Rec'd 08/11/2020 - NMOCD

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.: NMNM016131

6. If Indian, Allotee or Tribe Name:

1a. Type of work: ☑ DRILL ☐ REENTER

1b. Type of Well: ☑ Oil Well XX ☐ 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.: SHIRE 22-15 FED COM 732H

2. Name of Operator: DEVON ENERGY PRODUCTION COMPANY LP

9. API Well No.: 3001547326

3a. Address: 333 West Sheridan Avenue, Oklahoma City, OK 73102

3b. Phone No. *(include area code)*: (800) 583-3866

10. Field and Pool, or Exploratory: JENNINGS BONE SPRING WEST/BONE

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

At surface: SESW / 350 FSL / 1915 FWL / LAT 32.1095132 / LONG -103.7682887

At proposed prod. zone: NENW / 330 FNL / 2310 FWL / LAT 32.1367771 / LONG -103.7669217

11. Sec., T. R. M. or Blk. and Survey or Area: SEC 22/T25S/R31E/NMP

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

12. County or Parish: EDDY

13. State: NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any): 350 feet

16. No of acres in lease: 560

17. Spacing Unit dedicated to this well: 320.0

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.: 452 feet

19. Proposed Depth: 12110 feet / 22095 feet

20. BLM/BIA Bond No. in file: FED: NMB000801

21. Elevations (Show whether DF, KDB, RT, GL, etc.): 3339 feet

22. Approximate date work will start*: 10/01/2020

23. Estimated duration: 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: (Electronic Submission)

Name *(Printed/Typed)*: JENNY HARMS / Ph: (800) 583-3866

Date: 10/11/2019

Title: Regulatory Compliance Professional

Approved by *(Signature)*: (Electronic Submission)

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

Date: 07/30/2020

Title: Assistant Field Manager Lands & Minerals

Office: Carlsbad Field Office

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

**Approval Date: 07/30/2020**

(Continued on page 2)

*(Instructions on page 2)

Entered - KMS NMOCD

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 Road, 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, NM 87505

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

☐ AMENDED REPORT

# WELL LOCATION AND ACREAGE DEDICATION PLAT

| [1] API Number | [2] Pool Code | [3] Pool Name |
|---|---|---|
| 3001547326 | 98220 | Purple Sage Wolfcamp |

| [4] Property Code | [5] Property Name | [6] Well Number |
|---|---|---|
| 328885 | SHIRE 22-15 FED COM | 732H |

| [7] OGRID No. | [8] Operator Name | [9] Elevation |
|---|---|---|
| 6137 | DEVON ENERGY PRODUCTION COMPANY, L.P. | 3339.2 |

## [10] Surface Location

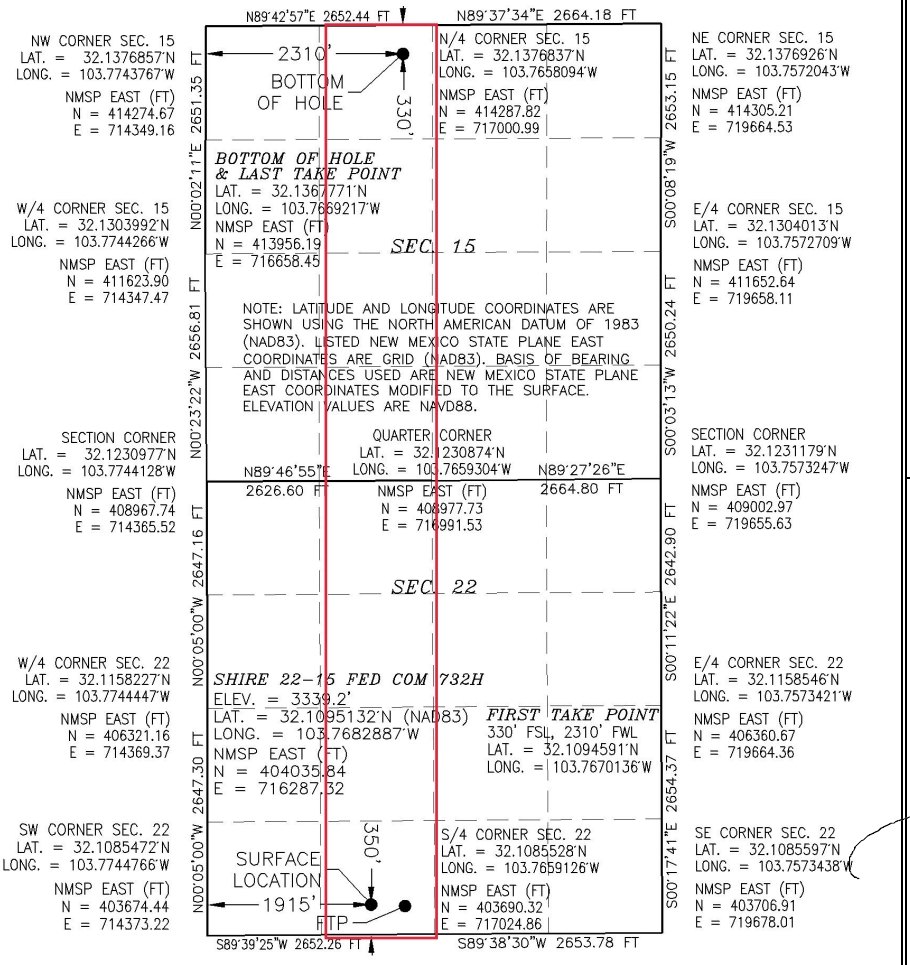
| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---|---|---|---|---|---|---|---|---|---|
| N | 22 | 25 S | 31 E | | 350 | SOUTH | 1915 | WEST | EDDY |

## [11] 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 |
|---|---|---|---|---|---|---|---|---|---|
| C | 15 | 25 S | 31 E | | 330 | NORTH | 2310 | WEST | EDDY |

| [12] Dedicated Acres | [13] Joint or Infill | [14] Consolidation Code | [15] Order No. |
|---|---|---|---|
| ~~320~~ 640 acres | | | |

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.




## [17] OPERATOR CERTIFICATION

*I hereby certify that the information contained 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 a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.*

Jenny Harms — 10-11-2019
Signature — Date

JENNY HARMS
Printed Name

JENNY.HARMS@DVN.COM
E-mail Address

## [18] 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.*

SEPTEMBER 11, 2019
Date of Survey

Signature and Seal of Professional Surveyor:

FILIMON F. JARAMILLO NEW MEXICO 12797 REGISTERED PROFESSIONAL SURVEYOR

Certificate Number: FILIMON F. JARAMILLO, PLS 12797

SURVEY NO. 7571

District I
1625 N. French Dr., Hobbs, NM 88240
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1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources Department

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Submit Original
to Appropriate
District Office

# GAS CAPTURE PLAN

Date: October 9, 2019

☒ Original Devon & OGRID No.: Devon Energy Production Co., L.P. 6137

☐ Amended - Reason for Amendment: _____

This Gas Capture Plan outlines actions to be taken by the Devon to reduce well/production facility flaring/venting for new completion (new drill, recomplete to new zone, re-frac) activity.

*Note: Form C-129 must be submitted and approved prior to exceeding 60 days allowed by Rule (Subsection A of 19.15.18.12 NMAC).*

**Well(s)/Production Facility – Name of facility**

The well(s) that will be located at the production facility are shown in the table below.

| Well Name | API | Well Location (ULSTR) | Footages | Expected MCF/D | Flared or Vented | Comments |
|---|---|---|---|---|---|---|
| SHIRE 22-15 FED COM 732H | | UL N, SEC 25, T25S, 31E | 350 FSL<br>1915 FWL | | | LUSITANO 27 CTB 3 |

**Gathering System and Pipeline Notification**

Well(s) will be connected to a production facility after flowback operations are complete, if DCP system is in place. The gas produced from production facility is dedicated to DCP and will be connected to DCP low/high pressure gathering system located in Lea County, New Mexico. It will require 0' of pipeline to connect the facility to low/high pressure gathering system. Devon provides (periodically) to DCP a drilling, completion and estimated first production date for wells that are scheduled to be drilled in the foreseeable future. In addition, Devon and DCP have periodic conference calls to discuss changes to drilling and completion schedules. Gas from these wells will be processed at DCP Processing Plant located in Sec 19, Twn. 19S, Rng. 32E, Lea County, New Mexico. The actual flow of the gas will be based on compression operating parameters and gathering system pressures.

**Flowback Strategy**

After the fracture treatment/completion operations, well(s) will be produced to temporary production tanks and gas will be flared or vented. During flowback, the fluids and sand content will be monitored. When the produced fluids contain minimal sand, the wells will be turned to production facilities. Gas sales should start as soon as the wells start flowing through the production facilities, unless there are operational issues on DCP system at that time. Based on current information, it is Devon's belief the system can take this gas upon completion of the well(s).

Safety requirements during cleanout operations from the use of underbalanced air cleanout systems may necessitate that sand and non-pipeline quality gas be vented and/or flared rather than sold on a temporary basis.

**Alternatives to Reduce Flaring**

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

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

**1. Geologic Formations**

| | | | |
|---|---|---|---|
| TVD of target | 12110 | Pilot hole depth | N/A |
| MD at TD: | 22095 | Deepest expected fresh water | |

**Basin**

| Formation | Depth (TVD) from KB | Water/Mineral Bearing/Target Zone? | Hazards* |
|---|---|---|---|
| RUSTLER | 1160 | | |
| SALADO | 1460 | | |
| TOP OF SALT | 1460 | | |
| BASE OF SALT | 4330 | | |
| Delaware | 4380 | | |
| CHERRY CANYON | 5295 | | |
| BRUSHY CANYON | 6650 | | |
| BONE SPRING LIME | 8250 | | |
| 1ST BONE SPRING SAND | 9320 | | |
| Bone Spring 2nd | 9945 | | |
| Bone Spring 3rd | 11215 | | |
| WOLFCAMP | 11670 | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

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

Intent [X] As Drilled [ ]

| API # |
|---|
| |

| Operator Name: | Property Name: | Well Number |
|---|---|---|
| DEVON ENERGY PRODUCTION COMPANY, L.P. | SHIRE 22-15 FED COM | 732H |

Kick Off Point (KOP)

| UL | Section | Township | Range | Lot | Feet | From N/S | Feet | From E/W | County |
|---|---|---|---|---|---|---|---|---|---|
| N | 22 | 25S | 31E | | 250 FSL | | 2310 FWL | | EDDY |

| Latitude | Longitude | NAD |
|---|---|---|
| 32.10923300 | -103.76701500 | 83 |

First Take Point (FTP)

| UL | Section | Township | Range | Lot | Feet | From N/S | Feet | From E/W | County |
|---|---|---|---|---|---|---|---|---|---|
| N | 22 | 25S | 31E | | 330 | SOUTH | 2310 | WEST | EDDY |

| Latitude | Longitude | NAD |
|---|---|---|
| 32.1094591 | 103.7670136 | 83 |

Last Take Point (LTP)

| UL | Section | Township | Range | Lot | Feet | From N/S | Feet | From E/W | County |
|---|---|---|---|---|---|---|---|---|---|
| C | 15 | 25S | 31E | | 330 | NORTH | 2310 | WEST | EDDY |

| Latitude | Longitude | NAD |
|---|---|---|
| 32.1367771 | 103.7669217 | 83 |

Is this well the defining well for the Horizontal Spacing Unit? [NO]

Is this well an infill well? [YES]

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

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.

Devon proposes using 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.

- Wellhead will be installed by wellhead representatives.
- If the welding is performed by a third party, the wellhead representative will monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
- Wellhead representative will install the test plug for the initial BOP test.
- Wellhead company will install a solid steel body pack-off to completely isolate the lower head after cementing intermediate casing. After installation of the pack-off, the pack-off and the lower flange will be tested to 5M, as shown on the attached schematic. Everything above the pack-off will not have been altered whatsoever from the initial nipple up. Therefore the BOP components will not be retested at that time.
- If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head will be cut and top out operations will be conducted.
- Devon will pressure test all seals above and below the mandrel (but still above the casing) to full working pressure rating.
- Devon will test the casing to 0.22 psi/ft or 1500 psi, whichever is greater, as per Onshore Order #2.

After running the surface casing, a 13-5/8" BOP/BOPE system with a minimum rating of 5M will be installed on the wellhead system and will undergo a 250 psi low pressure test followed by a 5,000 psi high pressure test. The 5,000 psi high and 250 psi low test will cover testing requirements a maximum of 30 days, as per Onshore Order #2. If the well is not complete within 30 days of this BOP test, another full BOP test will be conducted, as per Onshore Order #2.

After running the intermediate casing with a mandrel hanger, the 13-5/8" BOP/BOPE system with a minimum rating of 5M will already be installed on the wellhead.

The pipe rams will be operated and checked each 24 hour period and each time the drill pipe is out of the hole. These tests will be logged in the daily driller's log. A 2" kill line and 3" choke line will be incorporated into the drilling spool below the ram BOP. In addition to the rams and annular preventer, additional BOP accessories include a kelly cock, floor safety valve, choke lines, and choke manifold rated at 5,000 psi WP.

Devon's proposed wellhead manufactures will be FMC Technologies, Cactus Wellhead, or Cameron.

**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 | 1185 TVD | 13 3/8 | 48.0 | H40 | STC | 1.125 | 1.25 | 1.6 |
| 9 7/8 | 0 | 11215 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<br>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 | 1185 TVD | 13 3/8 | 48.0 | H40 | STC | 1.125 | 1.25 | 1.6 |
| 9 7/8 | 0 | 11215 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<br>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 | 896 | Surf | 13.2 | 1.44 | Lead: Class C Cement + additives |
| Int 1 | 719 | 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 | 880 | 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 |
| | 426 | 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 |
| | 719 | Surf | 9 | 3.27 | Lead: Class C Cement + additives |
| | 783 | 4000' above shoe | 13.2 | 1.44 | Tail: Class H / C + additives |
| Production | 61 | 9546 | 9.0 | 3.3 | Lead: Class H /C + additives |
| | 673 | 11546 | 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 | 896 | Surf | 13.2 | 1.44 | Lead: Class C Cement + additives |
| Int 1 | 475 | 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 | 517 | 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 |
| | 302 | 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 |
| | 475 | 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) | 676 | Surf | 9 | 3.27 | Lead: Class C Cement + additives |
| | 768 | 4000' above shoe | 13.2 | 1.44 | Tail: Class H / C + additives |
| Production | 117 | 9546 | 9.0 | 3.3 | Lead: Class H /C + additives |
| | 1396 | 11546 | 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" | 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 | 6612 |
| 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

# WCDSC Permian NM

**Eddy County (NAD 83 NM Eastern)**
**Sec 27-T25S-R31E**
**Shire 22-15 Fed Com 732H**

**Wellbore #1**

**Plan: Permit Plan 1**

# Standard Planning Report - Geographic

**30 September, 2019**

| | | | |
|---|---|---|---|
| **Database:** | EDM r5000.141_Prod US | **Local Co-ordinate Reference:** | Well Shire 22-15 Fed Com 732H |
| **Company:** | WCDSC Permian NM | **TVD Reference:** | RKB @ 3359.90ft |
| **Project:** | Eddy County (NAD 83 NM Eastern) | **MD Reference:** | RKB @ 3359.90ft |
| **Site:** | Sec 27-T25S-R31E | **North Reference:** | Grid |
| **Well:** | Shire 22-15 Fed Com 732H | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Wellbore #1 | | |
| **Design:** | Permit Plan 1 | | |

**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 27-T25S-R31E

| | | | | | |
|---|---|---|---|---|---|
| **Site Position:** | | **Northing:** | 403,674.44 usft | **Latitude:** | 32.108547 |
| **From:** | Map | **Easting:** | 714,373.23 usft | **Longitude:** | -103.774477 |
| **Position Uncertainty:** | 0.00 ft | **Slot Radius:** | 13-3/16 " | **Grid Convergence:** | 0.30 ° |

**Well** Shire 22-15 Fed Com 732H

| | | | | | | |
|---|---|---|---|---|---|---|
| **Well Position** | **+N/-S** | 0.00 ft | **Northing:** | 404,035.84 usft | **Latitude:** | 32.109513 |
| | **+E/-W** | 0.00 ft | **Easting:** | 716,287.32 usft | **Longitude:** | -103.768289 |
| **Position Uncertainty** | | 0.50 ft | **Wellhead Elevation:** | | **Ground Level:** | 3,339.20 ft |

**Wellbore** Wellbore #1

| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|---|---|---|---|---|---|
| | IGRF2015 | 2/19/2019 | 6.86 | 59.90 | 47,677.93092154 |

**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 | 2.23 |

**Plan Survey Tool Program** **Date** 9/30/2019

| | Depth From (ft) | Depth To (ft) | Survey (Wellbore) | Tool Name | Remarks |
|---|---|---|---|---|---|
| 1 | 0.00 | 22,095.19 | Permit Plan 1 (Wellbore #1) | MWD+HDGM<br>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 | |
| 2,000.00 | 0.00 | 0.00 | 2,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2,260.08 | 2.60 | 104.21 | 2,259.99 | -1.45 | 5.72 | 1.00 | 1.00 | 0.00 | 104.21 | |
| 11,022.79 | 2.60 | 104.21 | 11,013.67 | -99.03 | 391.19 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 11,196.18 | 0.00 | 0.00 | 11,187.00 | -100.00 | 395.00 | 1.50 | -1.50 | 0.00 | 180.00 | |
| 11,546.22 | 0.00 | 0.00 | 11,537.04 | -100.00 | 395.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 12,446.22 | 90.00 | 0.00 | 12,110.00 | 472.96 | 395.00 | 10.00 | 10.00 | 0.00 | 0.00 | |
| 22,095.19 | 90.00 | 0.00 | 12,110.00 | 10,121.93 | 395.00 | 0.00 | 0.00 | 0.00 | 0.00 | |

| | | | |
|---|---|---|---|
| **Database:** | EDM r5000.141_Prod US | **Local Co-ordinate Reference:** | Well Shire 22-15 Fed Com 732H |
| **Company:** | WCDSC Permian NM | **TVD Reference:** | RKB @ 3359.90ft |
| **Project:** | Eddy County (NAD 83 NM Eastern) | **MD Reference:** | RKB @ 3359.90ft |
| **Site:** | Sec 27-T25S-R31E | **North Reference:** | Grid |
| **Well:** | Shire 22-15 Fed Com 732H | **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 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 200.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 300.00 | 0.00 | 0.00 | 300.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 400.00 | 0.00 | 0.00 | 400.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 500.00 | 0.00 | 0.00 | 500.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 600.00 | 0.00 | 0.00 | 600.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 700.00 | 0.00 | 0.00 | 700.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 800.00 | 0.00 | 0.00 | 800.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 900.00 | 0.00 | 0.00 | 900.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 1,000.00 | 0.00 | 0.00 | 1,000.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 1,100.00 | 0.00 | 0.00 | 1,100.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 1,200.00 | 0.00 | 0.00 | 1,200.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 1,300.00 | 0.00 | 0.00 | 1,300.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 1,400.00 | 0.00 | 0.00 | 1,400.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 1,500.00 | 0.00 | 0.00 | 1,500.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 1,600.00 | 0.00 | 0.00 | 1,600.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 1,700.00 | 0.00 | 0.00 | 1,700.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 1,800.00 | 0.00 | 0.00 | 1,800.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 1,900.00 | 0.00 | 0.00 | 1,900.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 2,000.00 | 0.00 | 0.00 | 2,000.00 | 0.00 | 0.00 | 404,035.84 | 716,287.32 | 32.109513 | -103.768289 |
| 2,100.00 | 1.00 | 104.21 | 2,099.99 | -0.21 | 0.85 | 404,035.62 | 716,288.16 | 32.109513 | -103.768286 |
| 2,200.00 | 2.00 | 104.21 | 2,199.96 | -0.86 | 3.38 | 404,034.98 | 716,290.70 | 32.109511 | -103.768278 |
| 2,260.08 | 2.60 | 104.21 | 2,259.99 | -1.45 | 5.72 | 404,034.39 | 716,293.04 | 32.109509 | -103.768271 |
| 2,300.00 | 2.60 | 104.21 | 2,299.87 | -1.89 | 7.48 | 404,033.95 | 716,294.79 | 32.109508 | -103.768265 |
| 2,400.00 | 2.60 | 104.21 | 2,399.77 | -3.01 | 11.88 | 404,032.83 | 716,299.19 | 32.109505 | -103.768251 |
| 2,500.00 | 2.60 | 104.21 | 2,499.66 | -4.12 | 16.28 | 404,031.72 | 716,303.59 | 32.109502 | -103.768236 |
| 2,600.00 | 2.60 | 104.21 | 2,599.56 | -5.23 | 20.67 | 404,030.61 | 716,307.99 | 32.109499 | -103.768222 |
| 2,700.00 | 2.60 | 104.21 | 2,699.46 | -6.35 | 25.07 | 404,029.49 | 716,312.39 | 32.109495 | -103.768208 |
| 2,800.00 | 2.60 | 104.21 | 2,799.35 | -7.46 | 29.47 | 404,028.38 | 716,316.79 | 32.109492 | -103.768194 |
| 2,900.00 | 2.60 | 104.21 | 2,899.25 | -8.57 | 33.87 | 404,027.26 | 716,321.19 | 32.109489 | -103.768180 |
| 3,000.00 | 2.60 | 104.21 | 2,999.15 | -9.69 | 38.27 | 404,026.15 | 716,325.59 | 32.109486 | -103.768166 |
| 3,100.00 | 2.60 | 104.21 | 3,099.05 | -10.80 | 42.67 | 404,025.04 | 716,329.98 | 32.109483 | -103.768151 |
| 3,200.00 | 2.60 | 104.21 | 3,198.94 | -11.92 | 47.07 | 404,023.92 | 716,334.38 | 32.109480 | -103.768137 |
| 3,300.00 | 2.60 | 104.21 | 3,298.84 | -13.03 | 51.47 | 404,022.81 | 716,338.78 | 32.109477 | -103.768123 |
| 3,400.00 | 2.60 | 104.21 | 3,398.74 | -14.14 | 55.87 | 404,021.70 | 716,343.18 | 32.109474 | -103.768109 |
| 3,500.00 | 2.60 | 104.21 | 3,498.63 | -15.26 | 60.26 | 404,020.58 | 716,347.58 | 32.109470 | -103.768095 |
| 3,600.00 | 2.60 | 104.21 | 3,598.53 | -16.37 | 64.66 | 404,019.47 | 716,351.98 | 32.109467 | -103.768080 |
| 3,700.00 | 2.60 | 104.21 | 3,698.43 | -17.48 | 69.06 | 404,018.35 | 716,356.38 | 32.109464 | -103.768066 |
| 3,800.00 | 2.60 | 104.21 | 3,798.32 | -18.60 | 73.46 | 404,017.24 | 716,360.78 | 32.109461 | -103.768052 |
| 3,900.00 | 2.60 | 104.21 | 3,898.22 | -19.71 | 77.86 | 404,016.13 | 716,365.18 | 32.109458 | -103.768038 |
| 4,000.00 | 2.60 | 104.21 | 3,998.12 | -20.83 | 82.26 | 404,015.01 | 716,369.57 | 32.109455 | -103.768024 |
| 4,100.00 | 2.60 | 104.21 | 4,098.02 | -21.94 | 86.66 | 404,013.90 | 716,373.97 | 32.109452 | -103.768009 |
| 4,200.00 | 2.60 | 104.21 | 4,197.91 | -23.05 | 91.06 | 404,012.79 | 716,378.37 | 32.109449 | -103.767995 |
| 4,300.00 | 2.60 | 104.21 | 4,297.81 | -24.17 | 95.46 | 404,011.67 | 716,382.77 | 32.109445 | -103.767981 |
| 4,400.00 | 2.60 | 104.21 | 4,397.71 | -25.28 | 99.85 | 404,010.56 | 716,387.17 | 32.109442 | -103.767967 |
| 4,500.00 | 2.60 | 104.21 | 4,497.60 | -26.39 | 104.25 | 404,009.45 | 716,391.57 | 32.109439 | -103.767953 |
| 4,600.00 | 2.60 | 104.21 | 4,597.50 | -27.51 | 108.65 | 404,008.33 | 716,395.97 | 32.109436 | -103.767939 |
| 4,700.00 | 2.60 | 104.21 | 4,697.40 | -28.62 | 113.05 | 404,007.22 | 716,400.37 | 32.109433 | -103.767924 |
| 4,800.00 | 2.60 | 104.21 | 4,797.29 | -29.73 | 117.45 | 404,006.10 | 716,404.77 | 32.109430 | -103.767910 |
| 4,900.00 | 2.60 | 104.21 | 4,897.19 | -30.85 | 121.85 | 404,004.99 | 716,409.17 | 32.109427 | -103.767896 |
| 5,000.00 | 2.60 | 104.21 | 4,997.09 | -31.96 | 126.25 | 404,003.88 | 716,413.56 | 32.109424 | -103.767882 |
| 5,100.00 | 2.60 | 104.21 | 5,096.99 | -33.08 | 130.65 | 404,002.76 | 716,417.96 | 32.109421 | -103.767868 |
| 5,200.00 | 2.60 | 104.21 | 5,196.88 | -34.19 | 135.05 | 404,001.65 | 716,422.36 | 32.109417 | -103.767853 |
| 5,300.00 | 2.60 | 104.21 | 5,296.78 | -35.30 | 139.44 | 404,000.54 | 716,426.76 | 32.109414 | -103.767839 |

| | | | |
|---|---|---|---|
| **Database:** | EDM r5000.141_Prod US | **Local Co-ordinate Reference:** | Well Shire 22-15 Fed Com 732H |
| **Company:** | WCDSC Permian NM | **TVD Reference:** | RKB @ 3359.90ft |
| **Project:** | Eddy County (NAD 83 NM Eastern) | **MD Reference:** | RKB @ 3359.90ft |
| **Site:** | Sec 27-T25S-R31E | **North Reference:** | Grid |
| **Well:** | Shire 22-15 Fed Com 732H | **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 | 2.60 | 104.21 | 5,396.68 | -36.42 | 143.84 | 403,999.42 | 716,431.16 | 32.109411 | -103.767825 |
| 5,500.00 | 2.60 | 104.21 | 5,496.57 | -37.53 | 148.24 | 403,998.31 | 716,435.56 | 32.109408 | -103.767811 |
| 5,600.00 | 2.60 | 104.21 | 5,596.47 | -38.64 | 152.64 | 403,997.20 | 716,439.96 | 32.109405 | -103.767797 |
| 5,700.00 | 2.60 | 104.21 | 5,696.37 | -39.76 | 157.04 | 403,996.08 | 716,444.36 | 32.109402 | -103.767782 |
| 5,800.00 | 2.60 | 104.21 | 5,796.26 | -40.87 | 161.44 | 403,994.97 | 716,448.76 | 32.109399 | -103.767768 |
| 5,900.00 | 2.60 | 104.21 | 5,896.16 | -41.98 | 165.84 | 403,993.85 | 716,453.15 | 32.109396 | -103.767754 |
| 6,000.00 | 2.60 | 104.21 | 5,996.06 | -43.10 | 170.24 | 403,992.74 | 716,457.55 | 32.109392 | -103.767740 |
| 6,100.00 | 2.60 | 104.21 | 6,095.96 | -44.21 | 174.64 | 403,991.63 | 716,461.95 | 32.109389 | -103.767726 |
| 6,200.00 | 2.60 | 104.21 | 6,195.85 | -45.33 | 179.04 | 403,990.51 | 716,466.35 | 32.109386 | -103.767712 |
| 6,300.00 | 2.60 | 104.21 | 6,295.75 | -46.44 | 183.43 | 403,989.40 | 716,470.75 | 32.109383 | -103.767697 |
| 6,400.00 | 2.60 | 104.21 | 6,395.65 | -47.55 | 187.83 | 403,988.29 | 716,475.15 | 32.109380 | -103.767683 |
| 6,500.00 | 2.60 | 104.21 | 6,495.54 | -48.67 | 192.23 | 403,987.17 | 716,479.55 | 32.109377 | -103.767669 |
| 6,600.00 | 2.60 | 104.21 | 6,595.44 | -49.78 | 196.63 | 403,986.06 | 716,483.95 | 32.109374 | -103.767655 |
| 6,700.00 | 2.60 | 104.21 | 6,695.34 | -50.89 | 201.03 | 403,984.95 | 716,488.35 | 32.109371 | -103.767641 |
| 6,800.00 | 2.60 | 104.21 | 6,795.23 | -52.01 | 205.43 | 403,983.83 | 716,492.74 | 32.109367 | -103.767626 |
| 6,900.00 | 2.60 | 104.21 | 6,895.13 | -53.12 | 209.83 | 403,982.72 | 716,497.14 | 32.109364 | -103.767612 |
| 7,000.00 | 2.60 | 104.21 | 6,995.03 | -54.23 | 214.23 | 403,981.60 | 716,501.54 | 32.109361 | -103.767598 |
| 7,100.00 | 2.60 | 104.21 | 7,094.93 | -55.35 | 218.63 | 403,980.49 | 716,505.94 | 32.109358 | -103.767584 |
| 7,200.00 | 2.60 | 104.21 | 7,194.82 | -56.46 | 223.02 | 403,979.38 | 716,510.34 | 32.109355 | -103.767570 |
| 7,300.00 | 2.60 | 104.21 | 7,294.72 | -57.58 | 227.42 | 403,978.26 | 716,514.74 | 32.109352 | -103.767555 |
| 7,400.00 | 2.60 | 104.21 | 7,394.62 | -58.69 | 231.82 | 403,977.15 | 716,519.14 | 32.109349 | -103.767541 |
| 7,500.00 | 2.60 | 104.21 | 7,494.51 | -59.80 | 236.22 | 403,976.04 | 716,523.54 | 32.109346 | -103.767527 |
| 7,600.00 | 2.60 | 104.21 | 7,594.41 | -60.92 | 240.62 | 403,974.92 | 716,527.94 | 32.109342 | -103.767513 |
| 7,700.00 | 2.60 | 104.21 | 7,694.31 | -62.03 | 245.02 | 403,973.81 | 716,532.33 | 32.109339 | -103.767499 |
| 7,800.00 | 2.60 | 104.21 | 7,794.20 | -63.14 | 249.42 | 403,972.70 | 716,536.73 | 32.109336 | -103.767485 |
| 7,900.00 | 2.60 | 104.21 | 7,894.10 | -64.26 | 253.82 | 403,971.58 | 716,541.13 | 32.109333 | -103.767470 |
| 8,000.00 | 2.60 | 104.21 | 7,994.00 | -65.37 | 258.22 | 403,970.47 | 716,545.53 | 32.109330 | -103.767456 |
| 8,100.00 | 2.60 | 104.21 | 8,093.90 | -66.48 | 262.61 | 403,969.35 | 716,549.93 | 32.109327 | -103.767442 |
| 8,200.00 | 2.60 | 104.21 | 8,193.79 | -67.60 | 267.01 | 403,968.24 | 716,554.33 | 32.109324 | -103.767428 |
| 8,300.00 | 2.60 | 104.21 | 8,293.69 | -68.71 | 271.41 | 403,967.13 | 716,558.73 | 32.109321 | -103.767414 |
| 8,400.00 | 2.60 | 104.21 | 8,393.59 | -69.83 | 275.81 | 403,966.01 | 716,563.13 | 32.109317 | -103.767399 |
| 8,500.00 | 2.60 | 104.21 | 8,493.48 | -70.94 | 280.21 | 403,964.90 | 716,567.53 | 32.109314 | -103.767385 |
| 8,600.00 | 2.60 | 104.21 | 8,593.38 | -72.05 | 284.61 | 403,963.79 | 716,571.92 | 32.109311 | -103.767371 |
| 8,700.00 | 2.60 | 104.21 | 8,693.28 | -73.17 | 289.01 | 403,962.67 | 716,576.32 | 32.109308 | -103.767357 |
| 8,800.00 | 2.60 | 104.21 | 8,793.17 | -74.28 | 293.41 | 403,961.56 | 716,580.72 | 32.109305 | -103.767343 |
| 8,900.00 | 2.60 | 104.21 | 8,893.07 | -75.39 | 297.81 | 403,960.45 | 716,585.12 | 32.109302 | -103.767328 |
| 9,000.00 | 2.60 | 104.21 | 8,992.97 | -76.51 | 302.20 | 403,959.33 | 716,589.52 | 32.109299 | -103.767314 |
| 9,100.00 | 2.60 | 104.21 | 9,092.87 | -77.62 | 306.60 | 403,958.22 | 716,593.92 | 32.109296 | -103.767300 |
| 9,200.00 | 2.60 | 104.21 | 9,192.76 | -78.73 | 311.00 | 403,957.10 | 716,598.32 | 32.109292 | -103.767286 |
| 9,300.00 | 2.60 | 104.21 | 9,292.66 | -79.85 | 315.40 | 403,955.99 | 716,602.72 | 32.109289 | -103.767272 |
| 9,400.00 | 2.60 | 104.21 | 9,392.56 | -80.96 | 319.80 | 403,954.88 | 716,607.12 | 32.109286 | -103.767258 |
| 9,500.00 | 2.60 | 104.21 | 9,492.45 | -82.08 | 324.20 | 403,953.76 | 716,611.51 | 32.109283 | -103.767243 |
| 9,600.00 | 2.60 | 104.21 | 9,592.35 | -83.19 | 328.60 | 403,952.65 | 716,615.91 | 32.109280 | -103.767229 |
| 9,700.00 | 2.60 | 104.21 | 9,692.25 | -84.30 | 333.00 | 403,951.54 | 716,620.31 | 32.109277 | -103.767215 |
| 9,800.00 | 2.60 | 104.21 | 9,792.14 | -85.42 | 337.40 | 403,950.42 | 716,624.71 | 32.109274 | -103.767201 |
| 9,900.00 | 2.60 | 104.21 | 9,892.04 | -86.53 | 341.80 | 403,949.31 | 716,629.11 | 32.109271 | -103.767187 |
| 10,000.00 | 2.60 | 104.21 | 9,991.94 | -87.64 | 346.19 | 403,948.20 | 716,633.51 | 32.109267 | -103.767172 |
| 10,100.00 | 2.60 | 104.21 | 10,091.84 | -88.76 | 350.59 | 403,947.08 | 716,637.91 | 32.109264 | -103.767158 |
| 10,200.00 | 2.60 | 104.21 | 10,191.73 | -89.87 | 354.99 | 403,945.97 | 716,642.31 | 32.109261 | -103.767144 |
| 10,300.00 | 2.60 | 104.21 | 10,291.63 | -90.99 | 359.39 | 403,944.85 | 716,646.71 | 32.109258 | -103.767130 |
| 10,400.00 | 2.60 | 104.21 | 10,391.53 | -92.10 | 363.79 | 403,943.74 | 716,651.11 | 32.109255 | -103.767116 |
| 10,500.00 | 2.60 | 104.21 | 10,491.42 | -93.21 | 368.19 | 403,942.63 | 716,655.50 | 32.109252 | -103.767101 |
| 10,600.00 | 2.60 | 104.21 | 10,591.32 | -94.33 | 372.59 | 403,941.51 | 716,659.90 | 32.109249 | -103.767087 |
| 10,700.00 | 2.60 | 104.21 | 10,691.22 | -95.44 | 376.99 | 403,940.40 | 716,664.30 | 32.109246 | -103.767073 |
| 10,800.00 | 2.60 | 104.21 | 10,791.11 | -96.55 | 381.39 | 403,939.29 | 716,668.70 | 32.109242 | -103.767059 |

| | | | |
|---|---|---|---|
| **Database:** | EDM r5000.141_Prod US | **Local Co-ordinate Reference:** | Well Shire 22-15 Fed Com 732H |
| **Company:** | WCDSC Permian NM | **TVD Reference:** | RKB @ 3359.90ft |
| **Project:** | Eddy County (NAD 83 NM Eastern) | **MD Reference:** | RKB @ 3359.90ft |
| **Site:** | Sec 27-T25S-R31E | **North Reference:** | Grid |
| **Well:** | Shire 22-15 Fed Com 732H | **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 | 2.60 | 104.21 | 10,891.01 | -97.67 | 385.78 | 403,938.17 | 716,673.10 | 32.109239 | -103.767045 |
| 11,000.00 | 2.60 | 104.21 | 10,990.91 | -98.78 | 390.18 | 403,937.06 | 716,677.50 | 32.109236 | -103.767031 |
| 11,022.79 | 2.60 | 104.21 | 11,013.67 | -99.03 | 391.19 | 403,936.80 | 716,678.50 | 32.109235 | -103.767027 |
| 11,100.00 | 1.44 | 104.21 | 11,090.84 | -99.70 | 393.83 | 403,936.14 | 716,681.14 | 32.109234 | -103.767019 |
| 11,196.18 | 0.00 | 0.00 | 11,187.00 | -100.00 | 395.00 | 403,935.84 | 716,682.32 | 32.109233 | -103.767015 |
| 11,200.00 | 0.00 | 0.00 | 11,190.83 | -100.00 | 395.00 | 403,935.84 | 716,682.32 | 32.109233 | -103.767015 |
| 11,300.00 | 0.00 | 0.00 | 11,290.83 | -100.00 | 395.00 | 403,935.84 | 716,682.32 | 32.109233 | -103.767015 |
| 11,400.00 | 0.00 | 0.00 | 11,390.83 | -100.00 | 395.00 | 403,935.84 | 716,682.32 | 32.109233 | -103.767015 |
| 11,500.00 | 0.00 | 0.00 | 11,490.83 | -100.00 | 395.00 | 403,935.84 | 716,682.32 | 32.109233 | -103.767015 |
| 11,546.22 | 0.00 | 0.00 | 11,537.05 | -100.00 | 395.00 | 403,935.84 | 716,682.32 | 32.109233 | -103.767015 |
| **KOP @ 11546' MD, 250' FSL, 2310' FWL** | | | | | | | | | |
| 11,600.00 | 5.38 | 0.00 | 11,590.75 | -97.48 | 395.00 | 403,938.36 | 716,682.32 | 32.109240 | -103.767015 |
| 11,700.00 | 15.38 | 0.00 | 11,688.99 | -79.49 | 395.00 | 403,956.35 | 716,682.32 | 32.109289 | -103.767015 |
| 11,800.00 | 25.38 | 0.00 | 11,782.61 | -44.71 | 395.00 | 403,991.13 | 716,682.32 | 32.109385 | -103.767014 |
| 11,852.63 | 30.64 | 0.00 | 11,829.06 | -20.00 | 395.00 | 404,015.84 | 716,682.32 | 32.109453 | -103.767014 |
| **FTP @ 11853' MD, 330' FSL, 2310' FWL** | | | | | | | | | |
| 11,900.00 | 35.38 | 0.00 | 11,868.77 | 5.80 | 395.00 | 404,041.64 | 716,682.32 | 32.109524 | -103.767013 |
| 12,000.00 | 45.38 | 0.00 | 11,944.85 | 70.50 | 395.00 | 404,106.34 | 716,682.32 | 32.109701 | -103.767012 |
| 12,100.00 | 55.38 | 0.00 | 12,008.54 | 147.43 | 395.00 | 404,183.27 | 716,682.32 | 32.109913 | -103.767011 |
| 12,200.00 | 65.38 | 0.00 | 12,057.91 | 234.25 | 395.00 | 404,270.09 | 716,682.32 | 32.110152 | -103.767009 |
| 12,300.00 | 75.38 | 0.00 | 12,091.44 | 328.32 | 395.00 | 404,364.16 | 716,682.32 | 32.110410 | -103.767008 |
| 12,400.00 | 85.38 | 0.00 | 12,108.14 | 426.79 | 395.00 | 404,462.63 | 716,682.32 | 32.110681 | -103.767006 |
| 12,446.22 | 90.00 | 0.00 | 12,110.00 | 472.96 | 395.00 | 404,508.80 | 716,682.32 | 32.110808 | -103.767005 |
| 12,500.00 | 90.00 | 0.00 | 12,110.00 | 526.74 | 395.00 | 404,562.58 | 716,682.32 | 32.110956 | -103.767004 |
| 12,600.00 | 90.00 | 0.00 | 12,110.00 | 626.74 | 395.00 | 404,662.58 | 716,682.32 | 32.111230 | -103.767003 |
| 12,700.00 | 90.00 | 0.00 | 12,110.00 | 726.74 | 395.00 | 404,762.58 | 716,682.32 | 32.111505 | -103.767001 |
| 12,800.00 | 90.00 | 0.00 | 12,110.00 | 826.74 | 395.00 | 404,862.58 | 716,682.32 | 32.111780 | -103.766999 |
| 12,900.00 | 90.00 | 0.00 | 12,110.00 | 926.74 | 395.00 | 404,962.58 | 716,682.32 | 32.112055 | -103.766998 |
| 13,000.00 | 90.00 | 0.00 | 12,110.00 | 1,026.74 | 395.00 | 405,062.58 | 716,682.32 | 32.112330 | -103.766996 |
| 13,100.00 | 90.00 | 0.00 | 12,110.00 | 1,126.74 | 395.00 | 405,162.58 | 716,682.32 | 32.112605 | -103.766994 |
| 13,200.00 | 90.00 | 0.00 | 12,110.00 | 1,226.74 | 395.00 | 405,262.58 | 716,682.32 | 32.112880 | -103.766992 |
| 13,300.00 | 90.00 | 0.00 | 12,110.00 | 1,326.74 | 395.00 | 405,362.58 | 716,682.32 | 32.113155 | -103.766991 |
| 13,400.00 | 90.00 | 0.00 | 12,110.00 | 1,426.74 | 395.00 | 405,462.58 | 716,682.32 | 32.113429 | -103.766989 |
| 13,500.00 | 90.00 | 0.00 | 12,110.00 | 1,526.74 | 395.00 | 405,562.58 | 716,682.32 | 32.113704 | -103.766987 |
| 13,600.00 | 90.00 | 0.00 | 12,110.00 | 1,626.74 | 395.00 | 405,662.58 | 716,682.32 | 32.113979 | -103.766986 |
| 13,700.00 | 90.00 | 0.00 | 12,110.00 | 1,726.74 | 395.00 | 405,762.58 | 716,682.32 | 32.114254 | -103.766984 |
| 13,800.00 | 90.00 | 0.00 | 12,110.00 | 1,826.74 | 395.00 | 405,862.58 | 716,682.32 | 32.114529 | -103.766982 |
| 13,900.00 | 90.00 | 0.00 | 12,110.00 | 1,926.74 | 395.00 | 405,962.58 | 716,682.32 | 32.114804 | -103.766981 |
| 14,000.00 | 90.00 | 0.00 | 12,110.00 | 2,026.74 | 395.00 | 406,062.58 | 716,682.32 | 32.115079 | -103.766979 |
| 14,100.00 | 90.00 | 0.00 | 12,110.00 | 2,126.74 | 395.00 | 406,162.58 | 716,682.32 | 32.115354 | -103.766977 |
| 14,200.00 | 90.00 | 0.00 | 12,110.00 | 2,226.74 | 395.00 | 406,262.58 | 716,682.32 | 32.115629 | -103.766975 |
| 14,300.00 | 90.00 | 0.00 | 12,110.00 | 2,326.74 | 395.00 | 406,362.58 | 716,682.32 | 32.115903 | -103.766974 |
| 14,400.00 | 90.00 | 0.00 | 12,110.00 | 2,426.74 | 395.00 | 406,462.58 | 716,682.32 | 32.116178 | -103.766972 |
| 14,500.00 | 90.00 | 0.00 | 12,110.00 | 2,526.74 | 395.00 | 406,562.58 | 716,682.32 | 32.116453 | -103.766970 |
| 14,600.00 | 90.00 | 0.00 | 12,110.00 | 2,626.74 | 395.00 | 406,662.58 | 716,682.32 | 32.116728 | -103.766969 |
| 14,700.00 | 90.00 | 0.00 | 12,110.00 | 2,726.74 | 395.00 | 406,762.58 | 716,682.32 | 32.117003 | -103.766967 |
| 14,800.00 | 90.00 | 0.00 | 12,110.00 | 2,826.74 | 395.00 | 406,862.58 | 716,682.32 | 32.117278 | -103.766965 |
| 14,900.00 | 90.00 | 0.00 | 12,110.00 | 2,926.74 | 395.00 | 406,962.58 | 716,682.32 | 32.117553 | -103.766964 |
| 15,000.00 | 90.00 | 0.00 | 12,110.00 | 3,026.74 | 395.00 | 407,062.58 | 716,682.32 | 32.117828 | -103.766962 |
| 15,100.00 | 90.00 | 0.00 | 12,110.00 | 3,126.74 | 395.00 | 407,162.57 | 716,682.32 | 32.118102 | -103.766960 |
| 15,200.00 | 90.00 | 0.00 | 12,110.00 | 3,226.74 | 395.00 | 407,262.57 | 716,682.32 | 32.118377 | -103.766959 |
| 15,300.00 | 90.00 | 0.00 | 12,110.00 | 3,326.74 | 395.00 | 407,362.57 | 716,682.32 | 32.118652 | -103.766957 |
| 15,400.00 | 90.00 | 0.00 | 12,110.00 | 3,426.74 | 395.00 | 407,462.57 | 716,682.32 | 32.118927 | -103.766955 |
| 15,500.00 | 90.00 | 0.00 | 12,110.00 | 3,526.74 | 395.00 | 407,562.57 | 716,682.32 | 32.119202 | -103.766953 |

| | | | |
|---|---|---|---|
| **Database:** | EDM r5000.141_Prod US | **Local Co-ordinate Reference:** | Well Shire 22-15 Fed Com 732H |
| **Company:** | WCDSC Permian NM | **TVD Reference:** | RKB @ 3359.90ft |
| **Project:** | Eddy County (NAD 83 NM Eastern) | **MD Reference:** | RKB @ 3359.90ft |
| **Site:** | Sec 27-T25S-R31E | **North Reference:** | Grid |
| **Well:** | Shire 22-15 Fed Com 732H | **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 | 0.00 | 12,110.00 | 3,626.74 | 395.00 | 407,662.57 | 716,682.32 | 32.119477 | -103.766952 |
| 15,700.00 | 90.00 | 0.00 | 12,110.00 | 3,726.74 | 395.00 | 407,762.57 | 716,682.32 | 32.119752 | -103.766950 |
| 15,800.00 | 90.00 | 0.00 | 12,110.00 | 3,826.74 | 395.00 | 407,862.57 | 716,682.32 | 32.120027 | -103.766948 |
| 15,900.00 | 90.00 | 0.00 | 12,110.00 | 3,926.74 | 395.00 | 407,962.57 | 716,682.32 | 32.120301 | -103.766947 |
| 16,000.00 | 90.00 | 0.00 | 12,110.00 | 4,026.74 | 395.00 | 408,062.57 | 716,682.32 | 32.120576 | -103.766945 |
| 16,100.00 | 90.00 | 0.00 | 12,110.00 | 4,126.74 | 395.00 | 408,162.57 | 716,682.32 | 32.120851 | -103.766943 |
| 16,200.00 | 90.00 | 0.00 | 12,110.00 | 4,226.74 | 395.00 | 408,262.57 | 716,682.32 | 32.121126 | -103.766942 |
| 16,300.00 | 90.00 | 0.00 | 12,110.00 | 4,326.74 | 395.00 | 408,362.57 | 716,682.32 | 32.121401 | -103.766940 |
| 16,400.00 | 90.00 | 0.00 | 12,110.00 | 4,426.74 | 395.00 | 408,462.57 | 716,682.32 | 32.121676 | -103.766938 |
| 16,500.00 | 90.00 | 0.00 | 12,110.00 | 4,526.74 | 395.00 | 408,562.57 | 716,682.32 | 32.121951 | -103.766936 |
| 16,600.00 | 90.00 | 0.00 | 12,110.00 | 4,626.74 | 395.00 | 408,662.57 | 716,682.32 | 32.122226 | -103.766935 |
| 16,700.00 | 90.00 | 0.00 | 12,110.00 | 4,726.74 | 395.00 | 408,762.57 | 716,682.32 | 32.122501 | -103.766933 |
| 16,800.00 | 90.00 | 0.00 | 12,110.00 | 4,826.74 | 395.00 | 408,862.57 | 716,682.32 | 32.122775 | -103.766931 |
| 16,900.00 | 90.00 | 0.00 | 12,110.00 | 4,926.74 | 395.00 | 408,962.57 | 716,682.32 | 32.123050 | -103.766930 |
| 16,917.00 | 90.00 | 0.00 | 12,110.00 | 4,943.74 | 395.00 | 408,979.57 | 716,682.32 | 32.123097 | -103.766929 |
| **Cross section @ 16917' MD, 0' FSL, 2310' FWL** | | | | | | | | | |
| 17,000.00 | 90.00 | 0.00 | 12,110.00 | 5,026.74 | 395.00 | 409,062.57 | 716,682.32 | 32.123325 | -103.766928 |
| 17,100.00 | 90.00 | 0.00 | 12,110.00 | 5,126.74 | 395.00 | 409,162.57 | 716,682.32 | 32.123600 | -103.766926 |
| 17,200.00 | 90.00 | 0.00 | 12,110.00 | 5,226.74 | 395.00 | 409,262.57 | 716,682.32 | 32.123875 | -103.766925 |
| 17,300.00 | 90.00 | 0.00 | 12,110.00 | 5,326.74 | 395.00 | 409,362.57 | 716,682.32 | 32.124150 | -103.766923 |
| 17,400.00 | 90.00 | 0.00 | 12,110.00 | 5,426.74 | 395.00 | 409,462.57 | 716,682.32 | 32.124425 | -103.766921 |
| 17,500.00 | 90.00 | 0.00 | 12,110.00 | 5,526.74 | 395.00 | 409,562.57 | 716,682.32 | 32.124700 | -103.766919 |
| 17,600.00 | 90.00 | 0.00 | 12,110.00 | 5,626.74 | 395.00 | 409,662.57 | 716,682.32 | 32.124974 | -103.766918 |
| 17,700.00 | 90.00 | 0.00 | 12,110.00 | 5,726.74 | 395.00 | 409,762.57 | 716,682.32 | 32.125249 | -103.766916 |
| 17,800.00 | 90.00 | 0.00 | 12,110.00 | 5,826.74 | 395.00 | 409,862.57 | 716,682.32 | 32.125524 | -103.766914 |
| 17,900.00 | 90.00 | 0.00 | 12,110.00 | 5,926.74 | 395.00 | 409,962.57 | 716,682.32 | 32.125799 | -103.766913 |
| 18,000.00 | 90.00 | 0.00 | 12,110.00 | 6,026.74 | 395.00 | 410,062.57 | 716,682.32 | 32.126074 | -103.766911 |
| 18,100.00 | 90.00 | 0.00 | 12,110.00 | 6,126.74 | 395.00 | 410,162.57 | 716,682.32 | 32.126349 | -103.766909 |
| 18,200.00 | 90.00 | 0.00 | 12,110.00 | 6,226.74 | 395.00 | 410,262.57 | 716,682.32 | 32.126624 | -103.766908 |
| 18,300.00 | 90.00 | 0.00 | 12,110.00 | 6,326.74 | 395.00 | 410,362.57 | 716,682.32 | 32.126899 | -103.766906 |
| 18,400.00 | 90.00 | 0.00 | 12,110.00 | 6,426.74 | 395.00 | 410,462.57 | 716,682.32 | 32.127174 | -103.766904 |
| 18,500.00 | 90.00 | 0.00 | 12,110.00 | 6,526.74 | 395.00 | 410,562.57 | 716,682.32 | 32.127448 | -103.766902 |
| 18,600.00 | 90.00 | 0.00 | 12,110.00 | 6,626.74 | 395.00 | 410,662.57 | 716,682.32 | 32.127723 | -103.766901 |
| 18,700.00 | 90.00 | 0.00 | 12,110.00 | 6,726.74 | 395.00 | 410,762.57 | 716,682.32 | 32.127998 | -103.766899 |
| 18,800.00 | 90.00 | 0.00 | 12,110.00 | 6,826.74 | 395.00 | 410,862.57 | 716,682.32 | 32.128273 | -103.766897 |
| 18,900.00 | 90.00 | 0.00 | 12,110.00 | 6,926.74 | 395.00 | 410,962.57 | 716,682.32 | 32.128548 | -103.766896 |
| 19,000.00 | 90.00 | 0.00 | 12,110.00 | 7,026.74 | 395.00 | 411,062.57 | 716,682.32 | 32.128823 | -103.766894 |
| 19,100.00 | 90.00 | 0.00 | 12,110.00 | 7,126.74 | 395.00 | 411,162.57 | 716,682.32 | 32.129098 | -103.766892 |
| 19,200.00 | 90.00 | 0.00 | 12,110.00 | 7,226.74 | 395.00 | 411,262.57 | 716,682.32 | 32.129373 | -103.766891 |
| 19,300.00 | 90.00 | 0.00 | 12,110.00 | 7,326.74 | 395.00 | 411,362.57 | 716,682.32 | 32.129647 | -103.766889 |
| 19,400.00 | 90.00 | 0.00 | 12,110.00 | 7,426.74 | 395.00 | 411,462.57 | 716,682.32 | 32.129922 | -103.766887 |
| 19,500.00 | 90.00 | 0.00 | 12,110.00 | 7,526.74 | 395.00 | 411,562.57 | 716,682.32 | 32.130197 | -103.766886 |
| 19,600.00 | 90.00 | 0.00 | 12,110.00 | 7,626.74 | 395.00 | 411,662.57 | 716,682.32 | 32.130472 | -103.766884 |
| 19,700.00 | 90.00 | 0.00 | 12,110.00 | 7,726.74 | 395.00 | 411,762.57 | 716,682.32 | 32.130747 | -103.766882 |
| 19,800.00 | 90.00 | 0.00 | 12,110.00 | 7,826.74 | 395.00 | 411,862.57 | 716,682.32 | 32.131022 | -103.766880 |
| 19,900.00 | 90.00 | 0.00 | 12,110.00 | 7,926.74 | 395.00 | 411,962.57 | 716,682.32 | 32.131297 | -103.766879 |
| 20,000.00 | 90.00 | 0.00 | 12,110.00 | 8,026.74 | 395.00 | 412,062.57 | 716,682.32 | 32.131572 | -103.766877 |
| 20,100.00 | 90.00 | 0.00 | 12,110.00 | 8,126.74 | 395.00 | 412,162.57 | 716,682.32 | 32.131846 | -103.766875 |
| 20,200.00 | 90.00 | 0.00 | 12,110.00 | 8,226.74 | 395.00 | 412,262.56 | 716,682.32 | 32.132121 | -103.766874 |
| 20,300.00 | 90.00 | 0.00 | 12,110.00 | 8,326.74 | 395.00 | 412,362.56 | 716,682.32 | 32.132396 | -103.766872 |
| 20,400.00 | 90.00 | 0.00 | 12,110.00 | 8,426.74 | 395.00 | 412,462.56 | 716,682.32 | 32.132671 | -103.766870 |
| 20,500.00 | 90.00 | 0.00 | 12,110.00 | 8,526.74 | 395.00 | 412,562.56 | 716,682.32 | 32.132946 | -103.766869 |
| 20,600.00 | 90.00 | 0.00 | 12,110.00 | 8,626.74 | 395.00 | 412,662.56 | 716,682.32 | 32.133221 | -103.766867 |
| 20,700.00 | 90.00 | 0.00 | 12,110.00 | 8,726.74 | 395.00 | 412,762.56 | 716,682.32 | 32.133496 | -103.766865 |

| | | | |
|---|---|---|---|
| **Database:** | EDM r5000.141_Prod US | **Local Co-ordinate Reference:** | Well Shire 22-15 Fed Com 732H |
| **Company:** | WCDSC Permian NM | **TVD Reference:** | RKB @ 3359.90ft |
| **Project:** | Eddy County (NAD 83 NM Eastern) | **MD Reference:** | RKB @ 3359.90ft |
| **Site:** | Sec 27-T25S-R31E | **North Reference:** | Grid |
| **Well:** | Shire 22-15 Fed Com 732H | **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 | 0.00 | 12,110.00 | 8,826.74 | 395.00 | 412,862.56 | 716,682.32 | 32.133771 | -103.766863 |
| 20,900.00 | 90.00 | 0.00 | 12,110.00 | 8,926.74 | 395.00 | 412,962.56 | 716,682.32 | 32.134046 | -103.766862 |
| 21,000.00 | 90.00 | 0.00 | 12,110.00 | 9,026.74 | 395.00 | 413,062.56 | 716,682.32 | 32.134320 | -103.766860 |
| 21,100.00 | 90.00 | 0.00 | 12,110.00 | 9,126.74 | 395.00 | 413,162.56 | 716,682.32 | 32.134595 | -103.766858 |
| 21,200.00 | 90.00 | 0.00 | 12,110.00 | 9,226.74 | 395.00 | 413,262.56 | 716,682.32 | 32.134870 | -103.766857 |
| 21,300.00 | 90.00 | 0.00 | 12,110.00 | 9,326.74 | 395.00 | 413,362.56 | 716,682.32 | 32.135145 | -103.766855 |
| 21,400.00 | 90.00 | 0.00 | 12,110.00 | 9,426.74 | 395.00 | 413,462.56 | 716,682.32 | 32.135420 | -103.766853 |
| 21,500.00 | 90.00 | 0.00 | 12,110.00 | 9,526.74 | 395.00 | 413,562.56 | 716,682.32 | 32.135695 | -103.766852 |
| 21,600.00 | 90.00 | 0.00 | 12,110.00 | 9,626.74 | 395.00 | 413,662.56 | 716,682.32 | 32.135970 | -103.766850 |
| 21,700.00 | 90.00 | 0.00 | 12,110.00 | 9,726.74 | 395.00 | 413,762.56 | 716,682.32 | 32.136245 | -103.766848 |
| 21,800.00 | 90.00 | 0.00 | 12,110.00 | 9,826.74 | 395.00 | 413,862.56 | 716,682.32 | 32.136519 | -103.766846 |
| 21,900.00 | 90.00 | 0.00 | 12,110.00 | 9,926.74 | 395.00 | 413,962.56 | 716,682.32 | 32.136794 | -103.766845 |
| 22,000.00 | 90.00 | 0.00 | 12,110.00 | 10,026.74 | 395.00 | 414,062.56 | 716,682.32 | 32.137069 | -103.766843 |
| 22,095.18 | 90.00 | 0.00 | 12,110.00 | 10,121.92 | 395.00 | 414,157.74 | 716,682.32 | 32.137331 | -103.766841 |
| **PBHL & LTP @ 22095' MD, 330' FNL, 2310' FWL** | | | | | | | | | |
| 22,095.19 | 90.00 | 0.00 | 12,110.00 | 10,121.93 | 395.00 | 414,157.75 | 716,682.32 | 32.137331 | -103.766841 |

**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 - Shire 22-15 Fed | 0.00 | 0.00 | 0.00 | 9,920.37 | 371.13 | 413,956.19 | 716,658.45 | 32.136777 | -103.766922 |
| - plan misses target center by 9927.31ft 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 |
|---|---|---|---|---|
| 11,546.22 | 11,537.05 | -100.00 | 395.00 | KOP @ 11546' MD, 250' FSL, 2310' FWL |
| 11,852.63 | 11,829.06 | -20.00 | 395.00 | FTP @ 11853' MD, 330' FSL, 2310' FWL |
| 16,917.00 | 12,110.00 | 4,943.74 | 395.00 | Cross section @ 16917' MD, 0' FSL, 2310' FWL |
| 22,095.18 | 12,110.00 | 10,121.92 | 395.00 | PBHL & LTP @ 22095' MD, 330' FNL, 2310' FWL |

# Devon Energy

WELL DETAILS: Shire 22-15 Fed Com 732H

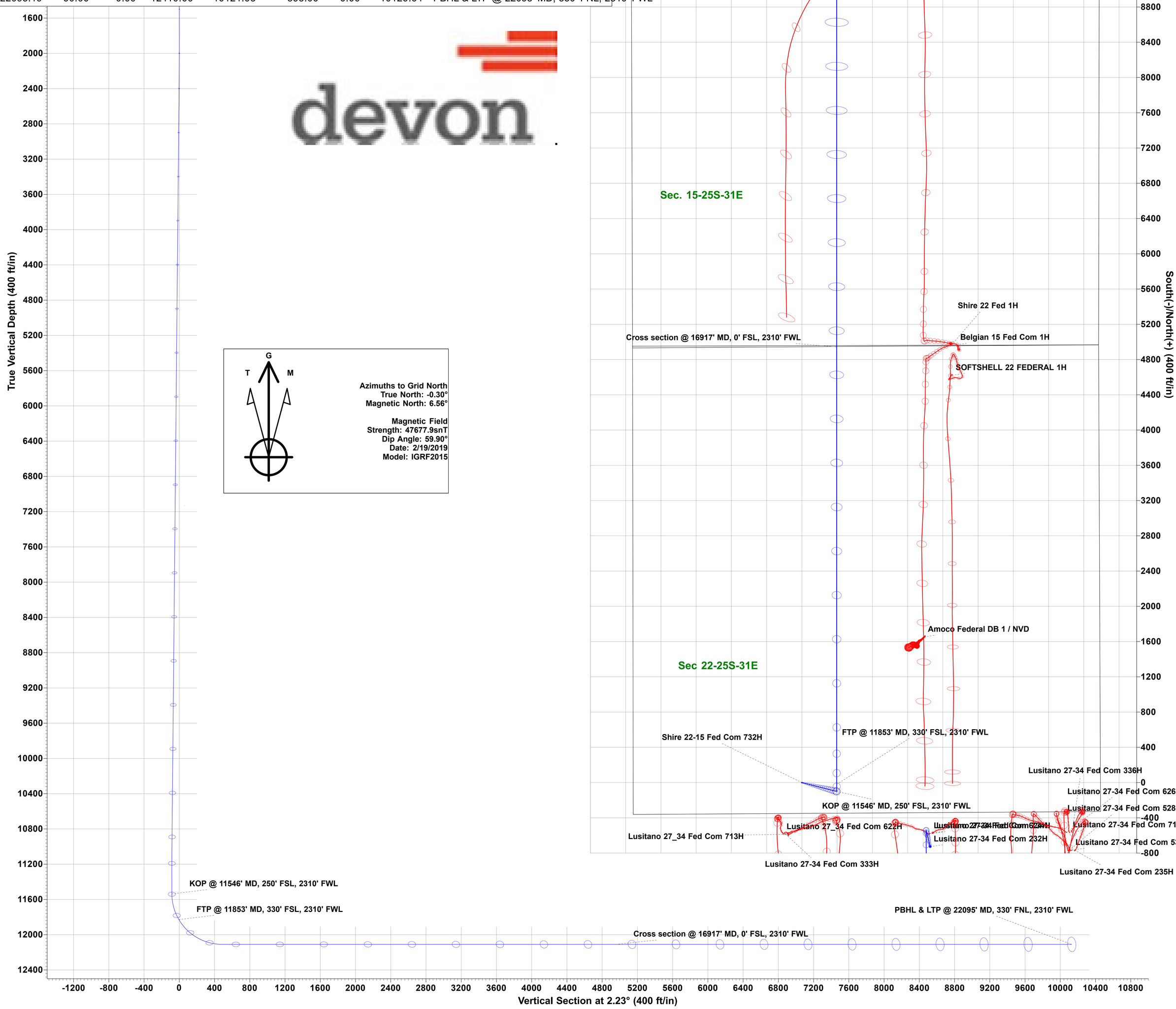
RKB @ 3359.90ft
3339.20

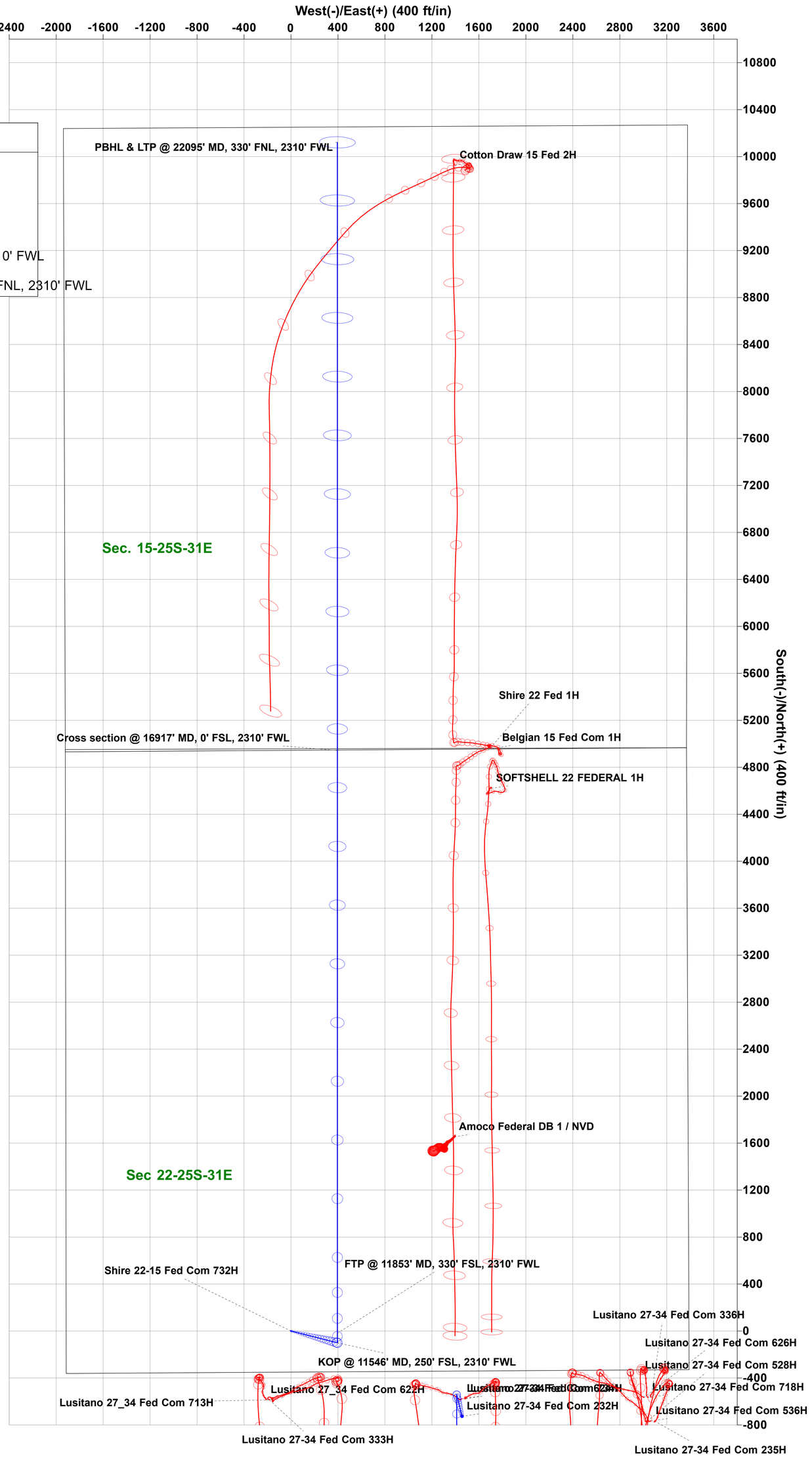
| Northing | Easting | Latitude | Longitude |
|---|---|---|---|
| 404035.84 | 716287.32 | 32.109513 | -103.768289 |

SECTION DETAILS Permit Plan 1

| MD | Inc | Azi | TVD | +N/-S | +E/-W | DIeg | VSect | Annotation |
|---|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2000.00 | 0.00 | 0.00 | 2000.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2260.08 | 2.60 | 104.21 | 2259.99 | -1.45 | 5.72 | 1.00 | -1.22 | |
| 11022.79 | 2.60 | 104.21 | 11013.67 | -99.03 | 391.19 | 0.00 | -83.70 | |
| 11196.18 | 0.00 | 0.00 | 11187.00 | -100.00 | 395.00 | 1.50 | -84.52 | |
| 11546.22 | 0.00 | 0.00 | 11537.04 | -100.00 | 395.00 | 0.00 | -84.52 | KOP @ 11546' MD, 250' FSL, 2310' FWL |
| 12446.22 | 90.00 | 0.00 | 12110.00 | 472.96 | 395.00 | 10.00 | 488.00 | |
| 22095.19 | 90.00 | 0.00 | 12110.00 | 10121.93 | 395.00 | 0.00 | 10129.64 | PBHL & LTP @ 22095' MD, 330' FNL, 2310' FWL |



# PECOS DISTRICT
# DRILLING CONDITIONS OF APPROVAL

| | |
|---|---|
| **OPERATOR'S NAME:** | **Devon Energy Production Company LP** |
| **LEASE NO.:** | **NMNM016131** |
| **LOCATION:** | Section 22, T.25 S., R.31 E., NMPM |
| **COUNTY:** | Eddy County, New Mexico |

| | |
|---|---|
| **WELL NAME & NO.:** | Shire 22-15 Fed Com 732H |
| **SURFACE HOLE FOOTAGE:** | 350'/S & 1915'/W |
| **BOTTOM HOLE FOOTAGE** | 330'/N & 2310'/W |

| | |
|---|---|
| **WELL NAME & NO.:** | Shire 22-15 Fed Com 733H |
| **SURFACE HOLE FOOTAGE:** | 350'/S & 1775'/E |
| **BOTTOM HOLE FOOTAGE** | 330'/N & 1650'/E |

| | |
|---|---|
| **WELL NAME & NO.:** | Shire 22-15 Fed Com 734H |
| **SURFACE HOLE FOOTAGE:** | 350'/S & 785'/E |
| **BOTTOM HOLE FOOTAGE** | 330'/N & 330'/E |

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 |

**OPERATOR IS ONLY APPROVED FOR THE FOLLOWING DESIGN, OTHER DESIGNS SUBMITTED WILL BE VOID.**

## 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

**Alternate Casing Design:**

1. The **13-3/8** inch surface casing shall be set at approximately **1100 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.

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

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

    - 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.**

    ❖ 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.**

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.**

## C. PRESSURE CONTROL

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

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

**Communitization Agreement**

- The operator will submit a Communitization Agreement to the Santa Fe Office, 301 Dinosaur Trail Santa Fe, New Mexico 87508, 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: 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.

Devon Energy Center
333 West Sheridan Avenue
Oklahoma City, Oklahoma 73102-5015

# Hydrogen Sulfide ($H_2S$) Contingency Plan

## For

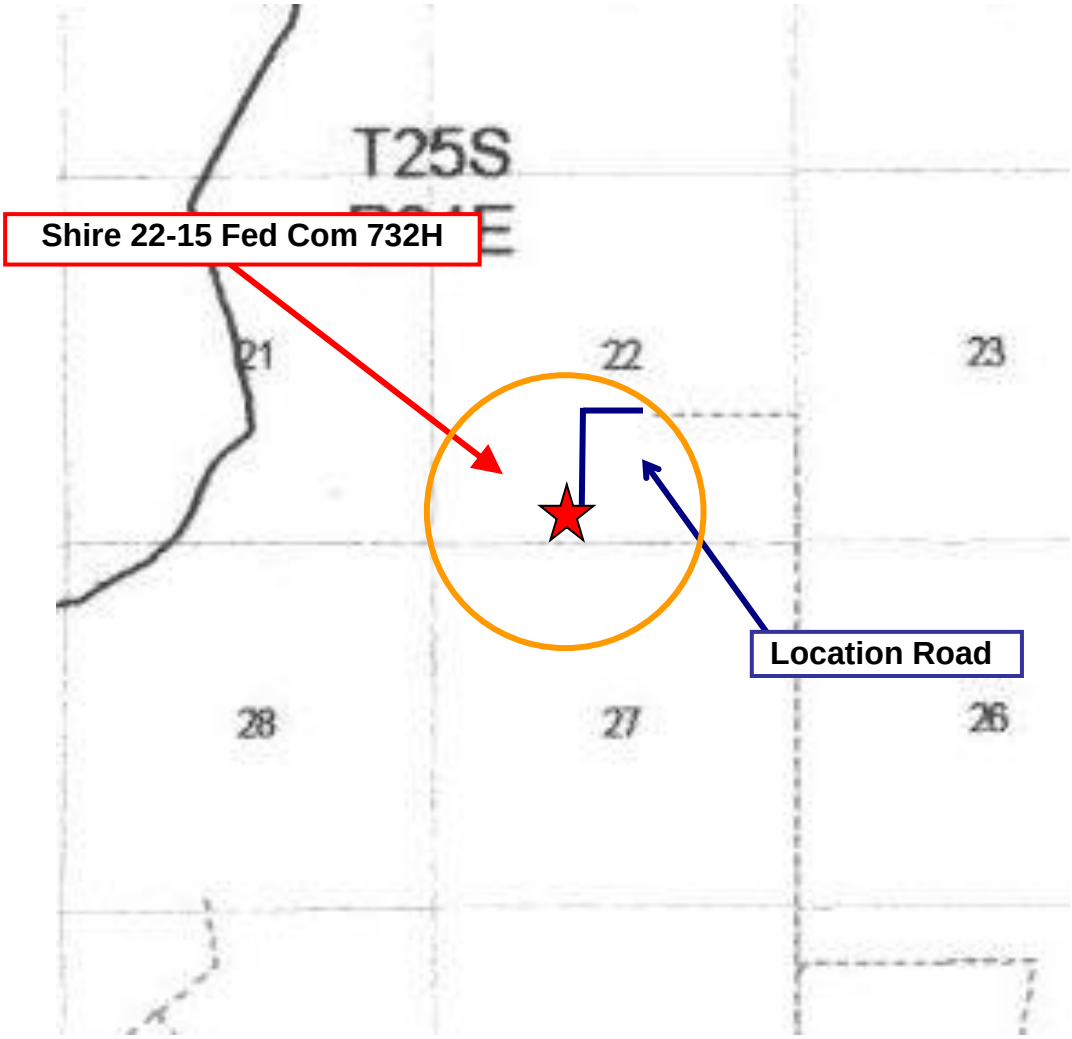
## Shire 22-15 Fed Com 732H

**Sec-22 T-25S R-31E**
**350’ FSL & 1915’ FWL**
**LAT. = 32.1095132’ N (NAD83)**
**LONG = 103.7682887’ W**

**Eddy County NM**

# Shire 22-15 Fed Com 732H

This is an open drilling site. $H_2S$ monitoring equipment and emergency response equipment will be used within 500' of zones known to contain $H_2S$, including warning signs, wind indicators and $H_2S$ monitor.




**Assumed 100 ppm ROE = 3000' (Radius of Exposure)**
**100 ppm H2S concentration shall trigger activation of this plan.**

**Escape**

Crews shall escape upwind of escaping gas in the event of an emergency release of gas. Escape can be facilitated from the location entrance road. Crews should then block the entrance to the location from the lease road so as not to allow anyone traversing into a hazardous area. The blockade should be at a safe distance outside of the ROE. There are no homes or buildings in or near the ROE.

**Assumed 100 ppm ROE = 3000'**

## 100 ppm $H_2S$ concentration shall trigger activation of this plan.

**Emergency Procedures**

**In the event of a release of gas containing $H_2S$, the first responder(s) must**

- **Isolate the area and prevent entry by other persons into the 100 ppm ROE.**
- **Evacuate any public places encompassed by the 100 ppm ROE.**
- **Be equipped with $H_2S$ monitors and air packs in order to control the release.**
- **Use the "buddy system" to ensure no injuries occur during the response**
- **Take precautions to avoid personal injury during this operation.**
- **Contact operator and/or local officials to aid in operation. See list of phone numbers attached.**
- **Have received training in the**
  - **Detection of $H_2S$, and**
  - **Measures for protection against the gas,**
  - **Equipment used for protection and emergency response.**

**Ignition of Gas Source**

Should control of the well be considered lost and ignition considered, take care to protect against exposure to Sulfur Dioxide ($SO_2$). Intentional ignition must be coordinated with the NMOCD and local officials. Additionally, the NM State Police may become involved. NM State Police shall be the Incident Command on scene of any major release. Take care to protect downwind whenever there is an ignition of the gas

**Characteristics of $H_2S$ and $SO_2$**

| Common Name | Chemical Formula | Specific Gravity | Threshold Limit | Hazardous Limit | Lethal Concentration |
|---|---|---|---|---|---|
| Hydrogen Sulfide | $H_2S$ | 1.189 Air = 1 | 10 ppm | 100 ppm/hr | 600 ppm |
| Sulfur Dioxide | $SO_2$ | 2.21 Air = 1 | 2 ppm | N/A | 1000 ppm |

## Contacting Authorities

Devon Energy Corp. personnel must liaison with local and state agencies to ensure a proper response to a major release. Additionally, the OCD must be notified of the release as soon as possible but no later than 4 hours. Agencies will ask for information such as type and volume of release, wind direction, location of release, etc. Be prepared with all information available. The following call list of essential and potential responders has been prepared for use during a release. Devon Energy Corp. Company response must be in coordination with the State of New Mexico's 'Hazardous Materials Emergency Response Plan' (HMER)

## Hydrogen Sulfide Drilling Operation Plan

## I. HYDROGEN SULFIDE ($H_2S$) TRAINING

All personnel, whether regularly assigned, contracted, or employed on an unscheduled basis, will receive training from a qualified instructor in the following areas prior to commencing drilling operations on this well:

1. The hazards and characteristics of hydrogen sulfide ($H_2S$)

2. The proper use and maintenance of personal protective equipment and life support systems.

3. The proper use of $H_2S$ detectors, alarms, warning systems, briefing areas, evacuation procedures, and prevailing winds.

4. The proper techniques for first aid and rescue procedures.

In addition, supervisory personnel will be trained in the following areas:

1. The effects of $H_2S$ metal components. If high tensile tubulars are to be used, personnel will be trained in their special maintenance requirements.

2. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.

3. The contents and requirements of the $H_2S$ Drilling Operations Plan and Public Protection Plan.

There will be an initial training session just prior to encountering a known or probable $H_2S$ zone (within 3 days or 500 feet) and weekly $H_2S$ and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific $H_2S$ Drilling Operations Plan and the Public Protection Plan.

## II. HYDROGEN SULFIDE TRAINING

Note: All $H_2S$ safety equipment and systems will be installed, tested, and operational when drilling reaches a depth of 500 feet above, or three days prior to penetrating the first zone containing or reasonably expected to contain $H_2S$.

1. **Well Control Equipment**

   A. Flare line

   B. Choke manifold – Remotely Operated

   C. Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit

   D. Auxiliary equipment may include if applicable: annular preventer and rotating head.

   E. Mud/Gas Separator

2. **Protective equipment for essential personnel:**

   30-minute SCBA units located at briefing areas, as indicated on well site diagram, with escape units available in the top doghouse. As it may be difficult to communicate audibly while wearing these units, hand signals shall be utilized.

3. **$H_2S$ detection and monitoring equipment:**

   Portable $H_2S$ monitors positioned on location for best coverage and response. These units have warning lights which activate when $H_2S$ levels reach 10 ppm and audible sirens which activate at 15 ppm. Sensor locations:

   - **Bell nipple**
   - **Rig floor**
   - **Cellar**
   - **Possum Belly/Shale shaker**
   - **Choke manifold**

   **Visual warning systems:**

   A. Wind direction indicators as shown on well site diagram

   B. Caution/ Danger signs shall be posted on roads providing direct access to locations. Signs will be painted a high visibility yellow with black lettering of sufficient size to be reasonable distance from the immediate location. Bilingual signs will be used when appropriate.

4. **Mud program:**

   The mud program has been designed to minimize the volume of $H_2S$ circulated to surface. Proper mud weight, safe drilling practices and the use of $H_2S$ scavengers will minimize hazards when penetrating $H_2S$ bearing zones.

5. **Metallurgy:**

   A. All drill strings, casings, tubing, wellhead, blowout preventer, drilling spool, kill lines, choke manifold lines, and valves shall be $H_2S$ trim.

   B. All elastomers used for packing and seals shall be $H_2S$ trim.

6. **Communication:**

   A. Company personnel have/use cellular telephones in the field.

   B. Land line (telephone) communications at Office

7. **Well testing:**

   A. Drill stem testing will be performed with a minimum number of personnel in the immediate vicinity, which are necessary to safety and adequately conduct the test. The drill stem testing will be conducted during daylight hours and formation fluids will not be flowed to the surface. All drill-stem-testing operations conducted in an $H_2S$ environment will use the closed chamber method of testing.

   B. There will be no drill stem testing.