



Cimarex Energy

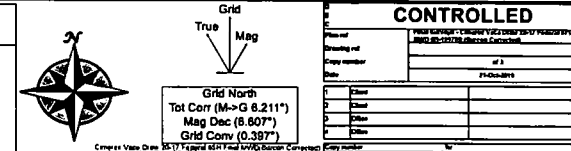
Final PvA



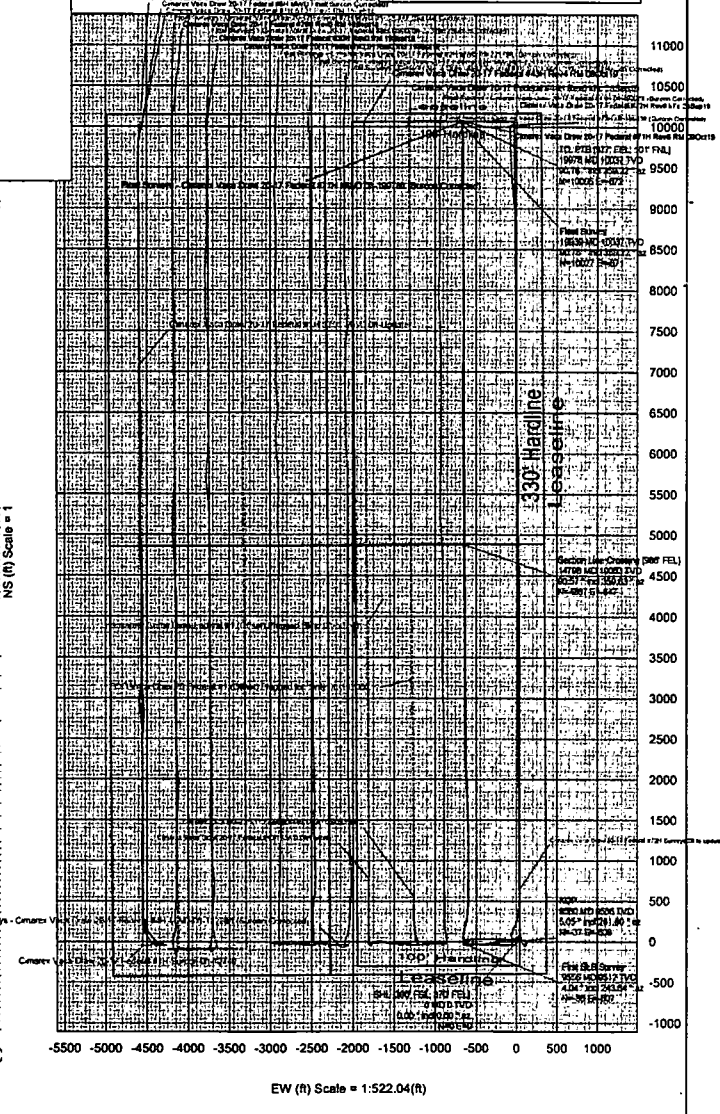
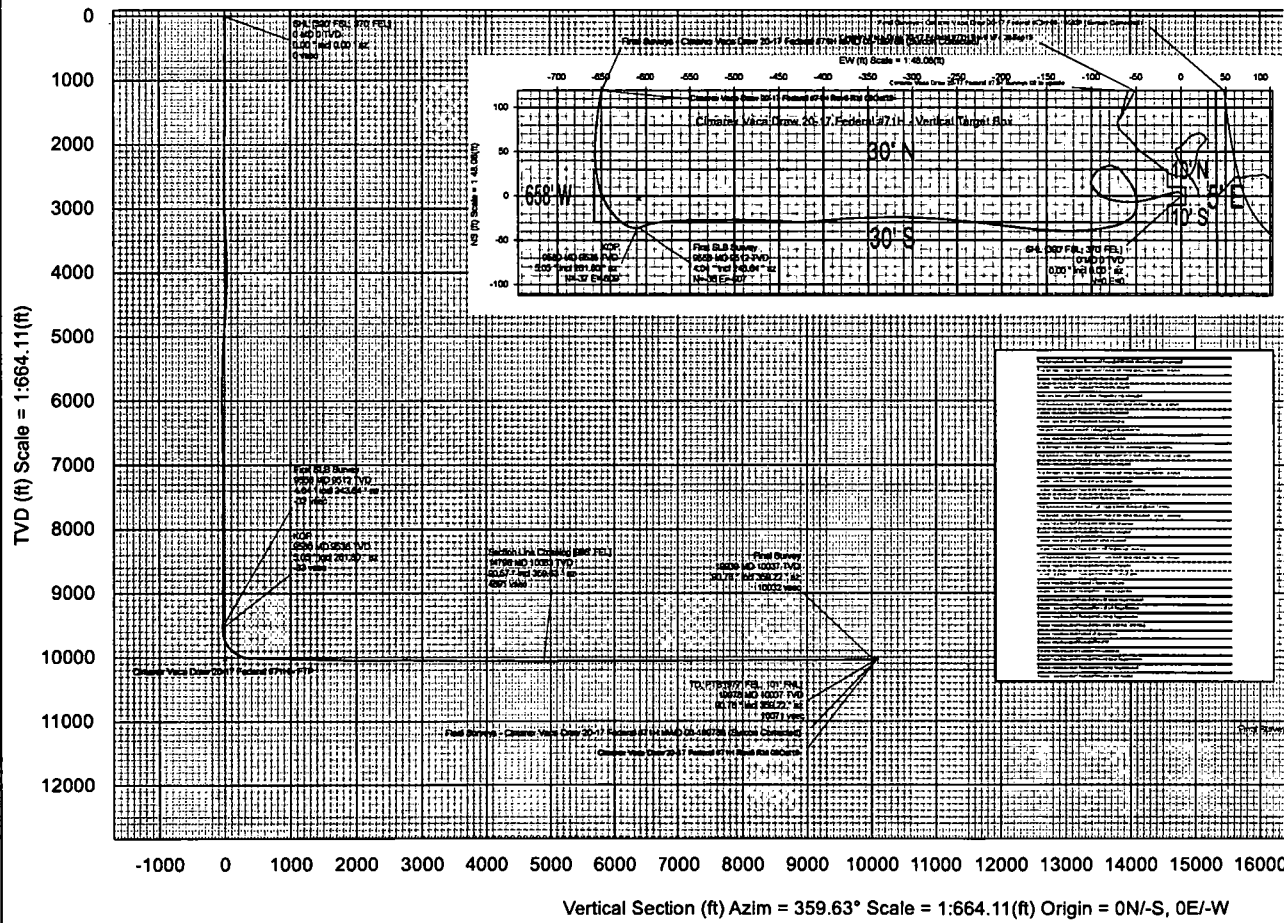
Borehole: Vaca Draw 20-17 Federal #71H Well: Vaca Draw 20-17 Federal #71H Field: NM Lea County (NAD 83) Structure: Cimarex Vaca Draw 20-17 Federal #71H

Gravity & Magnetic Parameters: Model: HOGM 2018 Dip: 83.70° Date: 13-Oct-2018 Surface Location: MA092 New Mexico State Plane, Eastern Zone, US Feet Grid Conv: 0.3867" Microfissures: Slot: New Slot TVD Ref: RKB(2421.88 above MSL)
MagDec: 8.607° PB: 47738.22nT Gravity FB: 986.433mg (BROOKS Based) Lon: W 103 36 13.07 Northing: 404516.182513 Easting: 772428.881173 Scale Fact: 0.88897038 Plan: Final Surveys - Cimarex Vaca Draw 20-17 Federal #71H MWYD 09-198781 (Surcon Corrected)

Critical Points								
Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/B(-)	E(+)/W(-)	DL8
SHL (380' FSL, 370' FEL)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
First GLB Survey	9556.00	4.04	243.64	9512.33	-32.08	-36.03	-507.38	0.51
XOP	9580.24	0.05	261.80	9538.49	-32.80	-36.56	-509.18	7.20
Section Line Crossing (889' FEL)	14797.80	90.87	359.83	10062.63	4891.01	4888.91	-548.82	0.80
Final Survey	19639.00	90.76	359.22	10037.18	10031.81	10027.47	-571.27	0.82
TD, PITS (377' FEL, 101' FNL)	19978.00	90.76	359.22	10036.83	10070.81	10068.48	-571.80	0.00



CONTROLLED	
Drawn by	
Checked by	
Date	
Scale	
Sheet	
Block	
Project	





**Final Surveys - Cimarex Vaca Draw 20-17 Federal #71H MWD 0ft-19978ft
(Surcon Corrected) Survey Geodetic Report
(Def Survey)**



Report Date: October 21, 2019 - 10:11 AM
Client: Cimarex Energy
Field: NM Lea County (NAD 83)
Structure / Slot: Cimarex Vaca Draw 20-17 Federal #71H / New Slot
Well: Vaca Draw 20-17 Federal #71H
Borehole: Vaca Draw 20-17 Federal #71H
UWI / API#: Unknown / Unknown
Survey Name: Final Surveys - Cimarex Vaca Draw 20-17 Federal #71H MWD 0ft-19978ft (Surcon Corrected)
Survey Date: October 13, 2019
Tort / AHD / DDI / ERD Ratio: 229.188 * / 10908.535 ft / 6.696 / 1.084
Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 6' 35.62096", W 103° 35' 13.07049"
Location Grid N/E Y/X: N 404516.160 RUS, E 772429.560 RUS
CRS Grid Convergence Angle: 0.3967 *
Grid Scale Factor: 0.99997026
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: 3421.800 ft above MSL
Seabed / Ground Elevation: 3395.800 ft above MSL
Magnetic Declination: 6.607 *
Total Gravity Field Strength: 998.4332mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 47736.220 nT
Magnetic Dip Angle: 59.706 *
Declination Date: October 13, 2019
Magnetic Declination Model: HDGM 2019
North Reference: Grid North
Grid Convergence Used: 0.3967 *
Total Corr Mag North->Grid North: 6.2105 *
Local Coord Referenced To: Well Head

Comments	MD (R)	Incl (°)	Azim Grid (°)	TVD (R)	VSEC (R)	NS (R)	EW (R)	DLS (*100ft)	Northing (RUS)	Easting (RUS)	Latitude (N/S * ° ' '')	Longitude (E/W * ° ' '')	Closure Azimuth (°)	Closure (R)
SHL [390° FSL, 370° FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404516.16	772429.56	N 32 6 35.62	W 103 35 13.07	0.00	0.00
	193.00	0.52	49.62	193.00	0.56	0.57	0.67	0.27	404516.73	772430.23	N 32 6 35.63	W 103 35 13.06	49.62	0.88
	293.00	0.48	41.02	292.99	1.17	1.18	1.29	0.08	404517.34	772430.85	N 32 6 35.63	W 103 35 13.06	47.56	1.74
	384.00	0.33	339.61	383.99	1.70	1.71	1.45	0.48	404517.87	772431.01	N 32 6 35.64	W 103 35 13.05	40.22	2.24
	476.00	0.32	307.22	475.99	2.11	2.11	1.15	0.20	404518.27	772430.71	N 32 6 35.64	W 103 35 13.06	28.54	2.41
	566.00	0.41	302.24	565.99	2.43	2.44	0.68	0.11	404518.60	772430.24	N 32 6 35.65	W 103 35 13.06	15.52	2.53
	657.00	0.44	307.42	656.99	2.82	2.82	0.12	0.05	404518.98	772429.68	N 32 6 35.65	W 103 35 13.07	2.52	2.83
	747.00	0.45	299.46	746.98	3.21	3.21	-0.46	0.07	404519.37	772429.10	N 32 6 35.65	W 103 35 13.08	351.88	3.24
	838.00	0.50	299.16	837.98	3.58	3.58	-1.12	0.06	404519.74	772428.44	N 32 6 35.66	W 103 35 13.08	342.68	3.75
	933.00	0.51	295.85	932.98	3.98	3.96	-1.88	0.03	404520.12	772427.70	N 32 6 35.66	W 103 35 13.09	334.88	4.38
	995.00	0.54	294.23	994.97	4.22	4.20	-2.37	0.05	404520.36	772427.19	N 32 6 35.66	W 103 35 13.10	330.56	4.83
	1120.00	0.44	287.15	1119.97	4.61	4.59	-3.37	0.09	404520.75	772426.19	N 32 6 35.67	W 103 35 13.11	323.71	5.69
	1215.00	1.47	258.67	1214.96	4.49	4.46	-4.91	1.16	404520.62	772424.65	N 32 6 35.67	W 103 35 13.13	312.21	6.63
	1403.00	1.97	255.63	1402.87	3.25	3.18	-10.41	0.27	404519.34	772419.15	N 32 6 35.65	W 103 35 13.19	286.99	10.88
	1592.00	2.14	253.53	1591.75	1.48	1.37	-16.94	0.10	404517.53	772412.62	N 32 6 35.64	W 103 35 13.27	274.63	16.99
	1687.00	2.31	254.92	1686.68	0.50	0.37	-20.49	0.19	404516.53	772409.07	N 32 6 35.63	W 103 35 13.31	271.04	20.49
	1876.00	2.41	255.60	1875.52	-1.43	-1.61	-28.01	0.05	404514.55	772401.55	N 32 6 35.61	W 103 35 13.40	266.72	28.06
	2065.00	2.47	256.22	2064.34	-3.33	-3.57	-35.82	0.03	404512.59	772393.74	N 32 6 35.59	W 103 35 13.49	264.31	36.00
	2159.00	2.56	256.33	2158.25	-4.29	-4.54	-39.83	0.10	404511.62	772389.74	N 32 6 35.58	W 103 35 13.53	263.49	40.08
	2253.00	2.62	257.15	2252.16	-5.23	-5.52	-43.96	0.08	404510.64	772385.60	N 32 6 35.57	W 103 35 13.58	262.85	44.30
	2442.00	2.76	266.70	2440.95	-6.40	-6.74	-52.71	0.25	404509.42	772376.85	N 32 6 35.56	W 103 35 13.68	262.71	53.14
	2537.00	2.77	270.25	2535.84	-6.49	-6.86	-57.29	0.18	404509.30	772372.27	N 32 6 35.56	W 103 35 13.74	263.17	57.70
	2631.00	2.85	273.19	2629.73	-6.32	-6.72	-61.90	0.18	404509.44	772367.66	N 32 6 35.56	W 103 35 13.79	263.80	62.26
	2726.00	3.01	277.47	2724.60	-5.83	-6.27	-66.73	0.29	404509.89	772362.83	N 32 6 35.56	W 103 35 13.85	264.63	67.02
	2820.00	3.01	279.65	2818.47	-5.07	-5.53	-71.61	0.12	404510.63	772357.95	N 32 6 35.57	W 103 35 13.90	265.58	71.82
	2915.00	3.07	284.68	2913.34	-3.97	-4.47	-76.53	0.29	404511.69	772353.03	N 32 6 35.58	W 103 35 13.96	266.66	76.66
	3009.00	3.19	288.55	3007.20	-2.47	-3.00	-81.44	0.26	404513.16	772348.12	N 32 6 35.60	W 103 35 14.02	267.89	81.50
	3103.00	3.18	298.10	3101.06	-0.38	-0.94	-86.22	0.56	404515.22	772343.34	N 32 6 35.62	W 103 35 14.07	269.38	86.23
	3197.00	3.22	306.97	3194.91	2.46	1.88	-90.63	0.53	404518.04	772338.93	N 32 6 35.65	W 103 35 14.12	271.19	90.65
	3292.00	3.39	318.64	3289.75	6.20	5.59	-94.62	0.73	404521.75	772334.84	N 32 6 35.68	W 103 35 14.17	273.38	94.78
	3386.00	3.87	325.65	3383.56	10.93	10.29	-98.25	0.69	404526.45	772331.32	N 32 6 35.73	W 103 35 14.21	275.98	98.78
	3480.00	3.38	356.58	3477.38	16.33	15.68	-100.20	2.12	404531.84	772329.36	N 32 6 35.78	W 103 35 14.23	278.89	101.42
	3575.00	4.25	32.08	3572.19	22.10	21.46	-98.50	2.60	404537.62	772331.06	N 32 6 35.84	W 103 35 14.21	282.29	100.81
	3669.00	4.05	40.83	3665.94	27.53	26.92	-94.48	0.71	404543.08	772335.08	N 32 6 35.89	W 103 35 14.17	285.90	98.24
	3764.00	3.17	62.48	3760.76	31.26	30.67	-89.96	1.69	404546.83	772339.61	N 32 6 35.93	W 103 35 14.11	288.83	95.04

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)
	3858.00	3.22	68.65	3854.61	33.39	32.84	-85.19	0.37	404549.00	772344.37	N 32 6 35.95	W 103 35 14.06	291.08	91.30
	3952.00	3.02	80.06	3948.47	34.75	34.22	-80.29	0.69	404550.38	772349.27	N 32 6 35.97	W 103 35 14.00	293.09	87.28
	4047.00	2.39	115.63	4043.37	34.29	33.80	-76.04	1.85	404549.96	772353.52	N 32 6 35.96	W 103 35 13.95	293.96	83.22
	4141.00	2.66	107.48	4137.28	32.76	32.30	-72.19	0.48	404548.46	772357.37	N 32 6 35.95	W 103 35 13.91	294.10	79.09
	4236.00	2.56	129.96	4232.18	30.72	30.27	-68.47	1.08	404546.43	772361.10	N 32 6 35.93	W 103 35 13.86	293.85	74.86
	4330.00	2.58	144.53	4326.09	27.63	27.20	-65.63	0.69	404543.36	772363.93	N 32 6 35.89	W 103 35 13.83	292.51	71.04
	4424.00	3.29	140.80	4419.97	23.79	23.39	-62.70	0.78	404539.55	772368.87	N 32 6 35.86	W 103 35 13.80	290.46	66.92
	4519.00	3.88	143.99	4514.78	19.08	18.67	-59.08	0.68	404534.83	772370.48	N 32 6 35.81	W 103 35 13.76	287.54	61.96
	4613.00	4.18	149.12	4608.55	13.52	13.16	-55.46	0.50	404529.32	772374.11	N 32 6 35.76	W 103 35 13.71	283.35	57.00
	4708.00	3.70	157.72	4703.32	7.69	7.35	-52.52	0.80	404523.51	772377.05	N 32 6 35.70	W 103 35 13.68	277.97	53.03
	4873.00	2.94	171.06	4868.05	-1.43	-1.75	-49.84	0.65	404514.41	772379.72	N 32 6 35.61	W 103 35 13.65	267.99	49.87
	4984.00	2.76	174.38	4978.91	-6.91	-7.22	-49.14	0.22	404508.94	772380.43	N 32 6 35.55	W 103 35 13.64	261.64	49.66
	5174.00	3.55	199.35	5168.63	-17.00	-17.33	-50.64	0.82	404498.83	772378.92	N 32 6 35.45	W 103 35 13.66	251.11	53.52
	5268.00	3.96	221.07	5262.43	-22.17	-22.52	-53.73	1.56	404493.64	772375.83	N 32 6 35.40	W 103 35 13.70	247.26	58.26
	5362.00	4.52	234.70	5356.18	-26.73	-27.11	-58.89	1.22	404489.05	772370.67	N 32 6 35.36	W 103 35 13.76	245.28	64.83
	5457.00	5.52	247.53	5450.82	-30.59	-31.02	-66.17	1.58	404485.14	772363.39	N 32 6 35.32	W 103 35 13.84	244.88	73.08
	5551.00	6.86	256.04	5544.27	-33.61	-34.10	-75.79	1.72	404482.06	772353.77	N 32 6 35.29	W 103 35 13.95	245.78	83.11
	5646.00	8.30	260.23	5638.44	-36.06	-36.63	-88.06	1.62	404479.53	772341.50	N 32 6 35.26	W 103 35 14.10	247.41	95.37
	5740.00	8.20	264.46	5731.46	-37.77	-38.43	-101.42	0.65	404477.73	772328.15	N 32 6 35.25	W 103 35 14.25	249.25	108.45
	5834.00	8.56	267.26	5824.46	-38.67	-39.41	-115.08	0.58	404476.75	772314.49	N 32 6 35.24	W 103 35 14.41	251.09	121.64
	5928.00	9.12	273.35	5917.35	-38.47	-39.31	-129.50	1.16	404476.85	772300.06	N 32 6 35.24	W 103 35 14.58	253.11	135.34
	6023.00	8.97	272.23	6011.16	-37.65	-38.58	-144.42	0.24	404477.58	772285.15	N 32 6 35.25	W 103 35 14.75	255.04	149.48
	6118.00	9.01	274.17	6105.00	-36.72	-37.78	-159.24	0.32	404478.41	772270.33	N 32 6 35.28	W 103 35 14.92	256.66	163.65
	6212.00	9.01	277.92	6197.84	-35.08	-36.21	-173.87	0.62	404479.96	772255.70	N 32 6 35.27	W 103 35 15.09	258.24	177.60
	6306.00	8.90	277.05	6290.69	-33.08	-34.30	-188.38	0.19	404481.86	772241.19	N 32 6 35.29	W 103 35 15.26	259.68	191.47
	6401.00	8.80	277.09	6384.56	-31.18	-32.50	-202.88	0.11	404483.66	772226.69	N 32 6 35.31	W 103 35 15.43	260.90	205.47
	6495.00	8.84	276.41	6477.45	-29.40	-30.81	-217.19	0.12	404485.35	772212.37	N 32 6 35.33	W 103 35 15.60	261.93	219.37
	6589.00	8.83	275.92	6570.33	-27.75	-29.26	-231.55	0.08	404486.91	772198.02	N 32 6 35.35	W 103 35 15.76	262.80	233.39
	6684.00	8.89	275.43	6664.20	-26.21	-27.81	-246.11	0.10	404488.35	772183.46	N 32 6 35.36	W 103 35 15.93	263.55	247.67
	6778.00	8.77	274.97	6757.09	-24.81	-26.50	-260.48	0.15	404489.66	772169.09	N 32 6 35.38	W 103 35 16.10	264.19	261.82
	6873.00	8.62	274.49	6851.00	-23.53	-25.32	-274.79	0.18	404490.84	772154.78	N 32 6 35.39	W 103 35 16.27	264.74	275.95
	6967.00	8.54	272.73	6943.94	-22.56	-24.43	-288.78	0.29	404491.73	772140.78	N 32 6 35.40	W 103 35 16.43	265.16	289.82
	7061.00	8.40	272.07	7036.92	-21.89	-23.85	-302.62	0.18	404492.31	772126.95	N 32 6 35.41	W 103 35 16.59	265.49	303.56
	7250.00	8.00	267.68	7223.99	-21.75	-23.89	-329.55	0.39	404492.28	772100.02	N 32 6 35.41	W 103 35 16.90	265.85	330.42
	7345.00	8.63	267.52	7317.99	-22.23	-24.48	-343.28	0.66	404491.70	772086.29	N 32 6 35.40	W 103 35 17.06	265.92	344.15
	7439.00	9.07	268.75	7410.87	-22.61	-24.93	-357.73	0.51	404491.23	772071.84	N 32 6 35.40	W 103 35 17.23	266.01	358.60
	7534.00	8.87	266.14	7504.71	-23.17	-25.58	-372.53	0.48	404490.58	772057.04	N 32 6 35.39	W 103 35 17.40	266.07	373.41
	7628.00	8.40	264.34	7597.64	-24.24	-26.75	-386.59	0.58	404489.41	772042.98	N 32 6 35.38	W 103 35 17.57	266.04	387.52
	7722.00	7.87	263.48	7690.70	-25.56	-28.16	-399.82	0.58	404488.00	772029.75	N 32 6 35.37	W 103 35 17.72	265.97	400.81
	7816.00	7.32	266.90	7783.87	-26.54	-29.21	-412.19	0.76	404486.95	772017.38	N 32 6 35.36	W 103 35 17.86	265.95	413.23
	7911.00	7.59	270.34	7878.07	-26.75	-29.50	-424.51	0.55	404486.66	772005.06	N 32 6 35.36	W 103 35 18.01	266.02	425.53
	8005.00	8.04	274.50	7971.20	-26.11	-28.95	-437.27	0.77	404487.21	771992.30	N 32 6 35.38	W 103 35 18.16	266.21	438.23
	8099.00	7.46	272.44	8064.34	-25.25	-28.17	-449.92	0.68	404487.99	771979.65	N 32 6 35.37	W 103 35 18.30	266.42	450.80
	8194.00	7.27	270.47	8158.55	-24.86	-27.86	-462.09	0.33	404488.30	771967.48	N 32 6 35.38	W 103 35 18.44	266.55	462.93
	8288.00	7.64	271.20	8251.76	-24.60	-27.68	-474.29	0.41	404488.48	771955.29	N 32 6 35.38	W 103 35 18.59	266.66	475.09
	8382.00	7.84	271.78	8344.90	-24.19	-27.35	-486.94	0.23	404488.81	771942.63	N 32 6 35.38	W 103 35 18.73	266.78	487.71
	8571.00	6.97	268.31	8532.33	-23.97	-27.29	-511.29	0.52	404488.87	771918.29	N 32 6 35.39	W 103 35 19.02	266.94	512.02
	8666.00	7.27	269.96	8626.59	-24.07	-27.46	-523.06	0.38	404488.70	771906.51	N 32 6 35.38	W 103 35 19.15	266.99	523.78
	8855.00	6.84	269.15	8814.16	-24.09	-27.64	-546.27	0.23	404488.52	771883.30	N 32 6 35.38	W 103 35 19.42	267.10	546.97
	9043.00	5.65	267.17	9001.04	-24.58	-28.26	-566.71	0.64	404487.90	771862.87	N 32 6 35.38	W 103 35 19.66	267.14	567.42
	9138.00	5.28	264.87	9095.61	-25.15	-28.88	-575.74	0.45	404487.28	771853.84	N 32 6 35.37	W 103 35 19.77	267.13	578.46
	9327.00	4.40	260.06	9283.94	-27.07	-30.91	-591.54	0.51	404485.25	771838.04	N 32 6 35.36	W 103 35 19.95	267.01	592.35
	9493.00	4.08	248.17	9449.48	-30.29	-34.21	-603.29	0.56	404481.95	771826.29	N 32 6 35.32	W 103 35 20.09	266.75	604.26
First SLB Survey	9556.00	4.04	243.64	9512.33	-32.08	-36.03	-607.36	0.51	404480.13	771822.22	N 32 6 35.31	W 103 35 20.13	266.61	608.43
KOP	9580.24	5.05	261.80	9536.49	-32.60	-36.56	-609.18	7.20	404479.60	771820.40	N 32 6 35.30	W 103 35 20.16	266.57	610.28
	9588.00	5.45	266.04	9544.22	-32.67	-36.63	-609.89	7.20	404479.53	771819.69	N 32 6 35.30	W 103 35 20.16	266.56	610.99
	9619.00	9.55	287.45	9574.95	-31.98	-35.96	-613.81	15.79	404480.20	771815.77	N 32 6 35.31	W 103 35 20.21	266.65	614.87
	9651.00	13.30	291.24	9606.31	-29.81	-33.83	-619.78	11.95	404482.33	771809.80	N 32 6 35.33	W 103 35 20.28	266.88	620.70
	9682.00	14.88	303.24	9636.39	-26.29	-30.36	-626.43	10.69	404485.80	771803.15	N 32 6 35.36	W 103 35 20.36	267.23	627.17
	9714.00	17.11	317.30	9667.16	-20.53	-24.64	-633.07	13.92	404491.52	771796.51	N 32 6 35.42	W 103 35 20.43	267.77	633.54
	9745.00	18.93	323.06	9696.64	-13.12	-17.27	-639.18	8.21	404498.89	771790.40	N 32 6 35.49	W 103 35 20.50	268.45	639.41
	9777.00	21.53	332.06	9726.67	-3.74	-7.93	-645.05	12.65	404508.23	771784.53	N 32 6 35.59	W 103 35 20.57	269.30	645.10
	9808.00	25.21	339.54	9755.13	7.50	3.28	-650.03	15.23	404519.44	771779.55	N 32 6 35.70	W 103 35 20.63	270.29	650.04
	9840.00	29.37	347.20	9783.57	21.58	17.33	-654.15	16.99	404533.49	771775.43	N 32 6 35.84	W 103 35 20.67	271.52	654.38
	9871.00	34.57	354.91	9809.87	37.79	33.52	-656.62	21.30	404549.68	771772.96	N 32 6 36.00	W 103 35 20.70	272.92	657.48
	9903.00	41.29	0.84	9835.10	57.42	53.15	-657.27	23.87	404569.31	771772.31	N 32 6 36.19	W 103 35 20.71	274.62	659.42
	9934.00	45.75	5.57	9857.58	78.70	74.45	-656.04	17.81	404590.60	771773.54	N 32 6 36.40	W 103 35 20.69	276.47	660.25

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (ft/100ft)	Northing (ft)	Easting (ft)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')	Closure Azimuth (°)	Closure (ft)
	9965.00	48.06	8.70	9878.76	101.14	96.90	-653.22	10.48	404613.06	771776.36	N 32 6 36.62	W 103 35 20.66	278.44	660.37
	9997.00	49.98	11.20	9899.75	124.90	120.69	-649.04	8.41	404636.84	771780.54	N 32 6 36.86	W 103 35 20.61	280.53	660.17
	10028.00	52.23	13.07	9919.21	148.45	144.27	-643.96	8.64	404660.43	771785.62	N 32 6 37.09	W 103 35 20.55	282.63	659.93
	10060.00	54.87	13.18	9938.22	173.48	169.34	-638.12	8.25	404685.49	771791.46	N 32 6 37.34	W 103 35 20.48	284.86	660.20
	10091.00	58.90	12.22	9955.16	198.76	194.66	-632.42	13.26	404710.82	771797.16	N 32 6 37.59	W 103 35 20.41	287.11	661.70
	10123.00	63.26	12.04	9970.63	226.10	222.04	-626.53	13.63	404738.19	771803.05	N 32 6 37.86	W 103 35 20.34	289.51	664.71
	10154.00	66.80	11.27	9983.71	253.58	249.56	-620.86	11.64	404765.71	771808.72	N 32 6 38.13	W 103 35 20.27	291.90	669.14
	10186.00	72.74	9.28	9994.77	283.08	279.09	-615.52	19.46	404795.24	771814.06	N 32 6 38.42	W 103 35 20.20	294.39	675.83
	10209.00	76.88	7.91	10000.80	305.00	301.03	-612.20	18.90	404817.18	771817.38	N 32 6 38.64	W 103 35 20.16	296.18	682.21
	10291.00	88.66	4.67	10011.10	385.65	381.74	-603.34	14.89	404897.89	771826.24	N 32 6 39.44	W 103 35 20.05	302.32	713.96
	10368.00	89.52	1.90	10012.33	462.47	458.60	-598.93	3.77	404974.74	771830.65	N 32 6 40.20	W 103 35 20.00	307.44	754.33
	10462.00	88.97	359.92	10013.56	556.44	552.57	-597.43	2.19	405068.71	771832.15	N 32 6 41.13	W 103 35 19.97	312.77	813.79
	10556.00	88.90	0.07	10015.31	650.42	646.55	-597.44	0.18	405162.69	771832.14	N 32 6 42.06	W 103 35 19.96	317.26	880.32
	10745.00	90.14	359.42	10016.90	839.41	835.54	-598.28	0.74	405351.67	771831.30	N 32 6 43.93	W 103 35 19.96	324.40	1027.65
	10933.00	88.58	0.68	10019.03	1027.38	1023.52	-598.12	1.07	405539.65	771831.46	N 32 6 45.79	W 103 35 19.94	329.70	1185.47
	11027.00	88.14	359.59	10021.73	1121.34	1117.48	-597.90	1.24	405633.60	771831.68	N 32 6 46.72	W 103 35 19.93	331.85	1267.37
	11121.00	88.80	0.30	10024.24	1215.30	1211.44	-597.99	1.03	405727.56	771831.59	N 32 6 47.65	W 103 35 19.93	333.73	1350.99
	11215.00	88.31	358.57	10026.62	1309.27	1305.40	-598.91	1.91	405821.52	771830.67	N 32 6 48.58	W 103 35 19.93	335.35	1436.24
	11309.00	87.90	358.10	10029.72	1403.19	1399.31	-601.64	0.66	405915.43	771827.94	N 32 6 49.51	W 103 35 19.95	336.73	1523.17
	11404.00	88.42	358.28	10032.77	1498.11	1494.22	-604.64	0.58	406010.33	771824.94	N 32 6 50.45	W 103 35 19.98	337.97	1611.92
	11499.00	89.11	358.49	10034.82	1593.07	1589.16	-607.32	0.76	406105.27	771822.26	N 32 6 51.39	W 103 35 20.00	339.08	1701.25
	11593.00	89.11	358.75	10036.28	1687.04	1683.12	-609.58	0.28	406199.22	771820.00	N 32 6 52.32	W 103 35 20.02	340.09	1790.10
	11687.00	86.83	357.07	10039.61	1780.93	1776.99	-613.01	3.01	406293.09	771816.57	N 32 6 53.25	W 103 35 20.05	340.97	1879.75
	11782.00	87.14	356.60	10044.61	1875.68	1871.71	-618.24	0.59	406387.81	771811.33	N 32 6 54.18	W 103 35 20.11	341.72	1971.17
	11876.00	88.31	358.70	10048.34	1969.55	1965.55	-622.10	2.56	406481.65	771807.48	N 32 6 55.11	W 103 35 20.15	342.44	2061.65
	11970.00	88.18	357.90	10051.22	2063.48	2059.46	-624.88	0.86	406575.56	771804.70	N 32 6 56.04	W 103 35 20.17	343.12	2152.18
	12159.00	91.13	359.72	10052.36	2252.43	2248.39	-628.81	1.83	406764.48	771800.77	N 32 6 57.91	W 103 35 20.20	344.38	2334.66
	12253.00	90.48	359.69	10051.04	2346.42	2342.38	-629.29	0.69	406858.47	771800.29	N 32 6 58.84	W 103 35 20.20	344.96	2425.44
	12441.00	90.89	0.26	10048.79	2534.40	2530.37	-629.37	0.37	407046.44	771800.21	N 32 7 0.70	W 103 35 20.18	346.03	2607.46
	12630.00	91.24	359.48	10045.28	2723.36	2719.33	-629.80	0.45	407235.40	771799.78	N 32 7 2.57	W 103 35 20.17	346.96	2791.31
	12818.00	88.83	358.91	10045.16	2911.34	2907.30	-632.44	1.32	407423.36	771797.14	N 32 7 4.43	W 103 35 20.19	347.73	2975.29
	12912.00	89.11	359.81	10046.85	3005.32	3001.27	-633.66	0.80	407517.34	771795.92	N 32 7 5.36	W 103 35 20.20	348.08	3067.44
	13007.00	89.38	359.45	10048.10	3100.32	3096.26	-634.44	0.33	407612.32	771795.14	N 32 7 6.30	W 103 35 20.20	348.42	3160.59
	13101.00	89.69	359.92	10048.87	3194.31	3190.26	-634.95	0.60	407706.32	771794.63	N 32 7 7.23	W 103 35 20.20	348.74	3252.83
	13195.00	89.59	0.02	10049.46	3288.31	3284.25	-635.00	0.15	407800.31	771794.58	N 32 7 8.16	W 103 35 20.19	349.06	3345.08
	13289.00	89.48	359.66	10050.22	3382.30	3378.25	-635.26	0.40	407894.30	771794.32	N 32 7 9.09	W 103 35 20.18	349.35	3437.46
	13384.00	89.38	359.55	10051.16	3477.30	3473.24	-635.92	0.16	407989.29	771793.66	N 32 7 10.03	W 103 35 20.18	349.62	3530.98
	13574.00	89.14	359.58	10053.62	3667.28	3663.22	-637.36	0.13	408179.27	771792.22	N 32 7 11.91	W 103 35 20.19	350.13	3718.26
	13668.00	89.48	359.32	10054.75	3761.28	3757.21	-638.26	0.46	408273.25	771791.32	N 32 7 12.84	W 103 35 20.19	350.36	3811.04
	13762.00	89.42	359.61	10055.65	3855.27	3851.20	-639.14	0.32	408367.24	771790.44	N 32 7 13.77	W 103 35 20.19	350.58	3903.88
	13857.00	89.79	358.99	10056.31	3950.27	3946.19	-640.30	0.76	408462.23	771789.28	N 32 7 14.71	W 103 35 20.20	350.78	3997.80
	13951.00	89.62	0.59	10058.79	4044.26	4040.19	-640.65	1.71	408556.22	771788.93	N 32 7 15.64	W 103 35 20.19	350.99	4090.67
	14046.00	89.52	359.71	10057.50	4139.25	4135.18	-640.40	0.93	408651.21	771789.18	N 32 7 16.58	W 103 35 20.18	351.20	4184.48
	14141.00	89.52	358.53	10058.30	4234.25	4230.17	-641.86	1.24	408746.19	771787.72	N 32 7 17.52	W 103 35 20.19	351.37	4278.59
	14328.00	89.83	359.83	10059.38	4421.23	4417.14	-644.53	0.71	408933.16	771785.05	N 32 7 19.37	W 103 35 20.21	351.70	4463.92
	14422.00	89.00	359.47	10060.32	4515.23	4511.13	-645.11	0.96	409027.15	771784.47	N 32 7 20.30	W 103 35 20.21	351.86	4557.03
	14610.00	89.72	359.83	10062.42	4703.21	4699.12	-646.25	0.43	409215.13	771783.33	N 32 7 22.16	W 103 35 20.21	352.17	4743.35
	14705.00	89.79	359.92	10062.83	4798.21	4794.12	-646.46	0.12	409310.12	771783.12	N 32 7 23.10	W 103 35 20.20	352.32	4837.51
Section Line Crossing [986' FEL]	14797.80	90.57	359.63	10062.53	4891.01	4886.91	-646.82	0.90	409402.92	771782.76	N 32 7 24.02	W 103 35 20.20	352.46	4929.53
	14799.00	90.58	359.63	10062.52	4892.21	4888.11	-646.83	0.90	409404.12	771782.75	N 32 7 24.03	W 103 35 20.20	352.46	4930.72
	14894.00	90.55	359.84	10061.59	4987.21	4983.11	-647.27	0.22	409499.11	771782.31	N 32 7 24.97	W 103 35 20.20	352.60	5024.97
	15083.00	90.69	359.65	10059.54	5176.19	5172.10	-648.11	0.12	409688.09	771781.47	N 32 7 26.84	W 103 35 20.19	352.86	5212.54
	15177.00	90.34	0.03	10058.70	5270.19	5266.09	-648.37	0.55	409782.08	771781.21	N 32 7 27.77	W 103 35 20.19	352.98	5305.86
	15271.00	90.03	358.94	10058.39	5364.19	5360.08	-649.22	1.21	409876.07	771780.36	N 32 7 28.70	W 103 35 20.19	353.09	5399.26
	15366.00	90.10	359.26	10058.28	5459.18	5455.07	-650.71	0.34	409971.06	771778.87	N 32 7 29.64	W 103 35 20.20	353.20	5493.75
	15554.00	90.14	359.76	10057.89	5647.18	5643.07	-652.32	0.27	410159.05	771777.26	N 32 7 31.50	W 103 35 20.20	353.41	5680.64
	15742.00	88.76	357.73	10059.70	5835.14	5831.00	-656.44	1.31	410346.97	771773.15	N 32 7 33.36	W 103 35 20.23	353.58	5867.83
	15930.00	92.41	0.41	10057.78	6023.07	6018.91	-659.49	2.41	410534.88	771770.09	N 32 7 35.22	W 103 35 20.25	353.75	6054.94
	16024.00	89.14	359.53	10056.50	6117.04	6112.89	-659.54	3.60	410628.86	771770.04	N 32 7 36.15	W 103 35 20.25	353.84	6148.37
	16118.00	90.10	359.40	10057.13	6211.04	6206.88	-660.41	1.03	410722.85	771769.17	N 32 7 37.08	W 103 35 20.25	353.93	6241.92
	16212.00	90.17	359.54	10056.91	6305.04	6300.88	-661.28	0.17	410816.84	771768.30	N 32 7 38.01	W 103 35 20.25	354.01	6335.49
	16307.00	90.00	359.55	10056.77	6400.04	6395.88	-662.04	0.18	410911.83	771767.54	N 32 7 38.95	W 103 35 20.25	354.09	6430.05
	16401.00	89.72	359.45	10057.00	6494.04	6489.87	-662.86	0.32	411005.83	771766.72	N 32 7 39.88	W 103 35 20.26	354.17	6523.64
	16495.00	90.31	359.41	10056.97	6588.04	6583.87	-663.79	0.63	411099.82	771765.79	N 32 7 40.81	W 103 35 20.26	354.24	6617.25
	16589.00	90.21	359.45	10056.54	6682.04	6677.86	-664.73	0.11	411193.81	771764.85	N 32 7 41.74	W 103 35 20.26	354.32	6710.86

Comments	MD (ft)	Incl (°)	Azim 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)
	16778.00	90.34	359.62	10055.64	6871.03	6866.85	-666.26	0.11	411382.80	771763.32	N 32 7 43.61	W 103 35 20.26	354.46	6899.10
	16966.00	89.86	1.81	10055.31	7058.99	7054.83	-663.92	1.19	411570.76	771765.66	N 32 7 45.47	W 103 35 20.22	354.62	7086.00
	17061.00	89.76	1.33	10055.62	7153.93	7149.79	-661.31	0.52	411665.72	771768.27	N 32 7 46.41	W 103 35 20.18	354.72	7180.31
	17156.00	89.83	2.03	10055.96	7248.87	7244.75	-658.53	0.74	411760.68	771771.05	N 32 7 47.35	W 103 35 20.14	354.81	7274.62
	17250.00	90.14	1.78	10055.99	7342.80	7338.70	-655.40	0.42	411854.62	771774.18	N 32 7 48.28	W 103 35 20.10	354.90	7367.90
	17437.00	90.28	359.39	10055.30	7529.76	7525.67	-653.50	1.28	412041.59	771776.09	N 32 7 50.13	W 103 35 20.06	355.04	7553.99
	17626.00	90.76	359.85	10053.59	7718.75	7714.66	-654.75	0.35	412230.57	771774.83	N 32 7 52.00	W 103 35 20.06	355.15	7742.39
	17721.00	90.24	359.72	10052.76	7813.74	7809.65	-655.11	0.56	412325.57	771774.48	N 32 7 52.94	W 103 35 20.06	355.21	7837.08
	17815.00	91.00	359.64	10051.74	7907.74	7903.65	-655.83	0.81	412419.55	771773.95	N 32 7 53.87	W 103 35 20.06	355.26	7930.79
	17910.00	90.55	359.59	10050.46	8002.73	7998.63	-656.27	0.48	412514.54	771773.31	N 32 7 54.81	W 103 35 20.06	355.31	8025.51
	18004.00	90.31	359.31	10049.75	8096.72	8092.63	-657.17	0.39	412608.53	771772.41	N 32 7 55.74	W 103 35 20.06	355.36	8119.27
	18099.00	90.76	359.46	10048.86	8191.72	8187.62	-658.19	0.50	412703.52	771771.39	N 32 7 56.68	W 103 35 20.06	355.40	8214.03
	18194.00	89.52	359.69	10048.63	8286.72	8282.61	-658.90	1.33	412798.51	771770.69	N 32 7 57.62	W 103 35 20.07	355.45	8308.78
	18382.00	90.93	359.84	10047.89	8474.71	8470.60	-659.67	0.75	412988.50	771769.91	N 32 7 59.48	W 103 35 20.06	355.55	8496.25
	18476.00	90.69	359.55	10046.56	8568.70	8564.59	-660.17	0.40	413080.48	771769.41	N 32 8 0.41	W 103 35 20.06	355.59	8590.00
	18571.00	90.79	359.39	10045.34	8663.69	8659.58	-661.05	0.20	413175.47	771768.54	N 32 8 1.35	W 103 35 20.06	355.63	8684.78
	18665.00	88.90	358.94	10045.59	8757.68	8753.57	-662.41	2.07	413269.45	771767.17	N 32 8 2.28	W 103 35 20.07	355.67	8778.60
	18853.00	90.24	0.07	10047.00	8945.67	8941.55	-664.04	0.93	413457.42	771765.54	N 32 8 4.14	W 103 35 20.07	355.75	8966.17
	19042.00	90.79	359.47	10045.30	9134.66	9130.54	-664.80	0.43	413646.41	771764.78	N 32 8 6.01	W 103 35 20.07	355.84	9154.71
	19136.00	90.79	359.51	10044.01	9228.65	9224.52	-665.63	0.04	413740.39	771763.95	N 32 8 6.94	W 103 35 20.07	355.87	9248.51
	19231.00	90.38	359.58	10043.04	9323.65	9319.52	-666.39	0.44	413835.38	771763.19	N 32 8 7.88	W 103 35 20.07	355.91	9343.31
	19326.00	90.62	359.42	10042.21	9418.64	9414.51	-667.22	0.30	413930.37	771762.36	N 32 8 8.82	W 103 35 20.07	355.95	9438.12
	19420.00	90.28	0.05	10041.47	9512.64	9508.50	-667.65	0.76	414024.36	771761.93	N 32 8 9.75	W 103 35 20.07	355.98	9531.92
	19515.00	90.65	359.75	10040.70	9607.63	9603.50	-667.82	0.50	414119.36	771761.76	N 32 8 10.69	W 103 35 20.06	356.02	9626.69
	19609.00	90.21	359.71	10039.99	9701.63	9697.50	-668.26	0.47	414213.35	771761.32	N 32 8 11.62	W 103 35 20.06	356.06	9720.49
	19703.00	90.45	359.85	10039.45	9795.63	9791.49	-668.62	0.30	414307.34	771760.96	N 32 8 12.55	W 103 35 20.06	356.09	9814.30
	19798.00	90.69	359.21	10038.51	9890.62	9886.49	-669.40	0.72	414402.33	771760.18	N 32 8 13.49	W 103 35 20.06	356.13	9909.12
	19892.00	90.38	359.27	10037.63	9984.62	9980.47	-670.65	0.34	414496.32	771758.93	N 32 8 14.42	W 103 35 20.07	356.16	10002.98
	19939.00	90.76	359.22	10037.16	10031.61	10027.47	-671.27	0.82	414543.31	771758.31	N 32 8 14.89	W 103 35 20.07	356.17	10049.91
Final Survey TD, PTB [977' FEL, 101' FNL]	19978.00	90.76	359.22	10036.65	10070.61	10066.46	-671.80	0.00	414582.30	771757.78	N 32 8 15.28	W 103 35 20.07	356.18	10088.85

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 #71H / Final Surveys - Cimarex Vaca Draw 20-17 Federal #71H MWD Off- Vaca Draw 20-17 Federal #71H /
	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 #71H MWD Off- Vaca Draw 20-17 Federal #71H /
	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 #71H /
	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 #71H /
	1	4945.000	10271.000	Act Stns	8.750	7.000	NAL_MWD_IFR1+MS	Final Surveys - Cimarex Vaca Draw Vaca Draw 20-17 Federal #71H /
	1	10271.000	19978.000	Act Stns	6.000	4.500	NAL_MWD_IFR1+MS	Final Surveys - Cimarex Vaca Draw Vaca Draw 20-17 Federal #71H /