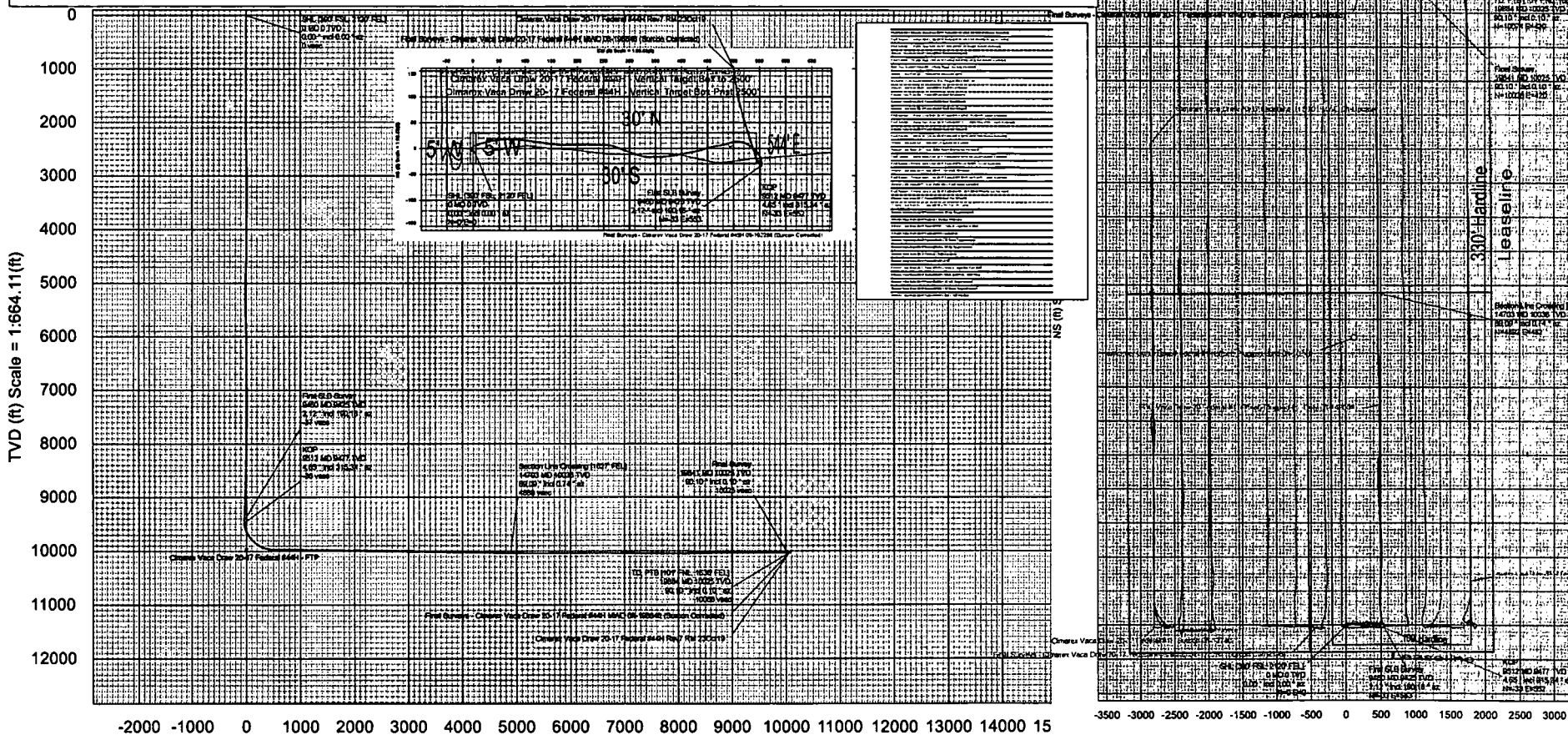


Borehole: **Vaca Draw 20-17 Federal #44H** Well: **Vaca Draw 20-17 Federal #44H** Field: **NM Lea County (NAD 83)** Structure: **Cimarex Vaca Draw 20-17 Federal #44H**

Gravity & Magnetic Parameters: Dpr: 53.73F Date: 23-Oct-2019 Surface Location: NAD83 New Mexico State Plane, Cimarex Zone, US Feet
 Model: HQGM 2019 FB: 47733.822mT Gravity FB: 986.432mgals (Bouguer Based) Lat: N 32 5 35.68 Lon: W 103 25 32.41 Northing: 404507.21mEasting: 770679.82mEasting
 Grid Conv: 0.3837" Scale Fact: 0.98888333 Slot: New Slot TVD Ref: RXB(3432.71 above MSL)
 Mag Dec: 6.806" Plan: Final Surveys - Cimarex Vaca Draw 20-17 Federal #44H MWD 05-19894H (Surcon Corrected)

Critical Points								
Critical Point	MD	INCL	AZIM	TVD	VBEC	N(+)/B(-)	E(+)/W(-)	DLB
SH-1 (387 FSL, 2120' FEL)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
First SLB Survey	9460.00	2.12	190.16	9425.13	-36.59	-32.99	553.40	0.76
KCP	9512.41	4.85	315.34	9477.49	-38.21	-32.83	551.78	13.88
Section Line Crossing (1627' FEL)	14703.30	59.09	0.74	10036.23	-4888.40	-4891.59	461.82	0.90
Final Survey	19841.00	90.10	0.10	10024.63	-10024.66	-10027.80	419.55	0.65
TD, PTB (101' FSL, 1636' FEL)	19894.00	90.10	0.10	10034.76	-10067.86	-10070.80	419.53	0.00



Vertical Section (ft) Azim = 359.63° Scale = 1:664.11(ft) Origin = 0N/-S, 0E/-W

EW (ft) Scale = 1:522.04(ft)

Final Surveys - Cimarex Vaca Draw 20-17 Federal #44H MWD 0ft-19884ft (Surcon Corrected) Survey Geodetic Report (Def Survey)



Report Date: November 11, 2019 - 10:17 AM
 Client: Cimarex Energy
 Field: NM Lea County (NAD 83)
 Structure / Slot: Cimarex Vaca Draw 20-17 Federal #44H / New Slot
 Well: Vaca Draw 20-17 Federal #44H
 Borehole: Vaca Draw 20-17 Federal #44H
 UWI / API#: Unknown / Unknown
 Survey Name: Final Surveys - Cimarex Vaca Draw 20-17 Federal #44H MWD 0ft-19884ft (Surcon Corrected)
 Survey Date: August 26, 2019
 Tort / AHD / DDI / ERD Ratio: 246.044' / 10728.924 ft / 6.718' / 1.068
 Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
 Location Lat / Long: N 32° 6' 35.65184", W 103° 35' 33.41344"
 Location Grid N/E Y/X: N 404507.210 RUS, E 770679.880 RUS
 CRS Grid Convergence Angle: 0.3937°
 Grid Scale Factor: 0.99996933
 Version / Patch: 2.10.782.0

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: 3432.700 ft above MSL
 Seabed / Ground Elevation: 3406.700 ft above MSL
 Magnetic Declination: 6.606°
 Total Gravity Field Strength: 998.4316mgn (9.80665 Based)
 Gravity Model: GARM
 Total Magnetic Field Strength: 47733.623 nT
 Magnetic Dip Angle: 59.705°
 Declination Date: October 23, 2019
 Magnetic Declination Model: HDGM 2019
 North Reference: Grid North
 Grid Convergence Used: 0.3937°
 Total Corr Mag North->Grid North: 6.2120°
 Local Coord Referenced To: Well Head

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (ft/100ft)	Northing (RUS)	Easting (RUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")	Closure Azimuth (°)	Closure (ft)
SHL [390° FSL, 2120° FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404507.21	770679.88	N 32 6 35.65	W 103 35 33.41	0.00	0.00
	169.00	0.11	192.17	169.00	-0.16	-0.16	-0.03	0.07	404507.05	770679.85	N 32 6 35.65	W 103 35 33.41	192.17	0.16
	299.00	0.12	151.64	299.00	-0.40	-0.40	0.00	0.06	404506.81	770679.88	N 32 6 35.65	W 103 35 33.41	179.40	0.40
	481.00	0.16	94.48	481.00	-0.59	-0.59	0.35	0.08	404506.62	770680.23	N 32 6 35.65	W 103 35 33.41	149.38	0.68
	572.00	0.15	132.48	572.00	-0.68	-0.68	0.56	0.11	404506.53	770680.44	N 32 6 35.65	W 103 35 33.41	140.33	0.88
	662.00	0.15	154.69	662.00	-0.87	-0.86	0.70	0.06	404506.35	770680.58	N 32 6 35.64	W 103 35 33.41	141.01	1.11
	754.00	0.13	164.09	754.00	-1.08	-1.07	0.78	0.03	404506.14	770680.66	N 32 6 35.64	W 103 35 33.40	144.00	1.33
	844.00	0.11	224.74	844.00	-1.24	-1.23	0.75	0.14	404505.98	770680.63	N 32 6 35.64	W 103 35 33.40	148.79	1.44
	939.00	0.09	205.52	939.00	-1.37	-1.37	0.65	0.04	404505.84	770680.53	N 32 6 35.64	W 103 35 33.41	154.52	1.51
	1001.00	0.03	128.18	1001.00	-1.42	-1.42	0.64	0.14	404505.79	770680.52	N 32 6 35.64	W 103 35 33.41	155.64	1.56
	1221.00	0.37	220.31	1221.00	-2.00	-2.00	0.23	0.17	404505.21	770680.11	N 32 6 35.63	W 103 35 33.41	173.48	2.01
	1316.00	0.45	222.02	1315.99	-2.51	-2.51	-0.22	0.09	404504.70	770679.66	N 32 6 35.63	W 103 35 33.42	185.01	2.52
	1505.00	0.56	231.14	1504.99	-3.63	-3.64	-1.44	0.07	404503.57	770678.44	N 32 6 35.62	W 103 35 33.43	201.54	3.91
	1600.00	0.65	222.58	1599.98	-4.31	-4.33	-2.16	0.13	404502.88	770677.72	N 32 6 35.61	W 103 35 33.44	206.55	4.84
	1789.00	0.65	230.82	1788.97	-5.77	-5.79	-3.72	0.05	404501.42	770676.16	N 32 6 35.59	W 103 35 33.46	212.69	6.88
	1883.00	0.47	251.16	1882.98	-6.23	-6.25	-4.50	0.28	404500.96	770675.38	N 32 6 35.59	W 103 35 33.47	215.71	7.70
	1977.00	0.38	334.26	1976.96	-8.07	-6.10	-5.00	0.60	404501.11	770674.88	N 32 6 35.59	W 103 35 33.47	219.33	7.88
	2072.00	0.42	337.48	2071.96	-5.48	-5.49	-5.27	0.05	404501.72	770674.61	N 32 6 35.60	W 103 35 33.48	223.79	7.61
	2168.00	0.85	20.19	2165.96	-4.49	-4.52	-5.16	0.65	404502.69	770674.72	N 32 6 35.61	W 103 35 33.47	228.77	6.86
	2261.00	1.09	28.53	2260.94	-3.04	-3.07	-4.48	0.29	404504.14	770675.40	N 32 6 35.62	W 103 35 33.47	235.64	5.43
	2355.00	1.22	30.32	2354.92	-1.39	-1.42	-3.55	0.14	404505.79	770676.33	N 32 6 35.64	W 103 35 33.45	248.26	3.82
	2450.00	1.68	24.25	2449.89	0.74	0.73	-2.47	0.51	404507.94	770677.41	N 32 6 35.66	W 103 35 33.44	286.40	2.57
	2544.00	2.55	56.48	2543.83	3.14	3.14	-0.16	1.53	404510.35	770679.72	N 32 6 35.88	W 103 35 33.42	357.09	3.14
	2638.00	4.71	67.13	2637.64	5.76	5.79	5.14	2.40	404513.00	770685.02	N 32 6 35.71	W 103 35 33.35	41.58	7.75
	2733.00	6.58	73.00	2732.17	8.81	8.90	13.94	2.06	404516.11	770693.82	N 32 6 35.74	W 103 35 33.25	57.44	16.54
	2827.00	8.61	76.11	2825.34	12.00	12.17	25.92	2.20	404519.38	770705.80	N 32 6 35.77	W 103 35 33.11	64.86	28.63
	2921.00	9.03	81.22	2918.23	14.72	14.98	40.04	0.95	404522.19	770719.92	N 32 6 35.80	W 103 35 32.95	69.49	42.75
	3016.00	9.48	83.90	3012.00	16.59	16.95	55.17	0.64	404524.16	770735.05	N 32 6 35.82	W 103 35 32.77	72.92	57.72
	3110.00	9.62	89.18	3104.70	17.42	17.88	70.71	0.95	404525.09	770750.59	N 32 6 35.82	W 103 35 32.59	75.81	72.94
	3205.00	9.80	94.99	3198.34	16.73	17.29	86.70	1.05	404524.50	770766.58	N 32 6 35.82	W 103 35 32.40	78.72	88.41
	3394.00	8.24	99.71	3385.00	12.85	13.61	116.08	0.91	404520.82	770795.95	N 32 6 35.78	W 103 35 32.06	83.31	116.87
	3488.00	7.88	97.58	3478.07	10.78	11.62	129.10	0.50	404518.83	770808.98	N 32 6 35.76	W 103 35 31.91	84.86	129.63
	3677.00	7.37	96.66	3665.40	7.51	8.51	153.99	0.28	404515.72	770833.86	N 32 6 35.73	W 103 35 31.62	86.84	154.22
	3772.00	6.60	96.91	3759.70	6.07	7.14	165.46	0.81	404514.35	770845.33	N 32 6 35.71	W 103 35 31.49	87.53	165.61
	3866.00	7.09	91.21	3853.03	5.22	6.37	176.62	0.89	404513.58	770856.50	N 32 6 35.70	W 103 35 31.36	87.93	176.74

Comments	MD (ft)	Incl (°)	Azlm Grd (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")	Closure Azimuth (°)	Closure (ft)
	3961.00	6.85	86.98	3947.33	5.32	6.55	188.14	0.60	404513.76	770868.01	N 32 6 35.70	W 103 35 31.23	88.01	188.25
	4149.00	6.81	90.15	4133.99	5.74	7.11	210.48	0.20	404514.32	770890.36	N 32 6 35.71	W 103 35 30.97	88.07	210.60
	4244.00	7.42	91.00	4228.26	5.54	6.99	222.25	0.65	404514.20	770902.12	N 32 6 35.71	W 103 35 30.83	88.20	222.36
	4338.00	8.72	92.03	4321.33	5.10	6.63	235.44	1.39	404513.84	770915.31	N 32 6 35.70	W 103 35 30.68	88.39	235.53
	4433.00	7.61	89.42	4415.36	4.82	6.44	248.93	1.23	404513.65	770928.80	N 32 6 35.70	W 103 35 30.52	88.52	249.01
	4527.00	8.31	98.10	4508.46	3.84	5.54	261.86	1.48	404512.75	770941.75	N 32 6 35.69	W 103 35 30.37	88.79	261.93
	4622.00	9.79	110.84	4602.28	-0.09	1.70	276.22	2.61	404508.91	770956.09	N 32 6 35.65	W 103 35 30.20	89.65	276.23
	4716.00	8.70	110.60	4695.06	-5.53	-3.64	290.35	1.16	404503.57	770970.22	N 32 6 35.60	W 103 35 30.04	90.72	290.37
	4810.00	7.18	108.79	4788.16	-10.00	-8.04	302.56	1.64	404499.17	770982.43	N 32 6 35.55	W 103 35 29.90	91.52	302.67
	4869.00	6.81	109.58	4846.72	-12.41	-10.40	309.35	0.65	404496.81	770989.22	N 32 6 35.53	W 103 35 29.82	91.93	309.52
	4983.00	6.10	105.25	4960.00	-16.34	-14.26	321.56	0.75	404492.95	771001.43	N 32 6 35.49	W 103 35 29.68	92.54	321.88
	5078.00	6.67	94.62	5054.41	-18.18	-16.03	331.93	1.38	404491.18	771011.80	N 32 6 35.47	W 103 35 29.56	92.76	332.32
	5267.00	7.28	88.66	5242.01	-18.94	-16.63	354.84	0.50	404490.58	771034.71	N 32 6 35.46	W 103 35 29.29	92.68	355.23
	5456.00	7.93	81.90	5429.35	-16.98	-14.52	379.72	0.58	404492.70	771059.59	N 32 6 35.48	W 103 35 29.00	92.19	380.00
	5550.00	8.05	80.60	5522.44	-15.08	-12.53	392.84	0.23	404494.68	771072.50	N 32 6 35.50	W 103 35 28.85	91.83	392.84
	5645.00	8.10	79.73	5616.50	-12.88	-10.25	405.79	0.14	404496.96	771085.65	N 32 6 35.52	W 103 35 28.70	91.45	405.91
	5740.00	8.38	77.62	5710.52	-10.29	-7.57	419.13	0.43	404499.64	771099.00	N 32 6 35.55	W 103 35 28.54	91.03	419.20
	5834.00	8.47	76.40	5803.50	-7.28	-4.47	432.55	0.21	404502.74	771112.42	N 32 6 35.58	W 103 35 28.39	90.59	432.57
	5929.00	8.43	73.85	5897.47	-3.79	-0.89	446.04	0.40	404506.32	771125.91	N 32 6 35.61	W 103 35 28.23	90.11	446.04
	6023.00	6.59	76.81	5990.66	-0.72	2.26	457.91	2.00	404509.47	771137.78	N 32 6 35.64	W 103 35 28.09	89.72	457.92
	6118.00	4.96	79.07	6085.18	1.25	4.28	467.25	1.73	404511.49	771147.12	N 32 6 35.66	W 103 35 27.98	89.48	467.27
	6212.00	3.59	82.19	6178.91	2.37	5.45	474.16	1.48	404512.66	771154.02	N 32 6 35.67	W 103 35 27.90	89.34	474.19
	6307.00	2.08	79.50	6273.79	3.06	6.17	478.80	1.60	404513.38	771158.66	N 32 6 35.68	W 103 35 27.85	89.26	478.84
	6401.00	1.81	75.29	6367.74	3.73	6.86	481.91	0.32	404514.07	771161.78	N 32 6 35.69	W 103 35 27.81	89.18	481.96
	6496.00	1.88	72.94	6462.69	4.55	7.69	484.85	0.11	404514.90	771164.72	N 32 6 35.69	W 103 35 27.78	89.09	484.91
	6590.00	1.74	71.67	6556.84	5.43	8.60	487.68	0.15	404515.81	771167.55	N 32 6 35.70	W 103 35 27.74	88.99	487.76
	6779.00	1.67	74.43	6745.56	7.04	10.24	493.06	0.06	404517.45	771172.92	N 32 6 35.72	W 103 35 27.68	88.81	493.17
	6873.00	1.65	72.28	6839.52	7.80	11.02	495.67	0.07	404518.23	771175.53	N 32 6 35.73	W 103 35 27.65	88.73	495.79
	6968.00	1.64	77.51	6934.48	8.49	11.73	498.30	0.16	404518.94	771178.16	N 32 6 35.73	W 103 35 27.62	88.65	498.44
	7062.00	1.46	80.82	7028.45	8.96	12.21	500.79	0.21	404519.42	771180.66	N 32 6 35.74	W 103 35 27.59	88.60	500.94
	7156.00	1.61	81.94	7122.41	9.32	12.58	503.28	0.16	404519.79	771183.15	N 32 6 35.74	W 103 35 27.56	88.57	503.44
	7250.00	1.60	87.14	7216.38	9.55	12.84	505.90	0.16	404520.05	771185.76	N 32 6 35.74	W 103 35 27.53	88.55	506.06
	7438.00	1.69	94.16	7404.30	9.45	12.77	511.29	0.12	404519.98	771191.15	N 32 6 35.74	W 103 35 27.47	88.57	511.45
	7533.00	1.86	97.15	7499.25	9.13	12.47	514.21	0.20	404519.68	771194.08	N 32 6 35.74	W 103 35 27.43	88.61	514.37
	7627.00	1.83	102.79	7593.21	8.59	11.95	517.19	0.20	404519.16	771197.05	N 32 6 35.73	W 103 35 27.40	88.68	517.33
	7816.00	1.82	114.82	7782.11	6.63	10.02	522.86	0.20	404517.23	771202.72	N 32 6 35.72	W 103 35 27.33	88.90	522.95
	7910.00	1.88	116.14	7876.06	5.30	8.72	525.60	0.08	404515.93	771205.46	N 32 6 35.70	W 103 35 27.30	89.05	525.67
	8004.00	1.80	122.30	7970.01	3.82	7.25	528.23	0.23	404514.46	771208.09	N 32 6 35.69	W 103 35 27.27	89.21	528.28
	8099.00	1.88	119.98	8064.96	2.23	5.67	530.84	0.12	404512.88	771210.70	N 32 6 35.67	W 103 35 27.24	89.39	530.87
	8287.00	2.02	128.74	8252.86	-1.42	2.06	536.10	0.17	404509.27	771215.96	N 32 6 35.64	W 103 35 27.18	89.78	536.10
	8476.00	2.15	133.77	8441.73	-5.99	-2.48	541.25	0.12	404504.73	771221.12	N 32 6 35.59	W 103 35 27.12	90.26	541.26
	8570.00	2.04	139.22	8535.67	-8.50	-4.97	543.62	0.24	404502.24	771223.48	N 32 6 35.57	W 103 35 27.09	90.52	543.64
	8758.00	2.19	149.28	8723.54	-14.14	-10.59	547.64	0.21	404496.82	771227.50	N 32 6 35.51	W 103 35 27.05	91.11	547.74
	8853.00	2.31	152.94	8818.47	-17.42	-13.85	549.44	0.20	404493.36	771229.30	N 32 6 35.48	W 103 35 27.03	91.44	549.62
	9042.00	2.06	160.86	9007.33	-24.04	-20.45	552.29	0.21	404486.76	771232.15	N 32 6 35.41	W 103 35 26.99	92.12	552.67
	9136.00	1.82	165.87	9101.28	-27.09	-23.50	553.21	0.31	404483.71	771233.07	N 32 6 35.38	W 103 35 26.98	92.43	553.70
	9231.00	1.46	174.20	9196.24	-29.76	-26.16	553.70	0.45	404481.05	771233.56	N 32 6 35.38	W 103 35 26.98	92.71	554.31
	9326.00	1.65	184.44	9291.20	-32.33	-28.73	553.71	0.35	404478.48	771233.57	N 32 6 35.33	W 103 35 26.98	92.97	554.46
	9402.00	1.81	181.10	9367.17	-34.62	-31.02	553.61	0.25	404476.19	771233.47	N 32 6 35.31	W 103 35 26.98	93.21	554.47
First SLB Survey	9460.00	2.12	190.16	9425.13	-38.59	-32.99	553.40	0.76	404474.22	771233.26	N 32 6 35.29	W 103 35 26.98	93.41	554.38
	9491.00	2.10	288.74	9456.12	-36.96	-33.38	552.76	10.32	404473.83	771232.62	N 32 6 35.28	W 103 35 26.99	93.46	553.77
KOP	9512.41	4.65	315.34	9477.49	-36.21	-32.63	551.78	13.68	404474.58	771231.64	N 32 6 35.29	W 103 35 27.00	93.38	552.74
	9523.00	6.04	319.77	9488.04	-35.48	-31.90	551.12	13.68	404475.31	771230.98	N 32 6 35.30	W 103 35 27.01	93.31	552.04
	9555.00	9.97	327.61	9519.72	-31.84	-28.28	548.54	12.72	404478.93	771228.41	N 32 6 35.33	W 103 35 27.04	92.95	549.27
	9602.00	15.97	338.99	9565.51	-22.33	-18.79	544.04	13.82	404488.42	771223.90	N 32 6 35.43	W 103 35 27.09	91.98	544.37
	9649.00	22.11	343.20	9609.92	-7.78	-4.28	539.16	13.38	404502.93	771219.02	N 32 6 35.57	W 103 35 27.15	90.45	539.18
	9696.00	27.25	341.23	9652.61	10.93	14.39	533.14	11.07	404521.60	771213.00	N 32 6 35.76	W 103 35 27.21	88.45	533.33
	9744.00	32.93	342.25	9694.12	33.83	37.24	525.62	11.88	404544.45	771205.48	N 32 6 35.98	W 103 35 27.30	85.95	526.94
	9791.00	37.15	344.57	9732.60	59.74	63.10	517.94	9.41	404570.31	771197.81	N 32 6 36.24	W 103 35 27.39	83.05	521.77
	9839.00	41.60	346.91	9769.70	89.29	92.61	510.48	9.77	404599.82	771190.34	N 32 6 36.53	W 103 35 27.47	79.72	518.81
	9887.00	45.79	350.51	9804.40	121.84	125.12	504.03	10.15	404632.32	771183.89	N 32 6 36.86	W 103 35 27.54	76.06	519.32
	9934.00	50.11	354.77	9835.88	156.46	159.71	499.60	11.39	404666.92	771179.47	N 32 6 37.20	W 103 35 27.59	72.27	524.51
	9981.00	54.00	355.37	9864.77	193.40	196.63	496.42	8.34	404703.83	771176.29	N 32 6 37.56	W 103 35 27.63	68.39	533.95
	10029.00	58.22	354.22	9891.53	233.10	236.30	492.80	9.01	404743.50	771172.66	N 32 6 37.96	W 103 35 27.67	64.38	546.52
	10077.00	63.34	353.76	9914.96	274.77	277.95	488.41	10.70	404785.15	771168.27	N 32 6 38.37	W 103 35 27.71	60.36	561.96
	10124.00	69.68	355.04	9933.68	317.68	320.83	484.22	13.72	404828.03	771164.08	N 32 6 38.79	W 103 35 27.76	56.47	580.86
	10171.00	74.34	358.87	9948.20	362.31	365.44	481.86	12.58	404872.64	771161.73	N 32 6 39.24	W 103 35 27.78	52.82	604.77

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 ° ' '')	Closure Azimuth (°)	Closure (ft)
	10218.00	78.30	2.08	9959.32	407.95	411.09	482.25	10.72	404918.29	771162.12	N 32 6 39.69	W 103 35 27.77	49.55	633.69
	10313.00	88.01	2.77	9970.62	502.05	505.22	486.25	10.25	405012.41	771166.11	N 32 6 40.62	W 103 35 27.72	43.90	701.20
	10419.00	89.97	4.43	9972.49	607.77	610.98	492.90	2.42	405118.17	771172.76	N 32 6 41.66	W 103 35 27.63	38.89	785.02
	10514.00	90.17	3.24	9972.38	702.51	705.77	499.25	1.27	405212.96	771179.12	N 32 6 42.60	W 103 35 27.55	35.28	864.50
	10609.00	89.21	2.59	9972.89	797.35	800.64	504.08	1.22	405307.83	771183.95	N 32 6 43.54	W 103 35 27.49	32.19	946.11
	10704.00	89.38	2.00	9974.06	892.24	895.56	507.89	0.65	405402.74	771187.75	N 32 6 44.48	W 103 35 27.44	29.56	1029.55
	10799.00	89.31	3.09	9975.15	987.11	990.46	512.11	1.15	405497.64	771191.97	N 32 6 45.42	W 103 35 27.38	27.34	1115.02
	10894.00	89.31	359.10	9976.29	1082.05	1085.41	513.92	4.20	405592.59	771193.78	N 32 6 46.36	W 103 35 27.35	25.34	1200.93
	10988.00	88.83	357.44	9977.82	1176.01	1179.36	511.08	1.84	405686.53	771190.95	N 32 6 47.29	W 103 35 27.38	23.43	1285.34
	11178.00	89.45	355.42	9980.67	1365.68	1368.95	499.26	1.11	405876.12	771179.12	N 32 6 49.16	W 103 35 27.50	20.04	1457.15
	11273.00	89.42	355.27	9981.60	1460.41	1463.64	491.55	0.16	405970.80	771171.41	N 32 6 50.10	W 103 35 27.58	18.56	1543.97
	11368.00	89.42	356.76	9982.57	1555.22	1558.40	484.94	1.57	406065.56	771164.81	N 32 6 51.04	W 103 35 27.65	17.29	1632.11
	11463.00	89.28	358.39	9983.64	1650.15	1653.31	480.93	1.72	406160.46	771160.79	N 32 6 51.98	W 103 35 27.69	16.22	1721.83
	11574.00	88.83	359.01	9985.48	1761.12	1764.26	478.41	0.69	406271.41	771158.27	N 32 6 53.08	W 103 35 27.71	15.17	1827.97
	11653.00	89.11	358.70	9986.90	1840.10	1843.23	476.83	0.53	406350.38	771156.69	N 32 6 53.86	W 103 35 27.72	14.50	1903.91
	11747.00	89.42	359.08	9988.10	1934.08	1937.21	475.01	0.52	406444.35	771154.87	N 32 6 54.79	W 103 35 27.74	13.78	1994.59
	11842.00	89.14	358.67	9989.29	2029.07	2032.18	473.14	0.52	406539.32	771153.01	N 32 6 55.73	W 103 35 27.75	13.11	2086.53
	11937.00	88.62	358.97	9991.15	2124.04	2127.14	471.19	0.63	406634.28	771151.05	N 32 6 56.67	W 103 35 27.77	12.49	2178.70
	12031.00	89.38	359.05	9992.79	2218.02	2221.11	469.56	0.81	406728.25	771149.43	N 32 6 57.60	W 103 35 27.78	11.94	2270.20
	12126.00	89.24	0.61	9993.94	2313.01	2316.10	469.28	1.65	406823.24	771149.15	N 32 6 58.54	W 103 35 27.77	11.45	2363.17
	12221.00	89.55	3.65	9994.94	2407.90	2411.02	472.81	3.22	406918.15	771152.68	N 32 6 59.48	W 103 35 27.72	11.10	2456.94
	12315.00	89.21	4.72	9995.96	2501.60	2504.78	479.67	1.19	407011.89	771159.54	N 32 7 0.40	W 103 35 27.64	10.84	2550.28
	12410.00	89.66	3.40	9996.89	2596.30	2599.52	486.40	1.47	407106.64	771166.26	N 32 7 1.34	W 103 35 27.55	10.60	2644.63
	12505.00	89.21	1.24	9997.83	2691.19	2694.43	490.24	2.32	407201.55	771170.11	N 32 7 2.28	W 103 35 27.50	10.31	2738.66
	12600.00	89.24	0.08	9999.12	2786.16	2789.41	491.34	1.22	407296.53	771171.20	N 32 7 3.22	W 103 35 27.48	9.99	2832.35
	12695.00	89.66	1.39	10000.03	2881.14	2884.40	492.55	1.45	407391.51	771172.42	N 32 7 4.16	W 103 35 27.46	9.69	2926.15
	12790.00	89.52	2.06	10000.71	2976.07	2979.35	495.41	0.72	407486.46	771175.28	N 32 7 5.10	W 103 35 27.42	9.44	3020.26
	12885.00	89.42	0.57	10001.59	3071.02	3074.32	497.59	1.57	407581.43	771177.46	N 32 7 6.04	W 103 35 27.38	9.19	3114.33
	12979.00	88.18	359.71	10003.55	3165.00	3168.30	497.82	1.61	407675.40	771177.69	N 32 7 6.97	W 103 35 27.37	8.93	3207.17
	13074.00	89.59	358.79	10005.40	3259.97	3263.27	498.58	1.77	407770.37	771178.44	N 32 7 7.91	W 103 35 27.38	8.65	3300.83
	13169.00	88.97	358.22	10006.60	3354.95	3358.23	494.10	0.89	407865.33	771173.97	N 32 7 8.85	W 103 35 27.40	8.37	3394.38
	13264.00	88.97	358.16	10008.30	3449.90	3453.16	491.10	0.06	407960.26	771170.97	N 32 7 9.79	W 103 35 27.43	8.09	3487.91
	13359.00	88.66	357.09	10010.27	3544.82	3548.06	487.17	1.17	408055.15	771167.03	N 32 7 10.73	W 103 35 27.47	7.82	3581.35
	13454.00	89.83	356.86	10011.52	3639.71	3642.92	482.15	1.26	408150.01	771162.02	N 32 7 11.67	W 103 35 27.52	7.54	3674.69
	13548.00	89.59	357.85	10012.00	3733.63	3736.81	477.82	1.08	408243.90	771157.68	N 32 7 12.60	W 103 35 27.56	7.29	3767.24
	13647.00	89.86	359.04	10012.47	3832.61	3835.78	475.13	1.23	408342.86	771154.99	N 32 7 13.57	W 103 35 27.58	7.06	3865.09
	13742.00	88.28	357.64	10014.01	3927.57	3930.72	472.38	2.22	408437.80	771152.24	N 32 7 14.51	W 103 35 27.61	6.85	3959.00
	13837.00	88.59	357.49	10016.61	4022.47	4025.60	468.34	0.36	408532.67	771148.21	N 32 7 15.45	W 103 35 27.65	6.64	4052.75
	13932.00	88.83	359.22	10018.75	4117.42	4120.53	465.62	1.84	408627.60	771145.48	N 32 7 16.39	W 103 35 27.67	6.45	4146.75
	14027.00	88.66	359.70	10020.83	4212.40	4215.50	464.72	0.54	408722.57	771144.59	N 32 7 17.33	W 103 35 27.67	6.29	4241.04
	14122.00	88.80	0.22	10022.93	4307.37	4310.48	464.66	0.57	408817.55	771144.52	N 32 7 18.27	W 103 35 27.67	6.15	4335.45
	14217.00	88.76	0.09	10024.96	4402.35	4405.46	464.91	0.14	408912.52	771144.78	N 32 7 19.21	W 103 35 27.66	6.02	4429.92
	14312.00	88.52	359.10	10027.21	4497.32	4500.43	464.24	1.07	409007.49	771144.11	N 32 7 20.15	W 103 35 27.66	5.89	4524.31
	14406.00	88.73	359.96	10029.47	4591.29	4594.39	463.47	0.94	409101.45	771143.34	N 32 7 21.08	W 103 35 27.66	5.76	4617.71
	14501.00	88.07	358.93	10032.12	4688.25	4689.35	462.55	1.29	409196.41	771142.42	N 32 7 22.02	W 103 35 27.66	5.63	4712.11
	14596.00	89.11	359.47	10034.46	4781.22	4784.31	461.23	1.23	409291.37	771141.09	N 32 7 22.96	W 103 35 27.67	5.51	4806.49
	14691.00	89.00	0.81	10036.02	4876.20	4879.30	461.46	1.42	409386.35	771141.32	N 32 7 23.90	W 103 35 27.66	5.40	4901.07
Section Line Crossing [1627' FEL]	14703.30	89.09	0.74	10036.23	4888.49	4891.59	461.62	0.93	409398.64	771141.49	N 32 7 24.02	W 103 35 27.65	5.39	4913.33
	14786.00	89.72	0.29	10037.09	4971.18	4974.29	462.37	0.93	409481.33	771142.23	N 32 7 24.84	W 103 35 27.64	5.31	4995.73
	14881.00	89.28	359.97	10037.91	5066.17	5069.28	462.58	0.57	409576.33	771142.45	N 32 7 25.78	W 103 35 27.63	5.21	5090.34
	14976.00	89.28	0.28	10039.11	5161.16	5164.27	462.79	0.33	409671.31	771142.66	N 32 7 26.72	W 103 35 27.62	5.12	5184.97
	15071.00	90.03	359.90	10039.88	5256.15	5259.27	462.94	0.89	409766.31	771142.81	N 32 7 27.66	W 103 35 27.61	5.03	5279.61
	15261.00	90.00	359.16	10039.63	5446.15	5449.26	461.38	0.39	409856.29	771141.25	N 32 7 29.54	W 103 35 27.61	4.84	5468.76
	15356.00	90.58	1.56	10039.15	5541.14	5544.25	461.98	2.60	410051.28	771141.84	N 32 7 30.48	W 103 35 27.60	4.76	5563.47
	15546.00	89.83	358.77	10038.47	5731.11	5734.23	462.53	1.52	410241.25	771142.39	N 32 7 32.36	W 103 35 27.58	4.61	5752.85
	15641.00	90.14	1.06	10038.49	5826.10	5829.22	462.39	2.43	410336.24	771142.25	N 32 7 33.30	W 103 35 27.57	4.54	5847.53
	15736.00	89.79	359.79	10038.55	5921.09	5924.22	463.09	1.39	410431.24	771142.95	N 32 7 34.24	W 103 35 27.56	4.47	5942.29
	15831.00	90.31	0.27	10038.47	6016.08	6019.22	463.14	0.74	410526.23	771143.00	N 32 7 35.18	W 103 35 27.55	4.40	6037.01
	16021.00	89.97	1.03	10038.01	6206.05	6209.20	465.30	0.44	410716.21	771145.16	N 32 7 37.06	W 103 35 27.51	4.29	6226.61
	16210.00	90.38	358.85	10037.43	6395.04	6398.19	464.77	1.28	410905.19	771144.63	N 32 7 38.93	W 103 35 27.50	4.15	6415.05
	16305.00	90.07	358.28	10037.06	6490.02	6493.15	462.22	0.51	411000.15	771142.09	N 32 7 39.87	W 103 35 27.52	4.07	6509.58
	16400.00	89.59	357.34	10037.34	6584.97	6588.08	458.59	1.11	411095.08	771138.46	N 32 7 40.81	W 103 35 27.55	3.98	6604.02
	16495.00	89.79	358.88	10037.85	6679.93	6683.03	455.46	1.63	411190.02	771135.32	N 32 7 41.75	W 103 35 27.58	3.90	6698.53
	16590.00	88.66	356.73	10039.14	6774.86	6777.94	451.82	2.56	411284.93	771131.69	N 32 7 42.69	W 103 35 27.62	3.81	6792.98
	16685.00	89.83	357.37	10040.39	6869.76	6872.80	446.93	1.40	411379.79	771126.80	N 32 7 43.63	W 103 35 27.67	3.72	6887.32

Comments	MD (R)	Incl (°)	Azim Grid (°)	TVD (R)	VSEC (R)	NS (R)	EW (R)	DLS (*100R)	Northing (RUS)	Easting (RUS)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')	Closure Azimuth (°)	Closure (R)
	16875.00	89.52	357.73	10041.47	7059.63	7062.63	438.81	0.25	411569.61	771118.68	N 32 7 45.51	W 103 35 27.75	3.56	7076.25
	16970.00	89.42	359.33	10042.34	7154.60	7157.59	436.37	1.69	411664.56	771116.24	N 32 7 46.45	W 103 35 27.77	3.49	7170.88
	17065.00	89.48	358.66	10043.26	7249.59	7252.57	434.71	0.71	411759.54	771114.57	N 32 7 47.39	W 103 35 27.78	3.43	7265.59
	17160.00	89.48	1.50	10044.12	7344.58	7347.56	434.84	2.99	411854.53	771114.71	N 32 7 48.33	W 103 35 27.77	3.28	7360.41
	17255.00	89.83	3.31	10044.69	7439.46	7442.47	438.83	1.94	411949.43	771118.69	N 32 7 49.27	W 103 35 27.72	3.37	7455.39
	17350.00	89.55	0.17	10045.20	7534.38	7537.41	441.71	3.32	412044.37	771121.58	N 32 7 50.20	W 103 35 27.67	3.35	7550.34
	17444.00	89.76	0.13	10045.77	7628.38	7631.41	441.96	0.23	412138.37	771121.82	N 32 7 51.14	W 103 35 27.66	3.31	7644.19
	17540.00	89.28	0.40	10046.58	7724.37	7727.40	442.40	0.57	412234.36	771122.27	N 32 7 52.08	W 103 35 27.65	3.28	7740.06
	17635.00	89.42	359.14	10047.65	7819.36	7822.39	442.02	1.33	412329.35	771121.89	N 32 7 53.02	W 103 35 27.65	3.23	7834.87
	17730.00	89.79	0.80	10048.31	7914.35	7917.39	441.97	1.79	412424.34	771121.84	N 32 7 53.96	W 103 35 27.64	3.20	7929.71
	17825.00	90.28	0.88	10048.25	8009.33	8012.38	443.36	0.52	412519.32	771123.23	N 32 7 54.90	W 103 35 27.62	3.17	8024.63
	17920.00	91.13	0.76	10047.08	8104.30	8107.36	444.72	0.90	412614.30	771124.59	N 32 7 55.84	W 103 35 27.59	3.14	8119.55
	18015.00	90.83	0.90	10045.46	8199.27	8202.33	446.10	0.35	412709.28	771125.96	N 32 7 56.78	W 103 35 27.57	3.11	8214.46
	18107.00	90.69	0.60	10044.24	8291.24	8294.32	447.30	0.36	412801.26	771127.17	N 32 7 57.69	W 103 35 27.55	3.09	8306.37
	18200.00	90.93	0.88	10042.92	8384.21	8387.30	448.50	0.40	412894.24	771128.37	N 32 7 58.61	W 103 35 27.53	3.06	8399.28
	18293.00	90.86	0.99	10041.47	8477.18	8480.28	450.02	0.14	412987.21	771129.89	N 32 7 59.53	W 103 35 27.50	3.04	8492.21
	18385.00	91.31	359.62	10039.73	8569.15	8572.26	450.51	1.57	413079.19	771130.38	N 32 8 0.44	W 103 35 27.49	3.01	8584.09
	18569.00	90.72	358.56	10036.47	8753.11	8756.20	447.59	0.66	413263.13	771127.45	N 32 8 2.26	W 103 35 27.51	2.93	8767.63
	18661.00	90.93	358.02	10035.14	8845.08	8848.15	444.84	0.63	413355.07	771124.71	N 32 8 3.17	W 103 35 27.53	2.88	8859.33
	18753.00	90.89	358.63	10033.68	8937.04	8940.10	442.15	0.66	413447.02	771122.02	N 32 8 4.08	W 103 35 27.56	2.83	8951.03
	18846.00	90.79	358.96	10032.32	9030.02	9033.07	440.20	0.37	413539.98	771120.06	N 32 8 5.00	W 103 35 27.57	2.79	9043.79
	18938.00	90.65	358.89	10031.16	9122.01	9125.05	438.47	0.17	413631.96	771118.34	N 32 8 5.91	W 103 35 27.58	2.75	9135.57
	19030.00	90.21	358.43	10030.47	9213.99	9217.02	436.32	0.69	413723.93	771116.19	N 32 8 6.83	W 103 35 27.60	2.71	9227.34
	19214.00	90.31	358.56	10029.64	9397.95	9400.95	431.49	0.09	413907.85	771111.36	N 32 8 8.65	W 103 35 27.64	2.63	9410.85
	19306.00	90.62	358.38	10028.89	9489.93	9492.92	429.03	0.39	413999.82	771108.90	N 32 8 9.56	W 103 35 27.67	2.59	9502.61
	19399.00	90.45	358.56	10028.02	9582.91	9585.88	426.55	0.27	414092.78	771106.42	N 32 8 10.48	W 103 35 27.69	2.55	9595.36
	19583.00	90.48	358.84	10026.53	9766.88	9769.83	422.38	0.15	414276.72	771102.24	N 32 8 12.30	W 103 35 27.72	2.48	9778.95
	19674.00	90.52	359.09	10025.73	9857.87	9860.81	420.73	0.28	414367.69	771100.60	N 32 8 13.20	W 103 35 27.73	2.44	9869.78
Final Survey	19841.00	90.10	0.10	10024.83	10024.86	10027.80	419.55	0.65	414534.68	771099.42	N 32 8 14.85	W 103 35 27.73	2.40	10036.57
TD, PTB [101' FNL, 1636' FEL]	19884.00	90.10	0.10	10024.76	10067.86	10070.80	419.63	0.00	414577.68	771099.49	N 32 8 15.27	W 103 35 27.73	2.39	10079.54

Survey Type: Def Survey

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

Description	Part	MD From (R)	MD To (R)	EOU Freq (R)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	26.000	1/98.425	17.500	13.375	NAL_MWD_IFR1+MS-Depth Only	Vaca Draw 20-17 Federal #44H / Final Surveys - Cimarex Vaca Draw
	1	26.000	26.000	Act Stns	17.500	13.375	NAL_MWD_IFR1+MS-Depth Only	20-17 Federal #44H MWD Off- Vaca Draw 20-17 Federal #44H / Final Surveys - Cimarex Vaca Draw
	1	26.000	1068.000	Act Stns	17.500	13.375	NAL_MWD_IFR1+MS	20-17 Federal #44H MWD Off- Vaca Draw 20-17 Federal #44H / Final Surveys - Cimarex Vaca Draw
	1	1068.000	4949.000	Act Stns	12.250	9.625	NAL_MWD_IFR1+MS	Vaca Draw 20-17 Federal #44H / Final Surveys - Cimarex Vaca Draw
	1	4949.000	10379.000	Act Stns	8.750	7.000	NAL_MWD_IFR1+MS	Vaca Draw 20-17 Federal #44H / Final Surveys - Cimarex Vaca Draw
	1	10379.000	19884.000	Act Stns	6.000	4.500	NAL_MWD_IFR1+MS	Vaca Draw 20-17 Federal #44H / Final Surveys - Cimarex Vaca Draw