

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
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

HOBBS OGD

AUG 21 2019

RECEIVED

1. Type of Well ☐ Oil Well ☒ Gas Well ☐ Other		5. Lease Serial No. NMNM26394
2. Name of Operator CIMAREX ENERGY COMPANY Contact: TERRI STATHEM E-Mail: tstathem@cimarex.com		6. If Indian, Allottee or Tribe Name
3a. Address 600 N. MARIENFELD SUITE 600 MIDLAND, TX 79701	3b. Phone No. (include area code) Ph: 432-620-1936	7. If Unit or CA/Agreement, Name and/or No.
4. Location of Well (Footage, Sec., T., R., M., or Survey Description) Sec 20 T25S R33E SESE 390FSL 370FEL 32.109901 N Lat, 103.586899 W Lon		8. Well Name and No. VACA DRAW 20-17 FEDERAL 71H
		9. API Well No. 30-025-46160-00-X1
		10. Field and Pool or Exploratory Area WILDCAT; WOLFCAMP WOLFCAMP
		11. County or Parish, State LEA COUNTY, NM

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

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Hydraulic Fracturing	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	Change to Original APD
	☐ 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 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 Energy respectfully request approval to change the BHL for the referenced well and the target completion interval to Bone Spring.

C102 attached
Directional Plan attached

Drilling Plan attached - casing & cement design for the Bone Spring well.

TD: MD: 20203', TVD: 10000'

OCD Hobbs

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

All Previous COAs Still Apply. Except For the Following:

14. I hereby certify that the foregoing is true and correct. Electronic Submission #471754 verified by the BLM Well Information System For CIMAREX ENERGY COMPANY, sent to the Hobbs Committed to AFMSS for processing by PRISCILLA PEREZ on 07/02/2019 (19PP2369SE)	
Name (Printed/Typed) TERRI STATHEM	Title MANAGER REGULATORY COMPLIANCE
Signature (Electronic Submission)	Date 07/01/2019

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By <u>JEREMY PORTER</u>	Title <u>PETROLEUM ENGINEER</u>	Date <u>07/02/2019</u>
Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.		Office Hobbs

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on page 2)

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

Revisions to Operator-Submitted EC Data for Sundry Notice #471754

	Operator Submitted	BLM Revised (AFMSS)
Sundry Type:	APDCH NOI	APDCH NOI
Lease:	NMNM26394	NMNM26394
Agreement:		
Operator:	CIMAREX ENERGY COMPANY 600 N. MARIENFELD ST, STE 600 MIDLAND, TX 79701 Ph: 432-620-1936	CIMAREX ENERGY COMPANY 600 N. MARIENFELD SUITE 600 MIDLAND, TX 79701 Ph: 432.620.1938
Admin Contact:	TERRI STATHEM MANAGER REGULATORY COMPLIANCE E-Mail: tstathem@cimarex.com Ph: 432-620-1936	TERRI STATHEM MANAGER REGULATORY COMPLIANCE E-Mail: tstathem@cimarex.com Ph: 432-620-1936
Tech Contact:	TERRI STATHEM MANAGER REGULATORY COMPLIANCE E-Mail: tstathem@cimarex.com Ph: 432-620-1936	TERRI STATHEM MANAGER REGULATORY COMPLIANCE E-Mail: tstathem@cimarex.com Ph: 432-620-1936
Location:		
State:	NM	NM
County:	LEA	LEA
Field/Pool:	WILDCAT BONE SPRING	WILDCAT;WOLFCAMP WOLFCAMP
Well/Facility:	VACA DRAW 20-17 FEDERAL 71H Sec 20 T25S R33E Mer NMP SESE 390FSL 370FEL	VACA DRAW 20-17 FEDERAL 71H Sec 20 T25S R33E SESE 390FSL 370FEL 32.109901 N Lat, 103.586899 W Lon

1. Geological Formations

TVD of target 10,000
MD at TD 20,203

Pilot Hole TD N/A
Deepest expected fresh water

Formation	Depth (TVD) from KB	Water/Mineral Bearing/Target Zone	Hazards
Rustler	935	N/A	
Top of Salt	1298	N/A	
Base of Salt	4714	N/A	
Lamar	4909	N/A	
Bell Canyon	4937	N/A	
Cherry Canyon	5990	N/A	
Brushy Canyon	7536	Hydrocarbons	
Bone Spring	9032	Hydrocarbons	
1st Bone Spring Sand	10011	Hydrocarbons	
2nd Bone Spring Sand	10583	Hydrocarbons	
3rd Bone Spring Sand	11722	Hydrocarbons	
Wolfcamp	12189	Hydrocarbons	
Wolfcamp	12430	Hydrocarbons	

2. Casing Program

Hole Size	Casing Depth From	Casing Depth To	Setting Depth TVD	Casing Size	Weight (lb/ft)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
17 1/2	0	1051	1051	13-3/8"	48.00	H-40/J-55 Hybrid	ST&C	1.54	3.60	6.38
12 1/4	0	4949	4949	9-5/8"	40.00	J-55	LT&C	1.45	1.50	2.63
8 3/4	0	9571	9571	7"	29.00	L-80	LT&C	1.57	1.82	3.45
8 3/4	9571	20203	10000	5-1/2"	17.00	L-80	BT&C	1.34	1.65	54.44
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

	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	# Sk	Wt. lb/gal	Yld ft ³ /sack	H ₂ O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surface	509	13.50	1.72	9.15	15.5	Lead: Class C + Bentonite
	137	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Intermediate	1025	13.50	1.72	9.15	15.5	Lead: Class C + Bentonite
	289	14.80	1.34	6.32	9.5	Tail: Class C + LCM
Production	248	10.30	3.64	22.18		Lead: Tuned Light + LCM
	1537	14.20	1.30	5.86	14:30	Tail: 50:50 (PozH) + Salt + Bentonite + Fluid Loss + Dispersant + SMS

Casing String	TOC	% Excess
Surface	0	45
Intermediate	0	50
Production	4749	25

4. Pressure Control Equipment

	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.
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BOP Installed and tested before drilling which hole?	Size	Min Required WP	Type		Tested To
12 1/4	13 5/8	3M	Annular	X	50% of working pressure
			Blind Ram		3M
			Pipe Ram		
			Double Ram	X	
			Other		
8 3/4	13 5/8	3M	Annular	X	50% of working pressure
			Blind Ram		3M
			Pipe Ram		
			Double Ram	X	
			Other		

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

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

	Formation integrity test will be performed per Onshore Order #2. 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.
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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.
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N	Are anchors required by manufacturer?
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5. Mud Program

Depth	Type	Weight (ppg)	Viscosity	Water Loss
0' to 1051'	FW Spud Mud	8.30 - 8.80	30-32	N/C
1051' to 4949'	Brine Water	9.70 - 10.20	30-32	N/C
4949' to 20203'	Cut Brine or OBM	8.50 - 9.00	27-70	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.

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.
☐	No logs are planned based on well control or offset log information.
☐	Drill stem test?
☐	Coring?

Additional Logs Planned	Interval
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7. Drilling Conditions

Condition	
BH Pressure at deepest TVD	4680 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.

☒	H2S is present
☒	H2S plan is attached

8. Other Facets of Operation**9. Wellhead**

A multi-bowl wellhead system will be utilized.

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

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

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

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

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

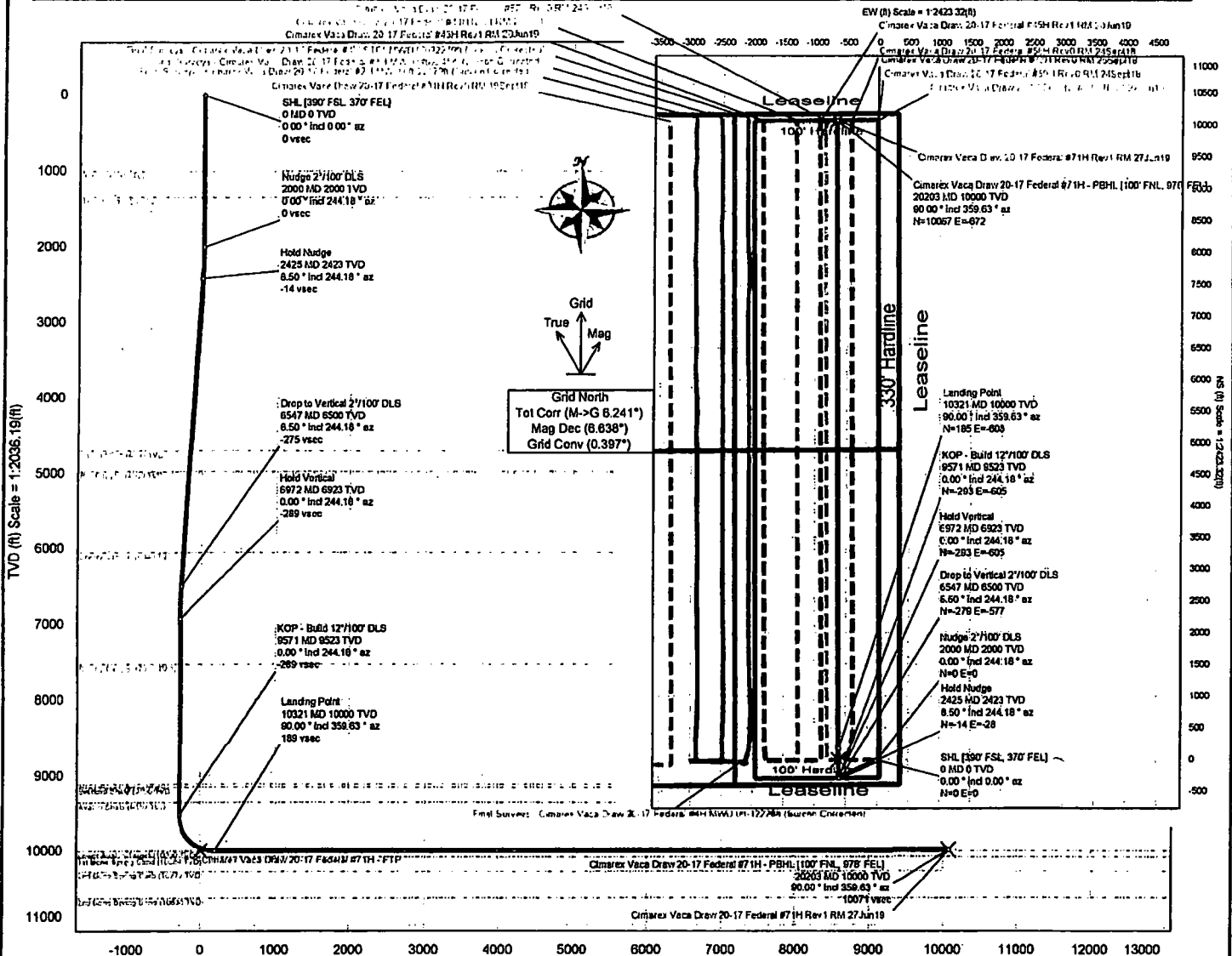
The surface casing string will be tested as per Onshore Order No. 2 to at least 0.22 psi/ft or 1500 psi, whichever is greater.

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

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

Borehole:	Well:	Field:	Structure:
Vaca Draw 20-17 Federal #71H	Vaca Draw 20-17 Federal #71H	NM Lea County (NAD 83)	Cimarex Vaca Draw 20-17 Federal #71H

Gravity & Magnetic Parameters	Surface Location	Miscellaneous
Model: HOGA 2019 Dip: 69.718° Date: 27-Jun-2019	NAD83 New Mexico State Plane, Eastern Zone, US Foot	EW (ft) Scale = 1:2423.32(8)
MagDec: 8.638° FB: 47769.279mT Gravity FB: 959.433mgals (9.80665 m/s²)	Lat: 32 6 35.62 N Long: 106 51 16.02 W Grid Conv: 0.3987'	Plot: New Site
	Lat: 32 6 35.62 N Long: 106 51 16.02 W Grid Conv: 0.3987'	Plan: Cimarex Vaca Draw 20-17 Federal #71H Rev1 RM 27-Jun-19



Vertical Section (ft) Azim = 359.63° Scale = 1:2036.19(ft) Origin = ON-S, OE-W

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL (390' FSL 370' FEL)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Router	1001.00	0.00	244.18	1001.00	0.00	0.00	0.00	0.00
Top of Salt	1341.00	0.00	244.18	1341.00	0.00	0.00	0.00	0.00
Nudge 2'/100' DLS	2000.00	0.00	244.18	2000.00	0.00	0.00	0.00	0.00
Hold Nudge	2425.00	8.50	244.18	2423.44	-13.52	-13.71	-28.32	2.00
Base of Salt	4721.79	8.50	244.18	4695.00	-158.42	-161.60	-333.81	0.00
Bell Canyon	4998.83	8.50	244.18	4969.00	-177.02	-178.43	-370.77	0.00
Cherry Canyon	6089.81	8.50	244.18	6048.00	-248.33	-248.68	-515.82	0.00
Drop to Vertical 2'/100' DLS	6546.83	8.50	244.18	6500.00	-275.36	-278.11	-576.72	0.00
Hold Vertical	6971.83	0.00	244.18	6923.44	-288.88	-292.82	-605.05	2.00
Brushy Canyon	7573.39	0.00	244.18	7525.00	-288.88	-292.82	-605.05	0.00
Bone Spring	9162.39	0.00	244.18	9114.00	-288.88	-292.82	-605.05	0.00
Leonard Shale	9198.39	0.00	244.18	9150.00	-288.88	-292.82	-605.05	0.00
Avalon Shale	9407.39	0.00	244.18	9359.00	-288.88	-292.82	-605.05	0.00
KOP - Build 12'/100' DLS	9570.82	0.00	244.18	9522.54	-288.88	-292.82	-605.05	0.00
Landing Point	10320.92	90.00	359.63	10000.00	188.58	184.64	-608.15	12.00
Lower Avalon Target	10320.92	90.00	359.63	10000.00	188.58	184.64	-608.15	12.00
Cimarex Vaca Draw 20-17 Federal #71H - PBHL (100' FNL 978' FEL)	20203.47	90.00	359.63	10000.00	10071.12	10068.97	-672.30	0.00
FNL 978' FEL	NaN	NaN	NaN	10084.00				
1st Bone Spring Sand	NaN	NaN	NaN	10272.00				
2nd Bone Spring Sand	NaN	NaN	NaN	10638.00				
3rd Bone Spring Sand	NaN	NaN	NaN	11158.00				
4th Bone Spring Sand	NaN	NaN	NaN	11788.00				
Top Wolfcamp	NaN	NaN	NaN	12269.00				
Wolfcamp X Sand	NaN	NaN	NaN	12294.00				
Wolfcamp Y Sand	NaN	NaN	NaN	12373.00				
Wolfcamp Upper A1	NaN	NaN	NaN	12415.00				

Cimarex Vaca Draw 20-17 Federal #71H Rev1 RM 27Jun19 Proposal

Geodetic Report

(Def Plan)



Report Date: June 27, 2019 - 03:53 PM
 Client: Cimarex Energy
 Field: NM Lea County (NAD 83)
 Structure / Slot: Cimarex Vaca Draw 20-17 Federal #71H / New Slot
 Well: Vaca Draw 20-17 Federal #71H
 Borehole: Vaca Draw 20-17 Federal #71H
 UWI / AP#: Unknown / Unknown
 Survey Name: Cimarex Vaca Draw 20-17 Federal #71H Rev1 RM 27Jun19
 Survey Date: September 25, 2018
 Tort / AHD / DDI / ERD Ratio: 107.000 ° / 11032.186 ft / 6.377 / 1.103
 Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
 Location Lat / Long: N 32° 6' 35.62096", W 103° 35' 13.07049"
 Location Grid N/E Y/X: N 404516.160 ftUS, E 772429.560 ftUS
 CRS Grid Convergence Angle: 0.3967 °
 Grid Scale Factor: 0.99997026
 Version / Patch: 2.10.760.0

Survey / DLS Computation: Minimum Curvature / Lubinski
 Vertical Section Azimuth: 359.628 ° (Grid North)
 Vertical Section Origin: 0.000 ft, 0.000 ft
 TVD Reference Datum: RKB
 TVD Reference Elevation: 3421.800 ft above MSL
 Seabed / Ground Elevation: 3395.800 ft above MSL
 Magnetic Declination: 6.638 °
 Total Gravity Field Strength: 998.4332mgn (9.80665 Based)
 Gravity Model: GARM
 Total Magnetic Field Strength: 47768.279 nT
 Magnetic Dip Angle: 59.718 °
 Declination Date: June 27, 2019
 Magnetic Declination Model: HDGM 2019
 North Reference: Grid North
 Grid Convergence Used: 0.3967 °
 Total Corr Mag North->Grid: 6.2408 °
 North:
 Local Coord Referenced To: Well Head

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, 370' FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404516.16	772429.56	N 32 6 35.62	W 103 35 13.07
Nudge 2"/100' DLS	2000.00	0.00	244.18	2000.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62	W 103 35 13.07
Hold Nudge	2425.00	8.50	244.18	2423.44	-13.52	-13.71	-28.32	2.00	404502.45	772401.24	N 32 6 35.49	W 103 35 13.40
Drop to Vertical 2"/100' DLS	6546.83	8.50	244.18	6500.00	-275.36	-279.11	-576.72	0.00	404237.06	771852.85	N 32 6 32.90	W 103 35 19.80
Hold Vertical	6971.83	0.00	244.18	6923.44	-288.88	-292.82	-605.05	2.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
KOP - Build 12"/100' DLS	9570.92	0.00	244.18	9522.54	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
Landing Point Cimarex Vaca Draw 20-17	10320.92	90.00	359.63	10000.00	188.58	184.64	-608.15	12.00	404700.79	771821.43	N 32 6 37.49	W 103 35 20.13
Federal #71H - PBHL [100' FNL, 978' FEL]	20203.47	90.00	359.63	10000.00	10071.12	10066.97	-672.30	0.00	414582.81	771757.28	N 32 8 15.28	W 103 35 20.08

Survey Type: Def Plan

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

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size	Casing Diameter (in)	Expected Max Inclination (deg)	Survey Tool Type	Borehole / Survey
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Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
		1	0.000	26.000	1/100.000	17.500	13.375		NAL_MWD_IFR1+MS-Depth Only		Vaca Draw 20-17 Federal #71H / Cimarex Vaca Draw 20-17 Federal #71H Rev1 RM 27Jun19	
		1	26.000	20203.465	1/100.000	17.500	13.375		NAL_MWD_IFR1+MS		Vaca Draw 20-17 Federal #71H / Cimarex Vaca Draw 20-17	

Cimarex Vaca Draw 20-17 Federal #71H Rev1 RM 27Jun19 Proposal

Geodetic Report

(Def Plan)



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SHL [390° FSL, 370° FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	100.00	0.00	244.18	100.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	200.00	0.00	244.18	200.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	300.00	0.00	244.18	300.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	400.00	0.00	244.18	400.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	500.00	0.00	244.18	500.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	600.00	0.00	244.18	600.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	700.00	0.00	244.18	700.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	800.00	0.00	244.18	800.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	900.00	0.00	244.18	900.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	1000.00	0.00	244.18	1000.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
Rustler	1001.00	0.00	244.18	1001.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	1100.00	0.00	244.18	1100.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	1200.00	0.00	244.18	1200.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	1300.00	0.00	244.18	1300.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
Top of Salt	1341.00	0.00	244.18	1341.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	1400.00	0.00	244.18	1400.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	1500.00	0.00	244.18	1500.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	1600.00	0.00	244.18	1600.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	1700.00	0.00	244.18	1700.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	1800.00	0.00	244.18	1800.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	1900.00	0.00	244.18	1900.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
Nudge 2"/100' DLS	2000.00	0.00	244.18	2000.00	0.00	0.00	0.00	0.00	404516.16	772429.56	N 32 6 35.62 W 103 35 13.07	
	2100.00	2.00	244.18	2099.98	-0.75	-0.76	-1.57	2.00	404515.40	772427.99	N 32 6 35.61 W 103 35 13.09	
	2200.00	4.00	244.18	2199.84	-3.00	-3.04	-6.28	2.00	404513.12	772423.28	N 32 6 35.59 W 103 35 13.14	
	2300.00	6.00	244.18	2299.45	-6.74	-6.84	-14.13	2.00	404509.32	772415.43	N 32 6 35.55 W 103 35 13.24	

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 ° ' ")
Hold Nudge	2400.00	8.00	244.18	2398.70	-11.98	-12.15	-25.10	2.00	404504.02	772404.47	N 32 6 35.50	W 103 35 13.36
	2425.00	8.50	244.18	2423.44	-13.52	-13.71	-28.32	2.00	404502.45	772401.24	N 32 6 35.49	W 103 35 13.40
	2500.00	8.50	244.18	2497.62	-18.29	-18.54	-38.30	0.00	404497.62	772391.26	N 32 6 35.44	W 103 35 13.52
	2600.00	8.50	244.18	2596.52	-24.64	-24.98	-51.61	0.00	404491.18	772377.95	N 32 6 35.38	W 103 35 13.67
	2700.00	8.50	244.18	2695.42	-30.99	-31.41	-64.91	0.00	404484.75	772364.65	N 32 6 35.31	W 103 35 13.83
	2800.00	8.50	244.18	2794.32	-37.35	-37.85	-78.22	0.00	404478.31	772351.35	N 32 6 35.25	W 103 35 13.98
	2900.00	8.50	244.18	2893.23	-43.70	-44.29	-91.52	0.00	404471.87	772338.04	N 32 6 35.19	W 103 35 14.14
	3000.00	8.50	244.18	2992.13	-50.05	-50.73	-104.83	0.00	404465.43	772324.74	N 32 6 35.13	W 103 35 14.29
	3100.00	8.50	244.18	3091.03	-56.40	-57.17	-118.13	0.00	404458.99	772311.43	N 32 6 35.08	W 103 35 14.45
	3200.00	8.50	244.18	3189.93	-62.75	-63.61	-131.44	0.00	404452.55	772298.13	N 32 6 35.00	W 103 35 14.60
	3300.00	8.50	244.18	3288.83	-69.11	-70.05	-144.74	0.00	404446.11	772284.82	N 32 6 34.94	W 103 35 14.76
	3400.00	8.50	244.18	3387.73	-75.46	-76.49	-158.05	0.00	404439.67	772271.52	N 32 6 34.87	W 103 35 14.91
	3500.00	8.50	244.18	3486.63	-81.81	-82.93	-171.35	0.00	404433.24	772258.21	N 32 6 34.81	W 103 35 15.07
	3600.00	8.50	244.18	3585.54	-88.16	-89.37	-184.66	0.00	404426.80	772244.91	N 32 6 34.75	W 103 35 15.22
	3700.00	8.50	244.18	3684.44	-94.52	-95.80	-197.96	0.00	404420.36	772231.61	N 32 6 34.69	W 103 35 15.38
	3800.00	8.50	244.18	3783.34	-100.87	-102.24	-211.26	0.00	404413.92	772218.30	N 32 6 34.62	W 103 35 15.53
	3900.00	8.50	244.18	3882.24	-107.22	-108.68	-224.57	0.00	404407.48	772205.00	N 32 6 34.56	W 103 35 15.69
	4000.00	8.50	244.18	3981.14	-113.57	-115.12	-237.87	0.00	404401.04	772191.69	N 32 6 34.50	W 103 35 15.85
	4100.00	8.50	244.18	4080.04	-119.93	-121.56	-251.18	0.00	404394.60	772178.39	N 32 6 34.44	W 103 35 16.00
	4200.00	8.50	244.18	4178.95	-126.28	-128.00	-264.48	0.00	404388.17	772165.08	N 32 6 34.37	W 103 35 16.16
	4300.00	8.50	244.18	4277.85	-132.63	-134.44	-277.79	0.00	404381.73	772151.78	N 32 6 34.31	W 103 35 16.31
	4400.00	8.50	244.18	4376.75	-138.98	-140.88	-291.09	0.00	404375.29	772138.48	N 32 6 34.25	W 103 35 16.47
	4500.00	8.50	244.18	4475.65	-145.34	-147.32	-304.40	0.00	404368.85	772125.17	N 32 6 34.18	W 103 35 16.62
	4600.00	8.50	244.18	4574.55	-151.69	-153.75	-317.70	0.00	404362.41	772111.87	N 32 6 34.12	W 103 35 16.78
	4700.00	8.50	244.18	4673.45	-158.04	-160.19	-331.01	0.00	404355.97	772098.56	N 32 6 34.06	W 103 35 16.93
	4721.79	8.50	244.18	4695.00	-159.42	-161.60	-333.91	0.00	404354.57	772095.66	N 32 6 34.04	W 103 35 16.97
	4800.00	8.50	244.18	4772.36	-164.39	-166.63	-344.31	0.00	404349.53	772085.26	N 32 6 34.00	W 103 35 17.09
	4900.00	8.50	244.18	4871.26	-170.75	-173.07	-357.62	0.00	404343.09	772071.95	N 32 6 33.93	W 103 35 17.24
Base of Salt	4998.83	8.50	244.18	4969.00	-177.02	-179.43	-370.77	0.00	404336.73	772058.81	N 32 6 33.87	W 103 35 17.40
	5000.00	8.50	244.18	4970.16	-177.10	-179.51	-370.92	0.00	404336.68	772058.85	N 32 6 33.87	W 103 35 17.40
	5100.00	8.50	244.18	5069.06	-183.45	-185.95	-384.23	0.00	404330.22	772045.35	N 32 6 33.81	W 103 35 17.55
Bell Canyon	5200.00	8.50	244.18	5167.96	-189.80	-192.39	-397.53	0.00	404323.78	772032.04	N 32 6 33.74	W 103 35 17.71
	5300.00	8.50	244.18	5266.86	-196.16	-198.83	-410.84	0.00	404317.34	772018.74	N 32 6 33.68	W 103 35 17.86
	5400.00	8.50	244.18	5365.76	-202.51	-205.27	-424.14	0.00	404310.90	772005.43	N 32 6 33.62	W 103 35 18.02
	5500.00	8.50	244.18	5464.67	-208.86	-211.71	-437.45	0.00	404304.46	771992.13	N 32 6 33.56	W 103 35 18.17
	5600.00	8.50	244.18	5563.57	-215.21	-218.14	-450.75	0.00	404298.02	771978.82	N 32 6 33.49	W 103 35 18.33
	5700.00	8.50	244.18	5662.47	-221.57	-224.58	-464.06	0.00	404291.58	771965.52	N 32 6 33.43	W 103 35 18.48
	5800.00	8.50	244.18	5761.37	-227.92	-231.02	-477.36	0.00	404285.15	771952.22	N 32 6 33.37	W 103 35 18.64
	5900.00	8.50	244.18	5860.27	-234.27	-237.46	-490.66	0.00	404278.71	771938.91	N 32 6 33.30	W 103 35 18.79
	6000.00	8.50	244.18	5959.17	-240.62	-243.90	-503.97	0.00	404272.27	771925.61	N 32 6 33.24	W 103 35 18.95
	6089.81	8.50	244.18	6048.00	-246.33	-249.68	-515.92	0.00	404266.49	771913.66	N 32 6 33.19	W 103 35 19.09
	6100.00	8.50	244.18	6058.08	-248.97	-250.34	-517.27	0.00	404265.83	771912.30	N 32 6 33.18	W 103 35 19.10
	6200.00	8.50	244.18	6156.98	-253.33	-256.78	-530.58	0.00	404259.39	771899.00	N 32 6 33.12	W 103 35 19.26
	6300.00	8.50	244.18	6255.88	-259.68	-263.22	-543.88	0.00	404252.95	771885.69	N 32 6 33.05	W 103 35 19.41
	6400.00	8.50	244.18	6354.78	-266.03	-269.66	-557.19	0.00	404246.51	771872.39	N 32 6 32.99	W 103 35 19.57
Drop to Vertical 2°/100' DLS	6500.00	8.50	244.18	6453.68	-272.38	-276.09	-570.49	0.00	404240.07	771859.08	N 32 6 32.93	W 103 35 19.73
	6546.83	8.50	244.18	6500.00	-275.36	-279.11	-576.72	0.00	404237.06	771852.85	N 32 6 32.90	W 103 35 19.80
	6600.00	7.44	244.18	6552.65	-278.53	-282.32	-583.36	2.00	404233.85	771846.22	N 32 6 32.87	W 103 35 19.88
Hold Vertical	6700.00	5.44	244.18	6652.02	-283.34	-287.20	-593.45	2.00	404228.97	771836.13	N 32 6 32.82	W 103 35 19.99
	6800.00	3.44	244.18	6751.71	-286.67	-290.57	-600.41	2.00	404225.60	771829.17	N 32 6 32.79	W 103 35 20.07
	6900.00	1.44	244.18	6851.62	-288.50	-292.43	-604.24	2.00	404223.74	771825.34	N 32 6 32.77	W 103 35 20.12
	6971.83	0.00	244.18	6923.44	-288.88	-292.82	-605.05	2.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	7000.00	0.00	244.18	6951.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	7100.00	0.00	244.18	7051.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	7200.00	0.00	244.18	7151.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	7300.00	0.00	244.18	7251.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	7400.00	0.00	244.18	7351.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13

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	7500.00	0.00	244.18	7451.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	7573.39	0.00	244.18	7525.00	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	7600.00	0.00	244.18	7551.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	7700.00	0.00	244.18	7651.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	7800.00	0.00	244.18	7751.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	7900.00	0.00	244.18	7851.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	8000.00	0.00	244.18	7951.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	8100.00	0.00	244.18	8051.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	8200.00	0.00	244.18	8151.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	8300.00	0.00	244.18	8251.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	8400.00	0.00	244.18	8351.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	8500.00	0.00	244.18	8451.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	8600.00	0.00	244.18	8551.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	8700.00	0.00	244.18	8651.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	8800.00	0.00	244.18	8751.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	8900.00	0.00	244.18	8851.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	9000.00	0.00	244.18	8951.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	9100.00	0.00	244.18	9051.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	9162.39	0.00	244.18	9114.00	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	9198.39	0.00	244.18	9150.00	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
Bone Spring Leonard Shale	9200.00	0.00	244.18	9151.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	9300.00	0.00	244.18	9251.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	9400.00	0.00	244.18	9351.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	9407.39	0.00	244.18	9359.00	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
Avalon Shale	9500.00	0.00	244.18	9451.61	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
KOP - Build 12"/100' DLS	9570.92	0.00	244.18	9522.54	-288.88	-292.82	-605.05	0.00	404223.35	771824.53	N 32 6 32.76	W 103 35 20.13
	9600.00	3.49	359.63	9551.59	-288.00	-291.93	-605.05	12.00	404224.24	771824.52	N 32 6 32.77	W 103 35 20.13
	9700.00	15.49	359.63	9650.04	-271.54	-275.48	-605.16	12.00	404240.69	771824.42	N 32 6 32.94	W 103 35 20.13
	9800.00	27.49	359.63	9742.92	-234.98	-238.91	-605.40	12.00	404277.26	771824.18	N 32 6 33.30	W 103 35 20.13
	9900.00	39.49	359.63	9826.17	-179.90	-183.84	-605.78	12.00	404332.33	771823.82	N 32 6 33.84	W 103 35 20.13
	10000.00	51.49	359.63	9896.15	-108.72	-112.66	-606.22	12.00	404403.51	771823.36	N 32 6 34.55	W 103 35 20.13
	10100.00	63.49	359.63	9949.79	-24.54	-28.48	-606.76	12.00	404487.68	771822.81	N 32 6 35.38	W 103 35 20.13
	10200.00	75.49	359.63	9984.77	68.95	65.00	-607.37	12.00	404581.16	771822.21	N 32 6 36.31	W 103 35 20.13
	10300.00	87.49	359.63	9999.54	167.66	163.72	-608.01	12.00	404679.87	771821.57	N 32 6 37.28	W 103 35 20.13
Lower Avalon Target Landing Point	10320.92	90.00	359.63	10000.00	188.58	184.64	-608.15	12.00	404700.79	771821.43	N 32 6 37.49	W 103 35 20.13
	10400.00	90.00	359.63	10000.00	267.66	263.71	-608.66	0.00	404779.86	771820.92	N 32 6 38.27	W 103 35 20.13
	10500.00	90.00	359.63	10000.00	367.66	363.71	-609.31	0.00	404879.86	771820.27	N 32 6 39.26	W 103 35 20.13
	10600.00	90.00	359.63	10000.00	467.66	463.71	-609.96	0.00	404979.85	771819.62	N 32 6 40.25	W 103 35 20.12
	10700.00	90.00	359.63	10000.00	567.66	563.70	-610.61	0.00	405079.85	771818.97	N 32 6 41.24	W 103 35 20.12
	10800.00	90.00	359.63	10000.00	667.66	663.70	-611.26	0.00	405179.84	771818.32	N 32 6 42.23	W 103 35 20.12
	10900.00	90.00	359.63	10000.00	767.66	763.70	-611.91	0.00	405279.84	771817.67	N 32 6 43.22	W 103 35 20.12
	11000.00	90.00	359.63	10000.00	867.66	863.70	-612.56	0.00	405379.83	771817.02	N 32 6 44.21	W 103 35 20.12
	11100.00	90.00	359.63	10000.00	967.66	963.70	-613.21	0.00	405479.83	771816.37	N 32 6 45.20	W 103 35 20.12
	11200.00	90.00	359.63	10000.00	1067.66	1063.69	-613.85	0.00	405579.82	771815.72	N 32 6 46.19	W 103 35 20.12
	11300.00	90.00	359.63	10000.00	1167.66	1163.69	-614.50	0.00	405679.82	771815.08	N 32 6 47.18	W 103 35 20.12
	11400.00	90.00	359.63	10000.00	1267.66	1263.69	-615.15	0.00	405779.81	771814.43	N 32 6 48.17	W 103 35 20.12
	11500.00	90.00	359.63	10000.00	1367.66	1363.69	-615.80	0.00	405879.80	771813.78	N 32 6 49.16	W 103 35 20.12
	11600.00	90.00	359.63	10000.00	1467.66	1463.69	-616.45	0.00	405979.80	771813.13	N 32 6 50.15	W 103 35 20.12
	11700.00	90.00	359.63	10000.00	1567.66	1563.68	-617.10	0.00	406079.79	771812.48	N 32 6 51.14	W 103 35 20.12
	11800.00	90.00	359.63	10000.00	1667.66	1663.68	-617.75	0.00	406179.79	771811.83	N 32 6 52.13	W 103 35 20.12
	11900.00	90.00	359.63	10000.00	1767.66	1763.68	-618.40	0.00	406279.78	771811.18	N 32 6 53.12	W 103 35 20.12
	12000.00	90.00	359.63	10000.00	1867.66	1863.68	-619.05	0.00	406379.78	771810.53	N 32 6 54.10	W 103 35 20.12
	12100.00	90.00	359.63	10000.00	1967.66	1963.68	-619.70	0.00	406479.77	771809.88	N 32 6 55.09	W 103 35 20.12
	12200.00	90.00	359.63	10000.00	2067.66	2063.67	-620.35	0.00	406579.77	771809.23	N 32 6 56.08	W 103 35 20.12
	12300.00	90.00	359.63	10000.00	2167.66	2163.67	-621.00	0.00	406679.76	771808.58	N 32 6 57.07	W 103 35 20.12

Comments	MD (ft)	Incl (°)	Azim Grd (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	12400.00	90.00	359.63	10000.00	2287.66	2283.67	-621.64	0.00	406779.76	771807.94	N 32 6 58.06	W 103 35 20.12
	12500.00	90.00	359.63	10000.00	2367.66	2363.67	-622.29	0.00	406879.75	771807.29	N 32 6 59.05	W 103 35 20.12
	12600.00	90.00	359.63	10000.00	2467.66	2463.66	-622.84	0.00	406979.75	771806.64	N 32 7 0.04	W 103 35 20.11
	12700.00	90.00	359.63	10000.00	2567.66	2563.66	-623.59	0.00	407079.74	771805.99	N 32 7 1.03	W 103 35 20.11
	12800.00	90.00	359.63	10000.00	2667.66	2663.66	-624.24	0.00	407179.74	771805.34	N 32 7 2.02	W 103 35 20.11
	12900.00	90.00	359.63	10000.00	2767.66	2763.66	-624.89	0.00	407279.73	771804.69	N 32 7 3.01	W 103 35 20.11
	13000.00	90.00	359.63	10000.00	2867.66	2863.66	-625.54	0.00	407379.73	771804.04	N 32 7 4.00	W 103 35 20.11
	13100.00	90.00	359.63	10000.00	2967.66	2963.65	-626.19	0.00	407479.72	771803.39	N 32 7 4.99	W 103 35 20.11
	13200.00	90.00	359.63	10000.00	3067.66	3063.65	-626.84	0.00	407579.71	771802.74	N 32 7 5.98	W 103 35 20.11
	13300.00	90.00	359.63	10000.00	3167.66	3163.65	-627.49	0.00	407679.71	771802.09	N 32 7 6.97	W 103 35 20.11
	13400.00	90.00	359.63	10000.00	3267.66	3263.65	-628.14	0.00	407779.70	771801.44	N 32 7 7.96	W 103 35 20.11
	13500.00	90.00	359.63	10000.00	3367.66	3363.65	-628.79	0.00	407879.70	771800.79	N 32 7 8.95	W 103 35 20.11
	13600.00	90.00	359.63	10000.00	3467.66	3463.64	-629.43	0.00	407979.69	771800.15	N 32 7 9.94	W 103 35 20.11
	13700.00	90.00	359.63	10000.00	3567.66	3563.64	-630.08	0.00	408079.69	771799.50	N 32 7 10.93	W 103 35 20.11
	13800.00	90.00	359.63	10000.00	3667.66	3663.64	-630.73	0.00	408179.68	771798.85	N 32 7 11.92	W 103 35 20.11
	13900.00	90.00	359.63	10000.00	3767.66	3763.64	-631.38	0.00	408279.68	771798.20	N 32 7 12.91	W 103 35 20.11
	14000.00	90.00	359.63	10000.00	3867.66	3863.64	-632.03	0.00	408379.67	771797.55	N 32 7 13.90	W 103 35 20.11
	14100.00	90.00	359.63	10000.00	3967.66	3963.63	-632.68	0.00	408479.67	771796.90	N 32 7 14.88	W 103 35 20.11
	14200.00	90.00	359.63	10000.00	4067.66	4063.63	-633.33	0.00	408579.66	771796.25	N 32 7 15.87	W 103 35 20.11
	14300.00	90.00	359.63	10000.00	4167.66	4163.63	-633.98	0.00	408679.66	771795.60	N 32 7 16.86	W 103 35 20.11
	14400.00	90.00	359.63	10000.00	4267.66	4263.63	-634.63	0.00	408779.65	771794.95	N 32 7 17.85	W 103 35 20.11
	14500.00	90.00	359.63	10000.00	4367.66	4363.62	-635.28	0.00	408879.65	771794.30	N 32 7 18.84	W 103 35 20.11
	14600.00	90.00	359.63	10000.00	4467.66	4463.62	-635.93	0.00	408979.64	771793.65	N 32 7 19.83	W 103 35 20.11
	14700.00	90.00	359.63	10000.00	4567.66	4563.62	-636.58	0.00	409079.64	771793.01	N 32 7 20.82	W 103 35 20.10
	14800.00	90.00	359.63	10000.00	4667.66	4663.62	-637.22	0.00	409179.63	771792.36	N 32 7 21.81	W 103 35 20.10
	14900.00	90.00	359.63	10000.00	4767.66	4763.62	-637.87	0.00	409279.62	771791.71	N 32 7 22.80	W 103 35 20.10
	15000.00	90.00	359.63	10000.00	4867.66	4863.61	-638.52	0.00	409379.62	771791.06	N 32 7 23.79	W 103 35 20.10
	15100.00	90.00	359.63	10000.00	4967.66	4963.61	-639.17	0.00	409479.61	771790.41	N 32 7 24.78	W 103 35 20.10
	15200.00	90.00	359.63	10000.00	5067.66	5063.61	-639.82	0.00	409579.61	771789.76	N 32 7 25.77	W 103 35 20.10
	15300.00	90.00	359.63	10000.00	5167.66	5163.61	-640.47	0.00	409679.60	771789.11	N 32 7 26.76	W 103 35 20.10
	15400.00	90.00	359.63	10000.00	5267.66	5263.61	-641.12	0.00	409779.60	771788.46	N 32 7 27.75	W 103 35 20.10
	15500.00	90.00	359.63	10000.00	5367.66	5363.60	-641.77	0.00	409879.59	771787.81	N 32 7 28.74	W 103 35 20.10
	15600.00	90.00	359.63	10000.00	5467.66	5463.60	-642.42	0.00	409979.59	771787.16	N 32 7 29.73	W 103 35 20.10
	15700.00	90.00	359.63	10000.00	5567.66	5563.60	-643.07	0.00	410079.58	771786.51	N 32 7 30.72	W 103 35 20.10
	15800.00	90.00	359.63	10000.00	5667.66	5663.60	-643.72	0.00	410179.58	771785.86	N 32 7 31.71	W 103 35 20.10
	15900.00	90.00	359.63	10000.00	5767.66	5763.60	-644.37	0.00	410279.57	771785.22	N 32 7 32.70	W 103 35 20.10
	16000.00	90.00	359.63	10000.00	5867.66	5863.59	-645.01	0.00	410379.57	771784.57	N 32 7 33.69	W 103 35 20.10
	16100.00	90.00	359.63	10000.00	5967.66	5963.59	-645.66	0.00	410479.56	771783.92	N 32 7 34.68	W 103 35 20.10
	16200.00	90.00	359.63	10000.00	6067.66	6063.59	-646.31	0.00	410579.56	771783.27	N 32 7 35.66	W 103 35 20.10
	16300.00	90.00	359.63	10000.00	6167.66	6163.59	-646.96	0.00	410679.55	771782.62	N 32 7 36.65	W 103 35 20.10
	16400.00	90.00	359.63	10000.00	6267.66	6263.58	-647.61	0.00	410779.55	771781.97	N 32 7 37.64	W 103 35 20.10
	16500.00	90.00	359.63	10000.00	6367.66	6363.58	-648.26	0.00	410879.54	771781.32	N 32 7 38.63	W 103 35 20.10
	16600.00	90.00	359.63	10000.00	6467.66	6463.58	-648.91	0.00	410979.54	771780.67	N 32 7 39.62	W 103 35 20.10
	16700.00	90.00	359.63	10000.00	6567.66	6563.58	-649.56	0.00	411079.53	771780.02	N 32 7 40.61	W 103 35 20.10
	16800.00	90.00	359.63	10000.00	6667.66	6663.58	-650.21	0.00	411179.52	771779.37	N 32 7 41.60	W 103 35 20.09
	16900.00	90.00	359.63	10000.00	6767.66	6763.57	-650.86	0.00	411279.52	771778.72	N 32 7 42.59	W 103 35 20.09
	17000.00	90.00	359.63	10000.00	6867.66	6863.57	-651.51	0.00	411379.51	771778.07	N 32 7 43.58	W 103 35 20.09
	17100.00	90.00	359.63	10000.00	6967.66	6963.57	-652.15	0.00	411479.51	771777.43	N 32 7 44.57	W 103 35 20.09
	17200.00	90.00	359.63	10000.00	7067.66	7063.57	-652.80	0.00	411579.50	771776.78	N 32 7 45.56	W 103 35 20.09
	17300.00	90.00	359.63	10000.00	7167.66	7163.57	-653.45	0.00	411679.50	771776.13	N 32 7 46.55	W 103 35 20.09
	17400.00	90.00	359.63	10000.00	7267.66	7263.56	-654.10	0.00	411779.49	771775.48	N 32 7 47.54	W 103 35 20.09
	17500.00	90.00	359.63	10000.00	7367.66	7363.56	-654.75	0.00	411879.49	771774.83	N 32 7 48.53	W 103 35 20.09
	17600.00	90.00	359.63	10000.00	7467.66	7463.56	-655.40	0.00	411979.48	771774.18	N 32 7 49.52	W 103 35 20.09
	17700.00	90.00	359.63	10000.00	7567.66	7563.56	-656.05	0.00	412079.48	771773.53	N 32 7 50.51	W 103 35 20.09
	17800.00	90.00	359.63	10000.00	7667.66	7663.56	-656.70	0.00	412179.47	771772.88	N 32 7 51.50	W 103 35 20.09
	17900.00	90.00	359.63	10000.00	7767.66	7763.55	-657.35	0.00	412279.47	771772.23	N 32 7 52.49	W 103 35 20.09
	18000.00	90.00	359.63	10000.00	7867.66	7863.55	-658.00	0.00	412379.46	771771.58	N 32 7 53.48	W 103 35 20.09
	18100.00	90.00	359.63	10000.00	7967.66	7963.55	-658.65	0.00	412479.46	771770.93	N 32 7 54.47	W 103 35 20.09

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 ° ' ")
	18200.00	90.00	359.63	10000.00	8067.66	8063.55	-659.30	0.00	412579.45	771770.29	N 32 7 55.46	W 103 35 20.09
	18300.00	90.00	359.63	10000.00	8167.66	8163.54	-659.94	0.00	412679.45	771769.64	N 32 7 56.44	W 103 35 20.09
	18400.00	90.00	359.63	10000.00	8267.66	8263.54	-660.59	0.00	412779.44	771768.99	N 32 7 57.43	W 103 35 20.09
	18500.00	90.00	359.63	10000.00	8367.66	8363.54	-661.24	0.00	412879.43	771768.34	N 32 7 58.42	W 103 35 20.09
	18600.00	90.00	359.63	10000.00	8467.66	8463.54	-661.89	0.00	412979.43	771767.69	N 32 7 59.41	W 103 35 20.09
	18700.00	90.00	359.63	10000.00	8567.66	8563.54	-662.54	0.00	413079.42	771767.04	N 32 8 0.40	W 103 35 20.09
	18800.00	90.00	359.63	10000.00	8667.66	8663.53	-663.19	0.00	413179.42	771766.39	N 32 8 1.39	W 103 35 20.08
	18900.00	90.00	359.63	10000.00	8767.66	8763.53	-663.84	0.00	413279.41	771765.74	N 32 8 2.38	W 103 35 20.08
	19000.00	90.00	359.63	10000.00	8867.66	8863.53	-664.49	0.00	413379.41	771765.09	N 32 8 3.37	W 103 35 20.08
	19100.00	90.00	359.63	10000.00	8967.66	8963.53	-665.14	0.00	413479.40	771764.44	N 32 8 4.36	W 103 35 20.08
	19200.00	90.00	359.63	10000.00	9067.66	9063.53	-665.79	0.00	413579.40	771763.79	N 32 8 5.35	W 103 35 20.08
	19300.00	90.00	359.63	10000.00	9167.66	9163.52	-666.44	0.00	413679.39	771763.14	N 32 8 6.34	W 103 35 20.08
	19400.00	90.00	359.63	10000.00	9267.66	9263.52	-667.09	0.00	413779.39	771762.50	N 32 8 7.33	W 103 35 20.08
	19500.00	90.00	359.63	10000.00	9367.66	9363.52	-667.73	0.00	413879.38	771761.85	N 32 8 8.32	W 103 35 20.08
	19600.00	90.00	359.63	10000.00	9467.66	9463.52	-668.38	0.00	413979.38	771761.20	N 32 8 9.31	W 103 35 20.08
	19700.00	90.00	359.63	10000.00	9567.66	9563.52	-669.03	0.00	414079.37	771760.55	N 32 8 10.30	W 103 35 20.08
	19800.00	90.00	359.63	10000.00	9667.66	9663.51	-669.68	0.00	414179.37	771759.90	N 32 8 11.29	W 103 35 20.08
	19900.00	90.00	359.63	10000.00	9767.66	9763.51	-670.33	0.00	414279.36	771759.25	N 32 8 12.28	W 103 35 20.08
	20000.00	90.00	359.63	10000.00	9867.66	9863.51	-670.98	0.00	414379.36	771758.60	N 32 8 13.27	W 103 35 20.08
	20100.00	90.00	359.63	10000.00	9967.66	9963.51	-671.63	0.00	414479.35	771757.95	N 32 8 14.26	W 103 35 20.08
	20200.00	90.00	359.63	10000.00	10067.66	10063.50	-672.28	0.00	414579.35	771757.30	N 32 8 15.25	W 103 35 20.08
Cimarex Vaca Draw 20-17 Federal #71H - PBHL [100' FNL, 978' FEL]	20203.47	90.00	359.63	10000.00	10071.12	10066.97	-672.30	0.00	414582.81	771757.28	N 32 8 15.28	W 103 35 20.08

Survey Type: Def Plan

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

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Expected Max Inclination (deg)	Survey Tool Type	Borehole / Survey
	1	0.000	26.000	1/100.000	17.500	13.375		NAL_MWD_IFR1+MS-Depth Only	Vaca Draw 20-17 Federal #71H / Cimarex Vaca Draw 20-17
	1	26.000	20203.465	1/100.000	17.500	13.375		NAL_MWD_IFR1+MS	Federal #71H Rev1 RM 27Jun19 Vaca Draw 20-17 Federal #71H / Cimarex Vaca Draw 20-17

Cimarex Vaca Draw 20-17 Federal #71H Rev1 RM 27Jun19 Anti-Collision Summary Report

Analysis Date-24hr Time: June 27, 2019 - 15:53
 Client: Cimarex Energy
 Field: NM Lea County (NAD 83)
 Structure: Cimarex Vaca Draw 20-17 Federal #71H
 Slot: New Slot
 Well: Vaca Draw 20-17 Federal #71H
 Borehole: Vaca Draw 20-17 Federal #71H
 Scan MD Range: 0.00ft ~ 20203.47ft

Analysis Method: 3D Least Distance
 Reference Trajectory: Cimarex Vaca Draw 20-17 Federal #71H Rev1 RM 27Jun19 (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: 2.10.760.0
 Database \ Project: US1153APP452.dir.sib.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 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 Trajectories Summary

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 #57H Rev0 RM
 24Sept18 (Non-Def Plan)

549.92	32.81	548.84	517.12	N/A	MAS = 10.00 (m)	0.00	0.00						Surface
549.92	32.81	548.83	517.12	91455.73	MAS = 10.00 (m)	26.00	26.00						WRP
549.92	32.81	536.52	517.12	45.27	MAS = 10.00 (m)	1990.00	1990.00						MinPts
549.88	32.81	536.20	517.07	44.26	MAS = 10.00 (m)	2110.00	2109.97						MinPt-O-SF
348.89	58.57	309.41	290.32	9.10	OSF1.50	9500.00	9451.81						MinPt-CtCl
348.89	58.64	309.36	290.25	9.09	OSF1.50	9510.00	9461.81						MINPT-O-EOU
348.88	58.73	309.38	290.24	9.08	OSF1.50	9520.00	9471.81						MinPt-O-ADP
348.44	58.88	309.78	290.56	9.07	OSF1.50	9540.00	9491.81						MinPt-O-SF
205.84	63.10	183.22	142.74	4.99	OSF1.50	10500.00	10000.00	OSF<5.00					Enter Alert
201.96	202.02	86.72	-0.06	1.50	OSF1.50	15640.00	10000.00		OSF<1.50				Enter Minor
201.96	302.22	-0.08	-100.28	1.00	OSF1.50	18830.00	10000.00			OSF<1.00			Enter Major
201.96	345.85	-29.17	-143.89	0.87	OSF1.50	20203.47	10000.00						MinPts

Fail Major

Cimarex Vaca Draw 20-17
 Federal #72H Rev1 27Jun19
 (Def Plan)

20.01	16.40	18.03	3.61	N/A	MAS = 5.00 (m)	0.00	0.00	Ct-Ct<15m<15.00					Enter Alert
20.00	16.40	18.02	3.60	N/A	MAS = 5.00 (m)	26.00	26.00						WRP
20.00	20.05	5.98	-0.05	1.50	OSF1.50	1980.00	1980.00		OSF<1.50				Enter Minor
20.00	20.24	5.85	-0.23	1.48	OSF1.50	2000.00	2000.00						MinPt-CtCl
20.02	20.30	5.83	-0.28	1.48	OSF1.50	2010.00	2010.00						MINPT-O-EOU
20.06	20.36	5.83	-0.29	1.48	OSF1.50	2020.00	2020.00						MinPts
20.57	20.60	6.18	-0.03	1.50	OSF1.50	2060.00	2060.00		OSF>1.50				Exit Minor
70.00	22.63	54.26	47.37	4.94	OSF1.50	2560.00	2556.96	OSF>5.00					Exit Alert

Fail Minor

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		
690.31	68.78	643.79	621.52	15.45		OSF1.50	8940.00	8891.61				MinPts	
691.02	68.82	644.41	622.10	15.44		OSF1.50	8980.00	8931.61				MinPt-O-SF	
910.35	55.17	872.91	855.18	25.62		OSF1.50	10620.00	10000.00				MinPt-CtCt	
910.35	274.54	726.66	635.81	5.00		OSF1.50	18540.00	10000.00	OSF<5.00			Enter Alert	
910.35	326.43	692.07	583.92	4.20		OSF1.50	20203.47	10000.00				MinPts	

Cimarex Vaca Draw 20-17
Federal #58H Rev0 RM
24Sept18 (Non-Def Plan)

529.87	32.81	527.89	497.07	N/A	MAS = 10.00 (m)	0.00	0.00					Fail Minor	
529.87	32.81	527.89	497.07	79198.07	MAS = 10.00 (m)	26.00	26.00					Surface	
228.44	44.91	197.84	183.53	7.91	OSF1.50	5450.00	5415.22					WRP	
228.63	45.45	197.67	183.18	7.82	OSF1.50	5510.00	5474.56					MinPt-CtCt	
228.85	45.72	197.71	183.13	7.78	OSF1.50	5540.00	5504.23					MINPT-O-EQU	
239.79	49.30	208.26	190.49	7.54	OSF1.50	5940.00	5899.83					MinPt-O-ADP	
299.77	73.22	250.30	228.55	6.27	OSF1.50	9480.00	9431.61					MinPt-O-SF	
299.91	73.27	250.40	228.64	6.27	OSF1.50	9490.00	9441.61					MinPts	
234.62	71.26	188.45	163.36	5.04	OSF1.50	10460.00	10000.00					MinPt-O-SF	
234.70	72.17	185.93	162.54	4.97	OSF1.50	10480.00	10000.00	OSF<5.00				MinPt-CtCt	
236.50	236.67	78.06	-0.17	1.50	OSF1.50	16790.00	10000.00			OSF<1.50		Enter Alert	
236.51	343.63	6.76	-107.12	1.03	OSF1.50	20203.47	10000.00					Enter Minor	
												MinPts	

Cimarex Vaca Draw 20-17
Federal #73H Rev0 RM
25Sept18 (Non-Def Plan)

40.00	32.40	38.02	7.61	N/A	MAS = 9.87 (m)	0.00	0.00	CtCt<=15m<15.00				Warning Alert	
40.00	32.40	38.02	7.60	N/A	MAS = 9.87 (m)	26.00	26.00					Enter Alert	
40.00	32.40	25.85	7.60	3.12	MAS = 9.87 (m)	2000.00	2000.00					WRP	
40.02	32.40	25.86	7.62	3.12	MAS = 9.87 (m)	2010.00	2010.00					MinPts	
58.06	32.40	44.78	25.66	4.96	MAS = 9.87 (m)	2330.00	2329.27	OSF>5.00				MinPt-O-SF	
428.57	32.40	411.50	396.17	28.26	MAS = 9.87 (m)	5040.00	5009.72					Exit Alert	
618.61	33.01	585.94	585.60	28.81	OSF1.50	6546.83	6500.00					MinPt-O-SF	
646.99	43.56	617.29	603.43	23.27	OSF1.50	9680.00	9630.66					MinPt-O-SF	
647.05	43.63	617.30	603.42	23.23	OSF1.50	9690.00	9640.38					MINPT-O-EQU	
653.32	44.67	622.88	608.65	22.89	OSF1.50	9870.00	9802.43					MinPt-O-ADP	
2515.28	326.06	2287.25	2189.22	11.63	OSF1.50	20203.47	10000.00					MinPt-O-SF	
												MinPts	

Cimarex Vaca Draw 20-17
Federal #58H Rev0 RM
24Sept18 (Non-Def Plan)

509.87	32.81	507.89	477.08	N/A	MAS = 10.00 (m)	0.00	0.00					Warning Alert	
509.87	32.81	507.89	477.08	81640.07	MAS = 10.00 (m)	26.00	26.00					Surface	
127.03	32.81	107.68	94.22	7.29	MAS = 10.00 (m)	4160.00	4139.39					WRP	
127.06	32.81	107.87	94.28	7.27	MAS = 10.00 (m)	4170.00	4149.28					MinPts	
128.31	32.81	108.81	95.50	7.21	MAS = 10.00 (m)	4230.00	4208.62					MINPT-O-EQU	
707.32	56.86	668.75	650.46	19.28	OSF1.50	9510.00	9461.61					MinPt-O-SF	
707.36	56.91	668.76	650.45	19.26	OSF1.50	9520.00	9471.61					MINPT-O-EQU	
649.97	62.51	607.84	587.46	16.06	OSF1.50	10610.00	10000.00					MinPt-O-ADP	
650.48	196.56	518.78	453.92	5.00	OSF1.50	15840.00	10000.00	OSF<5.00				MinPt-CtCt	
650.94	340.99	422.96	309.96	2.87	OSF1.50	20203.47	10000.00					Enter Alert	
												MinPts	

Cimarex Vaca Draw 20-17
Federal #45H Rev1 RM
20Jun19 (Def Plan)

1729.76	32.81	1727.78	1686.95	N/A	MAS = 10.00 (m)	0.00	0.00					Warning Alert	
1729.76	32.81	1727.75	1686.95	71342.84	MAS = 10.00 (m)	26.00	26.00					Surface	
1722.79	32.81	1708.39	1689.98	138.53	MAS = 10.00 (m)	2100.00	2099.98					WRP	
												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		
395.49	53.92	358.54	341.57	11.56		OSF1.50	7880.00	7831.61				MinPt-O-SF	
394.51	53.70	357.70	340.81	11.59		OSF1.50	7960.00	7911.61				MinPt-O-ADP	
394.48	53.67	357.70	340.81	11.59		OSF1.50	7970.00	7921.61				MINPT-O-EOU	
394.48	56.68	355.69	337.80	10.94		OSF1.50	8900.00	8851.61				MinPts	
394.67	56.75	355.83	337.92	10.93		OSF1.50	8920.00	8871.61				MinPt-O-SF	
723.93	218.66	577.49	505.27	5.00		OSF1.50	16910.00	10000.00	OSF<5.00			Enter Alert	
723.93	320.02	509.92	403.91	3.40		OSF1.50	20203.47	10000.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #44H Rev1 RM 20Jun19 (Def Plan)													
1749.76	32.81	1747.78	1716.95	N/A		MAS = 10.00 (m)	0.00	0.00				Surface	Warning Alert
1749.76	32.81	1747.76	1716.95	72168.71		MAS = 10.00 (m)	26.00	26.00				WRP	
709.07	57.58	669.67	651.50	19.42		OSF1.50	9410.00	9381.61				MinPt-CICt	
709.10	57.64	669.66	651.46	19.40		OSF1.50	9420.00	9371.61				MinPts	
712.30	58.13	672.54	654.17	19.30		OSF1.50	9520.00	9471.61				MinPt-O-SF	
667.59	202.73	531.39	484.86	4.99		OSF1.50	15780.00	10000.00	OSF<5.00			Enter Alert	
667.59	342.42	438.26	325.17	2.94		OSF1.50	20203.47	10000.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #43H Rev1 RM 20Jun19 (Def Plan)													
1769.75	32.81	1767.77	1738.94	N/A		MAS = 10.00 (m)	0.00	0.00				Surface	Pass
1769.75	32.81	1767.74	1738.94	65755.08		MAS = 10.00 (m)	26.00	26.00				WRP	
1198.75	69.23	1151.73	1129.52	26.93		OSF1.50	8870.00	8821.61				MinPt-CICt	
1198.78	69.34	1151.69	1129.44	26.88		OSF1.50	8890.00	8841.61				MinPts	
1203.41	69.92	1155.94	1133.49	26.75		OSF1.50	9030.00	8981.61				MinPt-O-SF	
1376.21	345.14	1147.46	1033.08	8.02		OSF1.50	20203.47	10000.00				MinPts	
Final Surveys - Cimarex Vaca Draw 20-17 Federal #4H STD1 MWD 06-22273ft (Surcon Corrected) (Def Survey)													
2968.54	32.81	2967.36	2935.73	N/A		MAS = 10.00 (m)	0.00	0.00				MinPts	Pass
2968.57	32.81	2967.35	2935.76	73746.38		MAS = 10.00 (m)	26.00	26.00				WRP	
2968.62	32.81	2967.34	2935.81	28993.94		MAS = 10.00 (m)	50.00	50.00				MINPT-O-EOU	
2849.53	32.81	2838.71	2816.72	292.73		MAS = 10.00 (m)	2100.00	2099.98				MinPt-O-SF	
1460.20	41.22	1431.74	1418.99	57.12		OSF1.50	9220.00	9171.61				MinPt-CICt	
1460.21	41.25	1431.73	1418.96	57.08		OSF1.50	9230.00	9181.61				MINPT-O-EOU	
1460.24	41.28	1431.74	1418.96	57.03		OSF1.50	9240.00	9191.61				MinPt-O-ADP	
1444.57	43.26	1414.73	1401.31	53.73		OSF1.50	10090.00	9945.24				MinPt-CICt	
1444.57	43.28	1414.72	1401.29	53.70		OSF1.50	10100.00	9949.79				MinPts	
1558.49	47.38	1526.09	1511.11	51.94		OSF1.50	10690.00	10000.00				MinPt-O-SF	
1566.10	47.57	1533.58	1518.53	51.94		OSF1.50	10710.00	10000.00				MinPt-O-SF	
2764.27	76.10	2713.21	2688.18	55.18		OSF1.50	12640.00	10000.00				MINPT-O-EOU	
2765.03	77.01	2713.36	2688.02	54.53		OSF1.50	12680.00	10000.00				MinPt-O-ADP	
2768.07	91.09	2707.01	2676.97	46.06		OSF1.50	13150.00	10000.00				MinPt-CICt	
2769.17	94.34	2705.95	2674.83	44.48		OSF1.50	13280.00	10000.00				MINPT-O-EOU	
2769.32	100.35	2702.09	2668.97	41.79		OSF1.50	13470.00	10000.00				MinPt-CICt	
2770.58	109.72	2697.11	2660.88	38.21		OSF1.50	13790.00	10000.00				MinPt-CICt	
2770.49	119.11	2690.75	2651.38	35.17		OSF1.50	14110.00	10000.00				MinPt-CICt	
2727.13	195.83	2596.18	2631.20	20.88		OSF1.50	16890.00	10000.00				MinPt-CICt	
2727.71	197.80	2595.51	2529.91	20.78		OSF1.50	16770.00	10000.00				MINPT-O-EOU	
2728.46	198.72	2595.66	2529.75	20.69		OSF1.50	16810.00	10000.00				MinPt-O-ADP	
2729.51	199.72	2596.04	2529.80	20.59		OSF1.50	16850.00	10000.00				MinPt-O-ADP	
2734.61	209.89	2594.36	2524.72	19.83		OSF1.50	17160.00	10000.00				MinPt-CICt	

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		
2735.53	212.63	2593.45	2522.90	19.38		OSF1.50	17270.00	10000.00				MINPT-O-EQU	
2737.32	217.15	2592.23	2520.17	18.99		OSF1.50	17420.00	10000.00				MINPT-O-EQU	
2732.37	225.43	2581.76	2506.94	18.25		OSF1.50	17680.00	10000.00				MinPt-CICt	
2734.60	230.90	2580.34	2503.70	17.83		OSF1.50	17880.00	10000.00				MINPT-O-EQU	
2735.84	232.40	2580.58	2503.44	17.73		OSF1.50	17940.00	10000.00				MinPt-O-ADP	
2756.72	247.34	2591.50	2509.38	18.78		OSF1.50	18430.00	10000.00				MINPT-O-EQU	
2757.04	263.04	2581.35	2493.99	15.78		OSF1.50	18930.00	10000.00				MinPt-CICt	
2753.06	274.20	2569.93	2478.86	15.11		OSF1.50	19300.00	10000.00				MinPt-CICt	
2754.92	301.40	2553.65	2453.51	13.75		OSF1.50	20203.47	10000.00				MinPts	

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #4H MWD
Off-12228ft (Surcon Corrected)
(Def Survey)

Pass

2968.54	32.81	2966.56	2935.73	N/A		MAS = 10.00 (m)	0.00	0.00				MinPts	
2968.57	32.81	2966.55	2935.76	73726.42		MAS = 10.00 (m)	28.00	26.00				WRP	
2968.62	32.81	2966.54	2935.81	28986.10		MAS = 10.00 (m)	50.00	50.00				MINPT-O-EQU	
2849.53	32.81	2837.85	2816.72	294.56		MAS = 10.00 (m)	2100.00	2099.98				MinPt-O-SF	
1460.20	42.16	1430.80	1418.05	57.07		OSF1.50	9220.00	9171.61				MinPt-CICt	
1460.21	42.19	1430.79	1418.03	57.03		OSF1.50	9230.00	9181.61				MINPT-O-EQU	
1460.24	42.22	1430.80	1418.02	56.99		OSF1.50	9240.00	9191.61				MinPt-O-ADP	
1444.57	44.19	1413.79	1400.38	53.69		OSF1.50	10090.00	9945.24				MinPt-CICt	
1444.57	44.22	1413.78	1400.36	53.66		OSF1.50	10100.00	9949.79				MinPts	
1558.49	48.30	1525.17	1510.19	51.92		OSF1.50	10690.00	10000.00				MinPt-O-SF	
1566.10	48.49	1532.66	1517.61	51.92		OSF1.50	10710.00	10000.00				MinPt-O-SF	
10200.45	64.55	10156.75	10135.89	244.47		OSF1.50	20203.47	10000.00				TD	

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #3H MWD
Off-22454' (Surcon Corrected)
(Def Survey)

Pass

2988.48	32.81	2987.34	2955.67	848870.71		MAS = 10.00 (m)	0.00	0.00				Surface	
2988.42	32.81	2987.22	2955.61	39974.14		MAS = 10.00 (m)	26.00	26.00				WRP	
2985.98	32.81	2983.68	2953.18	2296.05		MAS = 10.00 (m)	310.00	310.00				MinPts	
2988.02	32.81	2983.61	2953.21	2159.95		MAS = 10.00 (m)	330.00	330.00				MINPT-O-EQU	
2985.20	32.81	2977.71	2952.39	461.91		MAS = 10.00 (m)	1490.00	1490.00				MinPts	
2966.34	32.81	2956.48	2933.53	335.72		MAS = 10.00 (m)	2100.00	2099.98				MinPt-O-SF	
2883.94	32.81	2874.31	2851.13	336.98		MAS = 10.00 (m)	2530.00	2527.29				MinPt-O-SF	
2064.22	33.45	2041.24	2030.77	98.49		OSF1.50	6800.00	6552.65				MinPt-O-SF	
1871.68	37.91	1845.59	1833.77	79.06		OSF1.50	9260.00	9211.61				MinPt-CICt	
1871.74	38.09	1845.53	1833.65	78.68		OSF1.50	9310.00	9261.61				MINPT-O-EQU	
1871.83	38.19	1845.55	1833.63	78.45		OSF1.50	9340.00	9261.61				MinPt-O-ADP	
1862.55	40.32	1834.84	1822.23	73.74		OSF1.50	10090.00	9945.24				MinPts	
1862.57	40.35	1834.84	1822.22	73.68		OSF1.50	10100.00	9949.79				MinPt-O-ADP	
2174.22	50.85	2139.89	2123.38	65.80		OSF1.50	11240.00	10000.00				MinPt-O-SF	
3139.06	79.30	3085.87	3059.76	60.11		OSF1.50	12740.00	10000.00				MinPt-CICt	
3140.14	82.19	3085.02	3057.95	57.98		OSF1.50	12860.00	10000.00				MINPT-O-EQU	
3141.61	83.94	3085.32	3057.67	56.79		OSF1.50	12930.00	10000.00				MinPt-O-ADP	
3147.19	91.88	3085.61	3055.31	51.92		OSF1.50	13180.00	10000.00				MinPt-CICt	
3149.12	97.09	3084.06	3052.03	49.14		OSF1.50	13380.00	10000.00				MINPT-O-EQU	
3151.47	100.93	3083.86	3050.54	47.28		OSF1.50	13510.00	10000.00				MINPT-O-EQU	
3152.91	102.67	3084.14	3050.25	46.50		OSF1.50	13580.00	10000.00				MinPt-O-ADP	
3154.40	106.44	3083.11	3047.98	44.86		OSF1.50	13680.00	10000.00				MinPt-CICt	
3156.51	112.93	3080.90	3043.59	42.28		OSF1.50	13920.00	10000.00				MINPT-O-EQU	
3157.72	114.40	3081.12	3043.32	41.75		OSF1.50	13980.00	10000.00				MinPt-O-ADP	

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		
3162.02	121.69	3080.56	3040.33	39.28		OSF1.50	14220.00	10000.00				MINPT-O-EQU	
3162.38	132.31	3073.84	3030.07	36.11		OSF1.50	14560.00	10000.00				MinPt-CtCt	
3155.68	146.91	3057.42	3008.77	32.43		OSF1.50	15050.00	10000.00				MinPt-CtCt	
3149.81	166.26	3038.65	2983.56	28.58		OSF1.50	15700.00	10000.00				MinPt-CtCt	
3150.60	169.26	3037.43	2981.34	28.08		OSF1.50	15820.00	10000.00				MINPT-O-EQU	
3151.37	170.20	3037.57	2981.17	27.83		OSF1.50	15880.00	10000.00				MinPt-O-ADP	
3146.46	181.27	3025.29	2965.19	26.17		OSF1.50	16200.00	10000.00				MinPt-CtCt	
3147.54	184.51	3024.20	2963.02	25.72		OSF1.50	16330.00	10000.00				MINPT-O-EQU	
3147.57	189.60	3020.84	2957.97	25.02		OSF1.50	16480.00	10000.00				MinPt-CtCt	
3147.65	202.80	3012.12	2944.84	23.39		OSF1.50	16920.00	10000.00				MinPt-CtCt	
3149.59	233.51	2993.59	2918.09	20.31		OSF1.50	17940.00	10000.00				MinPt-CtCt	
3151.32	240.02	2990.98	2911.30	19.77		OSF1.50	18180.00	10000.00				MINPT-O-EQU	
3153.53	242.71	2991.39	2910.82	19.56		OSF1.50	18280.00	10000.00				MinPt-O-ADP	
3159.09	248.24	2993.26	2910.84	19.16		OSF1.50	18460.00	10000.00				MINPT-O-EQU	
3160.32	249.59	2993.60	2910.74	19.06		OSF1.50	18510.00	10000.00				MinPt-O-ADP	
3149.17	264.16	2972.74	2885.02	17.94		OSF1.50	18960.00	10000.00				MinPt-CtCt	
3148.96	275.30	2965.09	2873.65	17.21		OSF1.50	19330.00	10000.00				MinPt-CtCt	
3147.68	285.21	2957.21	2862.47	16.61		OSF1.50	19660.00	10000.00				MinPt-CtCt	
3149.46	289.93	2955.84	2859.52	16.34		OSF1.50	19840.00	10000.00				MINPT-O-EQU	
3152.30	297.18	2953.85	2855.11	15.96		OSF1.50	20080.00	10000.00				MINPT-O-EQU	
3155.05	300.84	2954.16	2854.21	15.78		OSF1.50	20203.47	10000.00				MinPts	

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #2H MWD
0ft-22179ft (Surcon Corrected)
(Def Survey)

													Poss
3008.51	32.81	3007.49	2975.70	N/A		MAS = 10.00 (m)	0.00	0.00					Surface
3008.50	32.81	3007.42	2975.89	55316.92		MAS = 10.00 (m)	26.00	26.00					WRP
3007.46	32.81	3003.23	2974.65	937.07		MAS = 10.00 (m)	770.00	770.00					MinPts
3008.00	32.81	3001.83	2975.20	583.86		MAS = 10.00 (m)	1220.00	1220.00					MinPts
3007.48	32.81	2997.11	2974.65	322.44		MAS = 10.00 (m)	2100.00	2099.98					MinPt-O-SF
2898.41	32.81	2887.42	2885.80	282.95		MAS = 10.00 (m)	2920.00	2913.01					MinPt-O-SF
2358.37	33.25	2335.62	2325.12	112.23		OSF1.50	6600.00	6552.65					MinPt-O-SF
2325.52	32.81	2303.20	2282.71	113.32		MAS = 10.00 (m)	7380.00	7331.61					MinPt-O-SF
2324.16	32.81	2301.88	2291.37	113.33		MAS = 10.00 (m)	7460.00	7411.61					MinPt-O-SF
2266.75	38.20	2240.64	2228.55	93.73		OSF1.50	10110.00	9954.16					MinPt-CtCt
2266.78	38.24	2240.64	2228.54	93.61		OSF1.50	10120.00	9958.34					MinPts
2778.19	55.60	2740.78	2722.59	76.32		OSF1.50	11720.00	10000.00					MinPt-O-SF
3253.00	70.71	3205.54	3182.30	69.96		OSF1.50	12450.00	10000.00					MINPT-O-EQU
3253.41	71.16	3205.64	3182.25	69.52		OSF1.50	12470.00	10000.00					MinPt-O-ADP
3264.30	77.89	3212.05	3186.42	63.65		OSF1.50	12730.00	10000.00					MinPt-O-ADP
3256.94	89.82	3196.87	3167.32	55.10		OSF1.50	13100.00	10000.00					MinPt-CtCt
3257.34	90.93	3196.40	3166.42	54.31		OSF1.50	13160.00	10000.00					MINPT-O-EQU
3267.86	91.57	3196.48	3168.28	53.93		OSF1.50	13190.00	10000.00					MinPt-O-ADP
3260.93	100.03	3193.92	3160.90	49.37		OSF1.50	13460.00	10000.00					MinPt-CtCt
3261.82	102.72	3193.01	3159.09	48.08		OSF1.50	13570.00	10000.00					MINPT-O-EQU
3264.04	105.30	3193.51	3158.74	46.92		OSF1.50	13670.00	10000.00					MinPt-O-ADP
3267.25	109.08	3194.20	3158.17	45.32		OSF1.50	13790.00	10000.00					MINPT-O-EQU
3271.95	117.89	3193.03	3154.06	41.97		OSF1.50	14070.00	10000.00					MinPt-CtCt
3273.22	125.00	3189.56	3148.22	39.58		OSF1.50	14330.00	10000.00					MINPT-O-EQU
3268.74	144.49	3172.09	3124.25	34.16		OSF1.50	14970.00	10000.00					MinPt-CtCt
3269.58	147.20	3171.12	3122.38	33.53		OSF1.50	15080.00	10000.00					MINPT-O-EQU
3270.81	148.67	3171.37	3122.14	33.21		OSF1.50	15140.00	10000.00					MinPt-O-ADP
3271.58	167.38	3159.66	3104.20	29.48		OSF1.50	15740.00	10000.00					MinPt-CtCt
3272.32	169.52	3158.98	3102.81	29.12		OSF1.50	15830.00	10000.00					MINPT-O-EQU

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		
3273.13	170.45	3159.16	3102.67	28.96		OSF1.50	15870.00	10000.00				MinPt-O-ADP	
3275.77	174.01	3159.44	3101.77	28.39		OSF1.50	15980.00	10000.00				MINPT-O-EQU	
3276.81	175.24	3159.65	3101.57	28.20		OSF1.50	16030.00	10000.00				MinPt-O-ADP	
3280.71	180.03	3160.36	3100.68	27.48		OSF1.50	16180.00	10000.00				MINPT-O-EQU	
3281.72	181.26	3160.56	3100.47	27.30		OSF1.50	16230.00	10000.00				MinPt-O-ADP	
3279.04	194.37	3149.13	3084.67	25.43		OSF1.50	16640.00	10000.00				MinPt-CiCi	
3279.40	195.67	3148.62	3083.72	25.26		OSF1.50	16700.00	10000.00				MINPT-O-EQU	
3279.90	196.31	3148.69	3083.58	25.18		OSF1.50	16730.00	10000.00				MinPt-O-ADP	
3284.30	201.11	3149.90	3083.19	24.81		OSF1.50	16900.00	10000.00				MinPt-O-ADP	
3284.14	219.56	3137.44	3084.58	22.53		OSF1.50	17480.00	10000.00				MinPt-CiCi	
3285.19	222.54	3138.51	3082.65	22.24		OSF1.50	17600.00	10000.00				MINPT-O-EQU	
3286.67	224.33	3138.76	3082.33	22.07		OSF1.50	17670.00	10000.00				MinPt-O-ADP	
3293.23	234.28	3136.72	3058.95	21.17		OSF1.50	17970.00	10000.00				MinPt-CiCi	
3289.67	242.68	3127.55	3046.99	20.41		OSF1.50	18250.00	10000.00				MinPt-CiCi	
3271.72	264.98	3094.74	3006.74	18.58		OSF1.50	18990.00	10000.00				MinPt-CiCi	
3272.19	266.56	3094.16	3005.63	18.48		OSF1.50	19060.00	10000.00				MINPT-O-EQU	
3272.93	267.43	3094.31	3005.49	18.42		OSF1.50	19100.00	10000.00				MinPt-O-ADP	
3252.05	289.11	3058.98	2962.94	16.93		OSF1.50	19790.00	10000.00				MinPt-CiCi	
3253.88	293.55	3057.85	2960.33	16.68		OSF1.50	19960.00	10000.00				MINPT-O-EQU	
3245.23	302.02	3043.56	2943.21	16.17		OSF1.50	20203.47	10000.00				MinPts	

Cimarex Vaca Draw 20-17
Federal #31H Rev0 RM
19Sept18 (Non-Def Plan)

3628.15	32.81	3628.17	3595.34	N/A	MAS = 10.00 (m)	0.00	0.00					Pass
3628.15	32.81	3628.12	3595.34	65544.74	MAS = 10.00 (m)	26.00	26.00					Surface
3611.20	32.81	3596.69	3578.39	288.07	MAS = 10.00 (m)	2100.00	2099.98					WRP
2695.42	58.41	2655.47	2637.01	72.91	OSF1.50	9480.00	9431.61					MinPt-O-SF
2695.49	58.63	2655.40	2636.86	72.62	OSF1.50	9520.00	9471.61					MinPt-CiCi
2695.54	58.68	2655.41	2636.85	72.55	OSF1.50	9530.00	9481.61					MINPT-O-EQU
2686.95	344.69	2458.14	2342.26	11.78	OSF1.50	20203.47	10000.00					MinPt-O-ADP
												MinPts

Cimarex Vaca Draw 20-17
Federal #30H Rev0 RM
19Sept18 (Non-Def Plan)

3648.13	32.81	3648.15	3615.32	N/A	MAS = 10.00 (m)	0.00	0.00					Pass
3648.13	32.81	3648.10	3615.32	64863.93	MAS = 10.00 (m)	26.00	26.00					Surface
3049.56	73.69	2999.54	2975.87	64.38	OSF1.50	9470.00	9421.61					WRP
3049.57	73.80	2999.48	2975.77	64.26	OSF1.50	9490.00	9441.61					MinPt-CiCi
3049.61	73.84	2999.48	2975.77	64.22	OSF1.50	9500.00	9451.61					MINPT-O-EQU
3101.73	350.66	2887.10	2751.07	13.36	OSF1.50	20203.47	10000.00					MinPt-O-ADP
												MinPts

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #8H MWD
08-22328H (Surcon Corrected)
(Def Survey)

4208.69	32.81	4207.56	4175.88	N/A	MAS = 10.00 (m)	0.00	0.00					Pass
4208.70	32.81	4207.52	4175.90	79573.58	MAS = 10.00 (m)	26.00	26.00					MinPts
4209.23	32.81	4207.01	4176.42	3860.99	MAS = 10.00 (m)	290.00	290.00					WRP
4210.12	32.81	4206.47	4177.31	1667.63	MAS = 10.00 (m)	590.00	590.00					MinPts
4204.87	32.81	4196.99	4172.06	623.10	MAS = 10.00 (m)	1540.00	1540.00					MINPT-O-EQU
4205.01	32.81	4196.84	4172.20	598.91	MAS = 10.00 (m)	1600.00	1600.00					MinPts
4207.30	32.81	4198.18	4174.48	526.59	MAS = 10.00 (m)	1790.00	1790.00					MINPT-O-EQU
4176.01	32.81	4165.93	4143.20	487.05	MAS = 10.00 (m)	2100.00	2099.98					MinPt-O-SF
4099.03	32.81	4089.14	4066.22	471.09	MAS = 10.00 (m)	2540.00	2537.18					MinPt-O-SF
4085.05	32.81	4075.19	4052.24	471.48	MAS = 10.00 (m)	2610.00	2606.41					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		
3820.09	32.81	3807.82	3787.28	352.18		MAS = 10.00 (m)	3980.00	3941.68				MinPt-O-SF	
3285.98	33.57	3262.88	3252.41	156.84		OSF1.50	6600.00	6552.65				MinPt-O-SF	
3108.41	36.93	3082.94	3071.48	135.52		OSF1.50	9110.00	9061.61				MinPt-CtCt	
3108.48	37.16	3082.88	3071.33	134.63		OSF1.50	9180.00	9131.61				MINPT-O-EQU	
3108.56	37.26	3082.88	3071.31	134.24		OSF1.50	9210.00	9161.61				MinPt-O-ADP	
3106.00	39.52	3078.80	3068.47	125.94		OSF1.50	10070.92	9938.03				MinPt-CtCt	
3108.01	39.54	3078.79	3066.46	125.87		OSF1.50	10080.00	9940.49				MinPts	
3878.38	80.64	3824.29	3797.74	73.02		OSF1.50	12680.00	10000.00				MinPt-CtCt	
3878.18	87.39	3820.60	3791.80	67.33		OSF1.50	12920.00	10000.00				MinPt-CtCt	
3880.39	96.48	3815.74	3783.91	60.94		OSF1.50	13240.00	10000.00				MinPt-CtCt	
3879.85	108.01	3808.95	3773.95	55.40		OSF1.50	13570.00	10000.00				MinPt-CtCt	
3880.76	108.28	3808.25	3772.48	54.24		OSF1.50	13670.00	10000.00				MINPT-O-EQU	
3881.48	112.72	3806.00	3768.78	52.09		OSF1.50	13800.00	10000.00				MinPt-CtCt	
3875.51	129.44	3788.89	3748.08	45.25		OSF1.50	14370.00	10000.00				MinPt-CtCt	
3874.78	134.11	3785.04	3740.67	43.65		OSF1.50	14530.00	10000.00				MinPt-CtCt	
3874.78	140.28	3780.93	3734.49	41.71		OSF1.50	14740.00	10000.00				MinPt-CtCt	
3874.15	145.31	3776.95	3728.84	40.25		OSF1.50	14910.00	10000.00				MinPt-CtCt	
3874.75	147.07	3776.38	3727.69	39.78		OSF1.50	14990.00	10000.00				MINPT-O-EQU	
3875.48	147.94	3776.52	3727.54	39.55		OSF1.50	15030.00	10000.00				MinPt-O-ADP	
3878.31	151.25	3777.15	3727.06	38.70		OSF1.50	15140.00	10000.00				MINPT-O-EQU	
3877.27	160.56	3769.90	3716.71	36.44		OSF1.50	15420.00	10000.00				MinPt-CtCt	
3878.07	162.83	3769.19	3715.24	35.93		OSF1.50	15520.00	10000.00				MINPT-O-EQU	
3878.83	163.74	3769.34	3715.09	35.74		OSF1.50	15560.00	10000.00				MinPt-O-ADP	
3902.57	190.56	3775.20	3712.01	30.87		OSF1.50	16430.00	10000.00				MinPt-CtCt	
3903.39	193.46	3774.09	3709.93	30.41		OSF1.50	16550.00	10000.00				MINPT-O-EQU	
3904.14	194.38	3774.24	3709.78	30.28		OSF1.50	16590.00	10000.00				MinPt-O-ADP	
3888.82	213.35	3746.28	3675.47	27.46		OSF1.50	17190.00	10000.00				MinPt-CtCt	
3887.72	218.16	3741.95	3669.58	26.84		OSF1.50	17350.00	10000.00				MinPt-CtCt	
3888.31	219.91	3741.37	3668.39	26.63		OSF1.50	17430.00	10000.00				MINPT-O-EQU	
3889.03	220.78	3741.52	3668.25	26.53		OSF1.50	17470.00	10000.00				MinPt-O-ADP	
3892.59	224.50	3742.60	3668.09	26.12		OSF1.50	17600.00	10000.00				MinPt-O-ADP	
3887.16	289.22	3674.01	3577.94	20.12		OSF1.50	19710.00	10000.00				MinPt-CtCt	
3887.88	291.27	3673.35	3576.59	19.98		OSF1.50	19800.00	10000.00				MINPT-O-EQU	
3872.24	299.89	3671.99	3572.35	19.43		OSF1.50	20060.00	10000.00				MinPt-CtCt	
3873.23	303.51	3670.56	3569.72	19.20		OSF1.50	20203.47	10000.00				MinPts	

Cimarex Vaca Draw 20-17
Federal #25H Rev0 RM
18Sept18 (Non-Def Plan)

3668.15	32.81	3666.17	3635.34	N/A	MAS = 10.00 (m)	0.00	0.00					Pass
3668.15	32.81	3666.12	3635.34	66267.76	MAS = 10.00 (m)	26.00	26.00					Surface
3668.15	32.81	3654.11	3635.34	303.93	MAS = 10.00 (m)	1970.00	1970.00					WRP
3668.20	32.81	3654.03	3635.39	300.76	MAS = 10.00 (m)	2000.00	2000.00					MinPts
3667.76	32.81	3653.43	3634.95	296.86	MAS = 10.00 (m)	2100.00	2099.98					MINPT-O-EQU
3520.43	46.67	3488.61	3473.76	118.47	OSF1.50	6640.00	6592.35					MinPt-O-SF
3520.44	46.69	3488.60	3473.75	118.42	OSF1.50	6650.00	6602.29					MinPt-CtCt
3526.44	47.00	3494.40	3479.44	117.77	OSF1.50	6840.00	6791.66					MinPts
3524.33	56.47	3485.97	3467.86	97.26	OSF1.50	9480.00	9431.61					MinPt-O-SF
3524.38	56.87	3485.89	3467.71	96.90	OSF1.50	9520.00	9471.61					MinPt-CtCt
3524.46	56.77	3485.90	3467.69	96.72	OSF1.50	9540.00	9491.61					MINPT-O-EQU
3517.52	343.13	3288.04	3174.39	15.46	OSF1.50	20203.47	10000.00					MinPt-O-ADP
												MinPts

Final Surveys - Cimarex Vaca
Draw 20-17 Federal #71H MWD
08-225448 (Surcon Corrected)
(Def Survey)

Pass

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		
4228.70	32.81	4227.52	4195.89	N/A	MAS = 10.00 (m)	0.00	0.00					MinPts	
4228.75	32.81	4227.53	4195.94	101522.90	MAS = 10.00 (m)	26.00	26.00					WRP	
4237.02	32.81	4228.77	4204.21	460.38	MAS = 10.00 (m)	2130.00	2129.98					MinPt-O-SF	
3822.11	32.81	3806.64	3789.30	272.28	MAS = 10.00 (m)	5020.00	4989.94					MinPt-O-SF	
3561.31	32.81	3538.91	3528.50	173.06	MAS = 10.00 (m)	6600.00	6552.65					MinPt-O-SF	
3525.16	32.81	3503.30	3492.35	178.49	MAS = 10.00 (m)	7780.00	7731.61					MinPts	
3525.17	32.81	3503.29	3492.38	178.41	MAS = 10.00 (m)	7790.00	7741.61					MINPT-O-EOU	
3526.40	32.81	3504.16	3493.59	173.28	MAS = 10.00 (m)	8140.00	8091.61					MINPT-O-EOU	
3546.11	37.38	3520.57	3508.73	149.66	OSF1.50	10000.00	9896.15					MinPt-CtCt	
3546.11	37.41	3520.56	3508.71	149.55	OSF1.50	10010.00	9902.29					MINPT-O-EOU	
3546.13	37.43	3520.56	3508.70	149.44	OSF1.50	10020.00	9908.27					MinPt-CtCt	
4303.28	73.77	4253.77	4229.50	88.66	OSF1.50	12480.00	10000.00					MinPts	
4316.65	83.79	4260.46	4232.86	78.18	OSF1.50	12820.00	10000.00					MinPts	
4325.69	89.57	4265.65	4236.12	73.23	OSF1.50	13030.00	10000.00					MINPT-O-EOU	
4309.31	112.96	4233.68	4196.36	57.72	OSF1.50	13790.00	10000.00					MinPt-CtCt	
4309.82	114.42	4233.21	4195.40	56.98	OSF1.50	13860.00	10000.00					MINPT-O-EOU	
4310.34	117.69	4231.55	4192.65	55.39	OSF1.50	13950.00	10000.00					MinPt-CtCt	
4309.88	125.99	4225.56	4183.89	51.71	OSF1.50	14230.00	10000.00					MinPt-CtCt	
4310.57	127.84	4224.95	4182.63	50.92	OSF1.50	14320.00	10000.00					MINPT-O-EOU	
4311.11	130.73	4223.63	4180.38	49.83	OSF1.50	14390.00	10000.00					MinPt-CtCt	
4311.61	132.16	4223.18	4179.45	49.29	OSF1.50	14460.00	10000.00					MINPT-O-EOU	
4312.11	132.77	4223.27	4179.34	49.07	OSF1.50	14490.00	10000.00					MinPt-O-ADP	
4331.28	195.26	4200.78	4136.02	33.43	OSF1.50	16560.00	10000.00					MinPt-CtCt	
4336.57	209.48	4196.59	4127.09	31.19	OSF1.50	17060.00	10000.00					MINPT-O-EOU	
4339.44	212.91	4197.18	4126.53	30.71	OSF1.50	17190.00	10000.00					MinPt-O-ADP	
4331.33	233.43	4175.38	4097.80	27.94	OSF1.50	17830.00	10000.00					MinPt-CtCt	
4333.62	250.88	4166.04	4082.74	26.01	OSF1.50	18410.00	10000.00					MinPt-CtCt	
4334.65	254.01	4164.99	4080.64	25.69	OSF1.50	18540.00	10000.00					MINPT-O-EOU	
4335.84	255.43	4165.23	4080.41	25.55	OSF1.50	18600.00	10000.00					MinPt-O-ADP	
4336.53	269.26	4156.69	4067.27	24.24	OSF1.50	19020.00	10000.00					MinPt-CtCt	
4330.17	281.92	4141.90	4048.25	23.12	OSF1.50	19440.00	10000.00					MinPt-CtCt	
4329.20	288.00	4136.88	4041.20	22.62	OSF1.50	19840.00	10000.00					MinPt-CtCt	
4330.00	290.54	4135.98	4039.47	22.43	OSF1.50	19750.00	10000.00					MINPT-O-EOU	
4330.94	291.67	4136.17	4039.27	22.34	OSF1.50	19800.00	10000.00					MinPt-O-ADP	
4335.90	301.57	4134.52	4034.33	21.63	OSF1.50	20090.00	10000.00					MinPt-CtCt	
4335.18	305.47	4131.21	4029.71	21.35	OSF1.50	20203.47	10000.00					MinPts	

Cimarex Vaca Draw 20-17
Federal #8H MWD
Final(Surcon Corrected) (Def
Survey)

Pass

4286.31	32.81	4286.31	4255.50	183170.69	MAS = 10.00 (m)	0.00	0.00					Surface	
4288.24	32.81	4286.17	4255.44	43017.08	MAS = 10.00 (m)	26.00	26.00					WRP	
4284.98	32.81	4280.07	4252.17	1459.34	MAS = 10.00 (m)	690.00	690.00					MinPts	
4285.62	32.81	4279.76	4252.61	1106.26	MAS = 10.00 (m)	910.00	910.00					MINPT-O-EOU	
4287.89	32.81	4280.34	4255.18	756.00	MAS = 10.00 (m)	1310.00	1310.00					MINPT-O-EOU	
4280.93	32.81	4270.00	4248.13	477.70	MAS = 10.00 (m)	2100.00	2099.98					MinPt-O-SF	
4259.82	32.81	4248.75	4227.01	468.75	MAS = 10.00 (m)	2320.00	2319.33					MinPt-O-SF	
3743.22	33.35	3720.13	3709.87	182.35	OSF1.50	6600.00	6552.65					MinPt-O-SF	
3728.24	32.81	3706.22	3695.43	191.86	MAS = 10.00 (m)	6970.00	6921.61					MINPT-O-EOU	
3728.09	32.81	3706.05	3695.28	191.61	MAS = 10.00 (m)	7080.00	7031.61					MinPt-O-SF	
3728.06	32.81	3706.01	3695.25	191.64	MAS = 10.00 (m)	7150.00	7101.61					MinPts	
4008.31	49.93	3974.37	3958.39	125.33	OSF1.50	10930.00	10000.00					MinPts	
4019.81	55.07	3982.54	3964.84	113.53	OSF1.50	11190.00	10000.00					MinPt-O-ADP	
4021.07	59.74	3980.59	3961.34	104.37	OSF1.50	11340.00	10000.00					MinPt-CtCt	
3989.75	73.06	3950.38	3926.69	84.36	OSF1.50	11880.00	10000.00					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		
4000.28	74.68	3949.83	3925.60	82.49		OSF1.50	11960.00	10000.00				MINPT-O-EOU	
4000.97	75.49	3949.98	3925.48	81.60		OSF1.50	12000.00	10000.00				MinPt-O-ADP	
3980.25	103.89	3910.33	3878.36	58.55		OSF1.50	13010.00	10000.00				MinPt-CiCi	
3980.73	105.38	3909.82	3875.36	57.72		OSF1.50	13080.00	10000.00				MINPT-O-EOU	
3981.45	106.22	3909.98	3875.23	57.26		OSF1.50	13120.00	10000.00				MinPt-O-ADP	
4005.50	129.12	3918.78	3878.38	47.23		OSF1.50	13890.00	10000.00				MinPt-CiCi	
4006.38	149.62	3905.98	3856.76	40.68		OSF1.50	14590.00	10000.00				MinPt-CiCi	
4007.26	152.24	3905.10	3855.02	39.88		OSF1.50	14700.00	10000.00				MINPT-O-EOU	
4008.25	153.42	3905.30	3854.82	39.68		OSF1.50	14750.00	10000.00				MinPt-O-ADP	
4011.17	163.37	3901.60	3847.80	37.26		OSF1.50	15060.00	10000.00				MinPt-CiCi	
4005.17	203.48	3868.86	3801.69	29.80		OSF1.50	16410.00	10000.00				MinPt-CiCi	
3998.05	236.64	3839.63	3761.41	25.54		OSF1.50	17520.00	10000.00				MinPt-CiCi	
3999.23	240.16	3838.46	3759.07	25.17		OSF1.50	17660.00	10000.00				MINPT-O-EOU	
4007.15	252.69	3838.02	3754.45	23.98		OSF1.50	18080.00	10000.00				MINPT-O-EOU	
4010.70	257.75	3838.21	3752.96	23.51		OSF1.50	18250.00	10000.00				MINPT-O-EOU	
3998.15	310.41	3790.55	3687.74	19.43		OSF1.50	19970.00	10000.00				MinPt-CiCi	
3998.54	311.61	3790.15	3686.84	19.36		OSF1.50	20030.00	10000.00				MINPT-O-EOU	
3998.87	311.99	3790.22	3686.89	19.34		OSF1.50	20050.00	10000.00				MinPt-O-ADP	
4004.73	314.68	3784.28	3690.05	19.20		OSF1.50	20203.47	10000.00				MinPt-O-SF	

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

Pass

4308.32	32.81	4306.33	4275.52	298030.49	MAS = 10.00 (m)	0.00	0.00	Surface
4308.28	32.81	4306.22	4275.48	52380.48	MAS = 10.00 (m)	26.00	26.00	WRP
4306.35	32.81	4302.22	4273.54	1999.65	MAS = 10.00 (m)	530.00	530.00	MinPts
4306.45	32.81	4301.48	4273.64	1441.97	MAS = 10.00 (m)	730.00	730.00	MinPts
4306.72	32.81	4301.09	4273.91	1178.55	MAS = 10.00 (m)	870.00	870.00	MINPT-O-EOU
4308.47	32.81	4299.38	4275.67	604.95	MAS = 10.00 (m)	1640.00	1640.00	MinPts
4308.60	32.81	4299.24	4275.79	583.88	MAS = 10.00 (m)	1700.00	1700.00	MINPT-O-EOU
4315.54	32.81	4304.81	4282.73	493.08	MAS = 10.00 (m)	2100.00	2099.98	MinPt-O-SF
3836.56	33.20	3813.58	3803.36	187.53	OSF1.50	6600.00	6552.65	MinPt-O-SF
3823.17	32.81	3800.99	3790.36	194.72	MAS = 10.00 (m)	6880.00	6831.63	MinPts
3833.43	32.81	3811.20	3800.62	194.47	MAS = 10.00 (m)	7630.00	7581.61	MinPt-O-SF
3829.37	33.40	3808.28	3795.97	186.01	OSF1.50	8390.00	8341.61	MinPt-CiCi
3829.39	33.44	3806.25	3795.95	185.77	OSF1.50	8410.00	8361.61	MINPT-O-EOU
3829.55	33.79	3806.18	3795.76	183.70	OSF1.50	8560.00	8511.61	MINPT-O-EOU
3829.62	33.87	3806.16	3795.75	183.23	OSF1.50	8590.00	8541.61	MinPt-O-ADP
3928.28	60.44	3887.22	3867.84	101.28	OSF1.50	11480.00	10000.00	MinPt-CiCi
3928.72	61.77	3886.77	3866.95	99.03	OSF1.50	11550.00	10000.00	MINPT-O-EOU
3928.35	62.54	3886.89	3866.81	97.78	OSF1.50	11580.00	10000.00	MinPt-O-ADP
3928.28	82.03	3872.82	3846.24	73.88	OSF1.50	12320.00	10000.00	MinPt-CiCi
3928.24	85.27	3871.63	3843.97	70.99	OSF1.50	12480.00	10000.00	MINPT-O-EOU
3930.20	80.37	3871.85	3843.83	70.08	OSF1.50	12510.00	10000.00	MinPt-O-ADP
3928.92	107.83	3854.27	3819.09	55.79	OSF1.50	13250.00	10000.00	MinPt-CiCi
3927.67	110.17	3853.46	3817.51	54.59	OSF1.50	13350.00	10000.00	MINPT-O-EOU
3928.62	111.33	3853.63	3817.29	54.02	OSF1.50	13400.00	10000.00	MinPt-O-ADP
3925.94	152.50	3823.51	3773.44	39.19	OSF1.50	14780.00	10000.00	MinPt-CiCi
3927.38	158.69	3820.81	3768.68	37.65	OSF1.50	14990.00	10000.00	MinPt-CiCi
3919.29	196.77	3787.34	3722.52	30.21	OSF1.50	16270.00	10000.00	MinPt-CiCi
3924.41	212.01	3782.31	3712.40	28.05	OSF1.50	16800.00	10000.00	MINPT-O-EOU
3929.38	220.65	3781.52	3708.73	26.98	OSF1.50	17090.00	10000.00	MINPT-O-EOU
3932.11	225.76	3780.84	3706.35	26.38	OSF1.50	17260.00	10000.00	MINPT-O-EOU
3933.11	229.13	3779.59	3703.97	25.99	OSF1.50	17350.00	10000.00	MinPt-CiCi
3934.21	232.40	3778.51	3701.81	25.63	OSF1.50	17480.00	10000.00	MINPT-O-EOU

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		
3934.75	233.21	3778.51	3701.54	25.54		OSF1.50	17510.00	10000.00				MINPT-O-EQU	
3923.96	274.87	3739.95	3849.09	21.58		OSF1.50	18870.00	10000.00				MinPt-CtCt	
3927.04	281.89	3738.35	3845.15	21.06		OSF1.50	19130.00	10000.00				MINPT-O-EQU	
3935.13	292.39	3739.44	3842.74	20.34		OSF1.50	19480.00	10000.00				MINPT-O-EQU	
3935.57	292.85	3739.57	3842.72	20.30		OSF1.50	19500.00	10000.00				MinPt-O-ADP	
3927.30	308.06	3721.18	3819.24	19.26		OSF1.50	19970.00	10000.00				MinPt-CtCt	
3927.58	309.07	3720.78	3818.51	19.19		OSF1.50	20020.00	10000.00				MINPT-O-EQU	
3928.05	309.65	3720.85	3818.40	19.16		OSF1.50	20050.00	10000.00				MinPt-O-ADP	
3934.05	312.38	3725.04	3821.88	19.02		OSF1.50	20203.47	10000.00				MinPt-O-SF	

Cimarex Vaca Draw 20-17
Federal #1H Surcon 08-12740
(Def Survey)

4328.28	32.81	4326.26	4295.47	108220.39	MAS = 10.00 (m)	0.00	0.00					Pass	
4328.15	32.81	4326.05	4295.35	33733.87	MAS = 10.00 (m)	26.00	26.00					Surface	
4328.29	32.81	4323.13	4293.49	3653.43	MAS = 10.00 (m)	290.00	290.00					WRP	
4326.75	32.81	4322.75	4293.94	2135.01	MAS = 10.00 (m)	450.00	450.00					MinPts	
4357.14	32.81	4346.29	4324.33	490.83	MAS = 10.00 (m)	2100.00	2099.98					MINPT-O-EQU	
3951.76	33.60	3928.56	3918.17	190.02	OSF1.50	6800.00	6552.65					MinPt-O-SF	
3943.47	32.81	3920.86	3910.66	195.34	MAS = 10.00 (m)	6830.00	6781.67					MinPts	
3978.90	34.42	3955.16	3944.48	186.09	OSF1.50	8340.00	8291.61					MinPt-O-ADP	
3984.20	37.38	3958.49	3946.82	170.56	OSF1.50	9570.00	9521.61					MinPt-CtCt	
3970.58	39.04	3943.76	3931.55	162.40	OSF1.50	10140.00	9966.13					MinPt-CtCt	
3970.59	39.08	3943.75	3931.51	162.22	OSF1.50	10150.00	9969.73					MINPT-O-EQU	
3970.63	39.12	3943.75	3931.51	162.04	OSF1.50	10160.00	9973.14					MinPt-O-ADP	
5225.97	82.25	5170.48	5143.72	97.62	OSF1.50	13520.00	10000.00					MinPt-O-SF	
10834.71	108.39	10761.79	10728.32	152.70	OSF1.50	20203.47	10000.00					TD	

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

4328.28	32.81	4326.26	4295.47	108220.39	MAS = 10.00 (m)	0.00	0.00					Pass	
4328.15	32.81	4326.05	4295.35	33733.87	MAS = 10.00 (m)	26.00	26.00					Surface	
4328.29	32.81	4323.13	4293.49	3653.43	MAS = 10.00 (m)	290.00	290.00					WRP	
4326.75	32.81	4322.75	4293.94	2135.01	MAS = 10.00 (m)	450.00	450.00					MinPts	
4357.14	32.81	4346.29	4324.33	490.83	MAS = 10.00 (m)	2100.00	2099.98					MINPT-O-EQU	
3951.76	33.60	3928.56	3918.17	190.02	OSF1.50	6800.00	6552.65					MinPt-O-SF	
3943.47	32.81	3920.86	3910.66	195.34	MAS = 10.00 (m)	6830.00	6781.67					MinPts	
3978.90	34.42	3955.16	3944.48	186.09	OSF1.50	8340.00	8291.61					MinPt-O-ADP	
3984.20	37.38	3958.49	3946.82	170.56	OSF1.50	9570.00	9521.61					MinPt-CtCt	
3970.58	39.04	3943.76	3931.55	162.40	OSF1.50	10140.00	9966.13					MinPt-CtCt	
3970.59	39.08	3943.75	3931.51	162.22	OSF1.50	10150.00	9969.73					MINPT-O-EQU	
3970.63	39.12	3943.75	3931.51	162.04	OSF1.50	10160.00	9973.14					MinPt-O-ADP	
4587.45	79.28	4533.93	4508.16	88.88	OSF1.50	12550.00	10000.00					MinPt-CtCt	
4589.01	84.84	4531.79	4504.17	83.04	OSF1.50	12770.00	10000.00					MINPT-O-EQU	
4589.88	85.91	4531.95	4503.97	81.89	OSF1.50	12820.00	10000.00					MinPt-O-ADP	
4574.08	122.51	4491.75	4451.57	56.90	OSF1.50	14070.00	10000.00					MinPt-CtCt	
4574.85	125.03	4490.84	4449.82	55.75	OSF1.50	14180.00	10000.00					MINPT-O-EQU	
4579.58	133.78	4489.74	4445.80	52.10	OSF1.50	14480.00	10000.00					MINPT-O-EQU	
4582.62	137.46	4490.32	4445.16	50.71	OSF1.50	14820.00	10000.00					MinPt-O-ADP	
4598.45	153.81	4495.28	4444.65	45.41	OSF1.50	15130.00	10000.00					MinPt-CtCt	
4600.74	162.00	4492.08	4438.74	43.11	OSF1.50	15430.00	10000.00					MINPT-O-EQU	
4602.61	164.27	4492.44	4438.35	42.52	OSF1.50	15520.00	10000.00					MinPt-O-ADP	
4580.66	194.66	4450.23	4386.00	35.64	OSF1.50	16500.00	10000.00					MinPt-CtCt	
4581.27	198.64	4449.52	4384.63	35.29	OSF1.50	16590.00	10000.00					MINPT-O-EQU	
4581.98	197.51	4449.64	4384.47	35.14	OSF1.50	16630.00	10000.00					MinPt-O-ADP	

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		
	4614.43	216.92	4469.15	4397.51	32.19	OSF1.50	17240.00	10000.00				MinPt-CICl	
	4614.82	218.11	4468.75	4396.71	32.01	OSF1.50	17300.00	10000.00				MINPT-O-EOU	
	4615.30	218.69	4468.85	4396.61	31.83	OSF1.50	17330.00	10000.00				MinPt-O-ADP	
	4723.61	232.43	4568.00	4491.18	30.73	OSF1.50	18250.00	10000.00				MinPt-O-SF	
	5483.93	237.29	5325.08	5246.64	34.94	OSF1.50	20203.47	10000.00				TD	

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

4328.28	32.81	4326.26	4295.47	108220.40	MAS = 10.00 (m)	0.00	0.00	Pass
4328.15	32.81	4326.05	4295.35	33733.88	MAS = 10.00 (m)	26.00	26.00	Surface
4328.29	32.81	4323.13	4293.49	3653.43	MAS = 10.00 (m)	290.00	290.00	WRP
4326.75	32.81	4322.75	4293.94	2135.01	MAS = 10.00 (m)	450.00	450.00	MinPts
4357.14	32.81	4346.29	4324.33	490.83	MAS = 10.00 (m)	2100.00	2099.98	MINPT-O-EOU
3851.76	33.60	3928.56	3918.17	190.02	OSF1.50	6800.00	6552.65	MinPt-O-SF
3943.47	32.81	3920.88	3910.66	195.34	MAS = 10.00 (m)	6830.00	6781.67	MinPt-O-SF
3978.90	34.42	3955.16	3944.48	188.09	OSF1.50	8340.00	8281.61	MinPts
3984.20	37.38	3958.49	3948.82	170.58	OSF1.50	9570.00	9521.61	MinPt-O-ADP
3970.58	39.04	3943.76	3931.55	162.40	OSF1.50	10140.00	9968.13	MinPt-CICl
3970.59	39.08	3943.75	3931.51	162.22	OSF1.50	10150.00	9969.73	MINPT-O-EOU
3970.63	39.12	3943.75	3931.51	162.04	OSF1.50	10160.00	9973.14	MinPt-O-ADP
4584.58	314.59	4374.17	4269.87	21.99	OSF1.50	19970.00	10000.00	MinPt-CICl
4584.91	315.70	4373.78	4269.20	21.91	OSF1.50	20030.00	10000.00	MINPT-O-EOU
4585.37	316.24	4373.88	4269.13	21.88	OSF1.50	20060.00	10000.00	MinPt-O-ADP
4590.31	318.84	4377.23	4271.87	21.73	OSF1.50	20203.47	10000.00	MinPt-O-SF

PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	CIMAREX ENERGY COMPANY
LEASE NO.:	NMNM26394
WELL NAME & NO.:	VACA DRAW 20-17 FEDERAL 71H
SURFACE HOLE FOOTAGE:	390' FSL & 370' FEL
BOTTOM HOLE FOOTAGE:	100' FNL & 978' FEL
LOCATION:	Section 20, T. 25 S., R 33 E., NMPM
COUNTY:	LEA County, New Mexico

COA

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
Other	☒ Fluid Filled	☐ Cement Squeeze	☐ Pilot Hole
Special Requirements	☐ Water Disposal	☐ COM	☐ Unit

All Previous COAs Still Apply, Except for the Following:

A. CASING

1. The 13-3/8 inch surface casing shall be set at approximately 1040 feet (a minimum of 25 feet (Lea County) into the Rustler Anhydrite and above the salt) and cemented to the surface.
 - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
 - b. Wait on cement (WOC) time for a primary cement job will be a minimum of 8 hours or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)
 - c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
 - d. If cement falls back, remedial cementing will be done prior to drilling out that string.

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

2. The minimum required fill of cement behind the 9-5/8 inch intermediate casing is:
 - Cement to surface. If cement does not circulate see B.1.a, c-d above.
3. The minimum required fill of cement behind the 7 X 5 ½ inch production casing is:
 - Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.

B. PRESSURE CONTROL

1. Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).'
2. Operator has proposed a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **3000 (3M) psi**.
 - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
 - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
 - c. Manufacturer representative shall install the test plug for the initial BOP test.
 - d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
 - e. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.

JJP07022019

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 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.
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.
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.

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.
- c. The tests shall be done by an independent service company utilizing a test plug not a cup or J-packer. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).
- d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.
- e. The results of the test shall be reported to the appropriate BLM office.
- f. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.
- g. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.
- h. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.