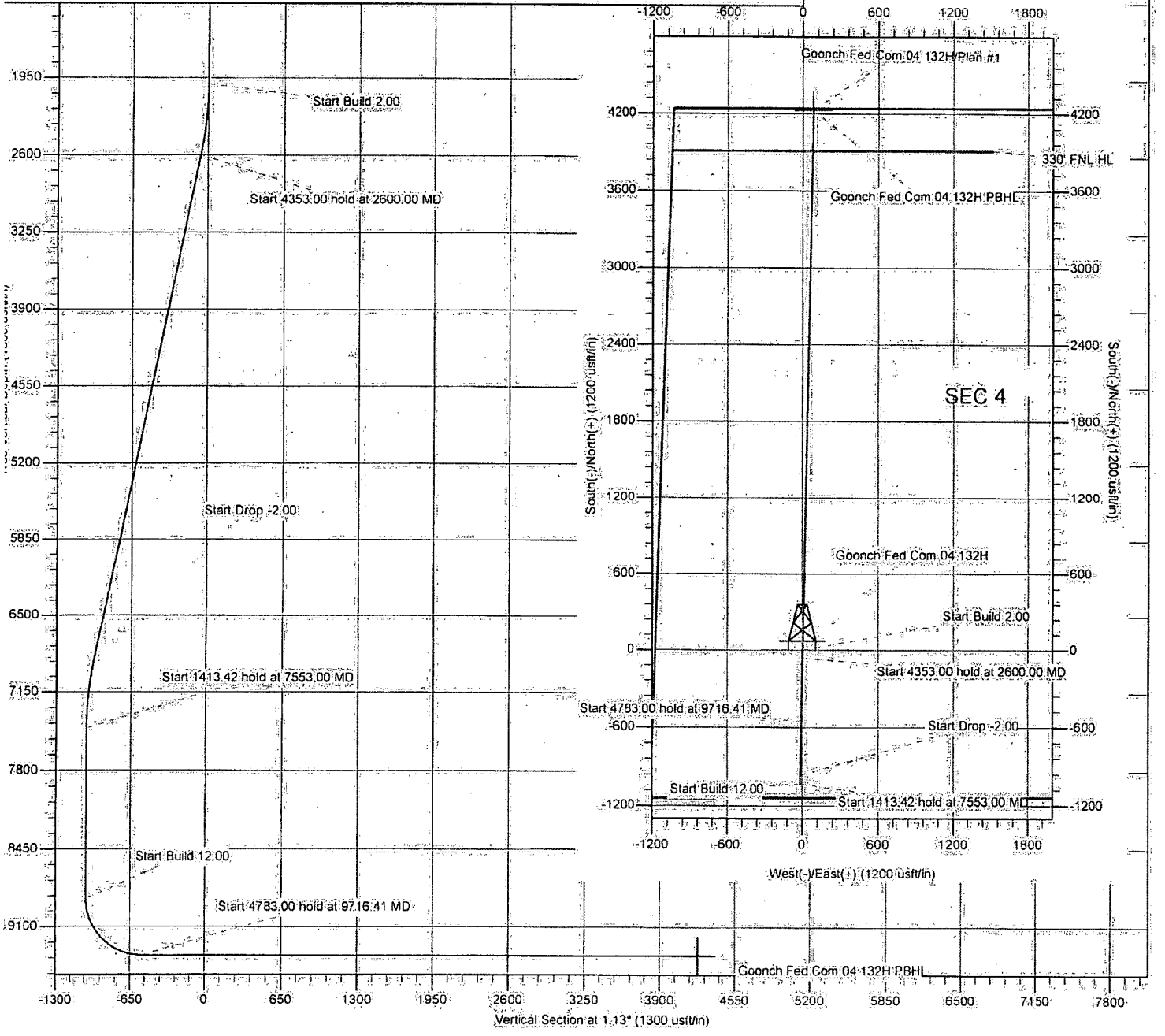


Azimuths to Grid North
True North: -0.13°
Magnetic North: 6.87°

Magnetic Field
Strength: 47745.6nT
Dip Angle: 60.05°
Date: 06/06/2019
Model: IGRF2015

SECTION DETAILS

	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	2000.00	0.00	0.00	2000.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.00
3	2600.00	12.00	181.00	2595.62	-62.59	-1.09	2.00	181.00	-62.60	Start 4353.00 hold at 2600.00 MD
4	6953.00	12.00	181.00	6853.50	-967.49	-16.89	0.00	0.00	-967.64	Start Drop -2.00
5	7553.00	0.00	0.00	7449.12	-1030.09	-17.98	2.00	180.00	-1030.24	Start 1413.42 hold at 7553.00 MD
6	8966.41	0.00	0.00	8862.54	-1030.09	-17.98	0.00	0.00	-1030.24	Start Build 12.00
7	9716.41	90.00	1.11	9340.00	-552.71	-8.77	12.00	1.11	-552.78	Start 4783.00 hold at 9716.41 MD
8	14499.41	90.00	1.11	9340.00	4229.40	83.50	0.00	0.00	4230.22	TD at 14499.41
										Goonch Fed Com 04 132H PBHL



Hawkeye Directional
Planning Report

Database:	HED_Compass_DSN	**Local Co-ordinate Reference:**	Well Goonch Fed Com 04 132H
Company:	Novo Oil & Gas, LLC	**TVD Reference:**	GL 3014.5 + 25' KB @ 3039.50usft
Project:	Eddy County, NM	**MD Reference:**	GL 3014.5 + 25' KB @ 3039.50usft
Site:	SEC 4 - T23S - R28E	**North Reference:**	Grid
Well:	Goonch Fed Com 04 132H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Project Eddy County, NM

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 4 - T23S - R28E

Site Position:		**Northing:**	483,964.87 usft	**Latitude:**	32° 19' 48.977 N
From:	Map	**Easting:**	614,092.09 usft	**Longitude:**	104° 5' 52.023 W
Position Uncertainty:	0.00 usft	**Slot Radius:**	13.200 in	**Grid Convergence:**	0.13 °

Well Goonch Fed Com 04 132H

Well Position	**+N/-S**	0.33 usft	**Northing:**	483,965.20 usft	**Latitude:**	32° 19' 48.976 N
	+E/-W	200.05 usft	**Easting:**	614,292.14 usft	**Longitude:**	104° 5' 49.691 W
Position Uncertainty		0.00 usft	**Wellhead Elevation:**		**Ground Level:**	3,014.50 usft

Wellbore OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	06/06/19	6.99	60.05	47,745.78622192

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	1.13

Plan Survey Tool Program Date 06/09/19

	Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	14,498.73	Plan #1 (OH)	MWD	
				OWSG MWD - Standard	

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,600.00	12.00	181.00	2,595.62	-62.59	-1.09	2.00	2.00	0.00	181.00	
6,953.00	12.00	181.00	6,853.50	-967.49	-16.89	0.00	0.00	0.00	0.00	
7,553.00	0.00	0.00	7,449.12	-1,030.09	-17.98	2.00	-2.00	0.00	180.00	
8,966.41	0.00	0.00	8,862.54	-1,030.09	-17.98	0.00	0.00	0.00	0.00	
9,716.41	90.00	1.11	9,340.00	-552.71	-8.77	12.00	12.00	0.00	1.11	
14,499.41	90.00	1.11	9,340.00	4,229.40	83.50	0.00	0.00	0.00	0.00	Goonch Fed Com 04

Database:	HED_Compass_DSN	**Local Co-ordinate Reference:**	Well Goonch Fed Com 04 132H
Company:	Novo Oil & Gas, LLC	**TVD Reference:**	GL 3014.5' + 25' KB @ 3039.50usft
Project:	Eddy County, NM	**MD Reference:**	GL 3014.5' + 25' KB @ 3039.50usft
Site:	SEC 4 - T23S - R28E	**North Reference:**	Grid
Well:	Goonch Fed Com 04 132H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
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	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
2,100.00	2.00	181.00	2,099.98	-1.74	-0.03	-1.75	2.00	2.00	0.00
2,200.00	4.00	181.00	2,199.84	-6.98	-0.12	-6.98	2.00	2.00	0.00
2,300.00	6.00	181.00	2,299.45	-15.69	-0.27	-15.69	2.00	2.00	0.00
2,400.00	8.00	181.00	2,398.70	-27.88	-0.49	-27.88	2.00	2.00	0.00
2,500.00	10.00	181.00	2,497.47	-43.52	-0.76	-43.52	2.00	2.00	0.00
2,600.00	12.00	181.00	2,595.62	-62.59	-1.09	-62.60	2.00	2.00	0.00
Start 4353.00 hold at 2600.00 MD									
2,700.00	12.00	181.00	2,693.44	-83.38	-1.46	-83.39	0.00	0.00	0.00
2,800.00	12.00	181.00	2,791.25	-104.17	-1.82	-104.18	0.00	0.00	0.00
2,900.00	12.00	181.00	2,889.07	-124.96	-2.18	-124.98	0.00	0.00	0.00
3,000.00	12.00	181.00	2,986.88	-145.75	-2.54	-145.77	0.00	0.00	0.00
3,100.00	12.00	181.00	3,084.70	-166.53	-2.91	-166.56	0.00	0.00	0.00
3,200.00	12.00	181.00	3,182.51	-187.32	-3.27	-187.35	0.00	0.00	0.00
3,300.00	12.00	181.00	3,280.33	-208.11	-3.63	-208.14	0.00	0.00	0.00
3,400.00	12.00	181.00	3,378.14	-228.90	-4.00	-228.93	0.00	0.00	0.00
3,500.00	12.00	181.00	3,475.96	-249.69	-4.36	-249.72	0.00	0.00	0.00
3,600.00	12.00	181.00	3,573.77	-270.47	-4.72	-270.51	0.00	0.00	0.00
3,700.00	12.00	181.00	3,671.59	-291.26	-5.08	-291.30	0.00	0.00	0.00
3,800.00	12.00	181.00	3,769.40	-312.05	-5.45	-312.10	0.00	0.00	0.00
3,900.00	12.00	181.00	3,867.22	-332.84	-5.81	-332.89	0.00	0.00	0.00
4,000.00	12.00	181.00	3,965.03	-353.63	-6.17	-353.68	0.00	0.00	0.00
4,100.00	12.00	181.00	4,062.84	-374.41	-6.54	-374.47	0.00	0.00	0.00
4,200.00	12.00	181.00	4,160.66	-395.20	-6.90	-395.26	0.00	0.00	0.00
4,300.00	12.00	181.00	4,258.47	-415.99	-7.26	-416.05	0.00	0.00	0.00
4,400.00	12.00	181.00	4,356.29	-436.78	-7.62	-436.84	0.00	0.00	0.00
4,500.00	12.00	181.00	4,454.10	-457.57	-7.99	-457.63	0.00	0.00	0.00
4,600.00	12.00	181.00	4,551.92	-478.35	-8.35	-478.42	0.00	0.00	0.00
4,700.00	12.00	181.00	4,649.73	-499.14	-8.71	-499.22	0.00	0.00	0.00
4,800.00	12.00	181.00	4,747.55	-519.93	-9.08	-520.01	0.00	0.00	0.00
4,900.00	12.00	181.00	4,845.36	-540.72	-9.44	-540.80	0.00	0.00	0.00
5,000.00	12.00	181.00	4,943.18	-561.51	-9.80	-561.59	0.00	0.00	0.00

Database:	HED_Compass_DSN	**Local Co-ordinate Reference:**	Well Goonch Fed Com 04 132H
Company:	Novo Oil & Gas, LLC	**TVD Reference:**	GL 3014.5' + 25' KB @ 3039.50usft
Project:	Eddy County, NM	**MD Reference:**	GL 3014.5' + 25' KB @ 3039.50usft
Site:	SEC 4 - T23S - R28E	**North Reference:**	Grid
Well:	Goonch Fed Com 04 132H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
5,100.00	12.00	181.00	5,040.99	-582.29	-10.16	-582.38	0.00	0.00	0.00
5,200.00	12.00	181.00	5,138.81	-603.08	-10.53	-603.17	0.00	0.00	0.00
5,300.00	12.00	181.00	5,236.62	-623.87	-10.89	-623.96	0.00	0.00	0.00
5,400.00	12.00	181.00	5,334.44	-644.66	-11.25	-644.75	0.00	0.00	0.00
5,500.00	12.00	181.00	5,432.25	-665.45	-11.62	-665.54	0.00	0.00	0.00
5,600.00	12.00	181.00	5,530.07	-686.23	-11.98	-686.34	0.00	0.00	0.00
5,700.00	12.00	181.00	5,627.88	-707.02	-12.34	-707.13	0.00	0.00	0.00
5,800.00	12.00	181.00	5,725.70	-727.81	-12.70	-727.92	0.00	0.00	0.00
5,900.00	12.00	181.00	5,823.51	-748.60	-13.07	-748.71	0.00	0.00	0.00
6,000.00	12.00	181.00	5,921.33	-769.39	-13.43	-769.50	0.00	0.00	0.00
6,100.00	12.00	181.00	6,019.14	-790.17	-13.79	-790.29	0.00	0.00	0.00
6,200.00	12.00	181.00	6,116.95	-810.96	-14.16	-811.08	0.00	0.00	0.00
6,300.00	12.00	181.00	6,214.77	-831.75	-14.52	-831.87	0.00	0.00	0.00
6,400.00	12.00	181.00	6,312.58	-852.54	-14.88	-852.66	0.00	0.00	0.00
6,500.00	12.00	181.00	6,410.40	-873.33	-15.24	-873.46	0.00	0.00	0.00
6,600.00	12.00	181.00	6,508.21	-894.11	-15.61	-894.25	0.00	0.00	0.00
6,700.00	12.00	181.00	6,606.03	-914.90	-15.97	-915.04	0.00	0.00	0.00
6,800.00	12.00	181.00	6,703.84	-935.69	-16.33	-935.83	0.00	0.00	0.00
6,900.00	12.00	181.00	6,801.66	-956.48	-16.70	-956.62	0.00	0.00	0.00
6,953.00	12.00	181.00	6,853.50	-967.49	-16.89	-967.64	0.00	0.00	0.00
Start Drop -2.00									
7,000.00	11.06	181.00	6,899.55	-976.89	-17.05	-977.03	2.00	-2.00	0.00
7,100.00	9.06	181.00	6,998.01	-994.35	-17.36	-994.50	2.00	-2.00	0.00
7,200.00	7.06	181.00	7,097.02	-1,008.37	-17.60	-1,008.52	2.00	-2.00	0.00
7,300.00	5.06	181.00	7,196.45	-1,018.92	-17.79	-1,019.08	2.00	-2.00	0.00
7,400.00	3.06	181.00	7,296.20	-1,026.00	-17.91	-1,026.16	2.00	-2.00	0.00
7,500.00	1.06	181.00	7,396.13	-1,029.60	-17.97	-1,029.75	2.00	-2.00	0.00
7,553.00	0.00	0.00	7,449.12	-1,030.09	-17.98	-1,030.24	2.00	-2.00	0.00
Start 1413.42 hold at 7553.00 MD									
7,600.00	0.00	0.00	7,496.12	-1,030.09	-17.98	-1,030.24	0.00	0.00	0.00
7,700.00	0.00	0.00	7,596.12	-1,030.09	-17.98	-1,030.24	0.00	0.00	0.00
7,800.00	0.00	0.00	7,696.12	-1,030.09	-17.98	-1,030.24	0.00	0.00	0.00
7,900.00	0.00	0.00	7,796.12	-1,030.09	-17.98	-1,030.24	0.00	0.00	0.00
8,000.00	0.00	0.00	7,896.12	-1,030.09	-17.98	-1,030.24	0.00	0.00	0.00
8,100.00	0.00	0.00	7,996.12	-1,030.09	-17.98	-1,030.24	0.00	0.00	0.00
8,200.00	0.00	0.00	8,096.12	-1,030.09	-17.98	-1,030.24	0.00	0.00	0.00
8,300.00	0.00	0.00	8,196.12	-1,030.09	-17.98	-1,030.24	0.00	0.00	0.00
8,400.00	0.00	0.00	8,296.12	-1,030.09	-17.98	-1,030.24	0.00	0.00	0.00
8,500.00	0.00	0.00	8,396.12	-1,030.09	-17.98	-1,030.24	0.00	0.00	0.00
8,600.00	0.00	0.00	8,496.12	-1,030.09	-17.98	-1,030.24	0.00	0.00	0.00
8,700.00	0.00	0.00	8,596.12	-1,030.09	-17.98	-1,030.24	0.00	0.00	0.00
8,800.00	0.00	0.00	8,696.12	-1,030.09	-17.98	-1,030.24	0.00	0.00	0.00
8,900.00	0.00	0.00	8,796.12	-1,030.09	-17.98	-1,030.24	0.00	0.00	0.00
8,966.41	0.00	0.00	8,862.54	-1,030.09	-17.98	-1,030.24	0.00	0.00	0.00
Start Build 12.00									
8,975.00	1.03	1.11	8,871.12	-1,030.01	-17.98	-1,030.16	12.00	12.00	0.00
9,000.00	4.03	1.11	8,896.10	-1,028.91	-17.96	-1,029.06	12.00	12.00	0.00
9,025.00	7.03	1.11	8,920.98	-1,026.50	-17.91	-1,026.65	12.00	12.00	0.00
9,050.00	10.03	1.11	8,945.70	-1,022.79	-17.84	-1,022.94	12.00	12.00	0.00
9,075.00	13.03	1.11	8,970.19	-1,017.80	-17.74	-1,017.95	12.00	12.00	0.00
9,100.00	16.03	1.11	8,994.39	-1,011.52	-17.62	-1,011.68	12.00	12.00	0.00
9,125.00	19.03	1.11	9,018.22	-1,004.00	-17.48	-1,004.15	12.00	12.00	0.00
9,150.00	22.03	1.11	9,041.63	-995.23	-17.31	-995.38	12.00	12.00	0.00

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Project:	Eddy County, NM	**MD Reference:**	GL 3014.5 + 25' KB @ 3039.50usft
Site:	SEC 4 - T23S - R28E	**North Reference:**	Grid
Well:	Goonch Fed Com 04 132H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
9,175.00	25.03	1.11	9,064.55	-985.25	-17.12	-985.40	12.00	12.00	0.00
9,200.00	28.03	1.11	9,086.92	-974.09	-16.90	-974.23	12.00	12.00	0.00
9,225.00	31.03	1.11	9,108.67	-961.77	-16.66	-961.91	12.00	12.00	0.00
9,250.00	34.03	1.11	9,129.74	-948.33	-16.40	-948.47	12.00	12.00	0.00
9,275.00	37.03	1.11	9,150.08	-933.81	-16.12	-933.94	12.00	12.00	0.00
9,300.00	40.03	1.11	9,169.64	-918.24	-15.82	-918.37	12.00	12.00	0.00
9,325.00	43.03	1.11	9,188.35	-901.67	-15.50	-901.80	12.00	12.00	0.00
9,350.00	46.03	1.11	9,206.17	-884.14	-15.16	-884.27	12.00	12.00	0.00
9,375.00	49.03	1.11	9,223.05	-865.71	-14.81	-865.83	12.00	12.00	0.00
9,400.00	52.03	1.11	9,238.94	-846.41	-14.44	-846.53	12.00	12.00	0.00
9,425.00	55.03	1.11	9,253.80	-826.32	-14.05	-826.43	12.00	12.00	0.00
9,450.00	58.03	1.11	9,267.58	-805.47	-13.65	-805.58	12.00	12.00	0.00
9,475.00	61.03	1.11	9,280.26	-783.93	-13.23	-784.03	12.00	12.00	0.00
9,500.00	64.03	1.11	9,291.79	-761.75	-12.80	-761.86	12.00	12.00	0.00
9,525.00	67.03	1.11	9,302.14	-739.00	-12.36	-739.10	12.00	12.00	0.00
9,550.00	70.03	1.11	9,311.29	-715.75	-11.92	-715.84	12.00	12.00	0.00
9,575.00	73.03	1.11	9,319.21	-692.04	-11.46	-692.13	12.00	12.00	0.00
9,600.00	76.03	1.11	9,325.88	-667.95	-10.99	-668.04	12.00	12.00	0.00
9,625.00	79.03	1.11	9,331.28	-643.55	-10.52	-643.63	12.00	12.00	0.00
9,650.00	82.03	1.11	9,335.39	-618.90	-10.05	-618.98	12.00	12.00	0.00
9,675.00	85.03	1.11	9,338.21	-594.06	-9.57	-594.14	12.00	12.00	0.00
9,700.00	88.03	1.11	9,339.72	-569.12	-9.09	-569.19	12.00	12.00	0.00
9,716.41	90.00	1.11	9,340.00	-552.71	-8.77	-552.78	12.00	12.00	0.00
Start 4783.00 hold at 9716.41 MD									
9,800.00	90.00	1.11	9,340.00	-469.14	-7.16	-469.19	0.00	0.00	0.00
9,900.00	90.00	1.11	9,340.00	-369.16	-5.23	-369.19	0.00	0.00	0.00
10,000.00	90.00	1.11	9,340.00	-269.18	-3.30	-269.19	0.00	0.00	0.00
10,100.00	90.00	1.11	9,340.00	-169.20	-1.37	-169.19	0.00	0.00	0.00
10,200.00	90.00	1.11	9,340.00	-69.21	0.56	-69.19	0.00	0.00	0.00
10,300.00	90.00	1.11	9,340.00	30.77	2.49	30.81	0.00	0.00	0.00
10,400.00	90.00	1.11	9,340.00	130.75	4.42	130.81	0.00	0.00	0.00
10,500.00	90.00	1.11	9,340.00	230.73	6.35	230.81	0.00	0.00	0.00
10,600.00	90.00	1.11	9,340.00	330.71	8.28	330.81	0.00	0.00	0.00
10,700.00	90.00	1.11	9,340.00	430.69	10.21	430.81	0.00	0.00	0.00
10,800.00	90.00	1.11	9,340.00	530.67	12.13	530.81	0.00	0.00	0.00
10,900.00	90.00	1.11	9,340.00	630.66	14.06	630.81	0.00	0.00	0.00
11,000.00	90.00	1.11	9,340.00	730.64	15.99	730.81	0.00	0.00	0.00
11,100.00	90.00	1.11	9,340.00	830.62	17.92	830.81	0.00	0.00	0.00
11,200.00	90.00	1.11	9,340.00	930.60	19.85	930.81	0.00	0.00	0.00
11,300.00	90.00	1.11	9,340.00	1,030.58	21.78	1,030.81	0.00	0.00	0.00
11,400.00	90.00	1.11	9,340.00	1,130.56	23.71	1,130.81	0.00	0.00	0.00
11,500.00	90.00	1.11	9,340.00	1,230.54	25.64	1,230.81	0.00	0.00	0.00
11,600.00	90.00	1.11	9,340.00	1,330.53	27.57	1,330.81	0.00	0.00	0.00
11,700.00	90.00	1.11	9,340.00	1,430.51	29.50	1,430.81	0.00	0.00	0.00
11,800.00	90.00	1.11	9,340.00	1,530.49	31.43	1,530.81	0.00	0.00	0.00
11,900.00	90.00	1.11	9,340.00	1,630.47	33.35	1,630.81	0.00	0.00	0.00
12,000.00	90.00	1.11	9,340.00	1,730.45	35.28	1,730.81	0.00	0.00	0.00
12,100.00	90.00	1.11	9,340.00	1,830.43	37.21	1,830.81	0.00	0.00	0.00
12,200.00	90.00	1.11	9,340.00	1,930.41	39.14	1,930.81	0.00	0.00	0.00
12,300.00	90.00	1.11	9,340.00	2,030.39	41.07	2,030.81	0.00	0.00	0.00
12,400.00	90.00	1.11	9,340.00	2,130.38	43.00	2,130.81	0.00	0.00	0.00
12,500.00	90.00	1.11	9,340.00	2,230.36	44.93	2,230.81	0.00	0.00	0.00
12,600.00	90.00	1.11	9,340.00	2,330.34	46.86	2,330.81	0.00	0.00	0.00
12,700.00	90.00	1.11	9,340.00	2,430.32	48.79	2,430.81	0.00	0.00	0.00

Database:	HED_Compass_DSN	**Local Co-ordinate Reference:**	Well Goonch Fed Com 04 132H
Company:	Novo Oil & Gas, LLC	**TVD Reference:**	GL 3014.5' + 25' KB @ 3039.50usft
Project:	Eddy County, NM	**MD Reference:**	GL 3014.5' + 25' KB @ 3039.50usft
Site:	SEC 4 - T23S - R28E	**North Reference:**	Grid
Well:	Goonch Fed Com 04 132H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

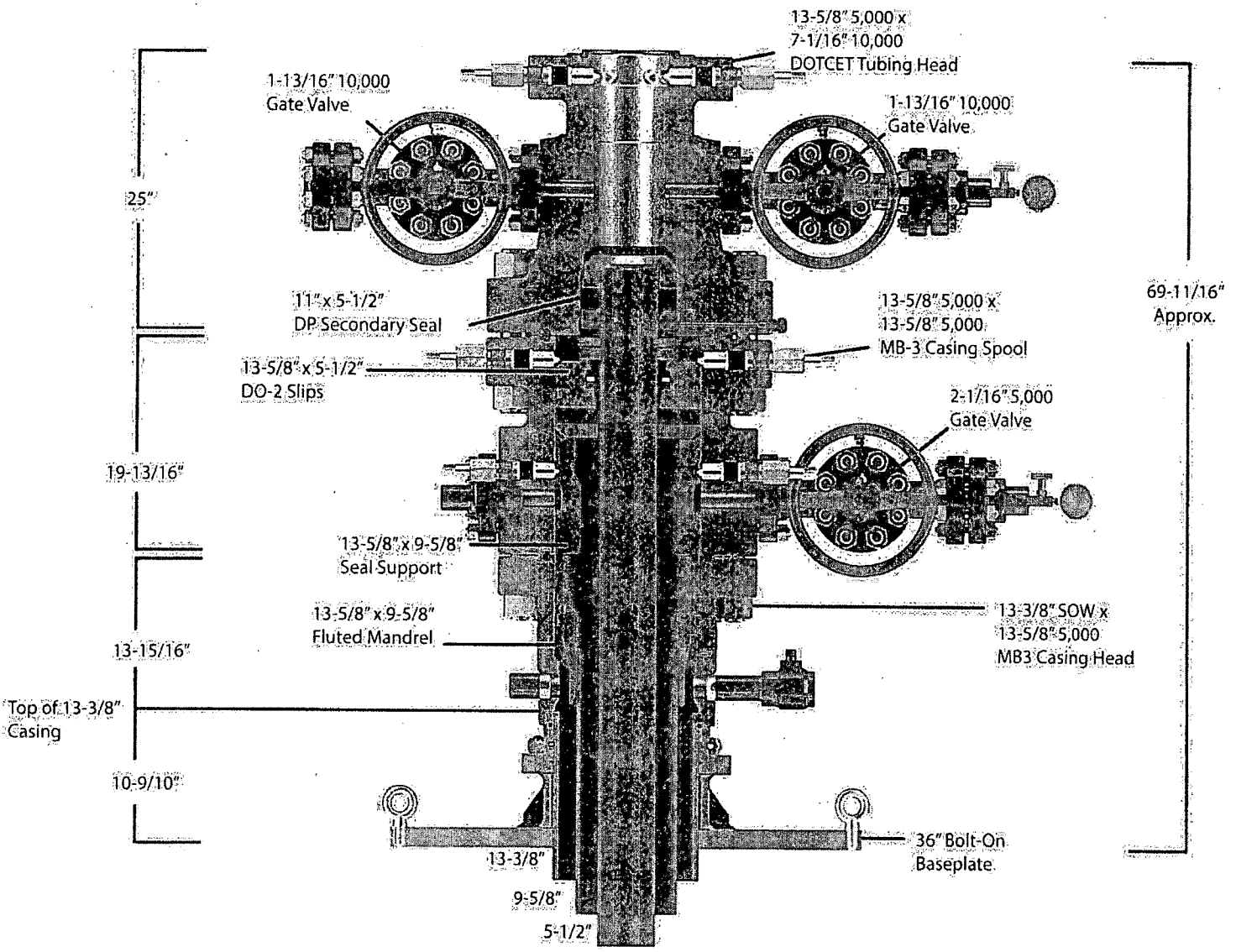
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
12,800.00	90.00	1.11	9,340.00	2,530.30	50.72	2,530.81	0.00	0.00	0.00
12,900.00	90.00	1.11	9,340.00	2,630.28	52.65	2,630.81	0.00	0.00	0.00
13,000.00	90.00	1.11	9,340.00	2,730.26	54.57	2,730.81	0.00	0.00	0.00
13,100.00	90.00	1.11	9,340.00	2,830.25	56.50	2,830.81	0.00	0.00	0.00
13,200.00	90.00	1.11	9,340.00	2,930.23	58.43	2,930.81	0.00	0.00	0.00
13,300.00	90.00	1.11	9,340.00	3,030.21	60.36	3,030.81	0.00	0.00	0.00
13,400.00	90.00	1.11	9,340.00	3,130.19	62.29	3,130.81	0.00	0.00	0.00
13,500.00	90.00	1.11	9,340.00	3,230.17	64.22	3,230.81	0.00	0.00	0.00
13,600.00	90.00	1.11	9,340.00	3,330.15	66.15	3,330.81	0.00	0.00	0.00
13,700.00	90.00	1.11	9,340.00	3,430.13	68.08	3,430.81	0.00	0.00	0.00
13,800.00	90.00	1.11	9,340.00	3,530.12	70.01	3,530.81	0.00	0.00	0.00
13,900.00	90.00	1.11	9,340.00	3,630.10	71.94	3,630.81	0.00	0.00	0.00
14,000.00	90.00	1.11	9,340.00	3,730.08	73.87	3,730.81	0.00	0.00	0.00
14,100.00	90.00	1.11	9,340.00	3,830.06	75.79	3,830.81	0.00	0.00	0.00
14,200.00	90.00	1.11	9,340.00	3,930.04	77.72	3,930.81	0.00	0.00	0.00
14,300.00	90.00	1.11	9,340.00	4,030.02	79.65	4,030.81	0.00	0.00	0.00
14,400.00	90.00	1.11	9,340.00	4,130.00	81.58	4,130.81	0.00	0.00	0.00
14,499.41	90.00	1.11	9,340.00	4,229.40	83.50	4,230.22	0.00	0.00	0.00
TD at 14499.41									

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
Goonch Fed Com 04 13 - plan hits target center - Point	0.00	0.00	9,340.00	4,229.40	83.50	488,194.60	614,375.64	32° 20' 30.828 N	104° 5' 48.609 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
2,000.00	2,000.00	0.00	0.00	Start Build 2.00
2,600.00	2,595.62	-62.59	-1.09	Start 4353.00 hold at 2600.00 MD
6,953.00	6,853.50	-967.49	-16.89	Start Drop -2.00
7,553.00	7,449.12	-1,030.09	-17.98	Start 1413.42 hold at 7553.00 MD
8,966.41	8,862.54	-1,030.09	-17.98	Start Build 12.00
9,716.41	9,340.00	-552.71	-8.77	Start 4783.00 hold at 9716.41 MD
14,499.41	9,340.00	4,229.40	83.50	TD at 14499.41



Quotation	Downing Wellhead Equipment	Oklahoma City, Oklahoma - USA

Reference Data:

NOVO

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TITLE:

NOVO OIL & GAS, MB-3 SYSTEM,
13-3/8" x 9-5/8" x 5-1/2"

DRAWN			SIZE	DWG. NO.	REV.
CHECKED			A		
APPROVED			Scale:	Weight:	Sheet:

, LLC

sk Report

Hawkeye Directional

Anticollision Risk Report

Company:	Novo Oil & Gas, LLC	Local Co-ordinate Reference:	Well Goonch Fed Com 04 132H
Project:	Eddy County, NM	TVD Reference:	GL 3014.5 + 25' KB @ 3039.50usft
Reference Site:	SEC 4 - T23S - R28E	MD Reference:	GL 3014.5 + 25' KB @ 3039.50usft
Site Error:	0.00	North Reference:	Grid
Reference Well:	Goonch Fed Com 04 132H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00	Output errors are at:	2.00 sigma
Reference Wellbore	OH	Database:	HED_Compass_DSN
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Reference Plan #1

Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations Interval 100.00usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum ellipse separation of 1,000.00usft	Error Surface:	Pedal Curve
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Risk Settings

Vertical Depth for Analysis:	usft	(Below TVD Reference Datum)
Level of Acceptable Risk (1 in):		
Minimum Separation:	usft	

Survey Tool Program Date 06/09/19

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	14,498.73	Plan #1 (OH)	MWD	OWSG MWD - Standard

Summary

Site Name / Offset Well / Wellbore / Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
SEC 4 - T23S - R28E						
Goonch Fed Com 04 131H - OH - Plan #1	2,000.00	1,999.50	200.05	186.16	14.404	CC, ES
Goonch Fed Com 04 131H - OH - Plan #1	14,499.41	14,531.88	792.37	626.55	4.779	SF
Goonch Fed Com 04 211H - OH - Plan #1	2,000.00	1,999.80	201.74	187.85	14.524	CC
Goonch Fed Com 04 211H - OH - Plan #1	2,100.00	2,097.37	202.13	187.57	13.882	ES
Goonch Fed Com 04 211H - OH - Plan #1	14,371.34	14,543.51	421.42	265.24	2.698	SF
Goonch Fed Com 04 212H - OH - Plan #1	2,259.97	2,258.33	19.56	4.00	1.257	Level 3, CC
Goonch Fed Com 04 212H - OH - Plan #1	2,300.00	2,298.06	19.62	3.61	1.241	Level 2, ES, SF
Goonch Fed Com 04 221H - OH - Plan #1	2,000.00	1,999.00	205.40	191.51	14.791	CC, ES
Goonch Fed Com 04 221H - OH - Plan #1	14,400.00	14,781.86	804.75	711.09	5.650	SF
Goonch Fed Com 04 222H - OH - Plan #1	2,608.27	2,599.27	38.99	21.39	2.215	CC
Goonch Fed Com 04 222H - OH - Plan #1	8,966.41	8,965.76	53.22	12.94	0.804	Level 1, ES, SF
Goonch Fed Com 04 231H - OH - Plan #1	2,000.00	1,999.10	210.91	197.02	15.187	CC, ES
Goonch Fed Com 04 231H - OH - Plan #1	14,400.00	15,354.95	1,195.32	1,068.83	9.450	SF
Goonch Fed Com 04 232H - OH - Plan #1	2,610.50	2,597.21	58.48	40.86	3.321	CC
Goonch Fed Com 04 232H - OH - Plan #1	3,500.00	3,486.44	62.38	38.40	2.601	ES
Goonch Fed Com 04 232H - OH - Plan #1	8,975.00	8,974.58	122.41	54.03	1.790	SF

Offset Design SEC 4 - T23S - R28E - Goonch Fed Com 04 131H - OH - Plan #1 — Offset Site Error: 0.00 usft; Survey Program: 0 MWD; Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Distance Between Centres (usft)	Distance Min Max Distance (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Ruled Separation Factor	Probability of Collision	Warning
0.00	0.00	0.00	0.00	0.00	0.00	200.05	200.05				0	< 1 in 1E+9	
100.00	100.00	99.50	99.50	0.13	0.13	200.05	200.05	199.78	0.27	749.050	0	< 1 in 1E+9	
200.00	200.00	199.50	199.50	0.49	0.49	200.05	200.05	199.07	0.98	203.302	0	< 1 in 1E+9	
300.00	300.00	299.50	299.50	0.89	0.89	200.05	200.05	198.35	1.70	117.611	0	< 1 in 1E+9	
400.00	400.00	399.50	399.50	1.21	1.21	200.05	200.05	197.63	2.42	82.738	0	< 1 in 1E+9	
500.00	500.00	499.50	499.50	1.57	1.57	200.05	200.05	196.92	3.13	63.915	0	< 1 in 1E+9	
600.00	600.00	599.50	599.50	1.93	1.93	200.05	200.05	196.20	3.85	51.937	0	< 1 in 1E+9	
700.00	700.00	699.50	699.50	2.29	2.29	200.05	200.05	195.48	4.57	43.787	0	< 1 in 1E+9	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

ocal Co-ordinate Reference:	Well Goonch Fed Com 04 132H
VD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
D Reference:	GL 3014.5' + 25' KB @ 3039.50usft
orth Reference:	Grid
urvey Calculation Method:	Minimum Curvature
utput errors are at	2.00 sigma
atabase:	HED_Compass_DSN
ffset TVD Reference:	Offset Datum

- Plan #1

Offset Site Error: 0.00 usft
Offset Well Error: 0.00 usft

Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Ribbed Separation Factor	Probability of Collision	Warning
194.78	5.29	37.848	0	<1 in 1E+9		
194.05	6.00	33.327	0	<1 in 1E+9		
193.33	6.72	29.771	0	<1 in 1E+9		
192.61	7.44	26.901	0	<1 in 1E+9		
191.90	8.15	24.526	0	<1 in 1E+9		
191.18	8.87	22.553	0	<1 in 1E+9		
190.46	9.59	20.864	0	<1 in 1E+9		
189.75	10.30	19.414	0	<1 in 1E+9		
189.03	11.02	18.151	0	<1 in 1E+9		
188.31	11.74	17.043	0	<1 in 1E+9		
187.60	12.46	16.062	0	<1 in 1E+9		
186.88	13.17	15.187	0	<1 in 1E+9		
186.16	13.89	14.404	0	<1 in 1E+9	CC, ES	
185.39	14.66	13.695	0	<1 in 1E+9		
184.65	15.39	13.048	0	<1 in 1E+9		
183.93	16.12	13.150	0	<1 in 1E+9		
107.98	19.46	13.027	0	<1 in 1E+9		
205.46	17.31	13.009	0	<1 in 1E+9		
214.74	17.78	13.078	0	<1 in 1E+9		
226.28	18.50	13.178	0	<1 in 1E+9		
236.98	19.25	13.255	0	<1 in 1E+9		
246.46	20.01	13.316	0	<1 in 1E+9		
257.10	20.80	13.382	0	<1 in 1E+9		
267.72	21.59	13.394	0	<1 in 1E+9		
276.35	22.41	13.423	0	<1 in 1E+9		
288.98	23.23	13.441	0	<1 in 1E+9		
299.02	24.06	13.453	0	<1 in 1E+9		
310.76	24.90	13.458	0	<1 in 1E+9		
320.81	25.76	13.460	0	<1 in 1E+9		
331.56	26.61	13.458	0	<1 in 1E+9		
342.21	27.48	13.453	0	<1 in 1E+9		
352.87	28.35	13.445	0	<1 in 1E+9		
363.53	29.23	13.436	0	<1 in 1E+9		
374.19	30.12	13.425	0	<1 in 1E+9		
384.85	31.01	13.412	0	<1 in 1E+9		
396.51	31.90	13.399	0	<1 in 1E+9		
406.18	32.80	13.385	0	<1 in 1E+9		
416.85	33.70	13.370	0	<1 in 1E+9		
427.52	34.60	13.356	0	<1 in 1E+9		
438.19	35.51	13.339	0	<1 in 1E+9		
448.86	36.42	13.324	0	<1 in 1E+9		
458.54	37.34	13.308	0	<1 in 1E+9		
470.21	38.25	13.292	0	<1 in 1E+9		
480.89	39.17	13.276	0	<1 in 1E+9		
491.57	40.09	13.260	0	<1 in 1E+9		
502.25	41.02	13.245	0	<1 in 1E+9		
512.93	41.94	13.229	0	<1 in 1E+9		
523.61	42.87	13.214	0	<1 in 1E+9		
534.29	43.80	13.199	0	<1 in 1E+9		
544.97	44.73	13.184	0	<1 in 1E+9		
555.65	45.66	13.169	0	<1 in 1E+9		
566.34	46.59	13.155	0	<1 in 1E+9		
577.02	47.53	13.141	0	<1 in 1E+9		
587.71	48.46	13.127	0	<1 in 1E+9		
598.39	49.40	13.113	0	<1 in 1E+9		
609.08	50.34	13.099	0	<1 in 1E+9		
619.77	51.28	13.086	0	<1 in 1E+9		
630.45	52.22	13.073	0	<1 in 1E+9		
641.14	53.16	13.061	0	<1 in 1E+9		
651.83	54.10	13.048	0	<1 in 1E+9		
662.52	55.05	13.036	0	<1 in 1E+9		
673.21	55.99	13.024	0	<1 in 1E+9		
678.89	56.49	13.018	0	<1 in 1E+9		

nt, SF - min separation factor, ES - min ellipse separation

Company:	Novo Oil & Gas, LLC
Project:	Eddy County, NM
Reference Site:	SEC 4 - T23S - R28E
Site Error:	0.00
Reference Well:	Goonch Fed Com 04 132H
Well Error:	0.00
Reference Wellbore	OH
Reference Design:	Plan #1

Local Co-ordinate Reference:	Well Goonch Fed Com 04 132H
TVD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
MD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
North Reference:	Grid
Survey Calculation Method:	Minimum Curvature
Output errors are at	2.00 sigma
Database:	HED_Compass_DSN
Offset TVD Reference:	Offset Datum

Offset Design — SEC 4 - T23S - R28E - Goonch Fed Com 04 131H - OH - Plan #1

Survey Program: 0-MWD

Offset Site Error: 0.00 usft
Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Ribbed Separation Factor	Probability of Collision	Warning
7,000.00	6,809.55	6,944.28	6,844.87	28.90	28.74	740.76	740.76	683.83	58.93	13.012	0	<1 in 1E+9
7,100.00	6,909.01	7,043.84	6,942.16	29.36	29.22	751.72	751.72	693.88	57.84	12.998	0	<1 in 1E+9
7,200.00	7,007.82	7,143.94	7,039.29	29.78	29.70	762.02	762.02	703.39	58.62	13.007	0	<1 in 1E+9
7,300.00	7,106.45	7,243.05	7,136.24	30.12	30.18	771.72	771.72	712.38	59.34	13.007	0	<1 in 1E+9
7,400.00	7,205.20	7,340.88	7,232.88	30.53	30.66	780.91	780.91	720.55	60.36	12.937	0	<1 in 1E+9
7,500.00	7,306.13	7,439.23	7,329.11	30.87	31.13	789.75	789.75	728.93	61.12	12.922	0	<1 in 1E+9
7,600.00	7,406.12	7,537.10	7,424.86	31.16	31.60	798.46	798.46	736.65	61.81	12.918	0	<1 in 1E+9
7,700.00	7,506.12	7,634.94	7,520.94	31.44	32.08	807.54	807.54	745.00	62.49	12.923	0	<1 in 1E+9
7,800.00	7,606.12	7,732.78	7,616.22	31.72	32.55	817.05	817.05	753.90	63.16	12.937	0	<1 in 1E+9
7,900.00	7,706.12	7,830.97	7,711.90	32.00	33.03	826.98	826.98	763.16	63.82	12.958	0	<1 in 1E+9
8,000.00	7,806.12	7,928.33	7,807.57	32.29	33.50	837.30	837.30	772.83	64.47	12.987	0	<1 in 1E+9
8,100.00	7,906.12	8,040.16	7,917.16	32.57	34.03	847.38	847.38	782.14	65.23	12.990	0	<1 in 1E+9
8,200.00	8,006.12	8,157.36	8,032.94	32.85	34.54	858.68	858.68	792.83	65.85	12.965	0	<1 in 1E+9
8,300.00	8,106.12	8,275.94	8,150.69	33.15	35.02	869.07	869.07	795.24	66.73	12.917	0	<1 in 1E+9
8,400.00	8,206.12	8,395.44	8,269.95	33.44	35.45	880.07	880.07	796.64	67.42	12.845	0	<1 in 1E+9
8,500.00	8,306.12	8,516.49	8,389.83	33.73	35.84	892.89	892.89	799.82	68.07	12.745	0	<1 in 1E+9
8,600.00	8,406.12	8,637.29	8,509.62	34.03	36.14	907.99	907.99	799.33	68.66	12.641	0	<1 in 1E+9
8,700.00	8,506.12	8,757.29	8,629.62	34.32	36.43	907.99	907.99	799.74	68.25	12.536	0	<1 in 1E+9
8,800.00	8,606.12	8,877.29	8,749.62	34.62	36.70	907.99	907.99	798.16	69.83	12.430	0	<1 in 1E+9
8,900.00	8,706.12	8,997.29	8,869.62	34.91	36.98	907.99	907.99	797.57	70.41	12.327	0	<1 in 1E+9
8,968.41	8,892.84	9,067.70	9,062.04	35.11	37.19	907.99	907.59	797.18	70.60	12.259	0	<1 in 1E+9
8,975.00	8,871.12	9,068.29	9,070.62	35.14	37.19	907.99	907.99	797.14	70.85	12.250	0	<1 in 1E+9
9,000.00	9,806.10	9,022.88	9,087.20	35.21	37.25	907.99	907.59	797.00	70.99	12.237	0	<1 in 1E+9
9,025.00	9,920.98	9,049.57	9,023.80	35.27	37.32	907.97	907.97	796.86	71.11	12.209	0	<1 in 1E+9
9,050.00	9,945.70	9,076.27	9,050.25	35.32	37.38	907.93	907.93	796.71	71.22	12.187	0	<1 in 1E+9
9,075.00	9,970.19	9,103.00	9,076.45	35.37	37.42	907.89	907.89	796.55	71.34	12.170	0	<1 in 1E+9
9,100.00	9,994.39	9,129.73	9,002.39	35.41	37.46	907.77	907.77	796.39	71.39	12.156	0	<1 in 1E+9
9,125.00	10,018.22	9,156.47	9,027.88	35.44	37.49	907.67	907.67	796.22	71.45	12.144	0	<1 in 1E+9
9,150.00	9,941.63	9,183.21	9,052.89	35.46	37.51	907.54	907.54	796.04	71.49	12.134	0	<1 in 1E+9
9,175.00	9,864.55	9,209.94	9,077.32	35.48	37.53	907.39	907.39	795.86	71.53	12.127	0	<1 in 1E+9
9,200.00	9,948.92	9,236.65	9,101.10	35.49	37.53	907.23	907.23	795.67	71.56	12.121	0	<1 in 1E+9
9,225.00	9,108.87	9,263.35	9,124.14	35.50	37.53	907.03	907.03	795.47	71.56	12.117	0	<1 in 1E+9
9,250.00	9,129.74	9,290.02	9,146.37	35.50	37.52	866.82	866.82	795.27	71.55	12.115	0	<1 in 1E+9
9,275.00	9,150.08	9,316.66	9,167.73	35.49	37.50	866.60	866.60	795.06	71.54	12.114	0	<1 in 1E+9
9,300.00	9,169.64	9,343.27	9,188.13	35.48	37.48	866.35	866.35	794.84	71.51	12.115	0	<1 in 1E+9
9,325.00	9,189.35	9,369.83	9,207.53	35.47	37.45	866.09	866.09	794.62	71.47	12.116	0	<1 in 1E+9
9,350.00	9,208.17	9,396.35	9,225.85	35.45	37.41	865.81	865.81	794.39	71.43	12.121	0	<1 in 1E+9
9,375.00	9,223.05	9,422.82	9,243.05	35.42	37.37	865.52	865.52	794.15	71.36	12.126	0	<1 in 1E+9
9,400.00	9,238.94	9,449.24	9,259.08	35.39	37.32	865.22	865.22	793.90	71.32	12.132	0	<1 in 1E+9
9,425.00	9,253.80	9,475.59	9,273.89	35.36	37.27	864.90	864.90	793.65	71.25	12.139	0	<1 in 1E+9
9,450.00	9,267.56	9,501.89	9,287.44	35.33	37.22	864.57	864.57	793.39	71.18	12.148	0	<1 in 1E+9
9,475.00	9,280.29	9,528.11	9,299.70	35.29	37.18	864.23	864.23	792.13	71.10	12.154	0	<1 in 1E+9
9,500.00	9,291.79	9,554.27	9,310.65	35.25	37.09	863.88	863.88	792.86	71.03	12.153	0	<1 in 1E+9
9,525.00	9,302.14	9,580.35	9,320.25	35.21	37.00	863.53	863.53	792.59	70.94	12.172	0	<1 in 1E+9
9,550.00	9,311.29	9,606.36	9,329.50	35.17	36.96	863.16	863.16	792.30	70.86	12.181	0	<1 in 1E+9
9,575.00	9,319.21	9,632.29	9,338.35	35.13	36.89	862.78	862.78	792.02	70.77	12.191	0	<1 in 1E+9
9,600.00	9,325.88	9,658.14	9,346.85	35.09	36.82	862.42	862.42	791.73	70.69	12.200	0	<1 in 1E+9
9,625.00	9,331.28	9,683.90	9,344.55	35.04	36.75	862.04	862.04	791.44	70.60	12.210	0	<1 in 1E+9
9,650.00	9,335.39	9,709.59	9,347.67	35.00	36.68	861.67	861.67	791.15	70.52	12.220	0	<1 in 1E+9
9,675.00	9,338.21	9,735.19	9,349.01	34.96	36.61	861.29	861.29	790.86	70.43	12.229	0	<1 in 1E+9
9,700.00	9,339.72	9,760.42	9,349.17	34.93	36.54	860.91	860.91	790.57	70.35	12.238	0	<1 in 1E+9
9,710.41	9,340.00	9,770.83	9,349.17	34.89	36.49	860.67	860.67	790.38	70.29	12.244	0	<1 in 1E+9
9,800.00	9,340.00	9,860.41	9,349.18	34.79	36.30	859.47	859.47	789.39	70.08	12.265	0	<1 in 1E+9
9,900.00	9,340.00	9,960.40	9,349.20	34.73	36.10	858.03	858.03	788.08	69.95	12.266	0	<1 in 1E+9
10,000.00	9,340.00	10,060.39	9,349.22	34.76	35.95	856.60	856.60	786.61	69.99	12.238	0	<1 in 1E+9
10,100.00	9,340.00	10,160.38	9,349.24	34.89	35.86	855.18	855.18	784.98	70.17	12.189	0	<1 in 1E+9
10,200.00	9,340.00	10,260.37	9,349.25	35.04	35.85	853.72	853.72	783.20	70.52	12.107	0	<1 in 1E+9
10,300.00	9,340.00	10,360.36	9,349.27	35.20	35.94	852.28	852.28	781.27	71.01	12.003	0	<1 in 1E+9
10,400.00	9,340.00	10,460.35	9,349.29	35.03	36.14	850.84	850.84	779.19	71.65	11.875	0	<1 in 1E+9
10,500.00	9,340.00	10,560.34	9,349.31	36.03	36.46	849.41	849.41	776.97	72.43	11.727	0	<1 in 1E+9
10,600.00	9,340.00	10,660.33	9,349.32	36.50	36.90	847.97	847.97	774.61	73.36	11.559	0	<1 in 1E+9
10,700.00	9,340.00	10,760.32	9,349.34	37.05	37.42	846.53	846.53	772.11	74.42	11.375	0	<1 in 1E+9

CC, - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

e Directional
ion Risk Report

ocal Co-ordinate Reference:	Well Goonch Fed Com 04 132H
VD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
D Reference:	GL 3014.5' + 25' KB @ 3039.50usft
orth Reference:	Grid
urvey Calculation Method:	Minimum Curvature
utput errors are at	2.00 sigma
atabase:	HED_Compass_DSN
ffset TVD Reference:	Offset Datum

- Plan #1 — Offset Site Error: 0.00 usft; Offset Well Error: 0.00 usft

Distance (partial)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Risked Separation Factor	Probability of Collision	Warning
09	769.45	75.61	11.177	0	< 1 in 1E+9	
65	766.73	76.02	10.968	0	< 1 in 1E+9	
22	763.87	78.35	10.740	0	< 1 in 1E+9	
78	760.89	79.89	10.524	0	< 1 in 1E+9	
34	757.81	81.53	10.295	0	< 1 in 1E+9	
90	754.83	83.27	10.062	0	< 1 in 1E+9	
46	751.35	85.11	9.828	0	< 1 in 1E+9	
03	748.00	87.03	9.595	0	< 1 in 1E+9	
59	744.58	89.03	9.363	0	< 1 in 1E+9	
15	741.05	91.10	9.134	0	< 1 in 1E+9	
71	737.48	93.25	8.908	0	< 1 in 1E+9	
27	733.81	95.46	8.687	0	< 1 in 1E+9	
83	730.10	97.73	8.470	0	< 1 in 1E+9	
40	726.33	100.08	8.259	0	< 1 in 1E+9	
96	722.51	102.45	8.053	0	< 1 in 1E+9	
52	718.64	104.88	7.852	0	< 1 in 1E+9	
08	714.72	107.36	7.657	0	< 1 in 1E+9	
64	710.76	109.88	7.469	0	< 1 in 1E+9	
21	706.77	112.44	7.286	0	< 1 in 1E+9	
77	702.73	115.04	7.109	0	< 1 in 1E+9	
33	698.66	117.67	6.937	0	< 1 in 1E+9	
89	694.55	120.34	6.772	0	< 1 in 1E+9	
45	690.42	123.04	6.611	0	< 1 in 1E+9	
02	686.25	125.76	6.457	0	< 1 in 1E+9	
58	682.06	128.52	6.307	0	< 1 in 1E+9	
14	677.85	131.29	6.163	0	< 1 in 1E+9	
70	673.61	134.10	6.023	0	< 1 in 1E+9	
26	669.35	136.92	5.889	0	< 1 in 1E+9	
83	665.06	139.78	5.759	0	< 1 in 1E+9	
39	660.76	142.63	5.633	0	< 1 in 1E+9	
95	656.44	145.51	5.511	0	< 1 in 1E+9	
51	652.11	148.41	5.394	0	< 1 in 1E+9	
08	647.75	151.32	5.281	0	< 1 in 1E+9	
64	643.39	154.26	5.171	0	< 1 in 1E+9	
20	639.00	157.20	5.065	0	< 1 in 1E+9	
76	634.61	160.15	4.962	0	< 1 in 1E+9	
32	630.20	163.13	4.863	0	< 1 in 1E+9	
21	626.70	165.51	4.787	0	< 1 in 1E+9	
37	626.55	165.83	4.770	0	< 1 in 1E+9	SF

int, SF - min separation factor, ES - min ellipse separation

Hawkeye Directional
Anticollision Risk Report

Company:	Novo Oil & Gas, LLC	Local Co-ordinate Reference:	Well Goonch Fed Com 04 132H
Project:	Eddy County, NM	TVD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
Reference Site:	SEC 4 - T23S - R28E	MD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
Site Error:	0.00	North Reference:	Grid
Reference Well:	Goonch Fed Com 04 132H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	HED_Compass_DSN
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design: SEC 4 - T23S - R28E - Goonch Fed Com 04 211H - OH - Plan #1 — Offset Site Error: 0.00 usft

Survey Program: 0-MWD — Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Distance Between Centres (usft)	Well-Well Distance (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Risked Separation Factor	Probability of Collision	Warning
0.00	0.00	0.00	0.00	0.00	0.00	201.74	201.74				0	< 1 in 1E+9	
100.00	100.00	99.80	99.80	0.13	0.13	201.74	201.74	201.47	0.27	751.106	0	< 1 in 1E+9	
200.00	200.00	199.80	199.80	0.49	0.49	201.74	201.74	200.75	0.99	204.791	0	< 1 in 1E+9	
300.00	300.00	299.80	299.80	0.85	0.85	201.74	201.74	200.03	1.70	118.627	0	< 1 in 1E+9	
400.00	400.00	399.80	399.80	1.21	1.21	201.74	201.74	199.32	2.42	83.308	0	< 1 in 1E+9	
500.00	500.00	499.80	499.80	1.57	1.57	201.74	201.74	198.60	3.14	64.301	0	< 1 in 1E+9	
600.00	600.00	599.80	599.80	1.93	1.93	201.74	201.74	197.88	3.85	52.360	0	< 1 in 1E+9	
700.00	700.00	699.80	699.80	2.28	2.28	201.74	201.74	197.17	4.57	44.140	0	< 1 in 1E+9	
800.00	800.00	799.80	799.80	2.64	2.64	201.74	201.74	196.45	5.29	38.159	0	< 1 in 1E+9	
900.00	900.00	899.80	899.80	3.00	3.00	201.74	201.74	195.73	6.00	33.602	0	< 1 in 1E+9	
1,000.00	1,000.00	999.80	999.80	3.36	3.36	201.74	201.74	195.02	6.72	30.017	0	< 1 in 1E+9	
1,100.00	1,100.00	1,099.80	1,099.80	3.72	3.72	201.74	201.74	194.30	7.44	27.124	0	< 1 in 1E+9	
1,200.00	1,200.00	1,199.80	1,199.80	4.08	4.08	201.74	201.74	193.58	8.15	24.739	0	< 1 in 1E+9	
1,300.00	1,300.00	1,299.80	1,299.80	4.44	4.44	201.74	201.74	192.86	8.87	22.740	0	< 1 in 1E+9	
1,400.00	1,400.00	1,399.80	1,399.80	4.79	4.79	201.74	201.74	192.15	9.59	21.040	0	< 1 in 1E+9	
1,500.00	1,500.00	1,499.80	1,499.80	5.15	5.15	201.74	201.74	191.43	10.31	19.576	0	< 1 in 1E+9	
1,600.00	1,600.00	1,599.80	1,599.80	5.51	5.51	201.74	201.74	190.71	11.02	18.303	0	< 1 in 1E+9	
1,700.00	1,700.00	1,699.80	1,699.80	5.87	5.87	201.74	201.74	190.00	11.74	17.185	0	< 1 in 1E+9	
1,800.00	1,800.00	1,799.80	1,799.80	6.23	6.23	201.74	201.74	189.28	12.46	16.196	0	< 1 in 1E+9	
1,900.00	1,900.00	1,899.80	1,899.80	6.59	6.59	201.74	201.74	188.56	13.17	15.314	0	< 1 in 1E+9	
2,000.00	2,000.00	1,999.80	1,999.80	6.95	6.94	201.74	201.74	187.85	13.89	14.524	0	< 1 in 1E+9	CC
2,100.00	2,099.98	2,097.37	2,097.35	7.29	7.28	202.13	202.13	187.57	14.56	13.882	0	< 1 in 1E+9	ES
2,200.00	2,199.84	2,194.93	2,194.77	7.61	7.60	203.32	203.32	188.12	15.20	13.378	0	< 1 in 1E+9	
2,300.00	2,299.45	2,292.40	2,291.95	7.94	7.92	205.31	205.31	189.47	15.84	12.961	0	< 1 in 1E+9	
2,400.00	2,398.70	2,389.98	2,388.77	8.27	8.24	208.00	208.00	191.60	16.49	12.617	0	< 1 in 1E+9	
2,500.00	2,497.47	2,487.46	2,485.11	8.61	8.57	211.67	211.67	194.51	17.16	12.335	0	< 1 in 1E+9	
2,600.00	2,595.62	2,584.91	2,580.86	8.97	8.92	216.05	216.05	198.20	17.85	12.104	0	< 1 in 1E+9	
2,700.00	2,693.44	2,684.41	2,678.19	9.34	9.28	220.98	220.98	202.40	18.58	11.895	0	< 1 in 1E+9	
2,800.00	2,791.25	2,784.26	2,775.86	9.72	9.68	225.93	225.93	206.60	19.33	11.687	0	< 1 in 1E+9	
2,900.00	2,889.07	2,884.15	2,873.56	10.10	10.05	230.89	230.89	210.79	20.10	11.485	0	< 1 in 1E+9	
3,000.00	2,986.88	2,984.02	2,971.25	10.50	10.45	235.85	235.85	214.96	20.89	11.288	0	< 1 in 1E+9	
3,100.00	3,084.70	3,083.89	3,068.94	10.91	10.85	240.82	240.82	219.12	21.70	11.099	0	< 1 in 1E+9	
3,200.00	3,182.51	3,183.77	3,166.63	11.32	11.26	245.79	245.79	223.27	22.53	10.916	0	< 1 in 1E+9	
3,300.00	3,280.33	3,283.64	3,264.32	11.74	11.68	250.77	250.77	227.42	23.35	10.740	0	< 1 in 1E+9	
3,400.00	3,378.14	3,383.51	3,362.01	12.16	12.10	255.74	255.74	231.55	24.19	10.572	0	< 1 in 1E+9	
3,500.00	3,475.96	3,483.38	3,459.70	12.59	12.53	260.72	260.72	235.68	25.04	10.412	0	< 1 in 1E+9	
3,600.00	3,573.77	3,583.25	3,557.39	13.02	12.96	265.71	265.71	239.81	25.90	10.258	0	< 1 in 1E+9	
3,700.00	3,671.59	3,683.12	3,655.08	13.46	13.40	270.70	270.70	243.92	26.77	10.111	0	< 1 in 1E+9	
3,800.00	3,769.40	3,783.00	3,752.77	13.90	13.84	275.69	275.69	248.04	27.65	9.971	0	< 1 in 1E+9	
3,900.00	3,867.22	3,882.87	3,850.46	14.35	14.28	280.68	280.68	252.15	28.53	9.837	0	< 1 in 1E+9	
4,000.00	3,965.03	3,982.74	3,948.15	14.80	14.73	285.68	285.68	256.25	29.42	9.710	0	< 1 in 1E+9	
4,100.00	4,062.84	4,082.61	4,045.83	15.25	15.18	290.67	290.67	260.36	30.32	9.588	0	< 1 in 1E+9	
4,200.00	4,160.66	4,182.48	4,143.52	15.70	15.63	295.68	295.68	264.46	31.22	9.472	0	< 1 in 1E+9	
4,300.00	4,258.47	4,282.35	4,241.21	16.15	16.08	300.68	300.68	268.56	32.12	9.360	0	< 1 in 1E+9	
4,400.00	4,356.29	4,382.23	4,338.90	16.61	16.54	305.68	305.68	272.65	33.03	9.254	0	< 1 in 1E+9	
4,500.00	4,454.10	4,482.10	4,436.59	17.07	17.00	310.69	310.69	276.74	33.94	9.153	0	< 1 in 1E+9	
4,600.00	4,551.92	4,581.97	4,534.28	17.53	17.46	315.70	315.70	280.84	34.86	9.056	0	< 1 in 1E+9	
4,700.00	4,649.73	4,681.84	4,631.97	17.99	17.92	320.71	320.71	284.93	35.78	8.963	0	< 1 in 1E+9	
4,800.00	4,747.55	4,781.71	4,729.66	18.46	18.38	325.72	325.72	289.02	36.71	8.874	0	< 1 in 1E+9	
4,900.00	4,845.36	4,881.58	4,827.35	18.92	18.85	330.73	330.73	293.10	37.63	8.789	0	< 1 in 1E+9	
5,000.00	4,943.18	4,981.45	4,925.04	19.39	19.32	335.75	335.75	297.19	38.56	8.707	0	< 1 in 1E+9	
5,100.00	5,040.99	5,081.33	5,022.73	19.86	19.78	340.77	340.77	301.27	39.49	8.629	0	< 1 in 1E+9	
5,200.00	5,138.81	5,181.20	5,120.42	20.33	20.25	345.79	345.79	305.36	40.43	8.553	0	< 1 in 1E+9	
5,300.00	5,236.62	5,281.07	5,218.10	20.80	20.72	350.80	350.80	309.44	41.36	8.481	0	< 1 in 1E+9	
5,400.00	5,334.44	5,380.94	5,315.79	21.27	21.19	355.83	355.83	313.52	42.30	8.412	0	< 1 in 1E+9	
5,500.00	5,432.25	5,480.81	5,413.48	21.74	21.66	360.85	360.85	317.61	43.24	8.345	0	< 1 in 1E+9	
5,600.00	5,530.07	5,580.68	5,511.17	22.21	22.14	365.87	365.87	321.69	44.18	8.281	0	< 1 in 1E+9	
5,700.00	5,627.88	5,680.56	5,608.86	22.69	22.61	370.90	370.90	325.77	45.13	8.219	0	< 1 in 1E+9	
5,800.00	5,725.70	5,780.43	5,706.55	23.16	23.08	375.92	375.92	329.85	46.07	8.159	0	< 1 in 1E+9	
5,900.00	5,823.51	5,880.30	5,804.24	23.64	23.56	380.95	380.95	333.93	47.02	8.102	0	< 1 in 1E+9	
6,000.00	5,921.33	5,980.17	5,901.93	24.12	24.03	385.98	385.98	338.01	47.97	8.046	0	< 1 in 1E+9	
6,100.00	6,019.14	6,080.04	5,999.62	24.59	24.51	391.01	391.01	342.09	48.92	7.993	0	< 1 in 1E+9	
6,200.00	6,116.95	6,179.91	6,097.31	25.07	24.99	396.04	396.04	346.17	49.87	7.942	0	< 1 in 1E+9	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

ocal Co-ordinate Reference:	Well Goonch Fed Com 04 132H
VD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
D Reference:	GL 3014.5' + 25' KB @ 3039.50usft
orth Reference:	Grid
urvey Calculation Method:	Minimum Curvature
utput errors are at	2.00 sigma
atabase:	HED_Compass_DSN
ffset TVD Reference:	Offset Datum

Plan #1

Offset Site Error: 0.00 usft
Offset Well Error: 0.00 usft

Distance+ Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Risked Separation Factor	Probability of Collision	Warning
350.25	50.42	7.892	0	< 1 in 1E+9	
354.32	51.77	7.844	0	< 1 in 1E+9	
359.40	52.73	7.787	0	< 1 in 1E+9	
362.46	53.68	7.752	0	< 1 in 1E+9	
366.56	54.64	7.709	0	< 1 in 1E+9	
370.64	55.60	7.667	0	< 1 in 1E+9	
374.71	56.55	7.626	0	< 1 in 1E+9	
378.87	57.08	7.605	0	< 1 in 1E+9	
379.79	57.51	7.567	0	< 1 in 1E+9	
382.68	58.43	7.553	0	< 1 in 1E+9	
386.93	59.31	7.524	0	< 1 in 1E+9	
390.35	60.15	7.490	0	< 1 in 1E+9	
393.05	60.92	7.451	0	< 1 in 1E+9	
396.02	61.63	7.409	0	< 1 in 1E+9	
395.77	61.97	7.386	0	< 1 in 1E+9	
398.24	62.20	7.364	0	< 1 in 1E+9	
399.45	62.86	7.307	0	< 1 in 1E+9	
395.95	63.43	7.242	0	< 1 in 1E+9	
395.36	64.00	7.176	0	< 1 in 1E+9	
394.81	64.57	7.115	0	< 1 in 1E+9	
394.29	65.14	7.052	0	< 1 in 1E+9	
393.65	65.71	6.990	0	< 1 in 1E+9	
393.09	66.29	6.930	0	< 1 in 1E+9	
392.50	66.87	6.869	0	< 1 in 1E+9	
391.92	67.46	6.810	0	< 1 in 1E+9	
391.33	68.04	6.751	0	< 1 in 1E+9	
390.75	68.63	6.693	0	< 1 in 1E+9	
390.15	69.22	6.636	0	< 1 in 1E+9	
389.58	69.82	6.580	0	< 1 in 1E+9	
389.17	70.21	6.543	0	< 1 in 1E+9	
389.13	70.26	6.538	0	< 1 in 1E+9	
389.06	70.40	6.526	0	< 1 in 1E+9	
389.10	70.62	6.506	0	< 1 in 1E+9	
389.29	70.63	6.512	0	< 1 in 1E+9	
389.62	70.72	6.510	0	< 1 in 1E+9	
390.17	70.79	6.512	0	< 1 in 1E+9	
390.93	70.84	6.518	0	< 1 in 1E+9	
391.77	70.87	6.529	0	< 1 in 1E+9	
392.72	70.88	6.541	0	< 1 in 1E+9	
393.73	70.88	6.556	0	< 1 in 1E+9	
394.85	70.82	6.575	0	< 1 in 1E+9	
396.01	70.75	6.595	0	< 1 in 1E+9	
397.21	70.64	6.623	0	< 1 in 1E+9	
398.44	70.51	6.651	0	< 1 in 1E+9	
399.68	70.36	6.681	0	< 1 in 1E+9	
400.91	70.19	6.714	0	< 1 in 1E+9	
402.11	69.99	6.749	0	< 1 in 1E+9	
403.29	69.71	6.784	0	< 1 in 1E+9	
404.31	69.47	6.820	0	< 1 in 1E+9	
405.27	69.21	6.856	0	< 1 in 1E+9	
406.11	68.94	6.893	0	< 1 in 1E+9	
406.80	68.71	6.921	0	< 1 in 1E+9	
407.32	68.48	6.948	0	< 1 in 1E+9	
407.68	68.28	6.971	0	< 1 in 1E+9	
407.80	68.11	6.988	0	< 1 in 1E+9	
407.73	67.97	6.998	0	< 1 in 1E+9	
407.45	67.86	7.002	0	< 1 in 1E+9	
408.06	67.83	6.998	0	< 1 in 1E+9	
409.26	67.83	6.990	0	< 1 in 1E+9	
409.57	67.91	6.981	0	< 1 in 1E+9	
405.35	67.77	6.981	0	< 1 in 1E+9	
404.55	67.53	6.988	0	< 1 in 1E+9	
403.59	67.50	6.979	0	< 1 in 1E+9	

int, SF - min separation factor, ES - min ellipse separation

Company:	Novo Oil & Gas, LLC	Local Co-ordinate Reference:	Well Goonch Fed Com 04 132H
Project:	Eddy County, NM	TVD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
Reference Site:	SEC 4 - T23S - R28E	MD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
Site Error:	0.00	North Reference:	Grid
Reference Well:	Goonch Fed Com 04 132H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	HED_Compass_DSN
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design SEC 4 - T23S - R28E - Goonch Fed Com 04 211H - OH - Plan #1

Offset Site Error: 0.00 usft
Survey Program: 0-MWD Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Distance Between Centres (usft)	Distance Well-Well Distance (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Risked Separation Factor	Probability of Collision	Warning
10,000.00	9,340.00	10,177.12	9,478.24	34.76	35.36	469.84	469.84	402.38	67.58	6.956	0	< 1 in 1E+9	
10,100.00	9,340.00	10,277.12	9,478.08	34.86	35.49	468.83	468.83	401.66	67.78	6.917	0	< 1 in 1E+9	
10,200.00	9,340.00	10,377.11	9,478.27	35.04	35.63	467.71	467.71	400.57	68.14	6.864	0	< 1 in 1E+9	
10,300.00	9,340.00	10,477.10	9,478.29	35.30	35.88	466.59	466.59	399.64	68.95	6.767	0	< 1 in 1E+9	
10,400.00	9,340.00	10,577.10	9,478.31	35.63	36.21	465.46	465.46	398.18	69.30	6.717	0	< 1 in 1E+9	
10,500.00	9,340.00	10,677.09	9,478.33	36.03	36.62	464.36	464.36	394.27	70.09	6.625	0	< 1 in 1E+9	
10,600.00	9,340.00	10,777.08	9,478.34	36.50	37.10	463.24	463.24	392.23	71.01	6.524	0	< 1 in 1E+9	
10,700.00	9,340.00	10,877.08	9,478.36	37.05	37.64	462.13	462.13	390.07	72.06	6.413	0	< 1 in 1E+9	
10,800.00	9,340.00	10,977.07	9,478.36	37.65	38.25	461.01	461.01	387.78	73.23	6.295	0	< 1 in 1E+9	
10,900.00	9,340.00	11,077.06	9,478.40	38.32	38.92	459.90	459.90	385.39	74.52	6.171	0	< 1 in 1E+9	
11,000.00	9,340.00	11,177.06	9,478.41	39.04	39.65	458.78	458.78	382.89	75.92	6.043	0	< 1 in 1E+9	
11,100.00	9,340.00	11,277.05	9,478.43	39.82	40.44	457.67	457.67	380.24	77.42	5.911	0	< 1 in 1E+9	
11,200.00	9,340.00	11,377.04	9,478.45	40.65	41.27	456.55	456.55	377.53	79.03	5.777	0	< 1 in 1E+9	
11,300.00	9,340.00	11,477.03	9,478.47	41.54	42.15	455.44	455.44	374.72	80.72	5.642	0	< 1 in 1E+9	
11,400.00	9,340.00	11,577.03	9,478.46	42.47	43.08	454.33	454.33	371.83	82.50	5.507	0	< 1 in 1E+9	
11,500.00	9,340.00	11,677.02	9,478.50	43.44	44.05	453.21	453.21	368.85	84.36	5.373	0	< 1 in 1E+9	
11,600.00	9,340.00	11,777.01	9,478.52	44.45	45.05	452.10	452.10	365.80	86.30	5.239	0	< 1 in 1E+9	
11,700.00	9,340.00	11,877.01	9,478.53	45.50	46.10	450.99	450.99	362.68	88.31	5.107	0	< 1 in 1E+9	
11,800.00	9,340.00	11,977.00	9,478.55	46.58	47.19	449.88	449.88	359.50	90.38	4.978	0	< 1 in 1E+9	
11,900.00	9,340.00	12,076.99	9,478.57	47.69	48.29	448.76	448.76	356.25	92.51	4.851	0	< 1 in 1E+9	
12,000.00	9,340.00	12,176.99	9,478.59	48.84	49.43	447.65	447.65	352.95	94.70	4.727	0	< 1 in 1E+9	
12,100.00	9,340.00	12,276.98	9,478.60	50.01	50.60	446.54	446.54	349.60	96.94	4.606	0	< 1 in 1E+9	
12,200.00	9,340.00	12,376.97	9,478.62	51.21	51.80	445.43	445.43	346.20	99.23	4.489	0	< 1 in 1E+9	
12,300.00	9,340.00	12,476.97	9,478.64	52.44	53.02	444.33	444.33	342.75	101.57	4.374	0	< 1 in 1E+9	
12,400.00	9,340.00	12,576.96	9,478.66	53.68	54.26	443.21	443.21	339.26	103.95	4.264	0	< 1 in 1E+9	
12,500.00	9,340.00	12,676.95	9,478.67	54.95	55.52	442.10	442.10	335.73	106.37	4.156	0	< 1 in 1E+9	
12,600.00	9,340.00	12,776.95	9,478.69	56.24	56.80	440.99	440.99	332.17	108.82	4.052	0	< 1 in 1E+9	
12,700.00	9,340.00	12,876.94	9,478.71	57.55	58.10	439.89	439.89	328.57	111.31	3.952	0	< 1 in 1E+9	
12,800.00	9,340.00	12,976.93	9,478.73	58.87	59.42	438.77	438.77	324.94	113.83	3.855	0	< 1 in 1E+9	
12,900.00	9,340.00	13,076.92	9,478.74	60.21	60.76	437.66	437.66	321.28	116.38	3.761	0	< 1 in 1E+9	
13,000.00	9,340.00	13,176.92	9,478.76	61.57	62.11	436.55	436.55	317.60	118.96	3.670	0	< 1 in 1E+9	
13,100.00	9,340.00	13,276.91	9,478.78	62.94	63.47	435.45	435.45	313.88	121.56	3.582	0	< 1 in 1E+9	
13,200.00	9,340.00	13,376.90	9,478.80	64.32	64.84	434.34	434.34	310.15	124.19	3.497	0	< 1 in 1E+9	
13,300.00	9,340.00	13,476.90	9,478.81	65.71	66.23	433.23	433.23	306.40	126.84	3.416	0	< 1 in 1E+9	
13,400.00	9,340.00	13,576.89	9,478.83	67.13	67.63	432.12	432.12	302.62	129.50	3.337	0	< 1 in 1E+9	
13,500.00	9,340.00	13,676.88	9,478.85	68.54	69.04	431.02	431.02	298.82	132.19	3.261	0	< 1 in 1E+9	
13,600.00	9,340.00	13,776.88	9,478.87	69.96	70.47	429.91	429.91	295.01	134.90	3.187	0	< 1 in 1E+9	
13,700.00	9,340.00	13,876.87	9,478.86	71.40	71.90	428.81	428.81	291.16	137.65	3.116	0	< 1 in 1E+9	
13,800.00	9,340.00	13,976.86	9,478.88	72.85	73.34	427.70	427.70	287.34	140.36	3.047	0	< 1 in 1E+9	
13,900.00	9,340.00	14,076.86	9,478.92	74.30	74.78	426.59	426.59	283.48	143.11	2.981	0	< 1 in 1E+9	
14,000.00	9,340.00	14,176.85	9,478.94	75.76	76.24	425.49	425.49	279.61	145.88	2.917	0	< 1 in 1E+9	
14,100.00	9,340.00	14,276.84	9,478.95	77.23	77.71	424.39	424.39	275.73	148.66	2.855	0	< 1 in 1E+9	
14,200.00	9,340.00	14,376.83	9,478.97	78.71	79.19	423.28	423.28	271.83	151.45	2.795	0	< 1 in 1E+9	
14,300.00	9,340.00	14,476.83	9,478.99	80.19	80.68	422.18	422.18	267.92	154.25	2.737	0	< 1 in 1E+9	
14,371.34	9,340.00	14,548.31	9,479.00	81.28	81.84	421.42	421.42	265.24	156.17	2.698	0	< 1 in 1E+9	SF
14,400.00	9,340.00	14,548.31	9,479.00	81.68	81.84	422.39	422.39	266.30	156.09	2.706	0	< 1 in 1E+9	
14,499.41	9,340.00	14,548.31	9,479.00	83.17	81.84	440.45	440.45	284.35	156.10	2.822	0	< 1 in 1E+9	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

ocal Co-Ordinate Reference:	Well Goonch Fed Com 04 132H
VD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
D Reference:	GL 3014.5' + 25' KB @ 3039.50usft
orth Reference:	Grid
urvey Calculation Method:	Minimum Curvature
utput errors are at	2.00 sigma
atabase:	HED_Compass_DSN
ffset TVD Reference:	Offset Datum

Plan #1

Offset Site Error: 0.00 usft
Offset Well Error: 0.00 usft

Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Risked Separation Factor	Probability of Collision	Warning
			0	1 in 1E+9	
19.75	0.27	74.386	0	1 in 1E+9	
19.03	0.99	20.301	0	1 in 1E+9	
18.32	1.70	11.759	0	1 in 1E+9	
17.60	2.42	8.273	0	1 in 1E+9	
16.88	3.14	6.382	0	1 in 1E+9	
19.17	3.85	5.105	0	1 in 1E+9	
19.45	4.57	4.380	0	1 in 1E+9	
14.73	5.29	3.786	0	1 in 1E+9	
14.02	6.00	3.354	0	1 in 1E+9	
13.30	6.72	2.978	0	1 in 1E+9	
12.58	7.44	2.691	0	1 in 1E+9	
11.86	8.16	2.455	0	1 in 1E+9	
11.15	8.87	2.256	0	1 in 1E+9	
10.43	9.59	2.086	0	1 in 1E+9	
9.71	10.31	1.943	0	1 in 1E+9	
9.00	11.02	1.818	0	1 in 1E+9	
8.29	11.74	1.709	0	1 in 1E+9	
7.56	12.46	1.607	0	1 in 1E+9	
6.45	13.17	1.520	0	1 in 1E+9	
6.13	13.88	1.441	0	1 in 1E+9	Level 3
8.01	14.01	1.429	0	1 in 1E+9	Level 3
8.33	14.56	1.396	0	1 in 1E+9	Level 3
4.45	15.19	1.263	0	1 in 1E+9	Level 3
4.00	15.56	1.297	0	1 in 1E+9	Level 3, CC
3.81	15.80	1.241	0	1 in 1E+9	Level 2, ES, SF
4.01	16.41	1.244	0	1 in 1E+9	Level 2
5.66	17.02	1.330	0	1 in 1E+9	Level 3
8.16	17.69	1.518	0	1 in 1E+9	
14.12	18.48	1.765	0	1 in 1E+9	
19.71	19.24	2.024	0	1 in 1E+9	
25.05	20.04	2.260	0	1 in 1E+9	
31.61	20.84	2.529	0	1 in 1E+9	
38.10	21.66	2.759	0	1 in 1E+9	
44.46	22.49	2.976	0	1 in 1E+9	
50.93	23.33	3.183	0	1 in 1E+9	
57.42	24.18	3.374	0	1 in 1E+9	
63.93	25.04	3.553	0	1 in 1E+9	
70.48	25.91	3.720	0	1 in 1E+9	
77.03	26.78	3.876	0	1 in 1E+9	
83.60	27.66	4.022	0	1 in 1E+9	
90.18	28.55	4.159	0	1 in 1E+9	
96.77	29.44	4.287	0	1 in 1E+9	
103.38	30.34	4.407	0	1 in 1E+9	
109.99	31.24	4.520	0	1 in 1E+9	
116.59	32.15	4.626	0	1 in 1E+9	
123.18	33.06	4.726	0	1 in 1E+9	
129.76	33.97	4.820	0	1 in 1E+9	
136.37	34.89	4.909	0	1 in 1E+9	
142.97	35.81	4.993	0	1 in 1E+9	
149.58	36.73	5.072	0	1 in 1E+9	
156.19	37.66	5.149	0	1 in 1E+9	
162.79	38.58	5.219	0	1 in 1E+9	
169.40	39.51	5.287	0	1 in 1E+9	
176.01	40.45	5.352	0	1 in 1E+9	
182.62	41.38	5.413	0	1 in 1E+9	
189.23	42.32	5.471	0	1 in 1E+9	
195.84	43.26	5.527	0	1 in 1E+9	
202.44	44.20	5.580	0	1 in 1E+9	
209.05	45.14	5.631	0	1 in 1E+9	
215.66	46.08	5.680	0	1 in 1E+9	
222.27	47.03	5.728	0	1 in 1E+9	
228.88	47.97	5.771	0	1 in 1E+9	

nt, SF - min separation factor, ES - min ellipse separation

Company:	Novo Oil & Gas, LLC	Local Co-ordinate Reference:	Well Goonch Fed Com 04 132H
Project:	Eddy County, NM	TVD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
Reference Site:	SEC 4 - T23S - R28E	MD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
Site Error:	0.00	North Reference:	Grid
Reference Well:	Goonch Fed Com 04 132H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	HED_Compass_DSN
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design SEC 4 - T23S - R28E - Goonch Fed Com 04 212H - OH - Plan #1

Offset Site Error: 0.00 usft
Survey Program: 0-MWD Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Distance Between Centres (usft)	Distance Wall-Wall Distance (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Risked Separation Factor	Probability of Collision	Warning
6,100.00	6,019.14	6,095.32	6,004.78	24.89	24.56	284.49	284.49	236.48	48.02	5.814	0	1 in 1E+9	
6,200.00	6,116.89	6,195.03	6,102.31	25.07	25.06	291.96	291.96	242.99	48.97	5.854	0	1 in 1E+9	
6,300.00	6,214.77	6,294.75	6,199.85	25.56	25.53	299.52	299.52	249.70	49.82	5.894	0	1 in 1E+9	
6,400.00	6,312.58	6,394.48	6,297.39	26.03	26.01	307.07	307.07	256.30	50.77	5.932	0	1 in 1E+9	
6,500.00	6,410.40	6,494.17	6,394.92	26.53	26.49	314.63	314.63	261.91	52.72	5.968	0	1 in 1E+9	
6,600.00	6,508.21	6,593.89	6,492.45	26.98	26.97	322.19	322.19	268.52	53.67	6.003	0	1 in 1E+9	
6,700.00	6,606.03	6,693.60	6,589.98	27.46	27.45	329.75	329.75	275.12	54.63	6.038	0	1 in 1E+9	
6,800.00	6,703.84	6,793.31	6,687.52	27.94	27.93	337.31	337.31	281.73	55.58	6.069	0	1 in 1E+9	
6,900.00	6,801.66	6,893.03	6,785.05	28.42	28.41	344.87	344.87	288.33	56.54	6.100	0	1 in 1E+9	
6,953.00	6,853.50	6,945.87	6,836.74	28.68	28.66	348.86	348.86	291.83	57.04	6.116	0	1 in 1E+9	
7,000.00	6,899.53	6,992.74	6,882.59	28.90	28.89	352.26	352.26	294.89	57.49	6.130	0	1 in 1E+9	
7,100.00	6,998.01	7,092.44	6,980.11	29.38	29.37	359.53	359.53	301.13	58.41	6.156	0	1 in 1E+9	
7,200.00	7,097.03	7,192.00	7,077.50	29.78	29.65	366.34	366.34	307.05	59.29	6.179	0	1 in 1E+9	
7,300.00	7,196.45	7,291.78	7,175.07	30.17	30.13	372.96	372.96	312.84	60.12	6.204	0	1 in 1E+9	
7,400.00	7,296.20	7,391.00	7,272.61	30.53	30.51	378.99	378.99	318.04	60.92	6.221	0	1 in 1E+9	
7,500.00	7,396.13	7,490.76	7,370.08	30.87	31.28	383.97	383.97	322.32	61.65	6.228	0	1 in 1E+9	
7,563.00	7,449.12	7,543.68	7,433.86	31.03	31.48	386.22	386.22	324.22	62.00	6.229	0	1 in 1E+9	
7,600.00	7,496.12	7,583.00	7,467.89	31.15	31.68	387.98	387.98	325.68	62.30	6.228	0	1 in 1E+9	
7,700.00	7,596.12	7,682.84	7,567.24	31.44	32.06	390.88	390.88	327.96	62.91	6.213	0	1 in 1E+9	
7,800.00	7,696.12	7,783.49	7,662.09	31.72	32.41	392.47	392.47	329.66	62.81	6.179	0	1 in 1E+9	
7,900.00	7,796.12	7,807.03	7,796.22	32.00	32.72	392.75	392.75	329.67	63.08	6.159	0	1 in 1E+9	
8,000.00	7,896.12	8,007.03	7,890.22	32.29	33.00	392.75	392.75	328.10	64.66	6.074	0	1 in 1E+9	
8,100.00	7,996.12	8,107.03	7,988.22	32.57	33.29	392.75	392.75	327.53	65.23	6.021	0	1 in 1E+9	
8,200.00	8,096.12	8,207.03	8,086.22	32.85	33.58	392.75	392.75	326.96	65.80	5.968	0	1 in 1E+9	
8,300.00	8,196.12	8,307.03	8,184.22	33.13	33.84	392.75	392.75	326.37	66.38	5.917	0	1 in 1E+9	
8,400.00	8,296.12	8,407.03	8,282.22	33.44	34.13	392.75	392.75	325.79	66.96	5.865	0	1 in 1E+9	
8,500.00	8,396.12	8,507.03	8,380.22	33.73	34.42	392.75	392.75	325.21	67.54	5.815	0	1 in 1E+9	
8,600.00	8,496.12	8,607.03	8,478.22	34.03	34.70	392.75	392.75	324.63	68.13	5.765	0	1 in 1E+9	
8,700.00	8,596.12	8,707.03	8,576.22	34.33	34.98	392.75	392.75	324.04	68.72	5.716	0	1 in 1E+9	
8,800.00	8,696.12	8,807.03	8,674.22	34.62	35.26	392.75	392.75	323.45	69.31	5.667	0	1 in 1E+9	
8,900.00	8,796.12	8,907.03	8,772.22	34.91	35.56	392.75	392.75	322.85	69.90	5.619	0	1 in 1E+9	
8,968.41	8,863.84	8,973.44	8,839.64	35.11	35.77	392.75	392.75	322.46	70.29	5.587	0	1 in 1E+9	
8,976.00	8,871.12	8,981.03	8,847.22	35.14	35.79	392.76	392.76	322.47	70.34	5.583	0	1 in 1E+9	
9,000.00	8,896.10	9,007.00	8,873.20	35.21	35.87	392.79	392.79	322.51	70.48	5.573	0	1 in 1E+9	
9,025.00	8,920.98	9,031.68	8,897.88	35.27	35.94	392.86	392.86	322.59	70.60	5.565	0	1 in 1E+9	
9,050.00	8,945.70	9,056.50	8,922.80	35.32	36.01	393.05	393.05	322.68	70.69	5.560	0	1 in 1E+9	
9,075.00	8,970.19	9,081.09	8,947.29	35.37	36.09	393.33	393.33	322.98	70.77	5.556	0	1 in 1E+9	
9,100.00	8,994.39	9,105.59	8,971.49	35.41	36.19	393.78	393.78	323.55	70.83	5.560	0	1 in 1E+9	
9,125.00	9,018.22	9,131.03	8,995.25	35.44	36.29	394.39	394.39	324.33	70.85	5.566	0	1 in 1E+9	
9,150.00	9,041.63	9,157.35	9,018.45	35.46	36.39	395.11	395.11	325.24	70.87	5.575	0	1 in 1E+9	
9,175.00	9,064.55	9,184.09	9,041.05	35.48	36.36	395.95	395.95	326.08	70.86	5.587	0	1 in 1E+9	
9,200.00	9,086.92	9,211.29	9,063.06	35.49	36.41	396.89	396.89	326.85	70.83	5.603	0	1 in 1E+9	
9,225.00	9,108.67	9,238.97	9,084.49	35.50	36.45	397.92	397.92	327.74	70.77	5.623	0	1 in 1E+9	
9,250.00	9,129.74	9,267.14	9,105.25	35.50	36.49	399.03	399.03	328.74	70.69	5.645	0	1 in 1E+9	
9,275.00	9,150.08	9,295.82	9,125.32	35.49	36.52	400.21	400.21	329.83	70.58	5.671	0	1 in 1E+9	
9,300.00	9,169.64	9,324.99	9,144.68	35.48	36.54	401.44	401.44	331.00	70.44	5.699	0	1 in 1E+9	
9,325.00	9,188.39	9,354.65	9,163.31	35.47	36.55	402.71	402.71	332.45	70.26	5.731	0	1 in 1E+9	
9,350.00	9,206.17	9,384.80	9,181.15	35.45	36.55	404.00	404.00	333.94	70.07	5.768	0	1 in 1E+9	
9,375.00	9,223.05	9,415.63	9,198.26	35.42	36.54	405.30	405.30	335.46	69.84	5.803	0	1 in 1E+9	
9,400.00	9,238.94	9,446.86	9,214.65	35.39	36.53	406.59	406.59	336.99	69.60	5.842	0	1 in 1E+9	
9,425.00	9,253.80	9,478.60	9,230.37	35.36	36.50	407.84	407.84	338.51	69.33	5.883	0	1 in 1E+9	
9,450.00	9,267.58	9,510.81	9,245.62	35.33	36.47	409.04	409.04	340.00	69.05	5.924	0	1 in 1E+9	
9,475.00	9,280.29	9,543.48	9,260.43	35.29	36.43	410.18	410.18	341.42	68.76	5.965	0	1 in 1E+9	
9,500.00	9,291.79	9,576.57	9,274.80	35.25	36.38	411.22	411.22	342.75	68.47	6.006	0	1 in 1E+9	
9,525.00	9,302.14	9,610.06	9,288.76	35.21	36.33	412.17	412.17	343.97	68.19	6.044	0	1 in 1E+9	
9,550.00	9,311.29	9,643.89	9,302.33	35.17	36.27	413.00	413.00	345.06	67.94	6.078	0	1 in 1E+9	
9,575.00	9,319.21	9,678.02	9,315.44	35.13	36.21	413.69	413.69	345.99	67.70	6.110	0	1 in 1E+9	
9,600.00	9,325.88	9,712.40	9,328.08	35.09	36.14	414.24	414.24	346.73	67.51	6.136	0	1 in 1E+9	
9,625.00	9,331.28	9,746.96	9,340.26	35.04	36.07	414.64	414.64	347.28	67.35	6.156	0	1 in 1E+9	
9,650.00	9,335.39	9,781.63	9,352.04	35.00	36.00	414.88	414.88	347.64	67.24	6.170	0	1 in 1E+9	
9,675.00	9,338.21	9,816.39	9,363.44	34.95	35.93	414.95	414.95	347.77	67.18	6.177	0	1 in 1E+9	
9,700.00	9,339.72	9,851.13	9,374.52	34.90	35.88	414.88	414.88	347.69	67.17	6.178	0	1 in 1E+9	
9,709.20	9,339.95	9,864.14	9,379.55	34.88	35.84	414.83	414.83	347.69	67.15	6.178	0	1 in 1E+9	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

ocal Co-ordinate Reference:	Well Goonch Fed Com 04 132H
VD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
D Reference:	GL 3014.5' + 25' KB @ 3039.50usft
orth Reference:	Grid
urvey Calculation Method:	Minimum Curvature
utput errors are at	2.00 sigma
atabase:	HED_Compass_DSN
ffset TVD Reference:	Offset Datum

Plan #1

Offset Site Error: 0.00 usft
Offset Well Error: 0.00 usft

Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Revised Separation Factor	Probability of Collision	Warning
347.79	67.13	6.182	0	< 1 in 1E+9	
348.39	68.90	6.209	0	< 1 in 1E+9	
348.99	68.76	6.238	0	< 1 in 1E+9	
349.48	68.76	6.235	0	< 1 in 1E+9	
349.82	68.92	6.277	0	< 1 in 1E+9	
350.01	67.72	6.207	0	< 1 in 1E+9	
350.07	67.67	6.173	0	< 1 in 1E+9	
349.69	68.25	6.127	0	< 1 in 1E+9	
349.78	68.09	6.070	0	< 1 in 1E+9	
349.44	68.64	6.003	0	< 1 in 1E+9	
349.97	70.83	5.957	0	< 1 in 1E+9	
348.40	71.93	5.844	0	< 1 in 1E+9	
347.71	73.15	5.753	0	< 1 in 1E+9	
346.91	74.47	5.658	0	< 1 in 1E+9	
346.02	75.90	5.559	0	< 1 in 1E+9	
345.04	77.42	5.457	0	< 1 in 1E+9	
343.97	79.03	5.352	0	< 1 in 1E+9	
342.83	80.73	5.247	0	< 1 in 1E+9	
341.61	82.50	5.141	0	< 1 in 1E+9	
340.32	84.34	5.035	0	< 1 in 1E+9	
338.97	86.25	4.930	0	< 1 in 1E+9	
337.57	88.23	4.826	0	< 1 in 1E+9	
336.10	90.25	4.724	0	< 1 in 1E+9	
334.60	92.34	4.624	0	< 1 in 1E+9	
333.04	94.48	4.526	0	< 1 in 1E+9	
331.45	96.64	4.430	0	< 1 in 1E+9	
329.81	98.85	4.336	0	< 1 in 1E+9	
328.13	101.11	4.245	0	< 1 in 1E+9	
326.45	103.39	4.157	0	< 1 in 1E+9	
324.73	105.72	4.072	0	< 1 in 1E+9	
322.97	108.06	3.989	0	< 1 in 1E+9	
321.20	110.44	3.908	0	< 1 in 1E+9	
319.40	112.84	3.831	0	< 1 in 1E+9	
317.59	115.27	3.755	0	< 1 in 1E+9	
315.76	117.71	3.682	0	< 1 in 1E+9	
313.91	120.18	3.612	0	< 1 in 1E+9	
312.05	122.66	3.544	0	< 1 in 1E+9	
310.17	125.16	3.478	0	< 1 in 1E+9	
308.29	127.67	3.415	0	< 1 in 1E+9	
306.39	130.19	3.353	0	< 1 in 1E+9	
304.49	132.73	3.294	0	< 1 in 1E+9	
302.58	135.28	3.237	0	< 1 in 1E+9	
300.66	137.84	3.181	0	< 1 in 1E+9	
298.73	140.41	3.128	0	< 1 in 1E+9	
296.81	142.98	3.078	0	< 1 in 1E+9	
294.87	145.57	3.029	0	< 1 in 1E+9	
292.94	148.15	2.979	0	< 1 in 1E+9	
291.22	150.54	2.935	0	< 1 in 1E+9	
289.94	147.72	3.085	0	< 1 in 1E+9	

Int: SF - min separation factor, ES - min ellipse separation

Company:	Novo Oil & Gas, LLC	Local Co-ordinate Reference:	Well Goonch Fed Com 04 132H
Project:	Eddy County, NM	TVD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
Reference Site:	SEC 4 - T23S - R28E	MD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
Site Error:	0.00	North Reference:	Grid
Reference Well:	Goonch Fed Com 04 132H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	HED_Compass_DSN
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design | SEC 4 - T23S - R28E - Goonch Fed Com 04 221H - OH - Plan #1

Offset Site Error: 0.00 usft
Survey Program: 0-MWD | Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre (usft)	Distance Ctr-Ctr (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Revised Separation Factor	Probability of Collision	Warning
0.00	0.00	0.00	0.00	0.00	0.00	205.40		205.40				0	< 1 in 1E+9	
100.00	100.00	99.00	99.00	0.13	0.13	205.40		205.40	205.13	0.03	767.824	0	< 1 in 1E+9	
200.00	200.00	199.00	199.00	0.49	0.49	205.40		205.40	204.42	0.98	209.129	0	< 1 in 1E+9	
300.00	300.00	299.00	299.00	0.85	0.85	205.40		205.40	203.70	1.70	120.884	0	< 1 in 1E+9	
400.00	400.00	399.00	399.00	1.21	1.21	205.40		205.40	202.98	2.42	85.013	0	< 1 in 1E+9	
500.00	500.00	499.00	499.00	1.57	1.56	205.40		205.40	202.27	3.13	65.559	0	< 1 in 1E+9	
600.00	600.00	599.00	599.00	1.93	1.92	205.40		205.40	201.55	3.85	53.351	0	< 1 in 1E+9	
700.00	700.00	699.00	699.00	2.29	2.28	205.40		205.40	200.83	4.57	44.976	0	< 1 in 1E+9	
800.00	800.00	799.00	799.00	2.64	2.64	205.40		205.40	200.12	5.28	38.973	0	< 1 in 1E+9	
900.00	900.00	899.00	899.00	3.00	3.00	205.40		205.40	199.40	6.00	34.220	0	< 1 in 1E+9	
1,000.00	1,000.00	999.00	999.00	3.36	3.36	205.40		205.40	198.68	6.72	30.576	0	< 1 in 1E+9	
1,100.00	1,100.00	1,099.00	1,099.00	3.72	3.72	205.40		205.40	197.97	7.43	27.627	0	< 1 in 1E+9	
1,200.00	1,200.00	1,199.00	1,199.00	4.08	4.07	205.40		205.40	197.25	8.15	25.197	0	< 1 in 1E+9	
1,300.00	1,300.00	1,299.00	1,299.00	4.44	4.43	205.40		205.40	196.53	8.87	23.160	0	< 1 in 1E+9	
1,400.00	1,400.00	1,399.00	1,399.00	4.79	4.79	205.40		205.40	195.81	9.59	21.429	0	< 1 in 1E+9	
1,500.00	1,500.00	1,499.00	1,499.00	5.15	5.15	205.40		205.40	195.10	10.30	19.937	0	< 1 in 1E+9	
1,600.00	1,600.00	1,599.00	1,599.00	5.51	5.51	205.40		205.40	194.38	11.02	18.640	0	< 1 in 1E+9	
1,700.00	1,700.00	1,699.00	1,699.00	5.87	5.87	205.40		205.40	193.66	11.74	17.501	0	< 1 in 1E+9	
1,800.00	1,800.00	1,799.00	1,799.00	6.23	6.23	205.40		205.40	192.95	12.45	16.494	0	< 1 in 1E+9	
1,900.00	1,900.00	1,899.00	1,899.00	6.59	6.58	205.40		205.40	192.23	13.17	15.598	0	< 1 in 1E+9	
2,000.00	2,000.00	1,999.00	1,999.00	6.95	6.94	205.40		205.40	191.51	13.89	14.791	0	< 1 in 1E+9	CC, ES
2,100.00	2,099.98	2,094.22	2,094.20	7.29	7.27	209.18		209.18	191.63	14.59	14.171	0	< 1 in 1E+9	
2,200.00	2,199.84	2,189.34	2,189.20	7.61	7.58	226.57		209.57	193.39	15.17	13.745	0	< 1 in 1E+9	
2,300.00	2,299.45	2,284.37	2,283.90	7.94	7.90	212.59		212.59	196.79	15.80	13.456	0	< 1 in 1E+9	
2,400.00	2,398.70	2,379.26	2,378.15	8.27	8.21	218.28		218.28	201.83	16.45	13.269	0	< 1 in 1E+9	
2,500.00	2,497.47	2,473.97	2,471.91	8.61	8.54	225.61		225.61	208.59	17.06	13.224	0	< 1 in 1E+9	
2,600.00	2,595.61	2,568.44	2,564.72	8.97	8.88	234.67		234.67	216.98	17.71	13.256	0	< 1 in 1E+9	
2,700.00	2,693.44	2,669.00	2,660.27	9.34	9.24	245.24		245.24	226.83	18.42	13.310	0	< 1 in 1E+9	
2,800.00	2,791.25	2,765.41	2,757.42	9.72	9.61	256.02		256.02	236.96	19.06	13.502	0	< 1 in 1E+9	
2,900.00	2,889.07	2,864.72	2,854.56	10.10	10.00	266.87		266.87	246.94	19.93	13.388	0	< 1 in 1E+9	
3,000.00	2,986.88	2,964.04	2,951.71	10.50	10.39	277.79		277.79	257.06	20.71	13.416	0	< 1 in 1E+9	
3,100.00	3,084.70	3,063.36	3,048.85	10.91	10.80	288.76		288.76	267.26	21.50	13.431	0	< 1 in 1E+9	
3,200.00	3,182.51	3,162.67	3,146.00	11.32	11.21	299.79		299.79	277.48	22.31	13.439	0	< 1 in 1E+9	
3,300.00	3,280.33	3,261.99	3,243.15	11.74	11.62	310.87		310.87	287.74	23.13	13.441	0	< 1 in 1E+9	
3,400.00	3,378.14	3,361.31	3,340.29	12.16	12.05	321.98		321.98	298.03	23.96	13.439	0	< 1 in 1E+9	
3,500.00	3,475.96	3,460.62	3,437.44	12.59	12.47	333.14		333.14	308.34	24.80	13.434	0	< 1 in 1E+9	
3,600.00	3,573.77	3,559.94	3,534.58	13.02	12.90	344.33		344.33	318.68	25.65	13.425	0	< 1 in 1E+9	
3,700.00	3,671.59	3,659.26	3,631.73	13.46	13.34	355.55		355.55	329.04	26.51	13.414	0	< 1 in 1E+9	
3,800.00	3,769.40	3,758.57	3,728.88	13.90	13.78	366.80		366.80	339.43	27.37	13.401	0	< 1 in 1E+9	
3,900.00	3,867.22	3,857.89	3,826.03	14.35	14.22	378.07		378.07	349.83	28.24	13.387	0	< 1 in 1E+9	
4,000.00	3,965.03	3,957.21	3,923.17	14.80	14.66	389.37		389.37	360.25	29.12	13.372	0	< 1 in 1E+9	
4,100.00	4,062.84	4,056.52	4,020.32	15.25	15.11	400.69		400.69	370.69	30.00	13.355	0	< 1 in 1E+9	
4,200.00	4,160.66	4,155.84	4,117.46	15.70	15.56	412.03		412.03	381.14	30.89	13.338	0	< 1 in 1E+9	
4,300.00	4,258.47	4,255.16	4,214.61	16.15	16.02	423.39		423.39	391.60	31.78	13.321	0	< 1 in 1E+9	
4,400.00	4,356.29	4,354.47	4,311.76	16.61	16.47	434.76		434.76	402.08	32.68	13.303	0	< 1 in 1E+9	
4,500.00	4,454.10	4,453.79	4,408.90	17.07	16.93	446.15		446.15	412.57	33.58	13.285	0	< 1 in 1E+9	
4,600.00	4,551.92	4,553.10	4,506.05	17.53	17.39	457.55		457.55	423.07	34.48	13.266	0	< 1 in 1E+9	
4,700.00	4,649.73	4,652.42	4,603.19	17.99	17.85	468.97		468.97	433.58	35.38	13.248	0	< 1 in 1E+9	
4,800.00	4,747.55	4,751.74	4,700.34	18.46	18.31	480.40		480.40	444.09	36.31	13.232	0	< 1 in 1E+9	
4,900.00	4,845.36	4,851.05	4,797.49	18.92	18.77	491.84		491.84	454.62	37.22	13.215	0	< 1 in 1E+9	
5,000.00	4,943.18	4,950.37	4,894.63	19.39	19.24	503.29		503.29	465.15	38.14	13.197	0	< 1 in 1E+9	
5,100.00	5,040.99	5,049.69	4,991.78	19.86	19.70	514.75		514.75	475.70	39.06	13.180	0	< 1 in 1E+9	
5,200.00	5,138.81	5,149.00	5,088.93	20.33	20.17	526.22		526.22	486.24	39.98	13.163	0	< 1 in 1E+9	
5,300.00	5,236.62	5,248.32	5,186.07	20.80	20.64	537.70		537.70	496.80	40.90	13.147	0	< 1 in 1E+9	
5,400.00	5,334.44	5,347.64	5,283.22	21.27	21.11	549.19		549.19	507.38	41.83	13.130	0	< 1 in 1E+9	
5,500.00	5,432.25	5,446.95	5,380.36	21.74	21.58	560.68		560.68	517.93	42.75	13.114	0	< 1 in 1E+9	
5,600.00	5,530.07	5,546.27	5,477.51	22.21	22.05	572.18		572.18	528.50	43.68	13.099	0	< 1 in 1E+9	
5,700.00	5,627.88	5,645.59	5,574.66	22.69	22.52	583.69		583.69	539.08	44.61	13.083	0	< 1 in 1E+9	
5,800.00	5,725.70	5,744.90	5,671.80	23.16	22.99	595.21		595.21	549.68	45.55	13.068	0	< 1 in 1E+9	
5,900.00	5,823.51	5,844.22	5,768.95	23.64	23.46	606.73		606.73	560.29	46.48	13.054	0	< 1 in 1E+9	
6,000.00	5,921.33	5,943.54	5,866.09	24.12	23.94	618.25		618.25	570.84	47.41	13.039	0	< 1 in 1E+9	
6,100.00	6,019.14	6,042.85	5,963.24	24.59	24.41	629.79		629.79	581.44	48.35	13.025	0	< 1 in 1E+9	
6,200.00	6,116.95	6,142.17	6,060.39	25.07	24.89	641.32		641.32	592.03	49.29	13.012	0	< 1 in 1E+9	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

cal Co-ordinate Reference:	Well Goonch Fed Com 04 132H
VD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
D Reference:	GL 3014.5' + 25' KB @ 3039.50usft
rth Reference:	Grid
rvey Calculation Method:	Minimum Curvature
tput errors are at	2.00 sigma
tabase:	HED_Compass_DSN
set TVD Reference:	Offset Datum

Plan #1

Offset Site Error: 0.00 usft
Offset Well Error: 0.00 usft

Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Ris Sep Fac	Probability of Collision	Warning
602.64	50.23	12.998	0	< 1 in 1E+9	
613.24	51.17	12.985	0	< 1 in 1E+9	
623.85	52.11	12.973	0	< 1 in 1E+9	
634.47	53.05	12.960	0	< 1 in 1E+9	
645.09	53.99	12.948	0	< 1 in 1E+9	
655.70	54.93	12.936	0	< 1 in 1E+9	
666.32	55.86	12.924	0	< 1 in 1E+9	
676.95	56.80	12.912	0	< 1 in 1E+9	
687.56	57.73	12.901	0	< 1 in 1E+9	
698.17	58.66	12.890	0	< 1 in 1E+9	
708.78	59.59	12.880	0	< 1 in 1E+9	
719.39	60.52	12.870	0	< 1 in 1E+9	
729.99	61.45	12.860	0	< 1 in 1E+9	
740.59	62.38	12.851	0	< 1 in 1E+9	
751.19	63.31	12.842	0	< 1 in 1E+9	
761.79	64.24	12.833	0	< 1 in 1E+9	
772.39	65.17	12.824	0	< 1 in 1E+9	
782.84	66.09	12.816	0	< 1 in 1E+9	
791.12	65.76	13.031	0	< 1 in 1E+9	
797.22	66.49	12.990	0	< 1 in 1E+9	
800.99	67.19	12.921	0	< 1 in 1E+9	
802.03	67.84	12.827	0	< 1 in 1E+9	
801.94	68.43	12.716	0	< 1 in 1E+9	
801.26	69.01	12.611	0	< 1 in 1E+9	
800.68	69.60	12.504	0	< 1 in 1E+9	
800.09	70.19	12.400	0	< 1 in 1E+9	
799.70	70.56	12.331	0	< 1 in 1E+9	
799.69	70.63	12.322	0	< 1 in 1E+9	
799.50	70.76	12.300	0	< 1 in 1E+9	
799.63	70.88	12.291	0	< 1 in 1E+9	
799.80	70.99	12.297	0	< 1 in 1E+9	
800.09	71.07	12.287	0	< 1 in 1E+9	
800.94	71.16	12.282	0	< 1 in 1E+9	
801.17	71.20	12.252	0	< 1 in 1E+9	
802.01	71.24	12.257	0	< 1 in 1E+9	
803.09	71.27	12.269	0	< 1 in 1E+9	
804.45	71.28	12.286	0	< 1 in 1E+9	
806.14	71.27	12.311	0	< 1 in 1E+9	
808.16	71.24	12.344	0	< 1 in 1E+9	
810.64	71.20	12.385	0	< 1 in 1E+9	
813.63	71.15	12.435	0	< 1 in 1E+9	
818.02	71.09	12.504	0	< 1 in 1E+9	
820.87	70.99	12.562	0	< 1 in 1E+9	
825.10	70.88	12.641	0	< 1 in 1E+9	
829.62	70.73	12.730	0	< 1 in 1E+9	
834.34	70.52	12.831	0	< 1 in 1E+9	
839.17	70.25	12.945	0	< 1 in 1E+9	
844.04	69.89	13.076	0	< 1 in 1E+9	
848.78	69.44	13.224	0	< 1 in 1E+9	
853.29	68.87	13.389	0	< 1 in 1E+9	
857.17	68.23	13.562	0	< 1 in 1E+9	
860.21	67.60	13.729	0	< 1 in 1E+9	
861.98	67.16	13.834	0	< 1 in 1E+9	
862.93	66.89	13.894	0	< 1 in 1E+9	
861.07	66.92	13.858	0	< 1 in 1E+9	
858.70	66.93	13.846	0	< 1 in 1E+9	
858.89	66.66	13.841	0	< 1 in 1E+9	
858.57	66.64	13.845	0	< 1 in 1E+9	
857.65	66.65	13.828	0	< 1 in 1E+9	
856.45	66.55	13.809	0	< 1 in 1E+9	

nt, SF - min separation factor, ES - min ellipse separation

Company:	Novo Oil & Gas, LLC
Project:	Eddy County, NM
Reference Site:	SEC 4 - T23S - R28E
Site Error:	0.00
Reference Well:	Goonch Fed Com 04 132H
Well Error:	0.00
Reference Wellbore	OH
Reference Design:	Plan #1

Local Co-ordinate Reference:	Well Goonch Fed Com 04 132H
TVD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
MD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
North Reference:	Grid
Survey Calculation Method:	Minimum Curvature
Output errors are at	2.00 sigma
Database:	HED_Compass_DSN
Offset TVD Reference:	Offset Datum

Offset Design SEC 4 - T23S - R28E - Goonch Fed Com 04 221H - OH - Plan #1

Offset Site Error: 0.00 usft
Survey Program: 0-MWD Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Between Centres (usft)	Distance Well-Well Distance (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Risked Separation Factor	Probability of Collision	Warning
10,000.00	9,340.00	10,400.38	9,679.24	34.75	36.92	921.64	921.64	855.04	66.60	13.838	0	< 1 in 1E+9	
10,100.00	9,340.00	10,500.37	9,679.26	34.66	36.88	870.31	920.31	853.51	66.80	13.777	0	< 1 in 1E+9	
10,200.00	9,340.00	10,600.36	9,679.28	35.04	36.93	918.98	918.98	851.84	67.14	13.687	0	< 1 in 1E+9	
10,300.00	9,340.00	10,700.35	9,679.29	35.30	37.01	917.65	917.65	850.03	67.62	13.570	0	< 1 in 1E+9	
10,400.00	9,340.00	10,800.34	9,679.31	35.63	37.25	916.32	916.32	848.07	68.24	13.427	0	< 1 in 1E+9	
10,500.00	9,340.00	10,900.33	9,679.33	36.03	37.61	914.99	914.99	845.99	69.00	13.261	0	< 1 in 1E+9	
10,600.00	9,340.00	11,000.32	9,679.35	36.50	38.06	913.66	913.66	843.78	69.88	13.074	0	< 1 in 1E+9	
10,700.00	9,340.00	11,100.31	9,679.36	37.05	38.60	912.33	912.33	841.43	70.90	12.868	0	< 1 in 1E+9	
10,800.00	9,340.00	11,200.30	9,679.38	37.65	39.22	911.00	911.00	838.97	72.03	12.647	0	< 1 in 1E+9	
10,900.00	9,340.00	11,300.29	9,679.40	38.32	39.89	909.67	909.67	836.40	73.28	12.414	0	< 1 in 1E+9	
11,000.00	9,340.00	11,400.28	9,679.42	39.04	40.62	908.35	908.35	833.72	74.63	12.171	0	< 1 in 1E+9	
11,100.00	9,340.00	11,500.27	9,679.43	39.83	41.41	907.02	907.02	830.93	76.09	11.921	0	< 1 in 1E+9	
11,200.00	9,340.00	11,600.26	9,679.45	40.68	42.24	905.69	905.69	828.05	77.64	11.665	0	< 1 in 1E+9	
11,300.00	9,340.00	11,700.25	9,679.47	41.54	43.12	904.37	904.37	825.06	79.28	11.407	0	< 1 in 1E+9	
11,400.00	9,340.00	11,800.24	9,679.49	42.47	44.04	903.04	903.04	822.03	81.01	11.147	0	< 1 in 1E+9	
11,500.00	9,340.00	11,900.23	9,679.50	43.44	45.00	901.71	901.71	818.89	82.82	10.888	0	< 1 in 1E+9	
11,600.00	9,340.00	12,000.22	9,679.52	44.45	46.00	900.39	900.39	815.69	84.70	10.630	0	< 1 in 1E+9	
11,700.00	9,340.00	12,100.21	9,679.54	45.50	47.04	899.06	899.06	812.41	86.65	10.375	0	< 1 in 1E+9	
11,800.00	9,340.00	12,200.20	9,679.55	46.56	48.11	897.74	897.74	809.07	88.67	10.124	0	< 1 in 1E+9	
11,900.00	9,340.00	12,300.19	9,679.57	47.69	49.21	896.41	896.41	805.67	90.75	9.878	0	< 1 in 1E+9	
12,000.00	9,340.00	12,400.18	9,679.59	48.84	50.34	895.09	895.09	802.21	92.88	9.637	0	< 1 in 1E+9	
12,100.00	9,340.00	12,500.17	9,679.61	50.01	51.49	893.76	893.76	798.70	95.06	9.402	0	< 1 in 1E+9	
12,200.00	9,340.00	12,600.16	9,679.62	51.21	52.68	892.44	892.44	795.14	97.30	9.172	0	< 1 in 1E+9	
12,300.00	9,340.00	12,700.14	9,679.64	52.44	53.88	891.12	891.12	791.54	99.58	8.949	0	< 1 in 1E+9	
12,400.00	9,340.00	12,800.13	9,679.66	53.68	55.11	889.79	889.79	787.90	101.89	8.732	0	< 1 in 1E+9	
12,500.00	9,340.00	12,900.12	9,679.68	54.95	56.36	888.47	888.47	784.22	104.26	8.522	0	< 1 in 1E+9	
12,600.00	9,340.00	13,000.11	9,679.69	56.24	57.63	887.15	887.15	780.50	106.65	8.318	0	< 1 in 1E+9	
12,700.00	9,340.00	13,100.10	9,679.71	57.55	58.91	885.83	885.83	776.75	109.08	8.121	0	< 1 in 1E+9	
12,800.00	9,340.00	13,200.09	9,679.73	58.87	60.22	884.51	884.51	772.96	111.54	7.930	0	< 1 in 1E+9	
12,900.00	9,340.00	13,300.08	9,679.75	60.21	61.54	883.19	883.19	769.15	114.03	7.745	0	< 1 in 1E+9	
13,000.00	9,340.00	13,400.07	9,679.76	61.57	62.87	881.87	881.87	765.31	116.55	7.566	0	< 1 in 1E+9	
13,100.00	9,340.00	13,500.06	9,679.78	62.94	64.22	880.55	880.55	761.45	119.09	7.394	0	< 1 in 1E+9	
13,200.00	9,340.00	13,600.05	9,679.80	64.32	65.58	879.23	879.23	757.56	121.66	7.227	0	< 1 in 1E+9	
13,300.00	9,340.00	13,700.04	9,679.82	65.71	66.95	877.91	877.91	753.65	124.25	7.066	0	< 1 in 1E+9	
13,400.00	9,340.00	13,800.03	9,679.83	67.12	68.35	876.59	876.59	749.73	126.86	6.910	0	< 1 in 1E+9	
13,500.00	9,340.00	13,900.02	9,679.85	68.54	69.74	875.27	875.27	745.79	129.48	6.759	0	< 1 in 1E+9	
13,600.00	9,340.00	14,000.01	9,679.87	69.99	71.19	873.95	873.95	741.81	132.14	6.614	0	< 1 in 1E+9	
13,700.00	9,340.00	14,100.00	9,679.89	71.46	72.67	872.63	872.63	737.83	134.80	6.473	0	< 1 in 1E+9	
13,800.00	9,340.00	14,199.99	9,679.90	72.95	74.00	871.31	871.31	733.83	137.49	6.338	0	< 1 in 1E+9	
13,900.00	9,340.00	14,299.98	9,679.92	74.30	75.44	870.00	870.00	729.82	140.18	6.206	0	< 1 in 1E+9	
14,000.00	9,340.00	14,399.97	9,679.94	75.79	76.88	868.68	868.68	725.79	142.89	6.079	0	< 1 in 1E+9	
14,100.00	9,340.00	14,499.96	9,679.96	77.23	78.33	867.36	867.36	721.75	145.61	5.957	0	< 1 in 1E+9	
14,200.00	9,340.00	14,599.95	9,679.97	78.71	79.79	866.05	866.05	717.70	148.34	5.838	0	< 1 in 1E+9	
14,300.00	9,340.00	14,699.94	9,679.99	80.19	81.26	864.73	864.73	713.64	151.09	5.723	0	< 1 in 1E+9	
14,393.29	9,340.00	14,781.85	9,680.00	81.14	82.03	863.97	863.97	711.29	152.68	5.659	0	< 1 in 1E+9	
14,400.00	9,340.00	14,781.86	9,680.00	81.58	82.03	864.75	864.75	711.69	153.06	5.650	0	< 1 in 1E+9	SF,
14,499.41	9,340.00	14,781.86	9,680.00	81.17	82.03	874.63	874.63	721.63	153.00	5.718	0	< 1 in 1E+9	

CC - Min centre to center distance or covergant point, SF - min separation factor, ES - min ellipse separation

ocal Co-ordinate Reference:	Well Goonch Fed Com 04 132H
VD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
D Reference:	GL 3014.5' + 25' KB @ 3039.50usft
orth Reference:	Grid
urvey Calculation Method:	Minimum Curvature
utput errors are at	2.00 sigma
atabase:	HED_Compass_DSN
ffset TVD Reference:	Offset Datum

Plan #1

Offset Site Error: 0.00 usft
Offset Well Error: 0.00 usft

Distance ll e	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Risked Separation Factor	Probability of Collision	Warning
.03				0	< 1 in 1E+9	
02	39.75	0.27	149.386	0	< 1 in 1E+9	
02	39.04	0.98	40.703	0	< 1 in 1E+9	
02	38.32	1.70	23.539	0	< 1 in 1E+9	
02	37.61	2.42	16.558	0	< 1 in 1E+9	
02	36.89	3.13	12.770	0	< 1 in 1E+9	
02	36.17	3.85	10.393	0	< 1 in 1E+9	
02	35.45	4.57	8.761	0	< 1 in 1E+9	
02	34.74	5.29	7.573	0	< 1 in 1E+9	
02	34.02	6.00	6.668	0	< 1 in 1E+9	
02	33.30	6.72	5.957	0	< 1 in 1E+9	
02	32.59	7.44	5.382	0	< 1 in 1E+9	
02	31.87	8.15	4.909	0	< 1 in 1E+9	
02	31.15	8.87	4.512	0	< 1 in 1E+9	
02	30.44	9.59	4.175	0	< 1 in 1E+9	
02	29.72	10.30	3.884	0	< 1 in 1E+9	
02	29.00	11.02	3.632	0	< 1 in 1E+9	
02	28.29	11.74	3.410	0	< 1 in 1E+9	
02	27.57	12.45	3.214	0	< 1 in 1E+9	
02	26.85	13.17	3.039	0	< 1 in 1E+9	
02	26.13	13.89	2.882	0	< 1 in 1E+9	
97	25.42	14.56	2.746	0	< 1 in 1E+9	
87	24.69	15.18	2.627	0	< 1 in 1E+9	
72	23.93	15.79	2.515	0	< 1 in 1E+9	
52	23.13	16.39	2.411	0	< 1 in 1E+9	
28	22.30	16.98	2.314	0	< 1 in 1E+9	
00	21.45	17.55	2.222	0	< 1 in 1E+9	
09	21.39	17.60	2.215	0	< 1 in 1E+9	CC
01	20.78	18.23	2.141	0	< 1 in 1E+9	
05	20.14	18.91	2.065	0	< 1 in 1E+9	
10	19.50	19.60	1.995	0	< 1 in 1E+9	
18	18.88	20.30	1.929	0	< 1 in 1E+9	
23	18.23	21.00	1.868	0	< 1 in 1E+9	
32	17.61	21.72	1.811	0	< 1 in 1E+9	
42	16.99	22.44	1.757	0	< 1 in 1E+9	
54	16.38	23.16	1.707	0	< 1 in 1E+9	
67	15.77	23.89	1.660	0	< 1 in 1E+9	
81	15.18	24.63	1.616	0	< 1 in 1E+9	
96	14.59	25.37	1.575	0	< 1 in 1E+9	
13	14.00	26.13	1.536	0	< 1 in 1E+9	
30	13.42	26.88	1.499	0	< 1 in 1E+9	Level 3
50	12.85	27.65	1.465	0	< 1 in 1E+9	Level 3
70	12.28	28.42	1.432	0	< 1 in 1E+9	Level 3
91	11.72	29.19	1.401	0	< 1 in 1E+9	Level 3
14	11.16	29.98	1.372	0	< 1 in 1E+9	Level 3
38	10.61	30.77	1.345	0	< 1 in 1E+9	Level 3
33	10.08	31.56	1.319	0	< 1 in 1E+9	Level 3
89	9.52	32.37	1.294	0	< 1 in 1E+9	Level 3
19	8.98	33.18	1.271	0	< 1 in 1E+9	Level 3
44	8.45	33.99	1.248	0	< 1 in 1E+9	Level 2
73	7.92	34.81	1.227	0	< 1 in 1E+9	Level 2
33	7.39	35.64	1.207	0	< 1 in 1E+9	Level 2
34	6.87	36.48	1.188	0	< 1 in 1E+9	Level 2
57	6.35	37.32	1.170	0	< 1 in 1E+9	Level 2
30	5.83	38.17	1.153	0	< 1 in 1E+9	Level 2
34	5.32	39.02	1.136	0	< 1 in 1E+9	Level 2
30	4.81	39.88	1.120	0	< 1 in 1E+9	Level 2
15	4.30	40.75	1.105	0	< 1 in 1E+9	Level 2
12	3.79	41.62	1.091	0	< 1 in 1E+9	Level 2
19	3.29	42.50	1.077	0	< 1 in 1E+9	Level 2
9	2.80	43.38	1.064	0	< 1 in 1E+9	Level 2
17	2.30	44.27	1.052	0	< 1 in 1E+9	Level 2
17	1.81	45.17	1.040	0	< 1 in 1E+9	Level 2

nt, SF - min separation factor, ES - min ellipse separation

Company:	Novo Oil & Gas, LLC	Local Co-ordinate Reference:	Well Goonch Fed Com 04 132H
Project:	Eddy County, NM	TVD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
Reference Site:	SEC 4 - T23S - R28E	MD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
Site Error:	0.00	North Reference:	Grid
Reference Well:	Goonch Fed Com 04 132H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	HED_Compass_DSN
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design: SEC 4 - T23S - R28E - Goonch Fed Com 04 222H - OH - Plan #1

Survey Program: 0 MWD

Offset Site Error: 0.00 usft
Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Distance Between Centres (usft)	Wall-Wall Distance (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Risked Separation Factor	Probability of Collision	Warning
6,200.00	6,116.95	6,190.90	6,108.00	25.07	25.03	47.38	47.38	1.32	46.07	1.029	0	< 1 in 1E+9	Level 2
6,300.00	6,214.77	6,290.90	6,205.87	25.55	25.51	47.80	47.80	0.83	46.97	1.018	0	< 1 in 1E+9	Level 2
6,400.00	6,312.58	6,390.90	6,303.68	26.03	25.98	48.22	48.22	0.35	47.86	1.007	0	< 1 in 1E+9	Level 2
6,500.00	6,410.40	6,490.89	6,401.49	26.50	26.46	48.65	48.65	-0.14	48.79	0.997	0	< 1 in 1E+9	Level 1
6,600.00	6,508.21	6,590.89	6,499.30	26.98	26.94	49.09	49.09	-0.62	49.71	0.988	0	< 1 in 1E+9	Level 1
6,700.00	6,606.03	6,690.89	6,597.12	27.46	27.42	49.54	49.54	-1.09	50.63	0.978	0	< 1 in 1E+9	Level 1
6,800.00	6,703.84	6,790.89	6,694.93	27.94	27.90	49.99	49.99	-1.57	51.55	0.970	0	< 1 in 1E+9	Level 1
6,900.00	6,801.66	6,890.88	6,792.74	28.42	28.38	50.44	50.44	-2.04	52.48	0.961	0	< 1 in 1E+9	Level 1
6,953.00	6,853.50	6,943.88	6,844.58	28.68	28.64	50.69	50.69	-2.29	52.98	0.957	0	< 1 in 1E+9	Level 1
7,000.00	6,899.59	6,991.36	6,891.09	28.90	28.86	51.02	51.02	-2.40	53.42	0.956	0	< 1 in 1E+9	Level 1
7,100.00	6,998.01	7,092.79	6,990.84	29.36	29.33	51.68	51.68	-2.63	54.31	0.952	0	< 1 in 1E+9	Level 1
7,200.00	7,097.02	7,194.22	7,091.25	29.76	29.76	52.23	52.23	-2.90	55.13	0.947	0	< 1 in 1E+9	Level 1
7,300.00	7,196.45	7,295.65	7,192.08	30.17	30.10	52.56	52.56	-3.22	55.88	0.942	0	< 1 in 1E+9	Level 1
7,400.00	7,296.20	7,397.09	7,293.25	30.53	30.53	52.97	52.97	-3.58	56.55	0.937	0	< 1 in 1E+9	Level 1
7,500.00	7,396.13	7,498.54	7,394.82	30.87	30.87	53.17	53.17	-3.98	57.15	0.930	0	< 1 in 1E+9	Level 1
7,553.00	7,449.12	7,552.30	7,448.39	31.02	31.03	53.22	53.22	-4.20	57.42	0.927	0	< 1 in 1E+9	Level 1
7,600.00	7,496.12	7,599.34	7,495.42	31.16	31.18	53.22	53.22	-4.48	57.70	0.922	0	< 1 in 1E+9	Level 1
7,700.00	7,596.12	7,699.34	7,595.42	31.44	31.44	53.22	53.22	-5.08	58.31	0.913	0	< 1 in 1E+9	Level 1
7,800.00	7,696.12	7,799.34	7,695.42	31.72	31.72	53.22	53.22	-5.69	58.91	0.903	0	< 1 in 1E+9	Level 1
7,900.00	7,796.12	7,899.34	7,795.42	32.00	32.01	53.22	53.22	-6.30	59.52	0.894	0	< 1 in 1E+9	Level 1
8,000.00	7,896.12	7,999.34	7,895.42	32.29	32.29	53.22	53.22	-6.92	60.14	0.885	0	< 1 in 1E+9	Level 1
8,100.00	7,996.12	8,099.34	7,995.42	32.57	32.58	53.22	53.22	-7.53	60.75	0.876	0	< 1 in 1E+9	Level 1
8,200.00	8,096.12	8,199.34	8,095.42	32.86	32.87	53.22	53.22	-8.15	61.37	0.867	0	< 1 in 1E+9	Level 1
8,300.00	8,196.12	8,299.34	8,195.42	33.15	33.15	53.22	53.22	-8.77	61.99	0.859	0	< 1 in 1E+9	Level 1
8,400.00	8,296.12	8,399.34	8,295.42	33.44	33.45	53.22	53.22	-9.39	62.61	0.850	0	< 1 in 1E+9	Level 1
8,500.00	8,396.12	8,499.34	8,395.42	33.73	33.74	53.22	53.22	-10.01	63.23	0.842	0	< 1 in 1E+9	Level 1
8,600.00	8,496.12	8,599.34	8,495.42	34.03	34.03	53.22	53.22	-10.64	63.86	0.833	0	< 1 in 1E+9	Level 1
8,700.00	8,596.12	8,699.34	8,595.42	34.32	34.33	53.22	53.22	-11.26	64.48	0.825	0	< 1 in 1E+9	Level 1
8,800.00	8,696.12	8,799.34	8,695.42	34.62	34.62	53.22	53.22	-11.89	65.11	0.817	0	< 1 in 1E+9	Level 1
8,900.00	8,796.12	8,899.34	8,795.42	34.91	34.92	53.22	53.22	-12.52	65.74	0.810	0	< 1 in 1E+9	Level 1
8,966.41	8,862.54	8,965.76	8,861.84	35.11	35.12	53.22	53.22	-12.94	66.16	0.804	0	< 1 in 1E+9	Level 1, ES, SF
8,975.00	8,871.12	8,974.34	8,870.42	35.14	35.14	53.28	53.28	-12.93	66.21	0.805	0	< 1 in 1E+9	Level 1
9,000.00	8,896.10	8,999.32	8,895.40	35.21	35.22	54.11	54.11	-12.16	66.27	0.817	0	< 1 in 1E+9	Level 1
9,025.00	8,920.98	9,024.20	8,920.28	35.27	35.29	55.95	55.95	-10.27	66.22	0.845	0	< 1 in 1E+9	Level 1
9,050.00	8,945.70	9,048.92	8,945.00	35.32	35.36	58.87	58.87	-7.21	66.09	0.891	0	< 1 in 1E+9	Level 1
9,075.00	8,970.19	9,073.41	8,969.40	35.37	35.44	62.84	62.84	-2.97	65.90	0.956	0	< 1 in 1E+9	Level 1
9,100.00	8,994.39	9,097.61	8,993.60	35.41	35.51	68.21	68.21	2.51	65.70	1.038	0	< 1 in 1E+9	Level 2
9,125.00	9,018.22	9,121.44	9,017.52	35.44	35.58	74.75	74.75	9.23	65.52	1.141	0	< 1 in 1E+9	Level 2
9,150.00	9,041.63	9,144.85	9,040.93	35.46	35.65	82.58	82.58	17.22	65.36	1.263	0	< 1 in 1E+9	Level 3
9,175.00	9,064.58	9,167.77	9,063.85	35.48	35.72	91.69	91.69	26.45	65.24	1.405	0	< 1 in 1E+9	Level 3
9,200.00	9,086.92	9,190.14	9,086.22	35.49	35.79	102.08	102.08	36.93	65.16	1.567	0	< 1 in 1E+9	
9,225.00	9,108.67	9,211.89	9,107.97	35.50	35.85	113.72	113.72	48.61	65.11	1.747	0	< 1 in 1E+9	
9,250.00	9,129.24	9,232.66	9,129.04	35.50	35.92	126.56	126.56	61.47	65.09	1.944	0	< 1 in 1E+9	
9,275.00	9,150.08	9,253.30	9,149.38	35.49	35.98	140.57	140.57	75.48	65.09	2.160	0	< 1 in 1E+9	
9,300.00	9,169.64	9,272.86	9,168.54	35.48	36.04	155.69	155.69	90.58	65.11	2.391	0	< 1 in 1E+9	
9,325.00	9,188.38	9,301.50	9,197.60	35.47	36.12	171.34	171.34	106.57	64.77	2.646	0	< 1 in 1E+9	
9,350.00	9,206.17	9,332.12	9,228.05	35.45	36.20	186.87	186.87	122.65	64.22	2.910	0	< 1 in 1E+9	
9,375.00	9,223.09	9,364.79	9,260.31	35.42	36.27	202.18	202.18	138.75	63.43	3.187	0	< 1 in 1E+9	
9,400.00	9,238.94	9,398.82	9,294.42	35.39	36.33	217.18	217.18	154.81	62.36	3.483	0	< 1 in 1E+9	
9,425.00	9,253.80	9,437.57	9,330.42	35.36	36.38	231.71	231.71	170.76	60.95	3.802	0	< 1 in 1E+9	
9,450.00	9,267.58	9,478.43	9,368.26	35.33	36.42	245.67	245.67	186.53	59.14	4.154	0	< 1 in 1E+9	
9,475.00	9,280.28	9,522.83	9,407.71	35.29	36.44	258.88	258.88	201.99	56.90	4.550	0	< 1 in 1E+9	
9,500.00	9,291.79	9,571.19	9,448.31	35.25	36.44	271.18	271.18	217.00	54.19	5.004	0	< 1 in 1E+9	
9,525.00	9,302.14	9,623.84	9,489.27	35.21	36.42	282.28	282.28	231.34	50.94	5.541	0	< 1 in 1E+9	
9,550.00	9,311.29	9,669.76	9,521.75	35.17	36.39	291.87	291.87	243.49	48.38	6.022	0	< 1 in 1E+9	
9,575.00	9,319.21	9,742.67	9,568.72	35.13	36.31	300.04	300.04	256.59	43.45	6.906	0	< 1 in 1E+9	
9,600.00	9,325.68	9,808.39	9,609.79	35.09	36.22	306.16	306.16	268.34	38.81	7.690	0	< 1 in 1E+9	
9,625.00	9,331.28	9,877.34	9,624.70	35.04	36.11	310.12	310.12	273.10	37.02	8.377	0	< 1 in 1E+9	
9,650.00	9,335.39	9,948.20	9,640.95	35.00	35.99	311.75	311.75	275.96	35.79	8.711	0	< 1 in 1E+9	
9,675.00	9,338.21	10,011.67	9,648.66	34.96	35.89	310.97	310.97	274.69	36.28	8.571	0	< 1 in 1E+9	
9,700.00	9,339.72	10,041.49	9,647.23	34.92	35.85	309.90	309.90	273.37	36.52	8.485	0	< 1 in 1E+9	
9,705.43	9,339.93	10,049.92	9,647.38	34.91	35.84	309.82	309.82	273.27	36.56	8.474	0	< 1 in 1E+9	
9,716.41	9,340.00	10,057.90	9,647.62	34.89	35.83	309.89	309.89	273.31	36.58	8.471	0	< 1 in 1E+9	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

cal Co-ordinate Reference:	Well Goonch Fed Com 04 132H
VD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
D Reference:	GL 3014.5' + 25' KB @ 3039.50usft
rth Reference:	Grid
irvey Calculation Method:	Minimum Curvature
utput errors are at	2.00 sigma
tabase:	HED_Compass_DSN
ffset TVD Reference:	Offset Datum

Plan #1

Offset Site Error: 0.00 usft
Offset Well Error: 0.00 usft

Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Risked Separation Factor	Probability of Collision	Warning
274.38	36.92	8.430	0	< 1 in 1E+9	
275.61	37.34	8.381	0	< 1 in 1E+9	
276.77	37.84	8.314	0	< 1 in 1E+9	
277.68	38.41	8.235	0	< 1 in 1E+9	
278.93	39.03	8.147	0	< 1 in 1E+9	
279.93	39.78	8.050	0	< 1 in 1E+9	
280.69	40.40	7.947	0	< 1 in 1E+9	
281.78	41.21	7.838	0	< 1 in 1E+9	
282.64	42.03	7.724	0	< 1 in 1E+9	
283.45	42.90	7.608	0	< 1 in 1E+9	
284.24	43.60	7.489	0	< 1 in 1E+9	
284.99	44.75	7.368	0	< 1 in 1E+9	
285.70	45.73	7.246	0	< 1 in 1E+9	
286.39	46.74	7.126	0	< 1 in 1E+9	
287.04	47.78	7.006	0	< 1 in 1E+9	
287.67	48.85	6.889	0	< 1 in 1E+9	
288.27	49.95	6.772	0	< 1 in 1E+9	
288.85	51.07	6.656	0	< 1 in 1E+9	
289.41	52.23	6.543	0	< 1 in 1E+9	
289.95	53.38	6.432	0	< 1 in 1E+9	
290.47	54.56	6.323	0	< 1 in 1E+9	
290.97	55.77	6.217	0	< 1 in 1E+9	
291.46	56.99	6.114	0	< 1 in 1E+9	
291.93	58.23	6.013	0	< 1 in 1E+9	
292.39	59.48	5.915	0	< 1 in 1E+9	
292.84	60.76	5.820	0	< 1 in 1E+9	
293.28	62.04	5.727	0	< 1 in 1E+9	
293.70	63.34	5.637	0	< 1 in 1E+9	
294.11	64.64	5.550	0	< 1 in 1E+9	
294.52	65.96	5.465	0	< 1 in 1E+9	
294.91	67.29	5.382	0	< 1 in 1E+9	
295.30	68.63	5.303	0	< 1 in 1E+9	
295.68	69.98	5.225	0	< 1 in 1E+9	
296.05	71.34	5.150	0	< 1 in 1E+9	
296.41	72.71	5.077	0	< 1 in 1E+9	
296.76	74.09	5.006	0	< 1 in 1E+9	
297.12	75.47	4.937	0	< 1 in 1E+9	
297.46	76.85	4.870	0	< 1 in 1E+9	
297.80	78.26	4.805	0	< 1 in 1E+9	
298.13	79.66	4.742	0	< 1 in 1E+9	
298.46	81.08	4.681	0	< 1 in 1E+9	
298.78	82.49	4.622	0	< 1 in 1E+9	
299.10	83.92	4.564	0	< 1 in 1E+9	
299.42	85.35	4.508	0	< 1 in 1E+9	
299.73	86.78	4.454	0	< 1 in 1E+9	
300.03	88.22	4.401	0	< 1 in 1E+9	
301.45	88.79	4.365	0	< 1 in 1E+9	
324.93	92.64	4.622	0	< 1 in 1E+9	

SF - min separation factor, ES - min ellipse separation

COMPASS 5000.15 Build 91

Company:	Novo Oil & Gas, LLC	Local Co-ordinate Reference:	Well Goonch Fed Com 04 132H
Project:	Eddy County, NM	TVD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
Reference Site:	SEC 4 - T23S - R28E	MD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
Site Error:	0.00	North Reference:	Grid
Reference Well:	Goonch Fed Com 04 132H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	HED_Compass_DSN
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design | SEC 4 - T23S - R28E - Goonch Fed Com 04 231H - OH - Plan #1

Survey Program: 0-MWD

Offset Site Error: 0.00 usft
Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Risked Separation Factor	Probability of Collision	Warning
0.00	0.00	0.00	0.00	0.00	0.00	210.91	210.91				0		< 1 in 1E+9	
100.00	100.00	99.10	99.10	0.13	0.13	210.91	210.91	210.64	0.27	788.008	0		< 1 in 1E+9	
200.00	200.00	199.10	199.10	0.49	0.49	210.91	210.91	208.92	0.98	214.647	0		< 1 in 1E+9	
300.00	300.00	299.10	299.10	0.85	0.85	210.91	210.91	209.21	1.70	104.098	0		< 1 in 1E+9	
400.00	400.00	399.10	399.10	1.21	1.21	210.91	210.91	209.49	2.42	67.279	0		< 1 in 1E+9	
500.00	500.00	499.10	499.10	1.57	1.57	210.91	210.91	207.77	3.13	47.309	0		< 1 in 1E+9	
600.00	600.00	599.10	599.10	1.93	1.92	210.91	210.91	207.06	3.85	34.778	0		< 1 in 1E+9	
700.00	700.00	699.10	699.10	2.29	2.28	210.91	210.91	206.34	4.57	26.175	0		< 1 in 1E+9	
800.00	800.00	799.10	799.10	2.64	2.64	210.91	210.91	205.62	5.28	19.912	0		< 1 in 1E+9	
900.00	900.00	899.10	899.10	3.00	3.00	210.91	210.91	204.90	6.00	15.144	0		< 1 in 1E+9	
1,000.00	1,000.00	999.10	999.10	3.36	3.36	210.91	210.91	204.18	6.72	11.594	0		< 1 in 1E+9	
1,100.00	1,100.00	1,099.10	1,099.10	3.72	3.72	210.91	210.91	203.47	7.44	8.866	0		< 1 in 1E+9	
1,200.00	1,200.00	1,199.10	1,199.10	4.08	4.07	210.91	210.91	202.75	8.15	6.872	0		< 1 in 1E+9	
1,300.00	1,300.00	1,299.10	1,299.10	4.44	4.43	210.91	210.91	202.04	8.87	5.780	0		< 1 in 1E+9	
1,400.00	1,400.00	1,399.10	1,399.10	4.79	4.79	210.91	210.91	201.32	9.58	5.002	0		< 1 in 1E+9	
1,500.00	1,500.00	1,499.10	1,499.10	5.15	5.15	210.91	210.91	200.60	10.30	4.471	0		< 1 in 1E+9	
1,600.00	1,600.00	1,598.10	1,598.10	5.51	5.51	210.91	210.91	199.89	11.02	4.130	0		< 1 in 1E+9	
1,700.00	1,700.00	1,699.10	1,699.10	5.87	5.87	210.91	210.91	199.17	11.74	3.970	0		< 1 in 1E+9	
1,800.00	1,800.00	1,799.10	1,799.10	6.23	6.23	210.91	210.91	198.45	12.45	3.939	0		< 1 in 1E+9	
1,900.00	1,900.00	1,899.10	1,899.10	6.58	6.58	210.91	210.91	197.74	13.17	4.013	0		< 1 in 1E+9	
2,000.00	2,000.00	1,999.10	1,999.10	6.94	6.94	210.91	210.91	197.02	13.88	4.187	0		< 1 in 1E+9	CC, ES
2,100.00	2,099.98	2,093.78	2,093.78	7.29	7.27	211.63	211.63	197.09	14.55	4.548	0		< 1 in 1E+9	
2,200.00	2,199.84	2,188.37	2,188.23	7.61	7.58	213.84	213.84	196.87	15.17	4.997	0		< 1 in 1E+9	
2,300.00	2,299.45	2,282.87	2,282.41	7.94	7.89	217.57	217.57	201.78	15.79	5.781	0		< 1 in 1E+9	
2,400.00	2,398.70	2,377.23	2,376.14	8.27	8.21	222.66	222.66	206.45	16.41	6.567	0		< 1 in 1E+9	
2,500.00	2,497.47	2,471.41	2,469.28	8.61	8.53	229.14	229.14	212.70	17.04	7.485	0		< 1 in 1E+9	
2,600.00	2,595.62	2,565.37	2,561.70	8.97	8.87	336.29	236.29	220.09	17.69	13.479	0		< 1 in 1E+9	
2,700.00	2,693.44	2,665.65	2,656.60	9.34	9.22	248.58	248.58	230.01	18.34	13.547	0		< 1 in 1E+9	
2,800.00	2,791.25	2,761.96	2,754.05	9.72	9.60	258.78	258.78	239.66	19.12	13.525	0		< 1 in 1E+9	
2,900.00	2,889.07	2,861.39	2,851.19	10.10	9.99	269.28	269.28	249.40	19.88	13.540	0		< 1 in 1E+9	
3,000.00	2,986.88	2,960.60	2,948.34	10.50	10.38	279.87	279.87	259.22	20.66	13.549	0		< 1 in 1E+9	
3,100.00	3,084.70	3,059.91	3,045.49	10.91	10.78	290.55	290.55	269.10	21.45	13.548	0		< 1 in 1E+9	
3,200.00	3,182.51	3,159.23	3,142.63	11.32	11.19	301.30	301.30	279.04	22.25	13.539	0		< 1 in 1E+9	
3,300.00	3,280.33	3,258.55	3,239.78	11.74	11.61	312.12	312.12	289.04	23.07	13.526	0		< 1 in 1E+9	
3,400.00	3,378.14	3,357.86	3,336.93	12.16	12.03	322.99	322.99	299.09	23.90	13.514	0		< 1 in 1E+9	
3,500.00	3,475.96	3,457.18	3,434.07	12.59	12.46	333.92	333.92	309.18	24.74	13.498	0		< 1 in 1E+9	
3,600.00	3,573.77	3,556.50	3,531.22	13.02	12.89	344.90	344.90	319.31	25.59	13.479	0		< 1 in 1E+9	
3,700.00	3,671.58	3,655.81	3,628.36	13.46	13.32	355.92	355.92	329.48	26.44	13.460	0		< 1 in 1E+9	
3,800.00	3,769.40	3,755.13	3,725.51	13.90	13.76	366.98	366.98	339.68	27.31	13.439	0		< 1 in 1E+9	
3,900.00	3,867.22	3,854.45	3,822.66	14.35	14.20	378.08	378.08	349.91	28.18	13.418	0		< 1 in 1E+9	
4,000.00	3,965.03	3,953.76	3,919.80	14.80	14.65	389.21	389.21	360.16	29.05	13.397	0		< 1 in 1E+9	
4,100.00	4,062.84	4,053.08	4,016.95	15.25	15.10	400.38	400.38	370.44	29.93	13.375	0		< 1 in 1E+9	
4,200.00	4,160.66	4,152.40	4,114.10	15.70	15.55	411.57	411.57	380.75	30.82	13.353	0		< 1 in 1E+9	
4,300.00	4,258.47	4,251.71	4,211.24	16.15	16.00	422.78	422.78	391.07	31.72	13.331	0		< 1 in 1E+9	
4,400.00	4,356.28	4,351.03	4,308.39	16.61	16.45	434.03	434.03	401.42	32.61	13.309	0		< 1 in 1E+9	
4,500.00	4,454.10	4,450.35	4,405.53	17.07	16.91	445.29	445.29	411.78	33.51	13.287	0		< 1 in 1E+9	
4,600.00	4,551.92	4,549.66	4,502.68	17.53	17.37	456.58	456.58	422.16	34.42	13.265	0		< 1 in 1E+9	
4,700.00	4,649.73	4,648.98	4,599.83	17.99	17.83	467.88	467.88	432.55	35.32	13.243	0		< 1 in 1E+9	
4,800.00	4,747.55	4,748.29	4,696.97	18.46	18.29	479.20	479.20	442.96	36.24	13.223	0		< 1 in 1E+9	
4,900.00	4,845.36	4,847.61	4,794.12	18.93	18.76	490.54	490.54	453.39	37.15	13.205	0		< 1 in 1E+9	
5,000.00	4,943.18	4,946.93	4,891.27	19.39	19.22	501.89	501.89	463.82	38.07	13.189	0		< 1 in 1E+9	
5,100.00	5,040.99	5,046.24	4,988.41	19.86	19.69	513.25	513.25	474.27	38.98	13.166	0		< 1 in 1E+9	
5,200.00	5,138.81	5,145.56	5,085.56	20.33	20.15	524.64	524.64	484.73	39.91	13.147	0		< 1 in 1E+9	
5,300.00	5,236.62	5,244.88	5,182.70	20.80	20.62	536.03	536.03	495.20	40.83	13.128	0		< 1 in 1E+9	
5,400.00	5,334.44	5,344.19	5,279.85	21.27	21.09	547.43	547.43	505.68	41.76	13.111	0		< 1 in 1E+9	
5,500.00	5,432.25	5,443.51	5,377.00	21.74	21.56	558.85	558.85	516.17	42.68	13.093	0		< 1 in 1E+9	
5,600.00	5,530.07	5,542.83	5,474.14	22.21	22.03	570.27	570.27	526.66	43.61	13.076	0		< 1 in 1E+9	
5,700.00	5,627.88	5,642.14	5,571.29	22.69	22.50	581.71	581.71	537.17	44.54	13.060	0		< 1 in 1E+9	
5,800.00	5,725.70	5,741.46	5,668.43	23.16	22.97	593.16	593.16	547.68	45.48	13.043	0		< 1 in 1E+9	
5,900.00	5,823.51	5,840.78	5,765.58	23.64	23.45	604.61	604.61	558.20	46.41	13.028	0		< 1 in 1E+9	
6,000.00	5,921.33	5,940.09	5,862.73	24.12	23.92	616.07	616.07	568.73	47.34	13.012	0		< 1 in 1E+9	
6,100.00	6,019.14	6,039.41	5,959.87	24.59	24.39	627.54	627.54	579.26	48.28	12.998	0		< 1 in 1E+9	
6,200.00	6,116.95	6,139.73	6,057.02	25.07	24.87	639.02	639.02	589.80	49.22	12.983	0		< 1 in 1E+9	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

cal Co-ordinate Reference:	Well Goonch Fed Com 04 132H
VD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
D Reference:	GL 3014.5' + 25' KB @ 3039.50usft
orth Reference:	Grid
rvey Calculation Method:	Minimum Curvature
utput errors are at	2.00 sigma
atabase:	HED_Compass_DSN
ffset TVD Reference:	Offset Datum

Plan #1

Offset Site Error: 0.00 usft
Offset Well Error: 0.00 usft

Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Ritked Separation Factor	Probability of Collision	Warning
600.34	56.18	12.069	0	<1 in 1E+9	
616.89	51.10	12.955	0	<1 in 1E+9	
621.45	52.04	12.942	0	<1 in 1E+9	
632.01	52.98	12.979	0	<1 in 1E+9	
642.57	53.92	12.918	0	<1 in 1E+9	
653.14	54.87	12.904	0	<1 in 1E+9	
663.72	55.81	12.892	0	<1 in 1E+9	
669.32	56.31	12.856	0	<1 in 1E+9	
674.29	56.75	12.860	0	<1 in 1E+9	
684.48	57.66	12.870	0	<1 in 1E+9	
694.31	58.53	12.862	0	<1 in 1E+9	
703.84	59.36	12.857	0	<1 in 1E+9	
713.19	60.14	12.858	0	<1 in 1E+9	
722.40	60.87	12.867	0	<1 in 1E+9	
727.34	61.24	12.878	0	<1 in 1E+9	
731.78	61.54	13.051	0	<1 in 1E+9	
741.57	62.19	12.923	0	<1 in 1E+9	
751.75	62.64	12.993	0	<1 in 1E+9	
762.32	63.48	13.009	0	<1 in 1E+9	
773.28	64.12	13.060	0	<1 in 1E+9	
784.02	64.65	13.090	0	<1 in 1E+9	
792.80	65.09	13.081	0	<1 in 1E+9	
798.31	66.36	13.044	0	<1 in 1E+9	
803.36	67.05	12.980	0	<1 in 1E+9	
804.94	67.31	12.967	0	<1 in 1E+9	
804.50	68.31	12.778	0	<1 in 1E+9	
803.92	68.69	12.609	0	<1 in 1E+9	
803.33	69.45	12.502	0	<1 in 1E+9	
802.74	70.07	12.497	0	<1 in 1E+9	
802.35	70.49	12.367	0	<1 in 1E+9	
802.31	70.51	12.378	0	<1 in 1E+9	
802.27	70.64	12.357	0	<1 in 1E+9	
802.37	70.76	12.339	0	<1 in 1E+9	
802.62	70.87	12.326	0	<1 in 1E+9	
803.04	70.95	12.318	0	<1 in 1E+9	
803.64	71.03	12.315	0	<1 in 1E+9	
804.45	71.08	12.317	0	<1 in 1E+9	
805.49	71.12	12.329	0	<1 in 1E+9	
806.81	71.14	12.341	0	<1 in 1E+9	
808.44	71.15	12.363	0	<1 in 1E+9	
810.41	71.14	12.392	0	<1 in 1E+9	
812.77	71.11	12.429	0	<1 in 1E+9	
815.55	71.07	12.475	0	<1 in 1E+9	
818.80	71.01	12.530	0	<1 in 1E+9	
822.56	70.94	12.595	0	<1 in 1E+9	
826.85	70.86	12.669	0	<1 in 1E+9	
831.73	70.76	12.755	0	<1 in 1E+9	
837.21	70.65	12.850	0	<1 in 1E+9	
843.33	70.53	12.956	0	<1 in 1E+9	
850.11	70.40	13.076	0	<1 in 1E+9	
857.55	70.26	13.206	0	<1 in 1E+9	
865.68	70.11	13.347	0	<1 in 1E+9	
874.48	69.96	13.500	0	<1 in 1E+9	
883.98	69.80	13.664	0	<1 in 1E+9	
894.14	69.65	13.838	0	<1 in 1E+9	
904.94	69.49	14.024	0	<1 in 1E+9	
916.37	69.32	14.219	0	<1 in 1E+9	
928.40	69.16	14.424	0	<1 in 1E+9	
940.97	69.00	14.637	0	<1 in 1E+9	
954.08	68.84	14.859	0	<1 in 1E+9	
967.90	68.74	15.084	0	<1 in 1E+9	
1,010.66	68.27	15.803	0	<1 in 1E+9	
1,073.18	67.85	16.818	0	<1 in 1E+9	

ml, SF - min separation factor, ES - min ellipse separation

Company:	Novo Oil & Gas, LLC	Local Co-ordinate Reference:	Well Goonch Fed Com 04 132H
Project:	Eddy County, NM	TVD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
Reference Site:	SEC 4 - T23S - R28E	MD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
Site Error:	0.00	North Reference:	Grid
Reference Well:	Goonch Fed Com 04 132H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	HED_Compass_DSN
Reference Design	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design | SEC 4 - T23S - R28E - Goonch Fed Com 04 231H - OH - Plan #1

Offset Site Error: 0.00 usft
Survey Program: 0-MWD | Offset Well Error: 0.00 usft

Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Distance Between Centres (usft)	Distance Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Ritked Separation Factor	Probability of Collision	Warning
10,000.00	9,340.00	9,464.66	9,339.10	34.78	38.53	1,208.21	1,208.21	1,140.66	67.54	17.888	0	<1 in 1E+9
10,100.00	9,340.00	11,193.47	10,231.26	34.66	38.58	1,230.12	1,230.13	1,179.43	56.69	21.695	0	<1 in 1E+9
10,200.00	9,340.00	11,293.46	10,231.28	35.04	38.62	1,235.13	1,235.13	1,178.05	57.07	21.642	0	<1 in 1E+9
10,300.00	9,340.00	11,393.45	10,231.29	35.32	38.75	1,234.14	1,234.14	1,176.98	57.16	21.591	0	<1 in 1E+9
10,400.00	9,340.00	11,493.44	10,231.31	35.65	39.00	1,233.19	1,233.19	1,174.99	58.19	21.204	0	<1 in 1E+9
10,500.00	9,340.00	11,593.43	10,231.33	36.03	39.26	1,232.16	1,232.16	1,173.30	58.86	20.939	0	<1 in 1E+9
10,600.00	9,340.00	11,693.42	10,231.35	36.50	39.61	1,231.17	1,231.17	1,171.53	59.64	20.656	0	<1 in 1E+9
10,700.00	9,340.00	11,793.41	10,231.36	37.05	40.04	1,230.19	1,230.19	1,169.64	60.55	20.317	0	<1 in 1E+9
10,800.00	9,340.00	11,893.39	10,231.38	37.65	40.54	1,229.20	1,229.20	1,167.57	61.64	19.939	0	<1 in 1E+9
10,900.00	9,340.00	11,993.38	10,231.40	38.32	41.09	1,228.22	1,228.22	1,165.61	62.61	19.618	0	<1 in 1E+9
11,000.00	9,340.00	12,093.37	10,231.42	39.04	42.31	1,227.23	1,227.23	1,163.47	63.76	19.248	0	<1 in 1E+9
11,100.00	9,340.00	12,193.36	10,231.43	39.82	43.06	1,226.25	1,226.25	1,161.26	64.99	18.869	0	<1 in 1E+9
11,200.00	9,340.00	12,293.35	10,231.45	40.66	43.89	1,225.27	1,225.27	1,159.09	66.19	18.514	0	<1 in 1E+9
11,300.00	9,340.00	12,393.34	10,231.47	41.54	44.75	1,224.29	1,224.29	1,156.83	67.46	18.156	0	<1 in 1E+9
11,400.00	9,340.00	12,493.33	10,231.49	42.47	45.65	1,223.31	1,223.31	1,154.22	69.09	17.707	0	<1 in 1E+9
11,500.00	9,340.00	12,593.32	10,231.50	43.44	46.59	1,222.33	1,222.33	1,151.75	70.58	17.319	0	<1 in 1E+9
11,600.00	9,340.00	12,693.31	10,231.52	44.45	47.58	1,221.35	1,221.35	1,149.23	72.12	16.934	0	<1 in 1E+9
11,700.00	9,340.00	12,793.30	10,231.54	45.50	48.58	1,220.37	1,220.37	1,146.65	73.72	16.554	0	<1 in 1E+9
11,800.00	9,340.00	12,893.29	10,231.55	46.58	49.63	1,219.40	1,219.40	1,144.03	75.36	16.180	0	<1 in 1E+9
11,900.00	9,340.00	12,993.28	10,231.57	47.69	50.70	1,218.42	1,218.42	1,141.37	77.05	15.813	0	<1 in 1E+9
12,000.00	9,340.00	13,093.27	10,231.59	48.84	51.81	1,217.45	1,217.45	1,138.67	78.78	15.454	0	<1 in 1E+9
12,100.00	9,340.00	13,193.26	10,231.61	50.01	52.94	1,216.47	1,216.47	1,135.92	80.55	15.102	0	<1 in 1E+9
12,200.00	9,340.00	13,293.25	10,231.62	51.21	54.10	1,215.50	1,215.50	1,133.16	82.35	14.760	0	<1 in 1E+9
12,300.00	9,340.00	13,393.24	10,231.64	52.44	55.28	1,214.53	1,214.53	1,130.34	84.19	14.426	0	<1 in 1E+9
12,400.00	9,340.00	13,493.23	10,231.66	53.69	56.49	1,213.56	1,213.56	1,127.53	86.04	14.102	0	<1 in 1E+9
12,500.00	9,340.00	13,593.22	10,231.68	54.95	57.71	1,212.59	1,212.59	1,124.84	87.95	13.787	0	<1 in 1E+9
12,600.00	9,340.00	13,693.21	10,231.69	56.24	58.96	1,211.62	1,211.62	1,121.75	89.87	13.481	0	<1 in 1E+9
12,700.00	9,340.00	13,793.19	10,231.71	57.55	60.23	1,210.65	1,210.65	1,118.63	91.83	13.185	0	<1 in 1E+9
12,800.00	9,340.00	13,893.18	10,231.73	58.87	61.51	1,209.69	1,209.69	1,115.90	93.79	12.898	0	<1 in 1E+9
12,900.00	9,340.00	13,993.17	10,231.75	60.21	62.81	1,208.72	1,208.72	1,112.84	95.78	12.620	0	<1 in 1E+9
13,000.00	9,340.00	14,093.16	10,231.76	61.57	64.13	1,207.76	1,207.76	1,109.97	97.79	12.351	0	<1 in 1E+9
13,100.00	9,340.00	14,193.15	10,231.78	62.94	65.46	1,206.79	1,206.79	1,106.98	99.82	12.090	0	<1 in 1E+9
13,200.00	9,340.00	14,293.14	10,231.80	64.32	66.80	1,205.83	1,205.83	1,103.97	101.86	11.836	0	<1 in 1E+9
13,300.00	9,340.00	14,393.13	10,231.82	65.71	68.16	1,204.87	1,204.87	1,100.95	103.92	11.591	0	<1 in 1E+9
13,400.00	9,340.00	14,493.12	10,231.83	67.12	69.53	1,203.91	1,203.91	1,097.81	106.00	11.358	0	<1 in 1E+9
13,500.00	9,340.00	14,593.11	10,231.85	68.54	70.91	1,202.95	1,202.95	1,094.86	108.09	11.130	0	<1 in 1E+9
13,600.00	9,340.00	14,693.10	10,231.87	69.98	72.31	1,201.99	1,201.99	1,091.80	110.19	10.909	0	<1 in 1E+9
13,700.00	9,340.00	14,793.09	10,231.88	71.40	73.71	1,201.03	1,201.03	1,088.72	112.30	10.695	0	<1 in 1E+9
13,800.00	9,340.00	14,893.08	10,231.90	72.85	75.12	1,200.07	1,200.07	1,085.65	114.42	10.488	0	<1 in 1E+9
13,900.00	9,340.00	14,993.07	10,231.92	74.30	76.54	1,199.12	1,199.12	1,082.57	116.55	10.286	0	<1 in 1E+9
14,000.00	9,340.00	15,093.06	10,231.94	75.76	77.98	1,198.16	1,198.16	1,079.47	118.69	10.095	0	<1 in 1E+9
14,100.00	9,340.00	15,193.05	10,231.96	77.23	79.41	1,197.21	1,197.21	1,076.36	120.84	9.907	0	<1 in 1E+9
14,200.00	9,340.00	15,293.04	10,231.97	78.71	80.86	1,196.25	1,196.25	1,073.25	123.00	9.726	0	<1 in 1E+9
14,300.00	9,340.00	15,393.03	10,231.99	80.19	82.32	1,195.30	1,195.30	1,070.14	125.17	9.550	0	<1 in 1E+9
14,383.30	9,340.00	15,354.66	10,232.00	81.14	83.07	1,194.75	1,194.75	1,068.40	126.35	9.456	0	<1 in 1E+9
14,400.00	9,340.00	15,354.66	10,232.00	81.68	83.07	1,195.32	1,195.32	1,068.83	126.49	9.450	0	<1 in 1E+9 SF
14,428.41	9,340.00	15,354.66	10,232.00	83.17	83.07	1,203.46	1,203.46	1,076.64	126.84	9.510	0	<1 in 1E+9

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

ocal Co-ordinate Reference:	Well Goonch Fed Com 04 132H
VD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
D Reference:	GL 3014.5' + 25' KB @ 3039.50usft
orth Reference:	Grid
urvey Calculation Method:	Minimum Curvature
utput errors are at	2.00 sigma
atabase:	HED_Compass_DSN
ffset TVD Reference:	Offset Datum

- Plan #1

Offset Site Error: 0.00 usft
Offset Well Error: 0.00 usft

Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Ruled Separation Factor	Probability of Collision	Warning
59.78	0.07	224.299	0	< 1 in 1E+9	
59.05	0.98	61.097	0	< 1 in 1E+9	
56.33	1.70	35.325	0	< 1 in 1E+9	
57.62	2.43	24.042	0	< 1 in 1E+9	
56.90	3.13	19.150	0	< 1 in 1E+9	
56.18	3.85	15.591	0	< 1 in 1E+9	
55.47	4.57	13.144	0	< 1 in 1E+9	
54.75	5.29	11.361	0	< 1 in 1E+9	
54.05	6.00	10.003	0	< 1 in 1E+9	
53.31	6.72	8.936	0	< 1 in 1E+9	
52.60	7.44	8.074	0	< 1 in 1E+9	
51.88	8.15	7.364	0	< 1 in 1E+9	
51.16	8.87	6.769	0	< 1 in 1E+9	
50.45	9.58	6.263	0	< 1 in 1E+9	
49.73	10.30	5.837	0	< 1 in 1E+9	
49.01	11.02	5.448	0	< 1 in 1E+9	
48.30	11.74	5.119	0	< 1 in 1E+9	
47.58	12.45	4.820	0	< 1 in 1E+9	
46.86	13.17	4.556	0	< 1 in 1E+9	
46.14	13.89	4.322	0	< 1 in 1E+9	
45.40	14.59	4.110	0	< 1 in 1E+9	
44.61	15.18	3.938	0	< 1 in 1E+9	
43.75	15.79	3.771	0	< 1 in 1E+9	
42.83	16.38	3.614	0	< 1 in 1E+9	
41.88	16.97	3.466	0	< 1 in 1E+9	
40.93	17.65	3.333	0	< 1 in 1E+9	
40.09	18.61	3.221	0	< 1 in 1E+9	CC
40.37	18.21	3.217	0	< 1 in 1E+9	
39.89	18.89	3.111	0	< 1 in 1E+9	
39.48	19.59	3.019	0	< 1 in 1E+9	
39.14	20.30	2.929	0	< 1 in 1E+9	
38.87	21.01	2.850	0	< 1 in 1E+9	
38.68	21.74	2.778	0	< 1 in 1E+9	
38.51	22.49	2.713	0	< 1 in 1E+9	
38.43	23.23	2.654	0	< 1 in 1E+9	
38.40	23.99	2.601	0	< 1 in 1E+9	ES
38.42	24.76	2.552	0	< 1 in 1E+9	
38.50	25.58	2.507	0	< 1 in 1E+9	
38.62	26.34	2.466	0	< 1 in 1E+9	
38.80	27.15	2.429	0	< 1 in 1E+9	
39.02	27.97	2.395	0	< 1 in 1E+9	
39.29	28.80	2.364	0	< 1 in 1E+9	
39.56	29.65	2.335	0	< 1 in 1E+9	
39.92	30.50	2.309	0	< 1 in 1E+9	
40.29	31.38	2.285	0	< 1 in 1E+9	
40.70	32.24	2.263	0	< 1 in 1E+9	
41.14	33.12	2.242	0	< 1 in 1E+9	
41.61	34.01	2.224	0	< 1 in 1E+9	
42.12	34.91	2.207	0	< 1 in 1E+9	
42.65	35.81	2.191	0	< 1 in 1E+9	
43.20	36.73	2.178	0	< 1 in 1E+9	
43.79	37.66	2.163	0	< 1 in 1E+9	
44.39	38.57	2.151	0	< 1 in 1E+9	
45.05	39.50	2.140	0	< 1 in 1E+9	
45.87	40.44	2.129	0	< 1 in 1E+9	
46.34	41.39	2.120	0	< 1 in 1E+9	
47.03	42.32	2.111	0	< 1 in 1E+9	
47.74	43.27	2.103	0	< 1 in 1E+9	
48.47	44.22	2.096	0	< 1 in 1E+9	
49.22	45.16	2.089	0	< 1 in 1E+9	
49.99	46.14	2.083	0	< 1 in 1E+9	
50.75	47.10	2.078	0	< 1 in 1E+9	

nt, SF - min separation factor, ES - min ellipse separation

Company:	Novo Oil & Gas, LLC	Local Co-ordinate Reference:	Well Goonch Fed Com 04 132H
Project:	Eddy County, NM	TVD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
Reference Site:	SEC 4 - T23S - R28E	MD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
Site Error:	0.00	North Reference:	Grid
Reference Well:	Goonch Fed Com 04 132H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	HED_Compass_DSN
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design - SEC 4 - T23S - R28E - Goonch Fed Com 04 232H - OH - Plan #1

Offset Site Error: 0.00 usft
Survey Program: 0-MWD
Offset Well Error: 0.00 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Distance Between Centres (usft)	Distance Wall-Wall Distance (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Ruled Separation Factor	Probability of Collision	Warning
6,200.00	6,116.05	6,185.80	6,103.07	25.67	25.01	99.60	99.60	51.64	48.06	2.072	0	< 1 in 1E+9	
6,300.00	6,214.77	6,285.76	6,200.89	25.88	25.49	101.37	101.37	52.34	49.03	2.068	0	< 1 in 1E+9	
6,400.00	6,312.58	6,385.76	6,298.65	26.03	25.99	103.19	103.19	53.17	49.98	2.063	0	< 1 in 1E+9	
6,500.00	6,410.40	6,485.73	6,396.44	26.50	26.44	104.98	104.98	54.00	50.98	2.060	0	< 1 in 1E+9	
6,600.00	6,508.21	6,585.71	6,494.24	26.99	26.92	106.78	106.78	54.84	51.94	2.056	0	< 1 in 1E+9	
6,700.00	6,606.03	6,685.69	6,592.03	27.46	27.40	108.61	108.61	55.70	52.91	2.053	0	< 1 in 1E+9	
6,800.00	6,703.84	6,785.68	6,689.82	27.94	27.88	110.45	110.45	56.56	53.88	2.050	0	< 1 in 1E+9	
6,900.00	6,801.66	6,885.64	6,787.61	28.42	28.36	112.30	112.30	57.44	54.86	2.047	0	< 1 in 1E+9	
6,953.00	6,853.50	6,938.62	6,839.44	28.68	28.62	113.29	113.29	57.91	55.38	2.046	0	< 1 in 1E+9	
7,000.00	6,899.55	6,985.65	6,885.64	28.90	28.85	114.33	114.33	58.51	55.82	2.046	0	< 1 in 1E+9	
7,100.00	6,998.01	7,088.13	6,985.11	29.36	29.32	118.58	118.58	59.86	56.72	2.056	0	< 1 in 1E+9	
7,200.00	7,097.02	7,190.45	7,087.25	29.78	29.76	118.48	118.48	60.92	57.56	2.058	0	< 1 in 1E+9	
7,300.00	7,196.45	7,292.63	7,188.93	30.17	30.17	120.02	120.02	61.70	58.32	2.058	0	< 1 in 1E+9	
7,400.00	7,296.20	7,395.29	7,291.01	30.53	30.55	121.20	121.20	62.19	59.01	2.054	0	< 1 in 1E+9	
7,500.00	7,396.13	7,497.71	7,393.36	30.87	30.90	122.03	122.03	62.40	59.63	2.048	0	< 1 in 1E+9	
7,593.00	7,489.12	7,592.02	7,487.66	31.02	31.07	122.32	122.32	62.41	59.91	2.042	0	< 1 in 1E+9	
7,600.00	7,496.12	7,599.58	7,495.22	31.19	31.20	122.37	122.37	62.20	60.17	2.034	0	< 1 in 1E+9	
7,700.00	7,596.12	7,699.58	7,595.22	31.44	31.48	122.37	122.37	61.62	60.75	2.014	0	< 1 in 1E+9	
7,800.00	7,696.12	7,799.58	7,695.22	31.72	31.77	122.37	122.37	61.03	61.34	1.995	0	< 1 in 1E+9	
7,900.00	7,796.12	7,899.58	7,795.22	32.00	32.05	122.37	122.37	60.45	61.92	1.976	0	< 1 in 1E+9	
8,000.00	7,896.12	7,999.58	7,895.22	32.29	32.33	122.37	122.37	59.86	62.51	1.958	0	< 1 in 1E+9	
8,100.00	7,996.12	8,099.58	7,995.22	32.57	32.62	122.37	122.37	59.27	63.10	1.939	0	< 1 in 1E+9	
8,200.00	8,096.12	8,199.58	8,095.22	32.86	32.91	122.37	122.37	58.67	63.70	1.921	0	< 1 in 1E+9	
8,300.00	8,196.12	8,299.58	8,195.22	33.15	33.20	122.37	122.37	58.08	64.29	1.903	0	< 1 in 1E+9	
8,400.00	8,296.12	8,399.58	8,295.22	33.44	33.49	122.37	122.37	57.48	64.89	1.886	0	< 1 in 1E+9	
8,500.00	8,396.12	8,499.58	8,395.22	33.73	33.78	122.37	122.37	56.88	65.49	1.868	0	< 1 in 1E+9	
8,600.00	8,496.12	8,599.58	8,495.22	34.03	34.07	122.37	122.37	56.27	66.10	1.851	0	< 1 in 1E+9	
8,700.00	8,596.12	8,699.58	8,595.22	34.32	34.37	122.37	122.37	55.67	66.70	1.835	0	< 1 in 1E+9	
8,800.00	8,696.12	8,799.58	8,695.22	34.62	34.66	122.37	122.37	55.08	67.31	1.818	0	< 1 in 1E+9	
8,900.00	8,796.12	8,899.58	8,795.22	34.91	34.96	122.37	122.37	54.49	67.92	1.802	0	< 1 in 1E+9	
8,966.41	8,862.54	8,966.00	8,861.64	35.11	35.16	122.37	122.37	54.04	68.33	1.791	0	< 1 in 1E+9	
8,975.00	8,871.12	8,974.58	8,870.22	35.14	35.16	122.41	122.41	54.03	68.38	1.790	0	< 1 in 1E+9	SF
9,000.00	8,896.10	8,999.53	8,895.20	35.23	35.26	122.94	122.94	54.47	68.48	1.795	0	< 1 in 1E+9	
9,025.00	8,920.88	9,024.48	8,920.08	35.32	35.33	124.13	124.13	55.02	68.51	1.812	0	< 1 in 1E+9	
9,050.00	8,945.70	9,049.15	8,944.80	35.32	35.41	126.04	126.04	57.56	68.48	1.841	0	< 1 in 1E+9	
9,075.00	8,970.10	9,073.63	8,969.29	35.37	35.48	128.72	128.72	60.33	68.39	1.882	0	< 1 in 1E+9	
9,100.00	8,994.39	9,097.84	8,993.49	35.41	35.55	132.20	132.20	64.04	68.24	1.939	0	< 1 in 1E+9	
9,125.00	9,018.22	9,121.68	9,017.32	35.44	35.62	136.82	136.82	68.77	68.05	2.011	0	< 1 in 1E+9	
9,150.00	9,041.60	9,145.09	9,040.73	35.46	35.69	142.42	142.42	74.60	67.83	2.100	0	< 1 in 1E+9	
9,175.00	9,064.55	9,168.01	9,063.65	35.48	35.76	149.17	149.17	81.59	67.58	2.207	0	< 1 in 1E+9	
9,200.00	9,086.92	9,190.37	9,086.02	35.49	35.83	157.13	157.13	89.80	67.33	2.334	0	< 1 in 1E+9	
9,225.00	9,108.67	9,212.12	9,107.77	35.50	35.89	166.34	166.34	99.26	67.09	2.480	0	< 1 in 1E+9	
9,250.00	9,129.74	9,233.20	9,128.84	35.50	35.96	176.82	176.82	109.97	66.86	2.645	0	< 1 in 1E+9	
9,275.00	9,150.08	9,253.54	9,149.19	35.49	36.02	188.57	188.57	121.92	66.65	2.829	0	< 1 in 1E+9	
9,300.00	9,169.64	9,273.10	9,168.74	35.48	36.08	201.57	201.57	135.10	66.48	3.033	0	< 1 in 1E+9	
9,325.00	9,188.35	9,291.81	9,187.45	35.47	36.13	215.78	215.78	149.47	66.31	3.254	0	< 1 in 1E+9	
9,350.00	9,206.17	9,309.63	9,205.27	35.45	36.19	231.15	231.15	164.97	66.18	3.493	0	< 1 in 1E+9	
9,375.00	9,223.05	9,326.51	9,222.15	35.42	36.24	247.63	247.63	181.55	66.07	3.748	0	< 1 in 1E+9	
9,400.00	9,238.94	9,342.40	9,238.04	35.39	36.29	265.15	265.15	199.19	65.96	4.018	0	< 1 in 1E+9	
9,425.00	9,253.80	9,357.26	9,252.90	35.36	36.33	283.64	283.64	217.73	65.92	4.303	0	< 1 in 1E+9	
9,450.00	9,267.58	9,371.04	9,266.68	35.33	36.37	303.05	303.05	237.18	65.86	4.601	0	< 1 in 1E+9	
9,475.00	9,280.28	9,383.72	9,279.36	35.29	36.41	323.29	323.29	257.47	65.82	4.912	0	< 1 in 1E+9	
9,500.00	9,291.79	9,395.25	9,290.89	35.25	36.45	344.29	344.29	278.50	65.78	5.234	0	< 1 in 1E+9	
9,525.00	9,302.14	9,405.60	9,301.24	35.21	36.48	365.97	365.97	300.22	65.76	5.566	0	< 1 in 1E+9	
9,550.00	9,311.29	9,414.75	9,310.39	35.17	36.51	388.27	388.27	322.54	65.73	5.907	0	< 1 in 1E+9	
9,575.00	9,319.21	9,422.67	9,318.31	35.13	36.53	411.11	411.11	345.42	65.71	6.256	0	< 1 in 1E+9	
9,600.00	9,325.88	9,429.34	9,324.98	35.09	36.55	434.41	434.41	368.72	65.69	6.613	0	< 1 in 1E+9	
9,625.00	9,331.28	9,434.73	9,330.38	35.04	36.57	458.10	458.10	392.43	65.67	6.975	0	< 1 in 1E+9	
9,650.00	9,335.39	9,438.85	9,334.49	35.00	36.58	482.10	482.10	416.45	65.66	7.343	0	< 1 in 1E+9	
9,675.00	9,338.21	9,441.66	9,337.31	34.96	36.59	506.35	506.35	440.71	65.64	7.714	0	< 1 in 1E+9	
9,700.00	9,339.72	9,443.18	9,338.82	34.92	36.59	530.79	530.79	465.14	65.65	8.088	0	< 1 in 1E+9	
9,718.41	9,340.00	9,443.46	9,339.10	34.89	36.59	548.84	548.84	481.20	65.64	8.335	0	< 1 in 1E+9	
9,800.00	9,340.00	9,443.46	9,339.10	34.76	36.59	629.01	629.01	563.45	65.56	9.594	0	< 1 in 1E+9	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

cal Co-ordinate Reference:	Well Goonch Fed Com 04 132H
VD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
D Reference:	GL 3014.5' + 25' KB @ 3039.50usft
rth Reference:	Grid
rvey Calculation Method:	Minimum Curvature
tput errors are at	2.00 sigma
tabase:	HED_Compass_DSN
fset TVD Reference:	Offset Datum

Plan #1

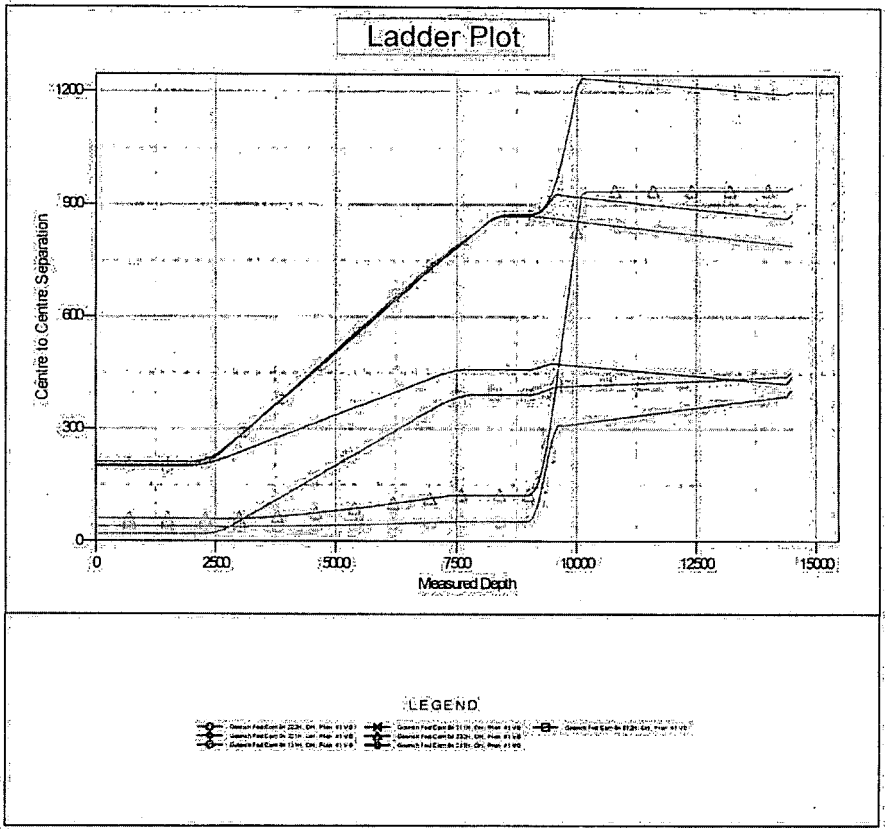
Offset Site Error: 0.00 usft
Offset Well Error: 0.00 usft

Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Ellipse Separation (usft)	Risked Separation Factor	Probability of Collision	Warning
882.21	65.53	11.105	0	<1 in 1E+9		
761.27	65.52	12.620	0	<1 in 1E+9		
860.52	69.91	14.137	0	<1 in 1E+9		
894.92	41.26	22.681	0	<1 in 1E+9		
894.00	41.95	22.314	0	<1 in 1E+9		
893.54	42.08	21.932	0	<1 in 1E+9		
892.63	43.48	21.540	0	<1 in 1E+9		
891.68	44.26	21.141	0	<1 in 1E+9		
891.08	45.15	20.738	0	<1 in 1E+9		
890.25	46.06	20.329	0	<1 in 1E+9		
889.37	47.00	19.922	0	<1 in 1E+9		
888.48	47.98	19.516	0	<1 in 1E+9		
887.52	49.00	19.114	0	<1 in 1E+9		
886.55	50.04	18.716	0	<1 in 1E+9		
885.54	51.12	18.323	0	<1 in 1E+9		
884.51	52.22	17.937	0	<1 in 1E+9		
883.48	53.35	17.556	0	<1 in 1E+9		
882.37	54.51	17.188	0	<1 in 1E+9		
881.22	55.68	16.826	0	<1 in 1E+9		
880.14	56.88	16.473	0	<1 in 1E+9		
878.00	58.10	16.128	0	<1 in 1E+9		
877.83	59.34	15.793	0	<1 in 1E+9		
876.65	60.60	15.466	0	<1 in 1E+9		
875.45	61.87	15.149	0	<1 in 1E+9		
874.23	63.16	14.841	0	<1 in 1E+9		
873.00	64.47	14.541	0	<1 in 1E+9		
871.76	65.79	14.251	0	<1 in 1E+9		
870.50	67.12	13.969	0	<1 in 1E+9		
869.23	68.47	13.695	0	<1 in 1E+9		
867.94	69.83	13.430	0	<1 in 1E+9		
866.65	71.20	13.173	0	<1 in 1E+9		
865.34	72.58	12.923	0	<1 in 1E+9		
864.03	73.97	12.681	0	<1 in 1E+9		
862.70	75.37	12.446	0	<1 in 1E+9		
861.37	76.78	12.219	0	<1 in 1E+9		
860.03	78.20	11.999	0	<1 in 1E+9		
858.68	79.63	11.784	0	<1 in 1E+9		
857.32	81.08	11.578	0	<1 in 1E+9		
855.95	82.50	11.375	0	<1 in 1E+9		
854.58	83.96	11.179	0	<1 in 1E+9		
853.20	85.41	10.989	0	<1 in 1E+9		
851.81	86.87	10.805	0	<1 in 1E+9		
850.42	88.34	10.626	0	<1 in 1E+9		
849.02	89.82	10.452	0	<1 in 1E+9		
847.62	91.30	10.284	0	<1 in 1E+9		
847.60	91.30	10.282	0	<1 in 1E+9		
846.85	92.28	10.178	0	<1 in 1E+9		
855.76	80.53	10.453	0	<1 in 1E+9		

Company:	Novo Oil & Gas, LLC	Local Co-ordinate Reference:	Well Goonch Fed Com 04 132H
Project:	Eddy County, NM	TVD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
Reference Site:	SEC 4 - T23S - R28E	MD Reference:	GL 3014.5' + 25' KB @ 3039.50usft
Site Error:	0.00	North Reference:	Grid
Reference Well:	Goonch Fed Com 04 132H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	HED_Compass_DSN
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Reference Depths are relative to GL 3014.5' + 25' KB @ 3039.50usft
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W.

Coordinates are relative to: Goonch Fed Com 04 132H
Coordinate System is US State Plane 1983, New Mexico Eastern Zone
Grid Convergence at Surface is: 0.13°

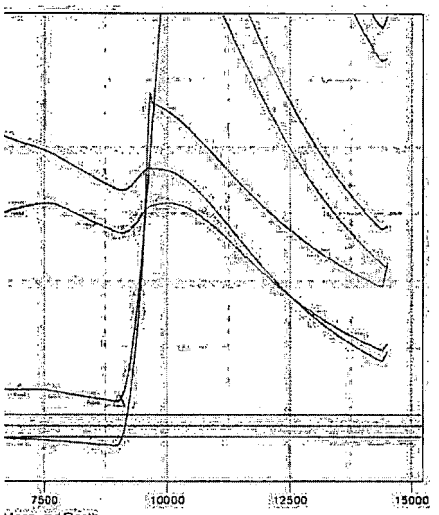


e Directional
ion Risk Report

xial Co-ordinate Reference:	Well Goonch Fed Com 04 132H
VD Reference:	GL 3014.5 + 25 KB @ 3039.50usft
D Reference:	GL 3014.5 + 25 KB @ 3039.50usft
orth Reference:	Grid
urvey Calculation Method:	Minimum Curvature
utput errors are at	2.00 sigma
atabase:	HED_Compass_DSN
fset TVD Reference:	Offset Datum

oordinates are relative to: Goonch Fed Com 04 132H
oordinate System is US State Plane 1983, New Mexico Eastern Zone
rid Convergence at Surface is: 0.13°

n Factor Plot



EGEND

nt, SF - min separation factor, ES - min ellipse separation
25

Novo Oil & Gas Northern Delaware, LLC
Goonch Fed Com 04 132H
SHL 1140' FSL & 1180' FWL 4-23S-28E
BHL 10' FNL & 1122' FWL 4-23S-28e
Eddy County, NM

fee/fee/Fed

Drilling Program

1. ESTIMATED TOPS

Formation Name	TVD KB	MD	Bearing
Quaternary	0'	0'	water
Rustler anhydrite (surface csg @ 594' MD)	100'	100'	N/A
Castile gypsum	970'	970'	N/A
Lamar limestone	2474'	2477'	N/A
Bell Canyon sandstone	2540'	2543'	hydrocarbons
Cherry Canyon sandstone	3615'	3642'	hydrocarbons
Brushy Canyon sandstone	4628'	4678'	hydrocarbons
Bone Spring limestone	6071'	6153'	hydrocarbons
Avalon shale	6579'	6672'	hydrocarbons
1st Bone Spring sandstone	7038'	7140'	hydrocarbons
2nd Bone Spring carbonate	7251'	7355'	hydrocarbons
2nd Bone Spring sandstone	7786'	7890'	hydrocarbons
3d Bone Spring carbonate (inter. csg @ 8900' MD)	8083'	8187'	hydrocarbons
(KOP	8862'	8966'	hydrocarbons)
3rd Bone Spring sandstone (pro. csg @ 14499' MD)	9017'	9124'	hydrocarbons
TD	9340'	14499'	hydrocarbons

2. NOTABLE ZONES

Third Bone Spring sandstone is the goal. All perforations will be ≥ 100' from the dedication perimeter. Closest water well (C 00800) is 0.90 mile southeast. Water bearing strata were found from 50' to 155' in the 200' deep well.

3. PRESSURE CONTROL

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

BOP system will be isolated with a test plug and tested by an independent tester to 250-psi low and 5000-psi high for 10 minutes. Variance is requested to use a co-flex hose between the BOP system and choke manifold. A typical co-flex pressure test certificate is attached. An equipment specific co-flex pressure test certificate will be on site when testing the BOP.

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

4. CASING & CEMENT

Variance is requested for an option to use a surface rig to drill the surface hole, set the surface casing, and cement the surface casing. If the schedule between rigs would preclude presetting the surface casing, then the primary rig will MIRU and drill all of the well.

All casing will be API and new. See attached casing assumption worksheet.

Novo Oil & Gas Northern Delaware, LLC
Goonch Fed Com 04 132H
SHL 1140' FSL & 1180' FWL 4-23S-28E
BHL 10' FNL & 1122' FWL 4-23S-28e
Eddy County, NM

fee/fee/Fed

Hole O. D.	Set MD	Set TVD	Casing OD	Weight (lb/ft)	Grade	Joint	Collapse	Burst	Tension
17.5"	0' - 595'	0' - 595'	13.375" surface	54.5	J-55	BTC	1.125	1.125	1.60
12.25"	0' - 5900'	0' - 5824'	9.625" intermed.	43.5	HCL-80	BTC	1.125	1.125	1.60
8.5"	0' – 14499'	0' – 9340'	5.5" product.	20	P-110	TMK DQX	1.125	1.125	1.60

Alternate Production Casing:

Hole O. D.	Set MD	Set TVD	Casing OD	Weight (lb/ft)	Grade	Joint	Collapse	Burst	Tension
8.5"	0' – 14499'	0' – 9340'	5.5" product.	20	P-110	GBCD	1.125	1.125	1.60
8.5"	0' – 14499'	0' – 9340'	5.5" product.	20	P-110 HC	CDC	1.125	1.125	1.60

Alternate weights and grades could be substituted to meet maximum stimulation pressures.

Name	Type	Sacks	Yield	Cu. Ft.	Weight	Blend
Surface	Tail	510	1.62	826	13.8	Class C + gel + accelerator + LCM
TOC = GL		100% Excess			Centralizers on every jt to GL	
Intermediate	Lead	855	2.28	1949	11.9	Class C + gel + extender + LCM
	Tail	200	1.34	268	14.8	Class C + gel + retarder + LCM
TOC = GL		20% Excess			Centralizers on bottom 3 jts and then 1 centralizer every 4th jt to GL	
Production	Tail	1942	1.42	2757	13.2	Class H + fluid loss + retarder + LCM
TOC = 5400'		20% Excess			None planned	

5. MUD PROGRAM

An electronic PVT mud system will monitor flow rate, pump pressure, stroke rate, and volume. 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. A closed loop system will be used.

Type	Interval (MD)	lb/gal	Viscosity	Fluid Loss
fresh water spud	0' - 595'	8.3	30 - 60	NC
brine or cut brine	595' - 5900'	9.8 – 10.2	35 - 45	NC
OBM	5900' – 14499'	8.5 – 10.0	35 - 65	4 - 6

6. CORES, TESTS, & LOGS

No core or drill stem test is planned. 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.

7. DOWN HOLE CONDITIONS

No abnormal pressure or temperature is expected. Maximum expected bottom hole pressure is ≈4642 psi. Expected bottom hole temperature is ≈150° F.

An H2S plan is attached.

8. OTHER INFORMATION

Anticipated spud date is upon approval. It is expected it will take ≈3 months to drill and complete the well.

Novo owns fee leases in the S2 Section 4.

Certificate of Authority to use the Official API Monogram

License Number: 16C-0383

ORIGINAL

The American Petroleum Institute hereby grants to

COPPER STATE RUBBER, INC.
750 S. 59th Avenue
Phoenix, AZ

the right to use the Official API Monogram® on manufactured products under the conditions in the official publications of the American Petroleum Institute entitled API Spec Q1® and **API-16C** and in accordance with the provisions of the License Agreement.

In all cases where the Official API Monogram is applied, the API Monogram shall be used in conjunction with this certificate number: **16C-0383**

The American Petroleum Institute reserves the right to revoke this authorization to use the Official API Monogram for any reason satisfactory to the Board of Directors of the American Petroleum Institute.

The scope of this license includes the following: Flexible Choke and Kill Lines atFSL 0, FSL 1, FSL 2, FSL 3

QMS Exclusions: No Exclusions Identified as Applicable

Effective Date: MARCH 28, 2017
Expiration Date: APRIL 21, 2019

To verify the authenticity of this license, go to www.api.org/compositelist.

Vice President, API Global Industry Services

copper state rubber
CSR Specialties Company

14141 S. Wayside Drive
Houston, Texas 77048

Phone 713-644-1491
Fax 713-644-9830
www.copperstaterubber.com
sales@copperstaterubber.com

February 23, 2018

Independence Contracting Drilling
11601 N. Galayda St.
Houston, Texas 77086

Subject: Purchase Order No.: PO00116446
Date: February 23, 2018
Specialties Company File No.: CSR / SPECO-81069

Equipment: Copper State Rubber Choke/Kill Hose Assembly, 10KSI MAWP X 15KSI T/P, API 16C FSL3, Fire Resistant Cover, Complete 4-1/16" 10KSI MAWP Flange With BX155 SS Lined Ring Groove Each End. H2S Suited.
1EA: 3" ID X 75Ft. S/N-33851

CERTIFICATE OF COMPLIANCE

This is to certify the above referenced equipment meets or exceeds the following requirements and were manufactured from same material specification and manufacturing methods as prototype assemblies for referenced specifications.

I. COMPLETE HOSE ASSEMBLY
- A. API Certificate of Accreditation for Spec: Q1 (Quality Programs) and Spec.: 16C
  1. Copper State Rubber, Inc. Certificate No.: 16C-0383
- B. **CSR** Specification No.: 090-1915C

II. PHYSICAL/CHEMICAL PROPERTIES OF METAL COMPONENTS
- A. **API** Spec. 6A, latest edition
- B. **API** Spec. 16A, latest edition
- C. **NACE** Standard MR0175, latest edition

III. WELDMENTS/NDE REQUIREMENTS
- A. Section IX, **ASME** Boiler & Pressure Code, 1986 Ed., 1987 Add.
- B. CSR/Specialties Company WPS/PQR Nos.: 911171-1, and 911171-2, Rev. 05 dated June 2005

III. WELDMENTS/NDE REQUIREMENTS (continued)

C. **API** Spec. 6A, latest edition

D. **API** Spec. 16A, latest edition

Sincerely,

Joe Leeper,
Technical Department

copper state rubber

Visual Inspection / Hydrostatic Test Report

Manufacturer	Copper State Rubber Inc.
Hose Type	Choke and Kill
Pressure Rating	10,000 PSI MAWP X 15,000 PSI T/P
Spec Number	090-1915C-48
FSL Rating	FSL 3

Serial Number	33851
Size ID	3"
Length	75'
Date	December 9, 2017
Shop Order Number	31162

Connections Description: 4 1/16" 10K API FLANGE WITH SS INLAID BX-155 RING GROOVE EACH END

Traceability of Terminating Connectors

	Insert	Male	Nut	Female	Flanges	Hubs	Other
Connector 1	14C1				V4760		CSR-H1263
Connector 2	14C1				V4760		CSR-H1265

Comments

Calibrated Devices

Pressure Recorder	07459	Calibration Date	1/23/2017
Pressure Gauge	111291-2	Calibration Date	1/23/2017

*This report signifies that the product has been visually inspected for defects in the interior tube, recess, gasket, cover and branding and all have been found to be conforming.

Comments

Hydrostatic Testing Requirements

60 Min @ 15,000 psi (-0/+500 psi)

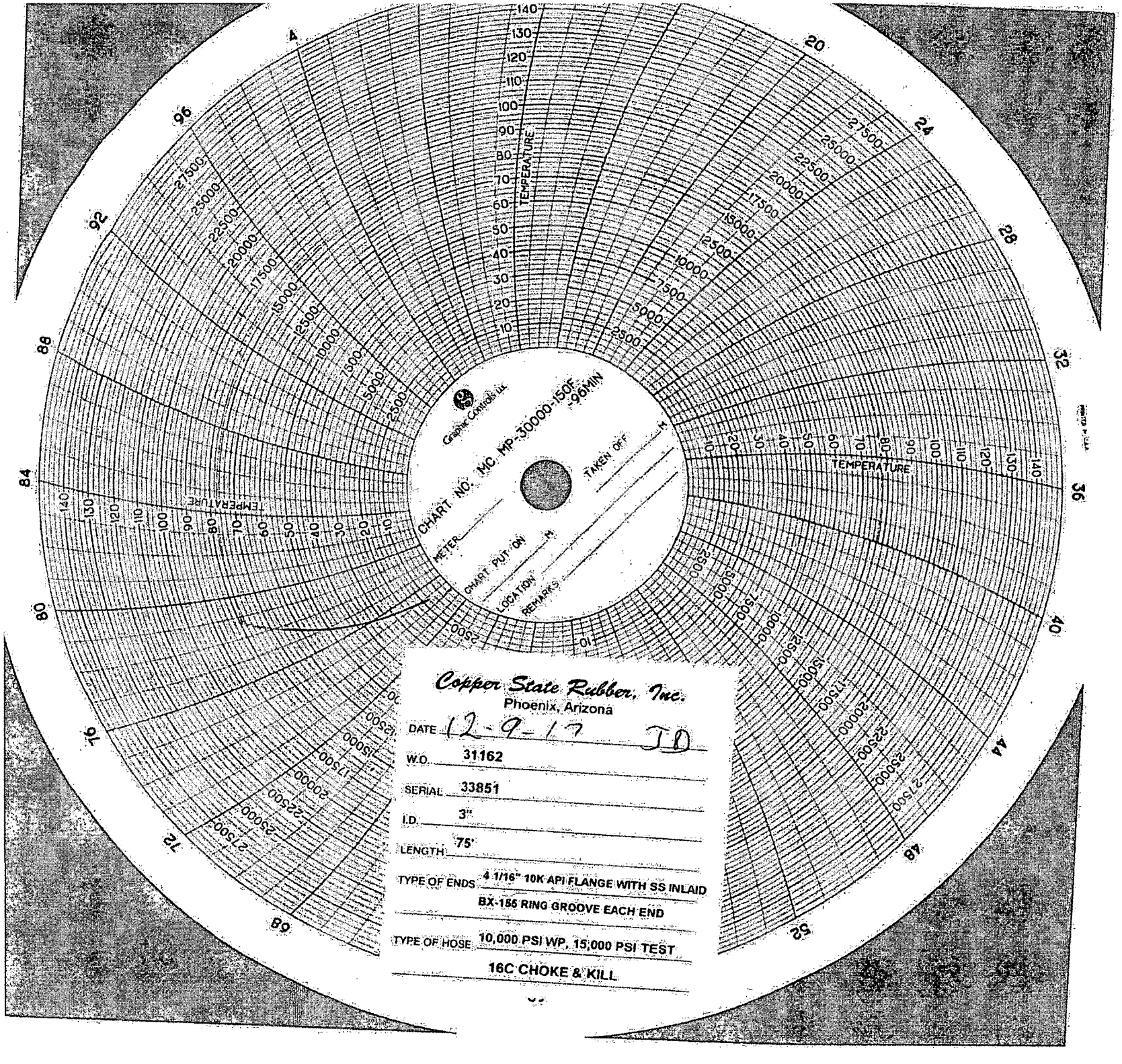
Length after test

75' OAL

Witness By: Phil Snider

Supervisor

INDEPENDENCE CONTRACT DRILLING
P.O. NO.: PO00116446
DATE: FEBRUARY 23, 2018
FILE NO.: CSR / SPECO-81069


Graphic Controls LLC
CHART NO. MC MP-30000-150F -96MIN
METER
CHART PUT ON
LOCATION
REMARKS
TAKEN OFF
TEMPERATURE
Copper State Rubber, Inc.
Phoenix, Arizona
DATE 12-9-17 JD
W.O. 31162
SERIAL 33851
I.D. 3"
LENGTH 75'
TYPE OF ENDS 4 1/16" 10K API FLANGE WITH SS INLAID
BX-155 RING GROOVE EACH END
TYPE OF HOSE 10,000 PSI WP, 15,000 PSI TEST
16C CHOKE & KILL

Novo Oil & Gas Northern Delaware Goonch Fed Com 04 Casing Variance Request

A variance is requested for an option to use a surface rig to drill the surface hole, set the surface casing, and cement the surface casing. If the schedule between rigs would preclude presetting the surface casing, then the primary rig will MIRU and drill all of the well.

Gnooch Fed Com 04 132H Alternative Casing Spec Request

Novo Oil & Gas Northern Delaware, LLC respectfully requests flexibility in the production casing spec in the event that drilling conditions and/or equipment availability determines the need for an alternate casing. The alternate casing specs are specified in the attached drill plan. The alternate casing spec sheets are attached.

ections

GB Connection Performance Properties Sheet

Rev. 1 (08/25/2015)

ENGINEERING THE RIGHT CONNECTIONS™

Casing:	**5.5 OD, 20 ppf**	**Connection:**	**GB CD Butt 6.300**
Casing Grade:	**P-110**	**Coupling Grade:**	**API P-110**

PIPE BODY GEOMETRY

Nominal OD (in.)	5 1/2	Wall Thickness (in.)	0.361	Drift Diameter (in.)	4.653
Nominal Weight (ppf)	20.00	Nominal ID (in.)	4.778	API Alternate Drift Dia. (in.)	N/A
Plain End Weight (ppf)	19.83	Plain End Area (in.^{2})	5.828		

PIPE BODY PERFORMANCE

Material Specification	P-110	Min. Yield Str. (psi)	110,000	Min. Ultimate Str. (psi)	125,000
Collapse		**Tension**		**Pressure**	
API (psi)	11,100	Pl. End Yield Str. (kips)	641	Min. Int. Yield Press. (psi)	12,640
High Collapse (psi)	N/A	**Torque**		**Bending**	
		Yield Torque (ft-lbs)	74,420	Build Rate to Yield (°/100 ft)	91.7

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.^{2})	8.527

GB CD Butt 6.300 CONNECTION PERFORMANCE RATINGS/EFFICIENCIES

Material Specification	API P-110	Min. Yield Str. (psi)	110,000	Min. Ultimate Str. (psi)	125,000
Tension		**Efficiency**		**Bending**	
Thread Str. (kips)	667	Internal Pressure (%)	100%	Build Rate to Yield (°/100 ft)	80.0
Min. Tension Yield (kips)	891	External Pressure (%)	100%	**Yield Torque**	
Min. Tension Ult. (kips)	1,013	Tension (%)	100%	Yield Torque (ft-lbs)	31,180
Joint Str. (kips)	667	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)*	29,620

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.

GBT Running Procedure (GBT RP): www.gbtubulars.com/pdf/RP-GB-DWC-Connections.pdf

Blanking Dimensions: www.gbtubulars.com/pdf/GB-DWC-Blanking-Dimensions.pdf

Connection yield torque rating based on physical testing or extrapolation therefrom

U. S. Steel Tubular Products

5.500" 20.00lbs/ft (0.361" Wall) P110 HC USS-CDC®

MECHANICAL PROPERTIES	Pipe	USS-CDC®	
Minimum Yield Strength	110,000	--	psi
Maximum Yield Strength	140,000	--	psi
Minimum Tensile Strength	125,000	--	psi

DIMENSIONS	Pipe	USS-CDC®	
Outside Diameter	5.500	6.050	in.
Wall Thickness	0.361	--	in.
Inside Diameter	4.778	4.778	in.
Standard Drift	4.653	4.653	in.
Alternate Drift	--	--	in.
Coupling Length	--	9.250	in.
Nominal Linear Weight, T&C	20.00	--	lbs/ft
Plain End Weight	19.83	--	lbs/ft

SECTION AREA	Pipe	USS-CDC®	
Critical Area	5.828	5.828	sq. in.
Joint Efficiency	--	100.0	%

PERFORMANCE	Pipe	USS-CDC®	
Minimum Collapse Pressure	12,200	12,200	psi
External Pressure Leak Resistance	--	9,760	psi
Minimum Internal Yield Pressure	12,640	12,370	psi
Minimum Pipe Body Yield Strength	641,000	--	lbs
Joint Strength	--	688,000	lbs
Compression Rating	--	413,000	lbs
Reference Length	--	22,933	ft
Maximum Uniaxial Bend Rating	--	59.1	deg/100 ft

MAKE-UP DATA	Pipe	USS-CDC®	
Make-Up Loss	--	4.63	in.
Minimum Make-Up Torque	--	10,500	ft-lbs
Maximum Make-Up Torque	--	13,000	ft-lbs
Connection Yield Torque	--	16,100	ft-lbs

1. Other than proprietary collapse and connection values, performance properties have been calculated using standard equations defined by API 5C3 and do not incorporate any additional design or safety factors. Calculations assume nominal pipe OD, nominal wall thickness and Specified Minimum Yield Strength (SMYS).
2. Uniaxial bending rating shown is structural only, and equal to compression efficiency.
3. Torques have been calculated assuming a thread compound friction factor of 1.0 and are recommended only. Field make-up torques may require adjustment based on actual field conditions (e.g. make-up speed, temperature, thread compound, etc.).
4. Reference length is calculated by joint strength divided by nominal threaded and coupled weight with 1.5 safety factor.
5. Connection external pressure leak resistance has been verified to 80% API pipe body collapse pressure following the guidelines of API 5C5 Call II.

U. S. Steel Tubular Products
460 Wildwood Forest Drive, Suite 300S
Spring, Texas 77380

1-877-893-9461
connections@uss.com
www.usstubular.com

AFMSS

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

SUPO Data Report

11/21/2019

APD ID: 10400045287 **Submission Date:** 08/02/2019

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

Well Type: OIL WELL **Well Work Type:** Drill

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - Existing Roads

Will existing roads be used? NO

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? NO

Section 3 - Location of Existing Wells

Existing Wells Map? NO

Attach Well map:

Existing Wells description: Fee Fee Fed- SUPO not required

Section 4 - Location of Existing and/or Proposed Production Facilities

Submit or defer a Proposed Production Facilities plan? DEFER

Estimated Production Facilities description: Fee Fee Fed- SUPO not required

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

Section 5 - Location and Types of Water Supply

Water Source Table

Water source type: OTHER

Describe type: Fee Fee Fed- SUPO not required

Water source use type: OTHER **Describe use type:** Fee Fee Fed- SUPO not required

Source latitude: **Source longitude:**

Source datum:

Water source permit type: OTHER

Water source transport method: TRUCKING

Source land ownership: OTHER **Describe land ownership:** Fee Fee Fed- SUPO not re

Source transportation land ownership: OTHER **Describe transportation land ownership:** Fee Fee Fe

Water source volume (barrels): 1 **Source volume (acre-feet):** 0.00012889

Source volume (gal): 42

Water source and transportation map:

Gnooch_Fed_Com_04_Fee_Fee_Fed_20190802131929.pdf

Water source comments:

New water well? N

New Water Well Info

Well latitude: **Well Longitude:** **Well datum:**

Well target aquifer:

Est. depth to top of aquifer(ft): **Est thickness of aquifer:**

Aquifer comments:

Aquifer documentation:

Well depth (ft): **Well casing type:**

Well casing outside diameter (in.): **Well casing inside diameter (in.):**

New water well casing? **Used casing source:**

Drilling method: **Drill material:**

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

Casing length (ft.): **Casing top depth (ft.):**

Well Production type: **Completion Method:**

Water well additional information:

State appropriation permit:

Additional information attachment:

Section 6 - Construction Materials

Using any construction materials: NO

Construction Materials description:

Construction Materials source location attachment:

Section 7 - Methods for Handling Waste

Waste type: DRILLING

Waste content description: Fee Fee Fed- SUPO not required

Amount of waste: 0 barrels

Waste disposal frequency : Daily

Safe containment description: Fee Fee Fed- SUPO not required

Safe containmant attachment:

Waste disposal type: OTHER **Disposal location ownership:** OTHER

Disposal type description: Fee Fee Fed- SUPO not required

Disposal location description: Fee Fee Fed- SUPO not required

Reserve Pit

Reserve Pit being used? N

Temporary disposal of produced water into reserve pit? NO

Reserve pit length (ft.) **Reserve pit width (ft.)**

Reserve pit depth (ft.) **Reserve pit volume (cu. yd.)**

Is at least 50% of the reserve pit in cut?

Reserve pit liner

Reserve pit liner specifications and installation description

Cuttings Area

Cuttings Area being used? NO

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

Are you storing cuttings on location?

Description of cuttings location

Cuttings area length (ft.) **Cuttings area width (ft.)**

Cuttings area depth (ft.) **Cuttings area volume (cu. yd.)**

Is at least 50% of the cuttings area in cut?

WCuttings area liner

Cuttings area liner specifications and installation description

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: N

Ancillary Facilities attachment:

Comments:

Section 9 - Well Site Layout

Well Site Layout Diagram:

Goonch_04_132H_Well_Site_Layout_20191001103644.pdf

Comments:

Section 10 - Plans for Surface Reclamation

Type of disturbance: No New Surface Disturbance **Multiple Well Pad Name:** Gnooch Fed Com 04

Multiple Well Pad Number: 131H (Pad G)

Recontouring attachment:

Gnooch_Fed_Com_04_Fee_Fee_Fed_20190802132413.pdf

Drainage/Erosion control construction: Fee Fee Fed- SUPO not required

Drainage/Erosion control reclamation: Fee Fee Fed- SUPO not required

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

Well pad proposed disturbance (acres):
Road proposed disturbance (acres):
Powerline proposed disturbance (acres):
Pipeline proposed disturbance (acres):
Other proposed disturbance (acres):
Total proposed disturbance: 0

Well pad interim reclamation (acres): 0
Road interim reclamation (acres): 0
Powerline interim reclamation (acres): 0
Pipeline interim reclamation (acres): 0
Other interim reclamation (acres): 0
Total interim reclamation: 0

Well pad long term disturbance (acres): 0
Road long term disturbance (acres): 0
Powerline long term disturbance (acres): 0
Pipeline long term disturbance (acres): 0
Other long term disturbance (acres): 0
Total long term disturbance: 0

Disturbance Comments:

Reconstruction method: Fee Fee Fed- SUPO not required

Topsoil redistribution: Fee Fee Fed- SUPO not required

Soil treatment: Fee Fee Fed- SUPO not required

Existing Vegetation at the well pad: Fee Fee Fed- SUPO not required

Existing Vegetation at the well pad attachment:

Existing Vegetation Community at the road: Fee Fee Fed- SUPO not required

Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline: Fee Fee Fed- SUPO not required

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances: Fee Fee Fed- SUPO not required

Existing Vegetation Community at other disturbances attachment:

Non native seed used? N

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? N

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation? N

Seed harvest description:

Seed harvest description attachment:

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

Seed Management

Seed Table

Seed type: **Seed source:**

Seed name:

Source name: **Source address:**

Source phone:

Seed cultivar:

Seed use location:

PLS pounds per acre: **Proposed seeding season:**

Seed Summary

Total pounds/Acre:

Seed Type	Pounds/Acre

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

First Name: **Last Name:**

Phone: **Email:**

Seedbed prep:

Seed BMP:

Seed method:

Existing invasive species? N

Existing invasive species treatment description:

Existing invasive species treatment attachment:

Weed treatment plan description: Fee Fee Fed- SUPO not required

Weed treatment plan attachment:

Monitoring plan description: Fee Fee Fed- SUPO not required

Monitoring plan attachment:

Success standards: Fee Fee Fed- SUPO not required

Pit closure description: No pit

Pit closure attachment:

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

Section 11 - Surface Ownership

Disturbance type: WELL PAD

Describe:

Surface Owner: OTHER

Other surface owner description: Fee Fee Fed- SUPO not required

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland: **USFS Ranger District:**

Section 12 - Other Information

Right of Way needed? N **Use APD as ROW?**

ROW Type(s):

ROW Applications

SUPO Additional Information:

Use a previously conducted onsite? N

Previous Onsite information:

Other SUPO Attachment

Novo Oil & Gas Northern Delaware LLC Gnooch Fed Com 04

Fee Fee Fed – SUPO not required

Novo Oil & Gas Northern Delaware LLC Gnooch Fed Com 04

Fee Fee Fed – SUPO not required

APD ID: 10400045287 **Submission Date:** 08/02/2019

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

Well Type: OIL WELL **Well Work Type:** Drill

Section 1 - General

Would you like to address long-term produced water disposal? NO

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? N

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

Lined pit Monitor description:

Lined pit Monitor attachment:

Lined pit: do you have a reclamation bond for the pit?

Is the reclamation bond a rider under the BLM bond?

Lined pit bond number:

Lined pit bond amount:

Additional bond information attachment:

Section 3 - Unlined Pits

Would you like to utilize Unlined Pit PWD options? N

Produced Water Disposal (PWD) Location:

PWD disturbance (acres): **PWD surface owner:**

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

Do you propose to put the produced water to beneficial use?

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

Does the produced water have an annual average Total Dissolved Solids (TDS) concentration equal to or less than that of the existing water to be protected?

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

Unlined pit: do you have a reclamation bond for the pit?

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information attachment:

Section 4 - Injection

Would you like to utilize Injection PWD options? N

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Injection PWD discharge volume (bbl/day):

Injection well mineral owner:

Injection well type:

Injection well number: **Injection well name:**

Assigned injection well API number? **Injection well API number:**

Injection well new surface disturbance (acres):

Minerals protection information:

Mineral protection attachment:

Underground Injection Control (UIC) Permit?

UIC Permit attachment:

Section 5 - Surface Discharge

Would you like to utilize Surface Discharge PWD options? N

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Surface discharge PWD discharge volume (bbl/day):

Surface Discharge NPDES Permit?

Surface Discharge NPDES Permit attachment:

Surface Discharge site facilities information:

Surface discharge site facilities map:

Section 6 - Other

Would you like to utilize Other PWD options? N

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

Other PWD type description:

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:

AFMSS

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

Bond Info Data Report

11/21/2019

APD ID: 10400045287 **Submission Date:** 08/02/2019

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: GOONCH FED COM 04 **Well Number:** 132H

Well Type: OIL WELL **Well Work Type:** Drill

Highlighted data reflects the most recent changes

Show Final Text

Bond Information

Federal/Indian APD: FED

BLM Bond number: NMB001536

BIA Bond number:

Do you have a reclamation bond? NO

Is the reclamation bond a rider under the BLM bond?

Is the reclamation bond BLM or Forest Service?

BLM reclamation bond number:

Forest Service reclamation bond number:

Forest Service reclamation bond attachment:

Reclamation bond number:

Reclamation bond amount:

Reclamation bond rider amount:

Additional reclamation bond information attachment: