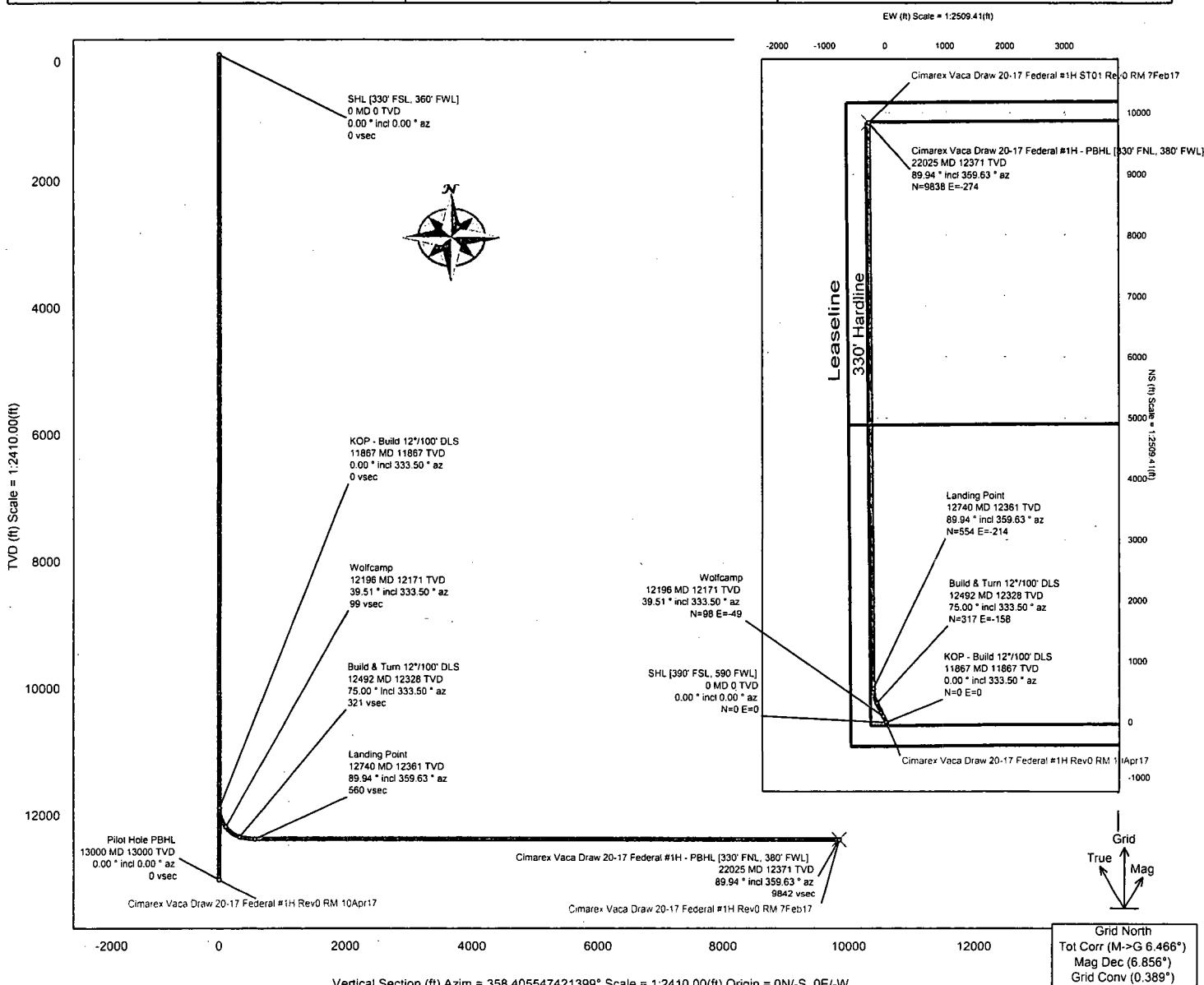


Borehole:	Well:	Field:	Structure:
ST01	Cimarex Vaca Draw 20-17 Federal #1H	NM Lea County (NAD 83)	Cimarex Vaca Draw 20-17 Federal #1H

Gravity & Magnetic Parameters	Surface Location	NAD83 New Mexico State Plane, Eastern Zone, US Feet	Miscellaneous
Model: HDGM 2016 Dip: 89.838° Date: 19-Apr-2017	Lat: N 32 6 35.65	Northings: 404499.79HUS	Grid Conv: 0.3893°
MagDec: 6.856° FS: 48018.274nT Gravity FS: 998.429mgN (9.80665 Based)	Lon: W 103 38 3.39	Easting: 766101.48HUS	Scale Fact: 0.99996799



Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL [390' FSL, 590 FWL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
KOP - Build 12°/100' DLS	11866.75	0.00	333.50	11866.75	0.00	0.00	0.00	0.00
Wolfcamp	12196.00	39.51	333.50	12170.52	98.95	97.63	-48.68	12.00
Build & Turn 12°/100' DLS	12491.75	75.00	333.50	12327.95	320.98	316.71	-157.90	12.00
Landing Point	12740.34	89.94	359.63	12361.00	559.55	553.82	-213.54	12.00
Cimarex Vaca Draw 20-17 Federal #1H - PBHL [330' FNL, 380' FWL]	22024.80	89.94	359.63	12371.00	9841.90	9838.08	-273.85	0.00

Cimarex Vaca Draw 20-17 Federal #1H Rev0 RM 7Feb17 Proposal

Geodetic Report

(Non-Def Plan)



Report Date: February 08, 2017 - 07:09 AM
Client: Cimarex
Field: NM Lea County (NAD 83)
Structure / Slot: Cimarex Vaca Draw 20-17 Federal #1H / Cimarex Vaca Draw 20-17 Federal #1H
Well: Cimarex Vaca Draw 20-17 Federal #1H
Borehole: Original Borehole
UWI / API#: Unknown / Unknown
Survey Name: Cimarex Vaca Draw 20-17 Federal #1H Rev0 RM 7Feb17
Survey Date: February 07, 2017
Tort / AHD / DDI / ERD Ratio: 104.831 ° / 9884.011 ft / 6.266 / 0.799
Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 6' 35.65382", W 103° 36' 3.39237"
Location Grid N/E Y/X: N 404489.790 ftUS, E 768101.450 ftUS
CRS Grid Convergence Angle: 0.3893 °
Grid Scale Factor: 0.99996799
Version / Patch: 2.10.254.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 358.406 ° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: RKB
TVD Reference Elevation: 3451.300 ft above MSL
Seabed / Ground Elevation: 3423.300 ft above MSL
Magnetic Declination: 6.872 °
Total Gravity Field Strength: 998.4289mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 48036.763 nT
Magnetic Dip Angle: 59.840 °
Declination Date: February 07, 2017
Magnetic Declination Model: HDGM 2016
North Reference: Grid North
Grid Convergence Used: 0.3893 °
Total Corr Mag North->Grid North: 6.4831 °
Local Coord Referenced To: Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL [390' FSL, 590 FWL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	100.00	0.00	333.50	100.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	200.00	0.00	333.50	200.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	300.00	0.00	333.50	300.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	400.00	0.00	333.50	400.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	500.00	0.00	333.50	500.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	600.00	0.00	333.50	600.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	700.00	0.00	333.50	700.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	800.00	0.00	333.50	800.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	900.00	0.00	333.50	900.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	1000.00	0.00	333.50	1000.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	1100.00	0.00	333.50	1100.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	1200.00	0.00	333.50	1200.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	1300.00	0.00	333.50	1300.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	1400.00	0.00	333.50	1400.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	1500.00	0.00	333.50	1500.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	1600.00	0.00	333.50	1600.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	1700.00	0.00	333.50	1700.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	1800.00	0.00	333.50	1800.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	1900.00	0.00	333.50	1900.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	2000.00	0.00	333.50	2000.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	2100.00	0.00	333.50	2100.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	2200.00	0.00	333.50	2200.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	2300.00	0.00	333.50	2300.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	2400.00	0.00	333.50	2400.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	
	2500.00	0.00	333.50	2500.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W 103 36 3.39	

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 ° ' ")
	8500.00	0.00	333.50	8500.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	8600.00	0.00	333.50	8600.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	8700.00	0.00	333.50	8700.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	8800.00	0.00	333.50	8800.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	8900.00	0.00	333.50	8900.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	9000.00	0.00	333.50	9000.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	9100.00	0.00	333.50	9100.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	9200.00	0.00	333.50	9200.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	9300.00	0.00	333.50	9300.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	9400.00	0.00	333.50	9400.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	9500.00	0.00	333.50	9500.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	9600.00	0.00	333.50	9600.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	9700.00	0.00	333.50	9700.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	9800.00	0.00	333.50	9800.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	9900.00	0.00	333.50	9900.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	10000.00	0.00	333.50	10000.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	10100.00	0.00	333.50	10100.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	10200.00	0.00	333.50	10200.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	10300.00	0.00	333.50	10300.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	10400.00	0.00	333.50	10400.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	10500.00	0.00	333.50	10500.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	10600.00	0.00	333.50	10600.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	10700.00	0.00	333.50	10700.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	10800.00	0.00	333.50	10800.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	10900.00	0.00	333.50	10900.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	11000.00	0.00	333.50	11000.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	11100.00	0.00	333.50	11100.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	11200.00	0.00	333.50	11200.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	11300.00	0.00	333.50	11300.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	11400.00	0.00	333.50	11400.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	11500.00	0.00	333.50	11500.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	11600.00	0.00	333.50	11600.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	11700.00	0.00	333.50	11700.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	11800.00	0.00	333.50	11800.00	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
KOP - Build 12"/100' DLS	11866.75	0.00	333.50	11866.75	0.00	0.00	0.00	0.00	404489.79	768101.45	N 32 6 35.65 W	103 36 3.39
	11900.00	3.99	333.50	11899.97	1.05	1.04	-0.52	12.00	404490.83	768100.93	N 32 6 35.66 W	103 36 3.40
	12000.00	15.99	333.50	11998.28	16.76	16.53	-8.24	12.00	404506.32	768093.21	N 32 6 35.82 W	103 36 3.49
	12100.00	27.99	333.50	12090.83	50.66	49.98	-24.92	12.00	404539.77	768076.53	N 32 6 36.15 W	103 36 3.68
Wolfcamp	12196.00	39.51	333.50	12170.52	98.95	97.63	-48.68	12.00	404587.42	768052.77	N 32 6 36.62 W	103 36 3.95
	12200.00	39.99	333.50	12173.59	101.27	99.92	-49.82	12.00	404589.71	768051.63	N 32 6 36.65 W	103 36 3.96
	12300.00	51.99	333.50	12242.95	166.38	164.17	-81.85	12.00	404653.95	768019.60	N 32 6 37.28 W	103 36 4.33
	12400.00	63.99	333.50	12295.86	243.15	239.92	-119.62	12.00	404729.70	767981.84	N 32 6 38.04 W	103 36 4.76
Build & Turn 12"/100' DLS	12491.75	75.00	333.50	12327.95	320.98	316.71	-157.90	12.00	404806.49	767943.55	N 32 6 38.80 W	103 36 5.20
	12500.00	75.46	334.41	12330.05	328.24	323.87	-161.41	12.00	404813.65	767940.05	N 32 6 38.87 W	103 36 5.24
	12600.00	81.30	345.11	12350.23	420.89	415.63	-195.14	12.00	404905.40	767906.32	N 32 6 39.78 W	103 36 5.63
	12700.00	87.43	355.49	12360.07	519.24	513.54	-211.83	12.00	405003.32	767889.63	N 32 6 40.75 W	103 36 5.81
Landing Point	12740.34	89.94	359.63	12361.00	559.55	553.82	-213.54	12.00	405043.59	767887.91	N 32 6 41.15 W	103 36 5.83
	12800.00	89.94	359.63	12361.06	619.20	613.48	-213.93	0.00	405103.25	767887.53	N 32 6 41.74 W	103 36 5.83
	12900.00	89.94	359.63	12361.17	719.18	713.48	-214.58	0.00	405203.25	767886.88	N 32 6 42.73 W	103 36 5.83
	13000.00	89.94	359.63	12361.28	819.15	813.48	-215.23	0.00	405303.24	767886.23	N 32 6 43.72 W	103 36 5.83
	13100.00	89.94	359.63	12361.39	919.13	913.48	-215.88	0.00	405403.24	767885.58	N 32 6 44.71 W	103 36 5.83
	13200.00	89.94	359.63	12361.49	1019.11	1013.48	-216.53	0.00	405503.23	767884.93	N 32 6 45.70 W	103 36 5.83
	13300.00	89.94	359.63	12361.60	1119.08	1113.47	-217.18	0.00	405603.22	767884.28	N 32 6 46.69 W	103 36 5.83
	13400.00	89.94	359.63	12361.71	1219.06	1213.47	-217.83	0.00	405703.22	767883.63	N 32 6 47.68 W	103 36 5.83
	13500.00	89.94	359.63	12361.82	1319.04	1313.47	-218.48	0.00	405803.21	767882.98	N 32 6 48.67 W	103 36 5.83
	13600.00	89.94	359.63	12361.93	1419.02	1413.47	-219.13	0.00	405903.21	767882.33	N 32 6 49.65 W	103 36 5.83
	13700.00	89.94	359.63	12362.03	1518.99	1513.46	-219.78	0.00	406003.20	767881.68	N 32 6 50.64 W	103 36 5.83

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (RUS)	Easting (RUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	13800.00	89.94	359.63	12362.14	1618.97	1613.46	-220.43	0.00	406103.20	767881.03	N 32 6 51.63 W	103 36 5.83
	13900.00	89.94	359.63	12362.25	1718.95	1713.46	-221.08	0.00	406203.19	767880.38	N 32 6 52.62 W	103 36 5.83
	14000.00	89.94	359.63	12362.36	1818.93	1813.46	-221.73	0.00	406303.19	767879.73	N 32 6 53.61 W	103 36 5.83
	14100.00	89.94	359.63	12362.46	1918.90	1913.46	-222.38	0.00	406403.18	767879.08	N 32 6 54.60 W	103 36 5.83
	14200.00	89.94	359.63	12362.57	2018.88	2013.45	-223.02	0.00	406503.17	767878.43	N 32 6 55.59 W	103 36 5.83
	14300.00	89.94	359.63	12362.68	2118.86	2113.45	-223.67	0.00	406603.17	767877.78	N 32 6 56.58 W	103 36 5.83
	14400.00	89.94	359.63	12362.79	2218.83	2213.45	-224.32	0.00	406703.16	767877.13	N 32 6 57.57 W	103 36 5.83
	14500.00	89.94	359.63	12362.89	2318.81	2313.45	-224.97	0.00	406803.16	767876.48	N 32 6 58.56 W	103 36 5.83
	14600.00	89.94	359.63	12363.00	2418.79	2413.44	-225.62	0.00	406903.15	767875.83	N 32 6 59.55 W	103 36 5.82
	14700.00	89.94	359.63	12363.11	2518.77	2513.44	-226.27	0.00	407003.15	767875.19	N 32 7 0.54 W	103 36 5.82
	14800.00	89.94	359.63	12363.22	2618.74	2613.44	-226.92	0.00	407103.14	767874.54	N 32 7 1.53 W	103 36 5.82
	14900.00	89.94	359.63	12363.33	2718.72	2713.44	-227.57	0.00	407203.14	767873.89	N 32 7 2.52 W	103 36 5.82
	15000.00	89.94	359.63	12363.43	2818.70	2813.44	-228.22	0.00	407303.13	767873.24	N 32 7 3.51 W	103 36 5.82
	15100.00	89.94	359.63	12363.54	2918.67	2913.43	-228.87	0.00	407403.12	767872.59	N 32 7 4.50 W	103 36 5.82
	15200.00	89.94	359.63	12363.65	3018.65	3013.43	-229.52	0.00	407503.12	767871.94	N 32 7 5.49 W	103 36 5.82
	15300.00	89.94	359.63	12363.76	3118.63	3113.43	-230.17	0.00	407603.11	767871.29	N 32 7 6.48 W	103 36 5.82
	15400.00	89.94	359.63	12363.86	3218.61	3213.43	-230.82	0.00	407703.11	767870.64	N 32 7 7.47 W	103 36 5.82
	15500.00	89.94	359.63	12363.97	3318.58	3313.43	-231.47	0.00	407803.10	767869.99	N 32 7 8.46 W	103 36 5.82
	15600.00	89.94	359.63	12364.08	3418.56	3413.42	-232.12	0.00	407903.10	767869.34	N 32 7 9.45 W	103 36 5.82
	15700.00	89.94	359.63	12364.19	3518.54	3513.42	-232.77	0.00	408003.09	767868.69	N 32 7 10.44 W	103 36 5.82
	15800.00	89.94	359.63	12364.29	3618.51	3613.42	-233.42	0.00	408103.09	767868.04	N 32 7 11.42 W	103 36 5.82
	15900.00	89.94	359.63	12364.40	3718.49	3713.42	-234.07	0.00	408203.08	767867.39	N 32 7 12.41 W	103 36 5.82
	16000.00	89.94	359.63	12364.51	3818.47	3813.41	-234.72	0.00	408303.07	767866.74	N 32 7 13.40 W	103 36 5.82
	16100.00	89.94	359.63	12364.62	3918.45	3913.41	-235.37	0.00	408403.07	767866.09	N 32 7 14.39 W	103 36 5.82
	16200.00	89.94	359.63	12364.73	4018.42	4013.41	-236.02	0.00	408503.06	767865.44	N 32 7 15.38 W	103 36 5.82
	16300.00	89.94	359.63	12364.83	4118.40	4113.41	-236.67	0.00	408603.06	767864.79	N 32 7 16.37 W	103 36 5.82
	16400.00	89.94	359.63	12364.94	4218.38	4213.41	-237.31	0.00	408703.05	767864.14	N 32 7 17.36 W	103 36 5.82
	16500.00	89.94	359.63	12365.05	4318.35	4313.40	-237.96	0.00	408803.05	767863.49	N 32 7 18.35 W	103 36 5.82
	16600.00	89.94	359.63	12365.16	4418.33	4413.40	-238.61	0.00	408903.04	767862.84	N 32 7 19.34 W	103 36 5.82
	16700.00	89.94	359.63	12365.26	4518.31	4513.40	-239.26	0.00	409003.04	767862.19	N 32 7 20.33 W	103 36 5.82
	16800.00	89.94	359.63	12365.37	4618.29	4613.40	-239.91	0.00	409103.03	767861.55	N 32 7 21.32 W	103 36 5.82
	16900.00	89.94	359.63	12365.48	4718.26	4713.39	-240.56	0.00	409203.02	767860.90	N 32 7 22.31 W	103 36 5.82
	17000.00	89.94	359.63	12365.59	4818.24	4813.39	-241.21	0.00	409303.02	767860.25	N 32 7 23.30 W	103 36 5.82
	17100.00	89.94	359.63	12365.70	4918.22	4913.39	-241.86	0.00	409403.01	767859.60	N 32 7 24.29 W	103 36 5.82
	17200.00	89.94	359.63	12365.80	5018.20	5013.39	-242.51	0.00	409503.01	767858.95	N 32 7 25.28 W	103 36 5.82
	17300.00	89.94	359.63	12365.91	5118.17	5113.39	-243.16	0.00	409603.00	767858.30	N 32 7 26.27 W	103 36 5.82
	17400.00	89.94	359.63	12366.02	5218.15	5213.38	-243.81	0.00	409703.00	767857.65	N 32 7 27.26 W	103 36 5.82
	17500.00	89.94	359.63	12366.13	5318.13	5313.38	-244.46	0.00	409802.99	767857.00	N 32 7 28.25 W	103 36 5.81
	17600.00	89.94	359.63	12366.23	5418.10	5413.38	-245.11	0.00	409902.99	767856.35	N 32 7 29.24 W	103 36 5.81
	17700.00	89.94	359.63	12366.34	5518.08	5513.38	-245.76	0.00	410002.98	767855.70	N 32 7 30.23 W	103 36 5.81
	17800.00	89.94	359.63	12366.45	5618.06	5613.38	-246.41	0.00	410102.97	767855.05	N 32 7 31.22 W	103 36 5.81
	17900.00	89.94	359.63	12366.56	5718.04	5713.37	-247.06	0.00	410202.97	767854.40	N 32 7 32.20 W	103 36 5.81
	18000.00	89.94	359.63	12366.66	5818.01	5813.37	-247.71	0.00	410302.96	767853.75	N 32 7 33.19 W	103 36 5.81
	18100.00	89.94	359.63	12366.77	5917.99	5913.37	-248.36	0.00	410402.96	767853.10	N 32 7 34.18 W	103 36 5.81
	18200.00	89.94	359.63	12366.88	6017.97	6013.37	-249.01	0.00	410502.95	767852.45	N 32 7 35.17 W	103 36 5.81
	18300.00	89.94	359.63	12366.99	6117.94	6113.36	-249.66	0.00	410602.95	767851.80	N 32 7 36.16 W	103 36 5.81
	18400.00	89.94	359.63	12367.10	6217.92	6213.36	-250.31	0.00	410702.94	767851.15	N 32 7 37.15 W	103 36 5.81
	18500.00	89.94	359.63	12367.20	6317.90	6313.36	-250.95	0.00	410802.94	767850.50	N 32 7 38.14 W	103 36 5.81
	18600.00	89.94	359.63	12367.31	6417.88	6413.36	-251.60	0.00	410902.93	767849.85	N 32 7 39.13 W	103 36 5.81
	18700.00	89.94	359.63	12367.42	6517.85	6513.36	-252.25	0.00	411002.92	767849.20	N 32 7 40.12 W	103 36 5.81
	18800.00	89.94	359.63	12367.53	6617.83	6613.35	-252.90	0.00	411102.92	767848.55	N 32 7 41.11 W	103 36 5.81
	18900.00	89.94	359.63	12367.63	6717.81	6713.35	-253.55	0.00	411202.91	767847.91	N 32 7 42.10 W	103 36 5.81
	19000.00	89.94	359.63	12367.74	6817.78	6813.35	-254.20	0.00	411302.91	767847.26	N 32 7 43.09 W	103 36 5.81
	19100.00	89.94	359.63	12367.85	6917.76	6913.35	-254.85	0.00	411402.90	767846.61	N 32 7 44.08 W	103 36 5.81
	19200.00	89.94	359.63	12367.96	7017.74	7013.34	-255.50	0.00	411502.90	767845.96	N 32 7 45.07 W	103 36 5.81
	19300.00	89.94	359.63	12368.06	7117.72	7113.34	-256.15	0.00	411602.89	767845.31	N 32 7 46.06 W	103 36 5.81
	19400.00	89.94	359.63	12368.17	7217.69	7213.34	-256.80	0.00	411702.89	767844.66	N 32 7 47.05 W	103 36 5.81
	19500.00	89.94	359.63	12368.28	7317.67	7313.34	-257.45	0.00	411802.88	767844.01	N 32 7 48.04 W	103 36 5.81
	19600.00	89.94	359.63	12368.39	7417.65	7413.34	-258.10	0.00	411902.87	767843.36	N 32 7 49.03 W	103 36 5.81

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 ° ' ")
	19700.00	89.94	359.63	12368.50	7517.62	7513.33	-258.75	0.00	412002.87	767842.71	N 32 7 50.02 W	103 36 5.81
	19800.00	89.94	359.63	12368.60	7617.60	7613.33	-259.40	0.00	412102.86	767842.06	N 32 7 51.01 W	103 36 5.81
	19900.00	89.94	359.63	12368.71	7717.58	7713.33	-260.05	0.00	412202.86	767841.41	N 32 7 52.00 W	103 36 5.81
	20000.00	89.94	359.63	12368.82	7817.56	7813.33	-260.70	0.00	412302.85	767840.76	N 32 7 52.98 W	103 36 5.81
	20100.00	89.94	359.63	12368.93	7917.53	7913.33	-261.35	0.00	412402.85	767840.11	N 32 7 53.97 W	103 36 5.81
	20200.00	89.94	359.63	12369.03	8017.51	8013.32	-262.00	0.00	412502.84	767839.46	N 32 7 54.96 W	103 36 5.81
	20300.00	89.94	359.63	12369.14	8117.49	8113.32	-262.65	0.00	412602.84	767838.81	N 32 7 55.95 W	103 36 5.81
	20400.00	89.94	359.63	12369.25	8217.47	8213.32	-263.30	0.00	412702.83	767838.16	N 32 7 56.94 W	103 36 5.80
	20500.00	89.94	359.63	12369.36	8317.44	8313.32	-263.95	0.00	412802.82	767837.51	N 32 7 57.93 W	103 36 5.80
	20600.00	89.94	359.63	12369.47	8417.42	8413.31	-264.59	0.00	412902.82	767836.86	N 32 7 58.92 W	103 36 5.80
	20700.00	89.94	359.63	12369.57	8517.40	8513.31	-265.24	0.00	413002.81	767836.21	N 32 7 59.91 W	103 36 5.80
	20800.00	89.94	359.63	12369.68	8617.37	8613.31	-265.89	0.00	413102.81	767835.57	N 32 8 0.90 W	103 36 5.80
	20900.00	89.94	359.63	12369.79	8717.35	8713.31	-266.54	0.00	413202.80	767834.92	N 32 8 1.89 W	103 36 5.80
	21000.00	89.94	359.63	12369.90	8817.33	8813.31	-267.19	0.00	413302.80	767834.27	N 32 8 2.88 W	103 36 5.80
	21100.00	89.94	359.63	12370.00	8917.31	8913.30	-267.84	0.00	413402.79	767833.62	N 32 8 3.87 W	103 36 5.80
	21200.00	89.94	359.63	12370.11	9017.28	9013.30	-268.49	0.00	413502.79	767832.97	N 32 8 4.86 W	103 36 5.80
	21300.00	89.94	359.63	12370.22	9117.26	9113.30	-269.14	0.00	413602.78	767832.32	N 32 8 5.85 W	103 36 5.80
	21400.00	89.94	359.63	12370.33	9217.24	9213.30	-269.79	0.00	413702.77	767831.67	N 32 8 6.84 W	103 36 5.80
	21500.00	89.94	359.63	12370.43	9317.21	9313.30	-270.44	0.00	413802.77	767831.02	N 32 8 7.83 W	103 36 5.80
	21600.00	89.94	359.63	12370.54	9417.19	9413.29	-271.09	0.00	413902.76	767830.37	N 32 8 8.82 W	103 36 5.80
	21700.00	89.94	359.63	12370.65	9517.17	9513.29	-271.74	0.00	414002.76	767829.72	N 32 8 9.81 W	103 36 5.80
	21800.00	89.94	359.63	12370.76	9617.15	9613.29	-272.39	0.00	414102.75	767829.07	N 32 8 10.80 W	103 36 5.80
	21900.00	89.94	359.63	12370.87	9717.12	9713.29	-273.04	0.00	414202.75	767828.42	N 32 8 11.79 W	103 36 5.80
	22000.00	89.94	359.63	12370.97	9817.10	9813.28	-273.69	0.00	414302.74	767827.77	N 32 8 12.78 W	103 36 5.80
Cimarex Vaca Draw 20-17 Federal #1H - PBHL [330' FNL, 380' FWL]	22024.80	89.94	359.63	12371.00	9841.90	9838.08	-273.85	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	28.000	1/100.000	30.000	30.000		NAL_MWD_PLUS_0.5_DEG- Depth Only	Original Borehole / Cimarex Vaca Draw 20-17 Federal #1H Rev0 RM 7Feb17
	1	28.000	22024.801	1/100.000	30.000	30.000		NAL_MWD_PLUS_0.5_DEG	Original Borehole / Cimarex Vaca Draw 20-17 Federal #1H Rev0