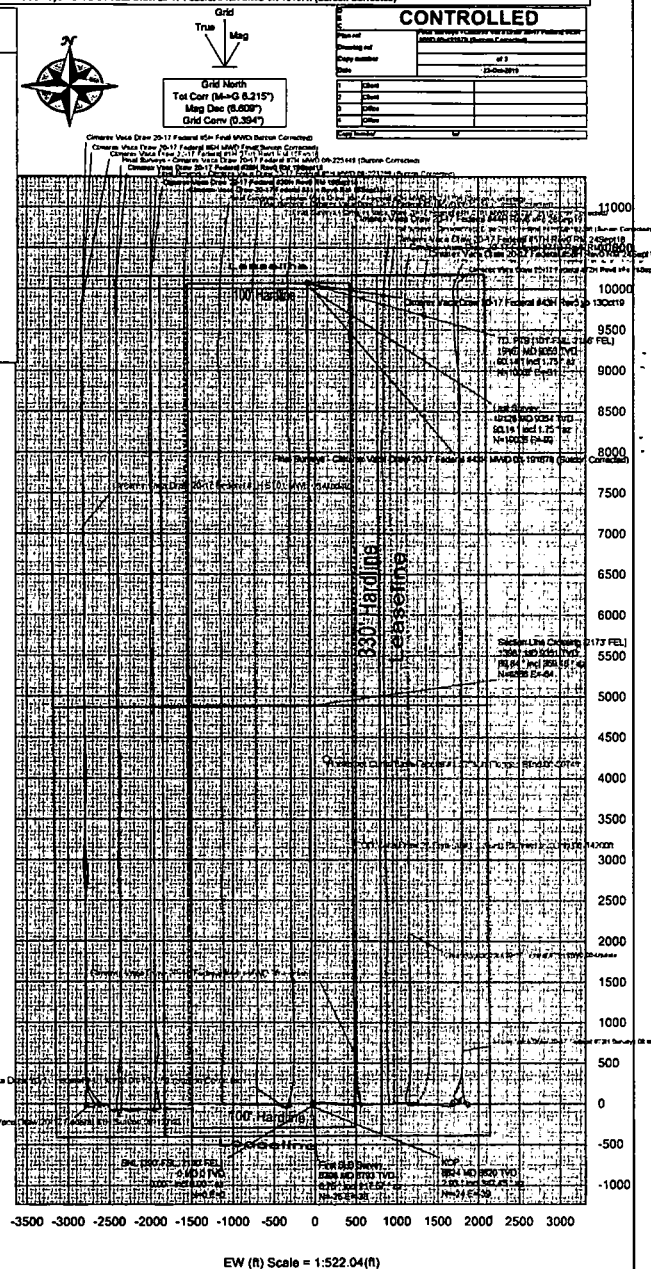


Borehole:	Well:	Field:	Structure:
Vaca Draw 20-17 Federal #43H	Vaca Draw 20-17 Federal #43H	NM Lea County (NAD 83)	Cimarex Vaca Draw 20-17 Federal #43H

Gravity & Magnetic Parameters				Surface Location				NAD83 New Mexico State Plane, Eastern Zone, US Feet				Miscellaneous			
Model:	NOG38 2010	Dip:	88.70°	Date:	13-Oct-2019	Lat:	N 32 6 35.65	Northings:	4545077.12543	Grid Coord:	0.3857°	Shot:	New Shot	TVD Ref:	R38(3433.00 above MSL)
MagDec:	6.50°	Fil:	4773045879.T	Gravity Fil:	0004011.mgn (NOG38 Based)	Lon:	W 103 26 33.63	Eastings:	770653.80543	Scale Fact:	0.98989832	Plan:	Final Surveys - Citimes Vaca Draw 20-17 Federal 643H MWD 01/19/170 (Burton Corrected)		

Critical Points								
Critical Point	MD	DNCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLB
SHL [390' FSL, 2140' FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
First SUB Survey	6796.00	0.73	217.57	6792.72	-24.28	-24.53	-38.46	1.23
XOP	6823.60	2.93	347.45	6820.31	-23.74	-23.99	-38.72	12.52
Section Line Crossing [2173' FEL]	13606.50	89.64	358.16	6061.04	4686.28	4687.87	-64.11	2.19
Last Survey	19126.00	90.14	1.75	6353.59	10026.67	10026.28	-91.97	1.89
TD, PTB [101' FSL, 2168' FEL]	19167.00	90.14	1.75	9353.49	10067.64	10067.26	-90.72	0.00



Final Surveys - Cimarex Vaca Draw 20-17 Federal #43H MWD 0ft-19167ft (Surcon Corrected) Survey Geodetic Report (Def Survey)

Report Date: October 23, 2019 - 10:01 AM
 Client: Cimarex Energy
 Field: NM Lea County (NAD 83)
 Structure / Slot: Cimarex Vaca Draw 20-17 Federal #43H / New Slot
 Well: Vaca Draw 20-17 Federal #43H
 Borehole: Vaca Draw 20-17 Federal #43H
 UWI / API#: Unknown / Unknown
 Survey Name: Final Surveys - Cimarex Vaca Draw 20-17 Federal #43H MWD 0ft-19167ft (Surcon Corrected)
 Survey Date: October 13, 2019
 Tort / AHD / DDI / ERD Ratio: 222.362° / 10293.506 ft / 6.671 / 1.099
 Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
 Location Lat / Long: N 32° 6' 35.65231", W 103° 35' 33.64588"
 Location Grid N/E Y/X: N 404507.120 RUS, E 770659.890 RUS
 CRS Grid Convergence Angle: 0.3937°
 Grid Scale Factor: 0.99996932
 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: 3433.900 ft above MSL
 Seabed / Ground Elevation: 3407.900 ft above MSL
 Magnetic Declination: 6.609°
 Total Gravity Field Strength: 998.4314mgn (9.80665 Based)
 Gravity Model: GARM
 Total Magnetic Field Strength: 47738.587 nT
 Magnetic Dip Angle: 59.706°
 Declination Date: October 13, 2019
 Magnetic Declination Model: HDGM 2019
 North Reference: Grid North
 Grid Convergence Used: 0.3937°
 Total Corr Mag North->Grid North: 6.2149°
 Local Coord Referenced To: Well Head

Comments	MD (ft)	Incl (°)	Azim Grd (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (RUS)	Easting (RUS)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')	Closure Azimuth (°)	Closure (ft)
SHL [390' FSL, 2140' FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404507.12	770659.89	N 32 6 35.65	W 103 35 33.65	0.00	0.00
	199.00	0.67	190.43	199.00	-1.14	-1.14	-0.21	0.34	404505.98	770659.68	N 32 6 35.64	W 103 35 33.65	190.43	1.16
	289.00	0.77	192.39	289.99	-2.37	-2.38	-0.46	0.10	404504.74	770659.43	N 32 6 35.63	W 103 35 33.65	190.97	2.42
	390.00	0.71	186.86	389.98	-3.53	-3.53	-0.66	0.10	404503.59	770659.23	N 32 6 35.62	W 103 35 33.65	190.57	3.59
	572.00	0.61	176.66	571.97	-5.61	-5.62	-0.74	0.08	404501.50	770659.15	N 32 6 35.60	W 103 35 33.65	187.48	5.67
	662.00	0.63	178.29	661.96	-6.59	-6.59	-0.69	0.03	404500.53	770659.20	N 32 6 35.59	W 103 35 33.65	186.02	6.63
	844.00	0.50	189.64	843.95	-8.37	-8.38	-0.80	0.09	404498.75	770659.09	N 32 6 35.57	W 103 35 33.66	185.44	8.41
	939.00	0.50	192.75	938.95	-9.18	-9.19	-0.96	0.03	404497.93	770658.93	N 32 6 35.56	W 103 35 33.66	185.96	9.24
	1000.00	0.47	179.86	999.95	-9.69	-9.70	-1.02	0.19	404497.42	770658.87	N 32 6 35.56	W 103 35 33.66	185.99	9.75
	1129.00	0.36	161.76	1128.94	-10.61	-10.61	-0.89	0.13	404496.51	770659.00	N 32 6 35.55	W 103 35 33.66	184.79	10.65
	1223.00	0.43	168.75	1222.94	-11.23	-11.24	-0.73	0.09	404495.88	770659.16	N 32 6 35.54	W 103 35 33.66	183.70	11.26
	1317.00	0.74	184.83	1316.94	-12.18	-12.19	-0.71	0.37	404494.93	770659.18	N 32 6 35.53	W 103 35 33.66	183.33	12.21
	1412.00	0.77	199.67	1411.93	-13.39	-13.40	-0.98	0.21	404493.72	770658.91	N 32 6 35.52	W 103 35 33.66	184.17	13.44
	1506.00	0.99	203.63	1505.92	-14.73	-14.74	-1.51	0.24	404492.38	770658.38	N 32 6 35.51	W 103 35 33.66	185.87	14.82
	1601.00	0.90	198.77	1600.91	-16.18	-16.20	-2.08	0.13	404490.92	770657.81	N 32 6 35.49	W 103 35 33.67	187.33	16.33
	1695.00	0.93	205.19	1694.89	-17.57	-17.59	-2.65	0.11	404489.53	770657.24	N 32 6 35.48	W 103 35 33.68	188.55	17.79
	1790.00	0.98	205.62	1789.88	-19.00	-19.02	-3.33	0.05	404488.10	770656.56	N 32 6 35.46	W 103 35 33.69	189.92	19.31
	1884.00	1.05	200.35	1883.87	-20.52	-20.55	-3.97	0.12	404486.57	770655.92	N 32 6 35.45	W 103 35 33.69	190.94	20.93
	1978.00	0.86	211.84	1977.85	-21.93	-21.96	-4.64	0.29	404485.16	770655.25	N 32 6 35.44	W 103 35 33.70	191.94	22.44
	2073.00	0.81	254.26	2072.84	-22.71	-22.74	-5.67	0.64	404484.38	770654.22	N 32 6 35.43	W 103 35 33.71	193.99	23.44
	2167.00	1.67	295.04	2166.82	-22.30	-22.35	-7.55	1.26	404484.78	770652.34	N 32 6 35.43	W 103 35 33.74	198.66	23.59
	2262.00	1.56	294.42	2261.78	-21.16	-21.22	-9.98	0.12	404485.90	770649.91	N 32 6 35.44	W 103 35 33.76	205.18	23.45
	2356.00	1.65	301.52	2355.75	-19.91	-19.99	-12.30	0.23	404487.13	770647.59	N 32 6 35.46	W 103 35 33.79	211.60	23.47
	2451.00	1.57	316.22	2450.71	-18.24	-18.33	-14.36	0.44	404488.79	770645.53	N 32 6 35.47	W 103 35 33.81	218.08	23.29
	2545.00	1.60	323.20	2544.67	-16.25	-16.35	-16.04	0.21	404490.77	770643.85	N 32 6 35.49	W 103 35 33.83	224.45	22.91
	2639.00	1.62	323.68	2638.64	-14.12	-14.23	-17.61	0.03	404492.89	770642.28	N 32 6 35.51	W 103 35 33.85	231.06	22.64
	2734.00	1.78	330.35	2733.60	-11.74	-11.87	-19.14	0.27	404495.25	770640.75	N 32 6 35.54	W 103 35 33.87	238.20	22.52
	2828.00	1.89	333.93	2827.55	-9.07	-9.21	-20.54	0.17	404497.91	770639.35	N 32 6 35.56	W 103 35 33.89	245.86	22.51
	2922.00	1.91	341.68	2921.50	-6.19	-6.33	-21.72	0.27	404500.79	770638.17	N 32 6 35.59	W 103 35 33.90	253.76	22.62
	3017.00	1.61	11.43	3016.45	-3.37	-3.52	-21.95	1.00	404503.60	770637.94	N 32 6 35.62	W 103 35 33.90	260.90	22.23
	3111.00	2.03	17.48	3110.41	-0.50	-0.63	-21.19	0.49	404506.49	770638.70	N 32 6 35.65	W 103 35 33.89	268.29	21.20
	3206.00	2.20	31.45	3205.34	2.65	2.53	-19.73	0.57	404509.65	770640.16	N 32 6 35.68	W 103 35 33.88	277.30	19.89
	3300.00	2.17	51.51	3299.27	5.29	5.17	-17.40	0.81	404512.29	770642.49	N 32 6 35.70	W 103 35 33.85	286.56	18.15
	3395.00	2.37	44.68	3394.20	7.78	7.69	-14.61	0.35	404514.81	770645.28	N 32 6 35.73	W 103 35 33.82	297.76	16.51
	3490.00	1.57	54.34	3489.14	9.92	9.85	-12.17	0.91	404516.96	770647.72	N 32 6 35.75	W 103 35 33.79	306.97	15.65

Comments	MD (R)	Incl (°)	Azlm Grid (°)	TVD (R)	VSEC (R)	NS (R)	EW (R)	DLS (°/100ft)	Northing (RUS)	Easting (RUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")	Closure Azimuth (°)	Closure (ft)
	3584.00	1.34	108.96	3583.12	10.30	10.24	-10.08	1.44	404517.36	770649.81	N 32 6 35.75	W 103 35 33.76	315.44	14.37
	3679.00	1.30	115.88	3678.09	9.46	9.41	-8.06	0.17	404516.53	770651.83	N 32 6 35.75	W 103 35 33.74	319.40	12.39
	3773.00	1.09	112.42	3772.07	8.64	8.60	-6.28	0.24	404515.72	770653.61	N 32 6 35.74	W 103 35 33.72	323.88	10.65
	3867.00	1.12	112.91	3866.05	7.93	7.90	-4.60	0.03	404515.02	770655.29	N 32 6 35.73	W 103 35 33.70	329.77	9.15
	3962.00	0.85	135.79	3961.04	7.06	7.04	-3.26	0.50	404514.16	770656.63	N 32 6 35.72	W 103 35 33.68	335.16	7.75
	4056.00	0.74	204.40	4055.03	6.00	5.98	-3.02	0.96	404513.10	770656.87	N 32 6 35.71	W 103 35 33.68	333.20	6.70
	4151.00	1.08	232.03	4150.02	4.90	4.87	-3.98	0.57	404511.99	770655.91	N 32 6 35.70	W 103 35 33.69	320.75	6.29
	4245.00	1.05	207.59	4244.01	3.60	3.57	-5.08	0.48	404510.69	770654.81	N 32 6 35.69	W 103 35 33.70	305.07	6.21
	4339.00	1.48	183.42	4337.98	1.63	1.59	-5.55	0.72	404508.71	770654.34	N 32 6 35.67	W 103 35 33.71	285.99	5.77
	4434.00	1.29	186.22	4432.96	-0.66	-0.70	-5.74	0.21	404506.42	770654.15	N 32 6 35.65	W 103 35 33.71	263.07	5.78
	4528.00	2.45	164.90	4526.90	-3.65	-3.69	-5.33	1.42	404503.43	770654.56	N 32 6 35.62	W 103 35 33.71	235.31	6.48
	4623.00	4.27	160.48	4621.74	-8.96	-8.98	-3.62	1.93	404498.14	770656.27	N 32 6 35.56	W 103 35 33.69	201.94	9.69
	4717.00	4.73	165.48	4715.45	-16.02	-16.03	-1.48	0.64	404491.09	770658.41	N 32 6 35.49	W 103 35 33.66	185.27	16.10
	4811.00	4.17	193.18	4809.17	-23.11	-23.11	-1.29	2.34	404484.01	770658.60	N 32 6 35.42	W 103 35 33.66	183.18	23.15
	4866.00	4.30	202.88	4864.03	-26.94	-26.96	-2.54	1.32	404480.16	770657.35	N 32 6 35.39	W 103 35 33.68	185.39	27.08
	4988.00	3.89	203.16	4985.71	-34.94	-34.98	-5.95	0.34	404472.14	770653.94	N 32 6 35.31	W 103 35 33.72	189.65	35.48
	5082.00	2.72	218.58	5079.56	-39.60	-39.65	-8.59	1.55	404467.47	770651.30	N 32 6 35.26	W 103 35 33.75	192.23	40.58
	5177.00	1.48	271.40	5174.50	-41.31	-41.39	-11.23	2.29	404465.73	770648.66	N 32 6 35.24	W 103 35 33.78	195.18	42.88
	5271.00	1.62	297.79	5268.47	-40.65	-40.74	-13.62	0.77	404466.38	770646.27	N 32 6 35.25	W 103 35 33.81	198.48	42.95
	5366.00	1.61	300.47	5363.43	-39.33	-39.44	-15.95	0.08	404467.69	770643.94	N 32 6 35.26	W 103 35 33.83	202.03	42.54
	5460.00	1.61	300.15	5457.39	-37.98	-38.10	-18.23	0.01	404469.02	770641.66	N 32 6 35.28	W 103 35 33.86	205.57	42.24
	5555.00	1.48	343.08	5552.36	-36.13	-36.26	-19.75	1.20	404470.86	770640.15	N 32 6 35.29	W 103 35 33.88	208.57	41.29
	5649.00	1.49	358.97	5646.33	-33.74	-33.88	-20.12	0.44	404473.25	770639.77	N 32 6 35.32	W 103 35 33.88	210.71	39.40
	5744.00	1.52	353.39	5741.30	-31.26	-31.39	-20.29	0.16	404475.73	770639.60	N 32 6 35.34	W 103 35 33.88	212.88	37.37
	5933.00	1.58	350.13	5930.23	-26.19	-26.33	-21.02	0.06	404480.79	770638.87	N 32 6 35.39	W 103 35 33.89	218.60	33.69
	6028.00	1.38	350.10	6025.20	-23.77	-23.91	-21.44	0.21	404483.21	770638.45	N 32 6 35.42	W 103 35 33.90	221.88	32.12
	6123.00	1.42	343.55	6120.17	-21.52	-21.66	-21.97	0.17	404485.46	770637.92	N 32 6 35.44	W 103 35 33.90	225.42	30.85
	6217.00	1.59	344.55	6214.13	-19.14	-19.28	-22.65	0.18	404487.84	770637.24	N 32 6 35.46	W 103 35 33.91	229.59	29.75
	6311.00	1.53	348.00	6308.10	-16.66	-16.81	-23.30	0.08	404490.31	770636.59	N 32 6 35.49	W 103 35 33.92	234.19	28.73
	6406.00	1.66	343.34	6403.06	-14.10	-14.26	-24.00	0.16	404492.86	770635.89	N 32 6 35.51	W 103 35 33.93	239.29	27.92
	6500.00	1.56	343.20	6497.03	-11.57	-11.73	-24.76	0.11	404495.39	770635.13	N 32 6 35.54	W 103 35 33.93	244.65	27.40
	6595.00	1.72	345.83	6591.99	-8.95	-9.11	-25.49	0.19	404498.01	770634.40	N 32 6 35.56	W 103 35 33.94	250.33	27.07
	6689.00	1.78	343.14	6685.94	-6.18	-6.35	-26.26	0.11	404500.77	770633.64	N 32 6 35.59	W 103 35 33.95	256.41	27.01
	6783.00	0.54	349.93	6779.92	-4.34	-4.51	-26.76	1.32	404502.61	770633.13	N 32 6 35.61	W 103 35 33.96	260.43	27.13
	6878.00	0.16	330.42	6874.92	-3.78	-3.96	-26.90	0.41	404503.16	770632.99	N 32 6 35.61	W 103 35 33.96	261.63	27.19
	6972.00	0.10	277.82	6968.92	-3.66	-3.83	-27.05	0.14	404503.29	770632.84	N 32 6 35.62	W 103 35 33.96	261.94	27.32
	7160.00	0.26	264.22	7156.92	-3.67	-3.85	-27.63	0.09	404503.27	770632.26	N 32 6 35.62	W 103 35 33.97	262.06	27.90
	7255.00	0.31	234.86	7251.92	-3.84	-4.02	-28.06	0.16	404503.10	770631.83	N 32 6 35.61	W 103 35 33.97	261.84	28.34
	7349.00	0.45	242.79	7345.92	-4.15	-4.34	-28.59	0.16	404502.78	770631.30	N 32 6 35.61	W 103 35 33.98	261.38	28.92
	7443.00	0.45	225.90	7439.91	-4.57	-4.76	-29.19	0.14	404502.36	770630.70	N 32 6 35.61	W 103 35 33.99	260.73	29.57
	7537.00	0.56	234.25	7533.91	-5.09	-5.29	-29.83	0.14	404501.83	770630.07	N 32 6 35.60	W 103 35 33.99	259.95	30.29
	7631.00	0.51	210.23	7627.90	-5.72	-5.92	-30.41	0.24	404501.20	770629.48	N 32 6 35.60	W 103 35 34.00	258.99	30.98
	7726.00	0.71	211.54	7722.90	-6.58	-6.78	-30.93	0.21	404500.34	770628.96	N 32 6 35.59	W 103 35 34.01	257.63	31.66
	7820.00	0.82	210.14	7816.89	-7.66	-7.86	-31.57	0.12	404499.26	770628.32	N 32 6 35.58	W 103 35 34.01	256.02	32.54
	8009.00	0.78	203.67	8005.87	-10.00	-10.21	-32.77	0.05	404496.91	770627.12	N 32 6 35.55	W 103 35 34.03	252.69	34.32
	8103.00	0.96	209.31	8099.86	-11.27	-11.48	-33.41	0.21	404495.64	770626.48	N 32 6 35.54	W 103 35 34.04	251.03	35.33
	8197.00	1.02	209.68	8193.85	-12.67	-12.90	-34.21	0.06	404494.22	770625.68	N 32 6 35.53	W 103 35 34.04	249.34	36.56
	8291.00	1.11	203.99	8287.83	-14.23	-14.46	-34.99	0.15	404492.67	770624.90	N 32 6 35.51	W 103 35 34.05	247.56	37.86
	8386.00	1.18	196.33	8382.81	-16.00	-16.23	-35.64	0.18	404490.89	770624.25	N 32 6 35.49	W 103 35 34.06	245.51	39.17
	8480.00	1.10	195.95	8476.79	-17.80	-18.03	-36.16	0.09	404489.09	770623.73	N 32 6 35.48	W 103 35 34.07	243.50	40.41
	8574.00	1.16	198.77	8570.78	-19.56	-19.80	-36.72	0.09	404487.32	770623.17	N 32 6 35.46	W 103 35 34.07	241.66	41.72
	8669.00	1.47	197.09	8665.75	-21.63	-21.87	-37.38	0.33	404485.25	770622.51	N 32 6 35.44	W 103 35 34.08	239.67	43.31
	8728.00	1.52	200.14	8724.73	-23.09	-23.33	-37.88	0.16	404483.79	770622.01	N 32 6 35.42	W 103 35 34.09	238.37	44.49
First SLB Survey	8796.00	0.75	217.57	8792.72	-24.28	-24.53	-38.46	1.23	404482.59	770621.43	N 32 6 35.41	W 103 35 34.09	237.47	45.62
KOP	8823.60	2.93	347.45	8820.31	-23.74	-23.99	-38.72	12.52	404483.13	770621.17	N 32 6 35.42	W 103 35 34.10	238.22	45.55
	8828.00	3.47	348.97	8824.70	-23.50	-23.75	-38.77	12.52	404483.37	770621.12	N 32 6 35.42	W 103 35 34.10	238.51	45.47
	8859.00	8.45	353.53	8855.52	-20.31	-20.56	-39.21	16.12	404486.56	770620.68	N 32 6 35.45	W 103 35 34.10	242.33	44.27
	8891.00	13.56	355.83	8886.92	-14.22	-14.48	-39.75	16.02	404492.84	770620.15	N 32 6 35.51	W 103 35 34.11	249.98	42.30
	8938.00	20.27	359.93	8931.87	-0.57	-0.83	-40.16	14.49	404506.29	770619.73	N 32 6 35.65	W 103 35 34.11	268.82	40.17
	8985.00	25.28	2.37	8975.19	17.61	17.35	-39.75	10.85	404524.47	770620.14	N 32 6 35.83	W 103 35 34.11	293.58	43.37
	9033.00	29.95	1.87	9017.71	39.83	39.58	-38.94	9.74	404546.70	770620.95	N 32 6 36.05	W 103 35 34.10	315.47	55.52
	9080.00	35.19	359.11	9057.31	65.12	64.87	-38.76	11.59	404571.99	770621.13	N 32 6 36.30	W 103 35 34.09	329.14	75.57
	9128.00	39.79	357.68	9095.38	94.32	94.06	-39.60	9.75	404601.18	770620.29	N 32 6 36.59	W 103 35 34.10	337.17	102.06
	9175.00	44.61	358.14	9130.19	125.86	125.60	-40.75	10.28	404632.72	770619.14	N 32 6 36.90	W 103 35 34.11	342.03	132.04
	9222.00	49.05	359.54	9162.34	160.13	159.86	-41.42	9.69	404666.98	770618.47	N 32 6 37.24	W 103 35 34.11	345.47	165.14
	9269.00	53.44	359.97	9191.75	196.77	196.50	-41.58	9.37	404703.62	770618.31	N 32 6 37.60	W 103 35 34.11	348.05	200.85
	9317.00	58.09	359.76	9218.75	236.44	236.18	-41.67	9.69	404743.29	770618.22	N 32 6 37.99	W 103 35 34.11	349.99	239.83

Comments	MD (R)	Incl (°)	Azlm Grd (°)	TVD (R)	VSEC (R)	NS (R)	EW (R)	DLS (°/100R)	Northing (RUS)	Easting (RUS)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')	Closure Azimuth (°)	Closure (R)
	9364.00	63.58	0.48	9241.65	277.47	277.20	-41.58	11.76	404784.31	770618.31	N 32 6 38.40	W 103 35 34.11	351.47	280.30
	9412.00	68.34	1.54	9261.19	321.28	321.02	-40.80	10.12	404828.13	770619.09	N 32 6 38.83	W 103 35 34.09	352.76	323.60
	9459.00	71.53	0.96	9277.32	365.40	365.15	-39.84	6.89	404872.26	770620.05	N 32 6 39.27	W 103 35 34.08	353.77	367.32
	9507.00	75.84	0.93	9290.80	411.44	411.20	-39.08	8.98	404918.31	770620.81	N 32 6 39.72	W 103 35 34.07	354.57	413.05
	9554.00	82.26	0.38	9299.72	457.56	457.32	-38.56	13.71	404964.42	770621.34	N 32 6 40.18	W 103 35 34.06	355.18	458.94
	9662.00	93.34	359.58	9303.88	565.31	565.07	-38.60	10.29	405072.17	770621.30	N 32 6 41.25	W 103 35 34.05	356.09	566.38
	9757.00	90.17	359.87	9300.95	660.25	660.01	-39.05	3.35	405167.11	770620.84	N 32 6 42.19	W 103 35 34.05	356.61	661.16
	9852.00	90.07	0.06	9300.75	755.25	755.01	-39.11	0.23	405262.10	770620.78	N 32 6 43.13	W 103 35 34.04	357.03	756.02
	9947.00	89.31	359.09	9301.27	850.24	850.00	-39.81	1.30	405357.10	770620.08	N 32 6 44.07	W 103 35 34.04	357.32	850.94
	10041.00	89.69	359.27	9302.09	944.24	943.99	-41.16	0.45	405451.08	770618.73	N 32 6 45.00	W 103 35 34.05	357.50	944.89
	10136.00	89.76	359.59	9302.54	1039.24	1038.98	-42.10	0.34	405546.07	770617.79	N 32 6 45.94	W 103 35 34.05	357.68	1039.84
	10231.00	89.69	359.57	9303.00	1134.23	1133.98	-42.80	0.08	405641.06	770617.09	N 32 6 46.88	W 103 35 34.05	357.84	1134.79
	10326.00	90.00	359.10	9303.26	1229.23	1228.97	-43.90	0.59	405738.05	770615.99	N 32 6 47.82	W 103 35 34.06	357.95	1229.76
	10421.00	89.42	359.17	9303.74	1324.23	1323.96	-45.34	0.61	405831.04	770614.55	N 32 6 48.76	W 103 35 34.07	358.04	1324.74
	10518.00	88.07	357.83	9305.82	1419.18	1418.90	-47.82	2.00	405925.97	770612.07	N 32 6 49.70	W 103 35 34.09	358.07	1419.71
	10611.00	89.24	359.20	9308.05	1514.13	1513.84	-50.28	1.90	406020.91	770609.61	N 32 6 50.64	W 103 35 34.11	358.10	1514.67
	10706.00	89.38	1.17	9309.19	1609.12	1608.83	-49.98	2.08	406115.89	770609.91	N 32 6 51.58	W 103 35 34.10	358.22	1609.60
	10801.00	89.28	1.41	9310.30	1704.07	1703.80	-47.84	0.27	406210.86	770612.05	N 32 6 52.51	W 103 35 34.07	358.39	1704.47
	10896.00	89.04	1.11	9311.70	1799.02	1798.76	-45.75	0.40	406305.82	770614.14	N 32 6 53.45	W 103 35 34.03	358.54	1799.34
	10991.00	89.59	1.62	9312.83	1893.97	1893.73	-43.49	0.79	406400.79	770616.40	N 32 6 54.39	W 103 35 34.00	358.68	1894.23
	11181.00	88.83	359.63	9315.45	2083.91	2083.69	-41.41	1.12	406590.74	770618.48	N 32 6 56.27	W 103 35 33.96	358.86	2084.10
	11370.00	88.80	359.58	9319.38	2272.87	2272.64	-42.72	0.03	406779.69	770617.17	N 32 6 58.14	W 103 35 33.96	358.92	2273.04
	11465.00	88.76	359.29	9321.38	2367.85	2367.62	-43.65	0.31	406874.66	770618.24	N 32 6 59.08	W 103 35 33.96	358.94	2368.02
	11560.00	88.59	359.60	9323.58	2462.82	2462.59	-44.57	0.37	406969.63	770615.32	N 32 7 0.02	W 103 35 33.97	358.96	2462.99
	11655.00	89.35	359.18	9325.29	2557.81	2557.57	-45.58	0.91	407064.60	770614.31	N 32 7 0.96	W 103 35 33.97	358.98	2557.97
	11750.00	90.10	358.86	9325.74	2652.80	2652.55	-47.21	0.86	407159.58	770612.68	N 32 7 1.90	W 103 35 33.98	358.98	2652.97
	11844.00	89.66	357.77	9325.94	2746.77	2746.51	-49.97	1.25	407253.54	770609.92	N 32 7 2.83	W 103 35 34.01	358.96	2746.96
	11939.00	90.17	357.87	9326.08	2841.73	2841.44	-53.59	0.55	407348.47	770606.30	N 32 7 3.77	W 103 35 34.04	358.92	2841.94
	12034.00	89.38	357.62	9326.45	2936.67	2936.36	-57.33	0.87	407443.39	770602.57	N 32 7 4.71	W 103 35 34.08	358.88	2936.92
	12128.00	89.38	357.96	9327.47	3030.62	3030.29	-60.95	0.36	407537.31	770598.94	N 32 7 5.64	W 103 35 34.11	358.85	3030.90
	12223.00	88.62	357.78	9329.13	3125.56	3125.21	-64.48	0.82	407632.22	770595.41	N 32 7 6.58	W 103 35 34.15	358.82	3125.87
	12318.00	88.93	0.44	9331.16	3220.53	3220.16	-65.96	2.82	407727.18	770593.94	N 32 7 7.52	W 103 35 34.16	358.83	3220.84
	12412.00	88.80	2.01	9333.02	3314.47	3314.12	-63.95	1.68	407821.13	770595.95	N 32 7 8.45	W 103 35 34.12	358.89	3314.74
	12507.00	88.80	1.63	9335.01	3409.38	3409.05	-60.93	0.40	407916.06	770598.96	N 32 7 9.39	W 103 35 34.08	358.98	3409.60
	12602.00	89.00	1.89	9336.84	3504.29	3503.99	-58.01	0.35	408011.00	770601.88	N 32 7 10.33	W 103 35 34.04	359.05	3504.47
	12698.00	88.93	2.20	9338.57	3600.19	3599.91	-54.59	0.33	408106.92	770605.30	N 32 7 11.28	W 103 35 33.99	359.13	3600.33
	12793.00	88.97	2.14	9340.31	3695.08	3694.83	-50.99	0.08	408201.83	770608.90	N 32 7 12.22	W 103 35 33.94	359.21	3695.18
	12887.00	89.04	0.45	9341.94	3789.03	3788.79	-48.87	1.80	408295.78	770611.03	N 32 7 13.15	W 103 35 33.91	359.26	3789.10
	12982.00	88.80	359.81	9343.73	3884.00	3883.77	-48.65	0.72	408390.76	770611.24	N 32 7 14.09	W 103 35 33.90	359.28	3884.07
	13077.00	89.17	359.81	9345.42	3978.99	3978.75	-48.97	0.72	408485.74	770610.93	N 32 7 15.03	W 103 35 33.90	359.29	3979.06
	13267.00	89.42	357.48	9347.75	4168.93	4168.67	-53.46	1.23	408675.66	770606.43	N 32 7 16.91	W 103 35 33.93	359.27	4169.02
	13362.00	89.21	357.50	9348.89	4263.86	4263.58	-57.62	0.22	408770.56	770602.27	N 32 7 17.84	W 103 35 33.98	359.23	4263.97
	13457.00	89.48	359.72	9349.98	4358.83	4358.54	-59.92	2.35	408865.51	770599.97	N 32 7 18.78	W 103 35 33.99	359.21	4358.95
	13552.00	90.76	0.25	9349.78	4453.83	4453.53	-59.95	1.46	408960.51	770599.94	N 32 7 19.72	W 103 35 33.99	359.23	4453.94
	13646.00	90.07	359.51	9349.10	4547.82	4547.53	-60.14	1.08	409054.50	770599.75	N 32 7 20.65	W 103 35 33.98	359.24	4547.93
	13741.00	90.28	0.12	9348.81	4642.82	4642.53	-60.45	0.68	409149.50	770599.44	N 32 7 21.59	W 103 35 33.98	359.25	4642.92
	13836.00	88.97	359.56	9349.43	4737.82	4737.52	-60.72	1.50	409244.49	770599.18	N 32 7 22.53	W 103 35 33.97	359.27	4737.91
	13931.00	89.48	358.00	9350.71	4832.80	4832.49	-62.74	1.73	409339.45	770597.15	N 32 7 23.47	W 103 35 33.99	359.26	4832.90
Section Line Crossing [2173' FEL]	13986.50	89.84	359.16	9351.04	4888.28	4887.97	-64.11	2.19	409394.93	770595.78	N 32 7 24.02	W 103 35 34.00	359.25	4888.39
	14026.00	90.10	359.99	9351.06	4927.78	4927.47	-64.41	2.19	409434.43	770595.49	N 32 7 24.41	W 103 35 34.00	359.25	4927.89
	14216.00	91.03	0.38	9349.18	5117.76	5117.46	-63.79	0.53	409624.41	770596.10	N 32 7 26.29	W 103 35 33.98	359.29	5117.85
	14311.00	90.72	359.61	9347.74	5212.75	5212.44	-63.80	0.87	409719.39	770596.09	N 32 7 27.23	W 103 35 33.97	359.30	5212.83
	14405.00	90.17	0.19	9347.01	5306.74	5306.44	-63.96	0.85	409813.39	770595.93	N 32 7 28.16	W 103 35 33.97	359.31	5306.83
	14500.00	89.69	359.25	9347.12	5401.74	5401.44	-64.43	1.11	409908.38	770595.46	N 32 7 29.10	W 103 35 33.96	359.32	5401.82
	14595.00	90.69	359.97	9346.81	5496.74	5496.43	-65.07	1.30	410003.37	770594.82	N 32 7 30.04	W 103 35 33.96	359.32	5496.82
	14690.00	89.72	359.39	9346.47	5591.74	5591.43	-65.61	1.19	410098.37	770594.29	N 32 7 30.98	W 103 35 33.96	359.33	5591.81
	14880.00	89.52	359.29	9347.73	5781.73	5781.41	-67.79	0.12	410288.34	770592.10	N 32 7 32.86	W 103 35 33.97	359.33	5781.81
	14975.00	89.42	359.33	9348.61	5876.73	5876.40	-68.94	0.11	410383.33	770590.95	N 32 7 33.80	W 103 35 33.98	359.33	5876.81
	15070.00	89.72	0.68	9349.32	5971.72	5971.40	-68.93	1.46	410478.32	770590.96	N 32 7 34.74	W 103 35 33.97	359.34	5971.79
	15165.00	89.28	1.39	9350.15	6066.69	6066.38	-67.21	0.88	410573.30	770592.68	N 32 7 35.68	W 103 35 33.94	359.37	6066.75
	15260.00	89.21	358.31	9351.40	6161.67	6161.36	-67.46	3.24	410668.28	770592.43	N 32 7 36.62	W 103 35 33.94	359.37	6161.73
	15355.00	89.38	359.25	9352.57	6256.65	6256.33	-69.48	1.01	410763.24	770590.41	N 32 7 37.56	W 103 35 33.95	359.36	6256.71
	15450.00	89.48	359.32	9353.52	6351.64	6351.32	-70.67	0.13	410858.23	770589.22	N 32 7 38.50	W 103 35 33.96	359.36	6351.71
	15545.00	89.45	359.93	9354.40	6446.64	6446.31	-71.29	0.64	410953.22	770588.60	N 32 7 39.44	W 103 35 33.96	359.37	6446.70
	15640.00	88.90	358.58	9355.77	6541.62	6541.29	-72.53	1.53	411048.19	770587.37	N 32 7 40.38	W 103 35 33.97	359.36	6541.69

Comments	MD (R)	Incl (°)	Azim Grd (°)	TVD (R)	VSEC (R)	NS (R)	EW (R)	DLS (*/100R)	Northing (RUS)	Easting (RUS)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')	Closure Azimuth (°)	Closure (R)
	15735.00	89.86	357.57	9356.80	6636.58	6636.23	-75.72	1.47	411143.13	770584.17	N 32 7 41.32	W 103 35 34.00	359.35	6636.66
	15830.00	89.93	359.14	9356.97	6731.55	6731.18	-78.45	1.65	411238.08	770581.45	N 32 7 42.26	W 103 35 34.02	359.33	6731.64
	15925.00	89.76	0.40	9357.23	6826.55	6826.18	-78.83	1.34	411333.08	770581.07	N 32 7 43.20	W 103 35 34.02	359.34	6826.64
	16020.00	90.14	1.05	9357.31	6921.53	6921.17	-77.62	0.79	411428.07	770582.27	N 32 7 44.14	W 103 35 34.00	359.36	6921.61
	16114.00	89.55	0.67	9357.57	7015.51	7015.16	-76.21	0.75	411522.05	770583.68	N 32 7 45.07	W 103 35 33.97	359.38	7015.58
	16209.00	89.76	359.97	9358.14	7110.50	7110.16	-75.68	0.77	411617.05	770584.21	N 32 7 46.01	W 103 35 33.96	359.39	7110.56
	16399.00	89.48	0.28	9359.40	7300.49	7300.15	-75.27	0.22	411807.03	770584.62	N 32 7 47.89	W 103 35 33.94	359.41	7300.54
	16494.00	89.69	359.68	9360.09	7395.48	7395.15	-75.30	0.67	411902.03	770584.59	N 32 7 48.83	W 103 35 33.93	359.42	7395.53
	16684.00	89.83	0.07	9360.88	7585.48	7585.15	-75.72	0.22	412092.02	770584.18	N 32 7 50.71	W 103 35 33.92	359.43	7585.52
	16874.00	89.59	0.23	9361.84	7775.47	7775.14	-75.22	0.15	412282.01	770584.67	N 32 7 52.59	W 103 35 33.90	359.45	7775.51
	16969.00	89.79	0.61	9362.36	7870.46	7870.14	-74.52	0.45	412377.00	770585.37	N 32 7 53.53	W 103 35 33.88	359.46	7870.49
	17064.00	88.31	358.42	9363.93	7965.44	7965.11	-75.33	2.78	412471.97	770584.57	N 32 7 54.47	W 103 35 33.89	359.46	7965.47
	17159.00	90.24	357.79	9365.14	8060.39	8060.05	-78.47	2.14	412566.91	770581.43	N 32 7 55.41	W 103 35 33.91	359.44	8060.43
	17346.00	90.83	358.29	9363.39	8247.31	8246.93	-84.86	0.41	412753.78	770575.03	N 32 7 57.26	W 103 35 33.97	359.41	8247.37
	17439.00	89.07	356.70	9363.47	8340.24	8339.84	-88.93	2.55	412846.68	770570.97	N 32 7 58.18	W 103 35 34.01	359.39	8340.31
	17531.00	90.21	358.61	9364.05	8432.18	8431.75	-92.69	2.42	412938.60	770567.20	N 32 7 59.09	W 103 35 34.05	359.37	8432.26
	17624.00	90.58	358.33	9363.41	8525.15	8524.72	-95.17	0.50	413031.56	770584.72	N 32 8 0.01	W 103 35 34.07	359.36	8525.25
	17716.00	90.03	359.43	9362.92	8617.14	8616.69	-96.97	1.34	413123.53	770562.92	N 32 8 0.92	W 103 35 34.08	359.36	8617.24
	17809.00	90.45	1.85	9362.53	8710.12	8709.68	-95.93	2.64	413216.52	770563.96	N 32 8 1.84	W 103 35 34.07	359.37	8710.21
	17901.00	90.31	1.18	9361.92	8802.07	8801.65	-93.50	0.74	413308.48	770566.39	N 32 8 2.75	W 103 35 34.03	359.39	8802.14
	17993.00	90.14	0.37	9361.56	8894.05	8893.64	-92.26	0.90	413400.47	770567.64	N 32 8 3.66	W 103 35 34.01	359.41	8894.11
	18084.00	90.03	360.00	9361.42	8985.04	8984.64	-91.96	0.42	413491.46	770567.93	N 32 8 4.56	W 103 35 34.00	359.41	8985.11
	18177.00	90.21	0.09	9361.23	9078.04	9077.64	-91.89	0.22	413584.46	770568.00	N 32 8 5.48	W 103 35 33.99	359.42	9078.10
	18270.00	90.65	0.34	9360.53	9171.03	9170.63	-91.54	0.54	413677.45	770568.35	N 32 8 6.40	W 103 35 33.98	359.43	9171.09
	18361.00	90.55	359.50	9359.58	9262.03	9261.63	-91.67	0.93	413768.44	770568.22	N 32 8 7.30	W 103 35 33.97	359.43	9262.08
	18453.00	90.17	358.65	9359.00	9354.02	9353.61	-93.15	1.01	413860.43	770566.74	N 32 8 8.21	W 103 35 33.98	359.43	9354.07
	18546.00	90.03	357.73	9358.84	9448.99	9448.56	-96.09	1.00	413953.37	770563.80	N 32 8 9.13	W 103 35 34.01	359.42	9447.05
	18637.00	90.55	357.84	9358.38	9537.94	9537.49	-99.61	0.58	414044.30	770560.29	N 32 8 10.03	W 103 35 34.04	359.40	9538.01
	18730.00	90.34	359.33	9357.65	9630.92	9630.46	-101.90	1.62	414137.27	770557.99	N 32 8 10.95	W 103 35 34.06	359.39	9631.00
	18822.00	90.28	1.31	9357.16	9722.91	9722.45	-101.39	2.15	414229.26	770558.50	N 32 8 11.86	W 103 35 34.05	359.40	9722.98
	18914.00	90.52	1.94	9356.51	9814.85	9814.41	-98.78	0.73	414321.21	770561.11	N 32 8 12.77	W 103 35 34.01	359.42	9814.91
	19006.00	91.20	2.05	9355.13	9906.76	9906.35	-95.58	0.75	414413.14	770564.31	N 32 8 13.68	W 103 35 33.97	359.45	9906.81
	19098.00	90.52	1.47	9353.75	9998.68	9998.29	-92.75	0.87	414505.08	770567.14	N 32 8 14.59	W 103 35 33.93	359.47	9998.72
Last Survey	19126.00	90.14	1.75	9353.59	10026.67	10026.28	-91.97	1.69	414533.07	770567.93	N 32 8 14.87	W 103 35 33.91	359.47	10026.70
TD, PTB [101' FNL, 2166' FEL]	19167.00	90.14	1.75	9353.49	10067.64	10067.26	-90.72	0.00	414574.05	770569.18	N 32 8 15.27	W 103 35 33.90	359.48	10067.67

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 #43H / Final Surveys - Cimarex Vaca Draw 20-17 Federal #43H MWD 0R-
	1	26.000	26.000	Act Stns	17.500	13.375	NAL_MWD_IFR1+MS-Depth Only	Vaca Draw 20-17 Federal #43H / Final Surveys - Cimarex Vaca Draw 20-17 Federal #43H MWD 0R-
	1	26.000	1067.000	Act Stns	17.500	13.375	NAL_MWD_IFR1+MS	Vaca Draw 20-17 Federal #43H / Final Surveys - Cimarex Vaca Draw 20-17 Federal #43H MWD 0R-
	1	1067.000	4945.000	Act Stns	12.250	9.625	NAL_MWD_IFR1+MS	Vaca Draw 20-17 Federal #43H / Final Surveys - Cimarex Vaca Draw 20-17 Federal #43H MWD 0R-
	1	4945.000	9637.000	Act Stns	8.750	7.000	NAL_MWD_IFR1+MS	Vaca Draw 20-17 Federal #43H / Final Surveys - Cimarex Vaca Draw 20-17 Federal #43H MWD 0R-
	1	9637.000	19167.000	Act Stns	6.000	4.500	NAL_MWD_IFR1+MS	Vaca Draw 20-17 Federal #43H / Final Surveys - Cimarex Vaca Draw 20-17 Federal #43H MWD 0R-