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

NOV 2 8 2018

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.
NMNM128835

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.
LEA 7 FEDERAL COM 29H

2. Name of Operator
CIMAREX ENERGY COMPANY OF CO
Contact: ARICKA EASTERLING
E-Mail: aeasterling@cimarex.com

9. API Well No.
30-025-45199-00-X1

3a. Address
600 N MARIENFELD STE 600
MIDLAND, TX 79703

3b. Phone No. (include area code)
Ph: 918.560.7060

10. Field and Pool or Exploratory Area
WILDCAT BONE SPRING

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 7 T20S R35E SESE 191FSL 1160FEL
32.580940 N Lat, 103.491806 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 APD |
| | ☐ 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.

Cimarex respectfully requests approval to change the BHL and add a DV tool and Packer at 3,500'

Approved BHL:
330 FNL & 1980 FEL

Proposed BHL:
100 FNL & 1980 FEL,

Carlsbad Field Office
OCD Hobbs

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

Please see attached C-102, Drilling Plan, Directional Plan, & Anti-Collision Report.

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

**Electronic Submission #443838 verified by the BLM Well Information System**
**For CIMAREX ENERGY COMPANY OF CO, sent to the Hobbs**
**Committed to AFMSS for processing by ZOTA STEVENS on 11/14/2018 (19ZS0013SE)**

Name *(Printed/Typed)* ARICKA EASTERLING — Title REGULATORY ANALYST

Signature (Electronic Submission) — Date 11/13/2018

**THIS SPACE FOR FEDERAL OR STATE OFFICE USE**

Approved By ZOTA STEVENS — Title PETROLEUM ENGINEER — Date 11/14/2018

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 Hobbs

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 ****

## Additional data for EC transaction #443838 that would not fit on the form

**32. Additional remarks, continued**

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 |
|---|---|---|
| 30-025-45199 | 97983 | WC-025 G-08 S203506D; Bone Spring |

| [4] Property Code | [5] Property Name | [6] Well Number |
|---|---|---|
| 313878 | LEA 7 FEDERAL COM | 29H |

| [7] OGRID No. | [8] Operator Name | [9] Elevation |
|---|---|---|
| 215099 | CIMAREX ENERGY CO. | 3676.4' |

### [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 |
|---|---|---|---|---|---|---|---|---|---|
| P | 7 | 20S | 35E | | 191 | SOUTH | 1160 | EAST | LEA |

### [11] Bottom Hole Location If Different From Surface

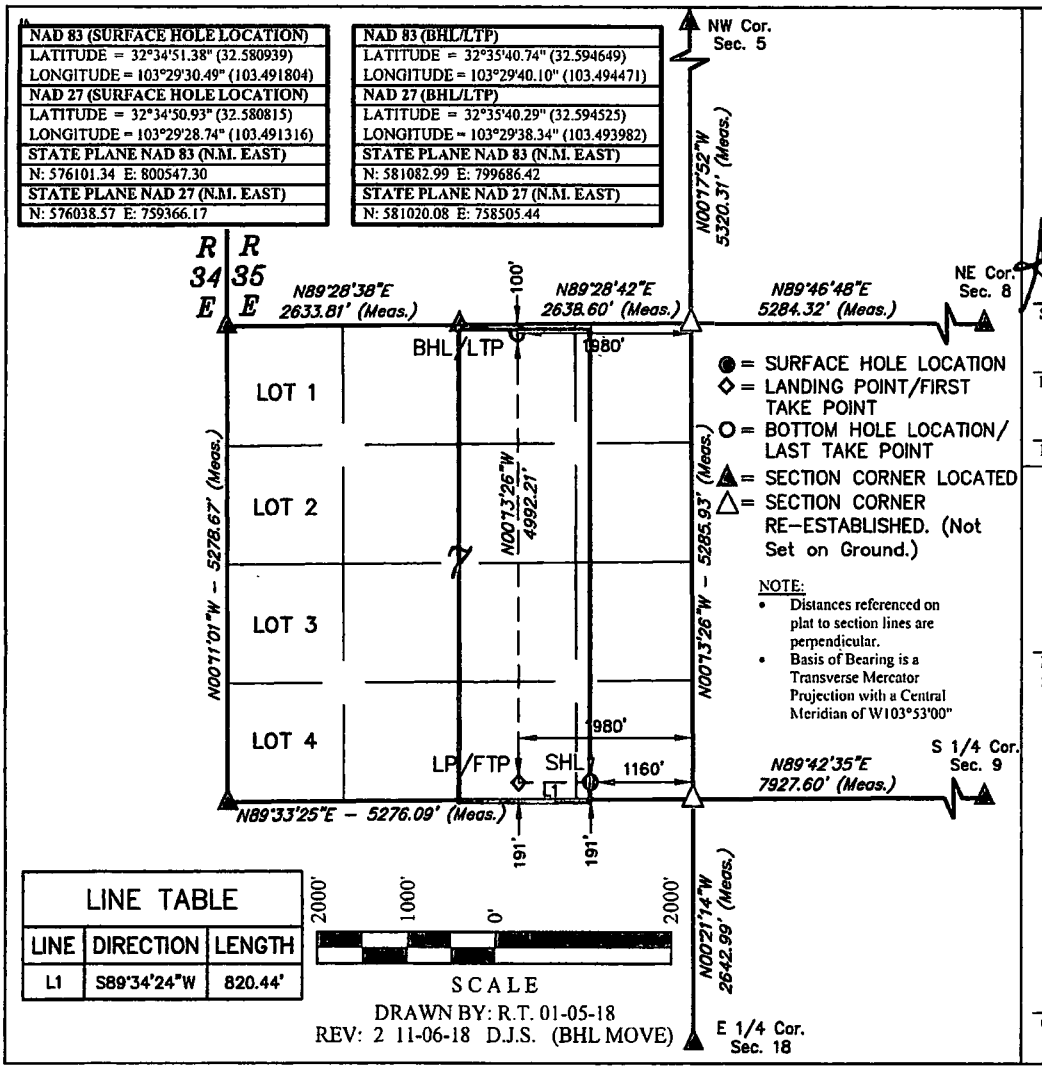
| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---|---|---|---|---|---|---|---|---|---|
| B | 7 | 20S | 35E | | 100 | NORTH | 1980 | EAST | LEA |

| [12] Dedicated Acres | [13] Joint or Infill | [14] Consolidation Code | [15] Order No. |
|---|---|---|---|
| 160 | | | |

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.

| NAD 83 (SURFACE HOLE LOCATION) |
|---|
| LATITUDE = 32°34'51.38" (32.580939) |
| LONGITUDE = 103°29'30.49" (103.491804) |
| NAD 27 (SURFACE HOLE LOCATION) |
| LATITUDE = 32°34'50.93" (32.580815) |
| LONGITUDE = 103°29'28.74" (103.491316) |
| STATE PLANE NAD 83 (N.M. EAST) |
| N: 576101.34 E: 800547.30 |
| STATE PLANE NAD 27 (N.M. EAST) |
| N: 576038.57 E: 759366.17 |

| NAD 83 (BHL/LTP) |
|---|
| LATITUDE = 32°35'40.74" (32.594649) |
| LONGITUDE = 103°29'40.10" (103.494471) |
| NAD 27 (BHL/LTP) |
| LATITUDE = 32°35'40.29" (32.594525) |
| LONGITUDE = 103°29'38.34" (103.493982) |
| STATE PLANE NAD 83 (N.M. EAST) |
| N: 581082.99 E: 799686.42 |
| STATE PLANE NAD 27 (N.M. EAST) |
| N: 581020.08 E: 758505.44 |




| LINE TABLE | | |
|---|---|---|
| LINE | DIRECTION | LENGTH |
| L1 | S89°34'24"W | 820.44' |

DRAWN BY: R.T. 01-05-18
REV: 2 11-06-18 D.J.S. (BHL MOVE)

### [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.*

Signature 11/7/18 Date

Aricka Easterling
Printed Name

aeasterling@cimarex.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.*

January 09, 2018
Date of Survey

Signature and Seal of Professional Surveyor:

PAUL BUCHELE NEW MEXICO 23782 PROFESSIONAL SURVEYOR 11-06-18

Certificate Number:

## 1. Geological Formations

TVD of target 11,060
MD at TD 15,979

Pilot Hole TD N/A
Deepest expected fresh water

| Formation | Depth (TVD) from KB | Water/Mineral Bearing/Target Zone | Hazards |
|---|---|---|---|
| Rustler | 1730 | N/A | |
| Top of Salt | 1830 | N/A | |
| Tansil | 3380 | N/A | |
| Capitan | 4000 | N/A | |
| Base Capitan | 4740 | N/A | |
| Delaware Sands | 5740 | N/A | |
| Brushy Canyon | 8150 | Hydrocarbons | |
| Bone Spring | 8359 | Hydrocarbons | |
| 1st Bone Spring Sand | 9666 | Hydrocarbons | |
| 2nd Bone Spring Sand | 10293 | Hydrocarbons | |
| 3rd Bone Spring Sand | 11045 | Hydrocarbons | |
| 3rd Bone Spring Target | 11120 | Hydrocarbons | |
| Wolfcamp | 11160 | Hydrocarbons | |

## 2. Casing Program

| Hole Size | Casing Depth From | Casing Depth To | Setting Depth TVD | Casing Size | Weight (lb/ft) | Grade | Conn. | SF Collapse | SF Burst | SF Tension |
|---|---|---|---|---|---|---|---|---|---|---|
| 17 1/2 | 0 | 1780 | 1780 | 13-3/8" | 54.50 | J-55 | ST&C | 1.39 | 3.36 | 5.30 |
| 12 1/4 | 0 | 5720 | 5720 | 9-5/8" | 40.00 | J-55 | LT&C | 1.31 | 1.30 | 2.27 |
| 8 3/4 | 0 | 10761 | 10761 | 5-1/2" | 17.00 | L-80 | LT&C | 1.25 | 1.54 | 1.80 |
| 8 3/4 | 10761 | 15979 | 11060 | 5-1/2" | 17.00 | L-80 | BT&C | 1.22 | 1.50 | 78.10 |
| | | | | | BLM Minimum Safety Factor | | | 1.125 | 1 | 1.6 Dry<br>1.8 Wet |

TVD was used on all calculations.
All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

| | 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 specification 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? | N |
| Is well within the designated 4 string boundary. | N |
| 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? | N |
| Is well located in R-111-P and SOPA? | N |
| If yes, are the first three strings cemented to surface? | N |
| Is 2nd string set 100' to 600' below the base of salt? | N |
| Is well located in high Cave/Karst? | N |
| If yes, are there two strings cemented to surface? | N |
| (For 2 string wells) If yes, is there a contingency casing if lost circulation occurs? | N |
| Is well located in critical Cave/Karst? | N |
| If yes, are there three strings cemented to surface? | N |
| Is AC Report included? | N |

### 3. Cementing Program

| Casing | # Sks | Wt. lb/gal | Yld ft3/sack | H2O gal/sk | 500# Comp. Strength (hours) | Slurry Description |
|---|---|---|---|---|---|---|
| **Surface** | 863 | 13.50 | 1.72 | 9.15 | 15.5 | Lead: Class C + Bentonite |
| | 231 | 14.80 | 1.34 | 6.32 | 9.5 | Tail: Class C + LCM |
| | | | | | | |
| **Intermediate Stage 1** | 306 | 12.90 | 1.88 | 9.65 | 12 | Lead: 35:65 (Poz:C) + Salt + Bentonite |
| | 292 | 14.80 | 1.34 | 6.32 | 9.5 | Tail: Class C + LCM |
| | | | | | | |
| **Intermediate Stage 2** | 774 | 12.90 | 1.88 | 9.65 | 12 | Lead: 35:65 (Poz:C) + Salt + Bentonite |
| | | | | | | |
| **Production** | 452 | 10.30 | 3.64 | 22.18 | | Lead: Tuned Light + LCM |
| | 1116 | 14.20 | 1.30 | 5.86 | 14:30 | Tail: 50:50 (Poz:H) + Salt + Bentonite + Fluid Loss + Dispersant + SMS |
| | | | | | | |

DV tool with possible annular casing packer as needed is proposed at a depth of +/- 3,500'.

| Casing String | TOC | % Excess |
|---|---|---|
| Surface | 0 | 45 |
| Intermediate Stage 1 | 3500 | 39 |
| Intermediate Stage 2 | 0 | 23 |
| Production | 5520 | 17 |

## 4. Pressure Control Equipment

| | |
|---|---|
| | A variance is requested for the use of a diverter on the surface casing. See attached for schematic. |

| BOP installed and tested before drilling which hole? | Size | Min Required WP | Type | | Tested To |
|---|---|---|---|---|---|
| 12 1/4 | 13 5/8 | 2M | Annular | X | 50% of working pressure |
| | | | Blind Ram | | 2M |
| | | | Pipe Ram | | |
| | | | Double Ram | X | |
| | | | Other | | |
| 8 3/4 | 13 5/8 | 3M | Annular | X | 50% of working pressure |
| | | | Blind Ram | | 3M |
| | | | Pipe Ram | | |
| | | | Double Ram | X | |
| | | | Other | | |

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold. See attached schematics.

| | | |
|---|---|---|
| | | Formation integrity test will be performed per Onshore Order #2.<br>On Exploratory wells or 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. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i. |
| X | | A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart. |
| | N | Are anchors required by manufacturer? |

## 5. Mud Program

| Depth | Type | Weight (ppg) | Viscosity | Water Loss |
|---|---|---|---|---|
| 0' to 1780' | FW Spud Mud | 8.30 - 8.80 | 30-32 | N/C |
| 1780' to 5720' | Brine Water | 9.70 - 10.20 | 30-32 | N/C |
| 5720' to 15979' | FW/Cut Brine | 8.50 - 9.00 | 30-32 | N/C |

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 | |
|---|---|
| | Will run GR/CNL fromTD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM. |
| | No logs are planned based on well control or offset log information. |
| | Drill stem test? |
| | Coring? |

| Additional Logs Planned | Interval |
|---|---|

## 7. Drilling Conditions

| Condition | |
|---|---|
| BH Pressure at deepest TVD | 5176 psi |
| Abnormal Temperature | No |

| | |
|---|---|
| | Hydrogen 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. |
| X | H2S is present |
| X | H2S plan is attached |

## 8. Other Facets of Operation

## 9. Wellhead

A multi-bowl wellhead system will be utilized.

After running the 13-3/8" surface casing, a 13 5/8" BOP/BOPE system with a minimum working pressure of 3000 psi will be installed on the wellhead system and will be pressure tested to 250 psi low followed by a 3000 psi test. Annular will be tested to 50% of working pressure. The pressure test will be repeated at least every 30 days, as per Onshore Order No. 2.

The multi-bowl wellhead will be installed by vendor's representative. A copy of the installation instructions has been sent to the BLM field office.

The wellhead will be installed by a third-party welder while being monitored by the wellhead vendor representative.

All BOP equipment will be tested utilizing a conventional test plug. Not a cup or J-packer type.

A solid steel body pack-off will be utilized after running and cementing the intermediate casing. After installation the pack-off and lower flange will be pressure tested to 3000 psi.

The surface casing string will be tested as per Onshore Order No. 2 to at least 0.22 psi/ft or 1500 psi, whichever is greater.

The casing string utilizing steel body pack-off will be tested to 70% of casing burst.

If well conditions dictate conventional slips will be set and BOPE will be tested to appropriate pressures based on permitted pressure requirements.

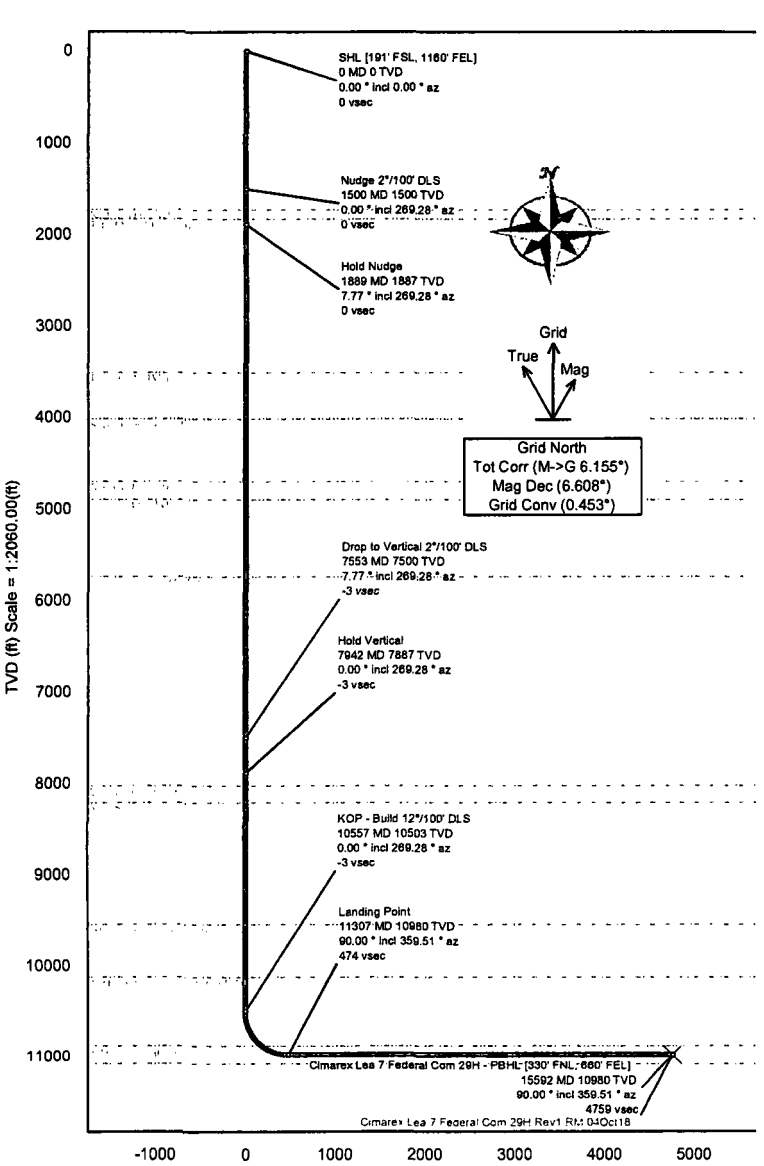
Schlumberger

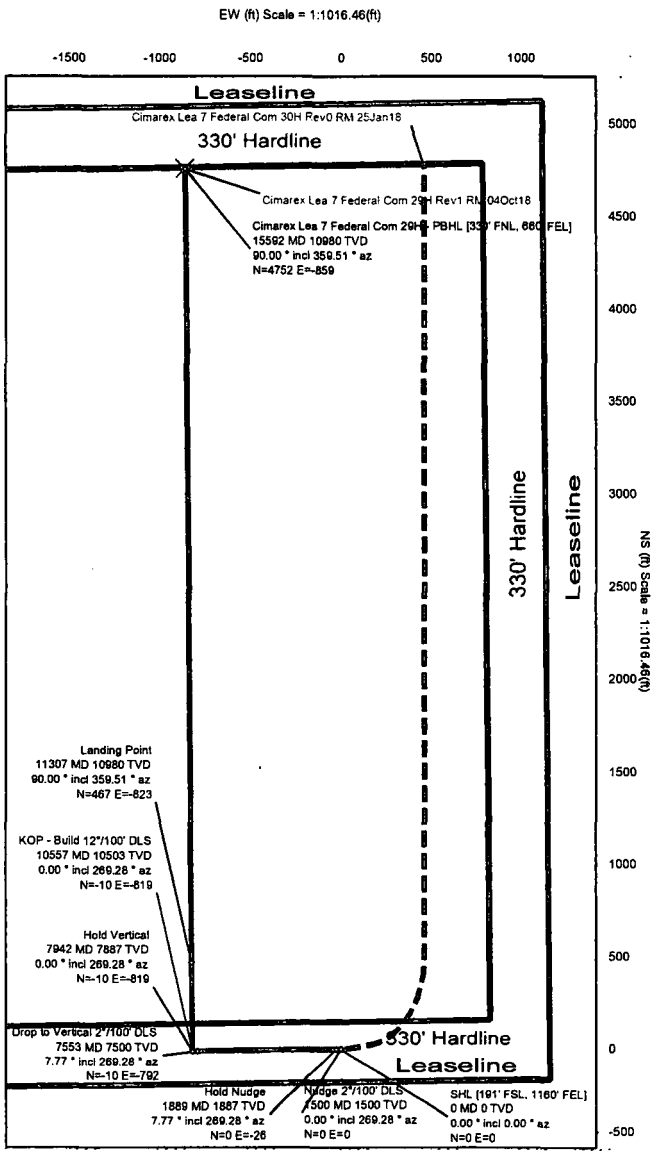
# Cimarex Rev 1

CIMAREX

| Borehole: | Well: | Field: | Structure: |
|---|---|---|---|
| Original Borehole | Cimarex Lea 7 Federal Com 29H | NM Lea County (NAD 83) | Cimarex Lea 7 Federal Com 29H |

| Gravity & Magnetic Parameters | | | | | Surface Location | NAD83 New Mexico State Plane, Eastern Zone, US Feet | | | | Miscellaneous | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Model: | HDGM 2018 | Dip: | 60.511° | Date: | 04-Oct-2018 | Lat: | N 32 34 61.38 | Northing: | 576101.34ftUS | Grid Conv: | 0.4532° | Slot: | Cimarex Lea 7 Federal Com 29H | TVD Ref: | RKB(3702.4ft above MSL) |
| MagDec: | 6.608° | FS: | 48139.112nT | Gravity FS: | 998.606mgn (9.80665 Based) | Lon: | W 103 29 30.49 | Easting: | 809547.3ftUS | Scale Fact: | 0.99998604 | Plan: | Cimarex Lea 7 Federal Com 29H Rev1 RM 04Oct18 | | |




Vertical Section (ft) Azim = 359.51° Scale = 1:2060.00(ft) Origin = 0N/-S, 0E/-W

## Critical Points

| Critical Point | MD | INCL | AZIM | TVD | VSEC | N(+)/S(-) | E(+)/W(-) | DLS |
|---|---|---|---|---|---|---|---|---|
| SHL [191' FSL, 1160' FEL] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| Nudge 2°/100' DLS | 1500.00 | 0.00 | 269.28 | 1500.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Rustler | 1730.25 | 4.60 | 269.28 | 1730.00 | -0.04 | -0.12 | -9.25 | 2.00 |
| Top of Salt | 1830.73 | 6.61 | 269.28 | 1830.00 | -0.08 | -0.24 | -19.07 | 2.00 |
| Hold Nudge | 1888.58 | 7.77 | 269.28 | 1887.38 | -0.11 | -0.33 | -26.31 | 2.00 |
| Tansil | 3526.23 | 7.77 | 269.28 | 3510.00 | -1.00 | -3.11 | -247.74 | 0.00 |
| Seven Rivers | 4040.96 | 7.77 | 269.28 | 4020.00 | -1.29 | -3.98 | -317.34 | 0.00 |
| Queen | 4727.26 | 7.77 | 269.28 | 4700.00 | -1.66 | -5.15 | -410.14 | 0.00 |
| Capitan | 4929.12 | 7.77 | 269.28 | 4900.00 | -1.77 | -5.49 | -437.43 | 0.00 |
| Cherry Canyon | 5776.90 | 7.77 | 269.28 | 5740.00 | -2.24 | -6.93 | -552.06 | 0.00 |
| Drop to Vertical 2°/100' DLS | 7553.22 | 7.77 | 269.28 | 7500.00 | -3.21 | -9.94 | -792.24 | 0.00 |
| Hold Vertical | 7941.79 | 0.00 | 269.28 | 7887.38 | -3.31 | -10.27 | -818.55 | 2.00 |
| Brushy Canyon | 8064.41 | 0.00 | 269.28 | 8030.00 | -3.31 | -10.27 | -818.55 | 0.00 |
| Bone Spring | 8264.41 | 0.00 | 269.28 | 8210.00 | -3.31 | -10.27 | -818.55 | 0.00 |
| 1st Bone Spring Sand | 9604.41 | 0.00 | 269.28 | 9550.00 | -3.31 | -10.27 | -818.55 | 0.00 |
| 2nd Bone Spring Sand | 10184.41 | 0.00 | 269.28 | 10130.00 | -3.31 | -10.27 | -818.55 | 0.00 |
| KOP - Build 12°/100' DLS | 10556.94 | 0.00 | 269.28 | 10502.54 | -3.31 | -10.27 | -818.55 | 0.00 |
| 3rd Bone Spring Sand | 10992.26 | 52.24 | 359.51 | 10880.00 | 181.76 | 174.79 | -820.12 | 12.00 |
| Landing Point | 11306.94 | 90.00 | 359.51 | 10980.00 | 474.15 | 467.18 | -822.61 | 12.00 |
| Cimarex Lea 7 Federal Com 29H - PBHL [330' FNL, 660' FEL] | 15591.69 | 90.00 | 359.51 | 10980.00 | 4758.90 | 4751.77 | -859.02 | 0.00 |
| Wolfcamp | NaN | | | 11090.00 | | | | |

Schlumberger

# Cimarex Lea 7 Federal Com 29H Rev3 RM 07Nov18 Proposal Geodetic Report

(Def Plan)

| | | | |
|---|---|---|---|
| **Report Date:** | November 07, 2018 - 03:21 PM | **Survey / DLS Computation:** | Minimum Curvature / Lubinski |
| **Client:** | Cimarex | **Vertical Section Azimuth:** | 359.534 ° (Grid North) |
| **Field:** | NM Lea County (NAD 83) | **Vertical Section Origin:** | 0.000 ft, 0.000 ft |
| **Structure / Slot:** | Cimarex Lea 7 Federal Com 29H / Cimarex Lea 7 Federal Com 29H | **TVD Reference Datum:** | RKB |
| **Well:** | Cimarex Lea 7 Federal Com 29H | **TVD Reference Elevation:** | 3702.400 ft above MSL |
| **Borehole:** | Original Borehole | **Seabed / Ground Elevation:** | 3676.400 ft above MSL |
| **UWI / API#:** | Unknown / Unknown | **Magnetic Declination:** | 6.600 ° |
| **Survey Name:** | Cimarex Lea 7 Federal Com 29H Rev3 RM 07Nov18 | **Total Gravity Field Strength:** | 998.5063mgn (9.80665 Based) |
| **Survey Date:** | October 04, 2018 | **Gravity Model:** | GARM |
| **Tort / AHD / DDI / ERD Ratio:** | 128.066 ° / 5766.693 ft / 6.026 / 0.519 | **Total Magnetic Field Strength:** | 48128.204 nT |
| **Coordinate Reference System:** | NAD83 New Mexico State Plane, Eastern Zone, US Feet | **Magnetic Dip Angle:** | 60.507 ° |
| **Location Lat / Long:** | N 32° 34' 51.37975", W 103° 29' 30.49453" | **Declination Date:** | November 07, 2018 |
| **Location Grid N/E Y/X:** | N 576101.340 ftUS, E 800547.300 ftUS | **Magnetic Declination Model:** | HDGM 2018 |
| **CRS Grid Convergence Angle:** | 0.4532 ° | **North Reference:** | Grid North |
| **Grid Scale Factor:** | 0.99998604 | **Grid Convergence Used:** | 0.4532 ° |
| **Version / Patch:** | 2.10.740.0 | **Total Corr Mag North->Grid North:** | 6.1466 ° |
| | | **Local Coord Referenced To:** | Structure Reference Point |

| Comments | MD (ft) | Incl (°) | Azim Grid (°) | TVD (ft) | VSEC (ft) | NS (ft) | EW (ft) | DLS (°/100ft) | Northing (ftUS) | Easting (ftUS) | Latitude (N/S ° ' ") | Longitude (E/W ° ' ") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SHL [191' FSL, 1160' FEL] | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | N/A | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 100.00 | 0.00 | 272.56 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 200.00 | 0.00 | 272.56 | 200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 300.00 | 0.00 | 272.56 | 300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 400.00 | 0.00 | 272.56 | 400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 500.00 | 0.00 | 272.56 | 500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 600.00 | 0.00 | 272.56 | 600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 700.00 | 0.00 | 272.56 | 700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 800.00 | 0.00 | 272.56 | 800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 900.00 | 0.00 | 272.56 | 900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 1000.00 | 0.00 | 272.56 | 1000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 1100.00 | 0.00 | 272.56 | 1100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 1200.00 | 0.00 | 272.56 | 1200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 1300.00 | 0.00 | 272.56 | 1300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 1400.00 | 0.00 | 272.56 | 1400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 1500.00 | 0.00 | 272.56 | 1500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 1600.00 | 0.00 | 272.56 | 1600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 1700.00 | 0.00 | 272.56 | 1700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| *Rustler* | *1730.00* | *0.00* | *272.56* | *1730.00* | *0.00* | *0.00* | *0.00* | *0.00* | *576101.34* | *800547.30* | *N 32 34 51.38* | *W 103 29 30.49* |
| | 1800.00 | 0.00 | 272.56 | 1800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| *Top of Salt* | *1830.00* | *0.00* | *272.56* | *1830.00* | *0.00* | *0.00* | *0.00* | *0.00* | *576101.34* | *800547.30* | *N 32 34 51.38* | *W 103 29 30.49* |
| | 1900.00 | 0.00 | 272.56 | 1900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 2000.00 | 0.00 | 272.56 | 2000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 2100.00 | 0.00 | 272.56 | 2100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 2200.00 | 0.00 | 272.56 | 2200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 2300.00 | 0.00 | 272.56 | 2300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |

| Comments | MD (ft) | Incl (°) | Azim Grid (°) | TVD (ft) | VSEC (ft) | NS (ft) | EW (ft) | DLS (°/100ft) | Northing (ftUS) | Easting (ftUS) | Latitude (N/S ° ' ") | Longitude (E/W ° ' ") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2400.00 | 0.00 | 272.56 | 2400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 2500.00 | 0.00 | 272.56 | 2500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 2600.00 | 0.00 | 272.56 | 2600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 2700.00 | 0.00 | 272.56 | 2700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 2800.00 | 0.00 | 272.56 | 2800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 2900.00 | 0.00 | 272.56 | 2900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 3000.00 | 0.00 | 272.56 | 3000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 3100.00 | 0.00 | 272.56 | 3100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 3200.00 | 0.00 | 272.56 | 3200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 3300.00 | 0.00 | 272.56 | 3300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| *Base Salt (Tansil)* | *3380.00* | *0.00* | *272.56* | *3380.00* | *0.00* | *0.00* | *0.00* | *0.00* | *576101.34* | *800547.30* | *N 32 34 51.38* | *W 103 29 30.49* |
| | 3400.00 | 0.00 | 272.56 | 3400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 3500.00 | 0.00 | 272.56 | 3500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 3600.00 | 0.00 | 272.56 | 3600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 3700.00 | 0.00 | 272.56 | 3700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 3800.00 | 0.00 | 272.56 | 3800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 3900.00 | 0.00 | 272.56 | 3900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| Capitan | 4000.00 | 0.00 | 272.56 | 4000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 4100.00 | 0.00 | 272.56 | 4100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 4200.00 | 0.00 | 272.56 | 4200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 4300.00 | 0.00 | 272.56 | 4300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 4400.00 | 0.00 | 272.56 | 4400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 4500.00 | 0.00 | 272.56 | 4500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 4600.00 | 0.00 | 272.56 | 4600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 4700.00 | 0.00 | 272.56 | 4700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| *Base Capitan* | *4740.00* | *0.00* | *272.56* | *4740.00* | *0.00* | *0.00* | *0.00* | *0.00* | *576101.34* | *800547.30* | *N 32 34 51.38* | *W 103 29 30.49* |
| | 4800.00 | 0.00 | 272.56 | 4800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 4900.00 | 0.00 | 272.56 | 4900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 5000.00 | 0.00 | 272.56 | 5000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 5100.00 | 0.00 | 272.56 | 5100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 5200.00 | 0.00 | 272.56 | 5200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 5300.00 | 0.00 | 272.56 | 5300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 5400.00 | 0.00 | 272.56 | 5400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 5500.00 | 0.00 | 272.56 | 5500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 5600.00 | 0.00 | 272.56 | 5600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 5700.00 | 0.00 | 272.56 | 5700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| *Delaware Sands* | *5740.00* | *0.00* | *272.56* | *5740.00* | *0.00* | *0.00* | *0.00* | *0.00* | *576101.34* | *800547.30* | *N 32 34 51.38* | *W 103 29 30.49* |
| | 5800.00 | 0.00 | 272.56 | 5800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| Nudge 2°/100' DLS | 5900.00 | 0.00 | 272.56 | 5900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 576101.34 | 800547.30 | N 32 34 51.38 | W 103 29 30.49 |
| | 6000.00 | 2.00 | 272.56 | 5999.98 | 0.09 | 0.08 | -1.74 | 2.00 | 576101.42 | 800545.56 | N 32 34 51.38 | W 103 29 30.51 |
| | 6100.00 | 4.00 | 272.56 | 6099.84 | 0.37 | 0.31 | -6.97 | 2.00 | 576101.65 | 800540.33 | N 32 34 51.38 | W 103 29 30.58 |
| | 6200.00 | 6.00 | 272.56 | 6199.45 | 0.83 | 0.70 | -15.68 | 2.00 | 576102.04 | 800531.62 | N 32 34 51.39 | W 103 29 30.68 |
| | 6300.00 | 8.00 | 272.56 | 6298.70 | 1.47 | 1.25 | -27.85 | 2.00 | 576102.59 | 800519.45 | N 32 34 51.39 | W 103 29 30.82 |
| | 6400.00 | 10.00 | 272.56 | 6397.47 | 2.30 | 1.94 | -43.48 | 2.00 | 576103.28 | 800503.82 | N 32 34 51.40 | W 103 29 31.00 |
| | 6500.00 | 12.00 | 272.56 | 6495.62 | 3.30 | 2.80 | -62.54 | 2.00 | 576104.14 | 800484.76 | N 32 34 51.41 | W 103 29 31.23 |
| | 6600.00 | 14.00 | 272.56 | 6593.06 | 4.49 | 3.80 | -85.01 | 2.00 | 576105.14 | 800462.29 | N 32 34 51.42 | W 103 29 31.49 |
| | 6700.00 | 16.00 | 272.56 | 6689.64 | 5.86 | 4.96 | -110.87 | 2.00 | 576106.30 | 800436.44 | N 32 34 51.44 | W 103 29 31.79 |
| | 6800.00 | 18.00 | 272.56 | 6785.27 | 7.40 | 6.26 | -140.07 | 2.00 | 576107.60 | 800407.23 | N 32 34 51.45 | W 103 29 32.13 |
| Hold Nudge | 6832.39 | 18.65 | 272.56 | 6816.01 | 7.94 | 6.72 | -150.24 | 2.00 | 576108.06 | 800397.06 | N 32 34 51.46 | W 103 29 32.25 |
| | 6900.00 | 18.65 | 272.56 | 6880.08 | 9.08 | 7.68 | -171.84 | 0.00 | 576109.02 | 800375.46 | N 32 34 51.47 | W 103 29 32.50 |
| | 7000.00 | 18.65 | 272.56 | 6974.83 | 10.77 | 9.11 | -203.79 | 0.00 | 576110.45 | 800343.52 | N 32 34 51.49 | W 103 29 32.88 |
| | 7100.00 | 18.65 | 272.56 | 7069.58 | 12.46 | 10.54 | -235.73 | 0.00 | 576111.88 | 800311.58 | N 32 34 51.50 | W 103 29 33.25 |
| | 7200.00 | 18.65 | 272.56 | 7164.33 | 14.14 | 11.97 | -267.67 | 0.00 | 576113.31 | 800279.63 | N 32 34 51.52 | W 103 29 33.62 |
| | 7300.00 | 18.65 | 272.56 | 7259.08 | 15.83 | 13.40 | -299.61 | 0.00 | 576114.74 | 800247.69 | N 32 34 51.54 | W 103 29 33.99 |
| | 7400.00 | 18.65 | 272.56 | 7353.83 | 17.52 | 14.82 | -331.56 | 0.00 | 576116.16 | 800215.75 | N 32 34 51.55 | W 103 29 34.37 |
| | 7500.00 | 18.65 | 272.56 | 7448.58 | 19.21 | 16.25 | -363.50 | 0.00 | 576117.59 | 800183.81 | N 32 34 51.57 | W 103 29 34.74 |

| Comments | MD (ft) | Incl (°) | Azim Grid (°) | TVD (ft) | VSEC (ft) | NS (ft) | EW (ft) | DLS (°/100ft) | Northing (ftUS) | Easting (ftUS) | Latitude (N/S ° ' ") | Longitude (E/W ° ' ") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 7600.00 | 18.65 | 272.56 | 7543.33 | 20.90 | 17.68 | -395.44 | 0.00 | 576119.02 | 800151.86 | N 32 34 51.59 | W 103 29 35.11 |
| | 7700.00 | 18.65 | 272.56 | 7638.08 | 22.58 | 19.11 | -427.39 | 0.00 | 576120.45 | 800119.92 | N 32 34 51.60 | W 103 29 35.49 |
| | 7800.00 | 18.65 | 272.56 | 7732.83 | 24.27 | 20.54 | -459.33 | 0.00 | 576121.88 | 800087.98 | N 32 34 51.62 | W 103 29 35.86 |
| | 7900.00 | 18.65 | 272.56 | 7827.58 | 25.96 | 21.96 | -491.27 | 0.00 | 576123.30 | 800056.04 | N 32 34 51.64 | W 103 29 36.23 |
| | 8000.00 | 18.65 | 272.56 | 7922.33 | 27.65 | 23.39 | -523.21 | 0.00 | 576124.73 | 800024.09 | N 32 34 51.65 | W 103 29 36.61 |
| | 8100.00 | 18.65 | 272.56 | 8017.08 | 29.34 | 24.82 | -555.16 | 0.00 | 576126.16 | 799992.15 | N 32 34 51.67 | W 103 29 36.98 |
| | 8200.00 | 18.65 | 272.56 | 8111.83 | 31.02 | 26.25 | -587.10 | 0.00 | 576127.59 | 799960.21 | N 32 34 51.69 | W 103 29 37.35 |
| *Brushy Canyon* | *8240.28* | *18.65* | *272.56* | *8150.00* | *31.70* | *26.82* | *-599.97* | *0.00* | *576128.16* | *799947.34* | *N 32 34 51.69* | *W 103 29 37.50* |
| | 8300.00 | 18.65 | 272.56 | 8206.58 | 32.71 | 27.68 | -619.04 | 0.00 | 576129.02 | 799928.27 | N 32 34 51.70 | W 103 29 37.73 |
| | 8400.00 | 18.65 | 272.56 | 8301.33 | 34.40 | 29.11 | -650.99 | 0.00 | 576130.45 | 799896.32 | N 32 34 51.72 | W 103 29 38.10 |
| Bone Spring Drop to Vertical 2°/100' DLS | 8460.86 | 18.65 | 272.56 | 8359.00 | 35.43 | 29.97 | -670.43 | 0.00 | 576131.31 | 799876.88 | N 32 34 51.73 | W 103 29 38.33 |
| | 8500.00 | 17.86 | 272.56 | 8396.16 | 36.07 | 30.52 | -682.68 | 2.00 | 576131.86 | 799864.64 | N 32 34 51.74 | W 103 29 38.47 |
| | 8600.00 | 15.86 | 272.56 | 8491.86 | 37.61 | 31.82 | -711.66 | 2.00 | 576133.16 | 799835.65 | N 32 34 51.75 | W 103 29 38.81 |
| | 8700.00 | 13.86 | 272.56 | 8588.51 | 38.96 | 32.96 | -737.28 | 2.00 | 576134.30 | 799810.03 | N 32 34 51.76 | W 103 29 39.11 |
| | 8800.00 | 11.86 | 272.56 | 8685.99 | 40.13 | 33.96 | -759.53 | 2.00 | 576135.30 | 799787.79 | N 32 34 51.78 | W 103 29 39.37 |
| | 8900.00 | 9.86 | 272.56 | 8784.19 | 41.13 | 34.80 | -778.36 | 2.00 | 576136.14 | 799768.96 | N 32 34 51.78 | W 103 29 39.59 |
| | 9000.00 | 7.86 | 272.56 | 8883.00 | 41.94 | 35.49 | -793.75 | 2.00 | 576136.83 | 799753.56 | N 32 34 51.79 | W 103 29 39.77 |
| | 9100.00 | 5.86 | 272.56 | 8982.27 | 42.57 | 36.02 | -805.69 | 2.00 | 576137.36 | 799741.62 | N 32 34 51.80 | W 103 29 39.91 |
| | 9200.00 | 3.86 | 272.56 | 9081.91 | 43.02 | 36.40 | -814.16 | 2.00 | 576137.74 | 799733.15 | N 32 34 51.80 | W 103 29 40.01 |
| | 9300.00 | 1.86 | 272.56 | 9181.78 | 43.29 | 36.62 | -819.16 | 2.00 | 576137.96 | 799728.16 | N 32 34 51.81 | W 103 29 40.06 |
| Hold Vertical | 9393.25 | 0.00 | 272.56 | 9275.01 | 43.37 | 36.69 | -820.67 | 2.00 | 576138.03 | 799726.64 | N 32 34 51.81 | W 103 29 40.08 |
| | 9400.00 | 0.00 | 272.56 | 9281.76 | 43.37 | 36.69 | -820.67 | 0.00 | 576138.03 | 799726.64 | N 32 34 51.81 | W 103 29 40.08 |
| | 9500.00 | 0.00 | 272.56 | 9381.76 | 43.37 | 36.69 | -820.67 | 0.00 | 576138.03 | 799726.64 | N 32 34 51.81 | W 103 29 40.08 |
| | 9600.00 | 0.00 | 272.56 | 9481.76 | 43.37 | 36.69 | -820.67 | 0.00 | 576138.03 | 799726.64 | N 32 34 51.81 | W 103 29 40.08 |
| | 9700.00 | 0.00 | 272.56 | 9581.76 | 43.37 | 36.69 | -820.67 | 0.00 | 576138.03 | 799726.64 | N 32 34 51.81 | W 103 29 40.08 |
| *1st Bone Spring Sand* | *9784.24* | *0.00* | *272.56* | *9666.00* | *43.37* | *36.69* | *-820.67* | *0.00* | *576138.03* | *799726.64* | *N 32 34 51.81* | *W 103 29 40.08* |
| | 9800.00 | 0.00 | 272.56 | 9681.76 | 43.37 | 36.69 | -820.67 | 0.00 | 576138.03 | 799726.64 | N 32 34 51.81 | W 103 29 40.08 |
| | 9900.00 | 0.00 | 272.56 | 9781.76 | 43.37 | 36.69 | -820.67 | 0.00 | 576138.03 | 799726.64 | N 32 34 51.81 | W 103 29 40.08 |
| | 10000.00 | 0.00 | 272.56 | 9881.76 | 43.37 | 36.69 | -820.67 | 0.00 | 576138.03 | 799726.64 | N 32 34 51.81 | W 103 29 40.08 |
| | 10100.00 | 0.00 | 272.56 | 9981.76 | 43.37 | 36.69 | -820.67 | 0.00 | 576138.03 | 799726.64 | N 32 34 51.81 | W 103 29 40.08 |
| | 10200.00 | 0.00 | 272.56 | 10081.76 | 43.37 | 36.69 | -820.67 | 0.00 | 576138.03 | 799726.64 | N 32 34 51.81 | W 103 29 40.08 |
| | 10300.00 | 0.00 | 272.56 | 10181.76 | 43.37 | 36.69 | -820.67 | 0.00 | 576138.03 | 799726.64 | N 32 34 51.81 | W 103 29 40.08 |
| | 10400.00 | 0.00 | 272.56 | 10281.76 | 43.37 | 36.69 | -820.67 | 0.00 | 576138.03 | 799726.64 | N 32 34 51.81 | W 103 29 40.08 |
| *2nd Bone Spring Sand* | *10411.24* | *0.00* | *272.56* | *10293.00* | *43.37* | *36.69* | *-820.67* | *0.00* | *576138.03* | *799726.64* | *N 32 34 51.81* | *W 103 29 40.08* |
| | 10500.00 | 0.00 | 272.56 | 10381.76 | 43.37 | 36.69 | -820.67 | 0.00 | 576138.03 | 799726.64 | N 32 34 51.81 | W 103 29 40.08 |
| | 10600.00 | 0.00 | 272.56 | 10481.76 | 43.37 | 36.69 | -820.67 | 0.00 | 576138.03 | 799726.64 | N 32 34 51.81 | W 103 29 40.08 |
| | 10700.00 | 0.00 | 272.56 | 10581.76 | 43.37 | 36.69 | -820.67 | 0.00 | 576138.03 | 799726.64 | N 32 34 51.81 | W 103 29 40.08 |
| KOP - Build 12°/100' DLS | 10760.82 | 0.00 | 272.56 | 10642.58 | 43.37 | 36.69 | -820.67 | 0.00 | 576138.03 | 799726.64 | N 32 34 51.81 | W 103 29 40.08 |
| | 10800.00 | 4.70 | 359.53 | 10681.72 | 44.97 | 38.30 | -820.69 | 12.00 | 576139.64 | 799726.63 | N 32 34 51.82 | W 103 29 40.08 |
| | 10900.00 | 16.70 | 359.53 | 10779.80 | 63.51 | 56.83 | -820.84 | 12.00 | 576158.17 | 799726.48 | N 32 34 52.01 | W 103 29 40.08 |
| | 11000.00 | 28.70 | 359.53 | 10871.88 | 102.03 | 95.36 | -821.15 | 12.00 | 576196.70 | 799726.16 | N 32 34 52.39 | W 103 29 40.08 |
| | 11100.00 | 40.70 | 359.53 | 10953.94 | 158.86 | 152.18 | -821.61 | 12.00 | 576253.52 | 799725.70 | N 32 34 52.95 | W 103 29 40.08 |
| | 11200.00 | 52.70 | 359.53 | 11022.40 | 231.51 | 224.83 | -822.20 | 12.00 | 576326.16 | 799725.11 | N 32 34 53.67 | W 103 29 40.08 |
| *3rd Bone Spring Sand* | *11239.49* | *57.44* | *359.53* | *11045.00* | *263.87* | *257.19* | *-822.47* | *12.00* | *576358.52* | *799724.85* | *N 32 34 53.99* | *W 103 29 40.08* |
| | 11300.00 | 64.70 | 359.53 | 11074.25 | 316.80 | 310.11 | -822.90 | 12.00 | 576411.45 | 799724.42 | N 32 34 54.51 | W 103 29 40.08 |
| | 11400.00 | 76.70 | 359.53 | 11107.24 | 411.01 | 404.32 | -823.66 | 12.00 | 576505.65 | 799723.65 | N 32 34 55.44 | W 103 29 40.08 |
| | 11500.00 | 88.70 | 359.53 | 11119.92 | 510.01 | 503.33 | -824.47 | 12.00 | 576604.66 | 799722.85 | N 32 34 56.42 | W 103 29 40.08 |
| Landing Point | 11517.24 | 90.77 | 359.53 | 11120.00 | 527.25 | 520.56 | -824.61 | 12.00 | 576621.89 | 799722.71 | N 32 34 56.59 | W 103 29 40.08 |
| | 11600.00 | 90.77 | 359.53 | 11118.89 | 610.01 | 603.31 | -825.28 | 0.00 | 576704.64 | 799722.03 | N 32 34 57.41 | W 103 29 40.08 |
| | 11700.00 | 90.77 | 359.53 | 11117.54 | 710.00 | 703.30 | -826.09 | 0.00 | 576804.63 | 799721.22 | N 32 34 58.40 | W 103 29 40.08 |
| | 11800.00 | 90.77 | 359.53 | 11116.20 | 809.99 | 803.29 | -826.91 | 0.00 | 576904.62 | 799720.41 | N 32 34 59.39 | W 103 29 40.08 |
| | 11900.00 | 90.77 | 359.53 | 11114.85 | 909.98 | 903.28 | -827.72 | 0.00 | 577004.60 | 799719.59 | N 32 35 0.38 | W 103 29 40.08 |
| | 12000.00 | 90.77 | 359.53 | 11113.51 | 1009.97 | 1003.26 | -828.53 | 0.00 | 577104.59 | 799718.78 | N 32 35 1.37 | W 103 29 40.08 |

| Comments | MD (ft) | Incl (°) | Azim Grid (°) | TVD (ft) | VSEC (ft) | NS (ft) | EW (ft) | DLS (°/100ft) | Northing (ftUS) | Easting (ftUS) | Latitude (N/S ° ' ") | Longitude (E/W ° ' ") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 12100.00 | 90.77 | 359.53 | 11112.16 | 1109.96 | 1103.25 | -829.35 | 0.00 | 577204.57 | 799717.97 | N 32 35 2.36 | W 103 29 40.08 |
| | 12200.00 | 90.77 | 359.53 | 11110.82 | 1209.95 | 1203.24 | -830.16 | 0.00 | 577304.56 | 799717.15 | N 32 35 3.35 | W 103 29 40.09 |
| | 12300.00 | 90.77 | 359.53 | 11109.47 | 1309.94 | 1303.23 | -830.97 | 0.00 | 577404.55 | 799716.34 | N 32 35 4.34 | W 103 29 40.09 |
| | 12400.00 | 90.77 | 359.53 | 11108.13 | 1409.93 | 1403.22 | -831.79 | 0.00 | 577504.53 | 799715.53 | N 32 35 5.33 | W 103 29 40.09 |
| | 12500.00 | 90.77 | 359.53 | 11106.78 | 1509.92 | 1503.20 | -832.60 | 0.00 | 577604.52 | 799714.71 | N 32 35 6.32 | W 103 29 40.09 |
| | 12600.00 | 90.77 | 359.53 | 11105.44 | 1609.92 | 1603.19 | -833.41 | 0.00 | 577704.50 | 799713.90 | N 32 35 7.31 | W 103 29 40.09 |
| | 12700.00 | 90.77 | 359.53 | 11104.09 | 1709.91 | 1703.18 | -834.23 | 0.00 | 577804.49 | 799713.09 | N 32 35 8.30 | W 103 29 40.09 |
| | 12800.00 | 90.77 | 359.53 | 11102.75 | 1809.90 | 1803.17 | -835.04 | 0.00 | 577904.48 | 799712.27 | N 32 35 9.29 | W 103 29 40.09 |
| | 12900.00 | 90.77 | 359.53 | 11101.40 | 1909.89 | 1903.15 | -835.85 | 0.00 | 578004.46 | 799711.46 | N 32 35 10.28 | W 103 29 40.09 |
| | 13000.00 | 90.77 | 359.53 | 11100.06 | 2009.88 | 2003.14 | -836.67 | 0.00 | 578104.45 | 799710.65 | N 32 35 11.26 | W 103 29 40.09 |
| | 13100.00 | 90.77 | 359.53 | 11098.72 | 2109.87 | 2103.13 | -837.48 | 0.00 | 578204.44 | 799709.83 | N 32 35 12.25 | W 103 29 40.09 |
| | 13200.00 | 90.77 | 359.53 | 11097.37 | 2209.86 | 2203.12 | -838.29 | 0.00 | 578304.42 | 799709.02 | N 32 35 13.24 | W 103 29 40.09 |
| | 13300.00 | 90.77 | 359.53 | 11096.03 | 2309.85 | 2303.10 | -839.11 | 0.00 | 578404.41 | 799708.21 | N 32 35 14.23 | W 103 29 40.09 |
| | 13400.00 | 90.77 | 359.53 | 11094.68 | 2409.84 | 2403.09 | -839.92 | 0.00 | 578504.39 | 799707.39 | N 32 35 15.22 | W 103 29 40.09 |
| | 13500.00 | 90.77 | 359.53 | 11093.34 | 2509.83 | 2503.08 | -840.73 | 0.00 | 578604.38 | 799706.58 | N 32 35 16.21 | W 103 29 40.09 |
| | 13600.00 | 90.77 | 359.53 | 11091.99 | 2609.83 | 2603.07 | -841.55 | 0.00 | 578704.37 | 799705.77 | N 32 35 17.20 | W 103 29 40.09 |
| | 13700.00 | 90.77 | 359.53 | 11090.65 | 2709.82 | 2703.05 | -842.36 | 0.00 | 578804.35 | 799704.95 | N 32 35 18.19 | W 103 29 40.09 |
| | 13800.00 | 90.77 | 359.53 | 11089.30 | 2809.81 | 2803.04 | -843.17 | 0.00 | 578904.34 | 799704.14 | N 32 35 19.18 | W 103 29 40.09 |
| | 13900.00 | 90.77 | 359.53 | 11087.96 | 2909.80 | 2903.03 | -843.99 | 0.00 | 579004.32 | 799703.33 | N 32 35 20.17 | W 103 29 40.09 |
| | 14000.00 | 90.77 | 359.53 | 11086.61 | 3009.79 | 3003.02 | -844.80 | 0.00 | 579104.31 | 799702.51 | N 32 35 21.16 | W 103 29 40.09 |
| | 14100.00 | 90.77 | 359.53 | 11085.27 | 3109.78 | 3103.01 | -845.61 | 0.00 | 579204.30 | 799701.70 | N 32 35 22.15 | W 103 29 40.09 |
| | 14200.00 | 90.77 | 359.53 | 11083.92 | 3209.77 | 3202.99 | -846.43 | 0.00 | 579304.28 | 799700.89 | N 32 35 23.14 | W 103 29 40.09 |
| | 14300.00 | 90.77 | 359.53 | 11082.58 | 3309.76 | 3302.98 | -847.24 | 0.00 | 579404.27 | 799700.07 | N 32 35 24.13 | W 103 29 40.09 |
| | 14400.00 | 90.77 | 359.53 | 11081.23 | 3409.75 | 3402.97 | -848.05 | 0.00 | 579504.25 | 799699.26 | N 32 35 25.12 | W 103 29 40.09 |
| | 14500.00 | 90.77 | 359.53 | 11079.89 | 3509.74 | 3502.96 | -848.87 | 0.00 | 579604.24 | 799698.45 | N 32 35 26.11 | W 103 29 40.09 |
| | 14600.00 | 90.77 | 359.53 | 11078.54 | 3609.73 | 3602.94 | -849.68 | 0.00 | 579704.23 | 799697.63 | N 32 35 27.09 | W 103 29 40.09 |
| | 14700.00 | 90.77 | 359.53 | 11077.20 | 3709.73 | 3702.93 | -850.49 | 0.00 | 579804.21 | 799696.82 | N 32 35 28.08 | W 103 29 40.09 |
| | 14800.00 | 90.77 | 359.53 | 11075.85 | 3809.72 | 3802.92 | -851.31 | 0.00 | 579904.20 | 799696.01 | N 32 35 29.07 | W 103 29 40.09 |
| | 14900.00 | 90.77 | 359.53 | 11074.51 | 3909.71 | 3902.91 | -852.12 | 0.00 | 580004.18 | 799695.19 | N 32 35 30.06 | W 103 29 40.09 |
| | 15000.00 | 90.77 | 359.53 | 11073.16 | 4009.70 | 4002.89 | -852.93 | 0.00 | 580104.17 | 799694.38 | N 32 35 31.05 | W 103 29 40.09 |
| | 15100.00 | 90.77 | 359.53 | 11071.82 | 4109.69 | 4102.88 | -853.75 | 0.00 | 580204.16 | 799693.57 | N 32 35 32.04 | W 103 29 40.09 |
| | 15200.00 | 90.77 | 359.53 | 11070.48 | 4209.68 | 4202.87 | -854.56 | 0.00 | 580304.14 | 799692.75 | N 32 35 33.03 | W 103 29 40.09 |
| | 15300.00 | 90.77 | 359.53 | 11069.13 | 4309.67 | 4302.86 | -855.37 | 0.00 | 580404.13 | 799691.94 | N 32 35 34.02 | W 103 29 40.09 |
| | 15400.00 | 90.77 | 359.53 | 11067.79 | 4409.66 | 4402.84 | -856.19 | 0.00 | 580504.11 | 799691.13 | N 32 35 35.01 | W 103 29 40.09 |
| | 15500.00 | 90.77 | 359.53 | 11066.44 | 4509.65 | 4502.83 | -857.00 | 0.00 | 580604.10 | 799690.32 | N 32 35 36.00 | W 103 29 40.09 |
| | 15600.00 | 90.77 | 359.53 | 11065.10 | 4609.64 | 4602.82 | -857.81 | 0.00 | 580704.09 | 799689.50 | N 32 35 36.99 | W 103 29 40.09 |
| | 15700.00 | 90.77 | 359.53 | 11063.75 | 4709.64 | 4702.81 | -858.63 | 0.00 | 580804.07 | 799688.69 | N 32 35 37.98 | W 103 29 40.10 |
| | 15800.00 | 90.77 | 359.53 | 11062.41 | 4809.63 | 4802.80 | -859.44 | 0.00 | 580904.06 | 799687.88 | N 32 35 38.97 | W 103 29 40.10 |
| | 15900.00 | 90.77 | 359.53 | 11061.06 | 4909.62 | 4902.78 | -860.25 | 0.00 | 581004.04 | 799687.06 | N 32 35 39.96 | W 103 29 40.10 |
| Cimarex Lea 7 Federal Com 29H - PBHL [100' FNL, 1980' FEL] | 15978.96 | 90.77 | 359.53 | 11060.00 | 4988.57 | 4981.73 | -860.89 | 0.00 | 581082.99 | 799686.42 | N 32 35 40.74 | W 103 29 40.10 |

**Survey Type:** Def Plan

**Survey Error Model:** ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

**Survey Program:**

| Description | Part | MD From (ft) | MD To (ft) | EOU Freq (ft) | Hole Size (in) | Casing Diameter (in) | Expected Max Inclination (deg) | Survey Tool Type | Borehole / Survey |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 0.000 | 26.000 | 1/100.000 | 30.000 | 30.000 | | NAL_MWD_IFR1+MS-Depth Only | Original Borehole / Cimarex Lea 7 Federal Com 29H Rev3 RM 07Nov18 |

| Comments | MD (ft) | Incl (°) | Azim Grid (°) | TVD (ft) | VSEC (ft) | NS (ft) | EW (ft) | DLS (°/100ft) | Northing (ftUS) | Easting (ftUS) | Latitude (N/S ° ' ") | Longitude (E/W ° ' ") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 26.000 | 15978.956 | 1/100.000 | 30.000 | 30.000 | | NAL_MWD_IFR1+MS | | Original Borehole / Cimarex Lea 7 Federal Com 29H Rev3 RM | |

Schlumberger

CIMAREX

# Cimarex Lea 7 Federal Com 29H Rev3 RM 07Nov18 Anti-Collision Summary Report

| | | | |
|---|---|---|---|
| **Analysis Date-24hr Time:** | November 07, 2018 - 15:21 | **Analysis Method:** | 3D Least Distance |
| **Client:** | Cimarex | **Reference Trajectory:** | Cimarex Lea 7 Federal Com 29H Rev3 RM 07Nov18 (Def Plan) |
| **Field:** | NM Lea County (NAD 83) | **Depth Interval:** | Every 10.00 Measured Depth (ft) |
| **Structure:** | Cimarex Lea 7 Federal Com 29H | **Rule Set:** | NAL Procedure: D&M AntiCollision Standard S002 |
| **Slot:** | Cimarex Lea 7 Federal Com 29H | **Min Pts:** | All local minima indicated. |
| **Well:** | Cimarex Lea 7 Federal Com 29H | **Version / Patch:** | 2.10.740.0 |
| **Borehole:** | Original Borehole | **Database \ Project:** | US1153APP452.dir.slb.com\drilling-NM Lea County 2.10 |
| **Scan MD Range:** | 0.00ft ~ 15978.96ft | | |

**Trajectory Error Model:** ISCWSA0 3-D 95.000% Confidence 2.7955 sigma, for subject well. For offset wells, error model version is specified with each well respectively.

**Offset Trajectories Summary**

**Offset Selection Criteria**

Wellhead distance scan: Not performed!

Selection filters: Definitive Surveys - Definitive Plans - Definitive surveys exclude definitive plans
- All Non-Def Surveys when no Def-Survey is set in a borehole - All Non-Def Plans when no Def-Plan is set in a borehole

| Offset Trajectory | Separation | | | Allow | Sep. | Controlling | Reference Trajectory | | Risk Level | | | Alert | Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ct-Ct (ft) | MAS (ft) | EOU (ft) | Dev. (ft) | Fact. | Rule | MD (ft) | TVD (ft) | Alert | Minor | Major | | |
| Results highlighted: Sep-Factor separation <= 1.50 ft | | | | | | | | | | | | | |
| Cimarex Lea 7 Federal Com 30H Rev2 RM 07Nov18 (Def Plan) | | | | | | | | | | | | | Fail Major |
| | 20.18 | 16.64 | 17.68 | 3.54 | N/A | MAS = 5.07 (m) | 0.00 | 0.00 | CtCt<=15m<15.00 | | | Enter Alert | |
| | 20.18 | 16.64 | 17.68 | 3.54 | 39789.18 | MAS = 5.07 (m) | 26.00 | 26.00 | | | | WRP | |
| | 20.18 | 20.19 | 5.88 | -0.01 | 1.50 | OSF1.50 | 1940.00 | 1940.00 | | OSF<1.50 | | Enter Minor | |
| | 20.18 | 29.06 | -0.02 | -8.87 | 1.00 | OSF1.50 | 2880.00 | 2880.00 | | | OSF<1.00 | Enter Major | |
| | 20.18 | 57.43 | -18.94 | -37.25 | 0.48 | OSF1.50 | 5890.00 | 5890.00 | | | | MinPt-CtCt | |
| | 20.18 | 57.52 | -19.00 | -37.34 | 0.48 | OSF1.50 | 5900.00 | 5900.00 | | | | MinPts | |
| | 20.22 | 57.57 | -19.00 | -37.36 | 0.48 | OSF1.50 | 5910.00 | 5910.00 | | | | MinPt-O-ADP | |
| | 38.51 | 57.95 | -0.96 | -19.45 | 0.97 | OSF1.50 | 6130.00 | 6129.75 | | | OSF>1.00 | Exit Major | |
| | 57.75 | 57.88 | 18.33 | -0.13 | 1.50 | OSF1.50 | 6230.00 | 6229.27 | | OSF>1.50 | | Exit Minor | |
| | 182.91 | 57.75 | 143.58 | 125.16 | 4.90 | OSF1.50 | 6600.00 | 6593.06 | OSF>5.00 | | | Exit Alert | |
| | 1319.95 | 194.04 | 1189.76 | 1125.91 | 10.32 | OSF1.50 | 15978.96 | 11060.00 | | | | MinPts | |
| Cimarex Lea 7 Federal Com 2H MWD Final(Surcon Corrected) (Def Survey) | | | | | | | | | | | | | Pass |
| | 2537.28 | 32.81 | 2535.47 | 2504.47 | N/A | MAS = 10.00 (m) | 0.00 | 0.00 | | | | Surface | |
| | 2537.26 | 32.81 | 2535.45 | 2504.46 | 538189.92 | MAS = 10.00 (m) | 26.00 | 26.00 | | | | WRP | |
| | 2535.82 | 32.81 | 2531.58 | 2503.02 | 1039.97 | MAS = 10.00 (m) | 610.00 | 610.00 | | | | MinPts | |
| | 2535.96 | 32.81 | 2530.51 | 2503.15 | 695.73 | MAS = 10.00 (m) | 880.00 | 880.00 | | | | MinPts | |
| | 2535.98 | 32.81 | 2529.22 | 2503.17 | 511.63 | MAS = 10.00 (m) | 1170.00 | 1170.00 | | | | MinPts | |
| | 2536.89 | 32.81 | 2528.32 | 2504.08 | 375.18 | MAS = 10.00 (m) | 1580.00 | 1580.00 | | | | MINPT-O-EOU | |
| | 2529.68 | 36.52 | 2504.73 | 2493.16 | 109.26 | OSF1.50 | 5250.00 | 5250.00 | | | | MinPt-CtCt | |
| | 1611.78 | 48.43 | 1578.29 | 1563.35 | 53.81 | OSF1.50 | 9260.00 | 9141.81 | | | | MinPt-O-SF | |
| | 1587.45 | 53.25 | 1550.73 | 1534.20 | 47.88 | OSF1.50 | 10220.00 | 10101.76 | | | | MinPt-CtCt | |
| | 1587.53 | 53.51 | 1550.64 | 1534.02 | 47.64 | OSF1.50 | 10260.00 | 10141.76 | | | | MINPT-O-EOU | |
| | 1587.63 | 53.64 | 1550.65 | 1533.98 | 47.52 | OSF1.50 | 10280.00 | 10161.76 | | | | MinPts | |

| Offset Trajectory | Separation | | | Allow | Sep. | Controlling | Reference Trajectory | | Risk Level | | | Alert | Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ct-Ct (ft) | MAS (ft) | EOU (ft) | Dev. (ft) | Fact. | Rule | MD (ft) | TVD (ft) | Alert | Minor | Major | | |
| | 1333.78 | 72.19 | 1284.22 | 1261.59 | 29.37 | OSF1.50 | 12240.00 | 11110.28 | | | | MinPt-CtCt | |
| | 1334.03 | 73.09 | 1283.88 | 1260.94 | 28.99 | OSF1.50 | 12290.00 | 11109.61 | | | | MINPT-O-EOU | |
| | 1340.27 | 82.77 | 1283.66 | 1257.49 | 25.53 | OSF1.50 | 12760.00 | 11103.29 | | | | MINPT-O-EOU | |
| | 1331.11 | 107.66 | 1257.90 | 1223.45 | 19.26 | OSF1.50 | 13790.00 | 11089.44 | | | | MinPt-CtCt | |
| | 1318.69 | 126.74 | 1232.76 | 1191.95 | 16.10 | OSF1.50 | 14510.00 | 11079.75 | | | | MinPt-CtCt | |
| | 1319.32 | 136.82 | 1226.67 | 1182.50 | 14.89 | OSF1.50 | 14880.00 | 11074.78 | | | | MinPt-CtCt | |
| | 1321.05 | 140.55 | 1225.91 | 1180.50 | 14.50 | OSF1.50 | 15020.00 | 11072.90 | | | | MINPT-O-EOU | |
| | 1305.33 | 161.32 | 1196.34 | 1144.01 | 12.43 | OSF1.50 | 15740.00 | 11063.21 | | | | MinPt-CtCt | |
| | 1305.48 | 161.76 | 1196.20 | 1143.73 | 12.40 | OSF1.50 | 15760.00 | 11062.94 | | | | MINPT-O-EOU | |
| | 1305.68 | 161.96 | 1196.26 | 1143.71 | 12.38 | OSF1.50 | 15770.00 | 11062.81 | | | | MinPt-O-ADP | |
| | 1311.80 | 163.59 | 1201.31 | 1148.21 | 12.31 | OSF1.50 | 15870.00 | 11061.47 | | | | MinPt-O-SF | |
| | 1327.04 | 164.45 | 1216.02 | 1162.59 | 12.38 | OSF1.50 | 15978.96 | 11060.00 | | | | TD | |
| Cimarex Lea 7 Federal Com 1H XEM+MWD Surveys 0ft - 15433ft MD (Def Survey) | | | | | | | | | | | | | Pass |
| | 3461.39 | 32.81 | 3458.89 | 3428.58 | N/A | MAS = 10.00 (m) | 0.00 | 0.00 | | | | Surface | |
| | 3461.38 | 32.81 | 3458.88 | 3428.57 | N/A | MAS = 10.00 (m) | 10.00 | 10.00 | | | | MinPts | |
| | 3461.39 | 32.81 | 3458.89 | 3428.58 | N/A | MAS = 10.00 (m) | 26.00 | 26.00 | | | | WRP | |
| | 3461.72 | 32.81 | 3457.02 | 3428.91 | 1576.68 | MAS = 10.00 (m) | 510.00 | 510.00 | | | | MinPts | |
| | 3462.22 | 32.81 | 3453.37 | 3429.41 | 544.83 | MAS = 10.00 (m) | 1450.00 | 1450.00 | | | | MinPts | |
| | 3464.87 | 32.81 | 3451.62 | 3432.06 | 322.17 | MAS = 10.00 (m) | 2350.00 | 2350.00 | | | | MINPT-O-EOU | |
| | 2650.76 | 50.45 | 2615.76 | 2600.30 | 85.63 | OSF1.50 | 9170.00 | 9051.99 | | | | MinPt-O-SF | |
| | 2647.28 | 50.14 | 2612.49 | 2597.14 | 86.13 | OSF1.50 | 9310.00 | 9191.77 | | | | MinPts | |
| | 2647.27 | 50.10 | 2612.50 | 2597.17 | 86.20 | OSF1.50 | 9320.00 | 9201.77 | | | | MinPt-CtCt | |
| | 2649.84 | 50.13 | 2615.05 | 2599.71 | 86.21 | OSF1.50 | 9440.00 | 9321.76 | | | | MinPt-O-SF | |
| | 2642.14 | 51.94 | 2606.14 | 2590.20 | 82.74 | OSF1.50 | 9810.00 | 9691.76 | | | | MinPt-CtCt | |
| | 2642.18 | 52.07 | 2606.09 | 2590.10 | 82.51 | OSF1.50 | 9830.00 | 9711.76 | | | | MINPT-O-EOU | |
| | 2642.23 | 52.14 | 2606.10 | 2590.09 | 82.40 | OSF1.50 | 9840.00 | 9721.76 | | | | MinPt-O-ADP | |
| | 2480.93 | 182.92 | 2357.53 | 2298.00 | 20.80 | OSF1.50 | 14150.00 | 11084.60 | | | | MinPt-CtCt | |
| | 2393.25 | 312.47 | 2183.44 | 2080.77 | 11.63 | OSF1.50 | 15740.00 | 11063.21 | | | | MinPt-CtCt | |
| | 2393.27 | 312.53 | 2183.43 | 2080.74 | 11.63 | OSF1.50 | 15750.00 | 11063.08 | | | | MinPts | |
| | 2394.02 | 312.72 | 2184.05 | 2081.30 | 11.63 | OSF1.50 | 15800.00 | 11062.41 | | | | MinPt-O-SF | |
| | 2405.25 | 312.42 | 2195.50 | 2092.83 | 11.69 | OSF1.50 | 15978.96 | 11060.00 | | | | TD | |

# PECOS DISTRICT
# DRILLING CONDITIONS OF APPROVAL

| | |
|---|---|
| **OPERATOR'S NAME:** | **Cimarex Energy Company** |
| **LEASE NO.:** | **NMNM128835** |
| **WELL NAME & NO.:** | **Lea 7 Federal Com 29H** |
| **SURFACE HOLE FOOTAGE:** | **191'/S & 1160'/E** |
| **BOTTOM HOLE FOOTAGE** | **100'/N & 1980'/E** |
| **LOCATION:** | **Section 7, T20S, R35E, NMPM** |
| **COUNTY:** | **Lea County, New Mexico** |

COA

**All previous COAs still apply expect the following:**

| | | | |
|---|---|---|---|
| H2S | ◉ Yes | ○ No | |
| Potash | ◉ None | ○ Secretary | ○ R-111-P |
| Cave/Karst Potential | ◉ Low | ○ Medium | ○ High |
| Variance | ○ None | ◉ Flex Hose | ○ Other |
| Wellhead | ○ Conventional | ◉ Multibowl | ○ Both |
| Other | ☐ 4 String Area | ☑ Capitan Reef | ☐ WIPP |

**A. Hydrogen Sulfide**

A Hydrogen Sulfide (H2S) Drilling Plan shall be activated 500 feet prior to drilling into the **Yates and Seven Rivers** formations. 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**

1. The **13-3/8** inch surface casing shall be set at approximately **1780** feet (a minimum of 25 feet 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.

**Operator shall filled 1/3rd casing with fluid while running intermediate casing to maintain collapse safety factor.**

2. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is: 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.**Additional cement maybe required. Excess calculates to 23%.**

Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.

❖ **Special Capitan Reef requirements.** If lost circulation (50% or greater) occurs below the Base of the Salt, the operator shall do the following:
**(Use this for 3 string wells in the Capitan Reef, if 4 string well ensure FW based mud used across the capitan interval)**

- Switch to fresh water mud to protect the Capitan Reef and use fresh water mud until setting the intermediate casing. The appropriate BLM office is to be notified for a PET to witness the switch to fresh water.

- Daily drilling reports from the Base of the Salt to the setting of the intermediate casing are to be submitted to the BLM CFO engineering staff via e-mail by 0800 hours each morning. Any lost circulation encountered is to be recorded on these drilling reports. The daily drilling report should show mud volume per shift/tour. Failure to submit these reports will result in an Incidence of Non-Compliance being issued for failure to comply with the Conditions of Approval. If not already planned, the operator shall run a caliper survey for the intermediate well bore and submit to the appropriate BLM office.

**Operator shall filled 1/3rd casing with fluid while running intermediate casing to maintain collapse safety factor.**

3. The minimum required fill of cement behind the **5-1/2** inch production casing is:
   - Cement should tie-back at least 50 feet above the Capitan Reef (**Top of Capitan 4000'**) into previous casing string. Operator shall provide method of verification. **Additional cement maybe required. Excess calculates to 1%.**

**ZS 111418**

# 203507O SUNDRY LEA 7 FEDERAL COM 29H 30015 NMNM128835 CIMAREX ENERGY 12-55 443838 11142018 ZS

Cap KFC

| 13 3/8 | surface csg in a | 17 1/2 | inch hole. | | Design Factors | | SURFACE | |
|---|---|---|---|---|---|---|---|---|
| Segment | #/ft | Grade | Coupling | Joint | Collapse | Burst | Length | Weight |
| "A" | 54.50 | J 55 | ST&C | 5.30 | 1.39 | 0.9 | 1,780 | 97,010 |
| "B" | | | | | | | 0 | 0 |
| w/8.4#/g mud, 30min Sfc Csg Test psig: 1,134 | | | Tail Cmt | does not | circ to sfc. | Totals: | 1,780 | 97,010 |

Comparison of Proposed to Minimum Required Cement Volumes

| Hole Size | Annular Volume | 1 Stage Cmt Sx | 1 Stage CuFt Cmt | Min Cu Ft | 1 Stage % Excess | Drilling Mud Wt | Calc MASP | Req'd BOPE | Min Dist Hole-Cplg |
|---|---|---|---|---|---|---|---|---|---|
| 17 1/2 | 0.6946 | 1094 | 1794 | 1291 | 39 | 8.80 | 1772 | 2M | 1.56 |

Burst Frac Gradient(s) for Segment(s) A, B = , b All > 0.70, OK.

| 9 5/8 | casing inside the | 13 3/8 | | | Design Factors | | INTERMEDIATE | |
|---|---|---|---|---|---|---|---|---|
| Segment | #/ft | Grade | Coupling | Joint | Collapse | Burst | Length | Weight |
| "A" | 40.00 | J 55 | LT&C | 2.27 | 0.85 | 0.76 | 5,720 | 228,800 |
| "B" | | | | | | | 0 | 0 |
| w/8.4#/g mud, 30min Sfc Csg Test psig: | | | | | | Totals: | 5,720 | 228,800 |

The cement volume(s) are intended to achieve a top of 0 ft from surface or a 1780 overlap.

| Hole Size | Annular Volume | 1 Stage Cmt Sx | 1 Stage CuFt Cmt | Min Cu Ft | 1 Stage % Excess | Drilling Mud Wt | Calc MASP | Req'd BOPE | Min Dist Hole-Cplg |
|---|---|---|---|---|---|---|---|---|---|
| 12 1/4 | 0.3132 | look ↘ | 0 | 1898 | | 10.20 | 2738 | 3M | 0.81 |

Class 'C' tail cmt yld > 1.35

Burst Frac Gradient(s) for Segment(s): A, B, C, D = 0.69, b, c, d

<0.70 a Problem!!

ALT. COLLAPSE SF: 0.85*1.5=1.27

| 5 1/2 | casing inside the | 9 5/8 | A Buoyant | | Design Factors | | PRODUCTION | |
|---|---|---|---|---|---|---|---|---|
| Segment | #/ft | Grade | Coupling | Joint | Collapse | Burst | Length | Weight |
| "A" | 17.00 | L 80 | LT&C | 2.21 | 1.27 | 1.5 | 10,557 | 179,469 |
| "B" | 17.00 | L 80 | BUTT | 5.01 | 1.09 | 1.5 | 5,422 | 92,174 |
| w/8.4#/g mud, 30min Sfc Csg Test psig: 592 | | | | | | Totals: | 15,979 | 271,643 |
| B would be: | | | | 46.43 | 1.22 | if it were a vertical wellbore. | | |

| No Pilot Hole Planned | MTD | Max VTD | Csg VD | Curve KOP | Dogleg° | Severity° | MEOC |
|---|---|---|---|---|---|---|---|
| | 15979 | 11060 | 11060 | 10557 | 90 | 12 | 11307 |

The cement volume(s) are intended to achieve a top of 3950 ft from surface or a 1770 overlap.

| Hole Size | Annular Volume | 1 Stage Cmt Sx | 1 Stage CuFt Cmt | Min Cu Ft | 1 Stage % Excess | Drilling Mud Wt | Calc MASP | Req'd BOPE | Min Dist Hole-Cplg |
|---|---|---|---|---|---|---|---|---|---|
| 8 3/4 | 0.2526 | 1568 | 3096 | 3059 | 1 | 9.00 | | | 1.35 |

Class 'H' tail cmt yld > 1.20

VERTICAL CURVE COLLAPSE SF IS TOO CONSERVATIVE.