Form 3160-5
(June 2015)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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

SUNDRY NOTICES AND REPORTS ON WELLS

HOBBS OCD
NOV 28 2018
RECEIVED

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

SUBMIT IN TRIPLICATE - Other instructions on page 2

5. Lease Serial No.
NMNM26394

6. If Indian, Allottee or Tribe Name

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

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

8. Well Name and No.
VACA DRAW 20-17 FED 2H

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

9. API Well No.
30-025-44136

3a. Address
202 S CHEYENNE AVE, SUITE 1000
TULSA, OK 74103

3b. Phone No. (include area code)
Ph: 918-560-7060

10. Field and Pool or Exploratory Area
WC-025 S253317M; WOLFCAMP

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 20 T25S R33E SESW 390FSL 1910FWL

11. County or Parish, State
LEA COUNTY, NM

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

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

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

Cimarex respectfully requests approval to change the BHL, casing & Rig layout.

Approved:
BHL: 330' FSL & 1613' FWL
Proposed
BHL: 100' FSL & 2042' FWL

Approved: Drill 9 7/8" hole from 1034' to 12,489' and run 7 5/8" 29.7# L80 BTC casing from surface to 12,489'

Surface good
11-7-2018 SP

Proposed: Drill 9 7/8" hole from 1,034' to 11,864' and then 8.75" hole from 11,864 to 12,489'.
Casing will be 7 5/8" 29.7# L80 BTC casing from surface to 11,864' and then 7 5/8" 29.7# L80 Ultra

Engineering is Good. JS 11/7/18. See Attached COA.

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

Electronic Submission #441228 verified by the BLM Well Information System
For CIMAREX ENERGY CO, sent to the Hobbs
Committed to AFMSS for processing by PRISCILLA PEREZ on 10/29/2018 ()

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 #441228 that would not fit on the form

32. Additional remarks, continued

FJ from 11,864' to 12,489'. 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) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone (505) 476-3460 Fax (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
30-025-44136	~~98220~~ ~~98180~~ WC-025 G-09 ~~S253309P;~~	~~WC-025-S253317M4~~ ; Wolfcamp

[4] Property Code	[5] Property Name	[6] Well Number
319775	VACA DRAW 20-17 FEDERAL	2H

[7] OGRID No.	[8] Operator Name	[9] Elevation
215099	CIMAREX ENERGY CO.	3418.2'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	20	25S	33E		390	SOUTH	1910	WEST	LEA

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
C	17	25S	33E		100	NORTH	2042	WEST	LEA

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
320			

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 HOLE LOCATION)
LATITUDE = 32°06'35.66" (32.109906)
LONGITUDE = 103°35'48.05" (103.596681)
NAD 27 (SURFACE HOLE LOCATION)
LATITUDE = 32°06'35.21" (32.109781)
LONGITUDE = 103°35'46.35" (103.596208)
STATE PLANE NAD 83 (N.M. EAST)
N. 404499.31 E. 769421.19
STATE PLANE NAD 27 (N.M. EAST)
N: 404441.52 E. 728235.04

NAD 83 (BOTTOM HOLE LOCATION)
LATITUDE = 32°08'15.29" (32.137580)
LONGITUDE = 103°35'46.47" (103.596243)
NAD 27 (BOTTOM HOLE LOCATION)
LATITUDE = 32°08'14.84" (32.137456)
LONGITUDE = 103°35'44.77" (103.595769)
STATE PLANE NAD 83 (N.M. EAST)
N. 414568.13 E. 769487.73
STATE PLANE NAD 27 (N.M. EAST)
N. 414510.11 E. 728302.02

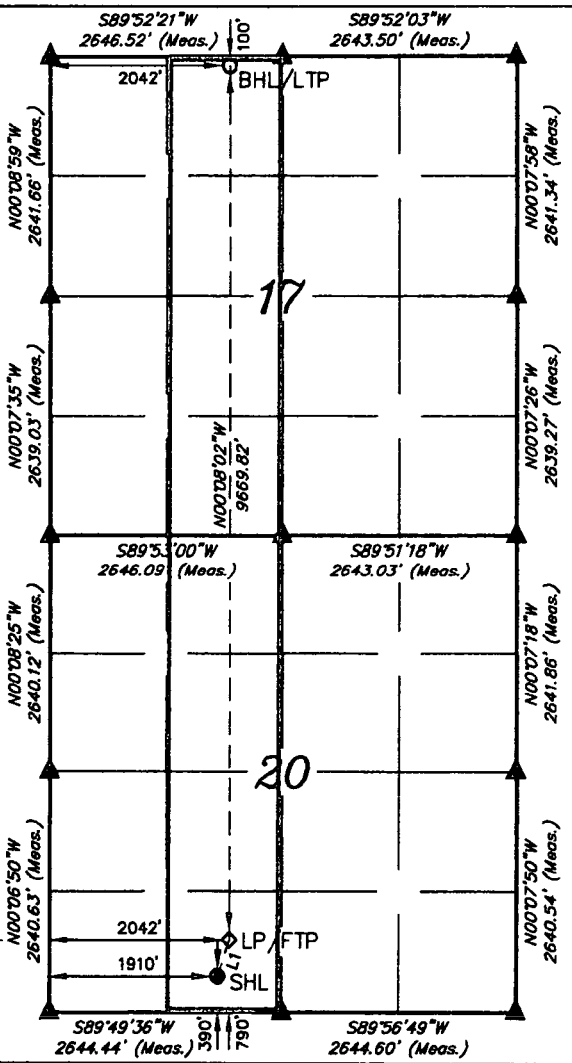
LINE TABLE		
LINE	DIRECTION	LENGTH
L1	N18°08'36"E	421.35'

2000' 1000' 0' 2000'

SCALE

REV: 2 10-19-18 C.M.T. (BHL MOVE)

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



[17] OPERATOR CERTIFICATION

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

Signature 10/24/18 Date

Aricka Easterling
Printed Name

aeasterling@cimarex.com
E-mail Address

[18] SURVEYOR CERTIFICATION

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

January 20, 2017
Date of Survey

Signature and Seal of Professional Surveyor

PAUL BUCHELE NEW MEXICO 23782 10-19-18 PROFESSIONAL SURVEYOR

Certificate Number

1. Geological Formations

TVD of target 12,370
MD at TD 22,209

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	
Woflcamp	12196	Hydrocarbons	
Wolfcamp A1 Shale	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	11864	11864	7-5/8"	29.70	L-80	BT&C	2.48	1.19	1.81
8 3/4	11864	12489	12321	7-5/8"	29.70	L-80	Ultra FJ	2.84	1.19	28.6
6 3/4	0	11864	11864	5-1/2"	20.00	P-110	LT&C	1.44	1.64	2.46
6 3/4	12132	22209	12370	5"	18.00	P-110	BT&C	1.67	1.69	63.68

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
Is AC Report included?	N

3. Cementing Program

Casing	# Sks	Wt. lb/gal	Yld ft3/sack	H2O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surface	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	584	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	732	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	12289	9

4. Pressure Control E it

	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
9 7/8 and 8 3/4	13 5/8	5M	Annular	X	50% of working pressure
			Blind Ram		5M
			Pipe Ram	X	
			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 12489'	Brine Diesel Emulsion	8.50 - 9.00	30-35	N/C
12489' to 22209'	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

6. Logging and Testing Procedures

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

Additional Logs Planned	Interval

7. Drilling Conditions

Condition	
BH Pressure at deepest TVD	8040 psi
Abnormal Temperature	No

Hydrogen Sulfide (H2S) monitors will be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.

X	H2S is present
X	H2S plan is attached

8. Other Facets of Operation

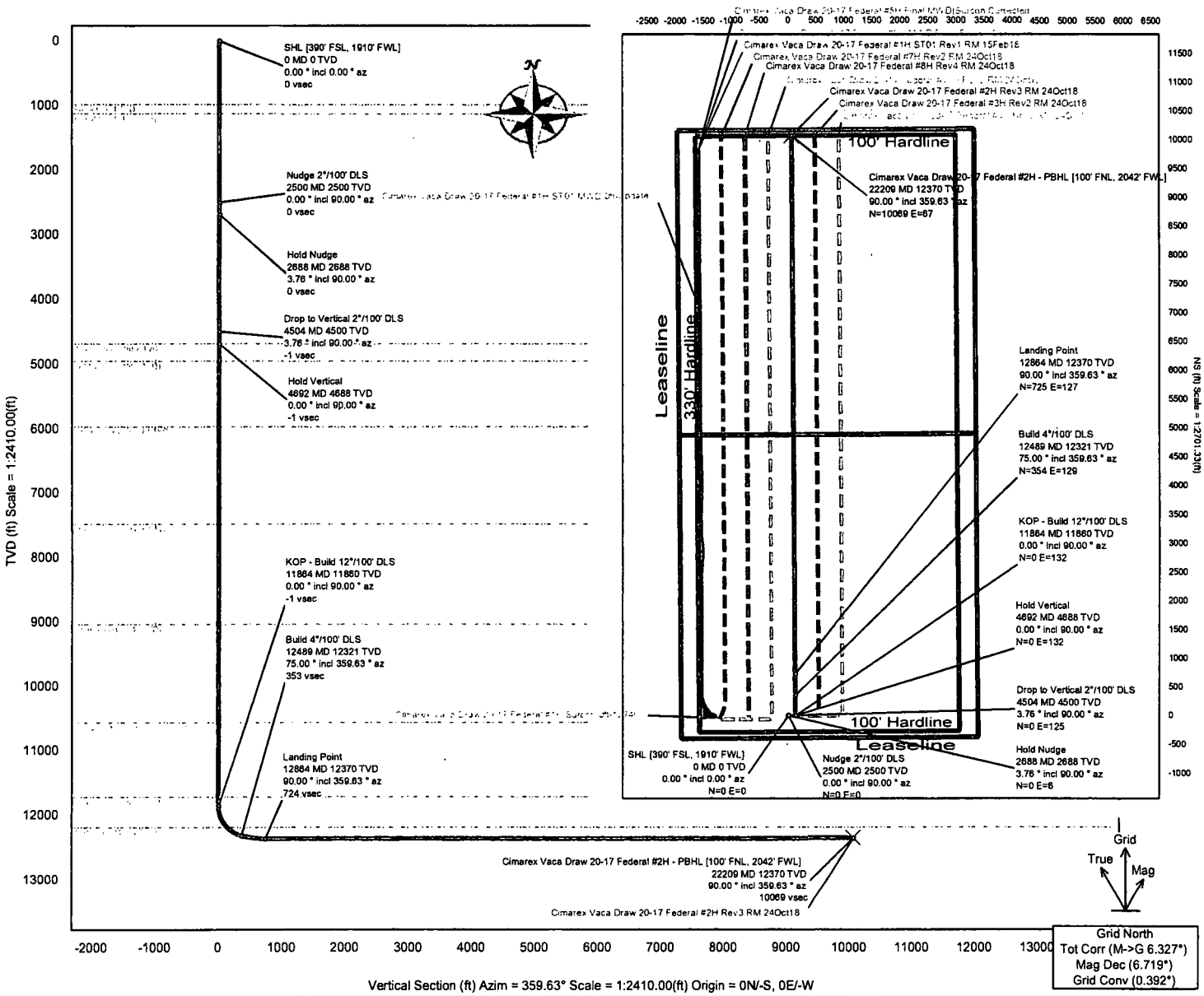
Schlumberger

Cimarex Rev 3

CIMAREX

Borehole:	Well:	Field:	Structure:
Original Borehole	Cimarex Vaca Draw 20-17 Federal #2H	NM Lea County (NAD 83)	Cimarex Vaca Draw 20-17 Federal #2H

Gravity & Magnetic Parameters						Surface Location	NAD83 New Mexico State Plane, Eastern Zone, US Feet					Miscellaneous			
Model:	HDGM 2018	Dip:	59.754°	Date:	24-Oct-2018	Lat:	N 32 6 35.66	Northing:	404499.31ftUS	Grid Conv:	0.3918°	Slot:	Cimarex Vaca Draw 20-17 Federal #2H	TVD Ref:	RKB(3444.2ft above MSL)
MagDec:	6.719°	FS:	47838.584nT	Gravity FS:	998.43mgn (9.80665 Based)	Lon:	W 103 35 48.05	Easting:	789421.19ftUS	Scale Fact:	0.99996867	Plan:	Cimarex Vaca Draw 20-17 Federal #2H 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 [390' FSL, 1910' 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	2500.00	0.00	90.00	2500.00	0.00	0.00	0.00	0.00
Hold Nudge	2688.20	3.76	90.00	2688.06	-0.04	0.00	6.18	2.00
Drop to Vertical 2°/100' DLS	4504.05	3.76	90.00	4500.00	-0.81	0.00	125.38	0.00
Base of Salt	4691.19	0.02	90.00	4687.00	-0.85	0.00	131.56	2.00
Hold Vertical	4692.25	0.00	90.00	4688.06	-0.85	0.00	131.56	2.00
Bell Canyon	4960.19	0.00	90.00	4956.00	-0.85	0.00	131.56	0.00
Cherry Canyon	5978.19	0.00	90.00	5974.00	-0.85	0.00	131.56	0.00
Brushy Canyon	7488.19	0.00	90.00	7484.00	-0.85	0.00	131.56	0.00
Bone Spring	9044.19	0.00	90.00	9040.00	-0.85	0.00	131.56	0.00
2nd Bone Spring Sand	10577.19	0.00	90.00	10573.00	-0.85	0.00	131.56	0.00
3rd Bone Spring Sand	11730.19	0.00	90.00	11726.00	-0.85	0.00	131.56	0.00
KOP - Build 12°/100' DLS	11864.18	0.00	90.00	11860.00	-0.85	0.00	131.56	0.00
Wolfcamp	12236.91	44.73	359.63	12196.00	137.39	138.24	130.67	12.00
Build 4°/100' DLS	12489.18	75.00	359.63	12321.19	353.04	353.88	129.28	12.00
Landing Point	12864.18	90.00	359.63	12370.00	723.77	724.60	126.88	4.00
Cimarex Vaca Draw 20-17 Federal #2H - PBHL [100' FNL, 2042' FWL]	22208.93	90.00	359.63	12370.00	10068.52	10069.16	66.54	0.00

Schlumberger

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

CIMAREX

Report Date:	October 24, 2018 - 05:46 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Cimarex	**Vertical Section Azimuth:**	359.630 ° (Grid North)
Field:	NM Lea County (NAD 83)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	Cimarex Vaca Draw 20-17 Federal #2H / Cimarex Vaca Draw 20-17 Federal #2H	**TVD Reference Datum:**	RKB
Well:	Cimarex Vaca Draw 20-17 Federal #2H	**TVD Reference Elevation:**	3444.200 ft above MSL
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3418.200 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	6.719 °
Survey Name:	Cimarex Vaca Draw 20-17 Federal #2H Rev3 RM 24Oct18	**Total Gravity Field Strength:**	998.4300mgn (9.80665 Based)
Survey Date:	April 13, 2017	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	97.528 ° / 10200.926 ft / 6.252 / 0.825	**Total Magnetic Field Strength:**	47835.584 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.754 °
Location Lat / Long:	N 32° 6' 35.65902", W 103° 35' 48.04794"	**Declination Date:**	October 24, 2018
Location Grid N/E Y/X:	N 404499.310 ftUS, E 769421.190 ftUS	**Magnetic Declination Model:**	HDGM 2018
CRS Grid Convergence Angle:	0.3916 °	**North Reference:**	Grid North
Grid Scale Factor:	0.99996867	**Grid Convergence Used:**	0.3916 °
Version / Patch:	2.10.740.0	**Total Corr Mag North->Grid North:**	6.3270 °
		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, 1910' FWL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	100.00	0.00	90.00	100.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	200.00	0.00	90.00	200.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	300.00	0.00	90.00	300.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	400.00	0.00	90.00	400.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	500.00	0.00	90.00	500.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	600.00	0.00	90.00	600.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	700.00	0.00	90.00	700.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	800.00	0.00	90.00	800.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	900.00	0.00	90.00	900.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
Rustler	*984.00*	*0.00*	*90.00*	*984.00*	*0.00*	*0.00*	*0.00*	*0.00*	*404499.31*	*769421.19*	*N 32 6 35.66*	*W 103 35 48.05*
	1000.00	0.00	90.00	1000.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	1100.00	0.00	90.00	1100.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
Top of Salt	*1128.00*	*0.00*	*90.00*	*1128.00*	*0.00*	*0.00*	*0.00*	*0.00*	*404499.31*	*769421.19*	*N 32 6 35.66*	*W 103 35 48.05*
	1200.00	0.00	90.00	1200.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	1300.00	0.00	90.00	1300.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	1400.00	0.00	90.00	1400.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	1500.00	0.00	90.00	1500.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	1600.00	0.00	90.00	1600.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	1700.00	0.00	90.00	1700.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	1800.00	0.00	90.00	1800.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	1900.00	0.00	90.00	1900.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	2000.00	0.00	90.00	2000.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	2100.00	0.00	90.00	2100.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	2200.00	0.00	90.00	2200.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	2300.00	0.00	90.00	2300.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05

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	90.00	2400.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
Nudge 2°/100' DLS	2500.00	0.00	90.00	2500.00	0.00	0.00	0.00	0.00	404499.31	769421.19	N 32 6 35.66	W 103 35 48.05
	2600.00	2.00	90.00	2599.98	-0.01	0.00	1.75	2.00	404499.31	769422.94	N 32 6 35.66	W 103 35 48.03
Hold Nudge	2688.20	3.76	90.00	2688.06	-0.04	0.00	6.18	2.00	404499.31	769427.37	N 32 6 35.66	W 103 35 47.98
	2700.00	3.76	90.00	2699.84	-0.04	0.00	6.95	0.00	404499.31	769428.14	N 32 6 35.66	W 103 35 47.97
	2800.00	3.76	90.00	2799.62	-0.09	0.00	13.52	0.00	404499.31	769434.71	N 32 6 35.66	W 103 35 47.89
	2900.00	3.76	90.00	2899.41	-0.13	0.00	20.08	0.00	404499.31	769441.27	N 32 6 35.66	W 103 35 47.81
	3000.00	3.76	90.00	2999.19	-0.17	0.00	26.65	0.00	404499.31	769447.84	N 32 6 35.66	W 103 35 47.74
	3100.00	3.76	90.00	3098.98	-0.21	0.00	33.21	0.00	404499.31	769454.40	N 32 6 35.66	W 103 35 47.66
	3200.00	3.76	90.00	3198.76	-0.26	0.00	39.78	0.00	404499.31	769460.97	N 32 6 35.66	W 103 35 47.59
	3300.00	3.76	90.00	3298.55	-0.30	0.00	46.34	0.00	404499.31	769467.53	N 32 6 35.66	W 103 35 47.51
	3400.00	3.76	90.00	3398.33	-0.34	0.00	52.91	0.00	404499.31	769474.09	N 32 6 35.66	W 103 35 47.43
	3500.00	3.76	90.00	3498.11	-0.38	0.00	59.47	0.00	404499.31	769480.66	N 32 6 35.66	W 103 35 47.36
	3600.00	3.76	90.00	3597.90	-0.43	0.00	66.03	0.00	404499.31	769487.22	N 32 6 35.65	W 103 35 47.28
	3700.00	3.76	90.00	3697.68	-0.47	0.00	72.60	0.00	404499.31	769493.79	N 32 6 35.65	W 103 35 47.20
	3800.00	3.76	90.00	3797.47	-0.51	0.00	79.16	0.00	404499.31	769500.35	N 32 6 35.65	W 103 35 47.13
	3900.00	3.76	90.00	3897.25	-0.55	0.00	85.73	0.00	404499.31	769506.92	N 32 6 35.65	W 103 35 47.05
	4000.00	3.76	90.00	3997.04	-0.60	0.00	92.29	0.00	404499.31	769513.48	N 32 6 35.65	W 103 35 46.97
	4100.00	3.76	90.00	4096.82	-0.64	0.00	98.86	0.00	404499.31	769520.04	N 32 6 35.65	W 103 35 46.90
	4200.00	3.76	90.00	4196.60	-0.68	0.00	105.42	0.00	404499.31	769526.61	N 32 6 35.65	W 103 35 46.82
	4300.00	3.76	90.00	4296.39	-0.72	0.00	111.99	0.00	404499.31	769533.17	N 32 6 35.65	W 103 35 46.75
	4400.00	3.76	90.00	4396.17	-0.77	0.00	118.55	0.00	404499.31	769539.74	N 32 6 35.65	W 103 35 46.67
	4500.00	3.76	90.00	4495.96	-0.81	0.00	125.12	0.00	404499.31	769546.30	N 32 6 35.65	W 103 35 46.59
Drop to Vertical 2°/100' DLS	4504.05	3.76	90.00	4500.00	-0.81	0.00	125.38	0.00	404499.31	769546.57	N 32 6 35.65	W 103 35 46.59
	4600.00	1.84	90.00	4595.83	-0.84	0.00	130.08	2.00	404499.31	769551.26	N 32 6 35.65	W 103 35 46.54
Base of Salt	*4691.19*	*0.02*	*90.00*	*4687.00*	*-0.85*	*0.00*	*131.56*	*2.00*	*404499.31*	*769552.75*	*N 32 6 35.65*	*W 103 35 46.52*
Hold Vertical	4692.25	0.00	90.00	4688.06	-0.85	0.00	131.56	2.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	4700.00	0.00	90.00	4695.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	4800.00	0.00	90.00	4795.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	4900.00	0.00	90.00	4895.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
Bell Canyon	*4960.19*	*0.00*	*90.00*	*4956.00*	*-0.85*	*0.00*	*131.56*	*0.00*	*404499.31*	*769552.75*	*N 32 6 35.65*	*W 103 35 46.52*
	5000.00	0.00	90.00	4995.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	5100.00	0.00	90.00	5095.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	5200.00	0.00	90.00	5195.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	5300.00	0.00	90.00	5295.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	5400.00	0.00	90.00	5395.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	5500.00	0.00	90.00	5495.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	5600.00	0.00	90.00	5595.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	5700.00	0.00	90.00	5695.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	5800.00	0.00	90.00	5795.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	5900.00	0.00	90.00	5895.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
Cherry Canyon	*5978.19*	*0.00*	*90.00*	*5974.00*	*-0.85*	*0.00*	*131.56*	*0.00*	*404499.31*	*769552.75*	*N 32 6 35.65*	*W 103 35 46.52*
	6000.00	0.00	90.00	5995.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	6100.00	0.00	90.00	6095.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	6200.00	0.00	90.00	6195.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	6300.00	0.00	90.00	6295.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	6400.00	0.00	90.00	6395.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	6500.00	0.00	90.00	6495.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	6600.00	0.00	90.00	6595.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	6700.00	0.00	90.00	6695.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	6800.00	0.00	90.00	6795.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	6900.00	0.00	90.00	6895.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	7000.00	0.00	90.00	6995.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	7100.00	0.00	90.00	7095.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	7200.00	0.00	90.00	7195.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	7300.00	0.00	90.00	7295.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	7400.00	0.00	90.00	7395.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52

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 ° ' ")
Brushy Canyon	*7488.19*	*0.00*	*90.00*	*7484.00*	*-0.85*	*0.00*	*131.56*	*0.00*	*404499.31*	*769552.75*	*N 32 6 35.65*	*W 103 35 46.52*
	7500.00	0.00	90.00	7495.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	7600.00	0.00	90.00	7595.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	7700.00	0.00	90.00	7695.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	7800.00	0.00	90.00	7795.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	7900.00	0.00	90.00	7895.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	8000.00	0.00	90.00	7995.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	8100.00	0.00	90.00	8095.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	8200.00	0.00	90.00	8195.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	8300.00	0.00	90.00	8295.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	8400.00	0.00	90.00	8395.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	8500.00	0.00	90.00	8495.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	8600.00	0.00	90.00	8595.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	8700.00	0.00	90.00	8695.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	8800.00	0.00	90.00	8795.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	8900.00	0.00	90.00	8895.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	9000.00	0.00	90.00	8995.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
Bone Spring	*9044.19*	*0.00*	*90.00*	*9040.00*	*-0.85*	*0.00*	*131.56*	*0.00*	*404499.31*	*769552.75*	*N 32 6 35.65*	*W 103 35 46.52*
	9100.00	0.00	90.00	9095.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	9200.00	0.00	90.00	9195.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	9300.00	0.00	90.00	9295.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	9400.00	0.00	90.00	9395.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	9500.00	0.00	90.00	9495.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	9600.00	0.00	90.00	9595.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	9700.00	0.00	90.00	9695.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	9800.00	0.00	90.00	9795.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	9900.00	0.00	90.00	9895.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	10000.00	0.00	90.00	9995.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	10100.00	0.00	90.00	10095.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	10200.00	0.00	90.00	10195.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	10300.00	0.00	90.00	10295.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	10400.00	0.00	90.00	10395.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	10500.00	0.00	90.00	10495.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
2nd Bone Spring Sand	*10577.19*	*0.00*	*90.00*	*10573.00*	*-0.85*	*0.00*	*131.56*	*0.00*	*404499.31*	*769552.75*	*N 32 6 35.65*	*W 103 35 46.52*
	10600.00	0.00	90.00	10595.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	10700.00	0.00	90.00	10695.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	10800.00	0.00	90.00	10795.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	10900.00	0.00	90.00	10895.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	11000.00	0.00	90.00	10995.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	11100.00	0.00	90.00	11095.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	11200.00	0.00	90.00	11195.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	11300.00	0.00	90.00	11295.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	11400.00	0.00	90.00	11395.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	11500.00	0.00	90.00	11495.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	11600.00	0.00	90.00	11595.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	11700.00	0.00	90.00	11695.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
3rd Bone Spring Sand	*11730.19*	*0.00*	*90.00*	*11726.00*	*-0.85*	*0.00*	*131.56*	*0.00*	*404499.31*	*769552.75*	*N 32 6 35.65*	*W 103 35 46.52*
	11800.00	0.00	90.00	11795.81	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
KOP - Build 12°/100' DLS	11864.18	0.00	90.00	11860.00	-0.85	0.00	131.56	0.00	404499.31	769552.75	N 32 6 35.65	W 103 35 46.52
	11900.00	4.30	359.63	11895.78	0.49	1.34	131.55	12.00	404500.65	769552.74	N 32 6 35.66	W 103 35 46.52
	12000.00	16.30	359.63	11993.99	18.34	19.19	131.44	12.00	404518.50	769552.62	N 32 6 35.84	W 103 35 46.52
	12100.00	28.30	359.63	12086.34	56.21	57.06	131.19	12.00	404556.37	769552.38	N 32 6 36.21	W 103 35 46.52
	12200.00	40.30	359.63	12168.80	112.46	113.30	130.83	12.00	404612.61	769552.01	N 32 6 36.77	W 103 35 46.52
Wolfcamp	*12236.91*	*44.73*	*359.63*	*12196.00*	*137.39*	*138.24*	*130.67*	*12.00*	*404637.54*	*769551.85*	*N 32 6 37.02*	*W 103 35 46.52*
	12300.00	52.30	359.63	12237.77	184.62	185.46	130.36	12.00	404684.77	769551.55	N 32 6 37.49	W 103 35 46.52
	12400.00	64.30	359.63	12290.22	269.54	270.39	129.81	12.00	404769.69	769551.00	N 32 6 38.33	W 103 35 46.52

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	12489.18	75.00	359.63	12321.19	353.04	353.88	129.28	12.00	404853.18	769550.46	N 32 6 39.15	W 103 35 46.52
	12500.00	75.43	359.63	12323.95	363.50	364.34	129.21	4.00	404863.64	769550.39	N 32 6 39.26	W 103 35 46.52
	12600.00	79.43	359.63	12345.71	461.08	461.92	128.58	4.00	404961.21	769549.76	N 32 6 40.22	W 103 35 46.52
	12700.00	83.43	359.63	12360.60	559.94	560.78	127.94	4.00	405060.07	769549.13	N 32 6 41.20	W 103 35 46.52
	12800.00	87.43	359.63	12368.56	659.61	660.44	127.30	4.00	405159.73	769548.48	N 32 6 42.19	W 103 35 46.52
Landing Point	12864.18	90.00	359.63	12370.00	723.77	724.60	126.88	4.00	405223.89	769548.07	N 32 6 42.82	W 103 35 46.52
	12900.00	90.00	359.63	12370.00	759.59	760.42	126.65	0.00	405259.70	769547.84	N 32 6 43.17	W 103 35 46.52
	13000.00	90.00	359.63	12370.00	859.59	860.42	126.00	0.00	405359.70	769547.19	N 32 6 44.16	W 103 35 46.51
	13100.00	90.00	359.63	12370.00	959.59	960.41	125.36	0.00	405459.69	769546.54	N 32 6 45.15	W 103 35 46.51
	13200.00	90.00	359.63	12370.00	1059.59	1060.41	124.71	0.00	405559.69	769545.90	N 32 6 46.14	W 103 35 46.51
	13300.00	90.00	359.63	12370.00	1159.59	1160.41	124.07	0.00	405659.68	769545.25	N 32 6 47.13	W 103 35 46.51
	13400.00	90.00	359.63	12370.00	1259.59	1260.41	123.42	0.00	405759.68	769544.61	N 32 6 48.12	W 103 35 46.51
	13500.00	90.00	359.63	12370.00	1359.59	1360.41	122.78	0.00	405859.67	769543.96	N 32 6 49.11	W 103 35 46.51
	13600.00	90.00	359.63	12370.00	1459.59	1460.40	122.13	0.00	405959.67	769543.32	N 32 6 50.10	W 103 35 46.51
	13700.00	90.00	359.63	12370.00	1559.59	1560.40	121.48	0.00	406059.66	769542.67	N 32 6 51.09	W 103 35 46.51
	13800.00	90.00	359.63	12370.00	1659.59	1660.40	120.84	0.00	406159.65	769542.03	N 32 6 52.08	W 103 35 46.51
	13900.00	90.00	359.63	12370.00	1759.59	1760.40	120.19	0.00	406259.65	769541.38	N 32 6 53.07	W 103 35 46.51
	14000.00	90.00	359.63	12370.00	1859.59	1860.40	119.55	0.00	406359.64	769540.73	N 32 6 54.06	W 103 35 46.51
	14100.00	90.00	359.63	12370.00	1959.59	1960.39	118.90	0.00	406459.64	769540.09	N 32 6 55.05	W 103 35 46.51
	14200.00	90.00	359.63	12370.00	2059.59	2060.39	118.26	0.00	406559.63	769539.44	N 32 6 56.04	W 103 35 46.51
	14300.00	90.00	359.63	12370.00	2159.59	2160.39	117.61	0.00	406659.63	769538.80	N 32 6 57.03	W 103 35 46.51
	14400.00	90.00	359.63	12370.00	2259.59	2260.39	116.96	0.00	406759.62	769538.15	N 32 6 58.02	W 103 35 46.51
	14500.00	90.00	359.63	12370.00	2359.59	2360.39	116.32	0.00	406859.62	769537.51	N 32 6 59.01	W 103 35 46.51
	14600.00	90.00	359.63	12370.00	2459.59	2460.38	115.67	0.00	406959.61	769536.86	N 32 7 0.00	W 103 35 46.51
	14700.00	90.00	359.63	12370.00	2559.59	2560.38	115.03	0.00	407059.61	769536.21	N 32 7 0.99	W 103 35 46.51
	14800.00	90.00	359.63	12370.00	2659.59	2660.38	114.38	0.00	407159.60	769535.57	N 32 7 1.98	W 103 35 46.51
	14900.00	90.00	359.63	12370.00	2759.59	2760.38	113.74	0.00	407259.60	769534.92	N 32 7 2.97	W 103 35 46.51
	15000.00	90.00	359.63	12370.00	2859.59	2860.38	113.09	0.00	407359.59	769534.28	N 32 7 3.96	W 103 35 46.51
	15100.00	90.00	359.63	12370.00	2959.59	2960.37	112.44	0.00	407459.58	769533.63	N 32 7 4.94	W 103 35 46.51
	15200.00	90.00	359.63	12370.00	3059.59	3060.37	111.80	0.00	407559.58	769532.99	N 32 7 5.93	W 103 35 46.50
	15300.00	90.00	359.63	12370.00	3159.59	3160.37	111.15	0.00	407659.57	769532.34	N 32 7 6.92	W 103 35 46.50
	15400.00	90.00	359.63	12370.00	3259.59	3260.37	110.51	0.00	407759.57	769531.69	N 32 7 7.91	W 103 35 46.50
	15500.00	90.00	359.63	12370.00	3359.59	3360.36	109.86	0.00	407859.56	769531.05	N 32 7 8.90	W 103 35 46.50
	15600.00	90.00	359.63	12370.00	3459.59	3460.36	109.22	0.00	407959.56	769530.40	N 32 7 9.89	W 103 35 46.50
	15700.00	90.00	359.63	12370.00	3559.59	3560.36	108.57	0.00	408059.55	769529.76	N 32 7 10.88	W 103 35 46.50
	15800.00	90.00	359.63	12370.00	3659.59	3660.36	107.92	0.00	408159.55	769529.11	N 32 7 11.87	W 103 35 46.50
	15900.00	90.00	359.63	12370.00	3759.59	3760.36	107.28	0.00	408259.54	769528.47	N 32 7 12.86	W 103 35 46.50
	16000.00	90.00	359.63	12370.00	3859.59	3860.35	106.63	0.00	408359.54	769527.82	N 32 7 13.85	W 103 35 46.50
	16100.00	90.00	359.63	12370.00	3959.59	3960.35	105.99	0.00	408459.53	769527.17	N 32 7 14.84	W 103 35 46.50
	16200.00	90.00	359.63	12370.00	4059.59	4060.35	105.34	0.00	408559.52	769526.53	N 32 7 15.83	W 103 35 46.50
	16300.00	90.00	359.63	12370.00	4159.59	4160.35	104.70	0.00	408659.52	769525.88	N 32 7 16.82	W 103 35 46.50
	16400.00	90.00	359.63	12370.00	4259.59	4260.35	104.05	0.00	408759.51	769525.24	N 32 7 17.81	W 103 35 46.50
	16500.00	90.00	359.63	12370.00	4359.59	4360.34	103.41	0.00	408859.51	769524.59	N 32 7 18.80	W 103 35 46.50
	16600.00	90.00	359.63	12370.00	4459.59	4460.34	102.76	0.00	408959.50	769523.95	N 32 7 19.79	W 103 35 46.50
	16700.00	90.00	359.63	12370.00	4559.59	4560.34	102.11	0.00	409059.50	769523.30	N 32 7 20.78	W 103 35 46.50
	16800.00	90.00	359.63	12370.00	4659.59	4660.34	101.47	0.00	409159.49	769522.65	N 32 7 21.77	W 103 35 46.50
	16900.00	90.00	359.63	12370.00	4759.59	4760.34	100.82	0.00	409259.49	769522.01	N 32 7 22.76	W 103 35 46.50
	17000.00	90.00	359.63	12370.00	4859.59	4860.33	100.18	0.00	409359.48	769521.36	N 32 7 23.75	W 103 35 46.50
	17100.00	90.00	359.63	12370.00	4959.59	4960.33	99.53	0.00	409459.48	769520.72	N 32 7 24.74	W 103 35 46.50
	17200.00	90.00	359.63	12370.00	5059.59	5060.33	98.89	0.00	409559.47	769520.07	N 32 7 25.72	W 103 35 46.50
	17300.00	90.00	359.63	12370.00	5159.59	5160.33	98.24	0.00	409659.47	769519.43	N 32 7 26.71	W 103 35 46.50
	17400.00	90.00	359.63	12370.00	5259.59	5260.33	97.59	0.00	409759.46	769518.78	N 32 7 27.70	W 103 35 46.50
	17500.00	90.00	359.63	12370.00	5359.59	5360.32	96.95	0.00	409859.45	769518.13	N 32 7 28.69	W 103 35 46.49
	17600.00	90.00	359.63	12370.00	5459.59	5460.32	96.30	0.00	409959.45	769517.49	N 32 7 29.68	W 103 35 46.49
	17700.00	90.00	359.63	12370.00	5559.59	5560.32	95.66	0.00	410059.44	769516.84	N 32 7 30.67	W 103 35 46.49
	17800.00	90.00	359.63	12370.00	5659.59	5660.32	95.01	0.00	410159.44	769516.20	N 32 7 31.66	W 103 35 46.49
	17900.00	90.00	359.63	12370.00	5759.59	5760.31	94.37	0.00	410259.43	769515.55	N 32 7 32.65	W 103 35 46.49
	18000.00	90.00	359.63	12370.00	5859.59	5860.31	93.72	0.00	410359.43	769514.91	N 32 7 33.64	W 103 35 46.49

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	18100.00	90.00	359.63	12370.00	5959.59	5960.31	93.07	0.00	410459.42	769514.26	N 32 7 34.63	W 103 35 46.49
	18200.00	90.00	359.63	12370.00	6059.59	6060.31	92.43	0.00	410559.42	769513.61	N 32 7 35.62	W 103 35 46.49
	18300.00	90.00	359.63	12370.00	6159.59	6160.31	91.78	0.00	410659.41	769512.97	N 32 7 36.61	W 103 35 46.49
	18400.00	90.00	359.63	12370.00	6259.59	6260.30	91.14	0.00	410759.41	769512.32	N 32 7 37.60	W 103 35 46.49
	18500.00	90.00	359.63	12370.00	6359.59	6360.30	90.49	0.00	410859.40	769511.68	N 32 7 38.59	W 103 35 46.49
	18600.00	90.00	359.63	12370.00	6459.59	6460.30	89.85	0.00	410959.39	769511.03	N 32 7 39.58	W 103 35 46.49
	18700.00	90.00	359.63	12370.00	6559.59	6560.30	89.20	0.00	411059.39	769510.39	N 32 7 40.57	W 103 35 46.49
	18800.00	90.00	359.63	12370.00	6659.59	6660.30	88.55	0.00	411159.38	769509.74	N 32 7 41.56	W 103 35 46.49
	18900.00	90.00	359.63	12370.00	6759.59	6760.29	87.91	0.00	411259.38	769509.10	N 32 7 42.55	W 103 35 46.49
	19000.00	90.00	359.63	12370.00	6859.59	6860.29	87.26	0.00	411359.37	769508.45	N 32 7 43.54	W 103 35 46.49
	19100.00	90.00	359.63	12370.00	6959.59	6960.29	86.62	0.00	411459.37	769507.80	N 32 7 44.53	W 103 35 46.49
	19200.00	90.00	359.63	12370.00	7059.59	7060.29	85.97	0.00	411559.36	769507.16	N 32 7 45.52	W 103 35 46.49
	19300.00	90.00	359.63	12370.00	7159.59	7160.29	85.33	0.00	411659.36	769506.51	N 32 7 46.50	W 103 35 46.49
	19400.00	90.00	359.63	12370.00	7259.59	7260.28	84.68	0.00	411759.35	769505.87	N 32 7 47.49	W 103 35 46.49
	19500.00	90.00	359.63	12370.00	7359.59	7360.28	84.03	0.00	411859.35	769505.22	N 32 7 48.48	W 103 35 46.49
	19600.00	90.00	359.63	12370.00	7459.59	7460.28	83.39	0.00	411959.34	769504.58	N 32 7 49.47	W 103 35 46.49
	19700.00	90.00	359.63	12370.00	7559.59	7560.28	82.74	0.00	412059.34	769503.93	N 32 7 50.46	W 103 35 46.48
	19800.00	90.00	359.63	12370.00	7659.59	7660.27	82.10	0.00	412159.33	769503.28	N 32 7 51.45	W 103 35 46.48
	19900.00	90.00	359.63	12370.00	7759.59	7760.27	81.45	0.00	412259.32	769502.64	N 32 7 52.44	W 103 35 46.48
	20000.00	90.00	359.63	12370.00	7859.59	7860.27	80.81	0.00	412359.32	769501.99	N 32 7 53.43	W 103 35 46.48
	20100.00	90.00	359.63	12370.00	7959.59	7960.27	80.16	0.00	412459.31	769501.35	N 32 7 54.42	W 103 35 46.48
	20200.00	90.00	359.63	12370.00	8059.59	8060.27	79.51	0.00	412559.31	769500.70	N 32 7 55.41	W 103 35 46.48
	20300.00	90.00	359.63	12370.00	8159.59	8160.26	78.87	0.00	412659.30	769500.06	N 32 7 56.40	W 103 35 46.48
	20400.00	90.00	359.63	12370.00	8259.59	8260.26	78.22	0.00	412759.30	769499.41	N 32 7 57.39	W 103 35 46.48
	20500.00	90.00	359.63	12370.00	8359.59	8360.26	77.58	0.00	412859.29	769498.76	N 32 7 58.38	W 103 35 46.48
	20600.00	90.00	359.63	12370.00	8459.59	8460.26	76.93	0.00	412959.29	769498.12	N 32 7 59.37	W 103 35 46.48
	20700.00	90.00	359.63	12370.00	8559.59	8560.26	76.29	0.00	413059.28	769497.47	N 32 8 0.36	W 103 35 46.48
	20800.00	90.00	359.63	12370.00	8659.59	8660.25	75.64	0.00	413159.28	769496.83	N 32 8 1.35	W 103 35 46.48
	20900.00	90.00	359.63	12370.00	8759.59	8760.25	74.99	0.00	413259.27	769496.18	N 32 8 2.34	W 103 35 46.48
	21000.00	90.00	359.63	12370.00	8859.59	8860.25	74.35	0.00	413359.26	769495.54	N 32 8 3.33	W 103 35 46.48
	21100.00	90.00	359.63	12370.00	8959.59	8960.25	73.70	0.00	413459.26	769494.89	N 32 8 4.32	W 103 35 46.48
	21200.00	90.00	359.63	12370.00	9059.59	9060.25	73.06	0.00	413559.25	769494.24	N 32 8 5.31	W 103 35 46.48
	21300.00	90.00	359.63	12370.00	9159.59	9160.24	72.41	0.00	413659.25	769493.60	N 32 8 6.30	W 103 35 46.48
	21400.00	90.00	359.63	12370.00	9259.59	9260.24	71.77	0.00	413759.24	769492.95	N 32 8 7.28	W 103 35 46.48
	21500.00	90.00	359.63	12370.00	9359.59	9360.24	71.12	0.00	413859.24	769492.31	N 32 8 8.27	W 103 35 46.48
	21600.00	90.00	359.63	12370.00	9459.59	9460.24	70.47	0.00	413959.23	769491.66	N 32 8 9.26	W 103 35 46.48
	21700.00	90.00	359.63	12370.00	9559.59	9560.24	69.83	0.00	414059.23	769491.02	N 32 8 10.25	W 103 35 46.48
	21800.00	90.00	359.63	12370.00	9659.59	9660.23	69.18	0.00	414159.22	769490.37	N 32 8 11.24	W 103 35 46.48
	21900.00	90.00	359.63	12370.00	9759.59	9760.23	68.54	0.00	414259.22	769489.72	N 32 8 12.23	W 103 35 46.47
	22000.00	90.00	359.63	12370.00	9859.59	9860.23	67.89	0.00	414359.21	769489.08	N 32 8 13.22	W 103 35 46.47
	22100.00	90.00	359.63	12370.00	9959.59	9960.23	67.25	0.00	414459.21	769488.43	N 32 8 14.21	W 103 35 46.47
	22200.00	90.00	359.63	12370.00	10059.59	10060.22	66.60	0.00	414559.20	769487.79	N 32 8 15.20	W 103 35 46.47
Cimarex Vaca Draw 20-17 Federal #2H - PBHL [100' FNL, 2042' FWL]	22208.93	90.00	359.63	12370.00	10068.52	10069.16	66.54	0.00	414568.13	769487.73	N 32 8 15.29	W 103 35 46.47

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 #2H Rev3 RM 24Oct18
	1	26.000	22208.931	1/100.000	30.000	30.000		NAL_MWD_IFR1+MS	Original Borehole / Cimarex Vaca Draw 20-17 Federal #2H Rev3

Schlumberger

CIMAREX

Cimarex Vaca Draw 20-17 Federal #2H Rev3 RM 24Oct18 Anti-Collision Summary Report

Analysis Date-24hr Time:	October 24, 2018 - 17:47	**Analysis Method:**	3D Least Distance
Client:	Cimarex	**Reference Trajectory:**	Cimarex Vaca Draw 20-17 Federal #2H Rev3 RM 24Oct18 (Def Plan)
Field:	NM Lea County (NAD 83)	**Depth Interval:**	Every 10.00 Measured Depth (ft)
Structure:	Cimarex Vaca Draw 20-17 Federal #2H	**Rule Set:**	NAL Procedure: D&M AntiCollision Standard S002
Slot:	Cimarex Vaca Draw 20-17 Federal #2H	**Min Pts:**	All local minima indicated.
Well:	Cimarex Vaca Draw 20-17 Federal #2H	**Version / Patch:**	2.10.740.0
Borehole:	Original Borehole	**Database \ Project:**	US1153APP452.dir.slb.com\drilling-NM Lea County 2.10
Scan MD Range:	0.00ft ~ 22208.93ft		

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

Offset Trajectories Summary

Offset Selection Criteria

Wellhead distance scan: Not performed!

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

Offset Trajectory	Separation			Allow	Sep.	Controlling	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)	Dev. (ft)	Fact.	Rule	MD (ft)	TVD (ft)	Alert	Minor	Major		
Results highlighted: Sep-Factor separation <= 1.50 ft													
Cimarex Vaca Draw 20-17 Federal #3H Rev2 RM 24Oct18 (Def Plan)													Fail Minor
	20.02	16.52	17.52	3.51	N/A	MAS = 5.03 (m)	0.00	0.00	CtCt<=15m<15.00			Enter Alert	
	20.02	16.52	17.52	3.50	N/A	MAS = 5.03 (m)	26.00	26.00				WRP	
	20.02	20.10	5.79	-0.08	1.49	OSF1.50	1930.00	1930.00		OSF<1.50		Enter Minor	
	20.02	20.76	5.35	-0.74	1.44	OSF1.50	2000.00	2000.00				MinPt-CtCt	
	20.04	20.83	5.32	-0.79	1.44	OSF1.50	2010.00	2010.00				MINPT-O-EOU	
	20.09	20.90	5.32	-0.81	1.43	OSF1.50	2020.00	2020.00				MinPts	
	21.12	21.32	6.08	-0.20	1.48	OSF1.50	2080.00	2080.00		OSF>1.50		Exit Minor	
	74.37	24.07	57.49	50.30	5.00	OSF1.50	2690.00	2689.86	OSF>5.00			Exit Alert	
	415.12	88.89	355.03	326.23	7.16	OSF1.50	11960.00	11955.17				MINPT-O-EOU	
	415.19	88.97	355.04	326.22	7.16	OSF1.50	11970.00	11964.95				MinPt-O-ADP	
	416.70	89.61	356.13	327.09	7.13	OSF1.50	12050.00	12041.16				MinPt-O-SF	
	524.12	78.45	470.99	445.67	10.30	OSF1.50	12864.18	12370.00				MinPt-CtCt	
	524.12	159.22	417.15	364.91	4.99	OSF1.50	16480.00	12370.00	OSF<5.00			Enter Alert	
	524.12	331.77	302.11	192.36	2.38	OSF1.50	22208.93	12370.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #4H 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	
	39.98	32.49	37.48	7.50	N/A	MAS = 9.90 (m)	26.00	26.00				WRP	
	39.98	32.49	28.45	7.50	4.15	MAS = 9.90 (m)	1500.00	1500.00				MinPts	
	40.00	32.49	28.42	7.51	4.13	MAS = 9.90 (m)	1510.00	1510.00				MINPT-O-EOU	
	40.59	32.49	28.78	8.11	4.09	MAS = 9.90 (m)	1560.00	1560.00				MinPt-O-SF	
	52.46	32.49	39.88	19.97	4.96	MAS = 9.90 (m)	1770.00	1770.00	OSF>5.00			Exit Alert	
	841.50	90.11	780.59	751.39	14.36	OSF1.50	12120.00	12103.75				MINPT-O-EOU	
	843.04	254.72	672.39	588.32	5.00	OSF1.50	19090.00	12370.00	OSF<5.00			Enter Alert	
	843.04	351.37	607.96	491.67	3.61	OSF1.50	22208.93	12370.00				MinPts	

Offset Trajectory	Separation			Allow	Sep.	Controlling	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)	Dev. (ft)	Fact.	Rule	MD (ft)	TVD (ft)	Alert	Minor	Major		
Cimarex Vaca Draw 20-17 Federal #13H Rev3 RM 24Oct18 (Def Plan)													Warning Alert
	1181.34	32.81	1178.84	1148.54	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	1181.34	32.81	1178.83	1148.54	110536.13	MAS = 10.00 (m)	26.00	26.00				WRP	
	421.74	89.98	360.56	331.76	7.26	OSF1.50	11864.18	11860.00				MinPt-CtCt	
	421.79	90.10	360.52	331.69	7.25	OSF1.50	11880.00	11875.81				MINPT-O-EOU	
	421.85	90.17	360.54	331.69	7.25	OSF1.50	11890.00	11885.80				MinPt-O-ADP	
	420.08	128.57	333.17	291.50	5.00	OSF1.50	14400.00	12370.00	OSF<5.00			Enter Alert	
	419.59	357.39	180.14	62.20	1.76	OSF1.50	22208.93	12370.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #8H Rev4 RM 24Oct18 (Def Plan)													Warning Alert
	1201.31	32.81	1198.81	1168.50	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	1201.31	32.81	1198.80	1168.50	114800.12	MAS = 10.00 (m)	26.00	26.00				WRP	
	833.93	88.11	774.20	745.83	14.64	OSF1.50	11864.18	11860.00				MinPt-CtCt	
	834.04	88.41	774.10	745.63	14.59	OSF1.50	11900.00	11895.78				MINPT-O-EOU	
	834.10	88.49	774.11	745.62	14.58	OSF1.50	11910.00	11905.74				MinPt-O-ADP	
	846.16	90.69	784.72	755.47	14.41	OSF1.50	12180.00	12153.28				MinPt-O-SF	
	861.08	260.39	686.56	600.69	5.00	OSF1.50	19090.00	12370.00	OSF<5.00			Enter Alert	
	860.89	357.27	621.78	503.62	3.63	OSF1.50	22208.93	12370.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #7H Rev2 RM 24Oct18 (Def Plan)													Pass
	1221.29	32.81	1218.79	1188.48	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	1221.29	32.81	1218.78	1188.48	105490.68	MAS = 10.00 (m)	26.00	26.00				WRP	
	1221.29	32.81	1203.46	1188.48	79.50	MAS = 10.00 (m)	2500.00	2500.00				MinPts	
	1221.31	32.81	1203.43	1188.50	79.25	MAS = 10.00 (m)	2510.00	2510.00				MINPT-O-EOU	
	1352.66	103.97	1282.51	1248.69	19.96	OSF1.50	11780.00	11775.81				MinPts	
	1251.43	113.38	1174.96	1138.05	16.92	OSF1.50	12770.00	12366.90				MinPt-CtCt	
	1250.84	364.04	1007.26	886.80	5.18	OSF1.50	22208.93	12370.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #6H MWD Final(Surcon Corrected) (Def Survey)													Pass
	1279.83	32.81	1277.33	1247.02	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	1279.80	32.81	1277.28	1246.99	61542.51	MAS = 10.00 (m)	26.00	26.00				WRP	
	1276.49	32.81	1270.97	1243.68	422.08	MAS = 10.00 (m)	710.00	710.00				MinPts	
	1277.07	32.81	1270.70	1244.26	329.27	MAS = 10.00 (m)	910.00	910.00				MINPT-O-EOU	
	1279.50	32.81	1271.29	1246.70	223.53	MAS = 10.00 (m)	1320.00	1320.00				MINPT-O-EOU	
	1261.54	32.81	1247.49	1228.73	109.09	MAS = 10.00 (m)	2580.00	2579.99				MinPts	
	1261.54	32.81	1247.47	1228.73	108.89	MAS = 10.00 (m)	2590.00	2589.99				MINPT-O-EOU	
	1261.60	32.81	1247.50	1228.79	108.69	MAS = 10.00 (m)	2600.00	2599.98				MinPt-O-SF	
	1306.05	32.81	1291.44	1273.24	107.70	MAS = 10.00 (m)	3310.00	3308.52				MinPt-O-SF	
	1392.69	32.81	1375.59	1359.88	95.22	MAS = 10.00 (m)	4504.05	4500.00				MinPt-O-SF	
	1394.87	32.81	1377.75	1362.06	95.24	MAS = 10.00 (m)	4580.00	4575.84				MinPt-O-SF	
	1395.49	32.81	1378.68	1362.68	97.32	MAS = 10.00 (m)	4710.00	4705.81				MinPts	
	1395.51	32.81	1378.64	1362.70	96.94	MAS = 10.00 (m)	4730.00	4725.81				MINPT-O-EOU	
	1447.37	37.69	1421.41	1409.68	61.58	OSF1.50	7140.00	7135.81				MinPt-CtCt	
	1447.67	38.51	1421.16	1409.16	60.20	OSF1.50	7280.00	7275.81				MINPT-O-EOU	
	1448.58	39.62	1421.33	1408.96	58.43	OSF1.50	7460.00	7455.81				MinPt-O-ADP	
	1479.88	48.81	1446.51	1431.07	47.85	OSF1.50	8970.00	8965.81				MinPt-O-SF	
	1988.94	50.48	1954.45	1938.46	62.10	OSF1.50	10270.00	10265.81				MinPt-O-SF	

Offset Trajectory	Separation			Allow	Sep.	Controlling	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)	Dev. (ft)	Fact.	Rule	MD (ft)	TVD (ft)	Alert	Minor	Major		
	3522.06	46.01	3490.55	3476.05	121.32	OSF1.50	12870.00	12370.00				MinPt-O-ADP	
	3527.12	49.48	3493.30	3477.64	112.54	OSF1.50	13100.00	12370.00				MinPt-O-ADP	
	3532.93	68.14	3486.67	3464.79	80.67	OSF1.50	13920.00	12370.00				MinPt-CtCt	
	3533.31	69.29	3486.28	3464.02	79.29	OSF1.50	13990.00	12370.00				MINPT-O-EOU	
	3515.14	97.18	3449.53	3417.97	55.65	OSF1.50	15020.00	12370.00				MinPt-CtCt	
	3515.40	97.96	3449.26	3417.44	55.20	OSF1.50	15070.00	12370.00				MINPT-O-EOU	
	3515.78	98.42	3449.33	3417.36	54.94	OSF1.50	15100.00	12370.00				MinPt-O-ADP	
	3524.86	123.30	3441.82	3401.55	43.74	OSF1.50	15940.00	12370.00				MinPt-CtCt	
	3521.85	142.06	3426.31	3379.79	37.83	OSF1.50	16590.00	12370.00				MinPt-CtCt	
	3523.53	155.71	3418.89	3367.82	34.47	OSF1.50	17060.00	12370.00				MinPt-CtCt	
	3522.06	168.05	3409.20	3354.01	31.89	OSF1.50	17480.00	12370.00				MinPt-CtCt	
	3519.09	229.70	3365.12	3289.38	23.22	OSF1.50	19570.00	12370.00				MinPt-CtCt	
	3524.66	258.33	3351.60	3266.32	20.65	OSF1.50	20530.00	12370.00				MinPt-CtCt	
	3519.73	278.08	3333.51	3241.65	19.14	OSF1.50	21190.00	12370.00				MinPt-CtCt	
	3519.73	286.43	3327.94	3233.30	18.58	OSF1.50	21470.00	12370.00				MinPt-CtCt	
	3517.93	301.60	3316.03	3216.32	17.63	OSF1.50	21980.00	12370.00				MinPt-CtCt	
	3517.99	301.82	3315.94	3216.17	17.62	OSF1.50	22000.00	12370.00				MINPT-O-EOU	
	3518.16	302.03	3315.96	3216.14	17.61	OSF1.50	22020.00	12370.00				MinPt-O-ADP	
	3525.41	303.54	3322.22	3221.88	17.55	OSF1.50	22208.93	12370.00				MinPt-O-SF	
Cimarex Vaca Draw 20-17 Federal #5H Final MWD(Surcon Corrected) (Def Survey)													Pass
	1299.83	32.81	1297.33	1267.02	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	1299.81	32.81	1297.30	1267.00	78555.54	MAS = 10.00 (m)	26.00	26.00				WRP	
	1297.84	32.81	1293.10	1265.03	578.59	MAS = 10.00 (m)	550.00	550.00				MinPts	
	1297.93	32.81	1292.31	1265.13	415.21	MAS = 10.00 (m)	760.00	760.00				MinPts	
	1298.19	32.81	1291.99	1265.38	350.45	MAS = 10.00 (m)	880.00	880.00				MINPT-O-EOU	
	1299.97	32.81	1290.26	1267.16	180.05	MAS = 10.00 (m)	1660.00	1660.00				MinPts	
	1300.07	32.81	1290.15	1267.26	174.89	MAS = 10.00 (m)	1710.00	1710.00				MINPT-O-EOU	
	1318.32	32.81	1304.68	1285.51	118.16	MAS = 10.00 (m)	2600.00	2599.98				MinPt-O-SF	
	1493.38	32.81	1476.61	1460.57	104.42	MAS = 10.00 (m)	4504.05	4500.00				MinPt-O-SF	
	1527.07	32.81	1505.06	1494.26	78.14	MAS = 10.00 (m)	6160.00	6155.81				MinPts	
	1527.11	32.81	1505.03	1494.31	77.84	MAS = 10.00 (m)	6180.00	6175.81				MINPT-O-EOU	
	1547.84	45.39	1516.74	1502.45	54.04	OSF1.50	8360.00	8355.81				MinPt-CtCt	
	1548.32	46.91	1516.22	1501.41	52.21	OSF1.50	8600.00	8595.81				MINPT-O-EOU	
	1548.75	47.47	1516.27	1501.28	51.57	OSF1.50	8690.00	8685.81				MinPt-O-ADP	
	1555.95	52.06	1520.41	1503.89	47.01	OSF1.50	9410.00	9405.81				MinPt-O-ADP	
	1575.23	53.80	1538.53	1521.43	45.99	OSF1.50	9740.00	9735.81				MinPt-O-SF	
	1809.24	54.91	1771.80	1754.33	51.71	OSF1.50	10550.00	10545.81				MinPt-O-SF	
	1822.02	55.40	1784.25	1766.62	51.59	OSF1.50	10580.00	10575.81				MinPt-O-SF	
	1842.97	55.80	1804.94	1787.17	51.80	OSF1.50	10630.00	10625.81				MinPt-O-SF	
	2921.89	51.33	2886.84	2870.56	89.68	OSF1.50	12890.00	12370.00				MINPT-O-EOU	
	2921.96	51.41	2886.85	2870.54	89.53	OSF1.50	12900.00	12370.00				MinPt-O-ADP	
	2914.68	63.68	2871.39	2851.00	71.40	OSF1.50	13560.00	12370.00				MinPt-CtCt	
	2914.96	64.54	2871.10	2850.42	70.42	OSF1.50	13620.00	12370.00				MINPT-O-EOU	
	2915.20	64.83	2871.15	2850.38	70.10	OSF1.50	13640.00	12370.00				MinPt-O-ADP	
	2911.65	77.73	2859.00	2833.92	58.01	OSF1.50	14160.00	12370.00				MinPt-CtCt	
	2909.99	88.41	2850.22	2821.59	50.77	OSF1.50	14580.00	12370.00				MinPt-CtCt	
	2900.12	107.24	2827.80	2792.89	41.50	OSF1.50	15280.00	12370.00				MinPt-CtCt	
	2900.46	108.27	2827.45	2792.20	41.10	OSF1.50	15340.00	12370.00				MINPT-O-EOU	
	2900.90	108.78	2827.55	2792.13	40.91	OSF1.50	15370.00	12370.00				MinPt-O-ADP	
	2903.77	120.97	2822.30	2782.81	36.74	OSF1.50	15770.00	12370.00				MinPt-CtCt	
	2904.62	124.12	2821.04	2780.50	35.79	OSF1.50	15910.00	12370.00				MINPT-O-EOU	

Offset Trajectory	Separation			Allow	Sep.	Controlling	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)	Dev. (ft)	Fact.	Rule	MD (ft)	TVD (ft)	Alert	Minor	Major		
	2905.52	125.17	2821.24	2780.35	35.50	OSF1.50	15960.00	12370.00				MinPt-O-ADP	
	2909.90	129.38	2822.81	2780.52	34.37	OSF1.50	16120.00	12370.00				MinPt-O-ADP	
	2903.76	151.43	2801.97	2752.33	29.22	OSF1.50	16840.00	12370.00				MinPt-CtCt	
	2903.13	157.51	2797.30	2745.63	28.07	OSF1.50	17050.00	12370.00				MinPt-CtCt	
	2899.88	182.32	2777.50	2717.56	24.17	OSF1.50	17900.00	12370.00				MinPt-CtCt	
	2897.85	193.13	2768.27	2704.72	22.78	OSF1.50	18270.00	12370.00				MinPt-CtCt	
	2900.45	205.53	2762.59	2694.91	21.41	OSF1.50	18690.00	12370.00				MinPt-CtCt	
	2906.62	224.45	2756.15	2682.17	19.63	OSF1.50	19360.00	12370.00				MINPT-O-EOU	
	2907.34	249.44	2740.22	2657.90	17.65	OSF1.50	20170.00	12370.00				MinPt-CtCt	
	2904.25	262.20	2728.61	2642.04	16.76	OSF1.50	20600.00	12370.00				MinPt-CtCt	
	2908.08	276.93	2722.63	2631.16	15.88	OSF1.50	21130.00	12370.00				MINPT-O-EOU	
	2914.35	286.67	2722.40	2627.68	15.37	OSF1.50	21460.00	12370.00				MINPT-O-EOU	
	2914.55	286.88	2722.46	2627.67	15.36	OSF1.50	21470.00	12370.00				MinPt-O-ADP	
	2912.69	303.26	2709.68	2609.43	14.51	OSF1.50	21980.00	12370.00				MinPt-CtCt	
	2912.77	303.46	2709.63	2609.30	14.50	OSF1.50	22000.00	12370.00				MINPT-O-EOU	
	2912.86	303.56	2709.65	2609.30	14.50	OSF1.50	22010.00	12370.00				MinPt-O-ADP	
	2916.63	304.45	2712.82	2612.17	14.48	OSF1.50	22130.00	12370.00				MinPt-O-SF	
	2921.79	304.78	2717.77	2617.01	14.49	OSF1.50	22208.93	12370.00				TD	
Cimarex Vaca Draw 20-17 Federal #1H Surcon 0ft-12740 (Def Survey)													Pass
	1319.82	32.81	1317.32	1287.01	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	1319.77	32.81	1317.24	1286.96	48024.40	MAS = 10.00 (m)	26.00	26.00				WRP	
	1317.78	32.81	1314.02	1284.97	1044.82	MAS = 10.00 (m)	310.00	310.00				MinPts	
	1318.22	32.81	1313.65	1285.41	637.36	MAS = 10.00 (m)	460.00	460.00				MINPT-O-EOU	
	1367.79	32.81	1354.17	1334.99	122.77	MAS = 10.00 (m)	2600.00	2599.98				MinPt-O-SF	
	1413.49	32.81	1399.57	1380.68	123.57	MAS = 10.00 (m)	3080.00	3079.02				MinPt-O-SF	
	1556.51	32.81	1539.72	1523.70	108.81	MAS = 10.00 (m)	4504.05	4500.00				MinPt-O-SF	
	1699.47	47.22	1667.15	1652.25	56.92	OSF1.50	8500.00	8495.81				MINPT-O-EOU	
	1699.87	47.71	1667.24	1652.17	56.32	OSF1.50	8590.00	8585.81				MinPt-O-ADP	
	1704.19	53.46	1667.71	1650.72	50.08	OSF1.50	9540.00	9535.81				MinPt-CtCt	
	1671.04	69.48	1623.89	1601.56	37.36	OSF1.50	12020.00	12013.06				MinPt-CtCt	
	1671.09	69.60	1623.86	1601.49	37.30	OSF1.50	12040.00	12031.87				MINPT-O-EOU	
	1671.14	69.65	1623.87	1601.48	37.27	OSF1.50	12050.00	12041.16				MinPt-O-ADP	
	1693.51	71.67	1644.90	1621.84	36.67	OSF1.50	12390.00	12285.79				MinPt-O-SF	
	1696.61	71.80	1647.91	1624.81	36.67	OSF1.50	12410.00	12294.46				MinPt-O-SF	
	10227.61	81.67	10172.33	10145.94	193.73	OSF1.50	22208.93	12370.00				TD	
Cimarex Vaca Draw 20-17 Federal #1H ST01 Rev1 RM 15Feb18 (Def Plan)													Pass
	1319.82	32.81	1317.32	1287.01	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	1319.77	32.81	1317.24	1286.96	48024.40	MAS = 10.00 (m)	26.00	26.00				WRP	
	1317.78	32.81	1314.02	1284.97	1044.82	MAS = 10.00 (m)	310.00	310.00				MinPts	
	1318.22	32.81	1313.65	1285.41	637.36	MAS = 10.00 (m)	460.00	460.00				MINPT-O-EOU	
	1367.79	32.81	1354.17	1334.99	122.77	MAS = 10.00 (m)	2600.00	2599.98				MinPt-O-SF	
	1413.49	32.81	1399.57	1380.68	123.57	MAS = 10.00 (m)	3080.00	3079.02				MinPt-O-SF	
	1556.51	32.81	1539.72	1523.70	108.81	MAS = 10.00 (m)	4504.05	4500.00				MinPt-O-SF	
	1699.47	47.22	1667.15	1652.25	56.92	OSF1.50	8500.00	8495.81				MINPT-O-EOU	
	1699.87	47.71	1667.24	1652.17	56.32	OSF1.50	8590.00	8585.81				MinPt-O-ADP	
	1704.19	53.46	1667.71	1650.72	50.08	OSF1.50	9540.00	9535.81				MinPt-CtCt	
	1672.95	68.68	1626.33	1604.27	37.86	OSF1.50	11890.00	11885.80				MinPt-CtCt	
	1673.00	68.79	1626.30	1604.20	37.80	OSF1.50	11910.00	11905.74				MINPT-O-EOU	
	1673.05	68.85	1626.31	1604.20	37.77	OSF1.50	11920.00	11915.69				MinPt-O-ADP	
	1673.40	69.26	1626.39	1604.13	37.54	OSF1.50	11990.00	11984.36				MINPT-O-EOU	

Offset Trajectory	Separation			Allow	Sep.	Controlling	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)	Dev. (ft)	Fact.	Rule	MD (ft)	TVD (ft)	Alert	Minor	Major		
	1673.44	69.32	1626.39	1604.12	37.51	OSF1.50	12000.00	11993.99				MinPt-O-ADP	
	1670.83	71.38	1622.41	1599.45	36.33	OSF1.50	12330.00	12255.36				MinPt-CtCt	
	1665.41	74.06	1615.20	1591.35	34.86	OSF1.50	12630.00	12350.90				MinPt-CtCt	
	1665.53	74.35	1615.13	1591.17	34.72	OSF1.50	12660.00	12355.47				MINPT-O-EOU	
	1665.91	75.09	1615.02	1590.82	34.37	OSF1.50	12720.00	12362.75				MinPt-CtCt	
	1666.01	75.41	1614.90	1590.60	34.22	OSF1.50	12750.00	12365.45				MINPT-O-EOU	
	1666.18	75.63	1614.93	1590.55	34.12	OSF1.50	12770.00	12366.90				MinPt-O-ADP	
	1661.73	335.20	1437.43	1326.53	7.48	OSF1.50	21980.00	12370.00				MinPt-CtCt	
	1661.77	335.35	1437.36	1326.41	7.48	OSF1.50	21990.00	12370.00				MINPT-O-EOU	
	1661.86	335.49	1437.37	1326.37	7.47	OSF1.50	22000.00	12370.00				MinPt-O-ADP	
	1663.24	336.01	1438.41	1327.24	7.47	OSF1.50	22050.00	12370.00				MinPt-O-SF	
	1677.55	335.76	1452.88	1341.79	7.54	OSF1.50	22208.93	12370.00				TD	
Cimarex Vaca Draw 20-17 Federal #1H ST01 MWD 0ft-Update (Non-Def Survey)													Pass
	1319.82	32.81	1317.32	1287.01	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	
	1319.77	32.81	1317.24	1286.96	48024.40	MAS = 10.00 (m)	26.00	26.00				WRP	
	1317.78	32.81	1314.02	1284.97	1044.82	MAS = 10.00 (m)	310.00	310.00				MinPts	
	1318.22	32.81	1313.65	1285.41	637.36	MAS = 10.00 (m)	460.00	460.00				MINPT-O-EOU	
	1367.79	32.81	1354.17	1334.99	122.77	MAS = 10.00 (m)	2600.00	2599.98				MinPt-O-SF	
	1413.49	32.81	1399.57	1380.68	123.57	MAS = 10.00 (m)	3080.00	3079.02				MinPt-O-SF	
	1556.51	32.81	1539.72	1523.70	108.81	MAS = 10.00 (m)	4504.05	4500.00				MinPt-O-SF	
	1699.47	47.22	1667.15	1652.25	56.92	OSF1.50	8500.00	8495.81				MINPT-O-EOU	
	1699.87	47.71	1667.24	1652.17	56.32	OSF1.50	8590.00	8585.81				MinPt-O-ADP	
	1704.19	53.46	1667.71	1650.72	50.08	OSF1.50	9540.00	9535.81				MinPt-CtCt	
	1672.95	68.68	1626.33	1604.27	37.86	OSF1.50	11890.00	11885.80				MinPt-CtCt	
	1673.00	68.79	1626.30	1604.20	37.80	OSF1.50	11910.00	11905.74				MINPT-O-EOU	
	1673.05	68.85	1626.31	1604.20	37.77	OSF1.50	11920.00	11915.69				MinPt-O-ADP	
	1673.40	69.26	1626.39	1604.13	37.54	OSF1.50	11990.00	11984.36				MINPT-O-EOU	
	1673.44	69.32	1626.39	1604.12	37.51	OSF1.50	12000.00	11993.99				MinPt-O-ADP	
	1670.83	71.38	1622.41	1599.45	36.33	OSF1.50	12330.00	12255.36				MinPt-CtCt	
	1665.41	74.06	1615.20	1591.35	34.86	OSF1.50	12630.00	12350.90				MinPt-CtCt	
	1665.53	74.35	1615.13	1591.17	34.72	OSF1.50	12660.00	12355.47				MINPT-O-EOU	
	1665.91	75.09	1615.02	1590.82	34.37	OSF1.50	12720.00	12362.75				MinPt-CtCt	
	1666.01	75.41	1614.90	1590.60	34.22	OSF1.50	12750.00	12365.45				MINPT-O-EOU	
	1666.18	75.63	1614.93	1590.55	34.12	OSF1.50	12770.00	12366.90				MinPt-O-ADP	
	1665.84	81.22	1610.85	1584.61	31.69	OSF1.50	13160.00	12370.00				MinPt-CtCt	
	1665.96	81.59	1610.73	1584.36	31.55	OSF1.50	13190.00	12370.00				MINPT-O-EOU	
	1666.06	81.72	1610.75	1584.34	31.50	OSF1.50	13200.00	12370.00				MinPt-O-ADP	
	1659.58	86.90	1600.82	1572.69	29.45	OSF1.50	13490.00	12370.00				MinPt-CtCt	
	1659.79	87.51	1600.62	1572.28	29.24	OSF1.50	13530.00	12370.00				MINPT-O-EOU	
	1660.05	87.81	1600.68	1572.24	29.14	OSF1.50	13550.00	12370.00				MinPt-O-ADP	
	1668.24	96.93	1602.79	1571.32	26.46	OSF1.50	14000.00	12370.00				MinPt-CtCt	
	1662.51	110.36	1588.10	1552.15	23.08	OSF1.50	14600.00	12370.00				MinPt-CtCt	
	1663.09	112.29	1587.40	1550.80	22.69	OSF1.50	14690.00	12370.00				MINPT-O-EOU	
	1663.97	113.36	1587.56	1550.60	22.48	OSF1.50	14740.00	12370.00				MinPt-O-ADP	
	1643.12	149.56	1542.58	1493.56	16.73	OSF1.50	16140.00	12370.00				MinPt-CtCt	
	1643.77	151.68	1541.82	1492.09	16.50	OSF1.50	16230.00	12370.00				MINPT-O-EOU	
	1645.73	156.07	1540.85	1489.66	16.05	OSF1.50	16390.00	12370.00				MINPT-O-EOU	
	1649.32	160.27	1541.64	1489.05	15.66	OSF1.50	16550.00	12370.00				MinPt-O-ADP	
	1660.60	168.19	1547.64	1492.41	15.01	OSF1.50	16840.00	12370.00				MinPt-O-ADP	
	1662.38	177.19	1543.42	1485.18	14.25	OSF1.50	17140.00	12370.00				MinPt-CtCt	
	1665.05	184.17	1541.44	1480.88	13.73	OSF1.50	17400.00	12370.00				MINPT-O-EOU	
	1666.32	185.68	1541.70	1480.64	13.62	OSF1.50	17460.00	12370.00				MinPt-O-ADP	

Offset Trajectory	Separation			Allow	Sep.	Controlling	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)	Dev. (ft)	Fact.	Rule	MD (ft)	TVD (ft)	Alert	Minor	Major		
	1647.56	218.43	1501.11	1429.14	11.43	OSF1.50	18590.00	12370.00				MinPt-CtCt	
	1647.91	219.57	1500.70	1428.34	11.37	OSF1.50	18640.00	12370.00				MINPT-O-EOU	
	1648.45	220.24	1500.79	1428.21	11.34	OSF1.50	18670.00	12370.00				MinPt-O-ADP	
	1670.26	232.77	1514.24	1437.48	10.86	OSF1.50	19100.00	12370.00				MINPT-O-EOU	
	1671.85	237.68	1512.57	1434.18	10.65	OSF1.50	19250.00	12370.00				MinPt-CtCt	
	1671.91	237.84	1512.52	1434.07	10.64	OSF1.50	19260.00	12370.00				MINPT-O-EOU	
	1672.03	238.00	1512.53	1434.03	10.63	OSF1.50	19270.00	12370.00				MinPt-O-ADP	
	1675.10	238.97	1514.96	1436.14	10.61	OSF1.50	19350.00	12370.00				MinPt-O-SF	
	3402.41	157.34	3296.69	3245.07	32.94	OSF1.50	22208.93	12370.00				TD	

PECOS DISTRICT
DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**CIMAREX ENERGY COMPANY**
LEASE NO.:	**NMNM26394**
WELL NAME & NO.:	**2H –VACA DRAW 20 17 FEDERAL**
SURFACE HOLE FOOTAGE:	**390'/S & 1910'/W**
BOTTOM HOLE FOOTAGE	**100'/S & 2042'/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 annualar 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 14%. 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 intergrity test can be done (prior to the cement setting up) immediately after bumping the plug.

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

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

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

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

7. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

B. PRESSURE CONTROL

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

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 071718

KFC

10 3/4	surface csg in a	14 3/4	inch hole.		Design Factors		SURFACE	
Segment	#/ft	Grade	Coupling	Joint	Collapse	Burst	Length	Weight
"A"	40.50	J 55	ST&C	10.03	3.34	0.54	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 Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
14 3/4	0.5563	509	835	601	39	8.80	3050	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			Design Factors		INTERMEDIATE	
Segment	#/ft	Grade	Coupling	Body	Collapse	Burst	Length	Weight
"A"	29.70	L 80	BUTT	1.84	0.86	0.86	11,864	352,361
"B"	29.70	L 80	#N/A	44.53	0.96	0.86	625	18,563
w/8.4#/g mud, 30min Sfc Csg Test psig:						Totals:	12,489	370,923
B s would be:				22.90	0.96	if it were a vertical wellbore.		

No Pilot Hole Planned	MTD	Max VTD	Csg VD	Curve KOP	Dogleg°	Severity°	MEOC
	12489	12321	12321	11864	75	-1	0

The cement volume(s) are intended to achieve a top of 0 ft from surface or a 1034 overlap.

Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
9 7/8	0.2148	look ↘	0	2713		9.00	5311	10M	0.69

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, 0.56, c, d
<0.70 a Problem!!

ALT. COLLAPSE SF:.98 *1.5= 1.47;CURVE SF IS CONSERVATIVE

Tail cmt

5 1/2	casing inside the	7 5/8			Design Factors		PRODUCTION	
Segment	#/ft	Grade	Coupling	Joint	Collapse	Burst	Length	Weight
"A"	20.00	P 110	LT&C	2.22	1.44	1.57	11,864	237,280
"B"	18.00	P 110	BUTT	5.87	1.52	1.7	10,345	186,210
w/8.4#/g mud, 30min Sfc Csg Test psig: 2,610						Totals:	22,209	423,490
B would be:				63.70	1.68	if it were a vertical wellbore.		

No Pilot Hole Planned	MTD	Max VTD	Csg VD	Curve KOP	Dogleg°	Severity°	MEOC
	22209	12370	12370	11864	90	14	12489

The cement volume(s) are intended to achieve a top of 12289 ft from surface or a 200 overlap.

Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
6 3/4	0.0835	732	952	835	14	12.50			0.35

Class 'H' tail cmt yld > 1.20