

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENTFORM APPROVED
OMB NO. 1004-0137
Expires: January 31, 2018**SUNDRY NOTICES AND REPORTS ON WELLS**
*Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.*5. Lease Serial No.
NMNM26394

6. If Indian, Allottee or Tribe Name

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

SUBMIT IN TRIPLICATE - Other instructions on page 2

1. Type of Well

☐ Oil Well ☒ Gas Well ☐ Other

2. Name of Operator

CIMAREX ENERGY COMPANY

Contact: ARICKA EASTERLING

E-Mail: aeasterling@cimarex.com

3a. Address

600 N. MARIENFELD SUITE 600
MIDLAND, TX 79701

3b. Phone No. (include area code)

Ph: 918.560.7060

8. Well Name and No.

VACA DRAW 20-17 FEDERAL 3H

9. API Well No.

30-025-44137-00-X1

Field and Pool or Exploratory Area
WILDCAT;WOLFCAMP

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

Sec 20 T25S R33E SESW 390FSL 1930FWL
32.109905 N Lat, 103.596619 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 Plans	☐ Plug and Abandon	☐ Temporarily Abandon	Change to Original A
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	PD

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 of the Vaca Draw 20-17 Federal 3H well

Approved:

BHL: 330 FNL & 1634 FWL

Proposed

BHL: 330 FNL & 1613 FWL

Please see attached plat, directional plan, and drilling plan for changes due to the BHL move.

Cimarex is also requesting approval to change from a 10K BOP system to a 5K BOP System. Please see attached procedure.

**SEE ATTACHED FOR
CONDITIONS OF APPROVAL**

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

Electronic Submission #420696 verified by the BLM Well Information System

For CIMAREX ENERGY COMPANY, sent to the Hobbs

Committed to AFMSS for processing by PRISCILLA PEREZ on 05/21/2018 (18PP1061SE)

Name (Printed/Typed) ARICKA EASTERLING

Title REGULATORY ANALYST

Signature (Electronic Submission)

Date 05/18/2018

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By ZOTA STEVENS

Title PETROLEUM ENGINEER

Date 07/18/2018

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 ****

1. Geological Formations

TVD of target 12,690
MD at TD 22,343

Pilot Hole TD N/A
Deepest expected fresh water

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone	Hazards
Rustler	984	N/A	
Salado	1128	N/A	
Castille	4687	N/A	
Bell Canyon	4956	N/A	
Cherry Canyon	5974	Hydrocarbons	
Brushy Canyon	7484	Hydrocarbons	
Bone Spring	9040	Hydrocarbons	
2nd Bone Spring Sand	10573	Hydrocarbons	
3rd Bone Spring Sand	11726	Hydrocarbons	
Wolfcamp	12196	Hydrocarbons	
Wolfcamp A1 Shale	12361	Hydrocarbons	

2. Casing Program

Hole Size	Casing Depth From	Casing Depth To	Casing Size	Weight (lb/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
14 3/4	0	1034 1050	10-3/4"	40.50	J-55	BT&C	3.29	6.51	14.79
9 7/8	0	12920	7-5/8"	29.70	L-80	BT&C	2.37	1.14	1.77
6 3/4	0	12021	5-1/2"	23.00	P-110	LT&C	1.86	1.74	2.89
6 3/4	12022	22343	5"	18.00	P-110	BT&C	1.67	1.69	92.33
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet

TVD was used on all calculations.

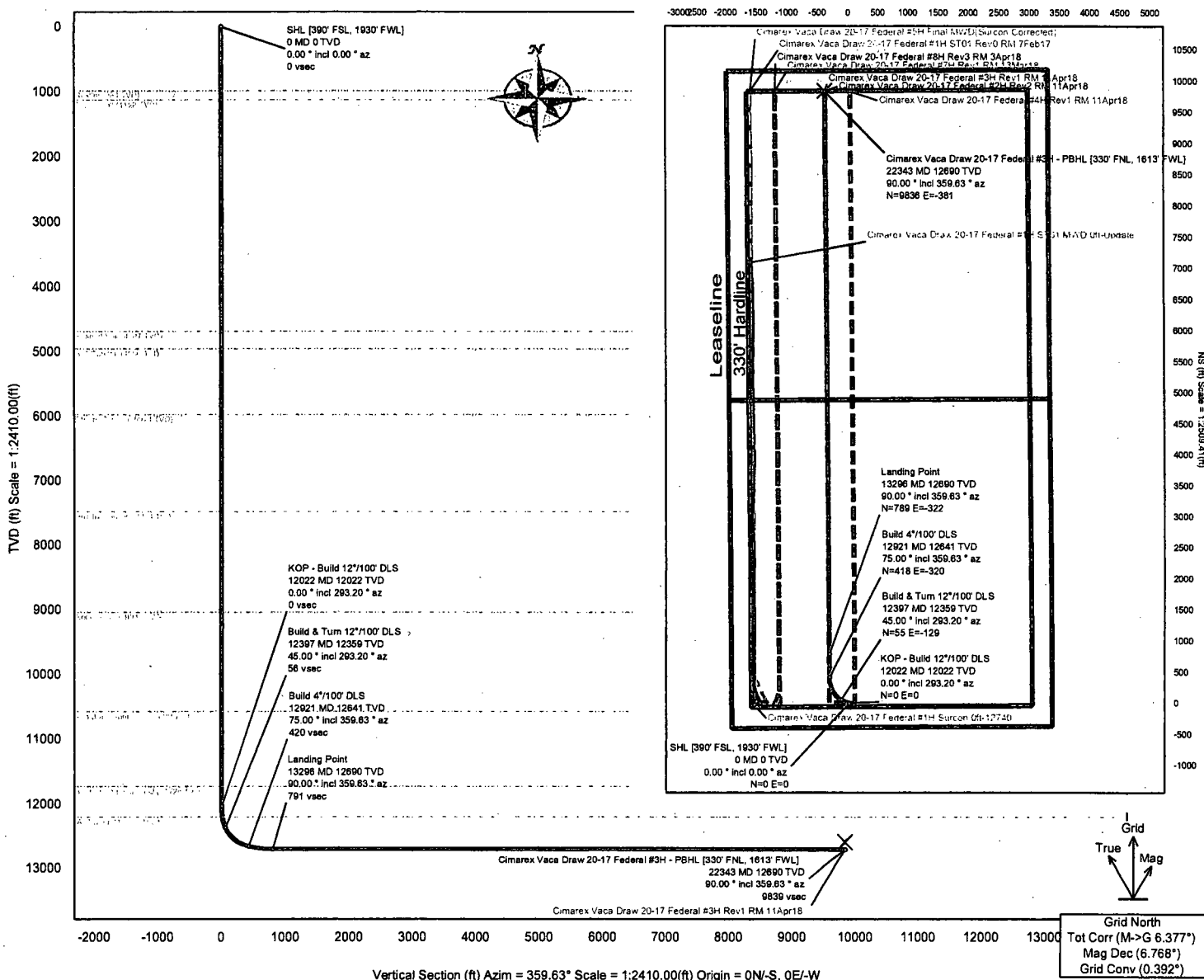
All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

Request Variance for 5-1/2" x 7-5/8" annular clearance. The portion that does not meet clearance will not be cemented

	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

Borehole:	Well:	Field:	Structure:
Original Borehole	Cimarex Vaca Draw 20-17 Federal #3H	NM Lea County (NAD 83)	Cimarex Vaca Draw 20-17 Federal #3H

Gravity & Magnetic Parameters		Surface Location		Miscellaneous	
Model:	HDGM 2016	Dip:	59.776°	Date:	11-Apr-2018
MagDec:	6.768°	FS:	47688.148nT	Gravity FS:	988.43mg (0.00005 Based)
		NAD83 New Mexico State Plane, Eastern Zone, US Feet		Cimarex Vaca Draw 20-17 Federal #3H Rev1 RM 11Apr18	
		Lat: N 32 6 35.68		TVD Ref: RKB(9442ft above MSL)	
		Northing: 404489.450US		Plan: Cimarex Vaca Draw 20-17 Federal #3H Rev1 RM 11Apr18	
		Easting: 769441.218US		EW (ft) Scale = 1:2500.41(ft)	
		Scale Fact: 0.99996888			



Critical Points								
Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL [390° FSL, 1930° FWL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Rustler	984.00	0.00	293.20	984.00	0.00	0.00	0.00	0.00
Top of Salt	1128.00	0.00	293.20	1128.00	0.00	0.00	0.00	0.00
Base of Salt	4687.00	0.00	293.20	4687.00	0.00	0.00	0.00	0.00
Bell Canyon	4956.00	0.00	293.20	4956.00	0.00	0.00	0.00	0.00
Cherry Canyon	5974.00	0.00	293.20	5974.00	0.00	0.00	0.00	0.00
Brushy Canyon	7484.00	0.00	293.20	7484.00	0.00	0.00	0.00	0.00
Bone Spring	9040.00	0.00	293.20	9040.00	0.00	0.00	0.00	0.00
2nd Bone Spring Sand	10573.00	0.00	293.20	10573.00	0.00	0.00	0.00	0.00
3rd Bone Spring Sand	11728.00	0.00	293.20	11728.00	0.00	0.00	0.00	0.00
KOP - Build 12°/100' DLS	12021.69	0.00	293.20	12021.69	0.00	0.00	0.00	0.00
Wolfcamp	12200.12	21.41	293.20	12196.00	13.17	12.98	-30.29	12.00
Build & Turn 12°/100' DLS	12396.69	45.00	293.20	12359.31	55.91	55.08	-128.54	12.00
Build 4°/100' DLS	12620.58	75.00	359.63	12641.19	420.29	418.23	-320.03	12.00
Landing Point	13295.58	90.00	359.63	12690.00	791.02	788.95	-322.43	4.00
Cimarex Vaca Draw 20-17 Federal #3H - PBHL [330° FNL, 1613° FWL]	22343.12	90.00	359.63	12690.00	9838.56	9836.31	-380.85	0.00

Cimarex Vaca Draw 20-17 Federal #3H Rev1 RM 11Apr18 Proposal

Geodetic Report

(Non-Def Plan)



Report Date: April 12, 2018 - 10:47 AM
Client: Cimarex
Field: NM Lea County (NAD 83)
Structure / Slot: Cimarex Vaca Draw 20-17 Federal #3H / Cimarex Vaca Draw 20-17 Federal #3H
Well: Cimarex Vaca Draw 20-17 Federal #3H
Borehole: Original Borehole
UWI / API#: Unknown / Unknown
Survey Name: Cimarex Vaca Draw 20-17 Federal #3H Rev1 RM 11Apr18
Survey Date: April 13, 2017
Tort / AHD / DDI / ERD Ratio: 122.866 ° / 9991.923 ft / 6.335 / 0.787
Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 6' 35.65906", W 103° 35' 47.81518"
Location Grid N/E Y/X: N 404499.450 ftUS, E 769441.210 ftUS
CRS Grid Convergence Angle: 0.3916 °
Grid Scale Factor: 0.99996868
Version / Patch: 2.10.715.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 359.630 ° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: RKB
TVD Reference Elevation: 3442.000 ft above MSL
Seabed / Ground Elevation: 3418.000 ft above MSL
Magnetic Declination: 6.768 °
Total Gravity Field Strength: 998.4303mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 47898.148 nT
Magnetic Dip Angle: 59.776 °
Declination Date: April 11, 2018
Magnetic Declination Model: HDGM 2018
North Reference: Grid North
Grid Convergence Used: 0.3916 °
Total Corr Mag North->Grid North: 6.3768 °
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 [390' FSL, 1930' FWL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	100.00	0.00	293.20	100.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	200.00	0.00	293.20	200.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	300.00	0.00	293.20	300.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	400.00	0.00	293.20	400.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	500.00	0.00	293.20	500.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	600.00	0.00	293.20	600.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	700.00	0.00	293.20	700.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	800.00	0.00	293.20	800.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	900.00	0.00	293.20	900.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
Rustler	984.00	0.00	293.20	984.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	1000.00	0.00	293.20	1000.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	1100.00	0.00	293.20	1100.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
Top of Salt	1128.00	0.00	293.20	1128.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	1200.00	0.00	293.20	1200.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	1300.00	0.00	293.20	1300.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	1400.00	0.00	293.20	1400.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	1500.00	0.00	293.20	1500.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	1600.00	0.00	293.20	1600.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	1700.00	0.00	293.20	1700.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	1800.00	0.00	293.20	1800.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	1900.00	0.00	293.20	1900.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	2000.00	0.00	293.20	2000.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	2100.00	0.00	293.20	2100.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	2200.00	0.00	293.20	2200.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	2300.00	0.00	293.20	2300.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	

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	293.20	2400.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	2500.00	0.00	293.20	2500.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	2600.00	0.00	293.20	2600.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	2700.00	0.00	293.20	2700.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	2800.00	0.00	293.20	2800.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	2900.00	0.00	293.20	2900.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	3000.00	0.00	293.20	3000.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	3100.00	0.00	293.20	3100.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	3200.00	0.00	293.20	3200.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	3300.00	0.00	293.20	3300.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	3400.00	0.00	293.20	3400.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	3500.00	0.00	293.20	3500.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	3600.00	0.00	293.20	3600.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	3700.00	0.00	293.20	3700.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	3800.00	0.00	293.20	3800.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	3900.00	0.00	293.20	3900.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	4000.00	0.00	293.20	4000.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	4100.00	0.00	293.20	4100.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	4200.00	0.00	293.20	4200.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	4300.00	0.00	293.20	4300.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	4400.00	0.00	293.20	4400.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	4500.00	0.00	293.20	4500.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	4600.00	0.00	293.20	4600.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
Base of Salt	4687.00	0.00	293.20	4687.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	4700.00	0.00	293.20	4700.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	4800.00	0.00	293.20	4800.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	4900.00	0.00	293.20	4900.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
Bell Canyon	4956.00	0.00	293.20	4956.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	5000.00	0.00	293.20	5000.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	5100.00	0.00	293.20	5100.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	5200.00	0.00	293.20	5200.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	5300.00	0.00	293.20	5300.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	5400.00	0.00	293.20	5400.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	5500.00	0.00	293.20	5500.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	5600.00	0.00	293.20	5600.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	5700.00	0.00	293.20	5700.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	5800.00	0.00	293.20	5800.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	5900.00	0.00	293.20	5900.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
Cherry Canyon	5974.00	0.00	293.20	5974.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	6000.00	0.00	293.20	6000.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	6100.00	0.00	293.20	6100.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	6200.00	0.00	293.20	6200.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	6300.00	0.00	293.20	6300.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	6400.00	0.00	293.20	6400.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	6500.00	0.00	293.20	6500.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	6600.00	0.00	293.20	6600.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	6700.00	0.00	293.20	6700.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	6800.00	0.00	293.20	6800.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	6900.00	0.00	293.20	6900.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	7000.00	0.00	293.20	7000.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	7100.00	0.00	293.20	7100.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	7200.00	0.00	293.20	7200.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	7300.00	0.00	293.20	7300.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	7400.00	0.00	293.20	7400.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
Brushy Canyon	7484.00	0.00	293.20	7484.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	7500.00	0.00	293.20	7500.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	7600.00	0.00	293.20	7600.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	7700.00	0.00	293.20	7700.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	
	7800.00	0.00	293.20	7800.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66 W 103 35 47.82	

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 ° ' ")
	7900.00	0.00	293.20	7900.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	8000.00	0.00	293.20	8000.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	8100.00	0.00	293.20	8100.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	8200.00	0.00	293.20	8200.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	8300.00	0.00	293.20	8300.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	8400.00	0.00	293.20	8400.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	8500.00	0.00	293.20	8500.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	8600.00	0.00	293.20	8600.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	8700.00	0.00	293.20	8700.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	8800.00	0.00	293.20	8800.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	8900.00	0.00	293.20	8900.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	9000.00	0.00	293.20	9000.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
Bone Spring	9040.00	0.00	293.20	9040.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	9100.00	0.00	293.20	9100.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	9200.00	0.00	293.20	9200.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	9300.00	0.00	293.20	9300.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	9400.00	0.00	293.20	9400.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	9500.00	0.00	293.20	9500.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	9600.00	0.00	293.20	9600.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	9700.00	0.00	293.20	9700.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	9800.00	0.00	293.20	9800.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	9900.00	0.00	293.20	9900.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	10000.00	0.00	293.20	10000.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	10100.00	0.00	293.20	10100.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	10200.00	0.00	293.20	10200.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	10300.00	0.00	293.20	10300.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	10400.00	0.00	293.20	10400.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	10500.00	0.00	293.20	10500.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
2nd Bone Spring Sand	10573.00	0.00	293.20	10573.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	10600.00	0.00	293.20	10600.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	10700.00	0.00	293.20	10700.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	10800.00	0.00	293.20	10800.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	10900.00	0.00	293.20	10900.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	11000.00	0.00	293.20	11000.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	11100.00	0.00	293.20	11100.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	11200.00	0.00	293.20	11200.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	11300.00	0.00	293.20	11300.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	11400.00	0.00	293.20	11400.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	11500.00	0.00	293.20	11500.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	11600.00	0.00	293.20	11600.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	11700.00	0.00	293.20	11700.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
3rd Bone Spring Sand	11726.00	0.00	293.20	11726.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	11800.00	0.00	293.20	11800.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	11900.00	0.00	293.20	11900.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	12000.00	0.00	293.20	12000.00	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
KOP - Build 12°/100' DLS	12021.69	0.00	293.20	12021.69	0.00	0.00	0.00	0.00	404499.45	769441.21	N 32 6 35.66	W 103 35 47.82
	12100.00	9.40	293.20	12099.65	2.56	2.52	-5.89	12.00	404501.97	769435.32	N 32 6 35.68	W 103 35 47.88
	12200.00	21.40	293.20	12195.88	13.16	12.96	-30.25	12.00	404512.41	769410.96	N 32 6 35.79	W 103 35 48.17
Wolfcamp	12200.12	21.41	293.20	12196.00	13.17	12.98	-30.29	12.00	404512.43	769410.92	N 32 6 35.79	W 103 35 48.17
	12300.00	33.40	293.20	12284.51	31.52	31.05	-72.47	12.00	404530.50	769368.75	N 32 6 35.97	W 103 35 48.66
Build & Turn 12°/100' DLS	12396.69	45.00	293.20	12359.31	55.91	55.08	-128.54	12.00	404554.53	769312.67	N 32 6 36.21	W 103 35 49.31
	12400.00	45.04	293.75	12361.65	56.85	56.01	-130.69	12.00	404555.46	769310.53	N 32 6 36.22	W 103 35 49.33
	12500.00	47.53	310.03	12431.00	95.36	94.12	-191.53	12.00	404593.57	769249.68	N 32 6 36.60	W 103 35 50.03
	12600.00	52.09	324.58	12495.72	151.76	150.19	-242.82	12.00	404649.64	769198.40	N 32 6 37.16	W 103 35 50.63
	12700.00	58.22	337.18	12552.98	223.60	221.78	-282.31	12.00	404721.22	769158.91	N 32 6 37.87	W 103 35 51.08

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 ° ' ")
Build 4"/100' DLS	12800.00	65.42	348.09	12600.29	307.74	305.75	-308.28	12.00	404805.19	769132.94	N 32 6 38.71	W 103 35 51.37
	12900.00	73.32	357.75	12635.57	400.49	398.44	-319.58	12.00	404897.88	769121.64	N 32 6 39.62	W 103 35 51.50
	12920.58	75.00	359.63	12641.19	420.29	418.23	-320.03	12.00	404917.66	769121.19	N 32 6 39.82	W 103 35 51.50
	13000.00	78.18	359.63	12659.61	497.53	495.47	-320.53	4.00	404994.91	769120.69	N 32 6 40.58	W 103 35 51.50
Landing Point	13100.00	82.18	359.63	12676.67	596.05	593.98	-321.17	4.00	405093.41	769120.05	N 32 6 41.56	W 103 35 51.50
	13200.00	86.18	359.63	12686.81	695.51	693.45	-321.81	4.00	405192.87	769119.41	N 32 6 42.54	W 103 35 51.50
	13295.58	90.00	359.63	12690.00	791.02	788.95	-322.43	4.00	405288.37	769118.79	N 32 6 43.49	W 103 35 51.50
	13300.00	90.00	359.63	12690.00	795.44	793.37	-322.46	0.00	405292.80	769118.76	N 32 6 43.53	W 103 35 51.50
	13400.00	90.00	359.63	12690.00	895.44	893.37	-323.10	0.00	405392.79	769118.12	N 32 6 44.52	W 103 35 51.50
	13500.00	90.00	359.63	12690.00	995.44	993.37	-323.75	0.00	405492.79	769117.47	N 32 6 45.51	W 103 35 51.50
	13600.00	90.00	359.63	12690.00	1095.44	1093.37	-324.39	0.00	405592.78	769116.83	N 32 6 46.50	W 103 35 51.50
	13700.00	90.00	359.63	12690.00	1195.44	1193.36	-325.04	0.00	405692.77	769116.18	N 32 6 47.49	W 103 35 51.50
	13800.00	90.00	359.63	12690.00	1295.44	1293.36	-325.68	0.00	405792.77	769115.54	N 32 6 48.48	W 103 35 51.50
	13900.00	90.00	359.63	12690.00	1395.44	1393.36	-326.33	0.00	405892.76	769114.89	N 32 6 49.47	W 103 35 51.50
	14000.00	90.00	359.63	12690.00	1495.44	1493.36	-326.98	0.00	405992.76	769114.24	N 32 6 50.46	W 103 35 51.50
	14100.00	90.00	359.63	12690.00	1595.44	1593.36	-327.62	0.00	406092.75	769113.60	N 32 6 51.45	W 103 35 51.50
	14200.00	90.00	359.63	12690.00	1695.44	1693.35	-328.27	0.00	406192.75	769112.95	N 32 6 52.44	W 103 35 51.50
	14300.00	90.00	359.63	12690.00	1795.44	1793.35	-328.91	0.00	406292.74	769112.31	N 32 6 53.43	W 103 35 51.50
	14400.00	90.00	359.63	12690.00	1895.44	1893.35	-329.56	0.00	406392.74	769111.66	N 32 6 54.42	W 103 35 51.50
	14500.00	90.00	359.63	12690.00	1995.44	1993.35	-330.21	0.00	406492.73	769111.02	N 32 6 55.41	W 103 35 51.50
	14600.00	90.00	359.63	12690.00	2095.44	2093.35	-330.85	0.00	406592.73	769110.37	N 32 6 56.40	W 103 35 51.50
	14700.00	90.00	359.63	12690.00	2195.44	2193.34	-331.50	0.00	406692.72	769109.72	N 32 6 57.38	W 103 35 51.50
	14800.00	90.00	359.63	12690.00	2295.44	2293.34	-332.14	0.00	406792.72	769109.08	N 32 6 58.37	W 103 35 51.49
	14900.00	90.00	359.63	12690.00	2395.44	2393.34	-332.79	0.00	406892.71	769108.43	N 32 6 59.36	W 103 35 51.49
	15000.00	90.00	359.63	12690.00	2495.44	2493.34	-333.43	0.00	406992.70	769107.79	N 32 7 0.35	W 103 35 51.49
	15100.00	90.00	359.63	12690.00	2595.44	2593.34	-334.08	0.00	407092.70	769107.14	N 32 7 1.34	W 103 35 51.49
	15200.00	90.00	359.63	12690.00	2695.44	2693.33	-334.73	0.00	407192.69	769106.50	N 32 7 2.33	W 103 35 51.49
	15300.00	90.00	359.63	12690.00	2795.44	2793.33	-335.37	0.00	407292.69	769105.85	N 32 7 3.32	W 103 35 51.49
	15400.00	90.00	359.63	12690.00	2895.44	2893.33	-336.02	0.00	407392.68	769105.20	N 32 7 4.31	W 103 35 51.49
	15500.00	90.00	359.63	12690.00	2995.44	2993.33	-336.66	0.00	407492.68	769104.56	N 32 7 5.30	W 103 35 51.49
	15600.00	90.00	359.63	12690.00	3095.44	3093.33	-337.31	0.00	407592.67	769103.91	N 32 7 6.29	W 103 35 51.49
	15700.00	90.00	359.63	12690.00	3195.44	3193.32	-337.95	0.00	407692.67	769103.27	N 32 7 7.28	W 103 35 51.49
	15800.00	90.00	359.63	12690.00	3295.44	3293.32	-338.60	0.00	407792.66	769102.62	N 32 7 8.27	W 103 35 51.49
	15900.00	90.00	359.63	12690.00	3395.44	3393.32	-339.25	0.00	407892.66	769101.98	N 32 7 9.26	W 103 35 51.49
	16000.00	90.00	359.63	12690.00	3495.44	3493.32	-339.89	0.00	407992.65	769101.33	N 32 7 10.25	W 103 35 51.49
	16100.00	90.00	359.63	12690.00	3595.44	3593.31	-340.54	0.00	408092.64	769100.68	N 32 7 11.24	W 103 35 51.49
	16200.00	90.00	359.63	12690.00	3695.44	3693.31	-341.18	0.00	408192.64	769100.04	N 32 7 12.23	W 103 35 51.49
	16300.00	90.00	359.63	12690.00	3795.44	3793.31	-341.83	0.00	408292.63	769099.39	N 32 7 13.22	W 103 35 51.49
	16400.00	90.00	359.63	12690.00	3895.44	3893.31	-342.47	0.00	408392.63	769098.75	N 32 7 14.21	W 103 35 51.49
	16500.00	90.00	359.63	12690.00	3995.44	3993.31	-343.12	0.00	408492.62	769098.10	N 32 7 15.20	W 103 35 51.49
	16600.00	90.00	359.63	12690.00	4095.44	4093.30	-343.77	0.00	408592.62	769097.46	N 32 7 16.19	W 103 35 51.49
	16700.00	90.00	359.63	12690.00	4195.44	4193.30	-344.41	0.00	408692.61	769096.81	N 32 7 17.18	W 103 35 51.49
	16800.00	90.00	359.63	12690.00	4295.44	4293.30	-345.06	0.00	408792.61	769096.16	N 32 7 18.16	W 103 35 51.49
	16900.00	90.00	359.63	12690.00	4395.44	4393.30	-345.70	0.00	408892.60	769095.52	N 32 7 19.15	W 103 35 51.49
	17000.00	90.00	359.63	12690.00	4495.44	4493.30	-346.35	0.00	408992.60	769094.87	N 32 7 20.14	W 103 35 51.49
	17100.00	90.00	359.63	12690.00	4595.44	4593.29	-346.99	0.00	409092.59	769094.23	N 32 7 21.13	W 103 35 51.48
	17200.00	90.00	359.63	12690.00	4695.44	4693.29	-347.64	0.00	409192.59	769093.58	N 32 7 22.12	W 103 35 51.48
	17300.00	90.00	359.63	12690.00	4795.44	4793.29	-348.29	0.00	409292.58	769092.94	N 32 7 23.11	W 103 35 51.48
	17400.00	90.00	359.63	12690.00	4895.44	4893.29	-348.93	0.00	409392.57	769092.29	N 32 7 24.10	W 103 35 51.48
	17500.00	90.00	359.63	12690.00	4995.44	4993.29	-349.58	0.00	409492.57	769091.64	N 32 7 25.09	W 103 35 51.48
	17600.00	90.00	359.63	12690.00	5095.44	5093.28	-350.22	0.00	409592.56	769091.00	N 32 7 26.08	W 103 35 51.48
	17700.00	90.00	359.63	12690.00	5195.44	5193.28	-350.87	0.00	409692.56	769090.35	N 32 7 27.07	W 103 35 51.48
	17800.00	90.00	359.63	12690.00	5295.44	5293.28	-351.52	0.00	409792.55	769089.71	N 32 7 28.06	W 103 35 51.48
	17900.00	90.00	359.63	12690.00	5395.44	5393.28	-352.16	0.00	409892.55	769089.06	N 32 7 29.05	W 103 35 51.48
	18000.00	90.00	359.63	12690.00	5495.44	5493.28	-352.81	0.00	409992.54	769088.42	N 32 7 30.04	W 103 35 51.48
	18100.00	90.00	359.63	12690.00	5595.44	5593.27	-353.45	0.00	410092.54	769087.77	N 32 7 31.03	W 103 35 51.48
	18200.00	90.00	359.63	12690.00	5695.44	5693.27	-354.10	0.00	410192.53	769087.12	N 32 7 32.02	W 103 35 51.48
	18300.00	90.00	359.63	12690.00	5795.44	5793.27	-354.74	0.00	410292.53	769086.48	N 32 7 33.01	W 103 35 51.48

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 ° ' ")
	18400.00	90.00	359.63	12690.00	5895.44	5893.27	-355.39	0.00	410392.52	769085.83	N 32 7 34.00 W	103 35 51.48
	18500.00	90.00	359.63	12690.00	5995.44	5993.26	-356.04	0.00	410492.51	769085.19	N 32 7 34.99 W	103 35 51.48
	18600.00	90.00	359.63	12690.00	6095.44	6093.26	-356.68	0.00	410592.51	769084.54	N 32 7 35.98 W	103 35 51.48
	18700.00	90.00	359.63	12690.00	6195.44	6193.26	-357.33	0.00	410692.50	769083.89	N 32 7 36.97 W	103 35 51.48
	18800.00	90.00	359.63	12690.00	6295.44	6293.26	-357.97	0.00	410792.50	769083.25	N 32 7 37.96 W	103 35 51.48
	18900.00	90.00	359.63	12690.00	6395.44	6393.26	-358.62	0.00	410892.49	769082.60	N 32 7 38.95 W	103 35 51.48
	19000.00	90.00	359.63	12690.00	6495.44	6493.25	-359.26	0.00	410992.49	769081.96	N 32 7 39.93 W	103 35 51.48
	19100.00	90.00	359.63	12690.00	6595.44	6593.25	-359.91	0.00	411092.48	769081.31	N 32 7 40.92 W	103 35 51.48
	19200.00	90.00	359.63	12690.00	6695.44	6693.25	-360.56	0.00	411192.48	769080.67	N 32 7 41.91 W	103 35 51.48
	19300.00	90.00	359.63	12690.00	6795.44	6793.25	-361.20	0.00	411292.47	769080.02	N 32 7 42.90 W	103 35 51.48
	19400.00	90.00	359.63	12690.00	6895.44	6893.25	-361.85	0.00	411392.47	769079.37	N 32 7 43.89 W	103 35 51.47
	19500.00	90.00	359.63	12690.00	6995.44	6993.24	-362.49	0.00	411492.46	769078.73	N 32 7 44.88 W	103 35 51.47
	19600.00	90.00	359.63	12690.00	7095.44	7093.24	-363.14	0.00	411592.46	769078.08	N 32 7 45.87 W	103 35 51.47
	19700.00	90.00	359.63	12690.00	7195.44	7193.24	-363.78	0.00	411692.45	769077.44	N 32 7 46.86 W	103 35 51.47
	19800.00	90.00	359.63	12690.00	7295.44	7293.24	-364.43	0.00	411792.44	769076.79	N 32 7 47.85 W	103 35 51.47
	19900.00	90.00	359.63	12690.00	7395.44	7393.24	-365.08	0.00	411892.44	769076.15	N 32 7 48.84 W	103 35 51.47
	20000.00	90.00	359.63	12690.00	7495.44	7493.23	-365.72	0.00	411992.43	769075.50	N 32 7 49.83 W	103 35 51.47
	20100.00	90.00	359.63	12690.00	7595.44	7593.23	-366.37	0.00	412092.43	769074.85	N 32 7 50.82 W	103 35 51.47
	20200.00	90.00	359.63	12690.00	7695.44	7693.23	-367.01	0.00	412192.42	769074.21	N 32 7 51.81 W	103 35 51.47
	20300.00	90.00	359.63	12690.00	7795.44	7793.23	-367.66	0.00	412292.42	769073.56	N 32 7 52.80 W	103 35 51.47
	20400.00	90.00	359.63	12690.00	7895.44	7893.23	-368.30	0.00	412392.41	769072.92	N 32 7 53.79 W	103 35 51.47
	20500.00	90.00	359.63	12690.00	7995.44	7993.22	-368.95	0.00	412492.41	769072.27	N 32 7 54.78 W	103 35 51.47
	20600.00	90.00	359.63	12690.00	8095.44	8093.22	-369.60	0.00	412592.40	769071.63	N 32 7 55.77 W	103 35 51.47
	20700.00	90.00	359.63	12690.00	8195.44	8193.22	-370.24	0.00	412692.40	769070.98	N 32 7 56.76 W	103 35 51.47
	20800.00	90.00	359.63	12690.00	8295.44	8293.22	-370.89	0.00	412792.39	769070.33	N 32 7 57.75 W	103 35 51.47
	20900.00	90.00	359.63	12690.00	8395.44	8393.21	-371.53	0.00	412892.38	769069.69	N 32 7 58.74 W	103 35 51.47
	21000.00	90.00	359.63	12690.00	8495.44	8493.21	-372.18	0.00	412992.38	769069.04	N 32 7 59.73 W	103 35 51.47
	21100.00	90.00	359.63	12690.00	8595.44	8593.21	-372.83	0.00	413092.37	769068.40	N 32 8 0.71 W	103 35 51.47
	21200.00	90.00	359.63	12690.00	8695.44	8693.21	-373.47	0.00	413192.37	769067.75	N 32 8 1.70 W	103 35 51.47
	21300.00	90.00	359.63	12690.00	8795.44	8793.21	-374.12	0.00	413292.36	769067.11	N 32 8 2.69 W	103 35 51.47
	21400.00	90.00	359.63	12690.00	8895.44	8893.20	-374.76	0.00	413392.36	769066.46	N 32 8 3.68 W	103 35 51.47
	21500.00	90.00	359.63	12690.00	8995.44	8993.20	-375.41	0.00	413492.35	769065.81	N 32 8 4.67 W	103 35 51.47
	21600.00	90.00	359.63	12690.00	9095.44	9093.20	-376.05	0.00	413592.35	769065.17	N 32 8 5.66 W	103 35 51.47
	21700.00	90.00	359.63	12690.00	9195.44	9193.20	-376.70	0.00	413692.34	769064.52	N 32 8 6.65 W	103 35 51.46
	21800.00	90.00	359.63	12690.00	9295.44	9293.20	-377.35	0.00	413792.34	769063.88	N 32 8 7.64 W	103 35 51.46
	21900.00	90.00	359.63	12690.00	9395.44	9393.19	-377.99	0.00	413892.33	769063.23	N 32 8 8.63 W	103 35 51.46
	22000.00	90.00	359.63	12690.00	9495.44	9493.19	-378.64	0.00	413992.33	769062.59	N 32 8 9.62 W	103 35 51.46
	22100.00	90.00	359.63	12690.00	9595.44	9593.19	-379.28	0.00	414092.32	769061.94	N 32 8 10.61 W	103 35 51.46
	22200.00	90.00	359.63	12690.00	9695.44	9693.19	-379.93	0.00	414192.31	769061.29	N 32 8 11.60 W	103 35 51.46
	22300.00	90.00	359.63	12690.00	9795.44	9793.19	-380.57	0.00	414292.31	769060.65	N 32 8 12.59 W	103 35 51.46

Cimarex Vaca
Draw 20-17
Federal #3H -
PBHL [330'
FNL, 1613'
FWL]

Survey Type: Non-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
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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	0.000	24.000	1/100.000	30.000	30.000		NAL_MWD_IFR1+MS-Depth Only		Original Borehole / Cimarex Vaca Draw 20-17 Federal #3H Rev1 RM 11Apr18	
		1	24.000	22343.123	1/100.000	30.000	30.000		NAL_MWD_IFR1+MS		Original Borehole / Cimarex Vaca Draw 20-17 Federal #3H Rev1	

Drilling 8-3/4" hole below
9-5/8" Casing

5M Annular Preventer

10M Double
Ram BOP

Pipe Rams

Blind Rams

2" Kill Line Valves (2)
with Check Valve

2" Kill Line

3" Manual Choke Valve
and 3" HCR Valve

3" Choke Line

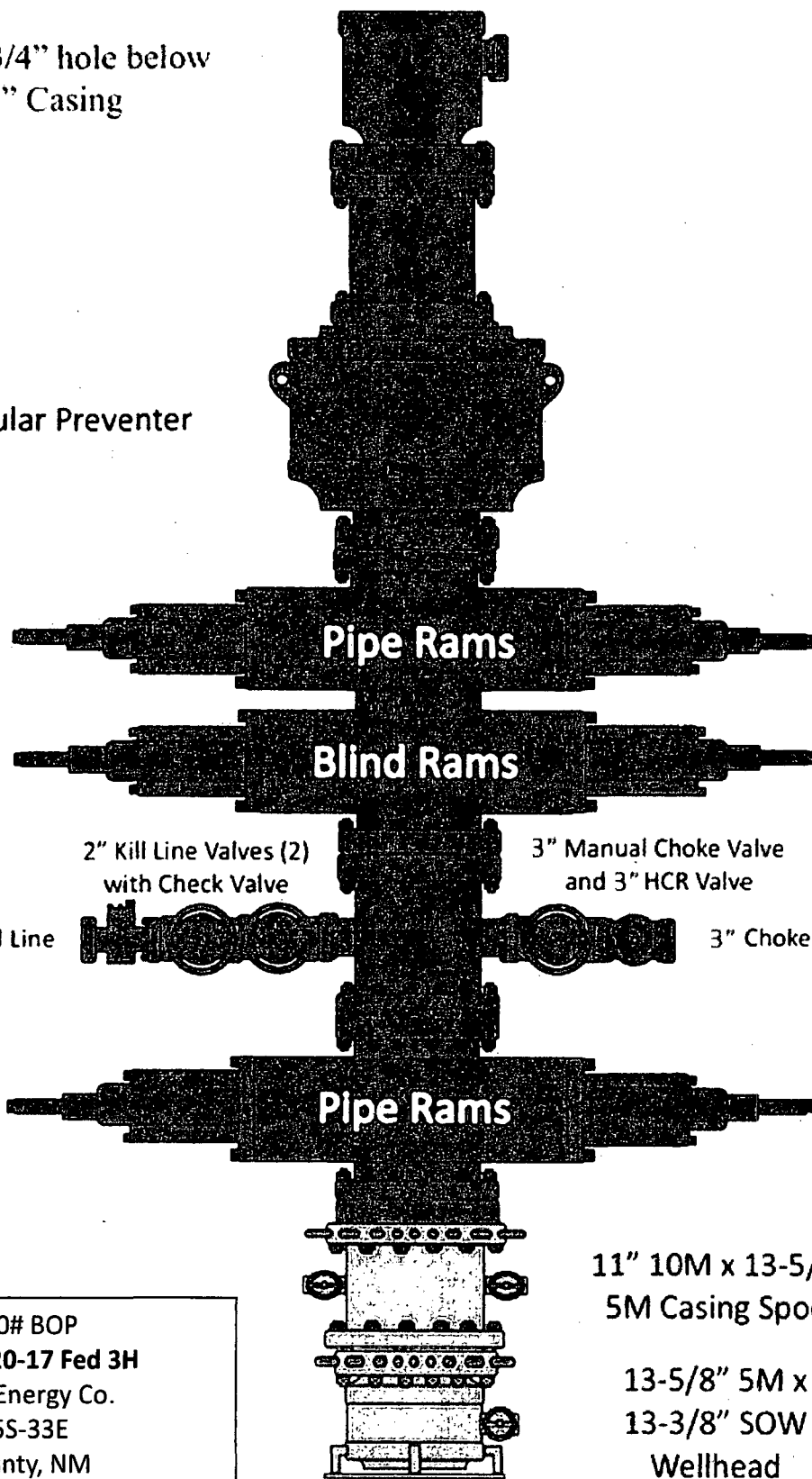
10M Single
Ram BOP

Pipe Rams

10,000# BOP
Vaca Draw 20-17 Fed 3H
Cimarex Energy Co.
20-25S-33E
Lea County, NM

11" 10M x 13-5/8"
5M Casing Spool

13-5/8" 5M x
13-3/8" SOW
Wellhead





Cimarex 10M Well Control Plan

Version 1.0

BOPE Preventer Utilization

The table below displays all BHA components, drill pipe, casing, or open hole that could be present during a required shut in and the associated preventer component that would provide a barrier to flow. It is specific to the hole section that requires a 10M system. The mud system being utilized in the hole will always assumed to be the first barrier to flow. The below table, combined with the mud program, documents that two barriers to flow can be maintained at all times, independent of the rating of the annular preventer.

Drill String Element	OD	Preventer	RWP
4" Drillpipe	4"	Lower Ram 3 1/2" - 5 1/2" VBR*	10M
		Upper Ram 3 1/2" - 5 1/2" VBR*	
4.5" Drillpipe	4.5"	Lower Ram 3 1/2" - 5 1/2" VBR*	10M
		Upper Ram 3 1/2" - 5 1/2" VBR*	
4" HWDP Drillpipe	4"	Lower Ram 3 1/2" - 5 1/2" VBR*	10M
		Upper Ram 3 1/2" - 5 1/2" VBR*	
4.5" HWDP Drillpipe	4.5"	Lower Ram 3 1/2" - 5 1/2" VBR*	10M
		Upper Ram 3 1/2" - 5 1/2" VBR*	
Drill Collars (including non-magnetic)	4.75"	Lower Ram 3 1/2" - 5 1/2" VBR*	10M
	5.25"	Upper Ram 3 1/2" - 5 1/2" VBR*	
Production Casing	5.5"	Lower Ram 3 1/2" - 5 1/2" VBR*	10M
		Upper Ram 3 1/2" - 5 1/2" VBR*	
Production Casing	5"	Lower Ram 3 1/2" - 5 1/2" VBR*	10M
		Upper Ram 3 1/2" - 5 1/2" VBR*	
Production Casing	4.5"	Lower Ram 3 1/2" - 5 1/2" VBR*	10M
		Upper Ram 3 1/2" - 5 1/2" VBR*	
ALL	0-13 5/8"	Annular	5M
Open Hole		Blind Rams	10M

*VBR – Variable Bore Ram

Well Control Procedures

Proper well control response is highly specific to current well conditions and must be adapted based on environment as needed. The procedures below are given in "common" operating conditions to cover the basic and most necessary operations required during the wellbore construction. These include drilling ahead, tripping pipe, tripping BHA, running casing, and pipe out of the hole/open hole. In some of the procedures below, there will be a switch of control from the lesser RWP annular to the appropriate 10M RWP ram. The pressure at which this is done is variable based on overall well conditions that must be evaluated situationally. The pressure that control is switched may be equal to or less than the RWP but at no time will the pressure on the annular preventer exceed the RWP of the annular. The annular will be tested to 5,000 psi. This will be the RWP of the annular preventer.

Shutting In While Drilling

1. Sound alarm to alert crew
2. Space out drill string
3. Shut down pumps
4. Shut in uppermost BOPE preventer (typically the annular preventer) and open HCR.
5. Verify well is shut-in and flow has stopped
6. Notify supervisory personnel
7. Record data (SIDP, SICP, Pit Gain, and Time)
8. Hold pre-job safety meeting and discuss kill procedure

9. If pressure is anticipated to climb to the RWP of the annular preventer during kill procedure, swap control of the well to the upper pipe ram

Shutting In While Tripping

1. Sound alarm and alert crew
2. Install open, full open safety valve and close valve
3. Shut in uppermost BOPE preventer (typically the annular preventer) and open HCR.
4. Verify well is shut-in and flow has stopped
5. Notify supervisory personnel
6. Record data (SIDP, SICP, Pit Gain, and Time)
7. Hold pre-job safety meeting and discuss kill procedure
8. If pressure is anticipated to climb to the RWP of the annular preventer during kill procedure, swap control of the well to the upper pipe ram

Shutting In While Running Casing

1. Sound alarm and alert crew
2. Install circulating swedge. Close high pressure, low torque valves.
3. Shut in uppermost BOPE preventer (typically the annular preventer) and open HCR.
4. Verify well is shut-in and flow has stopped
5. Notify supervisory personnel
6. Record data (SIDP, SICP, Pit Gain, and Time)
7. Hold Pre-job safety meeting and discuss kill procedure
8. If pressure is anticipated to climb to the RWP of the annular preventer during kill procedure, swap control of the well to the upper pipe ram

Shutting in while out of hole

1. Sound alarm
2. Shut-in well: close blind rams
3. Verify well is shut-in and monitor pressures
4. Notify supervisory personnel
5. Record data (SIDP, SICP, Pit Gain, and Time)
6. Hold Pre-job safety meeting and discuss kill procedure

Shutting in prior to pulling BHA through stack

1. Prior to pulling last joint of drill pipe thru the stack space out and check flow. If flowing see steps below.
2. Sound alarm and alert crew
3. Install open, full open safety valve and close valve
4. Shut in upper pipe ram and open HCR.

5. Verify well is shut-in and flow has stopped
6. Notify supervisory personnel
7. Record data (SIDP, SICP, Pit Gain, and Time)
8. Hold pre-job safety meeting and discuss kill procedure

Shutting in while BHA is in the stack and ram preventer and combo immediately available

1. Sound alarm and alert crew
2. Stab Crossover and install open, full open safety valve and close valve
3. Space out drill string with upset just beneath the compatible pipe ram.
4. Shut in upper compatible pipe ram and open HCR.
5. Verify well is shut-in and flow has stopped
6. Notify supervisory personnel
7. Record data (SIDP, SICP, Pit Gain, and Time)
8. Hold pre-job safety meeting and discuss kill procedure

Shutting in while BHA is in the stack and no ram preventer or combo immediately available

1. Sound alarm and alert crew
2. If possible pick up high enough, to pull string clear and follow "Open Hole" scenario
3. If not possible to pick up high enough:
 1. Stab Crossover, make up one joint/stand of drill pipe, and install open, full open safety valve and close valve
4. Space out drill string with upset just beneath the compatible pipe ram.
5. Shut in upper compatible pipe ram and open HCR.
6. Verify well is shut-in and flow has stopped
7. Notify supervisory personnel
8. Record data (SIDP, SICP, Pit Gain, and Time)
9. Hold pre-job safety meeting and discuss kill procedure

PECOS DISTRICT

DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	CIMAREX ENERGY COMPANY
LEASE NO.:	NMNM26394
WELL NAME & NO.:	3H -VACA DRAW 20 17 FEDERAL
SURFACE HOLE FOOTAGE:	390'/S & 1930'/W
BOTTOM HOLE FOOTAGE:	330'/N & 1613'/W
LOCATION:	Section 20 T.25 S., R.33 E., NMP
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

Hydrogen Sulfide (H2S) monitors shall be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.

B. CASING

1. The 13-3/8 inch surface casing shall be set at approximately 1034 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.

Keep the casing 1/3 full while running intermediate casing to maintain collapse safety factor.

2. The minimum required fill of cement behind the 7-5/8 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.

Variance is approved for the annular spacing between 5.5" x 7.625" casing.

3. The minimum required fill of cement behind the 5-1/2 x 5 inch production casing is: Cement should tie-back 200' into the previous casing. Operator shall provide method of verification. **Additional cement maybe required. Excess cement calculates only 17%. Variance for the casing annular clearance is approved.**

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. 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.**
3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the 7-5/8 intermediate casing shoe shall be **10,000 (10M) psi.**

Variance approved to use a 5M annular. The annular must be tested to full working pressure (5000 psi.)

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)

☒ 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 integrity 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 integrity 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.
2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.
3. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.
4. **If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:**
 - a. **Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.**
 - b. **If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.**
 - c. **Manufacturer representative shall install the test plug for the initial BOP test.**
 - d. **If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.**
 - e. **Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.**
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
 - a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not

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

- b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time, except the casing pressure test can be initiated immediately after bumping the plug (only applies to single stage cement jobs).
- c. The tests shall be done by an independent service company utilizing a test plug. The results of the test shall be reported to the appropriate BLM office.
- d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.
- e. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.
- f. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes. This test shall be performed prior to the test at full stack pressure.
- g. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

C. DRILLING MUD

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.

ZS 071818

KFC

10 3/4	surface csg in a	14 3/4	inch hole.	Design Factors			SURFACE		
Segment	#/ft	Grade	Coupling	Body	Collapse	Burst	Length	Weight	
"A"	40.50	J 55	BUTT	15.02	3.34	0.52	1,034	41,877	
"B"							0	0	
w/8.4#/g mud, 30min Sfc Csg Test psig: 1,500			Tail Cmt	does not	circ to sfc.	Totals:	1,034	41,877	
Comparison of Proposed to Minimum Required Cement Volumes									
Hole	Annular	1 Stage	1 Stage	Min	1 Stage	Drilling	Calc	Req'd	Min Dist
Size	Volume	Cmt Sx	CuFt Cmt	Cu Ft	% Excess	Mud Wt	MASP	BOPE	Hole-Cplg
14 3/4	0.5563	517	848	601	41	8.80	3260	5M	1.50

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

7 5/8 casing inside the 10 3/4			<u>Design Factors</u>				<u>INTERMEDIATE</u>		
Segment	#/ft	Grade	Coupling	Body	Collapse	Burst	Length	Weight	
"A"	29.70	L 80	BUTT	1.86	0.8	0.84	12,920	383,724	
"B"							0	0	
w/8.4#/g mud, 30min Sfc Csg Test psig:							Totals:	12,920	383,724
A s would be:				1.82	0.79	if it were a vertical wellbore.			
No Pilot Hole Planned			MTD	Max VTD	Csg VD	Curve KOP	Dogleg°	Severity°	MEOC
			12920	12641	12641	12022	75	-1	0
The cement volume(s) are intended to achieve a top of					0	ft from surface or a		1034	overlap.
Hole	Annular	1 Stage	1 Stage	Min	1 Stage	Drilling	Calc	Req'd	Min Dist
Size	Volume	Cmt Sx	CuFt Cmt	Cu Ft	% Excess	Mud Wt	MASP	BOPE	Hole-Cplg
9 7/8	0.2148	look >	0	2806		9.20	5448	10M	0.69
D V Tool(s):			4950				<u>sum of sx</u>	<u>Σ CuFt</u>	Σ%excess
t by stage % :			46	39			1659	4023	43
Class 'C' tail cmt yld > 1.35							MASP is within 10% of 5000psig, need		
Burst Frac Gradient(s) for Segment(s): A, B, C, D = 0.55, b, c, d									
<0.70 a Problem!!									
ALT. COLLAPSE SF IS GOOD. SF= .80 *1.5= 1.2 .									

Tail cmt										
5 1/2	casing inside the	7 5/8					Design Factors		PRODUCTION	
Segment	#/ft	Grade	Coupling	Joint	Collapse	Burst	Length	Weight		
"A"	23.00	P 110	LT&C	2.23	1.86	1.65	12,021	276,483		
"B"	18.00	P 110	BUTT	10.34	1.55	1.65	10,322	185,796		
w/8.4#/g mud, 30min Sfc Csg Test psig: 2,645						Totals:		22,343	462,279	
B	would be:			48.18	1.63	if it were a vertical wellbore.				
No Pilot Hole Planned		MTD	Max VTD	Csg VD	Curve KOP	Dogleg°	Severity°	MEOC		
		22343	12690	12690	12022	90	7	13296		
The cement volume(s) are intended to achieve a top of				12720	ft from surface or a		200	overlap.		
Hole	Annular	1 Stage	1 Stage	Min	1 Stage	Drilling	Calc	Req'd	Min Dist	
Size	Volume	Cmt Sx	CuFt Cmt	Cu Ft	% Excess	Mud Wt	MASP	BOPE	Hole-Cplg	
6 3/4	0.0835	730	949	810	17	12.50			0.35	
Class 'H' tail cmt yld > 1.20										