NM OIL CONSERVATION
ARTESIA DISTRICT
OCT 23 2019
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Form 3160-3
(June 2015)

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NMNM082886

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.
SPUD MUFFIN 31-30 FED COM
732H
322920

2. Name of Operator
DEVON ENERGY PRODUCTION COMPANY LP

9. API Well No.
30-015-46421

3a. Address	3b. Phone No. *(include area code)*	10. Field and Pool, or Exploratory
333 West Sheridan Avenue Oklahoma City OK 73102	(800)583-3866	PURPLE SAGE-WOLFCAMP / WOLFCAI

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface LOT 4 / 120 FSL / 1275 FWL / LAT 32.2546169 / LONG -104.0282246
At proposed prod. zone LOT 1 / 20 FNL / 1247 FWL / LAT 32.28344 / LONG -104.0282128

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 31 / T23S / R29E / NMP

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

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)	16. No of acres in lease	17. Spacing Unit dedicated to this well
120 feet	39.59	632.38

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.	19. Proposed Depth	20. BLM/BIA Bond No. in file
2040 feet	10870 feet / 21180 feet	FED: NMB000801

21. Elevations (Show whether DF, KDB, RT, GL, etc.)	22. Approximate date work will start*	23. Estimated duration
2959 feet	11/23/2020	45 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)	Erin Workman / Ph: (405)552-7970	12/31/2018

Title
Regulatory Compliance Professional

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Cody Layton / Ph: (575)234-5959	10/11/2019

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

NSL Required.

(Continued on page 2)

*(Instructions on page 2)

Approval Date: 10/11/2019

RWP 10-28-19

INSTRUCTIONS

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

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

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

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

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

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

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

NOTICES

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

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

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

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

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

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

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

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

(Continued on page 3)

PECOS DISTRICT
DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**Devon Energy Production Company LP**
LEASE NO.:	**NMNM082886**
WELL NAME & NO.:	Spud Muffin 31-30 Fed Com 732H
SURFACE HOLE FOOTAGE:	120'/S & 1275'/W
BOTTOM HOLE FOOTAGE	230'/N & 1247'/W
LOCATION:	Section 31, T.23 S., R.29 E., NMPM
COUNTY:	Eddy County, New Mexico

COA

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

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

Primary Casing Design:

1. The **13-3/8** inch surface casing shall be set at approximately **400 feet** (a minimum of **70 feet (Eddy County)** into the Rustler Anhydrite and above the salt) and cemented to the surface.

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

b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8 hours** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)
c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
d. If cement falls back, remedial cementing will be done prior to drilling out that string.

2. The minimum required fill of cement behind the **7-5/8** inch intermediate casing is:

Option 1 (Single Stage):

- Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash. Cement excess is less than 25%, more cement might be required. (22.21%)**

Option 2:

Operator has proposed a DV tool, the depth may be adjusted as long as the cement is changed proportionally. The DV tool may be cancelled if cement circulates to surface on the first stage.

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

b. Second stage above DV tool:

- Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash. Cement excess is less than 25%, more cement might be required. (22.21%)**

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

Operator has proposed to pump down 13-3/8" X 7-5/8" annulus. Operator must run a CBL from TD of the 7-5/8" casing to surface. Submit results to BLM.

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

    - Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.
      Cement excess is less than 25%, more cement might be required. (11.2%)

Alternate Casing Design:

4. The **13-3/8** inch surface casing shall be set at approximately **400 feet** (a minimum of **70 feet (Eddy County)** into the Rustler Anhydrite and above the salt) and cemented to the surface.

    e. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
    f. Wait on cement (WOC) time for a primary cement job will be a minimum of **8 hours** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)
    g. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
    h. If cement falls back, remedial cementing will be done prior to drilling out that string.

    Intermediate casing must be kept fluid filled to meet BLM minimum collapse requirement.

5. The minimum required fill of cement behind the **8-5/8** inch intermediate casing is:

    Option 1 (Single Stage):

    - Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.**
      Cement excess is less than 25%, more cement might be required. (17.59%)

    Option 2:

    Operator has proposed a DV tool, the depth may be adjusted as long as the cement is changed proportionally. The DV tool may be cancelled if cement circulates to surface on the first stage.

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

d. Second stage above DV tool:

- Cement to surface. If cement does not circulate, contact the appropriate BLM office.
  Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.
  Cement excess is less than 25%, more cement might be required. (17.59%)

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

Operator has proposed to pump down 13-3/8" X 8-5/8" annulus. Operator must run a CBL from TD of the 8-5/8" casing to surface. Submit results to BLM.

The Operator is approved to drill 10.625" hole instead of 9.875" for intermediate 1 with a BTC connection.

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

- Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.
  Cement excess is less than 25%, more cement might be required. (9%)

C. PRESSURE CONTROL

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

2.

Option 1:

a. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **3000 (3M)** psi.

b. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the intermediate casing shoe shall be **5000 (5M)** psi.

Option 2:

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

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

D. SPECIAL REQUIREMENT (S)

Communitization Agreement

- The operator will submit a Communitization Agreement to the Carlsbad Field Office, 620 E Greene St. Carlsbad, New Mexico 88220, at least 90 days before the anticipated date of first production from a well subject to a spacing order issued by the New Mexico Oil Conservation Division. The Communitization Agreement will include the signatures of all working interest owners in all Federal and Indian leases subject to the Communitization Agreement (i.e., operating rights owners and lessees of record), or certification that the operator has obtained the written signatures of all such owners and will make those signatures available to the BLM immediately upon request.
- If the operator does not comply with this condition of approval, the BLM may take enforcement actions that include, but are not limited to, those specified in 43 CFR 3163.1.
- In addition, the well sign shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

GENERAL REQUIREMENTS

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

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

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

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

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

   a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
   b. When the operator proposes to set surface casing with Spudder Rig
      - Notify the BLM when moving in and removing the Spudder Rig.
      - Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
      - BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.

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

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

A. CASING

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

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

3. Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing intergrity test can be done (prior to the cement setting up) immediately after bumping the plug.

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

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

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

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

B. PRESSURE CONTROL

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

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

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

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

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

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

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

hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

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

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

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

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

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

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

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

C. DRILLING MUD

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

D. WASTE MATERIAL AND FLUIDS

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

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

APD ID: 10400037596 **Submission Date:** 12/31/2018

Operator Name: DEVON ENERGY PRODUCTION COMPANY LP

Well Name: SPUD MUFFIN 31-30 FED COM **Well Number:** 732H

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

Highlighted data reflects the most recent changes

Show Final Text

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
1	UNKNOWN	2959	0	0	ALLUVIUM	NONE	N
2	TOP SALT	2630	329	329	SALT	NONE	N
3	BASE OF SALT	209	2750	2750	SALT	NONE	N
4	BELL CANYON	171	2788	2788	SANDSTONE	NATURAL GAS,OIL	N
5	CHERRY CANYON	-681	3640	3640	SANDSTONE	NATURAL GAS,OIL	N
6	BRUSHY CANYON	-1922	4881	4881	SANDSTONE	NATURAL GAS,OIL	N
7	BONE SPRING	-3497	6456	6456	SANDSTONE	NATURAL GAS,OIL	N
8	WOLFCAMP	-6741	9700	9700	SHALE	NATURAL GAS,OIL	Y

Section 2 - Blowout Prevention

Pressure Rating (PSI): 5M **Rating Depth:** 8615

Equipment: BOP/BOPE will be installed per Onshore Oil & Gas Order #2 requirements prior to drilling below surface casing, a BOP/BOPE system with the above minimum rating will be installed on the wellhead system. BOP/BOPE will be tested by an independent service company per Onshore Oil & Gas Order #2 requirements and MASP (Maximum Anticipated Surface Pressure) calculations. If the system is upgraded, all the components installed will be functional and tested.
Requesting Variance? YES

Variance request: A variance is requested for the use of a flexible choke line from the BOP stack to the choke manifold. See attached for specs for hydrostatic test chart.
Testing Procedure: A multibowl wellhead may be used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested.
Choke Diagram Attachment:

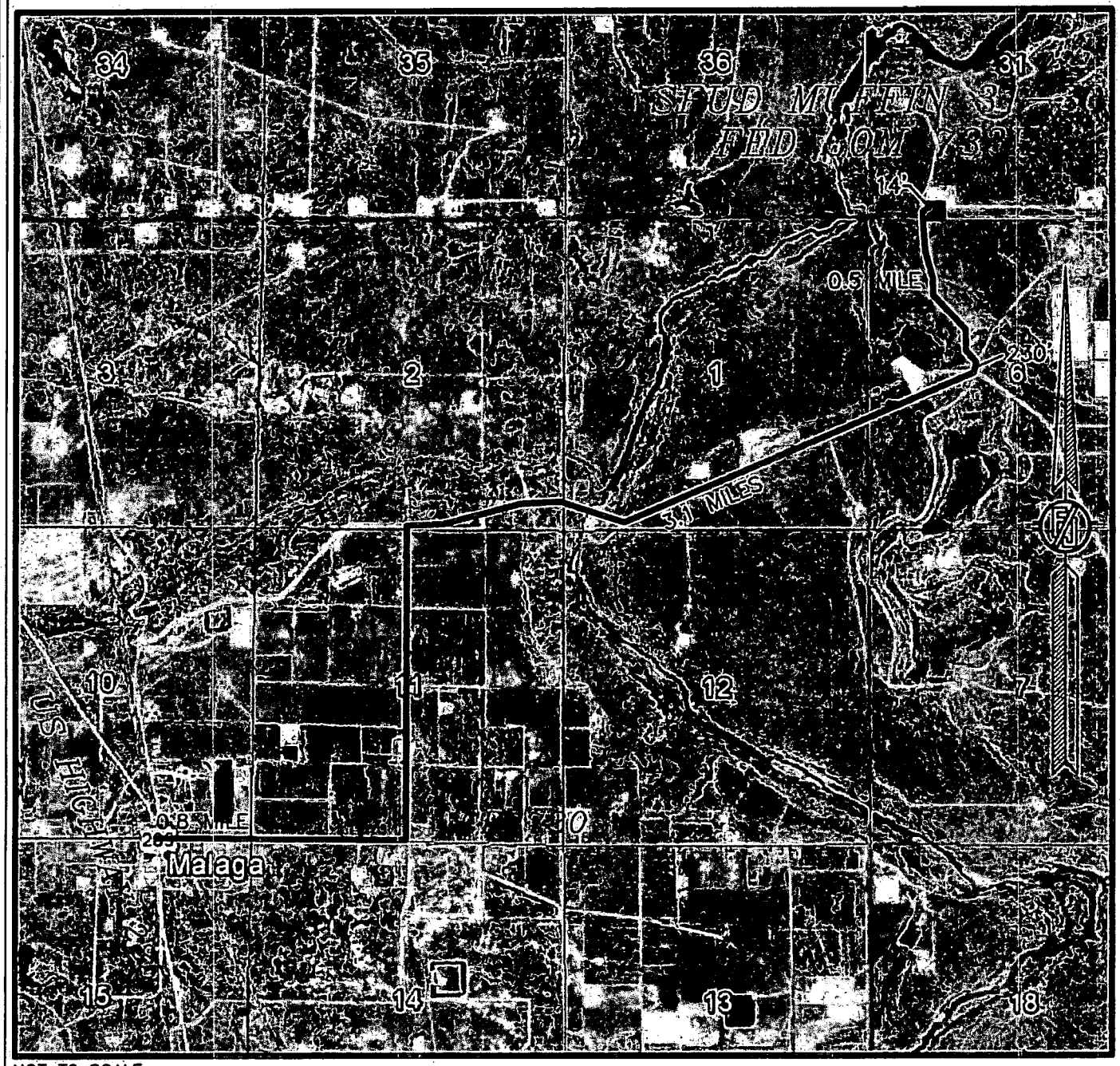
Spud_Muffin_31_30_FC_732H_5M_BOPE_CK_20181231113948.pdf

BOP Diagram Attachment:

Spud_Muffin_31_30_FC_732H_5M_BOPE_CK_20181231113957.pdf

SECTION 31, TOWNSHIP 23 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO

ACCESS AERIAL ROUTE MAP



NOT TO SCALE
AERIAL PHOTO:
GOOGLE EARTH
NOVEMBER 2017

DEVON ENERGY PRODUCTION COMPANY, L.P.

SPUD MUFFIN 31-30 FED COM 732H

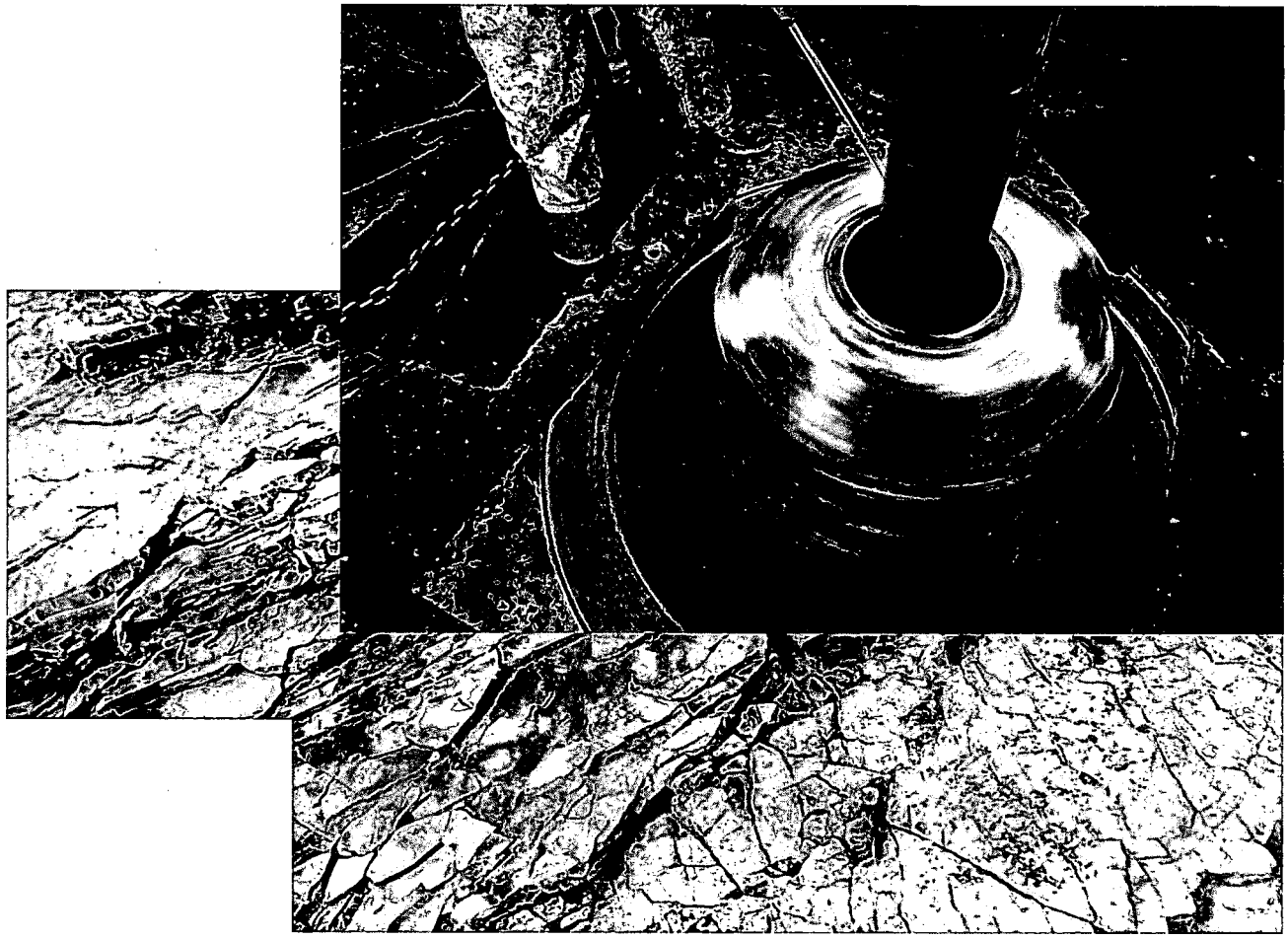
LOCATED 120 FT. FROM THE SOUTH LINE
AND 1275 FT. FROM THE WEST LINE OF
SECTION 31, TOWNSHIP 23 SOUTH,
RANGE 29 EAST, N.M.P.M.
EDDY COUNTY, STATE OF NEW MEXICO
LAND STATUS: BLM

DECEMBER 19, 2018 SURVEY NO. 5779I

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

devon

Commitment Runs Deep



Design Plan
Operation and Maintenance Plan
Closure Plan

SENM - Closed Loop Systems
June 2010

WCDSC Permian NM

WELL DETAILS: Spud Muffin 31-30 Fed Com 732H

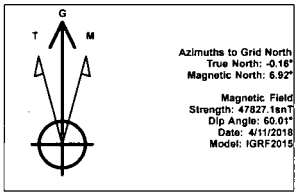
RKB @ 2982.00ft
2959.30

Northing	Easting	Latitude	Longitude
456496.91	635655.45	32.254617	-104.028225

SECTION DETAILS Permit Plan 4

	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	VSect	Annotation
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	4000.00	0.00	0.00	4000.00	0.00	0.00	0.00	0.00	
	4058.64	0.73	201.80	4058.63	-0.35	-0.14	1.25	-0.35	
	9898.62	0.73	201.80	9898.14	-69.71	-27.88	0.00	-69.64	
5	9947.48	0.00	0.00	9947.00	-70.00	-28.00	1.50	-69.93	
6	10297.52	0.00	0.00	10297.04	-70.00	-28.00	0.00	-69.93	KOP @ 10293' MD, 50' FSL, 1247' FWL
7	11197.52	90.00	0.01	10870.00	502.96	-27.90	10.00	503.03	
8	21180.03	90.00	0.01	10870.00	10485.47	-26.16	0.00	10485.50	PBHL; 20' FNL, 1247' FWL

devon



Database:	EDM r5000.141_Prod US	**Local Co-ordinate Reference:**	Well Spud Muffin 31-30 Fed Com 732H
Company:	WCDSC Permian NM	**TVD Reference:**	RKB @ 2982.00ft
Project:	Eddy County (NAD 83 NM Eastern)	**MD Reference:**	RKB @ 2982.00ft
Site:	Sec 31-T23S-R29E	**North Reference:**	Grid
Well:	Spud Muffin 31-30 Fed Com 732H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 4		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
20,700.00	90.00	0.01	10,870.00	10,005.44	-26.24	466,502.33	635,629.21	32.282121	-104.028218
20,800.00	90.00	0.01	10,870.00	10,105.44	-26.23	466,602.33	635,629.23	32.282395	-104.028217
20,900.00	90.00	0.01	10,870.00	10,205.44	-26.21	466,702.33	635,629.25	32.282670	-104.028216
21,000.00	90.00	0.01	10,870.00	10,305.44	-26.19	466,802.33	635,629.26	32.282945	-104.028215
21,100.00	90.00	0.01	10,870.00	10,405.44	-26.17	466,902.33	635,629.28	32.283220	-104.028214
21,100.03	90.00	0.01	10,870.00	10,405.47	-26.17	466,902.36	635,629.28	32.283220	-104.028214
LTP @ 21100' MD, 100' FNL, 1247' FWL									
21,180.02	90.00	0.01	10,870.00	10,485.46	-26.16	466,982.35	635,629.29	32.283440	-104.028213
PBHL; 20' FNL, 1247' FWL									
21,180.04	90.00	0.01	10,870.00	10,485.47	-26.16	466,982.36	635,629.29	32.283440	-104.028213

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL2 - Spud Muffin 31	0.00	0.00	0.00	10,485.47	-26.16	466,982.36	635,629.29	32.283440	-104.028213
- plan misses target center by 10485.50ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
10,297.52	10,297.04	-70.00	-28.00	KOP @ 10293' MD, 50' FSL, 1247' FWL
10,538.66	10,531.12	-20.00	-27.99	FTP @ 10539' MD, 100' FSL, 1247' FWL
15,879.05	10,870.00	5,184.49	-27.08	Cross Section @ 15879' MD, 0' FSL, 1247' FWL
21,100.03	10,870.00	10,405.47	-26.17	LTP @ 21100' MD, 100' FNL, 1247' FWL
21,180.02	10,870.00	10,485.46	-26.16	PBHL; 20' FNL, 1247' FWL

Database:	EDM r5000.141_Prod US	**Local Co-ordinate Reference:**	Well Spud Muffin 31-30 Fed Com 732H
Company:	WCDSC Permian NM	**TVD Reference:**	RKB @ 2982.00ft
Project:	Eddy County (NAD 83 NM Eastern)	**MD Reference:**	RKB @ 2982.00ft
Site:	Sec 31-T23S-R29E	**North Reference:**	Grid
Well:	Spud Muffin 31-30 Fed Com 732H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 4		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
15,500.00	90.00	0.01	10,870.00	4,805.44	-27.15	461,302.34	635,628.30	32.267827	-104.028269
15,600.00	90.00	0.01	10,870.00	4,905.44	-27.13	461,402.34	635,628.32	32.268101	-104.028268
15,700.00	90.00	0.01	10,870.00	5,005.44	-27.12	461,502.34	635,628.34	32.268376	-104.028267
15,800.00	90.00	0.01	10,870.00	5,105.44	-27.10	461,602.34	635,628.36	32.268651	-104.028266
15,879.05	90.00	0.01	10,870.00	5,184.49	-27.08	461,681.39	635,628.37	32.268869	-104.028265
Cross Section @ 15879' MD, 0' FSL, 1247' FWL									
15,900.00	90.00	0.01	10,870.00	5,205.44	-27.08	461,702.34	635,628.37	32.268926	-104.028265
16,000.00	90.00	0.01	10,870.00	5,305.44	-27.06	461,802.34	635,628.39	32.269201	-104.028264
16,100.00	90.00	0.01	10,870.00	5,405.44	-27.05	461,902.34	635,628.41	32.269476	-104.028263
16,200.00	90.00	0.01	10,870.00	5,505.44	-27.03	462,002.34	635,628.43	32.269751	-104.028262
16,300.00	90.00	0.01	10,870.00	5,605.44	-27.01	462,102.34	635,628.44	32.270026	-104.028261
16,400.00	90.00	0.01	10,870.00	5,705.44	-26.99	462,202.34	635,628.46	32.270301	-104.028260
16,500.00	90.00	0.01	10,870.00	5,805.44	-26.98	462,302.33	635,628.48	32.270575	-104.028259
16,600.00	90.00	0.01	10,870.00	5,905.44	-26.96	462,402.33	635,628.50	32.270850	-104.028258
16,700.00	90.00	0.01	10,870.00	6,005.44	-26.94	462,502.33	635,628.51	32.271125	-104.028257
16,800.00	90.00	0.01	10,870.00	6,105.44	-26.92	462,602.33	635,628.53	32.271400	-104.028256
16,900.00	90.00	0.01	10,870.00	6,205.44	-26.91	462,702.33	635,628.55	32.271675	-104.028255
17,000.00	90.00	0.01	10,870.00	6,305.44	-26.89	462,802.33	635,628.57	32.271950	-104.028254
17,100.00	90.00	0.01	10,870.00	6,405.44	-26.87	462,902.33	635,628.58	32.272225	-104.028253
17,200.00	90.00	0.01	10,870.00	6,505.44	-26.85	463,002.33	635,628.60	32.272500	-104.028252
17,300.00	90.00	0.01	10,870.00	6,605.44	-26.84	463,102.33	635,628.62	32.272774	-104.028251
17,400.00	90.00	0.01	10,870.00	6,705.44	-26.82	463,202.33	635,628.64	32.273049	-104.028250
17,500.00	90.00	0.01	10,870.00	6,805.44	-26.80	463,302.33	635,628.65	32.273324	-104.028249
17,600.00	90.00	0.01	10,870.00	6,905.44	-26.78	463,402.33	635,628.67	32.273599	-104.028248
17,700.00	90.00	0.01	10,870.00	7,005.44	-26.77	463,502.33	635,628.69	32.273874	-104.028247
17,800.00	90.00	0.01	10,870.00	7,105.44	-26.75	463,602.33	635,628.71	32.274149	-104.028246
17,900.00	90.00	0.01	10,870.00	7,205.44	-26.73	463,702.33	635,628.72	32.274424	-104.028245
18,000.00	90.00	0.01	10,870.00	7,305.44	-26.71	463,802.33	635,628.74	32.274699	-104.028244
18,100.00	90.00	0.01	10,870.00	7,405.44	-26.70	463,902.33	635,628.76	32.274974	-104.028243
18,200.00	90.00	0.01	10,870.00	7,505.44	-26.68	464,002.33	635,628.77	32.275248	-104.028242
18,300.00	90.00	0.01	10,870.00	7,605.44	-26.66	464,102.33	635,628.79	32.275523	-104.028241
18,400.00	90.00	0.01	10,870.00	7,705.44	-26.64	464,202.33	635,628.81	32.275798	-104.028240
18,500.00	90.00	0.01	10,870.00	7,805.44	-26.63	464,302.33	635,628.83	32.276073	-104.028239
18,600.00	90.00	0.01	10,870.00	7,905.44	-26.61	464,402.33	635,628.84	32.276348	-104.028238
18,700.00	90.00	0.01	10,870.00	8,005.44	-26.59	464,502.33	635,628.86	32.276623	-104.028237
18,800.00	90.00	0.01	10,870.00	8,105.44	-26.57	464,602.33	635,628.88	32.276898	-104.028236
18,900.00	90.00	0.01	10,870.00	8,205.44	-26.56	464,702.33	635,628.90	32.277173	-104.028235
19,000.00	90.00	0.01	10,870.00	8,305.44	-26.54	464,802.33	635,628.91	32.277448	-104.028234
19,100.00	90.00	0.01	10,870.00	8,405.44	-26.52	464,902.33	635,628.93	32.277722	-104.028233
19,200.00	90.00	0.01	10,870.00	8,505.44	-26.51	465,002.33	635,628.95	32.277997	-104.028232
19,300.00	90.00	0.01	10,870.00	8,605.44	-26.49	465,102.33	635,628.97	32.278272	-104.028231
19,400.00	90.00	0.01	10,870.00	8,705.44	-26.47	465,202.33	635,628.98	32.278547	-104.028230
19,500.00	90.00	0.01	10,870.00	8,805.44	-26.45	465,302.33	635,629.00	32.278822	-104.028229
19,600.00	90.00	0.01	10,870.00	8,905.44	-26.44	465,402.33	635,629.02	32.279097	-104.028229
19,700.00	90.00	0.01	10,870.00	9,005.44	-26.42	465,502.33	635,629.04	32.279372	-104.028228
19,800.00	90.00	0.01	10,870.00	9,105.44	-26.40	465,602.33	635,629.05	32.279647	-104.028227
19,900.00	90.00	0.01	10,870.00	9,205.44	-26.38	465,702.33	635,629.07	32.279921	-104.028226
20,000.00	90.00	0.01	10,870.00	9,305.44	-26.37	465,802.33	635,629.09	32.280196	-104.028225
20,100.00	90.00	0.01	10,870.00	9,405.44	-26.35	465,902.33	635,629.11	32.280471	-104.028224
20,200.00	90.00	0.01	10,870.00	9,505.44	-26.33	466,002.33	635,629.12	32.280746	-104.028223
20,300.00	90.00	0.01	10,870.00	9,605.44	-26.31	466,102.33	635,629.14	32.281021	-104.028222
20,400.00	90.00	0.01	10,870.00	9,705.44	-26.30	466,202.33	635,629.16	32.281296	-104.028221
20,500.00	90.00	0.01	10,870.00	9,805.44	-26.28	466,302.33	635,629.18	32.281571	-104.028220
20,600.00	90.00	0.01	10,870.00	9,905.44	-26.26	466,402.33	635,629.19	32.281846	-104.028219

Database:	EDM r5000.141_Prod US	**Local Co-ordinate Reference:**	Well Spud Muffin 31-30 Fed Com 732H
Company:	WCDSC Permian NM	**TVD Reference:**	RKB @ 2982.00ft
Project:	Eddy County (NAD 83 NM Eastern)	**MD Reference:**	RKB @ 2982.00ft
Site:	Sec 31-T23S-R29E	**North Reference:**	Grid
Well:	Spud Muffin 31-30 Fed Com 732H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 4		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,400.00	10.25	0.01	10,398.97	-60.86	-28.00	456,436.05	635,627.46	32.254450	-104.028316
10,500.00	20.25	0.01	10,495.33	-34.59	-27.99	456,462.32	635,627.46	32.254522	-104.028316
10,538.66	24.11	0.01	10,531.12	-20.00	-27.99	456,476.91	635,627.46	32.254562	-104.028316
FTP @ 10539' MD, 100' FSL, 1247' FWL									
10,600.00	30.25	0.01	10,585.66	8.01	-27.99	456,504.92	635,627.47	32.254639	-104.028315
10,700.00	40.25	0.01	10,667.23	65.64	-27.98	456,562.55	635,627.48	32.254798	-104.028315
10,800.00	50.25	0.01	10,737.54	136.57	-27.96	456,633.48	635,627.49	32.254993	-104.028314
10,900.00	60.25	0.01	10,794.47	218.63	-27.95	456,715.54	635,627.50	32.255218	-104.028313
11,000.00	70.25	0.01	10,836.29	309.33	-27.93	456,806.24	635,627.52	32.255467	-104.028312
11,100.00	80.25	0.01	10,861.72	405.91	-27.92	456,902.82	635,627.54	32.255733	-104.028311
11,197.52	90.00	0.01	10,870.00	502.96	-27.90	456,999.87	635,627.55	32.256000	-104.028311
11,200.00	90.00	0.01	10,870.00	505.44	-27.90	457,002.35	635,627.55	32.256007	-104.028310
11,300.00	90.00	0.01	10,870.00	605.44	-27.88	457,102.35	635,627.57	32.256281	-104.028310
11,400.00	90.00	0.01	10,870.00	705.44	-27.86	457,202.35	635,627.59	32.256556	-104.028309
11,500.00	90.00	0.01	10,870.00	805.44	-27.85	457,302.34	635,627.61	32.256831	-104.028308
11,600.00	90.00	0.01	10,870.00	905.44	-27.83	457,402.34	635,627.62	32.257106	-104.028307
11,700.00	90.00	0.01	10,870.00	1,005.44	-27.81	457,502.34	635,627.64	32.257381	-104.028306
11,800.00	90.00	0.01	10,870.00	1,105.44	-27.80	457,602.34	635,627.66	32.257656	-104.028305
11,900.00	90.00	0.01	10,870.00	1,205.44	-27.78	457,702.34	635,627.68	32.257931	-104.028304
12,000.00	90.00	0.01	10,870.00	1,305.44	-27.76	457,802.34	635,627.69	32.258206	-104.028303
12,100.00	90.00	0.01	10,870.00	1,405.44	-27.74	457,902.34	635,627.71	32.258481	-104.028302
12,200.00	90.00	0.01	10,870.00	1,505.44	-27.73	458,002.34	635,627.73	32.258755	-104.028301
12,300.00	90.00	0.01	10,870.00	1,605.44	-27.71	458,102.34	635,627.75	32.259030	-104.028300
12,400.00	90.00	0.01	10,870.00	1,705.44	-27.69	458,202.34	635,627.76	32.259305	-104.028299
12,500.00	90.00	0.01	10,870.00	1,805.44	-27.67	458,302.34	635,627.78	32.259580	-104.028298
12,600.00	90.00	0.01	10,870.00	1,905.44	-27.66	458,402.34	635,627.80	32.259855	-104.028297
12,700.00	90.00	0.01	10,870.00	2,005.44	-27.64	458,502.34	635,627.82	32.260130	-104.028296
12,800.00	90.00	0.01	10,870.00	2,105.44	-27.62	458,602.34	635,627.83	32.260405	-104.028295
12,900.00	90.00	0.01	10,870.00	2,205.44	-27.60	458,702.34	635,627.85	32.260680	-104.028294
13,000.00	90.00	0.01	10,870.00	2,305.44	-27.59	458,802.34	635,627.87	32.260954	-104.028293
13,100.00	90.00	0.01	10,870.00	2,405.44	-27.57	458,902.34	635,627.89	32.261229	-104.028292
13,200.00	90.00	0.01	10,870.00	2,505.44	-27.55	459,002.34	635,627.90	32.261504	-104.028291
13,300.00	90.00	0.01	10,870.00	2,605.44	-27.53	459,102.34	635,627.92	32.261779	-104.028290
13,400.00	90.00	0.01	10,870.00	2,705.44	-27.52	459,202.34	635,627.94	32.262054	-104.028289
13,500.00	90.00	0.01	10,870.00	2,805.44	-27.50	459,302.34	635,627.96	32.262329	-104.028288
13,600.00	90.00	0.01	10,870.00	2,905.44	-27.48	459,402.34	635,627.97	32.262604	-104.028287
13,700.00	90.00	0.01	10,870.00	3,005.44	-27.46	459,502.34	635,627.99	32.262879	-104.028286
13,800.00	90.00	0.01	10,870.00	3,105.44	-27.45	459,602.34	635,628.01	32.263154	-104.028285
13,900.00	90.00	0.01	10,870.00	3,205.44	-27.43	459,702.34	635,628.03	32.263428	-104.028284
14,000.00	90.00	0.01	10,870.00	3,305.44	-27.41	459,802.34	635,628.04	32.263703	-104.028283
14,100.00	90.00	0.01	10,870.00	3,405.44	-27.39	459,902.34	635,628.06	32.263978	-104.028282
14,200.00	90.00	0.01	10,870.00	3,505.44	-27.38	460,002.34	635,628.08	32.264253	-104.028281
14,300.00	90.00	0.01	10,870.00	3,605.44	-27.36	460,102.34	635,628.09	32.264528	-104.028280
14,400.00	90.00	0.01	10,870.00	3,705.44	-27.34	460,202.34	635,628.11	32.264803	-104.028279
14,500.00	90.00	0.01	10,870.00	3,805.44	-27.32	460,302.34	635,628.13	32.265078	-104.028278
14,600.00	90.00	0.01	10,870.00	3,905.44	-27.31	460,402.34	635,628.15	32.265353	-104.028277
14,700.00	90.00	0.01	10,870.00	4,005.44	-27.29	460,502.34	635,628.16	32.265628	-104.028276
14,800.00	90.00	0.01	10,870.00	4,105.44	-27.27	460,602.34	635,628.18	32.265902	-104.028275
14,900.00	90.00	0.01	10,870.00	4,205.44	-27.25	460,702.34	635,628.20	32.266177	-104.028274
15,000.00	90.00	0.01	10,870.00	4,305.44	-27.24	460,802.34	635,628.22	32.266452	-104.028273
15,100.00	90.00	0.01	10,870.00	4,405.44	-27.22	460,902.34	635,628.23	32.266727	-104.028272
15,200.00	90.00	0.01	10,870.00	4,505.44	-27.20	461,002.34	635,628.25	32.267002	-104.028271
15,300.00	90.00	0.01	10,870.00	4,605.44	-27.19	461,102.34	635,628.27	32.267277	-104.028270
15,400.00	90.00	0.01	10,870.00	4,705.44	-27.17	461,202.34	635,628.29	32.267552	-104.028270

Database:	EDM r5000.141_Prod US	**Local Co-ordinate Reference:**	Well Spud Muffin 31-30 Fed Com 732H
Company:	WCDSC Permian NM	**TVD Reference:**	RKB @ 2982.00ft
Project:	Eddy County (NAD 83 NM Eastern)	**MD Reference:**	RKB @ 2982.00ft
Site:	Sec 31-T23S-R29E	**North Reference:**	Grid
Well:	Spud Muffin 31-30 Fed Com 732H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 4		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,400.00	0.73	201.80	5,399.89	-16.28	-6.51	456,480.63	635,648.94	32.254572	-104.028246
5,500.00	0.73	201.80	5,499.88	-17.47	-6.99	456,479.44	635,648.47	32.254569	-104.028248
5,600.00	0.73	201.80	5,599.87	-18.66	-7.46	456,478.26	635,647.99	32.254566	-104.028249
5,700.00	0.73	201.80	5,699.86	-19.84	-7.94	456,477.07	635,647.52	32.254562	-104.028251
5,800.00	0.73	201.80	5,799.86	-21.03	-8.41	456,475.88	635,647.04	32.254559	-104.028252
5,900.00	0.73	201.80	5,899.85	-22.22	-8.89	456,474.69	635,646.57	32.254556	-104.028254
6,000.00	0.73	201.80	5,999.84	-23.41	-9.36	456,473.50	635,646.09	32.254553	-104.028255
6,100.00	0.73	201.80	6,099.83	-24.59	-9.84	456,472.32	635,645.62	32.254549	-104.028257
6,200.00	0.73	201.80	6,199.82	-25.78	-10.31	456,471.13	635,645.14	32.254546	-104.028258
6,300.00	0.73	201.80	6,299.82	-26.97	-10.79	456,469.94	635,644.67	32.254543	-104.028260
6,400.00	0.73	201.80	6,399.81	-28.16	-11.26	456,468.75	635,644.19	32.254540	-104.028262
6,500.00	0.73	201.80	6,499.80	-29.34	-11.74	456,467.57	635,643.72	32.254536	-104.028263
6,600.00	0.73	201.80	6,599.79	-30.53	-12.21	456,466.38	635,643.24	32.254533	-104.028265
6,700.00	0.73	201.80	6,699.78	-31.72	-12.69	456,465.19	635,642.77	32.254530	-104.028266
6,800.00	0.73	201.80	6,799.77	-32.91	-13.16	456,464.00	635,642.29	32.254527	-104.028268
6,900.00	0.73	201.80	6,899.77	-34.10	-13.64	456,462.82	635,641.82	32.254523	-104.028269
7,000.00	0.73	201.80	6,999.76	-35.28	-14.11	456,461.63	635,641.34	32.254520	-104.028271
7,100.00	0.73	201.80	7,099.75	-36.47	-14.59	456,460.44	635,640.87	32.254517	-104.028272
7,200.00	0.73	201.80	7,199.74	-37.66	-15.06	456,459.25	635,640.39	32.254514	-104.028274
7,300.00	0.73	201.80	7,299.73	-38.85	-15.54	456,458.06	635,639.92	32.254510	-104.028276
7,400.00	0.73	201.80	7,399.73	-40.03	-16.01	456,456.88	635,639.44	32.254507	-104.028277
7,500.00	0.73	201.80	7,499.72	-41.22	-16.49	456,455.69	635,638.97	32.254504	-104.028279
7,600.00	0.73	201.80	7,599.71	-42.41	-16.96	456,454.50	635,638.49	32.254501	-104.028280
7,700.00	0.73	201.80	7,699.70	-43.60	-17.44	456,453.31	635,638.02	32.254497	-104.028282
7,800.00	0.73	201.80	7,799.69	-44.78	-17.91	456,452.13	635,637.54	32.254494	-104.028283
7,900.00	0.73	201.80	7,899.68	-45.97	-18.39	456,450.94	635,637.07	32.254491	-104.028285
8,000.00	0.73	201.80	7,999.68	-47.16	-18.86	456,449.75	635,636.59	32.254487	-104.028286
8,100.00	0.73	201.80	8,099.67	-48.35	-19.34	456,448.56	635,636.12	32.254484	-104.028288
8,200.00	0.73	201.80	8,199.66	-49.54	-19.81	456,447.38	635,635.64	32.254481	-104.028289
8,300.00	0.73	201.80	8,299.65	-50.72	-20.29	456,446.19	635,635.17	32.254478	-104.028291
8,400.00	0.73	201.80	8,399.64	-51.91	-20.76	456,445.00	635,634.69	32.254474	-104.028293
8,500.00	0.73	201.80	8,499.64	-53.10	-21.24	456,443.81	635,634.21	32.254471	-104.028294
8,600.00	0.73	201.80	8,599.63	-54.29	-21.71	456,442.62	635,633.74	32.254468	-104.028296
8,700.00	0.73	201.80	8,699.62	-55.47	-22.19	456,441.44	635,633.26	32.254465	-104.028297
8,800.00	0.73	201.80	8,799.61	-56.66	-22.66	456,440.25	635,632.79	32.254461	-104.028299
8,900.00	0.73	201.80	8,899.60	-57.85	-23.14	456,439.06	635,632.31	32.254458	-104.028300
9,000.00	0.73	201.80	8,999.59	-59.04	-23.61	456,437.87	635,631.84	32.254455	-104.028302
9,100.00	0.73	201.80	9,099.59	-60.22	-24.09	456,436.69	635,631.36	32.254452	-104.028303
9,200.00	0.73	201.80	9,199.58	-61.41	-24.56	456,435.50	635,630.89	32.254448	-104.028305
9,300.00	0.73	201.80	9,299.57	-62.60	-25.04	456,434.31	635,630.41	32.254445	-104.028306
9,400.00	0.73	201.80	9,399.56	-63.79	-25.52	456,433.12	635,629.94	32.254442	-104.028308
9,500.00	0.73	201.80	9,499.55	-64.98	-25.99	456,431.93	635,629.46	32.254439	-104.028310
9,600.00	0.73	201.80	9,599.55	-66.16	-26.47	456,430.75	635,628.99	32.254435	-104.028311
9,700.00	0.73	201.80	9,699.54	-67.35	-26.94	456,429.56	635,628.51	32.254432	-104.028313
9,800.00	0.73	201.80	9,799.53	-68.54	-27.42	456,428.37	635,628.04	32.254429	-104.028314
9,898.62	0.73	201.80	9,898.14	-69.71	-27.88	456,427.20	635,627.57	32.254426	-104.028316
9,900.00	0.71	201.80	9,899.52	-69.73	-27.89	456,427.18	635,627.56	32.254426	-104.028316
9,947.48	0.00	0.00	9,947.00	-70.00	-28.00	456,426.91	635,627.45	32.254425	-104.028316
10,000.00	0.00	0.00	9,999.52	-70.00	-28.00	456,426.91	635,627.45	32.254425	-104.028316
10,100.00	0.00	0.00	10,099.52	-70.00	-28.00	456,426.91	635,627.45	32.254425	-104.028316
10,200.00	0.00	0.00	10,199.52	-70.00	-28.00	456,426.91	635,627.45	32.254425	-104.028316
10,297.52	0.00	0.00	10,297.04	-70.00	-28.00	456,426.91	635,627.45	32.254425	-104.028316
KOP @ 10293' MD, 50' FSL, 1247' FWL									
10,300.00	0.25	0.01	10,299.52	-69.99	-28.00	456,426.92	635,627.45	32.254425	-104.028316

Database:	EDM r5000.141_Prod US	**Local Co-ordinate Reference:**	Well Spud Muffin 31-30 Fed Com 732H
Company:	WCDSC Permian NM	**TVD Reference:**	RKB @ 2982.00ft
Project:	Eddy County (NAD 83 NM Eastern)	**MD Reference:**	RKB @ 2982.00ft
Site:	Sec 31-T23S-R29E	**North Reference:**	Grid
Well:	Spud Muffin 31-30 Fed Com 732H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 4		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
100.00	0.00	0.00	100.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
200.00	0.00	0.00	200.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
300.00	0.00	0.00	300.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
400.00	0.00	0.00	400.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
500.00	0.00	0.00	500.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
600.00	0.00	0.00	600.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
700.00	0.00	0.00	700.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
800.00	0.00	0.00	800.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
900.00	0.00	0.00	900.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
1,000.00	0.00	0.00	1,000.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
1,100.00	0.00	0.00	1,100.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
1,200.00	0.00	0.00	1,200.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
1,300.00	0.00	0.00	1,300.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
1,400.00	0.00	0.00	1,400.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
1,500.00	0.00	0.00	1,500.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
1,600.00	0.00	0.00	1,600.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
1,700.00	0.00	0.00	1,700.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
1,800.00	0.00	0.00	1,800.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
1,900.00	0.00	0.00	1,900.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
2,000.00	0.00	0.00	2,000.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
2,100.00	0.00	0.00	2,100.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
2,200.00	0.00	0.00	2,200.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
2,300.00	0.00	0.00	2,300.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
2,400.00	0.00	0.00	2,400.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
2,500.00	0.00	0.00	2,500.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
2,600.00	0.00	0.00	2,600.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
2,700.00	0.00	0.00	2,700.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
2,800.00	0.00	0.00	2,800.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
2,900.00	0.00	0.00	2,900.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
3,000.00	0.00	0.00	3,000.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
3,100.00	0.00	0.00	3,100.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
3,200.00	0.00	0.00	3,200.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
3,300.00	0.00	0.00	3,300.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
3,400.00	0.00	0.00	3,400.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
3,500.00	0.00	0.00	3,500.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
3,600.00	0.00	0.00	3,600.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
3,700.00	0.00	0.00	3,700.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
3,800.00	0.00	0.00	3,800.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
3,900.00	0.00	0.00	3,900.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
4,000.00	0.00	0.00	4,000.00	0.00	0.00	456,496.91	635,655.45	32.254617	-104.028225
4,058.64	0.73	201.80	4,058.63	-0.35	-0.14	456,496.56	635,655.31	32.254616	-104.028225
4,100.00	0.73	201.80	4,100.00	-0.84	-0.34	456,496.07	635,655.12	32.254615	-104.028226
4,200.00	0.73	201.80	4,199.99	-2.03	-0.81	456,494.88	635,654.64	32.254611	-104.028228
4,300.00	0.73	201.80	4,299.98	-3.21	-1.29	456,493.70	635,654.17	32.254608	-104.028229
4,400.00	0.73	201.80	4,399.97	-4.40	-1.76	456,492.51	635,653.69	32.254605	-104.028231
4,500.00	0.73	201.80	4,499.96	-5.59	-2.24	456,491.32	635,653.22	32.254602	-104.028232
4,600.00	0.73	201.80	4,599.95	-6.78	-2.71	456,490.13	635,652.74	32.254598	-104.028234
4,700.00	0.73	201.80	4,699.95	-7.97	-3.19	456,488.94	635,652.27	32.254595	-104.028235
4,800.00	0.73	201.80	4,799.94	-9.15	-3.66	456,487.76	635,651.79	32.254592	-104.028237
4,900.00	0.73	201.80	4,899.93	-10.34	-4.14	456,486.57	635,651.32	32.254589	-104.028238
5,000.00	0.73	201.80	4,999.92	-11.53	-4.61	456,485.38	635,650.84	32.254585	-104.028240
5,100.00	0.73	201.80	5,099.91	-12.72	-5.09	456,484.19	635,650.37	32.254582	-104.028241
5,200.00	0.73	201.80	5,199.91	-13.90	-5.56	456,483.01	635,649.89	32.254579	-104.028243
5,300.00	0.73	201.80	5,299.90	-15.09	-6.04	456,481.82	635,649.42	32.254576	-104.028245

Database:	EDM r5000.141_Prod US	**Local Co-ordinate Reference:**	Well Spud Muffin 31-30 Fed Com 732H
Company:	WCDSC Permian NM	**TVD Reference:**	RKB @ 2982.00ft
Project:	Eddy County (NAD 83 NM Eastern)	**MD Reference:**	RKB @ 2982.00ft
Site:	Sec 31-T23S-R29E	**North Reference:**	Grid
Well:	Spud Muffin 31-30 Fed Com 732H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 4		

Project Eddy County (NAD 83 NM Eastern)

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

Site Sec 31-T23S-R29E

Site Position:		**Northing:**	467,039.80 usft	**Latitude:**	32.283608
From:	Map	**Easting:**	634,382.44 usft	**Longitude:**	-104.032247
Position Uncertainty:	0.00 ft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.16 °

Well Spud Muffin 31-30 Fed Com 732H

Well Position	**+N/-S**	0.00 ft	**Northing:**	456,496.91 usft	**Latitude:**	32.254617
	+E/-W	0.00 ft	**Easting:**	635,655.45 usft	**Longitude:**	-104.028225
Position Uncertainty		0.50 ft	**Wellhead Elevation:**		**Ground Level:**	2,959.30 ft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	4/11/2018	7.08	60.01	47,827.08472791

Design Permit Plan 4

Audit Notes:

Version:		**Phase:**	PROTOTYPE	**Tie On Depth:**	0.00

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	359.86

Plan Survey Tool Program **Date** 6/27/2019

	Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	21,180.04	Permit Plan 4 (Wellbore #1)	MWD+HDGM OWSG MWD + HDGM	

Plan Sections

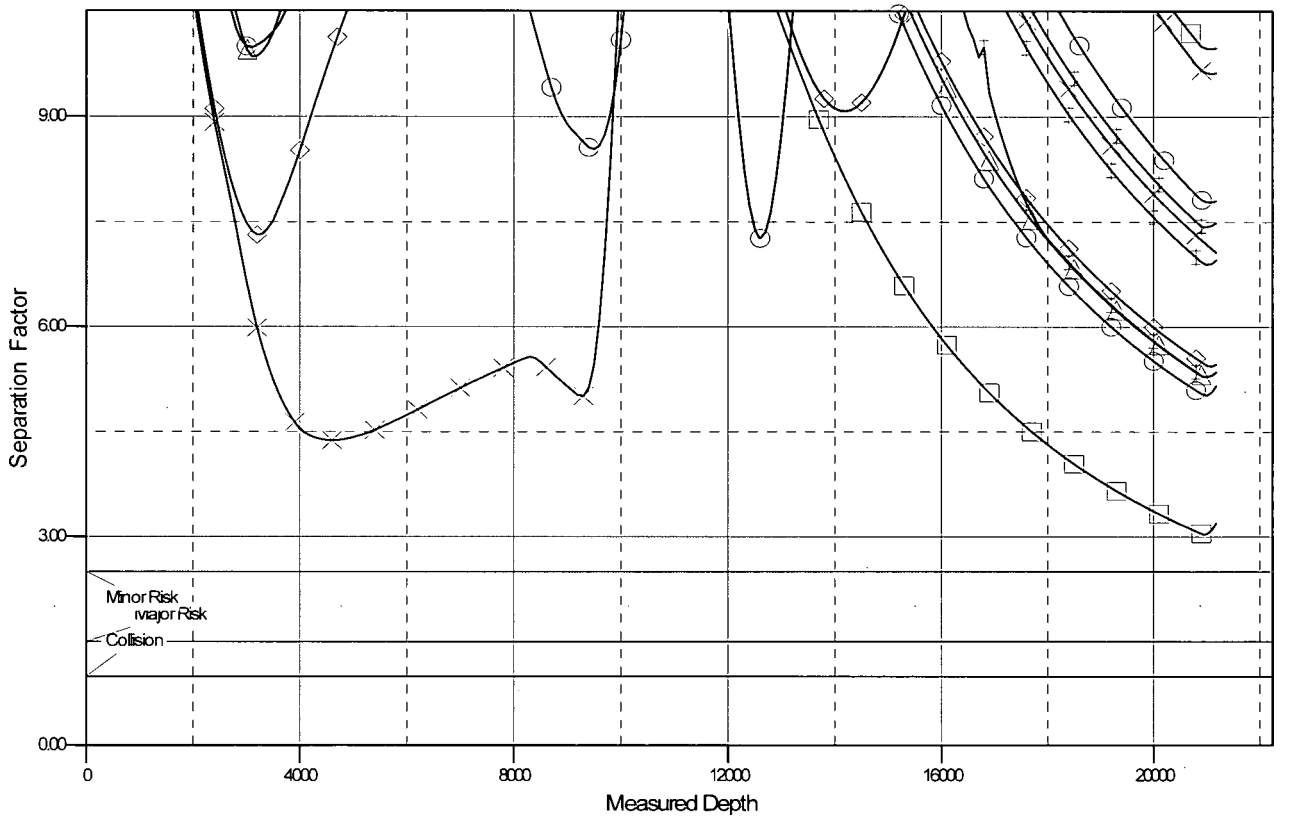
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,058.64	0.73	201.80	4,058.63	-0.35	-0.14	1.25	1.25	0.00	201.80	
9,898.62	0.73	201.80	9,898.14	-69.71	-27.88	0.00	0.00	0.00	0.00	
9,947.48	0.00	0.00	9,947.00	-70.00	-28.00	1.50	-1.50	0.00	180.00	
10,297.52	0.00	0.00	10,297.04	-70.00	-28.00	0.00	0.00	0.00	0.00	
11,197.52	90.00	0.01	10,870.00	502.96	-27.90	10.00	10.00	0.00	0.01	PBHL2 - Spud Muffin
21,180.04	90.00	0.01	10,870.00	10,485.47	-26.16	0.00	0.00	0.00	0.00	PBHL2 - Spud Muffin

Company:	WCDSC Permian NM	**Local Co-ordinate Reference:**	Well Spud Muffin 31-30 Fed Com 732H
Project:	Eddy County (NAD 83 NM Eastern)	**TVD Reference:**	RKB @ 2982.00ft
Reference Site:	Sec 31-T23S-R29E	**MD Reference:**	RKB @ 2982.00ft
Site Error:	0.00 ft	**North Reference:**	Grid
Reference Well:	Spud Muffin 31-30 Fed Com 732H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.50 ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM r5000.141_Prod US
Reference Design:	Permit Plan 4	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to RKB @ 2982.00ft
Offset Depths are relative to Offset Datum
Central Meridian is -104.333334

Coordinates are relative to: Spud Muffin 31-30 Fed Com 732H
Coordinate System is US State Plane 1983, New Mexico Eastern Zone
Grid Convergence at Surface is: 0.16°

Separation Factor Plot



LEGEND

Spud Muffin 31-30 Com 622H, Wellbore #1, Permit Plan2 V0
Spud Muffin 31-30 624H, Wellbore #1, Permit Plan 3 V0
Spud Muffin 31-30 Fed Com 331H, Wellbore #1, Permit Plan 2 V0
HarrounTrust Fed Com 3H, Wellbore #1, Wellbore #1 V0
Spud Muffin 31-30 738H, Wellbore #1, Permit Plan 2 V0
Spud Muffin 31-30 735H, Wellbore #1, Permit Plan 1 V0
HarrounTrust 31-30 #5H, Wellbore #1, Wellbore #1 V0
Malaga Harroun 31 #001 (P&A), Wellbore#1, Wellbore #1V0
Spud Muffin 31-30 332H, Wellbore #1, Permit Plan 1 V0
Spud Muffin 31-30 736H, Wellbore #1, Permit Plan 1 V0
Spud Muffin 31-30 Com 734H, Wellbore #1, Permit Plan2 V0
HarrounTrust 31-30 Fed Com 2H, Wellbore #1, Wellbore#1 V0
HarrounTrust 31 4H, Wellbore #1, Wellbore #1 V0
Spud Muffin 31-30 623H, Wellbore #1, Permit Plan 3 V0
Spud Muffin 31-30 735H, Wellbore #1, Plan X.2 V0
Spud Muffin 31-30 737H, Wellbore #1, Permit Plan 1 V0
HarrounTrust 31 Fed Com1, Wellbore #1, Wellbore #1 V0
Spud Muffin 31-30 Fed Com 621H, Wellbore #1, Permit Plan 2 V0
Spud Muffin 31-30 333H, Wellbore #1, Permit Plan 1 V0
Spud Muffin 31-30 334H, Wellbore #1, Permit Plan 3 V0
HarrounTrust #001 (Active), Wellbore#1, Wellbore #1 V0

WCDSC Permian NM

Eddy County (NAD 83 NM Eastern)
Sec 31-T23S-R29E
Spud Muffin 31-30 Fed Com 732H

Wellbore #1

Plan: Permit Plan 4

Standard Planning Report - Geographic

02 July, 2019

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

U. S. Steel Tubular Products

2/21/2019 8:12:22 AM

5.500" 17.00lbs/ft (0.304" Wall) P110

MECHANICAL PROPERTIES	Pipe	BTC	LTC	STC	
Minimum Yield Strength	110,000	--	--	--	psi
Maximum Yield Strength	140,000	--	--	--	psi
Minimum Tensile Strength	125,000	--	--	--	psi

DIMENSIONS	Pipe	BTC	LTC	STC	
Outside Diameter	5.500	6.050	6.050	--	in.
Wall Thickness	0.304	--	--	--	in.
Inside Diameter	4.892	4.892	4.892	--	in.
Standard Drift	4.767	4.767	4.767	--	in.
Alternate Drift	--	--	--	--	in.
Nominal Linear Weight, T&C	17.00	--	--	--	lbs/ft
Plain End Weight	16.89	--	--	--	lbs/ft

PERFORMANCE	Pipe	BTC	LTC	STC	
Minimum Collapse Pressure	7,480	7,480	7,480	--	psi
Minimum Internal Yield Pressure	10,640	10,640	10,640	--	psi
Minimum Pipe Body Yield Strength	546	--	--	--	1,000 lbs
Joint Strength	--	568	445	--	1,000 lbs
Reference Length	--	22,271	17,449	--	ft

MAKE-UP DATA	Pipe	BTC	LTC	STC	
Make-Up Loss	--	4.13	3.50	--	in.
Minimum Make-Up Torque	--	--	3,470	--	ft-lbs
Maximum Make-Up Torque	--	--	5,780	--	ft-lbs

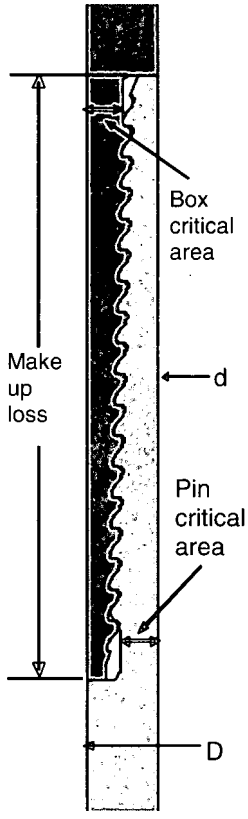
U. S. Steel Tubular Products
460 Wildwood Forest Drive, Suite 300S
Spring, Texas 77380

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

Metal One Corp.	FLUSHMAX-III	Page	44-O
Metal One		Date	25-Jan-17
	Connection Data Sheet		
		Rev.	N - 1

Geometry

FLUSHMAX-III



Pipe Body

	Imperial		S.I.	
Grade	P110		P110	
Pipe OD (D)	7 5/8	in	193.68	mm
Weight	29.70	lb/ft	44.20	kg/m
Actual weight	29.04		43.21	kg/m
Wall Thickness (t)	0.375	in	9.53	mm
Pipe ID (d)	6.875	in	174.63	mm
Pipe body cross section	8.537	in^2	5,508	mm^2
Drift Dia.	6.750	in	171.45	mm

Connection

Box OD (W)	7.625	in	193.68	mm
PIN ID	6.875	in	174.63	mm
Make up Loss	3.040	in	77.22	mm
Box Critical Area	4.424	in^2	2854	mm^2
Joint load efficiency	60	%	60	%
Thread Taper	1 / 16 (3/4" per ft)			
Number of Threads	5 TPI			

Performance

Performance Properties for Pipe Body

S.M.Y.S.	939	kips	4,177	kN
M.I.Y.P.	9,470	psi	65.31	MPa
Collapse Strength	5,350	psi	36.90	MPa

Note S.M.Y.S.= Specified Minimum YIELD Strength of Pipe body
M.I.Y.P. = Minimum Internal Yield Pressure of Pipe body

Performance Properties for Connection

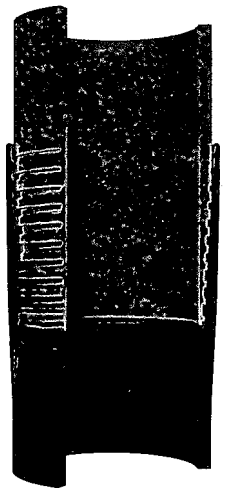
Tensile Yield load	563 kips (60% of S.M.Y.S.)
Min. Compression Yield	563 kips (60% of S.M.Y.S.)
Internal Pressure	7,580 psi (80% of M.I.Y.P.)
External Pressure	100% of Collapse Strength
Max. DLS (deg. /100ft)	25

Recommended Torque

Min.	15,500	ft-lb	21,000	N-m
Opti.	17,200	ft-lb	23,300	N-m
Max.	18,900	ft-lb	25,600	N-m
Operational Max.	23,600	ft-lb	32,000	N-m

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

TEC-LOCK WEDGE



8.625" 32.00 LB/FT (.352" Wall)
BORUSAN MANNESMANNP110 HSCY

Pipe Body Data

Nominal OD:	8.625	in
Nominal Wall:	.352	in
Nominal Weight:	32.00	lb/ft
Plain End Weight:	31.13	lb/ft
Material Grade:	P110 HSCY	
Mill/Specification:	BORUSAN MANNESMANN	
Yield Strength:	125,000	psi
Tensile Strength:	125,000	psi
Nominal ID:	7.921	in
API Drift Diameter:	7.796	in
Special Drift Diameter:	7.875	in
RBW:	87.5 %	
Body Yield:	1,144,000	lbf
Burst:	8,930	psi
Collapse:	4,230	psi

Connection Data

Standard OD:	9.000	in
Pin Bored ID:	7.921	in
Critical Section Area:	8.61433	in^2
Tensile Efficiency:	94.2 %	
Compressive Efficiency:	100.0 %	
Longitudinal Yield Strength:	1,077,000	lbf
Compressive Limit:	1,144,000	lbf
Internal Pressure Rating:	8,930	psi
External Pressure Rating:	4,230	psi
Maximum Bend:	62.6	°/100

Operational Data

Minimum Makeup Torque:	29,900	ft*lbf
Optimum Makeup Torque:	37,375	ft*lbf
Maximum Makeup Torque:	80,900	ft*lbf
Minimum Yield:	89,900	ft*lbf
Makeup Loss:	5.97	in

Notes

Operational Torque is equivalent to the Maximum Make-Up Torque.

HUNTING

U. S. Steel Tubular Products

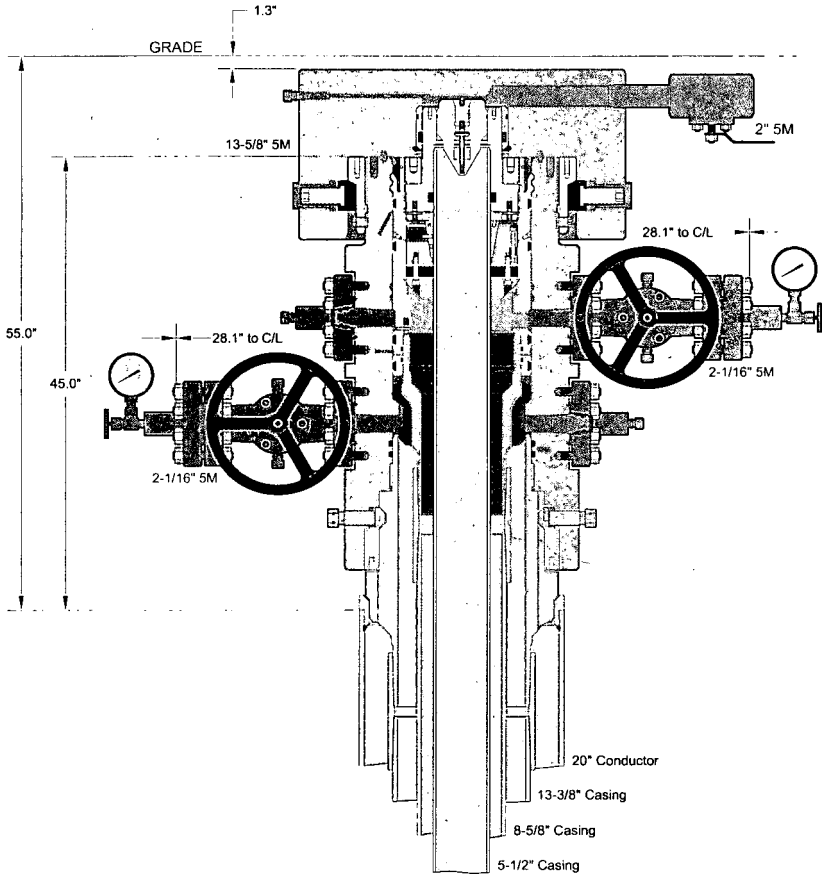
1/8/2019 12:38:52 PM

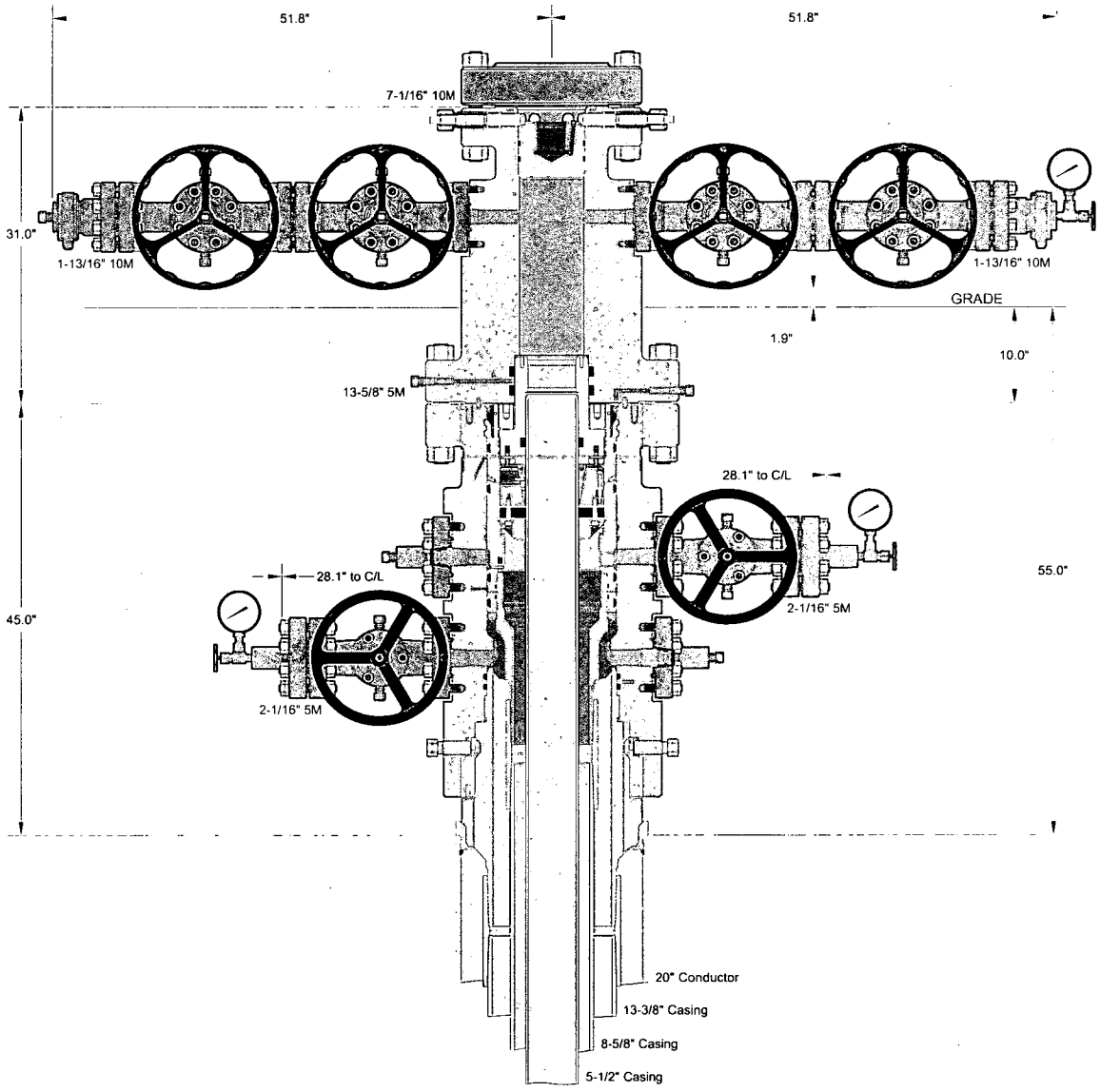
13.375" 48.00lbs/ft (0.330" Wall) H40

MECHANICAL PROPERTIES	Pipe	BTC	LTC	STC	
Minimum Yield Strength	40,000	--	--	--	psi
Maximum Yield Strength	80,000	--	--	--	psi
Minimum Tensile Strength	60,000	--	--	--	psi
DIMENSIONS	**Pipe**	**BTC**	**LTC**	**STC**	
Outside Diameter	13.375	--	--	14.375	in.
Wall Thickness	0.330	--	--	--	in.
Inside Diameter	12.715	--	--	12.715	in.
Standard Drift	12.559	12.559	--	12.559	in.
Alternate Drift	--	--	--	--	in.
Nominal Linear Weight, T&C	48.00	--	--	--	lbs/ft
Plain End Weight	46.02	--	--	--	lbs/ft
PERFORMANCE	**Pipe**	**BTC**	**LTC**	**STC**	
Minimum Collapse Pressure	740	740	--	740	psi
Minimum Internal Yield Pressure	1,730	1,730	--	1,730	psi
Minimum Pipe Body Yield Strength	541	--	--	--	1,000 lbs
Joint Strength	--	--	--	322	1,000 lbs
Reference Length	--	--	--	4,473	ft
MAKE-UP DATA	**Pipe**	**BTC**	**LTC**	**STC**	
Make-Up Loss	--	--	--	3.50	in.
Minimum Make-Up Torque	--	--	--	2,420	ft-lbs
Maximum Make-Up Torque	--	--	--	4,030	ft-lbs

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

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





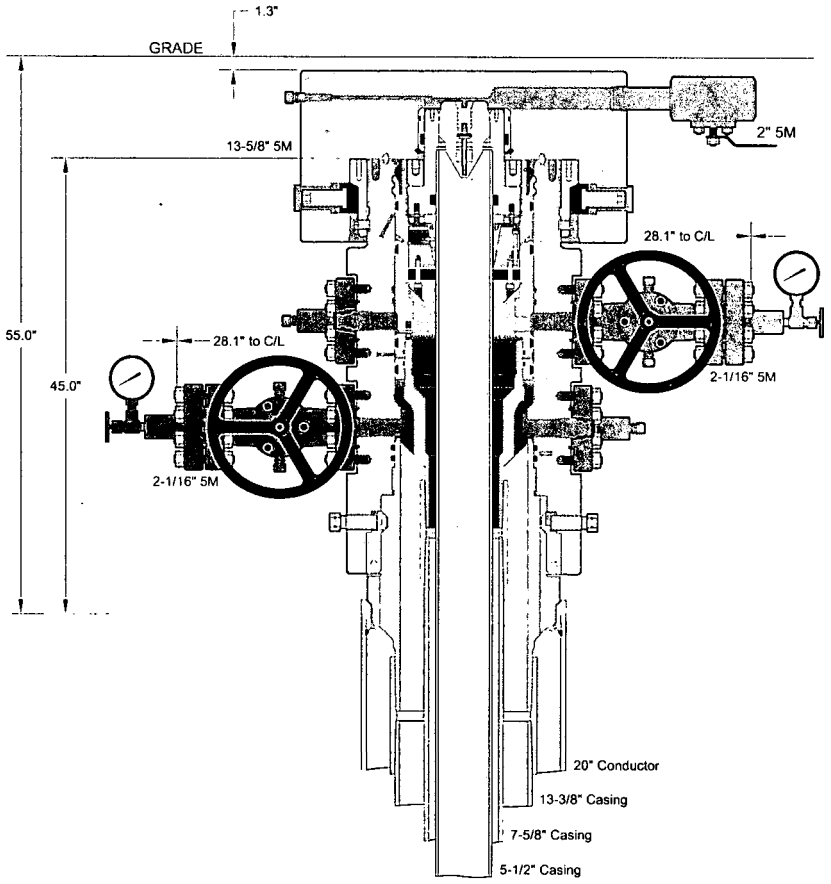
ALL DIMENSIONS APPROXIMATE

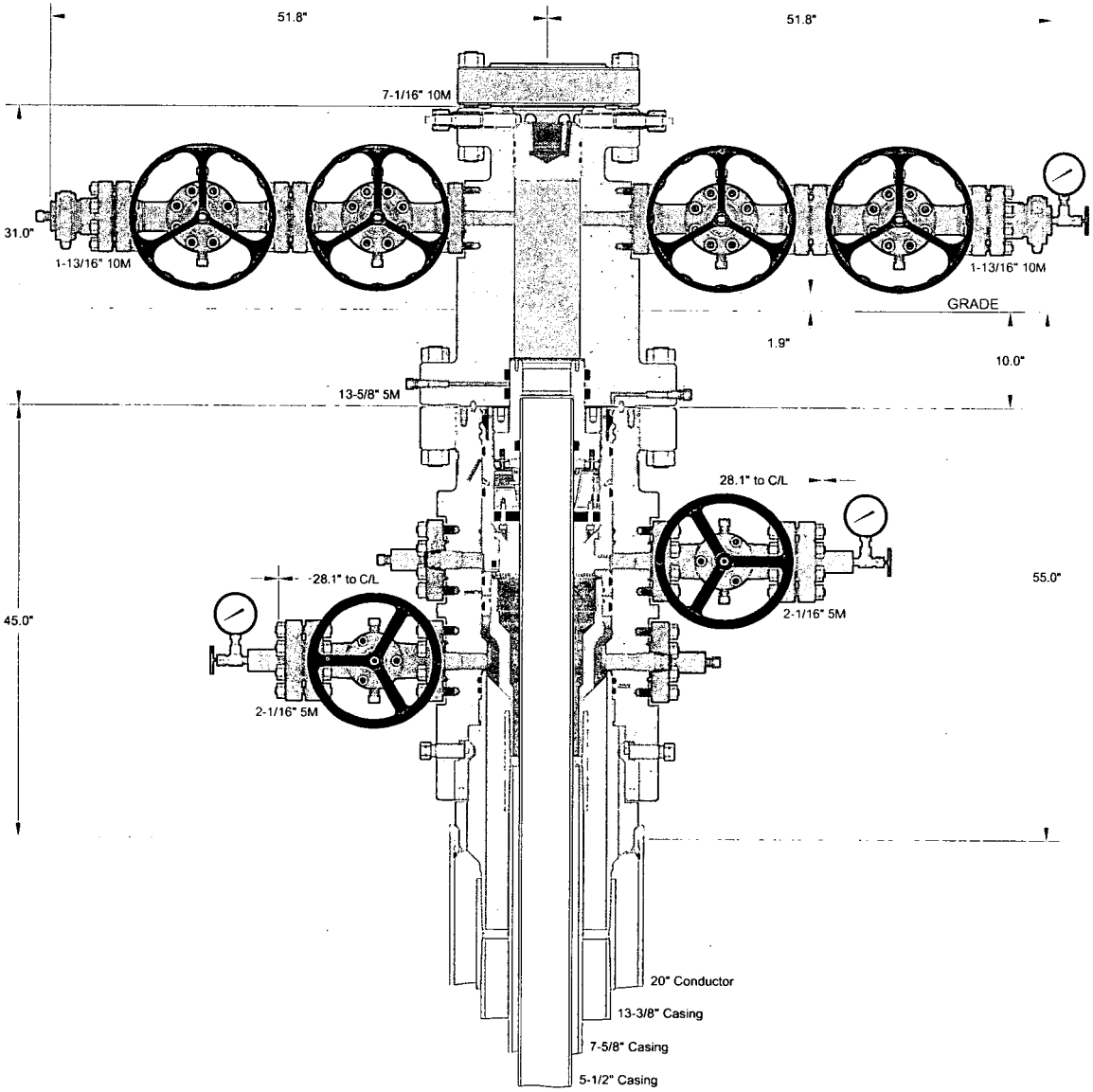
CACTUS WELLHEAD LLC

20" x 13-3/8" x 8-5/8" x 5-1/2" MBU-3T-CFL-R-DBLO Wellhead Sys.
With Quick Connect Top TA Cap, 5-1/2" Emergency Slip Hanger
And 13-5/8" 5M x 7-1/16" 10M CTH-DBLHPS Tubing Head

DEVON ENERGY CORPORATION
DELAWARE BASIN

DRAWN	DLE	25FEB19
APPRV		
DRAWING NO.	SDT-1929	





ALL DIMENSIONS APPROXIMATE

CACTUS WELLHEAD LLC

20" x 13-3/8" x 7-5/8" x 5-1/2" MBU-3T-CFL-R-DBLO Wellhead Sys.
With Quick Connect Top TA Cap, 5-1/2" Emergency Slip Hanger
And 13-5/8" 5M x 7-1/16" 10M CTH-DBLHPS Tubing Head

DEVON ENERGY CORPORATION
DELAWARE BASIN

DRAWN	DLE	13MAR19
APPRV		
DRAWING NO.	SDT-1960	

Devon Energy
APD VARIANCE DATA

OPERATOR NAME: Devon Energy

1. SUMMARY OF Variance:

Devon Energy respectfully requests approval for the following additions to the drilling plan:

1. Potential utilization of a spudder rig to pre-set surface casing.

2. Description of Operations

1. A spudder rig contractor may move in their rig to drill the surface hole section and pre-set surface casing on this well.
    a. After drilling the surface hole section, the rig will run casing and cement following all of the applicable rules and regulations (OnShore Order 2, all COAs and NMOCD regulations).
    b. Rig will utilize fresh water based mud to drill surface hole to TD.
2. The wellhead will be installed and tested once the surface casing is cut off and the WOC time has been reached.
3. A blind flange with the same pressure rating as the wellhead will be installed to seal the wellbore. Pressure will be monitored with needle valves installed on two wingvalves.
    a. A means for intervention will be maintained while the drilling rig is not over the well.
4. The BLM will be contacted and notified 24 hours prior to commencing spudder rig operations.
5. Drilling operation will be performed with the big rig. At that time an approved BOP stack will be nippled up and tested on the wellhead before drilling operations commences on each well.
    a. The BLM will be contacted / notified 24 hours before the big rig moves back on to the pad with the pre-set surface casing.
6. Devon Energy will have supervision on the rig to ensure compliance with all BLM and NMOCD regulations and to oversee operations.
7. Once the rig is removed, Devon Energy will secure the wellhead area by placing a guard rail around the cellar area.

1. Geologic Formations

TVD of target	10870	Pilot hole depth	N/A
MD at TD:	21180	Deepest expected fresh water	

Basin

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone?	Hazards*
Rustler	26		
Salt	26		
Base of Salt	2750		
Delaware	2778		
Bone Spring 2nd	7705		
Bone Spring 3rd	8615		
Wolfcamp	9660		

*H2S, water flows, loss of circulation, abnormal pressures, etc.

2. Casing Program (Primary Design)

Hole Size	Casing Interval		Csg. Size	Wt (PPF)	Grade	Conn	Min SF Collapse	Min SF Burst	Min SF Tension
	From	To							
17 1/2	0	300 TVD	13 3/8	48.0	H40	STC	1.125	1.25	1.6
9 7/8	0	8615 TVD	7 5/8	29.7	P110	Flushmax III	1.125	1.25	1.6
6 3/4	0	TD	5 1/2	20.0	P110	Vam SG	1.125	1.25	1.6
				BLM Minimum Safety Factor			1.125	1	1.6 Dry 1.8 Wet

• All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 IILB.1.h Must have table for continengcy casing.
• Rustler top will be validated via drilling parameters (i.e. reduction in ROP) and surface casing setting depth revised accordingly if needed.
• A variance is requested for collapse rating on intermediate casing. Operator will keep pipe full while running casing.

• Int casing shoe will be selected based on drilling data/gamma, setting depth with be revised accordingly if needed.

• A variance is requested to wave the centralizer requirement for the Intermediate casing and production casing.

• A variance is requested to set intermediate casing in the curve if hole conditions dictate that a higher shoe strength is required.

Casing Program (Alternative Design)

Hole Size	Casing Interval		Csg. Size	Wt (PPF)	Grade	Conn	Min SF Collapse	Min SF Burst	Min SF Tension
	From	To							
17 1/2	0	300 TVD	13 3/8	48.0	H40	STC	1.125	1.25	1.6
9 7/8	0	8615 TVD	8 5/8	32.0	P110	TLW	1.125	1.25	1.6
7 7/8	0	TD	5 1/2	17.0	P110	BTC	1.125	1.25	1.6
				BLM Minimum Safety Factor			1.125	1	1.6 Dry 1.8 Wet

• All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 IILB.1.h Must have table for continengcy casing.
• Rustler top will be validated via drilling parameters (i.e. reduction in ROP) and surface casing setting depth revised accordingly if needed.
• A variance is requested for collapse rating on intermediate casing. Operator will keep pipe full while running casing.
• Int casing shoe will be selected based on drilling data/gamma, setting depth with be revised accordingly if needed.
• A variance is requested to wave the centralizer requirement for the Intermediate casing and production casing.
•Variance requested to drill 10.625" hole instead of 9.875" for intermediate 1, the 8.625" connection will change from TLW to BTC.
• A variance is requested to set intermediate casing in the curve if hole conditions dictate that a higher shoe strength is required.

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

3. Cementing Program (Primary Design)

Casing	# Sks	TOC	Wt. (lb/gal)	Yld (ft3/sack)	Slurry Description
Surface	663	Surf	13.2	1.44	Lead: Class C Cement + additives
Int 1	398	Surf	9	3.27	Lead: Class C Cement + additives
	783	4000' above shoe	13.2	1.44	Tail: Class H / C + additives
Int 1 Two Stage w/ DV @ TVD of Delaware	666	Surf	9	3.27	1st stage Lead: Class C Cement + additives
	93	500' above shoe	13.2	1.44	1st stage Tail: Class H / C + additives
	192	Surf	9	3.27	2nd stage Lead: Class C Cement + additives
	93	500' above DV	13.2	1.44	2nd stage Tail: Class H / C + additives
Int 1 Intermediate Squeeze	As Needed	Surf	9	1.44	Squeeze Lead: Class C Cement + additives
	398	Surf	9	3.27	Lead: Class C Cement + additives
	783	4000' above shoe	13.2	1.44	Tail: Class H / C + additives
Production	57	8298	9.0	3.3	Lead: Class H /C + additives
	694	10298	13.2	1.4	Tail: Class H / C + additives

If a DV tool is ran the depth(s) will be adjusted based on hole conditions and cement volumes will be adjusted proportionally. Slurry weights will be adjusted based on estimated fracture gradient of the formation. DV tool will be set a minimum of 50 feet below previous casing and a minimum of 200 feet above current shoe. If cement is not returned to surface during the primary cement job on the surface casing string, a planned top job will be conducted immediately after completion of the primary job.

Casing String	% Excess
Surface	50%
Intermediate 1	30%
Intermediate 1 (Two Stage)	25%
Prod	10%

3. Cementing Program (Alternative Design)

Casing	# Sks	TOC	Wt. ppg	Yld (ft3/sack)	Slurry Description
Surface	663	Surf	13.2	1.44	Lead: Class C Cement + additives
Int 1	236	Surf	9	3.27	Lead: Class C Cement + additives
	465	4000' above shoe	13.2	1.44	Tail: Class H / C + additives
Int 1 Two Stage w DV @ ~4500	391	Surf	9	3.27	1st stage Lead: Class C Cement + additives
	55	500' above shoe	13.2	1.44	1st stage Tail: Class H / C + additives
	115	Surf	9	3.27	2nd stage Lead: Class C Cement + additives
	55	500' above DV	13.2	1.44	2nd stage Tail: Class H / C + additives
Int 1 Intermediate Squeeze	As Needed	Surf	13.2	1.44	Squeeze Lead: Class C Cement + additives
	236	Surf	9	3.27	Lead: Class C Cement + additives
	465	4000' above shoe	13.2	1.44	Tail: Class H / C + additives
Int 1 (10.625" Hole Size)	388	Surf	9	3.27	Lead: Class C Cement + additives
	768	4000' above shoe	13.2	1.44	Tail: Class H / C + additives
Production	117	8298	9.0	3.3	Lead: Class H /C + additives
	1440	10298	13.2	1.4	Tail: Class H / C + additives

If a DV tool is ran the depth(s) will be adjusted based on hole conditions and cement volumes will be adjusted proportionally. Slurry weights will be adjusted based on estimated fracture gradient of the formation. DV tool will be set a minimum of 50 feet below previous casing and a minimum of 200 feet above current shoe. If cement is not returned to surface during the primary cement job on the surface casing string, a planned top job will be conducted immediately after completion of the primary job.

Casing String	% Excess
Surface	50%
Intermediate 1	30%
Intermediate 1 (Two Stage)	25%
Prod	10%

4. Pressure Control Equipment (Three String Design)

BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	✓	Tested to:
Int 1	13-58"	5M	Annular	X	50% of rated working pressure
			Blind Ram	X	5M
			Pipe Ram		
			Double Ram	X	
			Other*		
Production	13-5/8"	5M	Annular (5M)	X	50% of rated working pressure
			Blind Ram	X	5M
			Pipe Ram		
			Double Ram	X	
			Other*		
			Annular (5M)		
			Blind Ram		
			Pipe Ram		
			Double Ram		
			Other*		

N	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.
Y	A variance is requested to run a 5 M annular on a 10M system

5. Mud Program (Three String Design)

Section	Type	Weight (ppg)
Surface	FW Gel	8.5-9
Intermediate	DBE / Cut Brine	10-10.5
Production	OBM	10-10.5

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

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

6. Logging and Testing Procedures

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

Additional logs planned		Interval
	Resistivity	Int. shoe to KOP
	Density	Int. shoe to KOP
X	CBL	Production casing
X	Mud log	Intermediate shoe to TD
	PEX	

7. Drilling Conditions

Condition	Specfiy what type and where?
BH pressure at deepest TVD	5935
Abnormal temperature	No

Mitigation measure for abnormal conditions. Describe. Lost circulation material/sweeps/mud scavengers.

Hydrogren Sulfide (H2S) monitors will be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered measured values and formations will be provided to the BLM.	
N	H2S is present
Y	H2S plan attached.

Additional Operator Remarks

Location of Well

1. SHL: LOT 4 / 120 FSL / 1275 FWL / TWSP: 23S / RANGE: 29E / SECTION: 31 / LAT: 32.2546169 / LONG: -104.0282246 (TVD: 0 feet, MD: 0 feet)
   PPP: LOT 4 / 100 FSL / 1275 FWL / TWSP: 23S / RANGE: 29E / SECTION: 31 / LAT: 32.2545618 / LONG: -104.0282251 (TVD: 10531 feet, MD: 10539 feet)
   BHL: LOT 1 / 20 FNL / 1247 FWL / TWSP: 23S / RANGE: 29E / SECTION: 30 / LAT: 32.28344 / LONG: -104.0282128 (TVD: 10870 feet, MD: 21180 feet)

BLM Point of Contact

Name: Ciji Methola
Title: GIS Support - Adjudicator
Phone: 5752345924
Email: cmethola@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.