



HOBBS OCD

OCT 17 2018

RECEIVED

5D Survey Report**Cimarex Energy**

Field Name: *Cimarex Nad 83 NMEZ*
Site Name: *Vaca Draw 20-17 Federal Pad*
Well Name: *Vaca Draw 20-17 Federal 1H ST01*
Survey: *Definitive survey*

19 February 2018

**Weatherford®**



Weatherford®



Vaca Draw 20-17 Federal 1H ST01

Field Name: Cimarex Nad 83 NMEZ	Map Units: US ft		Company Name: Cimarex Energy	
	Vertical Reference Datum (VRD): Mean Sea Level			
	Projected Coordinate System: NAD83 / New Mexico East (ftUS)			
	Comment:			
Site: Vaca Draw 20-17 Federal Pad	Units: US ft	North Reference: Grid	Convergence Angle: 0.39	
	Position:	Northing: 404489.79 US ft	Latitude: 32° 6' 35.65"	
		Easting: 768101.45 US ft	Longitude: -103° 36' 3.39"	
	Site TVD Reference: TVD relative to Mean Sea Level			
Elevation above MSL: 3423.30 US ft				
Comment:				
Slot: Vaca Draw 20-17 Federal 1H	Position (Relative to Site Centre)			
	+N/-S: 0.00 US ft	Northing: 404489.79 US ft	Latitude: 32°6'35.65"	
	+E/-W: 0.00 US ft	Easting: 768101.45 US ft	Longitude: -103°36'3.39"	
	Elevation above MSL: 3423.30 US ft			
Comment:				
Well: Vaca Draw 20-17 Federal 1H ST01	Type: Sidetrack		UWI: Vaca Draw 20-17 Federal 1H ST01	
	Parent: Vaca Draw 20-17 Federal 1H		Tie Point Method: MD	
	File Number:	Comment:		
	Closure Distance: 9840.5US ft		Closure Azimuth: 358.40°	
Vertical Section: Position of Origin (Relative to Slot centre)				
+N/-S: -0.00 US ft		+E/-W: 0.00 US ft		Az: 358.41°

Drill floor: Survey Name: Definitive Survey			
Rig Height (Drill Floor): 26.00us ft	Elevation above MSL: 3449.30us ft	Inclination: 0.00°	Azimuth: 0.00°

Survey Name: Definitive Survey

Date: 08/Jan/2018	Survey Tool: See Survey Tool Ranges below.	Comment:	Company:
--------------------------	---	-----------------	-----------------

Magnetic Model:			
Model Name: Surcon	Date: 20/Dec/2017	Field Strength: 47959.0nT	Declination: 6.88° Dip: 59.82°

Tie Point:			
MD: 11610.00 US ft	Inclination: 0.69°	Azimuth: 109.76°	TVD: 11604.36 US ft
		North Offset: -20.60 US ft	East Offset: -223.47 US ft

Survey Tool Ranges:

Name	Start MD(USft)	End MD(USft)	Source Survey
MWD + IFR + MS	0.00	994.00	Extreme 1 Surcon corrected
MWD + IFR + MS	994.00	11610.00	Extreme 2&3 Surcon corrected
MWD + IFR + MS	11610.00	12496.00	WFT MWD+IFR+MS_01
MWD + IFR + MS	12496.00	16013.00	Run 2

5D Survey Report

Survey Tool Ranges:			
Name	Start MD(USFt)	End MD(USFt)	Source Survey
MWD + IFR + MS	16013.00	18659.00	WFT MWD+IFR+MS_03
MWD + IFR + MS	18659.00	21966.00	WFT MWD+IFR+MS_04

Wellpath created using minimum curvature.

Survey Points: (Relative to Slot centre)(TVD relative to Drill Floor)													
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	N.Offset (US ft)	E.Offset (US ft)	Northing (US ft)	Easting (US ft)	DLS (°/100US ft)	Comment	Dist to Plan (US.ft)	High to Plan (US.ft)	Right to Plan (US.ft)	VS (US ft)
0.00	0.00	0.00	0.00	-0.00	0.00	404489.7 9	768101.4 5	0.00		224.48	-20.70	-223.52	0.00
152.00	0.93	44.73	151.99	0.88	0.87	404490.6 7	768102.3 2	0.61		386.99	-359.11	-144.23	0.85
244.00	0.89	29.53	243.98	2.03	1.75	404491.8 2	768103.2 0	0.27		358.54	-307.25	-184.80	1.98
334.00	1.06	353.53	333.97	3.46	2.00	404493.2 5	768103.4 5	0.69		307.13	-207.09	-226.81	3.41
428.00	1.20	349.68	427.95	5.30	1.72	404495.0 9	768103.1 7	0.17		315.09	-219.29	-226.26	5.25
518.00	1.08	341.45	517.93	7.03	1.28	404496.8 2	768102.7 3	0.23		275.81	-163.74	-221.95	6.99
609.00	0.99	336.25	608.92	8.56	0.69	404498.3 5	768102.1 4	0.14		251.17	-126.47	-217.01	8.54
700.00	0.97	332.65	699.91	9.96	0.02	404499.7 5	768101.4 7	0.07		239.02	-109.14	-212.64	9.96
790.00	0.89	327.69	789.89	11.23	-0.70	404501.0 2	768100.7 5	0.13		218.96	-75.88	-205.39	11.25
880.00	0.95	329.21	879.88	12.46	-1.46	404502.2 5	768099.9 9	0.07		227.46	-92.63	-207.74	12.50
971.00	1.02	335.47	970.87	13.85	-2.18	404503.6 4	768099.2 7	0.14		251.25	-128.83	-215.71	13.90
994.00	1.06	323.75	993.86	14.21	-2.39	404504.0 0	768099.0 6	0.94		219.93	-93.70	-198.97	14.27
1150.00	1.11	315.35	1149.84	16.44	-4.30	404506.2 3	768097.1 5	0.11		196.87	-74.91	-182.06	16.56
1244.00	0.77	332.15	1243.82	17.65	-5.24	404507.4 4	768096.2 1	0.46		222.60	-71.17	-210.92	17.79
1338.00	1.28	281.01	1337.81	18.41	-6.56	404508.2 0	768094.8 9	1.06		83.32	-23.89	-79.82	18.58
1433.00	2.21	267.71	1432.77	18.54	-9.44	404508.3 3	768092.0 1	1.06		179.55	-176.92	-30.65	18.79
1527.00	2.46	268.62	1526.69	18.42	-13.26	404508.2 1	768088.1 9	0.27		224.21	-221.61	-34.04	18.78
1621.00	2.09	266.27	1620.61	18.26	-16.99	404508.0 5	768084.4 6	0.41		157.68	-155.61	-25.44	18.72
1715.00	1.92	268.35	1714.56	18.10	-20.28	404507.8 9	768081.1 7	0.20		131.38	-127.18	-32.93	18.66
1809.00	1.77	272.43	1808.51	18.12	-23.30	404507.9 1	768078.1 5	0.21		114.48	-104.27	-47.27	18.76
1903.00	1.63	278.12	1902.47	18.37	-26.07	404508.1 6	768075.3 8	0.23		108.83	-86.10	-66.56	19.09
1997.00	1.37	283.24	1996.43	18.81	-28.49	404508.6 0	768072.9 6	0.31		96.48	-48.97	-83.13	19.60
2092.00	2.28	268.23	2091.39	19.02	-31.49	404508.8 1	768069.9 6	1.07		188.48	-185.44	-33.76	19.88
2186.00	2.30	276.54	2185.31	19.17	-35.23	404508.9 6	768066.2 2	0.35		204.93	-195.62	-61.06	20.15
2280.00	1.84	288.15	2279.25	19.86	-38.54	404509.6 5	768062.9 1	0.66		166.85	-136.35	-96.16	20.92
2374.00	1.45	299.85	2373.21	20.92	-41.00	404510.7 1	768060.4 5	0.55		159.18	-96.04	-126.94	22.05
2468.00	1.56	265.61	2467.18	21.41	-43.31	404511.2 0	768058.1 4	0.95		71.69	-65.91	-28.19	22.61
2562.00	1.18	267.61	2561.15	21.28	-45.55	404511.0 7	768055.9 0	0.41		35.16	-6.70	-34.52	22.53
2656.00	1.74	235.70	2655.12	20.43	-47.70	404510.2 2	768053.7 5	1.03		122.18	-103.39	65.10	21.75
2750.00	1.49	241.65	2749.09	19.05	-49.95	404508.8 4	768051.5 0	0.32		75.47	-58.69	47.44	20.43
2844.00	2.75	238.81	2843.02	17.30	-52.96	404507.0 9	768048.4 9	1.34		261.00	-254.95	55.83	18.76

5D Survey Report

Survey Points: (Relative to Slot centre)(TVD relative to Drill Floor)													
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	N.Offset (US ft)	E.Offset (US ft)	Northing (US ft)	Easting (US ft)	DLS (°/100US ft)	Comment	Dist to Plan (US ft)	High to Plan (US ft)	Right to Plan (US ft)	VS (US ft)
2939.00	2.78	244.62	2937.91	15.13	-56.99	404504.9 2	768044.4 6	0.30		257.68	-254.71	39.01	16.71
3033.00	2.29	245.91	3031.82	13.39	-60.76	404503.1 8	768040.6 9	0.52		183.60	-180.17	35.32	15.07
3128.00	1.65	236.63	3126.76	11.86	-63.64	404501.6 5	768037.8 1	0.75		110.86	-92.73	60.75	13.63
3222.00	1.33	237.26	3220.73	10.53	-65.69	404500.3 2	768035.7 6	0.34		74.27	-44.98	59.10	12.35
3316.00	2.59	248.16	3314.67	9.15	-68.57	404498.9 4	768032.8 8	1.39		221.86	-219.83	29.94	11.05
3411.00	2.68	251.39	3409.57	7.64	-72.67	404497.4 3	768028.7 8	0.18		232.31	-231.33	21.29	9.66
3505.00	2.45	248.15	3503.48	6.19	-76.62	404495.9 8	768024.8 3	0.29		202.26	-200.07	29.72	8.32
3599.00	2.49	247.63	3597.39	4.66	-80.37	404494.4 5	768021.0 8	0.05		208.29	-205.97	31.03	6.90
3693.00	2.40	249.74	3691.30	3.21	-84.11	404493.0 0	768017.3 4	0.14		194.15	-192.42	25.85	5.54
3787.00	1.29	263.17	3785.25	2.40	-87.00	404492.1 9	768014.4 5	1.26		38.36	-37.77	-6.70	4.82
3881.00	2.30	272.19	3879.21	2.34	-89.94	404492.1 3	768011.5 1	1.11		179.74	-177.53	-28.13	4.85
3975.00	2.32	276.50	3973.13	2.63	-93.71	404492.4 2	768007.7 4	0.19		186.57	-182.69	-37.87	5.24
4069.00	1.93	271.94	4067.07	2.90	-97.19	404492.6 9	768004.2 6	0.45		131.44	-128.45	-27.86	5.60
4164.00	1.42	268.55	4162.03	2.92	-99.96	404492.7 1	768001.4 9	0.55		63.73	-60.35	-20.49	5.71
4258.00	1.47	238.09	4256.00	2.26	-102.15	404492.0 5	767999.3 0	0.81		85.91	-73.38	44.67	5.10
4352.00	2.96	254.22	4349.93	0.96	-105.51	404490.7 5	767995.9 4	1.70		255.56	-255.31	11.25	3.90
4446.00	2.85	251.06	4443.80	-0.46	-110.06	404489.3 3	767991.3 9	0.21		242.92	-242.28	17.68	2.60
4541.00	2.27	234.02	4538.71	-2.33	-113.81	404487.4 6	767987.6 4	1.00		187.06	-180.37	49.59	0.84
4634.00	2.18	211.75	4631.64	-4.92	-116.23	404484.8 7	767985.2 2	0.93		212.28	-195.41	82.93	-1.68
4729.00	2.49	224.37	4726.56	-7.93	-118.63	404481.8 6	767982.8 2	0.63		226.26	-216.40	66.05	-4.62
4823.00	2.26	231.52	4820.48	-10.54	-121.51	404479.2 5	767979.9 4	0.40		189.71	-181.40	55.53	-7.16
4917.00	2.91	249.29	4914.39	-12.54	-125.19	404477.2 5	767976.2 6	1.09		246.39	-244.89	27.14	-9.05
5012.00	2.86	258.66	5009.27	-13.86	-129.77	404475.9 3	767971.6 8	0.50		236.20	-235.91	11.73	-10.24
5106.00	2.96	254.20	5103.15	-14.98	-134.40	404474.8 1	767967.0 5	0.26		249.23	-248.52	18.76	-11.23
5200.00	2.96	256.47	5197.02	-16.21	-139.10	404473.5 8	767962.3 5	0.12		248.32	-247.85	15.38	-12.33
5294.00	3.03	259.83	5290.89	-17.21	-143.90	404472.5 8	767957.5 5	0.20		255.07	-254.85	10.63	-13.20
5388.00	3.06	260.05	5384.76	-18.09	-148.82	404471.7 0	767952.6 3	0.03		258.29	-258.09	10.33	-13.94
5483.00	2.65	261.34	5479.64	-18.85	-153.49	404470.9 4	767947.9 6	0.44		213.91	-213.74	8.72	-14.58
5577.00	2.47	259.04	5573.55	-19.57	-157.63	404470.2 2	767943.8 2	0.22		195.39	-195.05	11.42	-15.17
5672.00	2.51	261.20	5668.46	-20.27	-161.69	404469.5 2	767939.7 6	0.11		199.05	-198.84	9.04	-15.77
5766.00	2.74	277.77	5762.36	-20.29	-165.95	404469.5 0	767935.5 0	0.84		222.50	-222.35	-8.19	-15.66
5860.00	3.05	278.14	5856.24	-19.63	-170.65	404470.1 6	767930.8 0	0.33		253.87	-253.73	-8.55	-14.87
5954.00	2.79	275.80	5950.12	-19.04	-175.40	404470.7 5	767926.0 5	0.30		227.67	-227.57	-6.51	-14.15
6049.00	2.64	279.40	6045.01	-18.45	-179.86	404471.3 4	767921.5 9	0.24		213.61	-213.40	-9.35	-13.44
6143.00	2.60	278.02	6138.92	-17.80	-184.11	404471.9 9	767917.3 4	0.08		209.51	-209.35	-8.37	-12.67

5D Survey Report

Survey Points: (Relative to Slot centre)(TVD relative to Drill Floor)													
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	N. Offset (US ft)	E. Offset (US ft)	Northing (US ft)	Easting (US ft)	DLS (°/100US ft)	Comment	Dist to Plan (US ft)	High to Plan (US ft)	Right to Plan (US ft)	VS (US ft)
6237.00	2.45	276.38	6232.82	-17.28	-188.22	404472.5 1	767913.2 3	0.18		195.08	-194.94	-7.32	-12.04
6331.00	2.57	278.51	6326.73	-16.74	-192.30	404473.0 5	767909.1 5	0.16		206.56	-206.38	-8.53	-11.39
6425.00	2.35	279.66	6420.65	-16.11	-196.28	404473.6 8	767905.1 7	0.24		186.71	-186.49	-9.10	-10.64
6519.00	2.48	280.52	6514.56	-15.41	-200.18	404474.3 8	767901.2 7	0.14		198.50	-198.28	-9.46	-9.84
6614.00	2.42	281.54	6609.48	-14.64	-204.17	404475.1 5	767897.2 8	0.08		193.42	-193.17	-9.81	-8.95
6708.00	2.39	281.37	6703.39	-13.85	-208.03	404475.9 4	767893.4 2	0.03		190.80	-190.55	-9.76	-8.06
6896.00	2.26	276.08	6891.24	-12.69	-215.56	404477.1 0	767885.8 9	0.13		179.01	-178.80	-8.81	-6.69
7085.00	1.83	274.63	7080.12	-12.05	-222.28	404477.7 4	767879.1 7	0.23		144.20	-143.93	-8.72	-5.86
7274.00	1.61	266.96	7269.03	-11.95	-227.94	404477.8 4	767873.5 1	0.17		126.07	-125.75	-8.97	-5.60
7463.00	1.56	264.88	7457.96	-12.32	-233.15	404477.4 7	767868.3 0	0.04		122.07	-121.72	-9.21	-5.83
7651.00	1.37	278.04	7645.90	-12.23	-237.92	404477.5 6	767863.5 3	0.20		110.26	-110.08	-6.37	-5.61
7840.00	1.39	272.21	7834.85	-11.83	-242.45	404477.9 6	767859.0 0	0.08		110.99	-110.69	-8.13	-5.08
7934.00	0.94	281.19	7928.83	-11.63	-244.35	404478.1 6	767857.1 0	0.52		82.63	-82.48	-4.85	-4.83
8122.00	0.47	298.73	8116.81	-10.96	-246.54	404478.8 3	767854.9 1	0.27		53.53	-53.47	2.53	-4.10
8311.00	0.15	297.38	8305.81	-10.48	-247.44	404479.3 1	767854.0 1	0.17		34.62	-34.57	1.92	-3.59
8499.00	0.25	305.43	8493.81	-10.13	-247.99	404479.6 6	767853.4 6	0.06		40.02	-39.64	5.57	-3.22
8688.00	0.43	265.39	8682.80	-9.95	-249.03	404479.8 4	767852.4 2	0.15		48.21	-46.49	-12.77	-3.01
8782.00	0.51	251.07	8776.80	-10.11	-249.78	404479.6 8	767851.6 7	0.15		50.12	-46.57	-18.53	-3.16
8877.00	0.62	242.50	8871.80	-10.48	-250.63	404479.3 1	767850.8 2	0.15		53.45	-48.90	-21.58	-3.51
8971.00	0.57	294.54	8965.79	-10.52	-251.51	404479.2 7	767849.9 4	0.56		55.98	-55.93	2.37	-3.52
9160.00	0.53	270.84	9154.78	-10.12	-253.24	404479.6 7	767848.2 1	0.12		53.50	-52.53	-10.14	-3.07
9254.00	0.36	92.87	9248.78	-10.13	-253.38	404479.6 6	767848.0 7	0.95		17.99	15.55	9.06	-3.08
9443.00	0.09	14.07	9437.78	-10.02	-252.75	404479.7 7	767848.7 0	0.19		31.66	-6.66	30.95	-2.98
9631.00	0.08	192.22	9625.78	-10.00	-252.74	404479.7 9	767848.7 1	0.09		30.86	1.51	-30.82	-2.96
9820.00	0.75	130.05	9814.78	-10.93	-251.82	404478.8 6	767849.6 3	0.38		11.64	4.52	-10.73	-3.91
10008.00	1.28	135.71	10002.75	-13.22	-249.42	404476.5 7	767852.0 3	0.29		18.16	-12.35	-13.31	-6.28
10197.00	1.34	137.93	10191.70	-16.37	-246.46	404473.4 2	767854.9 9	0.04		20.22	-14.46	-14.13	-9.51
10386.00	1.14	145.62	10380.65	-19.56	-243.92	404470.2 3	767857.5 3	0.14		20.09	-11.90	-16.19	-12.77
10574.00	1.49	146.08	10568.60	-23.14	-241.50	404466.6 5	767859.9 5	0.19		24.96	-18.93	-16.28	-16.41
10669.00	0.87	116.44	10663.58	-24.48	-240.16	404465.3 1	767861.2 9	0.90		10.85	-1.07	-10.80	-17.79
10763.00	0.44	118.86	10757.58	-24.97	-239.21	404464.8 2	767862.2 4	0.46		12.44	5.17	-11.31	-18.31
10951.00	0.63	125.41	10945.57	-25.92	-237.73	404463.8 7	767863.7 2	0.11		12.56	1.31	-12.49	-19.30
11046.00	1.68	52.53	11040.55	-25.38	-236.20	404464.4 1	767865.2 5	1.70		5.40	-3.63	4.00	-18.79
11234.00	1.69	54.57	11228.47	-22.09	-231.76	404467.7 0	767869.6 9	0.03		5.10	-3.57	3.64	-15.64
11328.00	1.85	74.81	11322.42	-20.89	-229.16	404468.9 0	767872.2 9	0.68		3.84	-3.61	1.29	-14.51

5D Survey Report

Survey Points: (Relative to Slot centre)(TVD relative to Drill Floor)													
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	N.Offset (US ft)	E.Offset (US ft)	Northing (US ft)	Easting (US ft)	DLS (°/100US ft)	Comment	Dist to Plan (US ft)	High to Plan (US ft)	Right to Plan (US ft)	VS (US ft)
11422.00	1.29	85.00	11416.39	-20.40	-226.64	404469.3 9	767874.8 1	0.66		1.28	-1.15	0.57	-14.09
11610.00	0.69	109.76	11604.36	-20.60	-223.47	404469.1 9	767877.9 8	0.38	Tie on Extreme First WFT Survey	0.11	-0.02	0.11	-14.37
11695.00	0.50	104.71	11689.36	-20.87	-222.63	404468.9 2	767878.8 2	0.23		0.11	-0.03	0.11	-14.66
11758.00	0.55	120.09	11752.35	-21.09	-222.10	404468.7 0	767879.3 5	0.24		0.11	0.00	0.11	-14.90
11852.00	11.91	0.47	11845.69	-11.58	-221.63	404478.2 1	767879.8 2	12.97		0.11	-0.10	-0.05	-5.41
11883.00	17.74	0.31	11875.65	-3.65	-221.58	404486.1 4	767879.8 7	18.81		0.11	-0.09	-0.05	2.52
11915.00	21.87	359.12	11905.75	7.19	-221.64	404496.9 8	767879.8 1	12.97		0.11	-0.09	-0.05	13.35
11946.00	24.56	358.63	11934.24	19.40	-221.89	404509.1 9	767879.5 6	8.70		0.10	-0.09	-0.05	25.57
11978.00	26.11	0.14	11963.16	33.09	-222.03	404522.8 8	767879.4 2	5.25		0.10	-0.09	-0.05	39.26
12009.00	27.45	359.20	11990.83	47.06	-222.11	404536.8 5	767879.3 4	4.53		0.10	-0.09	-0.05	53.22
12041.00	28.30	0.16	12019.12	62.02	-222.19	404551.8 1	767879.2 6	3.00		0.10	-0.09	-0.05	68.18
12072.00	29.20	0.67	12046.30	76.93	-222.09	404566.7 2	767879.3 6	3.01		0.10	-0.09	-0.05	83.08
12103.00	31.12	0.78	12073.10	92.50	-221.89	404582.2 9	767879.5 6	6.20		0.10	-0.09	-0.05	98.64
12135.00	33.59	0.95	12100.13	109.63	-221.63	404599.4 2	767879.8 2	7.72		0.10	-0.08	-0.05	115.75
12166.00	36.32	1.16	12125.53	127.38	-221.30	404617.1 7	767880.1 5	8.81		0.10	-0.08	-0.05	133.49
12198.00	40.01	1.06	12150.69	147.15	-220.92	404636.9 4	767880.5 3	11.53		0.09	-0.08	-0.05	153.24
12229.00	43.50	0.60	12173.81	167.79	-220.62	404657.5 8	767880.8 3	11.30		0.09	-0.07	-0.05	173.86
12260.00	46.08	0.45	12195.81	189.63	-220.42	404679.4 2	767881.0 3	8.33		0.09	-0.07	-0.05	195.69
12292.00	48.93	359.70	12217.43	213.22	-220.39	404703.0 1	767881.0 6	9.07		0.08	-0.07	-0.05	219.27
12323.00	51.76	359.37	12237.21	237.08	-220.59	404726.8 7	767880.8 6	9.17		0.08	-0.06	-0.05	243.13
12355.00	53.85	359.96	12256.55	262.57	-220.74	404752.3 6	767880.7 1	6.69		0.08	-0.06	-0.05	268.61
12386.00	56.08	1.35	12274.35	287.95	-220.44	404777.7 4	767881.0 1	8.08		0.08	-0.06	-0.05	293.97
12417.00	59.40	1.49	12290.89	314.15	-219.79	404803.9 4	767881.6 6	10.72		0.07	-0.05	-0.05	320.15
12449.00	62.44	1.54	12306.44	342.10	-219.05	404831.8 9	767882.4 0	9.50		0.07	-0.05	-0.05	348.07
12480.00	65.23	1.87	12320.11	369.91	-218.22	404859.7 0	767883.2 3	9.05		0.07	-0.04	-0.05	375.84
12496.00	67.22	1.18	12326.56	384.55	-217.84	404874.3 4	767883.6 1	13.05		0.06	-0.04	-0.05	390.46
12564.00	75.06	0.15	12348.53	448.84	-217.10	404938.6 3	767884.3 5	11.62		0.06	-0.03	-0.05	454.71
12596.00	77.01	359.73	12356.25	479.89	-217.14	404969.6 8	767884.3 1	6.23		0.06	-0.02	-0.05	485.75
12627.00	78.58	359.18	12362.80	510.19	-217.42	404999.9 8	767884.0 3	5.35		0.06	-0.02	-0.05	516.04
12659.00	80.72	359.06	12368.55	541.67	-217.91	405031.4 6	767883.5 4	6.70		0.06	-0.02	-0.05	547.52
12691.00	82.06	359.73	12373.34	573.30	-218.24	405063.0 9	767883.2 1	4.67		0.05	-0.01	-0.05	579.15
12786.00	84.53	357.98	12384.43	667.62	-220.13	405157.4 1	767881.3 2	3.18		0.06	-0.01	-0.06	673.49
12881.00	90.98	359.03	12388.15	762.47	-222.60	405252.2 6	767878.8 5	6.88		0.05	0.00	-0.05	768.36
12976.00	92.38	359.99	12385.37	857.42	-223.42	405347.2 1	767878.0 3	1.79		0.05	0.00	-0.05	863.30
13071.00	90.14	1.83	12383.28	952.37	-221.91	405442.1 6	767879.5 4	3.05		0.05	-0.00	-0.05	958.18

5D Survey Report

Survey Points: (Relative to Slot centre)(TVD relative to Drill Floor)														
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	N. Offset (US ft)	E. Offset (US ft)	Northing (US ft)	Easting (US ft)	DLS (%/100US ft)	Comment	Dist to Plan (US ft)	High to Plan (US ft)	Right to Plan (US ft)	VS (US ft)	
13166.00	85.73	358.77	12386.70	1047.28	-221.41	405537.0 7	767880.0 4	5.65		0.06	-0.01	-0.05	1053.03	
13260.00	88.81	1.89	12391.18	1141.14	-220.86	405630.9 3	767880.5 9	4.66		0.05	-0.00	-0.05	1146.85	
13355.00	89.58	1.40	12392.51	1236.09	-218.14	405725.8 8	767883.3 1	0.96		0.05	-0.00	-0.05	1241.69	
13450.00	92.52	0.16	12390.77	1331.06	-216.84	405820.8 5	767884.6 1	3.36		0.05	0.00	-0.05	1336.58	
13545.00	90.35	357.48	12388.39	1425.99	-218.80	405915.7 8	767882.6 5	3.63		0.06	-0.00	-0.06	1431.53	
13640.00	89.72	356.18	12388.34	1520.85	-224.05	406010.6 4	767877.4 0	1.52		0.06	-0.00	-0.06	1526.49	
13735.00	90.07	359.56	12388.51	1615.77	-227.58	406105.5 6	767873.8 7	3.58		0.05	-0.00	-0.05	1621.47	
13829.00	90.28	359.57	12388.22	1709.76	-228.30	406199.5 5	767873.1 5	0.22		0.05	-0.00	-0.05	1715.45	
13924.00	89.51	359.99	12388.40	1804.76	-228.66	406294.5 5	767872.7 9	0.92		0.05	-0.00	-0.05	1810.42	
14019.00	90.49	359.38	12388.40	1899.76	-229.18	406389.5 5	767872.2 7	1.22		0.05	-0.00	-0.05	1905.40	
14114.00	89.86	359.60	12388.11	1994.75	-230.03	406484.5 4	767871.4 2	0.70		0.05	-0.00	-0.05	2000.38	
14209.00	91.96	0.66	12386.60	2089.73	-229.81	406579.5 2	767871.6 4	2.48		0.05	0.00	-0.05	2095.32	
14304.00	88.04	0.22	12386.60	2184.71	-229.08	406674.5 0	767872.3 7	4.15		0.05	-0.00	-0.05	2190.24	
14399.00	89.02	0.68	12389.03	2279.68	-228.34	406769.4 7	767873.1 1	1.14		0.05	-0.00	-0.05	2285.15	
14494.00	88.88	0.67	12390.78	2374.65	-227.22	406864.4 4	767874.2 3	0.15		0.05	-0.00	-0.05	2380.06	
14589.00	89.16	359.57	12392.40	2469.64	-227.02	406959.4 3	767874.4 3	1.19		0.05	-0.00	-0.05	2475.00	
14684.00	91.12	358.37	12392.17	2564.62	-228.73	407054.4 1	767872.7 2	2.42		0.06	0.00	-0.06	2569.99	
14779.00	90.28	355.19	12391.01	2659.45	-234.06	407149.2 4	767867.3 9	3.46		0.06	-0.00	-0.06	2664.93	
14874.00	89.37	354.77	12391.30	2754.08	-242.38	407243.8 7	767859.0 7	1.05		0.06	-0.00	-0.06	2759.76	
14969.00	89.23	355.55	12392.46	2848.73	-250.39	407338.5 2	767851.0 6	0.83		0.06	-0.00	-0.06	2854.60	
15063.00	88.81	358.66	12394.07	2942.59	-255.14	407432.3 8	767846.3 1	3.34		0.05	-0.00	-0.05	2948.55	
15158.00	87.55	3.25	12397.08	3037.50	-253.56	407527.2 9	767847.8 9	5.01		0.05	-0.01	-0.05	3043.38	
15253.00	86.78	3.16	12401.78	3132.23	-248.25	407622.0 2	767853.2 0	0.82		0.05	-0.01	-0.05	3137.93	
15348.00	90.21	3.13	12404.28	3227.04	-243.04	407716.8 3	767858.4 1	3.61		0.05	-0.00	-0.05	3232.56	
15443.00	89.79	2.63	12404.28	3321.92	-238.27	407811.7 1	767863.1 8	0.69		0.05	-0.00	-0.05	3327.27	
15538.00	88.60	1.27	12405.61	3416.86	-235.04	407906.6 5	767866.4 1	1.90		0.05	-0.00	-0.05	3422.07	
15633.00	88.25	3.10	12408.22	3511.75	-231.42	408001.5 4	767870.0 3	1.96		0.05	-0.00	-0.05	3516.83	
15728.00	90.28	1.24	12409.44	3606.66	-227.82	408096.4 5	767873.6 3	2.90		0.05	-0.00	-0.05	3611.60	
15823.00	94.76	3.20	12405.27	3701.47	-224.15	408191.2 6	767877.3 0	5.15		0.05	0.01	-0.05	3706.27	
15918.00	92.52	1.68	12399.24	3796.18	-220.11	408285.9 7	767881.3 4	2.85		0.05	0.00	-0.05	3800.84	
16013.00	90.00	0.85	12397.15	3891.13	-218.02	408380.9 2	767883.4 3	2.79		0.05	-0.00	-0.05	3895.69	
16106.00	87.62	359.94	12399.08	3984.10	-217.38	408473.8 9	767884.0 7	2.74		0.05	-0.01	-0.05	3988.60	
16201.00	88.81	358.57	12402.04	4079.04	-218.61	408568.8 3	767882.8 4	1.91		0.05	-0.00	-0.05	4083.54	
16296.00	90.14	359.30	12402.91	4174.02	-220.38	408663.8 1	767881.0 7	1.60		0.05	-0.00	-0.05	4178.53	
16391.00	90.42	358.20	12402.44	4268.99	-222.45	408758.7 8	767879.0 0	1.19		0.06	-0.00	-0.06	4273.53	

5D Survey Report

Survey Points: (Relative to Slot centre)(TVD relative to Drill Floor)													
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	N.Offset (US ft)	E.Offset (US ft)	Northing (US ft)	Easting (US ft)	DLS (°/100US ft)	Comment	Dist to Plan (US ft)	High to Plan (US ft)	Right to Plan (US ft)	VS (US ft)
16486.00	89.23	358.34	12402.73	4363.95	-225.32	408853.7 4	767876.1 3	1.26		0.06	-0.00	-0.06	4368.53
16581.00	88.11	357.07	12404.94	4458.84	-229.12	408948.6 3	767872.3 3	1.78		0.06	-0.00	-0.06	4463.49
16676.00	88.81	356.98	12407.49	4553.68	-234.05	409043.4 7	767867.4 0	0.74		0.06	-0.00	-0.06	4558.43
16770.00	88.39	358.05	12409.79	4647.56	-238.12	409137.3 5	767863.3 3	1.22		0.06	-0.00	-0.06	4652.39
16866.00	89.51	358.07	12411.55	4743.49	-241.37	409233.2 8	767860.0 8	1.17		0.06	-0.00	-0.06	4748.37
16960.00	88.88	359.81	12412.87	4837.46	-243.11	409327.2 5	767858.3 4	1.97		0.05	-0.00	-0.05	4842.35
17055.00	89.79	0.44	12413.97	4932.45	-242.90	409422.2 4	767858.5 5	1.17		0.05	-0.00	-0.05	4937.30
17150.00	89.86	359.26	12414.26	5027.45	-243.15	409517.2 4	767858.3 0	1.24		0.05	-0.00	-0.05	5032.27
17245.00	90.63	358.96	12413.85	5122.43	-244.63	409612.2 2	767856.8 2	0.87		0.05	-0.00	-0.05	5127.26
17340.00	89.58	358.77	12413.68	5217.41	-246.51	409707.2 0	767854.9 4	1.12		0.05	-0.00	-0.05	5222.25
17435.00	89.37	357.87	12414.55	5312.37	-249.29	409802.1 6	767852.1 6	0.97		0.06	-0.00	-0.06	5317.25
17529.00	89.93	357.55	12415.13	5406.29	-253.05	409896.0 8	767848.4 0	0.69		0.06	-0.00	-0.06	5411.24
17624.00	89.23	358.92	12415.82	5501.24	-255.98	409991.0 3	767845.4 7	1.62		0.05	-0.00	-0.05	5506.23
17719.00	91.54	0.17	12415.18	5596.23	-256.73	410086.0 2	767844.7 2	2.76		0.05	0.00	-0.05	5601.20
17814.00	91.40	0.34	12412.75	5691.20	-256.31	410180.9 9	767845.1 4	0.23		0.05	0.00	-0.05	5696.12
17909.00	89.37	0.57	12412.11	5786.19	-255.55	410275.9 8	767845.9 0	2.15		0.05	-0.00	-0.05	5791.06
18004.00	91.82	1.97	12411.12	5881.15	-253.45	410370.9 4	767848.0 0	2.97		0.05	0.00	-0.05	5885.92
18099.00	92.03	1.95	12407.93	5976.04	-250.20	410465.8 3	767851.2 5	0.22		0.05	0.00	-0.05	5980.69
18194.00	91.82	2.23	12404.74	6070.92	-246.74	410560.7 1	767854.7 1	0.37		0.05	0.00	-0.05	6075.44
18289.00	91.47	1.89	12402.01	6165.82	-243.33	410655.6 1	767858.1 2	0.51		0.05	0.00	-0.05	6170.20
18384.00	89.09	1.83	12401.55	6260.76	-240.24	410750.5 5	767861.2 1	2.51		0.05	-0.00	-0.05	6265.02
18469.00	89.86	0.88	12402.33	6345.73	-238.23	410835.5 2	767863.2 2	1.44		0.05	-0.00	-0.05	6349.90
18564.00	83.62	359.99	12407.73	6440.53	-237.51	410930.3 2	767863.9 4	6.63		0.05	-0.01	-0.05	6444.64
18659.00	81.85	357.33	12419.74	6534.73	-239.71	411024.5 2	767861.7 4	3.34		0.06	-0.01	-0.06	6538.87
18756.00	82.84	356.24	12432.66	6630.71	-245.10	411120.5 0	767856.3 5	1.51		0.06	-0.01	-0.06	6634.96
18851.00	88.46	356.24	12439.87	6725.19	-251.31	411214.9 8	767850.1 4	5.92		0.06	-0.00	-0.06	6729.58
18946.00	90.35	356.48	12440.85	6819.99	-257.34	411309.7 8	767844.1 1	2.01		0.06	-0.00	-0.06	6824.51
19041.00	92.24	358.12	12438.71	6914.86	-261.82	411404.6 5	767839.6 3	2.63		0.06	0.00	-0.06	6919.46
19136.00	92.73	358.70	12434.59	7009.73	-264.45	411499.5 2	767837.0 0	0.80		0.05	0.00	-0.05	7014.37
19231.00	92.59	0.02	12430.18	7104.62	-265.51	411594.4 1	767835.9 4	1.40		0.05	0.00	-0.05	7109.26
19325.00	89.65	359.17	12428.34	7198.59	-266.17	411688.3 8	767835.2 8	3.26		2.23	2.11	0.71	7203.21
19420.00	89.79	1.33	12428.80	7293.58	-265.76	411783.3 7	767835.6 9	2.28		4.89	4.83	0.77	7298.15
19515.00	89.44	1.33	12429.44	7388.55	-263.55	411878.3 4	767837.9 0	0.37		7.68	7.62	-0.94	7393.02
19610.00	91.05	359.43	12429.04	7483.54	-262.92	411973.3 3	767838.5 3	2.62		9.44	9.37	-1.09	7487.96
19705.00	91.47	359.29	12426.95	7578.51	-263.99	412068.3 0	767837.4 6	0.47		9.45	9.44	0.47	7582.92

5D Survey Report

Survey Points: (Relative to Slot centre)(TVD relative to Drill Floor)													
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	N.Offset (US ft)	E.Offset (US ft)	Northing (US ft)	Easting (US ft)	DLS (°/100US ft)	Comment	Dist to Plan (US ft)	High to Plan (US ft)	Right to Plan (US ft)	VS (US ft)
19800.00	91.82	1.95	12424.22	7673.46	-262.96	412163.2 5	767838.4 9	2.82		8.87	8.87	-0.06	7677.80
19895.00	94.49	7.61	12418.99	7767.94	-255.06	412257.7 3	767846.3 9	6.58		9.43	5.85	-7.39	7772.03
19990.00	89.51	5.53	12415.67	7862.22	-244.21	412352.0 1	767857.2 4	5.68		18.61	3.84	-18.21	7865.97
20085.00	89.44	3.49	12416.54	7956.92	-236.74	412446.7 1	767864.7 1	2.15		26.77	5.21	-26.26	7960.43
20180.00	90.07	359.52	12416.95	8051.87	-234.24	412541.6 6	767867.2 1	4.23		30.00	6.13	-29.36	8055.27
20275.00	90.84	358.38	12416.20	8146.84	-235.98	412636.6 3	767865.4 7	1.45		28.77	5.86	-28.16	8150.26
20370.00	90.49	357.56	12415.09	8241.78	-239.35	412731.5 7	767862.1 0	0.94		25.87	5.26	-25.33	8245.25
20465.00	91.26	357.54	12413.64	8336.68	-243.41	412826.4 7	767858.0 4	0.81		22.24	4.29	-21.82	8340.22
20560.00	90.21	357.72	12412.42	8431.59	-247.34	412921.3 8	767854.1 1	1.12		18.79	3.59	-18.45	8435.21
20655.00	90.07	356.71	12412.19	8526.47	-251.95	413016.2 6	767849.5 0	1.07		14.88	3.85	-14.37	8530.18
20750.00	91.61	358.26	12410.80	8621.37	-256.12	413111.1 6	767845.3 3	2.30		11.16	2.95	-10.76	8625.16
20845.00	90.42	357.78	12409.12	8716.29	-259.40	413206.0 8	767842.0 5	1.35		8.22	1.77	-8.03	8720.14
20940.00	93.08	359.03	12406.21	8811.20	-262.05	413300.9 9	767839.4 0	3.09		5.97	-0.63	-5.93	8815.08
21035.00	90.84	359.70	12402.97	8906.13	-263.10	413395.9 2	767838.3 5	2.46		6.40	-3.38	-5.43	8910.01
21130.00	91.89	0.22	12400.70	9001.11	-263.17	413490.9 0	767838.2 8	1.23		7.83	-5.15	-5.91	9004.94
21225.00	90.49	359.27	12398.73	9096.08	-263.59	413585.8 7	767837.8 6	1.78		8.96	-6.62	-6.03	9099.89
21320.00	89.51	359.18	12398.73	9191.07	-264.87	413680.8 6	767836.5 8	1.04		8.10	-6.13	-5.29	9194.88
21415.00	88.46	358.46	12400.41	9286.03	-266.83	413775.8 2	767834.6 2	1.34		5.53	-3.94	-3.88	9289.86
21510.00	90.70	358.60	12401.11	9380.99	-269.27	413870.7 8	767832.1 8	2.36		3.40	-2.75	-2.00	9384.85
21605.00	86.50	356.92	12403.43	9475.87	-272.98	413965.6 6	767828.4 7	4.76		1.17	0.06	1.17	9479.79
21700.00	89.37	358.49	12406.85	9570.72	-276.78	414060.5 1	767824.6 7	3.44		5.95	3.98	4.42	9574.71
21795.00	91.26	0.42	12406.33	9665.70	-277.68	414155.4 9	767823.7 7	2.84		6.20	3.96	4.78	9669.69
21890.00	91.19	1.15	12404.30	9760.67	-276.38	414250.4 6	767825.0 7	0.77		3.80	2.42	2.93	9764.58
21914.00	91.33	0.89	12403.77	9784.66	-275.95	414274.4 5	767825.5 0	1.23	Last Svy	3.11	2.02	2.36	9788.55
21966.00	91.76	0.09	12402.37	9836.64	-275.51	414326.4 3	767825.9 4	1.75	PTB	1.85	0.89	1.62	9840.50

Formation Points: (Relative to Slot centre)(TVD relative to Drill Floor)											
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	N.Offset (US ft)	E.Offset (US ft)	Northing (US ft)	Easting (US ft)	Name	Comment		
N/A	N/A	N/A	950.00	N/A	N/A	N/A	N/A	Rustler			
N/A	N/A	N/A	1270.00	N/A	N/A	N/A	N/A	Top of Salt			
N/A	2.58	250.09	4690.00	7.04	-74.40	404496.83	768027.05	Base of Salt			
N/A	2.58	250.09	4890.00	7.04	-74.40	404496.83	768027.05	Delaware Sands			
N/A	2.58	250.09	9023.00	7.04	-74.40	404496.83	768027.05	Bone Spring			
N/A	2.58	250.09	9081.00	7.04	-74.40	404496.83	768027.05	Leonard Shale			
N/A	2.58	250.09	9320.00	7.04	-74.40	404496.83	768027.05	Avalon Shale			
N/A	2.58	250.09	10021.00	7.04	-74.40	404496.83	768027.05	1st Bone Spring Sand			
N/A	2.58	250.09	10239.00	7.04	-74.40	404496.83	768027.05	2nd Bone Spring Carb			
N/A	2.58	250.09	10587.00	7.04	-74.40	404496.83	768027.05	2nd Bone Spring Sand			
N/A	2.58	250.09	11107.00	7.04	-74.40	404496.83	768027.05	3rd Bone Spring Carb			

5D Survey Report

Formation Points: (Relative to Slot centre) (TVD relative to Drill Floor)									
MD (US ft)	Inc (°)	Az (°)	TVD (US ft)	N.Offset (US ft)	E.Offset (US ft)	Northing (US ft)	Easting (US ft)	Name	Comment
N/A	2.58	250.09	12934.00	7.04	-74.40	404496.83	768027.05	Wolfcamp A2	
140.64	0.86	44.73	140.64	0.75	0.74	404490.54	768102.19	3rd Bone Spring Sand	
682.87	0.97	333.34	682.78	9.70	0.16	404499.49	768101.61	Wolfcamp	
1023.15	1.07	322.12	1023.01	14.64	-2.71	404504.43	768098.74	Wolfcamp A1	
1125.11	1.10	316.64	1124.95	16.10	-3.97	404505.89	768097.48	Wolfcamp A1 Target	

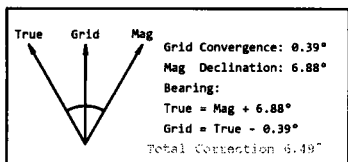
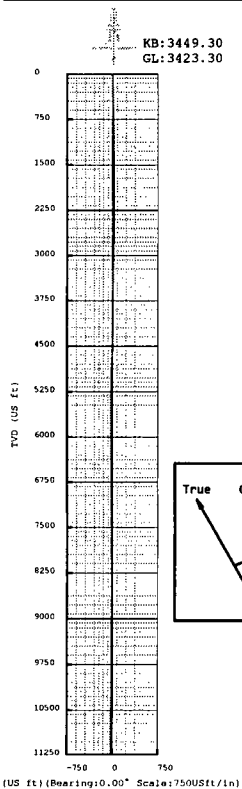


Plan vs Actual

Vaca Draw 20-17 Federal 1H ST01 Lea County, NM

Plan Data for Vaca Draw 20-17 Federal 1H ST01

Dolog Severity Unit: */100.00ft Position offsets from Slot centre									
MD	Inc	Az	TVD	+N/-S	+E/-W	VSec	DLS	Comments	
(USft)	(°)	(°)	(USft)	(USft)	(USft)	(USft)	(DLSU)		
19231.00	92.59	0.02	12430.18	7104.52	-265.54	7109.16	1.40	Last Svy	
19283.00	92.59	0.02	12427.83	7156.47	-265.54	7161.08	0.00	PTB/Drop	
19348.94	91.30	0.30	12425.59	7222.37	-265.36	7226.95	2.00	Hold	
19916.40	91.30	0.30	12412.71	7789.68	-262.42	7793.96	0.00	Drop/Turn	
19975.45	90.30	359.67	12411.89	7848.71	-262.44	7852.98	2.00	Hold	
21964.45	90.30	359.67	12401.47	9837.65	-273.89	9841.46	0.00	PBHL 330' FNL, 380' FNL	



Plan Data for Vaca Draw 20-17 Federal 1H ST01
Field: Cimarex Mad 83 NMEZ
Map Unit: USft Vertical Reference Datum (VRD): Mean Sea Level
Projected Coordinate System: NAD83 / New Mexico East (ftUS)

Site: Vaca Draw 20-17 Federal Pad
Unit: USfeet TVD Reference: Mean Sea Level
Company Name: Cimarex Energy
Position: Northing: 404489.79USft Latitude: 32.109904°
Easting: 768101.45USft Longitude: -103.600942°
North Reference: Grid Grid Convergence: 0.39°
Elevation Above VRD: 3423.30USft

Slot: Vaca Draw 20-17 Federal 1H
Position:

Offset is from Site centre
+N/-S: 0.00USft Northing: 404489.79USft Latitude: 32.109904°
+E/-W: 0.00USft Easting: 768101.45USft Longitude: -103.600942°
Elevation Above VRD: 3423.30USft

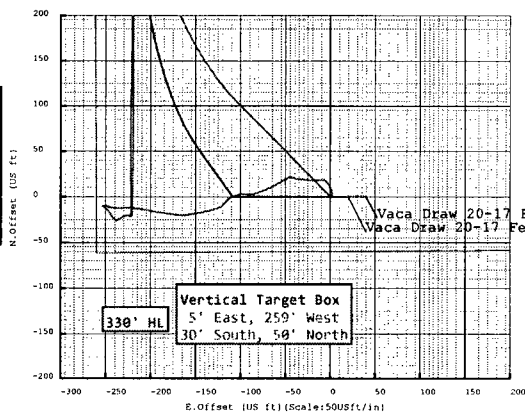
Well: Vaca Draw 20-17 Federal 1H ST01
Type: Side-Track

Plan Folder: P4 Plan: P4:V1
Vertical Section: Position offset of origin from Slot centre:
+N/-S: -0.00USft Azimuth: 358.41°
+E/-W: 0.00USft
Magnetic Parameters:
Model: Field Strength: Declination: Dip: Date:
Surcon 47959(nT) 6.88° 59.82° 2017-12-20

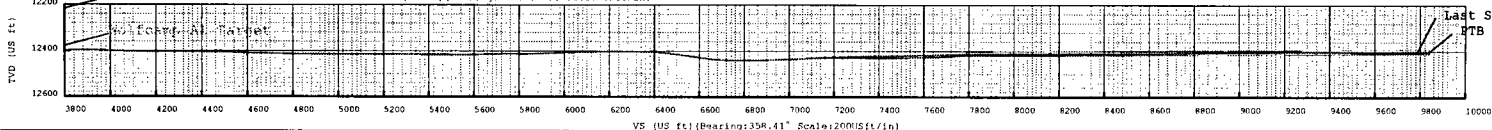
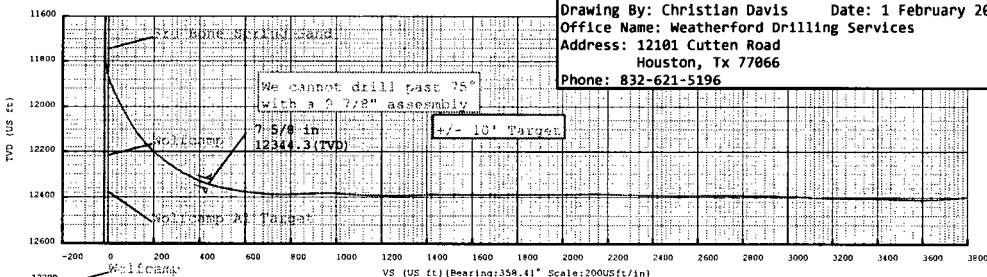
Plan Data for Vaca Draw 20-17 Federal 1H ST01

Target Set Information:									
Name: Vaca Draw 20-17 Federal 1H									
Position offsets from Slot centre									
Name	TVD	SS TVD	+N/-S	+E/-W	Northing	Easting			
(USft)	(USft)	(USft)	(USft)	(USft)	(USft)	(USft)			
5086 VS	12416.00	-8966.70	5086.00	-246.83	409575.79	767854.62			
PBHL 330' FNL, 380' FNL	12401.47	-8952.17	9837.75	-273.84	414327.54	767827.61			

Vaca Draw 20-17 Federal 1H ST01
Vaca Draw 20-17 Federal 5H
Vaca Draw 20-17 Federal 6H
Vaca Draw 20-17 Federal 1H ST01



Drawing By: Christian Davis Date: 1 February 2018
Office Name: Weatherford Drilling Services
Address: 12101 Cutten Road
Houston, Tx 77066
Phone: 832-621-5196



Weatherford

