Form 3160-3 RECEIVED
(June 2015)

JUN 0 8 2019

DISTRICT II-ARTESIA O.C.D.

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM091078

6. If Indian, Allotee or Tribe Name

1a. Type of work: ☑ DRILL ☐ REENTER

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

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

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

8. Lease Name and Well No.
RANA SALADA FED COM 0605
121H 325746

2. Name of Operator
NOVO OIL AND GAS NORTHERN DELAWARE LLC 372920

9. API Well No.
30-015 46076

3a. Address
1001 West Wilshire Boulevard Suite 206 Oklahoma City O

3b. Phone No. *(include area code)*
(405)404-0414

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

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

At surface LOT 1 / 1127 FNL / 335 FEL / LAT 32.3389514 / LONG -104.0330485

At proposed prod. zone LOT 2 / 330 FNL / 1650 FEL / LAT 32.340837 / LONG -104.00363

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 1 / T23S / R28E / NMP

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)
330 feet

16. No of acres in lease
798.88

17. Spacing Unit dedicated to this well
279.21

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

19. Proposed Depth
8241 feet / 16981 feet

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

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3091 feet

22. Approximate date work will start*
09/01/2018

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

25. Signature	Name *(Printed/Typed)*	Date
(Electronic Submission)	Brian Wood / Ph: (505)466-8120	07/11/2018

Title
President

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Cody Layton / Ph: (575)234-5959	05/30/2019

Title	Office
Assistant Field Manager Lands & Minerals	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

RWP 6-12-19

(Continued on page 2)

*(Instructions on page 2)

INSTRUCTIONS

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

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

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

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

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

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

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

NOTICES

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

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

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

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

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

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

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

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

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Additional Operator Remarks

Location of Well

1. SHL: LOT 1 / 1127 FNL / 335 FEL / TWSP: 23S / RANGE: 28E / SECTION: 1 / LAT: 32.3389514 / LONG: -104.0330485 (TVD: 0 feet, MD: 0 feet)
   PPP: LOT 1 / 1127 FNL / 335 FEL / TWSP: 23S / RANGE: 28E / SECTION: 1 / LAT: 32.3389514 / LONG: -104.0330485 (TVD: 0 feet, MD: 0 feet)
   PPP: LOT 4 / 410 FNL / 0 FWL / TWSP: 23S / RANGE: 28E / SECTION: 1 / LAT: 32.340909 / LONG: -104.032016 (TVD: 8115 feet, MD: 8213 feet)
   PPP: LOT 4 / 325 FNL / 0 FWL / TWSP: 23S / RANGE: 29E / SECTION: 5 / LAT: 32.340867 / LONG: -104.015451 (TVD: 8241 feet, MD: 13329 feet)
   BHL: LOT 2 / 330 FNL / 1650 FEL / TWSP: 23S / RANGE: 29E / SECTION: 5 / LAT: 32.340837 / LONG: -104.00363 (TVD: 8241 feet, MD: 16981 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.:	**NMNM091078**
WELL NAME & NO.:	**Rana Salada Fed Com 0605 121H**
SURFACE HOLE FOOTAGE:	**1127' FNL & 335' FEL**
BOTTOM HOLE FOOTAGE	**330' FNL & 1650' 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 **381'** (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.

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 intergrity 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, situating 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 values, 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.

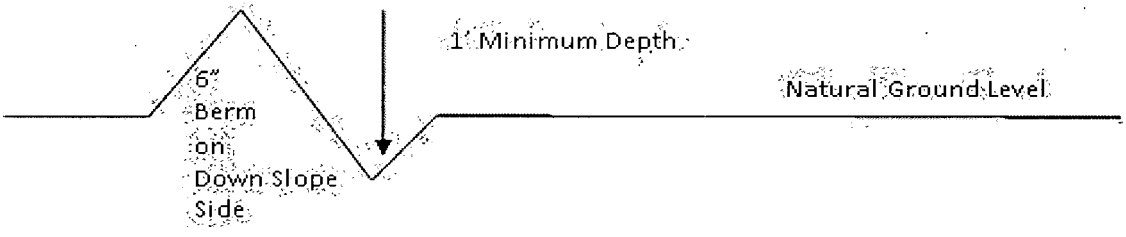
Ditching
Ditching shall be required on both sides of the road.

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

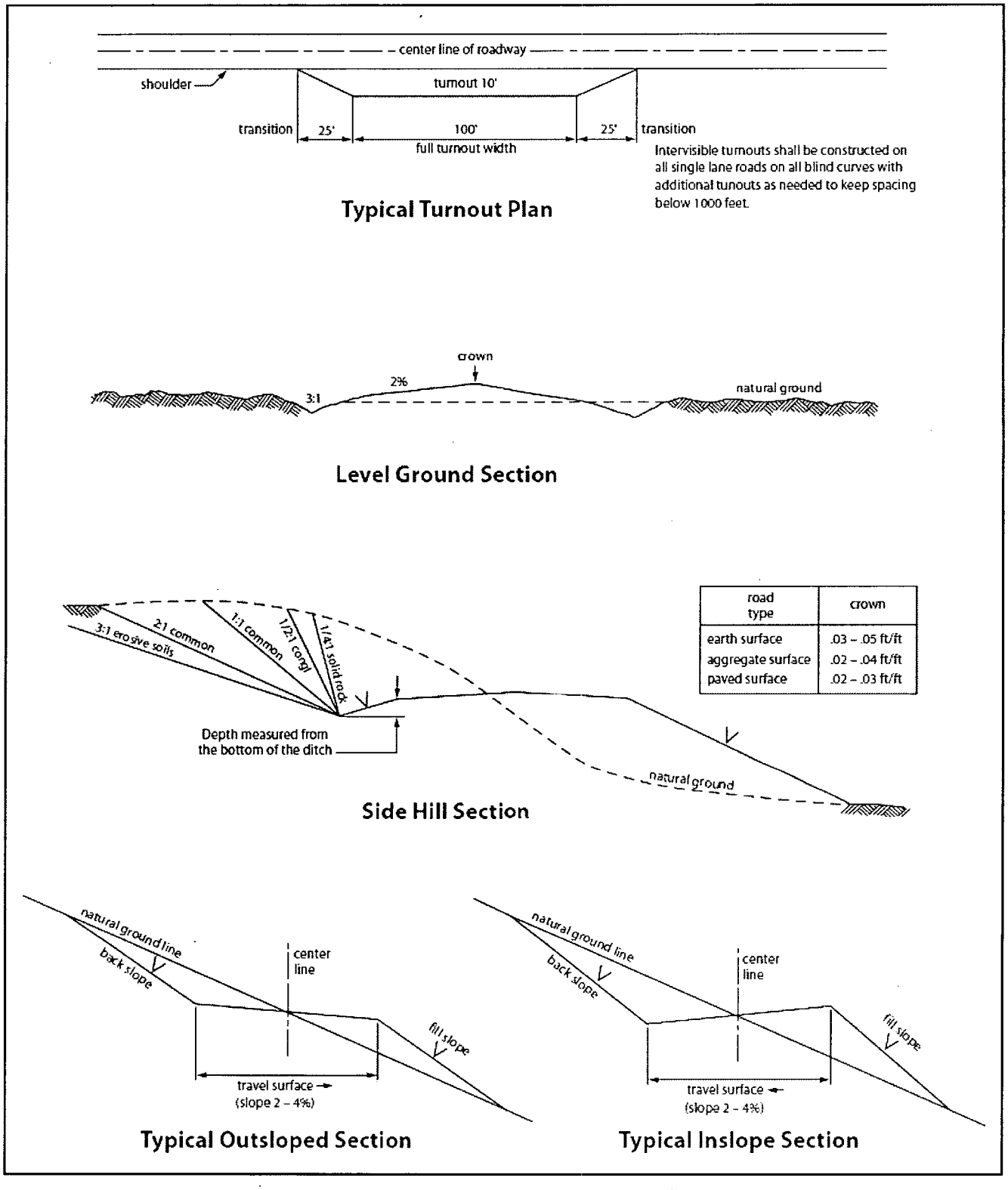


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

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:

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

*Pounds of pure live seed:

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

AFMSS

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:** 07/06/2018

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: 10400031963 **Submission Date:** 07/11/2018

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0605 **Well Number:** 121H

Well Type: CONVENTIONAL GAS WELL **Well Work Type:** Drill

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - General

APD ID: 10400031963 **Tie to previous NOS?** **Submission Date:** 07/11/2018

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: NMNM091078 **Lease Acres:** 798.88

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 0605 **Well Number:** 121H **Well API Number:**

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

Is the proposed well in an area containing other mineral resources? USEABLE WATER,NATURAL GAS,CO2,OIL

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0605 **Well Number:** 121H

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:** 1

Well Class: HORIZONTAL **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:** 30 FT **Distance to lease line:** 330 FT

Reservoir well spacing assigned acres Measurement: 279.21 Acres

Well plat: RS_121H_Plat_GasCap_Plan_20180709144105.pdf

Well work start Date: 09/01/2018 **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	1127	FNL	335	FEL	23S	28E	1	Lot 1	32.3389514	-104.0330485	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 091078	3091	0	0
KOP Leg #1	415	FNL	146	FEL	23S	28E	1	Lot 1	32.340909	-104.032429	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 091078	-4672	7814	7763
PPP Leg #1	1127	FNL	335	FEL	23S	28E	1	Lot 1	32.3389514	-104.0330485	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 091078	3091	0	0

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0605 **Well Number:** 121H

	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	410	FNL	0	FWL	23S	28E	1	Lot 4	32.340909	-104.032016	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 061349	-5024	8213	8115
PPP Leg #1	325	FNL	0	FWL	23S	29E	5	Lot 4	32.340867	-104.015451	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 059383	-5150	13329	8241
EXIT Leg #1	330	FNL	1650	FEL	23S	29E	5	Lot 2	32.340837	-104.003633	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 059383	-5150	16981	8241
BHL Leg #1	330	FNL	1650	FEL	23S	29E	5	Lot 2	32.340837	-104.003633	EDDY	NEW MEXICO	NEW MEXICO	F	NMNM 059383	-5150	16981	8241

APD ID: 10400031963 **Submission Date:** 07/11/2018

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0605 **Well Number:** 121H

Well Type: CONVENTIONAL GAS WELL **Well Work Type:** Drill

Highlighted data reflects the most recent changes

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Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
1	QUATERNARY	3090	0	0		USEABLE WATER	No
2	RUSTLER ANHYDRITE	2777	313	313		NONE	No
3	SALADO	2331	759	759	SALT	NONE	No
4	CASTILE	1684	1406	1406	ANHYDRITE	NONE	No
5	BASE OF SALT	463	2627	2630		NONE	No
6	BELL CANYON	264	2826	2831	SANDSTONE	NATURAL GAS,CO2,OIL	No
7	CHERRY CANYON	-827	3917	3931	SANDSTONE	NATURAL GAS,CO2,OIL	No
8	BRUSHY CANYON	-2270	5360	5390	SANDSTONE	NATURAL GAS,CO2,OIL	No
9	BONE SPRING	-3261	6351	6391	LIMESTONE	NATURAL GAS,CO2,OIL	No
10	BONE SPRING 1ST	-4391	7481	7532	SANDSTONE	NATURAL GAS,CO2,OIL	No
11	BONE SPRING 2ND	-4661	7751	7802	OTHER : Carbonate	NATURAL GAS,CO2,OIL	No
12	BONE SPRING 2ND	-5101	8191	8349	SANDSTONE	NATURAL GAS,CO2,OIL	Yes

Section 2 - Blowout Prevention

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? YES

Variance request: 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.

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0605 **Well Number:** 121H

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 prior to drilling out surface shoe. 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. Intermediate II casing will be pressure tested to 250 psi low and 70% (4823 psi) high for 30 minutes.

Choke Diagram Attachment:

RS_0605_121H_Choke_20190307082113.pdf

BOP Diagram Attachment:

RS_0605_121H_BOP_20190307082120.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	3091		225	J-55	54.5	OTHER - BTC	1.125	1.125	DRY	1.6	DRY	1.6
2	OTHER	12.25	9.625	NEW	API	N	0	2970	0	2963	3091		2970	J-55	40	OTHER - BTC	1.125	1.125	DRY	1.6	DRY	1.6
3	PRODUCTION	8.75	5.5	NEW	API	N	0	16981	0	8241	3091		16981	P-110	20	OTHER - DQX, GBCD,CDC, DWC/C	1.125	1.125	DRY	1.6	DRY	1.6

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

RS_121H_Casing_Design_Assumptions_20180709144937.pdf

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0605 **Well Number:** 121H

Casing Attachments

Casing ID: 2 **String Type:** OTHER - Salt Protection

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

RS_121H_Casing_Design_Assumptions_20180709145015.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

RS_121H_Casing_Design_Assumptions_20180709145130.pdf

RS_121H_5.5in_Casing_Spec_20190221095358.pdf

Section 4 - Cement

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	225	0	0	0	0		None	None
SURFACE	Tail		0	225	193	1.62	13.8	313	100	Class C	gel + accelerator + LCM
OTHER	Lead		0	2970	372	2.28	11.9	848	20	Class C	gel + extender + LCM
OTHER	Tail		0	2970	200	1.34	14.8	268	20	Class C	gel + retarder + LCM

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0605 **Well Number:** 121H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
PRODUCTION	Lead		0	16981	579	4.08	9.2	2362	20	Class H	Fluid loss + retarder + LCM, Extender and Beads
PRODUCTION	Tail		0	16981	1962	1.42	13.2	2786	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

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
2970	16981	OIL-BASED MUD	8.5	10							
0	225	OTHER : Fresh water spud	8.3	8.3							
225	2970	OTHER : Brine or cut brine	9.8	10.2							

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0605 **Well Number:** 121H

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:

CBL,GR

Coring operation description for the well:

No core or drill stem test is planned.

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 4096 **Anticipated Surface Pressure:** 2282.98

Anticipated Bottom Hole Temperature(F): 150

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

Describe:

Contingency Plans geoharzards description:

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

RS_121H_H2S_Plan_20180709145549.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

RS_121H_Horizontal_Drill_Plan_20180709145609.pdf

Other proposed operations facets description:

Deficiency notice dated 1/11/19 required 1) Anticipated BH pressure to be 4500 psi; Novo O&G feels the 4096 psi is correct; 2) Anti-collision report - was included in Horizontal Drilling Plan; 3) CBL is not required by Onshore Order #2.

Other proposed operations facets attachment:

RS_121H_Speedhead_Specs_20180709145641.pdf

RS_121H_Coflex_Certs_20190111133710.pdf

RS_0605_121H_Drill_Plan_20190307133230.pdf

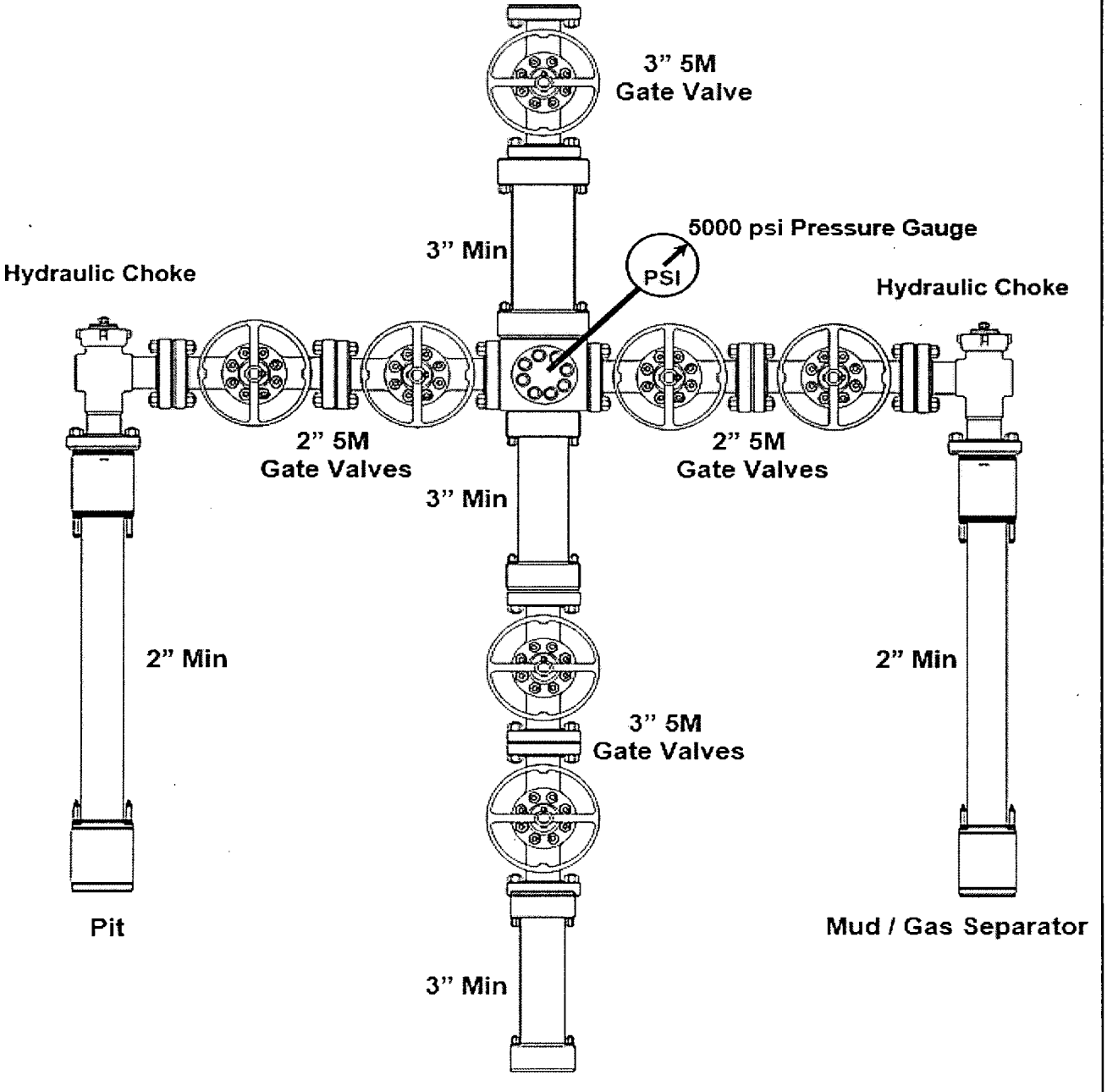
Other Variance attachment:

RS_121H_Casing_Cement_Variance_20180709145648.pdf

NOVO	NOVO OIL & GAS, LLC	Date	2/21/2019
	1001 West Wilshire Boulevard, Suite 206 Oklahoma City, Oklahoma 73116	Page No.	1 of 1

5M CHOKE MANIFOLD SCHEMATIC

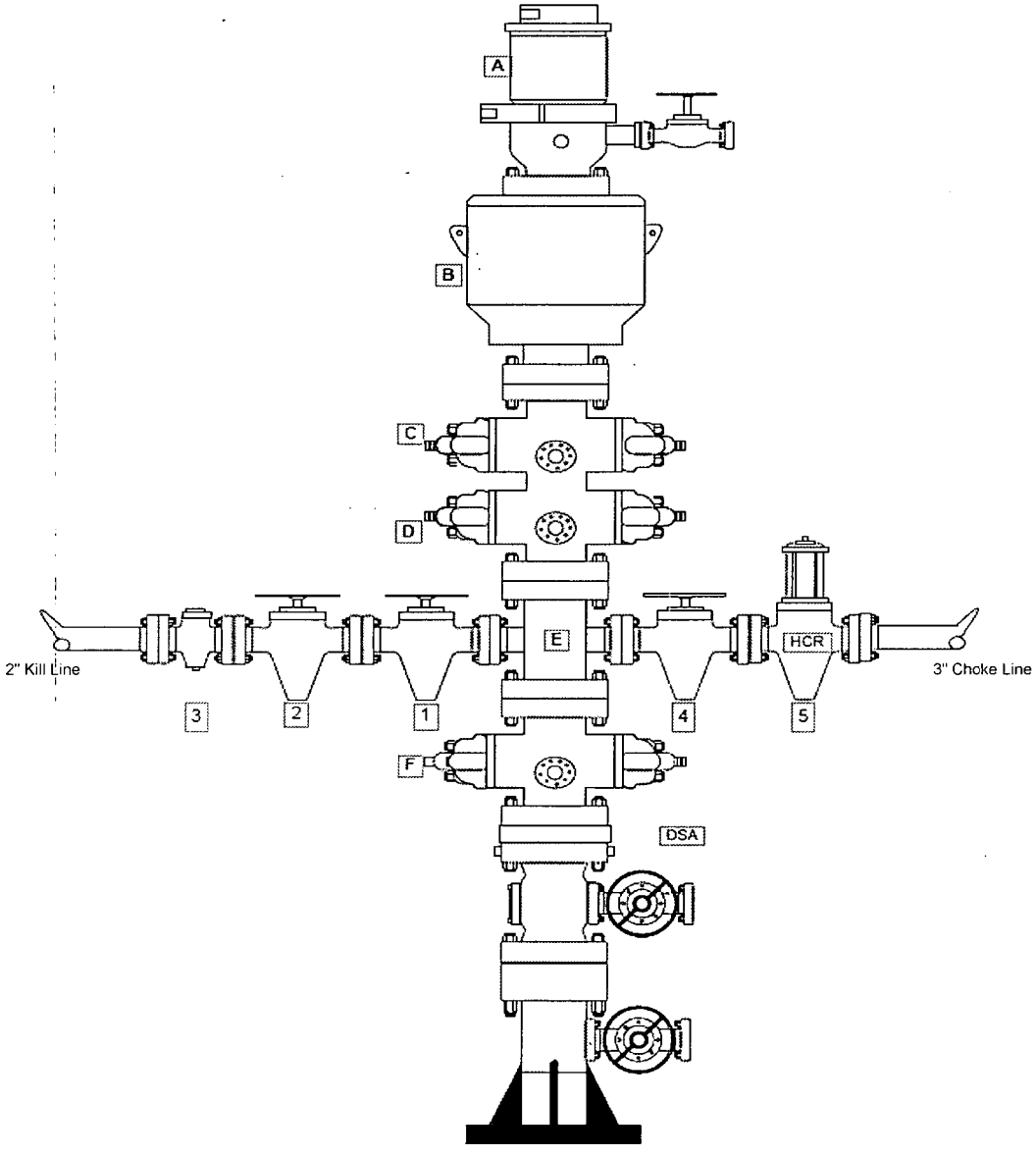
ITEM	SIZE	PRESSURE	DESCRIPTION



NOVO	NOVO OIL & GAS, LLC	Date	2/21/2019
	1001 West Wilshire Boulevard, Suite 206 Oklahoma City, Oklahoma 73116	Page No.	1 of 1

5M BLOWOUT PREVENTER SCHEMATIC

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



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

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

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).

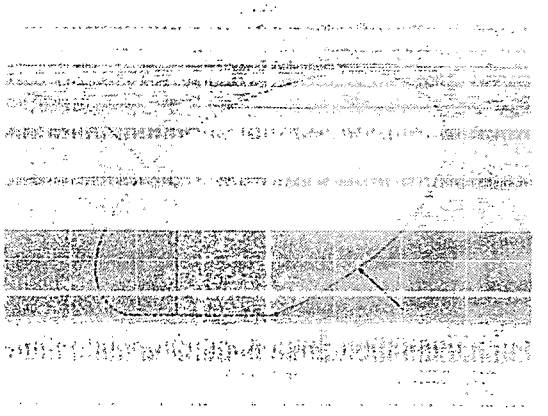
TECHNICAL DATA SHEET TMK UP DQX 5.5 X 20 P110

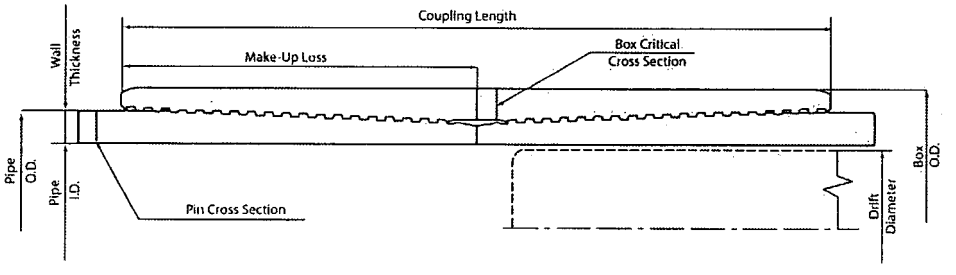
TUBULAR PARAMETERS	
Nominal OD, (inch)	5.500
Wall Thickness, (inch)	0.361
Pipe Grade	P110
Coupling	Special
Coupling Grade	P110
Drift	Standard

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
Yeld 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

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





Print date: 05/18/2018 01:22

GB tubulars
Casings & Connections

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

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

MECHANICAL PROPERTIES	Pipe	USS-CDC®	
Minimum Yield Strength	110,000	--	psi
Maximum Yield Strength	140,000	--	psi
Minimum Tensile Strength	125,000	--	psi
DIMENSIONS	**Pipe**	**USS-CDC®**	
Outside Diameter	5.500	6.050	in.
Wall Thickness	0.361	--	in.
Inside Diameter	4.778	4.778	in.
Standard Drift	4.653	4.653	in.
Alternate Drift	--	--	in.
Coupling Length	--	9.250	in.
Nominal Linear Weight, T&C	20.00	--	lbs/ft
Plain End Weight	19.83	--	lbs/ft
SECTION AREA	**Pipe**	**USS-CDC®**	
Critical Area	5.828	5.828	sq. in.
Joint Efficiency	--	100.0	%
PERFORMANCE	**Pipe**	**USS-CDC®**	
Minimum Collapse Pressure	12,200	12,200	psi
External Pressure Leak Resistance	--	9,760	psi
Minimum Internal Yield Pressure	12,640	12,370	psi
Minimum Pipe Body Yield Strength	641,000	--	lbs
Joint Strength	--	688,000	lbs
Compression Rating	--	413,000	lbs
Reference Length	--	22,933	ft
Maximum Uniaxial Bend Rating	--	59.1	deg/100 ft
MAKE-UP DATA	**Pipe**	**USS-CDC®**	
Make-Up Loss	--	4.63	in.
Minimum Make-Up Torque	--	10,500	ft-lbs
Maximum Make-Up Torque	--	13,000	ft-lbs
Connection Yield Torque	--	16,100	ft-lbs

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

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

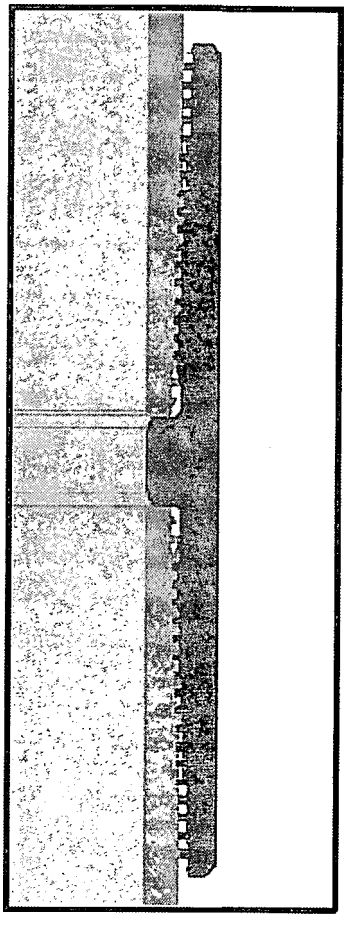
1-877-893-9461
connections@uss.com
www.usstubular.com

Technical Specifications

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

	Material
VST P110 EC	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]
	Appoximated 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

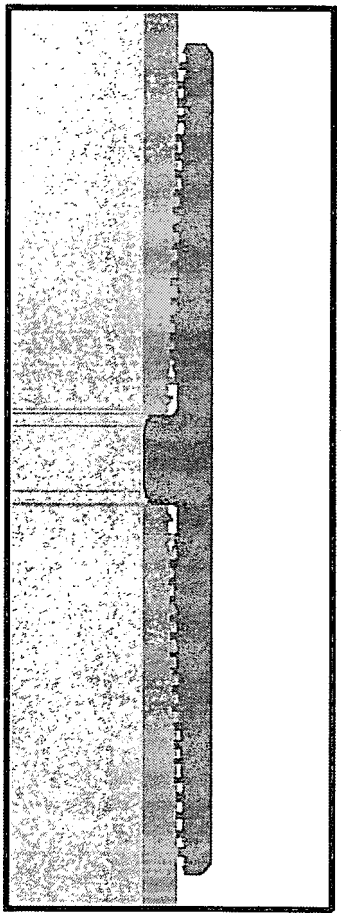


For detailed information on performance properties, refer to DWC Connection Data Notes on following page(s).

2/6/2015

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.



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: $DF_C = 1.125$

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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.

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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: $DF_B = 1.125$

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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).

NOVO

H_2S Drilling Operations Plan

a. All personnel will be trained in H_2S working conditions as required by Onshore Order 6 before drilling out of the surface casing.

b. Two briefing areas will be established. Each will be at least 150' from the wellhead, perpendicular from one another, and easily entered and exited. See H_2S page 5 for more details.

c. H_2S Safety Equipment/Systems:

i. Well Control Equipment

- Flare line will be ≥150' from the wellhead and ignited by a pilot light.
- Beware of SO_2 created by flaring.
- Choke manifold will include a remotely operated choke.
- Mud gas separator

ii. Protective Equipment for Essential Personnel

- Every person on site will be required to wear a personal H_2S and SO_2 monitor at all times while on site. Monitors will not be worn on hard hats. Monitors will be worn on the front of the chest.
- One self-contained breathing apparatus (SCBA) 30-minute rescue pack will be at each briefing area. Two 30-minute SCBA packs will be stored in the safety trailer.
- Four work/escape packs will be on the rig floor. Each pack will have a long enough hose to allow unimpaired work activity.
- Four emergency escape packs will be in the doghouse for emergency evacuation.
- Hand signals will be used when wearing protective breathing apparatus.
- Stokes litter or stretcher
- Two full OSHA compliant body harnesses
- A 100-foot long x 5/8 inch OSHA compliant rope
- One 20-pound ABC fire extinguisher

iii. H_2S Detection & Monitoring Equipment

- Every person on site will be required to wear a personal H_2S and SO_2 monitor at all times while on site. Monitors will not be worn on hard hats. Monitors will be worn on the front of the chest.
- A stationary detector with three sensors will be in the doghouse.
- Sensors will be installed on the rig floor, bell nipple, and at the end of the flow line or where drilling fluids are discharged.
- Visual alarm will be triggered at 10 ppm.
- Audible alarm will be triggered at 10 ppm.
- Calibration will occur at least every 30 days. Gas sample tubes will be kept in the safety trailer.

iv. Visual Warning System

- Color-coded H_2S condition sign will be set at the entrance to the pad.
- Color-coded condition flag will be installed to indicate current H_2S conditions.
- Two wind socks will be installed that will be visible from all sides.

v. Mud Program

- A water based mud with a pH of $\geq$10 will be maintained to control corrosion, H_2S gas returns to the surface, and minimize sulfide stress cracking and embrittlement.
- Drilling mud containing H_2S gas will be degassed at an optimum location for the rig configuration.
- This gas will be piped into the flare system.
- Enough mud additives will be on location to scavenge and/or neutralize H_2S where formation pressures are unknown.

vi. Metallurgy

- All equipment that has the potential to be exposed to H_2S will be suitable for H_2S service.
- Equipment that will meet these metallurgical standards include the drill string, casing, wellhead, BOP assembly, casing head and spool, rotating head, kill lines, choke, choke manifold and lines, valves, mud-gas separators, DST tools, test units, tubing, flanges, and other related equipment (elastomer packings and seals).

vii. Communication from well site

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

d. A remote-controlled choke, mud-gas separator, and a rotating head will be installed before drilling or testing any formation expected to contain H_2S.

Company Personnel to be Notified

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

Local & County Agencies

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

State Agencies

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

Federal Agencies

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

Residents within 2 miles

none

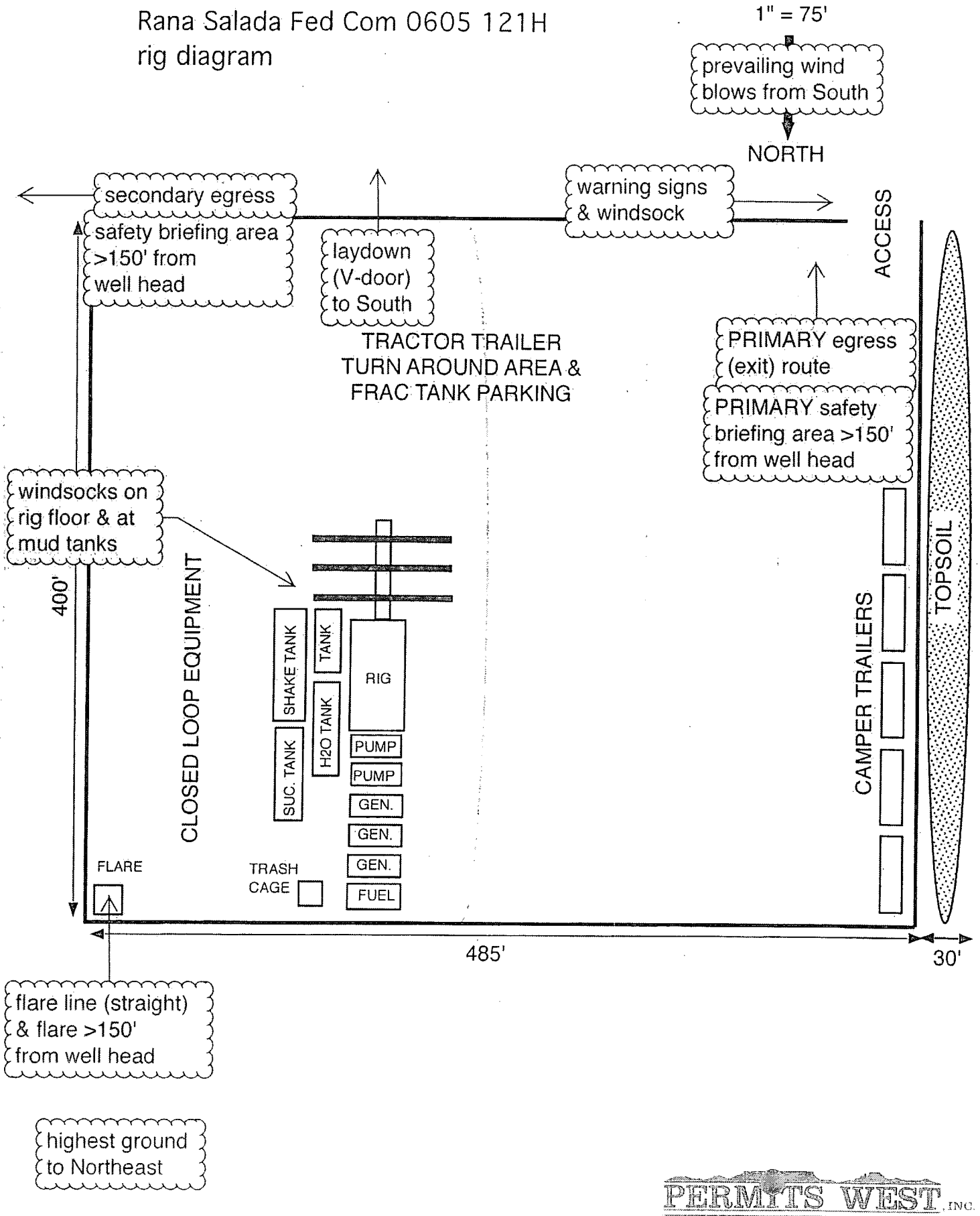
Air Evacuation

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

Veterinarians

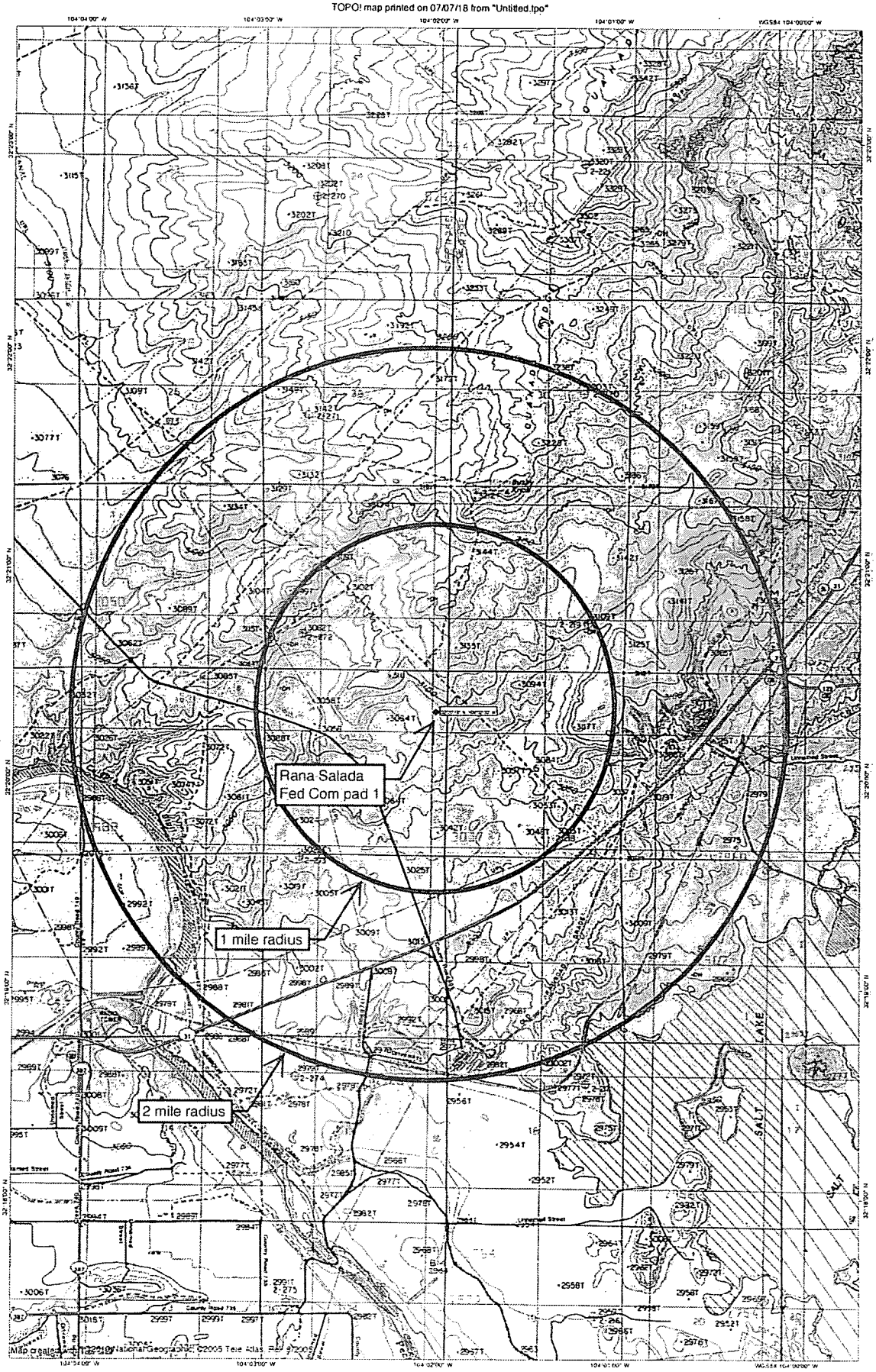
Desert Willow Veterinary Services (Carlsbad)	(575) 885-3399
Animal Care Center (Carlsbad)	(575) 885-5352

Novo's
Rana Salada Fed Com 0605 121H
rig diagram



PERMITS WEST, INC.
PROVIDING PERMITS for LAND USERS

TOPO! map printed on 07/07/18 from "Untitled.tpo"



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NATIONAL GEOGRAPHIC

NOVO

Well: Rana Salada Fed Com 0605 121H
Site: Section 01-T23S-R28E
Project: Eddy County, New Mexico
Design: rev2

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=3090.9+25 @ 3115.90ft

Northing	Easting	Latitude	Longitude
487172.53	634078.33	32.33895139	-104.03304850

Azimuths to Grid North
True North: -0.16°
Magnetic North: 6.92°

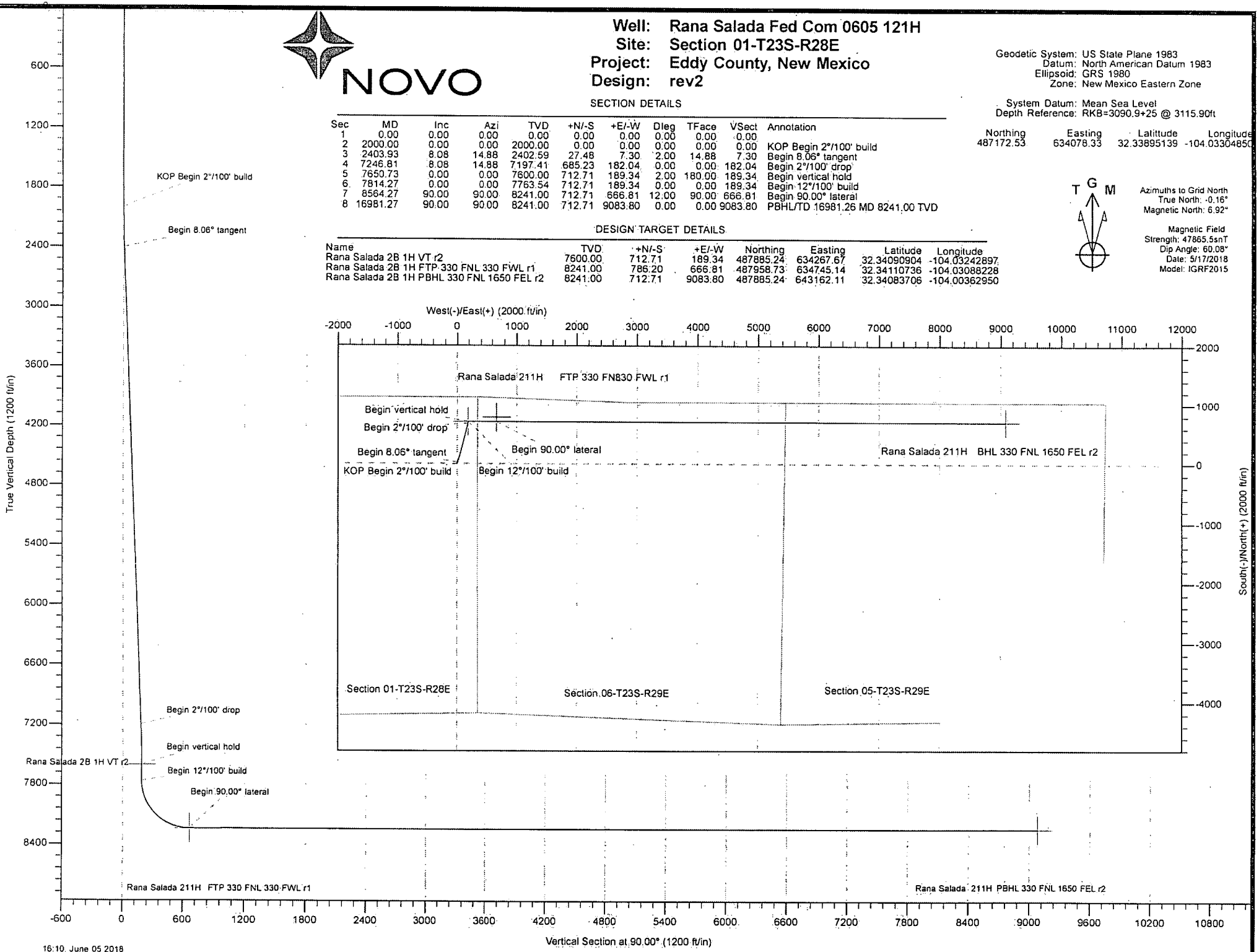
Magnetic Field
Strength: 47865.5snT
Dip Angle: 60.08°
Date: 5/17/2018
Model: IGRF2015

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	2000.00	0.00	0.00	2000.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2°/100' build
3	2403.93	8.08	14.88	2402.59	27.48	7.30	2.00	14.88	7.30	Begin 8.06° tangent
4	7246.81	8.08	14.88	7197.41	685.23	182.04	0.00	0.00	182.04	Begin 2°/100' drop
5	7650.73	0.00	0.00	7600.00	712.71	189.34	2.00	180.00	189.34	Begin vertical hold
6	7814.27	0.00	0.00	7763.54	712.71	189.34	0.00	0.00	189.34	Begin 12°/100' build
7	8564.27	90.00	90.00	8241.00	712.71	666.81	12.00	90.00	666.81	Begin 90.00° lateral
8	16981.27	90.00	90.00	8241.00	712.71	9083.80	0.00	0.00	9083.80	PBHL/TD 16981.26 MD 8241.00 TVD

DESIGN TARGET DETAILS

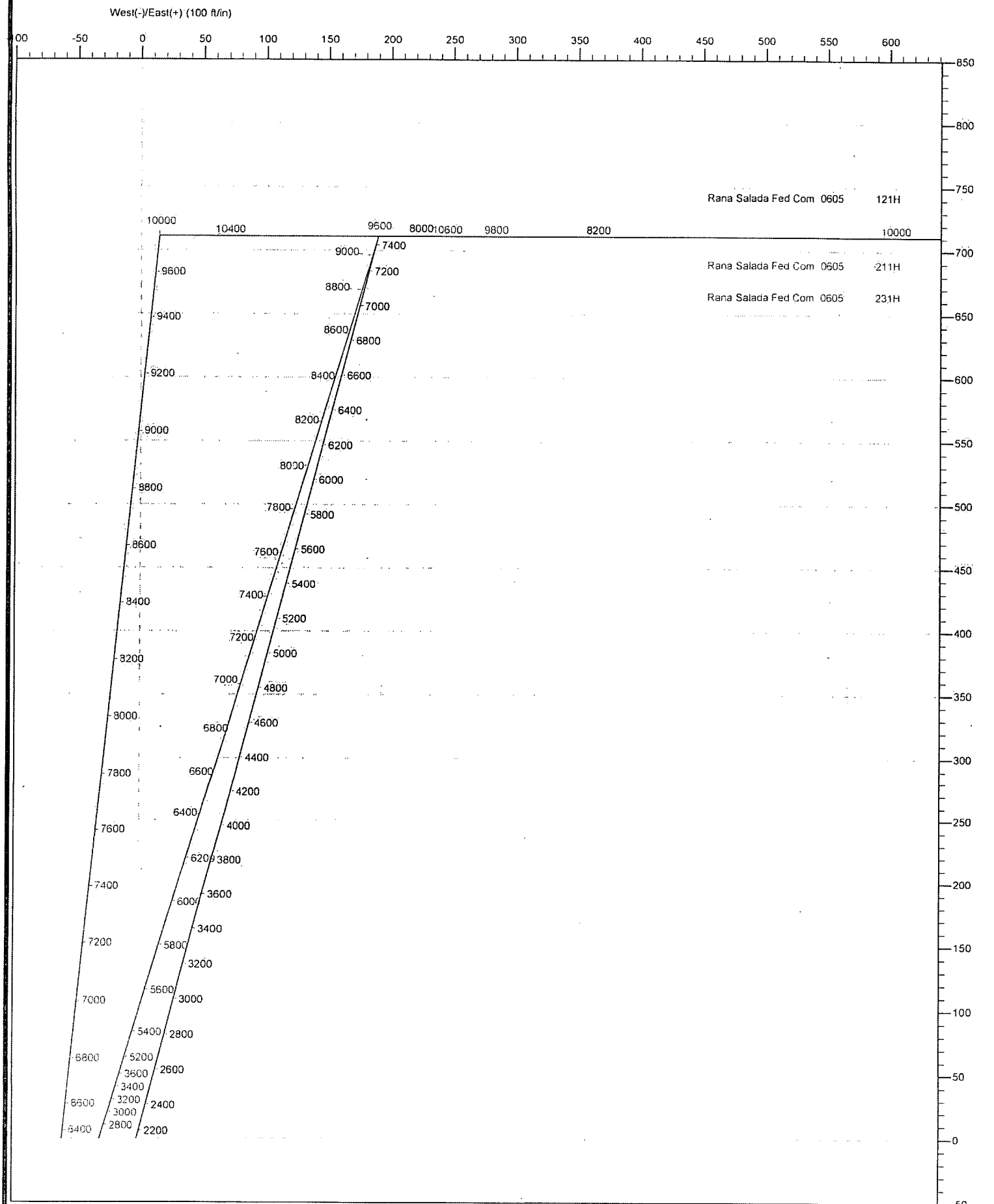
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Rana Salada 2B 1H VT r2	7600.00	712.71	189.34	487885.24	634267.67	32.34090904	-104.03242897
Rana Salada 2B 1H FTP 330 FNL 330 FWL r1	8241.00	786.20	666.81	487958.73	634745.14	32.34110736	-104.03088228
Rana Salada 2B 1H PBHL 330 FNL 1650 FEL r2	8241.00	712.71	9083.80	487885.24	643162.11	32.34083706	-104.00362950



16:10, June 05 2018

NOVO

Well: Rana Salada Fed Com 0605 121H
Site: Section 01-T23S-R28E
Project: Eddy County, New Mexico
Design: rev0



NOVO

Standard_Report

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 0605 121H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3090.9+25 @ 3115.90ft
Site:	Section 01-T23S-R28E	MD Reference:	RKB=3090.9+25 @ 3115.90ft
Well:	Rana Salada Fed Com 0605 121H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	rev2	Database:	DB_Aug0116_LT_v14

Project Eddy County, New Mexico

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

Site Section 01-T23S-R28E

Site Position:		Northing:	485,631.24 usft	Latitude:	32.33473233
From:	Map	Easting:	631,756.43 usft	Longitude:	-104.04058012
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.16 °

Well Rana Salada Fed Com 0605 121H, Surf loc: 1127 FNL 335 FEL Sec01-T23S-R28E

Well Position	+N/-S	0.00 ft	Northing:	487,172.53 usft	Latitude:	32.33895139
	+E/-W	0.00 ft	Easting:	634,078.33 usft	Longitude:	-104.03304850
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	3,090.90 ft

Wellbore Original Hole

Magnetics

Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
IGRF2015	5/17/2018	7.08	60.08	47,865.46462577

Design rev2

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	90.00

Survey Tool Program Date 6/5/2018

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.00	16,981.06	rev2 (Original Hole)	MWD	OWSG MWD - Standard

Company:	Nova Oil and Gas Northern Delaware LLC	**Local Co-ordinate Reference:**	Well Rana Salada Fed Com 0605 121H
Project:	Eddy County, New Mexico	**TVD Reference:**	RKB=3090.9+25 @ 3115.90ft
Site:	Section 01-T23S-R28E	**MD Reference:**	RKB=3090.9+25 @ 3115.90ft
Well:	Rana Salada Fed Com 0605 121H	**North Reference:**	Grid
Wellbore:	Original Hole	**Survey Calculation Method:**	Minimum Curvature
Design:	rev2	**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	487,172.53	634,078.33
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	487,172.53	634,078.33
KOP Begin 2°/100' build									
2,100.00	2.00	14.88	2,099.98	1.69	0.45	2.00	0.45	487,174.22	634,078.78
2,200.00	4.00	14.88	2,199.84	6.74	1.79	2.00	1.79	487,179.27	634,080.12
2,300.00	6.00	14.88	2,299.45	15.17	4.03	2.00	4.03	487,187.70	634,082.36
2,400.00	8.00	14.88	2,398.70	26.95	7.16	2.00	7.16	487,199.48	634,085.49

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 0605 121H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3090.9+25 @ 3115.90ft
Site:	Section 01-T23S-R28E	MD Reference:	RKB=3090.9+25 @ 3115.90ft
Well:	Rana Salada Fed Com 0605 121H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	rev2	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)
2,403.93	8.08	14.88	2,402.59	27.48	7.30	2.00	7.30	487,200.01	634,085.63
Begin 8.06° tangent									
2,500.00	8.08	14.88	2,497.71	40.52	10.77	0.00	10.77	487,213.05	634,089.10
2,600.00	8.08	14.88	2,596.72	54.11	14.37	0.00	14.37	487,226.64	634,092.70
2,700.00	8.08	14.88	2,695.72	67.69	17.98	0.00	17.98	487,240.22	634,096.31
2,800.00	8.08	14.88	2,794.73	81.27	21.59	0.00	21.59	487,253.80	634,099.92
2,900.00	8.08	14.88	2,893.74	94.85	25.20	0.00	25.20	487,267.38	634,103.53
3,000.00	8.08	14.88	2,992.75	108.43	28.81	0.00	28.81	487,280.96	634,107.14
3,100.00	8.08	14.88	3,091.76	122.02	32.42	0.00	32.42	487,294.55	634,110.75
3,200.00	8.08	14.88	3,190.76	135.60	36.02	0.00	36.02	487,308.13	634,114.35
3,300.00	8.08	14.88	3,289.77	149.18	39.63	0.00	39.63	487,321.71	634,117.96
3,400.00	8.08	14.88	3,388.78	162.76	43.24	0.00	43.24	487,335.29	634,121.57
3,500.00	8.08	14.88	3,487.79	176.34	46.85	0.00	46.85	487,348.87	634,125.18
3,600.00	8.08	14.88	3,586.79	189.93	50.46	0.00	50.46	487,362.46	634,128.79
3,700.00	8.08	14.88	3,685.80	203.51	54.06	0.00	54.06	487,376.04	634,132.39
3,800.00	8.08	14.88	3,784.81	217.09	57.67	0.00	57.67	487,389.62	634,136.00
3,900.00	8.08	14.88	3,883.82	230.67	61.28	0.00	61.28	487,403.20	634,139.61
4,000.00	8.08	14.88	3,982.82	244.25	64.89	0.00	64.89	487,416.78	634,143.22
4,100.00	8.08	14.88	4,081.83	257.84	68.50	0.00	68.50	487,430.37	634,146.83
4,200.00	8.08	14.88	4,180.84	271.42	72.11	0.00	72.11	487,443.95	634,150.44
4,300.00	8.08	14.88	4,279.85	285.00	75.71	0.00	75.71	487,457.53	634,154.04
4,400.00	8.08	14.88	4,378.85	298.58	79.32	0.00	79.32	487,471.11	634,157.65
4,500.00	8.08	14.88	4,477.86	312.16	82.93	0.00	82.93	487,484.69	634,161.26
4,600.00	8.08	14.88	4,576.87	325.75	86.54	0.00	86.54	487,498.28	634,164.87
4,700.00	8.08	14.88	4,675.88	339.33	90.15	0.00	90.15	487,511.86	634,168.48
4,800.00	8.08	14.88	4,774.89	352.91	93.75	0.00	93.75	487,525.44	634,172.08
4,900.00	8.08	14.88	4,873.89	366.49	97.36	0.00	97.36	487,539.02	634,175.69

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 0605 121H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3090.9+25 @ 3115.90ft
Site:	Section 01-T23S-R28E	MD Reference:	RKB=3090.9+25 @ 3115.90ft
Well:	Rana Salada Fed Com 0605 121H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	rev2	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)
5,000.00	8.08	14.88	4,972.90	380.07	100.97	0.00	100.97	487,552.60	634,179.30
5,100.00	8.08	14.88	5,071.91	393.66	104.58	0.00	104.58	487,566.18	634,182.91
5,200.00	8.08	14.88	5,170.92	407.24	108.19	0.00	108.19	487,579.77	634,186.52
5,300.00	8.08	14.88	5,269.92	420.82	111.80	0.00	111.80	487,593.35	634,190.13
5,400.00	8.08	14.88	5,368.93	434.40	115.40	0.00	115.40	487,606.93	634,193.73
5,500.00	8.08	14.88	5,467.94	447.98	119.01	0.00	119.01	487,620.51	634,197.34
5,600.00	8.08	14.88	5,566.95	461.57	122.62	0.00	122.62	487,634.09	634,200.95
5,700.00	8.08	14.88	5,665.95	475.15	126.23	0.00	126.23	487,647.68	634,204.56
5,800.00	8.08	14.88	5,764.96	488.73	129.84	0.00	129.84	487,661.26	634,208.17
5,900.00	8.08	14.88	5,863.97	502.31	133.45	0.00	133.45	487,674.84	634,211.77
6,000.00	8.08	14.88	5,962.98	515.89	137.05	0.00	137.05	487,688.42	634,215.38
6,100.00	8.08	14.88	6,061.98	529.48	140.66	0.00	140.66	487,702.00	634,218.99
6,200.00	8.08	14.88	6,160.99	543.06	144.27	0.00	144.27	487,715.59	634,222.60
6,300.00	8.08	14.88	6,260.00	556.64	147.88	0.00	147.88	487,729.17	634,226.21
6,400.00	8.08	14.88	6,359.01	570.22	151.49	0.00	151.49	487,742.75	634,229.82
6,500.00	8.08	14.88	6,458.01	583.80	155.09	0.00	155.09	487,756.33	634,233.42
6,600.00	8.08	14.88	6,557.02	597.38	158.70	0.00	158.70	487,769.91	634,237.03
6,700.00	8.08	14.88	6,656.03	610.97	162.31	0.00	162.31	487,783.50	634,240.64
6,800.00	8.08	14.88	6,755.04	624.55	165.92	0.00	165.92	487,797.08	634,244.25
6,900.00	8.08	14.88	6,854.05	638.13	169.53	0.00	169.53	487,810.66	634,247.86
7,000.00	8.08	14.88	6,953.05	651.71	173.14	0.00	173.14	487,824.24	634,251.47
7,100.00	8.08	14.88	7,052.06	665.29	176.74	0.00	176.74	487,837.82	634,255.07
7,200.00	8.08	14.88	7,151.07	678.88	180.35	0.00	180.35	487,851.41	634,258.68
7,246.81	8.08	14.88	7,197.41	685.23	182.04	0.00	182.04	487,857.76	634,260.37
Begin 2°/100' drop									
7,300.00	7.01	14.88	7,250.14	691.99	183.83	2.00	183.83	487,864.51	634,262.16
7,400.00	5.01	14.88	7,349.59	702.11	186.52	2.00	186.52	487,874.64	634,264.85

Company:	Nova Oil and Gas Northern Delaware LLC	**Local Co-ordinate Reference:**	Well Rana Salada Fed Com 0605 121H
Project:	Eddy County, New Mexico	**TVD Reference:**	RKB=3090.9+25 @ 3115.90ft
Site:	Section 01-T23S-R28E	**MD Reference:**	RKB=3090.9+25 @ 3115.90ft
Well:	Rana Salada Fed Com 0605 121H	**North Reference:**	Grid
Wellbore:	Original Hole	**Survey Calculation Method:**	Minimum Curvature
Design:	rev2	**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)
7,500.00	3.01	14.88	7,449.34	708.88	188.32	2.00	188.32	487,881.41	634,266.65
7,600.00	1.01	14.88	7,549.27	712.28	189.22	2.00	189.22	487,884.80	634,267.55
7,650.73	0.00	0.00	7,600.00	712.71	189.34	2.00	189.34	487,885.24	634,267.67
Begin vertical hold									
7,700.00	0.00	0.00	7,649.27	712.71	189.34	0.00	189.34	487,885.24	634,267.67
7,800.00	0.00	0.00	7,749.27	712.71	189.34	0.00	189.34	487,885.24	634,267.67
7,814.27	0.00	0.00	7,763.54	712.71	189.34	0.00	189.34	487,885.24	634,267.67
Begin 12°/100' build									
7,900.00	10.29	90.00	7,848.81	712.71	197.02	12.00	197.02	487,885.24	634,275.34
8,000.00	22.29	90.00	7,944.62	712.71	225.01	12.00	225.01	487,885.24	634,303.34
8,100.00	34.29	90.00	8,032.52	712.71	272.31	12.00	272.31	487,885.24	634,350.64
8,200.00	46.29	90.00	8,108.66	712.71	336.86	12.00	336.86	487,885.24	634,415.19
8,300.00	58.29	90.00	8,169.72	712.71	415.82	12.00	415.82	487,885.24	634,494.15
8,400.00	70.29	90.00	8,213.02	712.71	505.75	12.00	505.75	487,885.24	634,584.08
8,500.00	82.29	90.00	8,236.69	712.71	602.73	12.00	602.73	487,885.24	634,681.05
8,564.27	90.00	90.00	8,241.00	712.71	666.80	12.00	666.80	487,885.24	634,745.13
Begin 90.00° lateral									
8,600.00	90.00	90.00	8,241.00	712.71	702.53	0.00	702.53	487,885.24	634,780.86
8,700.00	90.00	90.00	8,241.00	712.71	802.53	0.00	802.53	487,885.24	634,880.86
8,800.00	90.00	90.00	8,241.00	712.71	902.53	0.00	902.53	487,885.24	634,980.86
8,900.00	90.00	90.00	8,241.00	712.71	1,002.53	0.00	1,002.53	487,885.24	635,080.86
9,000.00	90.00	90.00	8,241.00	712.71	1,102.53	0.00	1,102.53	487,885.24	635,180.86
9,100.00	90.00	90.00	8,241.00	712.71	1,202.53	0.00	1,202.53	487,885.24	635,280.86
9,200.00	90.00	90.00	8,241.00	712.71	1,302.53	0.00	1,302.53	487,885.24	635,380.86
9,300.00	90.00	90.00	8,241.00	712.71	1,402.53	0.00	1,402.53	487,885.24	635,480.86
9,400.00	90.00	90.00	8,241.00	712.71	1,502.53	0.00	1,502.53	487,885.24	635,580.86
9,500.00	90.00	90.00	8,241.00	712.71	1,602.53	0.00	1,602.53	487,885.24	635,680.86

Company:	Nova Oil and Gas Northern Delaware LLC	Local Co-ordinate Reference:	Well Rana Salada Fed Com 0605 121H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=3090.9+25 @ 3115.90ft
Site:	Section 01-T23S-R28E	MD Reference:	RKB=3090.9+25 @ 3115.90ft
Well:	Rana Salada Fed Com 0605 121H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	rev2	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)
9,600.00	90.00	90.00	8,241.00	712.71	1,702.53	0.00	1,702.53	487,885.24	635,780.86
9,700.00	90.00	90.00	8,241.00	712.71	1,802.53	0.00	1,802.53	487,885.24	635,880.86
9,800.00	90.00	90.00	8,241.00	712.71	1,902.53	0.00	1,902.53	487,885.24	635,980.86
9,900.00	90.00	90.00	8,241.00	712.71	2,002.53	0.00	2,002.53	487,885.24	636,080.86
10,000.00	90.00	90.00	8,241.00	712.71	2,102.53	0.00	2,102.53	487,885.24	636,180.86
10,100.00	90.00	90.00	8,241.00	712.71	2,202.53	0.00	2,202.53	487,885.24	636,280.86
10,200.00	90.00	90.00	8,241.00	712.71	2,302.53	0.00	2,302.53	487,885.24	636,380.86
10,300.00	90.00	90.00	8,241.00	712.71	2,402.53	0.00	2,402.53	487,885.24	636,480.86
10,400.00	90.00	90.00	8,241.00	712.71	2,502.53	0.00	2,502.53	487,885.24	636,580.86
10,500.00	90.00	90.00	8,241.00	712.71	2,602.53	0.00	2,602.53	487,885.24	636,680.86
10,600.00	90.00	90.00	8,241.00	712.71	2,702.53	0.00	2,702.53	487,885.24	636,780.86
10,700.00	90.00	90.00	8,241.00	712.71	2,802.53	0.00	2,802.53	487,885.24	636,880.86
10,800.00	90.00	90.00	8,241.00	712.71	2,902.53	0.00	2,902.53	487,885.24	636,980.86
10,900.00	90.00	90.00	8,241.00	712.71	3,002.53	0.00	3,002.53	487,885.24	637,080.86
11,000.00	90.00	90.00	8,241.00	712.71	3,102.53	0.00	3,102.53	487,885.24	637,180.86
11,100.00	90.00	90.00	8,241.00	712.71	3,202.53	0.00	3,202.53	487,885.24	637,280.86
11,200.00	90.00	90.00	8,241.00	712.71	3,302.53	0.00	3,302.53	487,885.24	637,380.85
11,300.00	90.00	90.00	8,241.00	712.71	3,402.53	0.00	3,402.53	487,885.24	637,480.85
11,400.00	90.00	90.00	8,241.00	712.71	3,502.53	0.00	3,502.53	487,885.24	637,580.85
11,500.00	90.00	90.00	8,241.00	712.71	3,602.53	0.00	3,602.53	487,885.24	637,680.85
11,600.00	90.00	90.00	8,241.00	712.71	3,702.53	0.00	3,702.53	487,885.24	637,780.85
11,700.00	90.00	90.00	8,241.00	712.71	3,802.53	0.00	3,802.53	487,885.24	637,880.85
11,800.00	90.00	90.00	8,241.00	712.71	3,902.53	0.00	3,902.53	487,885.24	637,980.85
11,900.00	90.00	90.00	8,241.00	712.71	4,002.53	0.00	4,002.53	487,885.24	638,080.85
12,000.00	90.00	90.00	8,241.00	712.71	4,102.53	0.00	4,102.53	487,885.24	638,180.85
12,100.00	90.00	90.00	8,241.00	712.71	4,202.53	0.00	4,202.53	487,885.24	638,280.85
12,200.00	90.00	90.00	8,241.00	712.71	4,302.53	0.00	4,302.53	487,885.24	638,380.85

Company:	Nova Oil and Gas Northern Delaware LLC	**Local Co-ordinate Reference:**	Well Rana Salada Fed Com 0605 121H
Project:	Eddy County, New Mexico	**TVD Reference:**	RKB=3090.9+25 @ 3115.90ft
Site:	Section 01-T23S-R28E	**MD Reference:**	RKB=3090.9+25 @ 3115.90ft
Well:	Rana Salada Fed Com 0605 121H	**North Reference:**	Grid
Wellbore:	Original Hole	**Survey Calculation Method:**	Minimum Curvature
Design:	rev2	**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)
12,300.00	90.00	90.00	8,241.00	712.71	4,402.53	0.00	4,402.53	487,885.24	638,480.85
12,400.00	90.00	90.00	8,241.00	712.71	4,502.53	0.00	4,502.53	487,885.24	638,580.85
12,500.00	90.00	90.00	8,241.00	712.71	4,602.53	0.00	4,602.53	487,885.24	638,680.85
12,600.00	90.00	90.00	8,241.00	712.71	4,702.53	0.00	4,702.53	487,885.24	638,780.85
12,700.00	90.00	90.00	8,241.00	712.71	4,802.53	0.00	4,802.53	487,885.24	638,880.85
12,800.00	90.00	90.00	8,241.00	712.71	4,902.53	0.00	4,902.53	487,885.24	638,980.85
12,900.00	90.00	90.00	8,241.00	712.71	5,002.53	0.00	5,002.53	487,885.24	639,080.85
13,000.00	90.00	90.00	8,241.00	712.71	5,102.53	0.00	5,102.53	487,885.24	639,180.85
13,100.00	90.00	90.00	8,241.00	712.71	5,202.53	0.00	5,202.53	487,885.24	639,280.85
13,200.00	90.00	90.00	8,241.00	712.71	5,302.53	0.00	5,302.53	487,885.24	639,380.85
13,300.00	90.00	90.00	8,241.00	712.71	5,402.53	0.00	5,402.53	487,885.24	639,480.85
13,400.00	90.00	90.00	8,241.00	712.71	5,502.53	0.00	5,502.53	487,885.24	639,580.85
13,500.00	90.00	90.00	8,241.00	712.71	5,602.53	0.00	5,602.53	487,885.24	639,680.85
13,600.00	90.00	90.00	8,241.00	712.71	5,702.53	0.00	5,702.53	487,885.24	639,780.85
13,700.00	90.00	90.00	8,241.00	712.71	5,802.53	0.00	5,802.53	487,885.24	639,880.85
13,800.00	90.00	90.00	8,241.00	712.71	5,902.53	0.00	5,902.53	487,885.24	639,980.85
13,900.00	90.00	90.00	8,241.00	712.71	6,002.53	0.00	6,002.53	487,885.24	640,080.85
14,000.00	90.00	90.00	8,241.00	712.71	6,102.53	0.00	6,102.53	487,885.24	640,180.85
14,100.00	90.00	90.00	8,241.00	712.71	6,202.53	0.00	6,202.53	487,885.24	640,280.85
14,200.00	90.00	90.00	8,241.00	712.71	6,302.53	0.00	6,302.53	487,885.24	640,380.85
14,300.00	90.00	90.00	8,241.00	712.71	6,402.53	0.00	6,402.53	487,885.24	640,480.85
14,400.00	90.00	90.00	8,241.00	712.71	6,502.53	0.00	6,502.53	487,885.24	640,580.85
14,500.00	90.00	90.00	8,241.00	712.71	6,602.53	0.00	6,602.53	487,885.24	640,680.85
14,600.00	90.00	90.00	8,241.00	712.71	6,702.53	0.00	6,702.53	487,885.24	640,780.85
14,700.00	90.00	90.00	8,241.00	712.71	6,802.53	0.00	6,802.53	487,885.24	640,880.85
14,800.00	90.00	90.00	8,241.00	712.71	6,902.53	0.00	6,902.53	487,885.24	640,980.85
14,900.00	90.00	90.00	8,241.00	712.71	7,002.53	0.00	7,002.53	487,885.24	641,080.85

Company:	Nova Oil and Gas Northern Delaware LLC	**Local Co-ordinate Reference:**	Well Rana Salada Fed Com 0605 121H
Project:	Eddy County, New Mexico	**TVD Reference:**	RKB=3090.9+25 @ 3115.90ft
Site:	Section 01-T23S-R28E	**MD Reference:**	RKB=3090.9+25 @ 3115.90ft
Well:	Rana Salada Fed Com 0605 121H	**North Reference:**	Grid
Wellbore:	Original Hole	**Survey Calculation Method:**	Minimum Curvature
Design:	rev2	**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)
15,000.00	90.00	90.00	8,241.00	712.71	7,102.53	0.00	7,102.53	487,885.24	641,180.85
15,100.00	90.00	90.00	8,241.00	712.71	7,202.53	0.00	7,202.53	487,885.24	641,280.85
15,200.00	90.00	90.00	8,241.00	712.71	7,302.53	0.00	7,302.53	487,885.24	641,380.85
15,300.00	90.00	90.00	8,241.00	712.71	7,402.53	0.00	7,402.53	487,885.24	641,480.85
15,400.00	90.00	90.00	8,241.00	712.71	7,502.53	0.00	7,502.53	487,885.24	641,580.85
15,500.00	90.00	90.00	8,241.00	712.71	7,602.53	0.00	7,602.53	487,885.24	641,680.85
15,600.00	90.00	90.00	8,241.00	712.71	7,702.53	0.00	7,702.53	487,885.24	641,780.85
15,700.00	90.00	90.00	8,241.00	712.71	7,802.53	0.00	7,802.53	487,885.24	641,880.85
15,800.00	90.00	90.00	8,241.00	712.71	7,902.53	0.00	7,902.53	487,885.24	641,980.85
15,900.00	90.00	90.00	8,241.00	712.71	8,002.53	0.00	8,002.53	487,885.24	642,080.85
16,000.00	90.00	90.00	8,241.00	712.71	8,102.53	0.00	8,102.53	487,885.24	642,180.85
16,100.00	90.00	90.00	8,241.00	712.71	8,202.53	0.00	8,202.53	487,885.24	642,280.85
16,200.00	90.00	90.00	8,241.00	712.71	8,302.53	0.00	8,302.53	487,885.24	642,380.84
16,300.00	90.00	90.00	8,241.00	712.71	8,402.53	0.00	8,402.53	487,885.24	642,480.84
16,400.00	90.00	90.00	8,241.00	712.71	8,502.53	0.00	8,502.53	487,885.24	642,580.84
16,500.00	90.00	90.00	8,241.00	712.71	8,602.53	0.00	8,602.53	487,885.24	642,680.84
16,600.00	90.00	90.00	8,241.00	712.71	8,702.53	0.00	8,702.53	487,885.24	642,780.84
16,700.00	90.00	90.00	8,241.00	712.71	8,802.53	0.00	8,802.53	487,885.24	642,880.84
16,800.00	90.00	90.00	8,241.00	712.71	8,902.53	0.00	8,902.53	487,885.24	642,980.84
16,900.00	90.00	90.00	8,241.00	712.71	9,002.53	0.00	9,002.53	487,885.24	643,080.84
16,981.26	90.00	90.00	8,241.00	712.71	9,083.79	0.00	9,083.79	487,885.24	643,162.10
PBHL/TD 16981.26 MD 8241.00 TVD									
16,981.27	90.00	90.00	8,241.00	712.71	9,083.80	0.01	9,083.80	487,885.24	643,162.11

Company:	Nova Oil and Gas Northern Delaware LLC	**Local Co-ordinate Reference:**	Well Rana Salada Fed Com 0605 121H
Project:	Eddy County, New Mexico	**TVD Reference:**	RKB=3090.9+25 @ 3115.90ft
Site:	Section 01-T23S-R28E	**MD Reference:**	RKB=3090.9+25 @ 3115.90ft
Well:	Rana Salada Fed Com 0605 121H	**North Reference:**	Grid
Wellbore:	Original Hole	**Survey Calculation Method:**	Minimum Curvature
Design:	rev2	**Database:**	DB_Aug0116_LT_v14

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
2,000.00	2,000.00	0.00	0.00	KOP Begin 2°/100' build
2,403.93	2,402.59	27.48	7.30	Begin 8.06° tangent
7,246.81	7,197.41	685.23	182.04	Begin 2°/100' drop
7,650.73	7,600.00	712.71	189.34	Begin vertical hold
7,814.27	7,763.54	712.71	189.34	Begin 12°/100' build
8,564.27	8,241.00	712.71	666.80	Begin 90.00° lateral
16,981.26	8,241.00	712.71	9,083.79	PBHL/TD 16981.26 MD 8241.00 TVD

NOVO

Anticollision Report

Company:	Nova Oil and Gas Northern Delaware LLC	**Local Co-ordinate Reference:**	Well Rana Salada Fed Com 0605 121H
			RKB=3090.9+25 @ 3115.90ft
Project:	Eddy County, New Mexico	**TVD Reference:**	RKB=3090.9+25 @ 3115.90ft
Reference Site:	Section 01-T23S-R28E	**MD Reference:**	Grid
Site Error:	0.00 ft Rana Salada Fed Com 0605 121H	**North Reference:**	Minimum Curvature
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	rev2	**Database:**	Offset Datum
Reference Design:		**Offset TVD Reference:**	

Reference rev2

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 1,898.13 ft	**Error Surface:**	Pedal Curve
Warning Levels Evaluated at:	2.00 **Sigma**	**Casing Method:**	Not applied

Survey Tool Program **Date** 6/5/2018

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.00	16,981.06	rev2 (Original Hole)	MWD	OWSG MWD - Standard

Summary

Site Name / Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Section 01-T23S-R28E						
Rana Salada Fed Com 0605 231H - Original Ho	2,000.00	2,001.80	59.96	46.06	4.315	CC
Rana Salada Fed Com 0605 231H - Original Ho	2,100.00	2,101.82	60.43	45.82	4.136	ES
Rana Salada Fed Com 0605 231H - Original Ho	2,200.00	2,201.96	62.13	46.80	4.053	SF
Rana Salada Fed Com 0605 211H - Original H	2,000.00	2,000.80	30.00	16.11	2.159	CC
Rana Salada Fed Com 0605 211H - Original H	2,100.00	2,100.82	30.50	15.89	2.087	ES, SF

Offset Design Section 01-T23S-R28E - Rana Salada Fed Com 0605 211H - Original Hole - rev1 — **Offset Site Error:** 0.00 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.00	0.00	1.80	-1.80	0.00	0.00	-90.07	-0.07	-59.96	59.96				
100.00	100.00	101.80	98.20	0.13	0.14	-90.07	-0.07	-59.96	59.96	59.68	0.28	217.794	
200.00	200.00	201.80	198.20	0.49	0.50	-90.07	-0.07	-59.96	59.96	58.97	0.99	60.429	
300.00	300.00	301.80	298.20	0.85	0.86	-90.07	-0.07	-59.96	59.96	58.25	1.71	35.081	
400.00	400.00	401.80	398.20	1.21	1.22	-90.07	-0.07	-59.96	59.96	57.53	2.43	24.714	
500.00	500.00	501.80	498.20	1.57	1.57	-90.07	-0.07	-59.96	59.96	56.82	3.14	19.077	
600.00	600.00	601.80	598.20	1.93	1.93	-90.07	-0.07	-59.96	59.96	56.10	3.86	15.534	
700.00	700.00	701.80	698.20	2.29	2.29	-90.07	-0.07	-59.96	59.96	55.38	4.58	13.100	
800.00	800.00	801.80	798.20	2.64	2.65	-90.07	-0.07	-59.96	59.96	54.67	5.29	11.326	
900.00	900.00	901.80	898.20	3.00	3.01	-90.07	-0.07	-59.96	59.96	53.95	6.01	9.975	
1,000.00	1,000.00	1,001.80	998.20	3.36	3.37	-90.07	-0.07	-59.96	59.96	53.23	6.73	8.912	
1,100.00	1,100.00	1,101.80	1,098.20	3.72	3.73	-90.07	-0.07	-59.96	59.96	52.52	7.44	8.054	
1,200.00	1,200.00	1,201.80	1,198.20	4.08	4.08	-90.07	-0.07	-59.96	59.96	51.80	8.16	7.347	
1,300.00	1,300.00	1,301.80	1,298.20	4.44	4.44	-90.07	-0.07	-59.96	59.96	51.08	8.88	6.753	
1,400.00	1,400.00	1,401.80	1,398.20	4.79	4.80	-90.07	-0.07	-59.96	59.96	50.36	9.60	6.249	
1,500.00	1,500.00	1,501.80	1,498.20	5.15	5.16	-90.07	-0.07	-59.96	59.96	49.65	10.31	5.814	
1,600.00	1,600.00	1,601.80	1,598.20	5.51	5.52	-90.07	-0.07	-59.96	59.96	48.93	11.03	5.436	
1,700.00	1,700.00	1,701.80	1,698.20	5.87	5.88	-90.07	-0.07	-59.96	59.96	48.21	11.75	5.105	
1,800.00	1,800.00	1,801.80	1,798.20	6.23	6.23	-90.07	-0.07	-59.96	59.96	47.50	12.46	4.811	
1,900.00	1,900.00	1,901.80	1,898.20	6.59	6.59	-90.07	-0.07	-59.96	59.96	46.78	13.18	4.549	
2,000.00	2,000.00	2,001.80	1,998.20	6.95	6.95	-90.07	-0.07	-59.96	59.96	46.06	13.90	4.315	CC

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

Company:	Nova Oil and Gas Northern Delaware LLC	**Local Co-ordinate Reference:**	Well Rana Salada Fed Com 0605 121H
			RKB=3090.9+25 @ 3115.90ft
Project:	Eddy County, New Mexico	**TVD Reference:**	RKB=3090.9+25 @ 3115.90ft
Reference Site:	Section 01-T23S-R28E	**MD Reference:**	Grid
Site Error:	0.00 ft Rana Salada Fed Com 0605 121H	**North Reference:**	Minimum Curvature
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	rev2	**Database:**	Offset Datum
Reference Design:		**Offset TVD Reference:**	

Offset Design Section 01-T23S-R28E - Rana Salada Fed Com 0605 231H - Original Hole - rev1 — **Offset Site Error:** 0.00 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
2,100.00	2,099.98	2,101.82	2,098.18	7.30	7.31	-106.53	-0.07	-59.96	60.43	45.82	14.61	4.136	ES
2,200.00	2,199.84	2,201.96	2,198.04	7.66	7.67	-111.13	-0.07	-59.96	62.13	46.80	15.33	4.053	SF
2,300.00	2,299.45	2,302.35	2,297.65	8.02	8.03	-118.14	-0.07	-59.96	65.78	49.73	16.05	4.099	
2,400.00	2,398.70	2,403.10	2,396.90	8.38	8.39	-126.53	-0.07	-59.96	72.35	55.59	16.77	4.315	
2,500.00	2,497.71	2,504.09	2,495.91	8.74	8.75	-134.45	-0.07	-59.96	81.55	64.06	17.49	4.663	
2,600.00	2,596.72	2,605.08	2,594.92	9.11	9.11	-140.68	-0.07	-59.96	91.98	73.77	18.21	5.052	
2,700.00	2,695.72	2,706.08	2,693.92	9.48	9.48	-145.61	-0.07	-59.96	103.28	84.35	18.93	5.456	
2,800.00	2,794.73	2,807.07	2,792.93	9.86	9.84	-149.55	-0.07	-59.96	115.18	95.53	19.65	5.861	
2,900.00	2,893.74	2,908.06	2,891.94	10.24	10.20	-152.75	-0.07	-59.96	127.52	107.15	20.37	6.259	
3,000.00	2,992.75	3,009.05	2,990.95	10.62	10.56	-155.38	-0.07	-59.96	140.19	119.09	21.10	6.646	
3,100.00	3,091.76	3,089.96	3,089.96	11.01	10.85	-157.56	-0.07	-59.96	153.10	131.35	21.75	7.040	
3,200.00	3,190.76	3,188.96	3,188.96	11.40	11.21	-159.41	-0.07	-59.96	166.19	143.73	22.46	7.399	
3,300.00	3,289.77	3,287.97	3,287.97	11.79	11.56	-160.99	-0.07	-59.96	179.43	156.25	23.18	7.742	
3,400.00	3,388.78	3,386.98	3,386.98	12.18	11.92	-162.35	-0.07	-59.96	192.78	168.89	23.89	8.068	
3,500.00	3,487.79	3,485.99	3,485.99	12.57	12.27	-163.53	-0.07	-59.96	206.23	181.62	24.61	8.380	
3,600.00	3,586.79	3,584.99	3,584.99	12.97	12.63	-164.57	-0.07	-59.96	219.75	194.42	25.33	8.677	
3,700.00	3,685.80	3,684.00	3,684.00	13.36	12.98	-165.49	-0.07	-59.96	233.34	207.29	26.04	8.959	
3,800.00	3,784.81	3,783.01	3,783.01	13.76	13.34	-166.30	-0.07	-59.96	246.97	220.21	26.76	9.229	
3,900.00	3,883.82	3,882.02	3,882.02	14.16	13.69	-167.03	-0.07	-59.96	260.66	233.18	27.48	9.485	
4,000.00	3,982.82	3,981.02	3,981.02	14.56	14.05	-167.69	-0.07	-59.96	274.37	246.18	28.20	9.730	
4,100.00	4,081.83	4,080.03	4,080.03	14.96	14.40	-168.29	-0.07	-59.96	288.13	259.21	28.92	9.964	
4,200.00	4,180.84	4,179.04	4,179.04	15.36	14.76	-168.83	-0.07	-59.96	301.91	272.27	29.64	10.187	
4,300.00	4,279.85	4,278.05	4,278.05	15.76	15.11	-169.32	-0.07	-59.96	315.71	285.35	30.35	10.401	
4,400.00	4,378.85	4,377.05	4,377.05	16.17	15.47	-169.78	-0.07	-59.96	329.53	298.46	31.07	10.605	
4,500.00	4,477.86	4,476.06	4,476.06	16.57	15.82	-170.19	-0.07	-59.96	343.38	311.58	31.79	10.800	
4,600.00	4,576.87	4,575.07	4,575.07	16.98	16.18	-170.58	-0.07	-59.96	357.24	324.72	32.51	10.988	
4,700.00	4,675.88	4,674.08	4,674.08	17.38	16.53	-170.93	-0.07	-59.96	371.11	337.88	33.23	11.167	
4,800.00	4,774.89	4,773.09	4,773.09	17.79	16.89	-171.26	-0.07	-59.96	385.00	351.04	33.95	11.339	
4,900.00	4,873.89	4,872.09	4,872.09	18.19	17.24	-171.57	-0.07	-59.96	398.90	364.22	34.67	11.505	
5,000.00	4,972.90	4,971.10	4,971.10	18.60	17.60	-171.85	-0.07	-59.96	412.81	377.41	35.39	11.663	
5,100.00	5,071.91	5,070.11	5,070.11	19.01	17.95	-172.12	-0.07	-59.96	426.72	390.61	36.11	11.816	
5,200.00	5,170.92	5,169.12	5,169.12	19.41	18.31	-172.37	-0.07	-59.96	440.65	403.82	36.83	11.963	
5,300.00	5,269.92	5,268.12	5,268.12	19.82	18.66	-172.61	-0.07	-59.96	454.59	417.03	37.56	12.104	
5,400.00	5,368.93	5,367.13	5,367.13	20.23	19.02	-172.83	-0.07	-59.96	468.53	430.25	38.28	12.241	
5,500.00	5,467.94	5,466.14	5,466.14	20.64	19.37	-173.04	-0.07	-59.96	482.48	443.48	39.00	12.372	
5,600.00	5,566.95	5,565.15	5,565.15	21.05	19.73	-173.23	-0.07	-59.96	496.43	456.71	39.72	12.499	
5,700.00	5,665.95	5,664.15	5,664.15	21.46	20.08	-173.42	-0.07	-59.96	510.39	469.95	40.44	12.621	
5,800.00	5,764.96	5,763.16	5,763.16	21.87	20.44	-173.59	-0.07	-59.96	524.35	483.19	41.16	12.739	
5,900.00	5,863.97	5,862.17	5,862.17	22.28	20.79	-173.76	-0.07	-59.96	538.32	496.44	41.88	12.853	
6,000.00	5,962.98	5,961.18	5,961.18	22.69	21.15	-173.92	-0.07	-59.96	552.30	509.69	42.61	12.963	
6,100.00	6,061.98	6,060.18	6,060.18	23.10	21.50	-174.07	-0.07	-59.96	566.27	522.95	43.33	13.070	
6,200.00	6,160.99	6,159.19	6,159.19	23.51	21.85	-174.21	-0.07	-59.96	580.26	536.21	44.05	13.173	
6,300.00	6,260.00	6,272.81	6,272.80	23.92	22.26	-174.35	0.85	-59.86	593.52	548.67	44.85	13.232	
6,400.00	6,359.01	6,397.60	6,397.44	24.33	22.71	-174.37	6.70	-59.25	602.98	557.30	45.67	13.203	
6,500.00	6,458.02	6,523.16	6,522.48	24.74	23.16	-174.27	18.04	-58.06	608.21	561.78	46.42	13.101	
6,600.00	6,557.02	6,649.02	6,647.18	25.16	23.60	-174.03	34.85	-56.30	609.20	562.09	47.11	12.932	
6,700.00	6,656.03	6,774.68	6,770.83	25.57	24.05	-173.66	57.06	-53.97	605.95	558.23	47.72	12.697	
6,800.00	6,755.04	6,899.67	6,892.73	25.98	24.50	-173.15	84.48	-51.09	598.52	550.25	48.27	12.399	
6,900.00	6,854.05	7,003.71	6,993.50	26.39	24.87	-172.63	110.23	-48.39	588.32	539.36	48.96	12.017	
7,000.00	6,953.05	7,103.04	7,089.69	26.81	25.24	-172.11	134.90	-45.81	578.10	528.41	49.69	11.635	
7,100.00	7,052.06	7,202.38	7,185.88	27.22	25.62	-171.58	159.57	-43.22	567.92	517.50	50.42	11.264	

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

Company:	Nova Oil and Gas Northern Delaware LLC	**Local Co-ordinate Reference:**	Well Rana Salada Fed Com 0605 121H
			RKB=3090.9+25 @ 3115.90ft
Project:	Eddy County, New Mexico	**TVD Reference:**	RKB=3090.9+25 @ 3115.90ft
Reference Site:	Section 01-T23S-R28E	**MD Reference:**	Grid
Site Error:	0.00 ft Rana Salada Fed Com 0605 121H	**North Reference:**	Minimum Curvature
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	rev2	**Database:**	Offset Datum
Reference Design:		**Offset TVD Reference:**	

Offset Design Section 01-T23S-R28E - Rana Salada Fed Com 0605 231H - Original Hole - rev1 — **Offset Site Error:** 0.00 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
7,200.00	7,151.07	7,301.72	7,282.07	27.63	25.99	-171.02	184.24	-40.63	557.80	506.64	51.16	10.904	
7,300.00	7,250.14	7,401.00	7,378.21	28.04	26.38	-170.42	208.90	-38.05	547.24	495.35	51.89	10.545	
7,400.00	7,349.59	7,500.12	7,473.96	28.43	26.77	-169.71	233.45	-35.47	533.71	481.08	52.63	10.141	
7,500.00	7,449.34	7,601.80	7,569.16	28.80	27.17	-168.87	257.87	-32.91	516.86	463.48	53.38	9.683	
7,600.00	7,549.27	7,704.17	7,663.70	29.15	27.58	-167.88	282.12	-30.37	496.76	442.63	54.12	9.178	
7,700.00	7,649.27	7,807.23	7,757.57	29.48	27.99	-151.89	306.19	-27.85	473.87	418.99	54.87	8.636	
7,800.00	7,749.27	7,889.61	7,851.33	29.81	28.33	-150.70	330.24	-25.32	450.72	395.17	55.55	8.114	
7,900.00	7,848.81	7,986.19	7,944.86	30.14	28.73	123.11	354.23	-22.81	431.75	375.45	56.30	7.668	
7,989.71	7,935.06	8,070.34	8,026.34	30.45	29.08	127.51	375.13	-20.62	425.57	368.53	57.04	7.461	
8,000.00	7,944.62	8,079.70	8,035.40	30.49	29.11	128.02	377.45	-20.37	425.66	368.53	57.13	7.451	
8,100.00	8,032.52	8,166.04	8,119.01	30.84	29.48	132.71	398.89	-18.12	436.61	378.62	58.00	7.528	
8,200.00	8,108.66	8,241.45	8,192.03	31.21	29.79	135.99	417.62	-16.16	467.92	409.08	58.84	7.952	
8,300.00	8,169.72	8,302.63	8,251.28	31.62	30.05	136.71	432.82	-14.57	520.12	460.55	59.57	8.731	
8,400.00	8,213.02	8,346.91	8,294.15	32.13	30.24	133.28	443.81	-13.41	590.52	530.42	60.10	9.825	
8,500.00	8,236.69	8,372.35	8,318.78	32.79	30.35	122.26	450.13	-12.75	674.39	613.97	60.42	11.162	
8,600.00	8,241.00	8,379.13	8,325.35	33.59	30.38	108.27	451.81	-12.58	766.07	705.52	60.55	12.652	
8,700.00	8,241.00	8,381.73	8,327.87	34.56	30.39	108.81	452.46	-12.51	860.16	799.54	60.63	14.188	
8,800.00	8,241.00	8,384.34	8,330.39	35.67	30.40	109.35	453.11	-12.44	955.45	894.76	60.69	15.744	
8,900.00	8,241.00	8,386.94	8,332.92	36.93	30.41	109.89	453.75	-12.37	1,051.60	990.86	60.74	17.312	
9,000.00	8,241.00	8,389.55	8,335.44	38.30	30.42	110.43	454.40	-12.30	1,148.41	1,087.62	60.79	18.891	
9,100.00	8,241.00	8,407.85	8,337.96	39.77	30.50	110.97	455.05	-12.24	1,245.71	1,184.81	60.90	20.455	
9,200.00	8,241.00	8,405.25	8,340.48	41.34	30.49	111.51	455.69	-12.17	1,343.41	1,282.49	60.92	22.052	
9,300.00	8,241.00	8,397.36	8,343.00	43.00	30.45	112.04	456.34	-12.10	1,441.42	1,380.50	60.92	23.662	
9,400.00	8,241.00	8,400.04	8,345.52	44.72	30.47	112.58	456.99	-12.03	1,539.68	1,478.72	60.96	25.259	
9,500.00	8,241.00	8,402.57	8,348.05	46.52	30.48	113.11	457.63	-11.97	1,638.14	1,577.15	60.99	26.858	
9,600.00	8,241.00	8,405.17	8,350.57	48.37	30.49	113.64	458.28	-11.90	1,736.78	1,675.75	61.03	28.458	
9,700.00	8,241.00	8,407.78	8,353.09	50.27	30.50	114.17	458.93	-11.83	1,835.56	1,774.49	61.07	30.058	

Company:	Nova Oil and Gas Northern Delaware LLC	**Local Co-ordinate Reference:**	Well Rana Salada Fed Com 0605 121H
			RKB=3090.9+25 @ 3115.90ft
Project:	Eddy County, New Mexico	**TVD Reference:**	RKB=3090.9+25 @ 3115.90ft
Reference Site:	Section 01-T23S-R28E	**MD Reference:**	Grid
Site Error:	0.00 ft Rana Salada Fed Com 0605 121H	**North Reference:**	Minimum Curvature
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	rev2	**Database:**	Offset Datum
Reference Design:		**Offset TVD Reference:**	

Offset Design Section 01-T23S-R28E - Rana Salada Fed Com 0605 211H - Original Hole - rev1 — Offset Site Error: 0.00 ft

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

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.00	0.00	0.80	-0.80	0.00	0.00	-90.08	-0.04	-30.00	30.00				
100.00	100.00	100.80	99.20	0.13	0.14	-90.08	-0.04	-30.00	30.00	29.73	0.27	110.407	
200.00	200.00	200.80	199.20	0.49	0.50	-90.08	-0.04	-30.00	30.00	29.01	0.99	30.344	
300.00	300.00	300.80	299.20	0.85	0.85	-90.08	-0.04	-30.00	30.00	28.29	1.71	17.589	
400.00	400.00	400.80	399.20	1.21	1.21	-90.08	-0.04	-30.00	30.00	27.58	2.42	12.384	
500.00	500.00	500.80	499.20	1.57	1.57	-90.08	-0.04	-30.00	30.00	26.86	3.14	9.556	
600.00	600.00	600.80	599.20	1.93	1.93	-90.08	-0.04	-30.00	30.00	26.14	3.86	7.779	
700.00	700.00	700.80	699.20	2.29	2.29	-90.08	-0.04	-30.00	30.00	25.43	4.57	6.560	
800.00	800.00	800.80	799.20	2.64	2.65	-90.08	-0.04	-30.00	30.00	24.71	5.29	5.671	
900.00	900.00	900.80	899.20	3.00	3.01	-90.08	-0.04	-30.00	30.00	23.99	6.01	4.994	
1,000.00	1,000.00	1,000.80	999.20	3.36	3.36	-90.08	-0.04	-30.00	30.00	23.28	6.72	4.462	
1,100.00	1,100.00	1,100.80	1,099.20	3.72	3.72	-90.08	-0.04	-30.00	30.00	22.56	7.44	4.032	
1,200.00	1,200.00	1,200.80	1,199.20	4.08	4.08	-90.08	-0.04	-30.00	30.00	21.84	8.16	3.677	
1,300.00	1,300.00	1,300.80	1,299.20	4.44	4.44	-90.08	-0.04	-30.00	30.00	21.13	8.88	3.380	
1,400.00	1,400.00	1,400.80	1,399.20	4.79	4.80	-90.08	-0.04	-30.00	30.00	20.41	9.59	3.128	
1,500.00	1,500.00	1,500.80	1,499.20	5.15	5.16	-90.08	-0.04	-30.00	30.00	19.69	10.31	2.910	
1,600.00	1,600.00	1,600.80	1,599.20	5.51	5.51	-90.08	-0.04	-30.00	30.00	18.97	11.03	2.721	
1,700.00	1,700.00	1,700.80	1,699.20	5.87	5.87	-90.08	-0.04	-30.00	30.00	18.26	11.74	2.555	
1,800.00	1,800.00	1,800.80	1,799.20	6.23	6.23	-90.08	-0.04	-30.00	30.00	17.54	12.46	2.408	
1,900.00	1,900.00	1,900.80	1,899.20	6.59	6.59	-90.08	-0.04	-30.00	30.00	16.82	13.18	2.277	
2,000.00	2,000.00	2,000.80	1,999.20	6.95	6.95	-90.08	-0.04	-30.00	30.00	16.11	13.89	2.159	CC
2,100.00	2,099.98	2,100.82	2,099.18	7.30	7.31	-108.11	-0.04	-30.00	30.50	15.89	14.61	2.087	ES, SF
2,200.00	2,199.84	2,200.96	2,199.04	7.66	7.67	-116.87	-0.04	-30.00	32.51	17.18	15.33	2.121	
2,300.00	2,299.45	2,301.35	2,298.65	8.02	8.03	-128.80	-0.04	-30.00	37.27	21.23	16.04	2.323	
2,400.00	2,398.70	2,402.10	2,397.90	8.38	8.39	-140.59	-0.04	-30.00	45.92	29.16	16.76	2.740	
2,500.00	2,497.71	2,496.91	2,496.91	8.74	8.73	-149.49	-0.04	-30.00	57.51	40.05	17.46	3.294	
2,600.00	2,596.72	2,598.10	2,598.08	9.11	9.09	-154.90	1.56	-29.51	68.49	50.31	18.17	3.769	
2,700.00	2,695.72	2,701.15	2,698.72	9.48	9.46	-158.01	6.15	-28.09	76.96	58.07	18.89	4.074	
2,800.00	2,794.73	2,801.54	2,798.19	9.86	9.82	-160.37	11.14	-26.55	85.17	65.56	19.61	4.343	
2,900.00	2,893.74	2,901.93	2,897.66	10.24	10.18	-162.31	16.12	-25.02	93.50	73.17	20.33	4.599	
3,000.00	2,992.75	3,002.33	2,997.13	10.62	10.53	-163.93	21.10	-23.48	101.92	80.87	21.05	4.842	
3,100.00	3,091.76	3,102.72	3,096.60	11.01	10.89	-165.31	26.08	-21.94	110.41	88.64	21.77	5.071	
3,200.00	3,190.76	3,203.11	3,196.07	11.40	11.26	-166.48	31.06	-20.41	118.95	96.46	22.49	5.288	
3,300.00	3,289.77	3,303.51	3,295.54	11.79	11.62	-167.50	36.04	-18.87	127.54	104.32	23.22	5.494	
3,400.00	3,388.78	3,403.90	3,395.01	12.18	11.98	-168.39	41.03	-17.34	136.16	112.22	23.94	5.688	
3,500.00	3,487.79	3,504.29	3,494.48	12.57	12.34	-169.18	46.01	-15.80	144.81	120.14	24.66	5.872	
3,600.00	3,586.79	3,604.68	3,593.95	12.97	12.70	-169.88	50.99	-14.26	153.48	128.09	25.39	6.046	
3,700.00	3,685.80	3,692.53	3,691.05	13.36	13.02	-170.50	55.55	-12.86	162.50	136.43	26.07	6.233	
3,800.00	3,784.81	3,786.34	3,784.83	13.76	13.36	-171.14	57.44	-12.27	174.30	147.54	26.76	6.514	
3,900.00	3,883.82	3,884.52	3,883.02	14.16	13.71	-171.79	57.48	-12.26	188.16	160.70	27.47	6.850	
4,000.00	3,982.82	3,983.53	3,982.02	14.56	14.06	-172.36	57.48	-12.26	202.09	173.90	28.19	7.170	
4,100.00	4,081.83	4,082.54	4,081.03	14.96	14.41	-172.85	57.48	-12.26	216.02	187.12	28.90	7.474	
4,200.00	4,180.84	4,181.55	4,180.04	15.36	14.77	-173.29	57.48	-12.26	229.98	200.35	29.62	7.763	
4,300.00	4,279.85	4,280.55	4,279.05	15.76	15.12	-173.68	57.48	-12.26	243.94	213.60	30.34	8.040	
4,400.00	4,378.85	4,379.56	4,378.05	16.17	15.48	-174.02	57.48	-12.26	257.92	226.85	31.06	8.304	
4,500.00	4,477.86	4,478.57	4,477.06	16.57	15.83	-174.33	57.48	-12.26	271.90	240.12	31.78	8.556	
4,600.00	4,576.87	4,577.58	4,576.07	16.98	16.18	-174.61	57.48	-12.26	285.89	253.39	32.50	8.797	
4,700.00	4,675.88	4,676.59	4,675.08	17.38	16.54	-174.86	57.48	-12.26	299.88	266.66	33.22	9.028	
4,800.00	4,774.89	4,775.59	4,774.09	17.79	16.89	-175.09	57.48	-12.26	313.88	279.94	33.94	9.249	
4,900.00	4,873.89	4,874.60	4,873.09	18.19	17.25	-175.30	57.48	-12.26	327.89	293.23	34.66	9.461	
5,000.00	4,972.90	4,973.61	4,972.10	18.60	17.60	-175.49	57.48	-12.26	341.89	306.52	35.38	9.664	

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

Company:	Nova Oil and Gas Northern Delaware LLC	**Local Co-ordinate Reference:**	Well Rana Salada Fed Com 0605 121H
			RKB=3090.9+25 @ 3115.90ft
Project:	Eddy County, New Mexico	**TVD Reference:**	RKB=3090.9+25 @ 3115.90ft
Reference Site:	Section 01-T23S-R28E	**MD Reference:**	Grid
Site Error:	0.00 ft Rana Salada Fed Com 0605 121H	**North Reference:**	Minimum Curvature
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	rev2	**Database:**	Offset Datum
Reference Design:		**Offset TVD Reference:**	

Offset Design Section 01-T23S-R28E - Rana Salada Fed Com 0605 211H - Original Hole - rev1 — Offset Site Error: 0.00 ft

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

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.00	5,071.91	5,082.67	5,081.16	19.01	17.99	-175.68	58.57	-11.92	354.90	318.74	36.16	9.814	
5,200.00	5,170.92	5,196.53	5,194.87	19.41	18.40	-175.84	63.82	-10.31	364.13	327.20	36.94	9.858	
5,300.00	5,269.92	5,311.05	5,308.94	19.82	18.82	-175.97	73.44	-7.34	369.39	331.73	37.66	9.807	
5,400.00	5,368.93	5,425.87	5,422.81	20.23	19.24	-176.08	87.45	-3.02	370.66	332.31	38.34	9.667	
5,500.00	5,467.94	5,539.17	5,534.52	20.64	19.65	-176.16	105.53	2.56	367.93	328.95	38.98	9.438	
5,600.00	5,566.95	5,639.08	5,632.73	21.05	20.03	-176.23	123.02	7.95	363.58	323.87	39.71	9.156	
5,700.00	5,665.95	5,738.98	5,730.95	21.46	20.40	-176.30	140.51	13.35	359.24	318.80	40.44	8.884	
5,800.00	5,764.96	5,838.89	5,829.16	21.87	20.78	-176.37	158.00	18.74	354.89	313.72	41.17	8.621	
5,900.00	5,863.97	5,938.79	5,927.37	22.28	21.17	-176.44	175.49	24.14	350.54	308.65	41.90	8.367	
6,000.00	5,962.98	6,038.70	6,025.59	22.69	21.55	-176.52	192.98	29.53	346.20	303.57	42.63	8.121	
6,100.00	6,061.98	6,138.60	6,123.80	23.10	21.94	-176.59	210.47	34.92	341.85	298.49	43.36	7.884	
6,200.00	6,160.99	6,238.51	6,222.01	23.51	22.33	-176.67	227.96	40.32	337.51	293.42	44.09	7.655	
6,300.00	6,260.00	6,338.41	6,320.23	23.92	22.73	-176.75	245.45	45.71	333.16	288.34	44.82	7.433	
6,400.00	6,359.01	6,438.32	6,418.44	24.33	23.12	-176.84	262.94	51.11	328.82	283.26	45.56	7.218	
6,500.00	6,458.02	6,538.22	6,516.66	24.74	23.52	-176.92	280.43	56.50	324.48	278.19	46.29	7.010	
6,600.00	6,557.02	6,638.12	6,614.87	25.16	23.92	-177.01	297.92	61.89	320.14	273.11	47.03	6.808	
6,700.00	6,656.03	6,738.03	6,713.08	25.57	24.32	-177.10	315.41	67.29	315.80	268.04	47.76	6.612	
6,800.00	6,755.04	6,837.93	6,811.30	25.98	24.73	-177.19	332.90	72.68	311.46	262.96	48.50	6.422	
6,900.00	6,854.05	6,937.84	6,909.51	26.39	25.13	-177.29	350.39	78.08	307.12	257.88	49.23	6.238	
7,000.00	6,953.05	7,037.74	7,007.72	26.81	25.54	-177.39	367.89	83.47	302.78	252.81	49.97	6.059	
7,100.00	7,052.06	7,137.65	7,105.94	27.22	25.95	-177.49	385.38	88.86	298.44	247.73	50.71	5.886	
7,200.00	7,151.07	7,237.55	7,204.15	27.63	26.36	-177.59	402.87	94.26	294.10	242.66	51.44	5.717	
7,300.00	7,250.14	7,337.43	7,302.34	28.04	26.77	-177.69	420.35	99.65	289.28	237.09	52.18	5.544	
7,400.00	7,349.59	7,437.11	7,400.33	28.43	27.18	-177.77	437.80	105.03	281.35	228.43	52.91	5.317	
7,500.00	7,449.34	7,536.45	7,497.99	28.80	27.60	-177.82	455.19	110.40	269.95	216.31	53.64	5.033	
7,600.00	7,549.27	7,635.34	7,595.20	29.15	28.01	-177.84	472.51	115.74	255.10	200.74	54.36	4.693	
7,700.00	7,649.27	7,733.73	7,691.93	29.48	28.42	-162.97	489.73	121.05	237.22	182.15	55.07	4.308	
7,800.00	7,749.27	7,832.03	7,788.57	29.81	28.83	-162.98	506.94	126.36	218.90	163.12	55.78	3.924	
7,900.00	7,848.81	7,930.30	7,885.18	30.14	29.24	110.62	524.15	131.66	203.00	146.52	56.48	3.594	
7,998.05	7,942.81	8,024.18	7,977.47	30.48	29.64	118.75	540.58	136.73	196.34	139.11	57.23	3.431	
8,000.00	7,944.62	8,026.00	7,979.26	30.49	29.65	118.95	540.90	136.83	196.34	139.09	57.25	3.430	
8,100.00	8,032.52	8,114.97	8,066.72	30.84	30.02	129.26	556.47	141.63	206.67	148.47	58.19	3.551	
8,200.00	8,108.66	8,193.31	8,143.73	31.21	30.35	137.93	570.19	145.86	240.99	181.73	59.26	4.067	
8,300.00	8,169.72	8,257.59	8,206.93	31.62	30.62	142.72	581.44	149.33	299.48	239.31	60.17	4.977	
8,400.00	8,213.02	8,305.02	8,253.56	32.13	30.82	142.16	589.75	151.89	376.89	316.09	60.80	6.199	
8,500.00	8,236.69	8,333.52	8,281.57	32.79	30.95	131.82	594.74	153.43	466.76	405.61	61.16	7.632	
8,600.00	8,241.00	8,343.16	8,291.04	33.59	30.99	113.61	596.42	153.95	563.07	501.76	61.31	9.184	
8,700.00	8,241.00	8,348.56	8,296.35	34.56	31.01	115.96	597.37	154.25	660.86	599.46	61.40	10.763	
8,800.00	8,241.00	8,353.96	8,301.66	35.67	31.03	118.24	598.31	154.54	759.18	697.71	61.47	12.350	
8,900.00	8,241.00	8,359.35	8,306.97	36.93	31.06	120.48	599.26	154.83	857.86	796.32	61.54	13.940	
9,000.00	8,241.00	8,364.75	8,312.27	38.30	31.08	122.64	600.20	155.12	956.79	895.19	61.60	15.532	
9,100.00	8,241.00	8,370.15	8,317.58	39.77	31.10	124.74	601.15	155.41	1,055.89	994.23	61.66	17.125	
9,200.00	8,241.00	8,375.55	8,322.89	41.34	31.12	126.78	602.09	155.70	1,155.11	1,093.40	61.71	18.718	
9,300.00	8,241.00	8,380.95	8,328.20	43.00	31.15	128.74	603.04	155.99	1,254.44	1,192.68	61.76	20.311	
9,400.00	8,241.00	8,386.35	8,333.51	44.72	31.17	130.63	603.99	156.29	1,353.85	1,292.03	61.81	21.902	
9,500.00	8,241.00	8,408.25	8,338.81	46.52	31.26	132.46	604.93	156.58	1,453.31	1,391.38	61.93	23.466	
9,600.00	8,241.00	8,402.85	8,344.12	48.37	31.24	134.21	605.88	156.87	1,552.83	1,490.89	61.94	25.070	
9,700.00	8,241.00	8,402.55	8,349.43	50.27	31.24	135.89	606.82	157.16	1,652.39	1,590.42	61.97	26.666	
9,800.00	8,241.00	11,469.98	9,900.00	52.21	56.02	179.95	711.16	1,902.53	1,659.80	1,617.19	42.62	38.949	
9,900.00	8,241.00	11,569.98	9,900.00	54.20	57.89	179.95	711.16	2,002.53	1,659.80	1,616.17	43.63	38.038	
10,000.00	8,241.00	11,669.98	9,900.00	56.22	59.80	179.95	711.16	2,102.53	1,659.80	1,615.11	44.69	37.144	

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

Company:	Nova Oil and Gas Northern Delaware LLC	**Local Co-ordinate Reference:**	Well Rana Salada Fed Com 0605 121H
			RKB=3090.9+25 @ 3115.90ft
Project:	Eddy County, New Mexico	**TVD Reference:**	RKB=3090.9+25 @ 3115.90ft
Reference Site:	Section 01-T23S-R28E	**MD Reference:**	Grid
Site Error:	0.00 ft Rana Salada Fed Com 0605 121H	**North Reference:**	Minimum Curvature
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	rev2	**Database:**	Offset Datum
Reference Design:		**Offset TVD Reference:**	

Offset Design Section 01-T23S-R28E - Rana Salada Fed Com 0605 211H - Original Hole - rev1 — **Offset Site Error:** 0.00 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,100.00	8,241.00	11,769.98	9,900.00	58.27	61.75	179.95	711.16	2,202.53	1,659.80	1,614.03	45.77	36.266	
10,200.00	8,241.00	11,869.98	9,900.00	60.36	63.73	179.95	711.16	2,302.53	1,659.80	1,612.93	46.87	35.409	
10,300.00	8,241.00	11,969.98	9,900.00	62.47	65.74	179.95	711.16	2,402.53	1,659.80	1,611.79	48.01	34.573	
10,400.00	8,241.00	12,069.98	9,900.00	64.60	67.78	179.95	711.16	2,502.53	1,659.80	1,610.63	49.17	33.759	
10,500.00	8,241.00	12,169.98	9,900.00	66.75	69.85	179.95	711.16	2,602.53	1,659.80	1,609.46	50.35	32.968	
10,600.00	8,241.00	12,269.98	9,900.00	68.93	71.94	179.95	711.16	2,702.53	1,659.80	1,608.26	51.55	32.201	
10,700.00	8,241.00	12,369.98	9,900.00	71.12	74.05	179.95	711.16	2,802.53	1,659.80	1,607.04	52.76	31.457	
10,800.00	8,241.00	12,469.98	9,900.00	73.32	76.18	179.95	711.16	2,902.53	1,659.80	1,605.80	54.00	30.736	
10,900.00	8,241.00	12,569.98	9,900.00	75.54	78.33	179.95	711.16	3,002.53	1,659.80	1,604.54	55.26	30.038	
11,000.00	8,241.00	12,669.98	9,900.00	77.78	80.50	179.95	711.16	3,102.53	1,659.80	1,603.28	56.53	29.364	
11,100.00	8,241.00	12,769.98	9,900.00	80.02	82.68	179.95	711.16	3,202.53	1,659.80	1,601.99	57.81	28.711	
11,200.00	8,241.00	12,869.98	9,900.00	82.28	84.87	179.95	711.16	3,302.53	1,659.80	1,600.69	59.11	28.081	
11,300.00	8,241.00	12,969.98	9,900.00	84.55	87.08	179.95	711.16	3,402.53	1,659.80	1,599.38	60.42	27.472	
11,400.00	8,241.00	13,069.98	9,900.00	86.82	89.30	179.95	711.16	3,502.53	1,659.80	1,598.06	61.74	26.883	
11,500.00	8,241.00	13,169.98	9,900.00	89.11	91.53	179.95	711.16	3,602.53	1,659.80	1,596.73	63.07	26.315	
11,600.00	8,241.00	13,269.98	9,900.00	91.40	93.77	179.95	711.16	3,702.53	1,659.80	1,595.38	64.42	25.766	
11,700.00	8,241.00	13,369.98	9,900.00	93.70	96.03	179.95	711.16	3,802.53	1,659.80	1,594.03	65.77	25.235	
11,800.00	8,241.00	13,469.98	9,900.00	96.01	98.29	179.95	711.16	3,902.53	1,659.80	1,592.66	67.14	24.723	
11,900.00	8,241.00	13,569.98	9,900.00	98.32	100.56	179.95	711.16	4,002.53	1,659.80	1,591.29	68.51	24.228	
12,000.00	8,241.00	13,669.98	9,900.00	100.64	102.83	179.95	711.16	4,102.53	1,659.80	1,589.91	69.89	23.749	
12,100.00	8,241.00	13,769.98	9,900.00	102.97	105.12	179.95	711.16	4,202.53	1,659.80	1,588.52	71.28	23.287	
12,200.00	8,241.00	13,869.98	9,900.00	105.30	107.41	179.95	711.16	4,302.53	1,659.80	1,587.13	72.67	22.839	
12,300.00	8,241.00	13,969.98	9,900.00	107.63	109.71	179.95	711.16	4,402.53	1,659.80	1,585.73	74.07	22.407	
12,400.00	8,241.00	14,069.98	9,900.00	109.97	112.01	179.95	711.16	4,502.53	1,659.80	1,584.32	75.48	21.989	
12,500.00	8,241.00	14,169.98	9,900.00	112.32	114.32	179.95	711.16	4,602.53	1,659.80	1,582.90	76.90	21.584	
12,600.00	8,241.00	14,269.98	9,900.00	114.67	116.63	179.95	711.16	4,702.53	1,659.80	1,581.48	78.32	21.193	
12,700.00	8,241.00	14,369.98	9,900.00	117.02	118.95	179.95	711.16	4,802.53	1,659.80	1,580.05	79.75	20.814	
12,800.00	8,241.00	14,469.98	9,900.00	119.37	121.28	179.95	711.16	4,902.53	1,659.80	1,578.62	81.18	20.446	
12,900.00	8,241.00	14,569.98	9,900.00	121.73	123.60	179.95	711.16	5,002.53	1,659.80	1,577.19	82.61	20.091	
13,000.00	8,241.00	14,669.98	9,900.00	124.09	125.94	179.95	711.16	5,102.53	1,659.80	1,575.74	84.06	19.746	
13,100.00	8,241.00	14,769.98	9,900.00	126.46	128.27	179.95	711.16	5,202.53	1,659.80	1,574.30	85.50	19.412	
13,200.00	8,241.00	14,869.98	9,900.00	128.83	130.61	179.95	711.16	5,302.53	1,659.80	1,572.85	86.95	19.089	
13,300.00	8,241.00	14,969.98	9,900.00	131.20	132.96	179.95	711.16	5,402.53	1,659.80	1,571.39	88.41	18.775	
13,400.00	8,241.00	15,069.98	9,900.00	133.57	135.31	179.95	711.16	5,502.53	1,659.80	1,569.94	89.86	18.470	
13,500.00	8,241.00	15,169.98	9,900.00	135.94	137.66	179.95	711.16	5,602.53	1,659.80	1,568.47	91.33	18.174	
13,600.00	8,241.00	15,269.98	9,900.00	138.32	140.01	179.95	711.16	5,702.53	1,659.80	1,567.01	92.79	17.887	
13,700.00	8,241.00	15,369.98	9,900.00	140.70	142.37	179.95	711.16	5,802.53	1,659.80	1,565.54	94.26	17.609	
13,800.00	8,241.00	15,469.98	9,900.00	143.08	144.73	179.95	711.16	5,902.53	1,659.80	1,564.07	95.73	17.338	
13,900.00	8,241.00	15,569.98	9,900.00	145.46	147.09	179.95	711.16	6,002.53	1,659.80	1,562.59	97.21	17.075	
14,000.00	8,241.00	15,669.98	9,900.00	147.85	149.45	179.95	711.16	6,102.53	1,659.80	1,561.12	98.68	16.819	
14,100.00	8,241.00	15,769.98	9,900.00	150.24	151.82	179.95	711.16	6,202.53	1,659.80	1,559.64	100.16	16.571	
14,200.00	8,241.00	15,869.98	9,900.00	152.63	154.19	179.95	711.16	6,302.53	1,659.80	1,558.15	101.65	16.329	
14,300.00	8,241.00	15,969.98	9,900.00	155.02	156.56	179.95	711.16	6,402.53	1,659.80	1,556.67	103.13	16.094	
14,400.00	8,241.00	16,069.98	9,900.00	157.41	158.93	179.95	711.16	6,502.53	1,659.80	1,555.18	104.62	15.865	
14,500.00	8,241.00	16,169.98	9,900.00	159.80	161.31	179.95	711.16	6,602.53	1,659.80	1,553.69	106.11	15.642	
14,600.00	8,241.00	16,269.98	9,900.00	162.20	163.69	179.95	711.16	6,702.53	1,659.80	1,552.20	107.61	15.425	
14,700.00	8,241.00	16,369.98	9,900.00	164.59	166.06	179.95	711.16	6,802.53	1,659.80	1,550.70	109.10	15.214	
14,800.00	8,241.00	16,469.98	9,900.00	166.99	168.45	179.95	711.16	6,902.53	1,659.80	1,549.20	110.60	15.008	
14,900.00	8,241.00	16,569.98	9,900.00	169.39	170.83	179.95	711.16	7,002.53	1,659.80	1,547.71	112.10	14.807	
15,000.00	8,241.00	16,669.98	9,900.00	171.79	173.21	179.95	711.16	7,102.53	1,659.80	1,546.20	113.60	14.611	
15,100.00	8,241.00	16,769.98	9,900.00	174.19	175.60	179.95	711.16	7,202.53	1,659.80	1,544.70	115.10	14.421	

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

Company:	Nova Oil and Gas Northern Delaware LLC	**Local Co-ordinate Reference:**	Well Rana Salada Fed Com 0605 121H
Project:	Eddy County, New Mexico	**TVD Reference:**	RKB=3090.9+25 @ 3115.90ft
Reference Site:	Section 01-T23S-R28E	**MD Reference:**	RKB=3090.9+25 @ 3115.90ft
Site Error:	0.00 ft Rana Salada Fed Com 0605 121H	**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	rev2	**Database:**	DB_Aug0116_LT_v14
Reference Design:		**Offset TVD Reference:**	Offset Datum

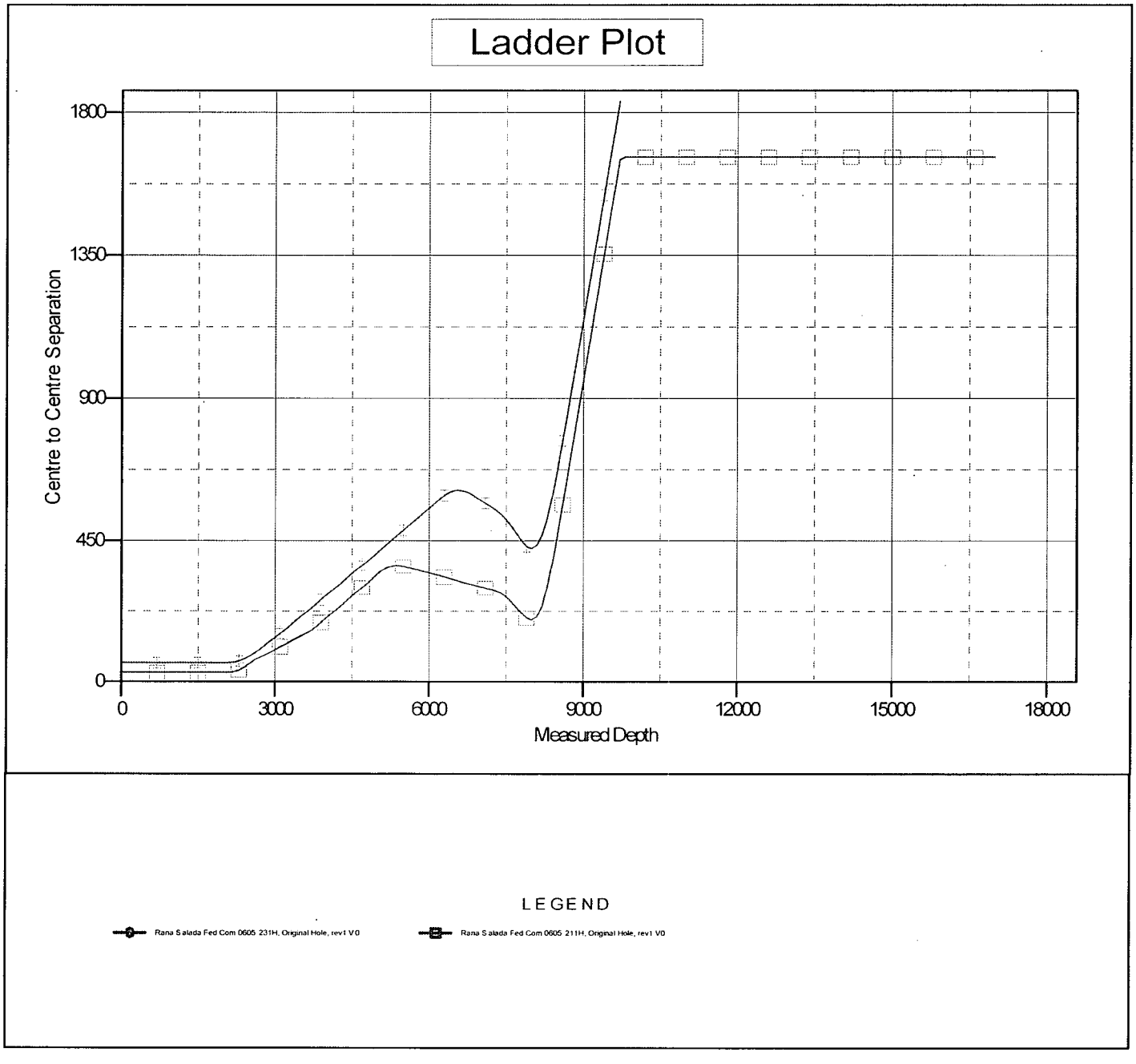
Offset Design Section 01-T23S-R28E - Rana Salada Fed Com 0605 211H - Original Hole - rev1 — **Offset Site Error:** 0.00 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.00 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
15,200.00	8,241.00	16,869.98	9,900.00	176.59	177.98	179.95	711.16	7,302.53	1,659.80	1,543.20	116.60	14.235	
15,300.00	8,241.00	16,969.98	9,900.00	178.99	180.37	179.95	711.16	7,402.53	1,659.80	1,541.69	118.11	14.053	
15,400.00	8,241.00	17,069.98	9,900.00	181.39	182.76	179.95	711.16	7,502.53	1,659.80	1,540.18	119.62	13.876	
15,500.00	8,241.00	17,169.98	9,900.00	183.80	185.15	179.95	711.16	7,602.53	1,659.80	1,538.67	121.13	13.703	
15,600.00	8,241.00	17,269.98	9,900.00	186.20	187.55	179.95	711.16	7,702.53	1,659.80	1,537.16	122.64	13.534	
15,700.00	8,241.00	17,369.98	9,900.00	188.61	189.94	179.95	711.16	7,802.53	1,659.80	1,535.65	124.15	13.369	
15,800.00	8,241.00	17,469.98	9,900.00	191.02	192.33	179.95	711.16	7,902.53	1,659.80	1,534.14	125.66	13.208	
15,900.00	8,241.00	17,569.98	9,900.00	193.43	194.73	179.95	711.16	8,002.53	1,659.80	1,532.62	127.18	13.051	
16,000.00	8,241.00	17,669.98	9,900.00	195.84	197.13	179.95	711.16	8,102.53	1,659.80	1,531.11	128.69	12.897	
16,100.00	8,241.00	17,769.98	9,900.00	198.24	199.52	179.95	711.16	8,202.53	1,659.80	1,529.59	130.21	12.747	
16,200.00	8,241.00	17,869.98	9,900.00	200.66	201.92	179.95	711.16	8,302.53	1,659.80	1,528.07	131.73	12.600	
16,300.00	8,241.00	17,969.98	9,900.00	203.07	204.32	179.95	711.16	8,402.53	1,659.80	1,526.55	133.25	12.456	
16,400.00	8,241.00	18,069.98	9,900.00	205.48	206.72	179.95	711.16	8,502.53	1,659.80	1,525.03	134.77	12.316	
16,500.00	8,241.00	18,169.98	9,900.00	207.89	209.12	179.95	711.16	8,602.53	1,659.80	1,523.51	136.29	12.178	
16,600.00	8,241.00	18,269.98	9,900.00	210.30	211.53	179.95	711.16	8,702.53	1,659.80	1,521.98	137.82	12.043	
16,700.00	8,241.00	18,369.98	9,900.00	212.72	213.93	179.95	711.16	8,802.53	1,659.80	1,520.46	139.34	11.912	
16,800.00	8,241.00	18,469.98	9,900.00	215.13	216.33	179.95	711.16	8,902.53	1,659.80	1,518.93	140.87	11.783	
16,900.00	8,241.00	18,569.98	9,900.00	217.55	218.74	179.95	711.16	9,002.53	1,659.80	1,517.41	142.39	11.656	
16,981.27	8,241.00	18,651.24	9,900.00	219.51	220.69	179.95	711.16	9,083.80	1,659.80	1,516.17	143.63	11.556	

Company:	Nova Oil and Gas Northern Delaware LLC	**Local Co-ordinate Reference:**	Well Rana Salada Fed Com 0605 121H
Project:	Eddy County, New Mexico	**TVD Reference:**	RKB=3090.9+25 @ 3115.90ft
Reference Site:	Section 01-T23S-R28E	**MD Reference:**	RKB=3090.9+25 @ 3115.90ft
Site Error:	0.00 ft Rana Salada Fed Com 0605 121H	**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	rev2	**Database:**	DB_Aug0116_LT_v14
Reference Design:		**Offset TVD Reference:**	Offset Datum

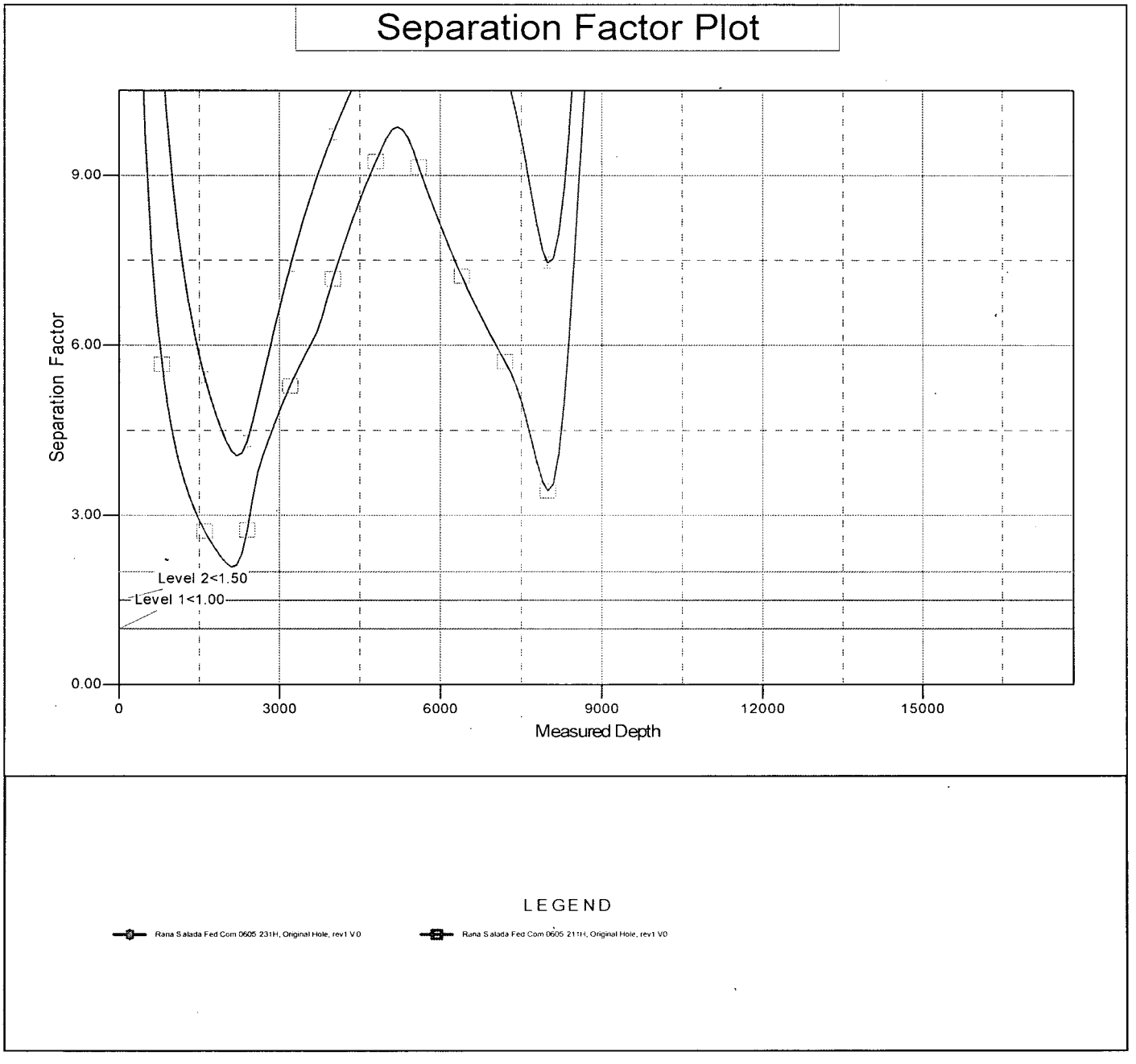
Reference Depths are relative to RKB=3090.9+25 @ 3115.90ft	Coordinates are relative to: Rana Salada Fed Com 0605 121H
Offset Depths are relative to Offset Datum	Coordinate System is US State Plane 1983, New Mexico Eastern Zone
Central Meridian is -104.33333334	Grid Convergence at Surface is: 0.16°

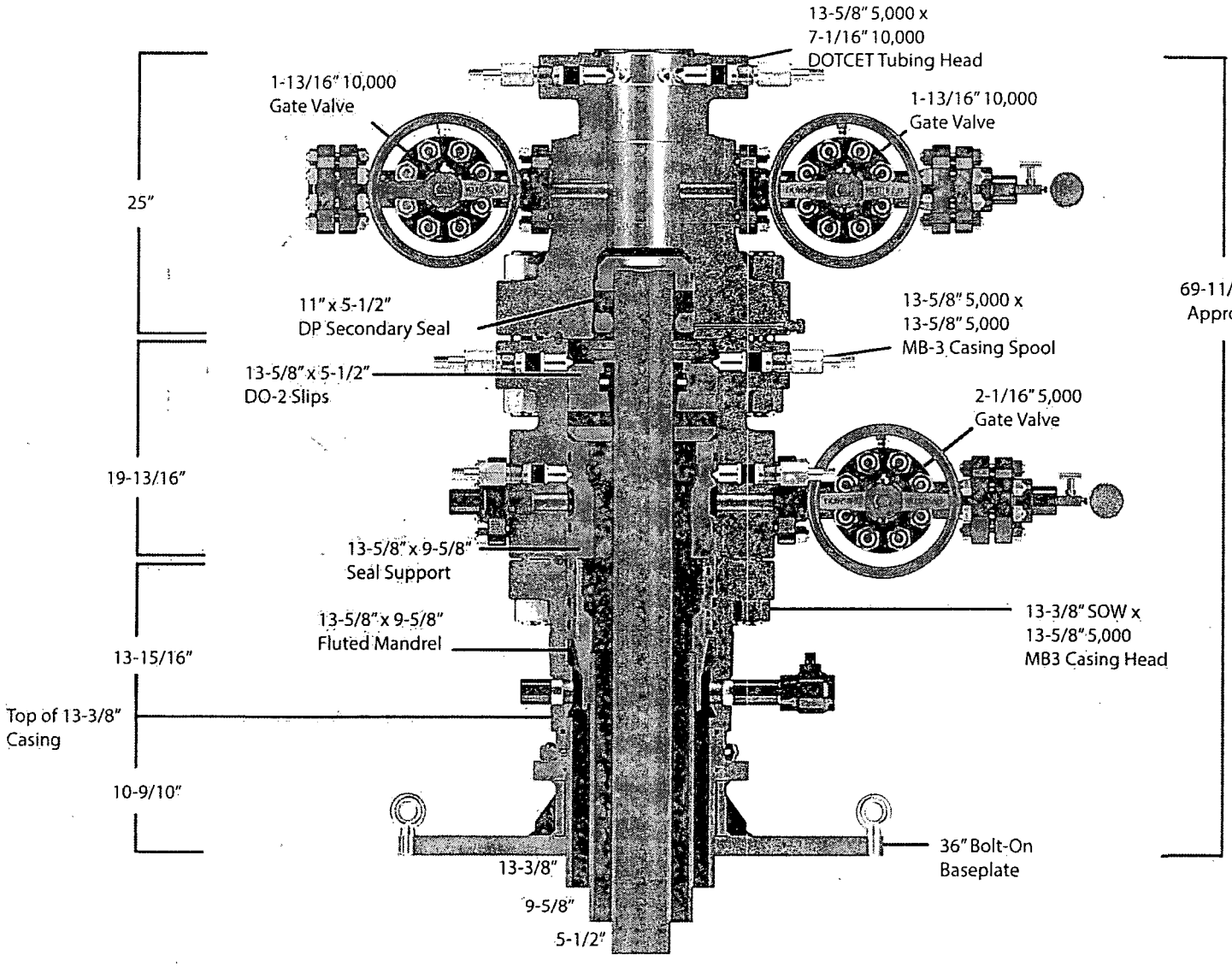


Company:	Nova Oil and Gas Northern Delaware LLC	**Local Co-ordinate Reference:**	Well Rana Salada Fed Com 0605 121H RKB=3090.9+25 @ 3115.90ft
Project:	Eddy County, New Mexico	**TVD Reference:**	RKB=3090.9+25 @ 3115.90ft
Reference Site:	Section 01-T23S-R28E	**MD Reference:**	Grid
Site Error:	0.00 ft Rana Salada Fed Com 0605 121H	**North Reference:**	Minimum Curvature
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	rev2	**Database:**	Offset Datum
Reference Design:		**Offset TVD Reference:**	

Reference Depths are relative to RKB=3090.9+25 @ 3115.90ft
Offset Depths are relative to Offset Datum
Central Meridian is -104.33333334

Coordinates are relative to: Rana Salada Fed Com 0605 121H
Coordinate System is US State Plane 1983, New Mexico Eastern Zone
Grid Convergence at Surface is: 0.16°





Quotation	Downing Wellhead Equipment	Oklahoma City, Oklahoma - USA

Reference Data:

NOVO

Proprietary and Confidential

TITLE:

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

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

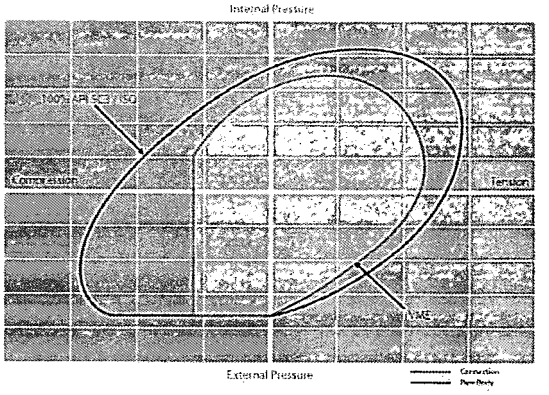
TECHNICAL DATA SHEET TMK UP SF 7.625 X 29.7 L80 HC

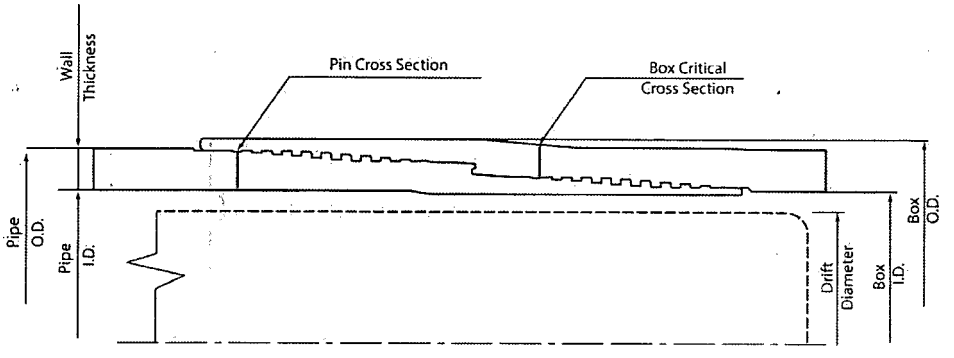
TUBULAR PARAMETERS	
Nominal OD, (inch)	7.625
Wall Thickness, (inch)	0.375
Pipe Grade	L80 HC
Drift	Special

CONNECTION PARAMETERS	
Connection OD (inch)	7.79
Connection ID, (inch)	6.844
Make-Up Loss, (inch)	5.640
Connection Critical Area, (sq inch)	6.777
Yield Strength in Tension, (klbs)	607
Yeld Strength in Compression, (klbs)	607
Tension Efficiency	89%
Compression Efficiency	89%
Min. Internal Yield Pressure, (psi)	6 890
Collapse Pressure, (psi)	5 510
Uniaxial Bending (deg/100ft)	42.8

MAKE-UP TORQUES	
Yield Torque, (ft-lb)	22 800
Minimum Make-Up Torque, (ft-lb)	15 200
Optimum Make-Up Torque, (ft-lb)	16 700
Maximum Make-Up Torque, (ft-lb)	18 400

PIPE BODY PROPERTIES	
PE Weight, (lbs/ft)	29.04
Nominal Weight, (lbs/ft)	29.70
Nominal ID, (inch)	6.875
Drift Diameter, (inch)	N/A
Nominal Pipe Body Area, (sq inch)	8.541
Yield Strength in Tension, (klbs)	683
Min. Internal Yield Pressure, (psi)	6 890
Collapse Pressure, (psi)	5 510





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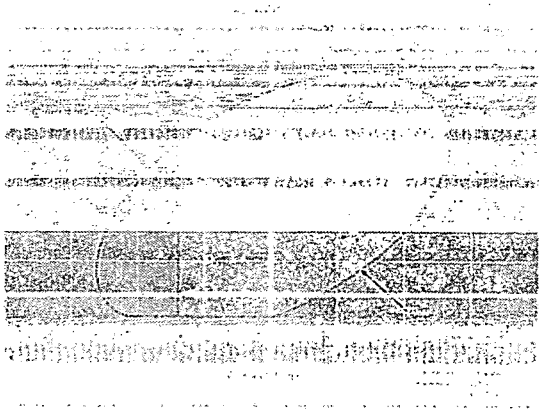
TECHNICAL DATA SHEET TMK UP DQX 5.5 X 20 P110

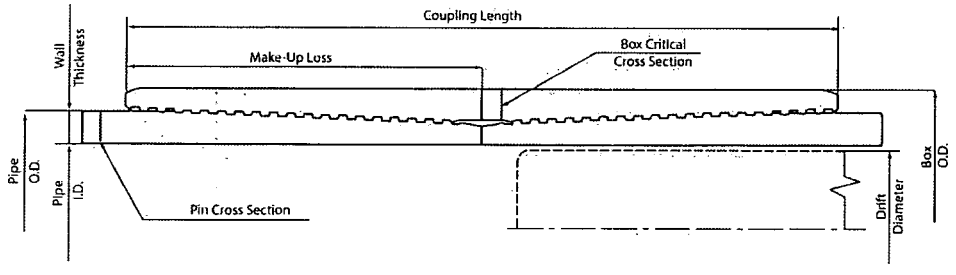
TUBULAR PARAMETERS	
Nominal OD, (inch)	5.500
Wall Thickness, (inch)	0.361
Pipe Grade	P110
Coupling	Special
Coupling Grade	P110
Drift	Standard

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

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
Yeld 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



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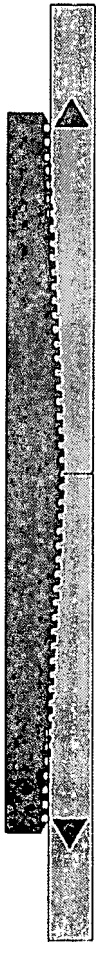
GB tubulars
Casings & Connections

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.

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

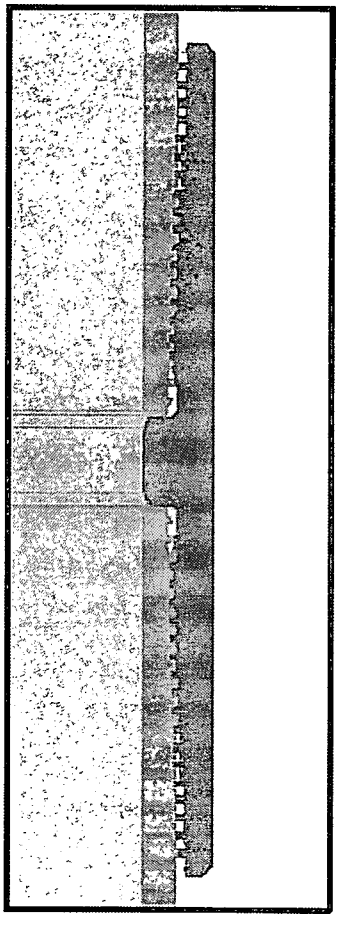
1-877-893-9461
connections@uss.com
www.usstubular.com

Technical Specifications

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

	Material
VST P110 EC	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]
	Appoximated 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

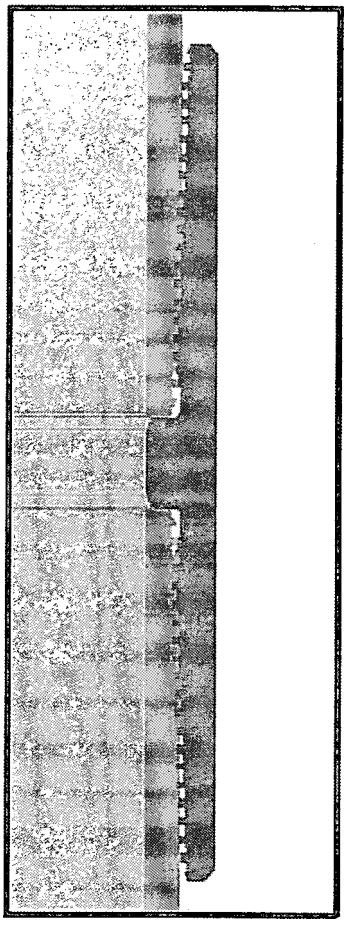


For detailed information on performance properties, refer to DWC Connection Data Notes on following page(s).

2/6/2015

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.



2/6/2015

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

936HXXX +64-15

14-177-1

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**
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	Mn	P	S	Si	Al	Cr	Mo	Ni	Pb	Cu	V	Ti	Sn
.31	.51	.011	.003	.27	.015	.97	.21	.13	-------	.16	.006	-------	.008

Cb	Ca	N	As	Sb	H
.001	.0017	.0095	.0039	.0014	-------

Product Checks

	C	Mn	P	S	Si	Al	Cr	Mo	Ni	Pb	Cu	V	Ti
CHK01	.317	.52	.012	.005	.275	.016	.96	.211	.123		.148	.0034	
CHK02	.31	.52	.011	.0043	.275	.016	.96	.211	.123		.147	.0035	

	Sn	Cb	Ca	N	As	Sb	H
CHK01	.0091	.000	.0017	.0000	.0095	.0000	
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 Gaskins
Quality Assurance

Date Printed: 06/18/2014

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

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**

Grain Size	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	C	R	S	AH	AT	BH	BT	CH	CT	DH	DT	SAM 'B'
7	50	49	48	45	42	38	35	33	33	33	33	32	--	--	--	0.0	0.5	1.0	1.0	0.0	0.0	1.0	1.5	-------

SAM 'D'	Freq.	Severity
-------	.000	.000

Methods of Manufacturing

Method of Mfg 1	Method of Mfg 2	Method of Mfg 3
Electric Arc Furnace Melted	Aircraft Quality	Continuous Cast

Method of Mfg 4	Method of Mfg 5
Mfg.Using Clean Steel Practice	Ladle Refined

Mechanical Properties

	Rc-High	Rc-Low	Tensile	Yield .2%	Yield .5%	Elong%	Reduction	Aust TempF	Aust Time	TemperTmpF
1	20	19	107000	91800	91800	28	59	1640	6.17	1315

	TemperTime
1	79

Charpy Impact Tests

	Temp 1	Size 1	Orient 1	FtLb-T1-Pc 1	LExp-T1-Pc 1	%Shr-T1-Pc 1	FtLb-T1-Pc 2	LExp-T1-Pc 2
1	-30C	10X10	Long	126	.073	100	128	.068

	%Shr-T1-Pc 2	FtLb-T1-Pc 3	LExp-T1-Pc 3	%Shr-T1-Pc 3
1	100	125	.073	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 Gaskins
Quality Assurance

Date Printed: 06/18/2014

PLYMOUTH TUBE CO USA®
572 W State Road 14, Winamac, Indiana 46996
Phone: (574) 946-3125 Fax-Cold Draw: (574) 946-3860 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

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

Date Printed: 06/18/2014

956HXXX+64wB-1H
14-245-1

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
EN 10204:2005-01

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

JP Steel
PO Box 592
BROOKSHIRE TX 77492
USA

Dokument-Nr.: / Document No.: / No. du document:	65-716081/002/P	Prüf-Nr.: / Inspection No.: / No. du certificat:	Blatt: 1 / 4 Page: Page:
Kunden-Bestell-Nr.: / Purchase Order No.: / No. de commande du client:	BST 12-12036 / JP 11459	Hersteller: / Manufacturer: / Producteur:	Warmrohrwerk Dinslaken (DIN EN ISO 9001, ISO/TS-16949 CERTIFIED BY TUEV NORD CERT) (PED 97/23/EC CERTIFIED BY TUEV NORD SYSTEMS)
Benteler Auftrags-Nr.: / Benteler Order No.: / No. de commande Benteler:	1578593	Herstellerzeichen: / Manufacturer's brand: / Marque du producteur:	
Versandanzeigen-Nr.: / Dispatch Note No.: / No. d'avis d'expédition:	6571039	Stempel des Abnahmebeauftragten: / Stamp of the inspection representative: / Poinçon du contrôleur:	WA
Produkt: / Product: / Produit:	NAHTLOSE STAHLROHRE / SEAMLESS STEEL TUBES / TUBES D' ACIER SANS SOUDURE	Stahlerschmelzungsverfahren: / Steelmaking process: / Procédé d'élaboration de l'acier:	ELEKTROSTAHL / ELECTRIC FURNACE / FOUR ELECTRIQUE

Lieferbedingungen: / Terms of delivery: / Conditions de livraison:	ASTM-A 519-2006
Maße - Toleranzen: / Dimensions-tolerances: / Dimensions-tolérances:	outside diameter acc. to customer request, wall thickness acc. to customer request, ASTM-A 519-2006
Stahlsorte: / Steel grade: / Nuance d'acier:	GRADE 4130
Lieferzustand: / Delivery condition: / État de livraison:	QT
Produktkennzeichnung: / Product marking: / Marquage du produit:	PKE: BENTELER SIGN BENTELER DIMENSIONS GRADE 4130 BST 12-12036 / JP 11459 ASTM-A 519 WA

AEZ = Ätztintenbeschriftung, Etching ink marking, Gravure à l'encre . FK = Farbkennzeichnung, colour marking, marquage par couleur . FS = Farbschablonierung, paint stencilling, marquage par peinture . FSD = Farbstrahldrucker, Colour jet printer, Imprimante à jet d'encre de couleur . LK = Laserkennzeichnung, Laser marking, Marquage laser . PKE = Etikettenkennzeichnung, 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/Tubo 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:

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

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

Pos. Item Poste	Schmelzen-Nr. Heat No. No. de coulée	C	SI	MN	P	S	CR	MO	NI
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:	PASSED	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 Probennahme erfolgte an Vielfachlängen.
The sampling was carried out on multiple lengths.
L'echantillonage etait realise aux longueurs multiples.

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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:

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 MAX 22,0	HB	HV	HRB	HBW
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 / Length / Longueur	Breite / Width / Largeur	Höhe / Height / Hauteur	längs (L) / longitudinal (L) / longitudinal (L)		einzel / single / individuelle	mittel / average / moyenne	einzel / single / individuelle	mittel / average / moyenne	
						quer (Q)	GRAD					
			mm	mm	mm	transversal (Q)	°C	ft-lbf	ft-lbf		J/cm²	
			55	10,00	10,00	transversal (Q)	-30		MIN 020			
0002	000001	573599	55	10,00	10,00	L	-30	116				
				10,00	10,00			110				
				10,00	10,00			111	112			

Benteler Steel/Tube GmbH
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33043 Paderborn
Deutschland
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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:

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 contionuous 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 representativo
Contrôleur
DR. BASEL KEITA / Thei

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

P&B TESTING INC

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

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

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

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

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-C 956HXXX769A-F

SHELBY ORDER NO. 447180

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

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

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

CHEMICAL ANALYSIS

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

MECHANICAL PROPERTIES — MAGNAFLUX

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

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

Q. C. INSPT

MELT SOURCE

OTHER INSPECTION Melted and Manufactured in USA
EN 10204 3.1

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

THIS TEST REPORT NOTARIZED WHEN REQUIRED
SWORN AND SUBSCRIBED BEFORE ME
THIS _____ DAY OF _____

_____
NOTARY PUBLIC

Frank Simeone

Form 89702-04 Revision 05-09-06

Frank Simeone, Chief Metallurgist
Frank.Simeone@Arcelormittal.com

Edwards Fabrication

1385 Hwy. 35 Bypass S.
P.O. Box 2350
Rockport, TX 78381

O: (361) 790-7910
F: (361) 790-7927

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

ISO 9001:2008
BUREAU VERITAS
Certification

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

Edwards Fabrication

1385 Hwy. 35 Bypass S.
P.O. Box 2350
Rockport, TX 78381

O: (361) 790-7910
F: (361) 790-7927

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

ISO 9001:2008
BUREAU VERITAS
Certification

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 OILFILED INC.USA

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

TC Ref.No.:21/K/2014-20

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

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 Energy (ft-lbs)	20 Ft-Lbs Min @ -75° F		
	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 EXAM (NDE)

	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.

MARS FORGE PVT. LTD. * INDIA * RAJKOT

Quality Control

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 4130 N.Q.T	INSPECTOR/ LEVEL	:	ASNT L-II
HEAT NO	:	R 20834	QUANTITY	:	27 PCS
PROC No	:	W-P-21-09	REJECT	:	None
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]

TÜV Rheinland
ISO 9001 : 2008
PED 97/23/EC
AD 2000-Merkblatt WO

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.co

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	---	1.0 / 0.5	0.5 / ---	--- / ---	1.0 / ---

* 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.

MARS FORGE PVT. LTD. INDIA RAJKOT

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 JEFFREY CHARLES TOWNSEND S. S. No.
Welding Process(es) Shielded Metal Arc Welding Type Manual Position (QW-405.1) 6-G
Welding Procedure Specification No. SM-4130 PQR No. SM-4130 Backing (QW-402.7) None
Material Spec. (QW-403) No. HF-4130 Grade LN80 P-No. - - Group - -
To
Material Spec (QW403) No. HF-4130 Grade LN80 P-No. - - Group - -
Test Thickness .531" Range Up to 1.062" Test Dia. 4.00" Range 2 7/8" O.D. over

Process(es)	SMAW	SMAW	
Filler Metal (QW-404) Spec.	SFA 5.1	SFA 5.5	SFA
	Class No. E-6010	Class No. E-8018	Class No.
	F No. 3 A No. 1	F No. 4 A No. 3	F No. A No.
Filler Diameter (QW-404.6)	1/8"	5/32"	
Weld Deposit Thickness	.125"	.406"	
Consumable Insert (QW-404.22)	N/A	N/A	
Gas (QW-408) Shielding	N/A	N/A	
Flow Rate	N/A	N/A	
Gas (QW-408) Purge	N/A	N/A	
Flow Rate	N/A	N/A	
Elec. (QW-409) AC-DC	Direct	Direct	
Polarity	Reverse	Reverse	
Volt Range	22-26	23-27	
Amp Range	80-120	150-210	
Progression (QW-405.3)	Root Up	Hot Pass Up	Filler Up Cap Up
Transfer Mode (QW-409.2) GMAW	N/A		

Other Preheat 70° F. PWHT. N/A

For Information Only
Material 4130 IS NOT listed in ASME Section IX
Submerged Arc Flux Trade Name but acceptable.

Guided Bend Test Results (QW-462.2(a), QW-462.3(a), QW-462.3(b))

Specimen No.	Type	Figure No.	Results	Specimen No.	Type	Figure No.	Results
			Radiographic Results in leiu of Sidebends				

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.

Joe Morris

Organization DU-TEX, INC.

Date March 23, 2009 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

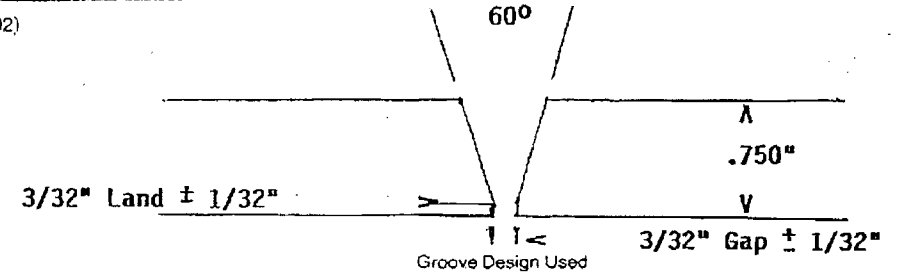
Mailing Address:
2316 Memorial Pkwy.
Portland, TX 78374-3206

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)



Groove Design Used

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 ½" 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)

Process(es)	SMAW	SMAW
Weld Metal Analysis A-No.	1	3
Weld Bead Number	1 & 2	Balance
Dia of Electrode	1/8"	5/32"
Filler Metal F-No.	3	4
SFA Specification	5.1	5.5
AWS Classification	E-6010	E-8018
Weld Deposit Range	.250"	1.250"
Weld Deposit Thickness	.125"	.625"

Tungsten: Size N/A Type: ____ Class: ____
Flux Trade Name: N/A Designation: ____
Other ____

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. 70° F.
Interpass Temp. Min. ____ Max. ____
Other ____

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)

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

Other ____

TECHNIQUE (QW-410)

Process(es)	SMAW	SMAW
Travel Speed	Variable	Variable
String or Weave Bead	String	String
Oscillation	None	None
Multi or Single Pass (per side)	Multiple	Multiple
Single or Multi Electrodes	Single	Single
Peening	None	None

Other ____

QW-483 (Back)

Tensile Test (QW-150) **NOTE: MATERIAL SPECS**
Electrode Tensile Strenth 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)

Speciman No.	Notch Location	Speciman 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-180)

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/A

Test 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.

Joe Morris

Manufacturer DU-TEX, INC.

Date March 25, 2009 By _____

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

Invoice # 06972

Non-Destructive Testing Report

Report # _____

Customer: Gates **Date:** 11/20/14

Project: 192114

METHOD

Ultrasonic	✓	Procedure #	NRS- PA-UT/2013/Rev0
Magnetic Particle		Standard #	ASME
Liquid Penetrant		Section # Level	II

TECHNIQUE

Shear wave	✓	Angle	AC		DC	Dwell Time	
Straight Beam	✓	60 ✓	Wet		Dry	Penetrant #	
Unit Type	~~Pr3MA~~	70 ✓	Continuous			Developer #	
Ref Standard	~~I.D/OD~~	45 ✓	Residual			Cleaner #	
Range	5"	0 ✓	Background				

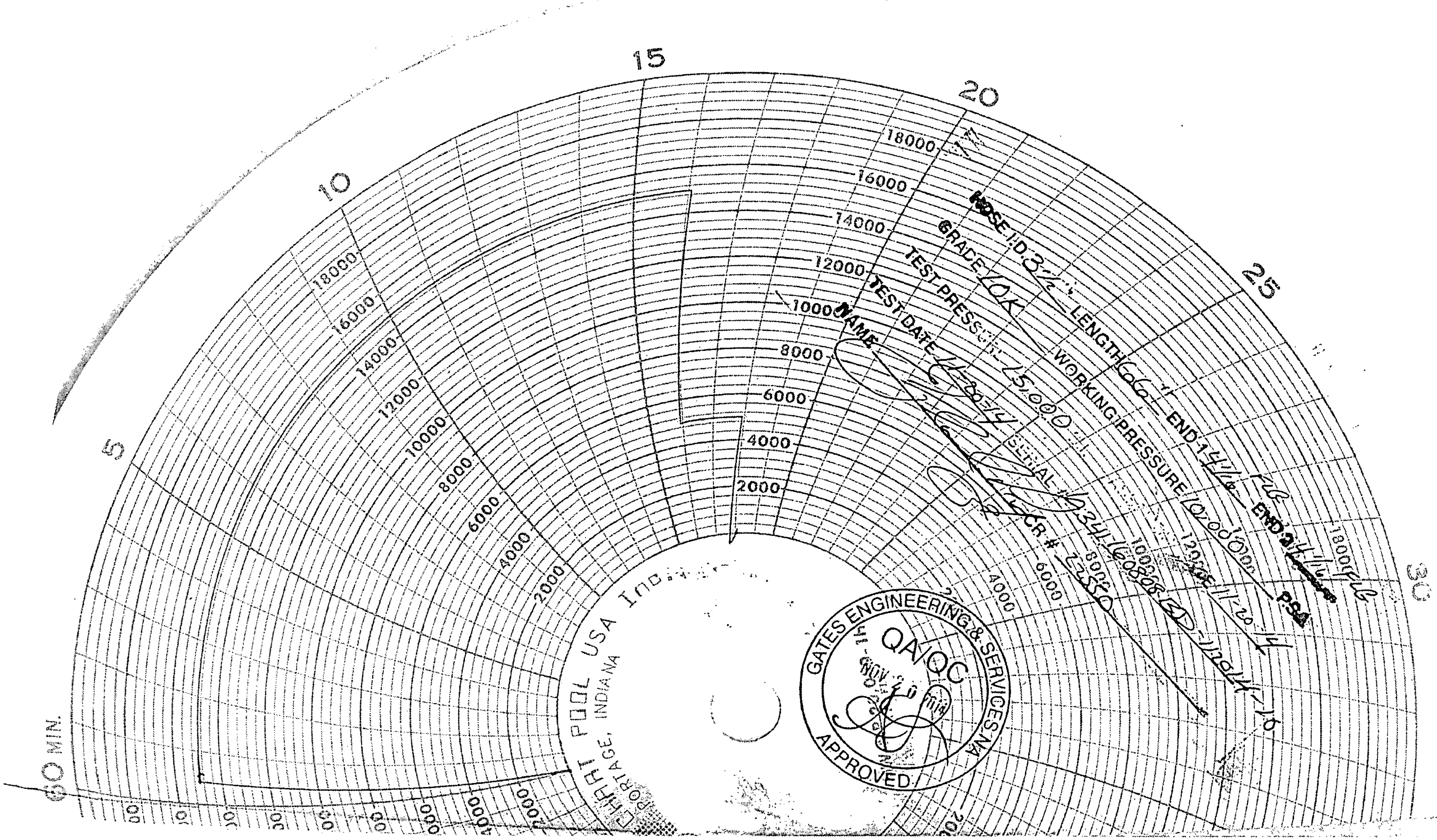
RESULTS

ITEM	LOCATION AND IDENTIFICATION	ACC / REJ	COMMENTS
	3½ x 4 x 4 1/16 10K	Acc	Qty 2
	Fig. 1-2		

Inspector: Joe Baldenegro **SNT Level** II **PG #** _____ **of** _____

Customer Representative: _____ **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)



HOSE I.D.
LENGTH
END 1
END 2
GRADE
WORKING PRESSURE
P.S.I.
TEST PRESSURE
TEST DATE
NAME
SERIAL
CR #
CHART POOL USA INC.
PORTAGE, INDIANA
60 MIN.
5
10
15
20
25
30
2000
4000
6000
8000
10000
12000
14000
16000
18000
GATES ENGINEERING & SERVICES NA
QA/QC
NOV 20
APPROVED

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

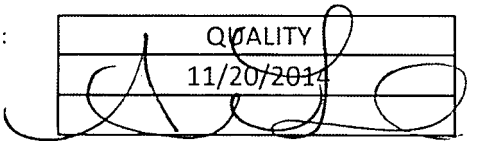
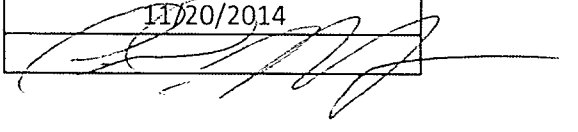
10K CHOKE AND KILL ASSEMBLY PRESSURE TEST CERTIFICATE

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 :	QUALITY	Technical Supervisor :	PRODUCTION
Date :	11/20/2014	Date :	11/20/2014
Signature :		Signature :	

POWERING PROGRESS™

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

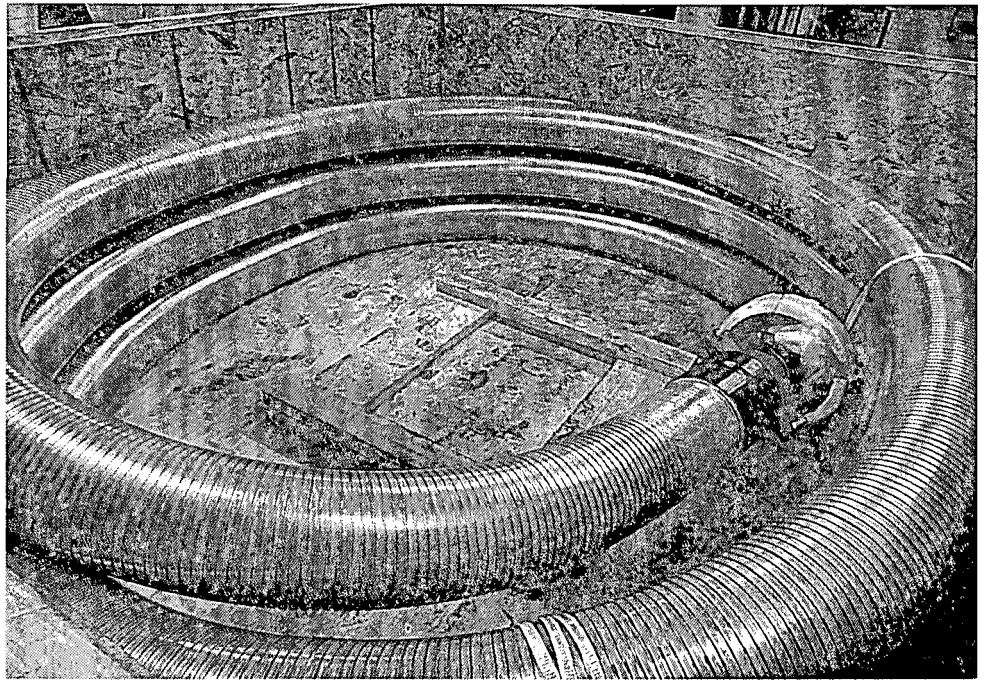
This is to verify that all Parts and/or Materials included in this shipment have been manufactured and/or processed in Conformance with applicable drawings and specifications, and that Records of Required Tests are on file and subject to examination. The following items were assembled at Gates E & S, 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.

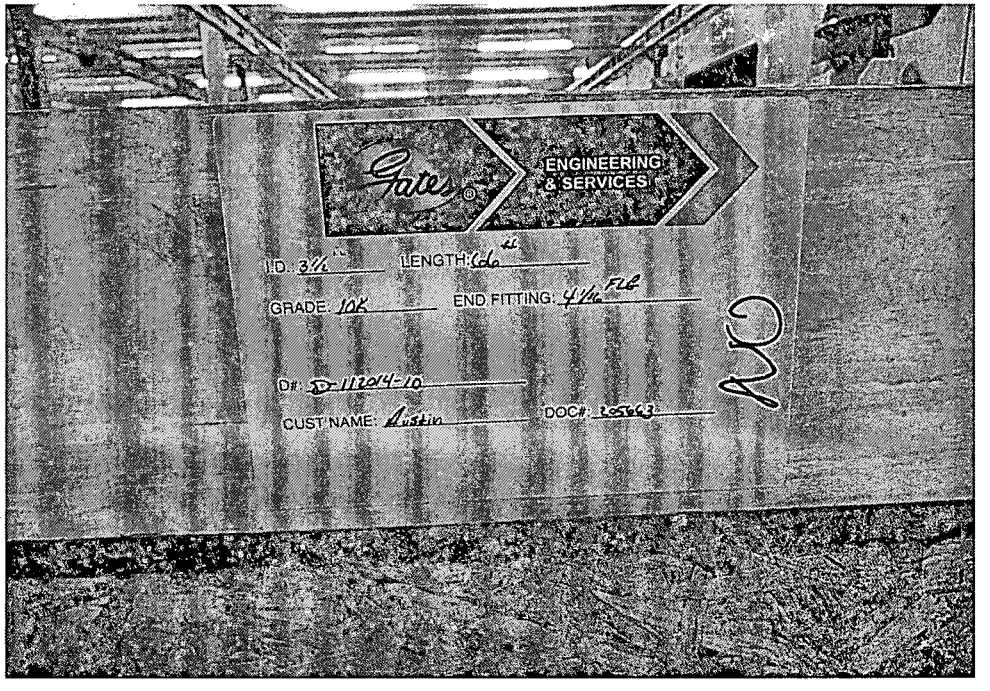
CUSTOMER: AUSTIN DISTRIBUTING
CUSTOMERS P.O.#: PENDING
PART DESCRIPTION: 10K3.566.0CK4.1/1610KFLGE/E L/E
SALES ORDER #: 205663
QUANTITY: 1
SERIAL #: D-112014-10

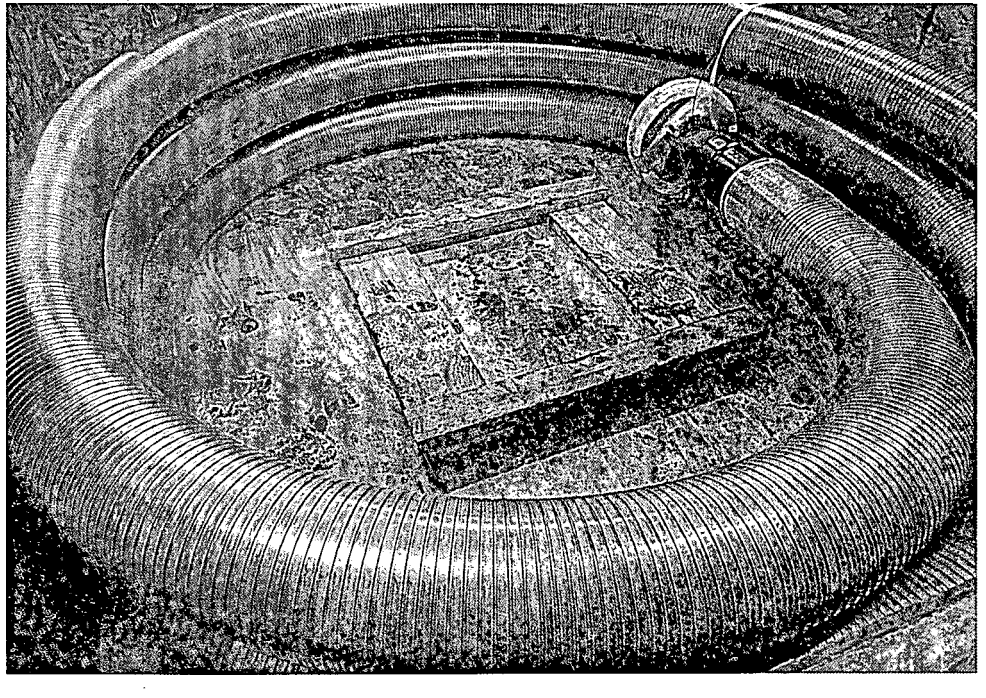
SIGNATURE: _____

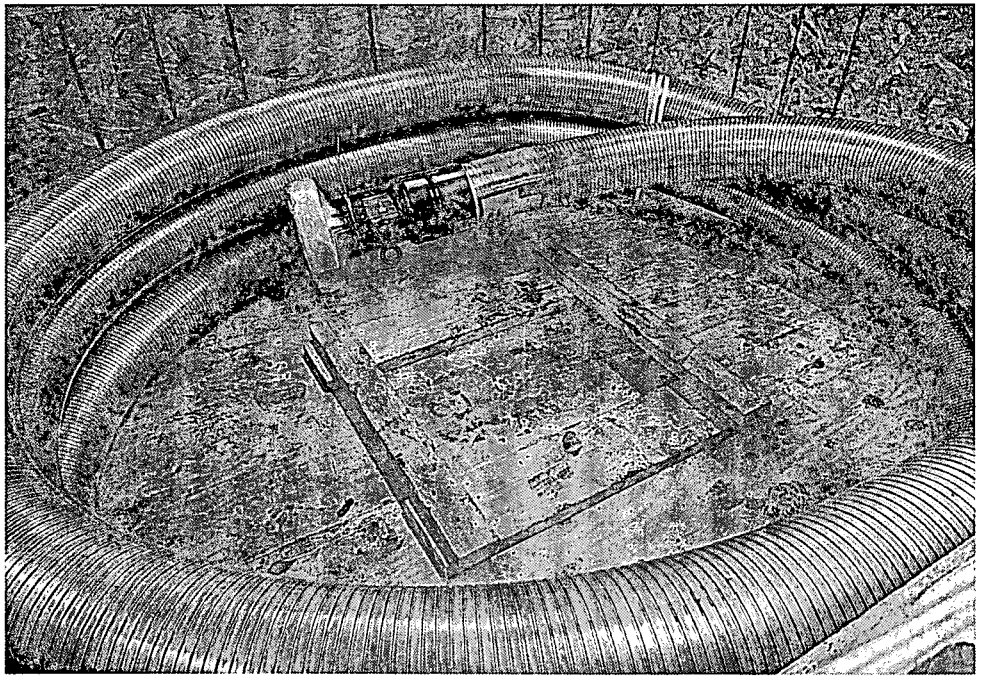
TITLE: QUALITY

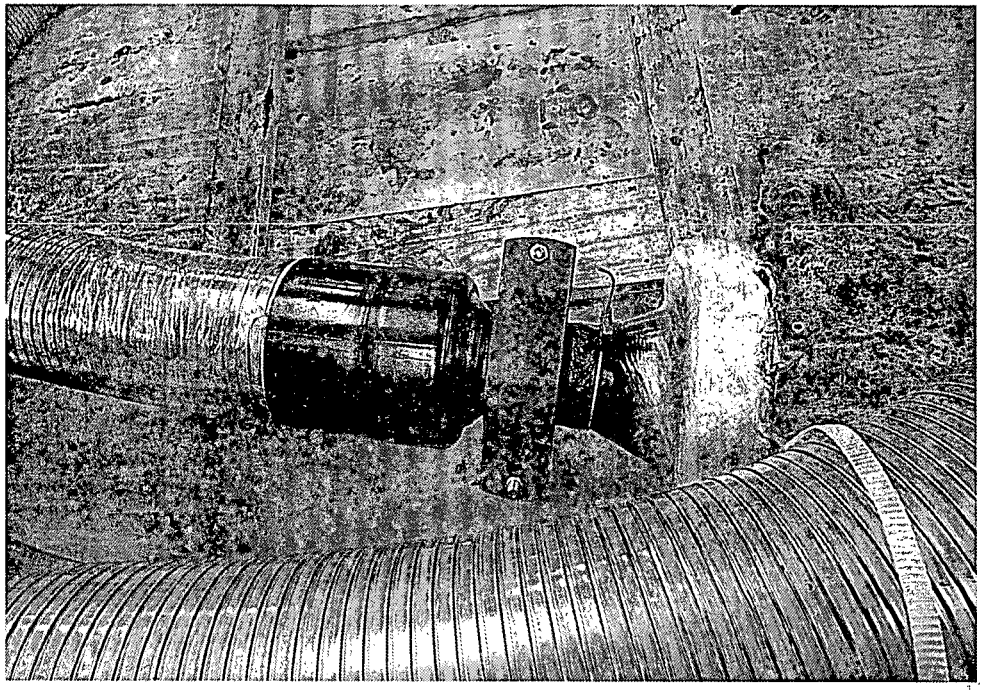
DATE: 11/20/2014




Gates
ENGINEERING
& SERVICES
ID: 3½"
LENGTH: Cda ft
GRADE: 10K
END FITTING: 4½" FLG
D#: D-112014-10
CUST NAME: Austin
DOC#: 25563
A2







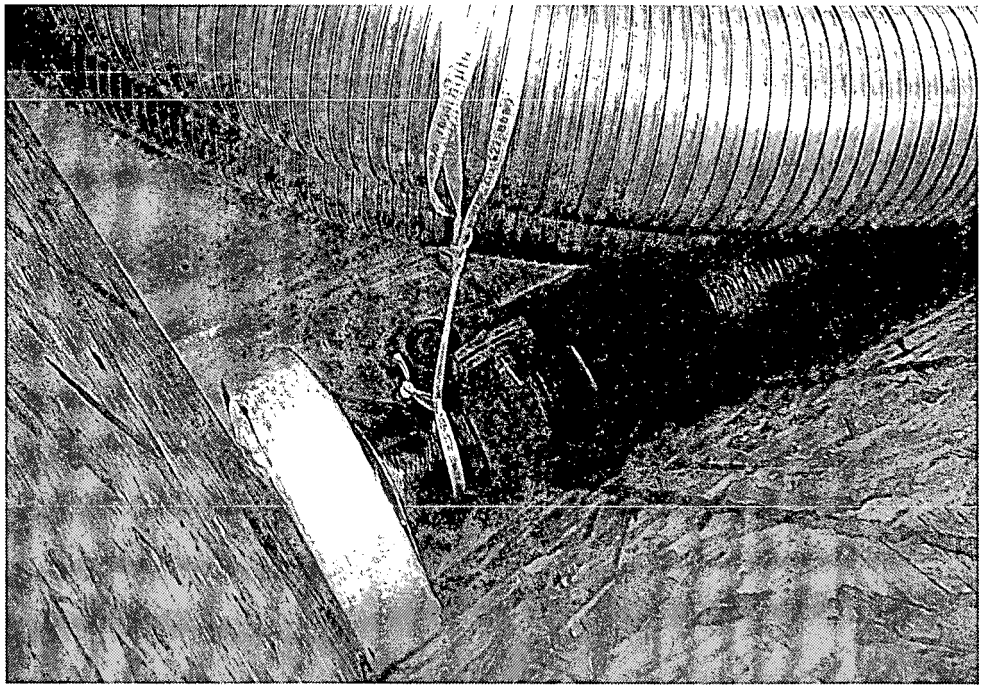
ILL ASSEMBLY PRESSURE TEST CERTIFICATE

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

10K3.566.0CK4.1/1610KFLGE/E L/E

4 1/16 10K FLG	End Fitting 2:	4 1/16 10K FLG
4773-6291	Assembly Code:	L-3411608081 3D-112014-10
10,000 PSI	Test Pressure:	15,000 PSI

hose assembly has been tested to the



POWERING PROGRESS™

PACKING LIST

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:						

Novo Oil & Gas Northern Delaware, LLC
Rana Salada Fed Com 0605 121H
SHL 1127' FNL & 335' FEL 1-23S-28E
BHL 330' FNL & 1650' FEL 5-23S-29e
Eddy County, NM

Drilling Program

1. ESTIMATED TOPS

Formation Name	TVD	MD	Bearing
Quaternary	0'	0'	water
Rustler anhydrite	313'	313'	N/A
Salado salt	759'	759'	N/A
Castile anhydrite	1406'	1406'	N/A
Base salt	2627'	2630'	N/A
Bell Canyon sandstone	2826'	2831'	hydrocarbons
Cherry Canyon sandstone	3917'	3931'	hydrocarbons
Brushy Canyon sandstone	5360'	5390'	hydrocarbons
Bone Spring limestone	6351'	6391'	hydrocarbons
1st Bone Spring sandstone	7481'	7532'	hydrocarbons
2nd Bone Spring carbonate	7751'	7802'	hydrocarbons
(KOP	7764'	7814'	hydrocarbons)
2nd Bone Spring sandstone (goal)	8191'	8349'	hydrocarbons
TD	8241'	16981'	hydrocarbons

2. NOTABLE ZONES

Second Bone Spring sand is the goal. All perforations will be ≥330' from the dedication perimeter. Closest water well (C 02804) is 8931' 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. 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.
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 prior to drilling out surface shoe. 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.

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' - 2963'	9.625" Other (Salt Protection)	40	J-55	BTC	1.125	1.125	1.60
8.75"	0' – 16981'	0' – 8241'	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	313	13.8	Class C + gel + accelerator + LCM
TOC = GL		100% Excess			Centralizers on every jt to GL	
Other – Salt Protection	Lead	372	2.28	848	11.9	Class C + gel + extender + LCM
	Tail	200	1.34	268	14.8	Class C + gel + retarder + LCM
TOC = GL		20% Excess			Centralizers on bottom 3 jts and then 1 centralizer every 4th jt to GL	
Production	Tail	845	1.72	1454	13.2	Class H + fluid loss + retarder + LCM
TOC = 2470'		20% Excess			None planned	

5. MUD PROGRAM

An electronic PVT mud system will monitor flow rate, pump pressure, stroke rate, and volume. All necessary mud products (barite, bentonite, LCM) to control weight and fluid loss will be on site at all times. Mud program may change due to hole conditions. A closed loop system will be used.

Type	Interval (MD)	lb/gal	Viscosity	Fluid Loss
fresh water spud	0' - 225'	8.3	30 - 60	NC
brine or cut brine	225' - 2970'	9.8 – 10.2	35 - 45	NC
OBM	2970' – 16981'	8.5 - 10.0	35 - 65	4 - 6

6. CORES, TESTS, & LOGS

No core or drill stem test is planned.

A 2-person mud logging program will be used from ≈3000' to TD.

GR 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 ≈4096 psi. Expected bottom hole temperature is ≈150° F.

An H2S plan is attached.

8. OTHER INFORMATION

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

Well was formerly known as Rana Salada Fed Com 1 5 23S 29E 2B 1H.

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: 10400031963 **Submission Date:** 07/11/2018

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0605 **Well Number:** 121H

Well Type: CONVENTIONAL GAS WELL **Well Work Type:** Drill

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

RS_121H_Road_Map_20180709145709.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_121H_New_Road_Map_20180709145725.pdf

New road type: LOCAL

Length: 552 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:

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:

Access miscellaneous information:

Number of access turnouts: **Access turnout map:**

Drainage Control

New road drainage crossing: OTHER

Drainage Control comments: Crowned and ditched

Road Drainage Control Structures (DCS) description: None

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_121H_Well_Map_20180709145748.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: A central tank battery (CTB) will be built immediately north of the well pad. Flare and/or CBU will be set on the northeast corner of the CTB. Process equipment (e. g., separators, heater-treaters) will be placed on the east side of the CTB. Tank battery will be on the north side of the CTB. 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 CTB, but this has not been finalized.
Production Facilities map:

RS_121H_Production_Facilities_20180709145759.pdf

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0605 **Well Number:** 121H

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): 17000

Source volume (acre-feet): 2.1911826

Source volume (gal): 714000

Water source and transportation map:

RS_121H_Water_Source_Map_20180709145817.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 0605 **Well Number:** 121H

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 west of the well pad and CTB. V-door will face south. 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. Entire 600' x 600' well pad will be graded. However, only a 400' x 485' sub-pad will initially be surfaced with caliche to accommodate the first three wells. As more wells are added, then more of the pad will be surfaced with more caliche. In the interim, the unsurfaced area will be ripped, harrowed, seeded, and revegetated.

Construction Materials source location attachment:

RS_121H_Construction_Methods_20180709150056.pdf

Section 7 - Methods for Handling Waste

Waste type: DRILLING

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

Amount of waste: 1000 barrels

Waste disposal frequency : Daily

Safe containment description: Drill cuttings, mud, salts, and other chemicals will be stored in steel tanks. All trash will be placed in a portable trash cage. Human waste will be disposed of in chemical toilets.

Safe containmant attachment:

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

Disposal type description:

Disposal location description: Mud tanks will be hauled to R360's state approved (NM-01-0006) disposal site at Halfway, NM. Trash will be hauled to Lea County landfill. Human waste will be hauled to Carlsbad wastewater treatment plant.

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

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_121H_Well_Site_Layout_20180709150121.pdf

Comments:

Section 10 - Plans for Surface Reclamation

Type of disturbance: New Surface Disturbance **Multiple Well Pad Name:** RANA

Multiple Well Pad Number: 1

Recontouring attachment:

RS_121H_Recontour_Plat_20180709150149.pdf

RS_121H_Interim_Reclamation_Plan_20180709150156.pdf

Drainage/Erosion control construction: Crowned and ditched

Drainage/Erosion control reclamation: Harrowed on the contour

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0605 **Well Number:** 121H

Well pad proposed disturbance (acres): 8.26
Road proposed disturbance (acres): 0.15
Powerline proposed disturbance (acres): 0
Pipeline proposed disturbance (acres): 0
Other proposed disturbance (acres): 3.81
Total proposed disturbance: 12.22

Well pad interim reclamation (acres): 6.36
Road interim reclamation (acres): 0
Powerline interim reclamation (acres): 0
Pipeline interim reclamation (acres): 0
Other interim reclamation (acres): 0
Total interim reclamation: 6.36

Well pad long term disturbance (acres): 1.9
Road long term disturbance (acres): 0.15
Powerline long term disturbance (acres): 0
Pipeline long term disturbance (acres): 0
Other long term disturbance (acres): 3.81
Total long term disturbance: 5.86

Disturbance Comments:

Reconstruction method: A 240' x 300' (= 1.65 acres) working area centered on the wells will remain after interim reclamation. Once the last well is plugged, then the pad, CTB, and new roads will be reclaimed within 6 months of plugging. Disturbed areas will be contoured to match pre-construction grades. Disturbed areas will be seeded in accordance with BLM requirements. Roads will be blocked. Noxious weeds will be controlled.
Topsoil redistribution: Soil and brush will be evenly spread over disturbed areas and harrowed on the contour.

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:

Source phone:

Seed cultivar:

Seed use location:

PLS pounds per acre:

Proposed seeding season:

Seed Summary

Total pounds/Acre:

Seed Type	Pounds/Acre

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

First Name:

Last Name:

Phone:

Email:

Seedbed prep:

Seed BMP:

Seed method:

Existing invasive species? 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: 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:**

Disturbance type: EXISTING 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:**

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:**

Disturbance type: OTHER

Describe: Central Tank Battery

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:

Operator Name: NOVO OIL AND GAS NORTHERN DELAWARE LLC

Well Name: RANA SALADA FED COM 0605 **Well Number:** 121H

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:

Use a previously conducted onsite? YES

Previous Onsite information: On-site inspection was held with Colleen Cepero Rios and Jim Rutley (both BLM) on March 21, 2018. Lone Mountain Archaeological Services will inspect and report on the project.

Other SUPO Attachment

RS_121H_SUPO_20180709150337.pdf

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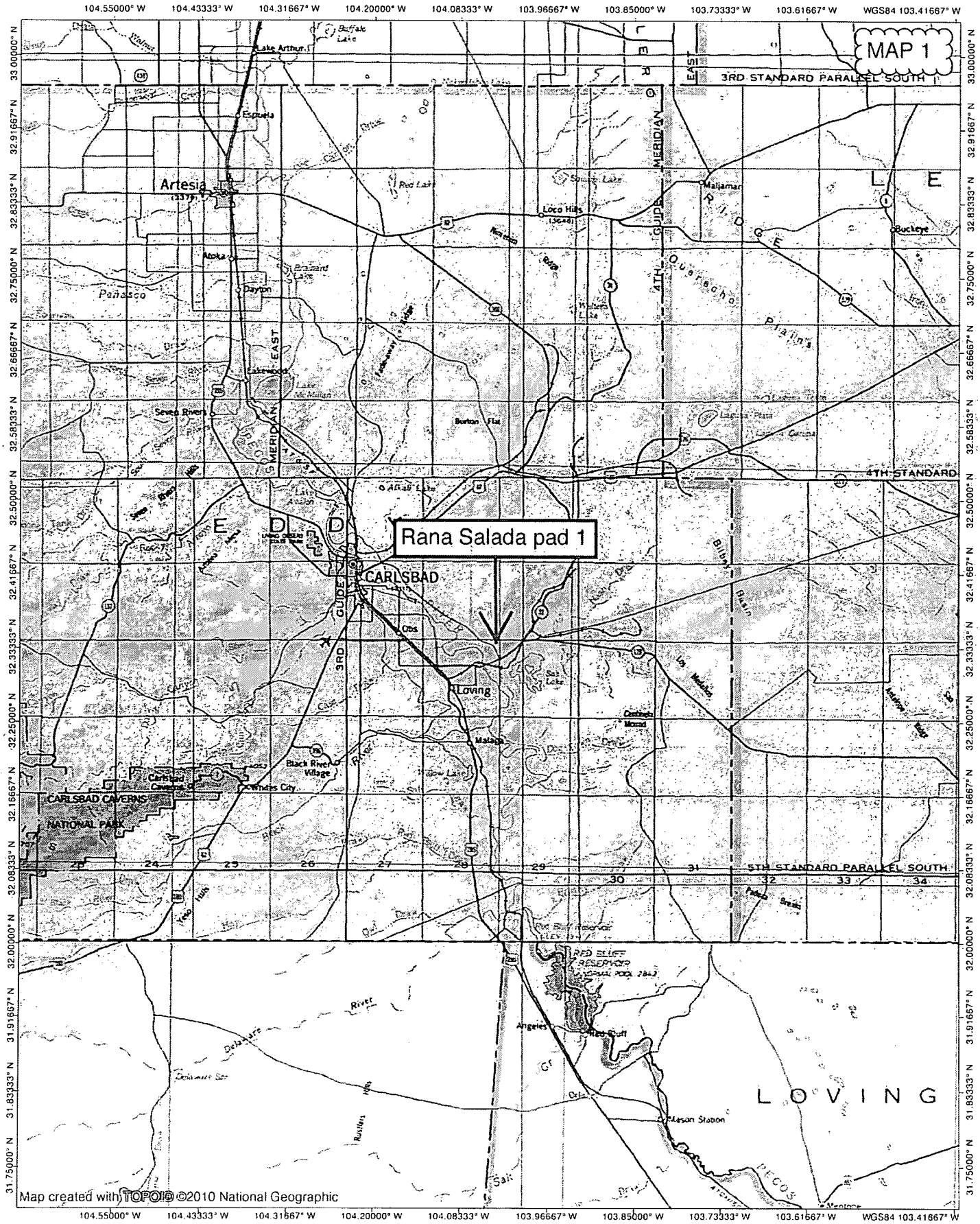

NATIONAL GEOGRAPHIC

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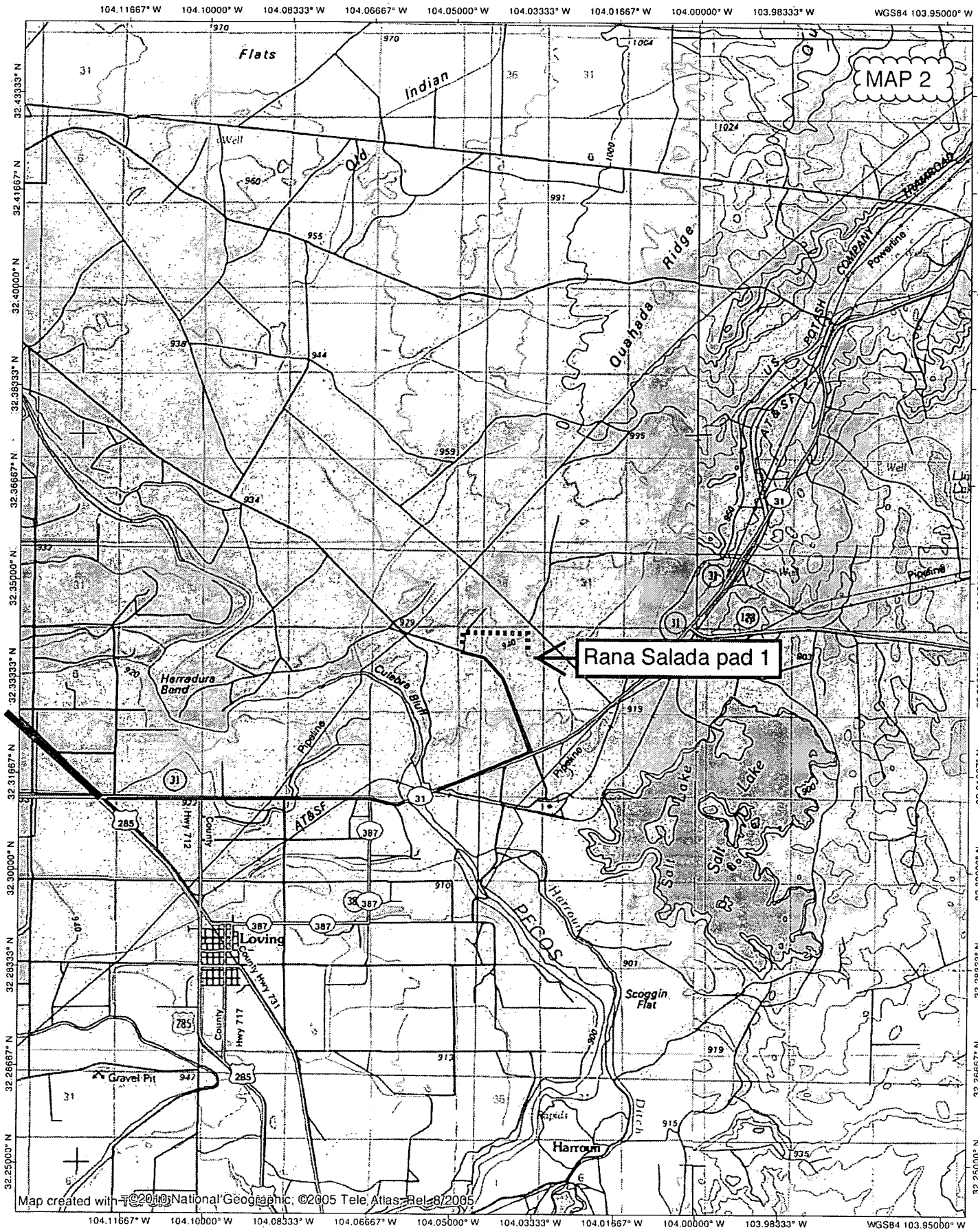
0 5 10 15 20 25 30 km

TN ↑ MN
7°
06/30/18

TOPO! map printed on 06/30/18 from "Untitled.tpo"



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0 1 2 3 4 5 km

TN ★ MN
7°
06/30/18

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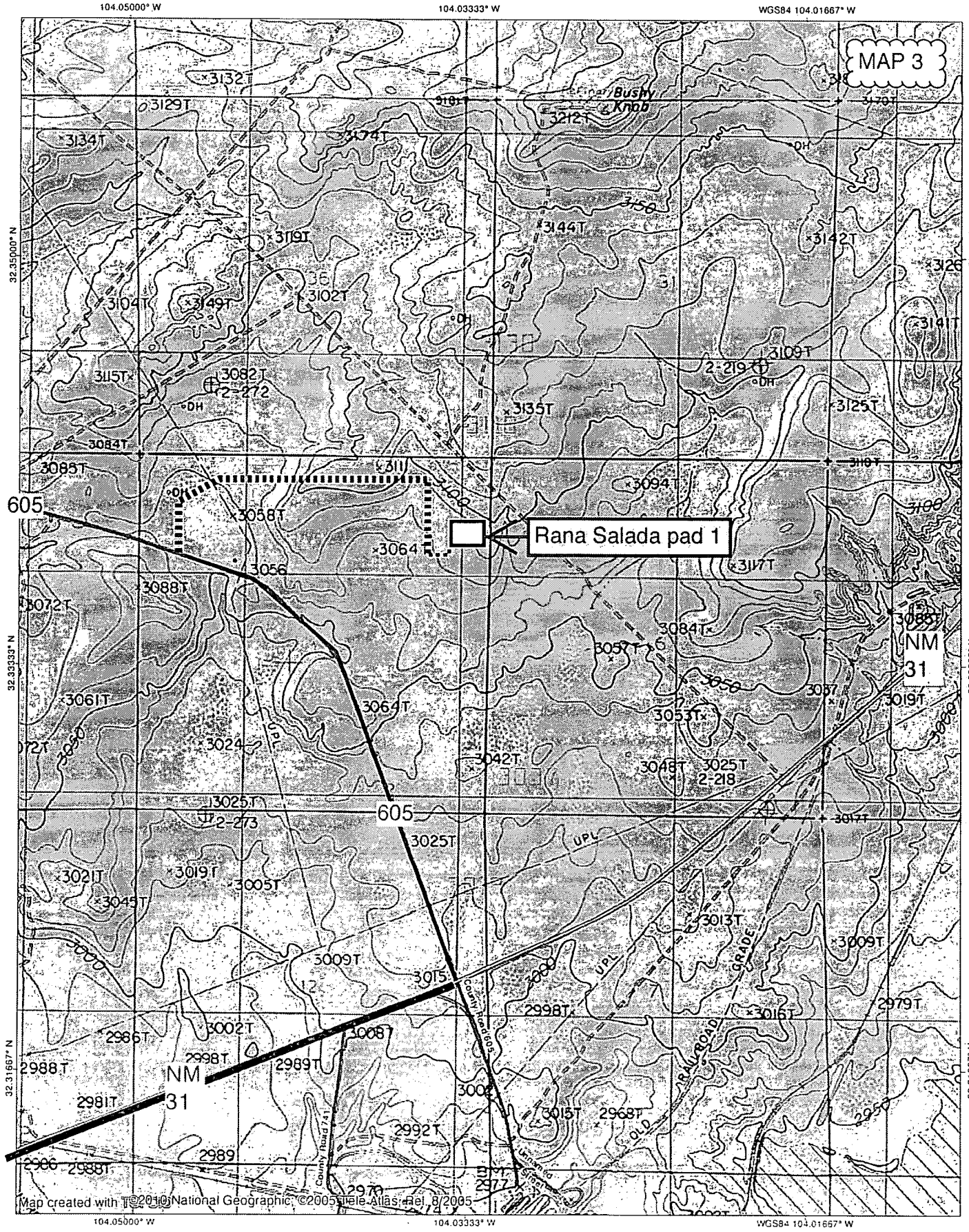


NATIONAL GEOGRAPHIC

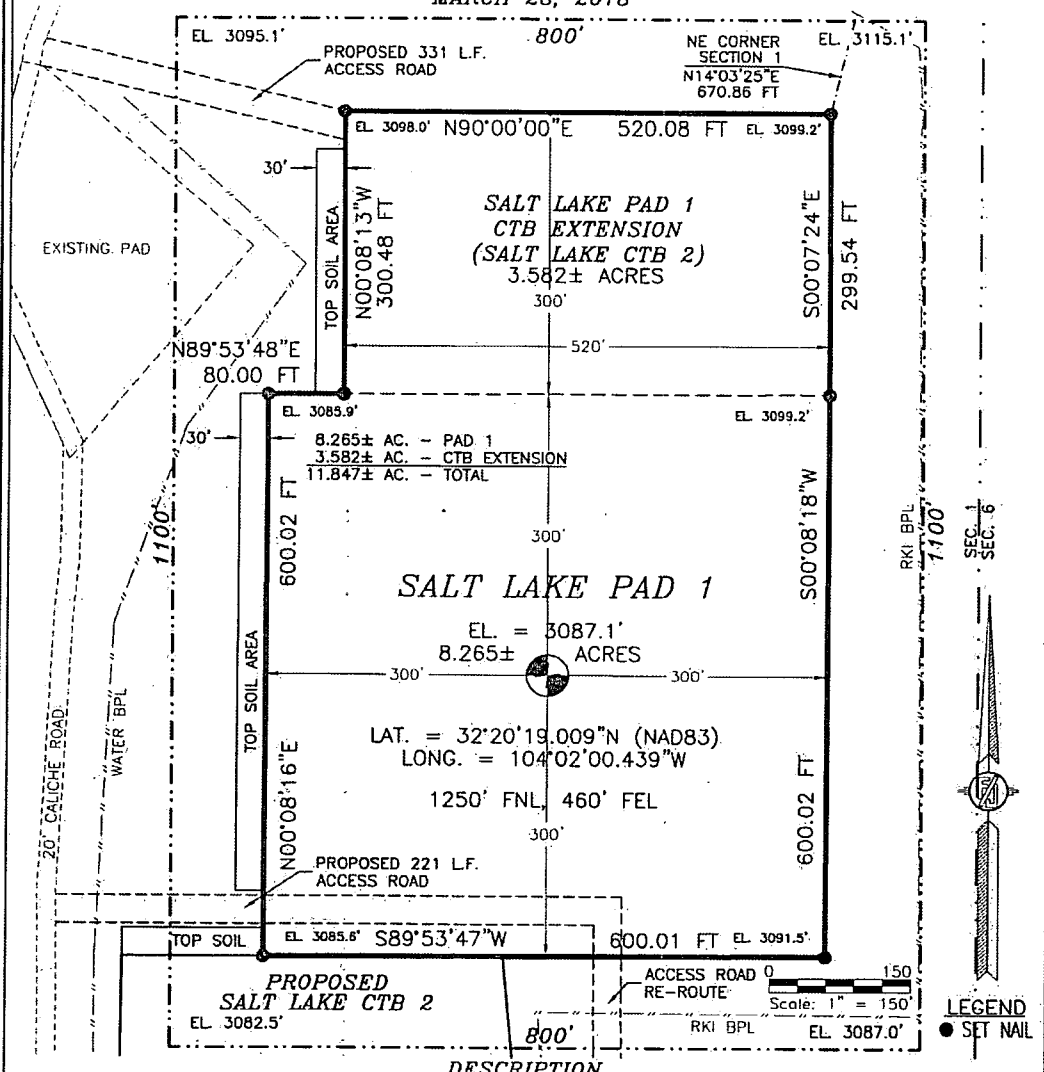
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 miles
0.0 0.5 1.0 km

TN MN 7°

06/30/18

SALT LAKE PAD 1
NOVO OIL AND GAS, LLC
IN THE W/2 NE/4 OF
SECTION 1, TOWNSHIP 23 SOUTH, RANGE 28 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
MARCH 23, 2018

MAP 4



DESCRIPTION

A CERTAIN PIECE OR PARCEL OF LAND AND REAL ESTATE LYING IN BUREAU OF LAND MANAGEMENT LAND IN THE W/2 NE/4 OF SECTION 1, TOWNSHIP 23 SOUTH, RANGE 28 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO.

BEGINNING AT THE NORTHEAST CORNER OF THE PARCEL, WHENCE THE NORTHEAST CORNER OF SECTION 1, TOWNSHIP 23 SOUTH, RANGE 28 EAST, N.M.P.M. BEARS N14°03'25"E, A DISTANCE OF 670.86 FEET;
THENCE S00°07'24"E A DISTANCE OF 299.54 FEET TO AN ANGLE POINT OF THE PARCEL;
THENCE S00°08'18"W A DISTANCE OF 600.02 FEET TO THE SOUTHEAST CORNER OF THE PARCEL;
THENCE S89°53';47"W A DISTANCE OF 600.01 FEET TO THE SOUTHWEST CORNER OF THE PARCEL;
THENCE N00°08'16"E A DISTANCE OF 600.02 FEET TO AN ANGLE POINT OF THE PARCEL;
THENCE N89°53'40"E A DISTANCE OF 80.00 FEET TO AN ANGLE POINT OF THE PARCEL;
THENCE N00°08'13"W A DISTANCE OF 300.48 FEET TO THE NORTHWEST CORNER OF THE PARCEL;
THENCE N90°00'00"E A DISTANCE OF 520.08 FEET TO THE NORTHEAST CORNER OF THE PARCEL, THE POINT OF BEGINNING;
CONTAINING 11.847 ACRES MORE OR LESS.

GENERAL NOTES

1.) THE INTENT OF THIS SURVEY IS TO ACQUIRE A BUSINESS LEASE FOR THE PURPOSE OF BUILDING A WELL PAD

2.) BASIS OF BEARING IS NEW MEXICO STATE PLANE EAST ZONE MODIFIED TO THE SURFACE (NAD83), COORDINATES ARE NAD 83, ELEVATIONS ARE NAVD 88

DRIVING DIRECTIONS: FROM CR. 31 (POTASH MINES RD.) AND CR. 605 (REFINERY RD.), GO NORTH ON CR. 605 APPROX. 0.4 MILE, TURN RIGHT (EAST) ON CALICHE ROAD AND GO EAST AND NORTHEAST APPROX. 0.2 MILE TO A Y IN ROAD, TURN LEFT (NORTH) AND GO APPROX. 0.8 MILE TO A ROAD SURVEY, FOLLOW ROAD SURVEY EAST 221' TO THE SOUTHWEST PAD CORNER FOR THIS LOCATION.

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 12 DAY OF APRIL 2018

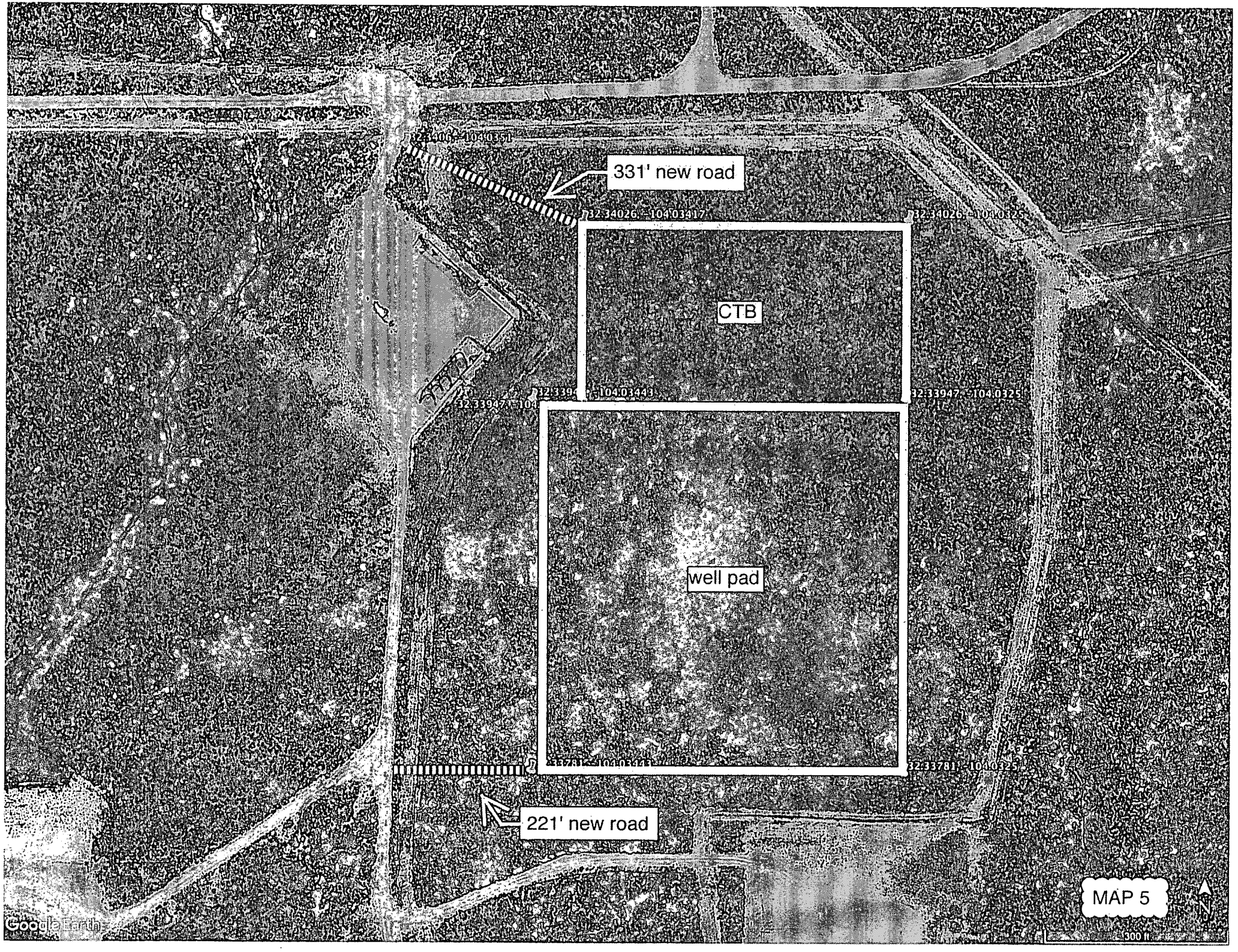
FILIMON F. JARAMILLO, PLS 12797

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

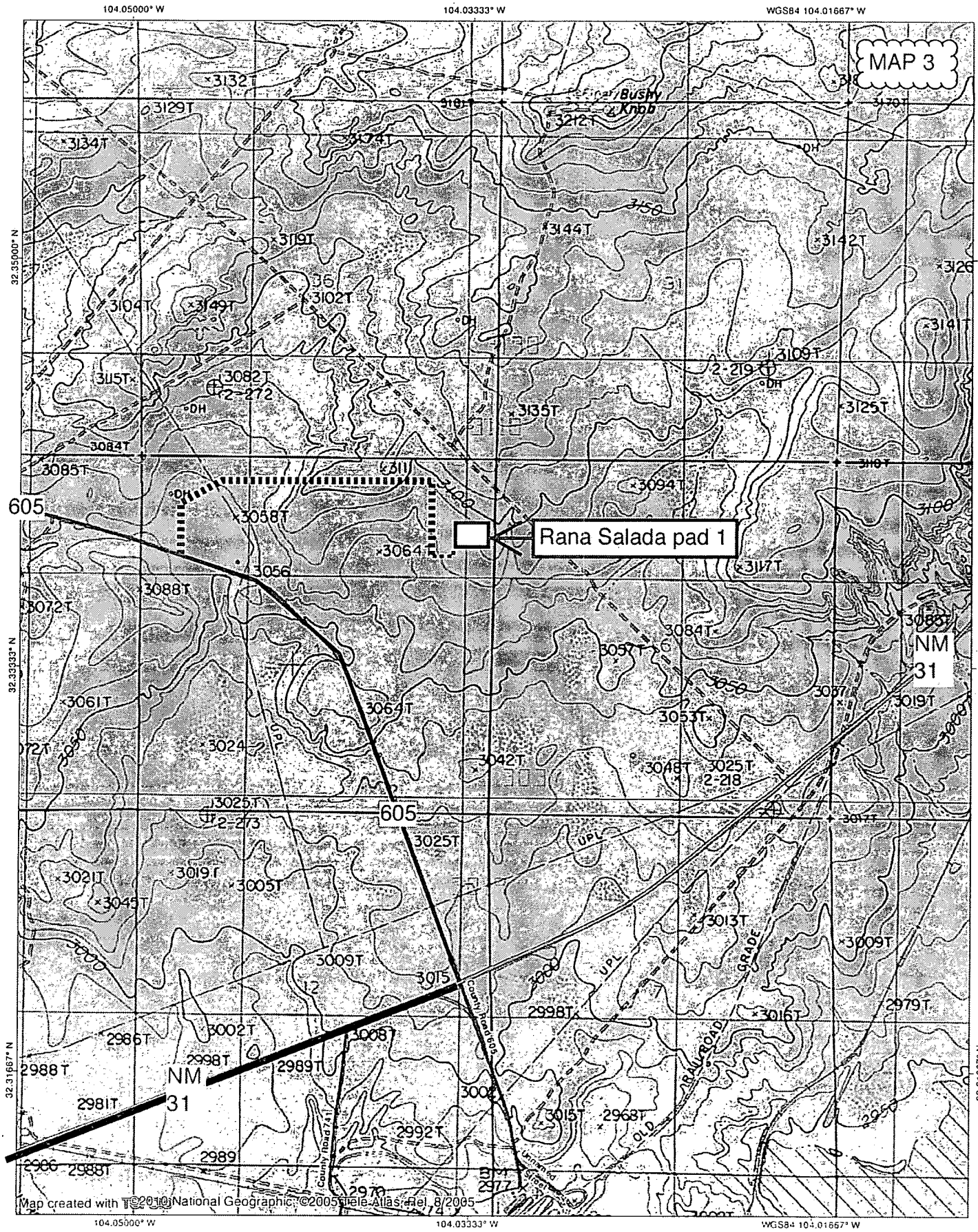
SHEET: 1-3

SURVEY NO. 6081

MADRON SURVEYING, INC. CARLSBAD, NEW MEXICO


331' new road
CTB
well pad
221' new road
MAP 5
N

TOPO! map printed on 06/30/18 from "Untitled.tpo"



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0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 miles
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TN MN
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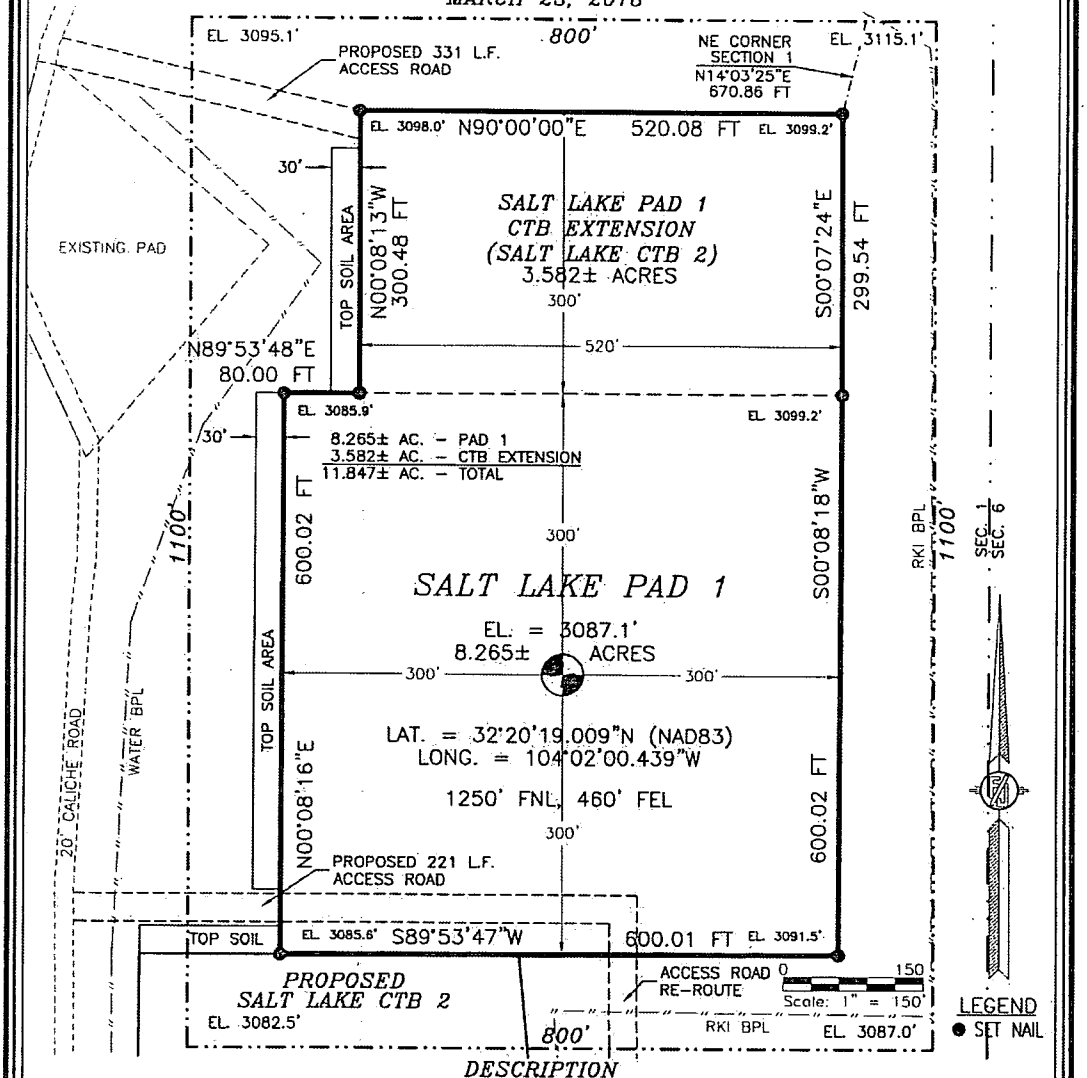
MARCH 23, 2018

MAP 4



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SURVEYOR CERTIFICATE

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IN WITNESS WHEREOF, THIS CERTIFICATE IS EXECUTED AT CARLSBAD, NEW MEXICO, THIS 27 DAY OF APRIL 2018

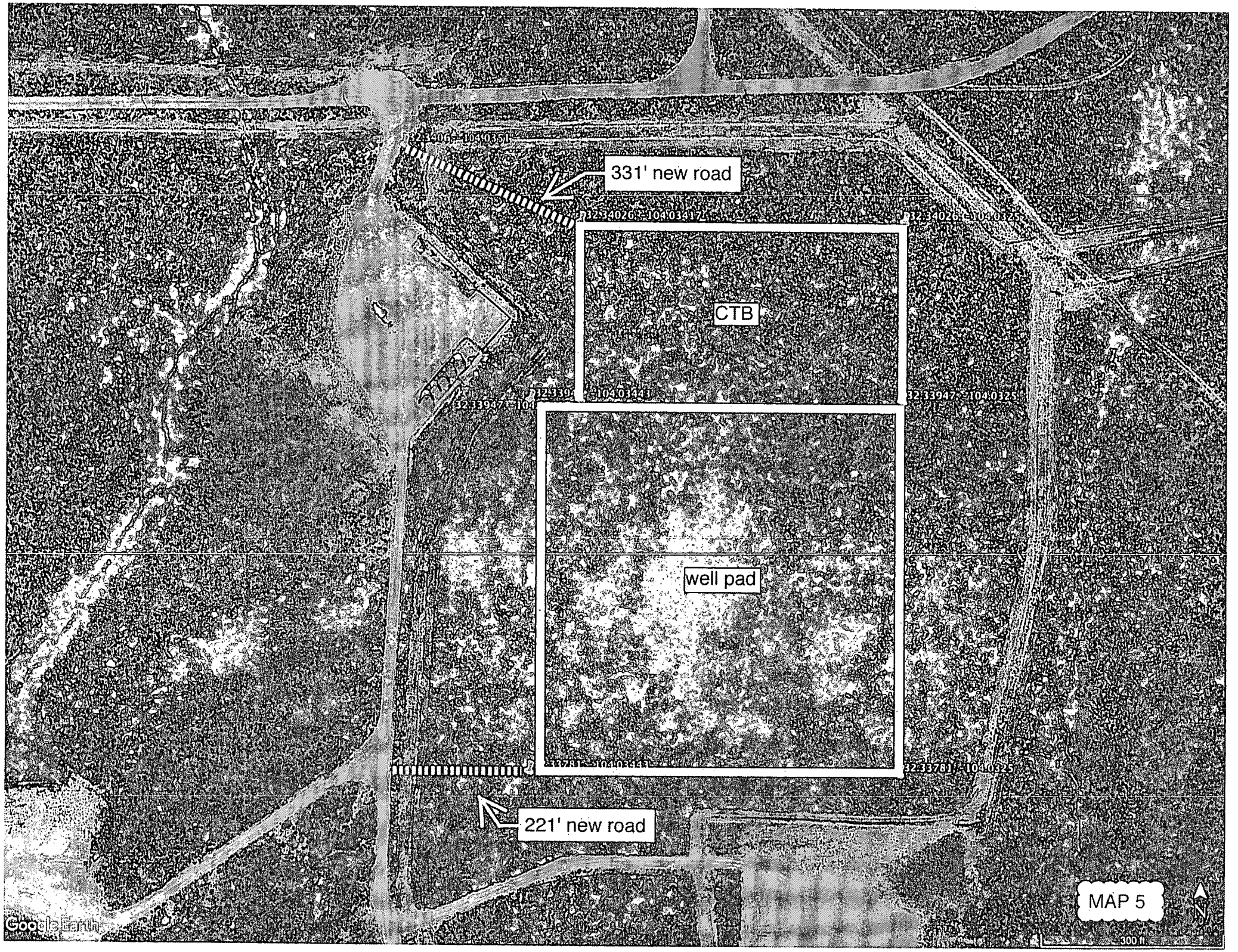
FILIMON F. JARAMILLO, PLS. 12797

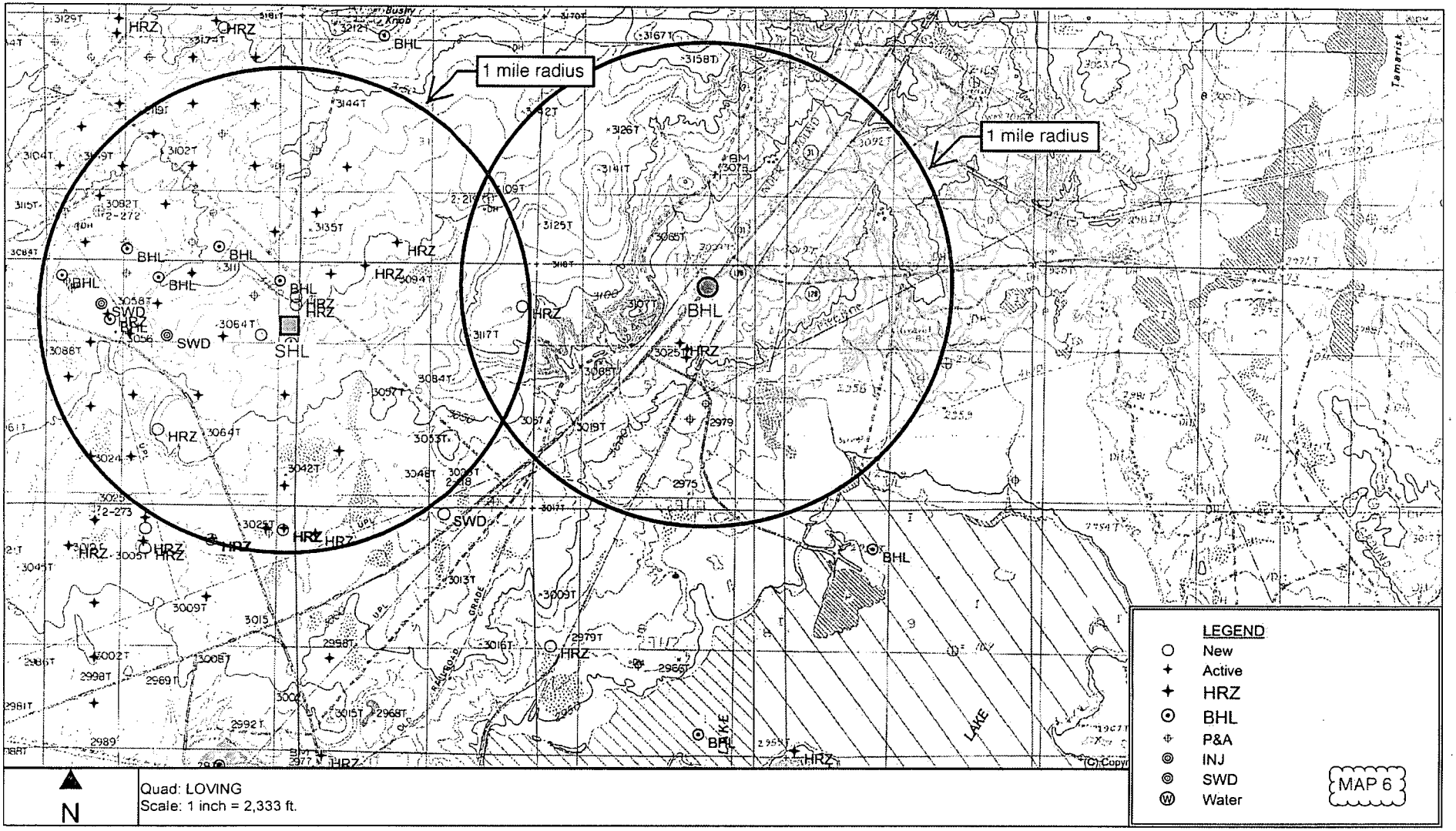
MADRON SURVEYING, INC.
301 SOUTH CANAL
CARLSBAD, NEW MEXICO 88220
Phone (575) 234-3341

SHEET: 1-3

SURVEY NO. 6081

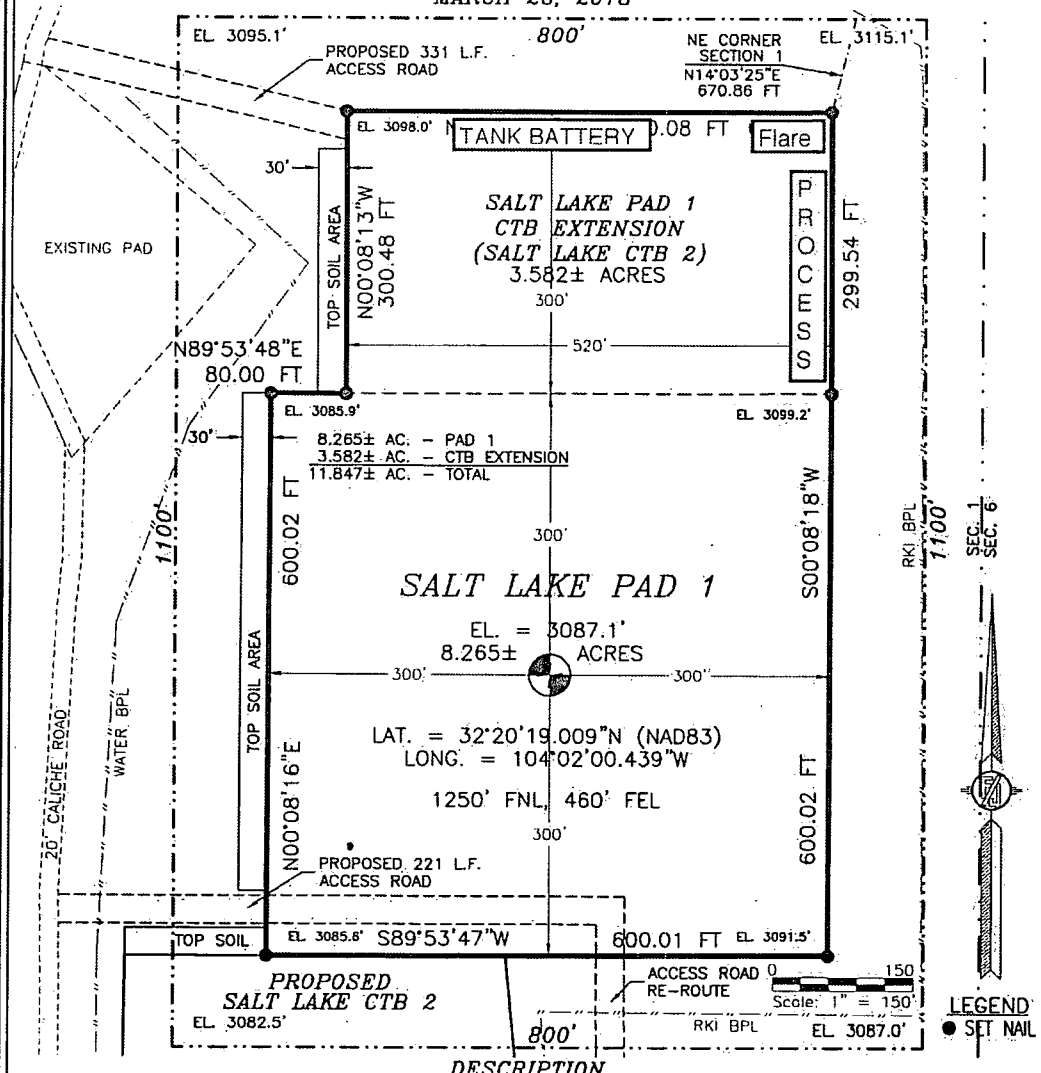
MADRON SURVEYING, INC. CARLSBAD, NEW MEXICO


331' new road
CTB
well pad
221' new road
MAP 5
Google Earth
300 ft


1 mile radius
1 mile radius
SHL
BHL
SWD
HRZ
LEGEND
New
Active
HRZ
BHL
P&A
INJ
SWD
Water
MAP 6
N
Quad: LOVING
Scale: 1 inch = 2,333 ft.

SALT LAKE PAD 1
NOVO OIL AND GAS, LLC
IN THE W/2 NE/4 OF
SECTION 1, TOWNSHIP 23 SOUTH, RANGE 28 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
MARCH 23, 2018

MAP 7



DESCRIPTION

A CERTAIN PIECE OR PARCEL OF LAND AND REAL ESTATE LYING IN BUREAU OF LAND MANAGEMENT LAND IN THE W/2 NE/4 OF SECTION 1, TOWNSHIP 23 SOUTH, RANGE 28 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO.

BEGINNING AT THE NORTHEAST CORNER OF THE PARCEL, WHENCE THE NORTHEAST CORNER OF SECTION 1, TOWNSHIP 23 SOUTH, RANGE 28 EAST, N.M.P.M. BEARS N14°03'25"E, A DISTANCE OF 670.86 FEET;
THENCE S00°07'24"E A DISTANCE OF 299.54 FEET TO AN ANGLE POINT OF THE PARCEL;
THENCE S00°08'18"W A DISTANCE OF 600.02 FEET TO THE SOUTHEAST CORNER OF THE PARCEL;
THENCE S89°53';47"W A DISTANCE OF 600.01 FEET TO THE SOUTHWEST CORNER OF THE PARCEL;
THENCE N00°08'16"E A DISTANCE OF 600.02 FEET TO AN ANGLE POINT OF THE PARCEL;
THENCE N89°53'40"E A DISTANCE OF 80.00 FEET TO AN ANGLE POINT OF THE PARCEL;
THENCE N00°08'13"W A DISTANCE OF 300.48 FEET TO THE NORTHWEST CORNER OF THE PARCEL;
THENCE N90°00'00"E A DISTANCE OF 520.08 FEET TO THE NORTHEAST CORNER OF THE PARCEL, THE POINT OF BEGINNING;
CONTAINING 11.847 ACRES MORE OR LESS.

GENERAL NOTES

1.) THE INTENT OF THIS SURVEY IS TO ACQUIRE A BUSINESS LEASE FOR THE PURPOSE OF BUILDING A WELL PAD

2.) BASIS OF BEARING IS NEW MEXICO STATE PLANE EAST ZONE MODIFIED TO THE SURFACE (NAD83), COORDINATES ARE NAD 83, ELEVATIONS ARE NAVD 88

DRIVING DIRECTIONS: FROM CR. 31 (POTASH MINES RD.) AND CR. 605 (REFINERY RD.), GO NORTH ON CR. 605 APPROX. 0.4 MILE, TURN RIGHT (EAST) ON CALICHE ROAD AND GO EAST AND NORTHEAST APPROX. 0.2 MILE TO A "Y" IN ROAD, TURN LEFT (NORTH) AND GO APPROX. 0.8 MILE TO A ROAD SURVEY, FOLLOW ROAD SURVEY EAST 221' TO THE SOUTHWEST PAD CORNER FOR THIS LOCATION.

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 12 DAY OF APRIL 2018

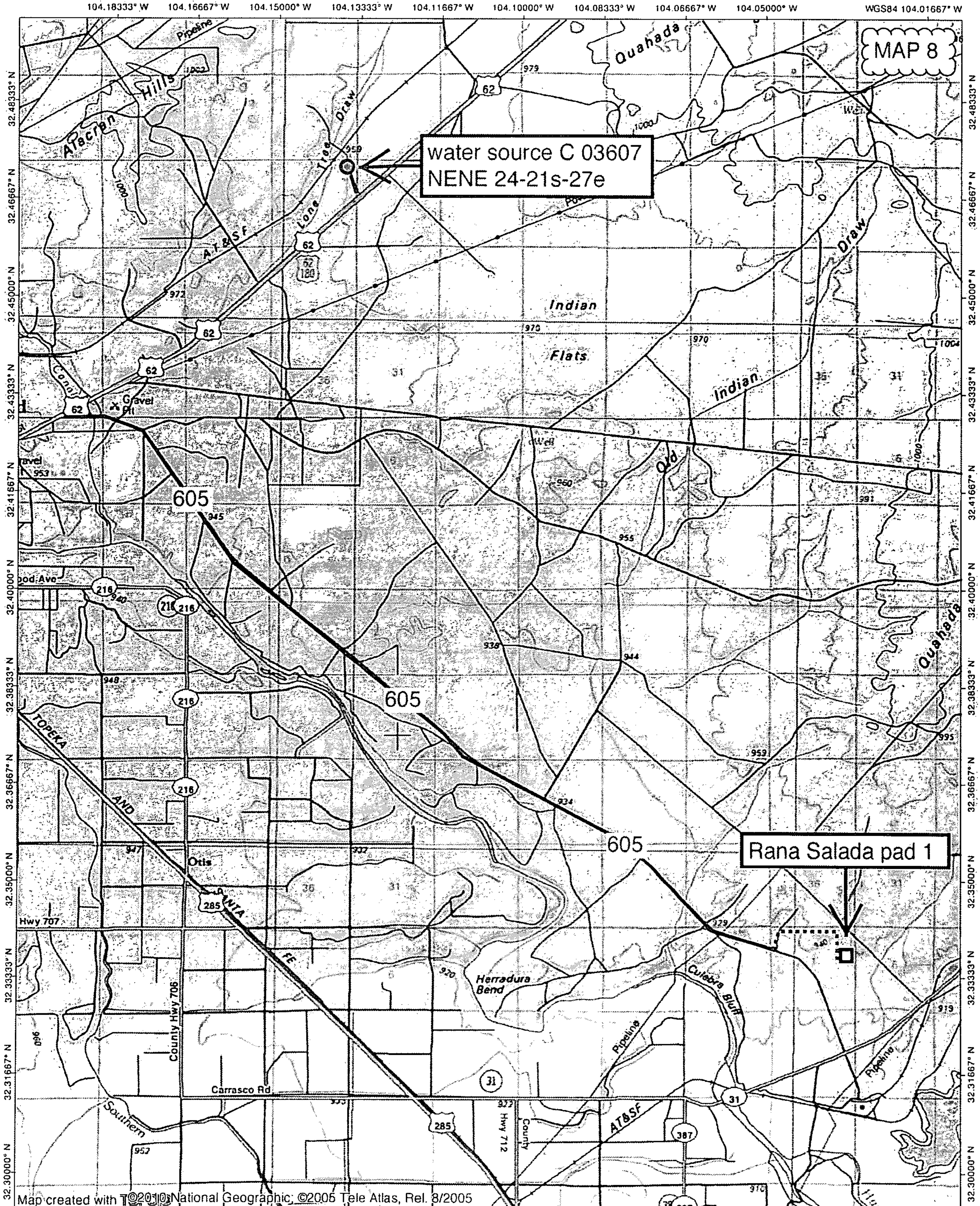
FILIMON F. JARAMILLO, P.S. 12797

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

SURVEY NO. 6081

MADRON SURVEYING, INC. CARLSBAD, NEW MEXICO

TOPO! map printed on 07/01/18 from "Untitled.tpo"



NATIONAL GEOGRAPHIC

0.0 0.5 1.0 1.5 2.0 2.5 3.0 miles

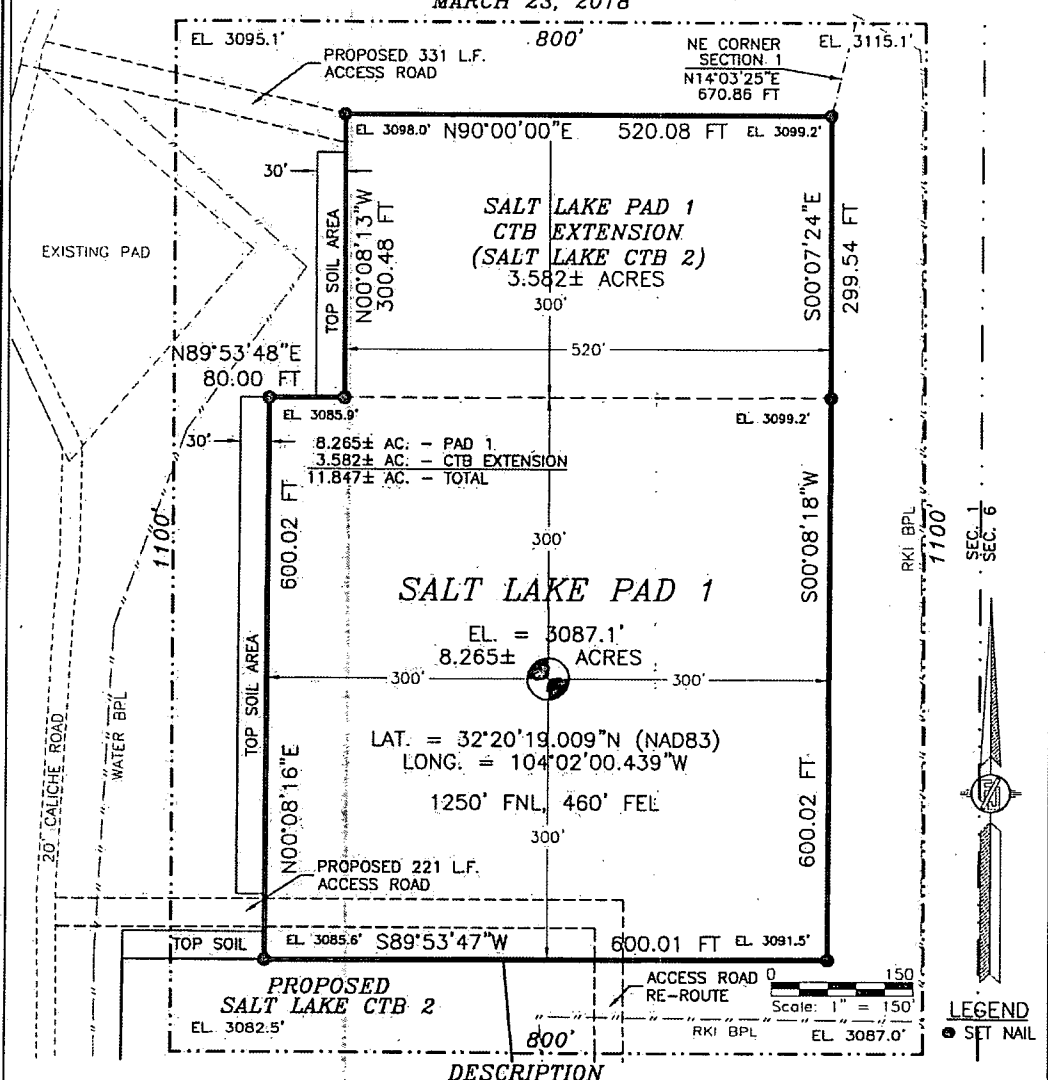
0 1 2 3 4 5 km

TN MN 7°

07/01/18

SALT LAKE PAD 1
NOVO OIL AND GAS, LLC
IN THE W/2 NE/4 OF
SECTION 1, TOWNSHIP 23 SOUTH, RANGE 28 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
MARCH 23, 2018

MAP 9



DESCRIPTION

A CERTAIN PIECE OR PARCEL OF LAND AND REAL ESTATE LYING IN BUREAU OF LAND MANAGEMENT LAND IN THE W/2 NE/4 OF SECTION 1, TOWNSHIP 23 SOUTH, RANGE 28 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO.

BEGINNING AT THE NORTHEAST CORNER OF THE PARCEL, WHENCE THE NORTHEAST CORNER OF SECTION 1, TOWNSHIP 23 SOUTH, RANGE 28 EAST, N.M.P.M. BEARS N14°03'25"E, A DISTANCE OF 670.86 FEET;
THENCE S00°07'24"E A DISTANCE OF 299.54 FEET TO AN ANGLE POINT OF THE PARCEL;
THENCE S00°08'18"W A DISTANCE OF 600.02 FEET TO THE SOUTHEAST CORNER OF THE PARCEL;
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THENCE N00°08'16"E A DISTANCE OF 600.02 FEET TO AN ANGLE POINT OF THE PARCEL;
THENCE N89°53'40"E A DISTANCE OF 80.00 FEET TO AN ANGLE POINT OF THE PARCEL;
THENCE N00°08'13"W A DISTANCE OF 300.48 FEET TO THE NORTHWEST CORNER OF THE PARCEL;
THENCE N90°00'00"E A DISTANCE OF 520.08 FEET TO THE NORTHEAST CORNER OF THE PARCEL, THE POINT OF BEGINNING;
CONTAINING 11.847 ACRES MORE OR LESS.

GENERAL NOTES

1.) THE INTENT OF THIS SURVEY IS TO ACQUIRE A BUSINESS LEASE FOR THE PURPOSE OF BUILDING A WELL PAD

2.) BASIS OF BEARING IS NEW MEXICO STATE PLANE EAST ZONE MODIFIED TO THE SURFACE (NAD83), COORDINATES ARE NAD 83, ELEVATIONS ARE NAVD 88

DRIVING DIRECTIONS: FROM CR. 31 (POTASH MINES RD.) AND CR. 605 (REFINERY RD.), GO NORTH ON CR. 605 APPROX. 0.4 MILE, TURN RIGHT (EAST) ON CALICHE ROAD AND GO EAST AND NORTHEAST APPROX. 0.2 MILE TO A "Y" IN ROAD, TURN LEFT (NORTH) AND GO APPROX. 0.8 MILE TO A ROAD SURVEY, FOLLOW ROAD SURVEY EAST 221' TO THE SOUTHWEST PAD CORNER FOR THIS LOCATION.

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 5th DAY OF APRIL 2018

FILIMON F. JARAMILLO PLS 12797
301 SOUTH CANAL
(575) 234-3341

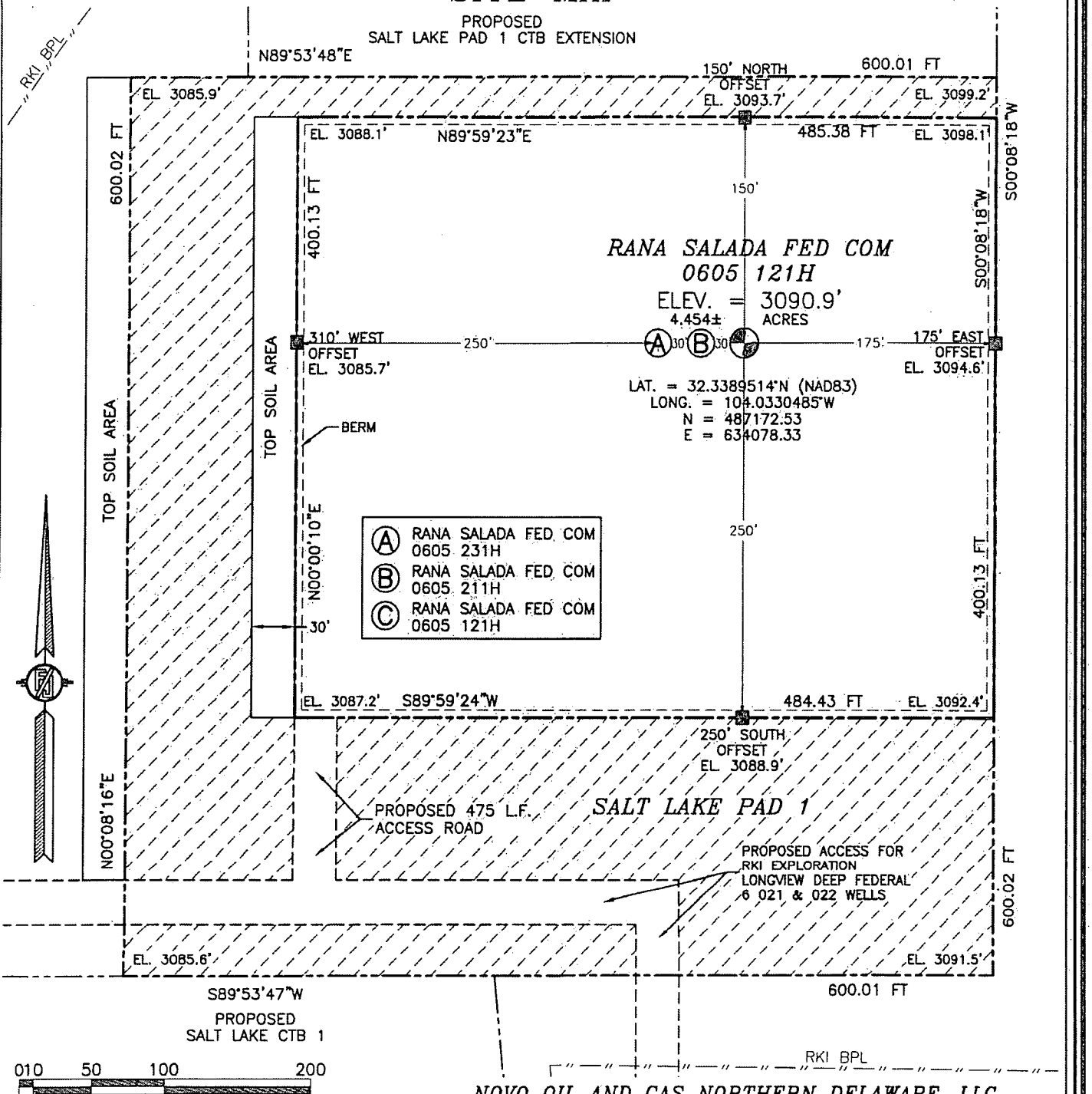
MADRON SURVEYING, INC.
301 SOUTH CANAL
CARLSBAD, NEW MEXICO 88220
Phone (575) 234-3341

SURVEY NO. 6081

MADRON SURVEYING, INC. CARLSBAD, NEW MEXICO

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

MAP 10



010 50 100 200

SCALE 1" = 100'

DIRECTIONS TO LOCATION

FROM CR. 31 (POTASH MINES RD.) AND CR. 605 (REFINERY RD.), GO NORTH ON CR. 605 APPROX. 0.4 MILE, TURN RIGHT (EAST) ON CALICHE ROAD AND GO EAST AND NORTHEAST APPROX. 0.2 MILE TO A "Y" IN ROAD, TURN LEFT (NORTH) AND GO APPROX. 0.8 MILE TO A ROAD SURVEY, FOLLOW ROAD SURVEY EAST 351' AND NORTH 124' TO THE SOUTHWEST PAD CORNER FOR THIS LOCATION.

NOVO OIL AND GAS NORTHERN DELAWARE, LLC

RANA SALADA FED COM 0605 121H

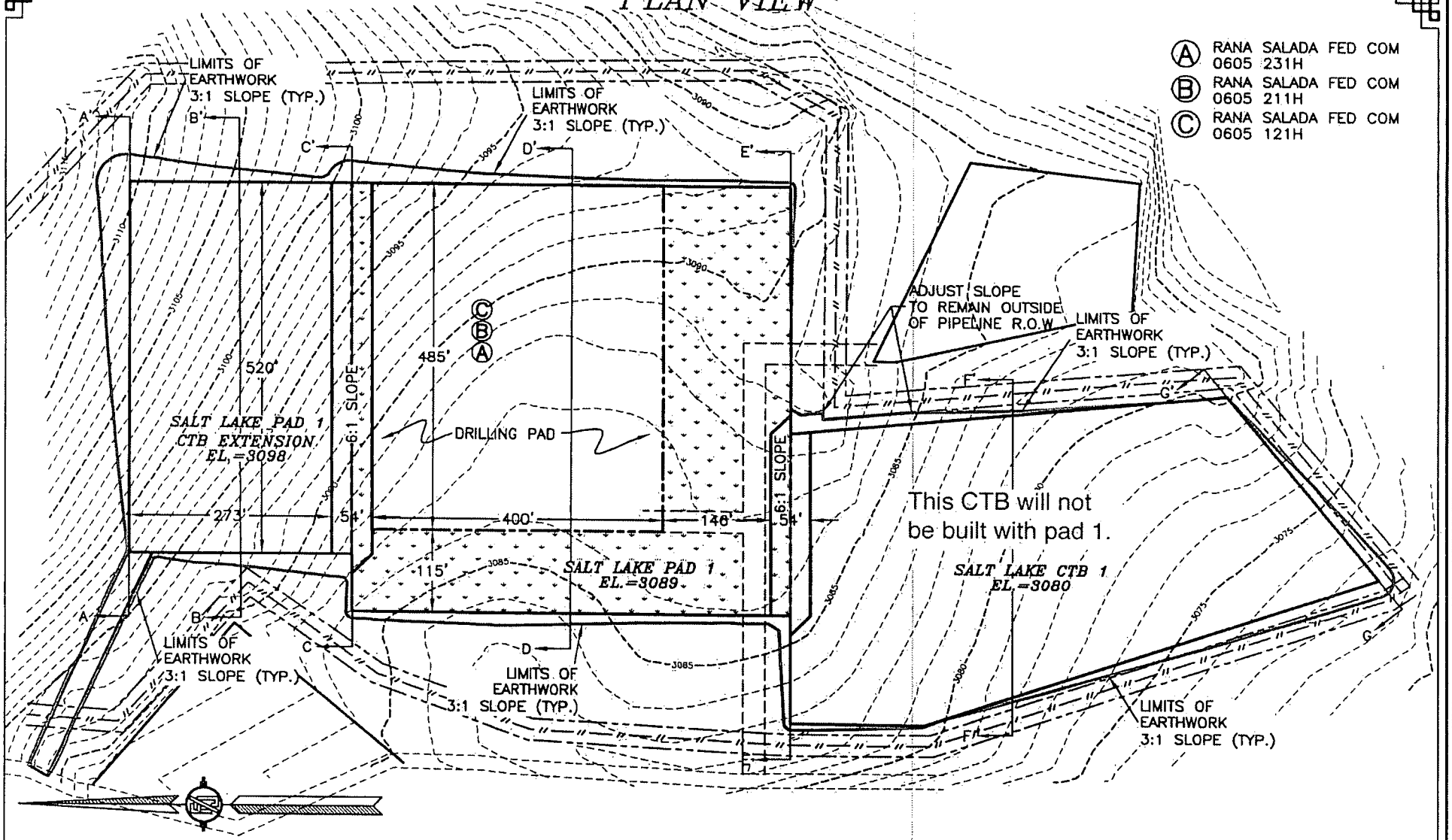
LOCATED 1127 FT. FROM THE NORTH LINE AND 335 FT. FROM THE EAST LINE OF SECTION 1, TOWNSHIP 23 SOUTH, RANGE 28 EAST, N.M.P.M. EDDY COUNTY, STATE OF NEW MEXICO

JUNE 26, 2018

SURVEY NO. 6145B

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

PLAN VIEW



020 100 200 400

SCALE 1" = 200'

NOVO OIL AND GAS NORTHERN DELAWARE, LLC
PAD GRADING AND CROSS SECTIONS
FOR RANA SALADA FED COM 0605 231H
SECTION 1, TOWNSHIP 23 SOUTH,
RANGE 28 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

CUT	FILL	NET
46251 CU. YD	41381 CU. YD	4871 CU. YD (CUT)

EARTHWORK QUANTITIES ARE ESTIMATED

MAP 11

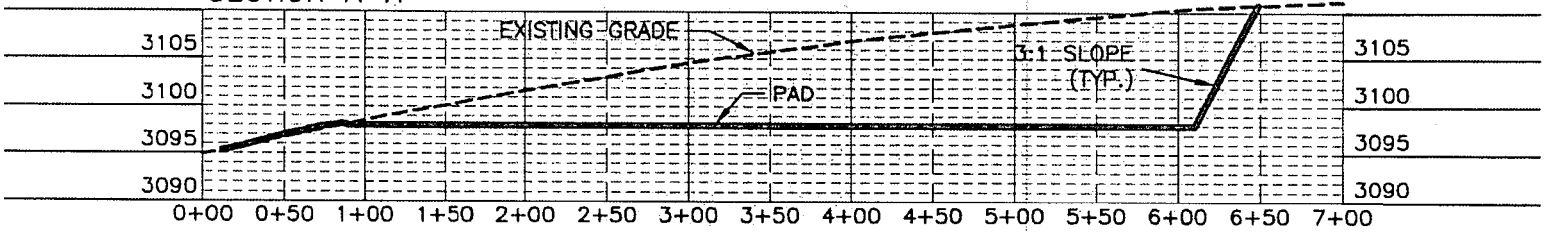
JUNE 26, 2018

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

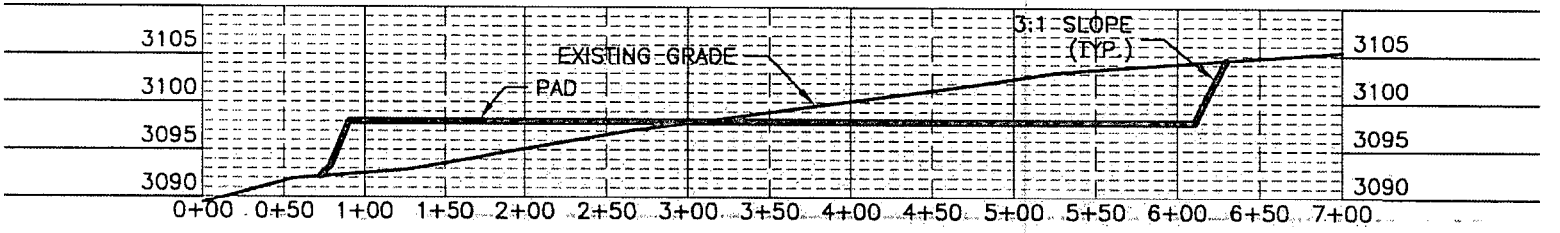
SURVEY NO. 6144B

CROSS-SECTIONS

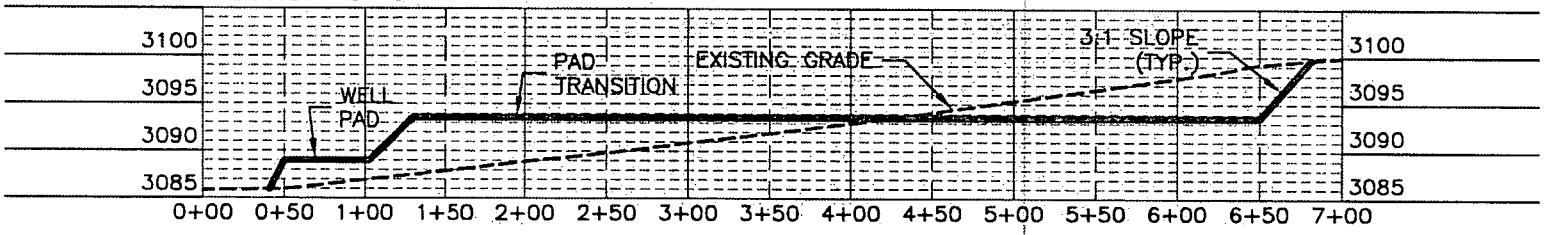
SECTION A-A'



SECTION B-B'



SECTION C-C'



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

NOVO OIL AND GAS NORTHERN DELAWARE, LLC
PAD GRADING AND CROSS SECTIONS
FOR RANA SALADA FED COM 0605 231H
SECTION 1, TOWNSHIP 23 SOUTH,
RANGE 28 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

JUNE 26, 2018

CUT	FILL	NET
46251 CU. YD	41381 CU. YD	4871 CU. YD (CUT)

EARTHWORK QUANTITIES ARE ESTIMATED

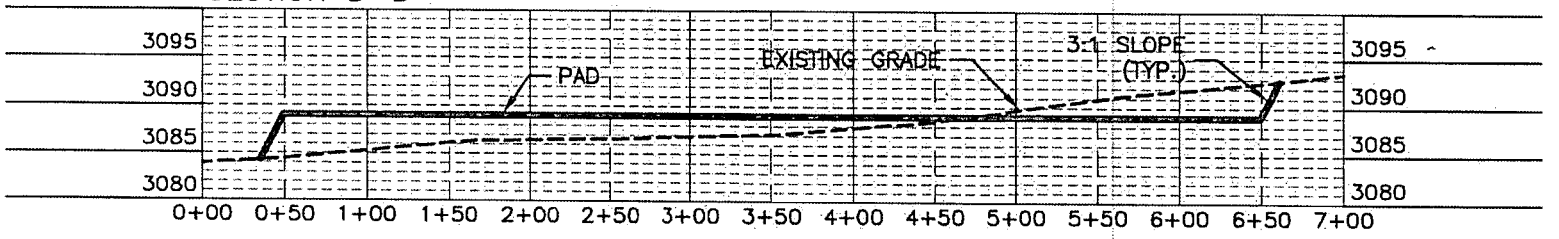
MAP 12

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

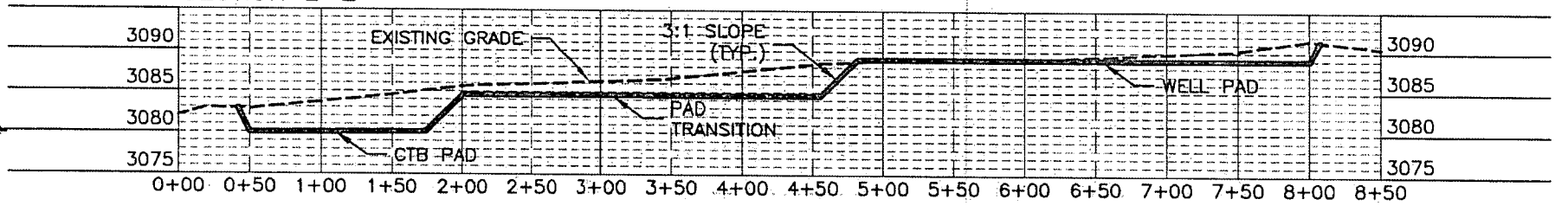
SURVEY NO. 6144B

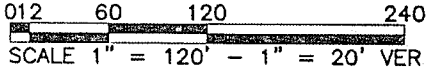
CROSS–SECTIONS

SECTION D–D'



SECTION E–E'





NOVO OIL AND GAS NORTHERN DELAWARE, LLC
PAD GRADING AND CROSS SECTIONS
FOR RANA SALADA FED COM 0605 231H
SECTION 1, TOWNSHIP 23 SOUTH,
RANGE 28 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

JUNE 26, 2018

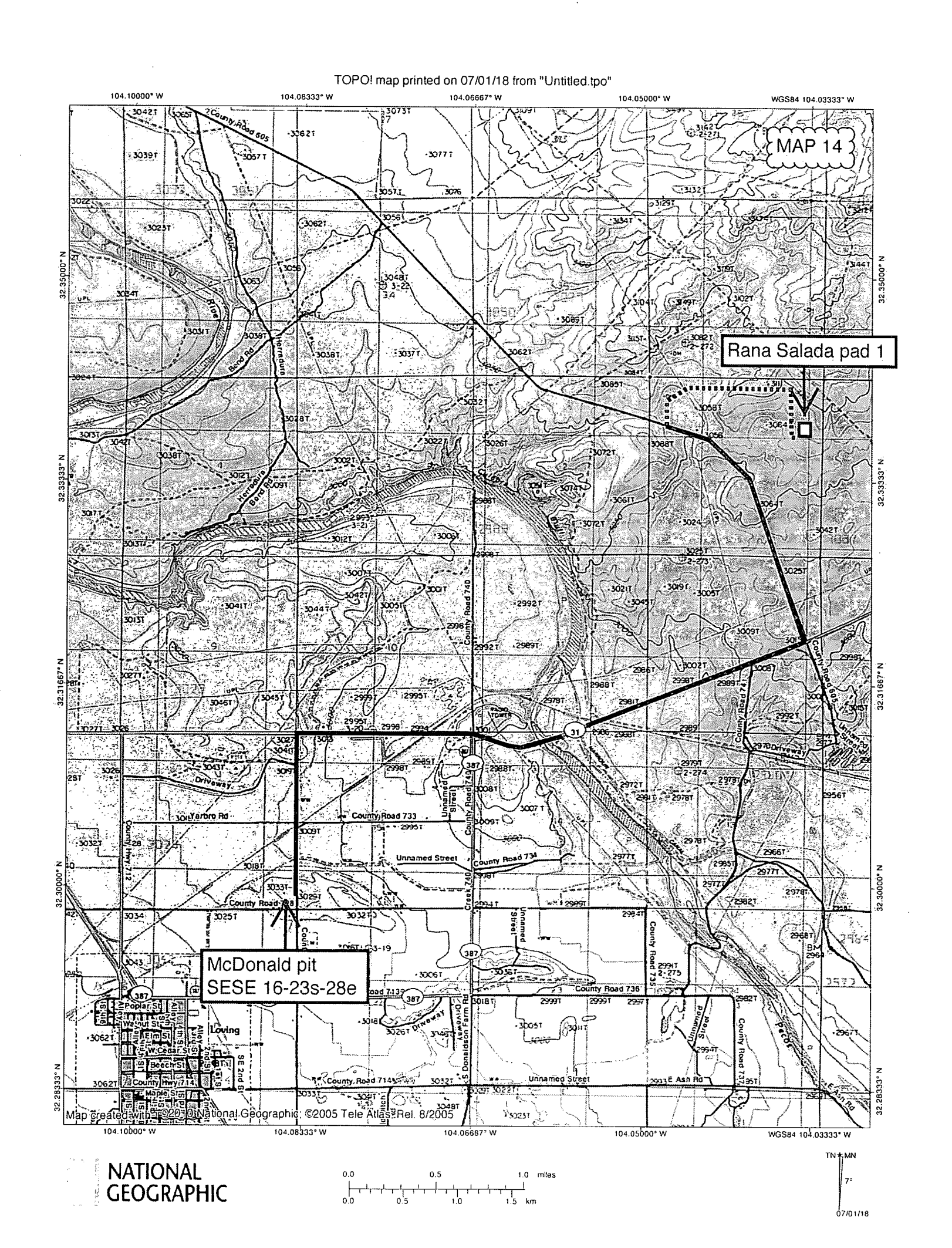
CUT	FILL	NET
46251 CU. YD	41381 CU. YD	4871 CU. YD (CUT)

EARTHWORK QUANTITIES ARE ESTIMATED

MAP 13

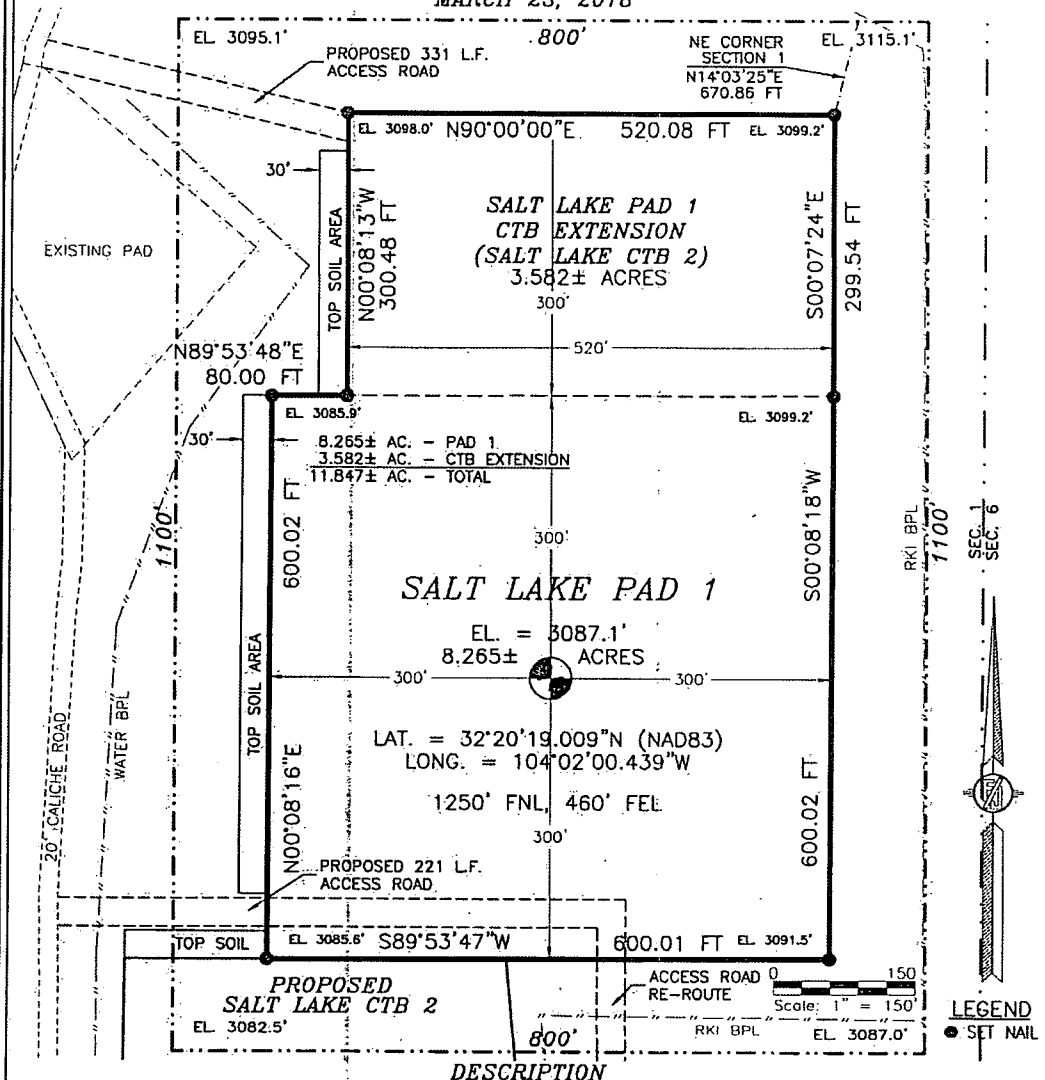
MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 *CARLSBAD, NEW MEXICO*

SURVEY NO. 6144B


TOPO! map printed on 07/01/18 from "Untitled.tpo"
104.10000° W
104.08333° W
104.06667° W
104.05000° W
WGS84 104.03333° W
32.35000° N
32.33333° N
32.31667° N
32.30000° N
32.28333° N
MAP 14
Rana Salada pad 1
McDonald pit
SESE 16-23s-28e
County Road 605
Bond Rd
Herradura Bend Rd
County Road 740
County Road 733
Unnamed Street
County Road 734
County Road 738
County Road 736
County Road 735
County Road 737
County Road 714
Yarbro Rd
E Ash Rd
Driveway
Loving
Poplar St
Walnut St
Elm St
W Cedar St
Beech St
Maple St
SE 2nd St
Donaldson Farm Rd
Creek 740
Map created with TOPO! ©2003 National Geographic; ©2005 Tele Atlas Rel. 8/2005
NATIONAL GEOGRAPHIC
0.0 0.5 1.0 miles
0.0 0.5 1.0 1.5 km
TN ↑ MN
07/01/18

SALT LAKE PAD 1
NOVO OIL AND GAS, LLC
IN THE W/2 NE/4 OF
SECTION 1, TOWNSHIP 23 SOUTH, RANGE 28 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
MARCH 23, 2018

MAP 9



DESCRIPTION

A CERTAIN PIECE OR PARCEL OF LAND AND REAL ESTATE LYING IN BUREAU OF LAND MANAGEMENT LAND IN THE W/2 NE/4 OF SECTION 1, TOWNSHIP 23 SOUTH, RANGE 28 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO.

BEGINNING AT THE NORTHEAST CORNER OF THE PARCEL, WHENCE THE NORTHEAST CORNER OF SECTION 1, TOWNSHIP 23 SOUTH, RANGE 28 EAST, N.M.P.M. BEARS N14°03'25"E, A DISTANCE OF 670.86 FEET;
THENCE S00°07'24"E A DISTANCE OF 299.54 FEET TO AN ANGLE POINT OF THE PARCEL;
THENCE S00°08'18"W A DISTANCE OF 600.02 FEET TO THE SOUTHEAST CORNER OF THE PARCEL;
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THENCE N90°00'00"E A DISTANCE OF 520.08 FEET TO THE NORTHEAST CORNER OF THE PARCEL, THE POINT OF BEGINNING;
CONTAINING 11.847 ACRES MORE OR LESS.

GENERAL NOTES

1.) THE INTENT OF THIS SURVEY IS TO ACQUIRE A BUSINESS LEASE FOR THE PURPOSE OF BUILDING A WELL PAD

2.) BASIS OF BEARING IS NEW MEXICO STATE PLANE EAST ZONE MODIFIED TO THE SURFACE (NAD83), COORDINATES ARE NAD 83, ELEVATIONS ARE NAVD 88

DRIVING DIRECTIONS: FROM CR. 31 (POTASH MINES RD.) AND CR. 605 (REFINERY RD.), GO NORTH ON CR. 605 APPROX. 0.4 MILE, TURN RIGHT (EAST) ON CALICHE ROAD AND GO EAST AND NORTHEAST APPROX. 0.2 MILE TO A "Y" IN ROAD, TURN LEFT (NORTH) AND GO APPROX. 0.8 MILE TO A ROAD SURVEY, FOLLOW ROAD SURVEY EAST 221' TO THE SOUTHWEST PAD CORNER FOR THIS LOCATION.

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 12TH DAY OF APRIL 2018

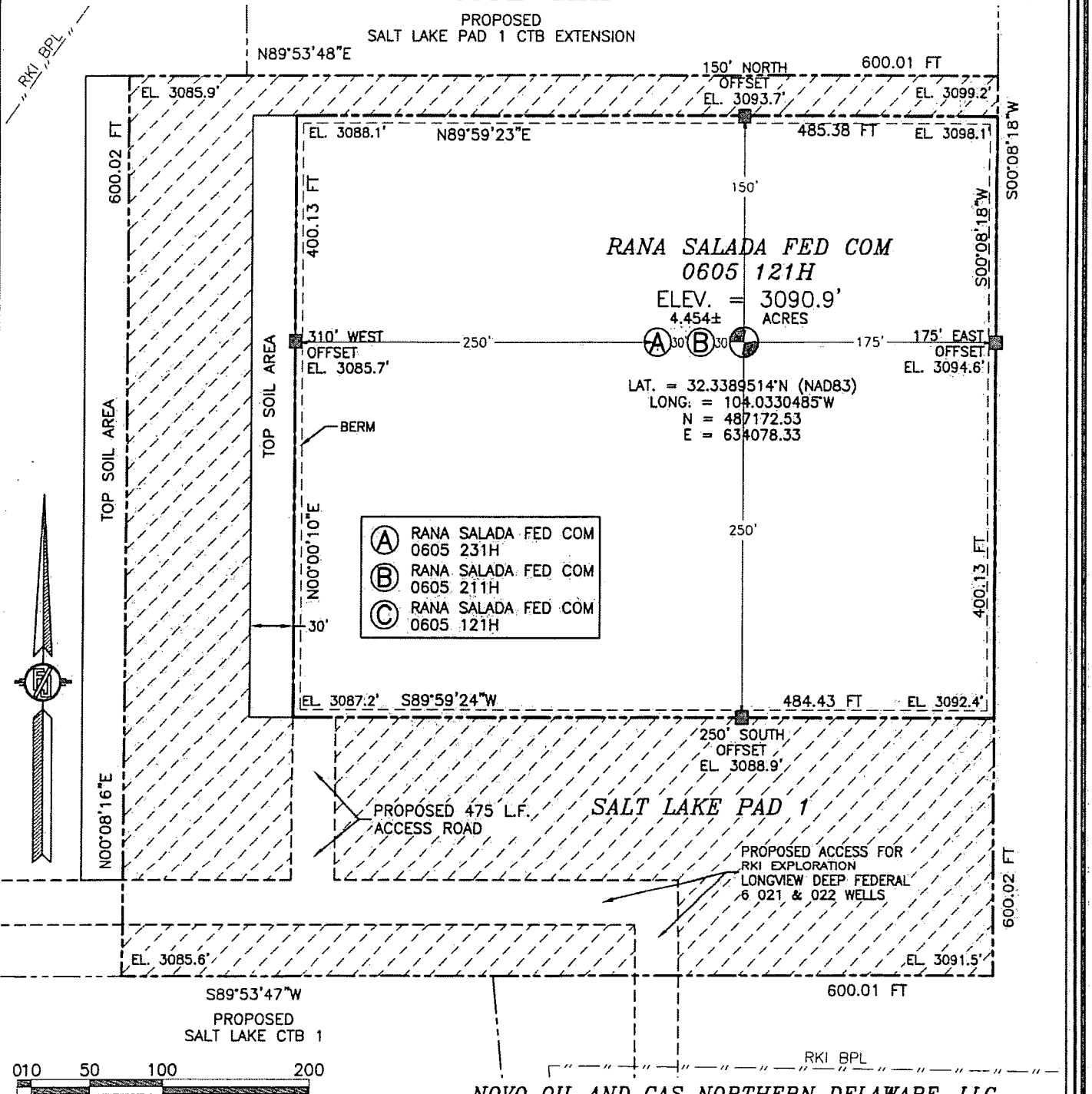
FILIMON F. JARAMILLO PLS. 12797

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

SURVEY NO. 6081

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

MAP 10



010 50 100 200

SCALE 1" = 100'

DIRECTIONS TO LOCATION

FROM CR. 31 (POTASH MINES RD.) AND CR. 605 (REFINERY RD.), GO NORTH ON CR. 605 APPROX. 0.4 MILE, TURN RIGHT (EAST) ON CALICHE ROAD AND GO EAST AND NORTHEAST APPROX. 0.2 MILE TO A "Y" IN ROAD, TURN LEFT (NORTH) AND GO APPROX. 0.8 MILE TO A ROAD SURVEY, FOLLOW ROAD SURVEY EAST 351' AND NORTH 124' TO THE SOUTHWEST PAD CORNER FOR THIS LOCATION.

NOVO OIL AND GAS NORTHERN DELAWARE, LLC

RANA SALADA FED COM 0605 121H

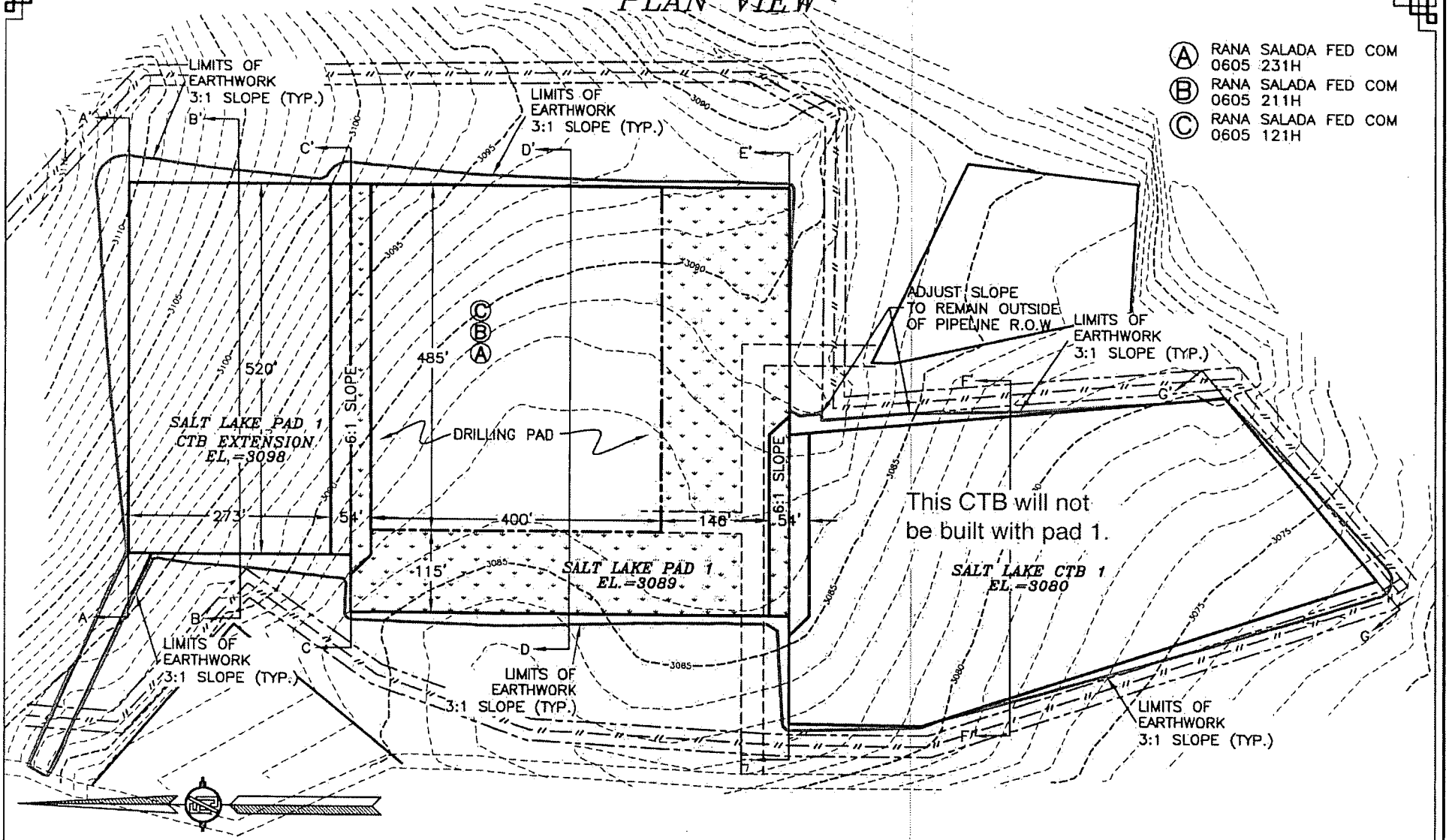
LOCATED 1127 FT. FROM THE NORTH LINE AND 335 FT. FROM THE EAST LINE OF SECTION 1, TOWNSHIP 23 SOUTH, RANGE 28 EAST, N.M.P.M. EDDY COUNTY, STATE OF NEW MEXICO

JUNE 26, 2018

SURVEY NO. 6145B

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

PLAN VIEW



020 100 200 400

SCALE 1" = 200'

NOVO OIL AND GAS NORTHERN DELAWARE, LLC
PAD GRADING AND CROSS SECTIONS
FOR RANA SALADA FED COM 0605 231H
SECTION 1, TOWNSHIP 23 SOUTH,
RANGE 28 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

CUT	FILL	NET
46251 CU. YD	41381 CU. YD	4871 CU. YD (CUT)

EARTHWORK QUANTITIES ARE ESTIMATED

MAP 11

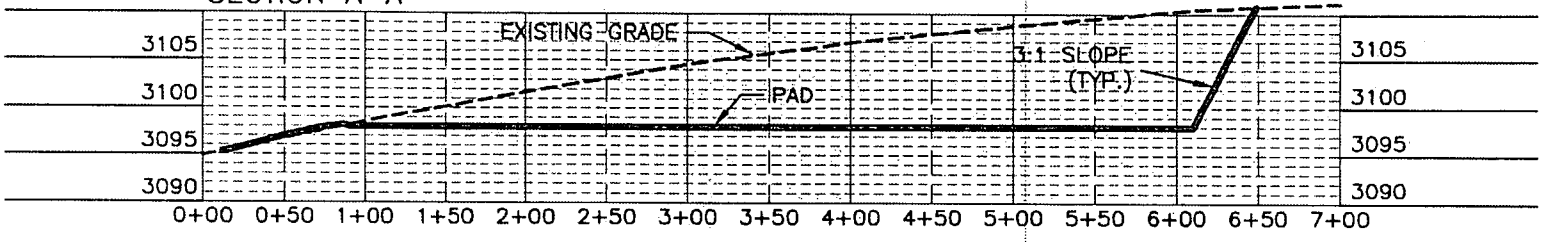
JUNE 26, 2018

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

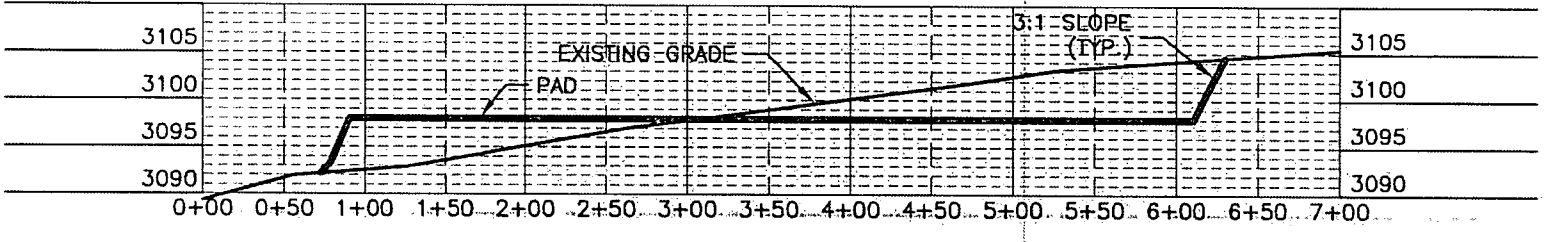
SURVEY NO. 6144B

CROSS-SECTIONS

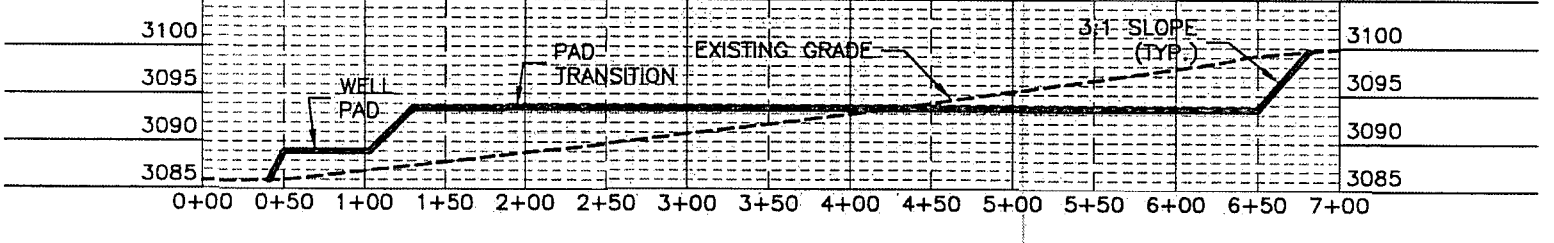
SECTION A-A'



SECTION B-B'



SECTION C-C'



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

NOVO OIL AND GAS NORTHERN DELAWARE, LLC
PAD GRADING AND CROSS SECTIONS
FOR RANA SALADA FED COM 0605 231H
SECTION 1, TOWNSHIP 23 SOUTH,
RANGE 28 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

JUNE 26, 2018

CUT	FILL	NET
46251 CU. YD	41381 CU. YD	4871 CU. YD (CUT)

EARTHWORK QUANTITIES ARE ESTIMATED

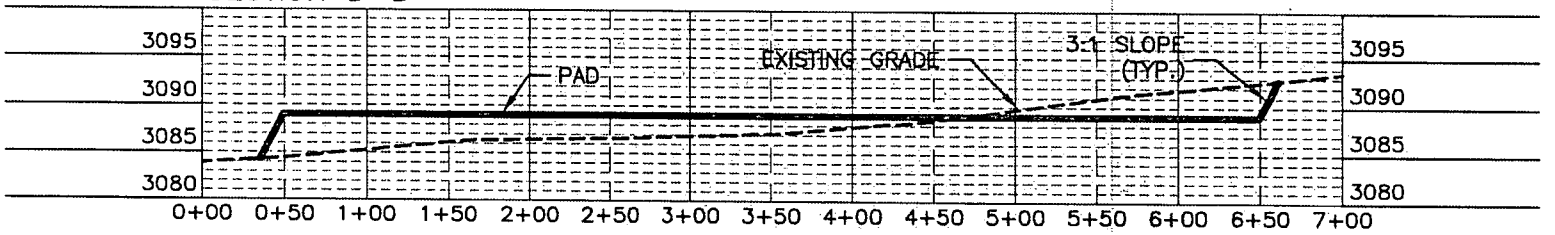
MAP 12

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

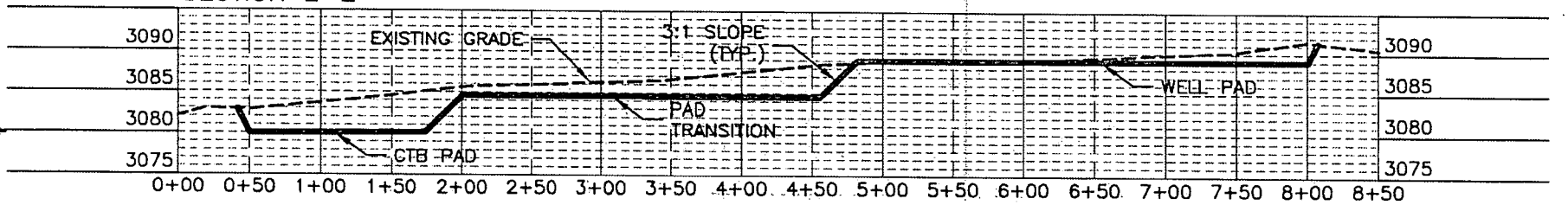
SURVEY NO. 6144B

CROSS-SECTIONS

SECTION D-D'



SECTION E-E'



012 60 120 240

SCALE 1" = 120' - 1" = 20' VER

NOVO OIL AND GAS NORTHERN DELAWARE, LLC
PAD GRADING AND CROSS SECTIONS
FOR RANA SALADA FED COM 0605 231H
SECTION 1, TOWNSHIP 23 SOUTH,
RANGE 28 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

JUNE 26, 2018

CUT	FILL	NET
46251 CU. YD	41381 CU. YD	4871 CU. YD (CUT)

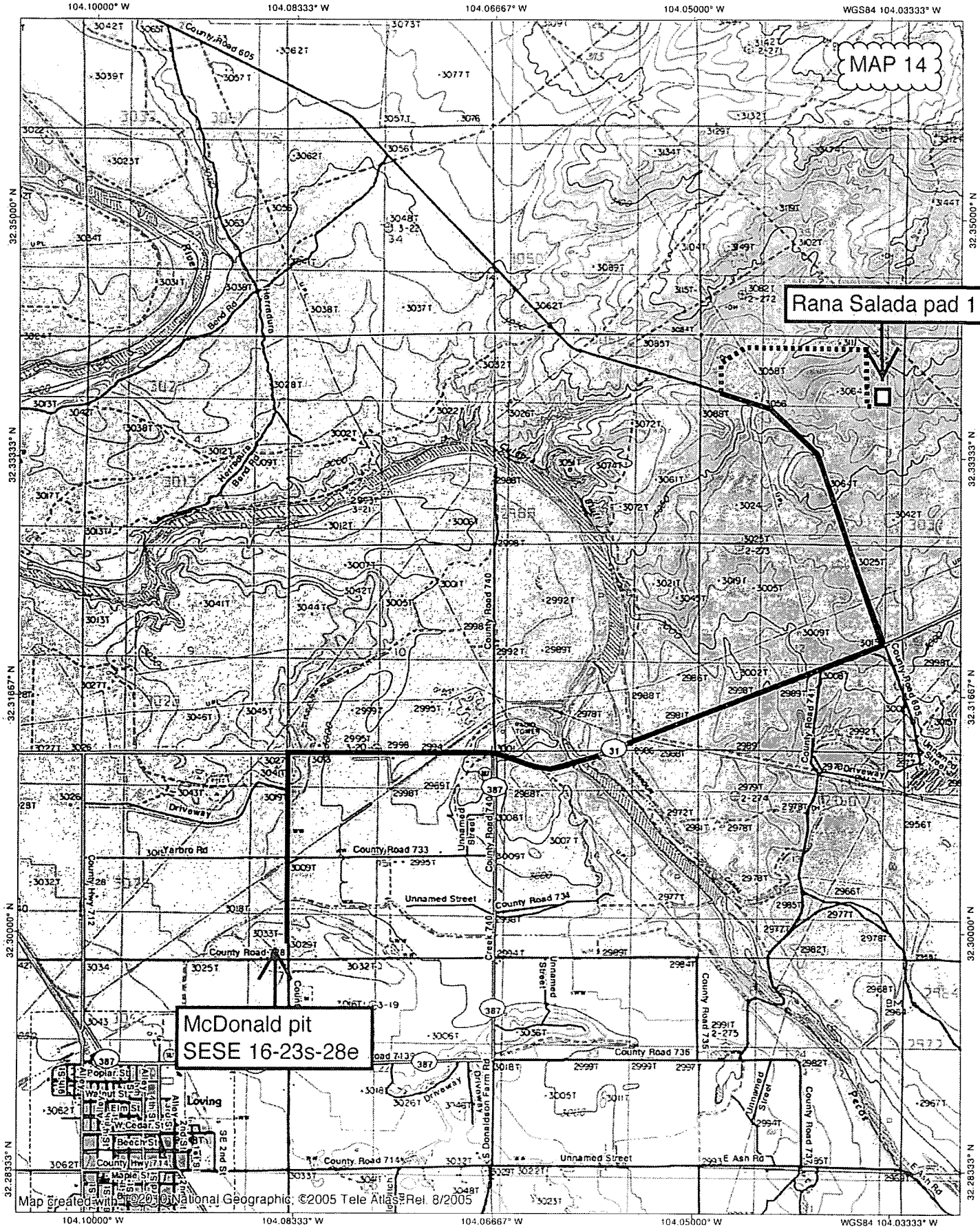
EARTHWORK QUANTITIES ARE ESTIMATED

MAP 13

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

SURVEY NO. 6144B

TOPO! map printed on 07/01/18 from "Untitled.tpo"

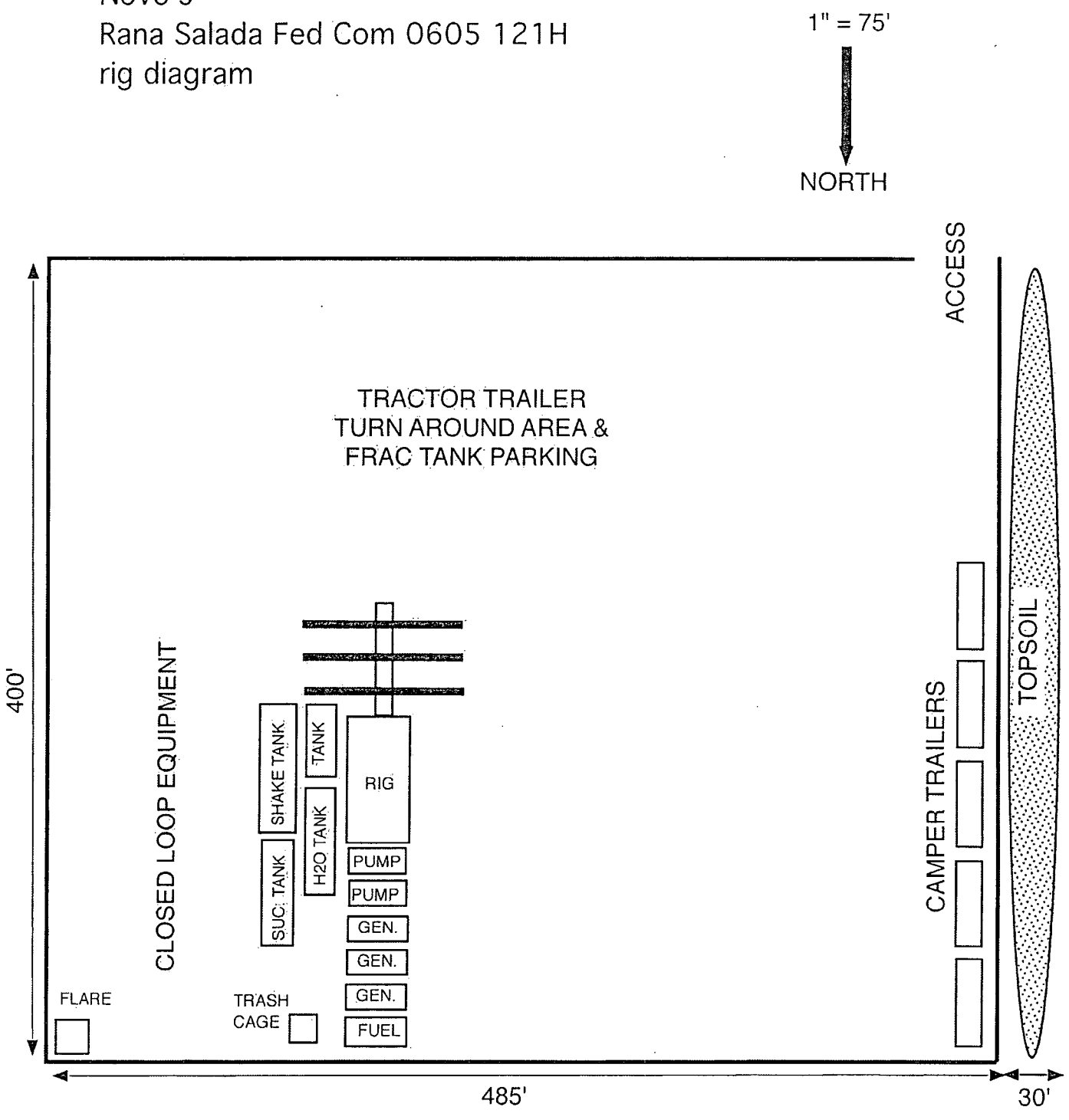


NATIONAL GEOGRAPHIC

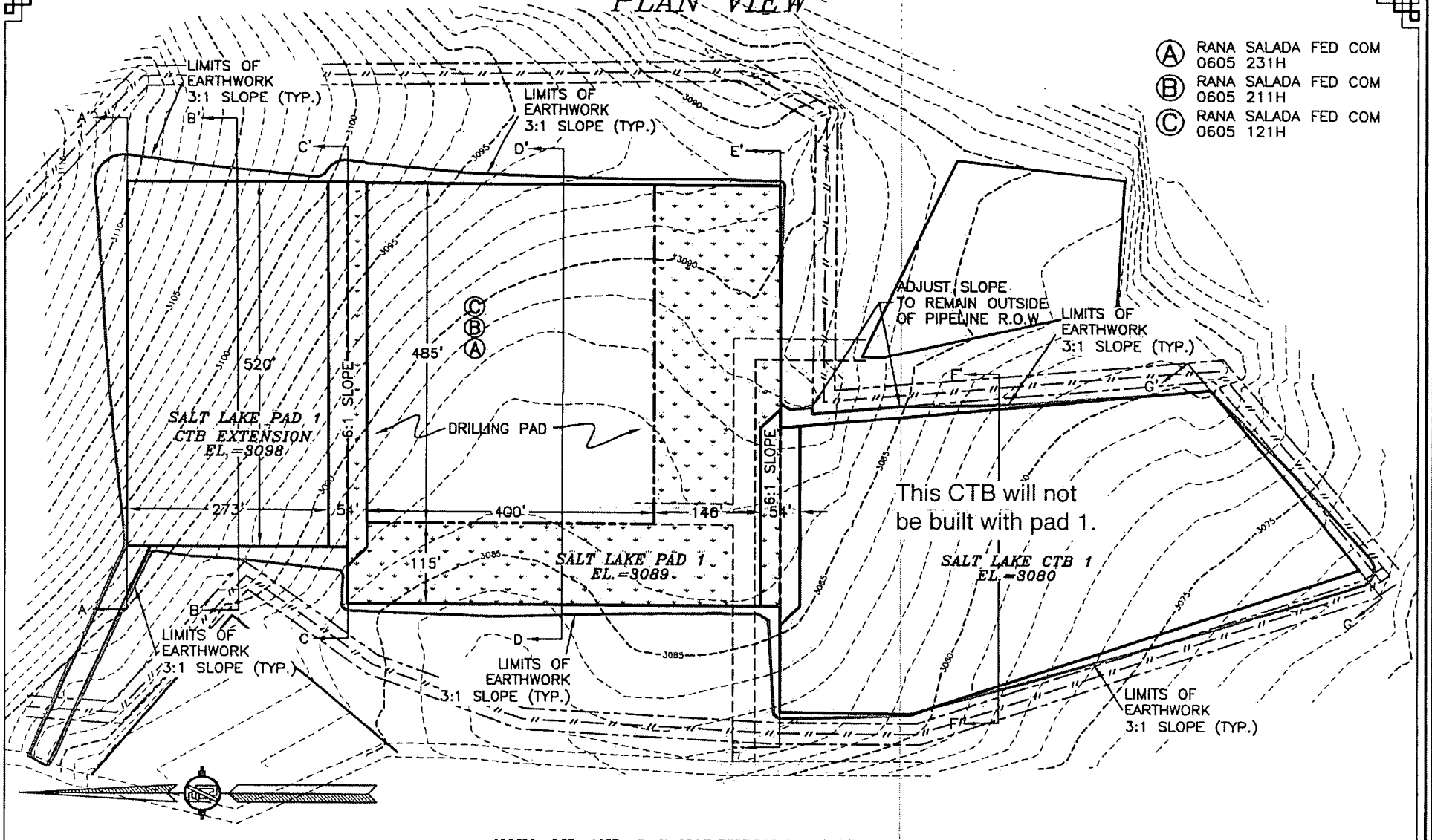
0.0 0.5 1.0 miles
0.0 0.5 1.0 1.5 km

TN + MN
7°
07/01/18

Novo's
Rana Salada Fed Com 0605 121H
rig diagram



PLAN VIEW



020 100 200 400
SCALE 1" = 200'

NOVO OIL AND GAS NORTHERN DELAWARE, LLC
PAD GRADING AND CROSS SECTIONS
FOR RANA SALADA FED COM 0605 231H
SECTION 1, TOWNSHIP 23 SOUTH,
RANGE 28 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

JUNE 26, 2018

CUT	FILL	NET
46251 CU. YD	41381 CU. YD	4871 CU. YD (CUT)

EARTHWORK QUANTITIES ARE ESTIMATED

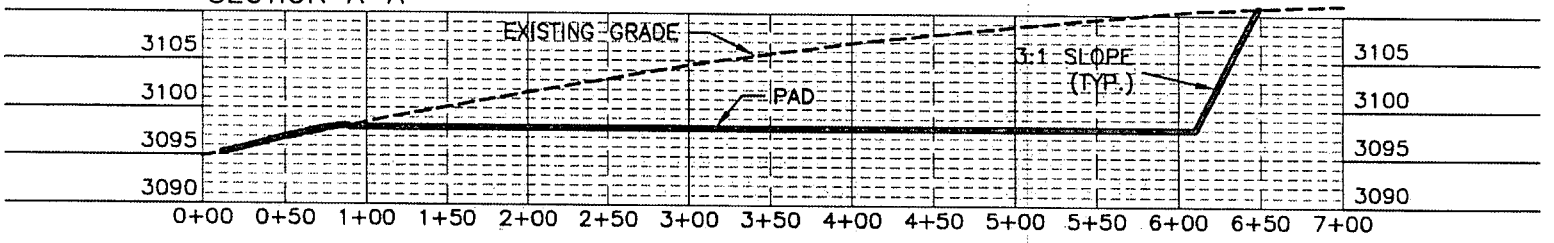
MAP 16

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

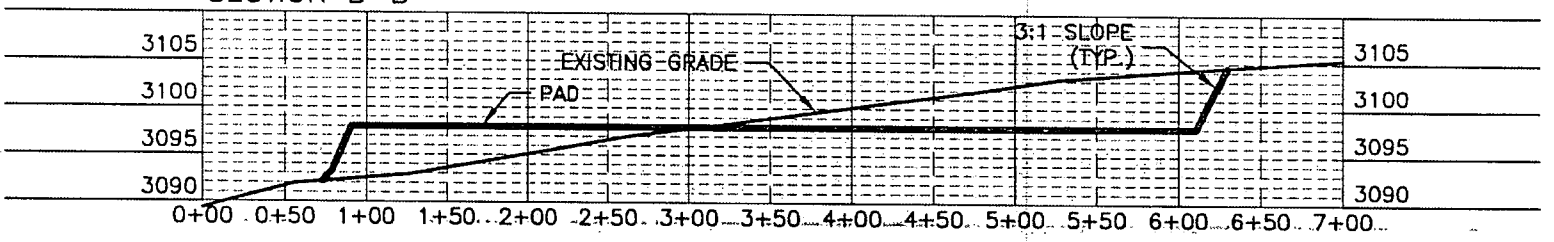
SURVEY NO. 6144B

CROSS–SECTIONS

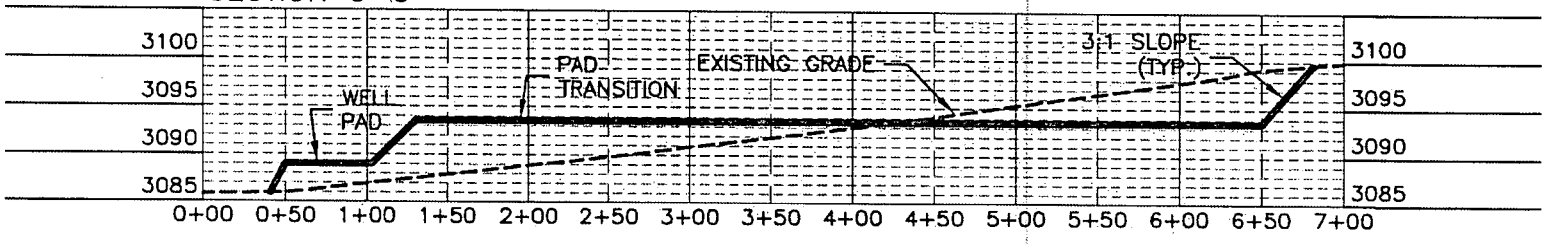
SECTION A–A'



SECTION B–B'



SECTION C–C'



012 60 120 240

SCALE 1" = 120' – 1" = 20' VER

NOVO OIL AND GAS NORTHERN DELAWARE, LLC
PAD GRADING AND CROSS SECTIONS
FOR RANA SALADA FED COM 0605 231H
SECTION 1, TOWNSHIP 23 SOUTH,
RANGE 28 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

JUNE 26, 2018

CUT	FILL	NET
46251 CU. YD	41381 CU. YD	4871 CU. YD (CUT)

EARTHWORK QUANTITIES ARE ESTIMATED

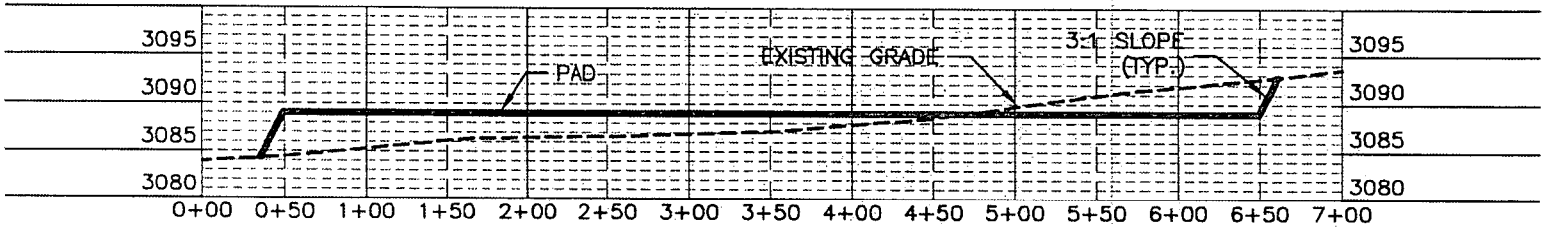
MAP 17

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

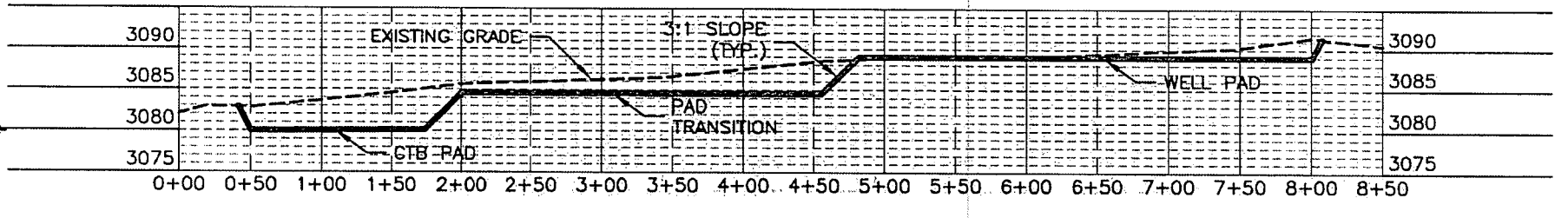
SURVEY NO. 6144B

CROSS-SECTIONS

SECTION D-D'



SECTION E-E'



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

NOVO OIL AND GAS NORTHERN DELAWARE, LLC
PAD GRADING AND CROSS SECTIONS
FOR RANA SALADA FED COM 0605 231H
SECTION 1, TOWNSHIP 23 SOUTH,
RANGE 28 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

JUNE 26, 2018

CUT	FILL	NET
46251 CU. YD	41381 CU. YD	4871 CU. YD (CUT)

EARTHWORK QUANTITIES ARE ESTIMATED

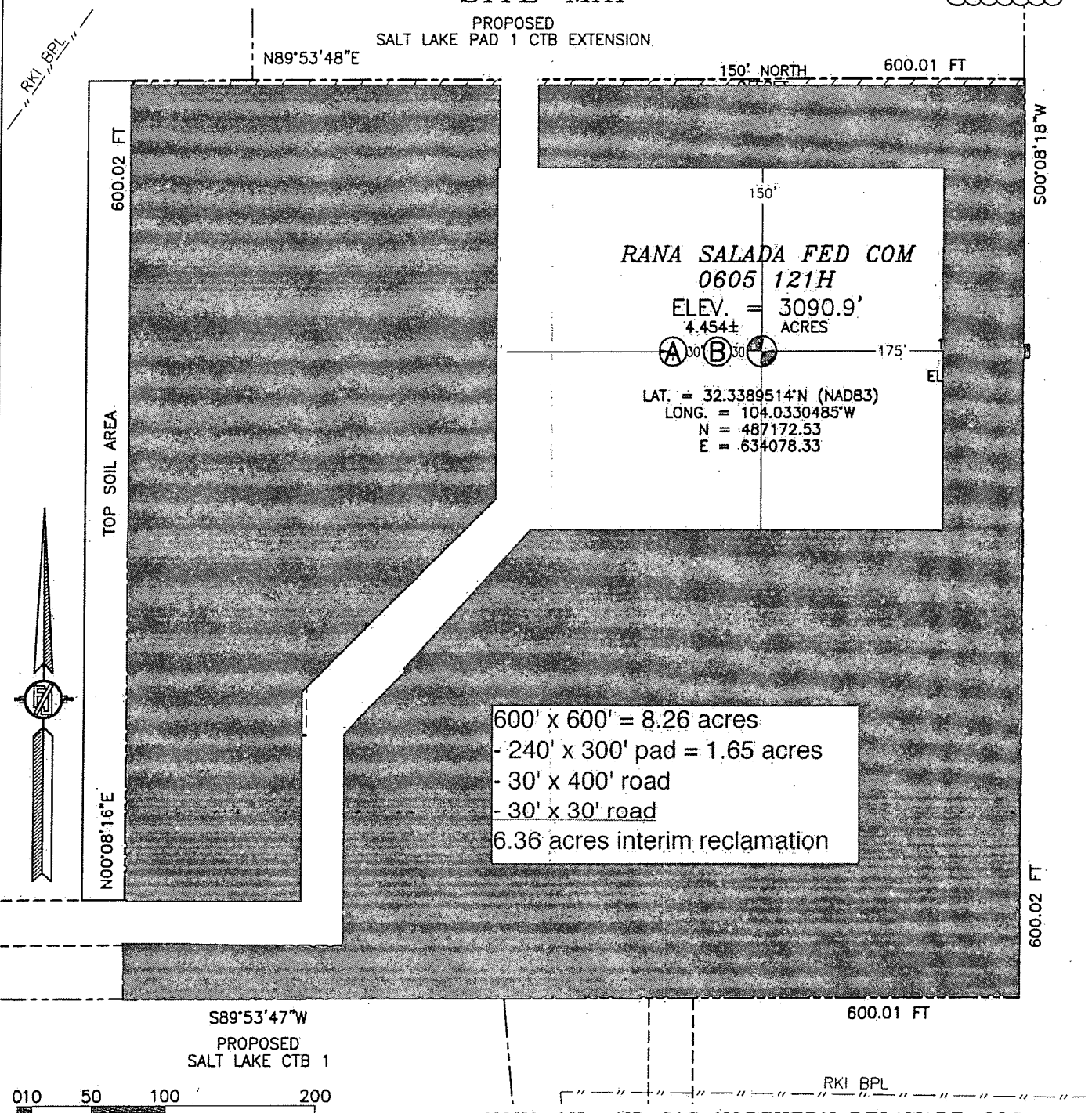
MAP 18

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

SURVEY NO. 6144B

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

MAP 15



010 50 100 200

SCALE 1" = 100'

DIRECTIONS TO LOCATION

FROM CR. 31 (POTASH MINES RD.) AND CR. 605 (REFINERY RD.), GO NORTH ON CR. 605 APPROX. 0.4 MILE, TURN RIGHT (EAST) ON CALICHE ROAD AND GO EAST AND NORTHEAST APPROX. 0.2 MILE TO A "Y" IN ROAD, TURN LEFT (NORTH) AND GO APPROX. 0.8 MILE TO A ROAD SURVEY, FOLLOW ROAD SURVEY EAST 351' AND NORTH 124' TO THE SOUTHWEST PAD CORNER FOR THIS LOCATION.

NOVO OIL AND GAS NORTHERN DELAWARE, LLC

RANA SALADA FED COM 0605 121H

LOCATED 1127 FT. FROM THE NORTH LINE AND 335 FT. FROM THE EAST LINE OF SECTION 1, TOWNSHIP 23 SOUTH, RANGE 28 EAST, N.M.P.M. EDDY COUNTY, STATE OF NEW MEXICO

JUNE 26, 2018

SURVEY NO. 6145B

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

Surface Use Plan

1. ROAD DIRECTIONS & DESCRIPTIONS (See MAPS 1 - 5)

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 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 ¾ mile on a caliche road
Then turn right and go S 0.2 mile on a caliche road*
Then turn left and go East 221' cross-country to the pad

*For access to the central tank battery (CTB)
Go South 75' on the same caliche road
Then turn left and go SE 331' cross-country to the CTB

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 3 - 5)

The 552' of new local roads will be crowned and ditched, have a ≤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 = 3'. No culvert, cattle guard, or vehicle turn out is needed. Upgrading will consist of filling potholes with caliche as needed.

3. EXISTING WELLS (See MAP 6)

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

4. PROPOSED PRODUCTION FACILITIES (See MAP 7)

A central tank battery (CTB) will be built immediately north of the well pad. Flare and/or CBU will be set on the northeast corner of the CTB. Process equipment (e. g., separators, heater-treaters) will be placed on the east side of the CTB. Tank battery will be on the north side of the CTB. 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 CTB, but this has not been finalized.

5. WATER SUPPLY (See MAP 8)

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 9 - 14)

NM One Call (811) will be notified before construction starts. Top ≈6" of soil and brush will be stockpiled west of the well pad and CTB. V-door will face south. 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.

Entire 600' x 600' well pad will be graded. However, only a 400' x 485' sub-pad will initially be surfaced with caliche to accommodate the first three wells. As more wells are added, then more of the pad will be surfaced with more caliche. In the interim, the unsurfaced area will be ripped, harrowed, seeded, and revegetated.

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 9-14)

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 15-18)

A 240' x 300' (= 1.65 acres) working area centered on the wells will remain after interim reclamation. Once the last well is plugged, then the pad, CTB, 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.

Land use:

221' x 30' road to pad = 0.15 acre
331' x 30' road to CTB = 0.23 acre
300' x 520' CTB = 3.58 acres
+ 600' x 600' pad = 8.26 acres
12.22 acres short term
- 6.36 acres interim reclamation
5.86 acres long term

11. SURFACE OWNER

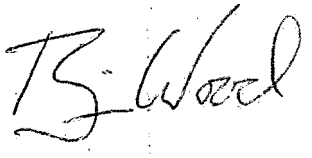
All construction will be on BLM. BLM office is the Carlsbad Field Office, 620 E. Greene, Carlsbad NM 88220. Phone is 575 234-5972.

12. OTHER INFORMATION

On-site inspection was held with Colleen Cepero Rios and Jim Rutley (both BLM) on March 21, 2018. Lone Mountain Archaeological Services will inspect a block and report on the project.

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 8th 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

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:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

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:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

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

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

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

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

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

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:

AFMSS

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: