

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 3160-4 (AFM) 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.

8. Well Name and No.
VACA DRAW 20-17 FED 13H9. API Well No.
30-025-4529010. Field and Pool or Exploratory Area
UPPER WOLFCAMP11. County or Parish, State
LEA COUNTY, NM

SUBMIT IN TRIPLICATE - Other instructions on page 2

1. Type of Well

☒ Oil Well ☐ Gas Well ☐ Other2. Name of Operator
CIMAREX ENERGY COContact: ARICKA EASTERLING
E-Mail: aeasterling@cimarex.com3a. Address
202 S CHEYENNE AVE, SUITE 1000
TULSA, OK 741033b. Phone No. (include area code)
Ph: 918-581-11114. Location of Well (Footage, Sec., T., R., M., or Survey Description)
Sec 20 T25S R33E SWSW 330FSL 730FWL

NOV 28 2018

RECEIVED

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

TYPE OF SUBMISSION

TYPE OF ACTION

☒ Notice of Intent☐ Subsequent Report☐ Final Abandonment Notice☐ Acidize☐ Alter Casing☐ Casing Repair☐ Change Plans☐ Convert to Injection☐ Deepen☐ Hydraulic Fracturing☐ New Construction☐ Plug and Abandon☐ Plug Back☐ Production (Start/Resume)☐ Reclamation☐ Recomplete☐ Temporarily Abandon☐ Water Disposal☐ Water Shut-Off☐ Well Integrity☒ Other
Change to Original A
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 recompleat 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 recompleat 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, casing & Rig layout.

Approved:

BHL: 330 FSL & 1202 FWL

Proposed

BHL: 100 FNL & 1626 FWL

Approved: Drill 9 7/8" hole from 1034' to 12,600' and run 7 5/8" 29.7# L80 BTC casing from surface to 12,600' *Surface good 11-5-2018 BR*

Proposed: Drill 9 7/8" hole from 1,034' to 11,976' and then 8.75" hole from 11,976' to 12,601'.

Casing will be 7 5/8" 29.7# L80 BTC casing from surface to 11,976' and then 7 5/8" 29.7# L80 Ultra

Eng. Approved by ZS 11/4/18

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

Electronic Submission #441259 verified by the BLM Well Information System
For CIMAREX ENERGY CO, sent to the Hobbs
Committed to AFMSS for processing by MUSTAFA HAQUE on 10/26/2018 ()

Name (Printed/Typed) ARICKA EASTERLING

Title REGULATORY ANALYST

Signature (Electronic Submission)

Date 10/25/2018

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By

Title

Date

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

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)

** OPERATOR-SUBMITTED ** OPERATOR-SUBMITTED ** OPERATOR-SUBMITTED **

Additional data for EC transaction #441259 that would not fit on the form

32. Additional remarks, continued

FJ from 11,976' to 12601'. Cement volumes will not change. Excess will increase due to hole size reduction.

The Rig layout, including v-door and flare line may change depending on rig availability. The pad dimensions and orientation will remain the same. There will be no addition disturbance if a rig layout change is necessary to accommodate the drilling rig.

Cimarex will no longer run a multibowl wellhead as approved on a previous sundry.

Please see attached plat, directional plan, drilling plan & AC Report.

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) 334-6176
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 30-025-45290		2 Pool Code 98180		3 Pool Name WC-025-G09-253309 Upper Wolfcamp (Oil)	
4 Property Code 319775		5 Property Name VACA DRAW 20-17 FEDERAL			6 Well Number 13H
7 OGRID No. 215099		8 Operator Name CIMAREX ENERGY CO.			9 Elevation 3423.0'

10 Surface Location

U/L or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	20	25S	33E		330	SOUTH	730	WEST	LEA

11 Bottom Hole Location If Different From Surface

U/L or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	17	25S	33E		100	NORTH	1626	WEST	LEA
12 Dedicated Acres 640		13 Joint or Infill		14 Consolidation Code		15 Order No.			

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.

16 NOTE

- Distances referenced on plat to section lines are perpendicular
- Basis of Bearing is a Transverse Mercator Projection with a Central Meridian of W103°53'00"

NAD 83 (SURFACE LOCATION)		
LATITUDE	- 32°06'35.06"	(32.109739)
LONGITUDE	- 103°36'01.76"	(103.600489)
NAD 27 (SURFACE LOCATION)		
LATITUDE	- 32°06'34.61"	(32.109614)
LONGITUDE	- 103°36'00.06"	(103.600017)
STATE PLANE NAD 83 (N.M. EAST)		
N	404430.85	E. 768241.87
STATE PLANE NAD 27 (N.M. EAST)		
N	404373.06	E. 727055.72
NAD 83 (BOTTOM HOLE LOCATION)		
LATITUDE	- 32°08'15.29"	(32.137581)
LONGITUDE	- 103°35'51.31"	(103.597586)
NAD 27 (BOTTOM HOLE LOCATION)		
LATITUDE	- 32°08'14.84"	(32.137456)
LONGITUDE	- 103°35'49.61"	(103.597113)
STATE PLANE NAD 83 (N.M. EAST)		
N	414565.47	E. 769071.81
STATE PLANE NAD 27 (N.M. EAST)		
N	414507.43	E. 727886.12

LINE TABLE		
LINE	DIRECTION	LENGTH
L1	N65°46'45"E	981.61'
L2	S89°52'21"W	2646.52'

SCALE
REV: 2 10-18-18
C.M.T. (BHL MOVE)

● = SURFACE HOLE LOCATION
◆ = LANDING POINT/FIRST TAKE POINT
○ = BOTTOM HOLE LOCATION/LAST TAKE POINT
▲ = SECTION CORNER LOCATED

17

20

1626'

730'

730'

100'

SHI

LP/FTF

BHL/LTP

S89°52'03"W
2643.50' (Meas.)

S89°53'00"W
2646.09' (Meas.)

S89°51'18"W
2643.03' (Meas.)

S89°49'36"W
2644.44' (Meas.)

S89°56'49"W
2644.60' (Meas.)

N00°08'59"W
2641.66' (Meas.)

N00°07'35"W
2639.03' (Meas.)

N00°08'25"W
2640.12' (Meas.)

N00°06'50"W
2640.64' (Meas.)

N00°07'58"W
2641.34' (Meas.)

N00°07'26"W
2639.27' (Meas.)

N00°07'18"W
2641.86' (Meas.)

N00°07'50"W
2640.54' (Meas.)

10/24/18

Signature

Aricka Easterling

Printed Name

aeasterling@cimarex.com

E-mail Address

17 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 19, 2017

Date of Survey

Signature and Seal of Professional Surveyor

PAUL BUCHELE
NEW MEXICO
23582
10-18-18
PROFESSIONAL SURVEYOR

Certificate Number

1. Geological Formations

TVD of target 12,430
MD at TD 22,387

Pilot Hole TD N/A
Deepest expected fresh water

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone	Hazards
Rustler	984	N/A	
Top of Salt	1128	N/A	
Base of Salt	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 Target	12361	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
14 3/4	0	1034	1034	10-3/4"	40.50	J-55	BT&C	3.34	6.62	15.02
9 7/8	0	11976	11976	7-5/8"	29.70	L-80	BT&C	2.47	1.19	1.81
8 3/4	11976	12600	12381	7-5/8"	29.70	L-80	Ultra FJ	2.86	1.19	28.6
6 3/4	0	11976	11976	5-1/2"	20.00	L-80	LT&C	1.13	1.18	1.86
6 3/4	11947	22386	12430	5"	18.00	P-110	BT&C	1.66	1.69	70.97

BLM Minimum Safety Factor	1.125	1	1.6 Dry 1.8 Wet
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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.

Y

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?

Y

3. Cementing Program

Casing	# Sks	Wt. lb/gal	Yld ft ³ /sack	H ₂ O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surface	402	13.50	1.72	9.15	15.5	Lead: Class C + Bentonite
	107	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Intermediate Stage 1	594	10.30	3.64	22.18		Lead: Tuned Light + LCM
	207	14.20	1.30	5.86	14:30	Tail: 50:50 (Poz:H) + Salt + Bentonite + Fluid Loss + Dispersant + SMS
Intermediate Stage 2	792	12.90	1.88	9.65	12	Lead: 35:65 (Poz:C) + Salt + Bentonite
Production	737	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 +/- 4,900'.

Casing String	TOC	% Excess
Surface	0	45
Intermediate Stage 1	4900	47
Intermediate Stage 2	0	39
Production	12400	9

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
14 3/4	13 5/8	2M	Annular	X	50% of working pressure
			Blind Ram		2M
			Pipe Ram		
			Double Ram	X	
			Other		
9 7/8	13 5/8	5M	Annular	X	50% of working pressure
			Blind Ram		5M
			Pipe Ram		
			Double Ram	X	
			Other		
6 3/4	13 5/8	10M	Annular	X	50% of working pressure
			Blind Ram		10M
			Pipe Ram	X	
			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.

X Formation integrity test will be performed per Onshore Order #2.
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 1034'	FW Spud Mud	8.30 - 8.80	30-32	N/C
1034' to 12600'	Brine Diesel Emulsion	8.50 - 9.00	30-35	N/C
12600' to 22386'	Oil Based Mud	12.00 - 12.50	50-70	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.

The Brine Emulsion is completely saturated brine fluid that ties diesel into itself to lower the weight of the fluid. The drilling fluid is completely salt saturated.

What will be used to monitor the loss or gain of fluid?	PVT/Pason/Visual Monitoring
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6. Logging and Testing Procedures

Logging, Coring and Testing

☒	Will run GR/CNL from TD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
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☐	No logs are planned based on well control or offset log information.
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☐	Drill stem test?
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☐	Coring?
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Additional Logs Planned	Interval
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7. Drilling Conditions

Condition	
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BH Pressure at deepest TVD	8079 psi
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Abnormal Temperature	No
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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.

☒	H ₂ S is present
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☒	H ₂ S plan is attached
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8. Other Facets of Operation

PERFORMANCE DATA

TMK UP ULTRA™ FJ
Technical Data Sheet

7.625 in

29.70 lbs/ft

L80 HC

Tubular Parameters

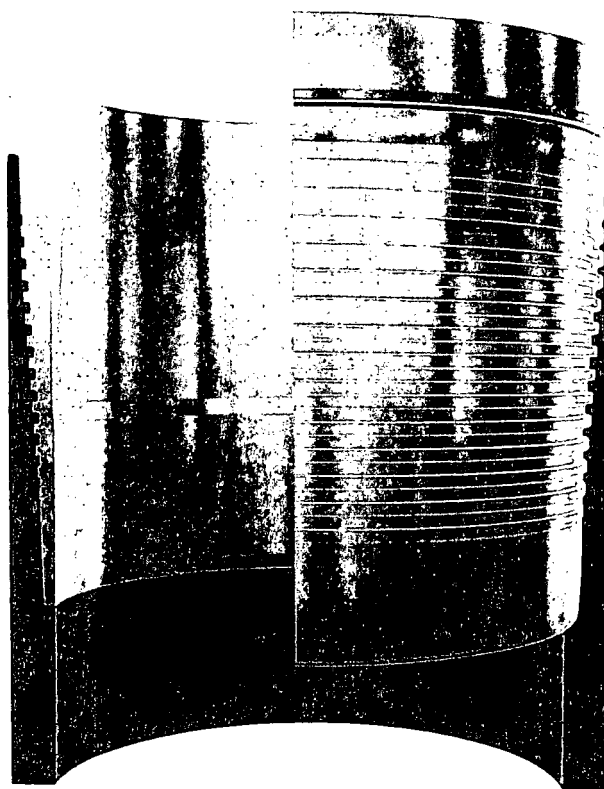
Size	7.625	in	Minimum Yield	80,000	psi
Nominal Weight	29.70	lbs/ft	Minimum Tensile	95,000	psi
Grade	L80 HC		Yield Load	683,000	lbs
PE Weight	29.04	lbs/ft	Tensile Load	811,000	lbs
Wall Thickness	0.375	in	Min. Internal Yield Pressure	6,890	psi
Nominal ID	6.875	in	Collapse Pressure	5,510	psi
Drift Diameter	6.750	in			
Nom. Pipe Body Area	8.541	in ²			

Connection Parameters

Connection OD	7.625	in
Connection ID	6.881	in
Make-Up Loss	4.022	in
Critical Section Area	5.316	in ²
Tension Efficiency	62.2	%
Compression Efficiency	62.2	%
Yield Load in Tension	425,000	lbs
Min. Internal Yield Pressure	6,890	psi
Collapse Pressure	5,510	psi
Uniaxial Bending	30	°/ 100 ft

Make-Up Torques

Min. Make-Up Torque	13,200	ft-lbs
Opt. Make-Up Torque	14,700	ft-lbs
Max. Make-Up Torque	16,200	ft-lbs
Operating Torque	13,200	ft-lbs
Yield Torque	23,500	ft-lbs



Printed on: August-27-2018

NOTE:

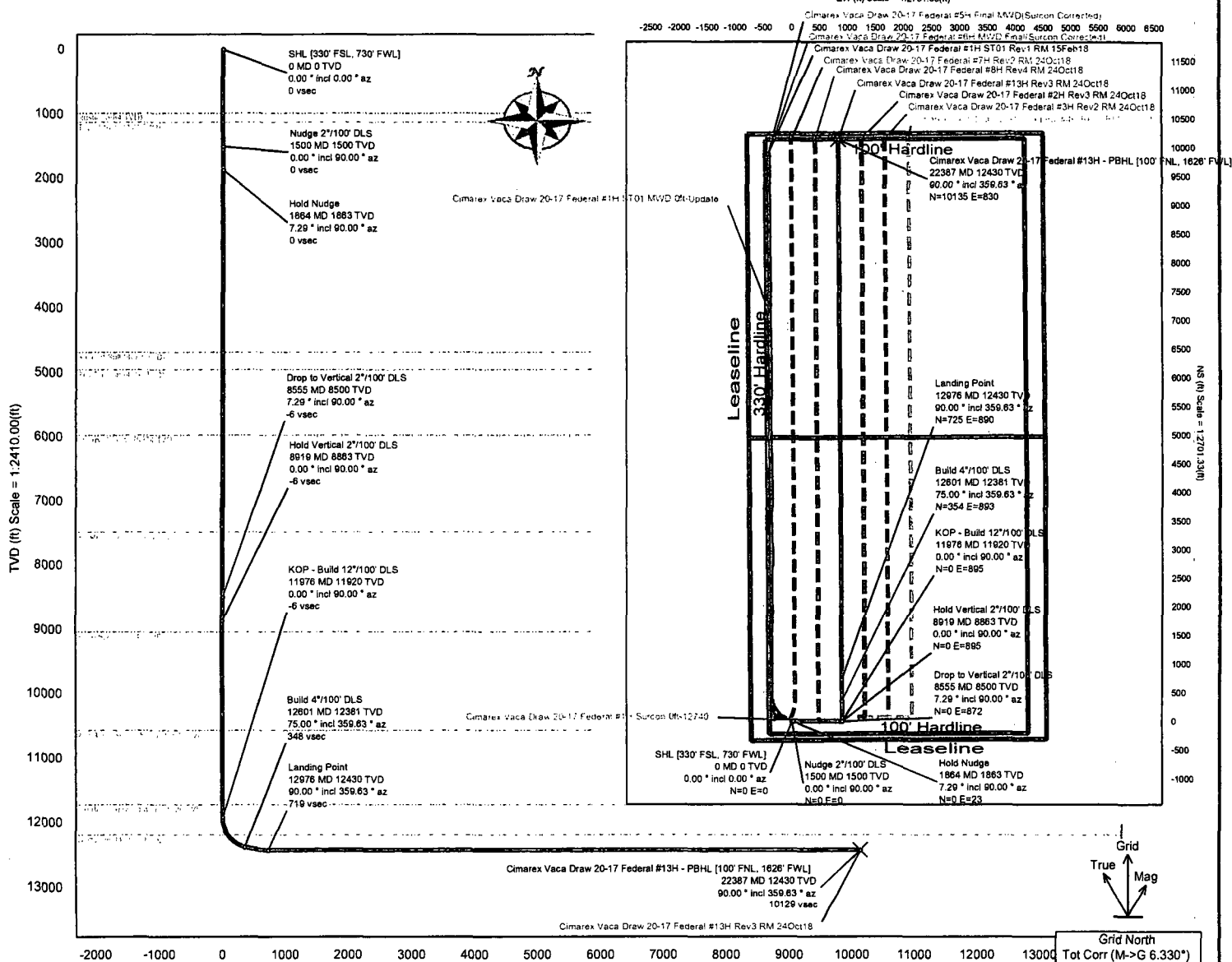
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IPSCO

Borehole:	Well:	Field:	Structure:
Original Borehole	Cimarex Vaca Draw 20-17 Federal #13H	NM Lea County (NAD 83)	Cimarex Vaca Draw 20-17 Federal #13H

Gravity & Magnetic Parameters	Surface Location	Miscellaneous
Model: HDGM 2016 Dip: 58.753° Date: 24-Oct-2018	NAD83 New Mexico State Plane, Eastern Zone, US Feet	Cimarex Vaca Draw 20-17 Federal #13H Final MWD (Surcon Corrected)
MagDec: 6.719° FB: 47835.665nT Gravity FB: 988.428mg (8.80865 Based)	Lat: N 32 8 35.06 Northing: 40430.857US Grid Conv: 0.3898°	Slot: Draw 20-17 Federal #13H TVD Ref: RKB(344ft above MSL)
	Lon: W 103 38 1.76 Easting: 768241.07RUS Scale Fact: 0.99999806	Plan: Cimarex Vaca Draw 20-17 Federal #13H Rev3 RM 24Oct18



Vertical Section (ft) Azim = 359.63° Scale = 1:2410.00(ft) Origin = 0N-S, 0E-W

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL (330° FSL, 730° FWL)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Rustler	984.00	0.00	90.00	984.00	0.00	0.00	0.00	0.00
Top of Salt	1128.00	0.00	90.00	1128.00	0.00	0.00	0.00	0.00
Nudge 2°/100' DLS	1500.00	0.00	90.00	1500.00	0.00	0.00	0.00	0.00
Hold Nudge	1864.29	7.29	90.00	1863.31	-0.15	0.00	23.13	2.00
Base of Salt	4710.97	7.29	90.00	4687.00	-2.46	0.00	384.14	0.00
Bell Canyon	4982.15	7.29	90.00	4956.00	-2.68	0.00	418.53	0.00
Cherry Canyon	6008.44	7.29	90.00	5974.00	-3.51	0.00	548.69	0.00
Brushy Canyon	7530.73	7.29	90.00	7484.00	-4.75	0.00	741.74	0.00
Drop to Vertical 2°/100' DLS	8555.00	7.29	90.00	8500.00	-5.58	0.00	871.64	0.00
Hold Vertical 2°/100' DLS	8919.29	0.00	90.00	8863.31	-5.73	0.00	894.77	2.00
Bone Spring	9095.98	0.00	90.00	9040.00	-5.73	0.00	894.77	0.00
2nd Bone Spring Sand	10628.98	0.00	90.00	10573.00	-5.73	0.00	894.77	0.00
3rd Bone Spring Sand	11781.98	0.00	90.00	11726.00	-5.73	0.00	894.77	0.00
KOP - Build 12°/100' DLS	11975.98	0.00	90.00	11920.00	-5.73	0.00	894.77	0.00
Wolfcamp	12270.27	35.31	359.63	12196.00	82.12	87.85	894.21	12.00
Build 4°/100' DLS	12600.98	75.00	359.63	12381.19	348.16	353.88	892.51	12.00
Landing Point	12975.98	90.00	359.63	12430.00	718.89	724.60	890.14	4.00
Cimarex Vaca Draw 20-17 Federal #13H - PBHL (100° FNL, 1626° FWL)	22386.53	90.00	359.63	12430.00	10129.44	10134.98	829.97	0.00

Grid North
Tot Corr (M->G 6.330°)
Mag Dec (6.719°)
Grid Conv (0.390°)

Cimarex Vaca Draw 20-17 Federal #13H Rev3 RM 24Oct18 Proposal

Geodetic Report

(Def Plan)



Report Date: October 24, 2018 - 04:27 PM
Client: Cimarex
Field: NM Lea County (NAD 83)
Structure / Slot: Cimarex Vaca Draw 20-17 Federal #13H / Cimarex Vaca Draw 20-17 Federal #13H
Well: Cimarex Vaca Draw 20-17 Federal #13H
Borehole: Original Borehole
UWI / API#: Unknown / Unknown
Survey Name: Cimarex Vaca Draw 20-17 Federal #13H Rev3 RM 24Oct18
Survey Date: March 09, 2018
Tort / AHD / DDI / ERD Ratio: 104.572 ° / 11029.940 ft / 6.318 / 0.887
Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 6' 35.06113", W 103° 36' 1.76446"
Location Grid N/E Y/X: N 404430.850 ftUS, E 768241.870 ftUS
CRS Grid Convergence Angle: 0.3896 °
Grid Scale Factor: 0.99996806
Version / Patch: 2.10.740.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 359.633 ° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: RKB
TVD Reference Elevation: 3449.000 ft above MSL
Seabed / Ground Elevation: 3423.000 ft above MSL
Magnetic Declination: 6.719 °
Total Gravity Field Strength: 998.4292mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 47835.665 nT
Magnetic Dip Angle: 59.753 °
Declination Date: October 24, 2018
Magnetic Declination Model: HDGM 2018
North Reference: Grid North
Grid Convergence Used: 0.3896 °
Total Corr Mag North->Grid North: 6.3299 °
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 [330' FSL, 730' FWL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404430.85	768241.87	N 32 6 35.06 W 103 36	1.76
	100.00	0.00	90.00	100.00	0.00	0.00	0.00	0.00	404430.85	768241.87	N 32 6 35.06 W 103 36	1.76
	200.00	0.00	90.00	200.00	0.00	0.00	0.00	0.00	404430.85	768241.87	N 32 6 35.06 W 103 36	1.76
	300.00	0.00	90.00	300.00	0.00	0.00	0.00	0.00	404430.85	768241.87	N 32 6 35.06 W 103 36	1.76
	400.00	0.00	90.00	400.00	0.00	0.00	0.00	0.00	404430.85	768241.87	N 32 6 35.06 W 103 36	1.76
	500.00	0.00	90.00	500.00	0.00	0.00	0.00	0.00	404430.85	768241.87	N 32 6 35.06 W 103 36	1.76
	600.00	0.00	90.00	600.00	0.00	0.00	0.00	0.00	404430.85	768241.87	N 32 6 35.06 W 103 36	1.76
	700.00	0.00	90.00	700.00	0.00	0.00	0.00	0.00	404430.85	768241.87	N 32 6 35.06 W 103 36	1.76
	800.00	0.00	90.00	800.00	0.00	0.00	0.00	0.00	404430.85	768241.87	N 32 6 35.06 W 103 36	1.76
	900.00	0.00	90.00	900.00	0.00	0.00	0.00	0.00	404430.85	768241.87	N 32 6 35.06 W 103 36	1.76
Rustler	984.00	0.00	90.00	984.00	0.00	0.00	0.00	0.00	404430.85	768241.87	N 32 6 35.06 W 103 36	1.76
	1000.00	0.00	90.00	1000.00	0.00	0.00	0.00	0.00	404430.85	768241.87	N 32 6 35.06 W 103 36	1.76
	1100.00	0.00	90.00	1100.00	0.00	0.00	0.00	0.00	404430.85	768241.87	N 32 6 35.06 W 103 36	1.76
Top of Salt	1128.00	0.00	90.00	1128.00	0.00	0.00	0.00	0.00	404430.85	768241.87	N 32 6 35.06 W 103 36	1.76
	1200.00	0.00	90.00	1200.00	0.00	0.00	0.00	0.00	404430.85	768241.87	N 32 6 35.06 W 103 36	1.76
	1300.00	0.00	90.00	1300.00	0.00	0.00	0.00	0.00	404430.85	768241.87	N 32 6 35.06 W 103 36	1.76
	1400.00	0.00	90.00	1400.00	0.00	0.00	0.00	0.00	404430.85	768241.87	N 32 6 35.06 W 103 36	1.76
Nudge 2°/100' DLS	1500.00	0.00	90.00	1500.00	0.00	0.00	0.00	0.00	404430.85	768241.87	N 32 6 35.06 W 103 36	1.76
	1600.00	2.00	90.00	1599.98	-0.01	0.00	1.75	2.00	404430.85	768243.62	N 32 6 35.06 W 103 36	1.74
	1700.00	4.00	90.00	1699.84	-0.04	0.00	6.98	2.00	404430.85	768248.85	N 32 6 35.06 W 103 36	1.68
	1800.00	6.00	90.00	1799.45	-0.10	0.00	15.69	2.00	404430.85	768257.56	N 32 6 35.06 W 103 36	1.58
Hold Nudge	1864.29	7.29	90.00	1863.31	-0.15	0.00	23.13	2.00	404430.85	768265.00	N 32 6 35.06 W 103 36	1.50
	1900.00	7.29	90.00	1898.73	-0.18	0.00	27.66	0.00	404430.85	768269.53	N 32 6 35.06 W 103 36	1.44
	2000.00	7.29	90.00	1997.92	-0.26	0.00	40.34	0.00	404430.85	768282.21	N 32 6 35.06 W 103 36	1.30
	2100.00	7.29	90.00	2097.12	-0.34	0.00	53.02	0.00	404430.85	768294.89	N 32 6 35.06 W 103 36	1.15

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 ° ' ")
	2200.00	7.29	90.00	2196.31	-0.42	0.00	65.70	0.00	404430.85	768307.57	N 32 6 35.06 W 103 36 1.00	
	2300.00	7.29	90.00	2295.50	-0.50	0.00	78.39	0.00	404430.85	768320.25	N 32 6 35.06 W 103 36 0.85	
	2400.00	7.29	90.00	2394.69	-0.58	0.00	91.07	0.00	404430.85	768332.94	N 32 6 35.06 W 103 36 0.71	
	2500.00	7.29	90.00	2493.89	-0.66	0.00	103.75	0.00	404430.85	768345.62	N 32 6 35.05 W 103 36 0.56	
	2600.00	7.29	90.00	2593.08	-0.75	0.00	116.43	0.00	404430.85	768358.30	N 32 6 35.05 W 103 36 0.41	
	2700.00	7.29	90.00	2692.27	-0.83	0.00	129.11	0.00	404430.85	768370.98	N 32 6 35.05 W 103 36 0.26	
	2800.00	7.29	90.00	2791.46	-0.91	0.00	141.80	0.00	404430.85	768383.66	N 32 6 35.05 W 103 36 0.12	
	2900.00	7.29	90.00	2890.66	-0.99	0.00	154.48	0.00	404430.85	768396.34	N 32 6 35.05 W 103 35 59.97	
	3000.00	7.29	90.00	2989.85	-1.07	0.00	167.16	0.00	404430.85	768409.02	N 32 6 35.05 W 103 35 59.82	
	3100.00	7.29	90.00	3089.04	-1.15	0.00	179.84	0.00	404430.85	768421.71	N 32 6 35.05 W 103 35 59.67	
	3200.00	7.29	90.00	3188.23	-1.23	0.00	192.52	0.00	404430.85	768434.39	N 32 6 35.05 W 103 35 59.53	
	3300.00	7.29	90.00	3287.43	-1.31	0.00	205.21	0.00	404430.85	768447.07	N 32 6 35.05 W 103 35 59.38	
	3400.00	7.29	90.00	3386.62	-1.40	0.00	217.89	0.00	404430.85	768459.75	N 32 6 35.05 W 103 35 59.23	
	3500.00	7.29	90.00	3485.81	-1.48	0.00	230.57	0.00	404430.85	768472.43	N 32 6 35.05 W 103 35 59.08	
	3600.00	7.29	90.00	3585.00	-1.56	0.00	243.25	0.00	404430.85	768485.11	N 32 6 35.04 W 103 35 58.94	
	3700.00	7.29	90.00	3684.20	-1.64	0.00	255.93	0.00	404430.85	768497.79	N 32 6 35.04 W 103 35 58.79	
	3800.00	7.29	90.00	3783.39	-1.72	0.00	268.61	0.00	404430.85	768510.48	N 32 6 35.04 W 103 35 58.64	
	3900.00	7.29	90.00	3882.58	-1.80	0.00	281.30	0.00	404430.85	768523.16	N 32 6 35.04 W 103 35 58.49	
	4000.00	7.29	90.00	3981.78	-1.88	0.00	293.98	0.00	404430.85	768535.84	N 32 6 35.04 W 103 35 58.35	
	4100.00	7.29	90.00	4080.97	-1.96	0.00	306.66	0.00	404430.85	768548.52	N 32 6 35.04 W 103 35 58.20	
	4200.00	7.29	90.00	4180.16	-2.05	0.00	319.34	0.00	404430.85	768561.20	N 32 6 35.04 W 103 35 58.05	
	4300.00	7.29	90.00	4279.35	-2.13	0.00	332.02	0.00	404430.85	768573.88	N 32 6 35.04 W 103 35 57.90	
	4400.00	7.29	90.00	4378.55	-2.21	0.00	344.71	0.00	404430.85	768586.56	N 32 6 35.04 W 103 35 57.76	
	4500.00	7.29	90.00	4477.74	-2.29	0.00	357.39	0.00	404430.85	768599.25	N 32 6 35.04 W 103 35 57.61	
	4600.00	7.29	90.00	4576.93	-2.37	0.00	370.07	0.00	404430.85	768611.93	N 32 6 35.04 W 103 35 57.46	
	4700.00	7.29	90.00	4676.12	-2.45	0.00	382.75	0.00	404430.85	768624.61	N 32 6 35.04 W 103 35 57.31	
Base of Salt	4710.97	7.29	90.00	4687.00	-2.46	0.00	384.14	0.00	404430.85	768626.00	N 32 6 35.04 W 103 35 57.30	
	4800.00	7.29	90.00	4775.32	-2.53	0.00	395.43	0.00	404430.85	768637.29	N 32 6 35.03 W 103 35 57.17	
Bell Canyon	4900.00	7.29	90.00	4874.51	-2.61	0.00	408.12	0.00	404430.85	768649.97	N 32 6 35.03 W 103 35 57.02	
	4982.15	7.29	90.00	4956.00	-2.68	0.00	418.53	0.00	404430.85	768660.39	N 32 6 35.03 W 103 35 56.90	
	5000.00	7.29	90.00	4973.70	-2.70	0.00	420.80	0.00	404430.85	768662.65	N 32 6 35.03 W 103 35 56.87	
	5100.00	7.29	90.00	5072.89	-2.78	0.00	433.48	0.00	404430.85	768675.33	N 32 6 35.03 W 103 35 56.72	
	5200.00	7.29	90.00	5172.09	-2.86	0.00	446.16	0.00	404430.85	768688.02	N 32 6 35.03 W 103 35 56.58	
	5300.00	7.29	90.00	5271.28	-2.94	0.00	458.84	0.00	404430.85	768700.70	N 32 6 35.03 W 103 35 56.43	
	5400.00	7.29	90.00	5370.47	-3.02	0.00	471.53	0.00	404430.85	768713.38	N 32 6 35.03 W 103 35 56.28	
	5500.00	7.29	90.00	5469.66	-3.10	0.00	484.21	0.00	404430.85	768726.06	N 32 6 35.03 W 103 35 56.14	
	5600.00	7.29	90.00	5568.86	-3.18	0.00	496.89	0.00	404430.85	768738.74	N 32 6 35.03 W 103 35 55.99	
	5700.00	7.29	90.00	5668.05	-3.26	0.00	509.57	0.00	404430.85	768751.42	N 32 6 35.03 W 103 35 55.84	
	5800.00	7.29	90.00	5767.24	-3.35	0.00	522.25	0.00	404430.85	768764.10	N 32 6 35.03 W 103 35 55.69	
	5900.00	7.29	90.00	5866.43	-3.43	0.00	534.93	0.00	404430.85	768776.79	N 32 6 35.03 W 103 35 55.55	
	6000.00	7.29	90.00	5965.63	-3.51	0.00	547.62	0.00	404430.85	768789.47	N 32 6 35.02 W 103 35 55.40	
Cherry Canyon	6008.44	7.29	90.00	5974.00	-3.51	0.00	548.69	0.00	404430.85	768790.54	N 32 6 35.02 W 103 35 55.39	
	6100.00	7.29	90.00	6064.82	-3.59	0.00	560.30	0.00	404430.85	768802.15	N 32 6 35.02 W 103 35 55.25	
	6200.00	7.29	90.00	6164.01	-3.67	0.00	572.98	0.00	404430.85	768814.83	N 32 6 35.02 W 103 35 55.10	
	6300.00	7.29	90.00	6263.20	-3.75	0.00	585.66	0.00	404430.85	768827.51	N 32 6 35.02 W 103 35 54.96	
	6400.00	7.29	90.00	6362.40	-3.83	0.00	598.34	0.00	404430.85	768840.19	N 32 6 35.02 W 103 35 54.81	
	6500.00	7.29	90.00	6461.59	-3.91	0.00	611.03	0.00	404430.85	768852.87	N 32 6 35.02 W 103 35 54.66	
	6600.00	7.29	90.00	6560.78	-4.00	0.00	623.71	0.00	404430.85	768865.56	N 32 6 35.02 W 103 35 54.51	
	6700.00	7.29	90.00	6659.98	-4.08	0.00	636.39	0.00	404430.85	768878.24	N 32 6 35.02 W 103 35 54.37	
	6800.00	7.29	90.00	6759.17	-4.16	0.00	649.07	0.00	404430.85	768890.92	N 32 6 35.02 W 103 35 54.22	
	6900.00	7.29	90.00	6858.36	-4.24	0.00	661.75	0.00	404430.85	768903.60	N 32 6 35.02 W 103 35 54.07	
	7000.00	7.29	90.00	6957.55	-4.32	0.00	674.44	0.00	404430.85	768916.28	N 32 6 35.02 W 103 35 53.92	
	7100.00	7.29	90.00	7056.75	-4.40	0.00	687.12	0.00	404430.85	768928.96	N 32 6 35.01 W 103 35 53.78	
	7200.00	7.29	90.00	7155.94	-4.48	0.00	699.80	0.00	404430.85	768941.65	N 32 6 35.01 W 103 35 53.63	
	7300.00	7.29	90.00	7255.13	-4.56	0.00	712.48	0.00	404430.85	768954.33	N 32 6 35.01 W 103 35 53.48	
	7400.00	7.29	90.00	7354.32	-4.64	0.00	725.16	0.00	404430.85	768967.01	N 32 6 35.01 W 103 35 53.33	
	7500.00	7.29	90.00	7453.52	-4.73	0.00	737.84	0.00	404430.85	768979.69	N 32 6 35.01 W 103 35 53.19	
Brushy Canyon	7530.73	7.29	90.00	7484.00	-4.75	0.00	741.74	0.00	404430.85	768983.59	N 32 6 35.01 W 103 35 53.14	
	7600.00	7.29	90.00	7552.71	-4.81	0.00	750.53	0.00	404430.85	768992.37	N 32 6 35.01 W 103 35 53.04	

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 ° ' ")
	7700.00	7.29	90.00	7651.90	-4.89	0.00	763.21	0.00	404430.85	769005.05	N 32 6 35.01	W 103 35 52.89
	7800.00	7.29	90.00	7751.09	-4.97	0.00	775.89	0.00	404430.85	769017.73	N 32 6 35.01	W 103 35 52.74
	7900.00	7.29	90.00	7850.29	-5.05	0.00	788.57	0.00	404430.85	769030.42	N 32 6 35.01	W 103 35 52.60
	8000.00	7.29	90.00	7949.48	-5.13	0.00	801.25	0.00	404430.85	769043.10	N 32 6 35.01	W 103 35 52.45
	8100.00	7.29	90.00	8048.67	-5.21	0.00	813.94	0.00	404430.85	769055.78	N 32 6 35.01	W 103 35 52.30
	8200.00	7.29	90.00	8147.86	-5.29	0.00	826.62	0.00	404430.85	769068.46	N 32 6 35.01	W 103 35 52.15
	8300.00	7.29	90.00	8247.06	-5.38	0.00	839.30	0.00	404430.85	769081.14	N 32 6 35.00	W 103 35 52.01
	8400.00	7.29	90.00	8346.25	-5.46	0.00	851.98	0.00	404430.85	769093.82	N 32 6 35.00	W 103 35 51.86
	8500.00	7.29	90.00	8445.44	-5.54	0.00	864.66	0.00	404430.85	769106.50	N 32 6 35.00	W 103 35 51.71
Drop to Vertical 2°/100' DLS	8555.00	7.29	90.00	8500.00	-5.58	0.00	871.64	0.00	404430.85	769113.48	N 32 6 35.00	W 103 35 51.63
	8600.00	6.39	90.00	8544.68	-5.62	0.00	876.99	2.00	404430.85	769118.83	N 32 6 35.00	W 103 35 51.57
	8700.00	4.39	90.00	8644.23	-5.68	0.00	886.38	2.00	404430.85	769128.22	N 32 6 35.00	W 103 35 51.46
	8800.00	2.39	90.00	8744.05	-5.72	0.00	892.29	2.00	404430.85	769134.13	N 32 6 35.00	W 103 35 51.39
	8900.00	0.39	90.00	8844.02	-5.73	0.00	894.70	2.00	404430.85	769136.54	N 32 6 35.00	W 103 35 51.36
Hold Vertical 2°/100' DLS	8919.29	0.00	90.00	8863.31	-5.73	0.00	894.77	2.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
Bone Spring	9000.00	0.00	90.00	8944.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	9095.98	0.00	90.00	9040.00	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	9100.00	0.00	90.00	9044.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	9200.00	0.00	90.00	9144.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	9300.00	0.00	90.00	9244.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	9400.00	0.00	90.00	9344.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	9500.00	0.00	90.00	9444.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	9600.00	0.00	90.00	9544.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	9700.00	0.00	90.00	9644.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	9800.00	0.00	90.00	9744.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	9900.00	0.00	90.00	9844.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	10000.00	0.00	90.00	9944.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	10100.00	0.00	90.00	10044.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	10200.00	0.00	90.00	10144.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	10300.00	0.00	90.00	10244.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	10400.00	0.00	90.00	10344.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	10500.00	0.00	90.00	10444.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	10600.00	0.00	90.00	10544.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
2nd Bone Spring Sand	10628.98	0.00	90.00	10573.00	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	10700.00	0.00	90.00	10644.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	10800.00	0.00	90.00	10744.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	10900.00	0.00	90.00	10844.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	11000.00	0.00	90.00	10944.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	11100.00	0.00	90.00	11044.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	11200.00	0.00	90.00	11144.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	11300.00	0.00	90.00	11244.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	11400.00	0.00	90.00	11344.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	11500.00	0.00	90.00	11444.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	11600.00	0.00	90.00	11544.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	11700.00	0.00	90.00	11644.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
3rd Bone Spring Sand	11781.98	0.00	90.00	11726.00	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	11800.00	0.00	90.00	11744.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	11900.00	0.00	90.00	11844.02	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
KOP - Build 12°/100' DLS	11975.98	0.00	90.00	11920.00	-5.73	0.00	894.77	0.00	404430.85	769136.61	N 32 6 35.00	W 103 35 51.36
	12000.00	2.88	359.63	11944.01	-5.13	0.60	894.77	12.00	404431.45	769136.60	N 32 6 35.01	W 103 35 51.36
	12100.00	14.88	359.63	12042.63	10.29	16.02	894.67	12.00	404446.87	769136.51	N 32 6 35.16	W 103 35 51.36
	12200.00	26.88	359.63	12135.89	45.87	51.60	894.44	12.00	404482.44	769136.28	N 32 6 35.51	W 103 35 51.36
Wolfcamp	12270.27	35.31	359.63	12196.00	82.12	87.85	894.21	12.00	404518.70	769136.05	N 32 6 35.87	W 103 35 51.36
	12300.00	38.88	359.63	12219.71	100.06	105.79	894.09	12.00	404536.63	769135.93	N 32 6 36.05	W 103 35 51.36

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	12400.00	50.88	359.63	12290.44	170.49	176.22	893.64	12.00	404607.07	769135.48	N 32 6 36.74 W	103 35 51.36
	12500.00	62.88	359.63	12344.98	254.10	259.82	893.11	12.00	404690.66	769134.95	N 32 6 37.57 W	103 35 51.36
	12600.00	74.88	359.63	12380.94	347.21	352.93	892.51	12.00	404783.77	769134.35	N 32 6 38.49 W	103 35 51.36
	12600.98	75.00	359.63	12381.19	348.16	353.88	892.51	12.00	404784.72	769134.35	N 32 6 38.50 W	103 35 51.36
Landing Point	12700.00	78.96	359.63	12403.50	444.61	450.33	891.89	4.00	404881.17	769133.73	N 32 6 39.46 W	103 35 51.36
	12800.00	82.96	359.63	12419.20	543.35	549.07	891.26	4.00	404979.90	769133.10	N 32 6 40.43 W	103 35 51.36
	12900.00	86.96	359.63	12427.99	642.94	648.66	890.62	4.00	405079.49	769132.46	N 32 6 41.42 W	103 35 51.36
	12975.98	90.00	359.63	12430.00	718.89	724.60	890.14	4.00	405155.43	769131.98	N 32 6 42.17 W	103 35 51.36
	13000.00	90.00	359.63	12430.00	742.91	748.62	889.98	0.00	405179.45	769131.82	N 32 6 42.41 W	103 35 51.36
	13100.00	90.00	359.63	12430.00	842.91	848.62	889.34	0.00	405279.44	769131.18	N 32 6 43.40 W	103 35 51.36
	13200.00	90.00	359.63	12430.00	942.91	948.62	888.70	0.00	405379.44	769130.54	N 32 6 44.39 W	103 35 51.36
	13300.00	90.00	359.63	12430.00	1042.91	1048.62	888.06	0.00	405479.43	769129.90	N 32 6 45.38 W	103 35 51.36
	13400.00	90.00	359.63	12430.00	1142.91	1148.62	887.43	0.00	405579.43	769129.27	N 32 6 46.37 W	103 35 51.36
	13500.00	90.00	359.63	12430.00	1242.91	1248.61	886.79	0.00	405679.42	769128.63	N 32 6 47.36 W	103 35 51.36
	13600.00	90.00	359.63	12430.00	1342.91	1348.61	886.15	0.00	405779.42	769127.99	N 32 6 48.35 W	103 35 51.36
	13700.00	90.00	359.63	12430.00	1442.91	1448.61	885.51	0.00	405879.41	769127.35	N 32 6 49.34 W	103 35 51.35
	13800.00	90.00	359.63	12430.00	1542.91	1548.61	884.87	0.00	405979.40	769126.71	N 32 6 50.33 W	103 35 51.35
	13900.00	90.00	359.63	12430.00	1642.91	1648.61	884.23	0.00	406079.40	769126.07	N 32 6 51.31 W	103 35 51.35
	14000.00	90.00	359.63	12430.00	1742.91	1748.60	883.59	0.00	406179.39	769125.43	N 32 6 52.30 W	103 35 51.35
	14100.00	90.00	359.63	12430.00	1842.91	1848.60	882.95	0.00	406279.39	769124.79	N 32 6 53.29 W	103 35 51.35
	14200.00	90.00	359.63	12430.00	1942.91	1948.60	882.31	0.00	406379.38	769124.15	N 32 6 54.28 W	103 35 51.35
	14300.00	90.00	359.63	12430.00	2042.91	2048.60	881.67	0.00	406479.38	769123.51	N 32 6 55.27 W	103 35 51.35
	14400.00	90.00	359.63	12430.00	2142.91	2148.59	881.03	0.00	406579.37	769122.87	N 32 6 56.26 W	103 35 51.35
	14500.00	90.00	359.63	12430.00	2242.91	2248.59	880.39	0.00	406679.37	769122.23	N 32 6 57.25 W	103 35 51.35
	14600.00	90.00	359.63	12430.00	2342.91	2348.59	879.75	0.00	406779.36	769121.59	N 32 6 58.24 W	103 35 51.35
	14700.00	90.00	359.63	12430.00	2442.91	2448.59	879.11	0.00	406879.36	769120.95	N 32 6 59.23 W	103 35 51.35
	14800.00	90.00	359.63	12430.00	2542.91	2548.59	878.47	0.00	406979.35	769120.31	N 32 7 0.22 W	103 35 51.35
	14900.00	90.00	359.63	12430.00	2642.91	2648.58	877.83	0.00	407079.34	769119.68	N 32 7 1.21 W	103 35 51.35
	15000.00	90.00	359.63	12430.00	2742.91	2748.58	877.20	0.00	407179.34	769119.04	N 32 7 2.20 W	103 35 51.35
	15100.00	90.00	359.63	12430.00	2842.91	2848.58	876.56	0.00	407279.33	769118.40	N 32 7 3.19 W	103 35 51.35
	15200.00	90.00	359.63	12430.00	2942.91	2948.58	875.92	0.00	407379.33	769117.76	N 32 7 4.18 W	103 35 51.35
	15300.00	90.00	359.63	12430.00	3042.91	3048.58	875.28	0.00	407479.32	769117.12	N 32 7 5.17 W	103 35 51.35
	15400.00	90.00	359.63	12430.00	3142.91	3148.57	874.64	0.00	407579.32	769116.48	N 32 7 6.16 W	103 35 51.35
	15500.00	90.00	359.63	12430.00	3242.91	3248.57	874.00	0.00	407679.31	769115.84	N 32 7 7.15 W	103 35 51.35
	15600.00	90.00	359.63	12430.00	3342.91	3348.57	873.36	0.00	407779.31	769115.20	N 32 7 8.14 W	103 35 51.35
	15700.00	90.00	359.63	12430.00	3442.91	3448.57	872.72	0.00	407879.30	769114.56	N 32 7 9.13 W	103 35 51.34
	15800.00	90.00	359.63	12430.00	3542.91	3548.57	872.08	0.00	407979.30	769113.92	N 32 7 10.12 W	103 35 51.34
	15900.00	90.00	359.63	12430.00	3642.91	3648.56	871.44	0.00	408079.29	769113.28	N 32 7 11.11 W	103 35 51.34
	16000.00	90.00	359.63	12430.00	3742.91	3748.56	870.80	0.00	408179.28	769112.64	N 32 7 12.09 W	103 35 51.34
	16100.00	90.00	359.63	12430.00	3842.91	3848.56	870.16	0.00	408279.28	769112.00	N 32 7 13.08 W	103 35 51.34
	16200.00	90.00	359.63	12430.00	3942.91	3948.56	869.52	0.00	408379.27	769111.36	N 32 7 14.07 W	103 35 51.34
	16300.00	90.00	359.63	12430.00	4042.91	4048.56	868.88	0.00	408479.27	769110.72	N 32 7 15.06 W	103 35 51.34
	16400.00	90.00	359.63	12430.00	4142.91	4148.55	868.24	0.00	408579.26	769110.08	N 32 7 16.05 W	103 35 51.34
	16500.00	90.00	359.63	12430.00	4242.91	4248.55	867.60	0.00	408679.26	769109.45	N 32 7 17.04 W	103 35 51.34
	16600.00	90.00	359.63	12430.00	4342.91	4348.55	866.97	0.00	408779.25	769108.81	N 32 7 18.03 W	103 35 51.34
	16700.00	90.00	359.63	12430.00	4442.91	4448.55	866.33	0.00	408879.25	769108.17	N 32 7 19.02 W	103 35 51.34
	16800.00	90.00	359.63	12430.00	4542.91	4548.55	865.69	0.00	408979.24	769107.53	N 32 7 20.01 W	103 35 51.34
	16900.00	90.00	359.63	12430.00	4642.91	4648.54	865.05	0.00	409079.24	769106.89	N 32 7 21.00 W	103 35 51.34
	17000.00	90.00	359.63	12430.00	4742.91	4748.54	864.41	0.00	409179.23	769106.25	N 32 7 21.99 W	103 35 51.34
	17100.00	90.00	359.63	12430.00	4842.91	4848.54	863.77	0.00	409279.23	769105.61	N 32 7 22.98 W	103 35 51.34
	17200.00	90.00	359.63	12430.00	4942.91	4948.54	863.13	0.00	409379.22	769104.97	N 32 7 23.97 W	103 35 51.34
	17300.00	90.00	359.63	12430.00	5042.91	5048.54	862.49	0.00	409479.21	769104.33	N 32 7 24.96 W	103 35 51.34
	17400.00	90.00	359.63	12430.00	5142.91	5148.53	861.85	0.00	409579.21	769103.69	N 32 7 25.95 W	103 35 51.34
	17500.00	90.00	359.63	12430.00	5242.91	5248.53	861.21	0.00	409679.20	769103.05	N 32 7 26.94 W	103 35 51.34
	17600.00	90.00	359.63	12430.00	5342.91	5348.53	860.57	0.00	409779.20	769102.41	N 32 7 27.93 W	103 35 51.34
	17700.00	90.00	359.63	12430.00	5442.91	5448.53	859.93	0.00	409879.19	769101.77	N 32 7 28.92 W	103 35 51.33
	17800.00	90.00	359.63	12430.00	5542.91	5548.53	859.29	0.00	409979.19	769101.13	N 32 7 29.91 W	103 35 51.33
	17900.00	90.00	359.63	12430.00	5642.91	5648.52	858.65	0.00	410079.18	769100.49	N 32 7 30.90 W	103 35 51.33

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 ° ' ")
	18000.00	90.00	359.63	12430.00	5742.91	5748.52	858.01	0.00	410179.18	769099.86	N 32 7 31.89 W	103 35 51.33
	18100.00	90.00	359.63	12430.00	5842.91	5848.52	857.37	0.00	410279.17	769099.22	N 32 7 32.87 W	103 35 51.33
	18200.00	90.00	359.63	12430.00	5942.91	5948.52	856.74	0.00	410379.17	769098.58	N 32 7 33.86 W	103 35 51.33
	18300.00	90.00	359.63	12430.00	6042.91	6048.52	856.10	0.00	410479.16	769097.94	N 32 7 34.85 W	103 35 51.33
	18400.00	90.00	359.63	12430.00	6142.91	6148.51	855.46	0.00	410579.15	769097.30	N 32 7 35.84 W	103 35 51.33
	18500.00	90.00	359.63	12430.00	6242.91	6248.51	854.82	0.00	410679.15	769096.66	N 32 7 36.83 W	103 35 51.33
	18600.00	90.00	359.63	12430.00	6342.91	6348.51	854.18	0.00	410779.14	769096.02	N 32 7 37.82 W	103 35 51.33
	18700.00	90.00	359.63	12430.00	6442.91	6448.51	853.54	0.00	410879.14	769095.38	N 32 7 38.81 W	103 35 51.33
	18800.00	90.00	359.63	12430.00	6542.91	6548.50	852.90	0.00	410979.13	769094.74	N 32 7 39.80 W	103 35 51.33
	18900.00	90.00	359.63	12430.00	6642.91	6648.50	852.26	0.00	411079.13	769094.10	N 32 7 40.79 W	103 35 51.33
	19000.00	90.00	359.63	12430.00	6742.91	6748.50	851.62	0.00	411179.12	769093.46	N 32 7 41.78 W	103 35 51.33
	19100.00	90.00	359.63	12430.00	6842.91	6848.50	850.98	0.00	411279.12	769092.82	N 32 7 42.77 W	103 35 51.33
	19200.00	90.00	359.63	12430.00	6942.91	6948.50	850.34	0.00	411379.11	769092.18	N 32 7 43.76 W	103 35 51.33
	19300.00	90.00	359.63	12430.00	7042.91	7048.49	849.70	0.00	411479.11	769091.54	N 32 7 44.75 W	103 35 51.33
	19400.00	90.00	359.63	12430.00	7142.91	7148.49	849.06	0.00	411579.10	769090.90	N 32 7 45.74 W	103 35 51.33
	19500.00	90.00	359.63	12430.00	7242.91	7248.49	848.42	0.00	411679.09	769090.27	N 32 7 46.73 W	103 35 51.33
	19600.00	90.00	359.63	12430.00	7342.91	7348.49	847.78	0.00	411779.09	769089.63	N 32 7 47.72 W	103 35 51.32
	19700.00	90.00	359.63	12430.00	7442.91	7448.49	847.15	0.00	411879.08	769088.99	N 32 7 48.71 W	103 35 51.32
	19800.00	90.00	359.63	12430.00	7542.91	7548.48	846.51	0.00	411979.08	769088.35	N 32 7 49.70 W	103 35 51.32
	19900.00	90.00	359.63	12430.00	7642.91	7648.48	845.87	0.00	412079.07	769087.71	N 32 7 50.69 W	103 35 51.32
	20000.00	90.00	359.63	12430.00	7742.91	7748.48	845.23	0.00	412179.07	769087.07	N 32 7 51.68 W	103 35 51.32
	20100.00	90.00	359.63	12430.00	7842.91	7848.48	844.59	0.00	412279.06	769086.43	N 32 7 52.67 W	103 35 51.32
	20200.00	90.00	359.63	12430.00	7942.91	7948.48	843.95	0.00	412379.06	769085.79	N 32 7 53.66 W	103 35 51.32
	20300.00	90.00	359.63	12430.00	8042.91	8048.47	843.31	0.00	412479.05	769085.15	N 32 7 54.64 W	103 35 51.32
	20400.00	90.00	359.63	12430.00	8142.91	8148.47	842.67	0.00	412579.05	769084.51	N 32 7 55.63 W	103 35 51.32
	20500.00	90.00	359.63	12430.00	8242.91	8248.47	842.03	0.00	412679.04	769083.87	N 32 7 56.62 W	103 35 51.32
	20600.00	90.00	359.63	12430.00	8342.91	8348.47	841.39	0.00	412779.03	769083.23	N 32 7 57.61 W	103 35 51.32
	20700.00	90.00	359.63	12430.00	8442.91	8448.47	840.75	0.00	412879.03	769082.59	N 32 7 58.60 W	103 35 51.32
	20800.00	90.00	359.63	12430.00	8542.91	8548.46	840.11	0.00	412979.02	769081.95	N 32 7 59.59 W	103 35 51.32
	20900.00	90.00	359.63	12430.00	8642.91	8648.46	839.47	0.00	413079.02	769081.31	N 32 8 0 58 W	103 35 51.32
	21000.00	90.00	359.63	12430.00	8742.91	8748.46	838.83	0.00	413179.01	769080.67	N 32 8 1 57 W	103 35 51.32
	21100.00	90.00	359.63	12430.00	8842.91	8848.46	838.19	0.00	413279.01	769080.04	N 32 8 2 56 W	103 35 51.32
	21200.00	90.00	359.63	12430.00	8942.91	8948.46	837.55	0.00	413379.00	769079.40	N 32 8 3 55 W	103 35 51.32
	21300.00	90.00	359.63	12430.00	9042.91	9048.45	836.92	0.00	413479.00	769078.76	N 32 8 4 54 W	103 35 51.32
	21400.00	90.00	359.63	12430.00	9142.91	9148.45	836.28	0.00	413578.99	769078.12	N 32 8 5 53 W	103 35 51.32
	21500.00	90.00	359.63	12430.00	9242.91	9248.45	835.64	0.00	413678.99	769077.48	N 32 8 6 52 W	103 35 51.32
	21600.00	90.00	359.63	12430.00	9342.91	9348.45	835.00	0.00	413778.98	769076.84	N 32 8 7 51 W	103 35 51.31
	21700.00	90.00	359.63	12430.00	9442.91	9448.45	834.36	0.00	413878.97	769076.20	N 32 8 8 50 W	103 35 51.31
	21800.00	90.00	359.63	12430.00	9542.91	9548.44	833.72	0.00	413978.97	769075.56	N 32 8 9 49 W	103 35 51.31
	21900.00	90.00	359.63	12430.00	9642.91	9648.44	833.08	0.00	414078.96	769074.92	N 32 8 10 48 W	103 35 51.31
	22000.00	90.00	359.63	12430.00	9742.91	9748.44	832.44	0.00	414178.96	769074.28	N 32 8 11 47 W	103 35 51.31
	22100.00	90.00	359.63	12430.00	9842.91	9848.44	831.80	0.00	414278.95	769073.64	N 32 8 12 46 W	103 35 51.31
	22200.00	90.00	359.63	12430.00	9942.91	9948.44	831.16	0.00	414378.95	769073.00	N 32 8 13 45 W	103 35 51.31
	22300.00	90.00	359.63	12430.00	10042.91	10048.43	830.52	0.00	414478.94	769072.36	N 32 8 14 44 W	103 35 51.31

Cimarex Vaca
Draw 20-17
Federal #13H -
PBHL [100'
FNL, 1626'
FWL]

Survey Type: Def Plan

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

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 ° ' ")
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 Vaca Draw 20-17 Federal #13H Rev3 RM 24Oct18			
	1	26.000	22386.532	1/100.000	30.000	30.000		NAL_MWD_IFR1+MS	Original Borehole / Cimarex Vaca Draw 20-17 Federal #13H Rev3			

Cimarex Vaca Draw 20-17 Federal #13H Rev3 RM 24Oct18 Anti-Collision Summary Report

Analysis Date-24hr Time: October 24, 2018 - 16:27
Client: Cimarex
Field: NM Lea County (NAD 83)
Structure: Cimarex Vaca Draw 20-17 Federal #13H
Slot: Cimarex Vaca Draw 20-17 Federal #13H
Well: Cimarex Vaca Draw 20-17 Federal #13H
Borehole: Original Borehole
Scan MD Range: 0.00ft ~ 22386.53ft

Analysis Method: 3D Least Distance
Reference Trajectory: Cimarex Vaca Draw 20-17 Federal #13H Rev3 RM 24Oct18 (Def Plan)
Depth Interval: Every 10.00 Measured Depth (ft)
Rule Set: NAL Procedure: D&M AntiCollision Standard S002
Min Pts: All local minima indicated.
Version / Patch: 2.10.740.0
Database \ Project: US1153APP452.dir.slb.com\drilling-NM Lea County 2.10

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:

Selection filters:

Not performed!

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 Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor	Major		

Results highlighted: Sep-Factor separation <= 1.50 ft

Cimarex Vaca Draw 20-17
 Federal #8H Rev4 RM
 24Oct18 (Def Plan)

Warning Alert												
19.99	16.49	17.49	3.50	N/A	MAS = 5.03 (m)	0.00	0.00	CtCt<=15m<15.00	Enter Alert			
19.99	16.49	17.49	3.50	N/A	MAS = 5.03 (m)	26.00	26.00		WRP			
19.99	16.49	8.46	3.50	1.94	MAS = 5.03 (m)	1500.00	1500.00		MinPts			
20.01	16.49	8.43	3.52	1.93	MAS = 5.03 (m)	1510.00	1510.00		MINPT-O-EOU			
20.15	16.49	8.48	3.66	1.92	MAS = 5.03 (m)	1530.00	1530.00		MinPt-O-SF			
56.53	18.90	43.10	37.63	4.94	OSF1.50	1970.00	1968.17	OSF>5.00	Exit Alert			
212.58	57.34	173.52	155.24	5.75	OSF1.50	7020.00	6977.39		MinPt-O-SF			
414.95	81.51	359.78	333.44	7.83	OSF1.50	12020.00	11963.95		MinPt-CtCt			
415.04	81.89	359.61	333.15	7.79	OSF1.50	12080.00	12023.20		MINPT-O-EOU			
415.09	81.96	359.62	333.13	7.79	OSF1.50	12090.00	12032.94		MinPt-O-ADP			
418.88	83.05	362.68	335.83	7.73	OSF1.50	12230.00	12162.20		MinPt-O-SF			
448.46	136.53	356.61	311.93	4.99	OSF1.50	15080.00	12430.00	OSF<5.00	Enter Alert			
448.45	357.14	209.53	91.31	1.89	OSF1.50	22386.53	12430.00		MinPts			

Cimarex Vaca Draw 20-17
 Federal #7H Rev2 RM
 24Oct18 (Def Plan)

Warning Alert												
39.99	32.49	37.49	7.50	N/A	MAS = 9.90 (m)	0.00	0.00	CtCt<=15m<15.00	Enter Alert			
39.99	32.49	37.49	7.50	42186.63	MAS = 9.90 (m)	26.00	26.00		WRP			
39.99	32.49	28.46	7.50	4.15	MAS = 9.90 (m)	1500.00	1500.00		MinPts			
40.01	32.49	28.43	7.52	4.13	MAS = 9.90 (m)	1510.00	1510.00		MINPT-O-EOU			
40.62	32.49	28.80	8.13	4.09	MAS = 9.90 (m)	1560.00	1560.00		MinPt-O-SF			
52.71	32.49	40.09	20.21	4.96	MAS = 9.90 (m)	1770.00	1769.60	OSF>5.00	Exit Alert			
837.07	252.98	667.58	584.09	5.00	OSF1.50	18980.00	12430.00	OSF<5.00	Enter Alert			

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor	Major		
	837.07	357.32	598.02	479.75	3.53	OSF1.50	22386.53	12430.00				MinPts	

Cimarex Vaca Draw 20-17
Federal #2H Rev3-RM
24Oct18 (Def Plan)

Warning Alert

1181.36	32.81	1178.86	1148.55	N/A	MAS = 10.00 (m)	0.00	0.00					Surface
1181.35	32.81	1178.85	1148.54	N/A	MAS = 10.00 (m)	26.00	26.00					WRP
421.75	89.98	360.56	331.77	7.26	OSF1.50	11920.00	11864.02					MinPt-CtCt
421.80	90.13	360.51	331.67	7.25	OSF1.50	11940.00	11884.02					MinPt-O-EOU
421.87	90.20	360.53	331.67	7.24	OSF1.50	11950.00	11894.02					MinPt-O-ADP
420.08	128.63	333.13	291.45	5.00	OSF1.50	14580.00	12430.00	OSF<5.00				Enter Alert
419.59	357.39	180.14	62.20	1.76	OSF1.50	22386.53	12430.00					MinPts

Cimarex Vaca Draw 20-17
Federal #3H Rev2 RM
24Oct18 (Def Plan)

Warning Alert

1201.35	32.81	1198.85	1168.54	N/A	MAS = 10.00 (m)	0.00	0.00					Surface
1201.34	32.81	1198.84	1168.53	N/A	MAS = 10.00 (m)	26.00	26.00					WRP
834.76	66.67	789.27	768.09	19.63	OSF1.50	8850.00	8794.02					MinPt-O-SF
831.53	83.92	774.54	747.60	15.38	OSF1.50	12220.00	12153.53					MinPt-CtCt
831.56	84.03	774.50	747.53	15.36	OSF1.50	12240.00	12170.77					MinPts
834.42	84.53	777.04	749.89	15.31	OSF1.50	12350.00	12256.92					MinPt-O-SF
872.27	263.69	695.53	608.58	5.00	OSF1.50	19990.00	12430.00	OSF<5.00				Enter Alert
872.12	338.29	645.65	533.83	3.89	OSF1.50	22386.53	12430.00					MinPts

Cimarex Vaca Draw 20-17
Federal #6H MWD
Final(Surcon Corrected) (Def Survey)

Pass

116.61	32.81	114.11	83.80	N/A	MAS = 10.00 (m)	0.00	0.00					Surface
116.58	32.81	114.07	83.77	11944.62	MAS = 10.00 (m)	26.00	26.00					WRP
109.78	32.81	103.75	76.97	30.43	MAS = 10.00 (m)	830.00	830.00					MinPts
110.39	32.81	102.81	77.59	21.21	MAS = 10.00 (m)	1180.00	1180.00					MinPt-O-EOU
110.87	32.81	101.95	78.07	16.87	MAS = 10.00 (m)	1510.00	1510.00					MinPts
110.88	32.81	101.94	78.07	16.81	MAS = 10.00 (m)	1520.00	1520.00					MinPt-O-EOU
112.09	32.81	102.98	79.29	16.57	MAS = 10.00 (m)	1600.00	1599.98					MinPt-O-SF
198.77	32.81	187.48	165.96	22.34	MAS = 10.00 (m)	2540.00	2533.56					MinPt-O-SF
380.99	32.81	364.83	348.19	27.71	MAS = 10.00 (m)	3970.00	3952.02					MinPt-O-SF
462.01	32.81	443.11	429.20	28.02	MAS = 10.00 (m)	4630.00	4606.69					MinPt-O-SF
747.52	39.41	720.41	708.11	30.27	OSF1.50	6540.00	6501.27					MinPt-O-SF
846.64	44.39	816.22	802.25	30.23	OSF1.50	7270.00	7225.37					MinPt-O-SF
876.87	45.94	845.40	830.92	30.19	OSF1.50	7500.00	7453.52					MinPt-O-SF
902.64	47.22	870.33	855.42	30.19	OSF1.50	7690.00	7641.98					MinPt-O-SF
969.64	50.58	935.09	919.06	30.17	OSF1.50	8180.00	8128.03					MinPt-O-SF
1020.61	53.18	984.33	967.43	30.13	OSF1.50	8550.00	8495.04					MinPt-O-SF
1561.68	43.03	1532.16	1518.65	57.71	OSF1.50	10150.00	10094.02					MinPt-O-SF
3396.40	34.17	3372.78	3362.23	160.75	OSF1.50	13000.00	12430.00					MinPt-CtCt
3396.47	34.42	3372.69	3362.05	159.49	OSF1.50	13030.00	12430.00					MinPt-O-EOU
3396.79	34.80	3372.75	3361.99	157.63	OSF1.50	13070.00	12430.00					MinPt-O-ADP
3400.35	38.01	3374.18	3362.34	143.53	OSF1.50	13260.00	12430.00					MinPt-O-EOU
3400.83	38.55	3374.30	3362.28	141.39	OSF1.50	13290.00	12430.00					MinPt-O-ADP
3409.48	59.29	3369.11	3350.18	89.98	OSF1.50	14110.00	12430.00					MinPt-CtCt
3393.13	89.63	3332.54	3303.49	58.37	OSF1.50	15200.00	12430.00					MinPt-CtCt
3393.39	90.44	3332.26	3302.95	57.84	OSF1.50	15250.00	12430.00					MinPt-O-EOU
3393.77	90.91	3332.32	3302.85	57.53	OSF1.50	15280.00	12430.00					MinPt-O-ADP
3396.55	135.39	3305.46	3261.16	38.31	OSF1.50	16770.00	12430.00					MinPt-CtCt

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor	Major		
	3397.67	148.96	3297.53	3248.71	34.77	OSF1.50	17230.00	12430.00				MinPt-CtCt	
	3398.42	160.84	3288.35	3235.57	32.15	OSF1.50	17630.00	12430.00				MinPt-CtCt	
	3394.80	224.24	3244.47	3170.55	22.95	OSF1.50	19760.00	12430.00				MinPt-CtCt	
	3398.40	252.39	3229.31	3146.01	20.38	OSF1.50	20700.00	12430.00				MinPt-CtCt	
	3394.14	272.19	3211.85	3121.95	18.86	OSF1.50	21360.00	12430.00				MinPt-CtCt	
	3394.66	280.02	3207.15	3114.64	18.33	OSF1.50	21620.00	12430.00				MinPt-CtCt	
	3393.61	296.15	3195.34	3097.46	17.32	OSF1.50	22160.00	12430.00				MinPt-CtCt	
	3393.69	296.35	3195.28	3097.33	17.31	OSF1.50	22180.00	12430.00				MINPT-O-EOU	
	3393.77	296.45	3195.30	3097.32	17.31	OSF1.50	22190.00	12430.00				MinPt-O-ADP	
	3400.30	297.80	3200.93	3102.50	17.26	OSF1.50	22370.00	12430.00				MinPt-O-SF	
	3401.37	297.88	3201.95	3103.49	17.26	OSF1.50	22386.53	12430.00				TD	

Cimarex Vaca Draw 20-17
Federal #5H Final
MWD(Surcon Corrected) (Def
Survey)

												Pass
	134.16	32.81	131.66	101.35	N/A	MAS = 10.00 (m)	0.00	0.00				Surface
	134.14	32.81	131.63	101.33	31982.43	MAS = 10.00 (m)	26.00	26.00				WRP
	133.41	32.81	129.44	100.60	89.36	MAS = 10.00 (m)	360.00	360.00				MinPts
	133.13	32.81	128.43	100.32	59.39	MAS = 10.00 (m)	540.00	540.00				MinPts
	133.18	32.81	127.56	100.37	41.91	MAS = 10.00 (m)	760.00	760.00				MinPts
	133.41	32.81	127.26	100.60	35.87	MAS = 10.00 (m)	870.00	870.00				MINPT-O-EOU
	137.14	32.81	128.18	104.33	20.83	MAS = 10.00 (m)	1510.00	1510.00				MINPT-O-EOU
	138.70	32.81	129.47	105.89	20.25	MAS = 10.00 (m)	1600.00	1599.98				MinPt-O-SF
	460.93	32.81	445.38	428.12	35.13	MAS = 10.00 (m)	3890.00	3872.66				MinPt-O-SF
	581.98	32.81	562.84	549.17	34.82	MAS = 10.00 (m)	4760.00	4735.64				MinPt-O-SF
	683.48	32.81	661.50	650.67	34.95	MAS = 10.00 (m)	5420.00	5390.31				MinPt-O-SF
	714.50	33.03	691.64	681.47	34.98	OSF1.50	5620.00	5588.70				MinPt-O-SF
	793.91	37.21	768.27	756.70	34.20	OSF1.50	6220.00	6183.85				MinPt-O-SF
	871.81	40.72	843.83	831.09	34.12	OSF1.50	6750.00	6709.57				MinPt-O-SF
	1110.58	53.38	1074.16	1057.20	32.67	OSF1.50	8555.00	8500.00				MinPt-O-SF
	1141.20	52.37	1105.46	1088.83	34.25	OSF1.50	9460.00	9404.02				MinPt-O-SF
	2755.06	36.51	2729.88	2718.55	121.40	OSF1.50	13030.00	12430.00				MinPt-CtCt
	2755.09	36.63	2729.84	2718.46	120.99	OSF1.50	13050.00	12430.00				MINPT-O-EOU
	2755.14	36.68	2729.85	2718.46	120.79	OSF1.50	13060.00	12430.00				MinPt-O-ADP
	2748.41	50.63	2713.82	2697.78	85.57	OSF1.50	13750.00	12430.00				MinPt-CtCt
	2748.61	51.30	2713.58	2697.31	84.42	OSF1.50	13800.00	12430.00				MINPT-O-EOU
	2748.83	51.57	2713.61	2697.25	83.95	OSF1.50	13820.00	12430.00				MinPt-O-ADP
	2745.13	64.79	2701.10	2680.34	66.05	OSF1.50	14310.00	12430.00				MinPt-CtCt
	2742.22	78.05	2689.35	2664.17	54.39	OSF1.50	14800.00	12430.00				MinPt-CtCt
	2733.13	96.66	2667.86	2636.47	43.50	OSF1.50	15460.00	12430.00				MinPt-CtCt
	2733.46	97.66	2667.52	2635.80	43.05	OSF1.50	15520.00	12430.00				MINPT-O-EOU
	2733.73	97.99	2667.57	2635.74	42.90	OSF1.50	15540.00	12430.00				MinPt-O-ADP
	2735.83	111.63	2660.57	2624.20	37.57	OSF1.50	15980.00	12430.00				MinPt-CtCt
	2736.49	113.75	2659.83	2622.74	36.86	OSF1.50	16080.00	12430.00				MINPT-O-EOU
	2737.34	114.79	2659.98	2622.55	36.53	OSF1.50	16130.00	12430.00				MinPt-O-ADP
	2741.71	118.98	2661.56	2622.73	35.28	OSF1.50	16290.00	12430.00				MinPt-O-ADP
	2737.23	142.66	2641.29	2594.57	29.27	OSF1.50	17040.00	12430.00				MinPt-CtCt
	2736.33	148.56	2636.46	2587.77	28.08	OSF1.50	17240.00	12430.00				MinPt-CtCt
	2736.29	151.82	2634.25	2584.47	27.46	OSF1.50	17350.00	12430.00				MinPt-CtCt
	2733.25	173.41	2616.81	2559.84	23.97	OSF1.50	18080.00	12430.00				MinPt-CtCt
	2732.03	184.18	2608.41	2547.85	22.54	OSF1.50	18440.00	12430.00				MinPt-CtCt
	2734.19	196.97	2602.04	2537.22	21.07	OSF1.50	18870.00	12430.00				MinPt-CtCt
	2738.80	215.15	2594.53	2523.65	19.30	OSF1.50	19510.00	12430.00				MINPT-O-EOU
	2740.26	240.59	2579.04	2499.67	17.25	OSF1.50	20330.00	12430.00				MinPt-CtCt

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor	Major		
2737.70		249.81	2570.33	2487.89	16.59	OSF1.50	20640.00	12430.00				MinPt-CtCt	
2737.67		253.42	2567.88	2484.24	16.35	OSF1.50	20760.00	12430.00				MinPt-CtCt	
2742.16		269.16	2561.88	2473.00	15.41	OSF1.50	21320.00	12430.00				MINPT-O-EOU	
2747.38		278.40	2560.95	2468.98	14.92	OSF1.50	21630.00	12430.00				MINPT-O-EOU	
2747.96		279.06	2561.09	2468.91	14.89	OSF1.50	21660.00	12430.00				MinPt-O-ADP	
2746.91		295.29	2549.22	2451.62	14.06	OSF1.50	22180.00	12430.00				MinPt-CtCt	
2746.94		295.37	2549.19	2451.57	14.06	OSF1.50	22170.00	12430.00				MINPT-O-EOU	
2747.01		295.46	2549.21	2451.56	14.05	OSF1.50	22180.00	12430.00				MinPt-O-ADP	
2749.27		296.02	2551.09	2453.25	14.04	OSF1.50	22270.00	12430.00				MinPt-O-SF	
2756.57		296.32	2558.19	2460.25	14.06	OSF1.50	22386.53	12430.00				TD	

Cimarex Vaca Draw 20-17
Federal #1H Surcon Off-12740
(Def Survey)

152.29	32.81	149.79	119.48	855529.18	MAS = 10.00 (m)	0.00	0.00	Pass
152.28	32.81	149.77	119.47	22778.03	MAS = 10.00 (m)	26.00	26.00	Surface
151.48	32.81	148.02	118.67	155.14	MAS = 10.00 (m)	250.00	250.00	WRP
151.60	32.81	147.90	118.80	123.80	MAS = 10.00 (m)	300.00	300.00	MinPts
173.28	32.81	163.66	140.48	23.99	MAS = 10.00 (m)	1550.00	1550.00	MINPT-O-EOU
510.34	32.81	494.93	477.53	39.33	MAS = 10.00 (m)	3870.00	3852.82	MinPt-O-SF
549.60	32.81	533.15	516.79	39.22	MAS = 10.00 (m)	4110.00	4090.89	MinPt-O-SF
576.79	32.81	559.63	543.98	39.17	MAS = 10.00 (m)	4290.00	4269.43	MinPt-O-SF
674.87	32.81	655.11	642.07	38.95	MAS = 10.00 (m)	4910.00	4884.43	MinPt-O-SF
702.25	32.81	681.78	669.44	38.94	MAS = 10.00 (m)	5070.00	5043.14	MinPt-O-SF
851.77	35.43	827.32	816.34	38.69	OSF1.50	5930.00	5896.19	MinPt-O-SF
900.49	37.33	874.77	863.16	38.67	OSF1.50	6210.00	6173.93	MinPt-O-SF
1261.02	54.21	1224.05	1206.81	36.51	OSF1.50	8555.00	8500.00	MinPt-O-SF
1288.86	53.23	1252.54	1235.62	38.03	OSF1.50	9600.00	9544.02	MinPt-CtCt
1253.24	60.50	1212.07	1192.74	32.35	OSF1.50	12190.00	12126.92	MinPt-CtCt
1253.24	60.53	1212.06	1192.72	32.33	OSF1.50	12200.00	12135.89	MINPT-O-EOU
1253.27	60.56	1212.07	1192.72	32.31	OSF1.50	12210.00	12144.76	MinPt-O-ADP
1262.82	61.49	1220.99	1201.32	32.05	OSF1.50	12430.00	12308.62	MinPt-O-SF
10168.36	60.98	10126.87	10107.37	260.74	OSF1.50	22386.53	12430.00	TD

Cimarex Vaca Draw 20-17
Federal #1H ST01 Rev1 RM
15Feb18 (Def Plan)

152.29	32.81	149.79	119.48	855529.18	MAS = 10.00 (m)	0.00	0.00	Pass
152.28	32.81	149.77	119.47	22778.04	MAS = 10.00 (m)	26.00	26.00	Surface
151.48	32.81	148.02	118.67	155.14	MAS = 10.00 (m)	250.00	250.00	WRP
151.60	32.81	147.90	118.80	123.80	MAS = 10.00 (m)	300.00	300.00	MinPts
173.28	32.81	163.66	140.48	23.99	MAS = 10.00 (m)	1550.00	1550.00	MINPT-O-EOU
510.34	32.81	494.93	477.53	39.33	MAS = 10.00 (m)	3870.00	3852.82	MinPt-O-SF
549.60	32.81	533.15	516.79	39.22	MAS = 10.00 (m)	4110.00	4090.89	MinPt-O-SF
576.79	32.81	559.63	543.98	39.17	MAS = 10.00 (m)	4290.00	4269.43	MinPt-O-SF
674.87	32.81	655.11	642.07	38.95	MAS = 10.00 (m)	4910.00	4884.43	MinPt-O-SF
702.25	32.81	681.78	669.44	38.94	MAS = 10.00 (m)	5070.00	5043.14	MinPt-O-SF
851.77	35.43	827.32	816.34	38.69	OSF1.50	5930.00	5896.19	MinPt-O-SF
900.49	37.33	874.77	863.16	38.67	OSF1.50	6210.00	6173.93	MinPt-O-SF
1261.02	54.21	1224.05	1206.81	36.51	OSF1.50	8555.00	8500.00	MinPt-O-SF
1288.86	53.23	1252.54	1235.62	38.03	OSF1.50	9600.00	9544.02	MinPt-CtCt
1257.61	59.41	1217.17	1198.20	33.08	OSF1.50	11860.00	11804.02	MinPt-CtCt
1257.63	59.46	1217.15	1198.17	33.05	OSF1.50	11880.00	11824.02	MinPts
1259.72	59.70	1219.09	1200.02	32.97	OSF1.50	12020.00	11963.95	MinPt-O-SF
1250.45	63.82	1207.07	1186.63	30.53	OSF1.50	12810.00	12420.39	MinPt-CtCt
1250.60	64.97	1206.45	1185.63	29.97	OSF1.50	12910.00	12428.48	MinPt-CtCt

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor	Major		
1250.73	65.29	1206.37	1185.44	29.82		OSF1.50	12940.00	12429.55				MINPT-O-EOU	
1250.92	65.50	1206.42	1185.42	29.72		OSF1.50	12960.00	12429.91				MinPt-O-ADP	
1246.53	329.05	1026.33	917.48	5.71		OSF1.50	22150.00	12430.00				MinPt-CtCt	
1246.53	329.26	1026.19	917.27	5.71		OSF1.50	22160.00	12430.00				MinPts	
1246.60	329.28	1026.24	917.31	5.71		OSF1.50	22170.00	12430.00				MinPt-O-SF	
1267.56	325.05	1050.03	942.51	5.88		OSF1.50	22386.53	12430.00				TD	

Cimarex Vaca Draw 20-17
Federal #1H ST01 MWD Off-
Update (Non-Def Survey)

152.29	32.81	149.79	119.48	855529.18	MAS = 10.00 (m)	0.00	0.00	Surface	Pass
152.28	32.81	149.77	119.47	22778.03	MAS = 10.00 (m)	26.00	26.00	WRP	
151.48	32.81	148.02	118.67	155.14	MAS = 10.00 (m)	250.00	250.00	MinPts	
151.60	32.81	147.90	118.80	123.80	MAS = 10.00 (m)	300.00	300.00	MINPT-O-EOU	
173.28	32.81	163.66	140.48	23.99	MAS = 10.00 (m)	1550.00	1550.00	MinPt-O-SF	
510.34	32.81	494.93	477.53	39.33	MAS = 10.00 (m)	3870.00	3852.82	MinPt-O-SF	
549.60	32.81	533.15	516.79	39.22	MAS = 10.00 (m)	4110.00	4090.89	MinPt-O-SF	
576.79	32.81	559.63	543.98	39.17	MAS = 10.00 (m)	4290.00	4269.43	MinPt-O-SF	
674.87	32.81	655.11	642.07	38.95	MAS = 10.00 (m)	4910.00	4884.43	MinPt-O-SF	
702.25	32.81	681.78	669.44	38.94	MAS = 10.00 (m)	5070.00	5043.14	MinPt-O-SF	
851.77	35.43	827.32	816.34	38.69	OSF1.50	5930.00	5896.19	MinPt-O-SF	
900.49	37.33	874.77	863.16	38.67	OSF1.50	6210.00	6173.93	MinPt-O-SF	
1261.02	54.21	1224.05	1206.81	36.51	OSF1.50	8555.00	8500.00	MinPt-O-SF	
1288.86	53.23	1252.54	1235.62	38.03	OSF1.50	9600.00	9544.02	MinPt-CtCt	
1257.61	59.41	1217.17	1198.20	33.08	OSF1.50	11860.00	11804.02	MinPt-CtCt	
1257.63	59.48	1217.15	1198.17	33.05	OSF1.50	11880.00	11824.02	MinPts	
1259.72	59.70	1219.09	1200.02	32.97	OSF1.50	12020.00	11963.95	MinPt-O-SF	
1250.45	63.82	1207.07	1186.63	30.53	OSF1.50	12810.00	12420.39	MinPt-CtCt	
1250.60	64.97	1206.45	1185.63	29.97	OSF1.50	12910.00	12428.48	MinPt-CtCt	
1250.73	65.29	1206.37	1185.44	29.82	OSF1.50	12940.00	12429.55	MINPT-O-EOU	
1250.92	65.50	1206.42	1185.42	29.72	OSF1.50	12960.00	12429.91	MinPt-O-ADP	
1250.19	71.09	1201.96	1179.10	27.28	OSF1.50	13340.00	12430.00	MinPt-CtCt	
1250.31	71.44	1201.85	1178.87	27.15	OSF1.50	13370.00	12430.00	MINPT-O-EOU	
1243.76	76.98	1191.61	1166.78	25.00	OSF1.50	13670.00	12430.00	MinPt-CtCt	
1243.94	77.38	1191.51	1166.55	24.87	OSF1.50	13700.00	12430.00	MINPT-O-EOU	
1244.05	77.52	1191.54	1166.53	24.82	OSF1.50	13710.00	12430.00	MinPt-O-ADP	
1252.50	87.39	1193.41	1165.11	22.09	OSF1.50	14180.00	12430.00	MinPt-CtCt	
1246.66	101.38	1178.24	1145.28	18.87	OSF1.50	14780.00	12430.00	MinPt-CtCt	
1247.16	103.04	1177.64	1144.12	18.57	OSF1.50	14860.00	12430.00	MINPT-O-EOU	
1247.85	103.86	1177.77	1143.99	18.43	OSF1.50	14900.00	12430.00	MinPt-O-ADP	
1227.06	142.02	1131.55	1085.05	13.17	OSF1.50	16330.00	12430.00	MinPt-CtCt	
1227.58	143.59	1131.02	1083.99	13.02	OSF1.50	16400.00	12430.00	MINPT-O-EOU	
1229.51	148.05	1129.97	1081.46	12.65	OSF1.50	16560.00	12430.00	MINPT-O-EOU	
1230.50	149.21	1130.19	1081.29	12.56	OSF1.50	16610.00	12430.00	MinPt-O-ADP	
1232.87	152.04	1130.68	1080.84	12.34	OSF1.50	16710.00	12430.00	MinPt-O-ADP	
1245.83	170.13	1131.58	1075.71	11.13	OSF1.50	17320.00	12430.00	MinPt-CtCt	
1248.31	176.56	1129.77	1071.75	10.74	OSF1.50	17560.00	12430.00	MINPT-O-EOU	
1249.49	178.02	1129.98	1071.48	10.66	OSF1.50	17620.00	12430.00	MinPt-O-ADP	
1231.30	212.11	1089.08	1019.19	8.79	OSF1.50	18780.00	12430.00	MinPt-CtCt	
1231.60	212.95	1088.80	1018.65	8.76	OSF1.50	18820.00	12430.00	MINPT-O-EOU	
1231.93	213.35	1088.86	1018.58	8.75	OSF1.50	18840.00	12430.00	MinPt-O-ADP	
1252.94	226.23	1101.29	1026.71	8.38	OSF1.50	19270.00	12430.00	MINPT-O-EOU	
1254.88	231.44	1099.76	1023.44	8.21	OSF1.50	19420.00	12430.00	MinPt-CtCt	
1254.90	231.50	1099.73	1023.40	8.20	OSF1.50	19430.00	12430.00	MinPts	
1255.17	231.58	1099.95	1023.59	8.20	OSF1.50	19450.00	12430.00	MinPt-O-SF	

Offset Trajectory	Separation			Allow Dev. (ft)	Sep. Fact.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)				MD (ft)	TVD (ft)	Alert	Minor	Major		
	3218.18	113.36	3141.78	3104.83	43.51	OSF1.50	22386.53	12430.00					TD

Cimarex Vaca Draw 20-17
Federal #4H Rev2 RM
24Oct18 (Def Plan)

1221.29	32.81	1218.79	1188.48	N/A	MAS = 10.00 (m)	0.00	0.00	Surface
1221.28	32.81	1218.78	1188.47	N/A	MAS = 10.00 (m)	26.00	26.00	WRP
1210.78	32.81	1198.63	1177.97	125.27	MAS = 10.00 (m)	2020.00	2017.76	MinPts
1210.78	32.81	1198.62	1177.97	125.09	MAS = 10.00 (m)	2030.00	2027.68	MINPT-O-EOU
1305.90	71.57	1257.36	1234.33	28.31	OSF1.50	8270.00	8217.30	MinPt-O-SF
1263.34	70.94	1215.21	1192.39	27.63	OSF1.50	8760.00	8704.10	MinPt-O-SF
1257.41	88.45	1197.61	1168.96	21.90	OSF1.50	12930.00	12429.26	MinPt-CICt
1256.82	348.06	1023.94	908.75	5.44	OSF1.50	22386.53	12430.00	MinPts

Pass

PECOS DISTRICT

DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	CIMAREX ENERGY
LEASE NO.:	NMNM026394
WELL NAME & NO.:	VACA DRAW 20 17 FEDERAL 13H
SURFACE HOLE FOOTAGE:	330'/S & 730'/W
BOTTOM HOLE FOOTAGE	100'/N & 1626'/W
LOCATION:	SECTION 20, T25S, R33E, NMPM
COUNTY:	LEA, 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.

Operator shall filled 1/3rd of casing with fluid 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: Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.

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 for an annular spacing between a 7 5/8" x 5 1/2" is approved.

- 3. The minimum required fill of cement behind the 5-1/2 x 5 inch production casing is:
 - Cement should tie-back at least 200 feet into previous casing string. Operator shall provide method of verification. **Additional cement maybe required. Excess calculates to 14%.**

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)

☒ Chaves and Roosevelt Counties

Call the Roswell Field Office, 2909 West Second St., Roswell NM 88201.

During office hours call (575) 627-0272.

After office hours call (575)

☒ Eddy County

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

☒ Lea County

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

1. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
 - a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
 - b. When the operator proposes to set surface casing with Spudder Rig
 - Notify the BLM when moving in and removing the Spudder Rig.
 - Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
 - BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.
2. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area

immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.

3. The record of the drilling rate along with the GR/N well log (one log per well pad is acceptable) 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 Sec. 17.
2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.
3. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.
4. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:
 - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
 - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
 - c. Manufacturer representative shall install the test plug for the initial BOP test.
 - d. 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.

Waste Minimization Plan (WMP)

In the interest of resource development, submission of additional well gas capture development plan information is deferred but may be required by the BLM Authorized Officer at a later date.

ZS 100418

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	0.56	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	509	835	601	39	8.80	2951	3M	1.50
CSG FRAC GRADIENT: 3130/1034=3.02									
Burst Frac Gradient(s) for Segment(s) A, B = , b All > 0.70, OK.									

7 5/8 casing inside the 10 3/4			Design Factors				INTERMEDIATE		
Segment	#/ft	Grade	Coupling	Body	Collapse	Burst	Length	Weight	
"A"	29.70	L 80	BUTT	1.93	0.86	0.85	11,976	355,687	
"B"	29.70	L 80	ULTRA FJ	∞	0.99	0.85	624	18,533	
w/8.4#/g mud, 30min Sfc Csg Test psig:						Totals:	12,600	374,220	
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	2737		9.00	5337	10M	0.69
D V Tool(s):			4900			sum of sx	Σ CuFt	Σ%excess	
t by stage % :		46	39			1593	3920	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 = 0.58, 0.58, c, d									
<0.70 a Problem!!									
ALT. COLLAPSE: 0.86*1.5=1.29; ALT BURST SF IS GOOD.									

Tail cmt		5 1/2 casing inside the		7 5/8		A Buoyant		Design Factors		PRODUCTION	
Segment	#/ft	Grade		Coupling	Joint	Collapse	Burst	Length	Weight		
"A"	20.00	L 80		LT&C	2.45	1.14	1.14	11,976	239,520		
"B"	18.00	P 110		BUTT	9.02	1.57	1.69	10,410	187,380		
w/8.4#/g mud, 30min Sfc Csg Test psig: 1,207								Totals:	22,386	426,900	
B	would be:				71.00	1.67	if it were a vertical wellbore.				
No Pilot Hole Planned			MTD	Max VTD	Csg VD	Curve KOP	Dogleg°	Severity°	MEOC		
			22386	12430	12430	11976	90	9	12976		
The cement volume(s) are intended to achieve a top of					12400	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	737	958	840	14	12.50			0.35		
Class 'H' tail cmt yld > 1.20											