Schlumberger

Cimarex Vaca Draw 20-17 Federal #5H Final MWD(Surcon Corrected)
Survey Geodetic Report
(Def Survey)

Report Date:	April 02, 2018 - 09:03 AM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Cimarex	**Vertical Section Azimuth:**	359.650 ° (Grid North)
Field:	NM Lea County (NAD 83)	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	Cimarex Vaca Draw 20-17 Federal #5H / Cimarex Vaca Draw 20-17 Federal #5H	**TVD Reference Datum:**	RKB
Well:	Cimarex Vaca Draw 20-17 Federal #5H	**TVD Reference Elevation:**	3447.200 ft above MSL
Borehole:	Original Borehole	**Seabed / Ground Elevation:**	3423.200 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	6.781 °
Survey Name:	Cimarex Vaca Draw 20-17 Federal #5H Final MWD(Surcon Corrected)	**Total Gravity Field Strength:**	998.4293mgn (9.80665 Based)
Survey Date:	February 26, 2018	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	257.020 ° / 10059.712 ft / 6.705 / 1.007	**Total Magnetic Field Strength:**	47905.685 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	59.781 °
Location Lat / Long:	N 32° 6' 35.65386", W 103° 36' 3.15995"	**Declination Date:**	March 19, 2018
Location Grid N/E Y/X:	N 404489.930 ftUS, E 768121.440 ftUS	**Magnetic Declination Model:**	HDGM 2017
CRS Grid Convergence Angle:	0.3893 °	**North Reference:**	Grid North
Grid Scale Factor:	0.999968	**Grid Convergence Used:**	0.3893 °
Version / Patch:	2.10.696.0	**Total Corr Mag North->Grid North:**	6.3912 °
		Local Coord Referenced To:	Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404489.93	768121.44	N 32 6 35.65	W 103 36 3.16
	156.00	0.30	93.24	156.00	-0.03	-0.02	0.41	0.19	404489.91	768121.85	N 32 6 35.65	W 103 36 3.16
	244.00	0.31	39.76	244.00	0.14	0.15	0.79	0.31	404490.08	768122.23	N 32 6 35.66	W 103 36 3.15
	303.00	0.40	34.41	303.00	0.43	0.44	1.01	0.16	404490.37	768122.45	N 32 6 35.66	W 103 36 3.15
	392.00	0.37	21.56	392.00	0.96	0.96	1.29	0.10	404490.89	768122.73	N 32 6 35.66	W 103 36 3.14
	487.00	0.48	59.00	486.99	1.44	1.45	1.74	0.31	404491.38	768123.18	N 32 6 35.67	W 103 36 3.14
	569.00	0.20	329.57	568.99	1.74	1.75	1.97	0.63	404491.68	768123.41	N 32 6 35.67	W 103 36 3.14
	659.00	0.18	183.61	658.99	1.74	1.75	1.88	0.40	404491.68	768123.32	N 32 6 35.67	W 103 36 3.14
	749.00	0.02	124.54	748.99	1.59	1.60	1.88	0.19	404491.53	768123.32	N 32 6 35.67	W 103 36 3.14
	846.00	0.19	305.96	845.99	1.67	1.68	1.76	0.22	404491.61	768123.20	N 32 6 35.67	W 103 36 3.14
	942.00	0.63	292.80	941.99	1.97	1.98	1.15	0.47	404491.91	768122.59	N 32 6 35.67	W 103 36 3.15
	966.00	0.51	316.54	965.99	2.10	2.11	0.95	1.09	404492.04	768122.39	N 32 6 35.67	W 103 36 3.15
	1130.00	0.58	301.00	1129.98	3.07	3.07	-0.26	0.10	404493.00	768121.18	N 32 6 35.68	W 103 36 3.16
	1223.00	0.45	319.23	1222.98	3.59	3.59	-0.90	0.22	404493.52	768120.54	N 32 6 35.69	W 103 36 3.17
	1318.00	0.33	12.75	1317.97	4.14	4.14	-1.08	0.39	404494.07	768120.36	N 32 6 35.69	W 103 36 3.17
	1412.00	0.29	18.25	1411.97	4.63	4.63	-0.95	0.05	404494.55	768120.49	N 32 6 35.70	W 103 36 3.17
	1507.00	0.40	28.23	1506.97	5.15	5.15	-0.72	0.13	404495.08	768120.72	N 32 6 35.70	W 103 36 3.17
	1602.00	0.69	24.39	1601.97	5.96	5.96	-0.33	0.31	404495.89	768121.11	N 32 6 35.71	W 103 36 3.16
	1695.00	0.49	342.41	1694.96	6.85	6.85	-0.21	0.50	404496.78	768121.23	N 32 6 35.72	W 103 36 3.16
	1789.00	1.00	279.88	1788.96	7.38	7.37	-1.14	0.94	404497.30	768120.30	N 32 6 35.73	W 103 36 3.17
	1883.00	1.79	264.38	1882.93	7.39	7.37	-3.41	0.92	404497.30	768118.03	N 32 6 35.73	W 103 36 3.20
	1980.00	1.75	262.96	1979.88	7.08	7.04	-6.39	0.06	404496.97	768115.05	N 32 6 35.72	W 103 36 3.23
	2074.00	1.48	269.51	2073.84	6.91	6.85	-9.03	0.35	404496.78	768112.41	N 32 6 35.72	W 103 36 3.26
	2168.00	1.22	276.25	2167.82	7.02	6.95	-11.24	0.32	404496.88	768110.20	N 32 6 35.72	W 103 36 3.29
	2261.00	1.02	296.64	2260.80	7.51	7.43	-12.96	0.48	404497.36	768108.48	N 32 6 35.73	W 103 36 3.31
	2355.00	0.79	279.72	2354.79	8.00	7.91	-14.35	0.37	404497.84	768107.09	N 32 6 35.73	W 103 36 3.33
	2449.00	0.30	246.29	2448.78	8.02	7.92	-15.21	0.60	404497.85	768106.23	N 32 6 35.73	W 103 36 3.34
	2545.00	0.84	240.01	2544.78	7.57	7.47	-16.05	0.57	404497.40	768105.39	N 32 6 35.73	W 103 36 3.35
	2640.00	1.77	232.61	2639.75	6.34	6.23	-17.82	0.99	404496.16	768103.62	N 32 6 35.72	W 103 36 3.37
	2733.00	1.67	227.33	2732.71	4.56	4.44	-19.96	0.20	404494.37	768101.48	N 32 6 35.70	W 103 36 3.39
	2823.00	1.71	229.24	2822.67	2.81	2.68	-21.94	0.08	404492.61	768099.50	N 32 6 35.68	W 103 36 3.41
	2920.00	1.74	232.77	2919.63	0.99	0.84	-24.21	0.11	404490.77	768097.23	N 32 6 35.66	W 103 36 3.44
	3015.00	1.28	228.23	3014.59	-0.58	-0.74	-26.15	0.50	404489.19	768095.29	N 32 6 35.65	W 103 36 3.46
	3110.00	1.04	231.28	3109.58	-1.82	-1.99	-27.61	0.26	404487.95	768093.83	N 32 6 35.64	W 103 36 3.48
	3205.00	2.23	256.43	3204.54	-2.77	-2.96	-30.08	1.43	404486.97	768091.36	N 32 6 35.63	W 103 36 3.51
	3298.00	2.95	256.41	3297.44	-3.74	-3.94	-34.17	0.77	404485.99	768087.27	N 32 6 35.62	W 103 36 3.56
	3392.00	2.72	255.81	3391.33	-4.82	-5.06	-38.68	0.25	404484.87	768082.76	N 32 6 35.61	W 103 36 3.61
	3487.00	2.59	255.81	3486.22	-5.88	-6.14	-42.95	0.14	404483.79	768078.50	N 32 6 35.60	W 103 36 3.66
	3580.00	2.81	257.62	3579.12	-6.85	-7.14	-47.21	0.25	404482.79	768074.23	N 32 6 35.59	W 103 36 3.71
	3675.00	2.75	261.86	3674.01	-7.65	-7.96	-51.74	0.23	404481.97	768069.70	N 32 6 35.58	W 103 36 3.76
	3768.00	1.89	300.06	3766.94	-7.17	-7.51	-55.28	1.85	404482.42	768066.17	N 32 6 35.58	W 103 36 3.80
	3862.00	1.48	327.92	3860.90	-5.36	-5.71	-57.26	0.96	404484.22	768064.18	N 32 6 35.60	W 103 36 3.83
	3949.00	1.36	302.60	3947.87	-3.84	-4.20	-58.73	0.73	404485.73	768062.71	N 32 6 35.62	W 103 36 3.84
	4044.00	1.50	288.33	4042.84	-3.26	-3.63	-60.92	0.90	404486.30	768060.52	N 32 6 35.62	W 103 36 3.87
	4147.00	1.29	286.35	4145.81	-2.95	-3.34	-63.38	0.47	404486.59	768058.06	N 32 6 35.63	W 103 36 3.90
	4243.00	0.75	257.40	4241.80	-2.78	-3.17	-65.03	0.76	404486.76	768056.41	N 32 6 35.63	W 103 36 3.92
	4338.00	1.07	218.07	4336.79	-3.60	-4.01	-66.19	0.72	404485.92	768055.26	N 32 6 35.62	W 103 36 3.93
	4432.00	1.37	211.38	4430.77	-5.25	-5.66	-67.31	0.35	404484.27	768054.13	N 32 6 35.60	W 103 36 3.94
	4525.00	2.26	200.65	4523.72	-7.90	-8.32	-68.54	1.02	404481.61	768052.90	N 32 6 35.58	W 103 36 3.96
	4620.00	3.06	181.72	4618.62	-12.19	-12.61	-69.27	1.24	404477.32	768052.17	N 32 6 35.53	W 103 36 3.97
	4714.00	3.15	186.31	4712.48	-17.26	-17.69	-69.63	0.28	404472.25	768051.81	N 32 6 35.48	W 103 36 3.97
	4804.00	2.53	208.56	4802.37	-21.45	-21.89	-70.86	1.39	404468.04	768050.59	N 32 6 35.44	W 103 36 3.99
	4898.00	2.56	211.79	4896.28	-25.05	-25.49	-72.95	0.16	404464.44	768048.49	N 32 6 35.41	W 103 36 4.01
	4992.00	1.56	264.89	4990.22	-28.93	-27.39	-75.33	2.18	404462.54	768046.11	N 32 6 35.39	W 103 36 4.04
	5086.00	2.18	302.70	5084.18	-28.06	-26.54	-78.11	1.43	404463.39	768043.33	N 32 6 35.40	W 103 36 4.07
	5180.00	3.43	311.05	5178.06	-23.23	-23.73	-81.74	1.40	404466.20	768039.70	N 32 6 35.42	W 103 36 4.11
	5274.00	2.39	322.22	5271.94	-19.81	-20.33	-85.06	1.26	404469.60	768036.38	N 32 6 35.46	W 103 36 4.15

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 ° ' ")	
	5389.00	2.29	324.52	5388.86	-16.69	-17.22	-87.37	0.14	404472.71	768034.07	N 32 6 35.49	W 103 36	4.18
	5483.00	2.39	317.12	5480.78	-13.71	-14.26	-89.80	0.34	404475.67	768031.64	N 32 6 35.52	W 103 36	4.21
	5556.00	2.33	318.06	5553.70	-10.86	-11.43	-92.38	0.08	404478.50	768029.06	N 32 6 35.55	W 103 36	4.23
	5651.00	2.52	317.69	5648.62	-7.87	-8.45	-95.08	0.20	404481.48	768026.37	N 32 6 35.58	W 103 36	4.27
	5745.00	1.78	334.79	5742.55	-5.01	-5.60	-97.09	1.03	404484.33	768024.35	N 32 6 35.60	W 103 36	4.29
	5839.00	1.23	348.05	5836.52	-2.69	-3.29	-97.92	0.69	404486.64	768023.52	N 32 6 35.63	W 103 36	4.30
	5933.00	0.65	64.35	5930.51	-1.48	-2.07	-97.65	1.33	404487.86	768023.79	N 32 6 35.64	W 103 36	4.30
	6027.00	0.84	35.12	6024.50	-0.69	-1.28	-96.77	0.45	404488.65	768024.67	N 32 6 35.65	W 103 36	4.29
	6121.00	0.71	58.05	6118.49	0.18	-0.41	-95.88	0.35	404489.52	768025.56	N 32 6 35.66	W 103 36	4.27
	6215.00	1.08	304.85	6212.49	0.99	0.41	-96.12	1.60	404490.34	768025.33	N 32 6 35.66	W 103 36	4.28
	6310.00	1.22	291.13	6307.47	1.88	1.28	-97.79	0.32	404491.21	768023.65	N 32 6 35.67	W 103 36	4.30
	6404.00	1.43	292.42	6401.44	2.70	2.09	-99.81	0.23	404492.02	768021.63	N 32 6 35.68	W 103 36	4.32
	6498.00	1.54	297.48	6495.41	3.75	3.12	-102.02	0.18	404493.05	768019.43	N 32 6 35.69	W 103 36	4.35
	6593.00	1.34	303.28	6590.38	4.96	4.32	-104.08	0.26	404494.25	768017.37	N 32 6 35.70	W 103 36	4.37
	6687.00	1.38	303.30	6684.36	6.19	5.55	-105.94	0.04	404495.48	768015.50	N 32 6 35.72	W 103 36	4.39
	6781.00	1.67	290.25	6778.32	7.30	6.64	-108.17	0.48	404496.57	768013.27	N 32 6 35.73	W 103 36	4.42
	6876.00	1.61	299.73	6873.28	8.48	7.78	-110.63	0.29	404497.71	768010.81	N 32 6 35.74	W 103 36	4.45
	6970.00	0.88	291.98	6967.26	9.39	8.70	-112.43	0.82	404498.63	768009.01	N 32 6 35.75	W 103 36	4.47
	7064.00	0.67	266.52	7061.25	9.63	8.93	-113.63	0.41	404498.86	768007.81	N 32 6 35.75	W 103 36	4.48
	7159.00	0.57	283.39	7156.25	9.71	9.01	-114.65	0.22	404498.94	768006.80	N 32 6 35.75	W 103 36	4.49
	7253.00	0.82	272.43	7250.24	9.85	9.14	-115.78	0.30	404499.07	768005.67	N 32 6 35.75	W 103 36	4.51
	7347.00	0.72	264.18	7344.23	9.83	9.11	-117.03	0.16	404499.04	768004.41	N 32 6 35.75	W 103 36	4.52
	7442.00	0.76	244.83	7439.23	9.51	8.78	-118.20	0.27	404498.71	768003.25	N 32 6 35.75	W 103 36	4.53
	7536.00	1.06	267.25	7533.21	9.21	8.48	-119.63	0.49	404498.41	768001.81	N 32 6 35.75	W 103 36	4.55
	7630.00	0.08	301.47	7627.21	9.21	8.47	-120.56	1.06	404498.40	768000.89	N 32 6 35.75	W 103 36	4.56
	7725.00	0.11	159.26	7722.21	9.16	8.42	-120.58	0.19	404498.35	768000.86	N 32 6 35.75	W 103 36	4.56
	7819.00	0.20	113.59	7816.21	9.00	8.27	-120.40	0.16	404498.20	768001.05	N 32 6 35.74	W 103 36	4.56
	7913.00	0.34	128.67	7910.21	8.76	8.03	-120.03	0.17	404497.96	768001.41	N 32 6 35.74	W 103 36	4.55
	8009.00	0.62	118.78	8006.20	8.33	7.60	-119.35	0.30	404497.53	768002.09	N 32 6 35.74	W 103 36	4.55
	8103.00	0.51	125.11	8100.20	7.84	7.12	-118.56	0.13	404497.05	768002.88	N 32 6 35.73	W 103 36	4.54
	8198.00	0.77	115.60	8195.19	7.32	6.60	-117.64	0.29	404496.53	768003.80	N 32 6 35.73	W 103 36	4.53
	8292.00	0.55	131.75	8289.19	6.74	6.02	-116.74	0.30	404495.95	768004.71	N 32 6 35.72	W 103 36	4.52
	8386.00	0.38	200.50	8383.18	6.14	5.43	-116.51	0.58	404495.36	768004.93	N 32 6 35.72	W 103 36	4.51
	8480.00	0.34	186.74	8477.18	5.57	4.86	-116.65	0.10	404494.79	768004.79	N 32 6 35.71	W 103 36	4.52
	8575.00	0.67	199.13	8572.18	4.77	4.06	-116.87	0.36	404493.99	768004.58	N 32 6 35.70	W 103 36	4.52
	8669.00	0.75	202.70	8666.17	3.69	2.97	-117.28	0.10	404492.90	768004.16	N 32 6 35.69	W 103 36	4.52
	8763.00	1.08	216.87	8760.16	2.42	1.69	-118.05	0.42	404491.62	768003.39	N 32 6 35.68	W 103 36	4.53
	8857.00	0.60	236.27	8854.15	1.44	0.71	-118.99	0.59	404490.64	768002.45	N 32 6 35.67	W 103 36	4.54
	8951.00	0.69	259.73	8948.14	1.07	0.34	-119.98	0.29	404490.27	768001.48	N 32 6 35.67	W 103 36	4.55
	9045.00	0.81	254.42	9042.13	0.80	0.06	-121.16	0.15	404489.99	768000.29	N 32 6 35.66	W 103 36	4.57
	9139.00	0.74	258.43	9136.13	0.51	-0.24	-122.39	0.09	404489.69	767999.05	N 32 6 35.66	W 103 36	4.58
	9233.00	0.55	260.92	9230.12	0.32	-0.43	-123.43	0.20	404489.50	767998.01	N 32 6 35.66	W 103 36	4.59
	9327.00	0.38	240.31	9324.12	0.10	-0.66	-124.15	0.25	404489.27	767997.30	N 32 6 35.66	W 103 36	4.60
	9391.00	0.59	204.11	9388.11	-0.31	-1.07	-124.47	0.56	404488.86	767996.98	N 32 6 35.65	W 103 36	4.61
	9474.00	2.30	309.30	9471.09	0.37	-0.40	-125.93	3.04	404489.53	767995.51	N 32 6 35.66	W 103 36	4.62
	9506.00	6.27	318.58	9503.00	2.10	1.32	-127.58	12.55	404491.25	767993.86	N 32 6 35.68	W 103 36	4.64
	9537.00	10.72	321.54	9533.65	5.84	4.85	-130.50	14.42	404494.78	767990.95	N 32 6 35.71	W 103 36	4.68
	9569.00	16.06	326.73	9564.77	11.70	10.88	-134.78	17.09	404500.81	767986.66	N 32 6 35.77	W 103 36	4.73
	9600.00	20.86	328.38	9594.17	20.03	19.17	-140.03	15.57	404509.10	767981.41	N 32 6 35.85	W 103 36	4.79
	9632.00	23.81	330.39	9623.76	30.53	29.64	-146.21	9.52	404519.57	767975.23	N 32 6 35.96	W 103 36	4.86
	9663.00	28.48	330.77	9651.58	42.47	41.54	-152.91	15.07	404531.47	767968.53	N 32 6 36.08	W 103 36	4.93
	9694.00	33.64	330.25	9678.13	56.43	55.45	-160.79	16.67	404545.38	767960.66	N 32 6 36.21	W 103 36	5.02
	9726.00	36.51	327.36	9704.32	72.21	71.17	-170.33	10.36	404561.10	767951.12	N 32 6 36.37	W 103 36	5.13
	9757.00	38.52	327.62	9728.90	88.19	87.09	-180.47	6.50	404577.01	767940.98	N 32 6 36.53	W 103 36	5.25
	9789.00	41.21	330.17	9753.47	105.82	104.65	-191.05	9.83	404594.58	767930.39	N 32 6 36.70	W 103 36	5.37
	9820.00	45.13	336.18	9776.08	124.80	123.58	-200.58	18.32	404613.50	767920.87	N 32 6 36.89	W 103 36	5.48
	9852.00	49.16	340.47	9797.85	146.65	145.37	-209.21	15.97	404635.30	767912.24	N 32 6 37.11	W 103 36	5.58
	9883.00	50.91	343.76	9817.76	169.30	167.98	-216.49	9.90	404657.90	767904.95	N 32 6 37.33	W 103 36	5.66
	9915.00	52.53	345.35	9837.58	193.55	192.19	-223.18	6.39	404682.11	767898.27	N 32 6 37.57	W 103 36	5.74
	9946.00	54.16	347.79	9856.09	217.77	216.38	-228.95	8.22	404706.30	767892.50	N 32 6 37.81	W 103 36	5.80
	9978.00	55.39	349.11	9874.55	243.41	241.99	-234.18	5.11	404731.91	767887.27	N 32 6 38.06	W 103 36	5.86
	10009.00	58.54	350.26	9891.45	269.01	267.55	-238.83	10.63	404757.47	767882.62	N 32 6 38.32	W 103 36	5.92
	10040.00	61.37	351.56	9908.97	295.53	294.05	-243.06	9.82	404783.97	767878.38	N 32 6 38.58	W 103 36	5.96
	10072.00	65.14	354.38	9921.37	323.90	322.40	-246.55	14.17	404812.32	767874.90	N 32 6 38.86	W 103 36	6.00
	10103.00	69.51	357.34	9933.32	352.43	350.92	-248.80	16.62	404840.84	767872.65	N 32 6 39.14	W 103 36	6.02
	10134.00	73.86	359.12	9943.06	381.85	380.33	-249.50	15.05	404870.25	767871.94	N 32 6 39.43	W 103 36	6.03
	10166.00	77.16	359.76	9951.06	412.82	411.30	-249.81	10.49	404901.22	767871.64	N 32 6 39.74	W 103 36	6.03
	10197.00	79.27	0.48	9957.40	443.17	441.65	-249.74	7.18	404931.56	767871.71	N 32 6 40.04	W 103 36	6.03
	10229.00	81.82	0.99	9962.65	474.72	473.21	-249.34	8.12	404963.12	767872.11	N 32 6 40.35	W 103 36	6.02
	10260.00	83.65	1.28	9966.57	505.48	503.95	-248.73	5.98	404993.87	767872.72	N 32 6 40.66	W 103 36	6.01
	10292.00	85.55	1.65	9969.58	537.30	535.80	-247.91	6.05	405025.71	767873.54	N 32 6 40.97	W 103 36	6.00
	10316.00	86.97	2.63	9971.15	561.23	559.73	-247.02	7.18	405049.64	767874.43	N 32 6 41.21	W 103 36	5.99
	10346.00	88.38	2.84	9972.37	591.16	589.67	-245.59	4.75	405079.58	767875.86	N 32 6 41.51	W 103 36	5.97
	10377.00	89.24	3.16	9973.01	622.10	620.62	-243.97	2.96	405110.53	767877.48	N 32 6 41.81	W 103 36	5.95
	10407.00	89.62	3.24	9973.31	652.04	650.57	-242.29	1.29	405140.48	767879.16	N 32 6 42.11	W 103 36	5.93
	10501.00	91.58	0.61	9972.32	745.95	744.50	-239.13	3.49	405234.41	767882.31	N 32 6 43.04	W 103 36	5.88
	10595.00	92.99	359.92	9968.58	839.87	838.42	-238.70	1.67	405328.32	767882.75	N 32 6 43.97	W 103 36	5.87
	10690.00	89.93	0.54	9966.16	934.82	933.38	-238.32	3.29	405423.28	767883.13	N 32 6 44.91	W 103 36	5.86
	10784.00	88.52	0.88	9967.43	1028.79	1027.36	-237.15	1.54	405517.26	767884.30	N 32 6 45.84	W 103 36	5.84
	10878.00	89.52	359.90	9969.03	1122.77	1121.34	-236.51	1.49	405611.23	767884.94	N 32 6 46.77	W 103 36	5.82
	10972.00	88.90	0.50	9970.33	1216.75	1215.33	-236.18	0.92	405705.22	767885.26	N 32 6 47.70	W 103 36	5.81
	11067.00	87.76	0.55	9973.10	1311.70	1310.29	-235.31	1.20	405800.17	767886.13	N 32 6 48.64	W 103 36	5.79
	11161.00	88.18	357.79	9976.43	1405.63	1404.21	-236.88	2.97	405894.09	767884.77	N 32 6 49.56	W 103 36	5.80
	11255.00	90.62	357.53	9977.41	1499.56	1498.12	-240.51	2.61	405988.00	767880.93	N 32 6 50.49	W 103 36	5.84
	11350.00	89.97	358.22	9976.92	1594.51	1593.05	-244.04	1.00	406082.93	767877.41	N 32 6 51.43	W 103 36	5.87
	11444.00	89.28	359.66	9977.54	1688.50	1687.03	-245.77	1.70	406176.90	767875.67	N 32 6 52.36	W 103 36	5.88
	11538.00	89.24	0.71	9978.75	1782.49	1781.02	-245.47	1.12	406270.89	767875.98	N 32 6 53.29	W 103 36	5.87
	11633.00	88.52	0.99	9980.61	1877.45	1875.99	-244.06	0.81	406365.86	767877.39	N 32 6 54.23	W 103 36	5.85
	11727.00	90.65	1.27	9981.29	1971.41	1969.96	-242.21	2.29	406459.83	767879.24	N 32 6 55.16	W 103 36	5.82
	11821.00	90.89	0.34	9980.03	2065.38	2063.94	-240.89	1.02	406553.80	767880.56	N 32 6 56.09	W 103 36	5.80
	11915.00	89.79	359.90	9979.47	2159.37	2157.94	-240.69	1.26	406647.80	767880.76	N 32 6 57.02	W 103 36	5.79
	12009.00	89.48	359.01	9980.07	2253.37	2251.93	-241.59	1.00	406741.79	767879.86	N 32 6 57.95	W 103 36	5.79
	12104.00	87.08	356.94	9982.92	2348.27	2346.82	-244.94	3.34	406836.67	767876.51	N 32 6 58.89	W 103 36	5.82
	12198.00	88.07	356.77	9986.90	2442.08	2440.59	-250.09	1.07	406930.44	767871.36	N 32 6 59.82	W 103 36	5.87
	12292.00	90.38	359.38	9988.17	2536.02	2534.52	-253.25	3.71	407024.36	767868.20	N 32 7 0.75	W 103 36	5.90
	12386.00	91.75	1.28	9986.42	2629.99	2628.49	-252.71	2.49	407118.33	767868.74	N 32 7 1.68	W 103 36	5.89
	12480.00	90.38	1.93	9984.68	2723.91	2722.44	-250.07	1.61	407212.27	767871.37	N 32 7 2.61	W 103 36	5.85
	12575.00	90.52	1.30	9983.93	2818.85	2817.40	-247.40	0.68	407307.23	767874.05	N 32 7 3.55	W 103 36	5.81
	12669.00	88.66	0.82	9984.60	2912.82	2911.37	-245.66	2.04	407401.20	767875.79	N 32 7 4.48	W 103 36	5.79

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 ° ' ")
	12763.00	88.56	359.68	9988.52	3006.73	3005.28	-245.25	2.54	407495.11	767876.20	N 32 7 5.41	W 103 36 5.77
	12858.00	88.88	359.95	9992.32	3101.64	3100.20	-245.55	2.44	407590.02	767875.89	N 32 7 6.35	W 103 36 5.77
	12952.00	90.58	357.90	9992.78	3195.63	3194.17	-247.32	2.85	407684.00	767874.13	N 32 7 7.28	W 103 36 5.78
	13046.00	89.90	358.44	9992.38	3289.59	3288.12	-250.32	0.92	407777.94	767871.13	N 32 7 8.21	W 103 36 5.81
	13141.00	89.90	358.72	9992.55	3384.58	3383.10	-252.67	0.29	407872.91	767868.78	N 32 7 9.15	W 103 36 5.83
	13235.00	89.83	359.03	9992.77	3478.57	3477.08	-254.52	0.34	407966.89	767866.93	N 32 7 10.08	W 103 36 5.84
	13329.00	89.52	359.30	9993.30	3572.56	3571.06	-255.89	0.44	408060.87	767865.56	N 32 7 11.01	W 103 36 5.85
	13423.00	89.76	359.11	9993.89	3666.56	3665.05	-257.19	0.33	408154.86	767864.26	N 32 7 11.94	W 103 36 5.86
	13556.00	91.38	358.60	9992.57	3799.53	3798.02	-259.85	1.28	408287.82	767861.60	N 32 7 13.25	W 103 36 5.88
	13650.00	91.62	359.22	9990.11	3893.49	3891.97	-261.64	0.71	408381.76	767859.81	N 32 7 14.18	W 103 36 5.89
	13745.00	91.51	358.78	9987.52	3988.45	3986.92	-263.30	0.48	408476.71	767858.15	N 32 7 15.12	W 103 36 5.91
	13839.00	90.55	0.15	9985.83	4082.43	4080.89	-264.17	1.78	408570.68	767857.28	N 32 7 16.05	W 103 36 5.91
	13933.00	90.62	0.59	9984.87	4176.42	4174.89	-263.57	0.47	408664.67	767857.88	N 32 7 16.98	W 103 36 5.89
	14028.00	89.69	0.70	9984.61	4271.40	4269.88	-262.50	0.99	408759.66	767858.95	N 32 7 17.92	W 103 36 5.87
	14122.00	89.48	0.61	9985.29	4365.39	4363.87	-261.42	0.24	408853.65	767860.03	N 32 7 18.85	W 103 36 5.85
	14216.00	89.52	1.91	9986.11	4459.34	4457.84	-259.36	1.38	408947.62	767862.09	N 32 7 19.78	W 103 36 5.82
	14310.00	89.62	2.23	9986.82	4553.26	4551.78	-255.96	0.36	409041.55	767865.49	N 32 7 20.71	W 103 36 5.78
	14404.00	89.55	359.52	9987.50	4647.22	4645.76	-254.52	2.88	409135.53	767866.92	N 32 7 21.64	W 103 36 5.75
	14499.00	89.59	358.62	9988.21	4742.22	4740.74	-256.07	0.95	409230.51	767865.38	N 32 7 22.58	W 103 36 5.76
	14593.00	89.45	359.94	9989.00	4836.21	4834.73	-257.25	1.41	409324.49	767864.20	N 32 7 23.51	W 103 36 5.77
	14687.00	89.55	358.64	9989.82	4930.20	4928.71	-258.41	1.39	409418.48	767863.04	N 32 7 24.44	W 103 36 5.78
	14781.00	89.35	358.56	9990.72	5024.18	5022.68	-260.71	0.23	409512.44	767860.74	N 32 7 25.37	W 103 36 5.79
	14875.00	90.14	358.72	9991.14	5118.16	5116.65	-262.94	0.86	409606.41	767858.51	N 32 7 26.30	W 103 36 5.81
	14970.00	89.93	0.42	9991.08	5213.16	5211.65	-263.65	1.80	409701.40	767857.80	N 32 7 27.24	W 103 36 5.81
	15064.00	90.03	0.45	9991.11	5307.15	5305.64	-262.94	0.11	409795.39	767858.51	N 32 7 28.17	W 103 36 5.80
	15158.00	90.03	0.20	9991.06	5401.14	5399.64	-262.41	0.27	409889.39	767859.04	N 32 7 29.10	W 103 36 5.78
	15252.00	90.21	0.32	9990.87	5495.14	5493.64	-261.98	0.23	409983.38	767859.47	N 32 7 30.03	W 103 36 5.77
	15346.00	89.69	0.63	9990.95	5589.13	5587.64	-261.20	0.64	410077.38	767860.25	N 32 7 30.96	W 103 36 5.76
	15440.00	89.52	359.92	9991.60	5683.12	5681.63	-260.75	0.78	410171.37	767860.70	N 32 7 31.89	W 103 36 5.74
	15535.00	90.21	359.76	9991.82	5778.12	5776.63	-261.01	0.75	410266.37	767860.43	N 32 7 32.83	W 103 36 5.74
	15629.00	90.21	0.42	9991.48	5872.12	5870.63	-260.87	0.70	410360.36	767860.58	N 32 7 33.76	W 103 36 5.73
	15724.00	90.38	0.71	9990.99	5967.10	5965.63	-259.93	0.35	410455.35	767861.52	N 32 7 34.70	W 103 36 5.71
	15818.00	90.24	1.43	9990.48	6061.07	6059.61	-258.17	0.78	410549.33	767863.27	N 32 7 35.63	W 103 36 5.68
	15912.00	90.00	359.01	9990.28	6155.06	6153.60	-257.81	2.59	410643.32	767863.64	N 32 7 36.56	W 103 36 5.67
	16006.00	90.21	358.65	9990.11	6249.05	6247.58	-259.73	0.44	410737.30	767861.72	N 32 7 37.49	W 103 36 5.69
	16101.00	90.00	359.38	9989.94	6344.04	6342.56	-261.38	0.78	410832.28	767860.07	N 32 7 38.43	W 103 36 5.70
	16195.00	90.21	358.94	9989.76	6438.04	6436.55	-262.78	0.50	410926.26	767858.67	N 32 7 39.36	W 103 36 5.71
	16289.00	89.69	359.49	9989.85	6532.03	6530.54	-264.06	0.81	411020.25	767857.38	N 32 7 40.29	W 103 36 5.71
	16383.00	90.10	358.39	9990.02	6626.03	6624.53	-265.80	1.25	411114.23	767855.65	N 32 7 41.22	W 103 36 5.73
	16478.00	90.21	358.57	9989.76	6721.01	6719.49	-268.32	0.22	411209.19	767853.13	N 32 7 42.16	W 103 36 5.75
	16572.00	89.97	358.95	9989.61	6814.99	6813.47	-270.36	0.48	411303.17	767851.09	N 32 7 43.09	W 103 36 5.77
	16666.00	89.97	358.44	9989.66	6908.98	6907.44	-272.50	0.54	411397.14	767848.95	N 32 7 44.02	W 103 36 5.78
	16760.00	89.72	358.98	9989.92	7002.97	7001.42	-274.61	0.63	411491.11	767846.83	N 32 7 44.95	W 103 36 5.80
	16854.00	89.72	358.31	9990.38	7096.95	7095.39	-276.84	0.71	411585.08	767844.61	N 32 7 45.88	W 103 36 5.82
	16948.00	91.51	359.94	9989.37	7190.93	7189.37	-278.27	2.58	411679.05	767843.18	N 32 7 46.81	W 103 36 5.83
	17043.00	90.10	358.61	9988.03	7285.92	7284.35	-279.48	2.04	411774.03	767841.97	N 32 7 47.75	W 103 36 5.83
	17137.00	89.97	358.31	9987.97	7379.90	7378.31	-282.00	0.35	411867.99	767839.45	N 32 7 48.68	W 103 36 5.86
	17231.00	89.90	358.44	9988.08	7473.87	7472.28	-284.67	0.16	411961.95	767836.78	N 32 7 49.61	W 103 36 5.88
	17325.00	89.97	359.34	9988.19	7567.87	7566.26	-286.49	0.96	412055.93	767834.96	N 32 7 50.54	W 103 36 5.89
	17420.00	90.10	0.53	9988.13	7662.86	7661.25	-286.60	1.26	412150.92	767834.85	N 32 7 51.48	W 103 36 5.89
	17514.00	90.10	0.59	9987.97	7756.85	7755.25	-285.68	0.06	412244.92	767835.77	N 32 7 52.41	W 103 36 5.87
	17608.00	90.14	0.77	9987.77	7850.83	7849.24	-284.56	0.20	412338.91	767836.89	N 32 7 53.34	W 103 36 5.85
	17703.00	89.83	0.79	9987.79	7945.82	7944.23	-283.27	0.33	412433.89	767838.18	N 32 7 54.28	W 103 36 5.83
	17797.00	90.62	0.30	9987.42	8039.80	8038.23	-282.37	0.99	412527.88	767839.08	N 32 7 55.21	W 103 36 5.81
	17891.00	90.10	0.50	9986.83	8133.79	8132.22	-281.72	0.59	412621.88	767839.73	N 32 7 56.14	W 103 36 5.79
	17986.00	88.59	0.03	9987.92	8228.78	8227.21	-281.28	1.66	412716.86	767840.17	N 32 7 57.08	W 103 36 5.78
	18080.00	90.45	0.39	9988.71	8322.77	8321.21	-280.93	2.02	412810.85	767840.52	N 32 7 58.01	W 103 36 5.77
	18174.00	90.03	359.87	9988.31	8416.76	8415.20	-280.72	0.71	412904.85	767840.73	N 32 7 58.94	W 103 36 5.76
	18269.00	90.62	0.31	9987.77	8511.76	8510.20	-280.57	0.77	412999.84	767840.88	N 32 7 59.88	W 103 36 5.75
	18363.00	90.86	0.80	9986.56	8605.74	8604.19	-279.66	0.58	413093.83	767841.79	N 32 8 0.81	W 103 36 5.73
	18457.00	90.76	0.06	9985.23	8699.72	8698.18	-278.96	0.79	413187.81	767842.49	N 32 8 1.74	W 103 36 5.72
	18551.00	90.41	358.91	9984.27	8793.71	8792.17	-279.80	1.28	413281.80	767841.65	N 32 8 2.67	W 103 36 5.72
	18645.00	90.17	358.65	9983.80	8887.70	8886.14	-281.80	0.38	413375.77	767839.65	N 32 8 3.60	W 103 36 5.73
	18740.00	90.58	358.37	9983.17	8982.68	8981.11	-284.27	0.52	413470.73	767837.18	N 32 8 4.54	W 103 36 5.76
	18834.00	90.24	358.14	9982.50	9076.65	9075.06	-287.13	0.44	413564.68	767834.32	N 32 8 5.47	W 103 36 5.78
	18928.00	90.34	358.24	9982.03	9170.62	9169.01	-290.10	0.15	413658.63	767831.35	N 32 8 6.40	W 103 36 5.81
	19022.00	90.55	358.49	9981.30	9264.59	9262.97	-292.79	0.35	413752.59	767828.66	N 32 8 7.33	W 103 36 5.83
	19117.00	90.55	356.19	9980.38	9359.50	9357.86	-297.19	2.42	413847.47	767824.26	N 32 8 8.27	W 103 36 5.88
	19211.00	91.03	357.85	9979.09	9453.39	9451.72	-302.08	1.84	413941.33	767819.37	N 32 8 9.20	W 103 36 5.93
	19305.00	90.76	1.92	9977.82	9547.36	9545.69	-302.27	4.34	414035.29	767819.18	N 32 8 10.13	W 103 36 5.92
	19399.00	89.45	1.38	9977.45	9641.30	9639.65	-299.56	1.51	414129.25	767821.89	N 32 8 11.06	W 103 36 5.88
	19493.00	90.10	3.66	9977.82	9735.17	9733.55	-295.43	2.52	414223.15	767826.02	N 32 8 11.99	W 103 36 5.83
	19558.00	89.97	3.11	9977.78	9800.03	9798.44	-291.59	0.87	414288.03	767829.86	N 32 8 12.63	W 103 36 5.78
TD, project to bit	19597.00	89.97	3.11	9977.80	9838.96	9837.38	-289.48	0.00	414326.97	767831.97	N 32 8 13.01	W 103 36 5.75

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	24.000	1/98.425	30.000	30.000	NAL_MWD_IFR1+MS-Depth Only	Original Borehole / Cimarex Vaca Draw 20-17 Federal #5H Final MWD(Surcon Corrected)
	1	24.000	24.000	Act Stns	30.000	30.000	NAL_MWD_IFR1+MS-Depth Only	Original Borehole / Cimarex Vaca Draw 20-17 Federal #5H Final MWD(Surcon Corrected)
	1	24.000	19597.000	Act Stns	30.000	30.000	NAL_MWD_IFR1+MS	Original Borehole / Cimarex Vaca Draw 20-17 Federal #5H Final

Schlumberger **Cimarex** Final PvA CIMAREX

Borehole:	Well:	Field:	Structure:
Original Borehole	Cimarex Vaca Draw 20-17 Federal #5H	NM Lea County (NAD 83)	Cimarex Vaca Draw 20-17 Federal #5H

Gravity & Magnetic Parameters					Surface Location					Miscellaneous			
Model:	HDGM 2017	Dip:	59.791°	Date:	19-Mar-2018	Lat:	N 32 0 35.66	Northing:	404488.93fUS	Grid Conv:	0.3883°	Slot:	20-17 Federal #
MagDec:	6.791°	FS:	47906.688nT	Gravity FS:	998.429mgn (9.80665 Based)	Lon:	W 103 36 3.16	Easting:	788121.44fUS	Scale Fact:	0.999969	Plan:	5)Cimarex Vaca Draw 20-17 Federal #5H Final MWD(Surcon Corrected)

TVD Ref: RKB(3447.2ft above MSL)

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
TD, project to bit	19597.00	89.97	3.11	9977.80	9838.96	9837.38	-289.48	0.00