



Final Surveys - Cimarex Red Hills 32-5 Fed Com #157H MWD 0ft-20220ft (Surcon Corrected) Survey Geodetic Report (Def Survey)



Report Date: December 17, 2020 - 08:52 AM
Client: Cimarex Energy
Field: NM Lea County (NAD 83)
Structure / Slot: Cimarex Red Hills 32-5 Fed Com #157H / New Slot
Well: Red Hills 32-5 Fed Com #157H
Borehole: Red Hills 32-5 Fed Com #157H
UWI / API#: Unknown / Unknown
Survey Name: Final Surveys - Cimarex Red Hills 32-5 Fed Com #157H MWD 0ft-20220ft (Surcon Corrected)
Survey Date: February 09, 2020
Tort / AHD / DDI / ERD Ratio: 256.064 ° / 10564.506 ft / 6.722 / 1.018
Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 5' 35.68082", W 103° 35' 43.02321"
Location Grid N/E Y/X: N 398441.350 ftUS, E 769894.850 ftUS
CRS Grid Convergence Angle: 0.3921 °
Grid Scale Factor: 0.99996892
Version / Patch: 2.10.824.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 179.604 ° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: RKB
TVD Reference Elevation: 3435.600 ft above MSL
Seabed / Ground Elevation: 3409.600 ft above MSL
Magnetic Declination: 6.574 °
Total Gravity Field Strength: 998.4285mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 47678.315 nT
Magnetic Dip Angle: 59.671 °
Declination Date: February 19, 2020
Magnetic Declination Model: HDGM 2019
North Reference: Grid North
Grid Convergence Used: 0.3921 °
Total Corr Mag North->Grid North: 6.1817 °
Local Coord Referenced To: Well Head

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)
SHL [390' FNL, 2345' FWL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	398441.35	769894.85	N 32 5 35.68	W 103 35 43.02	0.00	0.00
	195.00	0.74	106.54	194.99	0.37	-0.36	1.21	0.38	398440.99	769896.06	N 32 5 35.68	W 103 35 43.01	106.54	1.26
	294.00	0.42	49.72	293.99	0.32	-0.31	2.10	0.63	398441.04	769896.95	N 32 5 35.68	W 103 35 43.00	98.30	2.12
	385.00	1.03	336.63	384.98	-0.65	0.66	2.03	1.09	398442.01	769896.88	N 32 5 35.69	W 103 35 43.00	71.95	2.13
	476.00	1.11	338.57	475.97	-2.22	2.23	1.38	0.10	398443.58	769896.23	N 32 5 35.70	W 103 35 43.01	31.74	2.62
	566.00	1.19	326.32	565.95	-3.82	3.82	0.54	0.29	398445.17	769895.39	N 32 5 35.72	W 103 35 43.02	8.10	3.86
	656.00	1.13	318.35	655.93	-5.27	5.26	-0.56	0.19	398446.61	769894.29	N 32 5 35.73	W 103 35 43.03	353.88	5.29
	746.00	1.13	322.34	745.91	-6.64	6.63	-1.70	0.09	398447.98	769893.15	N 32 5 35.75	W 103 35 43.04	345.64	6.84
	837.00	1.26	311.68	836.89	-8.02	8.00	-2.99	0.28	398449.35	769891.86	N 32 5 35.76	W 103 35 43.06	339.50	8.54
	929.00	1.41	311.36	928.87	-9.46	9.42	-4.60	0.16	398450.77	769890.25	N 32 5 35.77	W 103 35 43.08	334.00	10.49
	975.00	1.36	305.07	974.86	-10.15	10.11	-5.47	0.35	398451.46	769889.38	N 32 5 35.78	W 103 35 43.09	331.59	11.50
	1120.00	1.48	312.57	1119.81	-12.42	12.37	-8.26	0.15	398453.72	769886.59	N 32 5 35.80	W 103 35 43.12	326.27	14.87
	1214.00	1.58	300.98	1213.78	-13.93	13.86	-10.26	0.35	398455.20	769884.59	N 32 5 35.82	W 103 35 43.14	323.48	17.24
	1309.00	1.63	301.45	1308.74	-15.32	15.23	-12.54	0.05	398456.58	769882.31	N 32 5 35.83	W 103 35 43.17	320.55	19.73
	1403.00	1.86	305.69	1402.70	-16.92	16.82	-14.92	0.28	398458.17	769879.93	N 32 5 35.85	W 103 35 43.20	318.44	22.48
	1591.00	1.79	306.92	1590.60	-20.50	20.37	-19.74	0.04	398461.71	769875.11	N 32 5 35.88	W 103 35 43.25	315.89	28.36
	1686.00	1.86	299.12	1685.55	-22.16	22.01	-22.27	0.27	398463.36	769872.58	N 32 5 35.90	W 103 35 43.28	314.65	31.31
	1780.00	2.92	290.86	1779.47	-23.78	23.60	-25.84	1.18	398464.95	769869.01	N 32 5 35.92	W 103 35 43.32	312.40	35.00
	1874.00	4.20	286.25	1873.29	-25.63	25.42	-31.39	1.39	398466.77	769863.46	N 32 5 35.93	W 103 35 43.39	309.00	40.39
	1969.00	5.15	274.77	1967.97	-27.01	26.75	-38.98	1.40	398468.10	769855.88	N 32 5 35.95	W 103 35 43.47	304.46	47.27
	2063.00	6.47	266.98	2061.49	-27.15	26.82	-48.47	1.63	398468.17	769846.38	N 32 5 35.95	W 103 35 43.58	298.96	55.39
	2158.00	7.17	265.43	2155.82	-26.48	26.06	-59.72	0.76	398467.41	769835.13	N 32 5 35.94	W 103 35 43.72	293.58	65.16
	2252.00	7.01	265.47	2249.10	-25.64	25.14	-71.29	0.17	398466.49	769823.56	N 32 5 35.93	W 103 35 43.85	289.43	75.59
	2346.00	6.94	264.78	2342.40	-24.74	24.17	-82.66	0.12	398465.52	769812.19	N 32 5 35.93	W 103 35 43.98	286.30	86.13
	2441.00	7.02	266.42	2436.70	-23.94	23.29	-94.17	0.23	398464.64	769800.68	N 32 5 35.92	W 103 35 44.12	283.89	97.01
	2535.00	7.26	266.09	2529.97	-23.26	22.52	-105.83	0.26	398463.87	769789.02	N 32 5 35.91	W 103 35 44.25	282.02	108.20
	2630.00	7.06	265.31	2624.23	-22.45	21.64	-117.64	0.23	398462.99	769777.21	N 32 5 35.90	W 103 35 44.39	280.42	119.61
	2724.00	7.23	266.06	2717.50	-21.65	20.76	-129.30	0.21	398462.11	769765.56	N 32 5 35.89	W 103 35 44.52	279.12	130.95
	2819.00	7.21	266.77	2811.75	-20.99	20.01	-141.21	0.10	398461.36	769753.64	N 32 5 35.89	W 103 35 44.66	278.07	142.62
	2913.00	7.04	266.34	2905.02	-20.37	19.31	-152.85	0.19	398460.66	769742.00	N 32 5 35.88	W 103 35 44.80	277.20	154.07
	3008.00	6.84	269.17	2999.32	-19.99	18.86	-164.32	0.42	398460.21	769730.54	N 32 5 35.88	W 103 35 44.93	276.55	165.40
	3102.00	6.63	269.73	3092.67	-19.96	18.75	-175.34	0.23	398460.10	769719.51	N 32 5 35.88	W 103 35 45.06	276.10	176.34
	3197.00	7.13	268.76	3186.99	-19.89	18.60	-186.72	0.54	398459.95	769708.14	N 32 5 35.88	W 103 35 45.19	275.69	187.64
	3292.00	7.05	268.47	3281.26	-19.69	18.32	-198.44	0.09	398459.67	769696.41	N 32 5 35.88	W 103 35 45.33	275.27	199.29

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)
	3386.00	7.09	268.32	3374.55	-19.44	17.99	-210.01	0.05	398459.34	769684.85	N 32 5 35.87	W 103 35 45.46	274.90	210.78
	3481.00	7.21	268.83	3468.81	-19.23	17.70	-221.83	0.14	398459.05	769673.03	N 32 5 35.87	W 103 35 45.60	274.56	222.53
	3575.00	7.53	270.12	3562.03	-19.21	17.59	-233.88	0.38	398458.94	769660.97	N 32 5 35.87	W 103 35 45.74	274.30	234.55
	3670.00	7.04	271.00	3656.27	-19.40	17.71	-245.93	0.53	398459.05	769648.93	N 32 5 35.87	W 103 35 45.88	274.12	246.57
	3765.00	7.07	272.28	3750.55	-19.82	18.04	-257.59	0.17	398459.39	769637.27	N 32 5 35.88	W 103 35 46.02	274.01	258.22
	3859.00	6.78	269.63	3843.86	-20.09	18.23	-268.92	0.46	398459.58	769625.94	N 32 5 35.88	W 103 35 46.15	273.88	269.54
	3954.00	6.83	263.26	3938.19	-19.47	17.53	-280.14	0.80	398458.88	769614.72	N 32 5 35.87	W 103 35 46.28	273.58	280.69
	4048.00	6.67	262.03	4031.54	-18.13	16.12	-291.10	0.23	398457.47	769603.76	N 32 5 35.86	W 103 35 46.41	273.17	291.54
	4143.00	6.75	261.72	4125.89	-16.64	14.55	-302.09	0.09	398455.90	769592.77	N 32 5 35.85	W 103 35 46.53	272.76	302.44
	4237.00	6.17	261.00	4219.29	-15.13	12.97	-312.54	0.62	398454.32	769582.32	N 32 5 35.83	W 103 35 46.66	272.38	312.81
	4331.00	5.67	258.84	4312.79	-13.50	11.28	-322.09	0.58	398452.63	769572.77	N 32 5 35.81	W 103 35 46.77	272.01	322.28
	4426.00	6.40	262.61	4407.27	-11.98	9.69	-331.94	0.87	398451.04	769562.92	N 32 5 35.80	W 103 35 46.88	271.67	332.08
	4520.00	6.60	261.10	4500.66	-10.55	8.18	-342.47	0.28	398449.53	769552.39	N 32 5 35.78	W 103 35 47.00	271.37	342.57
	4615.00	6.36	256.30	4595.06	-8.53	6.09	-352.98	0.62	398447.44	769541.88	N 32 5 35.76	W 103 35 47.13	270.99	353.03
	4709.00	6.10	264.40	4688.50	-6.88	4.37	-363.01	0.97	398445.72	769531.85	N 32 5 35.75	W 103 35 47.24	270.69	363.04
	4803.00	6.23	267.41	4781.96	-6.23	3.65	-373.08	0.37	398445.00	769521.79	N 32 5 35.74	W 103 35 47.36	270.56	373.09
	4825.00	6.17	267.03	4803.83	-6.13	3.53	-375.45	0.33	398444.88	769519.41	N 32 5 35.74	W 103 35 47.39	270.54	375.47
	5006.00	6.08	267.09	4983.80	-5.27	2.54	-394.74	0.05	398443.89	769500.13	N 32 5 35.73	W 103 35 47.61	270.37	394.74
	5100.00	6.26	268.91	5077.25	-4.99	2.19	-404.83	0.28	398443.54	769490.03	N 32 5 35.73	W 103 35 47.73	270.31	404.84
	5195.00	7.27	272.77	5171.59	-5.26	2.39	-416.01	1.17	398443.74	769478.85	N 32 5 35.73	W 103 35 47.86	270.33	416.02
	5289.00	6.49	271.76	5264.91	-5.79	2.84	-427.26	0.84	398444.19	769467.60	N 32 5 35.74	W 103 35 47.99	270.38	427.27
	5384.00	4.28	273.56	5359.49	-6.24	3.22	-436.17	2.33	398444.57	769458.69	N 32 5 35.74	W 103 35 48.09	270.42	436.18
	5478.00	2.52	262.39	5453.32	-6.22	3.17	-441.72	1.99	398444.52	769453.14	N 32 5 35.74	W 103 35 48.16	270.41	441.73
	5572.00	2.27	228.25	5547.24	-4.73	1.65	-445.16	1.52	398443.00	769449.71	N 32 5 35.73	W 103 35 48.20	270.21	445.16
	5667.00	2.32	214.90	5642.17	-1.92	-1.18	-447.66	0.56	398440.17	769447.20	N 32 5 35.70	W 103 35 48.23	269.85	447.66
	5761.00	2.48	215.54	5736.08	1.28	-4.39	-449.93	0.17	398436.96	769444.93	N 32 5 35.67	W 103 35 48.25	269.44	449.95
	5856.00	2.40	213.16	5831.00	4.61	-7.73	-452.21	0.14	398433.62	769442.65	N 32 5 35.63	W 103 35 48.28	269.02	452.28
	6044.00	2.20	215.06	6018.85	10.82	-13.98	-456.44	0.11	398427.37	769438.42	N 32 5 35.57	W 103 35 48.33	268.25	456.65
	6138.00	2.22	215.01	6112.78	13.78	-16.95	-458.52	0.02	398424.40	769436.34	N 32 5 35.54	W 103 35 48.35	267.88	458.83
	6233.00	1.85	203.60	6207.72	16.68	-19.86	-460.19	0.58	398421.49	769434.67	N 32 5 35.52	W 103 35 48.37	267.53	460.62
	6327.00	1.66	187.79	6301.67	19.41	-22.60	-460.98	0.55	398418.75	769433.88	N 32 5 35.49	W 103 35 48.38	267.19	461.54
	6421.00	1.64	188.82	6395.63	22.09	-25.28	-461.37	0.04	398416.07	769433.49	N 32 5 35.46	W 103 35 48.39	266.86	462.07
	6515.00	0.81	205.25	6489.61	24.02	-27.21	-461.86	0.95	398414.14	769433.00	N 32 5 35.44	W 103 35 48.39	266.63	462.66
	6610.00	0.26	214.28	6584.61	24.80	-27.99	-462.27	0.58	398413.36	769432.59	N 32 5 35.44	W 103 35 48.40	266.53	463.12
	6704.00	0.17	214.93	6678.61	25.09	-28.28	-462.47	0.10	398413.07	769432.39	N 32 5 35.43	W 103 35 48.40	266.50	463.34
	6798.00	0.39	190.11	6772.61	25.52	-28.71	-462.61	0.26	398412.64	769432.26	N 32 5 35.43	W 103 35 48.40	266.45	463.50
	6893.00	0.38	183.07	6867.60	26.15	-29.35	-462.68	0.05	398412.00	769432.18	N 32 5 35.42	W 103 35 48.40	266.37	463.61
	6987.00	0.50	173.32	6961.60	26.87	-30.06	-462.65	0.15	398411.29	769432.22	N 32 5 35.41	W 103 35 48.40	266.28	463.63
	7081.00	0.56	166.94	7055.60	27.72	-30.92	-462.50	0.09	398410.43	769432.37	N 32 5 35.41	W 103 35 48.40	266.18	463.53
	7176.00	0.38	171.58	7150.59	28.49	-31.68	-462.35	0.19	398409.67	769432.52	N 32 5 35.40	W 103 35 48.40	266.08	463.43
	7270.00	0.61	69.81	7244.59	28.63	-31.82	-461.83	0.83	398409.53	769433.03	N 32 5 35.40	W 103 35 48.39	266.06	462.93
	7364.00	1.07	57.78	7338.58	27.99	-31.18	-460.62	0.52	398410.17	769434.25	N 32 5 35.40	W 103 35 48.38	266.13	461.67
	7459.00	1.13	46.48	7433.56	26.89	-30.06	-459.19	0.24	398411.29	769435.68	N 32 5 35.41	W 103 35 48.36	266.25	460.17
	7553.00	0.91	51.44	7527.55	25.79	-28.96	-457.93	0.25	398412.39	769436.93	N 32 5 35.43	W 103 35 48.35	266.38	458.85
	7648.00	0.72	81.58	7622.54	25.24	-28.40	-456.75	0.49	398412.95	769438.11	N 32 5 35.43	W 103 35 48.33	266.44	457.64
	7742.00	0.76	91.58	7716.53	25.18	-28.33	-455.55	0.14	398413.02	769439.32	N 32 5 35.43	W 103 35 48.32	266.44	456.43
	7836.00	0.60	91.70	7810.53	25.22	-28.36	-454.43	0.17	398412.99	769440.43	N 32 5 35.43	W 103 35 48.31	266.43	455.32
	7930.00	0.61	107.21	7904.52	25.39	-28.52	-453.46	0.17	398412.83	769441.40	N 32 5 35.43	W 103 35 48.30	266.40	454.36
	8025.00	0.63	103.36	7999.51	25.67	-28.79	-452.47	0.05	398412.56	769442.39	N 32 5 35.43	W 103 35 48.28	266.36	453.39
	8119.00	0.76	109.80	8093.51	26.00	-29.13	-451.38	0.16	398412.23	769443.48	N 32 5 35.42	W 103 35 48.27	266.31	452.32
	8213.00	1.11	122.61	8187.49	26.72	-29.83	-450.03	0.43	398411.52	769444.84	N 32 5 35.42	W 103 35 48.26	266.21	451.01
	8307.00	0.81	126.05	8281.48	27.61	-30.71	-448.72	0.32	398410.64	769446.14	N 32 5 35.41	W 103 35 48.24	266.09	449.77
	8402.00	0.78	129.87	8376.47	28.42	-31.52	-447.68	0.06	398409.83	769447.18	N 32 5 35.40	W 103 35 48.23	265.97	448.79
	8496.00	1.07	137.14	8470.46	29.48	-32.57	-446.60	0.33	398408.78	769448.27	N 32 5 35.39	W 103 35 48.22	265.83	447.78
	8591.00	1.12	141.41	8565.44	30.87	-33.95	-445.41	0.10	398407.40	769449.45	N 32 5 35.38	W 103 35 48.20	265.64	446.71
	8685.00	1.20	138.73	8659.42	32.33	-35.41	-444.19	0.10	398405.95	769450.67	N 32 5 35.36	W 103 35 48.19	265.44	445.60
	8780.00	0.99	140.45	8754.41	33.72	-36.79	-443.01	0.22	398404.57	769451.85	N 32 5 35.35	W 103 35 48.18	265.25	444.54
	8874.00	1.05	151.19	8848.39	35.11	-38.17	-442.08	0.21	398403.18	769452.78	N 32 5 35.33	W 103 35 48.16	265.07	443.72
	8969.00	1.18	155.22	8943.37	36.77	-39.82	-441.25	0.16	398401.53	769453.61	N 32 5 35.32	W 103 35 48.16	264.84	443.04
	9063.00	1.04	161.78	9037.36	38.46	-41.51	-440.58	0.20	398399.84	769454.29	N 32 5 35.30	W 103 35 48.15	264.62	442.53
	9158.00	0.95	167.70	9132.34	40.05	-43.10	-440.14	0.14	398398.26	769454.72	N 32 5 35.28	W 103 35 48.14	264.41	442.25
	9252.00	0.87	177.86	9226.33	41.53	-44.57	-439.95	0.19	398396.78	769454.92	N 32 5 35.27	W 103 35 48.14	264.22	442.20
	9347.00	1.11	157.44	9321.32	43.10	-46.14	-439.57	0.45	398395.21	769455.30	N 32 5 35.25	W 103 35 48.14	264.01	441.98
	9441.00	0.81	159.15	9415.30	44.57	-47.60	-438.98	0.32	398393.75	769455.88	N 32 5 35.24	W 103 35 48.13	263.81	441.56
	9536.00	0.42	151.85	9510.30	45.50	-48.54	-438.58	0.42	398392.82	769456.29	N 32 5 35.23	W 103 35 48.13	263.68	441.26
	9630.00	0.66	246.90	9604.29	46.02	-49.05	-438.91	0.86	398392.30	769455.95	N 32 5 35.23	W 103 35 48.13	263.62	441.65
	9724.00	1.12	243.40	9698.28	46.63	-49.68	-440.23	0.49	398391.68	769454.63	N 32 5 35.22	W 103 35 48.14	263.56	443.03

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)
	9819.00	1.16	245.84	9793.26	47.43	-50.49	-441.94	0.07	398390.87	769452.92	N 32	5 35.21	W 103 35 48.16	263.48	444.82
KOP [438' FNL, 1902' FWL] First SLB Survey	9840.00	1.19	241.43	9814.26	47.62	-50.68	-442.33	0.45	398390.67	769452.54	N 32	5 35.21	W 103 35 48.17	263.46	445.22
	9935.00	6.18	179.93	9909.05	53.20	-56.27	-443.19	6.01	398385.08	769451.68	N 32	5 35.15	W 103 35 48.18	262.76	446.75
	9981.00	13.37	175.40	9954.35	60.99	-64.05	-442.76	15.71	398377.30	769452.11	N 32	5 35.08	W 103 35 48.17	261.77	447.37
	10029.00	18.28	175.56	10000.52	74.04	-77.10	-441.73	10.23	398364.25	769453.14	N 32	5 34.95	W 103 35 48.16	260.10	448.41
	10076.00	19.96	174.69	10044.93	89.39	-92.44	-440.42	3.63	398348.92	769454.45	N 32	5 34.80	W 103 35 48.15	258.15	450.01
	10123.00	23.65	180.06	10088.56	106.82	-109.86	-439.68	8.92	398331.49	769455.18	N 32	5 34.62	W 103 35 48.14	255.97	453.20
	10169.00	27.85	179.08	10129.98	126.80	-129.84	-439.52	9.18	398311.52	769455.34	N 32	5 34.43	W 103 35 48.14	253.54	458.30
	10217.00	29.74	177.15	10172.05	149.91	-152.94	-438.75	4.39	398288.41	769456.12	N 32	5 34.20	W 103 35 48.14	250.78	464.64
	10260.00	33.50	176.22	10208.66	172.42	-175.44	-437.44	8.82	398265.91	769457.43	N 32	5 33.97	W 103 35 48.12	248.15	471.31
	10312.00	37.28	178.14	10251.04	202.50	-205.51	-435.98	7.58	398235.84	769458.89	N 32	5 33.68	W 103 35 48.11	244.76	481.99
First Take Point [623' FNL, 1908' FWL]	10358.00	45.40	179.46	10285.55	232.85	-235.87	-435.37	17.75	398205.49	769459.49	N 32	5 33.38	W 103 35 48.10	241.55	495.16
	10406.00	54.22	182.13	10316.50	269.47	-272.49	-435.93	18.86	398168.87	769458.93	N 32	5 33.01	W 103 35 48.11	237.99	514.09
	10453.00	64.42	181.66	10340.45	309.80	-312.83	-437.26	21.72	398128.53	769457.60	N 32	5 32.61	W 103 35 48.13	234.42	537.64
	10500.00	74.19	180.16	10357.04	353.71	-356.74	-437.94	21.00	398084.62	769456.93	N 32	5 32.18	W 103 35 48.14	230.83	564.85
	10513.00	77.02	180.12	10360.27	366.30	-369.33	-437.97	21.77	398072.03	769456.89	N 32	5 32.06	W 103 35 48.14	229.86	572.91
	10595.00	88.69	178.78	10370.45	447.52	-450.55	-437.18	14.32	397990.82	769457.69	N 32	5 31.25	W 103 35 48.14	224.14	627.79
	10613.00	88.56	179.29	10370.89	465.51	-468.54	-436.87	2.92	397972.83	769457.99	N 32	5 31.07	W 103 35 48.14	223.00	640.62
	10635.00	88.67	179.13	10371.42	487.50	-490.53	-436.57	0.88	397950.83	769458.29	N 32	5 30.86	W 103 35 48.14	221.67	656.67
	10729.00	88.94	179.29	10373.38	581.48	-584.50	-435.28	0.33	397856.87	769459.59	N 32	5 29.93	W 103 35 48.13	216.67	728.77
	10824.00	90.55	179.24	10373.80	676.47	-679.49	-434.06	1.70	397761.88	769460.81	N 32	5 28.99	W 103 35 48.12	212.57	806.30
	10918.00	90.68	178.82	10372.79	770.46	-773.47	-432.47	0.47	397667.90	769462.40	N 32	5 28.06	W 103 35 48.11	209.21	886.16
	11012.00	91.46	178.59	10371.04	864.43	-867.43	-430.34	0.87	397573.95	769464.52	N 32	5 27.13	W 103 35 48.09	206.39	968.31
	11107.00	92.35	178.76	10367.88	959.37	-962.35	-428.15	0.95	397479.03	769466.72	N 32	5 26.19	W 103 35 48.08	203.98	1053.29
	11202.00	90.03	178.40	10365.91	1054.33	-1057.29	-425.79	2.47	397384.09	769469.07	N 32	5 25.25	W 103 35 48.06	201.94	1139.81
	11296.00	90.34	178.65	10365.60	1148.31	-1151.26	-423.37	0.42	397290.13	769471.49	N 32	5 24.32	W 103 35 48.04	200.19	1226.64
	11391.00	90.35	177.78	10365.03	1243.28	-1246.21	-420.41	0.92	397195.18	769474.45	N 32	5 23.38	W 103 35 48.01	198.64	1315.22
	11485.00	90.73	179.19	10364.14	1337.25	-1340.17	-417.93	1.55	397101.22	769476.93	N 32	5 22.45	W 103 35 47.99	197.32	1403.83
	11579.00	91.75	179.78	10362.11	1431.23	-1434.15	-417.08	1.25	397007.25	769477.78	N 32	5 21.52	W 103 35 47.99	196.22	1493.57
	11768.00	89.18	179.52	10360.58	1620.21	-1623.12	-415.93	1.37	396818.28	769478.93	N 32	5 19.65	W 103 35 47.99	194.37	1675.57
	11862.00	88.62	178.90	10362.38	1714.19	-1717.09	-414.63	0.89	396724.31	769480.23	N 32	5 18.72	W 103 35 47.98	193.58	1766.45
	12050.00	89.66	179.80	10365.20	1902.16	-1905.06	-412.50	0.73	396536.36	769482.36	N 32	5 16.86	W 103 35 47.97	192.22	1949.20
	12145.00	86.82	177.67	10368.12	1997.09	-1999.97	-410.41	3.74	396441.44	769484.46	N 32	5 15.92	W 103 35 47.95	191.60	2041.65
	12239.00	89.86	177.37	10370.84	2090.98	-2093.83	-406.34	3.25	396347.58	769488.52	N 32	5 14.99	W 103 35 47.91	190.98	2132.90
	12333.00	93.35	180.29	10368.21	2184.91	-2187.75	-404.42	4.84	396253.67	769490.44	N 32	5 14.06	W 103 35 47.90	190.47	2224.82
	12428.00	93.64	181.72	10362.42	2279.70	-2282.56	-406.08	1.53	396158.87	769488.78	N 32	5 13.12	W 103 35 47.92	190.09	2318.40
	12522.00	91.58	181.99	10358.14	2373.52	-2376.41	-409.12	2.21	396065.02	769485.74	N 32	5 12.19	W 103 35 47.97	189.77	2411.37
	12616.00	93.13	181.93	10354.28	2467.36	-2470.27	-412.34	1.65	395971.16	769482.53	N 32	5 11.27	W 103 35 48.01	189.48	2504.45
	12711.00	90.12	180.29	10351.58	2562.28	-2565.20	-414.17	3.61	395876.23	769480.69	N 32	5 10.33	W 103 35 48.04	189.17	2598.42
	12805.00	92.35	182.14	10349.56	2656.21	-2659.15	-416.17	3.08	395782.29	769478.70	N 32	5 9.40	W 103 35 48.07	188.89	2691.52
	12900.00	90.24	181.54	10347.41	2751.11	-2754.07	-419.22	2.31	395687.37	769475.65	N 32	5 8.46	W 103 35 48.11	188.65	2785.79
	12994.00	88.67	180.88	10348.30	2845.06	-2848.04	-421.20	1.81	395593.40	769473.66	N 32	5 7.53	W 103 35 48.15	188.41	2879.02
	13088.00	88.85	180.33	10350.34	2939.02	-2942.01	-422.19	0.62	395499.44	769472.67	N 32	5 6.60	W 103 35 48.16	188.17	2972.15
	13183.00	88.82	179.65	10352.27	3034.00	-3036.99	-422.18	0.72	395404.46	769472.69	N 32	5 5.66	W 103 35 48.17	187.91	3066.20
	13277.00	89.77	178.07	10353.43	3127.98	-3130.96	-420.31	1.96	395310.49	769474.56	N 32	5 4.73	W 103 35 48.16	187.65	3159.05
	13371.00	90.57	177.72	10353.15	3221.94	-3224.90	-416.85	0.93	395216.56	769478.01	N 32	5 3.80	W 103 35 48.12	187.37	3251.73
	13466.00	90.27	176.61	10352.45	3316.85	-3319.78	-412.15	1.21	395121.68	769482.71	N 32	5 2.86	W 103 35 48.08	187.08	3345.26
	13560.00	90.67	177.64	10351.68	3410.76	-3413.65	-407.44	1.18	395027.81	769487.42	N 32	5 1.93	W 103 35 48.03	186.81	3437.88
	13654.00	91.70	178.42	10349.73	3504.70	-3507.58	-404.21	1.37	394933.89	769490.65	N 32	5 1.00	W 103 35 48.00	186.57	3530.79
	13749.00	90.55	179.03	10347.87	3599.67	-3602.53	-402.10	1.37	394838.94	769492.77	N 32	5 0.06	W 103 35 47.98	186.37	3624.90
	13843.00	90.15	179.16	10347.30	3693.66	-3696.52	-400.61	0.45	394744.95	769494.25	N 32	4 59.13	W 103 35 47.97	186.19	3718.16
	13937.00	89.86	179.97	10347.29	3787.66	-3790.52	-399.90	0.92	394650.96	769494.97	N 32	4 58.20	W 103 35 47.97	186.02	3811.55
	14032.00	92.02	182.97	10345.73	3882.58	-3885.45	-402.33	3.89	394556.02	769492.53	N 32	4 57.26	W 103 35 48.01	185.91	3906.23
	14126.00	92.37	182.68	10342.13	3976.36	-3979.27	-406.96	0.48	394462.21	769487.90	N 32	4 56.33	W 103 35 48.07	185.84	4000.03
	14220.00	90.71	180.61	10339.60	4070.26	-4073.19	-409.66	2.82	394368.29	769485.20	N 32	4 55.40	W 103 35 48.11	185.74	4093.74
	14315.00	89.76	179.14	10339.21	4165.26	-4168.19	-409.45	1.84	394273.30	769485.41	N 32	4 54.46	W 103 35 48.11	185.61	4188.25
	14409.00	91.94	179.76	10337.82	4259.24	-4262.16	-408.55	2.41	394179.33	769486.31	N 32	4 53.53	W 103 35 48.11	185.48	4281.70
	14504.00	92.19	179.18	10334.39	4354.18	-4357.10	-407.67	0.66	394084.40	769487.19	N 32	4 52.59	W 103 35 48.11	185.35	4376.13
	14598.00	89.69	178.54	10332.85	4448.15	-4451.06	-405.80	2.75	393990.44	769489.06	N 32	4 51.66	W 103 35 48.09	185.21	4469.52
	14692.00	91.78	179.24	10331.65	4542.13	-4545.03	-403.98	2.34	393896.47	769490.88	N 32	4 50.73	W 103 35 48.08	185.08	4562.95
	14787.00	92.93	179.18	10327.74	4637.04	-4639.94	-402.67	1.21	393801.57	769492.19	N 32	4 49.80	W 103 35 48.07	184.96	4657.38
	14881.00	91.54	178.99	10324.08	4730.97	-4733.85	-401.17	1.49	393707.66	769493.69	N 32	4 48.87	W 103 35 48.06	184.84	4750.82

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)		Latitude (N/S ° ' ")	Longitude (E/W ° ' ")	Closure Azimuth (°)	Closure (ft)
Private Leaseline Crossing [1911' FWL]	14976.00	87.75	180.85	10324.67	4825.94	-4828.83	-401.04	4.44	393612.68	769493.82	N 32	4 47.93	W 103 35 48.07	184.75	4845.45
	15041.20	88.96	181.06	10326.54	4891.09	-4893.99	-402.12	1.88	393547.52	769492.74	N 32	4 47.28	W 103 35 48.09	184.70	4910.48
	15071.00	89.51	181.15	10326.94	4920.88	-4923.78	-402.70	1.88	393517.73	769492.17	N 32	4 46.99	W 103 35 48.09	184.68	4940.22
	15165.00	89.99	181.31	10327.35	5014.84	-5017.76	-404.71	0.54	393423.76	769490.15	N 32	4 46.06	W 103 35 48.13	184.61	5034.05
	15260.00	90.11	181.78	10327.26	5109.79	-5112.72	-407.28	0.51	393328.79	769487.59	N 32	4 45.12	W 103 35 48.16	184.55	5128.92
	15354.00	88.98	181.63	10328.01	5203.72	-5206.68	-410.07	1.21	393234.84	769484.79	N 32	4 44.19	W 103 35 48.20	184.50	5222.80
	15448.00	88.84	181.20	10329.80	5297.66	-5300.63	-412.39	0.48	393140.89	769482.47	N 32	4 43.26	W 103 35 48.24	184.45	5316.65
	15543.00	88.92	180.99	10331.66	5392.61	-5395.60	-414.21	0.24	393045.93	769480.65	N 32	4 42.32	W 103 35 48.27	184.39	5411.47
	15637.00	92.06	182.28	10330.85	5486.53	-5489.54	-416.89	3.61	392951.99	769477.97	N 32	4 41.39	W 103 35 48.30	184.34	5505.35
	15677.00	92.12	182.21	10329.39	5526.46	-5529.48	-418.46	0.23	392912.05	769476.41	N 32	4 40.99	W 103 35 48.33	184.33	5545.30
	15775.00	90.78	180.44	10326.91	5624.38	-5627.42	-420.72	2.26	392814.12	769474.14	N 32	4 40.03	W 103 35 48.36	184.28	5643.13
	15870.00	91.54	180.59	10324.99	5719.35	-5722.40	-421.57	0.82	392719.14	769473.29	N 32	4 39.09	W 103 35 48.38	184.21	5737.90
	15964.00	91.63	179.91	10322.39	5813.30	-5816.36	-421.98	0.73	392625.18	769472.88	N 32	4 38.16	W 103 35 48.39	184.15	5831.65
	16055.00	92.00	180.00	10319.51	5904.26	-5907.31	-421.91	0.42	392534.23	769472.95	N 32	4 37.26	W 103 35 48.40	184.09	5922.36
	16149.00	89.59	176.62	10318.20	5998.20	-6001.24	-419.14	4.42	392440.31	769475.72	N 32	4 36.33	W 103 35 48.37	184.00	6015.86
	16244.00	89.23	176.08	10319.18	6093.04	-6096.04	-413.09	0.68	392345.51	769481.77	N 32	4 35.39	W 103 35 48.31	183.88	6110.03
	16338.00	88.74	177.69	10320.85	6186.92	-6189.89	-407.99	1.79	392251.67	769486.88	N 32	4 34.46	W 103 35 48.26	183.77	6203.32
Private - NMNM0106040 4 Crossing [1896' FWL]	16364.60	88.76	178.14	10321.43	6213.50	-6216.46	-407.02	1.71	392225.09	769487.84	N 32	4 34.20	W 103 35 48.25	183.75	6229.77
	16433.00	88.80	179.31	10322.89	6281.88	-6284.83	-405.50	1.71	392156.73	769489.36	N 32	4 33.52	W 103 35 48.24	183.69	6297.90
	16527.00	88.76	178.29	10324.89	6375.85	-6378.79	-403.53	1.09	392062.77	769491.33	N 32	4 32.59	W 103 35 48.22	183.62	6391.54
	16621.00	88.74	178.60	10326.94	6469.80	-6472.73	-400.98	0.33	391968.83	769493.88	N 32	4 31.66	W 103 35 48.20	183.54	6485.14
	16716.00	88.64	179.41	10329.11	6564.77	-6567.69	-399.33	0.86	391873.88	769495.53	N 32	4 30.72	W 103 35 48.19	183.48	6579.82
	16810.00	89.29	178.32	10330.81	6658.75	-6661.65	-397.47	1.35	391779.92	769497.39	N 32	4 29.79	W 103 35 48.17	183.41	6673.50
	16905.00	89.11	178.58	10332.13	6753.72	-6756.61	-394.90	0.33	391684.96	769499.96	N 32	4 28.85	W 103 35 48.15	183.34	6768.14
	16999.00	89.05	178.70	10333.64	6847.69	-6850.57	-392.67	0.14	391591.01	769502.19	N 32	4 27.92	W 103 35 48.13	183.28	6861.82
	17093.00	89.23	178.69	10335.05	6941.67	-6944.54	-390.53	0.19	391497.04	769504.33	N 32	4 26.99	W 103 35 48.11	183.22	6955.51
	17188.00	89.41	179.37	10336.18	7036.66	-7039.52	-388.92	0.74	391402.07	769505.94	N 32	4 26.05	W 103 35 48.10	183.16	7050.25
	17282.00	89.72	178.91	10336.90	7130.65	-7133.50	-387.51	0.59	391308.08	769507.35	N 32	4 25.12	W 103 35 48.09	183.11	7144.02
	17376.00	89.61	179.28	10337.45	7224.65	-7227.49	-386.03	0.41	391214.10	769508.84	N 32	4 24.19	W 103 35 48.08	183.06	7237.79
	17471.00	89.76	178.74	10337.97	7319.64	-7322.47	-384.39	0.59	391119.12	769510.48	N 32	4 23.25	W 103 35 48.07	183.00	7332.55
	17565.00	89.75	178.39	10338.37	7413.62	-7416.44	-382.03	0.37	391025.15	769512.83	N 32	4 22.32	W 103 35 48.05	182.95	7426.27
	17660.00	89.79	179.02	10338.75	7508.61	-7511.42	-379.88	0.66	390930.18	769514.98	N 32	4 21.38	W 103 35 48.04	182.90	7521.02
NMNM0106040 4 - NMNM0160973 Crossing [1914' FWL]	17687.30	90.30	179.21	10338.73	7535.91	-7538.71	-379.46	2.01	390902.89	769515.40	N 32	4 21.11	W 103 35 48.03	182.88	7548.26
	17754.00	91.56	179.67	10337.64	7602.60	-7605.40	-378.81	2.01	390836.20	769516.05	N 32	4 20.45	W 103 35 48.03	182.85	7614.83
	17849.00	89.97	179.26	10336.38	7697.59	-7700.38	-377.92	1.73	390741.22	769516.94	N 32	4 19.51	W 103 35 48.03	182.81	7709.65
	17943.00	89.74	179.10	10336.61	7791.58	-7794.37	-376.58	0.30	390647.23	769518.29	N 32	4 18.58	W 103 35 48.02	182.77	7803.47
	18037.00	89.91	178.41	10336.90	7885.57	-7888.35	-374.53	0.76	390553.26	769520.33	N 32	4 17.65	W 103 35 48.00	182.72	7897.24
	18132.00	89.62	178.39	10337.29	7980.55	-7983.31	-371.88	0.31	390458.30	769522.98	N 32	4 16.71	W 103 35 47.98	182.67	7991.97
	18226.00	90.47	178.44	10337.22	8074.53	-8077.28	-369.28	0.91	390364.34	769525.58	N 32	4 15.78	W 103 35 47.96	182.62	8085.71
	18321.00	90.13	178.82	10336.72	8169.52	-8172.25	-367.01	0.54	390269.37	769527.85	N 32	4 14.84	W 103 35 47.94	182.57	8180.48
	18415.00	90.13	181.13	10336.51	8263.51	-8266.24	-366.97	2.46	390175.38	769527.89	N 32	4 13.91	W 103 35 47.94	182.54	8274.38
	18509.00	90.17	180.54	10336.26	8357.48	-8360.23	-368.34	0.63	390081.40	769526.52	N 32	4 12.98	W 103 35 47.97	182.52	8368.34
	18604.00	89.59	180.89	10336.46	8452.47	-8455.22	-369.53	0.71	389986.41	769525.34	N 32	4 12.04	W 103 35 47.99	182.50	8463.29
	18699.00	90.03	181.27	10336.77	8547.43	-8550.20	-371.32	0.61	389891.43	769523.55	N 32	4 11.10	W 103 35 48.02	182.49	8558.26
	18793.00	89.65	181.78	10337.04	8641.38	-8644.17	-373.82	0.68	389797.47	769521.04	N 32	4 10.17	W 103 35 48.05	182.48	8652.25
	18887.00	88.36	181.65	10338.67	8735.30	-8738.11	-376.63	1.38	389703.53	769518.23	N 32	4 9.24	W 103 35 48.09	182.47	8746.22
	18982.00	89.74	180.36	10340.24	8830.25	-8833.08	-378.30	1.99	389608.56	769516.57	N 32	4 8.30	W 103 35 48.12	182.45	8841.18
	19076.00	89.84	180.47	10340.59	8924.24	-8927.08	-378.98	0.16	389514.57	769515.89	N 32	4 7.37	W 103 35 48.14	182.43	8935.12
	19170.00	89.53	182.00	10341.10	9018.20	-9021.05	-381.00	1.66	389420.60	769513.86	N 32	4 6.44	W 103 35 48.17	182.42	9029.09
	19265.00	90.07	182.23	10341.44	9113.11	-9115.98	-384.51	0.62	389325.67	769510.35	N 32	4 5.50	W 103 35 48.22	182.42	9124.09
	19359.00	90.43	179.43	10341.03	9207.08	-9209.96	-385.87	3.00	389231.69	769508.99	N 32	4 4.57	W 103 35 48.24	182.40	9218.04
	19453.00	91.18	178.91	10339.71	9301.06	-9303.94	-384.51	0.97	389137.71	769510.35	N 32	4 3.64	W 103 35 48.23	182.37	9311.89
	19548.00	90.43	178.99	10338.37	9396.05	-9398.92	-382.77	0.79	389042.74	769512.09	N 32	4 2.70	W 103 35 48.22	182.33	9406.71
	19642.00	90.36	178.93	10337.72	9490.04	-9492.90	-381.06	0.10	388948.76	769513.80	N 32	4 1.77	W 103 35 48.21	182.30	9500.55
	19736.00	90.29	178.86	10337.19	9584.03	-9586.88	-379.25	0.11	388854.79	769515.61	N 32	4 0.84	W 103 35 48.19	182.27	9594.38
	19830.00	90.14	178.07	10336.84	9678.01	-9680.85	-376.73	0.86	388760.82	769518.13	N 32	3 59.91	W 103 35 48.17	182.23	9688.17
	19924.00	90.32	178.08	10336.46	9771.98	-9774.79	-373.57	0.19	388666.88	769521.29	N 32	3 58.98	W 103 35 48.14	182.19	9781.93

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)
	20017.00	90.58	178.18	10335.73	9864.94	-9867.74	-370.54	0.30	388573.94	769524.32	N 32 3 58.06	W 103 35 48.11	182.15	9874.69
	20108.00	90.34	178.00	10335.00	9955.91	-9958.69	-367.51	0.33	388482.99	769527.36	N 32 3 57.16	W 103 35 48.09	182.11	9965.46
Last Take Point [145' FSL, 1910' FWL]	20175.00	90.25	178.52	10334.66	10022.89	-10025.65	-365.47	0.79	388416.03	769529.39	N 32 3 56.50	W 103 35 48.07	182.09	10032.31
Final Survey	20193.00	90.22	178.66	10334.58	10040.89	-10043.65	-365.03	0.79	388398.03	769529.83	N 32 3 56.32	W 103 35 48.06	182.08	10050.28
TD, PTB [100' FSL, 1911' FWL]	20220.00	90.22	178.66	10334.48	10067.88	-10070.64	-364.40	0.00	388371.04	769530.46	N 32 3 56.06	W 103 35 48.06	182.07	10077.23

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	Red Hills 32-5 Fed Com #157H / Final Surveys - Cimarex Red Hills
	1	26.000	26.000	Act Stns	17.500	13.375	NAL_MWD_IFR1+MS-Depth Only	32-5 Fed Com #157H MWD 0ft- Red Hills 32-5 Fed Com #157H /
	1	26.000	1047.000	Act Stns	17.500	13.375	NAL_MWD_IFR1+MS	Final Surveys - Cimarex Red Hills
	1	1047.000	4895.000	Act Stns	12.250	9.625	NAL_MWD_IFR1+MS	Red Hills 32-5 Fed Com #157H / Final Surveys - Cimarex Red Hills
	1	4895.000	10675.000	Act Stns	8.750	7.000	NAL_MWD_IFR1+MS	Red Hills 32-5 Fed Com #157H / Final Surveys - Cimarex Red Hills
	1	10675.000	20220.000	Act Stns	8.500	7.000	NAL_MWD_IFR1+MS	Red Hills 32-5 Fed Com #157H / Final Surveys - Cimarex Red Hills

