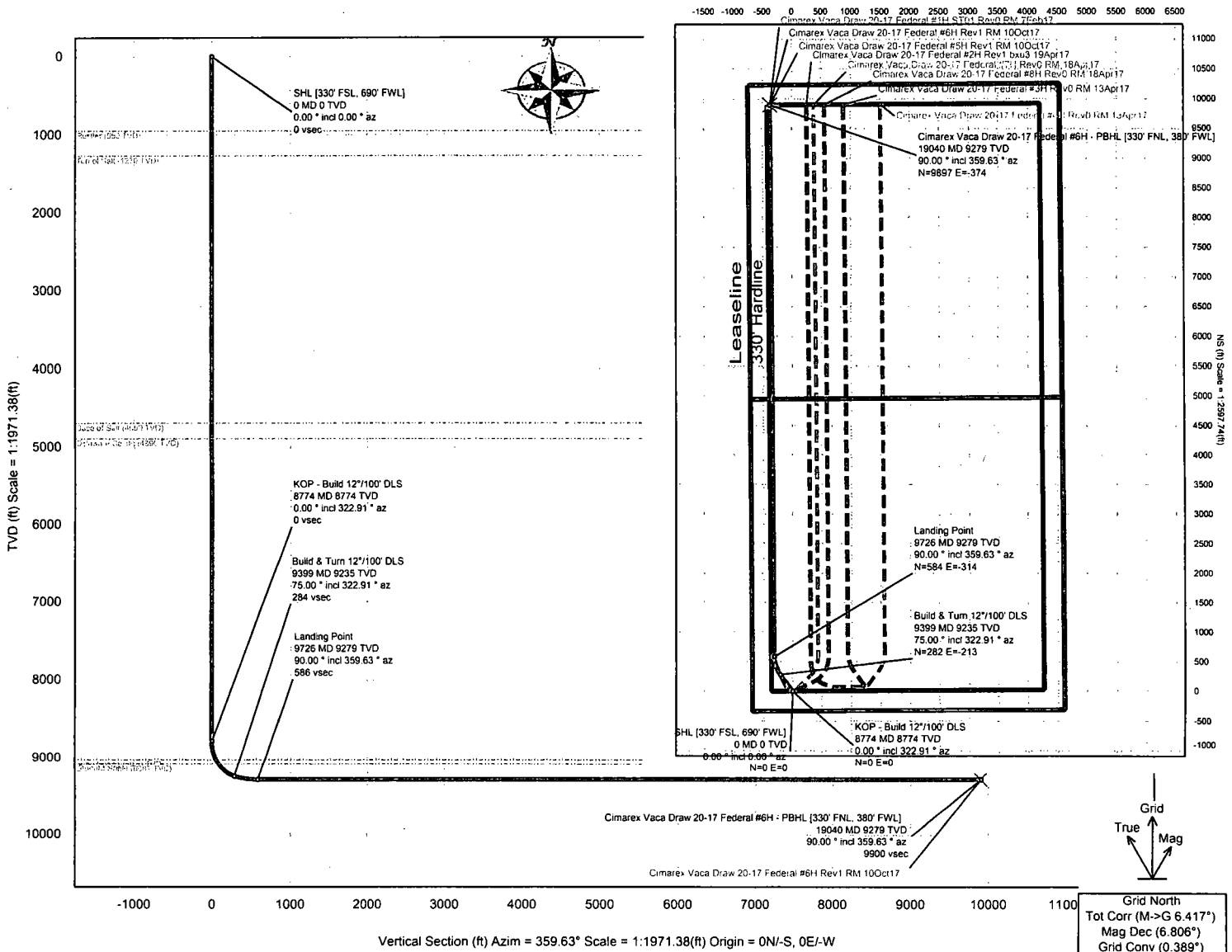


Borehole:	Well:	Field:	Structure:
Original Borehole	Cimarex Vaca Draw 20-17 Federal #6H	NM Lea County (NAD 83)	Cimarex Vaca Draw 20-17 Federal #6H

Gravity & Magnetic Parameters				Surface Location				Miscellaneous			
Model:	HD0M 2016	Dip:	69.83°	Date:	10-Oct-2017	Lat:	N 32 8 35.08	Northing:	404430.53HUS	Grid Conv:	0.3895°
MagDec:	6.806°	FS:	47963.51nT	Gravity FS:	998.429mgm (9.80665 Based)	Lon:	W 103 36 2.23	Eastings:	768201.88HUS	Scale Fact:	0.99996804
								Plan:			
								Slot:			
								Draw 20-17			
								Federal #6H			
								Cimarex Vaca Draw 20-17 Federal #6H Rev1 RM 10Oct17			

EW (ft) Scale = 1:2597.74(ft)



Vertical Section (ft) Azim = 359.63° Scale = 1:1971.38(ft) Origin = 0N/-S, 0E/-W

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL [330° FSL, 690° FWL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Rustler	950.00	0.00	322.91	950.00	0.00	0.00	0.00	0.00
Top of Salt	1270.00	0.00	322.91	1270.00	0.00	0.00	0.00	0.00
Base of Salt	4690.00	0.00	322.91	4690.00	0.00	0.00	0.00	0.00
Delaware Sands	4890.00	0.00	322.91	4890.00	0.00	0.00	0.00	0.00
KOP - Build 12°/100' DLS	8773.72	0.00	322.91	8773.72	0.00	0.00	0.00	0.00
Bone Spring	9035.99	31.47	322.91	9023.00	56.30	56.03	-42.36	12.00
Leonard Shale	9107.54	40.06	322.91	9081.00	89.78	89.35	-67.56	12.00
Build & Turn 12°/100' DLS	9398.72	75.00	322.91	9234.92	283.65	282.27	-213.44	12.00
Landing Point	9725.93	90.00	359.63	9279.00	585.83	583.82	-313.78	12.00
Cimarex Vaca Draw 20-17 Federal #6H - PBHL [330° FNL, 380° FWL]	19039.65	90.00	359.63	9279.00	9899.56	9897.35	-374.28	0.00
Avalon Shale	NaN			9320.00				

Cimarex Vaca Draw 20-17 Federal #6H Rev1 RM 10Oct17 Anti-Collision Summary Report

Analysis Date-24hr Time: October 10, 2017 - 10:18
Client: Cimarex
Field: NM Lea County (NAD 83)
Structure: Cimarex Vaca Draw 20-17 Federal #6H
Slot: Cimarex Vaca Draw 20-17 Federal #6H
Well: Cimarex Vaca Draw 20-17 Federal #6H
Borehole: Original Borehole
Scan MD Range: 0.00ft ~ 19039.65ft

Analysis Method: 3D Least Distance
Reference Trajectory: Cimarex Vaca Draw 20-17 Federal #6H Rev1 RM 10Oct17 (Non-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: 2.10.544.0
Database \ Project: US1153APP452.dir.slb.com\drilling-NM Lea County 2.10

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

Offset Trajectories Summary

Offset Selection Criteria

Wellhead distance scan: Restricted within 60050.15 ft
 Selection filters:
 - Definitive Surveys - Definitive Plans - Definitive surveys exclude definitive plans
 - All Non-Def Surveys when no Def-Survey is set in a borehole - All Non-Def Plans when no Def-Plan is set in a borehole

Offset Trajectory	Separation			Allow 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 #5H Rev1 RM 10Oct17 (Non-Def Plan)													Fail Major
20.02	16.52	17.52	3.51	N/A	MAS = 5.03 (m)	0.00	0.00	CtCt<=15m<15.00				Enter Alert	
20.02	16.52	17.52	3.50	N/A	MAS = 5.03 (m)	24.00	24.00					WRP	
20.02	20.11	5.78	-0.09	1.49	OSF1.50	1930.00	1930.00		OSF<1.50			Enter Minor	
20.02	28.87	-0.06	-8.85	1.00	OSF1.50	2860.00	2860.00			OSF<1.00		Enter Major	
16.06	85.53	-41.79	-69.47	0.24	OSF1.50	8880.00	8879.12					MinPts	
57.48	86.79	-1.21	-29.31	0.98	OSF1.50	9030.00	9017.87			OSF>1.00		Exit Major	
84.50	87.17	25.55	-2.67	1.45	OSF1.50	9080.00	9059.42		OSF>1.50			Exit Minor	
286.74	88.71	226.77	198.03	4.95	OSF1.50	9340.00	9216.27	OSF>5.00				Exit Alert	
640.20	28.77	620.19	611.43	36.41	OSF1.50	9725.93	9279.00					MinPt-CtCt	
640.20	194.02	510.02	446.18	4.99	OSF1.50	15360.00	9279.00	OSF<5.00				Enter Alert	
640.20	306.80	434.83	333.40	3.14	OSF1.50	19039.65	9279.00					MinPts	

Cimarex Vaca Draw 20-17 Federal #7H Rev0 RM 18Apr17 (Non-Def Plan)													Fail Major
20.01	16.50	17.51	3.51	N/A	MAS = 5.03 (m)	0.00	0.00	CtCt<=15m<15.00				Enter Alert	
20.00	16.50	17.50	3.50	N/A	MAS = 5.03 (m)	24.00	24.00					WRP	
20.00	20.01	5.83	-0.01	1.50	OSF1.50	1920.00	1920.00		OSF<1.50			Enter Minor	
20.00	28.78	-0.02	-8.78	1.00	OSF1.50	2850.00	2850.00			OSF<1.00		Enter Major	
20.00	84.62	-37.24	-64.62	0.32	OSF1.50	8773.72	8773.72					MinPts	
20.03	84.67	-37.26	-64.65	0.32	OSF1.50	8780.00	8780.00					MinPts	
58.08	86.36	-0.33	-28.28	0.99	OSF1.50	8980.00	8973.64			OSF>1.00		Exit Major	
85.81	86.85	27.08	-1.04	1.48	OSF1.50	9040.00	9026.41		OSF>1.50			Exit Minor	
283.22	88.59	223.33	194.63	4.89	OSF1.50	9310.00	9204.15	OSF>5.00				Exit Alert	
3182.12	329.78	2961.43	2852.34	14.57	OSF1.50	19039.65	9279.00					MinPts	

Cimarex Vaca Draw 20-17 Federal #6H Rev1 RM 10Oct17 Proposal

Geodetic Report

(Non-Def Plan)



Report Date: October 10, 2017 - 09:44 AM
Client: Cimarex
Field: NM Lea County (NAD 83)
Structure / Slot: Cimarex Vaca Draw 20-17 Federal #6H / Cimarex Vaca Draw 20-17 Federal #6H
Well: Cimarex Vaca Draw 20-17 Federal #6H
Borehole: Original Borehole
UWI / API#: Unknown / Unknown
Survey Name: Cimarex Vaca Draw 20-17 Federal #6H Rev1 RM 10Oct17
Survey Date: April 18, 2017
Tort / AHD / DDI / ERD Ratio: 114.265 ° / 9990.880 ft / 6.370 / 1.077
Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 6' 35.06066", W 103° 36' 2.22942"
Location Grid N/E Y/X: N 404430.530 ftUS, E 768201.880 ftUS
CRS Grid Convergence Angle: 0.3895 °
Grid Scale Factor: 0.99996804
Version / Patch: 2.10.544.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 359.630 ° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: RKB
TVD Reference Elevation: 3447.400 ft above MSL
Seabed / Ground Elevation: 3423.400 ft above MSL
Magnetic Declination: 6.806 °
Total Gravity Field Strength: 998.4293mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 47963.510 nT
Magnetic Dip Angle: 59.830 °
Declination Date: October 10, 2017
Magnetic Declination Model: HDGM 2016
North Reference: Grid North
Grid Convergence Used: 0.3895 °
Total Corr Mag North->Grid North: 6.4165 °
Local Coord Referenced To: Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL [330' FSL, 690' FWL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	100.00	0.00	322.91	100.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	200.00	0.00	322.91	200.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	300.00	0.00	322.91	300.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	400.00	0.00	322.91	400.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	500.00	0.00	322.91	500.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	600.00	0.00	322.91	600.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	700.00	0.00	322.91	700.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	800.00	0.00	322.91	800.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	900.00	0.00	322.91	900.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
Rustler	950.00	0.00	322.91	950.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	1000.00	0.00	322.91	1000.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	1100.00	0.00	322.91	1100.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	1200.00	0.00	322.91	1200.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
Top of Salt	1270.00	0.00	322.91	1270.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	1300.00	0.00	322.91	1300.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	1400.00	0.00	322.91	1400.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	1500.00	0.00	322.91	1500.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	1600.00	0.00	322.91	1600.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	1700.00	0.00	322.91	1700.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	1800.00	0.00	322.91	1800.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	1900.00	0.00	322.91	1900.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	2000.00	0.00	322.91	2000.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	2100.00	0.00	322.91	2100.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	2200.00	0.00	322.91	2200.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23
	2300.00	0.00	322.91	2300.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W 103 36	2.23

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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		
Cimarex Vaca Draw 20-17 Federal #8H Rev0 RM 18Apr17 (Non-Def Plan)													
	39.99	32.49	37.49	7.50	N/A	MAS = 9.90 (m)	0.00	0.00	CtCt<=15m<15.00			Enter Alert	Fail Major
	39.99	32.49	37.49	7.50	N/A	MAS = 9.90 (m)	24.00	24.00				WRP	
	39.99	40.00	12.49	0.00	1.50	OSF1.50	4040.00	4040.00		OSF<1.50		Enter Minor	
	39.99	58.76	-0.01	-18.76	1.00	OSF1.50	6030.00	6030.00			OSF<1.00	Enter Major	
	39.99	84.62	-17.25	-44.63	0.68	OSF1.50	8773.72	8773.72				MinPt-CtCt	
	40.02	84.67	-17.27	-44.66	0.68	OSF1.50	8780.00	8780.00				MinPts	
	56.17	85.86	-1.90	-29.69	0.97	OSF1.50	8920.00	8917.72			OSF>1.00	Exit Major	
	82.95	86.52	24.43	-3.57	1.44	OSF1.50	9000.00	8991.62		OSF>1.50		Exit Minor	
	287.50	88.55	227.64	198.96	4.97	OSF1.50	9300.00	9199.72	OSF>5.00			Exit Alert	
	3229.18	341.40	3000.74	2887.77	14.28	OSF1.50	19039.65	9279.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #1H ST01 Rev0 RM 17Feb17 (Non-Def Plan)													
	116.61	32.81	114.11	83.81	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	Fail Major
	116.61	32.81	114.11	83.81	N/A	MAS = 10.00 (m)	24.00	24.00				WRP	
	116.61	36.80	91.25	79.81	4.99	OSF1.50	3700.00	3700.00	OSF<5.00			Enter Alert	
	84.54	86.28	26.16	-1.74	1.47	OSF1.50	8960.00	8955.31		OSF<1.50		Enter Minor	
	56.82	86.96	-2.02	-30.14	0.96	OSF1.50	9040.00	9026.41			OSF<1.00	Enter Major	
	44.37	87.38	-14.72	-43.01	0.74	OSF1.50	9100.00	9075.19				MinPts	
	55.24	87.78	-4.11	-32.54	0.93	OSF1.50	9150.00	9112.24			OSF>1.00	Exit Major	
	82.99	88.08	23.44	-5.09	1.41	OSF1.50	9200.00	9145.58		OSF>1.50		Exit Minor	
	289.70	89.06	229.49	200.64	4.98	OSF1.50	9440.00	9245.02	OSF>5.00			Exit Alert	
	3088.10	305.55	2883.56	2782.55	15.27	OSF1.50	19039.65	9279.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #1H Rev0 RM 10Apr17 (Non-Def Plan)													
	116.61	32.81	114.11	83.81	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	Fail Major
	116.61	32.81	114.11	83.81	N/A	MAS = 10.00 (m)	24.00	24.00				WRP	
	116.61	36.80	91.25	79.81	4.99	OSF1.50	3700.00	3700.00	OSF<5.00			Enter Alert	
	84.54	86.28	26.16	-1.74	1.47	OSF1.50	8960.00	8955.31		OSF<1.50		Enter Minor	
	56.82	86.96	-2.02	-30.14	0.96	OSF1.50	9040.00	9026.41			OSF<1.00	Enter Major	
	44.37	87.38	-14.72	-43.01	0.74	OSF1.50	9100.00	9075.19				MinPts	
	55.24	87.78	-4.11	-32.54	0.93	OSF1.50	9150.00	9112.24			OSF>1.00	Exit Major	
	82.99	88.08	23.44	-5.09	1.41	OSF1.50	9200.00	9145.58		OSF>1.50		Exit Minor	
	289.70	89.06	229.49	200.64	4.98	OSF1.50	9440.00	9245.02	OSF>5.00			Exit Alert	
	9841.89	90.91	9780.45	9750.98	166.93	OSF1.50	19039.65	9279.00				TD	
Cimarex Vaca Draw 20-17 Federal #2H Rev1 bxu3 19Apr17 (Non-Def Plan)													
	1221.30	32.81	1218.80	1188.49	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	Pass
	1221.29	32.81	1218.79	1188.48	N/A	MAS = 10.00 (m)	24.00	24.00				WRP	
	1041.08	78.49	987.80	962.59	20.59	OSF1.50	8860.00	8859.53				MinPt-CtCt	
	1041.10	78.54	987.79	962.56	20.58	OSF1.50	8870.00	8869.35				MinPts	
	1043.04	78.80	989.55	964.24	20.55	OSF1.50	8920.00	8917.72				MinPt-O-SF	
	3532.28	324.45	3315.14	3207.83	16.45	OSF1.50	19039.65	9279.00				MinPts	
Cimarex Vaca Draw 20-17 Federal #3H Rev0 RM 13Apr17 (Non-Def Plan)													
	1241.30	32.81	1238.80	1208.49	N/A	MAS = 10.00 (m)	0.00	0.00				Surface	Pass
	1241.29	32.81	1238.79	1208.48	N/A	MAS = 10.00 (m)	24.00	24.00				WRP	

Offset Trajectory	Separation			Allow	Sep.	Controlling Rule	Reference Trajectory		Risk Level			Alert	Status
	Ct-Ct (ft)	MAS (ft)	EOU (ft)	Dev. (ft)	Fact.		MD (ft)	TVD (ft)	Alert	Minor	Major		
1241.29	84.59	1184.06	1156.69	22.63		OSF1.50	8773.72	8773.72				MinPt-CtCt	
1241.31	84.65	1184.04	1156.66	22.62		OSF1.50	8780.00	8780.00				MinPts	
1247.90	85.50	1190.06	1162.40	22.51		OSF1.50	8880.00	8879.12				MinPt-O-SF	
3341.55	361.24	3099.89	2980.31	13.96		OSF1.50	19039.65	9279.00				MinPts	

Cimarex Vaca Draw 20-17
Federal #4H Rev0 RM:
13Apr17 (Non-Def Plan)

1261.24	32.81	1258.74	1228.43	N/A	MAS = 10.00 (m)	0.00	0.00					Surface	
1261.23	32.81	1258.73	1228.42	N/A	MAS = 10.00 (m)	24.00	24.00					WRP	
1261.23	84.59	1204.00	1176.63	23.00	OSF1.50	8773.72	8773.72					MinPt-CtCt	
1261.25	84.65	1203.98	1176.60	22.98	OSF1.50	8780.00	8780.00					MinPts	
1267.84	85.50	1210.01	1182.34	22.87	OSF1.50	8880.00	8879.12					MinPt-O-SF	
3623.94	402.12	3355.02	3221.82	13.59	OSF1.50	19039.65	9279.00					MinPts	

Pass

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 ° ' ")
	8000.00	0.00	322.91	8000.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W	103 36 2.23
	8100.00	0.00	322.91	8100.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W	103 36 2.23
	8200.00	0.00	322.91	8200.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W	103 36 2.23
	8300.00	0.00	322.91	8300.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W	103 36 2.23
	8400.00	0.00	322.91	8400.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W	103 36 2.23
	8500.00	0.00	322.91	8500.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W	103 36 2.23
	8600.00	0.00	322.91	8600.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W	103 36 2.23
	8700.00	0.00	322.91	8700.00	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W	103 36 2.23
KOP - Build 12°/100' DLS	8773.72	0.00	322.91	8773.72	0.00	0.00	0.00	0.00	404430.53	768201.88	N 32 6 35.06 W	103 36 2.23
	8800.00	3.15	322.91	8799.99	0.58	0.58	-0.44	12.00	404431.11	768201.44	N 32 6 35.07 W	103 36 2.23
	8900.00	15.15	322.91	8898.53	13.31	13.24	-10.01	12.00	404443.77	768191.87	N 32 6 35.19 W	103 36 2.34
	9000.00	27.15	322.91	8891.62	42.18	41.97	-31.74	12.00	404472.50	768170.14	N 32 6 35.48 W	103 36 2.60
Bone Spring	9035.99	31.47	322.91	9023.00	56.30	56.03	-42.36	12.00	404486.55	768159.52	N 32 6 35.62 W	103 36 2.72
	9100.00	39.15	322.91	9075.19	85.93	85.52	-64.66	12.00	404516.04	768137.22	N 32 6 35.91 W	103 36 2.97
Leonard Shale	9107.54	40.06	322.91	9081.00	89.78	89.35	-67.56	12.00	404519.88	768134.32	N 32 6 35.95 W	103 36 3.01
	9200.00	51.15	322.91	9145.58	142.66	141.97	-107.35	12.00	404572.49	768094.54	N 32 6 36.47 W	103 36 3.47
	9300.00	63.15	322.91	9199.72	209.87	208.85	-157.93	12.00	404639.38	768043.96	N 32 6 37.14 W	103 36 4.05
Build & Turn 12°/100' DLS	9398.72	75.00	322.91	9234.92	283.65	282.27	-213.44	12.00	404712.79	767988.44	N 32 6 37.87 W	103 36 4.69
	9400.00	75.05	323.06	9235.25	284.64	283.26	-214.19	12.00	404713.78	767987.70	N 32 6 37.88 W	103 36 4.70
	9500.00	79.26	334.59	9257.54	368.24	366.54	-264.49	12.00	404797.06	767937.40	N 32 6 38.71 W	103 36 5.28
	9600.00	83.88	345.78	9272.25	461.36	459.45	-297.90	12.00	404889.96	767903.99	N 32 6 39.63 W	103 36 5.66
	9700.00	88.73	356.79	9278.71	559.92	557.91	-312.97	12.00	404988.42	767888.92	N 32 6 40.60 W	103 36 5.82
Landing Point	9725.93	90.00	359.63	9279.00	585.83	583.82	-313.78	12.00	405014.33	767888.11	N 32 6 40.86 W	103 36 5.83
	9800.00	90.00	359.63	9279.00	659.91	657.89	-314.26	0.00	405088.40	767887.63	N 32 6 41.59 W	103 36 5.83
	9900.00	90.00	359.63	9279.00	759.91	757.89	-314.91	0.00	405188.39	767886.98	N 32 6 42.58 W	103 36 5.83
	10000.00	90.00	359.63	9279.00	859.91	857.89	-315.56	0.00	405288.39	767886.33	N 32 6 43.57 W	103 36 5.83
	10100.00	90.00	359.63	9279.00	959.91	957.88	-316.21	0.00	405388.38	767885.68	N 32 6 44.56 W	103 36 5.83
	10200.00	90.00	359.63	9279.00	1059.91	1057.88	-316.86	0.00	405488.38	767885.03	N 32 6 45.55 W	103 36 5.83
	10300.00	90.00	359.63	9279.00	1159.91	1157.88	-317.51	0.00	405588.37	767884.38	N 32 6 46.54 W	103 36 5.83
	10400.00	90.00	359.63	9279.00	1259.91	1257.88	-318.16	0.00	405688.36	767883.73	N 32 6 47.53 W	103 36 5.83
	10500.00	90.00	359.63	9279.00	1359.91	1357.87	-318.81	0.00	405788.36	767883.08	N 32 6 48.52 W	103 36 5.83
	10600.00	90.00	359.63	9279.00	1459.91	1457.87	-319.46	0.00	405888.35	767882.43	N 32 6 49.51 W	103 36 5.83
	10700.00	90.00	359.63	9279.00	1559.91	1557.87	-320.11	0.00	405988.35	767881.79	N 32 6 50.50 W	103 36 5.83
	10800.00	90.00	359.63	9279.00	1659.91	1657.87	-320.76	0.00	406088.34	767881.14	N 32 6 51.49 W	103 36 5.83
	10900.00	90.00	359.63	9279.00	1759.91	1757.87	-321.40	0.00	406188.34	767880.49	N 32 6 52.48 W	103 36 5.83
	11000.00	90.00	359.63	9279.00	1859.91	1857.86	-322.05	0.00	406288.33	767879.84	N 32 6 53.47 W	103 36 5.83
	11100.00	90.00	359.63	9279.00	1959.91	1957.86	-322.70	0.00	406388.33	767879.19	N 32 6 54.46 W	103 36 5.83
	11200.00	90.00	359.63	9279.00	2059.91	2057.86	-323.35	0.00	406488.32	767878.54	N 32 6 55.45 W	103 36 5.83
	11300.00	90.00	359.63	9279.00	2159.91	2157.86	-324.00	0.00	406588.31	767877.89	N 32 6 56.43 W	103 36 5.83
	11400.00	90.00	359.63	9279.00	2259.91	2257.86	-324.65	0.00	406688.31	767877.24	N 32 6 57.42 W	103 36 5.83
	11500.00	90.00	359.63	9279.00	2359.91	2357.85	-325.30	0.00	406788.30	767876.59	N 32 6 58.41 W	103 36 5.83
	11600.00	90.00	359.63	9279.00	2459.91	2457.85	-325.95	0.00	406888.30	767875.94	N 32 6 59.40 W	103 36 5.82
	11700.00	90.00	359.63	9279.00	2559.91	2557.85	-326.60	0.00	406988.29	767875.29	N 32 7 0.39 W	103 36 5.82
	11800.00	90.00	359.63	9279.00	2659.91	2657.85	-327.25	0.00	407088.29	767874.64	N 32 7 1.38 W	103 36 5.82
	11900.00	90.00	359.63	9279.00	2759.91	2757.85	-327.90	0.00	407188.28	767873.99	N 32 7 2.37 W	103 36 5.82
	12000.00	90.00	359.63	9279.00	2859.91	2857.84	-328.55	0.00	407288.28	767873.34	N 32 7 3.36 W	103 36 5.82
	12100.00	90.00	359.63	9279.00	2959.91	2957.84	-329.20	0.00	407388.27	767872.69	N 32 7 4.35 W	103 36 5.82
	12200.00	90.00	359.63	9279.00	3059.91	3057.84	-329.85	0.00	407488.27	767872.04	N 32 7 5.34 W	103 36 5.82
	12300.00	90.00	359.63	9279.00	3159.91	3157.84	-330.50	0.00	407588.26	767871.39	N 32 7 6.33 W	103 36 5.82
	12400.00	90.00	359.63	9279.00	3259.91	3257.83	-331.15	0.00	407688.25	767870.74	N 32 7 7.32 W	103 36 5.82
	12500.00	90.00	359.63	9279.00	3359.91	3357.83	-331.80	0.00	407788.25	767870.09	N 32 7 8.31 W	103 36 5.82
	12600.00	90.00	359.63	9279.00	3459.91	3457.83	-332.45	0.00	407888.24	767869.44	N 32 7 9.30 W	103 36 5.82
	12700.00	90.00	359.63	9279.00	3559.91	3557.83	-333.10	0.00	407988.24	767868.79	N 32 7 10.29 W	103 36 5.82
	12800.00	90.00	359.63	9279.00	3659.91	3657.83	-333.75	0.00	408088.23	767868.14	N 32 7 11.28 W	103 36 5.82
	12900.00	90.00	359.63	9279.00	3759.91	3757.82	-334.40	0.00	408188.23	767867.49	N 32 7 12.27 W	103 36 5.82
	13000.00	90.00	359.63	9279.00	3859.91	3857.82	-335.05	0.00	408288.22	767866.84	N 32 7 13.26 W	103 36 5.82
	13100.00	90.00	359.63	9279.00	3959.91	3957.82	-335.70	0.00	408388.22	767866.19	N 32 7 14.25 W	103 36 5.82

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	13200.00	90.00	359.63	9279.00	4059.91	4057.82	-336.35	0.00	408488.21	767865.54	N 32 7 15.24 W	103 36 5.82
	13300.00	90.00	359.63	9279.00	4159.91	4157.82	-337.00	0.00	408588.20	767864.90	N 32 7 16.23 W	103 36 5.82
	13400.00	90.00	359.63	9279.00	4259.91	4257.81	-337.65	0.00	408688.20	767864.25	N 32 7 17.21 W	103 36 5.82
	13500.00	90.00	359.63	9279.00	4359.91	4357.81	-338.30	0.00	408788.19	767863.60	N 32 7 18.20 W	103 36 5.82
	13600.00	90.00	359.63	9279.00	4459.91	4457.81	-338.95	0.00	408888.19	767862.95	N 32 7 19.19 W	103 36 5.82
	13700.00	90.00	359.63	9279.00	4559.91	4557.81	-339.59	0.00	408988.18	767862.30	N 32 7 20.18 W	103 36 5.82
	13800.00	90.00	359.63	9279.00	4659.91	4657.81	-340.24	0.00	409088.18	767861.65	N 32 7 21.17 W	103 36 5.82
	13900.00	90.00	359.63	9279.00	4759.91	4757.80	-340.89	0.00	409188.17	767861.00	N 32 7 22.16 W	103 36 5.82
	14000.00	90.00	359.63	9279.00	4859.91	4857.80	-341.54	0.00	409288.17	767860.35	N 32 7 23.15 W	103 36 5.82
	14100.00	90.00	359.63	9279.00	4959.91	4957.80	-342.19	0.00	409388.16	767859.70	N 32 7 24.14 W	103 36 5.82
	14200.00	90.00	359.63	9279.00	5059.91	5057.80	-342.84	0.00	409488.16	767859.05	N 32 7 25.13 W	103 36 5.82
	14300.00	90.00	359.63	9279.00	5159.91	5157.79	-343.49	0.00	409588.15	767858.40	N 32 7 26.12 W	103 36 5.82
	14400.00	90.00	359.63	9279.00	5259.91	5257.79	-344.14	0.00	409688.14	767857.75	N 32 7 27.11 W	103 36 5.82
	14500.00	90.00	359.63	9279.00	5359.91	5357.79	-344.79	0.00	409788.14	767857.10	N 32 7 28.10 W	103 36 5.81
	14600.00	90.00	359.63	9279.00	5459.91	5457.79	-345.44	0.00	409888.13	767856.45	N 32 7 29.09 W	103 36 5.81
	14700.00	90.00	359.63	9279.00	5559.91	5557.79	-346.09	0.00	409988.13	767855.80	N 32 7 30.08 W	103 36 5.81
	14800.00	90.00	359.63	9279.00	5659.91	5657.78	-346.74	0.00	410088.12	767855.15	N 32 7 31.07 W	103 36 5.81
	14900.00	90.00	359.63	9279.00	5759.91	5757.78	-347.39	0.00	410188.12	767854.50	N 32 7 32.06 W	103 36 5.81
	15000.00	90.00	359.63	9279.00	5859.91	5857.78	-348.04	0.00	410288.11	767853.85	N 32 7 33.05 W	103 36 5.81
	15100.00	90.00	359.63	9279.00	5959.91	5957.78	-348.69	0.00	410388.11	767853.20	N 32 7 34.04 W	103 36 5.81
	15200.00	90.00	359.63	9279.00	6059.91	6057.78	-349.34	0.00	410488.10	767852.55	N 32 7 35.03 W	103 36 5.81
	15300.00	90.00	359.63	9279.00	6159.91	6157.77	-349.99	0.00	410588.09	767851.90	N 32 7 36.02 W	103 36 5.81
	15400.00	90.00	359.63	9279.00	6259.91	6257.77	-350.64	0.00	410688.09	767851.25	N 32 7 37.01 W	103 36 5.81
	15500.00	90.00	359.63	9279.00	6359.91	6357.77	-351.29	0.00	410788.08	767850.60	N 32 7 37.99 W	103 36 5.81
	15600.00	90.00	359.63	9279.00	6459.91	6457.77	-351.94	0.00	410888.08	767849.95	N 32 7 38.98 W	103 36 5.81
	15700.00	90.00	359.63	9279.00	6559.91	6557.77	-352.59	0.00	410988.07	767849.30	N 32 7 39.97 W	103 36 5.81
	15800.00	90.00	359.63	9279.00	6659.91	6657.76	-353.24	0.00	411088.07	767848.66	N 32 7 40.96 W	103 36 5.81
	15900.00	90.00	359.63	9279.00	6759.91	6757.76	-353.89	0.00	411188.06	767848.01	N 32 7 41.95 W	103 36 5.81
	16000.00	90.00	359.63	9279.00	6859.91	6857.76	-354.54	0.00	411288.06	767847.36	N 32 7 42.94 W	103 36 5.81
	16100.00	90.00	359.63	9279.00	6959.91	6957.76	-355.19	0.00	411388.05	767846.71	N 32 7 43.93 W	103 36 5.81
	16200.00	90.00	359.63	9279.00	7059.91	7057.75	-355.84	0.00	411488.04	767846.06	N 32 7 44.92 W	103 36 5.81
	16300.00	90.00	359.63	9279.00	7159.91	7157.75	-356.49	0.00	411588.04	767845.41	N 32 7 45.91 W	103 36 5.81
	16400.00	90.00	359.63	9279.00	7259.91	7257.75	-357.13	0.00	411688.03	767844.76	N 32 7 46.90 W	103 36 5.81
	16500.00	90.00	359.63	9279.00	7359.91	7357.75	-357.78	0.00	411788.03	767844.11	N 32 7 47.89 W	103 36 5.81
	16600.00	90.00	359.63	9279.00	7459.91	7457.75	-358.43	0.00	411888.02	767843.46	N 32 7 48.88 W	103 36 5.81
	16700.00	90.00	359.63	9279.00	7559.91	7557.74	-359.08	0.00	411988.02	767842.81	N 32 7 49.87 W	103 36 5.81
	16800.00	90.00	359.63	9279.00	7659.91	7657.74	-359.73	0.00	412088.01	767842.16	N 32 7 50.86 W	103 36 5.81
	16900.00	90.00	359.63	9279.00	7759.91	7757.74	-360.38	0.00	412188.01	767841.51	N 32 7 51.85 W	103 36 5.81
	17000.00	90.00	359.63	9279.00	7859.91	7857.74	-361.03	0.00	412288.00	767840.86	N 32 7 52.84 W	103 36 5.81
	17100.00	90.00	359.63	9279.00	7959.91	7957.74	-361.68	0.00	412388.00	767840.21	N 32 7 53.83 W	103 36 5.81
	17200.00	90.00	359.63	9279.00	8059.91	8057.73	-362.33	0.00	412487.99	767839.56	N 32 7 54.82 W	103 36 5.81
	17300.00	90.00	359.63	9279.00	8159.91	8157.73	-362.98	0.00	412587.98	767838.91	N 32 7 55.81 W	103 36 5.81
	17400.00	90.00	359.63	9279.00	8259.91	8257.73	-363.63	0.00	412687.98	767838.26	N 32 7 56.80 W	103 36 5.81
	17500.00	90.00	359.63	9279.00	8359.91	8357.73	-364.28	0.00	412787.97	767837.61	N 32 7 57.79 W	103 36 5.80
	17600.00	90.00	359.63	9279.00	8459.91	8457.73	-364.93	0.00	412887.97	767836.96	N 32 7 58.78 W	103 36 5.80
	17700.00	90.00	359.63	9279.00	8559.91	8557.72	-365.58	0.00	412987.96	767836.31	N 32 7 59.76 W	103 36 5.80
	17800.00	90.00	359.63	9279.00	8659.91	8657.72	-366.23	0.00	413087.96	767835.66	N 32 8 0.75 W	103 36 5.80
	17900.00	90.00	359.63	9279.00	8759.91	8757.72	-366.88	0.00	413187.95	767835.01	N 32 8 1.74 W	103 36 5.80
	18000.00	90.00	359.63	9279.00	8859.91	8857.72	-367.53	0.00	413287.95	767834.36	N 32 8 2.73 W	103 36 5.80
	18100.00	90.00	359.63	9279.00	8959.91	8957.71	-368.18	0.00	413387.94	767833.71	N 32 8 3.72 W	103 36 5.80
	18200.00	90.00	359.63	9279.00	9059.91	9057.71	-368.83	0.00	413487.93	767833.06	N 32 8 4.71 W	103 36 5.80
	18300.00	90.00	359.63	9279.00	9159.91	9157.71	-369.48	0.00	413587.93	767832.41	N 32 8 5.70 W	103 36 5.80
	18400.00	90.00	359.63	9279.00	9259.91	9257.71	-370.13	0.00	413687.92	767831.77	N 32 8 6.69 W	103 36 5.80
	18500.00	90.00	359.63	9279.00	9359.91	9357.71	-370.78	0.00	413787.92	767831.12	N 32 8 7.68 W	103 36 5.80
	18600.00	90.00	359.63	9279.00	9459.91	9457.70	-371.43	0.00	413887.91	767830.47	N 32 8 8.67 W	103 36 5.80
	18700.00	90.00	359.63	9279.00	9559.91	9557.70	-372.08	0.00	413987.91	767829.82	N 32 8 9.66 W	103 36 5.80
	18800.00	90.00	359.63	9279.00	9659.91	9657.70	-372.73	0.00	414087.90	767829.17	N 32 8 10.65 W	103 36 5.80
	18900.00	90.00	359.63	9279.00	9759.91	9757.70	-373.38	0.00	414187.90	767828.52	N 32 8 11.64 W	103 36 5.80
	19000.00	90.00	359.63	9279.00	9859.91	9857.70	-374.03	0.00	414287.89	767827.87	N 32 8 12.63 W	103 36 5.80

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 ° ' ")
Cimarex Vaca Draw 20-17 Federal #6H - PBHL [330' FNL, 380' FWL]	19039.65	90.00	359.63	9279.00	9899.56	9897.35	-374.28	0.00	414327.54	767827.61	N 32 8 13.02 W 103 36 5.80	

Survey Type: Non-Def Plan

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

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Expected Max Inclination (deg)	Survey Tool Type	Borehole / Survey
	1	0.000	24.000	1/100.000	30.000	30.000		NAL_MWD_PLUS_0.5_DEG- Depth Only	Original Borehole / Cimarex Vaca Draw 20-17 Federal #6H Rev1 RM 10Oct17
	1	24.000	19039.651	1/100.000	30.000	30.000		NAL_MWD_PLUS_0.5_DEG	Original Borehole / Cimarex Vaca Draw 20-17 Federal #6H Rev1