

RECEIVED

JUN 03 2019

DISTRICT II ARTESIAN CO.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

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

5. Lease Serial No.
NMNM061349

6. If Indian, Allottee or Tribe Name

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

8. Lease Name and Well No.

RANA SALADA FED COM 0504
133H 325748

9. API Well No.

30-015-46086

10. Field and Pool, or Exploratory
CULEBRA BLUFF / BONE SPRING SOU

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 6 / T23S / R29E / NMP

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

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

3a. Address 3b. Phone No. (include area code)
1001 West Wilshire Boulevard Suite 206 Oklahoma City O (405)404-0414

4. Location of Well (Report location clearly and in accordance with any State requirements. *)
At surface NESE / 1443 FSL / 612 FEL / LAT 32.3309826 / LONG -104.0175754
At proposed prod. zone NESE / 1870 FSL / 330 FEL / LAT 32.3322813 / LONG -103.9823504

14. Distance in miles and direction from nearest town or post office*
5 miles

12. County or Parish
EDDY 13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft.
(Also to nearest drig. unit line, if any)
612 feet

16. No of acres in lease
937.86

17. Spacing Unit dedicated to this well
320

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.
200 feet

19. Proposed Depth
9761 feet / 20017 feet

20. BLM/BIA Bond No. in file
FED: NMB001536

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3041 feet

22. Approximate date work will start*
10/01/2018

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

25. Signature
(Electronic Submission)

Name (Printed/Typed)
Brian Wood / Ph: (505)466-8120

Date
07/30/2018

Title
President

Approved by (Signature)
(Electronic Submission)

Name (Printed/Typed)
Cody Layton / Ph: (575)234-5959

Date
05/30/2019

Title
Assistant Field Manager Lands & Minerals

Office
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: 05/30/2019

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

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

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

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

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

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

NOTICES

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

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

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

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

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

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

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

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

Additional Operator Remarks

Location of Well

1. SHL: NESE / 1443 FSL / 612 FEL / TWSP: 23S / RANGE: 29E / SECTION: 6 / LAT: 32.3309826 / LONG: -104.0175754 (TVD: 0 feet, MD: 0 feet)
PPP: NESE / 1443 FSL / 612 FEL / TWSP: 23S / RANGE: 29E / SECTION: 6 / LAT: 32.3309826 / LONG: -104.0175754 (TVD: 0 feet, MD: 0 feet)
PPP: NWSW / 1860 FSL / 0 FWL / TWSP: 23S / RANGE: 29E / SECTION: 5 / LAT: 32.332096 / LONG: -104.015553 (TVD: 9652 feet, MD: 9761 feet)
PPP: NWSW / 1860 FSL / 0 FWL / TWSP: 23S / RANGE: 29E / SECTION: 4 / LAT: 32.332193 / LONG: -103.998412 (TVD: 9761 feet, MD: 15067 feet)
BHL: NESE / 1870 FSL / 330 FEL / TWSP: 23S / RANGE: 29E / SECTION: 4 / LAT: 32.3322813 / LONG: -103.9823504 (TVD: 9761 feet, MD: 20017 feet)

BLM Point of Contact

Name: Tenille Ortiz

Title: Legal Instruments Examiner

Phone: 5752342224

Email: tortiz@blm.gov

Review and Appeal Rights

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

PECOS DISTRICT DRILLING OPERATIONS CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Novo Oil and Gas Northern Delaware LLC		
LEASE NO.:	NMNM061349		
WELL NAME & NO.:	Rana Salada Fed Com 0504 133H		
SURFACE HOLE FOOTAGE:	1443' FSL & 612' FEL		
BOTTOM HOLE FOOTAGE:	1870' FSL & 330' FEL		
LOCATION:	Section 6, T 23S, R 29E, NMPM		
COUNTY:	Eddy County, New Mexico		

H2S	☐ Yes	☒ No	
Potash	☐ None	☐ Secretary	☒ R-111-P
Cave/Karst Potential	☐ Low	☒ Medium	☐ High
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

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

B. CASING

1. Wait on cement (WOC) time for primary cement jobs in R-111 Potash will be a minimum of **24 hours** or **500 psi** compressive strength, whichever is greater. This is to include the lead cement. WOC time shall be recorded in the driller's log. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
2. The **13-3/8"** surface casing shall be set at approximately **250'** (a minimum of 75' into the Rustler Anhydrite and 25' above the salt) and cemented to surface.
 - a. **If cement does not circulate to 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 6 hours after pumping cement, ideally between 8-10 hours after completing the cement job.
 - b. If cement falls back, a remedial job will be done prior to drilling out that string.
 - c. WOC time for a remedial job will be a minimum of 4 hours after bringing cement

to surface or 500 psi compressive strength, whichever is greater.

2. The 9-5/8" intermediate casing shall be cemented to surface.
 - a. **If cement does not circulate to surface**, see B.1.a-c.
3. The 5-1/2" production casing shall be cemented to surface.
 - a. **If cement does not circulate to surface**, see B.1.a-c.
 - b. **This casing is only approved in an 8.75" open hole** as described in the attached Novo Drilling Program. As discussed with Novo, there was a typo of the production hole size in the AFMSS casing design (reads 6.75" instead of 8.75"). This casing does not meet the 0.422" clearance requirements in a 6.75" open hole.

C. PRESSURE CONTROL

1. 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.
2. Blowout prevention equipment shall be installed per Onshore Order 2 III.A.2.a.iv and tested per Onshore Order 2 III.A.2.i.
3. 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).

D. SPECIAL REQUIREMENTS

1. 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.
2. The well sign on location shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

DR 5/29/2019

GENERAL REQUIREMENTS

1. 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)
 - ☒ Chaves and Roosevelt Counties
Call the Roswell Field Office, 2909 West Second St., Roswell NM 88201.
During office hours call (575) 627-0272.
After office hours call (575)
 - ☒ 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
2. 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.
3. 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.
4. The record of the drilling rate along with the GR/N well log (one log per well pad is acceptable) 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 Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
3. 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.
4. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.
5. 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.
6. 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.
7. 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. 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.
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. The results of the test shall be reported to the appropriate BLM office.
 - 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. 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.
- f. 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. This test shall be performed prior to the test at full stack pressure.
- g. 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

- 1. 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

- 1. 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.
- 2. Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

**PECOS DISTRICT
SURFACE USE
CONDITIONS OF APPROVAL**

OPERATOR'S NAME: Novo Oil & Gas Delaware, LLC
LEASE NO.: NMNM 091078 / 061349 / 059383
LOCATION: Section 1, T. 23 S., R. 28 E., NMPM
COUNTY: Eddy County, New Mexico

Rana Salada Federal Com 0605 121H

Surface Hole Location: 1127 ft. FNL and 335 ft. FEL; Section 1, T. 23 S., R. 28 E.

**Bottom Hole Location (at proposed production zone): 330 ft. FNL and 1650 ft. FEL;
Section 5, T. 23 S., R. 29 E.**

Rana Salada Federal Com 0605 211H

Surface Hole Location: 1127 ft. FNL and 365 ft. FEL; Section 1, T. 23 S., R. 28 E.

**Bottom Hole Location (at proposed production zone): 330 ft. FNL and 330 ft. FEL;
Section 5, T. 23 S., R. 29 E.**

Rana Salada Federal Com 0605 231H

Surface Hole Location: 1127 ft. FNL and 395 ft. FEL; Section 1, T. 23 S., R. 28 E.

**Bottom Hole Location (at proposed production zone): 330 ft. FNL and 330 ft. FEL;
Section 5, T. 22 S., R. 29 E.**

TABLE OF CONTENTS

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

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

- Well Structures & Facilities
- ☐ **Interim Reclamation**
- ☐ **Final Abandonment & Reclamation**

GENERAL PROVISIONS

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

I. PERMIT EXPIRATION

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

II. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES

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

III. NOXIOUS WEEDS

The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, pads, associated pipeline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult

with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

IV. SPECIAL REQUIREMENT(S)

Hydrology:

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

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

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

Cave/Karst:

Construction:

General Construction:

- No blasting
- The BLM, Carlsbad Field Office, will be informed immediately if any subsurface drainage channels, cave passages, or voids are penetrated during construction, and no additional construction shall occur until clearance has been issued by the Authorized Officer.
- All linear surface disturbance activities will avoid sinkholes and other karst features to lessen the possibility of encountering near surface voids during

construction, minimize changes to runoff, and prevent untimely leaks and spills from entering the karst drainage system.

- All spills or leaks will be reported to the BLM immediately for their immediate and proper treatment.

Pad Construction:

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

Tank Battery Construction:

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

Road Construction:

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

Leak Detection System:

- A method of detecting leaks is required. The method could incorporate gauges to measure loss, siting values and lines so they can be visually inspected, or installing electronic sensors to alarm when a leak is present.
- A leak detection plan will be submitted to BLM that incorporates an automatic shut off system (see below) to minimize the effects of an undesirable event that could negatively sensitive cave/karst resources.
- Well heads, pipelines (surface and buried), storage tanks, and all supporting equipment should be monitored regularly after installation to promptly identify and fix leaks.

Automatic Shut-off Systems:

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

Cave/Karst Subsurface Mitigation

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

Closed Loop System:

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

Rotary Drilling with Fresh Water:

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

Directional Drilling:

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

Lost Circulation:

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

Abandonment Cementing:

- Additional plugging conditions of approval may be required upon well abandonment in high and medium karst potential occurrence zones.

- The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore.

Pressure Testing:

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

V. CONSTRUCTION

A. NOTIFICATION

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

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

B. TOPSOIL

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

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

C. CLOSED LOOP SYSTEM

Tanks are required for drilling operations: No Pits.

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

D. FEDERAL MINERAL MATERIALS PIT

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

E. WELL PAD SURFACING

Surfacing of the well pad is not required.

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

F. EXCLOSURE FENCING (CELLARS & PITS)

Exclosure Fencing

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

G. ON LEASE ACCESS ROADS

Road Width

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

Surfacing

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

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

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

Crowning

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

Ditching

Ditching shall be required on both sides of the road.

Turnouts

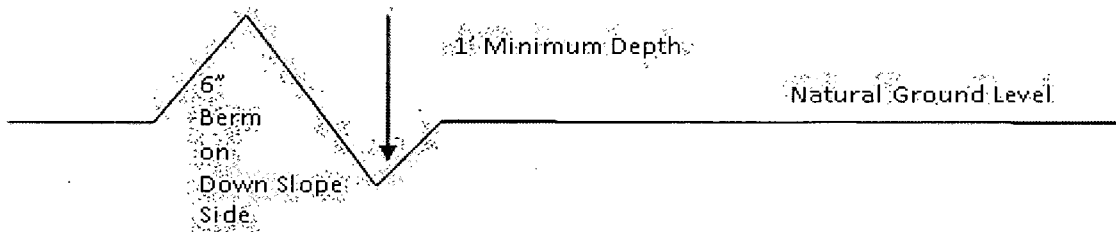
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

Drainage

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

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

Cross Section of a Typical Lead-off Ditch



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

Formula for Spacing Interval of Lead-off Ditches

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

Cattle guards

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

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

Fence Requirement

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

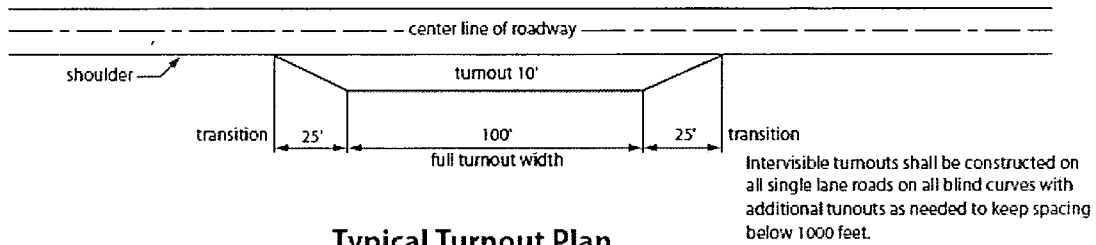
Public Access

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

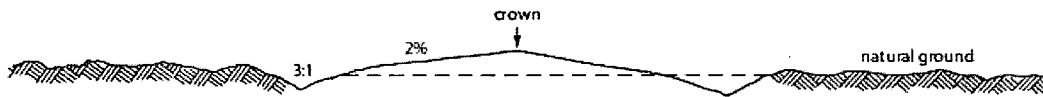
Construction Steps

1. Salvage topsoil
2. Construct road

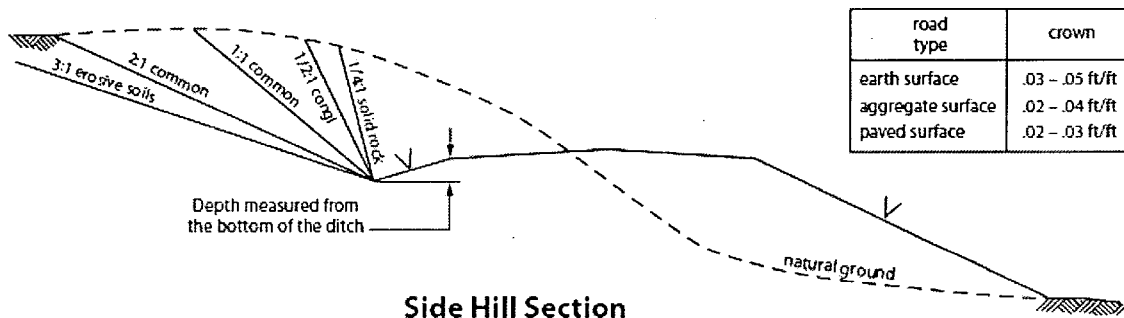
3. Redistribute topsoil
4. Revegetate slopes



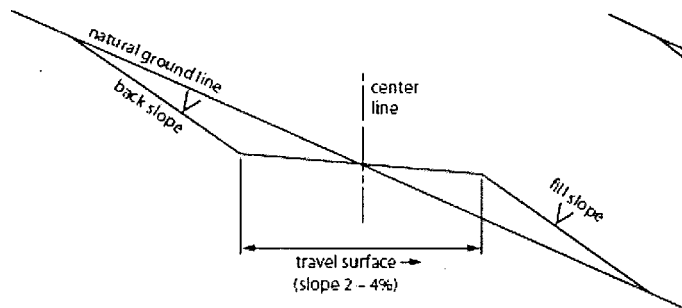
Typical Turnout Plan



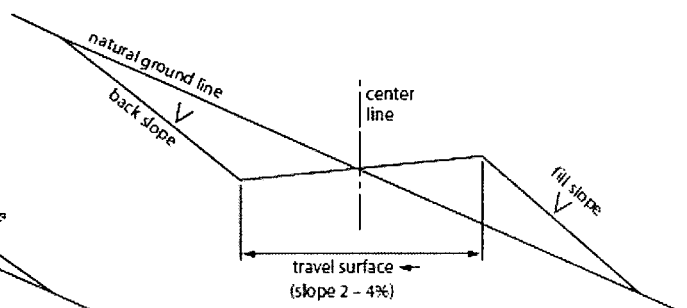
Level Ground Section



Side Hill Section



Typical Outsloped Section



Typical Insloped Section

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

VI. PRODUCTION (POST DRILLING)

A. WELL STRUCTURES & FACILITIES

Placement of Production Facilities

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

Exclosure Netting (Open-top Tanks)

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

Chemical and Fuel Secondary Containment and Exclosure Screening

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

Open-Vent Exhaust Stack Exclosures

The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. (*Recommended exclosure structures on open-vent exhaust stacks are in the shape of a cone.*) Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, in-line units, and compressor mufflers.

Containment Structures

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

Painting Requirement

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

VII. INTERIM RECLAMATION

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

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

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

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

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

VIII. FINAL ABANDONMENT & RECLAMATION

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

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

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

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

Seed Mixture 2, for Sandy Sites

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

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

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

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

*Pounds of pure live seed:

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



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

Operator Certification Data Report

05/30/2019

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: 07/30/2018

Title: President

Street Address: 37 Verano Loop

City: Santa Fe

State: NM

Zip: 87508

Phone: (505)466-8120

Email address: afmss@permitswest.com

Field Representative

Representative Name:

Street Address:

City:

State:

Zip:

Phone:

Email address:



APD ID: 10400032591

Submission Date: 07/30/2018

Highlighted data
reflects the most
recent changes

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0504

Well Number: 133H

[Show Final Text](#)

Well Type: CONVENTIONAL GAS WELL

Well Work Type: Drill

Section 1 - General

APD ID: 10400032591

Tie to previous NOS?

Submission Date: 07/30/2018

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: NMNM061349

Lease Acres: 937.86

Surface access agreement in place?

Allotted?

Reservation:

Agreement in place? NO

Federal or Indian agreement:

Agreement number:

Agreement name:

Keep application confidential? NO

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: RANA SALADA FED COM 0504

Well Number: 133H

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? POTASH

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0504

Well Number: 133H

Describe other minerals:

Is the proposed well in a Helium production area? N **Use Existing Well Pad?** NO **New surface disturbance?**

Type of Well Pad: MULTIPLE WELL

Multiple Well Pad Name: RANA **Number:** 3

Well Class: HORIZONTAL

SALADA 0504

Number of Legs: 1

Well Work Type: Drill

Well Type: CONVENTIONAL GAS WELL

Describe Well Type:

Well sub-Type: INFILL

Describe sub-type:

Distance to town: 5 Miles

Distance to nearest well: 200 FT

Distance to lease line: 612 FT

Reservoir well spacing assigned acres Measurement: 320 Acres

Well plat: RS_133H_Plat_GasCap_Plan_20180730160447.pdf

Well work start Date: 10/01/2018

Duration: 90 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83

Vertical Datum: NAVD88

Survey number: 12797

	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
SHL Leg #1	144 3	FSL	612	FEL	23S	29E	6	Aliquot NESE	32.33098 26	- 104.0175 754	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMNM 061349	304 1	0	0
KOP Leg #1	184 8	FSL	142	FEL	23S	29E	6	Aliquot NESE	32.33209 15	- 104.0160 537	DON A ANA	NEW MEXI CO	NEW MEXI CO	F	NMNM 061349	- 624 3	933 6	928 4
PPP Leg #1	144 3	FSL	612	FEL	23S	29E	6	Aliquot NESE	32.33098 26	- 104.0175 754	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMNM 061349	304 1	0	0

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0504

Well Number: 133H

	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
PPP Leg #1	186 0	FSL	0	FWL	23S	29E	5	Aliquot NWS W	32.33209 6	- 104.0155 53	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMNM 059383	- 661 1	976 1	965 2
PPP Leg #1	186 0	FSL	0	FWL	23S	29E	4	Aliquot NWS W	32.33219 3	- 103.9984 12	DON A ANA	NEW MEXI CO	NEW MEXI CO	F	NMNM 121951	- 672 0	150 67	976 1
EXIT Leg #1	187 0	FSL	330	FEL	23S	29E	4	Aliquot NESE	32.33228 13	- 103.9823 504	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMLC0 069506	- 672 0	200 17	976 1
BHL Leg #1	187 0	FSL	330	FEL	23S	29E	4	Aliquot NESE	32.33228 13	- 103.9823 504	EDD Y	NEW MEXI CO	NEW MEXI CO	F	NMLC0 069506	- 672 0	200 17	976 1

Alternatives to Reduce Flaring

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

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

APD ID: 10400032591

Submission Date: 07/30/2018

Highlighted data
reflects the most
recent changes

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0504

Well Number: 133H

[Show Final Text](#)

Well Type: CONVENTIONAL GAS WELL

Well Work Type: Drill

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
1	QUATERNARY	3041	0	0		USEABLE WATER	No
2	RUSTLER ANHYDRITE	2753	288	288		NONE	No
3	SALADO	2307	734	734	SALT	NONE	No
4	CASTILE	1660	1381	1381	ANHYDRITE	NONE	No
5	BELL CANYON	185	2856	2856	SANDSTONE	NATURAL GAS,OIL	No
6	CHERRY CANYON	-906	3947	3947	SANDSTONE	NATURAL GAS,OIL	No
7	BRUSHY CANYON	-1911	4950	4953	SANDSTONE	NATURAL GAS,OIL	No
8	BONE SPRING	-3405	6446	6453	LIMESTONE	NATURAL GAS,OIL	No
9	BONE SPRING 1ST	-4505	7546	7580	SANDSTONE	NATURAL GAS,OIL	No
10	BONE SPRING 2ND	-4795	7836	7876	OTHER : Carbonate	NATURAL GAS,OIL	No
11	BONE SPRING 2ND	-5248	8289	8335	SANDSTONE	NATURAL GAS,OIL	No
12	BONE SPRING 3RD	-5613	8654	8705	OTHER : Carbonate	NATURAL GAS,OIL	No
13	BONE SPRING 3RD	-6470	9511	9573	SANDSTONE	NATURAL GAS,OIL	Yes

Section 2 - Blowout Prevention

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0504

Well Number: 133H

Pressure Rating (PSI): 5M

Rating Depth: 12000

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. The 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. The 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 co-flex pressure test certificate will be on the location when testing the BOP. Surface casing will be pressure tested to 250-psi low and 1500-psi high. Intermediate casing will be pressure tested to 250-psi low and 70% of burst pressure (4025 psi) for 30 minutes.

Choke Diagram Attachment:

RS_133H_Choke_20190219123206.pdf

BOP Diagram Attachment:

RS_133H_BOP_20180730160425.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	225	0	225	3041		225	J-55	54.5	OTHER - BTC	1.125	1.125	DRY	1.6	DRY	1.6
2	INTERMEDIATE	12.25	9.625	NEW	API	N	0	2970	0	2970	3041		2970	J-55	40	OTHER - BTC	1.125	1.125	DRY	1.6	DRY	1.6
3	PRODUCTION	6.75	5.5	NEW	API	N	0	20017	0	9761	3041		20017	P-110	20	OTHER - DQX, GBCD, CDC, DWC/C	1.125	1.125	DRY	1.6	DRY	1.6

Casing Attachments

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0504

Well Number: 133H

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

RS_133H_Casing_Design_Assumptions_20180730161959.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

RS_133H_Casing_Design_Assumptions_20180730162044.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

RS_133H_Casing_Design_Assumptions_20180730162726.pdf

RS_133H_5.5in_Casing_Spec_20190219124244.pdf

Section 4 - Cement

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0504

Well Number: 133H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	250	0	0	0	0	0	None	None
SURFACE	Tail		0	250	193	1.62	13.8	312	100	Class C	Gel + accelerator + LCM
INTERMEDIATE	Lead		0	2970	372	2.28	11.9	848	20	Class C	gel + retarder + LCM
INTERMEDIATE	Tail		0	2970	200	1.34	14.8	268	20		gel + retarder + LCM
PRODUCTION	Lead		0	2001 7	692	4.08	9.2	2822	20	Class H	fluid loss + retarder + LCM + extender and beads
PRODUCTION	Tail		0	2001 7	2285	1.42	13.2	3245	20	Class H	fluid loss + retarder + LCM

Section 5 - Circulating Medium

Mud System Type: Closed

Will an air or gas system be Used? NO

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

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

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

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	500	OTHER : Fresh water spud	8.3	8.3							
500	5200	OTHER : Brine or cut brine	9.8	10.2							

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0504

Well Number: 133H

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
5200	2001 7	OIL-BASED MUD	8.5	10							

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 will be log will be acquired by MDW tools from the intermediate casing to TD.

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

GR

Coring operation description for the well:

No core or drill stem test is planned.

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 4851

Anticipated Surface Pressure: 2703.58

Anticipated Bottom Hole Temperature(F): 150

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

Describe:

Contingency Plans geohazards description:

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

RS_133H_H2S_Plan_20180730162512.pdf

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0504

Well Number: 133H

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

RS_133H_Horizontal_Drill_Plan_20180730162559.pdf

Other proposed operations facets description:

1/11/19 Deficiency states that First and Last Take point should be mentioned on C-102; current C-102 is correct and mentions both.

Other proposed operations facets attachment:

RS_133H_Wellhead_Specs_20180730162624.pdf

RS_133H_Drill_Plan_Revised_4_5_19_20190408093540.pdf

Other Variance attachment:

RS_133H_Casing_Cement_Variance_20180730162650.pdf



NOVO OIL & GAS, LLC

Date

1/15/2019

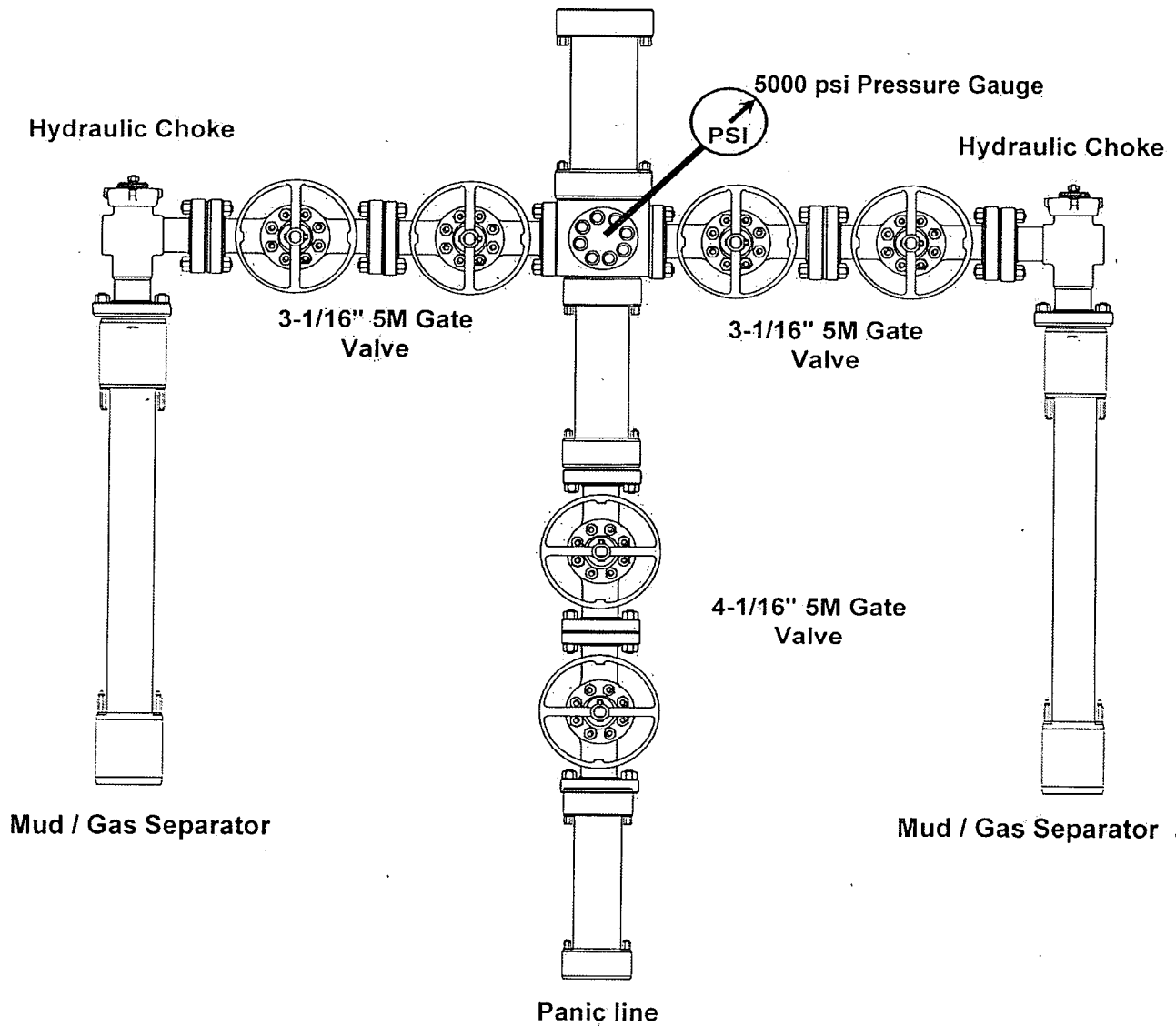
1001 West Wilshire Boulevard, Suite 206
Oklahoma City, Oklahoma 73116

Page No.

1 of 1

5M CHOKE MANIFOLD SCHEMATIC

ITEM	SIZE	PRESSURE	DESCRIPTION



ITEM	SIZE	PRESSURE	DESCRIPTION

ITEM	SIZE	PRESSURE	DESCRIPTION



NOVO OIL & GAS, LLC

Date

5/22/2018

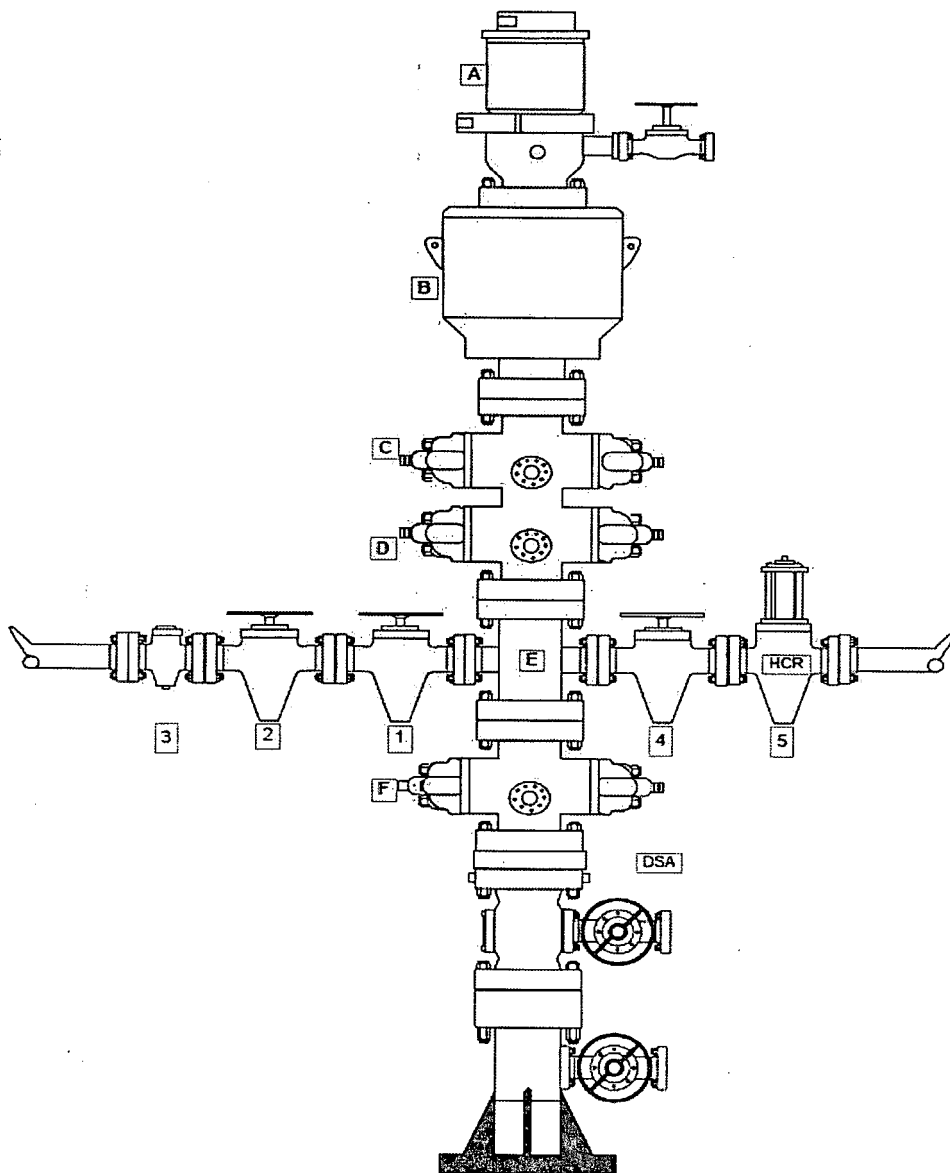
105 North Hudson Ave, Suite 500
Oklahoma City, Oklahoma 73102

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 + Orbit 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	2-1/16"	5,000 psi	Gate Valve
2	2-1/16"	5,000 psi	Gate Valve
3	2-1/16"	5,000 psi	Check Valve

CHOKE LINE			
ITEM	SIZE	PRESSURE	DESCRIPTION
4	2-1/16"	5,000 psi	Gate Valve
5	2-1/16"	5,000 psi	HCR Valve



POWERING PROGRESS™

MTR DATA BOOK

CUSTOMER: AUSTIN DISTRIBUTING

DATE: 11/20/2014

Purchase Order: PENDING

Sales Order #: 205663

Product Description: 10K3.566.0CK4.1/1610KFLGE/E L/E

Hose S/N: D-112014-10

CONTENTS INCLUDED

1	GMCO FITTINGS
	14-177-1 INSERT STEM
	14-245-1 INSERT HEAD
	14-242-1 FERRULE
2	EDWARDS FABRICATION LIFT EYE CLAMPS
	19351, 19356 Individual Test Certificates for Each Clamp
3	4 1/16 10K FLANGES
	R20834 Heat Numbers
4	WELDING SPECIFICATIONS
	Certification and Procedure for welding
5	NDE RESULTS
	1921 Ultrasonic Test Results and Imaging
6	TEST CHART
	Chart Recording of Hydrostatic Test
7	TEST CERTIFICATE
	Document Product Details & Positive Results of Hydrostatic Testing
8	CERTIFICATE OF CONFORMANCE
	A Declaration of the conformity with the type approval
9	IMAGES
	Images of the product prior to shipping.
10	PACKING LIST
	Details of Shipping Contents, Dimensions and Weights



PLYMOUTH TUBE CO. USA
 572 W State Road 14, Winamac, Indiana 46996
 Phone: (574) 946-3125 Fax-Cold Draw: (574) 946-3850 Fax-Hot Mill: (574) 946-7220

PRODUCT CERTIFICATION

SALES ORDER - LINE / RLS

119679 - 1 / 1

WORK ORDER 006409

HEAT NUMBER 486597

MELT SOURCE TMK IPSCO Koppel-USA Mfg/Melt

SOLD TO

J P Steel

6811 FM 362

Brookshire, TX 77423

USA

956 HXXX +64-15

14-177-1

ISO 9001: 2008
Registered

CUSTOMER P.O. 17554	CUSTOMER PART JP 3.562X.531	QUANTITY 9,736.34 Lb	LADING NO 00071757	CERT ID / REV 01	CERT DATE 06/18/2014								
PART DESCRIPTION EJ35620531DR1724-00 Spec: ASTM A-519 Seamless Mech. Alloy Smls Mechanical, HF [D/E] Smls Q&T Grade: 4130 OD: 3.5625" Tol+.0360" Tol-.0360" Wall: 0.5310" Tol+.0530" Tol-.0530" AW Lgth Type: Random Lgth: 17.00' / 24.00' End Finish: Debur ID & OD Finish Type: Quench & Temper L80/N80 Oil: Light Oil													
CERTIFICATION REQUIREMENTS ASTM A-519-06 / API 5CT Quench & Tempered. Induction heated, water quenched and infrared pyrometer monitored. Tensiles tested were 1" STRIP specimens per A370. Ultrasonic tested and passed. Tubes UT Inspected to ASTM E213/API 5CT 10.15 and SR2 requirements w/ 5% notches. Test covered 100% full length of OD & ID surfaces both longitudinal & transverse.													
Chemical Analysis													
C .31	Mn .51	P .011	S .003	Si .27	Al .015	Cr .97	Mo .21	Ni .13	Pb -----	Cu .16	V .006	Ti -----	Sn .008
Cb .001	Ca .0017	N .0095	As .0039	Sb .0014	H -----								
Product Checks													
CHK01	C .317	Mn .52	P .012	S .005	Si .275	Al .016	Cr .96	Mo .211	Ni .123	Pb	Cu .148	V .0034	Ti
CHK02	.31	.52	.011	.0043	.275	.016	.96	.211	.123		.147	.0035	
CHK01	Sn .0091	Cb .000	Ca .0017	N .0000	As .0095	Sb .0000	H						
CHK02	.0091	.000	.0016	.0000	.0099	.0000							
Physical Properties													

I certify that the described material has been manufactured, inspected, and tested in accordance with the above specification(s) and satisfies the requirements.

David J. Paulsen
Quality Assurance



PLYMOUTH TUBE CO. USA®

572 W State Road 14, Winamac, Indiana 46896

Phone: (574) 948-3125 Fax-Cold Draw: (574) 948-3850 Fax-Hot Mill: (574) 948-7220

PRODUCT CERTIFICATION

SALES ORDER - LINE / RLS

119679 - 1 / 1

SOLD TO

J P Steel
6811 FM 362
Brookshire, TX 77423
USA

WORK ORDER 006409

HEAT NUMBER 486597

MELT SOURCE TMK IPSCO Koppel-USA Mfg/Melt

ISO 9001: 2008
Registered

CUSTOMER P.O. 17554	CUSTOMER PART JP 3.562X.531	QUANTITY 9,736.34 Lb	LADING NO 00071757	CERT ID / REV 01	CERT DATE 06/18/2014																																																		
PART DESCRIPTION EJ35620531DR1724-00																																																							
<table border="0"> <tr> <td>Grain Size</td> <td>J1</td><td>J2</td><td>J3</td><td>J4</td><td>J5</td><td>J6</td><td>J7</td><td>J8</td><td>J9</td><td>J10</td><td>J11</td><td>J12</td><td>C</td><td>R</td><td>S</td><td>AH</td><td>AT</td><td>BH</td><td>BT</td><td>CH</td><td>CT</td><td>DE</td><td>DT</td><td>SAM 'B'</td> </tr> <tr> <td></td> <td>7</td><td>50</td><td>49</td><td>48</td><td>45</td><td>42</td><td>38</td><td>35</td><td>33</td><td>33</td><td>33</td><td>32</td><td>--</td><td>--</td><td>--</td><td>0.0</td><td>0.5</td><td>1.0</td><td>1.0</td><td>0.0</td><td>0.0</td><td>1.0</td><td>1.5</td><td>-----</td> </tr> </table>						Grain Size	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	C	R	S	AH	AT	BH	BT	CH	CT	DE	DT	SAM 'B'		7	50	49	48	45	42	38	35	33	33	33	32	--	--	--	0.0	0.5	1.0	1.0	0.0	0.0	1.0	1.5	-----
Grain Size	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	C	R	S	AH	AT	BH	BT	CH	CT	DE	DT	SAM 'B'																															
	7	50	49	48	45	42	38	35	33	33	33	32	--	--	--	0.0	0.5	1.0	1.0	0.0	0.0	1.0	1.5	-----																															
<table border="0"> <tr> <td>SAM 'D'</td> <td>Freq.</td> <td>Severity</td> <td colspan="3"></td> </tr> <tr> <td>-----</td> <td>.000</td> <td>.000</td> <td colspan="3"></td> </tr> </table>						SAM 'D'	Freq.	Severity				-----	.000	.000																																									
SAM 'D'	Freq.	Severity																																																					
-----	.000	.000																																																					
Methods of Manufacturing																																																							
Method of Mfg 1 Electric Arc Furnace Melted		Method of Mfg 2 Aircraft Quality		Method of Mfg 3 Continuous Cast																																																			
Method of Mfg 4 Mfg.Using Clean Steel Practice		Method of Mfg 5 Ladle Refined																																																					
Mechanical Properties																																																							
1	Rc-High 20	Rc-Low 19	Tensile 107000	Yield .2% 91800	Yield .5% 91800	Elong% 28	Reduction 59	Aust TempF 1640	Aust Time 6.17	TemperTempF 1315																																													
1	TemperTime 79																																																						
Charpy Impact Tests																																																							
1	Temp 1 -30C	Size 1 10X10	Orient 1 Long	FtLb-Tl-Pc 1 126	LExp-Tl-Pc 1 .073	%Shr-Tl-Pc 1 100	FtLb-Tl-Pc 2 128	LExp-Tl-Pc 2 .068																																															
1	%Shr-Tl-Pc 2 100	FtLb-Tl-Pc 3 125	LExp-Tl-Pc 3 .073	%Shr-Tl-Pc 3 100																																																			
This test report data is for the heat Chemistry Stated above. The material in this test report is: 1) Manufactured in the USA. 2) Free from Polybrominated Biphenyls (PBB), Polybrominated Diphenyl Ethers (PBDE), and Mercury contamination.																																																							

I certify that the described material has been manufactured, inspected, and tested in accordance with the above specification(s) and satisfies the requirements.

David Paulsen
Quality Assurance



PLYMOUTH TUBE CO. USA

572 W State Road 14, Winamac, Indiana 46898

Phone: (574) 948-3125 Fax-Cold Draw: (574) 948-3850 Fax-Hot Mill: (574) 948-7220

PRODUCT CERTIFICATION

SALES ORDER - LINE / RLS

119679 - 1 / 1

SOLD TO

J P Steel
6811 FM 362
Brookshire, TX 77423
USA

WORK ORDER 006409

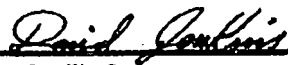
HEAT NUMBER 486597

MELT SOURCE TMK IPSCO Koppel-USA Mfg/Melt

ISO 9001: 2008
Registered

CUSTOMER P.O.	CUSTOMER PART	QUANTITY	LADING NO	CERT ID / REV	CERT DATE
17554	JP 3.562X.531	9,736.34 Lb	00071757	01	06/18/2014
PART DESCRIPTION EJ35620531DR1724-00					
3) No Repairs by welding					
End of Certification					

I certify that the described material has been manufactured, inspected, and tested in accordance with the above specification(s) and satisfies the requirements.


Quality Assurance

Benteler Steel/Tube GmbH
Postfach 13 40
33043 Paderborn
Deutschland
Tel.: +49.5254.81-0 Fax: +49.5254.13686

Ersetzt / replace

Dok. Nr. / Doc. No. 65-716081/001/E vom / dated 26.09.2012

BENTELER 

Steel/Tube

ABNAHMEPRÜFZEUGNIS EN 10204-3.1
INSPECTION CERTIFICATE EN 10204-3.1
CERTIFICAT DE RECEPTION EN 10204-3.1
EN 10204:2005-01

Benteler Steel/Tube GmbH - Postfach 1340 - 33043 Paderborn - Deutschland

JP Steel
PO Box 592
BROOKSHIRE TX 77492
USA

Dokument-Nr.: 65-716081/002/P
Document No.:
No. du document:

Kunden-Bestell-Nr.: BST 12-12036 / JP 11459
Purchase Order No.:
No. de commande du client:

Benteler Auftrags-Nr.: 1578593
Benteler Order No.:
No. de commande Benteler:

Versandanzeigen-Nr.: 6571039
Dispatch Note No.:
No. d'avis d'expédition:

Produkt: NAHTLOSE STAHLROHRE
Product: SEAMLESS STEEL TUBES
Produit: TUBES D'ACIER SANS SOUDURE

Prüf-Nr.:
Inspection No.:
No. du certificat:

Hersteller: Warmrohrwerk Dinslaken
Manufacturer: (DIN EN ISO 9001, ISO/TS-16949 CERTIFIED BY TUEV NORD CERT)
Producteur: (PED 97/23/EC CERTIFIED BY TUEV NORD SYSTEMS)

Herstellerzeichen: 
Manufacturer's brand:
Marque du producteur:

Stempel des Abnahmebeauftragten: WA
Stamp of the inspection representative:
Poinçon du contrôleur:

Stahlschmelzungsverfahren: ELEKTROSTAHL
Steelmaking process: ELECTRIC FURNACE
Procédé d'élaboration de l'acier: FOUR ELECTRIQUE

Blatt: 1 / 4
Page:
Page:

Lieferbedingungen: ASTM-A 519-2006

Terms of delivery:

Conditions de livraison:

Maße - Toleranzen: outside diameter acc. to customer request, wall thickness acc. to customer request, ASTM-A 519-2006

Dimensions-tolerances:

Dimensions-tolérances:

Stahlsorte: GRADE 4130

Steel grade:

Nuance d'acier:

Lieferzustand: QT

Delivery condition:

État de livraison:

Produktkennzeichnung: PKE: BENTELER SIGN BENTELER DIMENSIONS GRADE 4130 BST 12-12036 / JP 11459 ASTM-A 519 WA

Product marking:

Marquage du produit:

AEZ = Ätztintenbeschriftung, Etching ink marking, Gravure à l'encre . FK = Farbkennzeichnung, colour marking, marquage par couleur . FS = Farbschablonierung, point stencilling, marquage par peinture . FSD = Farbstrahl-drucker, Colour jet printer, imprimante à jet d'encre de couleur . LK = Laserkennzeichnung, Laser marking, Marquage laser . PKE = Etikettens-kennzeichnung, tag marking, marquage sur étiquette . PS = Prägestempel, die stamp, marquage par poinçonnage . TS = Tintenstrahlkennzeichnung, Ink jet spray marking, imprimante à jet d'encre .

Benteler Steel/Tube GmbH
Postfach 13 40
33043 Paderborn
Deutschland
Tel.: +49.5254.81-0 Fax: +49.5254.13666

Ersetzt / replace

Dok. Nr. / Doc. No.

65-716081/001/E vom / dated 26.09.2012

BENTELER 

Steel/Tube

ABNAHMEPRÜFZEUGNIS EN 10204-3.1
INSPECTION CERTIFICATE EN 10204-3.1
CERTIFICAT DE RECEPTION EN 10204-3.1

Dokument-Nr.:
Document No.:
No. du document:

65-716081/002/P

Prüf-Nr.:
Inspection No.:
No. du certificat:

Blatt: 2 / 4
Page:
Page:

Pos.	Stück	Maße	Länge	Gewicht	Schmelzen-Nr.	Prüfdruck	Rohr-Nr.-Gruppe	Vielfachlängen
Item	Number	Dimensions	Length	Weight	Heat No.	Test pressure	Tube number group	Multiple lengths
Poste	Nombre	Dimensions	Longueur	Poids	No. de coulée	Pression d'épreuve	Série de no. des tubes	Longueurs multiples
			feet	lbs				
0002	34	4.500" O.D. * 0.625" 17 FT - 24 FT	748,36	19326	573599			

Schmelzenanalyse [%] / Heat analysis [%] / Analyse sur coulée [%]

Pos.	Schmelzen-Nr.	C	SI	MN	P	S	CR	MO	NI
Item	Heat No.								
Poste	No. de coulée								
0002	573599	0,310	0,220	0,53	0,007	0,002	0,89	0,17	0,09

Prüfergebnisse / Test results / Résultats des essais

Die Rohre wurden zerstörungsfrei geprüft: The tubes are non destructive tested: Les tubes ont passé un essai non destructif:	UT-long.imperfections: acc. to API 5CT, SR 2; UT-long. Test method: acc. to ASTM-E 213; Outside notch depth: 5,0 %; Inside notch depth: 5,0 %; UT-transv. imperfections: acc. to API 5CT, SR2; acc. to ASTM-E 213; Outside notch depth: 5,0 %; Inside notch depth: 5,0 %; UT-lamination detection: acc. to EN 10246-14, table 1	PASSED
Augensichtkontrolle: Visual inspection: Examen visuel:	MATERIALVERWECHSLUNGSPRÜFUNG: Material conformity test: Vérification de la nuance:	PASSED
	MAßKONTROLLE: Dimensions examination: Vérification des dimensions:	PASSED

Ergebnisse der mechanischen Prüfung / Results of mechanical testing / Résultats des essais mécaniques

Die Probenahme erfolgte an Vielfachlängen.
The sampling was carried out on multiple lengths.
L'échantillonnage était réalisé aux longueurs multiples.

Benteler Steel/Tube GmbH
Postfach 13 40
33043 Paderborn
Deutschland
Tel.: +49.5254.81-0 Fax: +49.5254.13666

Ersetzt / replace

Dok. Nr. / Doc. No. 65-716081/001/E vom / dated 26.09.2012

BENTELER 

Steel/Tube

ABNAHMEPRÜFZEUGNIS EN 10204-3.1
INSPECTION CERTIFICATE EN 10204-3.1
CERTIFICAT DE RECEPTION EN 10204-3.1

Dokument-Nr.: 65-716081/002/P
Document No.:
No. du document:

Prüf-Nr.:
Inspection No.:
No. du certificat:

Blatt: 3 / 4
Page:
Page:

Zugversuch längs Streifenprobe / Tensile test longitudinal Strip test specimen / Essai de traction longitudinale Bande decoupee sur tube

Pos. Item Poste	Proben-Nr. Specimen No. No. de l'éprouvette	Schmelzen-Nr. Heat No. No. de coulée	Probenabmessung Specimen dimensions Dimensions de l'éprouv.	Streckgrenze Yield strength Limite élastique	Zugfestigkeit Tensile strength Résistance à la traction	Dehnung Elongation Allongement	Einschnürung Area reduction Coefficient de striction
Anforderungen Requirements Exigences			mm	RT 0,5 % MPa 552-655	Rm MPa MIN 655	A2" % MIN 14	1. Formel 1. Formula 1. Formule
0002	000001	573599	25,40 X 15,40	637	758	36	
0002	000002	573599	25,40 X 15,70	635	769	36	

Härteprüfung / Hardness test / Essai de dureté

Pos. Item Poste	Proben-Nr. Specimen No. No. de l'éprouv.	Schmelzen-Nr. Heat No. No. de coulée	Härte Hardness Dureté
Anforderungen Requirements Exigences			HRC HB HV HRB HBW MAX 22,0
0002	000001	573599	020

Kerbschlagbiegeversuch Notched bar impact test / Essai de flexion par choc (résilience) [1 CHARPY_V]

Pos. Item Poste	Proben-Nr. Specimen No. No. de l'éprouv.	Schmelzen-Nr. Heat No. No. de coulée	Probenabmessung Specimen dimensions Dimensions de l'éprouvette	Probenlage Specimen position Position de l'éprouvette	Prüftemperatur Test temperature Température d'essai	Kerbschlagarbeit Absorbed energy Energie absorbée	Kerbschlagzähigkeit Impact strength Résistance au choc	Verf.-Bruchanteil Shear fracture Rupture ductile
Anforderungen Requirements Exigences			Länge Breite Höhe Length Width Height Longueur Largeur Hauteur	längs (L) longitudinal (L) longitudinal (L)		einzel mittel single average individuelle moyenne	einzel mittel single average individuelle moyenne	
			mm mm mm	quer (Q) transversal (Q) transversal (Q)	GRAD °C -30	ft-lbf ft-lbf MIN 020	J/cm²	
0002	000001	573599	55 10,00 10,00	L	-30	116 110 111	112	
			10,00 10,00					
			10,00 10,00					

Benteler Steel/Tube GmbH
Postfach 13 40
33043 Paderborn
Deutschland
Tel.: +49.5254.81-0 Fax: +49.5254.13666

Ersetzt / replace

Dok. Nr. / Doc. No. 65-716081/001/E vom / dated 26.09.2012

BENTELER 

Steel/Tube

ABNAHMEPRÜFZEUGNIS EN 10204-3.1

INSPECTION CERTIFICATE EN 10204-3.1

CERTIFICAT DE RECEPTION EN 10204-3.1

Dokument-Nr.:

Document No.:

No. du document:

65-716081/002/P

Prüf-Nr.:

Inspection No.:

No. du certificat:

Blatt: 4 / 4

Page:

Page:

Wärmebehandlung / Heat treatment / Traitement thermique

Hardening temperature: 850°C, Holding time: 1 min, Cooling: water / Tempering temperature: 735°C, Holding time: 6 min, Cooling: air

Vermerk / Remark / Remarque

Certificate remarks: Steel is manufactured to fine grain practice, The tubes comply with the requirements of NACE MR0175-03., hardness max. 22 HRC, No mercury, mercury compounds or mercury bearing instruments and / or equipment has been used in any manner which might cause contamination in manufacture assembly, or test of material. No weld repair has been carried out.;

Certificate-Remark: The steel will be produced by an electric arc furnace, ladle furnace and continuous casting machine, stirring by argon. The mode of operation in this process is commonly referred to as "clean steel process". The products are fully killed.

Verkäufer(in) / Salesman/ woman in charge / Personne chargée : Mr Storm, Tel.: 05254/81-4274, Fax: 4289

Dinslaken, 26.10.2012, TEL.: 02064.623-5370 FAX: 02064.623-5390

Abnahmebeauftragter

Inspection representative

Contrôleur

DR. BASEL KEITA / Thei

Es wird bestätigt, daß die gelieferten Erzeugnisse den techn. Lieferbedingungen des Auftrages entsprechen. Dieses Dokument wurde mittels EDV erstellt und ist ohne Unterschrift rechtsgültig.
We certify that the supplied products comply with the order specification. This document was prepared by means of electronic data processing and is valid without signature.
Nous attestons que les produits livrés sont conformes aux stipulations de la commande. Ce document a été établi par traitement électronique de l'information et est valide sans signature.

P.O. BOX 924469
HOUSTON, TX 77292
PHONE: (713) 290-8490



6645 W. TIDWELL
HOUSTON, TX 77092
FAX: (713) 290-8627

To: J.P. STEEL, LLC
PO BOX 592
KATY, TX 77492-0592

Report Date: 10/18/13
Report No: 250944.0
Rev.: A
Cust Acct: JPS10050

PO#: 15484
Material: 4.50" OD X .625" WALL 4130 Q & T ALLOY
ID/Heat: HT# 573599
Job Info:

Tensile Test Results

No./Location	Size (in.)	Area (in ²)	Ult. Load (lbs.)	Yield (psi)	Tensile (psi)	Elong. (%)	R. of A. (%)	Hardness
1	.495	.1924		90,200	112,300	26	73	

Unless otherwise stated, yield stress is 0.2% offset, gage length is 2 in. for 1/2 in. bars or 1 in. for 1/4 in. bars.

Signed: _____

MIKE MASON

Our reports are for the exclusive use of our customer and our name may be used only with prior written approval. Our reports apply only to the sample tested or inspected and do not necessarily represent the quality of other apparently similar or identical materials. All test specimens and testing conforms to ASTM A-370 requirements unless otherwise stated. This test report shall not be reproduced, except in full, without the written approval of P&B Testing Inc.

ArcelorMittal

ARCELORMITTAL TUBULAR PRODUCTS
SHELBY LLC.
132 WEST MAIN STREET
SHELBY, OHIO 44875-1471
Telephone 419/342-1200 FAX: 419/342-1437

MATERIAL TEST REPORT

ISO/TS 16949:2009 ISO 9001:2008

14-242-1 9564XXX+69A-F

SHELBY ORDER NO.
447180

C U S T O M E R	MARMON KEYSTONE CORPORATION 6441 BINGLE ROAD HOUSTON TX 77092 ATTN: EARTHA JILES	SPECIFICATION ASTM A513 GMCO A513 DOM 1 01-10 FAX: (713)460-5414	CUSTOMER ORDER 35-057810-03

GRADE 520	SIZE(O.D. x ID x WALL) 7.250 X 6.000 X .625	QUANTITY 17509 LB	396.00 FT	SHIPPED 09/02/14	DATE 09/02/14
--------------	--	----------------------	-----------	---------------------	------------------

CONDITION ASTM 513 Type 5 Produced to OD/ID Ref: WALL EW TUFFDOM STRESS RELIEVE ANNEAL	PART NO. REV.	S#00335344 50064541
--	------------------	------------------------

HEAT NO.	CHEMICAL ANALYSIS												GRAIN SIZE
	C	Mn	P	S	Si	Ni	Cr	Mo	Cu	V	Al	OTHER	
4131797	.16	1.41	.012	.003	.220	.010	.040	.010	.040	.002	.040	.0030 TI .0010 Cb .0020	

MECHANICAL PROPERTIES										MAGNAFLUX	
HEAT NO.	LOAD NO.	YIELD PSI	TENSILE PSI	ELONG % 2.0" 33	RED AREA %	HARDNESS		IMPACT FT.-LBS SIZE 10.0X10.0 TEMP C -20-30 RESULTS 128 57 140 68 133 65	FREQ.	SEVERITY	
						BHN	ROCKWELL RB 92				
4131797	T6457128	76900	89400								

JOMINY HARDENABILITY (EXPRESSED IN 16THS)																	
HEAT NO.	1	2	3	4	5	6	7	8	10	12	14	16	20	24	28	32	

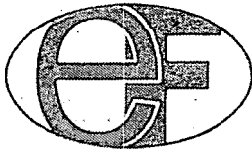
J-K RATING					SLAG-OXIDE RATING		
HEAT NO.	A	B	C	D	INGOT	OXIDE	SLAG

MELT SOURCE	OTHER INSPECTION	THIS TEST REPORT NOTARIZED WHEN REQUIRED SWORN AND SUBSCRIBED BEFORE ME THIS _____ DAY OF _____
-------------	------------------	---

Material under this mtr was not exposed to mercury during processing.

NOTARY PUBLIC

Frank Simeone



Edwards Fabrication

1385 Hwy. 35 Bypass S. O: (361) 790-7910
P.O. Box 2350 F: (361) 790-7927
Rockport, TX 78381

tedwards@edwardsfabrication.com
www.edwardsfabrication.com

CERTIFICATE OF TEST

Client:
Gates E & S North America
134 44th Street
Corpus Christi, TX 78405

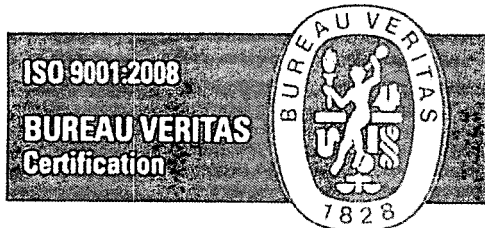
Purchase Order: 16522

Certificate Number			Date of Examination	
19351			09/11/14	
ID#	Part Number	Description	SWL*	Proofload
19351	7361-0864	4.0" Lift-Eye Clamp 2 Bolt	4205 lbs.	8410 lbs.
DO NOT WELD, CUT, ADD-TO, TAKE AWAY ANY COMPONENTS OR MAKE ANY MODIFICATION TO THIS CLAMP UNIT. Doing so voids this test certificate.				
* Safe Work Load				

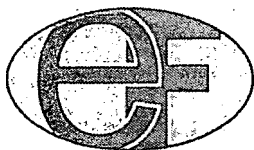
THIS PRODUCT IS MANUFACTURED IN THE U.S.A.

We hereby verify that the above information is correct
as contained in the records of Edwards Fabrication L.L.C.

Michael White
Test Operator



Thomas F. Edwards
President
Edwards Fabrication L.L.C.



Edwards Fabrication, Inc.

1385 Hwy. 35 Bypass S. O: (361) 790-7910
P.O. Box 2350 F: (361) 790-7927
Rockport, TX 78381

tedwards@edwardsfabrication.com
www.edwardsfabrication.com

CERTIFICATE OF TEST

Client:
Gates E & S North America
134 44th Street
Corpus Christi, TX 78405

Purchase Order: 16522

Certificate Number			Date of Examination	
19356			09/11/14	
ID#	Part Number	Description	SWL*	Proofload
19356	7361-0864	4.0" Lift-Eye Clamp 2 Bolt	4208 lbs.	8416 lbs.
DO NOT WELD, CUT, ADD-TO, TAKE AWAY ANY COMPONENTS OR MAKE ANY MODIFICATION TO THIS CLAMP UNIT. Doing so voids this test certificate.				
* Safe Work Load				

THIS PRODUCT IS MANUFACTURED IN THE U.S.A.

We hereby verify that the above information is correct
as contained in the records of Edwards Fabrication L.L.C.

Michael White
Test Operator



Thomas F. Edwards
President
Edwards Fabrication L.L.C.

API Monogram Licensee
ISO 9001-2008 Certified
PED 97/23/EC
AD 2000-Merkblatt W0



MARS FORGE PVT. LTD.

Rajkot Gondal Nh. 8-B, Village : Shapar - 360024 Dist. Rajkot (Guj.) India.
Tel. No. : 91 - 2827 - 252190, 252191, Fax No. : 91 - 2827 - 252119
E-mail : info@marsforge.com, Web. : www.marsforge.com

MATERIAL TEST REPORT

The certificate of Material as per EN 10204 3.1

Customer : R & S OILFIELD INC.USA

Doc.No.F-P-21-12/

TC Ref No : 21/K/2014-20

DATE 25.08.2014	Purchase Order Ref.No. : 520 Dated 31.07.2014	Invoice No. : 21	MF Drawing No. : MF 0294-01F
Chemical Analysis Ref: 54/270714	Physical Analysis Ref: MFT-644, MFI-147	Test Certificate Ref 025396	Mode of Shipping : SEA
Quantity : 27 PCS	Part Description: Weld Neck Flange, 4-1/16" 10M X 4" SCH XXH AISI 4130 N.Q.T	PSL LEVEL 2	Raw Material Spec No MARS 6A -001 REV.03
Heat Code Punch : R 20834	R & S Part Number : RSMFW410X...	Grade/Condition: SAE4130	Melting Practice : EAF→LRF→VD→CCM
Heat Number: R 20834	Reduction Ratio: Raw Material Reduction Ratio : 1:3.02		

CHEMICAL ANALYSIS RESULTS

Elements	C.	Mn.	Si.	Cr.	Ni.	Mo.	S.	P.	V.	Cu.
Minimum %	0.28	0.40	0.15	0.80	---	0.15	---	---	---	---
Maximum %	0.33	0.60	0.35	1.10	0.25	0.25	0.025	0.025	0.10	0.30
Heat Analysis %	0.32	0.55	0.19	1.07	0.21	0.22	0.005	0.008	0.003	0.05

MECHANICAL PROPERTIES(QTC SIZE: 4" x 4")

(ASTM A 370)	Requirement	Actual
0.2% Yield Strength (PSI)	75,000 PSI MIN	78798 PSI
Tensile Strength (PSI)	95,000 PSI MIN	104814 PSI
% Elongation	18.0% MIN	25.20%
% Reduction Of Area	35.0% MIN	70.30%
Hardness (HBW)	207-235 HBW	207 TO 229 HBW

CHARPY IMPACT PROPERTIES

Size	10 x 10 x 55mm	DIRN	L
Impact	20 Ft-Lbs Min @ -75° F		
Energy (ft-lbs)	51.63	57.53	50.15
Average	53.10 Ft Lbs		
L.E. (inch)	0.026	0.029	0.024

HEAT TREATMENT

CYCLE	TEMPERATURE(C)	TEMPERATURE (F)	TIME@TEMP	QUENCH MEDIA
Normalized	910 °C	1670 °F	150 Minutes	AIR COOLED
Austenitized	880 °C	1616 °F	150 Minutes	WATER QUENCHED
Tempered	695 °C	1283 °F	150 Minutes	AIR COOLED

Water Temperature IN AT 35°C AND OUT AT 45°C

NON DESTRUCTIVE EXAMINATION

	Yes/No	Spec Number
Ultrasonic Testing (UT)	NO	---
Magnetic Particle Inspection (MPI)	YES	ASME Section-V,Article -7

*Country of origin - India

* We hereby declare that the material herein described is in accordance with specifications of the order.



API Monogram Licensee
ISO 9001-2008 Certified
PED 97/23/EC
AD 2000-Merkblatt W0



MARS FORGE PVT. LTD.

Rajkot Gondal Nh. 8-B, Village : Shapar - 360024 Dist. Rajkot (Guj.) India.
Tel. No. : 91 - 2827 - 252190, 252191, Fax No. : 91 - 2827 - 252119
E-mail : info@marsforge.com, Web. : www.marsforge.com

Doc No : F-P-21-17

MAGNETIC PARTICLE EXAMINATION REPORT

PART No.	: RSMFW410X	DATE	: 25.08.2014
PART NAME	: Weld Neck Flange, 4-1/16" 10M X 4" SCH XXH AISI	INSPECTOR/LEVEL	: ASNT L-II
HEAT NO	: 4130 N.Q.T	QUANTITY	: 27 PCS
PROC No.	: R 20834	REJECT	: None
W-P-21-09			
ACCEPT	: Acceptable		
WO/PO No.	: R&S PO#520 Dated 31.07.2014		

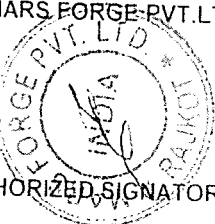
TEST PROCEDURE

EQUIPMENT :	: "Magnafield "Make , Electromagnetic Crack Detector
DETECTING MEDIA	: Fluorescent Powder
METHOD	: Wet fluorescent method
CURRENT APPLY	: H.W.D.C./A.C. Current used
LOCATION	: Cover 100% (Assessable) area of the job
MAGNETIZATION	: Longitudinal
TYPE OF MAGNETIZATION	: Continuous
EXAMINATION	: Surface & sub surface defect.
REFERENCE STANDARD	: ASME Section V, Article 7, SE709
TESTED BY	: HITESH MAHETA
DATE OF TEST	: 02.08.2014

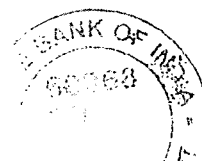
OBSERVATION : No relevant indication found

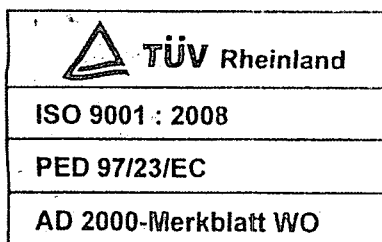
RESULT : Jobs are found satisfactory in MPT.

For, MARS FORGE PVT. LTD.



[AUTHORIZED SIGNATORY]





MARS FORGE PVT. LTD.

"Shraddha House" M-170, Gujarat Housing Board
Akshar Marg, Rajkot - 360 001. Gujarat (India)
Tel. No. : 91 - 281 - 244 83 83, 247 90 88, Fax : 91- 281 - 245533

Works : Rajkot Gondal Nh. 8-B, Village : Shapar, Dist. Rajkot (Guj.) Ind
Tel. No. : 91 - 2827 - 252190, 252191, Fax No. : 91 - 2827 - 2521
E-mail : info@marsforge.com, Web. : www.marsforge.com

TEST CERTIFICATE

TC Ref : 12/A/2011-2012

Date : 27-05-2012

Our Drawing No.	: MF 0285 P1
Heat No. Code	: R 15965
Quantity	: 159 Nos.
Sample Qty.	: 01 Nos.
Chemical Analysis Ref.	: 111/07052012
Physical Analysis Ref.	: AI-277
Test Certificate Ref.	: 1111

Customer : R & S OILFIELD INC. HOUSTON - USA.
Customer's Part No. : 4 - 1500 WN
Purchase Order Ref. : 172 / Dt. 19-03-2012
Delivery Challan No. : 12/ DT : 27.05.2011
Vehicle No. : BY SEA

CHEMICAL ANALYSIS RESULTS :

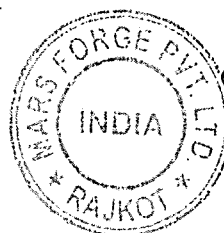
Material	Heat No.	C.	Mn.	Si.	Cr.	Ni.	Mo.	S.	P.	V.
Specified A350 LF2	SPECN.	---	0.60	0.10	--	---	---	---	--	---
		0.35	1.05	0.35	0.30	0.40	0.12	0.050	0.040	0.08
Actual	R 15965	0.20	0.93	0.20	0.058	0.076	0.021	0.008	0.009	0.002

Hardness Reqd. Range	Hardness Actual	ASTM Grain Size	Heat Treatment	Jominy Value	INCLUSION RATING			
					A	B	C	D
187 BHN MAX.	143 - 174 BHN	6-7	Normalised	---	<u>1.0</u> 0.5	<u>0.5</u> ---	---	<u>1.0</u> ---

* NORMALISED AT 930° C, SOAK FOR 120 MINUTES, AIR COOL.

PHYSICAL TEST RESULTS :

Heat Code On Forgings	Yield PSI.	UTS PSI.	%E	%RA.	Impact (dirn. - L, Size- 10x10x55 mm) 27 Joules min. at -50° F			
---	45000	70000	22.00	30.00	I	II	III	Avg.
PUNCH R 15965	50235	76393	33.80	67.10	67 1.40	65 2.30	63 1.31	65.16 J.



Signature
QUALITY CONTROL





MORRIS INSPECTIONS

Mailing Address:
2316 Memorial Pkwy.
Portland, TX 78374-3206

Business Telephone
(361) 643-7066
Cellular Telephone
(361) 877-0776

**QW-484 SUGGESTED FORMAT FOR MANUFACTURER'S RECORD OF WELDER
OR WELDING OPERATOR QUALIFICATION TESTS**
(See QW-301, Section IX, ASME Boiler and Pressure Vessel Code)

Welder's Name	<u>JEFFREY CHARLES TOWNSEND</u>		S. S. No.		
Welding Process(es)	<u>Shielded Metal Arc Welding</u>	Type	<u>Manual</u>	Position (QW-405.1)	<u>6-G</u>
Welding Procedure Specification No.	<u>SM-4130</u>	PQR No.	<u>SM-4130</u>	Backing (QW-402.7)	<u>None</u>
Material Spec. (QW-403) No.	<u>HF-4130</u>	Grade	<u>LN80</u>	P-No.	<u>-</u>
To				Group	<u>-</u>
Material Spec (QW403) No.	<u>HF-4130</u>	Grade	<u>LN80</u>	P-No.	<u>-</u>
Test Thickness	<u>.531"</u>	Range	<u>Up to 1.062"</u>	Test Dia.	<u>4.00"</u>
Process(es)	<u>SMAW</u>		<u>SMAW</u>	Range	<u>2 7/8" O.D. over</u>
Filler Metal (QW-404) Spec.	<u>SFA 5.1</u>		<u>SFA 5.5</u>		
	Class No. <u>E-6010</u>		Class No. <u>E-8018</u>		
	F No. <u>3</u> A No. <u>1</u>		F No. <u>4</u> A No. <u>3</u>		
Filler Diameter (QW-404.8)	<u>1/8"</u>		<u>5/32"</u>		
Weld Deposit Thickness	<u>.125"</u>		<u>.406"</u>		
Consumable Insert (QW-404.22)	<u>N/A</u>		<u>N/A</u>		
Gas (QW-408) Shielding	<u>N/A</u>		<u>N/A</u>		
Flow Rate	<u>N/A</u>		<u>N/A</u>		
Gas (QW-408) Purge	<u>N/A</u>		<u>N/A</u>		
Flow Rate	<u>N/A</u>		<u>N/A</u>		
Elec. (QW-409) AC-DC	<u>Direct</u>		<u>Direct</u>		
Polarity	<u>Reverse</u>		<u>Reverse</u>		
Volt Range	<u>22-26</u>		<u>23-27</u>		
Amp Range	<u>80-120</u>		<u>150-210</u>		
Progression (QW-405.3)	Root <u>Up</u>	Hot Pass	<u>Up</u>	Filler	<u>Up</u>
Transfer Mode (QW-409.2) GMAW	<u>N/A</u>			Cap	<u>Up</u>
Other		Preheat	<u>700 F.</u>	PWHT.	<u>N/A</u>

For Information Only
Material 4130 IS NOT listed in ASME Section IX
but acceptable.

Submerged Arc Flux Trade Name _____

Guided Bend Test Results (QW-482.2(a), QW-482.3(a), QW-482.3(b))

Specimen No.	Type	Figure No.	Results	Specimen No.	Type	Figure No.	Results

Radiographic Test Results (QW-304 & QW-305)

For alternative qualification of groove welds by radiography

Radiographic Results: Satisfactory

Test Conducted by J. Morris - MORRIS INSPECTIONS Laboratory—Test No. 09-019

We certify that the statements in this record are correct and that the test welds prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Date March 23, 2009

Organization DU-TEX, INC.

By _____

(Details of record of tests are illustrative only and may be modified to conform to the type and number of test required by the Code.)
NOTE: Any essential variables in addition to those above shall be recorded. This form modified for information and typing purposes, (QW-301.4).



MORRIS INSPECTIONS

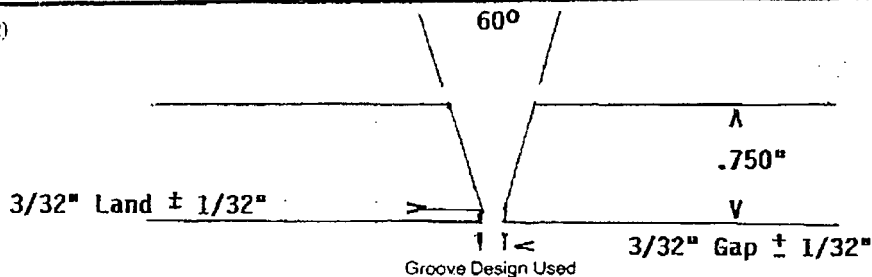
Mailing Address:
2316 Memorial Pkwy.
Portland, TX 78374-3206

Business Telephone
(361) 643-7066
Cellular Telephone
(361) 877-0776

QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORD (PQR) (See QW-201.2, Section IX, ASME Boiler and Pressure Vessel Code)

Company Name DU-TEX, INC.
Procedure Qualification Record No. SM-4130 Date March 24, 2009
WPS No. SM-4130 Transfer Mode GMAW N/A
Welding Process(es) Shielded Metal Arc Welding
Types (Manual, Automatic, Semi-Auto.) Manual

JOINTS (QW-402)



BASE METALS (QW-403)

Material Spec. HF-4130 To HF-4130
Type or Grade LN 80 To LN 80
P-No. - Grp. - to P-No. - Grp. -
Thickness Tested .750" Range: .1875" - 1.500"
Diameter Tested 4.500" Range: Proc. unlimited
No Pass Greater than 1/8" in thickness No
Backing: Yes No XX Material Weld Metal only
Other Material 4130 IS NOT listed in ASME Section IX
but is acceptable.

FILLER METALS (QW404)

	SMAW	SMAW
Process(es)	1	3
Weld Metal Analysis A-No.	1 & 2	Balance
Weld Bead Number	1/8"	5/32"
Dia of Electrode	3	4
Filler Metal F-No.	5.1	5.5
SFA Specification	E-6010	E-8018
AWS Classification	.250"	1.250"
Weld Deposit Range	.125"	.625"
Tungsten: Size <u>N/A</u> Type: <u>-</u> Class: <u>-</u>		
Flux Trade Name: <u>N/A</u> Designation: <u>-</u>		
Other <u>-</u>		

POSTWELD HEAT TREATMENT (QW-407)

Temperature None applied
Time -
Other -

GAS (QW-408)

Process(es) SMAW-N/A
Shielding -
Flow Rate -
Purge -
Flow Rate -
Other -

ELECTRICAL CHARACTERISTICS (QW-409)

	SMAW	SMAW
Process(es)	Direct	Direct
Current	Reverse	Reverse
Polarity	22-26	23-27
Volts Range	80-120	150-210
AMPS Range		
Other <u>-</u>		

POSITION (QW-405)

Position of Test Groove 6-G
Weld Progression (Up, Down, Flat) -
Root Up Hot Pass Up Filler Up Cap Up

PREHEAT (QW-406)

Preheat Temp. 700 F.
Interpass Temp. Min. - Max. -
Other -

TECHNIQUE (QW-410)

	SMAW	SMAW
Process(es)	Variable	Variable
Travel Speed	String	String
String or Weave Bead	None	None
Oscillation	Multiple	Multiple
Multi or Single Pass (per side)	Single	Single
Single or Multi Electrodes	None	None
Peening		
Other <u>-</u>		

QW-483 (Back)

Tensile Test (QW-150)

NOTE: MATERIAL SPECS

Electrode Tensile Strength is 80,000 PSI

Specimen No.	Width	Thickness	Area	Ultimate Total Load lbs.	Ultimate Unit Stress psi	Character of Failure & Location
T - 1	.751"	.743"	.558"	45,000	80,645	Satisfactory-Broke in Weld Area
T - 2	.748"	.748"	.554"	44,400	80,144	Satisfactory-Broke in Weld Area

Guided Bend Test (QW-160)

Specimen No.	Type	Figure No.	Results	Specimen No.	Type	Figure	Results
6G - SB1	SBend	QW462.2	Satisfactory				
6G - SB2	SBend	QW462.2	Satisfactory				
6G - SB3	SBend	QW462.2	Satisfactory				
6G - SB4	SBend	QW462.2	Satisfactory				

Toughness Tests (QW-170)

Specimen No.	Notch Location	Specimen Size	Test Temp.	Impact Values	Lateral Exp.		Drop Weight	
					% Shear	Mils	Break	No Break

Average ft/lb for this size _____

Minimum ft/lb for this size _____

Fillet Weld Test (QW-190)

Pos.	Spec. No.	Contour	Leg No. 1	Leg No. 2	Throat	Bend Defects	Macro-Pent.	Results

Other Tests

Type of Test _____

Deposit Analysis _____

Other _____

Welder's Name Jeffrey Charles Townsend S.S.# _____ Stamp No. N/ATest conducted by: J. Morris-MORRIS INSPECTIONS Laboratory Test No. 09-022

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Date March 25, 2009By Joe Morris

DU-TEX, INC.

Details of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code. This form modified for information and typing purposes (QW200.2(D))

NQS INSPECTION, LTD

06972

Non-Destructive Testing Report

Report # _____

Customer: Gates

Date: 11/20/14

Project: 192114

METHOD

Ultrasonic	<u>✓</u>	Procedure #	<u>NRS-PA-VT/2013/Ruo</u>
Magnetic Particle	<u> </u>	Standard #	<u>ASME</u>
Liquid Penetrant	<u> </u>	Section # Level	<u>II</u>

TECHNIQUE

Shear wave		Angle	AC _____	DC _____	Dwell Time _____
Straight Beam		60 	Wet _____	Dry _____	Penetrant # _____
Unit Type	Pr BMA	70 	Continuous _____		Developer # _____
Ref Standard	T. D. 12	45 	Residual _____		Cleaner # _____
Range	5"	0 	Background _____		

RESULTS

[illegible]Inspector: Tr. Baldearth SNT Level 11

PG # _____ of _____

Customer Representative: [Signature]

Hours 2 Mileage

PO BOX 23036 CORPUS CHRISTI, TEXAS 78403

PHONE # 361-533-4563 / FAX # 361-884-1984 / E-MAIL emanahan@nqsltd.com (Eric) / lray@nqsltd.com (Bud)



30

25

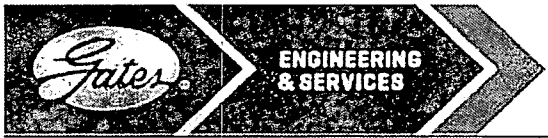
20

15

10

5

60 MIN



GATES E & S NORTH AMERICA, INC.
134 44TH STREET
CORPUS CHRISTI, TEXAS 78405

PHONE: 361-887-9807
FAX: 361-887-0812
EMAIL: Tim.Cantu@gates.com
WEB: www.gates.com

10K CHOKE AND KILL ASSEMBLY PRESSURE TEST CERTIFICATE

Customer :	AUSTIN DISTRIBUTING	Test Date:	11/20/2014
Customer Ref. :	PENDING	Hose Serial No.:	D-112014-10
Invoice No. :	205663	Created By:	NORMA MATA

Product Description:	10K3.566.0CK4.1/1610KFLGE/E L/E
----------------------	---------------------------------

End Fitting 1 :	4 1/16 10K FLG	End Fitting 2 :	4 1/16 10K FLG
Gates Part No. :	4773-6291	Assembly Code :	L34116080813D-112014-10
Working Pressure :	10,000 PSI	Test Pressure :	15,000 PSI

Gates E & S North America, Inc. certifies that the following hose assembly has been tested to the Gates Oilfield Roughneck Agreement/Specification requirements and passed the 15 minute hydrostatic test per API Spec 7K/Q1, Fifth Edition, June 2010, Test pressure 9.6.7 and per Table 9 to 15,000 psi in accordance with this product number. Hose burst pressure 9.6.7.2 exceeds the minimum of 2.5 times the working pressure per Table 9.

Quality Manager :
Date :
Signature :

QUALITY
11/20/2014

Technical Supervisor :
Date :
Signature :

PRODUCTION
11/20/2014



Gates E&S North America, Inc.
134 - 44th St.
CORPUS CHRISTI, TEXAS 78405
PHONE : (361) 887-9807
FAX: (361) 887-0812
Tim.Cantu@gates.com

CERTIFICATE OF CONFORMANCE

This is to verify that all Parts and/or Materials included in this shipment have been manufactured and/or processed in Conformance with applicable drawings and specifications, and that Records of Required Tests are on file and subject to examination. The following items were assembled at Gates E & S, North America Inc., facilities in Corpus Christi, TX, USA. This hose assembly was designed and manufactured to meet all the requirements of API Spec 7K.

CUSTOMER: AUSTIN DISTRIBUTING
CUSTOMERS P.O.#: PENDING
PART DESCRIPTION: 10K3.566.0CK4.1/1610KFLGE/E L/E
SALES ORDER #: 205663
QUANTITY: 1
SERIAL #: D-112014-10

SIGNATURE:

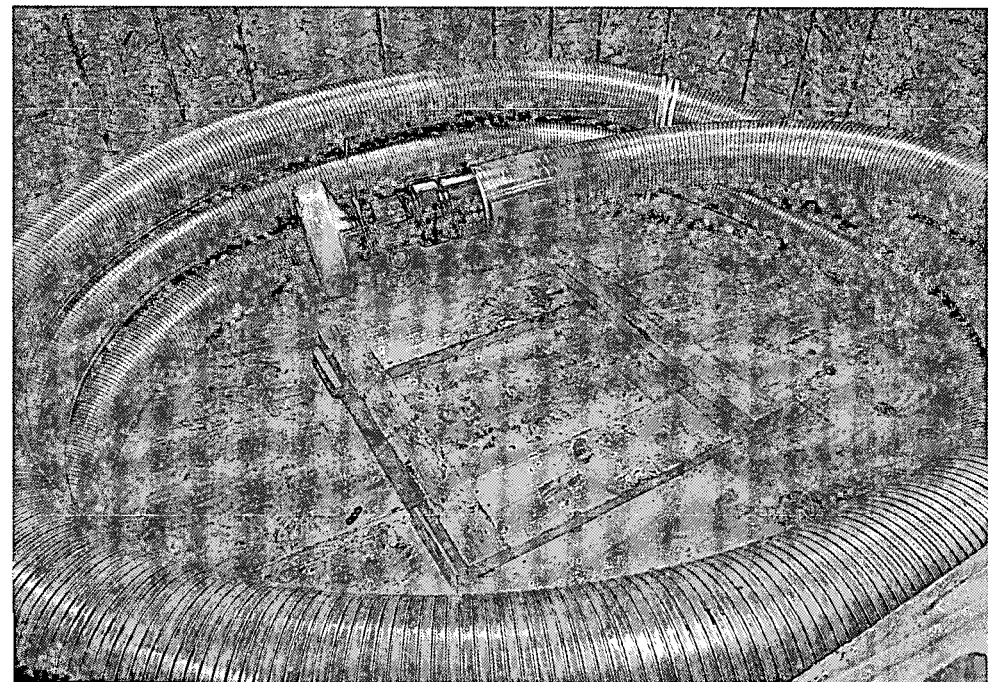
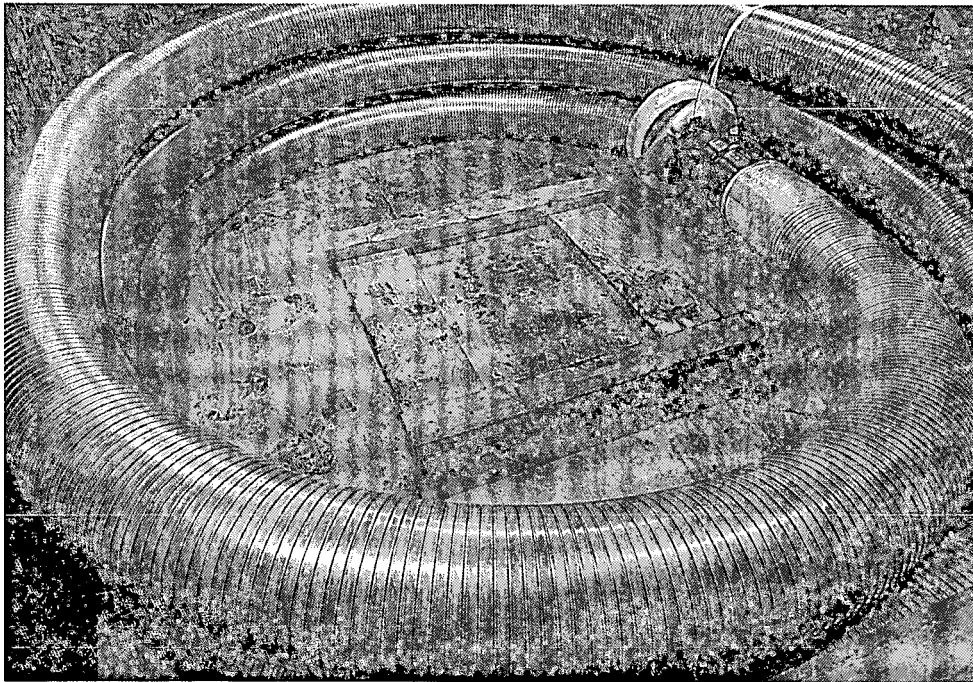
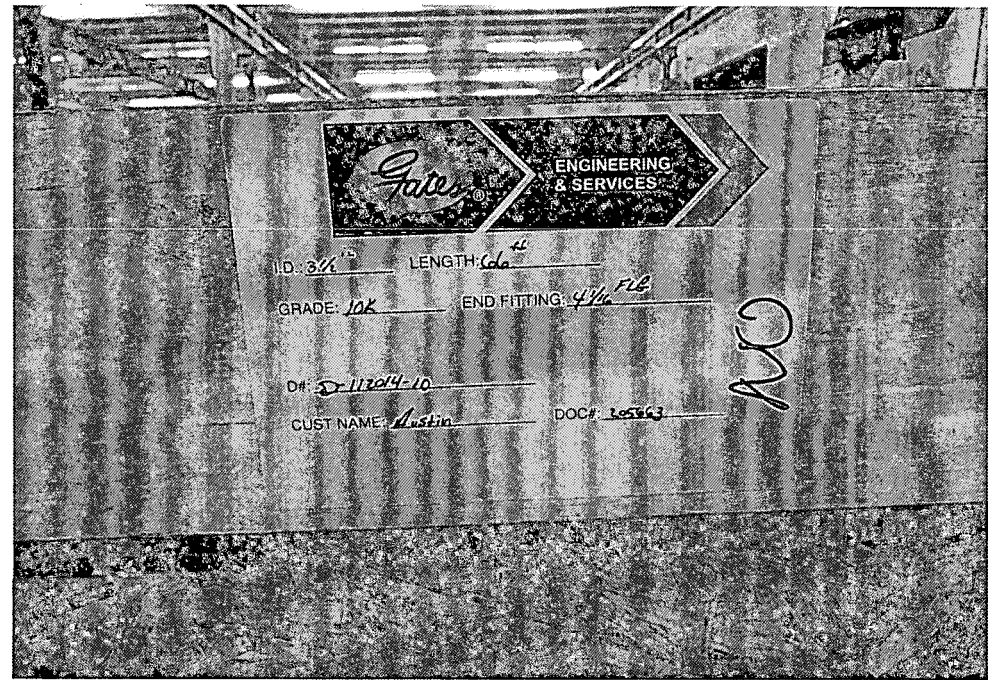
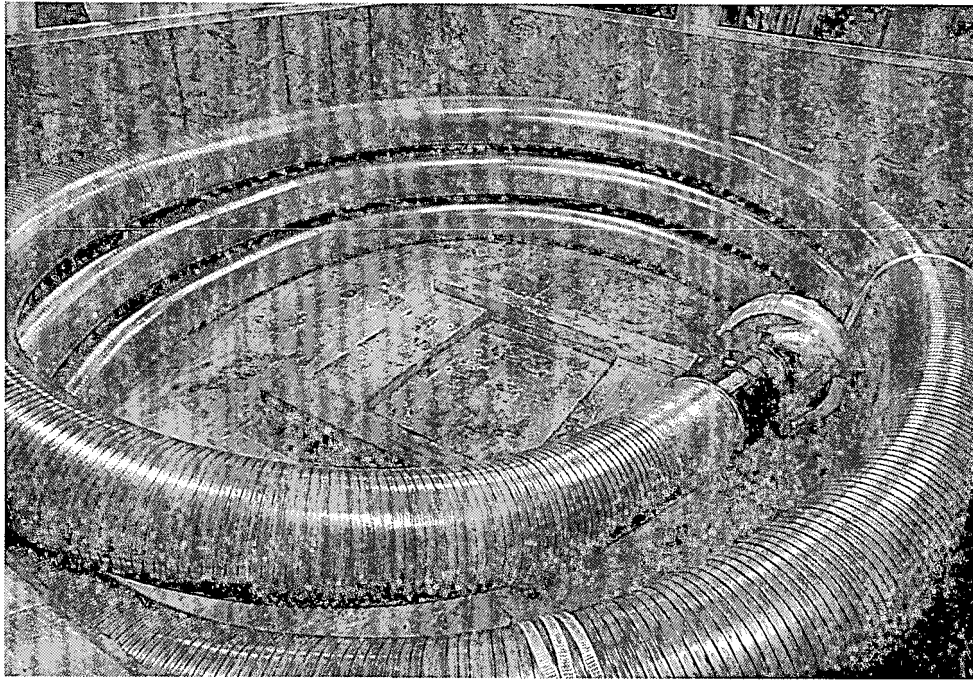
TITLE:

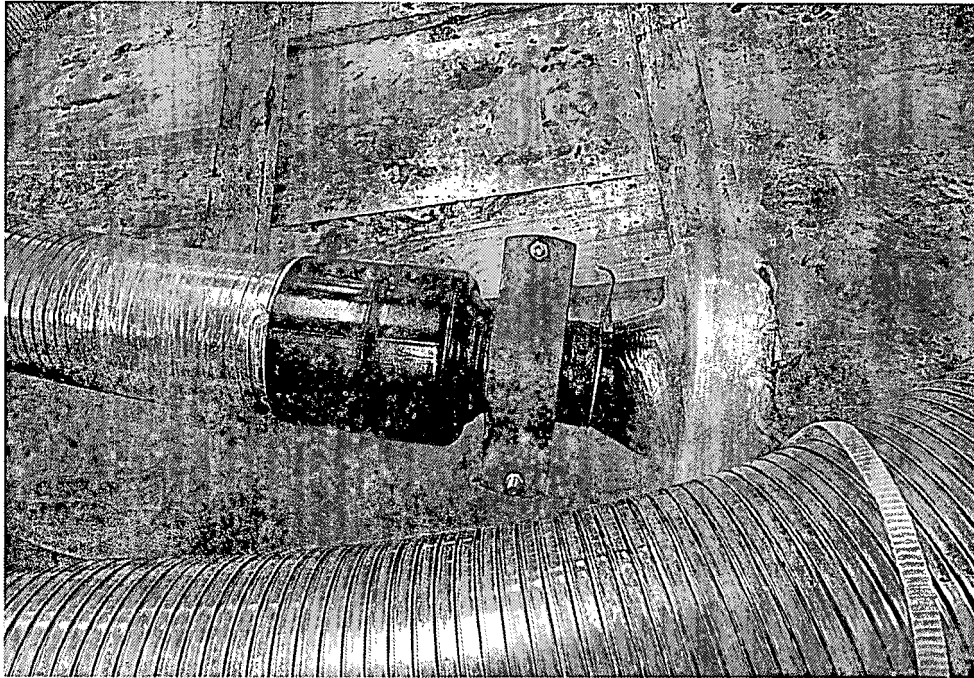
DATE:

Norma

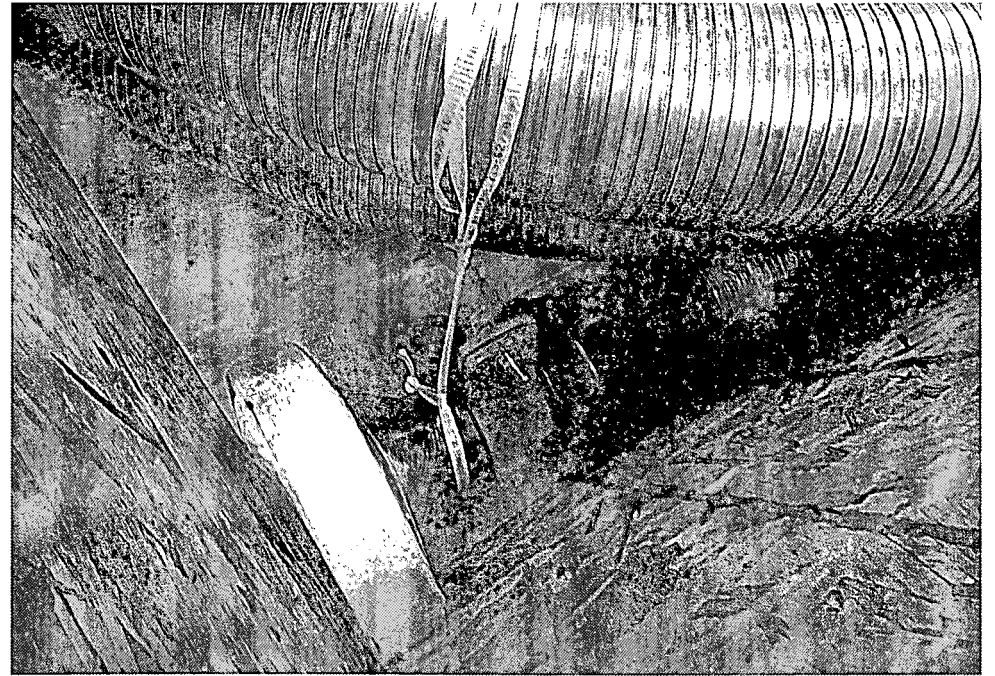
11/20/2014

QUALITY





HILL ASSEMBLY PRESSURE TEST CERTIFICATE			
AUSTIN DISTRIBUTING		Test Date:	11/20/2014
PENDING		Hose Serial No.:	D-112014-10
205663		Created By:	NORMA MATA
10K3566.0CK4.1/1610KFLGE/E 1/E			
4 1/16 10K FLG		End Fitting 2:	4 1/16 10K FLG
4773-6291		Assembly Code:	L34116080813D-112014-10
10,000 PSI		Test Pressure:	15,000 PSI
This hose assembly has been tested to the			





Gates E&S North America
134 - 44th St.
CORPUS CHRISTI, TEXAS 78405
PHONE : (361) 887-9807
FAX: (361) 887-0812
Tim.Cantu@gates.com

CUSTOMER. : AUSTIN DISTRIBUTING
PURCHASE ORDER # : PENDING
DATE : 11/20/2014
SALES ORDER #: 205663

SOLD TO: AUSTIN DISTRIBUTING
P.O. BOX 7890
AMARILLO, TEXAS
79114

SHIP TO: 0
0
0
0

PACKAGING: ENCLOSED CRATE

PRODUCT DESCRIPTION:

ITEM	QTY	DESCRIPTION	ID	LENGTH	WORKING	TEST	END CONNECTION	SAFETY CLAMPS / LIFT EYES
1	1	10K3.566.0CK4.1/1610KFLGE/E L/E	3.5 in.	66 ft.	10,000 PSI	15,000 PSI	4 1/16 10K FLG E/E	LE
COMMENTS:		CRATE DIMENSIONS:						
		HOSE WEIGHT: CRATE WEIGHT:						
		TOTAL WEIGHT:						

Rana Salada Fed Com 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).

Intermediate II Casing

Collapse: $DF_C = 1.125$

- a. Partial Internal Evacuation: Collapse force is equal to mud gradient (0.531 psi/ft) in which the casing will be run and a 50% internal evacuation of casing with a gas gradient and 10.0 ppg brine water gradient.
- b. Cementing: Collapse force is equal net force of the planned cement slurry gradient (0.6232 psi/ft) in which the casing will be run and internal force equivalent to the displacement 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 not 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 the internal force will be with 8.8 ppg oil-based mud gradient (0.459 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).

Rana Salada Fed Com 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).

Intermediate II Casing

Collapse: $DF_C = 1.125$

- a. Partial Internal Evacuation: Collapse force is equal to mud gradient (0.531 psi/ft) in which the casing will be run and a 50% internal evacuation of casing with a gas gradient and 10.0 ppg brine water gradient.
- b. Cementing: Collapse force is equal net force of the planned cement slurry gradient (0.6232 psi/ft) in which the casing will be run and internal force equivalent to the displacement 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 not 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 the internal force will be with 8.8 ppg oil-based mud gradient (0.459 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).



U. S. Steel Tubular Products

5 1/2 20.00 lb (0.361) P110 HP

USS-EAGLE SFH™

	PIPE	CONNECTION	
MECHANICAL PROPERTIES			
Minimum Yield Strength	125,000	125,000	psi
Maximum Yield Strength	140,000	140,000	psi
Minimum Tensile Strength	130,000	130,000	psi
DIMENSIONS			
Outside Diameter	5.500	5.830	in.
Wall Thickness	0.361		in.
Inside Diameter	4.778	4.693	in.
Drift - API	4.653	4.653	in.
Nominal Linear Weight, T&C	19.83		lbs/ft
Plain End Weight	19.83	19.83	lbs/ft
SECTION AREA			
Cross Sectional Area Critical Area	5.828	5.054	sq. in.
Joint Efficiency		86.25	%
PERFORMANCE			
Minimum Collapse Pressure	13,150	13,150	psi
External Pressure Leak Resistance		10,000	psi
Minimum Internal Yield Pressure	14,360	14,360	psi
Minimum Pipe Body Yield Strength	729,000		lbs
Joint Strength		631,750	lbs
Compression Rating		631,750	lbs
Reference Length		21,240	ft
Maximum Uniaxial Bend Rating		89.9	deg/100 ft
MAKE-UP DATA			
Minimum Make-Up Torque		14,000	ft-lbs
Maximum Make-Up Torque		16,900	ft-lbs
Maximum Operating Torque		25,000	ft-lbs
Make-Up Loss		5.92	in.

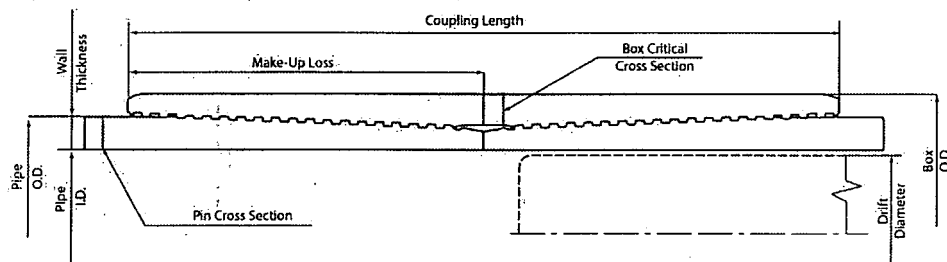
Notes:

- 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) Compressive & Tensile Connection Efficiencies are calculated by dividing the connection critical area by the pipe body area.
- 3) Uniaxial bending rating shown is structural only, and equal to compression efficiency.
- 4) 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.).
- 5) Reference length is calculated by joint strength divided by plain end weight with 1.5 safety factor.
- 6) Connection external pressure resistance has been verified to 10,000 psi (Application specific testing).

Legal Notice: All material contained in this publication is for general information only. This material should not therefore be used or relied upon for any specific application without independent competent professional examination and verification of accuracy, suitability, and applicability. Anyone making use of this material does so at their own risk and assumes any and all liability resulting from such use. U. S. Steel disclaims any and all expressed or implied warranties of fitness for any general or particular application.
Manual USS Product Data Sheet 2017 rev25 (April)

TECHNICAL DATA SHEET TMK UP DQX 5.5 X 20 P110

TUBULAR PARAMETERS		PIPE BODY PROPERTIES	
Nominal OD, (inch)	5.500	PE Weight, (lbs/ft)	19.81
Wall Thickness, (inch)	0.361	Nominal Weight, (lbs/ft)	20.00
Pipe Grade	P110	Nominal ID, (inch)	4.778
Coupling	Special	Drift Diameter, (inch)	4.653
Coupling Grade	P110	Nominal Pipe Body Area, (sq inch)	5.828
Drift	Standard	Yield Strength in Tension, (klbs)	641
CONNECTION PARAMETERS		Min. Internal Yield Pressure, (psi)	12 640
		Collapse Pressure, (psi)	11 110
Connection OD (inch)	NA		
Connection ID, (inch)	4.778		
Make-Up Loss, (inch)	4.122		
Connection Critical Area, (sq inch)	0.000		
Yield Strength in Tension, (klbs)	NA		
Yield Strength in Compression, (klbs)	.641		
Tension Efficiency	NA		
Compression Efficiency	100%		
Min. Internal Yield Pressure, (psi)	12 640		
Collapse Pressure, (psi)	11 110		
Uniaxial Bending (deg/100ft)	91.7		
MAKE-UP TORQUES			
Yield Torque, (ft-lb)	16 480		
Minimum Make-Up Torque, (ft-lb)	9 280		
Optimum Make-Up Torque, (ft-lb)	10 320		
Maximum Make-Up Torque, (ft-lb)	11 280		



NOTE: The content of this Technical Data Sheet is for general information only and does not guarantee performance or imply fitness for a particular purpose, which only a competent drilling professional can determine, considering the specific installation and operation parameters. This information supersedes all prior versions for this connection; information that is printed or downloaded is no longer controlled by TMK and might not be the latest information. Anyone using the information herein does so at their own risk. To verify that you have the latest technical information, please contact PAO "TMK" Technical Sales in Russia (Tel: +7 (495) 735-76-00, Email: techsales@tmk-group.com) and TMK IPSCO in North America (Tel: +1 (818) 49-1044, Email: techsales@tmk-ipasco.com).

Print date: 05/18/2018 01:22

GB Connection Performance Properties Sheet

Rev. 1 (08/25/2015)

ENGINEERING THE RIGHT CONNECTIONS™

Casing: 5.5 OD, 20 ppf
Casing Grade: P-110

Connection: GB CD Butt 6.300
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

5/17/2018 5:40:28 PM

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 5C3 Call II.

Legal Notice

USS - CDC® (Casing Drilling Connection) is a trademark of U. S. Steel Corporation. This product is a modified API Buttress threaded and coupled connection designed for drilling with casing applications. All material contained in this publication is for general information only. This material should not therefore be used or relied upon for any specific application without independent competent professional examination and verification of accuracy, suitability and applicability. Anyone making use of this material does so at their own risk and assumes any and all liability resulting from such use. U. S. Steel disclaims any and all expressed or implied warranties of fitness for any general or particular application.

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

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

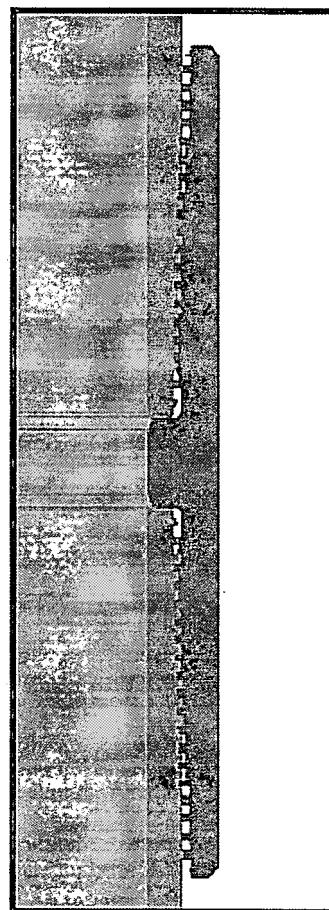
Technical Specifications

Connection Type:	Size(O.D.):	Weight (Wall):	Grade:
DWC/C-IS PLUS Casing standard	5-1/2 in	20.00 lb/ft (0.361 in)	VST P110 EC

VST P110 EC	Material
125,000	Grade
135,000	Minimum Yield Strength (psi)
	Minimum Ultimate Strength (psi)
	Pipe Dimensions
5.500	Nominal Pipe Body O.D. (in)
4.778	Nominal Pipe Body I.D.(in)
0.361	Nominal Wall Thickness (in)
20.00	Nominal Weight (lbs/ft)
19.83	Plain End Weight (lbs/ft)
5.828	Nominal Pipe Body Area (sq in)
	Pipe Body Performance Properties
729,000	Minimum Pipe Body Yield Strength (lbs)
12,090	Minimum Collapse Pressure (psi)
14,360	Minimum Internal Yield Pressure (psi)
13,100	Hydrostatic Test Pressure (psi)
	Connection Dimensions
6.300	Connection O.D. (in)
4.778	Connection I.D. (in)
4.653	Connection Drift Diameter (in)
4.13	Make-up Loss (in)
5.828	Critical Area (sq in)
100.0	Joint Efficiency (%)
	Connection Performance Properties
729,000	Joint Strength (lbs)
26,040	Reference String Length (ft) 1.4 Design Factor
728,000	API Joint Strength (lbs)
729,000	Compression Rating (lbs)
12,090	API Collapse Pressure Rating (psi)
14,360	API Internal Pressure Resistance (psi)
104.2	Maximum Uniaxial Bend Rating [degrees/100 ft]
	Approximated Field End Torque Values
16,600	Minimum Final Torque (ft-lbs)
19,100	Maximum Final Torque (ft-lbs)
21,600	Connection Yield Torque (ft-lbs)



VAM USA
4424 W. Sam Houston Pkwy. Suite 150
Houston, TX 77041
Phone: 713-479-3200
Fax: 713-479-3234
E-mail: VAMUSAsales@vam-usa.com



For detailed information on performance properties, refer to DWC Connection Data Notes on following page(s).

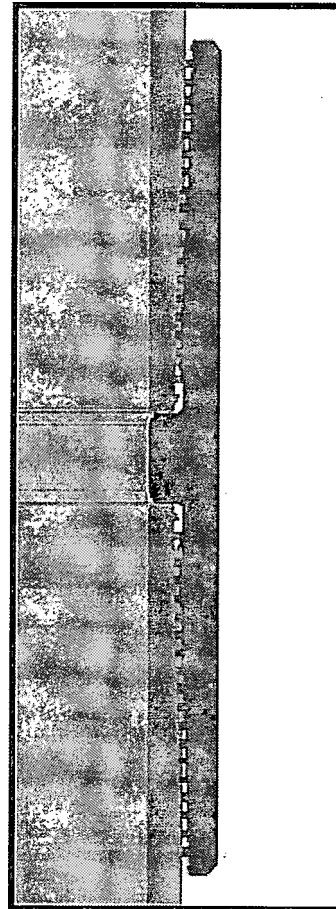
Connection specifications within the control of VAM USA were correct as of the date printed. Specifications are subject to change without notice. Certain connection specifications are dependent on the mechanical properties of the pipe. Mechanical properties of mill proprietary pipe grades were obtained from mill publications and are subject to change. Properties of mill proprietary grades should be confirmed with the mill. Users are advised to obtain current connection specifications and verify pipe mechanical properties for each application.

All information is provided by VAM USA or its affiliates at user's sole risk, without liability for loss, damage or injury resulting from the use thereof, and on an "AS IS" basis without warranty or representation of any kind, whether express or implied, including without limitation any warranty of merchantability, fitness for purpose or completeness. This document and its contents are subject to change without notice. In no event shall VAM USA or its affiliates be responsible for any indirect, special, incidental, punitive, exemplary or consequential loss or damage (including without limitation, loss of use, loss of bargain, loss of revenue, profit or anticipated profit) however caused or arising, and whether such losses or damages were foreseeable or VAM USA or its affiliates was advised of the possibility of such damages.



DWC Connection Data Notes:

1. DWC connections are available with a seal ring (SR) option.
2. All standard DWC/C connections are interchangeable for a give pipe OD. DWC connections are interchangeable with DWC/C-SR connections of the same OD and wall.
3. Connection performance properties are based on nominal pipe body and connection dimensions.
4. DWC connection internal and external pressure resistance is calculated using the API rating for buttress connections. API internal pressure resistance is calculated from formulas 31, 32, and 35 in the API Bulletin 5C3.
5. DWC joint strength is the minimum pipe body yield strength multiplied by the connection critical area.
6. API joint strength is for reference only. It is calculated from formulas 42 and 43 in the API Bulletin 5C3.
7. Bending efficiency is equal to the compression efficiency.
8. The torque values listed are recommended. The actual torque required may be affected by field conditions such as temperature, thread compound, speed of make-up, weather conditions, etc.
9. Connection yield torque is not to be exceeded.
10. Reference string length is calculated by dividing the joint strength by both the nominal weight in air and a design factor (DF) of 1.4. These values are offered for reference only and do not include load factors such as bending, buoyancy, temperature, load dynamics, etc.
11. DWC connections will accommodate API standard drift diameters.



Connection specifications within the control of VAM USA were correct as of the date printed. Specifications are subject to change without notice. Certain connection specifications are dependent on the mechanical properties of the pipe. Mechanical properties of mill proprietary pipe grades were obtained from mill publications and are subject to change. Properties of mill proprietary grades should be confirmed with the mill. Users are advised to obtain current connection specifications and verify pipe mechanical properties for each application.

All information is provided by VAM USA or its affiliates at user's sole risk, without liability for loss, damage or injury resulting from the use thereof; and on an "AS IS" basis without warranty or representation of any kind, whether express or implied, including without limitation any warranty of merchantability, fitness for purpose or completeness. This document and its contents are subject to change without notice. In no event shall VAM USA or its affiliates be responsible for any indirect, special, incidental, punitive, exemplary or consequential loss or damage (including without limitation, loss of use, loss of bargain, loss of revenue, profit or anticipated profit) however caused or arising, and whether such losses or damages were foreseeable or VAM USA or its affiliates was advised of the possibility of such damages.

2/6/2015

Rana Salada Fed Com 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).

Intermediate II Casing

Collapse: $DF_C = 1.125$

- a. Partial Internal Evacuation: Collapse force is equal to mud gradient (0.531 psi/ft) in which the casing will be run and a 50% internal evacuation of casing with a gas gradient and 10.0 ppg brine water gradient.
- b. Cementing: Collapse force is equal net force of the planned cement slurry gradient (0.6232 psi/ft) in which the casing will be run and internal force equivalent to the displacement 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 not 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 the internal force will be with 8.8 ppg oil-based mud gradient (0.459 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).



H₂S Drilling Operations Plan

- a. All personnel will be trained in H₂S 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 H₂S page 5 for more details.
- c. H₂S Safety Equipment/Systems:
 - i. Well Control Equipment
 - Flare line will be $\geq 150'$ from the wellhead and ignited by a pilot light.
 - Beware of SO₂ 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 H₂S and SO₂ 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. H₂S Detection & Monitoring Equipment

- Every person on site will be required to wear a personal H₂S and SO₂ 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 H₂S condition sign will be set at the entrance to the pad.
- Color-coded condition flag will be installed to indicate current H₂S 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 ≥ 10 will be maintained to control corrosion, H₂S gas returns to the surface, and minimize sulfide stress cracking and embrittlement.
- Drilling mud containing H₂S 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 H₂S where formation pressures are unknown.

vi. Metallurgy

- All equipment that has the potential to be exposed to H₂S will be suitable for H₂S 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 H₂S.

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 2 miles

none

Air Evacuation

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

Lifeguard (Albuquerque) (888) 866-7256

Veterinarians

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

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

SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST H2S PAGE 5
EDDY COUNTY, STATE OF NEW MEXICO

highest ground
to the north

EL. 3047.2'

NOTE: LATITUDE AND LONGITUDE COORDINATES ARE SHOWN USING THE NORTH AMERICAN DATUM OF 1983 (NAD83). LISTED NEW MEXICO STATE PLANE EAST COORDINATES ARE GRID (NAD83). BASIS OF BEARING AND DISTANCES USED ARE NEW MEXICO STATE PLANE EAST COORDINATES, MODIFIED TO THE SURFACE. ELEVATION VALUES ARE NAVD88.

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

150' NORTH
OFFSET
EL. 3043.7'

500.00 FT EL. 3045.3'

PRIMARY safety
briefing area
>150' from
well head

STAKED PAD

M 0504 133H

M 0504 234H

M 0504 214H

LADA FED COM 0504 134H

PRIMARY
egress
(exit) route

325' WEST
OFFSET
EL. 3042.5'

**RANA SALADA FED
COM 0504 133H**

ELEV. = 3041.2'

5.740± ACRES

LAT. = 32.3309826°N (NAD83)

LONG. = 104.0175754°W

NMSP EAST (FT)

N = 484287.29

E = 638865.65

windsocks on
rig floor & at
mud tanks

prevailing wind
blows from
South

laydown (V-door)
to east

warning signs
& windsock

warning signs
& windsock

safety briefing area
>150' from well head
secondary egress

PROPOSED 20'
ACCESS ROAD

EL. 3035.8'

EL. 3039.5'

010 50 100 200

SCALE 1" = 100'

DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF CR. 605 (REFINERY ROAD) AND SR. 31 (POTASH MINES ROAD), GO NORTHEAST ON SR. 31 APPROX. 1.1 MILES, TURN LEFT ON PIPELINE ROAD AND GO NORTHWEST 311' THROUGH GATE TO A ROAD SURVEY, FOLLOW ROAD SURVEY NORTH 200' TO THE SOUTHWEST PAD CORNER FOR THIS LOCATION.

NOVO OIL & GAS NORTHERN DELAWARE, LLC
RANA SALADA FED COM 0504 133H
LOCATED 1443 FT. FROM THE SOUTH LINE
AND 612 FT. FROM THE EAST LINE OF
SECTION 6, TOWNSHIP 23 SOUTH,
RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

JUNE 26, 2018

SURVEY NO. 6156A

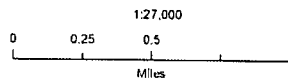
MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 CARLSBAD, NEW MEXICO

Novo Oil and Gas Northern Delaware, LLC

Rana Salada Fed Com 0504 #133H
H₂S Contingency Plan:
Radius Map

Section 6, Township 23S, Range 29E
Eddy County, New Mexico

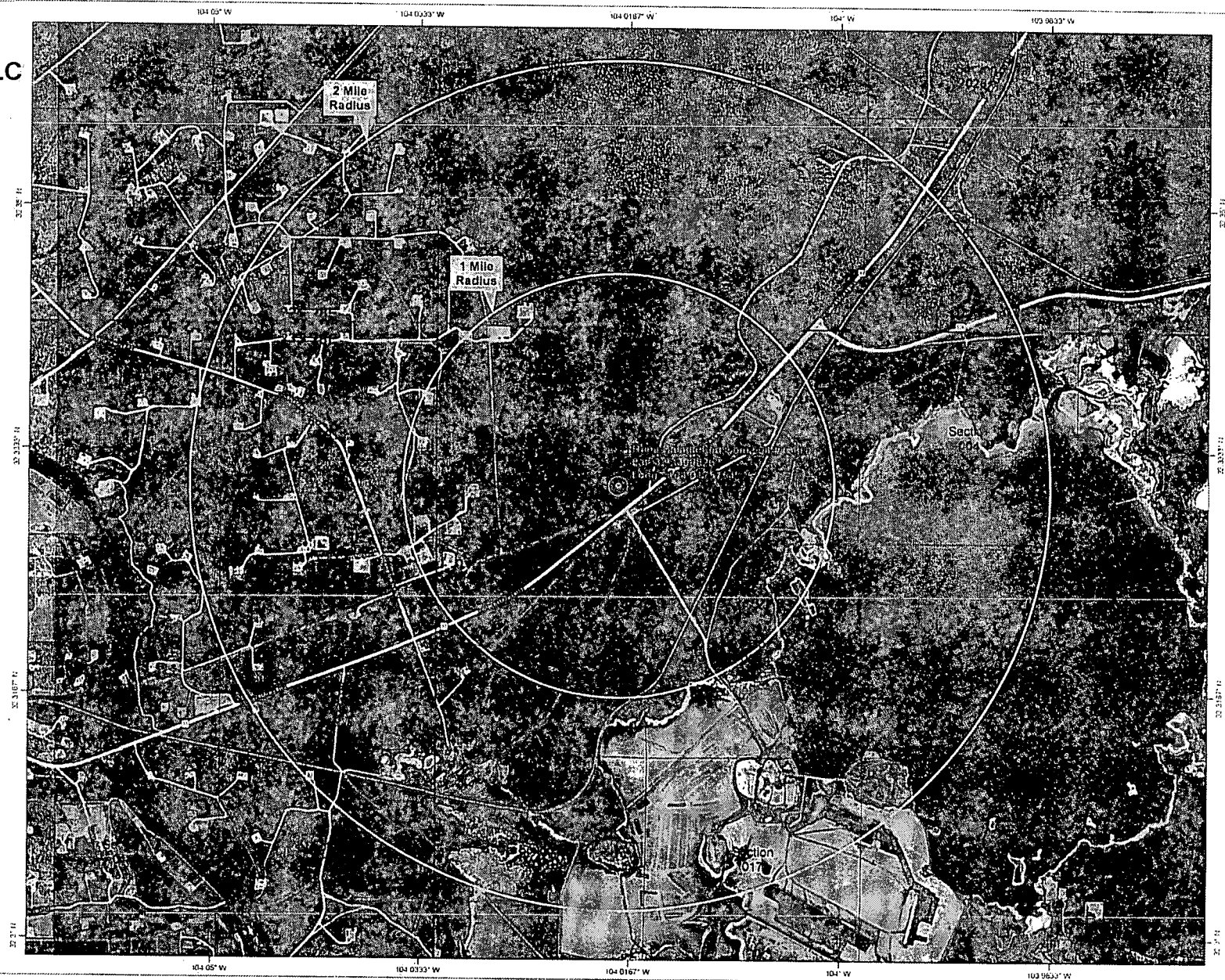
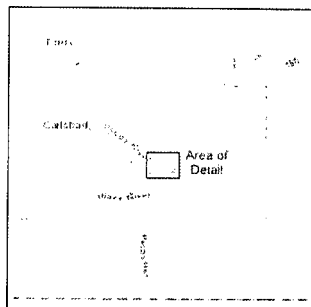
⊙ Surface Hole Location



NAD 1983 New Mexico State Plane East
FIPS 3001 Feet

PERMITS WEST
A Division of

Prepared by Permits West, Inc., July 23, 2018
for Novo Oil and Gas Northern Delaware, LLC





Well: Rana Salada Fed Com 0504 133H
Site: Section 06-T23S-R29E
Project: Eddy County, New Mexico
Design: rev0

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

System Datum: Mean Sea Level
Depth Reference: RKB=3041.2+25 @ 3066.20ft

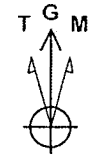
SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	5000.00	0.00	0.00	5000.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2"/100' build
3	5503.49	10.07	49:27	5500.90	28.79	33.44	2.00	49.27	33.72	Begin 10.07° tangent
4	8548.59	10.07	49:27	8499.10	376.20	436.92	0.00	0.00	440.57	Begin 2"/100' drop
5	9052.08	0.00	0.00	9000.00	404.99	470.36	2.00	180.00	474.30	Begin vertical hold section
6	9335.62	0.00	0.00	9283.54	404.99	470.36	0.00	0.00	474.30	Begin 12"/100' build
7	10085.62	90.00	89.44	9761.00	409.64	947.80	12.00	89.44	951.76	Begin 0.00° lateral section
8	20016.77	90.00	89.44	9761.00	506.31	10878.48	0.00	0.00	0882.91	PBHLTD 20016.77 MD 9761.00 TVD

Northing 484287.29 Easting 638865.65 Latitude 32.33098255 Longitude -104.01757541

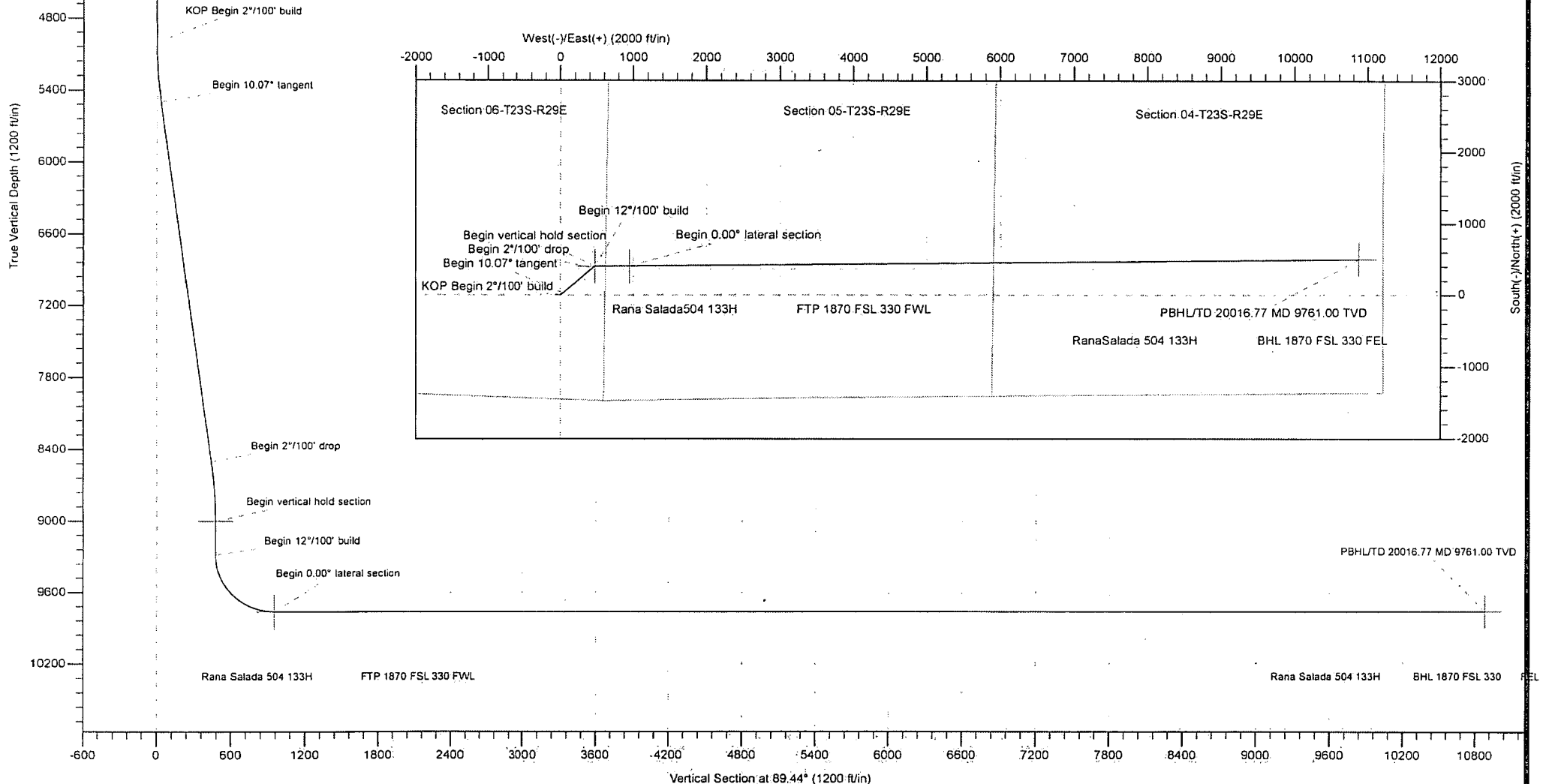
DESIGN TARGET DETAILS

Name	VT	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Rana Salada 504 133H		9000.00	404.99	470.36	484692.28	639336.01	32.33209197	-104.01604871
Rana Salada 504 133H	BHL 1870 FSL 330 FEL	9761.00	506.31	10878.48	484793.60	649744.11	32.33228125	-103.98235039
Rana Salada 504 133H	FTP 1870 FSL 330 FWL	9761.00	409.64	947.80	484696.93	639813.45	32.33210086	-104.01450290



Azimuths to Grid North
True North: -0.17°
Magnetic North: 6.90°

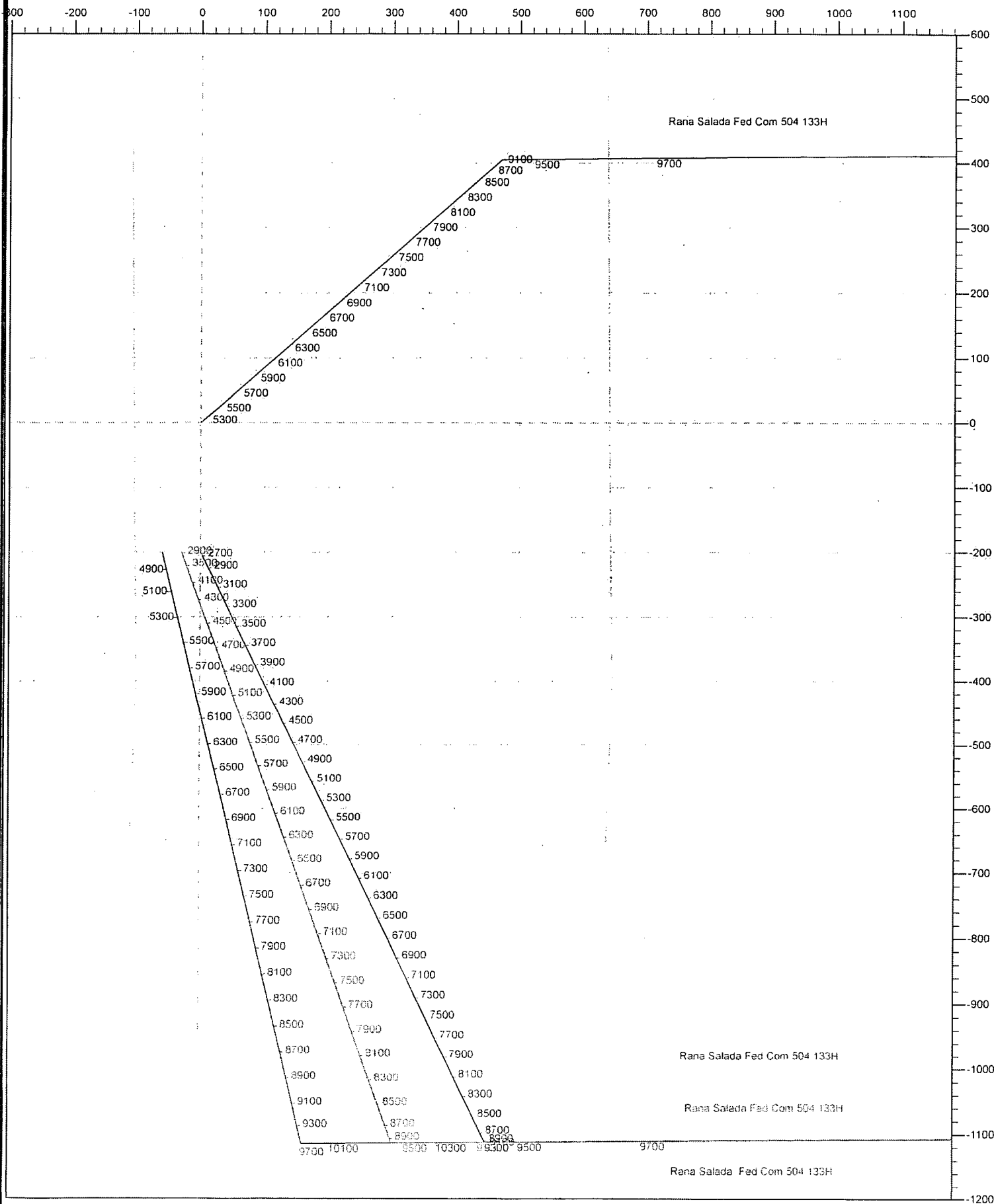
Magnetic Field
Strength: 47858.0nT
Dip Angle: 60.08°
Date: 6/3/2018
Model: IGRF2015





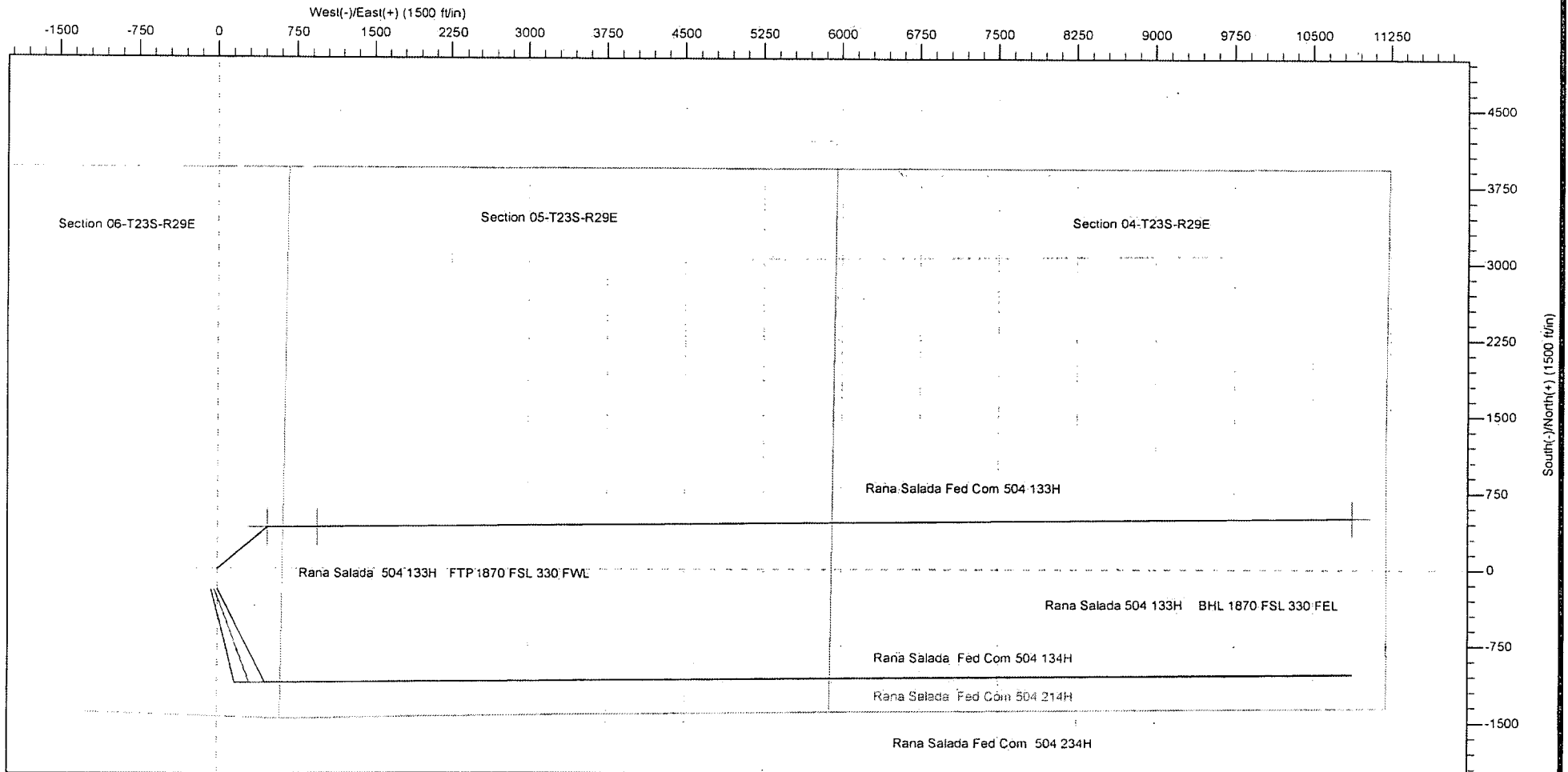
Well: Rana Salada Fed Com 504 133H
Site: Section 06-T23S-R29E
Project: Eddy County, New Mexico
Design: rev0

West(-)/East(+) (200 ft/in)





Well: Rana Salada Fed Com 504 133H
Site: Section 06-T23S-R29E
Project: Eddy County, New Mexico
Design: rev0





Standard_Report

Company: Nova Oil and Gas Northern Delaware LLC
Project: Eddy County, New Mexico
Site: Section 06-T23S-R29E
Well: Rana Salada Fed Com 0504 133H
Wellbore: Original Hole
Design: rev0

Local Co-ordinate Reference: Well Rana Salada Fed Com 0504 133H
TVD Reference: RKB=3041.2+25 @ 3066.20ft
MD Reference: RKB=3041.2+25 @ 3066.20ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: DB_Aug0116_LT_v14

Project: Eddy County, New Mexico

Map System: US State Plane 1983
Geo Datum: North American Datum 1983
Map Zone: New Mexico Eastern Zone

System Datum: Mean Sea Level

Site: Section 06-T23S-R29E

Site Position: Northing: 485,559.46 usft Latitude: 32.33449510
From: Map Easting: 636,922.26 usft Longitude: -104.02385537
Position Uncertainty: 0.00 ft Slot Radius: 13-3/16 " Grid Convergence: 0.17 °

Well: Rana Salada Fed Com 6 4 23S 29E 3B 2H, Surf loc: 1443 FSL 612 FEL Section 06-T23S-R29E

Well Position: +N/-S 0.00 ft Northing: 484,287.29 usft Latitude: 32.33098255
+E/-W 0.00 ft Easting: 638,865.65 usft Longitude: -104.01757541
Position Uncertainty: 0.00 ft Wellhead Elevation: ft Ground Level: 3,041.20 ft

Wellbore: Original Hole

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	6/3/2018	7.06	60.08	47,857.99938402

Design: rev0

Audit Notes:

Version: Phase: PLAN Tie On Depth: 0.00

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	87.34

Survey Tool Program: Date 6/3/2018

From (ft)	To (ft)	Survey: (Wellbore)	Tool Name	Description
0.00	20,016.77	rev0 (Original Hole)	MWD	OWSG MWD - Standard



Standard_Report

Company: Nova Oil and Gas Northern Delaware LLC
Project: Eddy County, New Mexico
Site: Section 06-T23S-R29E
Well: Rana Salada Fed Com 0504 133H
Wellbore: Original Hole
Design: rev0

Local Co-ordinate Reference: Well Rana Salada Fed Com 0504 133H
TVD Reference: RKB=3041.2+25 @ 3066.20ft
MD Reference: RKB=3041.2+25 @ 3066.20ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: DB_Aug0116_LT_v14

Planned Survey

MD (ft)	Inc (°)	Azi (azimuth) (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)	Northing (usft)	Easting (usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65



Standard_Report

Company: Nova Oil and Gas Northern Delaware LLC
 Project: Eddy County, New Mexico
 Site: Section 06-T23S-R29E
 Well: Rana Salada Fed Com 0504 133H
 Wellbore: Original Hole
 Design: rev0

Local Co-ordinate Reference: Well Rana Salada Fed Com 0504 133H
 TVD Reference: RKB=3041.2+25 @ 3066.20ft
 MD Reference: RKB=3041.2+25 @ 3066.20ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: DB_Aug0116_LT_v14

Planned Survey

MD (ft)	Inc (°)	Azi (azimuth) (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)	Northing (usft)	Easting (usft)
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
4,500.00	0.00	0.00	4,500.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
4,600.00	0.00	0.00	4,600.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
4,700.00	0.00	0.00	4,700.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
4,800.00	0.00	0.00	4,800.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
4,900.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
5,000.00	0.00	0.00	5,000.00	0.00	0.00	0.00	0.00	484,287.29	638,865.65
KOP Begin 2°/100' build									
5,100.00	2.00	49.27	5,099.98	1.14	1.32	2.00	1.37	484,288.43	638,866.97
5,200.00	4.00	49.27	5,199.84	4.55	5.29	2.00	5.49	484,291.84	638,870.94



Standard_Report

Company: Nova Oil and Gas Northern Delaware LLC
 Project: Eddy County, New Mexico
 Site: Section 06-T23S-R29E
 Well: Rana Salada Fed Com 0504 133H
 Wellbore: Original Hole
 Design: rev0

Local Co-ordinate Reference: Well Rana Salada Fed Com 0504 133H
 TVD Reference: RKB=3041.2+25 @ 3066.20ft
 MD Reference: RKB=3041.2+25 @ 3066.20ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: DB_Aug0116_LT_v14

Planned Survey

MD (ft)	Inc (°)	Azi (azimuth) (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)	Northing (usft)	Easting (usft)
5,300.00	6.00	49.27	5,299.45	10.24	11.89	2.00	12.36	484,297.53	638,877.54
5,400.00	8.00	49.27	5,398.70	18.19	21.13	2.00	21.95	484,305.48	638,886.78
5,500.00	10.00	49.27	5,497.47	28.40	32.98	2.00	34.27	484,315.69	638,898.63
5,503.49	10.07	49.27	5,500.90	28.79	33.44	2.00	34.74	484,316.08	638,899.09
Begin 10.07° tangent									
5,600.00	10.07	49.27	5,595.93	39.80	46.23	0.00	48.03	484,327.09	638,911.88
5,700.00	10.07	49.27	5,694.38	51.21	59.48	0.00	61.80	484,338.50	638,925.13
5,800.00	10.07	49.27	5,792.84	62.62	72.73	0.00	75.56	484,349.91	638,938.38
5,900.00	10.07	49.27	5,891.30	74.03	85.98	0.00	89.33	484,361.32	638,951.63
6,000.00	10.07	49.27	5,989.76	85.44	99.23	0.00	103.09	484,372.73	638,964.88
6,100.00	10.07	49.27	6,088.22	96.85	112.48	0.00	116.86	484,384.14	638,978.13
6,200.00	10.07	49.27	6,186.68	108.26	125.73	0.00	130.63	484,395.55	638,991.38
6,300.00	10.07	49.27	6,285.14	119.66	138.98	0.00	144.39	484,406.95	639,004.63
6,400.00	10.07	49.27	6,383.60	131.07	152.23	0.00	158.16	484,418.36	639,017.88
6,500.00	10.07	49.27	6,482.06	142.48	165.48	0.00	171.93	484,429.77	639,031.13
6,600.00	10.07	49.27	6,580.52	153.89	178.73	0.00	185.69	484,441.18	639,044.38
6,700.00	10.07	49.27	6,678.98	165.30	191.98	0.00	199.46	484,452.59	639,057.63
6,800.00	10.07	49.27	6,777.44	176.71	205.23	0.00	213.22	484,464.00	639,070.88
6,900.00	10.07	49.27	6,875.90	188.12	218.48	0.00	226.99	484,475.41	639,084.13
7,000.00	10.07	49.27	6,974.36	199.52	231.73	0.00	240.76	484,486.81	639,097.38
7,100.00	10.07	49.27	7,072.82	210.93	244.98	0.00	254.52	484,498.22	639,110.63
7,200.00	10.07	49.27	7,171.28	222.34	258.23	0.00	268.29	484,509.63	639,123.88
7,300.00	10.07	49.27	7,269.74	233.75	271.48	0.00	282.05	484,521.04	639,137.13
7,400.00	10.07	49.27	7,368.20	245.16	284.73	0.00	295.82	484,532.45	639,150.38
7,500.00	10.07	49.27	7,466.66	256.57	297.98	0.00	309.59	484,543.86	639,163.63
7,600.00	10.07	49.27	7,565.12	267.98	311.23	0.00	323.35	484,555.27	639,176.88
7,700.00	10.07	49.27	7,663.58	279.38	324.48	0.00	337.12	484,566.67	639,190.13



Standard_Report

Company: Nova Oil and Gas Northern Delaware LLC
 Project: Eddy County, New Mexico
 Site: Section 06-T23S-R29E
 Well: Rana Salada Fed Com 054 133H
 Wellbore: Original Hole
 Design: rev0

Local Co-ordinate Reference: Well Rana Salada Fed Com 0504 133H
 TVD Reference: RKB=3041.2+25 @ 3066.20ft
 MD Reference: RKB=3041.2+25 @ 3066.20ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: DB_Aug0116_LT_v14

Planned Survey

MD (ft)	Inc (°)	Azi (azimuth) (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)	Northing (usft)	Easting (usft)
7,800.00	10.07	49.27	7,762.04	290.79	337.73	0.00	350.88	484,578.08	639,203.38
7,900.00	10.07	49.27	7,860.49	302.20	350.98	0.00	364.65	484,589.49	639,216.63
8,000.00	10.07	49.27	7,958.95	313.61	364.23	0.00	378.42	484,600.90	639,229.88
8,100.00	10.07	49.27	8,057.41	325.02	377.48	0.00	392.18	484,612.31	639,243.13
8,200.00	10.07	49.27	8,155.87	336.43	390.73	0.00	405.95	484,623.72	639,256.38
8,300.00	10.07	49.27	8,254.33	347.84	403.98	0.00	419.71	484,635.12	639,269.63
8,400.00	10.07	49.27	8,352.79	359.24	417.23	0.00	433.48	484,646.53	639,282.88
8,500.00	10.07	49.27	8,451.25	370.65	430.48	0.00	447.25	484,657.94	639,296.13
8,548.59	10.07	49.27	8,499.10	376.20	436.92	0.00	453.94	484,663.49	639,302.57
Begin 2°/100' drop									
8,600.00	9.04	49.27	8,549.79	381.76	443.39	2.00	460.65	484,669.05	639,309.03
8,700.00	7.04	49.27	8,648.80	390.89	453.99	2.00	471.67	484,678.18	639,319.64
8,800.00	5.04	49.27	8,748.24	397.76	461.96	2.00	479.95	484,685.05	639,327.61
8,900.00	3.04	49.27	8,847.99	402.36	467.30	2.00	485.50	484,689.65	639,332.95
9,000.00	1.04	49.27	8,947.92	404.68	470.00	2.00	488.31	484,691.97	639,335.65
9,052.08	0.00	0.00	9,000.00	404.99	470.36	2.00	488.68	484,692.28	639,336.01
Begin vertical hold section									
9,100.00	0.00	0.00	9,047.92	404.99	470.36	0.00	488.68	484,692.28	639,336.01
9,200.00	0.00	0.00	9,147.92	404.99	470.36	0.00	488.68	484,692.28	639,336.01
9,300.00	0.00	0.00	9,247.92	404.99	470.36	0.00	488.68	484,692.28	639,336.01
9,335.62	0.00	0.00	9,283.54	404.99	470.36	0.00	488.68	484,692.28	639,336.01
Begin 12°/100' build									
9,400.00	7.73	89.44	9,347.72	405.03	474.69	12.00	493.01	484,692.32	639,340.34
9,500.00	19.73	89.44	9,444.69	405.26	498.38	12.00	516.68	484,692.55	639,364.02
9,600.00	31.73	89.44	9,534.61	405.69	541.70	12.00	559.98	484,692.97	639,407.35
9,700.00	43.73	89.44	9,613.56	406.28	602.77	12.00	621.01	484,693.57	639,468.42
9,800.00	55.73	89.44	9,678.09	407.02	678.92	12.00	697.11	484,694.31	639,544.57



Standard_Report

Company: Nova Oil and Gas Northern Delaware LLC
 Project: Eddy County, New Mexico
 Site: Section 06-T23S-R29E
 Well: Rana Salada Fed Com 0504 133H
 Wellbore: Original Hole
 Design: rev0

Local Co-ordinate Reference: Well Rana Salada Fed Com 0504 133H
 TVD Reference: RKB=3041.2+25 @ 3066.20ft
 MD Reference: RKB=3041.2+25 @ 3066.20ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: DB_Aug0116_LT_v14

Planned Survey

MD (ft)	Inc (°)	Azi (azimuth) (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V_Sec (ft)	Northing (usft)	Easting (usft)
9,900.00	67.73	89.44	9,725.37	407.88	766.83	12.00	784.96	484,695.17	639,632.48
10,000.00	79.73	89.44	9,753.35	408.81	862.64	12.00	880.71	484,696.10	639,728.29
10,085.62	90.00	89.44	9,761.00	409.64	947.80	12.00	965.82	484,696.93	639,813.45
Begin 0.00° lateral section									
10,100.00	90.00	89.44	9,761.00	409.78	962.18	0.00	980.19	484,697.07	639,827.83
10,200.00	90.00	89.44	9,761.00	410.75	1,062.17	0.00	1,080.12	484,698.04	639,927.82
10,300.00	90.00	89.44	9,761.00	411.73	1,162.17	0.00	1,180.05	484,699.01	640,027.82
10,400.00	90.00	89.44	9,761.00	412.70	1,262.16	0.00	1,279.99	484,699.99	640,127.81
10,500.00	90.00	89.44	9,761.00	413.67	1,362.16	0.00	1,379.92	484,700.96	640,227.81
10,600.00	90.00	89.44	9,761.00	414.65	1,462.15	0.00	1,479.85	484,701.93	640,327.80
10,700.00	90.00	89.44	9,761.00	415.62	1,562.15	0.00	1,579.78	484,702.91	640,427.80
10,800.00	90.00	89.44	9,761.00	416.59	1,662.14	0.00	1,679.72	484,703.88	640,527.79
10,900.00	90.00	89.44	9,761.00	417.57	1,762.14	0.00	1,779.65	484,704.86	640,627.79
11,000.00	90.00	89.44	9,761.00	418.54	1,862.14	0.00	1,879.58	484,705.83	640,727.78
11,100.00	90.00	89.44	9,761.00	419.51	1,962.13	0.00	1,979.51	484,706.80	640,827.78
11,200.00	90.00	89.44	9,761.00	420.49	2,062.13	0.00	2,079.45	484,707.78	640,927.77
11,300.00	90.00	89.44	9,761.00	421.46	2,162.12	0.00	2,179.38	484,708.75	641,027.77
11,400.00	90.00	89.44	9,761.00	422.43	2,262.12	0.00	2,279.31	484,709.72	641,127.76
11,500.00	90.00	89.44	9,761.00	423.41	2,362.11	0.00	2,379.24	484,710.70	641,227.76
11,600.00	90.00	89.44	9,761.00	424.38	2,462.11	0.00	2,479.17	484,711.67	641,327.75
11,700.00	90.00	89.44	9,761.00	425.35	2,562.10	0.00	2,579.11	484,712.64	641,427.75
11,800.00	90.00	89.44	9,761.00	426.33	2,662.10	0.00	2,679.04	484,713.62	641,527.74
11,900.00	90.00	89.44	9,761.00	427.30	2,762.09	0.00	2,778.97	484,714.59	641,627.74
12,000.00	90.00	89.44	9,761.00	428.27	2,862.09	0.00	2,878.90	484,715.56	641,727.73
12,100.00	90.00	89.44	9,761.00	429.25	2,962.08	0.00	2,978.84	484,716.54	641,827.73
12,200.00	90.00	89.44	9,761.00	430.22	3,062.08	0.00	3,078.77	484,717.51	641,927.72
12,300.00	90.00	89.44	9,761.00	431.19	3,162.07	0.00	3,178.70	484,718.48	642,027.72



Standard_Report

Company: Nova Oil and Gas Northern Delaware LLC
 Project: Eddy County, New Mexico
 Site: Section 06-T23S-R29E
 Well: Rana Salada Fed Com 0504 133H
 Wellbore: Original Hole
 Design: rev0

Local Co-ordinate Reference: Well Rana Salada Fed Com 0504 133H
 TVD Reference: RKB=3041.2+25 @ 3066.20ft
 MD Reference: RKB=3041.2+25 @ 3066.20ft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: DB_Aug0116_LT_v14

Planned Survey

MD (ft)	Inc (°)	Azi (azimuth) (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)	Northing (usft)	Easting (usft)
12,400.00	90.00	89.44	9,761.00	432.17	3,262.07	0.00	3,278.63	484,719.46	642,127.71
12,500.00	90.00	89.44	9,761.00	433.14	3,362.06	0.00	3,378.57	484,720.43	642,227.71
12,600.00	90.00	89.44	9,761.00	434.11	3,462.06	0.00	3,478.50	484,721.40	642,327.70
12,700.00	90.00	89.44	9,761.00	435.09	3,562.05	0.00	3,578.43	484,722.38	642,427.70
12,800.00	90.00	89.44	9,761.00	436.06	3,662.05	0.00	3,678.36	484,723.35	642,527.69
12,900.00	90.00	89.44	9,761.00	437.03	3,762.05	0.00	3,778.30	484,724.32	642,627.69
13,000.00	90.00	89.44	9,761.00	438.01	3,862.04	0.00	3,878.23	484,725.30	642,727.68
13,100.00	90.00	89.44	9,761.00	438.98	3,962.04	0.00	3,978.16	484,726.27	642,827.68
13,200.00	90.00	89.44	9,761.00	439.95	4,062.03	0.00	4,078.09	484,727.24	642,927.67
13,300.00	90.00	89.44	9,761.00	440.93	4,162.03	0.00	4,178.03	484,728.22	643,027.67
13,400.00	90.00	89.44	9,761.00	441.90	4,262.02	0.00	4,277.96	484,729.19	643,127.66
13,500.00	90.00	89.44	9,761.00	442.88	4,362.02	0.00	4,377.89	484,730.16	643,227.66
13,600.00	90.00	89.44	9,761.00	443.85	4,462.01	0.00	4,477.82	484,731.14	643,327.65
13,700.00	90.00	89.44	9,761.00	444.82	4,562.01	0.00	4,577.76	484,732.11	643,427.65
13,800.00	90.00	89.44	9,761.00	445.80	4,662.00	0.00	4,677.69	484,733.08	643,527.64
13,900.00	90.00	89.44	9,761.00	446.77	4,762.00	0.00	4,777.62	484,734.06	643,627.64
14,000.00	90.00	89.44	9,761.00	447.74	4,861.99	0.00	4,877.55	484,735.03	643,727.63
14,100.00	90.00	89.44	9,761.00	448.72	4,961.99	0.00	4,977.48	484,736.00	643,827.63
14,200.00	90.00	89.44	9,761.00	449.69	5,061.98	0.00	5,077.42	484,736.98	643,927.62
14,300.00	90.00	89.44	9,761.00	450.66	5,161.98	0.00	5,177.35	484,737.95	644,027.62
14,400.00	90.00	89.44	9,761.00	451.64	5,261.97	0.00	5,277.28	484,738.92	644,127.61
14,500.00	90.00	89.44	9,761.00	452.61	5,361.97	0.00	5,377.21	484,739.90	644,227.61
14,600.00	90.00	89.44	9,761.00	453.58	5,461.96	0.00	5,477.15	484,740.87	644,327.60
14,700.00	90.00	89.44	9,761.00	454.56	5,561.96	0.00	5,577.08	484,741.85	644,427.60
14,800.00	90.00	89.44	9,761.00	455.53	5,661.96	0.00	5,677.01	484,742.82	644,527.59
14,900.00	90.00	89.44	9,761.00	456.50	5,761.95	0.00	5,776.94	484,743.79	644,627.59
15,000.00	90.00	89.44	9,761.00	457.48	5,861.95	0.00	5,876.88	484,744.77	644,727.58



Standard_Report

Company: Nova Oil and Gas Northern Delaware LLC
Project: Eddy County, New Mexico
Site: Section 06-T23S-R29E
Well: Rana Salada Fed Com 0504 133H
Wellbore: Original Hole
Design: rev0

Local Co-ordinate Reference: Well Rana Salada Fed Com 0504 133H
TVD Reference: RKB=3041.2+25 @ 3066.20ft
MD Reference: RKB=3041.2+25 @ 3066.20ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: DB_Aug0116_LT_v14

Planned Survey

MD (ft)	Inc (°)	Azi (azimuth) (°)	TVD (ft)	N/S (ft)	E/W (ft)	DLeg (°/100ft)	V. Sec (ft)	Northing (usft)	Easting (usft)
15,100.00	90.00	89.44	9,761.00	458.45	5,961.94	0.00	5,976.81	484,745.74	644,827.58
15,200.00	90.00	89.44	9,761.00	459.42	6,061.94	0.00	6,076.74	484,746.71	644,927.57
15,300.00	90.00	89.44	9,761.00	460.40	6,161.93	0.00	6,176.67	484,747.69	645,027.57
15,400.00	90.00	89.44	9,761.00	461.37	6,261.93	0.00	6,276.61	484,748.66	645,127.56
15,500.00	90.00	89.44	9,761.00	462.34	6,361.92	0.00	6,376.54	484,749.63	645,227.56
15,600.00	90.00	89.44	9,761.00	463.32	6,461.92	0.00	6,476.47	484,750.61	645,327.55
15,700.00	90.00	89.44	9,761.00	464.29	6,561.91	0.00	6,576.40	484,751.58	645,427.55
15,800.00	90.00	89.44	9,761.00	465.26	6,661.91	0.00	6,676.34	484,752.55	645,527.54
15,900.00	90.00	89.44	9,761.00	466.24	6,761.90	0.00	6,776.27	484,753.53	645,627.54
16,000.00	90.00	89.44	9,761.00	467.21	6,861.90	0.00	6,876.20	484,754.50	645,727.53
16,100.00	90.00	89.44	9,761.00	468.18	6,961.89	0.00	6,976.13	484,755.47	645,827.53
16,200.00	90.00	89.44	9,761.00	469.16	7,061.89	0.00	7,076.06	484,756.45	645,927.52
16,300.00	90.00	89.44	9,761.00	470.13	7,161.88	0.00	7,176.00	484,757.42	646,027.52
16,400.00	90.00	89.44	9,761.00	471.10	7,261.88	0.00	7,275.93	484,758.39	646,127.52
16,500.00	90.00	89.44	9,761.00	472.08	7,361.87	0.00	7,375.86	484,759.37	646,227.51
16,600.00	90.00	89.44	9,761.00	473.05	7,461.87	0.00	7,475.79	484,760.34	646,327.51
16,700.00	90.00	89.44	9,761.00	474.02	7,561.87	0.00	7,575.73	484,761.31	646,427.50
16,800.00	90.00	89.44	9,761.00	475.00	7,661.86	0.00	7,675.66	484,762.29	646,527.50
16,900.00	90.00	89.44	9,761.00	475.97	7,761.86	0.00	7,775.59	484,763.26	646,627.49
17,000.00	90.00	89.44	9,761.00	476.94	7,861.85	0.00	7,875.52	484,764.23	646,727.49
17,100.00	90.00	89.44	9,761.00	477.92	7,961.85	0.00	7,975.46	484,765.21	646,827.48
17,200.00	90.00	89.44	9,761.00	478.89	8,061.84	0.00	8,075.39	484,766.18	646,927.48
17,300.00	90.00	89.44	9,761.00	479.87	8,161.84	0.00	8,175.32	484,767.15	647,027.47
17,400.00	90.00	89.44	9,761.00	480.84	8,261.83	0.00	8,275.25	484,768.13	647,127.47
17,500.00	90.00	89.44	9,761.00	481.81	8,361.83	0.00	8,375.19	484,769.10	647,227.46
17,600.00	90.00	89.44	9,761.00	482.79	8,461.82	0.00	8,475.12	484,770.07	647,327.46
17,700.00	90.00	89.44	9,761.00	483.76	8,561.82	0.00	8,575.05	484,771.05	647,427.45



Standard_Report

Company: Nova Oil and Gas Northern Delaware LLC
Project: Eddy County, New Mexico
Site: Section 06-T23S-R29E
Well: Rana Salada Fed Com 0504 133H
Wellbore: Original Hole
Design: rev0

Local Co-ordinate Reference: Well Rana Salada Fed Com 0504 133H
TVD Reference: RKB=3041.2+25 @ 3066.20ft
MD Reference: RKB=3041.2+25 @ 3066.20ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: DB_Aug0116_LT_V14

Planned Survey

MD (ft)	Inc (°)	Azi (azimuth) (°)	TVD (ft)	N/S (ft)	E/W (ft)	D Leg (°/100ft)	V-Sec (ft)	Northing (usft)	Easting (usft)
17,800.00	90.00	89.44	9,761.00	484.73	8,661.81	0.00	8,674.98	484,772.02	647,527.45
17,900.00	90.00	89.44	9,761.00	485.71	8,761.81	0.00	8,774.92	484,772.99	647,627.44
18,000.00	90.00	89.44	9,761.00	486.68	8,861.80	0.00	8,874.85	484,773.97	647,727.44
18,100.00	90.00	89.44	9,761.00	487.65	8,961.80	0.00	8,974.78	484,774.94	647,827.43
18,200.00	90.00	89.44	9,761.00	488.63	9,061.79	0.00	9,074.71	484,775.92	647,927.43
18,300.00	90.00	89.44	9,761.00	489.60	9,161.79	0.00	9,174.65	484,776.89	648,027.42
18,400.00	90.00	89.44	9,761.00	490.57	9,261.78	0.00	9,274.58	484,777.86	648,127.42
18,500.00	90.00	89.44	9,761.00	491.55	9,361.78	0.00	9,374.51	484,778.84	648,227.41
18,600.00	90.00	89.44	9,761.00	492.52	9,461.78	0.00	9,474.44	484,779.81	648,327.41
18,700.00	90.00	89.44	9,761.00	493.49	9,561.77	0.00	9,574.37	484,780.78	648,427.40
18,800.00	90.00	89.44	9,761.00	494.47	9,661.77	0.00	9,674.31	484,781.76	648,527.40
18,900.00	90.00	89.44	9,761.00	495.44	9,761.76	0.00	9,774.24	484,782.73	648,627.39
19,000.00	90.00	89.44	9,761.00	496.41	9,861.76	0.00	9,874.17	484,783.70	648,727.39
19,100.00	90.00	89.44	9,761.00	497.39	9,961.75	0.00	9,974.10	484,784.68	648,827.38
19,200.00	90.00	89.44	9,761.00	498.36	10,061.75	0.00	10,074.04	484,785.65	648,927.38
19,300.00	90.00	89.44	9,761.00	499.33	10,161.74	0.00	10,173.97	484,786.62	649,027.37
19,400.00	90.00	89.44	9,761.00	500.31	10,261.74	0.00	10,273.90	484,787.60	649,127.37
19,500.00	90.00	89.44	9,761.00	501.28	10,361.73	0.00	10,373.83	484,788.57	649,227.36
19,600.00	90.00	89.44	9,761.00	502.25	10,461.73	0.00	10,473.77	484,789.54	649,327.36
19,700.00	90.00	89.44	9,761.00	503.23	10,561.72	0.00	10,573.70	484,790.52	649,427.35
19,800.00	90.00	89.44	9,761.00	504.20	10,661.72	0.00	10,673.63	484,791.49	649,527.35
19,900.00	90.00	89.44	9,761.00	505.17	10,761.71	0.00	10,773.56	484,792.46	649,627.34
20,000.00	90.00	89.44	9,761.00	506.15	10,861.71	0.00	10,873.50	484,793.44	649,727.34
20,016.77	90.00	89.44	9,761.00	506.31	10,878.48	0.00	10,890.26	484,793.60	649,744.11

PBHL/TD 20016.77 MD 9761.00 TVD



Standard_Report

Company: Nova Oil and Gas Northern Delaware LLC
Project: Eddy County, New Mexico
Site: Section 06-T23S-R29E
Well: Rana Salada Fed Com 0504 133H
Wellbore: Original Hole
Design: rev0

Local Co-ordinate Reference: Well Rana Salada Fed Com 0504 133H
TVD Reference: RKB=3041.2+25 @ 3066.20ft
MD Reference: RKB=3041.2+25 @ 3066.20ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: DB_Aug0116_LT_v14

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
5,000.00	5,000.00	0.00	0.00	KOP Begin 2°/100' build
5,503.49	5,500.90	28.79	33.44	Begin 10.07° tangent
8,548.59	8,499.10	376.20	436.92	Begin 2°/100' drop
9,052.08	9,000.00	404.99	470.36	Begin vertical hold section
9,335.62	9,283.54	404.99	470.36	Begin 12°/100' build
10,085.62	9,761.00	409.64	947.80	Begin 0.00° lateral section
20,016.77	9,761.00	506.31	10,878.48	PBHL/TD 20016.77 MD 9761.00 TVD



Anticollision Report

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 504 133H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3041.2+25 @ 3066.20ft
Reference Site:	Section 06-T23S-R29E	MD Reference:	RKB=3041.2+25 @ 3066.20ft
Site Error:	0.00 ft Rana Salada Fed Com 504 133H	North Reference:	Grid
Reference Well:	0.00 ft	Survey Calculation Method:	Minimum Curvature
Well Error:	Original Hole	Output errors are at	2.00 sigma
Reference Wellbore	rev0	Database:	DB_Aug0116_LT_v14
Reference Design:		Offset TVD Reference:	Offset Datum

Reference	rev0		
Filter type:	GLOBAL FILTER APPLIED: All wellpaths within 200'+ 100/1000 of reference		
Interpolation Method:	MD Interval 100.00ft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 2,201.68 ft	Error Surface:	Pedal Curve
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date 6/3/2018		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.00	20,016.77	rev0 (Original Hole)	MWD	OWSG MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Section 06-T23S-R29E						
Rana Salada Fed Com 504	134H - Original Hol	2,500.00	2,498.20	200.11	182.64	11.455 CC, ES
Rana Salada Fed Com 504	134H - Original Hol	20,016.77	20,070.71	1,539.70	1,019.87	2.962 SF
Rana Salada Fed Com 504	234H - Original Ho	4,500.00	4,497.90	208.75	176.94	6.563 CC, ES
Rana Salada Fed Com 504	234HH - Original Ho	20,016.77	20,985.64	1,650.98	1,160.92	3.369 SF
Rana Salada Fed Com 504	214H - Original H	2,800.00	2,798.10	202.24	182.62	10.308 CC, ES
Rana Salada Fed Com 504 214H - Original H		20,016.77	20,315.78	1,542.01	1,020.45	2.957 SF

Offset Design												
Section 06-T23S-R29E - Rana Salada Fed Com 504 134H - Original Hole - rev0												
Survey Program: 0-MWD												
Reference												
Offset												
Semi Major Axis												
Distance												
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor
0.00	0.00	1.80	-1.80	0.00	0.00	179.97	-200.11	0.11	200.11			
100.00	100.00	101.80	98.20	0.13	0.14	179.97	-200.11	0.11	200.11	199.84	0.28	726.864
200.00	200.00	201.80	198.20	0.49	0.50	179.97	-200.11	0.11	200.11	199.12	0.99	201.673
300.00	300.00	301.80	298.20	0.85	0.86	179.97	-200.11	0.11	200.11	198.40	1.71	117.079
400.00	400.00	401.80	398.20	1.21	1.22	179.97	-200.11	0.11	200.11	197.68	2.43	82.481
500.00	500.00	501.80	498.20	1.57	1.57	179.97	-200.11	0.11	200.11	196.97	3.14	63.667
600.00	600.00	601.80	598.20	1.93	1.93	179.97	-200.11	0.11	200.11	196.25	3.86	51.842
700.00	700.00	701.80	698.20	2.29	2.29	179.97	-200.11	0.11	200.11	195.53	4.58	43.721
800.00	800.00	801.80	798.20	2.64	2.65	179.97	-200.11	0.11	200.11	194.82	5.29	37.800
900.00	900.00	901.80	898.20	3.00	3.01	179.97	-200.11	0.11	200.11	194.10	6.01	33.292
1,000.00	1,000.00	1,001.80	998.20	3.36	3.37	179.97	-200.11	0.11	200.11	193.38	6.73	29.744
1,100.00	1,100.00	1,101.80	1,098.20	3.72	3.73	179.97	-200.11	0.11	200.11	192.67	7.44	26.879
1,200.00	1,200.00	1,201.80	1,198.20	4.08	4.08	179.97	-200.11	0.11	200.11	191.95	8.16	24.518
1,300.00	1,300.00	1,301.80	1,298.20	4.44	4.44	179.97	-200.11	0.11	200.11	191.23	8.88	22.538
1,400.00	1,400.00	1,401.80	1,398.20	4.79	4.80	179.97	-200.11	0.11	200.11	190.51	9.60	20.854
1,500.00	1,500.00	1,501.80	1,498.20	5.15	5.16	179.97	-200.11	0.11	200.11	189.80	10.31	19.405
1,600.00	1,600.00	1,601.80	1,598.20	5.51	5.52	179.97	-200.11	0.11	200.11	189.08	11.03	18.143
1,700.00	1,700.00	1,701.80	1,698.20	5.87	5.88	179.97	-200.11	0.11	200.11	188.36	11.75	17.036
1,800.00	1,800.00	1,801.80	1,798.20	6.23	6.23	179.97	-200.11	0.11	200.11	187.65	12.46	16.056
1,900.00	1,900.00	1,901.80	1,898.20	6.59	6.59	179.97	-200.11	0.11	200.11	186.93	13.18	15.183
2,000.00	2,000.00	2,001.80	1,998.20	6.95	6.95	179.97	-200.11	0.11	200.11	186.21	13.90	14.399

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



Anticollision Report

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 0504 133H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3041.2+25 @ 3066.20ft
Reference Site:	Section 06-T23S-R29E	MD Reference:	RKB=3041.2+25 @ 3066.20ft
Site Error:	0.00 ft Rana Salada Fed Com 0504 133H	North Reference:	Grid
Reference Well:	0.00 ft	Survey Calculation Method:	Minimum Curvature
Well Error:	Original Hole	Output errors are at	2.00 sigma
Reference Wellbore:	rev0	Database:	DB_Aug0116_LT_v14
Reference Design:		Offset TVD Reference:	Offset Datum

Offset Design Section 06-T23S-R29E - Rana Salada Fed Com 0504 134H - Original Hole - rev0													Offset Site Error:	0.00 ft
Survey Program: 0-MWD													Offset Well Error:	0.00 ft
Reference	Offset	Semi Major Axis		Distance		Minimum		Separation		Warning				
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (ft)	+E-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
2,100.00	2,100.00	2,101.80	2,098.20	7.30	7.31	179.97	-200.11	0.11	200.11	185.50	14.61	13.693		
2,200.00	2,200.00	2,201.80	2,198.20	7.66	7.67	179.97	-200.11	0.11	200.11	184.78	15.33	13.053		
2,300.00	2,300.00	2,301.80	2,298.20	8.02	8.03	179.97	-200.11	0.11	200.11	184.06	16.05	12.469		
2,400.00	2,400.00	2,401.80	2,398.20	8.38	8.39	179.97	-200.11	0.11	200.11	183.35	16.76	11.936		
2,500.00	2,500.00	2,498.20	2,498.20	8.74	8.73	179.97	-200.11	0.11	200.11	182.64	17.47	11.455 CC, ES		
2,600.00	2,600.00	2,592.37	2,592.36	9.10	9.05	179.78	-201.45	0.77	201.53	183.39	18.14	11.108		
2,700.00	2,700.00	2,686.24	2,686.11	9.45	9.36	179.23	-205.54	2.78	205.92	187.13	18.79	10.960		
2,800.00	2,800.00	2,779.71	2,779.27	9.81	9.67	178.35	-212.36	6.13	213.29	193.87	19.42	10.985		
2,900.00	2,900.00	2,872.59	2,871.54	10.17	9.98	177.22	-221.83	10.78	223.68	203.66	20.03	11.169		
3,000.00	3,000.00	2,964.68	2,962.65	10.53	10.29	175.92	-233.86	16.69	237.14	216.52	20.62	11.501		
3,100.00	3,100.00	3,062.15	3,058.76	10.89	10.62	174.52	-248.40	23.84	252.64	231.36	21.28	11.871		
3,200.00	3,200.00	3,160.75	3,155.98	11.25	10.97	173.26	-263.14	31.08	268.31	246.35	21.97	12.214		
3,300.00	3,300.00	3,259.35	3,253.21	11.61	11.33	172.15	-277.88	38.32	284.10	261.45	22.65	12.541		
3,400.00	3,400.00	3,357.96	3,350.43	11.96	11.69	171.15	-292.63	45.57	299.98	276.64	23.34	12.851		
3,500.00	3,500.00	3,456.56	3,447.66	12.32	12.06	170.25	-307.37	52.81	315.94	291.91	24.04	13.145		
3,600.00	3,600.00	3,555.16	3,544.88	12.68	12.43	169.44	-322.11	60.05	331.97	307.24	24.73	13.424		
3,700.00	3,700.00	3,653.77	3,642.11	13.04	12.80	168.70	-336.86	67.30	348.06	322.64	25.42	13.690		
3,800.00	3,800.00	3,752.37	3,739.33	13.40	13.18	168.03	-351.60	74.54	364.20	338.08	26.12	13.942		
3,900.00	3,900.00	3,850.97	3,836.56	13.76	13.57	167.42	-366.34	81.78	380.39	353.56	26.82	14.182		
4,000.00	4,000.00	3,949.57	3,933.78	14.11	13.96	166.85	-381.08	89.03	396.61	369.09	27.52	14.411		
4,100.00	4,100.00	4,048.18	4,031.01	14.47	14.35	166.33	-395.83	96.27	412.87	384.64	28.22	14.628		
4,200.00	4,200.00	4,146.78	4,128.23	14.83	14.74	165.85	-410.57	103.51	429.16	400.23	28.93	14.836		
4,300.00	4,300.00	4,245.38	4,225.46	15.19	15.14	165.40	-425.31	110.76	445.47	415.84	29.63	15.034		
4,400.00	4,400.00	4,343.98	4,322.68	15.55	15.54	164.99	-440.05	118.00	461.81	431.48	30.34	15.223		
4,500.00	4,500.00	4,442.59	4,419.91	15.91	15.94	164.60	-454.80	125.24	478.18	447.14	31.04	15.404		
4,600.00	4,600.00	4,541.19	4,517.13	16.27	16.34	164.24	-469.54	132.49	494.56	462.81	31.75	15.577		
4,700.00	4,700.00	4,639.79	4,614.36	16.62	16.75	163.91	-484.28	139.73	510.96	478.50	32.46	15.742		
4,800.00	4,800.00	4,738.40	4,711.58	16.98	17.16	163.59	-499.02	146.97	527.38	494.21	33.17	15.901		
4,900.00	4,900.00	4,837.00	4,808.81	17.34	17.57	163.29	-513.77	154.22	543.81	509.93	33.88	16.053		
5,000.00	5,000.00	4,935.60	4,906.03	17.70	17.98	163.01	-528.51	161.46	560.25	525.67	34.59	16.198		
5,100.00	5,099.98	5,034.11	5,003.17	18.05	18.39	113.32	-543.24	168.70	577.40	542.10	35.30	16.359		
5,200.00	5,199.84	5,132.35	5,100.04	18.41	18.80	113.19	-557.93	175.91	595.90	559.90	36.00	16.551		
5,300.00	5,299.45	5,230.21	5,196.53	18.76	19.21	113.32	-572.56	183.10	615.78	579.07	36.71	16.773		
5,400.00	5,398.70	5,327.56	5,292.52	19.12	19.63	113.69	-587.11	190.25	637.10	599.67	37.42	17.024		
5,500.00	5,497.47	5,424.29	5,387.89	19.47	20.04	114.25	-601.57	197.36	659.92	621.79	38.14	17.304		
5,600.00	5,595.93	5,520.64	5,482.90	19.83	20.44	115.31	-615.98	204.44	683.71	644.85	38.85	17.597		
5,700.00	5,694.38	5,616.99	5,577.91	20.19	20.85	116.31	-630.39	211.51	707.70	668.13	39.57	17.884		
5,800.00	5,792.84	5,713.35	5,672.91	20.56	21.27	117.24	-644.79	218.59	731.89	691.60	40.30	18.163		
5,900.00	5,891.30	5,809.70	5,767.92	20.93	21.68	118.11	-659.20	225.67	756.25	715.23	41.02	18.435		
6,000.00	5,889.76	5,906.05	5,862.92	21.30	22.09	118.93	-673.60	232.75	780.77	739.02	41.75	18.700		
6,100.00	6,088.22	6,002.40	5,957.93	21.68	22.50	119.71	-688.01	239.83	805.44	762.95	42.49	18.958		
6,200.00	6,186.68	6,101.25	6,052.93	22.06	22.93	120.43	-702.42	246.90	830.23	787.00	43.23	19.205		
6,300.00	6,285.14	6,204.90	6,147.94	22.44	23.38	121.11	-716.82	253.98	855.14	811.15	44.00	19.437		
6,400.00	6,383.60	6,291.45	6,242.94	22.83	23.75	121.76	-731.23	261.06	880.16	835.46	44.70	19.691		
6,500.00	6,482.06	6,387.81	6,337.95	23.21	24.17	122.37	-745.63	268.14	905.28	859.84	45.44	19.922		
6,600.00	6,580.52	6,484.16	6,432.95	23.60	24.58	122.95	-760.04	275.22	930.50	884.31	46.19	20.146		
6,700.00	6,678.98	6,580.51	6,527.96	23.99	25.00	123.49	-774.45	282.29	955.79	908.86	46.93	20.365		
6,800.00	6,777.44	6,676.86	6,622.96	24.38	25.42	124.01	-788.85	289.37	981.17	933.49	47.68	20.578		
6,900.00	6,875.90	6,773.21	6,717.97	24.78	25.84	124.51	-803.26	296.45	1,006.62	958.19	48.43	20.784		
7,000.00	6,974.36	6,869.56	6,812.97	25.18	26.25	124.97	-817.66	303.53	1,032.13	982.95	49.18	20.986		
7,100.00	7,072.82	6,965.91	6,907.98	25.57	26.67	125.42	-832.07	310.61	1,057.71	1,007.77	49.94	21.181		

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



Anticollision Report

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 0504 133H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3041.2+25 @ 3066.20ft
Reference Site:	Section 06-T23S-R29E	MD Reference:	RKB=3041.2+25 @ 3066.20ft
Site Error:	0.00 ft Rana Salada Fed Com 0504 133H	North Reference:	Grid
Reference Well:	0.00 ft	Survey Calculation Method:	2.00 sigma
Well Error:	Original Hole	Output errors are at	DB_Aug0116_LT_v14
Reference Wellbore:	rev0	Database:	Offset Datum
Reference Design:		Offset TVD Reference:	

Offset Design Section 06-T23S-R29E - Rana Salada Fed Com 0504 134H - Original Hole - rev0													Offset Site Error:	0.00 ft
Survey Program: 0-MWD													Offset Well Error:	0.00 ft
Reference	Offset		Semi Major Axis		Distance		Minimum		Separation		Warning			
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
7,200.00	7,171.28	7,062.27	7,002.98	25.98	27.09	125.85	-846.47	317.68	1,083.34	1,032.65	50.69	21.372		
7,300.00	7,269.74	7,158.62	7,097.99	26.38	27.51	126.25	-860.88	324.76	1,109.03	1,057.58	51.45	21.557		
7,400.00	7,368.20	7,254.97	7,192.99	26.78	27.93	126.64	-875.29	331.84	1,134.76	1,082.56	52.20	21.738		
7,500.00	7,466.66	7,351.32	7,288.00	27.19	28.36	127.01	-889.69	338.92	1,160.55	1,107.58	52.96	21.913		
7,600.00	7,565.12	7,447.67	7,383.00	27.59	28.78	127.36	-904.10	346.00	1,186.37	1,132.65	53.72	22.084		
7,700.00	7,663.58	7,544.02	7,478.01	28.00	29.20	127.70	-918.50	353.07	1,212.24	1,157.76	54.48	22.251		
7,800.00	7,762.04	7,640.37	7,573.01	28.41	29.62	128.03	-932.91	360.15	1,238.15	1,182.90	55.24	22.413		
7,900.00	7,860.50	7,736.73	7,668.02	28.82	30.04	128.34	-947.32	367.23	1,264.09	1,208.08	56.00	22.571		
8,000.00	7,958.95	7,833.08	7,763.02	29.23	30.47	128.64	-961.72	374.31	1,290.06	1,233.29	56.77	22.725		
8,100.00	8,057.41	7,929.43	7,858.03	29.64	30.89	128.93	-976.13	381.39	1,316.07	1,258.54	57.53	22.875		
8,200.00	8,155.87	8,025.78	7,953.03	30.06	31.31	129.20	-990.53	388.46	1,342.11	1,283.81	58.30	23.022		
8,300.00	8,254.33	8,122.13	8,048.04	30.47	31.74	129.47	-1,004.94	395.54	1,368.17	1,309.11	59.06	23.165		
8,400.00	8,352.79	8,218.48	8,143.04	30.89	32.16	129.73	-1,019.35	402.62	1,394.26	1,334.43	59.83	23.304		
8,500.00	8,451.25	8,314.83	8,238.05	31.31	32.58	129.97	-1,033.75	409.70	1,420.38	1,359.78	60.60	23.440		
8,600.00	8,549.71	8,411.28	8,333.15	31.72	33.01	130.40	-1,048.17	416.78	1,446.23	1,384.87	61.36	23.568		
8,700.00	8,648.18	8,508.32	8,428.83	32.12	33.44	130.90	-1,062.68	423.91	1,470.16	1,408.04	62.12	23.665		
8,800.00	8,746.64	8,606.78	8,527.08	32.51	33.88	131.25	-1,077.58	431.23	1,491.87	1,428.98	62.89	23.722		
8,900.00	8,845.10	8,705.24	8,626.28	32.88	34.34	131.44	-1,092.67	438.76	1,508.37	1,444.17	64.20	23.493		
9,000.00	8,943.56	8,803.70	8,726.52	33.24	34.83	131.54	-1,111.22	447.06	1,516.83	1,451.50	65.33	23.218		
9,100.00	9,042.02	8,902.16	8,829.96	33.58	35.30	131.54	-1,112.85	448.56	1,518.00	1,451.85	66.15	22.947		
9,200.00	9,140.48	8,999.62	8,932.42	33.92	35.76	131.54	-1,112.85	448.56	1,518.00	1,451.18	66.82	22.717		
9,300.00	9,238.94	9,097.08	9,030.92	34.26	36.20	131.54	-1,112.85	448.56	1,518.00	1,450.51	67.49	22.491		
9,400.00	9,337.40	9,194.54	9,128.36	34.60	36.64	131.54	-1,112.85	448.56	1,518.00	1,450.51	67.49	22.491		
9,500.00	9,435.86	9,292.00	9,231.80	34.94	37.08	131.54	-1,112.85	448.56	1,518.00	1,449.79	68.21	22.255		
9,600.00	9,534.32	9,389.46	9,335.24	35.28	37.52	131.54	-1,112.85	448.56	1,518.00	1,448.96	69.05	21.983		
9,700.00	9,632.78	9,486.92	9,432.68	35.62	37.96	131.54	-1,112.85	448.56	1,518.00	1,448.01	70.03	21.677		
9,800.00	9,731.24	9,584.38	9,530.14	35.96	38.40	131.54	-1,111.71	598.29	1,518.09	1,446.95	71.15	21.337		
9,900.00	9,829.70	9,681.84	9,627.60	36.30	38.84	131.54	-1,111.08	681.37	1,518.18	1,445.73	72.45	20.956		
10,000.00	9,928.16	9,779.30	9,725.06	36.64	39.28	131.54	-1,110.37	774.77	1,518.30	1,444.35	73.96	20.530		
10,100.00	10,026.62	9,876.76	9,822.52	36.98	39.72	131.54	-1,109.61	873.70	1,518.47	1,442.79	75.68	20.064		
10,200.00	10,125.08	9,974.22	9,919.98	37.32	40.16	131.54	-1,108.85	973.75	1,518.67	1,441.09	77.58	19.575		
10,300.00	10,223.54	10,071.68	10,017.44	37.66	40.60	131.54	-1,108.09	1,073.74	1,518.89	1,439.19	79.70	19.058		
10,400.00	10,322.00	10,169.14	10,114.90	38.00	41.04	131.54	-1,107.33	1,173.74	1,519.10	1,437.06	82.04	18.516		
10,500.00	10,420.46	10,266.60	10,212.36	38.34	41.48	131.54	-1,106.57	1,273.74	1,519.31	1,434.71	84.60	17.958		
10,600.00	10,518.92	10,364.06	10,309.82	38.68	41.92	131.54	-1,105.81	1,373.73	1,519.52	1,432.16	87.36	17.393		
10,700.00	10,617.38	10,461.52	10,407.28	39.02	42.36	131.54	-1,105.04	1,473.73	1,519.73	1,429.43	90.30	16.830		
10,800.00	10,715.84	10,559.98	10,505.74	39.36	42.80	131.54	-1,104.28	1,573.73	1,519.95	1,426.54	93.40	16.273		
10,900.00	10,814.30	10,657.44	10,603.20	39.70	43.24	131.54	-1,103.52	1,673.72	1,520.16	1,423.51	96.65	15.729		
11,000.00	10,912.76	10,754.90	10,700.66	40.04	43.68	131.54	-1,102.76	1,773.72	1,520.37	1,420.34	100.03	15.199		
11,100.00	11,011.22	10,852.36	10,798.12	40.38	44.12	131.54	-1,102.00	1,873.72	1,520.58	1,417.05	103.53	14.688		
11,200.00	11,109.68	10,949.82	10,895.58	40.72	44.56	131.54	-1,101.24	1,973.71	1,520.79	1,413.66	107.13	14.195		
11,300.00	11,208.14	11,047.28	10,993.04	41.06	45.00	131.54	-1,100.47	2,073.71	1,521.00	1,410.17	110.84	13.723		
11,400.00	11,306.60	11,144.74	11,089.50	41.40	45.44	131.54	-1,099.71	2,173.71	1,521.22	1,406.59	114.63	13.271		
11,500.00	11,405.06	11,242.20	11,185.96	41.74	45.88	131.54	-1,098.95	2,273.70	1,521.43	1,402.93	118.50	12.839		
11,600.00	11,503.52	11,339.66	11,283.42	42.08	46.32	131.54	-1,098.19	2,373.70	1,521.64	1,399.19	122.44	12.427		
11,700.00	11,601.98	11,437.12	11,380.88	42.42	46.76	131.54	-1,097.43	2,473.70	1,521.85	1,395.40	126.45	12.035		
11,800.00	11,700.44	11,534.58	11,478.34	42.76	47.20	131.54	-1,096.67	2,573.70	1,522.06	1,391.54	130.52	11.662		
11,900.00	11,798.90	11,632.04	11,575.80	43.10	47.64	131.54	-1,095.90	2,673.69	1,522.27	1,387.63	134.64	11.306		
12,000.00	11,897.36	11,729.50	11,673.26	43.44	48.08	131.54	-1,095.14	2,773.69	1,522.49	1,383.67	138.81	10.968		
12,100.00	11,995.82	11,826.96	11,770.72	43.78	48.52	131.54	-1,094.38	2,873.69	1,522.70	1,379.67	143.03	10.646		
12,200.00	12,094.28	11,924.42	11,868.18	44.12	48.96	131.54	-1,093.62	2,973.68	1,522.91	1,375.63	147.28	10.340		

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



Anticollision Report

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 0504 133H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3041.2+25 @ 3066.20ft
Reference Site:	Section 06-T23S-R29E	MD Reference:	RKB=3041.2+25 @ 3066.20ft
Site Error:	0.00 ft Rana Salada Fed Com 0504 133H	North Reference:	Grid
Reference Well:	0.00 ft	Survey Calculation Method:	2.00 sigma
Well Error:	Original Hole	Output errors are at	DB_Aug0116_LT_v14
Reference Wellbore:	rev0	Database:	Offset Datum
Reference Design:		Offset TVD Reference:	

Offset Design Section 06-T23S-R29E - Rana Salada Fed Com 0504 134H - Original Hole - rev0													Offset Site Error:	0.00 ft
Survey Program: 0-MWD													Offset Well Error:	0.00 ft
Reference	Offset	Semi Major Axis		Distance		Minimum		Separation		Warning				
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre -N-S (ft)	-E-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
12,200.00	9,761.00	12,262.33	9,759.00	75.94	76.47	89.99	-1,092.86	3,073.68	1,523.12	1,371.55	151.57	10.049		
12,300.00	9,761.00	12,362.33	9,759.00	78.10	78.61	89.99	-1,092.10	3,173.68	1,523.33	1,367.43	155.90	9.771		
12,400.00	9,761.00	12,462.33	9,759.00	80.27	80.77	89.99	-1,091.33	3,273.67	1,523.54	1,363.28	160.26	9.507		
12,500.00	9,761.00	12,562.33	9,759.00	82.46	82.95	89.99	-1,090.57	3,373.67	1,523.76	1,359.11	164.65	9.255		
12,600.00	9,761.00	12,662.33	9,759.00	84.66	85.14	89.99	-1,089.81	3,473.67	1,523.97	1,354.91	169.06	9.014		
12,700.00	9,761.00	12,762.33	9,759.00	86.87	87.34	89.99	-1,089.05	3,573.66	1,524.18	1,350.68	173.50	8.785		
12,800.00	9,761.00	12,862.33	9,759.00	89.10	89.55	89.99	-1,088.29	3,673.66	1,524.39	1,346.43	177.96	8.566		
12,900.00	9,761.00	12,962.33	9,759.00	91.34	91.78	89.99	-1,087.53	3,773.66	1,524.60	1,342.16	182.45	8.356		
13,000.00	9,761.00	13,062.33	9,759.00	93.59	94.02	89.99	-1,086.76	3,873.65	1,524.82	1,337.86	186.95	8.156		
13,100.00	9,761.00	13,162.33	9,759.00	95.84	96.27	89.99	-1,086.00	3,973.65	1,525.03	1,333.56	191.47	7.965		
13,200.00	9,761.00	13,262.33	9,759.00	98.11	98.52	89.99	-1,085.24	4,073.65	1,525.24	1,329.23	196.01	7.781		
13,300.00	9,761.00	13,362.33	9,759.00	100.38	100.79	89.99	-1,084.48	4,173.65	1,525.45	1,324.89	200.56	7.606		
13,400.00	9,761.00	13,462.32	9,759.00	102.66	103.06	89.99	-1,083.72	4,273.64	1,525.66	1,320.53	205.13	7.437		
13,500.00	9,761.00	13,562.32	9,759.00	104.95	105.34	89.99	-1,082.95	4,373.64	1,525.87	1,316.16	209.72	7.276		
13,600.00	9,761.00	13,662.32	9,759.00	107.25	107.63	89.99	-1,082.19	4,473.64	1,526.09	1,311.77	214.31	7.121		
13,700.00	9,761.00	13,762.32	9,759.00	109.55	109.92	89.99	-1,081.43	4,573.63	1,526.30	1,307.38	218.92	6.972		
13,800.00	9,761.00	13,862.32	9,759.00	111.85	112.22	89.99	-1,080.67	4,673.63	1,526.51	1,302.97	223.54	6.829		
13,900.00	9,761.00	13,962.32	9,759.00	114.17	114.53	89.99	-1,079.91	4,773.63	1,526.72	1,298.55	228.17	6.691		
14,000.00	9,761.00	14,062.32	9,759.00	116.48	116.84	89.99	-1,079.15	4,873.62	1,526.93	1,294.12	232.81	6.559		
14,100.00	9,761.00	14,162.32	9,759.00	118.81	119.16	89.99	-1,078.38	4,973.62	1,527.14	1,289.69	237.46	6.431		
14,200.00	9,761.00	14,262.32	9,759.00	121.13	121.48	89.99	-1,077.62	5,073.62	1,527.36	1,285.24	242.12	6.308		
14,300.00	9,761.00	14,362.32	9,759.00	123.46	123.80	89.99	-1,076.86	5,173.61	1,527.57	1,280.78	246.78	6.190		
14,400.00	9,761.00	14,462.32	9,759.00	125.80	126.13	89.99	-1,076.10	5,273.61	1,527.78	1,276.32	251.46	6.076		
14,500.00	9,761.00	14,562.32	9,759.00	128.14	128.47	89.99	-1,075.34	5,373.61	1,527.99	1,271.85	256.14	5.965		
14,600.00	9,761.00	14,662.32	9,759.00	130.48	130.81	89.99	-1,074.58	5,473.60	1,528.20	1,267.37	260.83	5.859		
14,700.00	9,761.00	14,762.32	9,759.00	132.83	133.15	89.99	-1,073.81	5,573.60	1,528.42	1,262.89	265.53	5.756		
14,800.00	9,761.00	14,862.32	9,759.00	135.17	135.49	89.99	-1,073.05	5,673.60	1,528.63	1,258.40	270.23	5.657		
14,900.00	9,761.00	14,962.32	9,759.00	137.53	137.84	89.99	-1,072.29	5,773.60	1,528.84	1,253.90	274.94	5.561		
15,000.00	9,761.00	15,062.32	9,759.00	139.88	140.19	89.99	-1,071.53	5,873.59	1,529.05	1,249.40	279.65	5.468		
15,100.00	9,761.00	15,162.32	9,759.00	142.24	142.55	89.99	-1,070.77	5,973.59	1,529.26	1,244.89	284.37	5.378		
15,200.00	9,761.00	15,262.32	9,759.00	144.60	144.90	89.99	-1,070.01	6,073.59	1,529.47	1,240.38	289.10	5.291		
15,300.00	9,761.00	15,362.32	9,759.00	146.96	147.26	89.99	-1,069.24	6,173.58	1,529.69	1,235.86	293.83	5.206		
15,400.00	9,761.00	15,462.32	9,759.00	149.33	149.63	89.99	-1,068.48	6,273.58	1,529.90	1,231.34	298.56	5.124		
15,500.00	9,761.00	15,562.32	9,759.00	151.70	151.99	89.99	-1,067.72	6,373.58	1,530.11	1,226.81	303.30	5.045		
15,600.00	9,761.00	15,662.32	9,759.00	154.07	154.36	89.99	-1,066.96	6,473.57	1,530.32	1,222.28	308.05	4.968		
15,700.00	9,761.00	15,762.32	9,759.00	156.44	156.73	89.99	-1,066.20	6,573.57	1,530.53	1,217.74	312.79	4.893		
15,800.00	9,761.00	15,862.32	9,759.00	158.81	159.10	89.99	-1,065.44	6,673.57	1,530.74	1,213.20	317.54	4.821		
15,900.00	9,761.00	15,962.32	9,759.00	161.19	161.47	89.99	-1,064.67	6,773.56	1,530.96	1,208.66	322.30	4.750		
16,000.00	9,761.00	16,062.32	9,759.00	163.57	163.85	89.99	-1,063.91	6,873.56	1,531.17	1,204.11	327.06	4.682		
16,100.00	9,761.00	16,162.32	9,759.00	165.95	166.22	89.99	-1,063.15	6,973.56	1,531.38	1,199.56	331.82	4.615		
16,200.00	9,761.00	16,262.32	9,759.00	168.33	168.60	89.99	-1,062.39	7,073.56	1,531.59	1,195.01	336.59	4.550		
16,300.00	9,761.00	16,362.32	9,759.00	170.71	170.98	89.99	-1,061.63	7,173.55	1,531.80	1,190.45	341.35	4.487		
16,400.00	9,761.00	16,462.32	9,759.00	173.10	173.37	89.99	-1,060.87	7,273.55	1,532.02	1,185.89	346.13	4.426		
16,500.00	9,761.00	16,562.32	9,759.00	175.48	175.75	89.99	-1,060.10	7,373.55	1,532.23	1,181.33	350.90	4.367		
16,600.00	9,761.00	16,662.32	9,759.00	177.87	178.13	89.99	-1,059.34	7,473.54	1,532.44	1,176.76	355.68	4.309		
16,700.00	9,761.00	16,762.32	9,759.00	180.26	180.52	89.99	-1,058.58	7,573.54	1,532.65	1,172.19	360.46	4.252		
16,800.00	9,761.00	16,862.32	9,759.00	182.65	182.91	89.99	-1,057.82	7,673.54	1,532.86	1,167.62	365.24	4.197		
16,900.00	9,761.00	16,962.32	9,759.00	185.04	185.30	89.99	-1,057.06	7,773.53	1,533.07	1,163.05	370.02	4.143		
17,000.00	9,761.00	17,062.32	9,759.00	187.43	187.69	89.99	-1,056.30	7,873.53	1,533.29	1,158.47	374.81	4.091		
17,100.00	9,761.00	17,162.32	9,759.00	189.83	190.08	89.99	-1,055.53	7,973.53	1,533.50	1,153.90	379.60	4.040		
17,200.00	9,761.00	17,262.32	9,759.00	192.22	192.47	89.99	-1,054.77	8,073.52	1,533.71	1,149.32	384.39	3.990		

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



Anticollision Report

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 0504 133H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3041.2+25 @ 3066.20ft
Reference Site:	Section 06-T23S-R29E	MD Reference:	RKB=3041.2+25 @ 3066.20ft
Site Error:	0.00 ft Rana Salada Fed Com 0504 133H	North Reference:	Grid
Reference Well:	0.00 ft	Survey Calculation Method:	Minimum Curvature
Well Error:	Original Hole	Output errors are at	2.00 sigma
Reference Wellbore:	rev0	Database:	DB_Aug0116_LT_v14
Reference Design:		Offset TVD Reference:	Offset Datum

Offset Design										Section 06-T23S-R29E - Rana Salada Fed Com 0504 134H - Original Hole - rev0		Offset Site Error:	0.00 ft
Survey Program: 10-MWD												Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis		Distance		Minimum Separation		Separation Factor		Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
17,300.00	9,761.00	17,362.32	9,759.00	194.62	194.87	89.99	-1,054.01	8,173.52	1,533.92	1,144.74	389.19	3.941	
17,400.00	9,761.00	17,462.32	9,759.00	197.01	197.26	89.99	-1,053.25	8,273.52	1,534.13	1,140.15	393.98	3.894	
17,500.00	9,761.00	17,562.32	9,759.00	199.41	199.66	89.99	-1,052.49	8,373.51	1,534.34	1,135.57	398.78	3.848	
17,600.00	9,761.00	17,662.32	9,759.00	201.81	202.06	89.99	-1,051.73	8,473.51	1,534.56	1,130.98	403.58	3.802	
17,700.00	9,761.00	17,762.32	9,759.00	204.21	204.45	89.99	-1,050.96	8,573.51	1,534.77	1,126.39	408.38	3.758	
17,800.00	9,761.00	17,862.32	9,759.00	206.61	206.85	89.99	-1,050.20	8,673.51	1,534.98	1,121.80	413.18	3.715	
17,900.00	9,761.00	17,962.31	9,759.00	209.01	209.25	89.99	-1,049.44	8,773.50	1,535.19	1,117.20	417.99	3.673	
18,000.00	9,761.00	18,062.31	9,759.00	211.41	211.65	89.99	-1,048.68	8,873.50	1,535.40	1,112.61	422.79	3.632	
18,100.00	9,761.00	18,162.31	9,759.00	213.82	214.06	89.99	-1,047.92	8,973.50	1,535.62	1,108.01	427.60	3.591	
18,200.00	9,761.00	18,262.31	9,759.00	216.22	216.46	89.99	-1,047.16	9,073.49	1,535.83	1,103.41	432.41	3.552	
18,300.00	9,761.00	18,362.31	9,759.00	218.63	218.86	89.99	-1,046.39	9,173.49	1,536.04	1,098.82	437.22	3.513	
18,400.00	9,761.00	18,462.31	9,759.00	221.03	221.27	89.99	-1,045.63	9,273.49	1,536.25	1,094.21	442.04	3.475	
18,500.00	9,761.00	18,562.31	9,759.00	223.44	223.67	89.99	-1,044.87	9,373.48	1,536.46	1,089.61	446.85	3.438	
18,600.00	9,761.00	18,662.31	9,759.00	225.84	226.08	89.99	-1,044.11	9,473.48	1,536.67	1,085.01	451.66	3.402	
18,700.00	9,761.00	18,762.31	9,759.00	228.25	228.48	89.99	-1,043.35	9,573.48	1,536.89	1,080.40	456.48	3.367	
18,800.00	9,761.00	18,862.31	9,759.00	230.66	230.89	89.99	-1,042.59	9,673.47	1,537.10	1,075.80	461.30	3.332	
18,900.00	9,761.00	18,962.31	9,759.00	233.07	233.30	89.99	-1,041.82	9,773.47	1,537.31	1,071.19	466.12	3.298	
19,000.00	9,761.00	19,062.31	9,759.00	235.48	235.71	89.99	-1,041.06	9,873.47	1,537.52	1,066.58	470.94	3.265	
19,100.00	9,761.00	19,162.31	9,759.00	237.89	238.12	89.99	-1,040.30	9,973.46	1,537.73	1,061.97	475.76	3.232	
19,200.00	9,761.00	19,262.31	9,759.00	240.30	240.52	89.99	-1,039.54	10,073.46	1,537.94	1,057.36	480.58	3.200	
19,300.00	9,761.00	19,362.31	9,759.00	242.71	242.93	89.99	-1,038.78	10,173.46	1,538.16	1,052.75	485.40	3.169	
19,400.00	9,761.00	19,462.31	9,759.00	245.12	245.35	89.99	-1,038.02	10,273.46	1,538.37	1,048.14	490.23	3.138	
19,500.00	9,761.00	19,562.31	9,759.00	247.53	247.76	89.99	-1,037.25	10,373.45	1,538.58	1,043.52	495.06	3.108	
19,600.00	9,761.00	19,662.31	9,759.00	249.95	250.17	89.99	-1,036.49	10,473.45	1,538.79	1,038.91	499.88	3.078	
19,700.00	9,761.00	19,762.31	9,759.00	252.36	252.58	89.99	-1,035.73	10,573.45	1,539.00	1,034.29	504.71	3.049	
19,800.00	9,761.00	19,862.31	9,759.00	254.77	254.99	89.99	-1,034.97	10,673.44	1,539.21	1,029.68	509.54	3.021	
19,900.00	9,761.00	19,962.31	9,759.00	257.19	257.41	89.99	-1,034.21	10,773.44	1,539.43	1,025.06	514.37	2.993	
20,000.00	9,761.00	20,062.31	9,759.00	259.60	259.82	89.99	-1,033.45	10,873.44	1,539.64	1,020.44	519.20	2.965	
20,016.77	9,761.00	20,070.71	9,759.00	260.01	260.02	89.99	-1,033.38	10,881.83	1,539.70	1,019.87	519.82	2.962 SF	



Anticollision Report

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 0504 133H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3041.2+25 @ 3066.20ft
Reference Site:	Section 06-T23S-R29E	MD Reference:	RKB=3041.2+25 @ 3066.20ft
Site Error:	0.00 ft Rana Salada Fed Com 0504 133H	North Reference:	Grid
Reference Well:	0.00 ft	Survey Calculation Method:	2.00 sigma
Well Error:	Original Hole	Output errors are at	DB_Aug0116_LT_v14
Reference Wellbore	rev0	Database:	Offset Datum
Reference Design:		Offset TVD Reference:	

Offset Design: Section 06-T23S-R29E - Rana Salada Fed Com 0504 134H - Original Hole - rev0												Offset Site Error:	0.00 ft
Survey Program: 0-MWD												Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		N-S (ft)	E-W (ft)	Between Centres (ft)	Between Ellipses (ft)			
0.00	0.00	2.10	-2.10	0.00	0.00	-163.41	-200.06	-59.60	208.75				
100.00	100.00	102.10	97.90	0.13	0.14	-163.41	-200.06	-59.60	208.75	208.47	0.28	755.294	
200.00	200.00	202.10	197.90	0.49	0.50	-163.41	-200.06	-59.60	208.75	207.76	0.99	210.152	
300.00	300.00	302.10	297.90	0.85	0.86	-163.41	-200.06	-59.60	208.75	207.04	1.71	122.057	
400.00	400.00	402.10	397.90	1.21	1.22	-163.41	-200.06	-59.60	208.75	206.32	2.43	86.004	
500.00	500.00	502.10	497.90	1.57	1.58	-163.41	-200.06	-59.60	208.75	205.61	3.14	66.393	
600.00	600.00	602.10	597.90	1.93	1.93	-163.41	-200.06	-59.60	208.75	204.89	3.86	54.065	
700.00	700.00	702.10	697.90	2.29	2.29	-163.41	-200.06	-59.60	208.75	204.17	4.58	45.598	
800.00	800.00	802.10	797.90	2.64	2.65	-163.41	-200.06	-59.60	208.75	203.45	5.29	39.424	
900.00	900.00	902.10	897.90	3.00	3.01	-163.41	-200.06	-59.60	208.75	202.74	6.01	34.723	
1,000.00	1,000.00	1,002.10	997.90	3.36	3.37	-163.41	-200.06	-59.60	208.75	202.02	6.73	31.023	
1,100.00	1,100.00	1,102.10	1,097.90	3.72	3.73	-163.41	-200.06	-59.60	208.75	201.30	7.45	28.036	
1,200.00	1,200.00	1,202.10	1,197.90	4.08	4.09	-163.41	-200.06	-59.60	208.75	200.59	8.16	25.573	
1,300.00	1,300.00	1,302.10	1,297.90	4.44	4.44	-163.41	-200.06	-59.60	208.75	199.87	8.88	23.509	
1,400.00	1,400.00	1,402.10	1,397.90	4.79	4.80	-163.41	-200.06	-59.60	208.75	199.15	9.60	21.752	
1,500.00	1,500.00	1,502.10	1,497.90	5.15	5.16	-163.41	-200.06	-59.60	208.75	198.44	10.31	20.240	
1,600.00	1,600.00	1,602.10	1,597.90	5.51	5.52	-163.41	-200.06	-59.60	208.75	197.72	11.03	18.925	
1,700.00	1,700.00	1,702.10	1,697.90	5.87	5.88	-163.41	-200.06	-59.60	208.75	197.00	11.75	17.770	
1,800.00	1,800.00	1,802.10	1,797.90	6.23	6.24	-163.41	-200.06	-59.60	208.75	196.29	12.46	16.748	
1,900.00	1,900.00	1,902.10	1,897.90	6.59	6.59	-163.41	-200.06	-59.60	208.75	195.57	13.18	15.837	
2,000.00	2,000.00	2,002.10	1,997.90	6.95	6.95	-163.41	-200.06	-59.60	208.75	194.85	13.90	15.020	
2,100.00	2,100.00	2,102.10	2,097.90	7.30	7.31	-163.41	-200.06	-59.60	208.75	194.13	14.62	14.283	
2,200.00	2,200.00	2,202.10	2,197.90	7.66	7.67	-163.41	-200.06	-59.60	208.75	193.42	15.33	13.615	
2,300.00	2,300.00	2,302.10	2,297.90	8.02	8.03	-163.41	-200.06	-59.60	208.75	192.70	16.05	13.007	
2,400.00	2,400.00	2,402.10	2,397.90	8.38	8.39	-163.41	-200.06	-59.60	208.75	191.98	16.77	12.451	
2,500.00	2,500.00	2,502.10	2,497.90	8.74	8.75	-163.41	-200.06	-59.60	208.75	191.27	17.48	11.940	
2,600.00	2,600.00	2,602.10	2,597.90	9.10	9.10	-163.41	-200.06	-59.60	208.75	190.55	18.20	11.470	
2,700.00	2,700.00	2,702.10	2,697.90	9.45	9.46	-163.41	-200.06	-59.60	208.75	189.83	18.92	11.035	
2,800.00	2,800.00	2,802.10	2,797.90	9.81	9.82	-163.41	-200.06	-59.60	208.75	189.12	19.63	10.632	
2,900.00	2,900.00	2,902.10	2,897.90	10.17	10.18	-163.41	-200.06	-59.60	208.75	188.40	20.35	10.258	
3,000.00	3,000.00	3,002.10	2,997.90	10.53	10.54	-163.41	-200.06	-59.60	208.75	187.68	21.07	9.908	
3,100.00	3,100.00	3,102.10	3,097.90	10.89	10.90	-163.41	-200.06	-59.60	208.75	186.96	21.78	9.582	
3,200.00	3,200.00	3,202.10	3,197.90	11.25	11.25	-163.41	-200.06	-59.60	208.75	186.25	22.50	9.277	
3,300.00	3,300.00	3,302.10	3,297.90	11.61	11.61	-163.41	-200.06	-59.60	208.75	185.53	23.22	8.991	
3,400.00	3,400.00	3,402.10	3,397.90	11.96	11.97	-163.41	-200.06	-59.60	208.75	184.81	23.94	8.721	
3,500.00	3,500.00	3,502.10	3,497.90	12.32	12.33	-163.41	-200.06	-59.60	208.75	184.10	24.65	8.468	
3,600.00	3,600.00	3,602.10	3,597.90	12.68	12.69	-163.41	-200.06	-59.60	208.75	183.38	25.37	8.228	
3,700.00	3,700.00	3,702.10	3,697.90	13.04	13.05	-163.41	-200.06	-59.60	208.75	182.66	26.09	8.002	
3,800.00	3,800.00	3,802.10	3,797.90	13.40	13.41	-163.41	-200.06	-59.60	208.75	181.95	26.80	7.788	
3,900.00	3,900.00	3,902.10	3,897.90	13.76	13.76	-163.41	-200.06	-59.60	208.75	181.23	27.52	7.585	
4,000.00	4,000.00	4,002.10	3,997.90	14.11	14.12	-163.41	-200.06	-59.60	208.75	180.51	28.24	7.393	
4,100.00	4,100.00	4,102.10	4,097.90	14.47	14.48	-163.41	-200.06	-59.60	208.75	179.80	28.95	7.210	
4,200.00	4,200.00	4,202.10	4,197.90	14.83	14.84	-163.41	-200.06	-59.60	208.75	179.08	29.67	7.035	
4,300.00	4,300.00	4,302.10	4,297.90	15.19	15.20	-163.41	-200.06	-59.60	208.75	178.36	30.39	6.869	
4,400.00	4,400.00	4,402.10	4,397.90	15.55	15.56	-163.41	-200.06	-59.60	208.75	177.64	31.10	6.711	
4,500.00	4,500.00	4,497.90	4,497.90	15.91	15.90	-163.41	-200.06	-59.60	208.75	176.94	31.81	6.563 CC, ES	
4,600.00	4,600.00	4,592.07	4,592.05	16.27	16.22	-163.61	-201.50	-59.25	210.11	177.63	32.48	6.470	
4,700.00	4,700.00	4,685.92	4,685.79	16.62	16.53	-164.22	-205.92	-58.18	214.32	181.22	33.10	6.474	
4,800.00	4,800.00	4,779.37	4,778.93	16.98	16.83	-165.19	-213.29	-56.39	221.43	187.72	33.71	6.569	
4,900.00	4,900.00	4,872.23	4,871.18	17.34	17.13	-166.44	-223.53	-53.90	231.48	197.20	34.28	6.753	
5,000.00	5,000.00	4,964.31	4,962.28	17.70	17.43	-167.89	-236.54	-50.74	244.53	209.71	34.82	7.022	

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



Anticollision Report

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 0504 133H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3041.2+25 @ 3066.20ft
Reference Site:	Section 06-T23S-R29E	MD Reference:	RKB=3041.2+25 @ 3066.20ft
Site Error:	0.00 ft Rana Salada Fed Com 0504 133H	North Reference:	Grid
Reference Well:	0.00 ft	Survey Calculation Method:	Minimum Curvature
Well Error:	Original Hole	Output errors are at	2.00 sigma
Reference Wellbore:	rev0	Database:	DB_Aug0116_LT_v14
Reference Design:		Offset TVD Reference:	Offset Datum

Offset Design Section 06-T23S-R29E - Rana Salada Fed Com 0504 234H - Original Hole - rev0											Offset Site Error: 0.00 ft	
Survey Program: 0-MWD											Offset Well Error: 0.00 ft	
Reference		Offset		Semi Major Axis			Distance				Separation Factor	Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)		
5,100.00	5,099.98	5,055.27	5,051.80	18.05	17.73	141.27	-252.19	-46.94	261.97	226.64	35.33	7.415
5,200.00	5,199.84	5,150.93	5,145.55	18.41	18.05	140.02	-270.67	-42.44	284.17	248.22	35.95	7.905
5,300.00	5,299.45	5,247.75	5,240.42	18.76	18.39	139.27	-289.45	-37.88	309.09	272.47	36.61	8.442
5,400.00	5,398.70	5,343.90	5,334.63	19.12	18.72	138.95	-308.10	-33.35	336.56	299.29	37.28	9.028
5,500.00	5,497.47	5,439.25	5,428.07	19.47	19.06	138.95	-326.60	-28.86	366.57	328.62	37.95	9.660
5,600.00	5,595.93	5,534.14	5,521.05	19.83	19.40	139.47	-345.00	-24.39	397.94	359.33	38.62	10.305
5,700.00	5,694.38	5,629.03	5,614.03	20.19	19.75	139.93	-363.41	-19.91	429.34	390.06	39.29	10.928
5,800.00	5,792.84	5,723.92	5,707.01	20.56	20.10	140.32	-381.81	-15.44	460.77	420.81	39.96	11.530
5,900.00	5,891.30	5,818.81	5,799.99	20.93	20.46	140.67	-400.22	-10.97	492.21	451.57	40.64	12.111
6,000.00	5,989.76	5,913.70	5,892.97	21.30	20.82	140.97	-418.62	-6.50	523.66	482.34	41.32	12.672
6,100.00	6,088.22	6,008.59	5,985.95	21.68	21.18	141.24	-437.03	-2.03	555.13	513.12	42.01	13.214
6,200.00	6,186.68	6,103.48	6,078.93	22.06	21.55	141.48	-455.43	2.44	586.60	543.91	42.70	13.738
6,300.00	6,285.14	6,198.37	6,171.91	22.44	21.92	141.70	-473.84	6.92	618.09	574.70	43.39	14.245
6,400.00	6,383.60	6,306.74	6,264.89	22.83	22.35	141.90	-492.24	11.39	649.58	605.45	44.13	14.718
6,500.00	6,482.06	6,388.15	6,357.87	23.21	22.67	142.07	-510.65	15.86	681.08	636.30	44.78	15.208
6,600.00	6,580.52	6,483.04	6,450.85	23.60	23.05	142.23	-529.05	20.33	712.58	667.10	45.48	15.667
6,700.00	6,678.98	6,577.93	6,543.83	23.99	23.43	142.38	-547.46	24.80	744.09	697.90	46.19	16.110
6,800.00	6,777.44	6,672.82	6,636.81	24.38	23.82	142.52	-565.86	29.27	775.60	728.71	46.89	16.540
6,900.00	6,875.90	6,767.71	6,729.80	24.78	24.21	142.64	-584.27	33.75	807.12	759.52	47.60	16.956
7,000.00	6,974.36	6,862.60	6,822.78	25.18	24.60	142.76	-602.67	38.22	838.64	790.33	48.31	17.359
7,100.00	7,072.82	6,957.49	6,915.76	25.57	24.99	142.87	-621.08	42.69	870.16	821.14	49.02	17.750
7,200.00	7,171.28	7,052.38	7,008.74	25.98	25.38	142.97	-639.48	47.16	901.68	851.95	49.74	18.129
7,300.00	7,269.74	7,147.27	7,101.72	26.38	25.78	143.06	-657.89	51.63	933.21	882.76	50.45	18.497
7,400.00	7,368.20	7,242.16	7,194.70	26.78	26.18	143.15	-676.29	56.10	964.74	913.57	51.17	18.853
7,500.00	7,466.66	7,337.05	7,287.68	27.19	26.58	143.23	-694.70	60.58	996.27	944.38	51.89	19.199
7,600.00	7,565.12	7,431.94	7,380.66	27.59	26.98	143.31	-713.10	65.05	1,027.80	975.19	52.61	19.535
7,700.00	7,663.58	7,526.83	7,473.64	28.00	27.39	143.38	-731.51	69.52	1,059.33	1,006.00	53.34	19.861
7,800.00	7,762.04	7,621.72	7,566.62	28.41	27.80	143.44	-749.91	73.99	1,090.87	1,036.81	54.06	20.178
7,900.00	7,860.50	7,716.61	7,659.60	28.82	28.20	143.51	-768.32	78.46	1,122.40	1,067.61	54.79	20.485
8,000.00	7,958.95	7,811.50	7,752.58	29.23	28.61	143.57	-786.72	82.93	1,153.94	1,098.42	55.52	20.785
8,100.00	8,057.41	7,906.39	7,845.56	29.64	29.02	143.63	-805.13	87.41	1,185.48	1,129.23	56.25	21.075
8,200.00	8,155.87	8,001.28	7,938.54	30.06	29.44	143.68	-823.53	91.88	1,217.02	1,160.04	56.98	21.358
8,300.00	8,254.33	8,103.83	8,031.52	30.47	29.88	143.73	-841.94	96.35	1,248.56	1,190.82	57.74	21.623
8,400.00	8,352.79	8,208.94	8,124.50	30.89	30.34	143.78	-860.34	100.82	1,280.10	1,221.59	58.52	21.876
8,500.00	8,451.25	8,285.95	8,217.48	31.31	30.68	143.83	-878.75	105.29	1,311.65	1,252.46	59.18	22.162
8,600.00	8,549.79	8,380.96	8,310.58	31.72	31.10	144.06	-897.17	109.77	1,342.83	1,282.91	59.92	22.410
8,700.00	8,648.80	8,476.70	8,404.40	32.12	31.52	144.36	-915.74	114.28	1,371.64	1,310.99	60.66	22.613
8,800.00	8,748.24	8,573.19	8,498.94	32.51	31.95	144.54	-934.46	118.83	1,397.73	1,336.34	61.39	22.769
8,900.00	8,847.99	8,670.28	8,594.08	32.88	32.38	144.61	-953.29	123.40	1,421.08	1,358.96	62.11	22.878
9,000.00	8,947.92	8,767.88	8,689.72	33.24	32.81	144.56	-972.22	128.00	1,441.67	1,378.83	62.84	22.943
9,100.00	9,047.92	8,865.82	8,785.69	33.58	33.25	-166.40	-991.22	132.62	1,459.84	1,396.29	63.55	22.971
9,200.00	9,147.92	8,963.81	8,881.70	33.92	33.69	-166.75	-1,010.22	137.24	1,477.69	1,413.42	64.27	22.992
9,300.00	9,247.92	9,061.80	8,977.72	34.26	34.13	-167.10	-1,029.23	141.85	1,495.59	1,430.60	64.99	23.014
9,400.00	9,347.72	9,159.79	9,073.74	34.62	34.57	101.79	-1,048.24	146.47	1,514.48	1,448.76	65.71	23.047
9,500.00	9,444.69	9,293.33	9,204.79	35.03	35.16	99.95	-1,073.13	152.52	1,536.81	1,469.99	66.82	22.998
9,600.00	9,534.61	9,467.46	9,377.11	35.51	35.88	99.72	-1,097.29	158.39	1,558.85	1,490.59	68.26	22.838
9,700.00	9,613.56	9,621.05	9,530.12	36.05	36.46	100.25	-1,110.13	161.51	1,581.40	1,511.91	69.50	22.755
9,800.00	9,678.09	9,745.42	9,654.38	36.68	36.89	100.51	-1,114.68	162.61	1,607.05	1,536.49	70.56	22.776
9,900.00	9,725.37	9,814.31	9,723.27	37.41	37.11	98.79	-1,115.03	162.70	1,638.36	1,566.94	71.42	22.940
10,000.00	9,753.35	10,979.06	10,380.00	38.26	42.47	112.19	-1,108.94	875.62	1,642.88	1,569.04	73.84	22.250
10,098.38	9,762.29	11,076.90	10,380.00	39.17	43.47	112.21	-1,108.10	973.46	1,639.59	1,563.76	75.82	21.624

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



Anticollision Report

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 0504 133H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3041.2+25 @ 3066.20ft
Reference Site:	Section 06-T23S-R29E	MD Reference:	RKB=3041.2+25 @ 3066.20ft
Site Error:	0.00 ft Rana Salada Fed Com 0504 133H	North Reference:	Grid
Reference Well:	0.00 ft	Survey Calculation Method:	2.00 sigma
Well Error:	Original Hole	Output errors are at	DB_Aug0116_LT_v14
Reference Wellbore:	rev0	Database:	Offset Datum
Reference Design:		Offset TVD Reference:	

Offset Design: Section 06-T23S-R29E - Rana Salada Fed Com 0504 234H - Original Hole - rev0												Offset Site Error:	0.00 ft
Survey Program: 0-MWD												Offset Well Error:	0.00 ft
Reference	Offset	Semi Major Axis		Distance		Warning							
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
10,100.00	9,761.01	11,078.60	10,380.00	39.19	43.49	112.25	-1,108.09	975.16	1,640.07	1,564.24	75.84	21.626	
10,200.00	9,761.00	11,178.60	10,380.00	40.23	44.63	112.25	-1,107.23	1,075.15	1,640.18	1,562.24	77.94	21.044	
10,300.00	9,761.00	11,278.60	10,380.00	41.38	45.88	112.25	-1,106.38	1,175.15	1,640.29	1,560.04	80.25	20.440	
10,400.00	9,761.00	11,378.60	10,380.00	42.64	47.24	112.25	-1,105.52	1,275.15	1,640.40	1,557.66	82.74	19.825	
10,500.00	9,761.00	11,478.60	10,380.00	44.01	48.68	112.25	-1,104.67	1,375.14	1,640.51	1,555.10	85.41	19.208	
10,600.00	9,761.00	11,578.60	10,380.00	45.46	50.21	112.25	-1,103.81	1,475.14	1,640.62	1,552.39	88.23	18.595	
10,700.00	9,761.00	11,678.60	10,380.00	47.00	51.80	112.24	-1,102.96	1,575.13	1,640.73	1,549.54	91.19	17.992	
10,800.00	9,761.00	11,778.60	10,380.00	48.61	53.47	112.24	-1,102.10	1,675.13	1,640.84	1,546.56	94.28	17.404	
10,900.00	9,761.00	11,878.60	10,380.00	50.28	55.19	112.24	-1,101.25	1,775.13	1,640.95	1,543.47	97.48	16.833	
11,000.00	9,761.00	11,978.60	10,380.00	52.02	56.97	112.24	-1,100.39	1,875.12	1,641.06	1,540.27	100.79	16.282	
11,100.00	9,761.00	12,078.60	10,380.00	53.81	58.80	112.24	-1,099.54	1,975.12	1,641.17	1,536.98	104.19	15.751	
11,200.00	9,761.00	12,178.60	10,380.00	55.65	60.67	112.24	-1,098.68	2,075.12	1,641.28	1,533.60	107.68	15.242	
11,300.00	9,761.00	12,278.60	10,380.00	57.54	62.58	112.23	-1,097.83	2,175.11	1,641.39	1,530.14	111.25	14.754	
11,400.00	9,761.00	12,378.60	10,380.00	59.46	64.53	112.23	-1,096.97	2,275.11	1,641.50	1,526.62	114.88	14.288	
11,500.00	9,761.00	12,478.60	10,380.00	61.42	66.51	112.23	-1,096.12	2,375.10	1,641.61	1,523.03	118.58	13.843	
11,600.00	9,761.00	12,578.60	10,380.00	63.42	68.52	112.23	-1,095.26	2,475.10	1,641.72	1,519.38	122.34	13.419	
11,700.00	9,761.00	12,678.60	10,380.00	65.45	70.55	112.23	-1,094.41	2,575.10	1,641.83	1,515.68	126.15	13.015	
11,800.00	9,761.00	12,778.60	10,380.00	67.50	72.62	112.23	-1,093.55	2,675.09	1,641.94	1,511.93	130.01	12.629	
11,900.00	9,761.00	12,878.60	10,380.00	69.58	74.70	112.23	-1,092.70	2,775.09	1,642.05	1,508.13	133.91	12.262	
12,000.00	9,761.00	12,978.60	10,380.00	71.68	76.81	112.22	-1,091.84	2,875.09	1,642.16	1,504.30	137.86	11.912	
12,100.00	9,761.00	13,078.60	10,380.00	73.80	78.93	112.22	-1,090.99	2,975.08	1,642.27	1,500.43	141.84	11.578	
12,200.00	9,761.00	13,178.60	10,380.00	75.94	81.08	112.22	-1,090.13	3,075.08	1,642.38	1,496.53	145.85	11.261	
12,300.00	9,761.00	13,278.60	10,380.00	78.10	83.24	112.22	-1,089.28	3,175.07	1,642.49	1,492.59	149.90	10.957	
12,400.00	9,761.00	13,378.60	10,380.00	80.27	85.41	112.22	-1,088.42	3,275.07	1,642.60	1,488.63	153.97	10.668	
12,500.00	9,761.00	13,478.60	10,380.00	82.46	87.60	112.22	-1,087.57	3,375.07	1,642.71	1,484.63	158.07	10.392	
12,600.00	9,761.00	13,578.60	10,380.00	84.66	89.80	112.21	-1,086.71	3,475.06	1,642.82	1,480.62	162.20	10.129	
12,700.00	9,761.00	13,678.60	10,380.00	86.87	92.02	112.21	-1,085.86	3,575.06	1,642.93	1,476.58	166.34	9.877	
12,800.00	9,761.00	13,778.60	10,380.00	89.10	94.24	112.21	-1,085.00	3,675.06	1,643.04	1,472.52	170.51	9.636	
12,900.00	9,761.00	13,878.60	10,380.00	91.34	96.48	112.21	-1,084.15	3,775.05	1,643.14	1,468.44	174.70	9.405	
13,000.00	9,761.00	13,978.60	10,380.00	93.59	98.72	112.21	-1,083.29	3,875.05	1,643.25	1,464.35	178.91	9.185	
13,100.00	9,761.00	14,078.60	10,380.00	95.84	100.98	112.21	-1,082.44	3,975.04	1,643.36	1,460.23	183.13	8.974	
13,200.00	9,761.00	14,178.60	10,380.00	98.11	103.24	112.20	-1,081.58	4,075.04	1,643.47	1,456.10	187.37	8.771	
13,300.00	9,761.00	14,278.60	10,380.00	100.38	105.51	112.20	-1,080.73	4,175.04	1,643.58	1,451.96	191.62	8.577	
13,400.00	9,761.00	14,378.60	10,380.00	102.66	107.79	112.20	-1,079.87	4,275.03	1,643.69	1,447.80	195.89	8.391	
13,500.00	9,761.00	14,478.60	10,380.00	104.95	110.07	112.20	-1,079.02	4,375.03	1,643.80	1,443.63	200.17	8.212	
13,600.00	9,761.00	14,578.60	10,380.00	107.25	112.36	112.20	-1,078.16	4,475.03	1,643.91	1,439.45	204.47	8.040	
13,700.00	9,761.00	14,678.60	10,380.00	109.55	114.66	112.20	-1,077.31	4,575.02	1,644.02	1,435.25	208.77	7.875	
13,800.00	9,761.00	14,778.60	10,380.00	111.85	116.96	112.20	-1,076.45	4,675.02	1,644.13	1,431.05	213.08	7.716	
13,900.00	9,761.00	14,878.60	10,380.00	114.17	119.27	112.19	-1,075.60	4,775.01	1,644.24	1,426.83	217.41	7.563	
14,000.00	9,761.00	14,978.60	10,380.00	116.48	121.58	112.19	-1,074.74	4,875.01	1,644.35	1,422.61	221.74	7.416	
14,100.00	9,761.00	15,078.60	10,380.00	118.81	123.90	112.19	-1,073.89	4,975.01	1,644.46	1,418.37	226.09	7.274	
14,200.00	9,761.00	15,178.60	10,380.00	121.13	126.23	112.19	-1,073.03	5,075.00	1,644.57	1,414.13	230.44	7.137	
14,300.00	9,761.00	15,278.60	10,380.00	123.46	128.55	112.19	-1,072.18	5,175.00	1,644.68	1,409.88	234.80	7.005	
14,400.00	9,761.00	15,378.60	10,380.00	125.80	130.88	112.19	-1,071.32	5,275.00	1,644.79	1,405.62	239.17	6.877	
14,500.00	9,761.00	15,478.60	10,380.00	128.14	133.22	112.18	-1,070.47	5,374.99	1,644.90	1,401.36	243.54	6.754	
14,600.00	9,761.00	15,578.60	10,380.00	130.48	135.56	112.18	-1,069.61	5,474.99	1,645.01	1,397.09	247.92	6.635	
14,700.00	9,761.00	15,678.60	10,380.00	132.83	137.90	112.18	-1,068.76	5,574.99	1,645.12	1,392.81	252.31	6.520	
14,800.00	9,761.00	15,778.60	10,380.00	135.17	140.25	112.18	-1,067.90	5,674.98	1,645.23	1,388.53	256.70	6.409	
14,900.00	9,761.00	15,878.60	10,380.00	137.53	142.59	112.18	-1,067.05	5,774.98	1,645.34	1,384.24	261.10	6.301	
15,000.00	9,761.00	15,978.60	10,380.00	139.88	144.95	112.18	-1,066.19	5,874.97	1,645.45	1,379.94	265.51	6.197	
15,100.00	9,761.00	16,078.59	10,380.00	142.24	147.30	112.18	-1,065.34	5,974.97	1,645.56	1,375.64	269.92	6.097	

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



Anticollision Report

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 0504 133H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3041.2+25 @ 3066.20ft
Reference Site:	Section 06-T23S-R29E	MD Reference:	RKB=3041.2+25 @ 3066.20ft
Site Error:	0.00 ft Rana Salada Fed Com 0504 133H	North Reference:	Grid
Reference Well:	0.00 ft	Survey Calculation Method:	Minimum Curvature
Well Error:	Original Hole	Output errors are at	2.00 sigma
Reference Wellbore	rev0	Database:	DB_Aug0116_LT_v14
Reference Design:		Offset TVD Reference:	Offset Datum

Offset Design										Section 06-T23S-R29E - Rana Salada Fed Com 0504 234H - Original Hole - rev0		Offset Site Error: 0.00 ft	
Survey Program: 0-MWD												Offset Well Error: 0.00 ft	
Reference		Offset		Semi Major Axis					Distance		Minimum Separation (ft)	Separation Factor	Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (ft)	+E-W (ft)	Between Centres (ft)	Between Ellipses (ft)			
15,200.00	9,761.00	16,178.59	10,380.00	144.60	149.66	112.17	-1,064.48	6,074.97	1,645.67	1,371.33	274.33	5.999	
15,300.00	9,761.00	16,278.59	10,380.00	146.96	152.02	112.17	-1,063.63	6,174.96	1,645.78	1,367.02	278.75	5.904	
15,400.00	9,761.00	16,378.59	10,380.00	149.33	154.38	112.17	-1,062.77	6,274.96	1,645.89	1,362.71	283.18	5.812	
15,500.00	9,761.00	16,478.59	10,380.00	151.70	156.74	112.17	-1,061.92	6,374.96	1,646.00	1,358.39	287.61	5.723	
15,600.00	9,761.00	16,578.59	10,380.00	154.07	159.11	112.17	-1,061.06	6,474.95	1,646.11	1,354.07	292.04	5.637	
15,700.00	9,761.00	16,678.59	10,380.00	156.44	161.48	112.17	-1,060.21	6,574.95	1,646.22	1,349.74	296.48	5.553	
15,800.00	9,761.00	16,778.59	10,380.00	158.81	163.85	112.16	-1,059.35	6,674.94	1,646.33	1,345.41	300.92	5.471	
15,900.00	9,761.00	16,878.59	10,380.00	161.19	166.22	112.16	-1,058.50	6,774.94	1,646.44	1,341.07	305.36	5.392	
16,000.00	9,761.00	16,978.59	10,380.00	163.57	168.60	112.16	-1,057.64	6,874.94	1,646.54	1,336.74	309.81	5.315	
16,100.00	9,761.00	17,078.59	10,380.00	165.95	170.97	112.16	-1,056.79	6,974.93	1,646.65	1,332.39	314.26	5.240	
16,200.00	9,761.00	17,178.59	10,380.00	168.33	173.35	112.16	-1,055.93	7,074.93	1,646.76	1,328.05	318.71	5.167	
16,300.00	9,761.00	17,278.59	10,380.00	170.71	175.73	112.16	-1,055.08	7,174.93	1,646.87	1,323.70	323.17	5.096	
16,400.00	9,761.00	17,378.59	10,380.00	173.10	178.11	112.16	-1,054.22	7,274.92	1,646.98	1,319.35	327.63	5.027	
16,500.00	9,761.00	17,478.59	10,380.00	175.48	180.49	112.15	-1,053.37	7,374.92	1,647.09	1,315.00	332.10	4.960	
16,600.00	9,761.00	17,578.59	10,380.00	177.87	182.88	112.15	-1,052.51	7,474.91	1,647.20	1,310.64	336.56	4.894	
16,700.00	9,761.00	17,678.59	10,380.00	180.26	185.26	112.15	-1,051.66	7,574.91	1,647.31	1,306.28	341.03	4.830	
16,800.00	9,761.00	17,778.59	10,380.00	182.65	187.65	112.15	-1,050.80	7,674.91	1,647.42	1,301.92	345.50	4.768	
16,900.00	9,761.00	17,878.59	10,380.00	185.04	190.04	112.15	-1,049.95	7,774.90	1,647.53	1,297.56	349.97	4.708	
17,000.00	9,761.00	17,978.59	10,380.00	187.43	192.43	112.15	-1,049.09	7,874.90	1,647.64	1,293.19	354.45	4.648	
17,100.00	9,761.00	18,078.59	10,380.00	189.83	194.82	112.14	-1,048.24	7,974.90	1,647.75	1,288.82	358.93	4.591	
17,200.00	9,761.00	18,178.59	10,380.00	192.22	197.21	112.14	-1,047.38	8,074.89	1,647.86	1,284.45	363.41	4.534	
17,300.00	9,761.00	18,278.59	10,380.00	194.62	199.61	112.14	-1,046.53	8,174.89	1,647.97	1,280.08	367.89	4.480	
17,400.00	9,761.00	18,378.59	10,380.00	197.01	202.00	112.14	-1,045.67	8,274.88	1,648.08	1,275.71	372.37	4.426	
17,500.00	9,761.00	18,478.59	10,380.00	199.41	204.40	112.14	-1,044.82	8,374.88	1,648.19	1,271.33	376.86	4.373	
17,600.00	9,761.00	18,578.59	10,380.00	201.81	206.79	112.14	-1,043.96	8,474.88	1,648.30	1,266.95	381.35	4.322	
17,700.00	9,761.00	18,678.59	10,380.00	204.21	209.19	112.13	-1,043.11	8,574.87	1,648.41	1,262.57	385.84	4.272	
17,800.00	9,761.00	18,778.59	10,380.00	206.61	211.59	112.13	-1,042.25	8,674.87	1,648.52	1,258.19	390.33	4.223	
17,900.00	9,761.00	18,878.59	10,380.00	209.01	213.99	112.13	-1,041.40	8,774.87	1,648.63	1,253.80	394.82	4.176	
18,000.00	9,761.00	18,978.59	10,380.00	211.41	216.39	112.13	-1,040.54	8,874.86	1,648.74	1,249.42	399.32	4.129	
18,100.00	9,761.00	19,078.59	10,380.00	213.82	218.79	112.13	-1,039.69	8,974.86	1,648.85	1,245.03	403.82	4.083	
18,200.00	9,761.00	19,178.59	10,380.00	216.22	221.19	112.13	-1,038.83	9,074.85	1,648.96	1,240.64	408.31	4.038	
18,300.00	9,761.00	19,278.59	10,380.00	218.63	223.59	112.13	-1,037.98	9,174.85	1,649.07	1,236.25	412.81	3.995	
18,400.00	9,761.00	19,378.59	10,380.00	221.03	225.99	112.12	-1,037.12	9,274.85	1,649.18	1,231.86	417.32	3.952	
18,500.00	9,761.00	19,478.59	10,380.00	223.44	228.40	112.12	-1,036.27	9,374.84	1,649.29	1,227.47	421.82	3.910	
18,600.00	9,761.00	19,578.59	10,380.00	225.84	230.80	112.12	-1,035.41	9,474.84	1,649.40	1,223.08	426.32	3.869	
18,700.00	9,761.00	19,678.59	10,380.00	228.25	233.21	112.12	-1,034.56	9,574.84	1,649.51	1,218.68	430.83	3.829	
18,800.00	9,761.00	19,778.59	10,380.00	230.66	235.61	112.12	-1,033.70	9,674.83	1,649.62	1,214.28	435.33	3.789	
18,900.00	9,761.00	19,878.59	10,380.00	233.07	238.02	112.12	-1,032.85	9,774.83	1,649.73	1,209.88	439.84	3.751	
19,000.00	9,761.00	19,978.59	10,380.00	235.48	240.43	112.11	-1,031.99	9,874.83	1,649.84	1,205.48	444.35	3.713	
19,100.00	9,761.00	20,078.59	10,380.00	237.89	242.84	112.11	-1,031.14	9,974.82	1,649.95	1,201.08	448.86	3.676	
19,200.00	9,761.00	20,178.59	10,380.00	240.30	245.24	112.11	-1,030.28	10,074.82	1,650.06	1,196.68	453.37	3.640	
19,300.00	9,761.00	20,278.59	10,380.00	242.71	247.65	112.11	-1,029.43	10,174.81	1,650.17	1,192.28	457.89	3.604	
19,400.00	9,761.00	20,378.59	10,380.00	245.12	250.06	112.11	-1,028.57	10,274.81	1,650.28	1,187.88	462.40	3.569	
19,500.00	9,761.00	20,478.59	10,380.00	247.53	252.47	112.11	-1,027.72	10,374.81	1,650.38	1,183.47	466.91	3.535	
19,600.00	9,761.00	20,578.59	10,380.00	249.95	254.88	112.11	-1,026.86	10,474.80	1,650.49	1,179.06	471.43	3.501	
19,700.00	9,761.00	20,678.59	10,380.00	252.36	257.29	112.10	-1,026.01	10,574.80	1,650.60	1,174.66	475.95	3.468	
19,800.00	9,761.00	20,778.59	10,380.00	254.77	259.71	112.10	-1,025.15	10,674.80	1,650.71	1,170.25	480.46	3.436	
19,900.00	9,761.00	20,878.59	10,380.00	257.19	262.12	112.10	-1,024.30	10,774.79	1,650.82	1,165.84	484.98	3.404	
20,000.00	9,761.00	20,978.59	10,380.00	259.60	264.53	112.10	-1,023.44	10,874.79	1,650.93	1,161.43	489.50	3.373	
20,016.77	9,761.00	20,985.64	10,380.00	260.01	264.70	112.10	-1,023.38	10,881.83	1,650.98	1,160.92	490.06	3.369 SF	

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



Anticollision Report

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 0504 133H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3041.2+25 @ 3066.20ft
Reference Site:	Section 06-T23S-R29E	MD Reference:	RKB=3041.2+25 @ 3066.20ft
Site Error:	0.00 ft Rana Salada Fed Com 0504 133H	North Reference:	Grid
Reference Well:	0.00 ft	Survey Calculation Method:	2.00 sigma
Well Error:	Original Hole	Output errors are at	DB_Aug0116_LT_v14
Reference Wellbore:	rev0	Database:	Offset Datum
Reference Design:		Offset TVD Reference:	

Offset Design Section 06-T23S-R29E - Rana Salada Fed Com 0504 234H - Original Hole - rev0												Offset Site Error:	0.00 ft
Survey Program: 0-MWD												Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)					
0.00	0.00	1.90	-1.90	0.00	0.00	-171.58	-200.06	-29.61	202.24				
100.00	100.00	101.90	98.10	0.13	0.14	-171.58	-200.06	-29.61	202.24	201.96	0.28	733.643	
200.00	200.00	201.90	198.10	0.49	0.50	-171.58	-200.06	-29.61	202.24	201.25	0.99	203.746	
300.00	300.00	301.90	298.10	0.85	0.86	-171.58	-200.06	-29.61	202.24	200.53	1.71	118.300	
400.00	400.00	401.90	398.10	1.21	1.22	-171.58	-200.06	-29.61	202.24	199.81	2.43	83.346	
500.00	500.00	501.90	498.10	1.57	1.58	-171.58	-200.06	-29.61	202.24	199.10	3.14	64.337	
600.00	600.00	601.90	598.10	1.93	1.93	-171.58	-200.06	-29.61	202.24	198.38	3.86	52.389	
700.00	700.00	701.90	698.10	2.29	2.29	-171.58	-200.06	-29.61	202.24	197.66	4.58	44.183	
800.00	800.00	801.90	798.10	2.64	2.65	-171.58	-200.06	-29.61	202.24	196.95	5.29	38.200	
900.00	900.00	901.90	898.10	3.00	3.01	-171.58	-200.06	-29.61	202.24	196.23	6.01	33.644	
1,000.00	1,000.00	1,001.90	998.10	3.36	3.37	-171.58	-200.06	-29.61	202.24	195.51	6.73	30.059	
1,100.00	1,100.00	1,101.90	1,098.10	3.72	3.73	-171.58	-200.06	-29.61	202.24	194.79	7.45	27.164	
1,200.00	1,200.00	1,201.90	1,198.10	4.08	4.08	-171.58	-200.06	-29.61	202.24	194.08	8.16	24.778	
1,300.00	1,300.00	1,301.90	1,298.10	4.44	4.44	-171.58	-200.06	-29.61	202.24	193.36	8.88	22.777	
1,400.00	1,400.00	1,401.90	1,398.10	4.79	4.80	-171.58	-200.06	-29.61	202.24	192.64	9.60	21.076	
1,500.00	1,500.00	1,501.90	1,498.10	5.15	5.16	-171.58	-200.06	-29.61	202.24	191.93	10.31	19.610	
1,600.00	1,600.00	1,601.90	1,598.10	5.51	5.52	-171.58	-200.06	-29.61	202.24	191.21	11.03	18.336	
1,700.00	1,700.00	1,701.90	1,698.10	5.87	5.88	-171.58	-200.06	-29.61	202.24	190.49	11.75	17.217	
1,800.00	1,800.00	1,801.90	1,798.10	6.23	6.24	-171.58	-200.06	-29.61	202.24	189.78	12.46	16.226	
1,900.00	1,900.00	1,901.90	1,898.10	6.59	6.59	-171.58	-200.06	-29.61	202.24	189.06	13.18	15.344	
2,000.00	2,000.00	2,001.90	1,998.10	6.95	6.95	-171.58	-200.06	-29.61	202.24	188.34	13.90	14.552	
2,100.00	2,100.00	2,101.90	2,098.10	7.30	7.31	-171.58	-200.06	-29.61	202.24	187.63	14.61	13.838	
2,200.00	2,200.00	2,201.90	2,198.10	7.66	7.67	-171.58	-200.06	-29.61	202.24	186.91	15.33	13.191	
2,300.00	2,300.00	2,301.90	2,298.10	8.02	8.03	-171.58	-200.06	-29.61	202.24	186.19	16.05	12.602	
2,400.00	2,400.00	2,401.90	2,398.10	8.38	8.39	-171.58	-200.06	-29.61	202.24	185.47	16.77	12.063	
2,500.00	2,500.00	2,501.90	2,498.10	8.74	8.74	-171.58	-200.06	-29.61	202.24	184.76	17.48	11.568	
2,600.00	2,600.00	2,601.90	2,598.10	9.10	9.10	-171.58	-200.06	-29.61	202.24	184.04	18.20	11.113	
2,700.00	2,700.00	2,701.90	2,698.10	9.45	9.46	-171.58	-200.06	-29.61	202.24	183.32	18.92	10.691	
2,800.00	2,800.00	2,798.10	2,798.10	9.81	9.81	-171.58	-200.06	-29.61	202.24	182.62	19.62	10.308 CC, ES	
2,900.00	2,900.00	2,908.13	2,891.86	10.17	10.18	-171.78	-201.43	-29.10	203.62	183.27	20.34	10.009	
3,000.00	3,000.00	3,008.19	2,991.73	10.53	10.51	-172.24	-204.70	-27.89	206.69	185.66	21.03	9.830	
3,100.00	3,100.00	3,108.25	3,091.61	10.89	10.83	-172.69	-207.97	-26.68	209.78	188.07	21.71	9.661	
3,200.00	3,200.00	3,208.31	3,191.49	11.25	11.16	-173.12	-211.24	-25.47	212.88	190.48	22.40	9.503	
3,300.00	3,300.00	3,308.37	3,291.37	11.61	11.49	-173.55	-214.52	-24.26	215.99	192.90	23.09	9.354	
3,400.00	3,400.00	3,408.43	3,391.25	11.96	11.83	-173.96	-217.79	-23.05	219.11	195.33	23.78	9.213	
3,500.00	3,500.00	3,508.49	3,491.12	12.32	12.16	-174.36	-221.06	-21.84	222.24	197.77	24.47	9.081	
3,600.00	3,600.00	3,608.56	3,591.00	12.68	12.50	-174.75	-224.33	-20.63	225.39	200.22	25.17	8.955	
3,700.00	3,700.00	3,708.62	3,690.88	13.04	12.84	-175.12	-227.60	-19.42	228.54	202.68	25.86	8.836	
3,800.00	3,800.00	3,808.68	3,790.76	13.40	13.18	-175.49	-230.87	-18.21	231.71	205.14	26.56	8.723	
3,900.00	3,900.00	3,891.26	3,890.64	13.76	13.46	-175.85	-234.14	-17.00	234.88	207.68	27.20	8.635	
4,000.00	4,000.00	3,984.73	3,983.99	14.11	13.78	-176.29	-238.38	-15.44	239.30	211.45	27.85	8.592	
4,100.00	4,100.00	4,077.20	4,076.15	14.47	14.10	-176.99	-245.37	-12.89	246.69	218.22	28.47	8.664	
4,200.00	4,200.00	4,169.09	4,167.46	14.83	14.42	-177.90	-255.09	-9.35	257.10	228.02	29.07	8.844	
4,300.00	4,300.00	4,260.23	4,257.64	15.19	14.74	-178.96	-267.44	-4.85	270.53	240.89	29.64	9.127	
4,400.00	4,400.00	4,350.43	4,346.44	15.55	15.07	-179.89	-282.32	0.55	287.01	256.83	30.18	9.509	
4,500.00	4,500.00	4,447.67	4,441.84	15.91	15.43	-178.67	-300.04	6.99	305.35	274.50	30.85	9.897	
4,600.00	4,600.00	4,545.77	4,538.07	16.27	15.79	-177.57	-317.94	13.49	323.84	292.29	31.54	10.267	
4,700.00	4,700.00	4,643.87	4,634.31	16.62	16.16	-176.59	-335.83	19.99	342.42	310.19	32.23	10.623	
4,800.00	4,800.00	4,741.97	4,730.54	16.98	16.54	-175.72	-353.72	26.49	361.09	328.16	32.93	10.966	
4,900.00	4,900.00	4,840.07	4,826.78	17.34	16.92	-174.93	-371.62	32.99	379.84	346.21	33.62	11.297	
5,000.00	5,000.00	4,938.17	4,923.01	17.70	17.31	-174.21	-389.51	39.50	398.64	364.32	34.32	11.616	

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



Anticollision Report

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 0504 133H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3041.2+25 @ 3066.20ft
Reference Site:	Section 06-T23S-R29E	MD Reference:	RKB=3041.2+25 @ 3066.20ft
Site Error:	0.00 ft Rana Salada Fed Com 0504 133H	North Reference:	Grid
Reference Well:	0.00 ft	Survey Calculation Method:	Minimum Curvature
Well Error:	Original Hole	Output errors are at	2.00 sigma
Reference Wellbore	rev0	Database:	DB_Aug0116_LT_v14
Reference Design:		Offset TVD Reference:	Offset Datum

Offset Design Section 06-T23S-R29E - Rana Salada Fed Com 0504 214H - Original Hole - rev0											Offset Site Error: 0.00 ft		
Survey Program: 0-MWD											Offset Well Error: 0.00 ft		
Reference		Offset		Semi Major Axis			Distance					Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)		Separation Factor
5,100.00	5,099.98	5,036.13	5,019.11	18.05	17.70	124.16	-407.38	45.99	418.47	383.45	35.02	11.951	
5,200.00	5,199.84	5,133.73	5,114.85	18.41	18.09	123.76	-425.18	52.45	440.23	404.51	35.71	12.327	
5,300.00	5,299.45	5,230.85	5,210.12	18.76	18.48	123.70	-442.89	58.89	463.88	427.47	36.41	12.741	
5,400.00	5,398.70	5,327.37	5,304.81	19.12	18.88	123.92	-460.50	65.29	489.45	452.34	37.11	13.190	
5,500.00	5,497.47	5,423.18	5,398.80	19.47	19.27	124.37	-477.98	71.64	516.98	479.18	37.81	13.674	
5,600.00	5,595.93	5,518.57	5,492.37	19.83	19.66	125.35	-495.37	77.96	545.67	507.16	38.51	14.170	
5,700.00	5,694.38	5,613.95	5,585.95	20.19	20.06	126.25	-512.77	84.28	574.50	535.28	39.21	14.650	
5,800.00	5,792.84	5,709.34	5,679.52	20.56	20.46	127.06	-530.17	90.60	603.44	563.52	39.92	15.115	
5,900.00	5,891.30	5,804.72	5,773.09	20.93	20.86	127.79	-547.57	96.92	632.48	591.85	40.63	15.565	
6,000.00	5,989.76	5,900.11	5,866.66	21.30	21.27	128.47	-564.97	103.24	661.61	620.27	41.35	16.001	
6,100.00	6,088.22	6,004.51	5,960.23	21.68	21.71	129.08	-582.36	109.56	690.82	648.72	42.10	16.409	
6,200.00	6,186.68	6,109.12	6,053.80	22.06	22.16	129.65	-599.76	115.88	720.10	677.25	42.85	16.804	
6,300.00	6,285.14	6,186.26	6,147.37	22.44	22.49	130.17	-617.16	122.20	749.44	705.93	43.51	17.225	
6,400.00	6,383.60	6,281.65	6,240.95	22.83	22.90	130.65	-634.56	128.52	778.82	734.59	44.23	17.607	
6,500.00	6,482.06	6,377.03	6,334.52	23.21	23.32	131.10	-651.96	134.85	808.26	763.30	44.96	17.977	
6,600.00	6,580.52	6,472.42	6,428.09	23.60	23.73	131.52	-669.36	141.17	837.74	792.05	45.69	18.335	
6,700.00	6,678.98	6,567.80	6,521.66	23.99	24.15	131.91	-686.75	147.49	867.25	820.83	46.42	18.682	
6,800.00	6,777.44	6,663.19	6,615.23	24.38	24.57	132.27	-704.15	153.81	896.80	849.65	47.16	19.018	
6,900.00	6,875.90	6,758.57	6,708.80	24.78	24.99	132.61	-721.55	160.13	926.38	878.49	47.89	19.344	
7,000.00	6,974.36	6,853.96	6,802.38	25.18	25.41	132.93	-738.95	166.45	955.99	907.36	48.63	19.659	
7,100.00	7,072.82	6,949.34	6,895.95	25.57	25.83	133.23	-756.35	172.77	985.63	936.26	49.37	19.965	
7,200.00	7,171.28	7,044.73	6,989.52	25.98	26.25	133.51	-773.74	179.09	1,015.28	965.18	50.11	20.262	
7,300.00	7,269.74	7,140.11	7,083.09	26.38	26.68	133.77	-791.14	185.41	1,044.96	994.11	50.85	20.550	
7,400.00	7,368.20	7,235.50	7,176.66	26.78	27.10	134.03	-808.54	191.73	1,074.66	1,023.07	51.59	20.830	
7,500.00	7,466.66	7,330.88	7,270.23	27.19	27.53	134.26	-825.94	198.05	1,104.37	1,052.04	52.34	21.101	
7,600.00	7,565.12	7,426.27	7,363.80	27.59	27.95	134.49	-843.34	204.38	1,134.11	1,081.02	53.08	21.364	
7,700.00	7,663.58	7,521.65	7,457.38	28.00	28.38	134.70	-860.73	210.70	1,163.85	1,110.02	53.83	21.620	
7,800.00	7,762.04	7,617.04	7,550.95	28.41	28.81	134.91	-878.13	217.02	1,193.61	1,139.03	54.58	21.869	
7,900.00	7,860.50	7,712.42	7,644.52	28.82	29.24	135.10	-895.53	223.34	1,223.39	1,168.06	55.33	22.110	
8,000.00	7,958.95	7,807.81	7,738.09	29.23	29.67	135.29	-912.93	229.66	1,253.18	1,197.09	56.08	22.345	
8,100.00	8,057.41	7,903.19	7,831.66	29.64	30.10	135.46	-930.33	235.98	1,282.97	1,226.14	56.84	22.574	
8,200.00	8,155.87	8,001.43	7,925.23	30.06	30.54	135.63	-947.72	242.30	1,312.78	1,255.18	57.60	22.791	
8,300.00	8,254.33	8,106.04	8,018.80	30.47	31.02	135.79	-965.12	248.62	1,342.60	1,284.21	58.39	22.993	
8,400.00	8,352.79	8,189.35	8,112.38	30.89	31.40	135.94	-982.52	254.94	1,372.43	1,313.33	59.10	23.222	
8,500.00	8,451.25	8,284.73	8,205.95	31.31	31.83	136.09	-999.92	261.26	1,402.26	1,342.41	59.86	23.427	
8,600.00	8,549.79	8,380.22	8,299.63	31.72	32.27	136.43	-1,017.34	267.59	1,431.79	1,371.18	60.61	23.622	
8,700.00	8,648.80	8,476.39	8,393.96	32.12	32.70	136.86	-1,034.88	273.96	1,459.18	1,397.81	61.37	23.778	
8,800.00	8,748.24	8,573.21	8,488.95	32.51	33.15	137.15	-1,052.54	280.38	1,484.11	1,422.00	62.11	23.894	
8,900.00	8,847.99	8,707.18	8,620.56	32.88	33.75	137.26	-1,076.00	288.90	1,506.06	1,442.91	63.15	23.848	
9,000.00	8,947.92	8,894.77	8,806.40	33.24	34.53	137.20	-1,099.79	297.55	1,520.75	1,456.26	64.49	23.581	
9,100.00	9,047.92	9,085.44	8,996.58	33.58	35.23	-173.67	-1,112.22	302.06	1,527.31	1,461.68	65.64	23.269	
9,200.00	9,147.92	9,234.90	9,146.02	33.92	35.71	-173.70	-1,113.97	302.70	1,528.19	1,461.71	66.48	22.989	
9,300.00	9,247.92	9,334.90	9,246.02	34.26	36.01	-173.70	-1,113.97	302.70	1,528.19	1,461.04	67.15	22.758	
9,302.53	9,250.45	9,337.43	9,248.55	34.27	36.02	96.86	-1,113.97	302.70	1,528.19	1,461.02	67.17	22.752	
9,400.00	9,347.72	9,434.71	9,345.82	34.62	36.32	96.95	-1,113.97	302.70	1,528.71	1,460.88	67.84	22.536	
9,500.00	9,444.69	9,586.74	9,496.20	35.03	36.83	97.48	-1,113.84	320.64	1,530.39	1,461.65	68.74	22.263	
9,600.00	9,534.61	9,757.24	9,648.65	35.51	37.48	97.45	-1,113.27	394.96	1,530.42	1,460.64	69.79	21.931	
9,700.00	9,613.56	9,921.44	9,762.01	36.05	38.15	96.75	-1,112.37	512.63	1,528.74	1,457.71	71.02	21.524	
9,800.00	9,678.09	10,070.85	9,825.16	36.68	38.90	95.61	-1,111.35	647.35	1,525.99	1,453.39	72.60	21.020	
9,900.00	9,725.37	10,203.07	9,844.00	37.41	39.75	94.26	-1,110.35	777.80	1,523.05	1,448.59	74.46	20.455	
10,000.00	9,753.35	10,300.52	9,844.01	38.26	40.51	93.45	-1,109.62	874.21	1,521.29	1,444.97	76.32	19.932	

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



Anticollision Report

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 0504 133H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3041.2+25 @ 3066.20ft
Reference Site:	Section 06-T23S-R29E	MD Reference:	RKB=3041.2+25 @ 3066.20ft
Site Error:	0.00 ft Rana Salada Fed Com 0504 133H	North Reference:	Grid
Reference Well:	0.00 ft	Survey Calculation Method:	2.00 sigma
Well Error:	Original Hole	Output errors are at	DB_Aug0116_LT_v14
Reference Wellbore:	rev0	Database:	Offset Datum
Reference Design:		Offset TVD Reference:	

Offset Design Section 06-T23S-R29E - Rana Salada Fed Com 0504 214H - Original Hole - rev0													Offset Site Error:	0.00 ft
Survey Program: 0-MWD													Offset Well Error:	0.00 ft
Reference	Offset	Semi Major Axis		Distance		Minimum		Separation		Warning				
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
10,078.64	9,761.88	10,377.59	9,844.00	38.99	41.21	93.17	-1,109.02	952.31	1,520.96	1,443.05	77.91	19.523		
10,100.00	9,761.01	10,400.97	9,844.00	39.19	41.43	93.20	-1,108.86	973.75	1,521.05	1,442.70	78.35	19.413		
10,200.00	9,761.00	10,500.98	9,844.00	40.23	42.48	93.20	-1,108.10	1,073.74	1,521.27	1,440.69	80.58	18.880		
10,300.00	9,761.00	10,600.98	9,844.00	41.38	43.66	93.20	-1,107.34	1,173.74	1,521.48	1,438.45	83.02	18.326		
10,400.00	9,761.00	10,700.98	9,844.00	42.64	44.94	93.20	-1,106.58	1,273.74	1,521.69	1,436.01	85.68	17.760		
10,500.00	9,761.00	10,800.98	9,844.00	44.01	46.33	93.20	-1,105.81	1,373.73	1,521.90	1,433.37	88.52	17.192		
10,600.00	9,761.00	10,900.98	9,844.00	45.46	47.81	93.20	-1,105.05	1,473.73	1,522.11	1,430.57	91.54	16.628		
10,700.00	9,761.00	11,000.98	9,844.00	47.00	49.36	93.20	-1,104.29	1,573.73	1,522.32	1,427.61	94.71	16.074		
10,800.00	9,761.00	11,100.98	9,844.00	48.61	51.00	93.20	-1,103.53	1,673.73	1,522.53	1,424.51	98.02	15.533		
10,900.00	9,761.00	11,200.98	9,844.00	50.28	52.69	93.20	-1,102.77	1,773.72	1,522.74	1,421.29	101.45	15.009		
11,000.00	9,761.00	11,300.98	9,844.00	52.02	54.45	93.20	-1,102.00	1,873.72	1,522.96	1,417.95	105.00	14.504		
11,100.00	9,761.00	11,400.98	9,844.00	53.81	56.26	93.20	-1,101.24	1,973.72	1,523.17	1,414.51	108.65	14.018		
11,200.00	9,761.00	11,500.98	9,844.00	55.65	58.11	93.19	-1,100.48	2,073.71	1,523.38	1,410.98	112.40	13.553		
11,300.00	9,761.00	11,600.98	9,844.00	57.54	60.01	93.19	-1,099.72	2,173.71	1,523.59	1,407.36	116.23	13.109		
11,400.00	9,761.00	11,700.98	9,844.00	59.46	61.95	93.19	-1,098.96	2,273.71	1,523.80	1,403.67	120.13	12.685		
11,500.00	9,761.00	11,800.98	9,844.00	61.42	63.92	93.19	-1,098.20	2,373.70	1,524.01	1,399.91	124.10	12.281		
11,600.00	9,761.00	11,900.98	9,844.00	63.42	65.93	93.19	-1,097.43	2,473.70	1,524.22	1,396.09	128.13	11.896		
11,700.00	9,761.00	12,000.98	9,844.00	65.45	67.96	93.19	-1,096.67	2,573.70	1,524.44	1,392.21	132.22	11.529		
11,800.00	9,761.00	12,100.98	9,844.00	67.50	70.02	93.19	-1,095.91	2,673.69	1,524.65	1,388.28	136.36	11.181		
11,900.00	9,761.00	12,200.98	9,844.00	69.58	72.10	93.19	-1,095.15	2,773.69	1,524.86	1,384.31	140.55	10.849		
12,000.00	9,761.00	12,300.98	9,844.00	71.68	74.21	93.19	-1,094.39	2,873.69	1,525.07	1,380.29	144.78	10.534		
12,100.00	9,761.00	12,400.98	9,844.00	73.80	76.34	93.19	-1,093.63	2,973.68	1,525.28	1,376.23	149.05	10.233		
12,200.00	9,761.00	12,500.98	9,844.00	75.94	78.48	93.19	-1,092.86	3,073.68	1,525.49	1,372.14	153.36	9.947		
12,300.00	9,761.00	12,600.98	9,844.00	78.10	80.64	93.19	-1,092.10	3,173.68	1,525.70	1,368.01	157.70	9.675		
12,400.00	9,761.00	12,700.98	9,844.00	80.27	82.82	93.19	-1,091.34	3,273.68	1,525.92	1,363.85	162.06	9.416		
12,500.00	9,761.00	12,800.98	9,844.00	82.46	85.01	93.19	-1,090.58	3,373.67	1,526.13	1,359.67	166.46	9.168		
12,600.00	9,761.00	12,900.98	9,844.00	84.66	87.22	93.19	-1,089.82	3,473.67	1,526.34	1,355.46	170.88	8.932		
12,700.00	9,761.00	13,000.98	9,844.00	86.87	89.43	93.19	-1,089.05	3,573.67	1,526.55	1,351.22	175.33	8.707		
12,800.00	9,761.00	13,099.02	9,844.00	89.10	91.62	93.19	-1,088.29	3,673.66	1,526.76	1,347.01	179.75	8.494		
12,900.00	9,761.00	13,200.98	9,844.00	91.34	93.90	93.19	-1,087.53	3,773.66	1,526.97	1,342.69	184.28	8.286		
13,000.00	9,761.00	13,300.98	9,844.00	93.59	96.15	93.19	-1,086.77	3,873.66	1,527.18	1,338.39	188.79	8.089		
13,100.00	9,761.00	13,400.98	9,844.00	95.84	98.41	93.19	-1,086.01	3,973.65	1,527.39	1,334.08	193.32	7.901		
13,200.00	9,761.00	13,500.98	9,844.00	98.11	100.67	93.19	-1,085.25	4,073.65	1,527.61	1,329.75	197.86	7.721		
13,300.00	9,761.00	13,600.98	9,844.00	100.38	102.95	93.19	-1,084.48	4,173.65	1,527.82	1,325.40	202.41	7.548		
13,400.00	9,761.00	13,700.98	9,844.00	102.66	105.23	93.19	-1,083.72	4,273.64	1,528.03	1,321.04	206.98	7.382		
13,500.00	9,761.00	13,800.98	9,844.00	104.95	107.52	93.18	-1,082.96	4,373.64	1,528.24	1,316.67	211.57	7.223		
13,600.00	9,761.00	13,900.98	9,844.00	107.25	109.81	93.18	-1,082.20	4,473.64	1,528.45	1,312.29	216.17	7.071		
13,700.00	9,761.00	14,000.98	9,844.00	109.55	112.11	93.18	-1,081.44	4,573.63	1,528.66	1,307.89	220.77	6.924		
13,800.00	9,761.00	14,100.98	9,844.00	111.85	114.42	93.18	-1,080.68	4,673.63	1,528.87	1,303.48	225.39	6.783		
13,900.00	9,761.00	14,200.98	9,844.00	114.17	116.73	93.18	-1,079.91	4,773.63	1,529.09	1,299.06	230.02	6.648		
14,000.00	9,761.00	14,300.98	9,844.00	116.48	119.05	93.18	-1,079.15	4,873.63	1,529.30	1,294.63	234.66	6.517		
14,100.00	9,761.00	14,400.98	9,844.00	118.81	121.37	93.18	-1,078.39	4,973.62	1,529.51	1,290.20	239.31	6.391		
14,200.00	9,761.00	14,500.98	9,844.00	121.13	123.70	93.18	-1,077.63	5,073.62	1,529.72	1,285.75	243.97	6.270		
14,300.00	9,761.00	14,600.98	9,844.00	123.46	126.03	93.18	-1,076.87	5,173.62	1,529.93	1,281.30	248.63	6.153		
14,400.00	9,761.00	14,700.98	9,844.00	125.80	128.37	93.18	-1,076.10	5,273.61	1,530.14	1,276.84	253.31	6.041		
14,500.00	9,761.00	14,800.98	9,844.00	128.14	130.70	93.18	-1,075.34	5,373.61	1,530.35	1,272.37	257.99	5.932		
14,600.00	9,761.00	14,900.99	9,844.00	130.48	133.05	93.18	-1,074.58	5,473.61	1,530.56	1,267.89	262.67	5.827		
14,700.00	9,761.00	15,000.99	9,844.00	132.83	135.39	93.18	-1,073.82	5,573.60	1,530.78	1,263.41	267.37	5.725		
14,800.00	9,761.00	15,100.99	9,844.00	135.17	137.74	93.18	-1,073.06	5,673.60	1,530.99	1,258.92	272.07	5.627		
14,900.00	9,761.00	15,200.99	9,844.00	137.53	140.09	93.18	-1,072.30	5,773.60	1,531.20	1,254.42	276.77	5.532		
15,000.00	9,761.00	15,300.99	9,844.00	139.88	142.45	93.18	-1,071.53	5,873.59	1,531.41	1,249.92	281.49	5.440		

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



Anticollision Report

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 0504 133H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3041.2+25 @ 3066.20ft
Reference Site:	Section 06-T23S-R29E	MD Reference:	RKB=3041.2+25 @ 3066.20ft
Site Error:	0.00 ft Rana Salada Fed Com 0504 133H	North Reference:	Grid
Reference Well:	0.00 ft	Survey Calculation Method:	2.00 sigma
Well Error:	Original Hole	Output errors are at	DB_Aug0116_LT_v14
Reference Wellbore	rev0	Database:	Offset Datum
Reference Design:		Offset TVD Reference:	

Offset Design Section 06-T23S-R29E - Rana Salada Fed Com 0504 214H - Original Hole - rev0													Offset Site Error:	0.00 ft
Survey Program: 0-MWD													Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis		Distance		Warning						
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Tooface (")	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
15,100.00	9,761.00	15,400.99	9,844.00	142.24	144.81	93.18	-1,070.77	5,973.59	1,531.62	1,245.42	286.20	5.352		
15,200.00	9,761.00	15,500.99	9,844.00	144.60	147.17	93.18	-1,070.01	6,073.59	1,531.83	1,240.91	290.93	5.265		
15,300.00	9,761.00	15,600.99	9,844.00	146.96	149.53	93.18	-1,069.25	6,173.58	1,532.04	1,236.39	295.65	5.182		
15,400.00	9,761.00	15,700.99	9,844.00	149.33	151.89	93.18	-1,068.49	6,273.58	1,532.26	1,231.87	300.38	5.101		
15,500.00	9,761.00	15,800.99	9,844.00	151.70	154.26	93.18	-1,067.73	6,373.58	1,532.47	1,227.35	305.12	5.023		
15,600.00	9,761.00	15,900.99	9,844.00	154.07	156.63	93.18	-1,066.96	6,473.58	1,532.68	1,222.82	309.86	4.946		
15,700.00	9,761.00	16,000.99	9,844.00	156.44	159.00	93.17	-1,066.20	6,573.57	1,532.89	1,218.29	314.60	4.872		
15,800.00	9,761.00	16,100.99	9,844.00	158.81	161.38	93.17	-1,065.44	6,673.57	1,533.10	1,213.75	319.35	4.801		
15,900.00	9,761.00	16,200.99	9,844.00	161.19	163.75	93.17	-1,064.68	6,773.57	1,533.31	1,209.21	324.10	4.731		
16,000.00	9,761.00	16,300.99	9,844.00	163.57	166.13	93.17	-1,063.92	6,873.56	1,533.52	1,204.67	328.86	4.663		
16,100.00	9,761.00	16,400.99	9,844.00	165.95	168.51	93.17	-1,063.15	6,973.56	1,533.73	1,200.12	333.61	4.597		
16,200.00	9,761.00	16,500.99	9,844.00	168.33	170.89	93.17	-1,062.39	7,073.56	1,533.95	1,195.57	338.38	4.533		
16,300.00	9,761.00	16,600.99	9,844.00	170.71	173.27	93.17	-1,061.63	7,173.55	1,534.16	1,191.02	343.14	4.471		
16,400.00	9,761.00	16,700.99	9,844.00	173.10	175.66	93.17	-1,060.87	7,273.55	1,534.37	1,186.46	347.91	4.410		
16,500.00	9,761.00	16,800.99	9,844.00	175.48	178.04	93.17	-1,060.11	7,373.55	1,534.58	1,181.90	352.68	4.351		
16,600.00	9,761.00	16,899.01	9,844.00	177.87	180.38	93.17	-1,059.35	7,473.54	1,534.79	1,177.39	357.40	4.294		
16,700.00	9,761.00	17,000.99	9,844.00	180.26	182.82	93.17	-1,058.58	7,573.54	1,535.00	1,172.78	362.23	4.238		
16,800.00	9,761.00	17,100.99	9,844.00	182.65	185.21	93.17	-1,057.82	7,673.54	1,535.21	1,168.21	367.00	4.183		
16,900.00	9,761.00	17,200.99	9,844.00	185.04	187.60	93.17	-1,057.06	7,773.53	1,535.43	1,163.64	371.78	4.130		
17,000.00	9,761.00	17,300.99	9,844.00	187.43	189.99	93.17	-1,056.30	7,873.53	1,535.64	1,159.07	376.57	4.078		
17,100.00	9,761.00	17,400.99	9,844.00	189.83	192.38	93.17	-1,055.54	7,973.53	1,535.85	1,154.50	381.35	4.027		
17,200.00	9,761.00	17,500.99	9,844.00	192.22	194.78	93.17	-1,054.78	8,073.53	1,536.06	1,149.92	386.14	3.978		
17,300.00	9,761.00	17,599.01	9,844.00	194.62	197.13	93.17	-1,054.01	8,173.52	1,536.27	1,145.39	390.88	3.930		
17,400.00	9,761.00	17,700.99	9,844.00	197.01	199.57	93.17	-1,053.25	8,273.52	1,536.48	1,140.76	395.72	3.883		
17,500.00	9,761.00	17,800.99	9,844.00	199.41	201.97	93.17	-1,052.49	8,373.52	1,536.69	1,136.18	400.51	3.837		
17,600.00	9,761.00	17,900.99	9,844.00	201.81	204.37	93.17	-1,051.73	8,473.51	1,536.91	1,131.60	405.31	3.792		
17,700.00	9,761.00	18,000.99	9,844.00	204.21	206.77	93.17	-1,050.97	8,573.51	1,537.12	1,127.01	410.10	3.748		
17,800.00	9,761.00	18,100.99	9,844.00	206.61	209.17	93.17	-1,050.20	8,673.51	1,537.33	1,122.43	414.90	3.705		
17,900.00	9,761.00	18,200.99	9,844.00	209.01	211.57	93.17	-1,049.44	8,773.50	1,537.54	1,117.84	419.70	3.663		
18,000.00	9,761.00	18,300.99	9,844.00	211.41	213.97	93.16	-1,048.68	8,873.50	1,537.75	1,113.25	424.50	3.622		
18,100.00	9,761.00	18,400.99	9,844.00	213.82	216.37	93.16	-1,047.92	8,973.50	1,537.96	1,108.66	429.31	3.582		
18,200.00	9,761.00	18,500.99	9,844.00	216.22	218.78	93.16	-1,047.16	9,073.49	1,538.17	1,104.06	434.11	3.543		
18,300.00	9,761.00	18,600.99	9,844.00	218.63	221.18	93.16	-1,046.40	9,173.49	1,538.38	1,099.47	438.92	3.505		
18,400.00	9,761.00	18,700.99	9,844.00	221.03	223.58	93.16	-1,045.63	9,273.49	1,538.60	1,094.87	443.72	3.467		
18,500.00	9,761.00	18,800.99	9,844.00	223.44	225.99	93.16	-1,044.87	9,373.48	1,538.81	1,090.27	448.53	3.431		
18,600.00	9,761.00	18,900.99	9,844.00	225.84	228.40	93.16	-1,044.11	9,473.48	1,539.02	1,085.68	453.34	3.395		
18,700.00	9,761.00	19,000.99	9,844.00	228.25	230.80	93.16	-1,043.35	9,573.48	1,539.23	1,081.08	458.15	3.360		
18,800.00	9,761.00	19,100.99	9,844.00	230.66	233.21	93.16	-1,042.59	9,673.48	1,539.44	1,076.47	462.97	3.325		
18,900.00	9,761.00	19,200.99	9,844.00	233.07	235.62	93.16	-1,041.83	9,773.47	1,539.65	1,071.87	467.78	3.291		
19,000.00	9,761.00	19,301.00	9,844.00	235.48	238.03	93.16	-1,041.06	9,873.47	1,539.86	1,067.27	472.60	3.258		
19,100.00	9,761.00	19,401.00	9,844.00	237.89	240.44	93.16	-1,040.30	9,973.47	1,540.08	1,062.66	477.41	3.226		
19,200.00	9,761.00	19,501.00	9,844.00	240.30	242.85	93.16	-1,039.54	10,073.46	1,540.29	1,058.06	482.23	3.194		
19,300.00	9,761.00	19,601.00	9,844.00	242.71	245.26	93.16	-1,038.78	10,173.46	1,540.50	1,053.45	487.05	3.163		
19,400.00	9,761.00	19,701.00	9,844.00	245.12	247.67	93.16	-1,038.02	10,273.46	1,540.71	1,048.84	491.87	3.132		
19,500.00	9,761.00	19,801.00	9,844.00	247.53	250.08	93.16	-1,037.25	10,373.45	1,540.92	1,044.23	496.69	3.102		
19,600.00	9,761.00	19,901.00	9,844.00	249.95	252.50	93.16	-1,036.49	10,473.45	1,541.13	1,039.62	501.51	3.073		
19,700.00	9,761.00	20,001.00	9,844.00	252.36	254.91	93.16	-1,035.73	10,573.45	1,541.34	1,035.01	506.33	3.044		
19,800.00	9,761.00	20,101.00	9,844.00	254.77	257.32	93.16	-1,034.97	10,673.44	1,541.55	1,030.40	511.15	3.016		
19,900.00	9,761.00	20,201.00	9,844.00	257.19	259.74	93.16	-1,034.21	10,773.44	1,541.77	1,025.79	515.98	2.988		
20,000.00	9,761.00	20,299.00	9,844.00	259.60	262.10	93.16	-1,033.45	10,873.44	1,541.98	1,021.22	520.75	2.961		
20,016.77	9,761.00	20,315.78	9,844.00	260.01	262.51	93.16	-1,033.32	10,890.21	1,542.01	1,020.45	521.56	2.957 SF		

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



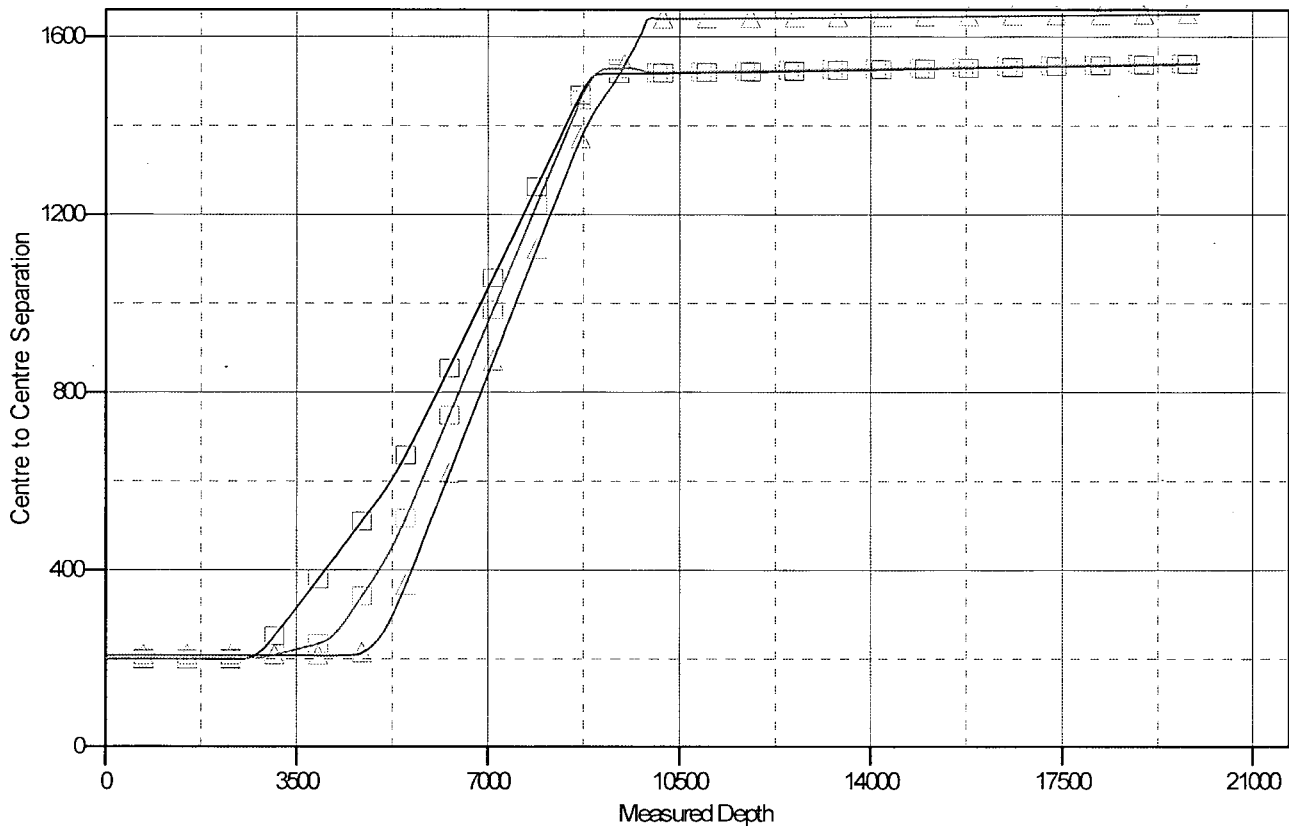
Anticollision Report

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 0504 133H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3041.2+25 @ 3066.20ft
Reference Site:	Section 06-T23S-R29E	MD Reference:	RKB=3041.2+25 @ 3066.20ft
Site Error:	0.00 ft Rana Salada Fed Com 0504 133H	North Reference:	Grid
Reference Well:	0.00 ft	Survey Calculation Method:	Minimum Curvature
Well Error:	Original Hole	Output errors are at	2.00 sigma
Reference Wellbore	rev0	Database:	DB_Aug0116_LT_v14
Reference Design:		Offset TVD Reference:	Offset Datum

Reference Depths are relative to RKB=3041.2+25 @ 3066.20ft
Offset Depths are relative to Offset Datum
Central Meridian is -104.33333334

Coordinates are relative to: Rana Salada Fed Com 0504 133H
Coordinate System is US State Plane 1983, New Mexico Eastern Zone
Grid Convergence at Surface is: 0.17°

Ladder Plot



LEGEND

—△— Rana Salada Fed Com 0504 234H, Original Hole, rev0 V0

—□— Rana Salada Fed Com 0504 134H, Original Hole, rev0 V0

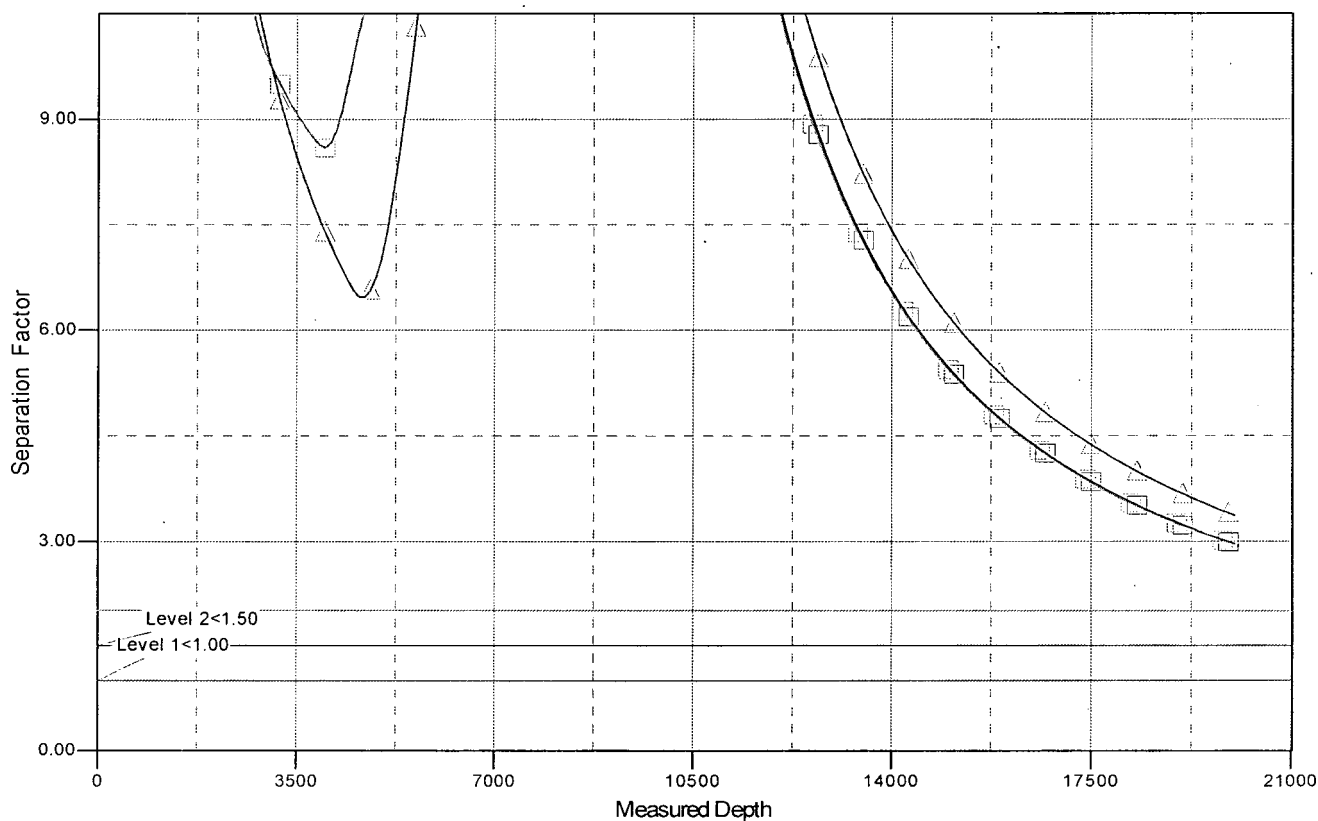
—◇— Rana Salada Fed Com 0504 214H, Original Hole, rev0 V0

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 0504 133H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3041.2+25 @ 3066.20ft
Reference Site:	Section 06-T23S-R29E	MD Reference:	RKB=3041.2+25 @ 3066.20ft
Site Error:	0.00 ft Rana Salada Fed Com 0504 133H	North Reference:	Grid.
Reference Well:	0.00 ft	Survey Calculation Method:	Minimum Curvature
Well Error:	Original Hole	Output errors are at	2.00 sigma
Reference Wellbore	rev0	Database:	DB_Aug0116_LT_v14
Reference Design:		Offset TVD Reference:	Offset Datum

Reference Depths are relative to RKB=3041.2+25 @ 3066.20ft
 Offset Depths are relative to Offset Datum
 Central Meridian is -104.33333334

Coordinates are relative to: Rana Salada Fed Com 0504 133H
 Coordinate System is US State Plane 1983, New Mexico Eastern Zone
 Grid Convergence at Surface is: 0.17°

Separation Factor Plot

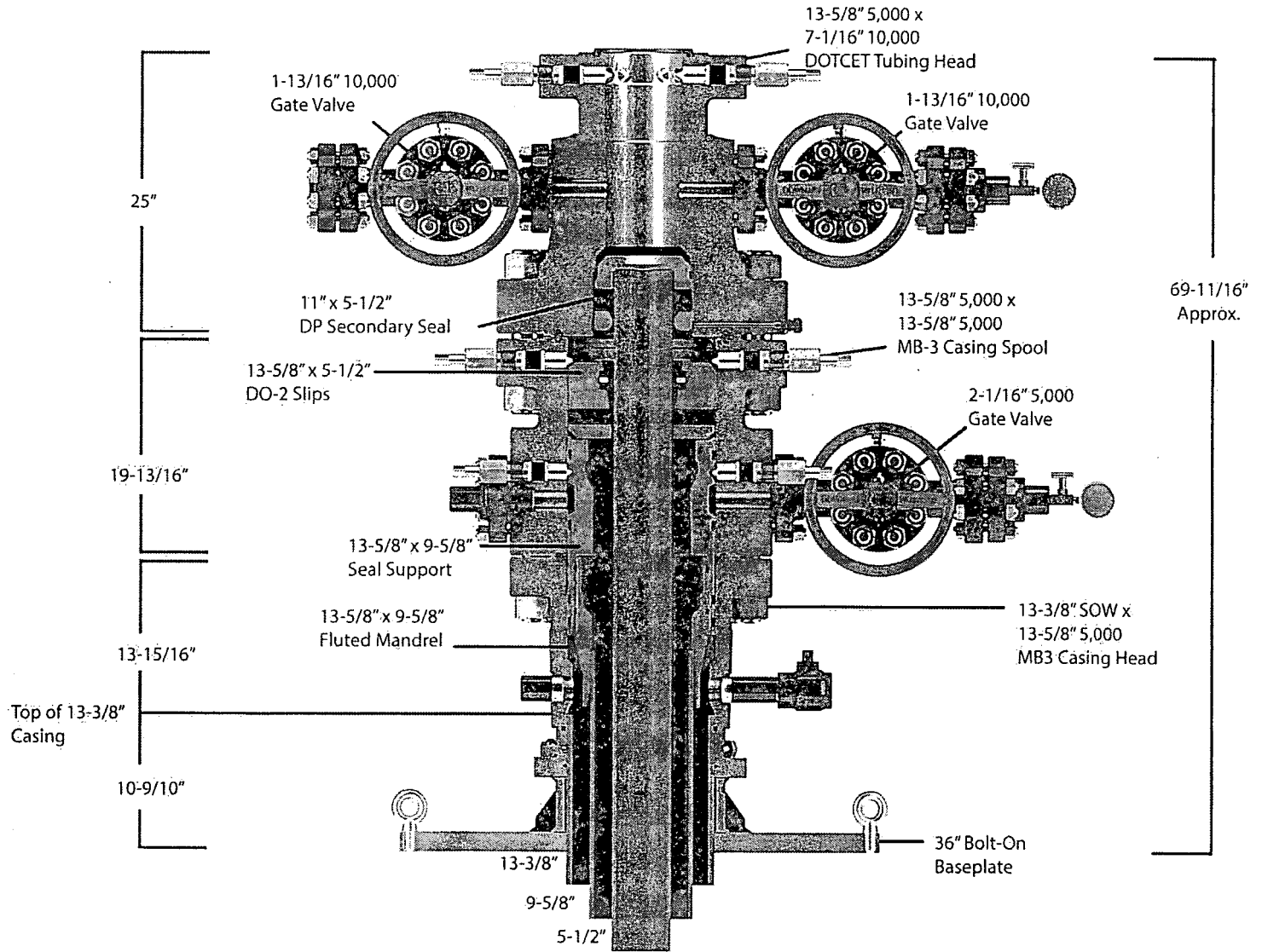


LEGEND

△ Rana Salada Fed Com 0504 234H, Original Hole, rev0 V0

□ Rana Salada Fed Com 0504 134H, Original Hole, rev0 V0

■ Rana Salada Fed Com 0504 214H, Original Hole, rev0 V0



Quotation

Downing Wellhead Equipment

Oklahoma City,
Oklahoma - USA

Reference Data:

NOVO

Proprietary and Confidential

The information contained in this drawing is the sole property of Downing Wellhead Equipment, any reproduction in part or in whole without the written permission of Downing Wellhead Equipment is prohibited.

TITLE:

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

DRAWN

CHECKED

APPROVED

SIZE

DWG. NO.

REV.

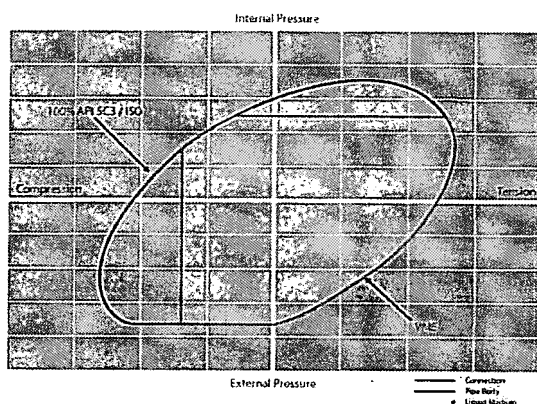
Scale:

Weight:

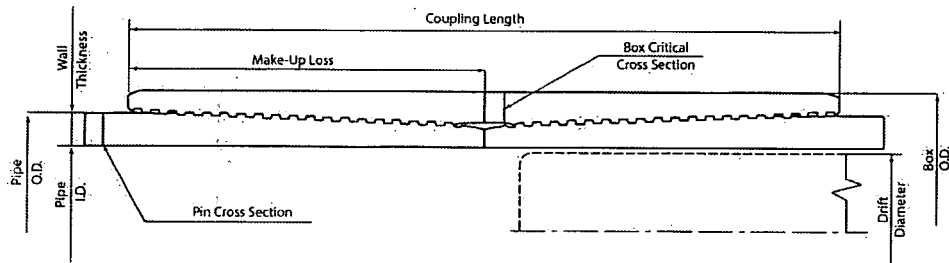
Sheet:

TECHNICAL DATA SHEET TMK UP DQX 5.5 X 20 P110

TUBULAR PARAMETERS		PIPE BODY PROPERTIES	
Nominal OD, (inch)	5.500	PE Weight, (lbs/ft)	19.81
Wall Thickness, (inch)	0.361	Nominal Weight, (lbs/ft)	20.00
Pipe Grade	P110	Nominal ID, (inch)	4.778
Coupling	Special	Drift Diameter, (inch)	4.653
Coupling Grade	P110	Nominal Pipe Body Area, (sq inch)	5.828
Drift	Standard	Yield Strength in Tension, (klbs)	641
		Min. Internal Yield Pressure, (psi)	12 640
		Collapse Pressure, (psi)	11 110
CONNECTION PARAMETERS			
Connection OD (inch)	NA		
Connection ID, (inch)	4.778		
Make-Up Loss, (inch)	4.122		
Connection Critical Area, (sq inch)	0.000		
Yield Strength in Tension, (klbs)	NA		
Yield Strength in Compression, (klbs)	641		
Tension Efficiency	NA		
Compression Efficiency	100%		
Min. Internal Yield Pressure, (psi)	12 640		
Collapse Pressure, (psi)	11 110		
Uniaxial Bending (deg/100ft)	91.7		
MAKE-UP TORQUES			
Yield Torque, (ft-lb)	16 480		
Minimum Make-Up Torque, (ft-lb)	9 280		
Optimum Make-Up Torque, (ft-lb)	10 320		
Maximum Make-Up Torque, (ft-lb)	11 280		



The diagram illustrates a stress analysis on a grid. A central oval shape is labeled 'Internal Pressure' and 'External Pressure'. A legend indicates 'Connection', 'Pipe Body', and 'Liquid Medium'. The grid is divided into sections labeled '100% API 5C3 / 150', 'Compression', and 'Tension'. The 'Internal Pressure' section is further divided into 'Internal Pressure' and 'External Pressure'.



NOTE: The content of this Technical Data Sheet is for general information only and does not guarantee performance or imply fitness for a particular purpose, which only a competent drilling professional can determine considering the specific installation and operation parameters. This information supersedes all prior versions for this connection. Information that is printed or downloaded is no longer controlled by TMK and might not be the latest information. Anyone using the information herein does so at their own risk. To verify that you have the latest technical information, please contact PAO TMK Technical Sales in Russia (Tel: +7 (495) 775-76-00, Email: techsales@tmk-group.com) and TMK IPSCO in North America (Tel: +1 (281) 949-1044, Email: techsales@tmk-ipsco.com).

Print date: 05/19/2018 01:22

GB Connection Performance Properties Sheet

Rev. 1 (08/25/2015)

ENGINEERING THE RIGHT CONNECTIONS™

Casing: 5.5 OD, 20 ppf
Casing Grade: P-110

Connection: GB CD Butt 6.300
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

5/17/2018 5:40:28 PM

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.

Legal Notice

USS - CDC® (Casing Drilling Connection) is a trademark of U. S. Steel Corporation. This product is a modified API Buttress threaded and coupled connection designed for drilling with casing applications. All material contained in this publication is for general information only. This material should not therefore be used or relied upon for any specific application without independent competent professional examination and verification of accuracy, suitability and applicability. Anyone making use of this material does so at their own risk and assumes any and all liability resulting from such use. U. S. Steel disclaims any and all expressed or implied warranties of fitness for any general or particular application.

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

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

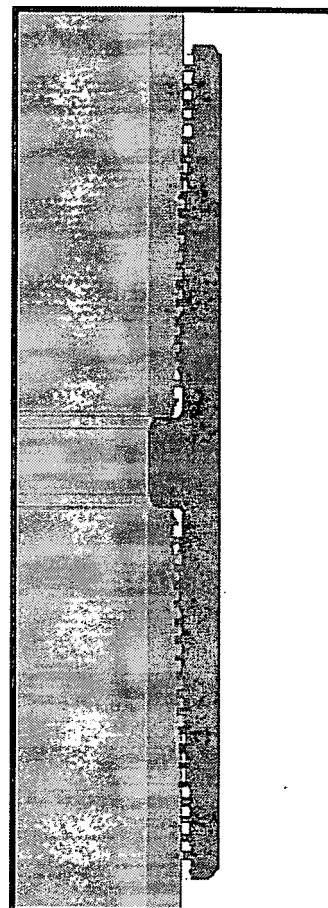
Technical Specifications

Connection Type: DWC/C-IS PLUS Casing standard	Size(O.D.): 5-1/2 in	Weight (Wall): 20.00 lb/ft (0.361 in)	Grade: VST P110 EC
---	--------------------------------	---	------------------------------

VST P110 EC	Material Grade 125,000 Minimum Yield Strength (psi) 135,000 Minimum Ultimate Strength (psi)
	Pipe Dimensions 5.500 Nominal Pipe Body O.D. (in) 4.778 Nominal Pipe Body I.D.(in) 0.361 Nominal Wall Thickness (in) 20.00 Nominal Weight (lbs/ft) 19.83 Plain End Weight (lbs/ft) 5.828 Nominal Pipe Body Area (sq in)
	Pipe Body Performance Properties 729,000 Minimum Pipe Body Yield Strength (lbs) 12,090 Minimum Collapse Pressure (psi) 14,360 Minimum Internal Yield Pressure (psi) 13,100 Hydrostatic Test Pressure (psi)
	Connection Dimensions 6.300 Connection O.D. (in) 4.778 Connection I.D. (in) 4.653 Connection Drift Diameter (in) 4.13 Make-up Loss (in) 5.828 Critical Area (sq in) 100.0 Joint Efficiency (%)
	Connection Performance Properties 729,000 Joint Strength (lbs) 26,040 Reference String Length (ft) 1.4 Design Factor 728,000 API Joint Strength (lbs) 729,000 Compression Rating (lbs) 12,090 API Collapse Pressure Rating (psi) 14,360 API Internal Pressure Resistance (psi) 104.2 Maximum Uniaxial Bend Rating [degrees/100 ft]
	Approximated Field End Torque Values 16,600 Minimum Final Torque (ft-lbs) 19,100 Maximum Final Torque (ft-lbs) 21,600 Connection Yield Torque (ft-lbs)



VAM USA
4424 W. Sam Houston Pkwy. Suite 153
Houston, TX 77041
Phone: 713-479-3200
Fax: 713-479-3234
E-mail: VAMUSAsales@vam-usa.com



For detailed information on performance properties, refer to DWC Connection Data Notes on following page(s).

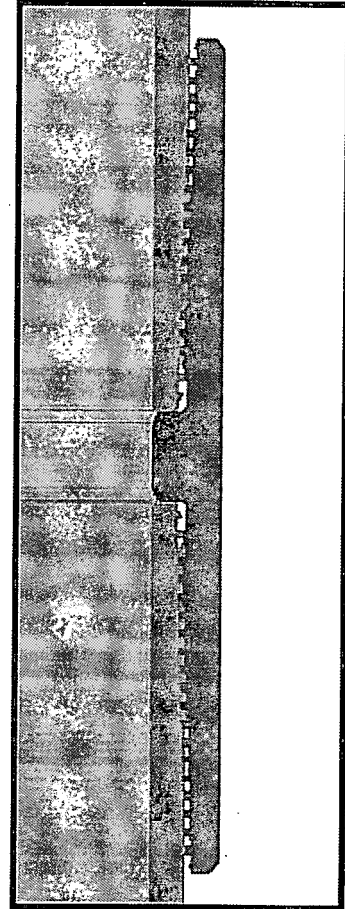
Connection specifications within the control of VAM USA were correct as of the date printed. Specifications are subject to change without notice. Certain connection specifications are dependent on the mechanical properties of the pipe. Mechanical properties of mill proprietary pipe grades were obtained from mill publications and are subject to change. Properties of mill proprietary grades should be confirmed with the mill. Users are advised to obtain current connection specifications and verify pipe mechanical properties for each application.

All information is provided by VAM USA or its affiliates at user's sole risk, without liability for loss, damage or injury resulting from the use thereof, and on an "AS IS" basis without warranty or representation of any kind, whether express or implied, including without limitation any warranty of merchantability, fitness for purpose or completeness. This document and its contents are subject to change without notice. In no event shall VAM USA or its affiliates be responsible for any indirect, special, incidental, punitive, exemplary or consequential loss or damage (including without limitation, loss of use, loss of bargain, loss of revenue, profit or anticipated profit) however caused or arising, and whether such losses or damages were foreseeable or VAM USA or its affiliates was advised of the possibility of such damages.



DWC Connection Data Notes:

1. DWC connections are available with a seal ring (SR) option.
2. All standard DWC/C connections are interchangeable for a give pipe OD. DWC connections are interchangeable with DWC/C-SR connections of the same OD and wall.
3. Connection performance properties are based on nominal pipe body and connection dimensions.
4. DWC connection internal and external pressure resistance is calculated using the API rating for buttress connections. API Internal pressure resistance is calculated from formulas 31, 32, and 35 in the API Bulletin 5C3.
5. DWC joint strength is the minimum pipe body yield strength multiplied by the connection critical area.
6. API joint strength is for reference only. It is calculated from formulas 42 and 43 in the API Bulletin 5C3.
7. Bending efficiency is equal to the compression efficiency.
8. The torque values listed are recommended. The actual torque required may be affected by field conditions such as temperature, thread compound, speed of make-up, weather conditions, etc.
9. Connection yield torque is not to be exceeded.
10. Reference string length is calculated by dividing the joint strength by both the nominal weight in air and a design factor (DF) of 1.4. These values are offered for reference only and do not include load factors such as bending, buoyancy, temperature, load dynamics, etc.
11. DWC connections will accommodate API standard drift diameters.



Connection specifications within the control of VAM USA were correct as of the date printed. Specifications are subject to change without notice. Certain connection specifications are dependent on the mechanical properties of the pipe. Mechanical properties of mill proprietary pipe grades were obtained from mill publications and are subject to change. Properties of mill proprietary grades should be confirmed with the mill. Users are advised to obtain current connection specifications and verify pipe mechanical properties for each application.

All information is provided by VAM USA or its affiliates at user's sole risk, without liability for loss, damage or injury resulting from the use thereof; and on an "AS IS" basis without warranty or representation of any kind, whether express or implied, including without limitation any warranty of merchantability, fitness for purpose or completeness. This document and its contents are subject to change without notice. In no event shall VAM USA or its affiliates be responsible for any indirect, special, incidental, punitive, exemplary or consequential loss or damage (including without limitation, loss of use, loss of bargain, loss of revenue, profit or anticipated profit) however caused or arising, and whether such losses or damages were foreseeable or VAM USA or its affiliates was advised of the possibility of such damages.

2/6/2015

Novo Oil & Gas Northern Delaware, LLC
Rana Salada Fed Com 0504 133H
SHL 1443' FSL & 612' FEL 6-23S-29E
BHL 1870' FSL & 330' FEL 4-23S-29e
Eddy County, NM

DRILL PLAN PAGE 1

Drilling Program

1. ESTIMATED TOPS

Formation Name	TVD	MD	Bearing
Quaternary	0'	0'	water
Rustler anhydrite	288'	288'	N/A
Salado salt	734'	734'	N/A
Castile anhydrite	1381'	1381'	N/A
Bell Canyon sandstone	2856'	2856'	hydrocarbons
Cherry Canyon sandstone	3947'	3947'	hydrocarbons
Brushy Canyon sandstone	5390'	5391'	hydrocarbons
Bone Spring limestone	6446'	6453'	hydrocarbons
1 st Bone Spring sandstone	7546'	7580'	hydrocarbons
2 nd Bone Spring carbonate	7836'	7876'	hydrocarbons
2nd Bone Spring sandstone	8289'	8335'	hydrocarbons
3 rd Bone Spring carbonate	8654'	8705'	hydrocarbons
(KOP	9284'	9336'	hydrocarbons)
3 rd Bone Spring sandstone	9511'	9573'	hydrocarbons
TD	9761'	20017'	hydrocarbons

2. NOTABLE ZONES

Third Bone Spring sand is the goal. All perforations will be $\geq 330'$ from the dedication perimeter. Closest water well (C 02804) is 3358' southeast. Depth to water was not reported in this 100' 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

Novo Oil & Gas Northern Delaware, LLC
Rana Salada Fed Com 0504 133H
SHL 1443' FSL & 612' FEL 6-23S-29E
BHL 1870' FSL & 330' FEL 4-23S-29e
Eddy County, NM

DRILL PLAN PAGE 2

between the BOP system and choke manifold. A co-flex pressure test certificate will be on the location when testing the BOP.

Surface casing will be pressure tested to 250-psi low and 1500-psi high. Intermediate casing will be pressure tested to 250-psi low and 70% of burst pressure (4025 psi) for 30 minutes.

4. CASING & CEMENT

Variance is requested for the 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

Hole O. D.	Set MD	Set TVD	Casing OD	Weight (lb/ft)	Grade	Joint	Collapse	Burst	Tension
17.5"	0' - 225'	0' - 225'	13.375" surface	54.5	J-55	BTC	1.125	1.125	1.60
12.25"	0' - 2970'	0' - 2970'	9.625" intermed.	40	J-55	BTC	1.125	1.125	1.60
8.75"	0' - 20017'	0' - 9761'	5.5" product.	20	P-110	DQX, GBCD, CDC, DWC/C	1.125	1.125	1.60

Name	Type	Sacks	Yield	Cu. Ft.	Weight	Blend
Surface	Tail	193	1.62	312	13.8	Class C + gel + accelerator + LCM
TOC = GL		100% Excess			Centralizers on every jt to GL	
Intermediate	Lead	372	2.28	848	11.9	Class C + gel + accelerator + 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	Lead	692	4.08	2822	9.2	Class H + fluid loss + retarder + LCM + extender and beads
	Tail	2285	1.42	3245	13.2	Class H + fluid loss + retarder + LCM
TOC = GL		20% Excess			None planned	

Novo Oil & Gas Northern Delaware, LLC
Rana Salada Fed Com 0504 133H
SHL 1443' FSL & 612' FEL 6-23S-29E
BHL 1870' FSL & 330' FEL 4-23S-29e
Eddy County, NM

DRILL PLAN PAGE 3

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' - 500'	8.3	30 - 60	NC
brine or cut brine	500' - 5200'	9.8 - 10.2	35 - 45	NC
OBM	5200' - 20017'	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 $\approx 3000'$ to TD.

GR will be log will be acquired by MDW tools from the intermediate casing to TD.

7. DOWN HOLE CONDITIONS

No abnormal pressure or temperature is expected. Maximum expected bottom hole pressure is ≈ 4851 psi. Expected bottom hole temperature is $\approx 150^\circ$ 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.

Casing/Cementing Variance

A variance is requested for the 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.



APD ID: 10400032591

Submission Date: 07/30/2018

Highlighted data
reflects the most
recent changes

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0504

Well Number: 133H

[Show Final Text](#)

Well Type: CONVENTIONAL GAS WELL

Well Work Type: Drill

Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

RS_133H_Road_Map_Revised_4_5_19_20190408085608.pdf

Existing Road Purpose: ACCESS

Row(s) Exist? NO

ROW ID(s)

ID:

Do the existing roads need to be improved? NO

Existing Road Improvement Description:

Existing Road Improvement Attachment:

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? YES

New Road Map:

RS_133H_New_Road_Map_Revised_4_5_19_20190408085712.pdf

New road type: LOCAL

Length: 5590.5 Feet

Width (ft.): 30

Max slope (%): 0

Max grade (%): 5

Army Corp of Engineers (ACOE) permit required? NO

ACOE Permit Number(s):

New road travel width: 24

New road access erosion control: Crowned and ditched

New road access plan or profile prepared? NO

New road access plan attachment:

Access road engineering design? NO

Access road engineering design attachment:

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0504

Well Number: 133H

Access surfacing type: OTHER

Access topsoil source: ONSITE

Access surfacing type description: Caliche

Access onsite topsoil source depth: 6

Offsite topsoil source description:

Onsite topsoil removal process: Grader

Access other construction information: Two 36" OD x 40' culverts will be installed in the center of the NW4 Section 6. A two-lane (>20') cattle guard will be installed NE of the gate on NM 31. Cattle guard will be installed NW of the fence and >75' from the pavement. Permanent caution signs will be installed along NM 31. Four vehicle turn outs will be installed on the new road that leads SE from the Longview well. Each turnout will be 100' long with 50' transitional tapers at each end. Upgrading will consist of filling potholes with caliche as needed.

Access miscellaneous information:

Number of access turnouts: 4

Access turnout map:

Drainage Control

New road drainage crossing: CULVERT, OTHER

Drainage Control comments: Crowned and ditched

Road Drainage Control Structures (DCS) description: Cattle guard

Road Drainage Control Structures (DCS) attachment:

Access Additional Attachments

Additional Attachment(s):

Section 3 - Location of Existing Wells

Existing Wells Map? YES

Attach Well map:

RS_133H_Well_Map_20180730162841.pdf

Existing Wells description:

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

Submit or defer a Proposed Production Facilities plan? SUBMIT

Production Facilities description: Flare and/or CBU will be set on the northwest corner of the pad. Tank battery will be on the west side of the pad. Process equipment (e. g., separators, heater-treaters) will be south of the battery. No power line is planned at this time. Novo is not planning any off-pad pipelines at this time. Lucid may run a gas line to the pad, but this has not been finalized.

Production Facilities map:

RS_133H_Production_Facilities_20180730162852.pdf

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0504

Well Number: 133H

Section 5 - Location and Types of Water Supply

Water Source Table

Water source use type: DUST CONTROL,
INTERMEDIATE/PRODUCTION CASING, STIMULATION, SURFACE
CASING

Water source type: GW WELL

Describe type:

Source longitude:

Source latitude:

Source datum:

Water source permit type: PRIVATE CONTRACT

Source land ownership: PRIVATE

Water source transport method: TRUCKING

Source transportation land ownership: PRIVATE

Water source volume (barrels): 21000

Source volume (acre-feet): 2.706755

Source volume (gal): 882000

Water source and transportation map:

RS_133H_Water_Source_Map_20180730162905.pdf

Water source comments: Water will be trucked from an existing water well (C 03607) on private (Branson) land in NENE 24-21s-27e.

New water well? NO

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:

Grout material:

Grout depth:

Casing length (ft.):

Casing top depth (ft.):

Well Production type:

Completion Method:

Water well additional information:

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0504

Well Number: 133H

State appropriation permit:

Additional information attachment:

Section 6 - Construction Materials

Construction Materials description: NM One Call (811) will be notified before construction starts. Top 6" of soil and brush will be stockpiled north of the well pad. V-door will face west. Closed loop mud system will be used. Caliche will be hauled from an existing caliche pit on private (McDonald) land in SESE 16-23s-28e.

Construction Materials source location attachment:

RS_133H_Construction_Methods_Revised_4_5_19_20190408085811.pdf

Section 7 - Methods for Handling Waste

Waste type: DRILLING

Waste content description: Drill cuttings, mud, salts, other chemicals, human waste; trash.

Amount of waste: 1000 barrels

Waste disposal frequency : Daily

Safe containment description: Drill cuttings, mud, salts, other chemical will be placed in steel tanks; human waste will be disposed of in chemical toilets; trash will be placed in portable trash cage.

Safe containmant attachment:

Waste disposal type: HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** PRIVATE

Disposal type description:

Disposal location description: Steel tanks to R360's state approved (NM-01-0006) disposal site at Halfway, NM; chemical toilets to Carlsbad wastewater treatment plant; trash cage to Lea County landfill.

Reserve Pit

Reserve Pit being used? NO

Temporary disposal of produced water into reserve pit?

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

Are you storing cuttings on location? YES

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0504

Well Number: 133H

Description of cuttings location Steel tanks on pad

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?: NO

Ancillary Facilities attachment:

Comments:

Section 9 - Well Site Layout

Well Site Layout Diagram:

RS_133H_Well_Site_Layout_20190219130409.pdf

Comments:

Section 10 - Plans for Surface Reclamation

Type of disturbance: New Surface Disturbance

Multiple Well Pad Name: RANA SALADA 0504

Multiple Well Pad Number: 3

Recontouring attachment:

RS_133H_Interim_Reclamation_Diagram_20180730163102.pdf

RS_133H_Recontour_Plat_Revised_4_5_19_20190408085835.pdf

Drainage/Erosion control construction: Crowned and ditched

Drainage/Erosion control reclamation: Harrowed on the contour

Well pad proposed disturbance
(acres): 5.74

Well pad interim reclamation (acres): 0.57

Well pad long term disturbance
(acres): 5.17

Road proposed disturbance (acres): 3.85

Road interim reclamation (acres): 0

Road long term disturbance (acres): 3.85

Powerline proposed disturbance
(acres): 0

Powerline interim reclamation (acres): 0

Powerline long term disturbance
(acres): 0

Pipeline proposed disturbance
(acres): 0

Pipeline interim reclamation (acres): 0

Pipeline long term disturbance
(acres): 0

Other proposed disturbance (acres): 0

Other interim reclamation (acres): 0

Other long term disturbance (acres): 0

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0504

Well Number: 133H

Total proposed disturbance: 9.59

Total interim reclamation: 0.57

Total long term disturbance: 9.02

Disturbance Comments:

Reconstruction method: A 50' x 500' (0.57 acre) swath on the east side of the pad will be interim reclaimed. A 450' x 500' (= 5.17 acres) working area will remain after interim reclamation. Once the last well is plugged, then the pad and new roads will be reclaimed within 6 months of plugging. Disturbed areas will be contoured to match pre-construction grades.

Topsoil redistribution: Soil and brush will be evenly spread over disturbed areas and harrowed on the contour. Disturbed areas will be seeded in accordance with BLM requirements. Roads will be blocked. Noxious weeds will be controlled.

Soil treatment: None

Existing Vegetation at the well pad:

Existing Vegetation at the well pad attachment:

Existing Vegetation Community at the road:

Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline:

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances:

Existing Vegetation Community at other disturbances attachment:

Non native seed used? NO

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? NO

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation? NO

Seed harvest description:

Seed harvest description attachment:

Seed Management

Seed Table

Seed type:

Seed source:

Seed name:

Source name:

Source address:

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0504

Well Number: 133H

Source phone:

Seed cultivar:

Seed use location:

PLS pounds per acre:

Proposed seeding season:

Seed Summary	
Seed Type	Pounds/Acre

Total 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? NO

Existing invasive species treatment description:

Existing invasive species treatment attachment:

Weed treatment plan description: To BLM standards

Weed treatment plan attachment:

Monitoring plan description: To BLM standards

Monitoring plan attachment:

Success standards: To BLM satisfaction

Pit closure description: No pit

Pit closure attachment:

Section 11 - Surface Ownership

Disturbance type: EXISTING ACCESS ROAD

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0504

Well Number: 133H

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:

Disturbance type: NEW ACCESS ROAD

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT

Other surface owner description:

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:

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0504

Well Number: 133H

Disturbance type: WELL PAD

Describe:

Surface Owner: BUREAU OF LAND MANAGEMENT

Other surface owner description:

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? NO

Use APD as ROW?

ROW Type(s):

ROW Applications

SUPO Additional Information: There will be access from the north and south. Length of road has not changed. Supplemental plats for south have been added. The 350' is a reference point, 1 of 4 surrounding the pad.

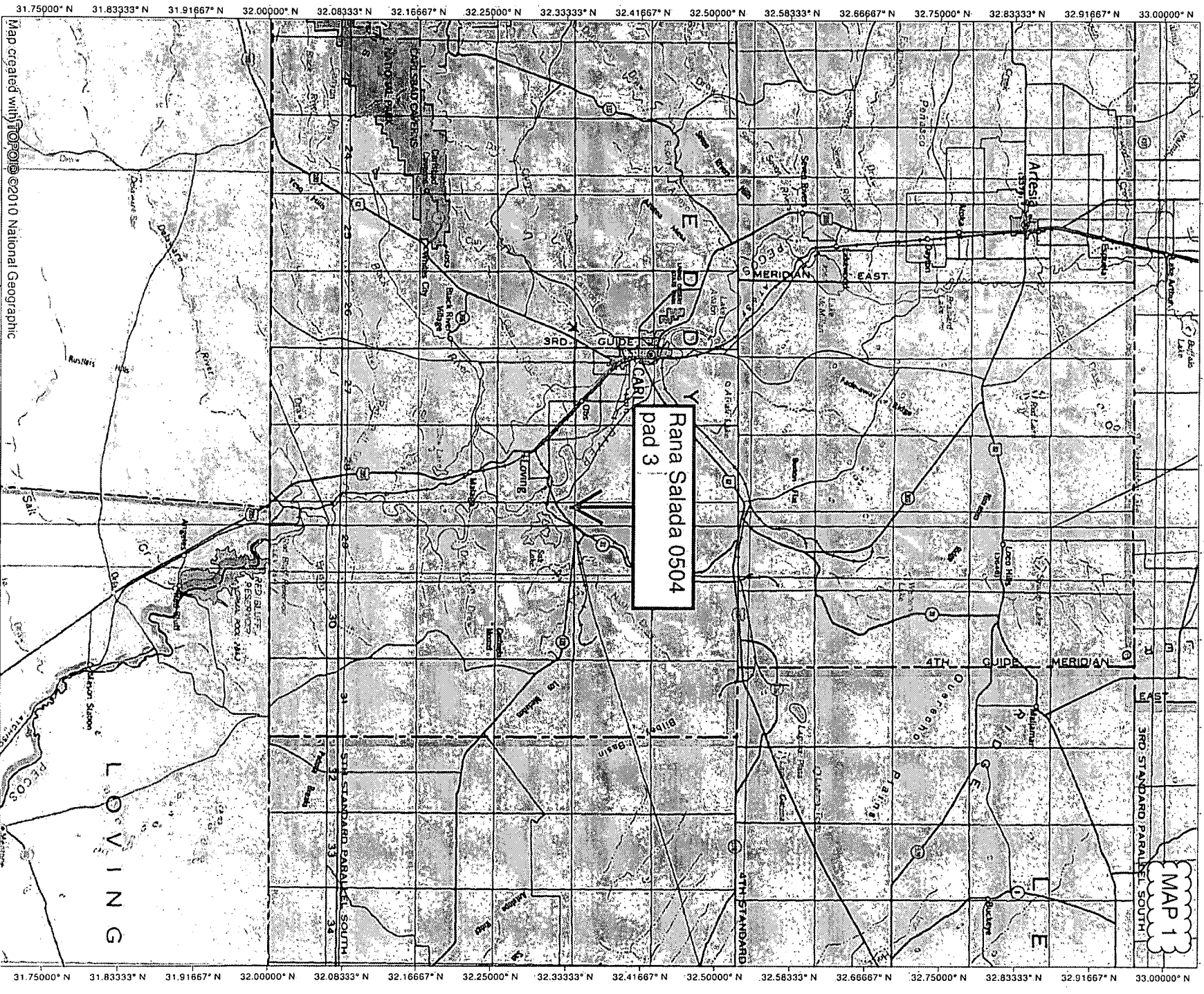
Use a previously conducted onsite? YES

Previous Onsite information: On-site inspection was held with Jim Rutley (both BLM). Lone Mountain Archaeological Services will inspect and report on the project.

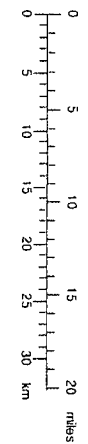
Other SUPO Attachment

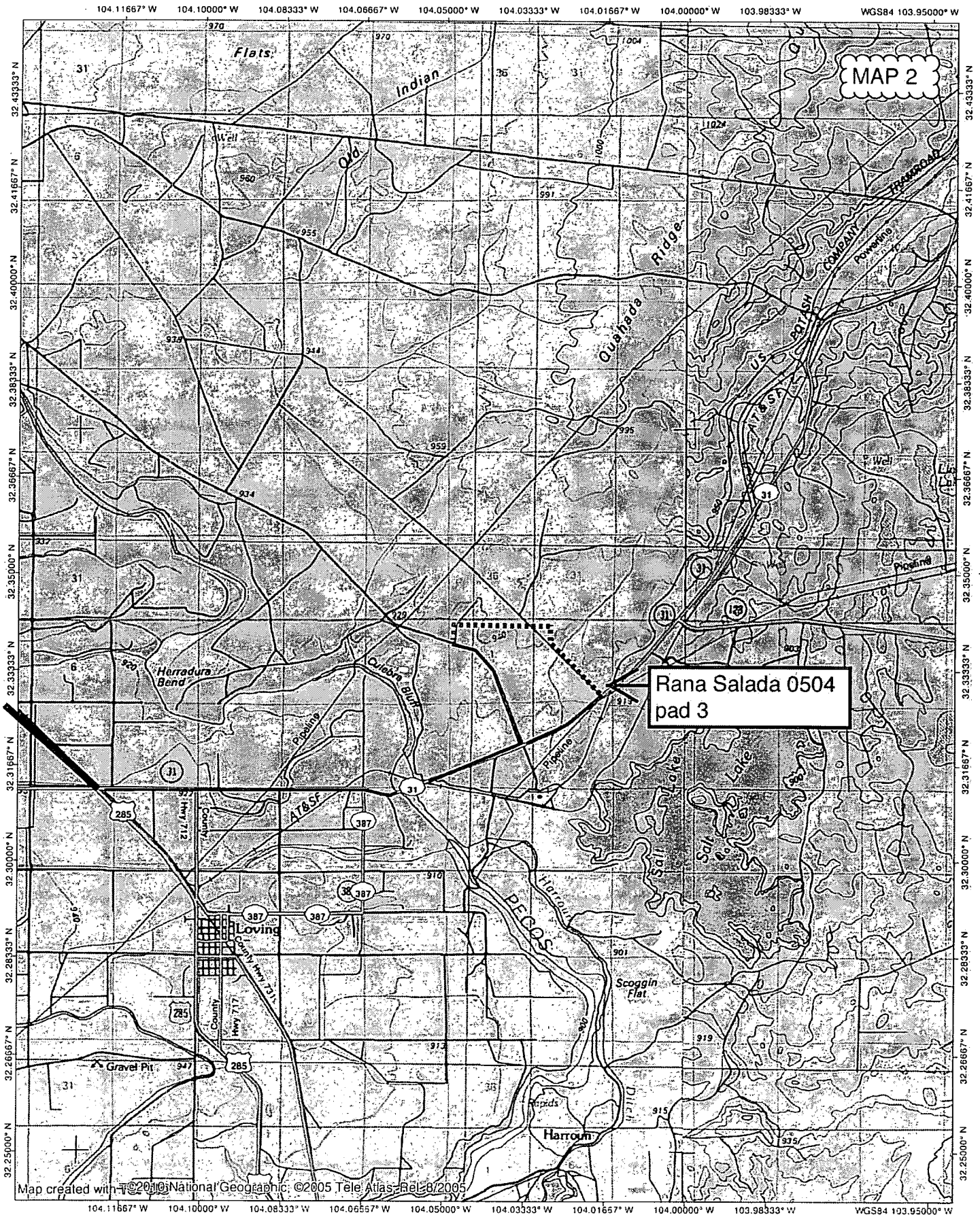
RS_133H_SUPO_Revised_4_5_19_20190408090001.pdf

104.55000° W 104.43333° W 104.31667° W 104.20000° W 104.08333° W 103.96667° W 103.85000° W 103.73333° W 103.61667° W WGS84 103.41667° W

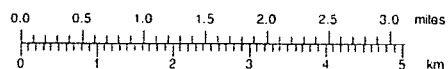


NATIONAL
GEOGRAPHIC

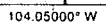




NATIONAL
GEOGRAPHIC



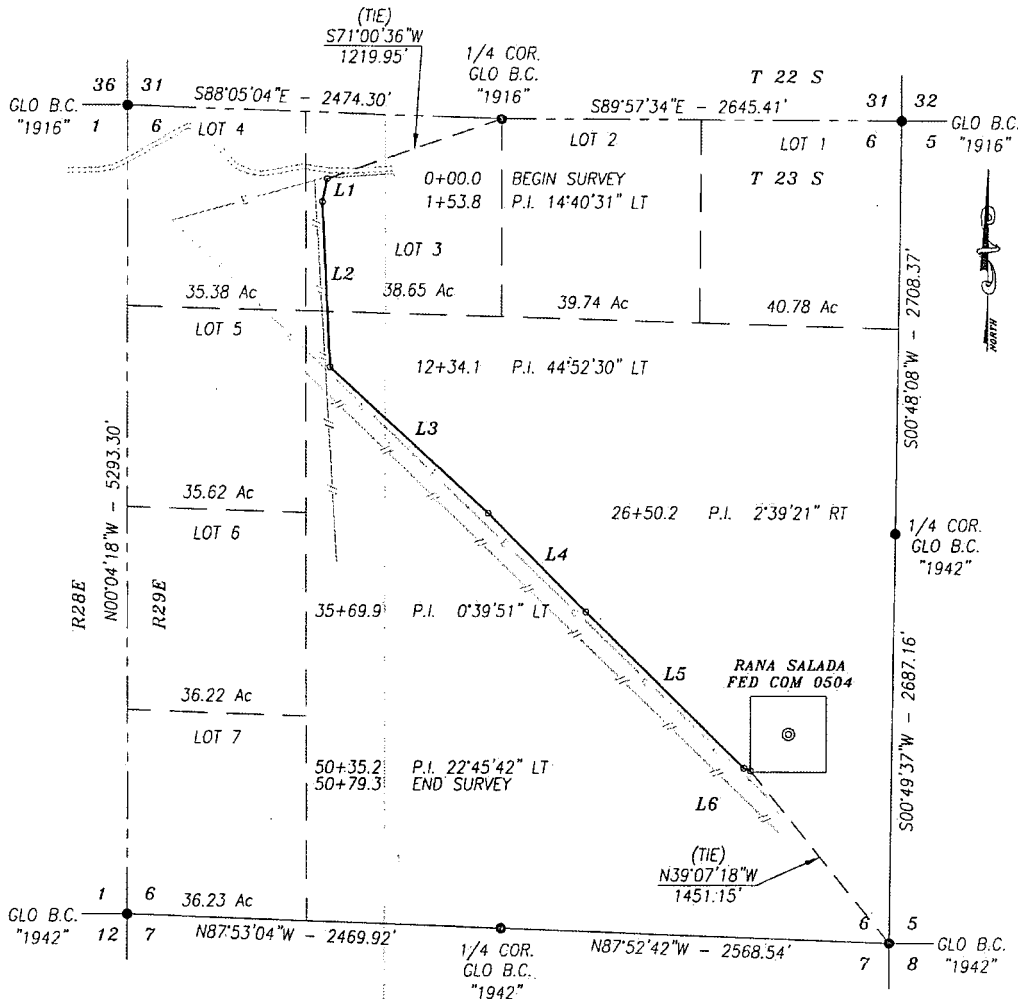
TN MN
7°
06/30/18



ACCESS ROAD PLAT NOVO OIL & GAS, LLC

MAP 4A

A PROPOSED ACCESS ROAD FROM AN EXISTING ROAD
TO THE RANA SALADA FEDERAL COM 0504 IN
SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.,
EDDY COUNTY,
NEW MEXICO.



DESCRIPTION

A STRIP OF LAND 30.0 FEET WIDE AND 5079.3 FEET OR 307.84 RODS OR 0.962 MILES IN LENGTH CROSSING USA LAND IN SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET LEFT AND 15.0 FEET RIGHT OF THE ABOVE PLATTED CENTERLINE SURVEY.

LINE	BEARING	DISTANCE
L1	S11°53'48"W	153.8'
L2	S02°46'43"E	1080.3'
L3	S47°39'13"E	1416.1'
L4	S44°59'51"E	919.7'
L5	S45°39'42"E	1465.3'
L6	S68°25'24"E	44.1'

BASIS OF BEARING:

BEARINGS SHOWN HEREON ARE MERCATOR GRID AND CONFORM TO THE NEW MEXICO COORDINATE SYSTEM "NEW MEXICO EAST ZONE" NORTH AMERICAN DATUM 1983. DISTANCES ARE SURFACE VALUES.

HARCROW SURVEYING, LLC

2314 W. MAIN ST, ARTESIA, N.M. 88210

PH: (575) 746-2158

c.harcrow@harcrowsurveying.com



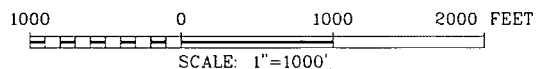
CERTIFICATION

I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.



Chad Harcrow
CHAD HARCROW N.M.P.S. NO. 17777

2/14/19
DATE



NOVO OIL & GAS, LLC

SURVEY OF A PROPOSED ACCESS ROAD LOCATED IN
SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST,
NMPM, EDDY COUNTY, NEW MEXICO

SURVEY DATE: JANUARY 2018

DRAFTING DATE: FEBRUARY 13, 2019

APPROVED BY: CH

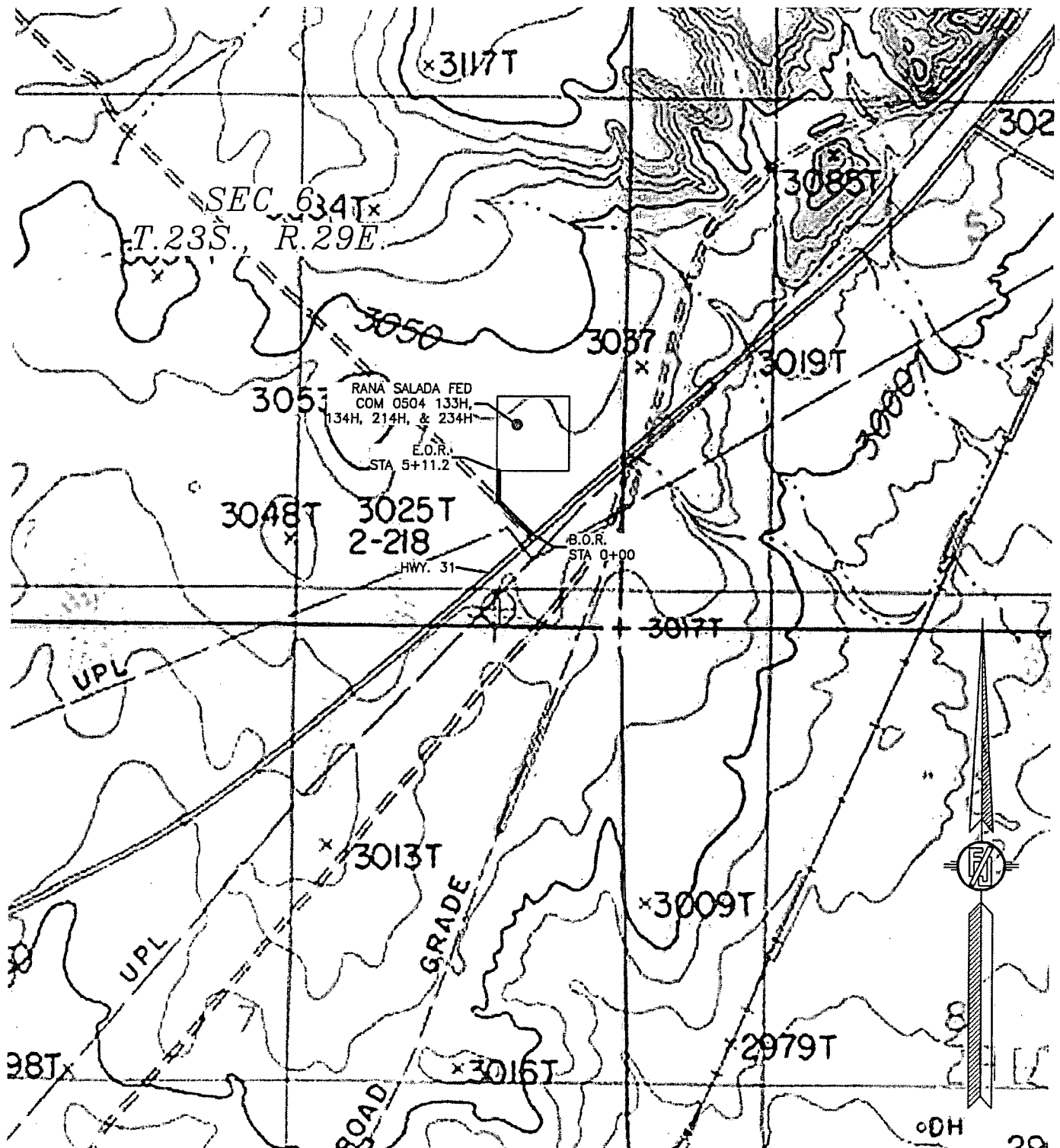
DRAWN BY: VD

PAGE 1 OF 1

FILE: 19-94

MAP 4B

NOVO OIL & GAS NORTHERN DELAWARE, LLC
CENTERLINE SURVEY OF AN ACCESS ROAD CROSSING
SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
APRIL 1, 2019



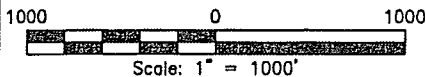
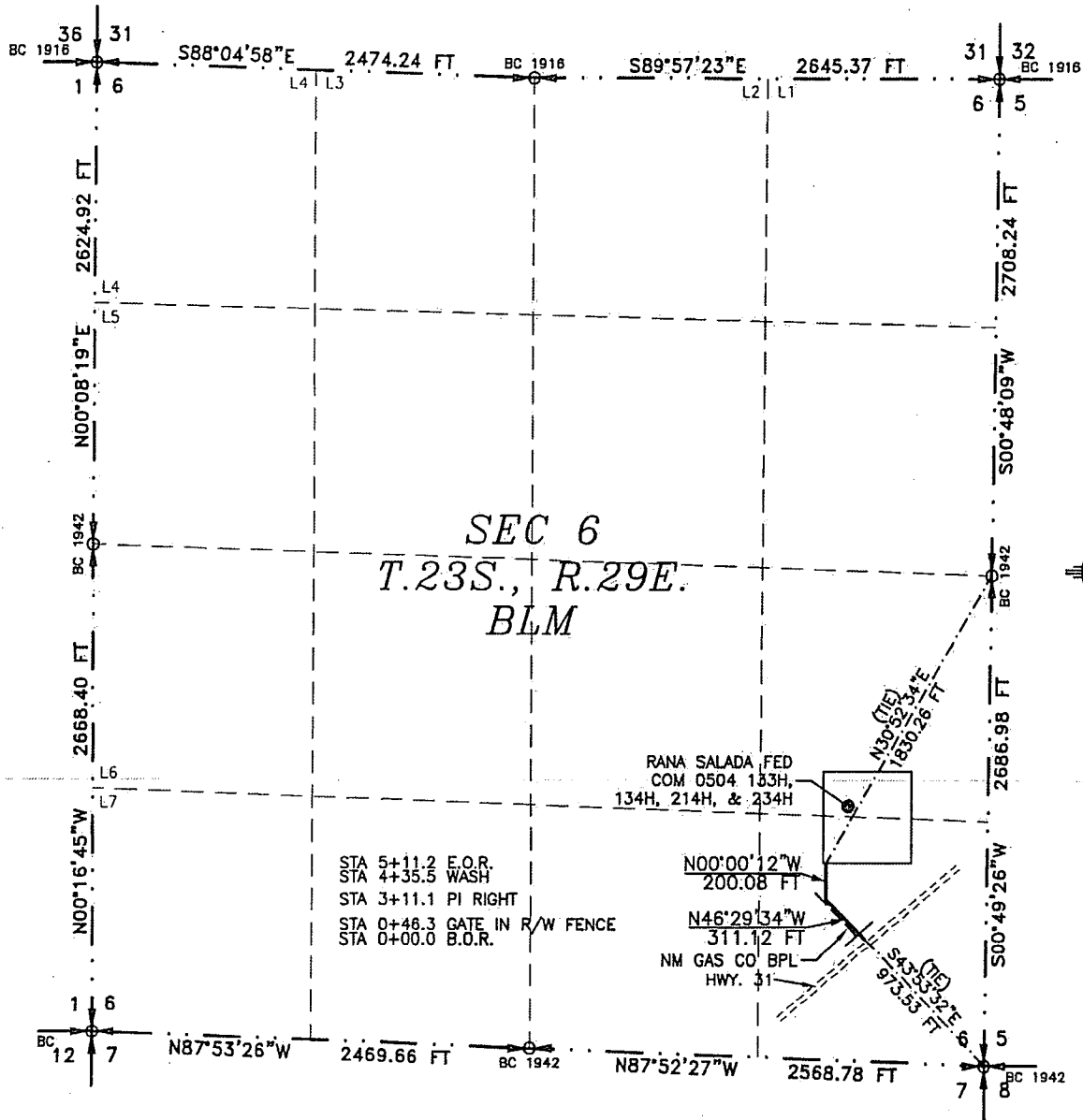
MADRON SURVEYING, INC. 301 SOUTH CANAL CARLSBAD, NEW MEXICO (575) 234-3341

ACCESS ROAD PLAT

ACCESS ROAD FOR RANA SALADA FED COM 0504 133H, 134H, 214H, & 234H

MAP 4C

NOVO OIL & GAS NORTHERN DELAWARE, LLC
CENTERLINE SURVEY OF AN ACCESS ROAD CROSSING
SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
APRIL 1, 2019



GENERAL NOTES

- 1.) THE INTENT OF THIS ROUTE SURVEY IS TO ACQUIRE AN EASEMENT.
- 2.) BASIS OF BEARING AND DISTANCE IS NMSP EAST (NAD83) MODIFIED TO SURFACE COORDINATES. NAD 83 (FEET) AND NAVD 88 (FEET) COORDINATE SYSTEMS USED IN THE SURVEY.

SURVEYOR CERTIFICATE

I, FILMON F. JARAMILLO, A NEW MEXICO PROFESSIONAL SURVEYOR NO. 12797, HEREBY CERTIFY THAT I HAVE CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR LAND SURVEYING IN THE STATE OF NEW MEXICO.

IN WITNESS WHEREOF THIS CERTIFICATE IS EXECUTED AT CARLSBAD,

NEW MEXICO, THIS 1 DAY OF APRIL 2019.

FILMON F. JARAMILLO, PLS. 12797

MADRON SURVEYING, INC.
301 SOUTH CANAL
CARLSBAD, NEW MEXICO 88220
Phone (575) 234-3341

SURVEY NO. 6939

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

ACCESS ROAD PLAT

ACCESS ROAD FOR RANA SALADA FED COM 0504 133H, 134H, 214H, & 234H

MAP 4D

NOVO OIL & GAS NORTHERN DELAWARE, LLC
CENTERLINE SURVEY OF AN ACCESS ROAD CROSSING
SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
APRIL 1, 2019

DESCRIPTION

A STRIP OF LAND 30 FEET WIDE CROSSING BUREAU OF LAND MANAGEMENT LAND IN SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M., EDDY COUNTY, STATE OF NEW MEXICO AND BEING 15 FEET EACH SIDE OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY:

BEGINNING AT A POINT WITHIN THE SE/4 SE/4 OF SAID SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M., WHENCE THE SOUTHEAST CORNER OF SAID SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M. BEARS S43°53'32"E, A DISTANCE OF 973.53 FEET;
THENCE N46°29'34"W A DISTANCE OF 311.12 FEET TO AN ANGLE POINT OF THE LINE HEREIN DESCRIBED;
THENCE N00°00'12"W A DISTANCE OF 200.08 FEET THE TERMINUS OF THIS CENTERLINE SURVEY, WHENCE THE EAST QUARTER CORNER OF SAID SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M. BEARS N30°52'34"E, A DISTANCE OF 1830.26 FEET;

SAID STRIP OF LAND BEING 511.20 FEET OR 30.98 RODS IN LENGTH, CONTAINING 0.352 ACRES MORE OR LESS AND BEING ALLOCATED BY FORTIES AS FOLLOWS:

SE/4 SE/4 511.20 L.F. 30.98 RODS 0.352 ACRES

SURVEYOR CERTIFICATE

I, FILIMON F. JARAMILLO, A NEW MEXICO PROFESSIONAL SURVEYOR NO. 12797, HEREBY CERTIFY THAT I HAVE CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR LAND SURVEYING IN THE STATE OF NEW MEXICO.

IN WITNESS WHEREOF, THIS CERTIFICATE IS EXECUTED AT CARLSBAD, NEW MEXICO, THIS 1 DAY OF APRIL 2019.

FILIMON F. JARAMILLO, PLSO 12797

MADRON SURVEYING, INC.
301 SOUTH CANAL
CARLSBAD, NEW MEXICO 88220
Phone (575) 234-3341

SURVEY NO. 6939

MADRON SURVEYING, INC. CARLSBAD, NEW MEXICO

GENERAL NOTES

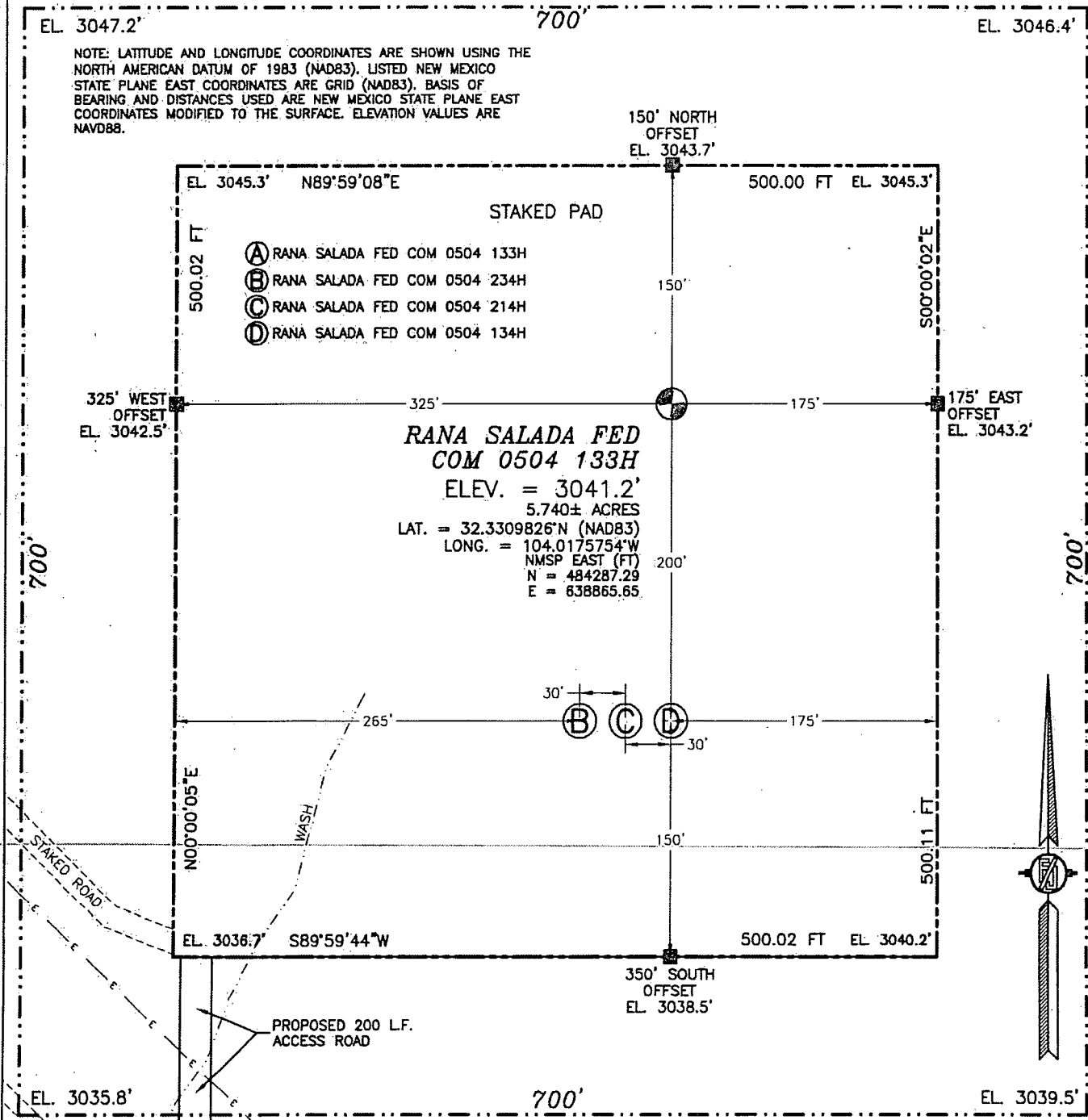
1.) THE INTENT OF THIS ROUTE SURVEY IS TO ACQUIRE AN EASEMENT.

2.) BASIS OF BEARING AND DISTANCE IS NMSP EAST (NAD83) MODIFIED TO SURFACE COORDINATES. NAD 83 (FEET) AND NAVD 88 (FEET) COORDINATE SYSTEMS USED IN THE SURVEY.

SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.
 EDDY COUNTY, STATE OF NEW MEXICO
 SITE MAP

MAP 5

NOTE: LATITUDE AND LONGITUDE COORDINATES ARE SHOWN USING THE NORTH AMERICAN DATUM OF 1983 (NAD83). LISTED NEW MEXICO STATE PLANE EAST COORDINATES ARE GRID (NAD83). BASIS OF BEARING AND DISTANCES USED ARE NEW MEXICO STATE PLANE EAST COORDINATES MODIFIED TO THE SURFACE. ELEVATION VALUES ARE NAVD88.



**RANA SALADA FED
 COM 0504 133H**
 ELEV. = 3041.2'
 5.740± ACRES
 LAT. = 32.3309826°N (NAD83)
 LONG. = 104.0175754°W
 NMSP EAST (FT)
 N = 484287.29
 E = 638865.65

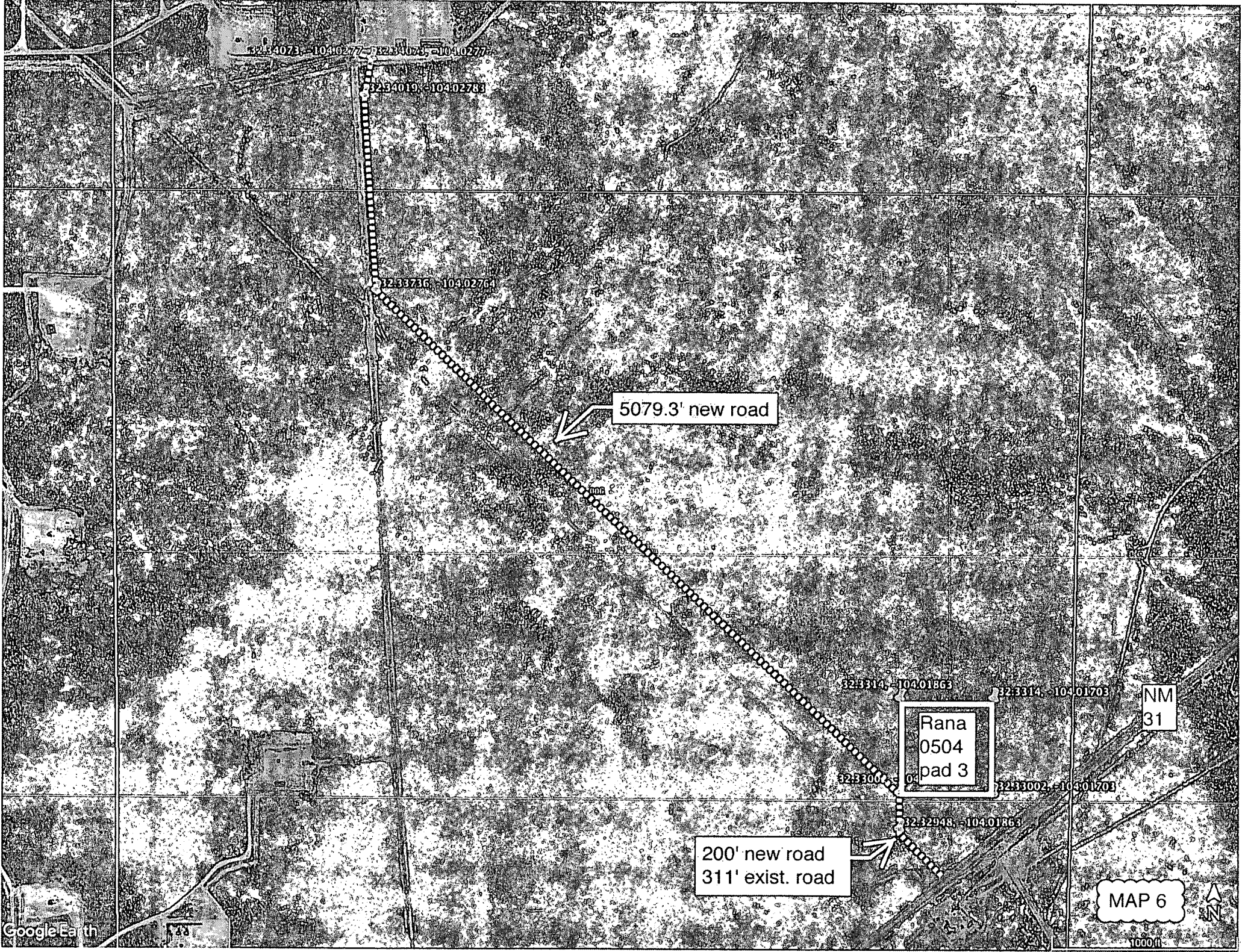
NOVO OIL & GAS NORTHERN DELAWARE, LLC
RANA SALADA FED COM 0504 133H
 LOCATED 1443 FT. FROM THE SOUTH LINE
 AND 612 FT. FROM THE EAST LINE OF
 SECTION 6, TOWNSHIP 23 SOUTH,
 RANGE 29 EAST, N.M.P.M.
 EDDY COUNTY, STATE OF NEW MEXICO

JUNE 26, 2018

SURVEY NO. 6156A

DIRECTIONS TO LOCATION
 FROM THE INTERSECTION OF CR. 605 (REFINERY
 ROAD) AND SR. 31 (POTASH MINES ROAD), GO
 NORTHEAST ON SR. 31 APPROX. 1.1 MILES, TURN
 LEFT ON PIPELINE ROAD AND GO NORTHWEST 311'
 THROUGH GATE TO A ROAD SURVEY, FOLLOW ROAD
 SURVEY NORTH 200' TO THE SOUTHWEST PAD
 CORNER FOR THIS LOCATION.

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



32.34073, -104.0277 32.34073, -104.0277

32.34019, -104.02763

32.33736, -104.02764

5079.3' new road

32.3314, -104.01863

32.3314, -104.01703

Rana
0504
pad 3

32.3300, -104.01863

32.33002, -104.01703

32.32948, -104.01863

200' new road
311' exist. road

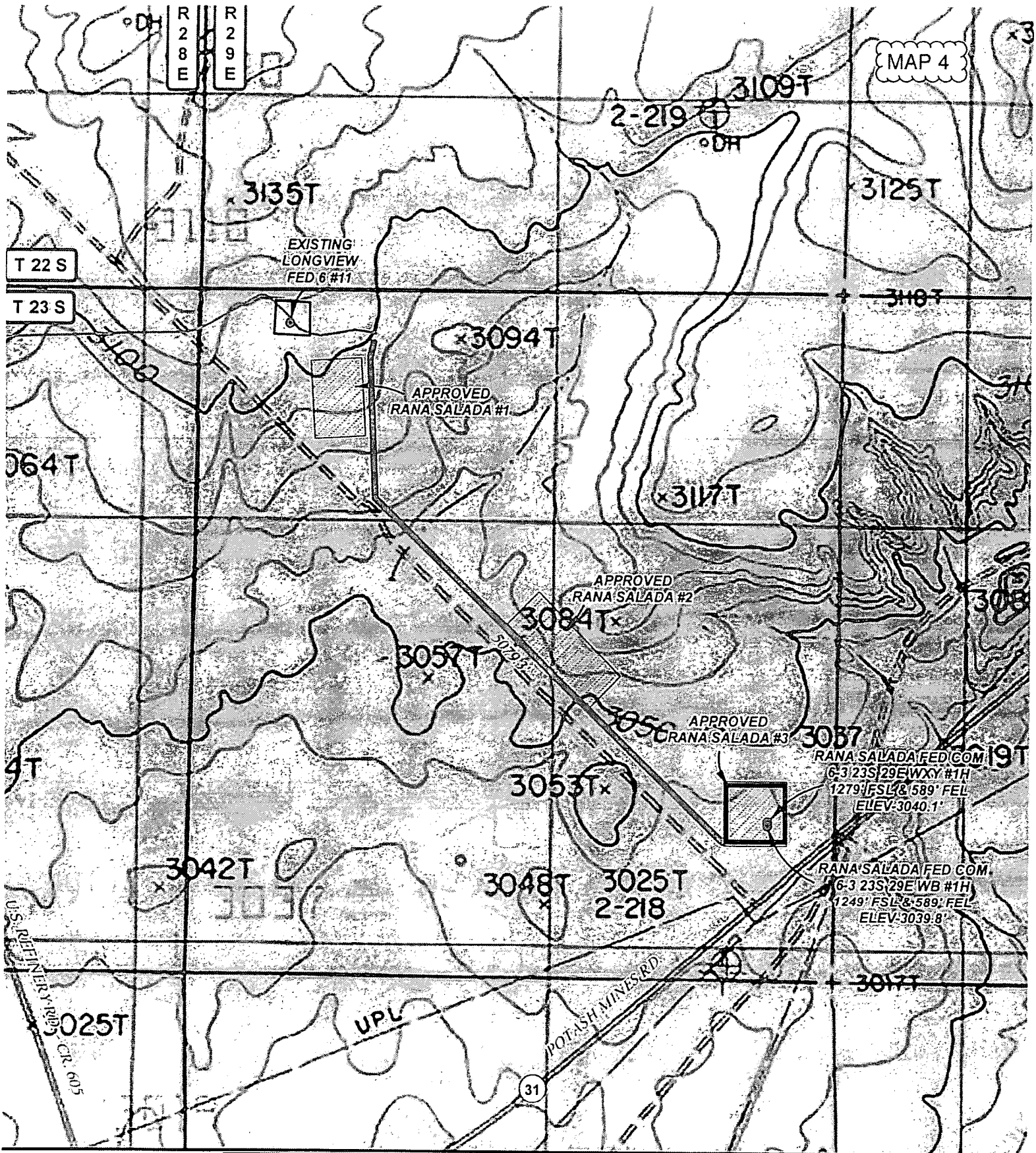
NM
31

MAP 6



1000 ft

Google Earth



LEGEND

-  WELL
-  WELLPAD
-  DRILL ISLAND
-  EXISTING ROAD
-  PROPOSED ROAD

RANA SALADA FED COM 6-3 23S 29E WXY/WB #1H		
SECTION: 6	TOWNSHIP: 23 S.	RANGE: 29 E.
STATE: NEW MEXICO	COUNTY: EDDY	SURVEY: N.M.P.M
W.O. # 18-4 & 18-5 LEASE: RANA SALADA FED COM 6-3 23S 29E WXY/WB		
02,500 FEET 0 0.05 0.1 0.2 Miles		
1 IN = 1,000 FT		
LOCATION/MAP	TOPO	1/12/2018 S.P.



NOVO
OIL & GAS NORTHERN
DELAWARE, LLC



HARCROW SURVEYING, LLC.
2314 W. MAIN ST, ARTESIA, NM 88210
PH: (575) 746-2158 FAX: (575) 746-2158
TEXAS FIRM NO. 10194089
c.harcrow@harcrowsurveying.com

MAP 4A

Survey Map Details:

- Tract:** RANA SALADA, FED COM 0504
- Area:** 120 Ac
- Survey Line:**
 - Start: BEGIN SURVEY, P.I. 14°40'31" LT
 - End: END SURVEY, P.I. 22°45'42" LT
 - Points: L1, L2, L3, L4, L5, L6
- Lot Areas:**
 - LOT 1: 40.78 Ac
 - LOT 2: 39.74 Ac
 - LOT 3: 38.65 Ac
 - LOT 4: 2474.30'
 - LOT 5: 35.38 Ac
 - LOT 6: 35.62 Ac
 - LOT 7: 36.22 Ac
- Boundary Bearings and Distances:**
 - Top: S88°05'04"E - 2474.30' (GLO B.C. "1916")
 - Right: S89°57'34"E - 2645.41' (GLO B.C. "1916")
 - Bottom Right: S00°48'08"W - 2708.37' (GLO B.C. "1942")
 - Bottom: N87°52'42"W - 2568.54' (GLO B.C. "1942")
 - Bottom Left: N87°53'04"W - 2469.92' (GLO B.C. "1942")
 - Left: N00°04'18"W - 5293.30' (GLO B.C. "1942")
- Other Features:**
 - 1/4 COR. GLO B.C. "1916"
 - 1/4 COR. GLO B.C. "1942"
 - North Arrow

LINE	BEARING	DISTANCE
L1	S11°53'48"W	153.8
L2	S02°46'43"E	1080.3
L3	S47°39'13"E	1416.1
L4	S44°59'51"E	919.7
L5	S45°39'42"E	1465.3
L6	S68°25'24"E	44.1

1000 0 1000 2000 FEET

SCALE: 1"=1000'



Chad Harrow

CHAD HARCROW N.M.P.S. NO. 17777

2/14/19
DATE

SURVEY OF A PROPOSED ACCESS ROAD LOCATED IN
SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST,
NMPM, EDDY COUNTY, NEW MEXICO

SURVEY DATE: JANUARY 2018

DRAFTING DATE: FEBUARY 13, 2019

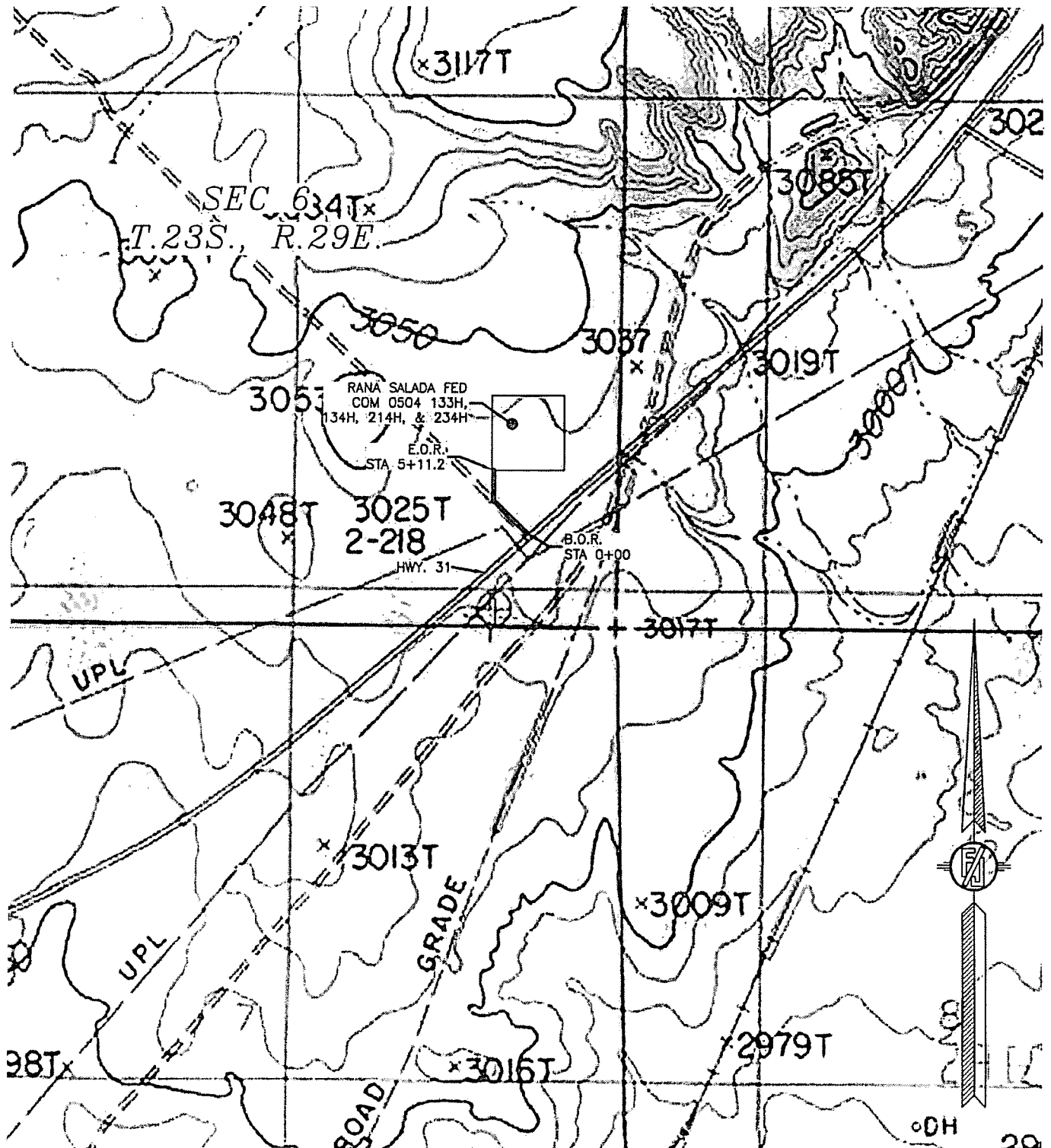
PAGE 1 OF 1

APPROVED BY: CH | DRAWN BY: VD

FILE: 19-94

MAP 4B

NOVO OIL & GAS NORTHERN DELAWARE, LLC
CENTERLINE SURVEY OF AN ACCESS ROAD CROSSING
SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
APRIL 1, 2019



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

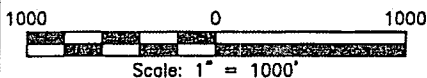
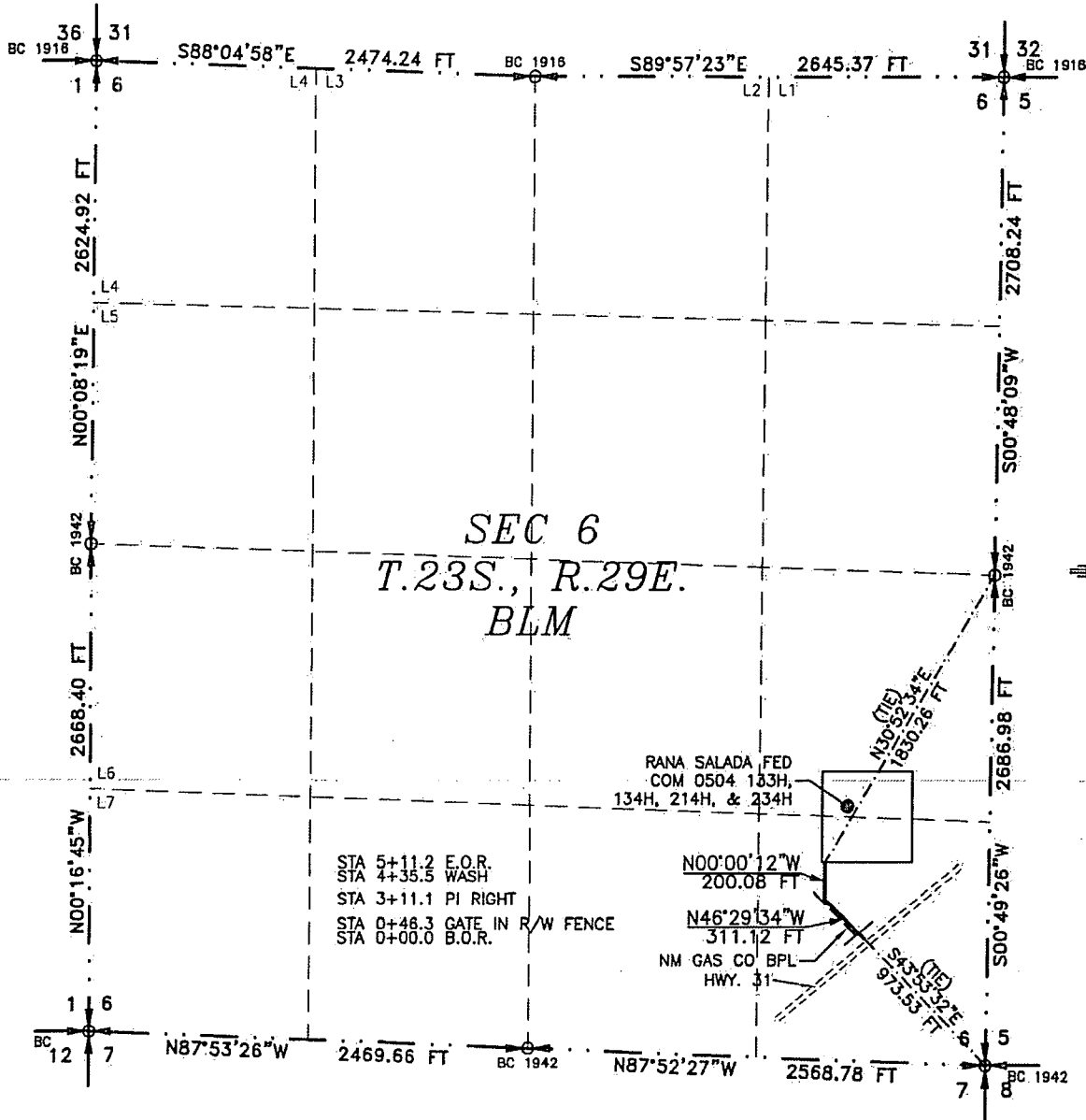
SURVEY NO. 6939

ACCESS ROAD PLAT

ACCESS ROAD FOR RANA SALADA FED COM 0504 133H, 134H, 214H, & 234H

MAP 4C

NOVO OIL & GAS NORTHERN DELAWARE, LLC
CENTERLINE SURVEY OF AN ACCESS ROAD CROSSING
SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
APRIL 1, 2019



GENERAL NOTES

- 1.) THE INTENT OF THIS ROUTE SURVEY IS TO ACQUIRE AN EASEMENT.
- 2.) BASIS OF BEARING AND DISTANCE IS NMSP EAST (NAD83) MODIFIED TO SURFACE COORDINATES. NAD 83 (FEET) AND NAVD 88 (FEET) COORDINATE SYSTEMS USED IN THE SURVEY.

SURVEYOR CERTIFICATE

I, FILMON F. JARAMILLO, A NEW MEXICO PROFESSIONAL SURVEYOR NO. 12797, HEREBY CERTIFY THAT I HAVE CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR LAND SURVEYING IN THE STATE OF NEW MEXICO.

IN WITNESS WHEREOF, THIS CERTIFICATE IS EXECUTED AT CARLSBAD, NEW MEXICO, THIS 1ST DAY OF APRIL 2019.

FILMON F. JARAMILLO, PLS. 12797
NEW MEXICO PROFESSIONAL SURVEYOR

MADRON SURVEYING, INC.
301 SOUTH CANAL
CARLSBAD, NEW MEXICO 88220
Phone (575) 234-3341

SURVEY NO. 6939

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

ACCESS ROAD PLAT

ACCESS ROAD FOR RANA SALADA FED COM 0504 133H, 134H, 214H, & 234H

MAP 4D

NOVO OIL & GAS NORTHERN DELAWARE, LLC
CENTERLINE SURVEY OF AN ACCESS ROAD CROSSING
SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
APRIL 1, 2019

DESCRIPTION

A STRIP OF LAND 30 FEET WIDE CROSSING BUREAU OF LAND MANAGEMENT LAND IN SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M., EDDY COUNTY, STATE OF NEW MEXICO AND BEING 15 FEET EACH SIDE OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY:

BEGINNING AT A POINT WITHIN THE SE/4 SE/4 OF SAID SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M., WHENCE THE SOUTHEAST CORNER OF SAID SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M. BEARS S43°53'32"E, A DISTANCE OF 973.53 FEET;
THENCE N46°29'34"W A DISTANCE OF 311.12 FEET TO AN ANGLE POINT OF THE LINE HEREIN DESCRIBED;
THENCE N00°00'12"W A DISTANCE OF 200.08 FEET THE TERMINUS OF THIS CENTERLINE SURVEY, WHENCE THE EAST QUARTER CORNER OF SAID SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M. BEARS N30°52'34"E, A DISTANCE OF 1830.26 FEET;

SAID STRIP OF LAND BEING 511.20 FEET OR 30.98 RODS IN LENGTH, CONTAINING 0.352 ACRES MORE OR LESS AND BEING ALLOCATED BY FORTIES AS FOLLOWS:

SE/4 SE/4 511.20 L.F. 30.98 RODS 0.352 ACRES

GENERAL NOTES

1.) THE INTENT OF THIS ROUTE SURVEY IS TO ACQUIRE AN EASEMENT.

2.) BASIS OF BEARING AND DISTANCE IS NMSP EAST (NAD83) MODIFIED TO SURFACE COORDINATES. NAD 83 (FEET) AND NAVD 88 (FEET) COORDINATE SYSTEMS USED IN THE SURVEY.

SURVEYOR CERTIFICATE

I, FILMON F. JARAMILLO, A NEW MEXICO PROFESSIONAL SURVEYOR NO. 12797, HEREBY CERTIFY THAT I HAVE CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR LAND SURVEYING IN THE STATE OF NEW MEXICO.

IN WITNESS WHEREOF, THIS CERTIFICATE IS EXECUTED AT CARLSBAD, NEW MEXICO, THIS 1 DAY OF APRIL 2019

FILMON F. JARAMILLO, P.S. 12797

301 SOUTH CANAL
(575) 234-3341

MADRON SURVEYING, INC.
301 SOUTH CANAL
CARLSBAD, NEW MEXICO 88220
Phone (575) 234-3341

SURVEY NO. 6939

MADRON SURVEYING, INC. CARLSBAD, NEW MEXICO

SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
SITE MAP

MAP 5

EL. 3047.2'

700'

EL. 3046.4'

NOTE: LATITUDE AND LONGITUDE COORDINATES ARE SHOWN USING THE NORTH AMERICAN DATUM OF 1983 (NAD83). LISTED NEW MEXICO STATE PLANE EAST COORDINATES ARE GRID (NAD83). BASIS OF BEARING AND DISTANCES USED ARE NEW MEXICO STATE PLANE EAST COORDINATES MODIFIED TO THE SURFACE. ELEVATION VALUES ARE NAVD88.

150' NORTH
OFFSET
EL. 3043.7'

EL. 3045.3' N89°59'08"E

500.00 FT EL. 3045.3'

STAKED PAD

500.02 FT

- (A) RANA SALADA FED COM 0504 133H
- (B) RANA SALADA FED COM 0504 234H
- (C) RANA SALADA FED COM 0504 214H
- (D) RANA SALADA FED COM 0504 134H

150'

500'00'02"E

325' WEST
OFFSET
EL. 3042.5'

325'

175'

175' EAST
OFFSET
EL. 3043.2'

**RANA SALADA FED
COM 0504 133H**

ELEV. = 3041.2'

5.740± ACRES

LAT. = 32.3309826°N (NAD83)

LONG. = 104.0175754°W

NMSP EAST (FT)

N = 484287.29

E = 638865.65

200'

30'

265'

175'

30'

N00°00'05"E

500.11 FT

EL. 3036.7' S89°59'44"W

500.02 FT EL. 3040.2'

350' SOUTH
OFFSET
EL. 3038.5'

PROPOSED 200 L.F.
ACCESS ROAD

EL. 3035.8'

700'

EL. 3039.5'

010 50 100 200

SCALE 1" = 100'

DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF CR. 605 (REFINERY ROAD) AND SR. 31 (POTASH MINES ROAD), GO NORTHEAST ON SR. 31 APPROX. 1.1 MILES, TURN LEFT ON PIPELINE ROAD AND GO NORTHWEST 311' THROUGH GATE TO A ROAD SURVEY, FOLLOW ROAD SURVEY NORTH 200' TO THE SOUTHWEST PAD CORNER FOR THIS LOCATION.

NOVO OIL & GAS NORTHERN DELAWARE, LLC
RANA SALADA FED COM 0504 133H
LOCATED 1443 FT. FROM THE SOUTH LINE
AND 612 FT. FROM THE EAST LINE OF
SECTION 6, TOWNSHIP 23 SOUTH,
RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

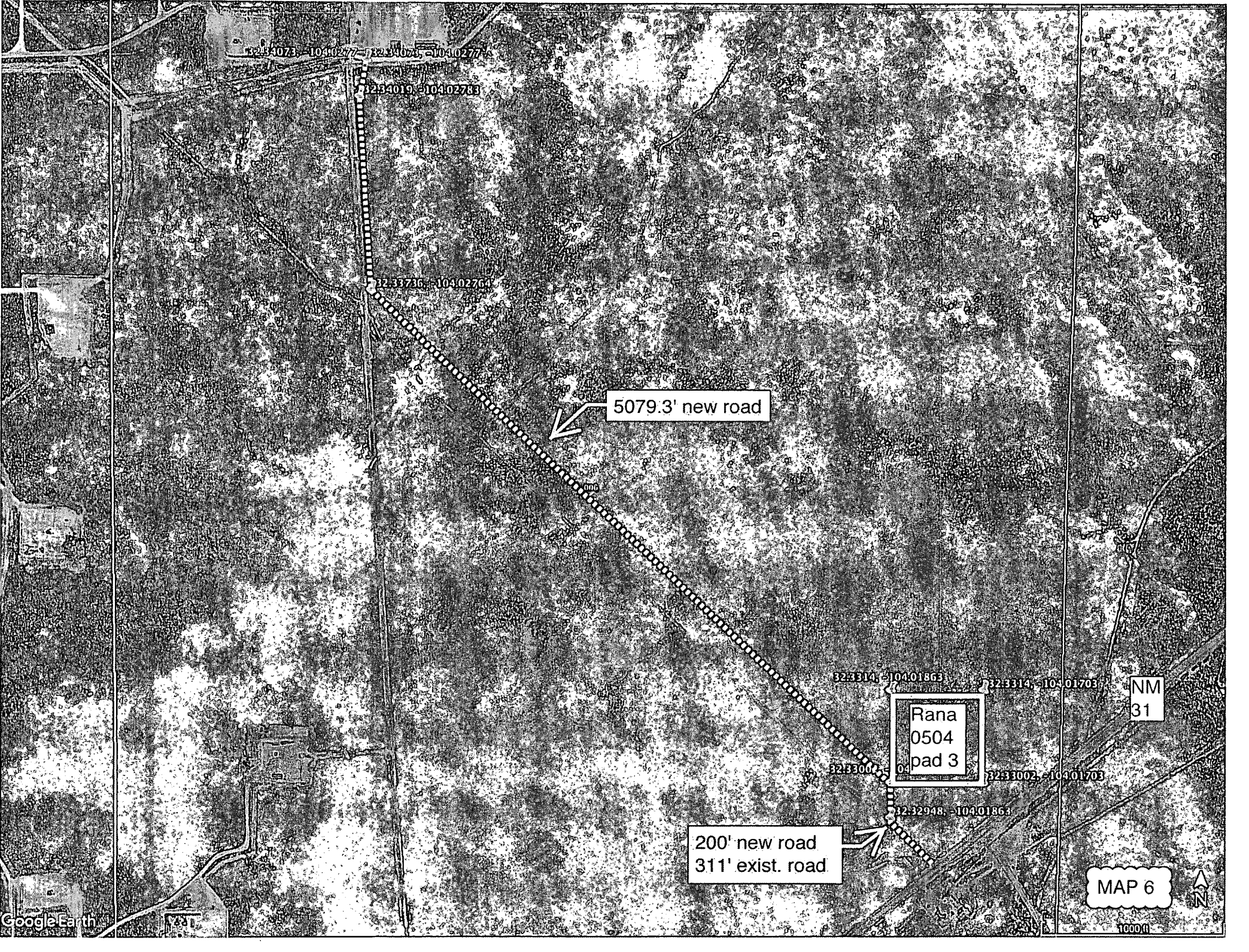
JUNE 26, 2018

SURVEY NO. 6156A

MADRON SURVEYING, INC.

301 SOUTH CANAL
(575) 234-3341

CARLSBAD, NEW MEXICO



3234073, -104.0277
3234019, -104.0273

3233736, -104.0276

5079.3' new road

323314, -104.01863
323314, -104.01703
323300, -104.01703
3232948, -104.01863

Rana
0504
pad 3

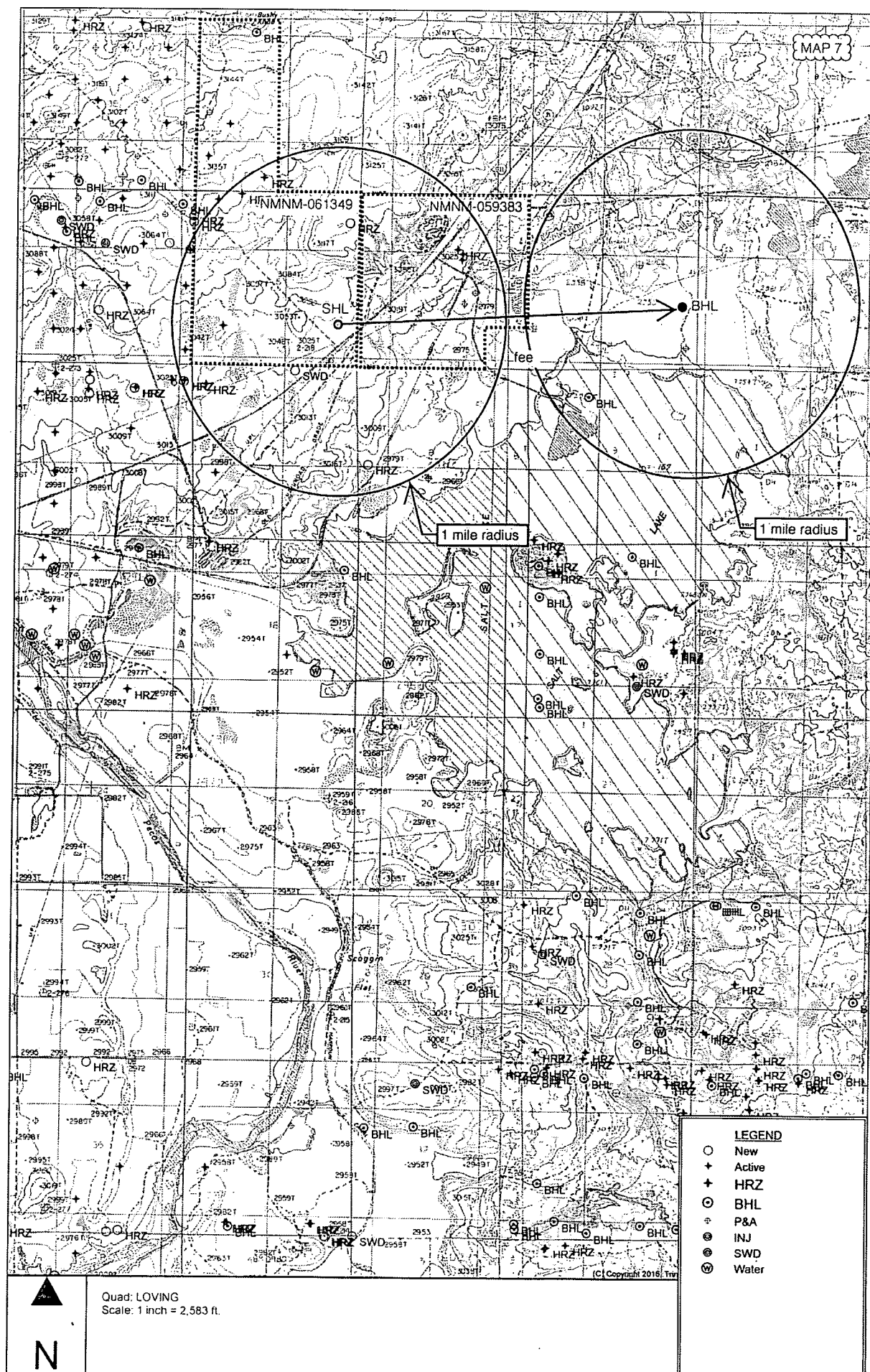
NM
31

200' new road
311' exist. road

MAP 6



1000 ft



SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
SITE MAP

MAP 8

EL. 3047.2'

700'

EL. 3046.4'

NOTE: LATITUDE AND LONGITUDE COORDINATES ARE SHOWN USING THE NORTH AMERICAN DATUM OF 1983 (NAD83). LISTED NEW MEXICO STATE PLANE EAST COORDINATES ARE GRID (NAD83). BASIS OF BEARING AND DISTANCES USED ARE NEW MEXICO STATE PLANE EAST COORDINATES MODIFIED TO THE SURFACE. ELEVATION VALUES ARE NAVD88.

150' NORTH
OFFSET
EL. 3043.7'

Flare
CBU

N89°59'08"E

STAKED PAD

500.00 FT EL. 3045.3'

500.02

- (A) RANA SALADA FED COM 0504 133H
- (B) RANA SALADA FED COM 0504 234H
- (C) RANA SALADA FED COM 0504 214H
- (D) RANA SALADA FED COM 0504 134H

150'

500'00'02"E

325' WEST
OFFSET
EL. 3042.5'

325'

175'

175' EAST
OFFSET
EL. 3043.2'

**RANA SALADA FED
COM 0504 133H**

ELEV. = 3041.2'

5.740± ACRES

LAT. = 32.3309826°N (NAD83)

LONG. = 104.0175754°W

NMSP EAST (FT)

N = 484287.29

E = 638865.65

200'

T
A
N
K
S

30'

(B)

(C)

(D)

30'

175'

500.11 FT

150'

S
E
P
S

EL. 3036.7'

S89°59'44"W

500.02 FT EL. 3040.2'

350' SOUTH
OFFSET
EL. 3038.5'

PROPOSED 200 L.F.
ACCESS ROAD

EL. 3035.8'

700'

EL. 3039.5'

010 50 100 200

SCALE 1" = 100'

DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF CR. 605 (REFINERY ROAD) AND SR. 31 (POTASH MINES ROAD), GO NORTHEAST ON SR. 31 APPROX. 1.1 MILES, TURN LEFT ON PIPELINE ROAD AND GO NORTHWEST 311' THROUGH GATE TO A ROAD SURVEY, FOLLOW ROAD SURVEY NORTH 200' TO THE SOUTHWEST PAD CORNER FOR THIS LOCATION.

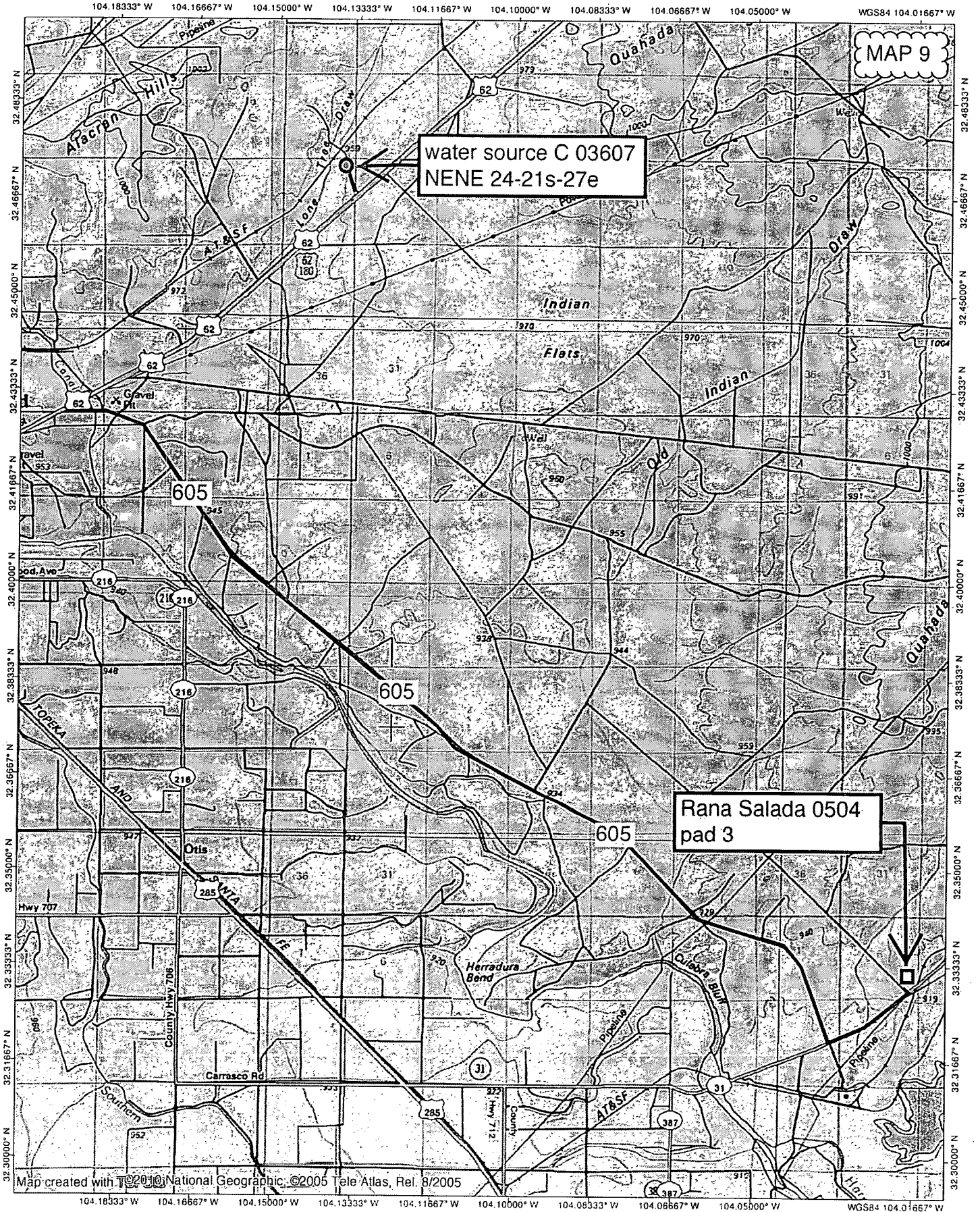
NOVO OIL & GAS NORTHERN DELAWARE, LLC
RANA SALADA FED COM 0504 133H
LOCATED 1443 FT. FROM THE SOUTH LINE
AND 612 FT. FROM THE EAST LINE OF
SECTION 6, TOWNSHIP 23 SOUTH,
RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

JUNE 26, 2018

SURVEY NO. 6156A

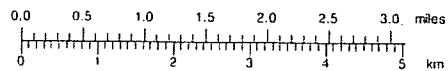
MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341

CARLSBAD, NEW MEXICO



Map created with TOPO! National Geographic, ©2005 Tele Atlas, Rel. 8/2005

NATIONAL
GEOGRAPHIC



TN MN

7°

07/01/18

SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
SITE MAP

MAP 10

EL. 3047.2'

700'

EL. 3046.4'

NOTE: LATITUDE AND LONGITUDE COORDINATES ARE SHOWN USING THE NORTH AMERICAN DATUM OF 1983 (NAD83). LISTED NEW MEXICO STATE PLANE EAST COORDINATES ARE GRID (NAD83). BASIS OF BEARING AND DISTANCES USED ARE NEW MEXICO STATE PLANE EAST COORDINATES MODIFIED TO THE SURFACE. ELEVATION VALUES ARE NAVD88.

150' NORTH

TOPSOIL

EL. 3045.3' N89°59'08"E

500.00 FT EL. 3045.3'

STAKED PAD

- (A) RANA SALADA FED COM 0504 133H
- (B) RANA SALADA FED COM 0504 234H
- (C) RANA SALADA FED COM 0504 214H
- (D) RANA SALADA FED COM 0504 134H

500.02 FT

500'00'02"E

325' WEST
OFFSET
EL. 3042.5'

RANA SALADA FED
COM 0504 133H
ELEV. = 3041.2'
5.740± ACRES
LAT. = 32.3309826°N (NAD83)
LONG. = 104.0175754°W
NMSP EAST (FT)
N = 484287.29
E = 638865.65

175' EAST
OFFSET
EL. 3043.2'

700'

700'

30' 30' 30'

265'

175'

150'

500.11 FT

EL. 3036.7' S89°59'44"W

500.02 FT EL. 3040.2'

350' SOUTH
OFFSET
EL. 3038.5'

PROPOSED 200 L.F.
ACCESS ROAD

EL. 3035.8'

700'

EL. 3039.5'

010 50 100 200

SCALE 1" = 100'

DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF CR. 605 (REFINERY ROAD) AND SR. 31 (POTASH MINES ROAD), GO NORTHEAST ON SR. 31 APPROX. 1.1 MILES, TURN LEFT ON PIPELINE ROAD AND GO NORTHWEST 311' THROUGH GATE TO A ROAD SURVEY, FOLLOW ROAD SURVEY NORTH 200' TO THE SOUTHWEST PAD CORNER FOR THIS LOCATION.

NOVO OIL & GAS NORTHERN DELAWARE, LLC
RANA SALADA FED COM 0504 133H
LOCATED 1443 FT. FROM THE SOUTH LINE
AND 612 FT. FROM THE EAST LINE OF
SECTION 6, TOWNSHIP 23 SOUTH,
RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

JUNE 26, 2018

SURVEY NO. 6156A

MADRON SURVEYING, INC.

301 SOUTH CANAL
(575) 234-3341

CARLSBAD, NEW MEXICO

PLAN VIEW

LIMITS OF
EARTHWORK
3:1 SLOPE (TYP.)

LIMITS OF
EARTHWORK
3:1 SLOPE (TYP.)

- Ⓐ RANA SALADA FED COM 0504 133H
- Ⓑ RANA SALADA FED COM 0504 234H
- Ⓒ RANA SALADA FED COM 0504 214H
- Ⓓ RANA SALADA FED COM 0504 134H

PAD
CENTER
POINT

PROPOSED PAD
EL. = 3040.0'

MAP 11

I, FILIMON F. JARAMILLO, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.

NOVO OIL & GAS NORTHERN DELAWARE, LLC
PAD GRADING AND CROSS SECTIONS
FOR RANA SALADA FED COM 0504 214H
 SECTION 6, TOWNSHIP 23 SOUTH,
 RANGE 29 EAST, N.M.P.M.
 EDDY COUNTY, STATE OF NEW MEXICO

012 60 120 240
 SCALE 1" = 120'

CUT	FILL	NET
12106 CU. YD	5117 CU. YD	6989 CU. YD (CUT)

EARTHWORK QUANTITIES ARE ESTIMATED

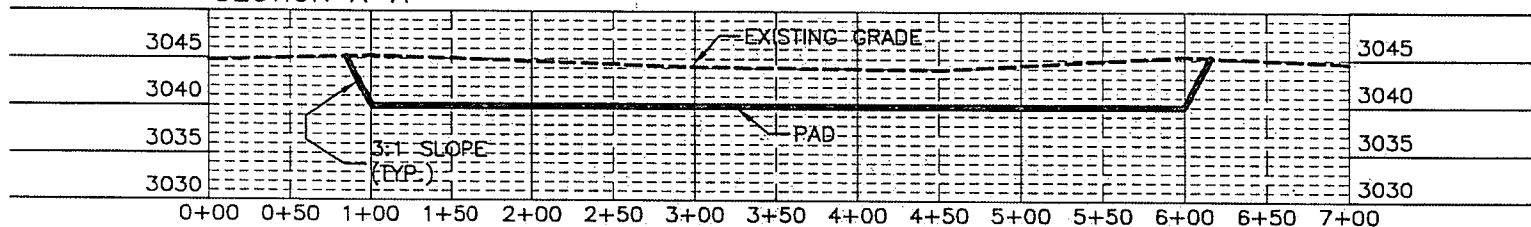
APRIL 1, 2019

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

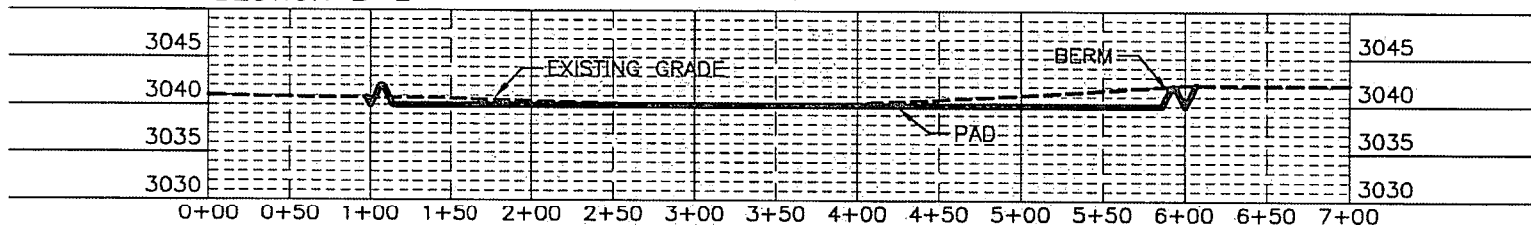
SHEET 1-2
 SURVEY NO. 6290B

CROSS-SECTIONS

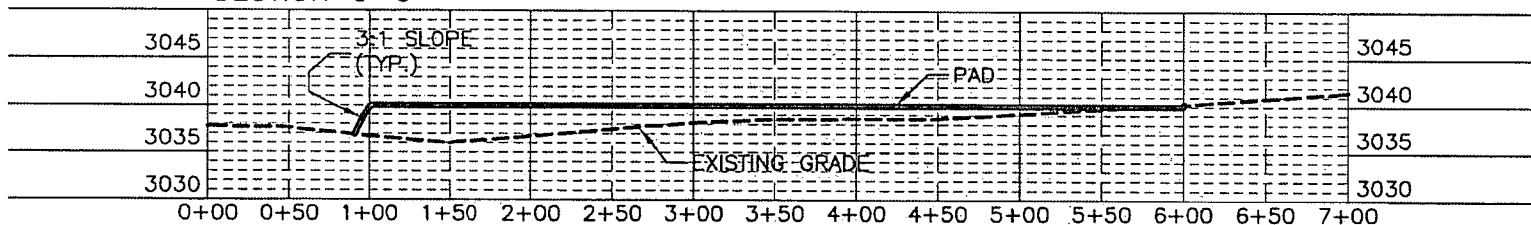
SECTION A-A'



SECTION B-B'



SECTION C-C'



I, FILIMON F. JARAMILLO, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.

NOVO OIL & GAS NORTHERN DELAWARE, LLC
PAD GRADING AND CROSS SECTIONS
FOR RANA SALADA FED COM 0504 214H
 SECTION 6, TOWNSHIP 23 SOUTH,
 RANGE 29 EAST, N.M.P.M.
 EDDY COUNTY, STATE OF NEW MEXICO

APRIL 1, 2019

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

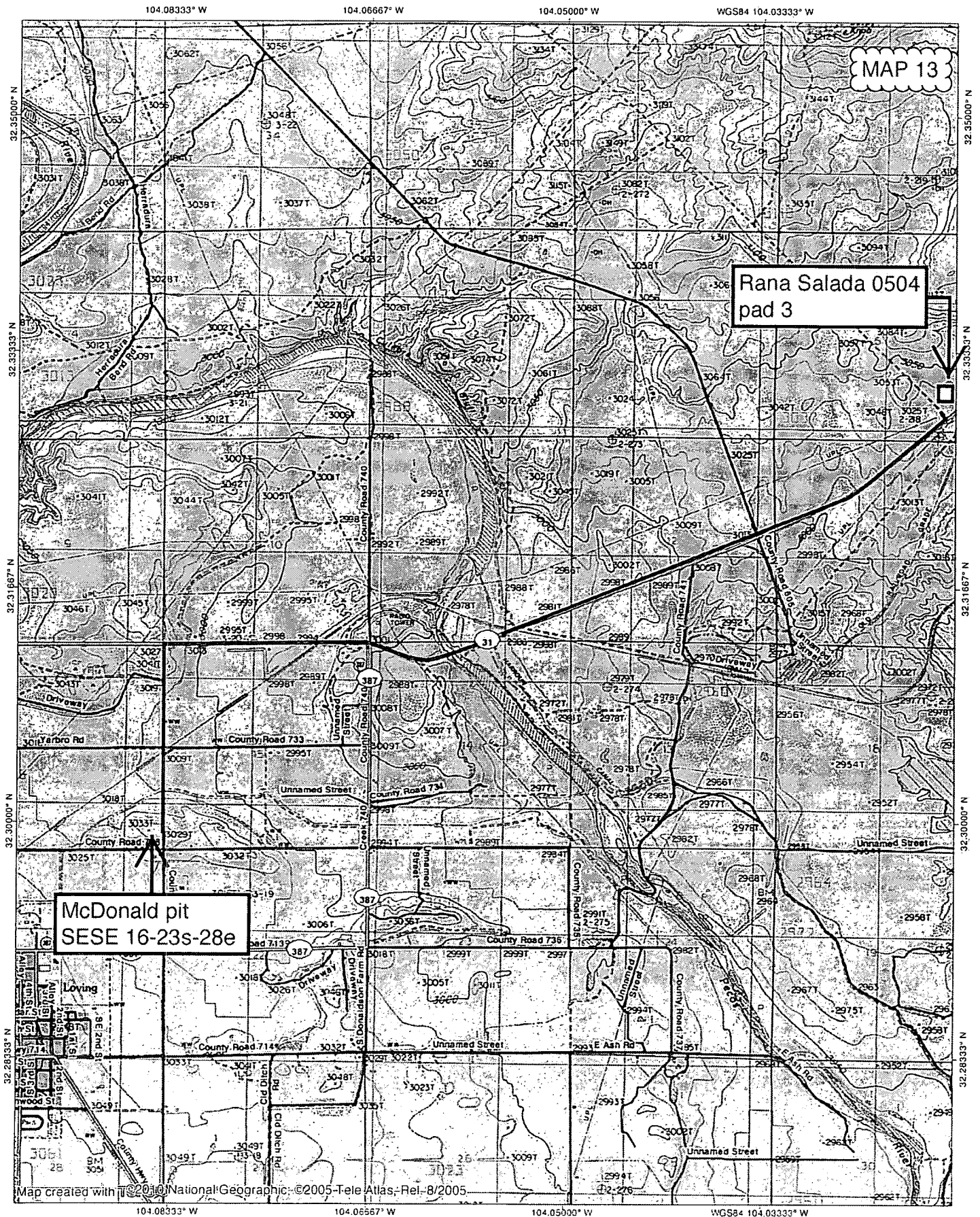
MAP 12

012 60 120 240
 SCALE 1" = 120' - 1" = 20' VER

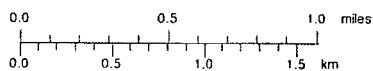
CUT	FILL	NET
12106 CU. YD	5117 CU. YD	6989 CU. YD (CUT)

EARTHWORK QUANTITIES ARE ESTIMATED

SHEET 2-2
 SURVEY NO. 6290B



NATIONAL
GEOGRAPHIC



TN 6 MM
7°
07/25/18

SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
SITE MAP

MAP 10

EL. 3047.2'

700'

EL. 3046.4'

NOTE: LATITUDE AND LONGITUDE COORDINATES ARE SHOWN USING THE NORTH AMERICAN DATUM OF 1983 (NAD83). LISTED NEW MEXICO STATE PLANE EAST COORDINATES ARE GRID (NAD83). BASIS OF BEARING AND DISTANCES USED ARE NEW MEXICO STATE PLANE EAST COORDINATES MODIFIED TO THE SURFACE. ELEVATION VALUES ARE NAVD88.

150' NORTH

TOPSOIL

EL. 3045.3' N89°59'08"E

500.00 FT EL. 3045.3'

STAKED PAD

500.02 FT

- (A) RANA SALADA FED COM 0504 133H
- (B) RANA SALADA FED COM 0504 234H
- (C) RANA SALADA FED COM 0504 214H
- (D) RANA SALADA FED COM 0504 134H

150'

500'00'02"E

325' WEST
OFFSET
EL. 3042.5'

325'

175'

175' EAST
OFFSET
EL. 3043.2'

RANA SALADA FED
COM 0504 133H

ELEV. = 3041.2'

5.740± ACRES

LAT. = 32.3309826°N (NAD83)

LONG. = 104.0175754°W

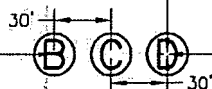
NMSP EAST (FT)

N = 484287.29

E = 638865.85

200'

700'



265'

175'

150'

500.11 FT

N00°00'05"E

EL. 3036.7' S89°59'44"W

500.02 FT EL. 3040.2'

350' SOUTH
OFFSET
EL. 3038.5'

PROPOSED 200 LF.
ACCESS ROAD

EL. 3035.8'

700'

EL. 3039.5'

010 50 100 200

SCALE 1" = 100'

DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF CR. 605 (REFINERY ROAD) AND SR. 31 (POTASH MINES ROAD), GO NORTHEAST ON SR. 31 APPROX. 1.1 MILES, TURN LEFT ON PIPELINE ROAD AND GO NORTHWEST 311' THROUGH GATE TO A ROAD SURVEY, FOLLOW ROAD SURVEY NORTH 200' TO THE SOUTHWEST PAD CORNER FOR THIS LOCATION.

NOVO OIL & GAS NORTHERN DELAWARE, LLC
RANA SALADA FED COM 0504 133H
LOCATED 1443 FT. FROM THE SOUTH LINE
AND 612 FT. FROM THE EAST LINE OF
SECTION 6, TOWNSHIP 23 SOUTH,
RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

JUNE 26, 2018

SURVEY NO. 6156A

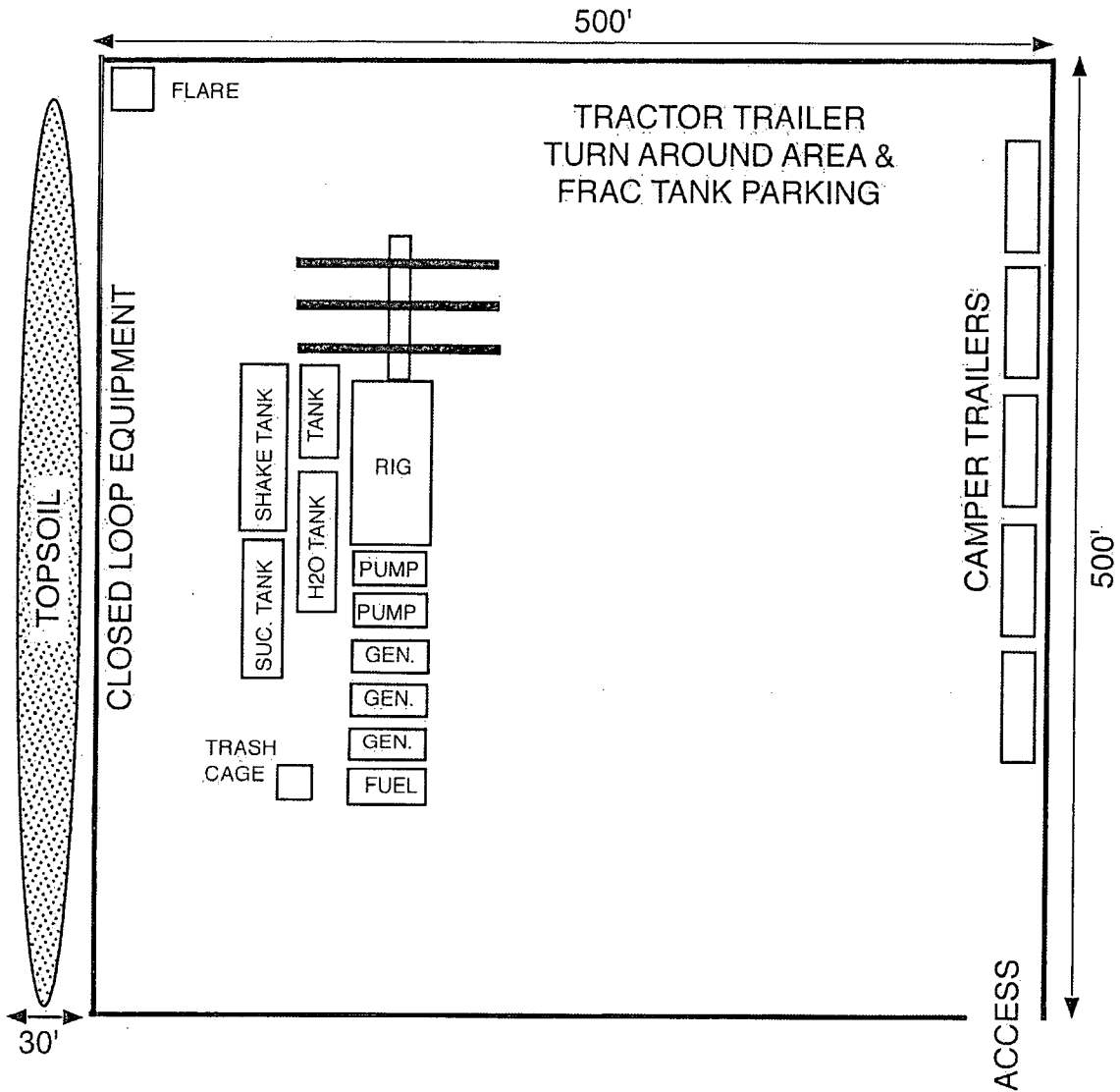
MADRON SURVEYING, INC.

301 SOUTH CANAL
(575) 234-3341

CARLSBAD, NEW MEXICO

Novo's
Rana Salada Fed Com 0504 133H
rig diagram

NORTH 
1" = 100'



SECTION 6, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
SITE MAP

MAP 14

EL. 3047.2'

700'

EL. 3046.4'

NOTE: LATITUDE AND LONGITUDE COORDINATES ARE SHOWN USING THE NORTH AMERICAN DATUM OF 1983 (NAD83). LISTED NEW MEXICO STATE PLANE EAST COORDINATES ARE GRID (NAD83). BASIS OF BEARING AND DISTANCES USED ARE NEW MEXICO STATE PLANE EAST COORDINATES MODIFIED TO THE SURFACE. ELEVATION VALUES ARE NAVD88.

Flare
CBU

N89°59'08"E

STAKED PAD

150' NORTH
OFFSET
EL. 3043.7'

500.00 FT

EL. 3045.3'

interim
reclaim
50' x 500'
0.57 acre

- (A) RANA SALADA FED COM 0504 133H
- (B) RANA SALADA FED COM 0504 234H
- (C) RANA SALADA FED COM 0504 214H
- (D) RANA SALADA FED COM 0504 134H

500.02

325' WEST
OFFSET
EL. 3042.5'

RANA SALADA FED
COM 0504 133H

ELEV. = 3041.2'

5.740± ACRES

LAT. = 32.3309826°N (NAD83)

LONG. = 104.0175754°W

NMSP EAST (FT)

N = 484287.29

E = 838865.65

T
A
N
K
S

450' x 500'
left open for
production &
tractor-trailer
turn around

265'

30'

(B)

(C)

(D)

30'

175'

150'

350' SOUTH
OFFSET
EL. 3038.5'

500.02 FT

EL. 3040.2'

500.11 FT

EL. 3036.7'

S89°59'44"W

PROPOSED 200 L.F.
ACCESS ROAD

EL. 3035.8'

700'

EL. 3039.5'

010 50 100 200

SCALE 1" = 100'

DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF CR. 605 (REFINERY ROAD) AND SR. 31 (POTASH MINES ROAD), GO NORTHEAST ON SR. 31 APPROX. 1.1 MILES, TURN LEFT ON PIPELINE ROAD AND GO NORTHWEST 311' THROUGH GATE TO A ROAD SURVEY, FOLLOW ROAD SURVEY NORTH 200' TO THE SOUTHWEST PAD CORNER FOR THIS LOCATION.

NOVO OIL & GAS NORTHERN DELAWARE, LLC
RANA SALADA FED COM 0504 133H
LOCATED 1443 FT. FROM THE SOUTH LINE
AND 612 FT. FROM THE EAST LINE OF
SECTION 6, TOWNSHIP 23 SOUTH,
RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

JUNE 26, 2018

SURVEY NO. 6156A

MADRON SURVEYING, INC.

301 SOUTH CANAL
(575) 234-3341

CARLSBAD, NEW MEXICO

PLAN VIEW

LIMITS OF
EARTHWORK
3:1 SLOPE (TYP.)

- Ⓐ RANA SALADA FED COM 0504 133H
- Ⓑ RANA SALADA FED COM 0504 234H
- Ⓒ RANA SALADA FED COM 0504 214H
- Ⓓ RANA SALADA FED COM 0504 134H

LIMITS OF
EARTHWORK
3:1 SLOPE (TYP.)

PAD
CENTER
POINT

PROPOSED PAD
EL. = 3040.0'

MAP 15

I, FILIMON F. JARAMILLO, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.

NOVO OIL & GAS NORTHERN DELAWARE, LLC
PAD GRADING AND CROSS SECTIONS
FOR RANA SALADA FED COM 0504 214H
 SECTION 6, TOWNSHIP 23 SOUTH,
 RANGE 29 EAST, N.M.P.M.
 EDDY COUNTY, STATE OF NEW MEXICO

012 60 120 240
 SCALE 1" = 120'

CUT	FILL	NET
12106 CU. YD.	5117 CU. YD.	6989 CU. YD. (CUT)

EARTHWORK QUANTITIES ARE ESTIMATED

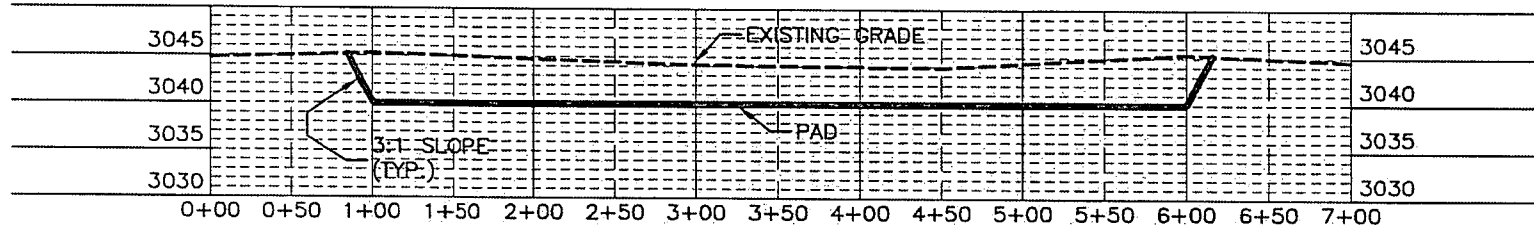
APRIL 1, 2019

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

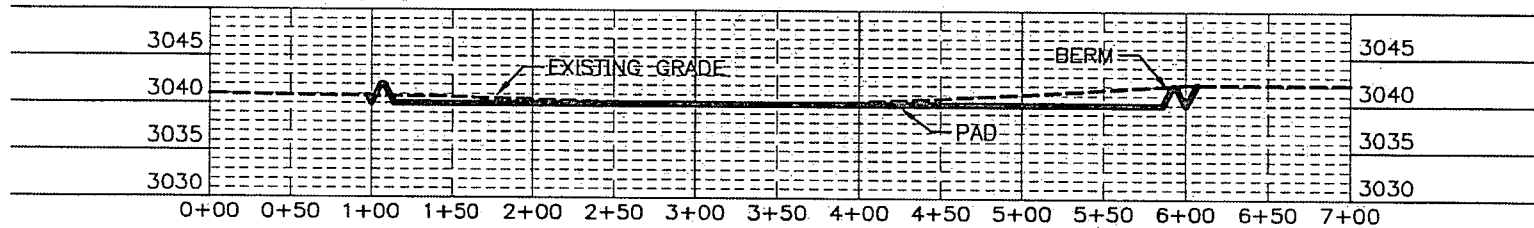
SHEET 1-2
 SURVEY NO. 6290B

CROSS-SECTIONS

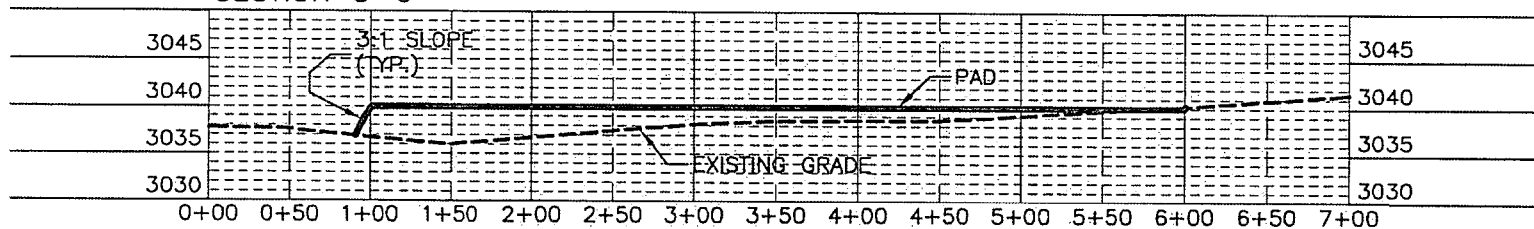
SECTION A-A'



SECTION B-B'



SECTION C-C'



I, FILIMON F. JARAMILLO, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.

NOVO OIL & GAS NORTHERN DELAWARE, LLC
 PAD GRADING AND CROSS SECTIONS
 FOR RANA SALADA FED COM 0504 214H
 SECTION 6, TOWNSHIP 23 SOUTH,
 RANGE 29 EAST, N.M.P.M.
 EDDY COUNTY, STATE OF NEW MEXICO

MAP 16

012 60 120 240
 SCALE 1" = 120' - 1" = 20' VER

CUT	FILL	NET
12106 CU. YD	5117 CU. YD	6989 CU. YD (CUT)

EARTHWORK QUANTITIES ARE ESTIMATED

APRIL 1, 2019

MADRON SURVEYING, INC. CARLSBAD, NEW MEXICO

SHEET 2-2
 SURVEY NO. 6290B

Novo Oil & Gas Northern Delaware, LLC
Rana Salada Fed Com 0504 133H
SHL 1443' FSL & 612' FEL 6-23S-29E
Eddy County, NM

SURFACE PLAN PAGE 1

Surface Use Plan

1. ROAD DIRECTIONS & DESCRIPTIONS (See MAPS 1 - 6)

From the junction of US 285 and US 62/180 in Carlsbad
Go SE 9.9 miles on US 285 to the equivalent of Mile Post 23.4

Then turn left and go East 6.4 miles on paved NM 31
Turn left at a gate at the equivalent of Mile Post 6.4
Go NW 311.12' on a caliche RKI pipeline patrol road
Then turn right and go N 200.08' cross-country to the pad

Or, from US 285 Mile Post 23.4

Then turn left and go East 5-1/4 miles on paved NM 31
Turn left and go NW 1.6 miles on paved County Road 605 (Refinery Road)
Then turn right and go N 0.15 mile on a caliche road
Then bear right and go East 1.25 mile on a caliche road to Longview Fed. 31 1H
Then turn right and go South and SE 5079.3' cross-country to the pad
The southeast segment is 35' east of an overhead power line

Non-state and non-county roads will be maintained as needed to Gold Book standards. This includes pulling ditches, preserving the crown, and cleaning culverts. This will be done at least once a year, and more often as needed.

2. ROAD TO BE BUILT OR UPGRADED (See MAPS 4 - 6)

The 5590.5' of local roads will be crowned and ditched, have a $\leq 24'$ wide driving surface, and be surfaced with caliche. Pipelines that are crossed will be padded. Maximum disturbed width = 30'. Maximum grade = 5%. Maximum cut or fill = 5'. Two 36" OD x 40' culverts will be installed in the center of the NW4 Section 6. A two-lane ($\geq 20'$) cattle guard will be installed NE of the gate on NM 31. Cattle guard will be installed NW of the fence and $\geq 75'$ from the pavement. Permanent caution signs will be installed along NM 31.

Novo Oil & Gas Northern Delaware, LLC
Rana Salada Fed Com 0504 133H
SHL 1443' FSL & 612' FEL 6-23S-29E
Eddy County, NM

SURFACE PLAN PAGE 2

Four vehicle turn outs will be installed on the new road that leads SE from the Longview well. Each turnout will be 100' long with 50' transitional tapers at each end. Upgrading will consist of filling potholes with caliche as needed.

3. EXISTING WELLS (See MAP 7)

Existing oil, gas, water, and P&A wells are within a mile. No SWD or injection well is within a mile radius.

4. PROPOSED PRODUCTION FACILITIES (See MAP 8)

Flare and/or CBU will be set on the northwest corner of the pad. Tank battery will be on the west side of the pad. Process equipment (e. g., separators, heater-treaters) will be south of the battery. No power line is planned at this time. Novo is not planning any off-pad pipelines at this time. Lucid may run a gas line to the pad, but this has not been finalized.

5. WATER SUPPLY (See MAP 9)

Water will be trucked from an existing water well (C 03607) on private (Branson) land in NENE 24-21s-27e.

6. CONSTRUCTION MATERIALS & METHODS (See MAPS 10 - 13)

NM One Call (811) will be notified before construction starts. Top ≈6" of soil and brush will be stockpiled north of the well pad. V-door will face west. Closed loop mud system will be used. Caliche will be hauled from an existing caliche pit on private (McDonald) land in SESE 16-23s-28e.

Novo Oil & Gas Northern Delaware, LLC
Rana Salada Fed Com 0504 133H
SHL 1443' FSL & 612' FEL 6-23S-29E
Eddy County, NM

SURFACE PLAN PAGE 3

7. WASTE DISPOSAL

All trash will be placed in a portable trash cage. It will be hauled to the Lea County landfill. There will be no trash burning. Contents (drill cuttings, mud, salts, and other chemicals) of the mud tanks will be hauled to R360's state approved (NM-01-0006) disposal site at Halfway. Human waste will be disposed of in chemical toilets and hauled to the Carlsbad wastewater treatment plant.

8. ANCILLARY FACILITIES

There will be no airstrip or camp. Camper trailers will be on location for the company man, tool pusher, and mud logger.

9. WELL SITE LAYOUT (See MAPS 10 - 12)

Also see Rig Layout diagram for depictions of the well pad, trash cage, access onto the location, parking, living facilities, and rig orientation.

10. RECLAMATION (See MAPS 14 - 16)

A 50' x 500' (0.57 acre) swath on the east side of the pad will be interim reclaimed. A 450' x 500' (= 5.17 acres) working area will remain after interim reclamation. Once the last well is plugged, then the pad and new roads will be reclaimed within 6 months of plugging. Disturbed areas will be contoured to match pre-construction grades. Soil and brush will be evenly spread over disturbed areas and harrowed on the contour. Disturbed areas will be seeded in accordance with BLM requirements. Roads will be blocked. Noxious weeds will be controlled.

Novo Oil & Gas Northern Delaware, LLC
Rana Salada Fed Com 0504 133H
SHL 1443' FSL & 612' FEL 6-23S-29E
Eddy County, NM

SURFACE PLAN PAGE 4

Land use:

511.2' x 30' south road = 0.35 acre
5079.3' x 30' north road = 3.50 acres
+ 500' x 500' pad = 5.74 acres
9.59 acres short term
- 0.57 acre interim reclamation
9.02 acres long term

11. SURFACE OWNER

All construction will be on BLM. BLM office is the Carlsbad Field Office, 620 E. Greene, Carlsbad NM 88220. Phone is 575 234-5972.

12. OTHER INFORMATION

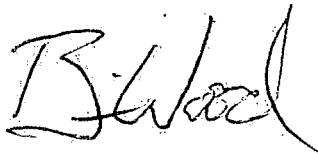
On-site inspection was held with Jim Rutley (both BLM). Lone Mountain Archaeological Services will inspect and report on the project.

Novo Oil & Gas Northern Delaware, LLC
Rana Salada Fed Com 0504 133H
SHL 1443' FSL & 612' FEL 6-23S-29E
Eddy County, NM

SURFACE PLAN PAGE 5

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. Executed this 28th day of July, 2018.



Brian Wood, Consultant

Permits West, Inc.

37 Verano Loop, Santa Fe, NM 87508

(505) 466-8120

FAX: (505) 466-9682

Cellular: (505) 699-2276

Field representative will be:

Kurt Shipley

Vice President, Operations

Novo Oil & Gas Northern Delaware, LLC

105 North Hudson Ave., Suite 500

Oklahoma City OK 73102

Office: (405) 609-1596

Cell: (405) 404-0414



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

PWD Data Report

05/30/2019

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? NO

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:

Describe 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:

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? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Describe 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?

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? NO

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? NO

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? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Other PWD discharge volume (bbl/day):

Other PWD type description:

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:



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

Bond Info Data Report

05/30/2019

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: