Form 3160-5
(June 2015)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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

SUNDRY NOTICES AND REPORTS ON WELLS

HOBBS OCD
DEC 13 2019
RECEIVED

Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on page 2

5. Lease Serial No.
NMNM94186

6. If Indian, Allottee or Tribe Name

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

1. Type of Well
☒ Oil Well ☐ Gas Well ☐ Other

8. Well Name and No.
THISTLE UNIT 108H

2. Name of Operator
DEVON ENERGY PRODUCTION COM LP
Contact: REBECCA DEAL
E-Mail: Rebecca.Deal@dvn.com

9. API Well No.
30-025-43727-00-X1

3a. Address
P O BOX 250
ARTESIA, NM 88201

3b. Phone No. (include area code)
Ph: 405-228-8429

10. Field and Pool or Exploratory Area
TRIPLE X

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 21 T23S R33E NENE 315FNL 800FEL
32.296612 N Lat, 103.571350 W Lon

11. County or Parish, State
LEA COUNTY, NM

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Hydraulic Fracturing	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other Change to Original A PD
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.

Devon Energy Production Co., L.P. (Devon) respectfully requests SHL & BHL moves for the Thistle Unit 108H.

SHL move from 315 FNL & 800 FEL ~~to 438 FNL & 734 FEL~~, both 21-23S-33E
BHL move from 2630 FNL & 450 FEL, 28-23S-33E ~~to 20 FSL & 786 FEL, 33-23S-33E~~
TVD/MD change from 9751'/17,114' Bone Spring to 12,600'/28,157' Wolfcamp
Annular Varianae Request

OCD Hobbs

Please see attached revised C-102, drill plan and directional plans, spec sheets, annular variance request documents and other supporting drilling documentation.

Engineering Review by Long Vo 11/19/19
NRS JB 11-20-19 USE Existing COA's

14. I hereby certify that the foregoing is true and correct.

Electronic Submission #492414 verified by the BLM Well Information System
For DEVON ENERGY PRODUCTION COM LP, sent to the Hobbs
Committed to AFMSS for processing by PRISCILLA PEREZ on 11/15/2019 (20PP0388SE)

Name *(Printed/Typed)* REBECCA DEAL — Title REGULATORY COMPLIANCE PROFESSI

Signature (Electronic Submission) — Date 11/14/2019

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By _____ for _____ Title AFM — Date 11/20/19

Conditions of approval, if any, are attached. Approval of this notice 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.

Office CFO

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.

(Instructions on page 2)

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

KZ

PECOS DISTRICT
DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Devon Energy Production Company, LP
LEASE NO.:	NMNM94186
WELL NAME & NO.:	108H-Thistle Unit
SURFACE HOLE FOOTAGE:	438'/N & 734'/E
BOTTOM HOLE FOOTAGE	20'/N & 785'/E
LOCATION:	Section 21, T.23 S., R.33 E., NMPM
COUNTY:	Lea County, New Mexico

COA

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

A. HYDROGEN SULFIDE

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

B. CASING

Primary Casing Design:

1. The **13-3/8** inch surface casing shall be set at approximately **1390 feet** (a minimum of **25 feet (Lea 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.

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

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. **Cement excess is less than 25%, more cement might be required.**

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.
  Cement excess is less than 25%, more cement might be required.

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.

Alternate Casing Design:

4. The **13-3/8** inch surface casing shall be set at approximately **1390 feet** (a minimum of **25 feet (Lea 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. **Cement excess is less than 25%, more cement might be required.**

    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.
      Cement excess is less than 25%, more cement might be required.

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.

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

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

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.

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 **5000 (5M)** psi.

b. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the intermediate casing shoe shall be **10,000 (10M)** psi. **Variance is approved to use a 5000 (5M) Annular which shall be tested to 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 **10,000 (10M)** psi. **Variance is approved to use a 5000 (5M) Annular which shall be tested to 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)

Unit Wells

The well sign for a unit well shall include the unit number in addition to the surface and bottom hole lease numbers. This also applies to participating area numbers. If a participating area has not been established, the operator can use the general unit designation, but will replace the unit number with the participating area number when the sign is replaced.

Commercial Well Determination

A commercial well determination shall be submitted after production has been established for at least six months.

GENERAL REQUIREMENTS

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

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

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

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

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

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

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

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

A. CASING

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

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

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

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

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

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

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

B. PRESSURE CONTROL

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

C. DRILLING MUD

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

D. WASTE MATERIAL AND FLUIDS

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

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

1. Geologic Formations

TVD of target	12600	Pilot hole depth	N/A
MD at TD:	28157	Deepest expected fresh water	

Basin

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone?	Hazards*
Rustler	1365		
Salt	1869		
Base of Salt	5180		
Delaware	5214		
Bone Spring 1st	9095		
Bone Spring 2nd	10466		
Bone Spring 3rd	11308		
Wolfcamp	12285		

*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	1390 TVD	13 3/8	48.0	H40	STC	1.125	1.25	1.6
9 7/8	0	11308 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

Fluid Filled

- 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	1390 TVD	13 3/8	48.0	H40	STC	1.125	1.25	1.6
9 7/8	0	11308 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

] Fluid Filled

- 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.

[redacted] ok

- 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	1044	Surf	13.2	1.44	Lead: Class C Cement + additives	
Int 1	745	Surf	9	3.27	Lead: Class C Cement + additives	<25% excess
	783	4000' above shoe	13.2	1.44	Tail: Class H / C + additives	
Int 1 Two Stage w/ DV @ TVD of Delaware	887	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	
	513	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	
	745	Surf	9	3.27	Lead: Class C Cement + additives	
	783	4000' above shoe	13.2	1.44	Tail: Class H / C + additives	
Production	60	10037	9.0	3.3	Lead: Class H /C + additives	<25% excess
	1028	12037	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	1044	Surf	13.2	1.44	Lead: Class C Cement + additives
Int 1	499	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	521	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
	363	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
	499	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)	696	Surf	9	3.27	Lead: Class C Cement + additives
	768	4000' above shoe	13.2	1.44	Tail: Class H / C + additives
Production	117	10037	9.0	3.3	Lead: Class H /C + additives
	2133	12037	13.2	1.4	Tail: Class H / C + additives

<25% excess

<25% excess

<25% excess

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"	10M	Annular (5M)	X	100% of rated working pressure
			Blind Ram	X	10M
			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	6880
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.

8. Other facets of operation

Is this a walking operation? Potentially

1 If operator elects, drilling rig will batch drill the surface holes and run/cement surface casing; walking the rig to next wells on the pad.
2 The drilling rig will then batch drill the intermediate sections and run/cement intermediate casing; the wellbore will be isolated with a blind flange and pressure gauge installed for monitoring the well before walking to the next well.
3 The drilling rig will then batch drill the production hole sections on the wells with OBM, run/cement production casing, and install TA caps or tubing heads for completions.

NOTE: During batch operations the drilling rig will be moved from well to well however, it will not be removed from the pad until all wells have production casing run/cemented.

Will be pre-setting casing? Potentially

1 Spudder rig will move in and batch drill surface hole.
    a. Rig will utilize fresh water based mud to drill surface hole to TD. Solids control will be handled entirely on a closed loop basis.,
2 After drilling the surface hole section, the spudder rig will run casing and cement following all of the applicable rules and regulations (OnShore Order 2, all COAs and NMOCD regulations).
3 The wellhead will be installed and tested once the surface casing is cut off and the WOC time has been reached.
4 A blind flange with the same pressure rating as the wellhead will be installed to seal the wellbore. Pressure will be monitored with a pressure gauge installed on the wellhead.
5 Spudder rig operations is expected to take 4-5 days per well on a multi-well pa.
6 The NMOCD will be contacted and notified 24 hours prior to commencing spudder rig operations.
7 Drilling operations will be performed with drilling rig. A that time an approved BOP stack will be nippled up and tested on the wellhead before drilling operations commences on each well.
    a. The NMOCD will be contacted / notified 24 hours before the drilling rig moves back on to the pad with the pre-set surface casing.

Attachments

X_____ Directional Plan
_____ Other, describe

DISTRICT I
1625 N. FRENCH DR., HOBBS, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
811 S. FIRST ST., ARTESIA, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 RIO BRAZOS RD., AZTEC, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV
1220 S. ST. FRANCIS DR., SANTA FE, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 SOUTH ST. FRANCIS DR.
Santa Fe, New Mexico 87505

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
30-025-43727	96689	BRINNINSTOOL; [redacted], WEST

Property Code	Property Name	Well Number
	THISTLE UNIT	108H

OGRID No.	Operator Name	Elevation
6137	DEVON ENERGY PRODUCTION COMPANY, L.P.	3724.0'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	21	23-S	33-E		438	NORTH	734	EAST	LEA

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	33	23-S	33-E		20	SOUTH	785	EAST	LEA

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
480			

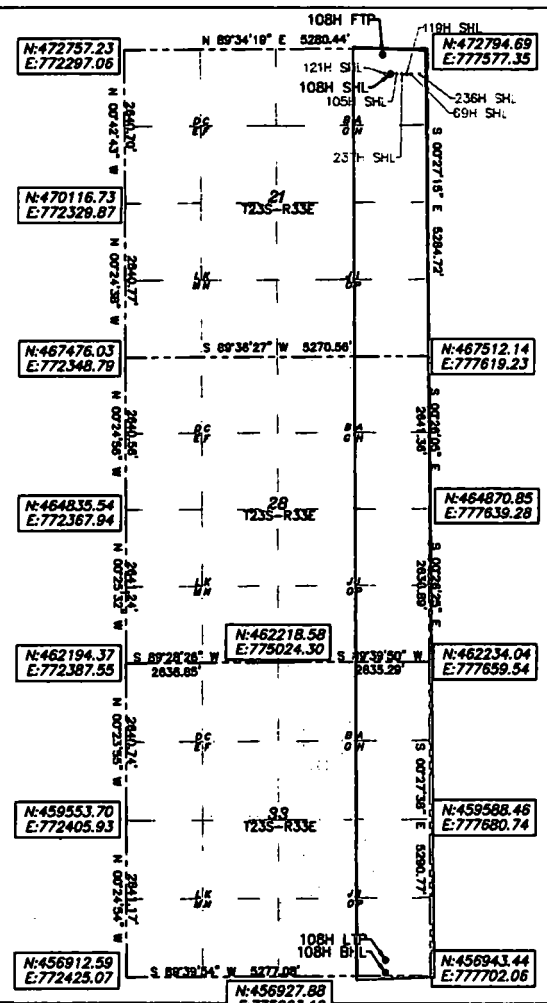
NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

THISTLE UNIT 108H
EL: 3725.7'
LAT:32.296272
LON:103.571145
N:472353.22
E:776846.84

FIRST TAKE POINT
100' FNL 785' FEL SEC. 21
LAT:32.297201
LON:103.571311
N:472690.83
E:776793.16

LAST TAKE POINT
100' FSL 785' FEL SEC. 33
LAT:32.254177
LON:103.571273
N:457038.85
E:776916.27

BOTTOM OF HOLE
LAT:32.253957
LON:103.571272
N:456958.85
E:776916.91



Note: All bearings recited herein are based on the New Mexico State Plane Coordinate System, NAD 83,New Mexico East Zone 3001, US Survey Feet, all distances are grid.

OPERATOR CERTIFICATION

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

Rebecca Deal 11/14/2019
Signature Date

Rebecca Deal, Regulatory Analyst
Printed Name

rebecca.deal@dvn.com
E-mail Address

SURVEYOR CERTIFICATION

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

10/2019
Date of Survey

Signature & Seal of Professional Surveyor

B. L. LAMAN
NEW MEXICO
22404
PROFESSIONAL SURVEYOR

10/12/19
Certificate No. 22404 B.L. LAMAN

W.O. # DRAWN BY: CM

Intent [x] As Drilled [ ]

API #
30-025-43727

Operator Name:	Property Name:	Well Number
DEVON ENERGY PRODUCTION COMPANY, LP.	THISTLE UNIT	108H

Kick Off Point (KOP)

UL	Section	Township	Range	Lot	Feet	From N/S	Feet	From E/W	County
	21	23S	33E		50	FNL	785	FEL	LEA

Latitude	Longitude	NAD
32.297367	-103.571301	

First Take Point (FTP)

UL	Section	Township	Range	Lot	Feet	From N/S	Feet	From E/W	County
A	21	23-S	33-E		100	NORTH	785	EAST	LEA

Latitude	Longitude	NAD
32.297201	103.571311	83

Last Take Point (LTP)

UL	Section	Township	Range	Lot	Feet	From N/S	Feet	From E/W	County
P	33	23-S	33-E		100	SOUTH	785	EAST	LEA

Latitude	Longitude	NAD
32.254177	103.571273	83

Is this well the defining well for the Horizontal Spacing Unit? [ ]

Is this well an infill well? [ ]

If infill is yes please provide API if available, Operator Name and well number for Defining well for Horizontal Spacing Unit.

API #

Operator Name:	Property Name:	Well Number

KZ 06/29/2018

WCDSC Permian NM

Lea County (NAD83 New Mexico East)
Sec 21-T23S-R33E
Thistle Unit 108H

Wellbore #1

Plan: Permit Plan 1

Standard Planning Report - Geographic

12 November, 2019

Planning Report - Geographic

Database:	EDM r5000.141_Prod US	**Local Co-ordinate Reference:**	Well Thistle Unit 108H
Company:	WCDSC Permian NM	**TVD Reference:**	RKB @ 3749.00ft
Project:	Lea County (NAD83 New Mexico East)	**MD Reference:**	RKB @ 3749.00ft
Site:	Sec 21-T23S-R33E	**North Reference:**	Grid
Well:	Thistle Unit 108H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 1		

Project	Lea County (NAD83 New Mexico East)		
Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Sec 21-T23S-R33E				
Site Position:		**Northing:**	472,758.13 usft	**Latitude:**	32.297473
From:	Map	**Easting:**	772,310.54 usft	**Longitude:**	-103.585816
Position Uncertainty:	0.00 ft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.40 °

Well	Thistle Unit 108H					
Well Position	**+N/-S**	0.00 ft	**Northing:**	472,353.22 usft	**Latitude:**	32.296272
	+E/-W	0.00 ft	**Easting:**	776,846.84 usft	**Longitude:**	-103.571145
Position Uncertainty		0.50 ft	**Wellhead Elevation:**		**Ground Level:**	3,724.00 ft

Wellbore	Wellbore #1			
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2015	11/12/2019	6.70	60.10	47,731.29488624

Design	Permit Plan 1			
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	179.74

Plan Survey Tool Program **Date** 11/12/2019

	Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	28,156.98	Permit Plan 1 (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	
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,789.46	2.89	352.70	3,789.34	7.25	-0.93	1.00	1.00	0.00	352.70	
11,494.06	2.89	352.70	11,484.11	393.17	-50.38	0.00	0.00	0.00	0.00	
11,687.04	0.00	0.00	11,677.00	398.00	-51.00	1.50	-1.50	0.00	180.00	
12,037.08	0.00	0.00	12,027.04	398.00	-51.00	0.00	0.00	0.00	0.00	
12,937.08	90.00	179.56	12,600.00	-174.94	-46.61	10.00	10.00	0.00	179.56	PBHL - Thistle Unit 1(
28,156.98	90.00	179.56	12,600.00	-15,394.40	70.07	0.00	0.00	0.00	0.00	PBHL - Thistle Unit 1(

Database:	EDM r5000.141_Prod US	**Local Co-ordinate Reference:**	Well Thistle Unit 108H
Company:	WCDSC Permian NM	**TVD Reference:**	RKB @ 3749.00ft
Project:	Lea County (NAD83 New Mexico East)	**MD Reference:**	RKB @ 3749.00ft
Site:	Sec 21-T23S-R33E	**North Reference:**	Grid
Well:	Thistle Unit 108H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 1		

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	472,353.22	776,846.84	32.296272	-103.571145
100.00	0.00	0.00	100.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
200.00	0.00	0.00	200.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
300.00	0.00	0.00	300.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
400.00	0.00	0.00	400.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
500.00	0.00	0.00	500.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
600.00	0.00	0.00	600.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
700.00	0.00	0.00	700.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
800.00	0.00	0.00	800.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
900.00	0.00	0.00	900.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
1,000.00	0.00	0.00	1,000.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
1,100.00	0.00	0.00	1,100.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
1,200.00	0.00	0.00	1,200.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
1,300.00	0.00	0.00	1,300.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
1,400.00	0.00	0.00	1,400.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
1,500.00	0.00	0.00	1,500.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
1,600.00	0.00	0.00	1,600.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
1,700.00	0.00	0.00	1,700.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
1,800.00	0.00	0.00	1,800.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
1,900.00	0.00	0.00	1,900.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
2,000.00	0.00	0.00	2,000.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
2,100.00	0.00	0.00	2,100.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
2,200.00	0.00	0.00	2,200.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
2,300.00	0.00	0.00	2,300.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
2,400.00	0.00	0.00	2,400.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
2,500.00	0.00	0.00	2,500.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
2,600.00	0.00	0.00	2,600.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
2,700.00	0.00	0.00	2,700.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
2,800.00	0.00	0.00	2,800.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
2,900.00	0.00	0.00	2,900.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
3,000.00	0.00	0.00	3,000.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
3,100.00	0.00	0.00	3,100.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
3,200.00	0.00	0.00	3,200.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
3,300.00	0.00	0.00	3,300.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
3,400.00	0.00	0.00	3,400.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
3,500.00	0.00	0.00	3,500.00	0.00	0.00	472,353.22	776,846.84	32.296272	-103.571145
3,600.00	1.00	352.70	3,600.00	0.87	-0.11	472,354.09	776,846.73	32.296274	-103.571146
3,700.00	2.00	352.70	3,699.96	3.46	-0.44	472,356.68	776,846.39	32.296281	-103.571147
3,789.46	2.89	352.70	3,789.34	7.25	-0.93	472,360.47	776,845.91	32.296292	-103.571148
3,800.00	2.89	352.70	3,799.86	7.78	-1.00	472,361.00	776,845.84	32.296293	-103.571148
3,900.00	2.89	352.70	3,899.74	12.79	-1.64	472,366.01	776,845.20	32.296307	-103.571150
4,000.00	2.89	352.70	3,999.61	17.80	-2.28	472,371.02	776,844.56	32.296321	-103.571152
4,100.00	2.89	352.70	4,099.48	22.81	-2.92	472,376.03	776,843.92	32.296335	-103.571154
4,200.00	2.89	352.70	4,199.35	27.81	-3.56	472,381.03	776,843.27	32.296348	-103.571156
4,300.00	2.89	352.70	4,299.23	32.82	-4.21	472,386.04	776,842.63	32.296362	-103.571158
4,400.00	2.89	352.70	4,399.10	37.83	-4.85	472,391.05	776,841.99	32.296376	-103.571160
4,500.00	2.89	352.70	4,498.97	42.84	-5.49	472,396.06	776,841.35	32.296390	-103.571162
4,600.00	2.89	352.70	4,598.84	47.85	-6.13	472,401.07	776,840.71	32.296403	-103.571164
4,700.00	2.89	352.70	4,698.72	52.86	-6.77	472,406.08	776,840.06	32.296417	-103.571166
4,800.00	2.89	352.70	4,798.59	57.87	-7.42	472,411.09	776,839.42	32.296431	-103.571168
4,900.00	2.89	352.70	4,898.46	62.88	-8.06	472,416.10	776,838.78	32.296445	-103.571170
5,000.00	2.89	352.70	4,998.33	67.89	-8.70	472,421.11	776,838.14	32.296459	-103.571172
5,100.00	2.89	352.70	5,098.20	72.89	-9.34	472,426.11	776,837.50	32.296472	-103.571174
5,200.00	2.89	352.70	5,198.08	77.90	-9.98	472,431.12	776,836.85	32.296486	-103.571176
5,300.00	2.89	352.70	5,297.95	82.91	-10.62	472,436.13	776,836.21	32.296500	-103.571178

Database:	EDM r5000.141_Prod US	**Local Co-ordinate Reference:**	Well Thistle Unit 108H
Company:	WCDSC Permian NM	**TVD Reference:**	RKB @ 3749.00ft
Project:	Lea County (NAD83 New Mexico East)	**MD Reference:**	RKB @ 3749.00ft
Site:	Sec 21-T23S-R33E	**North Reference:**	Grid
Well:	Thistle Unit 108H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 1		

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	2.89	352.70	5,397.82	87.92	-11.27	472,441.14	776,835.57	32.296514	-103.571180
5,500.00	2.89	352.70	5,497.69	92.93	-11.91	472,446.15	776,834.93	32.296527	-103.571182
5,600.00	2.89	352.70	5,597.57	97.94	-12.55	472,451.16	776,834.29	32.296541	-103.571184
5,700.00	2.89	352.70	5,697.44	102.95	-13.19	472,456.17	776,833.65	32.296555	-103.571186
5,800.00	2.89	352.70	5,797.31	107.96	-13.83	472,461.18	776,833.00	32.296569	-103.571188
5,900.00	2.89	352.70	5,897.18	112.97	-14.48	472,466.19	776,832.36	32.296583	-103.571190
6,000.00	2.89	352.70	5,997.06	117.97	-15.12	472,471.19	776,831.72	32.296596	-103.571192
6,100.00	2.89	352.70	6,096.93	122.98	-15.76	472,476.20	776,831.08	32.296610	-103.571194
6,200.00	2.89	352.70	6,196.80	127.99	-16.40	472,481.21	776,830.44	32.296624	-103.571196
6,300.00	2.89	352.70	6,296.67	133.00	-17.04	472,486.22	776,829.79	32.296638	-103.571198
6,400.00	2.89	352.70	6,396.55	138.01	-17.68	472,491.23	776,829.15	32.296651	-103.571199
6,500.00	2.89	352.70	6,496.42	143.02	-18.33	472,496.24	776,828.51	32.296665	-103.571201
6,600.00	2.89	352.70	6,596.29	148.03	-18.97	472,501.25	776,827.87	32.296679	-103.571203
6,700.00	2.89	352.70	6,696.16	153.04	-19.61	472,506.26	776,827.23	32.296693	-103.571205
6,800.00	2.89	352.70	6,796.04	158.05	-20.25	472,511.27	776,826.59	32.296707	-103.571207
6,900.00	2.89	352.70	6,895.91	163.05	-20.89	472,516.27	776,825.94	32.296720	-103.571209
7,000.00	2.89	352.70	6,995.78	168.06	-21.54	472,521.28	776,825.30	32.296734	-103.571211
7,100.00	2.89	352.70	7,095.65	173.07	-22.18	472,526.29	776,824.66	32.296748	-103.571213
7,200.00	2.89	352.70	7,195.53	178.08	-22.82	472,531.30	776,824.02	32.296762	-103.571215
7,300.00	2.89	352.70	7,295.40	183.09	-23.46	472,536.31	776,823.38	32.296775	-103.571217
7,400.00	2.89	352.70	7,395.27	188.10	-24.10	472,541.32	776,822.73	32.296789	-103.571219
7,500.00	2.89	352.70	7,495.14	193.11	-24.74	472,546.33	776,822.09	32.296803	-103.571221
7,600.00	2.89	352.70	7,595.02	198.12	-25.39	472,551.34	776,821.45	32.296817	-103.571223
7,700.00	2.89	352.70	7,694.89	203.13	-26.03	472,556.35	776,820.81	32.296831	-103.571225
7,800.00	2.89	352.70	7,794.76	208.13	-26.67	472,561.35	776,820.17	32.296844	-103.571227
7,900.00	2.89	352.70	7,894.63	213.14	-27.31	472,566.36	776,819.53	32.296858	-103.571229
8,000.00	2.89	352.70	7,994.50	218.15	-27.95	472,571.37	776,818.88	32.296872	-103.571231
8,100.00	2.89	352.70	8,094.38	223.16	-28.60	472,576.38	776,818.24	32.296886	-103.571233
8,200.00	2.89	352.70	8,194.25	228.17	-29.24	472,581.39	776,817.60	32.296900	-103.571235
8,300.00	2.89	352.70	8,294.12	233.18	-29.88	472,586.40	776,816.96	32.296913	-103.571237
8,400.00	2.89	352.70	8,393.99	238.19	-30.52	472,591.41	776,816.32	32.296927	-103.571239
8,500.00	2.89	352.70	8,493.87	243.20	-31.16	472,596.42	776,815.67	32.296941	-103.571241
8,600.00	2.89	352.70	8,593.74	248.21	-31.81	472,601.43	776,815.03	32.296955	-103.571243
8,700.00	2.89	352.70	8,693.61	253.21	-32.45	472,606.43	776,814.39	32.296968	-103.571245
8,800.00	2.89	352.70	8,793.48	258.22	-33.09	472,611.44	776,813.75	32.296982	-103.571247
8,900.00	2.89	352.70	8,893.36	263.23	-33.73	472,616.45	776,813.11	32.296996	-103.571249
9,000.00	2.89	352.70	8,993.23	268.24	-34.37	472,621.46	776,812.46	32.297010	-103.571251
9,100.00	2.89	352.70	9,093.10	273.25	-35.01	472,626.47	776,811.82	32.297024	-103.571252
9,200.00	2.89	352.70	9,192.97	278.26	-35.66	472,631.48	776,811.18	32.297037	-103.571254
9,300.00	2.89	352.70	9,292.85	283.27	-36.30	472,636.49	776,810.54	32.297051	-103.571256
9,400.00	2.89	352.70	9,392.72	288.28	-36.94	472,641.50	776,809.90	32.297065	-103.571258
9,500.00	2.89	352.70	9,492.59	293.29	-37.58	472,646.51	776,809.26	32.297079	-103.571260
9,600.00	2.89	352.70	9,592.46	298.29	-38.22	472,651.51	776,808.61	32.297092	-103.571262
9,700.00	2.89	352.70	9,692.34	303.30	-38.87	472,656.52	776,807.97	32.297106	-103.571264
9,800.00	2.89	352.70	9,792.21	308.31	-39.51	472,661.53	776,807.33	32.297120	-103.571266
9,900.00	2.89	352.70	9,892.08	313.32	-40.15	472,666.54	776,806.69	32.297134	-103.571268
10,000.00	2.89	352.70	9,991.95	318.33	-40.79	472,671.55	776,806.05	32.297148	-103.571270
10,100.00	2.89	352.70	10,091.83	323.34	-41.43	472,676.56	776,805.40	32.297161	-103.571272
10,200.00	2.89	352.70	10,191.70	328.35	-42.07	472,681.57	776,804.76	32.297175	-103.571274
10,300.00	2.89	352.70	10,291.57	333.36	-42.72	472,686.58	776,804.12	32.297189	-103.571276
10,400.00	2.89	352.70	10,391.44	338.37	-43.36	472,691.59	776,803.48	32.297203	-103.571278
10,500.00	2.89	352.70	10,491.32	343.37	-44.00	472,696.59	776,802.84	32.297216	-103.571280
10,600.00	2.89	352.70	10,591.19	348.38	-44.64	472,701.60	776,802.20	32.297230	-103.571282
10,700.00	2.89	352.70	10,691.06	353.39	-45.28	472,706.61	776,801.55	32.297244	-103.571284
10,800.00	2.89	352.70	10,790.93	358.40	-45.93	472,711.62	776,800.91	32.297258	-103.571286

Database:	EDM r5000.141_Prod US	**Local Co-ordinate Reference:**	Well Thistle Unit 108H
Company:	WCDSC Permian NM	**TVD Reference:**	RKB @ 3749.00ft
Project:	Lea County (NAD83 New Mexico East)	**MD Reference:**	RKB @ 3749.00ft
Site:	Sec 21-T23S-R33E	**North Reference:**	Grid
Well:	Thistle Unit 108H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,900.00	2.89	352.70	10,890.81	363.41	-46.57	472,716.63	776,800.27	32.297272	-103.571288
11,000.00	2.89	352.70	10,990.68	368.42	-47.21	472,721.64	776,799.63	32.297285	-103.571290
11,100.00	2.89	352.70	11,090.55	373.43	-47.85	472,726.65	776,798.99	32.297299	-103.571292
11,200.00	2.89	352.70	11,190.42	378.44	-48.49	472,731.66	776,798.34	32.297313	-103.571294
11,300.00	2.89	352.70	11,290.29	383.45	-49.14	472,736.67	776,797.70	32.297327	-103.571296
11,400.00	2.89	352.70	11,390.17	388.45	-49.78	472,741.67	776,797.06	32.297340	-103.571298
11,494.06	2.89	352.70	11,484.11	393.17	-50.38	472,746.39	776,796.46	32.297353	-103.571299
11,500.00	2.81	352.70	11,490.04	393.46	-50.42	472,746.68	776,796.42	32.297354	-103.571300
11,600.00	1.31	352.70	11,589.97	397.02	-50.87	472,750.24	776,795.96	32.297364	-103.571301
11,687.04	0.00	0.00	11,677.00	398.00	-51.00	472,751.22	776,795.84	32.297367	-103.571301
11,700.00	0.00	0.00	11,689.97	398.00	-51.00	472,751.22	776,795.84	32.297367	-103.571301
11,800.00	0.00	0.00	11,789.97	398.00	-51.00	472,751.22	776,795.84	32.297367	-103.571301
11,900.00	0.00	0.00	11,889.97	398.00	-51.00	472,751.22	776,795.84	32.297367	-103.571301
12,000.00	0.00	0.00	11,989.97	398.00	-51.00	472,751.22	776,795.84	32.297367	-103.571301
12,037.08	0.00	0.00	12,027.05	398.00	-51.00	472,751.22	776,795.84	32.297367	-103.571301
KOP @ 12037' MD, 50' FNL, 785' FEL									
12,100.00	6.29	179.56	12,089.84	394.55	-50.97	472,747.77	776,795.86	32.297357	-103.571301
12,200.00	16.29	179.56	12,187.78	374.99	-50.82	472,728.21	776,796.01	32.297303	-103.571301
12,300.00	26.29	179.56	12,280.83	338.73	-50.55	472,691.95	776,796.29	32.297204	-103.571301
12,302.00	26.49	179.56	12,282.63	337.84	-50.54	472,691.06	776,796.30	32.297201	-103.571301
FTP @ 12302' MD, 100' FNL, 785' FEL									
12,400.00	36.29	179.56	12,366.18	286.85	-50.15	472,640.07	776,796.69	32.297061	-103.571301
12,500.00	46.29	179.56	12,441.22	220.95	-49.64	472,574.17	776,797.19	32.296880	-103.571301
12,600.00	56.29	179.56	12,503.67	143.02	-49.05	472,496.24	776,797.79	32.296666	-103.571301
12,700.00	66.29	179.56	12,551.65	55.42	-48.37	472,408.64	776,798.46	32.296425	-103.571301
12,800.00	76.29	179.56	12,583.68	-39.17	-47.65	472,314.05	776,799.19	32.296165	-103.571301
12,900.00	86.29	179.56	12,598.80	-137.89	-46.89	472,215.33	776,799.95	32.295894	-103.571300
12,937.08	90.00	179.56	12,600.00	-174.94	-46.61	472,178.28	776,800.23	32.295792	-103.571300
13,000.00	90.00	179.56	12,600.00	-237.86	-46.13	472,115.36	776,800.71	32.295619	-103.571300
13,100.00	90.00	179.56	12,600.00	-337.86	-45.36	472,015.36	776,801.48	32.295344	-103.571300
13,200.00	90.00	179.56	12,600.00	-437.86	-44.59	471,915.36	776,802.25	32.295069	-103.571300
13,300.00	90.00	179.56	12,600.00	-537.85	-43.83	471,815.37	776,803.01	32.294794	-103.571300
13,400.00	90.00	179.56	12,600.00	-637.85	-43.06	471,715.37	776,803.78	32.294519	-103.571299
13,500.00	90.00	179.56	12,600.00	-737.85	-42.29	471,615.37	776,804.55	32.294245	-103.571299
13,600.00	90.00	179.56	12,600.00	-837.85	-41.53	471,515.38	776,805.31	32.293970	-103.571299
13,700.00	90.00	179.56	12,600.00	-937.84	-40.76	471,415.38	776,806.08	32.293695	-103.571299
13,800.00	90.00	179.56	12,600.00	-1,037.84	-39.99	471,315.38	776,806.85	32.293420	-103.571299
13,900.00	90.00	179.56	12,600.00	-1,137.84	-39.23	471,215.39	776,807.61	32.293145	-103.571299
14,000.00	90.00	179.56	12,600.00	-1,237.83	-38.46	471,115.39	776,808.38	32.292870	-103.571298
14,100.00	90.00	179.56	12,600.00	-1,337.83	-37.69	471,015.39	776,809.14	32.292595	-103.571298
14,200.00	90.00	179.56	12,600.00	-1,437.83	-36.93	470,915.40	776,809.91	32.292320	-103.571298
14,300.00	90.00	179.56	12,600.00	-1,537.83	-36.16	470,815.40	776,810.68	32.292046	-103.571298
14,400.00	90.00	179.56	12,600.00	-1,637.82	-35.39	470,715.40	776,811.44	32.291771	-103.571298
14,500.00	90.00	179.56	12,600.00	-1,737.82	-34.63	470,615.40	776,812.21	32.291496	-103.571297
14,600.00	90.00	179.56	12,600.00	-1,837.82	-33.86	470,515.41	776,812.98	32.291221	-103.571297
14,700.00	90.00	179.56	12,600.00	-1,937.81	-33.09	470,415.41	776,813.74	32.290946	-103.571297
14,800.00	90.00	179.56	12,600.00	-2,037.81	-32.33	470,315.41	776,814.51	32.290671	-103.571297
14,900.00	90.00	179.56	12,600.00	-2,137.81	-31.56	470,215.42	776,815.28	32.290396	-103.571297
15,000.00	90.00	179.56	12,600.00	-2,237.80	-30.79	470,115.42	776,816.04	32.290121	-103.571297
15,100.00	90.00	179.56	12,600.00	-2,337.80	-30.03	470,015.42	776,816.81	32.289847	-103.571296
15,200.00	90.00	179.56	12,600.00	-2,437.80	-29.26	469,915.43	776,817.58	32.289572	-103.571296
15,300.00	90.00	179.56	12,600.00	-2,537.80	-28.49	469,815.43	776,818.34	32.289297	-103.571296
15,400.00	90.00	179.56	12,600.00	-2,637.79	-27.73	469,715.43	776,819.11	32.289022	-103.571296
15,500.00	90.00	179.56	12,600.00	-2,737.79	-26.96	469,615.44	776,819.88	32.288747	-103.571296

Database:	EDM r5000.141_Prod US	**Local Co-ordinate Reference:**	Well Thistle Unit 108H
Company:	WCDSC Permian NM	**TVD Reference:**	RKB @ 3749.00ft
Project:	Lea County (NAD83 New Mexico East)	**MD Reference:**	RKB @ 3749.00ft
Site:	Sec 21-T23S-R33E	**North Reference:**	Grid
Well:	Thistle Unit 108H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
15,600.00	90.00	179.56	12,600.00	-2,837.79	-26.19	469,515.44	776,820.64	32.288472	-103.571295
15,700.00	90.00	179.56	12,600.00	-2,937.78	-25.43	469,415.44	776,821.41	32.288197	-103.571295
15,800.00	90.00	179.56	12,600.00	-3,037.78	-24.66	469,315.45	776,822.18	32.287923	-103.571295
15,900.00	90.00	179.56	12,600.00	-3,137.78	-23.89	469,215.45	776,822.94	32.287648	-103.571295
16,000.00	90.00	179.56	12,600.00	-3,237.78	-23.13	469,115.45	776,823.71	32.287373	-103.571295
16,100.00	90.00	179.56	12,600.00	-3,337.77	-22.36	469,015.46	776,824.48	32.287098	-103.571295
16,200.00	90.00	179.56	12,600.00	-3,437.77	-21.59	468,915.46	776,825.24	32.286823	-103.571294
16,300.00	90.00	179.56	12,600.00	-3,537.77	-20.83	468,815.46	776,826.01	32.286548	-103.571294
16,400.00	90.00	179.56	12,600.00	-3,637.76	-20.06	468,715.46	776,826.78	32.286273	-103.571294
16,500.00	90.00	179.56	12,600.00	-3,737.76	-19.29	468,615.47	776,827.54	32.285998	-103.571294
16,600.00	90.00	179.56	12,600.00	-3,837.76	-18.53	468,515.47	776,828.31	32.285724	-103.571294
16,700.00	90.00	179.56	12,600.00	-3,937.75	-17.76	468,415.47	776,829.08	32.285449	-103.571293
16,800.00	90.00	179.56	12,600.00	-4,037.75	-16.99	468,315.48	776,829.84	32.285174	-103.571293
16,900.00	90.00	179.56	12,600.00	-4,137.75	-16.23	468,215.48	776,830.61	32.284899	-103.571293
17,000.00	90.00	179.56	12,600.00	-4,237.75	-15.46	468,115.48	776,831.38	32.284624	-103.571293
17,100.00	90.00	179.56	12,600.00	-4,337.74	-14.69	468,015.49	776,832.14	32.284349	-103.571293
17,200.00	90.00	179.56	12,600.00	-4,437.74	-13.93	467,915.49	776,832.91	32.284074	-103.571293
17,300.00	90.00	179.56	12,600.00	-4,537.74	-13.16	467,815.49	776,833.68	32.283799	-103.571292
17,400.00	90.00	179.56	12,600.00	-4,637.73	-12.39	467,715.50	776,834.44	32.283525	-103.571292
17,500.00	90.00	179.56	12,600.00	-4,737.73	-11.63	467,615.50	776,835.21	32.283250	-103.571292
17,600.00	90.00	179.56	12,600.00	-4,837.73	-10.86	467,515.50	776,835.98	32.282975	-103.571292
17,609.00	90.00	179.56	12,600.00	-4,846.73	-10.79	467,506.50	776,836.05	32.282950	-103.571292
Cross section @ 17609' MD, 0' FNL, 785' FEL									
17,700.00	90.00	179.56	12,600.00	-4,937.73	-10.09	467,415.51	776,836.74	32.282700	-103.571292
17,800.00	90.00	179.56	12,600.00	-5,037.72	-9.33	467,315.51	776,837.51	32.282425	-103.571291
17,900.00	90.00	179.56	12,600.00	-5,137.72	-8.56	467,215.51	776,838.28	32.282150	-103.571291
18,000.00	90.00	179.56	12,600.00	-5,237.72	-7.79	467,115.51	776,839.04	32.281875	-103.571291
18,100.00	90.00	179.56	12,600.00	-5,337.71	-7.03	467,015.52	776,839.81	32.281601	-103.571291
18,200.00	90.00	179.56	12,600.00	-5,437.71	-6.26	466,915.52	776,840.58	32.281326	-103.571291
18,300.00	90.00	179.56	12,600.00	-5,537.71	-5.49	466,815.52	776,841.34	32.281051	-103.571291
18,400.00	90.00	179.56	12,600.00	-5,637.70	-4.73	466,715.53	776,842.11	32.280776	-103.571290
18,500.00	90.00	179.56	12,600.00	-5,737.70	-3.96	466,615.53	776,842.88	32.280501	-103.571290
18,600.00	90.00	179.56	12,600.00	-5,837.70	-3.19	466,515.53	776,843.64	32.280226	-103.571290
18,700.00	90.00	179.56	12,600.00	-5,937.70	-2.43	466,415.54	776,844.41	32.279951	-103.571290
18,800.00	90.00	179.56	12,600.00	-6,037.69	-1.66	466,315.54	776,845.18	32.279676	-103.571290
18,900.00	90.00	179.56	12,600.00	-6,137.69	-0.90	466,215.54	776,845.94	32.279402	-103.571289
19,000.00	90.00	179.56	12,600.00	-6,237.69	-0.13	466,115.55	776,846.71	32.279127	-103.571289
19,100.00	90.00	179.56	12,600.00	-6,337.68	0.64	466,015.55	776,847.48	32.278852	-103.571289
19,200.00	90.00	179.56	12,600.00	-6,437.68	1.40	465,915.55	776,848.24	32.278577	-103.571289
19,300.00	90.00	179.56	12,600.00	-6,537.68	2.17	465,815.56	776,849.01	32.278302	-103.571289
19,400.00	90.00	179.56	12,600.00	-6,637.68	2.94	465,715.56	776,849.78	32.278027	-103.571289
19,500.00	90.00	179.56	12,600.00	-6,737.67	3.70	465,615.56	776,850.54	32.277752	-103.571288
19,600.00	90.00	179.56	12,600.00	-6,837.67	4.47	465,515.56	776,851.31	32.277477	-103.571288
19,700.00	90.00	179.56	12,600.00	-6,937.67	5.24	465,415.57	776,852.08	32.277203	-103.571288
19,800.00	90.00	179.56	12,600.00	-7,037.66	6.00	465,315.57	776,852.84	32.276928	-103.571288
19,900.00	90.00	179.56	12,600.00	-7,137.66	6.77	465,215.57	776,853.61	32.276653	-103.571288
20,000.00	90.00	179.56	12,600.00	-7,237.66	7.54	465,115.58	776,854.38	32.276378	-103.571287
20,100.00	90.00	179.56	12,600.00	-7,337.65	8.30	465,015.58	776,855.14	32.276103	-103.571287
20,200.00	90.00	179.56	12,600.00	-7,437.65	9.07	464,915.58	776,855.91	32.275828	-103.571287
20,300.00	90.00	179.56	12,600.00	-7,537.65	9.84	464,815.59	776,856.67	32.275553	-103.571287
20,400.00	90.00	179.56	12,600.00	-7,637.65	10.60	464,715.59	776,857.44	32.275279	-103.571287
20,500.00	90.00	179.56	12,600.00	-7,737.64	11.37	464,615.59	776,858.21	32.275004	-103.571287
20,600.00	90.00	179.56	12,600.00	-7,837.64	12.14	464,515.60	776,858.97	32.274729	-103.571286
20,700.00	90.00	179.56	12,600.00	-7,937.64	12.90	464,415.60	776,859.74	32.274454	-103.571286

Database:	EDM r5000.141_Prod US	**Local Co-ordinate Reference:**	Well Thistle Unit 108H
Company:	WCDSC Permian NM	**TVD Reference:**	RKB @ 3749.00ft
Project:	Lea County (NAD83 New Mexico East)	**MD Reference:**	RKB @ 3749.00ft
Site:	Sec 21-T23S-R33E	**North Reference:**	Grid
Well:	Thistle Unit 108H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
20,800.00	90.00	179.56	12,600.00	-8,037.63	13.67	464,315.60	776,860.51	32.274179	-103.571286
20,900.00	90.00	179.56	12,600.00	-8,137.63	14.44	464,215.61	776,861.27	32.273904	-103.571286
21,000.00	90.00	179.56	12,600.00	-8,237.63	15.20	464,115.61	776,862.04	32.273629	-103.571286
21,100.00	90.00	179.56	12,600.00	-8,337.63	15.97	464,015.61	776,862.81	32.273354	-103.571285
21,200.00	90.00	179.56	12,600.00	-8,437.62	16.74	463,915.61	776,863.57	32.273080	-103.571285
21,300.00	90.00	179.56	12,600.00	-8,537.62	17.50	463,815.62	776,864.34	32.272805	-103.571285
21,400.00	90.00	179.56	12,600.00	-8,637.62	18.27	463,715.62	776,865.11	32.272530	-103.571285
21,500.00	90.00	179.56	12,600.00	-8,737.61	19.04	463,615.62	776,865.87	32.272255	-103.571285
21,600.00	90.00	179.56	12,600.00	-8,837.61	19.80	463,515.63	776,866.64	32.271980	-103.571285
21,700.00	90.00	179.56	12,600.00	-8,937.61	20.57	463,415.63	776,867.41	32.271705	-103.571284
21,800.00	90.00	179.56	12,600.00	-9,037.60	21.34	463,315.63	776,868.17	32.271430	-103.571284
21,900.00	90.00	179.56	12,600.00	-9,137.60	22.10	463,215.64	776,868.94	32.271155	-103.571284
22,000.00	90.00	179.56	12,600.00	-9,237.60	22.87	463,115.64	776,869.71	32.270881	-103.571284
22,100.00	90.00	179.56	12,600.00	-9,337.60	23.64	463,015.64	776,870.47	32.270606	-103.571284
22,200.00	90.00	179.56	12,600.00	-9,437.59	24.40	462,915.65	776,871.24	32.270331	-103.571283
22,300.00	90.00	179.56	12,600.00	-9,537.59	25.17	462,815.65	776,872.01	32.270056	-103.571283
22,400.00	90.00	179.56	12,600.00	-9,637.59	25.94	462,715.65	776,872.77	32.269781	-103.571283
22,500.00	90.00	179.56	12,600.00	-9,737.58	26.70	462,615.66	776,873.54	32.269506	-103.571283
22,600.00	90.00	179.56	12,600.00	-9,837.58	27.47	462,515.66	776,874.31	32.269231	-103.571283
22,700.00	90.00	179.56	12,600.00	-9,937.58	28.24	462,415.66	776,875.07	32.268956	-103.571283
22,800.00	90.00	179.56	12,600.00	-10,037.58	29.00	462,315.67	776,875.84	32.268682	-103.571282
22,887.00	90.00	179.56	12,600.00	-10,124.57	29.67	462,228.67	776,876.51	32.268442	-103.571282
Cross section @ 22887' MD, 0' FNL, 785' FEL									
22,900.00	90.00	179.56	12,600.00	-10,137.57	29.77	462,215.67	776,876.61	32.268407	-103.571282
23,000.00	90.00	179.56	12,600.00	-10,237.57	30.54	462,115.67	776,877.37	32.268132	-103.571282
23,100.00	90.00	179.56	12,600.00	-10,337.57	31.30	462,015.67	776,878.14	32.267857	-103.571282
23,200.00	90.00	179.56	12,600.00	-10,437.56	32.07	461,915.68	776,878.91	32.267582	-103.571282
23,300.00	90.00	179.56	12,600.00	-10,537.56	32.84	461,815.68	776,879.67	32.267307	-103.571281
23,400.00	90.00	179.56	12,600.00	-10,637.56	33.60	461,715.68	776,880.44	32.267032	-103.571281
23,500.00	90.00	179.56	12,600.00	-10,737.55	34.37	461,615.69	776,881.21	32.266758	-103.571281
23,600.00	90.00	179.56	12,600.00	-10,837.55	35.14	461,515.69	776,881.97	32.266483	-103.571281
23,700.00	90.00	179.56	12,600.00	-10,937.55	35.90	461,415.69	776,882.74	32.266208	-103.571281
23,800.00	90.00	179.56	12,600.00	-11,037.55	36.67	461,315.70	776,883.51	32.265933	-103.571281
23,900.00	90.00	179.56	12,600.00	-11,137.54	37.44	461,215.70	776,884.27	32.265658	-103.571280
24,000.00	90.00	179.56	12,600.00	-11,237.54	38.20	461,115.70	776,885.04	32.265383	-103.571280
24,100.00	90.00	179.56	12,600.00	-11,337.54	38.97	461,015.71	776,885.81	32.265108	-103.571280
24,200.00	90.00	179.56	12,600.00	-11,437.53	39.74	460,915.71	776,886.57	32.264833	-103.571280
24,300.00	90.00	179.56	12,600.00	-11,537.53	40.50	460,815.71	776,887.34	32.264559	-103.571280
24,400.00	90.00	179.56	12,600.00	-11,637.53	41.27	460,715.72	776,888.11	32.264284	-103.571279
24,500.00	90.00	179.56	12,600.00	-11,737.53	42.04	460,615.72	776,888.87	32.264009	-103.571279
24,600.00	90.00	179.56	12,600.00	-11,837.52	42.80	460,515.72	776,889.64	32.263734	-103.571279
24,700.00	90.00	179.56	12,600.00	-11,937.52	43.57	460,415.72	776,890.41	32.263459	-103.571279
24,800.00	90.00	179.56	12,600.00	-12,037.52	44.34	460,315.73	776,891.17	32.263184	-103.571279
24,900.00	90.00	179.56	12,600.00	-12,137.51	45.10	460,215.73	776,891.94	32.262909	-103.571278
25,000.00	90.00	179.56	12,600.00	-12,237.51	45.87	460,115.73	776,892.71	32.262634	-103.571278
25,100.00	90.00	179.56	12,600.00	-12,337.51	46.63	460,015.74	776,893.47	32.262360	-103.571278
25,200.00	90.00	179.56	12,600.00	-12,437.51	47.40	459,915.74	776,894.24	32.262085	-103.571278
25,300.00	90.00	179.56	12,600.00	-12,537.50	48.17	459,815.74	776,895.01	32.261810	-103.571278
25,400.00	90.00	179.56	12,600.00	-12,637.50	48.93	459,715.75	776,895.77	32.261535	-103.571278
25,500.00	90.00	179.56	12,600.00	-12,737.50	49.70	459,615.75	776,896.54	32.261260	-103.571277
25,600.00	90.00	179.56	12,600.00	-12,837.49	50.47	459,515.75	776,897.31	32.260985	-103.571277
25,700.00	90.00	179.56	12,600.00	-12,937.49	51.23	459,415.76	776,898.07	32.260710	-103.571277
25,800.00	90.00	179.56	12,600.00	-13,037.49	52.00	459,315.76	776,898.84	32.260435	-103.571277
25,900.00	90.00	179.56	12,600.00	-13,137.48	52.77	459,215.76	776,899.61	32.260161	-103.571277

Database:	EDM r5000.141_Prod US	**Local Co-ordinate Reference:**	Well Thistle Unit 108H
Company:	WCDSC Permian NM	**TVD Reference:**	RKB @ 3749.00ft
Project:	Lea County (NAD83 New Mexico East)	**MD Reference:**	RKB @ 3749.00ft
Site:	Sec 21-T23S-R33E	**North Reference:**	Grid
Well:	Thistle Unit 108H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permit Plan 1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
26,000.00	90.00	179.56	12,600.00	-13,237.48	53.53	459,115.77	776,900.37	32.259886	-103.571276
26,100.00	90.00	179.56	12,600.00	-13,337.48	54.30	459,015.77	776,901.14	32.259611	-103.571276
26,200.00	90.00	179.56	12,600.00	-13,437.48	55.07	458,915.77	776,901.90	32.259336	-103.571276
26,300.00	90.00	179.56	12,600.00	-13,537.47	55.83	458,815.77	776,902.67	32.259061	-103.571276
26,400.00	90.00	179.56	12,600.00	-13,637.47	56.60	458,715.78	776,903.44	32.258786	-103.571276
26,500.00	90.00	179.56	12,600.00	-13,737.47	57.37	458,615.78	776,904.20	32.258511	-103.571276
26,600.00	90.00	179.56	12,600.00	-13,837.46	58.13	458,515.78	776,904.97	32.258237	-103.571275
26,700.00	90.00	179.56	12,600.00	-13,937.46	58.90	458,415.79	776,905.74	32.257962	-103.571275
26,800.00	90.00	179.56	12,600.00	-14,037.46	59.67	458,315.79	776,906.50	32.257687	-103.571275
26,900.00	90.00	179.56	12,600.00	-14,137.46	60.43	458,215.79	776,907.27	32.257412	-103.571275
27,000.00	90.00	179.56	12,600.00	-14,237.45	61.20	458,115.80	776,908.04	32.257137	-103.571275
27,100.00	90.00	179.56	12,600.00	-14,337.45	61.97	458,015.80	776,908.80	32.256862	-103.571274
27,200.00	90.00	179.56	12,600.00	-14,437.45	62.73	457,915.80	776,909.57	32.256587	-103.571274
27,300.00	90.00	179.56	12,600.00	-14,537.44	63.50	457,815.81	776,910.34	32.256312	-103.571274
27,400.00	90.00	179.56	12,600.00	-14,637.44	64.27	457,715.81	776,911.10	32.256038	-103.571274
27,500.00	90.00	179.56	12,600.00	-14,737.44	65.03	457,615.81	776,911.87	32.255763	-103.571274
27,600.00	90.00	179.56	12,600.00	-14,837.43	65.80	457,515.82	776,912.64	32.255488	-103.571274
27,700.00	90.00	179.56	12,600.00	-14,937.43	66.57	457,415.82	776,913.40	32.255213	-103.571273
27,800.00	90.00	179.56	12,600.00	-15,037.43	67.33	457,315.82	776,914.17	32.254938	-103.571273
27,900.00	90.00	179.56	12,600.00	-15,137.43	68.10	457,215.83	776,914.94	32.254663	-103.571273
28,000.00	90.00	179.56	12,600.00	-15,237.42	68.87	457,115.83	776,915.70	32.254388	-103.571273
28,077.00	90.00	179.56	12,600.00	-15,314.42	69.46	457,038.83	776,916.29	32.254177	-103.571273
LTP @ 28077' MD, 100' FSL, 785' FEL									
28,100.00	90.00	179.56	12,600.00	-15,337.42	69.63	457,015.83	776,916.47	32.254113	-103.571273
28,156.97	90.00	179.56	12,600.00	-15,394.39	70.07	456,958.86	776,916.91	32.253957	-103.571273
PBHL; 20' FSL, 785' FEL									
28,156.98	90.00	179.56	12,600.00	-15,394.40	70.07	456,958.85	776,916.91	32.253957	-103.571273

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
PBHL - Thistle Unit 108H	0.00	0.00	0.00	-15,394.40	70.07	456,958.85	776,916.91	32.253957	-103.571273
- plan misses target center by 12600.00ft at 28156.98ft MD (12600.00 TVD, -15394.40 N, 70.07 E)									
- Point									

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
12,037.08	12,027.05	398.00	-51.00	KOP @ 12037' MD, 50' FNL, 785' FEL
12,302.00	12,282.63	337.84	-50.54	FTP @ 12302' MD, 100' FNL, 785' FEL
17,609.00	12,600.00	-4,846.73	-10.79	Cross section @ 17609' MD, 0' FNL, 785' FEL
22,887.00	12,600.00	-10,124.57	29.67	Cross section @ 22887' MD, 0' FNL, 785' FEL
28,077.00	12,600.00	-15,314.42	69.46	LTP @ 28077' MD, 100' FSL, 785' FEL
28,156.97	12,600.00	-15,394.39	70.07	PBHL; 20' FSL, 785' FEL