

Final Surveys - Cimarex Vaca Draw 20-17 Federal #72H Surveys Off to 19073ft (Surcon Corrected) Survey Geodetic Report

(Def Survey)

Report Date: November 01, 2019 - 10:32 AM
 Client: Cimarex Energy
 Field: NM Lea County (NAD 83)
 Structure / Slot: Cimarex Vaca Draw 20-17 Federal #72H / New Slot
 Well: Vaca Draw 20-17 Federal #72H
 Borehole: Vaca Draw 20-17 Federal #72H
 UWI / API#: Unknown / Unknown
 Survey Name: Final Surveys - Cimarex Vaca Draw 20-17 Federal #72H Surveys Off to 19073ft (Surcon Corrected)
 Survey Date: August 03, 2019
 Tort / AHD / DDI / ERD Ratio: 242.481' / 10285.184 ft / 6.705' / 1.097
 Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
 Location Lat / Long: N 32° 6' 35.62058", W 103° 35' 12.83796"
 Location Grid N/E Y/X: N 404516.260 RUS, E 772449.560 RUS
 CRS Grid Convergence Angle: 0.3968°
 Grid Scale Factor: 0.99997027
 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: 3421.300 ft above MSL
 Seabed / Ground Elevation: 3395.300 ft above MSL
 Magnetic Declination: 6.605°
 Total Gravity Field Strength: 998.4332mgn (9.80665 Based)
 Gravity Model: GARM
 Total Magnetic Field Strength: 47733.845 nT
 Magnetic Dip Angle: 59.705°
 Declination Date: October 21, 2019
 Magnetic Declination Model: HDGM 2019
 North Reference: Grid North
 Grid Convergence Used: 0.3968°
 Total Corr Mag North-Grid North: 6.2082°
 Local Coord Referenced To: Well Head

Comments	MD (ft)	Incl (°)	Azlm Grid (°)	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, 350' FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404516.26	772449.56	N 32 6 35.62	W 103 35 12.84	0.00	0.00
	193.00	0.73	357.32	192.99	1.23	1.23	-0.06	0.38	404517.49	772449.50	N 32 6 35.63	W 103 35 12.84	357.32	1.23
	384.00	0.70	355.36	383.98	3.61	3.61	-0.21	0.02	404519.87	772449.35	N 32 6 35.66	W 103 35 12.84	356.69	3.61
	476.00	0.60	345.19	475.97	4.63	4.63	-0.38	0.17	404520.89	772449.18	N 32 6 35.67	W 103 35 12.84	355.34	4.65
	566.00	0.59	340.88	565.97	5.53	5.53	-0.65	0.05	404521.79	772448.91	N 32 6 35.68	W 103 35 12.85	353.30	5.56
	657.00	0.60	343.24	656.96	6.43	6.42	-0.94	0.03	404522.68	772448.62	N 32 6 35.68	W 103 35 12.85	351.67	6.49
	747.00	0.59	339.36	746.96	7.32	7.31	-1.24	0.05	404523.57	772448.32	N 32 6 35.69	W 103 35 12.85	350.37	7.41
	838.00	0.63	334.96	837.95	8.21	8.20	-1.62	0.07	404524.46	772447.94	N 32 6 35.70	W 103 35 12.86	348.85	8.36
	933.00	0.68	329.62	932.95	9.17	9.16	-2.12	0.08	404525.42	772447.44	N 32 6 35.71	W 103 35 12.86	346.95	9.40
	995.00	0.67	336.53	994.94	9.83	9.81	-2.45	0.13	404526.07	772447.11	N 32 6 35.72	W 103 35 12.87	345.96	10.11
	1120.00	0.75	332.47	1119.93	11.23	11.21	-3.12	0.08	404527.47	772446.44	N 32 6 35.73	W 103 35 12.87	344.43	11.63
	1309.00	0.87	329.73	1308.92	13.57	13.54	-4.42	0.07	404529.80	772445.14	N 32 6 35.75	W 103 35 12.89	341.93	14.24
	1403.00	0.98	327.56	1402.90	14.87	14.84	-5.21	0.12	404531.10	772444.35	N 32 6 35.77	W 103 35 12.90	340.66	15.72
	1592.00	1.53	326.68	1591.86	18.36	18.31	-7.46	0.29	404534.57	772442.10	N 32 6 35.80	W 103 35 12.92	337.83	19.77
	1781.00	1.42	319.80	1780.79	22.27	22.21	-10.38	0.11	404538.47	772439.20	N 32 6 35.84	W 103 35 12.96	334.99	24.50
	1875.00	1.56	320.52	1874.76	24.16	24.08	-11.92	0.15	404540.34	772437.64	N 32 6 35.86	W 103 35 12.97	333.66	26.87
	1970.00	1.73	324.84	1969.72	26.34	26.25	-13.57	0.22	404542.51	772435.99	N 32 6 35.88	W 103 35 12.99	332.66	29.56
	2064.00	1.67	326.03	2063.68	28.65	28.55	-15.15	0.07	404544.81	772434.41	N 32 6 35.90	W 103 35 13.01	332.04	32.32
	2159.00	1.82	326.35	2158.64	31.06	30.95	-16.76	0.16	404547.21	772432.80	N 32 6 35.93	W 103 35 13.03	331.56	35.20
	2253.00	1.78	324.24	2252.59	33.50	33.38	-18.44	0.08	404549.64	772431.12	N 32 6 35.95	W 103 35 13.05	331.08	38.14
	2348.00	2.00	331.98	2347.54	36.17	36.04	-20.09	0.35	404552.30	772429.48	N 32 6 35.98	W 103 35 13.07	330.87	41.26
	2442.00	2.06	334.06	2441.48	39.15	39.01	-21.59	0.10	404555.27	772427.97	N 32 6 36.01	W 103 35 13.09	331.03	44.59
	2537.00	2.10	333.19	2536.42	42.25	42.10	-23.13	0.05	404558.36	772426.43	N 32 6 36.04	W 103 35 13.10	331.22	48.03
	2631.00	2.40	337.37	2630.35	45.61	45.45	-24.66	0.36	404561.71	772424.90	N 32 6 36.07	W 103 35 13.12	331.52	51.71
	2726.00	1.00	349.72	2725.30	48.27	48.10	-25.57	1.51	404564.36	772423.99	N 32 6 36.10	W 103 35 13.13	332.00	54.48
	2820.00	0.54	6.38	2819.29	49.52	49.35	-25.67	0.54	404565.81	772423.89	N 32 6 36.11	W 103 35 13.13	332.52	55.63
	2914.00	0.80	1.45	2913.29	50.61	50.45	-25.61	0.28	404566.71	772423.96	N 32 6 36.12	W 103 35 13.13	333.09	56.57
	3009.00	0.96	4.45	3008.28	52.07	51.90	-25.53	0.18	404568.16	772424.03	N 32 6 36.14	W 103 35 13.13	333.81	57.84
	3188.00	0.98	72.09	3187.25	54.13	53.98	-23.87	0.57	404570.24	772425.89	N 32 6 36.16	W 103 35 13.11	336.15	59.02
	3387.00	2.54	51.66	3386.16	57.20	57.07	-19.04	0.88	404573.33	772430.52	N 32 6 36.19	W 103 35 13.05	341.55	60.17
	3481.00	3.48	36.93	3480.03	60.75	60.65	-15.70	1.29	404576.91	772433.87	N 32 6 36.22	W 103 35 13.02	345.49	62.65
	3575.00	3.77	42.79	3573.84	65.27	65.20	-11.88	0.50	404581.45	772437.68	N 32 6 36.27	W 103 35 12.97	349.67	66.27
	3670.00	3.21	67.94	3668.67	68.53	68.49	-7.29	1.70	404584.74	772442.27	N 32 6 36.30	W 103 35 12.92	353.92	68.87
	3764.00	3.27	71.85	3762.52	70.32	70.31	-2.31	0.24	404586.57	772447.25	N 32 6 36.32	W 103 35 12.86	358.12	70.35
	3858.00	2.10	97.95	3856.42	70.89	70.91	1.95	1.77	404587.17	772451.51	N 32 6 36.32	W 103 35 12.81	1.57	70.93

Comments	MD (ft)	Incl (°)	Azin Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')	Closure Azimuth (°)	Closure (ft)
	3953.00	3.77	135.23	3951.30	68.41	68.45	5.87	2.58	404584.71	772455.43	N 32 6 36.30	W 103 35 12.76	4.90	68.70
	4047.00	1.86	179.53	4045.19	64.68	64.73	8.06	2.94	404580.99	772457.62	N 32 6 36.26	W 103 35 12.74	7.10	65.23
	4142.00	2.61	225.09	4140.13	61.62	61.66	6.54	1.96	404577.92	772456.10	N 32 6 36.23	W 103 35 12.76	6.05	62.01
	4236.00	2.35	219.64	4234.04	58.64	58.66	3.79	0.37	404574.92	772453.35	N 32 6 36.20	W 103 35 12.79	3.70	58.79
	4331.00	2.02	217.23	4328.97	55.82	55.83	1.54	0.36	404572.09	772451.10	N 32 6 36.17	W 103 35 12.82	1.58	55.85
	4425.00	2.34	208.72	4422.90	52.83	52.83	-0.39	0.48	404569.09	772449.17	N 32 6 36.14	W 103 35 12.84	359.58	52.83
	4519.00	2.41	193.67	4516.82	49.24	49.23	-1.78	0.67	404565.49	772447.79	N 32 6 36.11	W 103 35 12.85	357.93	49.26
	4614.00	3.13	186.04	4611.71	44.72	44.71	-2.52	0.85	404560.97	772447.04	N 32 6 36.06	W 103 35 12.86	356.77	44.78
	4708.00	2.98	187.02	4705.58	39.75	39.73	-3.09	0.17	404555.99	772446.47	N 32 6 36.01	W 103 35 12.87	355.55	39.85
	4803.00	2.60	197.51	4800.46	35.25	35.22	-4.04	0.67	404551.48	772445.52	N 32 6 35.97	W 103 35 12.88	353.46	35.45
	4872.00	2.66	203.07	4869.39	32.29	32.28	-5.14	0.38	404548.52	772444.42	N 32 6 35.94	W 103 35 12.90	350.95	32.66
	4988.00	2.68	205.14	4983.27	27.46	27.41	-7.31	0.09	404543.67	772442.25	N 32 6 35.89	W 103 35 12.92	345.08	28.37
	5081.00	2.89	234.24	5078.16	24.07	24.00	-10.19	1.49	404540.26	772439.37	N 32 6 35.86	W 103 35 12.95	336.99	26.08
	5175.00	3.44	263.21	5172.02	22.38	22.28	-14.92	1.78	404538.54	772434.64	N 32 6 35.84	W 103 35 13.01	326.20	26.81
	5270.00	3.85	272.71	5266.83	22.23	22.10	-20.93	0.77	404538.36	772428.63	N 32 6 35.84	W 103 35 13.08	316.55	30.44
	5458.00	4.11	299.61	5454.39	25.94	25.72	-33.10	0.99	404541.98	772416.47	N 32 6 35.88	W 103 35 13.22	307.86	41.92
	5553.00	4.48	312.07	5549.13	30.14	29.89	-38.81	1.05	404546.15	772410.75	N 32 6 35.92	W 103 35 13.29	307.60	48.99
	5647.00	4.32	310.37	5642.85	34.93	34.65	-44.23	0.22	404550.90	772405.33	N 32 6 35.97	W 103 35 13.35	308.07	56.19
	5741.00	4.49	309.25	5736.57	39.59	39.27	-49.78	0.20	404555.53	772399.78	N 32 6 36.01	W 103 35 13.41	308.27	63.40
	5930.00	4.08	303.83	5925.05	48.09	47.69	-61.09	0.30	404563.95	772388.47	N 32 6 36.10	W 103 35 13.54	307.98	77.50
	6024.00	4.55	314.57	6018.78	52.60	52.17	-66.53	0.99	404568.43	772383.03	N 32 6 36.14	W 103 35 13.61	308.10	84.54
	6119.00	4.95	320.79	6113.46	58.45	57.99	-71.80	0.69	404574.25	772377.76	N 32 6 36.20	W 103 35 13.67	308.92	92.30
	6214.00	4.86	318.84	6208.11	64.69	64.19	-77.04	0.20	404580.45	772372.52	N 32 6 36.26	W 103 35 13.73	309.80	100.28
	6308.00	4.18	309.62	6301.82	69.91	69.38	-82.30	1.06	404585.64	772367.26	N 32 6 36.31	W 103 35 13.79	310.13	107.64
	6402.00	3.34	317.81	6395.61	74.15	73.59	-86.78	1.06	404589.85	772362.78	N 32 6 36.35	W 103 35 13.84	310.30	113.78
	6496.00	2.31	338.06	6489.50	77.96	77.38	-89.33	1.51	404593.63	772360.24	N 32 6 36.39	W 103 35 13.87	310.90	118.18
	6591.00	2.06	347.96	6584.43	81.41	80.82	-90.40	0.48	404597.08	772359.16	N 32 6 36.43	W 103 35 13.88	311.80	121.26
	6685.00	1.69	14.39	6678.38	84.40	83.82	-90.41	0.99	404600.08	772359.16	N 32 6 36.46	W 103 35 13.88	312.83	123.28
	6780.00	1.30	34.45	6773.35	86.64	86.06	-89.45	0.68	404602.32	772360.11	N 32 6 36.48	W 103 35 13.87	313.90	124.13
	6874.00	1.44	34.13	6867.32	88.49	87.92	-88.18	0.15	404604.18	772361.38	N 32 6 36.50	W 103 35 13.86	314.91	124.52
	6968.00	1.27	29.02	6961.30	90.37	89.81	-87.01	0.22	404606.07	772362.55	N 32 6 36.52	W 103 35 13.84	315.91	125.05
	7063.00	1.10	23.16	7056.28	92.13	91.57	-86.15	0.22	404607.83	772363.42	N 32 6 36.53	W 103 35 13.83	316.75	125.72
	7252.00	0.94	16.93	7245.25	95.27	94.72	-84.98	0.10	404610.98	772364.58	N 32 6 36.56	W 103 35 13.82	318.10	127.25
	7346.00	0.62	11.36	7339.24	96.50	95.96	-84.66	0.35	404612.21	772364.91	N 32 6 36.58	W 103 35 13.81	318.58	127.96
	7441.00	0.62	346.23	7434.23	97.51	96.96	-84.88	0.28	404613.22	772364.89	N 32 6 36.59	W 103 35 13.81	318.87	128.73
	7629.00	0.30	346.40	7622.23	98.97	98.42	-85.03	0.17	404614.68	772364.53	N 32 6 36.60	W 103 35 13.82	319.17	130.07
	7818.00	0.18	60.77	7811.23	99.60	99.05	-84.89	0.16	404615.31	772364.67	N 32 6 36.61	W 103 35 13.82	319.40	130.45
	8007.00	0.30	182.85	8000.22	99.25	98.70	-84.66	0.22	404614.96	772364.91	N 32 6 36.60	W 103 35 13.81	319.38	130.03
	8195.00	0.58	176.96	8188.22	97.81	97.26	-84.63	0.15	404613.52	772364.93	N 32 6 36.59	W 103 35 13.81	318.97	128.93
	8384.00	0.87	205.27	8377.20	95.56	95.01	-85.19	0.24	404611.26	772364.37	N 32 6 36.57	W 103 35 13.82	318.12	127.61
	8573.00	0.94	194.28	8566.18	92.78	92.21	-88.19	0.10	404608.46	772363.37	N 32 6 36.54	W 103 35 13.83	316.93	126.22
	8667.00	1.17	195.60	8660.16	91.10	90.54	-86.64	0.25	404606.79	772362.93	N 32 6 36.52	W 103 35 13.84	316.26	125.31
	8713.00	1.19	198.99	8706.15	90.19	89.63	-86.92	0.16	404605.89	772362.64	N 32 6 36.51	W 103 35 13.84	315.88	124.85
KOP	8800.00	2.70	16.08	8793.13	91.31	90.75	-86.64	4.47	404607.00	772362.92	N 32 6 36.52	W 103 35 13.84	316.32	125.47
First SLB Survey	8828.00	3.95	16.36	8821.08	92.86	92.30	-86.19	4.47	404608.56	772363.37	N 32 6 36.54	W 103 35 13.83	316.96	126.29
	8860.00	8.88	13.02	8852.87	96.32	95.77	-85.32	15.44	404612.03	772364.24	N 32 6 36.57	W 103 35 13.82	318.30	128.27
	8891.00	12.76	15.06	8883.32	101.95	101.41	-83.89	12.58	404617.67	772365.67	N 32 6 36.63	W 103 35 13.81	320.40	131.61
	8923.00	16.61	14.33	8914.27	109.79	109.26	-81.84	12.04	404625.51	772367.72	N 32 6 36.71	W 103 35 13.78	323.16	136.51
	8954.00	19.62	24.32	8943.73	118.80	118.30	-78.60	13.92	404634.55	772370.96	N 32 6 36.80	W 103 35 13.74	326.40	142.03
	8986.00	23.30	27.02	8973.51	129.31	128.83	-73.51	11.90	404645.09	772376.05	N 32 6 36.90	W 103 35 13.68	330.29	148.33
	9032.00	29.46	26.17	9014.70	147.52	147.11	-64.38	13.42	404663.36	772385.18	N 32 6 37.08	W 103 35 13.57	336.36	160.58
	9080.00	36.01	24.37	9055.06	170.92	170.58	-53.34	13.79	404686.84	772396.22	N 32 6 37.31	W 103 35 13.44	342.64	178.73
	9127.00	42.03	24.07	9091.55	197.82	197.56	-41.21	12.81	404713.81	772408.35	N 32 6 37.58	W 103 35 13.30	348.22	201.81
	9175.00	45.61	18.68	9126.19	228.68	228.50	-29.16	10.77	404744.75	772420.40	N 32 6 37.88	W 103 35 13.16	352.73	230.35
	9221.00	49.52	14.54	9157.23	261.14	261.02	-19.49	10.78	404777.27	772430.07	N 32 6 38.20	W 103 35 13.04	355.73	261.75
	9269.00	54.34	13.85	9186.82	297.71	297.65	-10.24	10.11	404813.90	772439.32	N 32 6 38.57	W 103 35 12.93	358.03	297.82
	9315.00	58.06	11.85	9212.41	334.91	334.91	-1.75	8.86	404851.16	772447.81	N 32 6 38.93	W 103 35 12.83	359.70	334.91
	9363.00	63.77	8.32	9235.74	376.14	376.19	5.55	13.52	404892.43	772455.11	N 32 6 39.34	W 103 35 12.74	0.85	376.23
	9410.00	69.58	6.39	9254.34	418.89	418.97	11.06	12.92	404935.22	772460.62	N 32 6 39.77	W 103 35 12.68	1.51	419.12
	9458.00	73.39	4.29	9269.58	464.17	464.28	15.28	8.96	404980.52	772464.84	N 32 6 40.21	W 103 35 12.62	1.89	464.53
	9504.00	77.55	1.93	9281.12	508.60	508.73	17.69	10.32	405024.97	772467.25	N 32 6 40.65	W 103 35 12.59	1.99	509.04
	9552.00	82.89	359.88	9289.27	555.88	556.01	18.35	12.05	405072.25	772467.91	N 32 6 41.12	W 103 35 12.58	1.89	556.31
	9583.00	85.25	0.74	9292.48	586.71	586.84	18.46	8.34	405103.08	772468.02	N 32 6 41.43	W 103 35 12.58	1.80	587.13
	9649.00	86.11	2.20	9297.45	652.48	652.63	20.15	2.56	405168.87	772469.71	N 32 6 42.08	W 103 35 12.55	1.77	652.94
	9712.00	86.83	1.32	9301.33	715.32	715.48	22.08	1.80	405231.71	772471.64	N 32 6 42.70	W 103 35 12.52	1.77	715.82
	9806.00	89.42	1.61	9304.40	809.21	809.39	24.48	2.77	405325.62	772474.04	N 32 6 43.63	W 103 35 12.49	1.73	809.76
	9900.00	88.25	0.12	9306.31	903.16	903.35	25.90	2.02	405419.58	772475.46	N 32 6 44.56	W 103 35 12.46	1.64	903.72

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 ° ' '')	Closure Azimuth (°)	Closure (ft)
	10088.00	88.97	359.60	9310.88	1091.11	1091.29	25.44	0.47	405607.52	772475.00	N 32 6 48.42	W 103 35 12.45	1.34	1091.59
	10182.00	87.56	358.69	9313.72	1185.06	1185.24	24.04	1.79	405701.46	772473.60	N 32 6 47.35	W 103 35 12.46	1.16	1185.48
	10276.00	88.00	356.59	9317.36	1278.92	1279.08	20.17	2.28	405795.30	772469.73	N 32 6 48.28	W 103 35 12.50	0.90	1279.24
	10370.00	88.11	356.66	9320.55	1372.74	1372.86	14.64	0.14	405889.08	772464.20	N 32 6 49.20	W 103 35 12.56	0.61	1372.94
	10464.00	85.73	354.69	9325.60	1466.37	1466.45	7.57	3.28	405982.66	772457.13	N 32 6 50.13	W 103 35 12.63	0.30	1466.47
	10559.00	87.90	357.55	9330.88	1561.03	1561.07	1.15	3.78	406077.28	772450.71	N 32 6 51.07	W 103 35 12.70	0.04	1561.07
	10653.00	87.87	0.50	9334.35	1654.95	1654.98	-0.45	3.14	406171.19	772449.11	N 32 6 52.00	W 103 35 12.71	359.98	1654.98
	10747.00	87.80	0.52	9337.90	1748.87	1748.91	0.39	0.08	406265.12	772449.95	N 32 6 52.93	W 103 35 12.69	0.01	1748.91
	10841.00	88.04	0.01	9341.32	1842.80	1842.85	0.82	0.60	406359.05	772450.38	N 32 6 53.86	W 103 35 12.68	0.03	1842.85
	11029.00	88.66	0.00	9346.73	2030.72	2030.77	0.84	0.33	406546.97	772450.40	N 32 6 55.72	W 103 35 12.66	0.02	2030.77
	11124.00	88.83	0.20	9348.81	2125.70	2125.75	1.01	0.28	406641.94	772450.57	N 32 6 56.65	W 103 35 12.66	0.03	2125.75
	11312.00	88.56	0.54	9353.09	2313.63	2313.69	2.22	0.23	406829.88	772451.78	N 32 6 58.51	W 103 35 12.63	0.05	2313.69
	11501.00	88.00	0.11	9358.76	2502.53	2502.60	3.29	0.37	407018.78	772452.85	N 32 7 0 38	W 103 35 12.60	0.08	2502.61
	11595.00	87.87	359.63	9362.15	2596.47	2596.54	3.08	0.53	407112.72	772452.64	N 32 7 1 31	W 103 35 12.59	0.07	2596.54
	11784.00	88.31	359.65	9368.45	2785.36	2785.43	1.89	0.23	407301.60	772451.45	N 32 7 3 18	W 103 35 12.59	0.04	2785.43
	11879.00	88.45	0.11	9371.14	2880.32	2880.39	1.69	0.51	407396.56	772451.25	N 32 7 4 12	W 103 35 12.59	0.03	2880.40
	11973.00	88.93	0.80	9373.29	2974.29	2974.37	2.44	0.89	407490.53	772452.00	N 32 7 5 05	W 103 35 12.57	0.05	2974.37
	12067.00	90.17	0.55	9374.02	3068.27	3068.36	3.55	1.35	407584.52	772453.11	N 32 7 5 98	W 103 35 12.55	0.07	3068.36
	12256.00	92.34	356.66	9369.88	3257.14	3257.21	-1.05	2.36	407773.36	772448.51	N 32 7 7 85	W 103 35 12.59	359.98	3257.21
	12444.00	91.41	359.88	9363.73	3444.96	3444.99	-8.72	1.78	407961.14	772442.84	N 32 7 9 71	W 103 35 12.64	359.89	3445.00
	12632.00	90.52	0.31	9360.56	3632.93	3632.96	-6.41	0.53	408149.11	772443.15	N 32 7 11 57	W 103 35 12.62	359.90	3632.97
	12727.00	89.79	0.79	9360.31	3727.92	3727.96	-5.50	0.92	408244.10	772444.06	N 32 7 12 51	W 103 35 12.60	359.92	3727.96
	12926.00	90.55	359.91	9359.72	3926.90	3926.95	-4.28	0.58	408443.09	772445.28	N 32 7 14 48	W 103 35 12.57	359.94	3926.95
	13009.00	90.34	1.26	9359.07	4009.88	4009.94	-3.43	1.65	408526.07	772446.13	N 32 7 15 30	W 103 35 12.55	359.95	4009.94
	13197.00	90.52	0.49	9357.66	4197.83	4197.91	-0.56	0.42	408714.04	772449.00	N 32 7 17 16	W 103 35 12.51	359.99	4197.91
	13387.00	89.66	0.93	9357.36	4387.79	4387.90	1.79	0.51	408904.02	772451.35	N 32 7 19 04	W 103 35 12.46	0.02	4387.90
	13576.00	89.79	0.00	9358.27	4576.77	4576.89	3.32	0.50	409093.00	772452.88	N 32 7 20 91	W 103 35 12.43	0.04	4576.89
	13671.00	90.65	359.88	9357.90	4671.76	4671.88	3.23	0.91	409188.00	772452.79	N 32 7 21 85	W 103 35 12.42	0.04	4671.88
	13765.00	90.69	0.43	9356.81	4765.75	4765.88	3.48	0.59	409281.99	772453.04	N 32 7 22 78	W 103 35 12.41	0.04	4765.88
Section Line Crossing [316' FEL]	13890.42	90.25	359.02	9355.77	4891.17	4891.29	2.88	1.17	409407.39	772452.44	N 32 7 24.02	W 103 35 12.41	0.03	4891.29
	13954.00	90.03	358.31	9355.62	4954.74	4954.85	1.40	1.17	409470.95	772450.96	N 32 7 24.65	W 103 35 12.42	0.02	4954.85
	14048.00	90.34	357.89	9355.31	5048.70	5048.80	-1.71	0.56	409564.90	772447.85	N 32 7 25.58	W 103 35 12.45	359.98	5048.80
	14237.00	90.65	357.63	9353.68	5237.59	5237.65	-9.10	0.21	409753.74	772440.46	N 32 7 27.45	W 103 35 12.52	359.90	5237.65
	14331.00	90.38	358.62	9352.84	5331.58	5331.59	-12.18	1.09	409847.68	772437.38	N 32 7 28.38	W 103 35 12.55	359.87	5331.60
	14424.00	90.34	356.48	9352.25	5424.49	5424.50	-16.15	2.30	409940.59	772433.41	N 32 7 29.30	W 103 35 12.59	359.83	5424.52
	14518.00	90.86	359.33	9351.27	5518.43	5518.42	-19.59	3.08	410034.50	772429.97	N 32 7 30.23	W 103 35 12.62	359.80	5518.45
	14612.00	90.41	0.64	9350.23	5612.42	5612.41	-19.61	1.47	410128.49	772429.95	N 32 7 31.16	W 103 35 12.61	359.80	5612.45
	14707.00	90.28	358.11	9349.65	5707.41	5707.40	-20.65	2.67	410223.48	772428.91	N 32 7 32.10	W 103 35 12.62	359.79	5707.43
	14801.00	90.34	357.98	9349.14	5801.37	5801.34	-23.86	0.15	410317.42	772425.71	N 32 7 33.03	W 103 35 12.65	359.76	5801.39
	14896.00	88.28	354.40	9350.29	5896.17	5896.10	-30.17	4.35	410412.18	772419.40	N 32 7 33.97	W 103 35 12.71	359.71	5896.18
	14990.00	90.24	357.59	9351.50	5989.96	5989.85	-36.73	3.98	410505.92	772412.83	N 32 7 34.89	W 103 35 12.78	359.65	5989.96
	15085.00	89.86	359.36	9351.42	6084.94	6084.81	-39.26	1.91	410600.88	772410.30	N 32 7 35.83	W 103 35 12.80	359.63	6084.94
	15179.00	89.66	359.55	9351.81	6178.94	6178.81	-40.15	0.29	410694.87	772409.41	N 32 7 36.76	W 103 35 12.81	359.63	6178.94
	15273.00	90.45	1.40	9351.72	6272.92	6272.80	-39.37	2.14	410788.86	772410.19	N 32 7 37.69	W 103 35 12.79	359.64	6272.92
	15368.00	90.48	2.33	9350.95	6367.84	6367.74	-38.28	0.98	410883.80	772413.28	N 32 7 38.63	W 103 35 12.75	359.67	6367.85
	15462.00	90.69	3.45	9349.99	6461.69	6461.62	-31.54	1.21	410977.67	772418.02	N 32 7 39.56	W 103 35 12.68	359.72	6461.69
	15556.00	90.28	0.26	9349.20	6555.60	6555.55	-28.50	3.42	411071.60	772421.06	N 32 7 40.49	W 103 35 12.64	359.75	6555.61
	15650.00	90.41	1.18	9348.63	6649.58	6649.54	-27.32	0.99	411165.59	772422.24	N 32 7 41.42	W 103 35 12.62	359.76	6649.60
	15744.00	90.65	359.97	9347.76	6743.56	6743.53	-26.37	1.31	411259.58	772423.19	N 32 7 42.35	W 103 35 12.60	359.78	6743.58
	15932.00	89.45	0.21	9347.60	6931.55	6931.53	-26.08	0.65	411447.57	772423.48	N 32 7 44.21	W 103 35 12.58	359.78	6931.58
	16026.00	89.45	0.39	9348.50	7025.54	7025.52	-25.59	0.19	411541.56	772423.97	N 32 7 45.14	W 103 35 12.57	359.79	7025.57
	16120.00	89.69	0.72	9349.21	7119.53	7119.51	-24.68	0.43	411635.55	772424.88	N 32 7 46.07	W 103 35 12.55	359.80	7119.56
	16214.00	89.31	0.96	9350.03	7213.50	7213.50	-23.30	0.48	411729.53	772426.26	N 32 7 47.00	W 103 35 12.53	359.81	7213.54
	16309.00	89.14	0.21	9351.31	7308.48	7308.49	-22.33	0.81	411824.51	772427.23	N 32 7 47.94	W 103 35 12.51	359.82	7308.52
	16403.00	89.52	359.60	9352.41	7402.47	7402.48	-22.48	0.76	411918.50	772427.08	N 32 7 48.87	W 103 35 12.50	359.83	7402.51
	16497.00	89.17	359.50	9353.48	7496.46	7496.47	-23.22	0.39	412012.49	772426.34	N 32 7 49.80	W 103 35 12.50	359.82	7496.51
	16591.00	89.48	359.65	9354.59	7590.46	7590.46	-23.92	0.37	412106.48	772425.64	N 32 7 50.73	W 103 35 12.50	359.82	7590.50
	16686.00	89.66	0.72	9355.30	7685.45	7685.46	-23.61	1.14	412201.47	772425.95	N 32 7 51.67	W 103 35 12.49	359.82	7685.49
	16780.00	89.59	1.49	9355.92	7779.41	7779.44	-21.80	0.82	412295.45	772427.76	N 32 7 52.60	W 103 35 12.46	359.84	7779.47
	16874.00	90.14	2.08	9356.14	7873.35	7873.39	-18.87	0.86	412389.40	772430.69	N 32 7 53.53	W 103 35 12.42	359.86	7873.41
	16968.00	88.80	0.82	9357.01	7967.29	7967.35	-16.49	1.96	412483.38	772433.07	N 32 7 54.46	W 103 35 12.39	359.88	7967.37
	17063.00	89.38	358.32	9358.52	8062.27	8062.33	-17.21	2.70	412578.33	772432.35	N 32 7 55.40	W 103 35 12.39	359.88	8062.35
	17158.00	89.35	358.32	9359.57	8157.24	8157.28	-19.99	0.03	412673.28	772429.57	N 32 7 56.34	W 103 35 12.41	359.86	8157.31
	17252.00	89.42	358.05	9360.58	8251.20	8251.23	-22.97	0.30	412767.23	772426.59	N 32 7 57.27	W 103 35 12.44	359.84	8251.26
	17346.00	89.59	358.41	9361.39	8345.17	8345.18	-25.87	0.42	412861.18	772423.69	N 32 7 58.20	W 103 35 12.47	359.82	8345.22

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 ° ' '')	Closure Azimuth (°)	Closure (ft)
	17440.00	89.79	357.47	9361.90	8439.13	8439.12	-29.25	1.02	412955.11	772420.31	N 32 7 59.13	W 103 35 12.50	359.80	8439.17
	17616.00	90.83	358.02	9360.95	8615.03	8614.98	-36.18	0.67	413130.96	772413.39	N 32 8 0.87	W 103 35 12.56	359.76	8615.05
	17706.00	90.93	358.20	9359.57	8704.99	8704.92	-39.14	0.23	413220.90	772410.42	N 32 8 1.76	W 103 35 12.59	359.74	8705.00
	17797.00	90.79	358.17	9358.20	8795.95	8795.88	-42.03	0.16	413311.84	772407.54	N 32 8 2.66	W 103 35 12.62	359.73	8795.96
	17889.00	91.00	357.79	9356.77	8887.90	8887.79	-45.27	0.47	413403.77	772404.29	N 32 8 3.57	W 103 35 12.65	359.71	8887.91
	17980.00	91.13	358.75	9355.07	8978.86	8978.73	-48.02	1.06	413494.71	772401.55	N 32 8 4.47	W 103 35 12.67	359.69	8978.86
	18071.00	90.79	358.13	9353.55	9069.82	9069.69	-50.49	0.78	413585.66	772399.07	N 32 8 5.37	W 103 35 12.69	359.68	9069.83
	18162.00	91.20	357.77	9351.97	9160.77	9160.61	-53.75	0.60	413676.58	772395.81	N 32 8 6.27	W 103 35 12.72	359.66	9160.77
	18253.00	90.62	358.91	9350.52	9251.73	9251.56	-56.38	1.41	413767.53	772393.18	N 32 8 7.17	W 103 35 12.75	359.65	9251.73
	18344.00	89.97	359.91	9350.06	9342.73	9342.55	-57.32	1.31	413858.52	772392.24	N 32 8 8.07	W 103 35 12.75	359.65	9342.73
	18435.00	90.14	0.40	9349.97	9433.73	9433.55	-57.07	0.57	413949.51	772392.49	N 32 8 8.97	W 103 35 12.74	359.65	9433.73
	18570.00	90.07	0.55	9349.72	9568.71	9568.55	-55.95	0.12	414084.51	772393.61	N 32 8 10.31	W 103 35 12.72	359.66	9568.71
	18706.00	88.76	0.74	9351.11	9704.68	9704.53	-54.42	0.97	414220.48	772395.14	N 32 8 11.65	W 103 35 12.69	359.68	9704.68
	18797.00	88.90	4.40	9352.97	9795.52	9795.40	-50.34	4.02	414311.35	772399.22	N 32 8 12.55	W 103 35 12.63	359.71	9795.53
	18889.00	89.35	4.18	9354.37	9887.21	9887.14	-43.46	0.54	414403.08	772406.10	N 32 8 13.46	W 103 35 12.55	359.75	9887.23
	18980.00	89.07	2.42	9355.63	9978.01	9977.97	-38.23	1.96	414493.92	772411.34	N 32 8 14.36	W 103 35 12.48	359.78	9978.05
Final Surveys	19032.00	89.52	2.48	9356.27	10029.94	10029.92	-38.00	0.87	414545.86	772413.56	N 32 8 14.87	W 103 35 12.45	359.79	10029.99
TD, PTB [100' FNL, 320' FEL]	19073.00	89.52	2.48	9356.61	10070.89	10070.88	-34.23	0.00	414586.82	772415.33	N 32 8 15.27	W 103 35 12.42	359.81	10070.94

Survey Type: Def Survey

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)	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 #72H / Final Surveys - Cimarex Vaca Draw 20-17 Federal #72H Surveys 0ft to Vaca Draw 20-17 Federal #72H /
	1	26.000	26.000	Act Stns	17.500	13.375	NAL_MWD_IFR1+MS-Depth Only	Final Surveys - Cimarex Vaca Draw 20-17 Federal #72H Surveys 0ft to Vaca Draw 20-17 Federal #72H /
	1	26.000	1066.000	Act Stns	17.500	13.375	NAL_MWD_IFR1+MS	Final Surveys - Cimarex Vaca Draw Vaca Draw 20-17 Federal #72H /
	1	1066.000	4945.000	Act Stns	12.250	9.625	NAL_MWD_IFR1+MS	Final Surveys - Cimarex Vaca Draw Vaca Draw 20-17 Federal #72H /
	1	4945.000	9645.000	Act Stns	8.750	7.000	NAL_MWD_IFR1+MS	Final Surveys - Cimarex Vaca Draw Vaca Draw 20-17 Federal #72H /
	1	9645.000	19073.000	Act Stns	6.000	4.500	NAL_MWD_IFR1+MS	Final Surveys - Cimarex Vaca Draw Vaca Draw 20-17 Federal #72H /