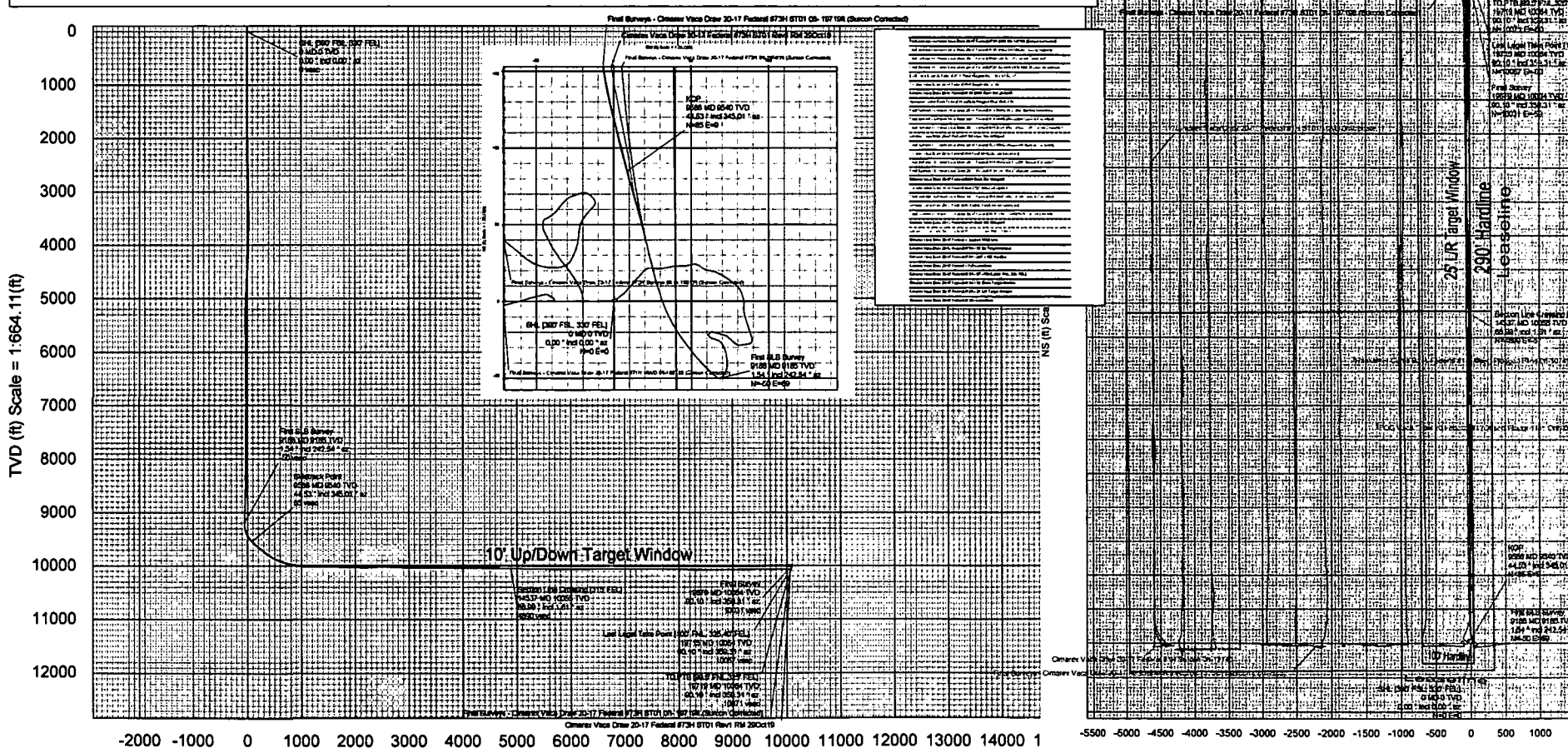
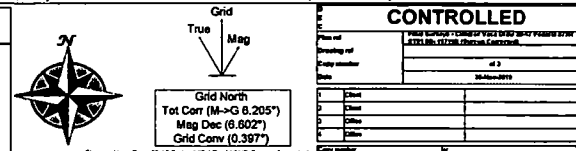


Borehole:	ST01	Well:	Vaca Draw 20-17 Federal #73H	Field:	NM Lea County (NAD 83)	Structure:	Cimarex Vaca Draw 20-17 Federal #73H
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Gravity & Magnetic Parameters				Surface Location				NAD83 New Mexico State Plane, Eastern Zone, US Feet		Miscellaneous	
Model:	HOGM 2019	Dip:	63.704"	Date:	01-Nov-2019	Lat:	N 32 6 16.82	Northings:	404814.362013	Grid Corr:	0.3368"
Magnetic:	8.602"	FB:	47720.574mT	Gravity FB:	986.433mg (0.00095 Based)	Lon:	W 103 35 12.61	Eastings:	772469.580113	Scale Fact:	0.99997028
										Plan: Final Survey - Cimarex Vaca Draw 20-17 Federal #73H ST01 05-187108 (Surcon Corrected)	

Critical Points							
Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)
SH4 (287 FSL, 330' FEL)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
First SLB Survey	9188.00	1.54	242.54	9184.52	-50.28	-49.84	88.59
Slideback Point	9585.95	44.53	345.01	9540.40	84.71	84.77	8.77
Section Line Crossing (315' FEL)	14536.83	88.99	1.81	10054.50	4890.40	4890.14	-58.90
Final Survey	19679.00	90.10	359.31	10064.33	10031.18	10031.00	-58.48
Last Legal Take Point (100' FNL, 325.40' FEL)	19715.00	90.10	359.31	10064.27	10067.18	10067.00	-59.88
TD, PTH (90.5' FNL, 325' FEL)	19719.00	90.10	359.31	10064.27	10071.18	10071.00	-59.94



Vertical Section (ft) Azim = 359.63° Scale = 1:664.11 (ft) Origin = 0N/-S, 0E/-W

EW (ft) Scale = 1:522.04 (ft)



**Final Surveys - Cimarex Vaca Draw 20-17 Federal #73H ST01 0ft- 19719ft
(Surcon Corrected) Survey Geodetic Report
(Def Survey)**



Report Date: November 26, 2019 - 03:04 PM
Client: Cimarex Energy
Field: NM Lea County (NAD 83)
Structure / Slot: Cimarex Vaca Draw 20-17 Federal #73H / New Slot
Well: Vaca Draw 20-17 Federal #73H
Borehole: ST01
UWI / API#: Unknown / Unknown
Survey Name: Final Surveys - Cimarex Vaca Draw 20-17 Federal #73H ST01 0ft- 19719ft (Surcon Corrected)
Survey Date: August 05, 2019
Tort / AHD / DDI / ERD Ratio: 284.746 * / 10346.492 ft / 6.761 / 1.028
Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 6' 35.62020", W 103° 35' 12.60543"
Location Grid N/E Y/X: N 404516.360 ftUS, E 772469.560 ftUS
CRS Grid Convergence Angle: 0.3968 °
Grid Scale Factor: 0.99997028
Version / Patch: 2.10.787.0

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: 3421.400 ft above MSL
Seabed / Ground Elevation: 3395.400 ft above MSL
Magnetic Declination: 6.602 °
Total Gravity Field Strength: 998.4332mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 47730.574 nT
Magnetic Dip Angle: 59.704 °
Declination Date: November 01, 2019
Magnetic Declination Model: HDGM 2019
North Reference: Grid North
Grid Convergence Used: 0.3968 °
Total Corr Mag North->Grid North: 6.2051 °
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° FSL, 330° FEL]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404516.36	772469.56	N 32° 6' 35.62"	W 103° 35' 12.61"	0.00	0.00
	193.00	0.31	200.49	193.00	-0.49	-0.49	-0.18	0.16	404515.87	772469.38	N 32° 6' 35.62"	W 103° 35' 12.61"	200.49	0.52
	293.00	0.12	1.16	293.00	-0.64	-0.64	-0.28	0.43	404515.72	772469.28	N 32° 6' 35.61"	W 103° 35' 12.61"	203.35	0.69
	475.00	0.22	329.77	475.00	-0.14	-0.15	-0.45	0.07	404516.21	772469.11	N 32° 6' 35.62"	W 103° 35' 12.61"	252.00	0.47
	657.00	0.16	312.54	657.00	0.33	0.33	-0.81	0.05	404516.69	772468.75	N 32° 6' 35.62"	W 103° 35' 12.61"	292.05	0.87
	747.00	0.19	319.40	747.00	0.53	0.53	-1.00	0.04	404516.89	772468.56	N 32° 6' 35.63"	W 103° 35' 12.62"	297.77	1.13
	838.00	0.17	28.79	838.00	0.77	0.76	-1.03	0.23	404517.12	772468.53	N 32° 6' 35.63"	W 103° 35' 12.62"	306.31	1.28
	932.00	0.37	80.26	932.00	0.94	0.93	-0.67	0.31	404517.29	772468.89	N 32° 6' 35.63"	W 103° 35' 12.61"	324.44	1.15
	998.00	0.47	89.94	997.99	0.97	0.97	-0.19	0.19	404517.33	772469.37	N 32° 6' 35.63"	W 103° 35' 12.61"	349.12	0.99
	1120.00	0.36	75.52	1119.99	1.06	1.07	0.69	0.12	404517.43	772470.25	N 32° 6' 35.63"	W 103° 35' 12.60"	32.73	1.27
	1309.00	0.44	65.80	1308.99	1.50	1.51	1.92	0.06	404517.87	772471.48	N 32° 6' 35.64"	W 103° 35' 12.58"	51.81	2.45
	1403.00	0.50	47.37	1402.98	1.92	1.94	2.55	0.17	404518.30	772472.11	N 32° 6' 35.64"	W 103° 35' 12.58"	52.80	3.20
	1497.00	0.54	49.68	1496.98	2.48	2.50	3.19	0.05	404518.86	772472.75	N 32° 6' 35.64"	W 103° 35' 12.57"	51.91	4.06
	1592.00	0.51	49.36	1591.97	3.04	3.07	3.85	0.03	404519.43	772473.41	N 32° 6' 35.65"	W 103° 35' 12.56"	51.49	4.93
	1686.00	-0.55	50.92	1685.97	3.59	3.62	4.52	0.05	404519.98	772474.08	N 32° 6' 35.66"	W 103° 35' 12.55"	51.29	5.79
	1781.00	0.67	53.87	1780.97	4.20	4.24	5.32	0.13	404520.60	772474.88	N 32° 6' 35.66"	W 103° 35' 12.54"	51.48	6.81
	1875.00	0.73	48.69	1874.96	4.92	4.96	6.22	0.09	404521.32	772475.78	N 32° 6' 35.67"	W 103° 35' 12.53"	51.43	7.95
	1969.00	0.83	41.16	1968.95	5.82	5.87	7.12	0.15	404522.23	772476.68	N 32° 6' 35.68"	W 103° 35' 12.52"	50.50	9.22
	2064.00	0.96	43.63	2063.94	6.91	6.96	8.12	0.14	404523.32	772477.68	N 32° 6' 35.69"	W 103° 35' 12.51"	49.39	10.69
	2158.00	0.99	43.06	2157.92	8.06	8.12	9.22	0.03	404524.48	772478.78	N 32° 6' 35.70"	W 103° 35' 12.50"	48.61	12.29
	2252.00	1.13	43.18	2251.91	9.32	9.39	10.40	0.15	404525.75	772479.96	N 32° 6' 35.71"	W 103° 35' 12.48"	47.93	14.02
	2347.00	1.19	41.62	2346.89	10.74	10.81	11.70	0.07	404527.17	772481.26	N 32° 6' 35.73"	W 103° 35' 12.47"	47.26	15.93
	2441.00	1.28	37.74	2440.87	12.29	12.37	12.99	0.13	404528.73	772482.55	N 32° 6' 35.74"	W 103° 35' 12.45"	46.40	17.94
	2536.00	1.37	42.26	2535.84	13.98	14.05	14.41	0.15	404530.41	772483.96	N 32° 6' 35.76"	W 103° 35' 12.44"	45.71	20.12
	2630.00	1.49	41.89	2629.81	15.69	15.79	15.98	0.13	404532.15	772485.54	N 32° 6' 35.78"	W 103° 35' 12.42"	45.33	22.47
	2725.00	1.62	41.62	2724.78	17.60	17.72	17.69	0.14	404534.08	772487.25	N 32° 6' 35.79"	W 103° 35' 12.40"	44.96	25.04
	2819.00	1.65	39.46	2818.74	19.63	19.76	19.44	0.07	404536.11	772489.00	N 32° 6' 35.81"	W 103° 35' 12.38"	44.53	27.71
	2914.00	1.64	71.03	2913.70	21.11	21.25	21.59	0.94	404537.61	772491.15	N 32° 6' 35.83"	W 103° 35' 12.35"	45.45	30.30
	3008.00	2.09	98.44	3007.65	21.28	21.44	24.56	1.05	404537.80	772494.12	N 32° 6' 35.83"	W 103° 35' 12.32"	48.88	32.60
	3197.00	2.57	82.35	3196.50	21.29	21.50	32.17	0.43	404537.86	772501.73	N 32° 6' 35.83"	W 103° 35' 12.23"	56.25	38.69
	3291.00	2.76	76.80	3290.40	22.06	22.29	36.46	0.34	404538.65	772506.02	N 32° 6' 35.84"	W 103° 35' 12.18"	58.55	42.74
	3385.00	2.75	87.10	3384.29	22.66	22.93	40.91	0.53	404539.28	772510.47	N 32° 6' 35.84"	W 103° 35' 12.13"	60.74	46.90
	3480.00	2.70	90.49	3479.18	22.73	23.02	45.43	0.18	404539.38	772514.99	N 32° 6' 35.84"	W 103° 35' 12.08"	63.13	50.93
	3574.00	2.79	72.66	3573.08	23.36	23.68	49.83	0.91	404540.04	772519.38	N 32° 6' 35.85"	W 103° 35' 12.02"	64.58	55.17
	3668.00	1.90	102.80	3667.00	23.67	24.02	53.53	1.59	404540.38	772523.09	N 32° 6' 35.85"	W 103° 35' 11.98"	65.83	58.67
	3763.00	1.93	132.61	3761.95	22.22	22.59	56.24	1.04	404538.95	772525.80	N 32° 6' 35.84"	W 103° 35' 11.95"	68.12	60.61

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)
	3857.00	1.87	111.92	3855.90	20.56	20.95	58.83	0.73	404537.30	772528.39	N 32 6 35.82	W 103 35 11.92	70.40	62.45
	3952.00	2.59	99.51	3950.83	19.61	20.01	62.39	0.91	404536.37	772531.94	N 32 6 35.81	W 103 35 11.88	72.22	65.52
	4046.00	2.73	113.43	4044.73	18.34	18.77	66.53	0.70	404535.13	772536.09	N 32 6 35.80	W 103 35 11.83	74.25	69.13
	4235.00	3.42	126.51	4233.45	13.14	13.63	75.20	0.52	404529.99	772544.75	N 32 6 35.75	W 103 35 11.73	79.73	76.42
	4329.00	3.47	133.10	4327.29	9.50	10.02	79.53	0.42	404526.37	772549.08	N 32 6 35.71	W 103 35 11.68	82.82	80.15
	4423.00	3.15	160.85	4421.13	5.10	5.63	82.45	1.72	404521.99	772552.01	N 32 6 35.67	W 103 35 11.65	86.09	82.64
	4517.00	2.55	167.94	4515.02	0.60	1.15	83.73	0.74	404517.51	772553.29	N 32 6 35.63	W 103 35 11.63	89.22	83.74
	4612.00	2.40	186.21	4609.93	-3.44	-2.90	83.96	0.84	404513.46	772553.52	N 32 6 35.59	W 103 35 11.63	91.98	84.01
	4706.00	2.94	170.94	4703.83	-7.78	-7.23	84.13	0.95	404509.13	772553.69	N 32 6 35.54	W 103 35 11.63	94.92	84.44
	4801.00	3.20	160.94	4798.69	-12.70	-12.15	85.38	0.63	404504.21	772554.93	N 32 6 35.49	W 103 35 11.61	98.10	86.24
	4870.00	3.19	163.43	4867.59	-18.37	-15.81	86.55	0.20	404500.55	772556.11	N 32 6 35.46	W 103 35 11.60	100.35	87.99
	4989.00	3.01	161.72	4988.41	-22.52	-21.95	88.48	0.17	404494.41	772558.04	N 32 6 35.40	W 103 35 11.58	103.93	91.16
	5083.00	1.40	182.51	5080.34	-28.02	-25.44	89.20	1.89	404490.92	772558.76	N 32 6 35.36	W 103 35 11.57	105.92	92.76
	5209.00	1.26	251.21	5206.31	-27.99	-27.42	87.82	1.19	404488.94	772557.38	N 32 6 35.34	W 103 35 11.59	107.34	92.00
	5272.00	1.28	260.34	5269.30	-28.32	-27.76	86.47	0.32	404488.60	772556.03	N 32 6 35.34	W 103 35 11.60	107.80	90.82
	5367.00	1.41	263.51	5364.27	-28.62	-28.07	84.27	0.16	404488.29	772553.82	N 32 6 35.34	W 103 35 11.63	108.43	88.82
	5461.00	1.40	259.22	5458.24	-28.95	-28.42	81.99	0.11	404487.94	772551.55	N 32 6 35.33	W 103 35 11.65	109.12	86.77
	5555.00	1.23	294.63	5552.22	-28.73	-28.21	79.94	0.87	404488.15	772549.50	N 32 6 35.34	W 103 35 11.68	109.44	84.78
	5650.00	1.46	310.28	5647.20	-27.51	-27.01	78.09	0.45	404489.35	772547.65	N 32 6 35.35	W 103 35 11.70	109.08	82.63
	5745.00	1.54	311.10	5742.16	-25.88	-25.38	76.21	0.09	404490.98	772545.77	N 32 6 35.36	W 103 35 11.72	108.42	80.33
	5839.00	1.30	308.83	5836.13	-24.37	-23.89	74.43	0.26	404492.48	772543.98	N 32 6 35.38	W 103 35 11.74	107.79	78.17
	5934.00	0.81	312.06	5931.12	-23.23	-22.76	73.09	0.52	404493.60	772542.65	N 32 6 35.39	W 103 35 11.76	107.30	76.55
	6028.00	0.57	290.09	6025.11	-22.62	-22.15	72.16	0.38	404494.21	772541.71	N 32 6 35.40	W 103 35 11.77	107.07	75.48
	6122.00	0.63	286.52	6119.11	-22.31	-21.85	71.22	0.08	404494.51	772540.78	N 32 6 35.40	W 103 35 11.78	107.05	74.50
	6216.00	0.66	282.11	6213.10	-22.04	-21.59	70.20	0.06	404494.77	772539.75	N 32 6 35.40	W 103 35 11.79	107.09	73.44
	6311.00	0.65	292.11	6308.09	-21.72	-21.27	69.16	0.12	404495.09	772538.72	N 32 6 35.41	W 103 35 11.80	107.09	72.36
	6500.00	0.70	277.90	6497.08	-21.14	-20.71	67.03	0.09	404495.65	772536.58	N 32 6 35.41	W 103 35 11.83	107.17	70.15
	6594.00	0.62	292.38	6591.07	-20.88	-20.43	65.99	0.20	404495.93	772535.54	N 32 6 35.41	W 103 35 11.84	107.21	69.08
	6688.00	0.68	275.35	6685.07	-20.61	-20.19	64.96	0.21	404496.17	772534.52	N 32 6 35.42	W 103 35 11.85	107.26	68.03
	6783.00	0.42	274.48	6780.06	-20.52	-20.11	64.05	0.27	404496.25	772533.61	N 32 6 35.42	W 103 35 11.86	107.43	67.13
	6878.00	0.42	284.23	6875.06	-20.41	-20.00	63.37	0.08	404496.36	772532.93	N 32 6 35.42	W 103 35 11.87	107.51	66.45
	6972.00	0.53	246.09	6969.06	-20.49	-20.09	62.64	0.35	404496.27	772532.19	N 32 6 35.42	W 103 35 11.88	107.78	65.78
	7161.00	0.51	217.07	7158.05	-21.51	-21.11	61.33	0.14	404495.25	772530.89	N 32 6 35.41	W 103 35 11.89	109.00	64.86
	7350.00	0.40	143.98	7347.05	-22.71	-22.32	61.21	0.29	404494.04	772530.77	N 32 6 35.40	W 103 35 11.90	110.03	65.15
	7444.00	0.39	134.46	7441.04	-23.21	-22.81	61.63	0.07	404493.55	772531.19	N 32 6 35.39	W 103 35 11.89	110.31	65.72
	7538.00	0.34	131.02	7535.04	-23.62	-23.21	62.07	0.06	404493.15	772531.63	N 32 6 35.39	W 103 35 11.89	110.51	66.27
	7633.00	0.63	124.67	7630.04	-24.10	-23.70	62.71	0.31	404492.68	772532.27	N 32 6 35.38	W 103 35 11.88	110.70	67.04
	7727.00	0.51	113.24	7724.03	-24.57	-24.16	63.52	0.18	404492.21	772533.08	N 32 6 35.38	W 103 35 11.87	110.82	67.96
	7822.00	0.65	89.96	7819.03	-24.74	-24.32	64.45	0.29	404492.04	772534.01	N 32 6 35.38	W 103 35 11.86	110.68	68.89
	7916.00	0.76	116.25	7913.02	-25.02	-24.60	65.54	0.36	404491.76	772535.10	N 32 6 35.37	W 103 35 11.85	110.57	70.01
	8010.00	0.59	100.09	8007.02	-25.39	-24.96	66.58	0.27	404491.40	772536.14	N 32 6 35.37	W 103 35 11.83	110.55	71.10
	8200.00	0.80	131.67	8197.00	-26.46	-26.01	68.53	0.23	404490.35	772538.09	N 32 6 35.36	W 103 35 11.81	110.78	73.30
	8388.00	1.04	150.90	8384.98	-28.83	-28.37	70.34	0.21	404487.99	772539.90	N 32 6 35.33	W 103 35 11.79	111.97	75.85
	8483.00	1.43	157.52	8479.96	-30.68	-30.22	71.21	0.44	404486.14	772540.77	N 32 6 35.32	W 103 35 11.78	113.00	77.36
	8577.00	1.51	161.99	8573.93	-32.95	-32.48	72.05	0.15	404483.88	772541.60	N 32 6 35.29	W 103 35 11.77	114.27	79.03
	8766.00	1.85	175.71	8762.84	-38.37	-37.89	73.04	0.28	404478.47	772542.60	N 32 6 35.24	W 103 35 11.76	117.42	82.29
	8860.00	2.32	184.08	8856.78	-41.78	-41.31	73.02	0.59	404475.06	772542.58	N 32 6 35.21	W 103 35 11.76	119.50	83.90
	8955.00	2.04	197.95	8951.71	-45.30	-44.83	72.36	0.63	404471.53	772541.92	N 32 6 35.17	W 103 35 11.77	121.78	85.13
	9049.00	1.55	213.28	9045.67	-47.95	-47.49	71.15	0.73	404468.87	772540.71	N 32 6 35.15	W 103 35 11.78	123.72	85.54
	9120.00	1.37	227.18	9116.65	-49.32	-48.87	70.00	0.56	404467.50	772539.56	N 32 6 35.13	W 103 35 11.80	124.92	85.37
	9188.00	1.54	242.54	9184.62	-50.28	-49.84	68.59	0.62	404466.52	772538.15	N 32 6 35.12	W 103 35 11.81	126.00	84.79
	9251.00	4.59	307.56	9247.54	-49.12	-48.69	65.84	6.63	404467.67	772535.40	N 32 6 35.13	W 103 35 11.84	126.48	81.89
	9283.00	9.20	313.39	9279.30	-46.56	-46.15	62.97	14.55	404470.21	772532.53	N 32 6 35.16	W 103 35 11.88	126.24	78.07
	9314.00	15.07	315.22	9309.59	-41.97	-41.59	58.32	18.97	404474.77	772527.88	N 32 6 35.20	W 103 35 11.93	125.49	71.63
	9345.00	20.03	320.08	9339.14	-34.99	-34.65	52.07	16.67	404481.71	772521.63	N 32 6 35.27	W 103 35 12.00	123.64	62.55
	9377.00	23.24	324.06	9368.89	-25.62	-25.33	44.85	11.02	404491.03	772514.41	N 32 6 35.37	W 103 35 12.09	119.46	51.51
	9408.00	25.91	330.76	9397.08	-14.71	-14.47	37.95	12.44	404501.89	772507.51	N 32 6 35.47	W 103 35 12.17	110.87	40.61
	9440.00	28.78	339.49	9425.51	-1.35	-1.14	31.83	15.39	404515.22	772501.39	N 32 6 35.61	W 103 35 12.24	92.06	31.85
	9471.00	32.15	344.85	9452.24	13.64	13.81	27.06	13.96	404530.17	772496.62	N 32 6 35.76	W 103 35 12.29	62.96	30.38
	9518.00	38.41	347.70	9490.59	40.04	40.18	20.67	13.77	404556.54	772490.23	N 32 6 36.02	W 103 35 12.36	27.23	45.19
	9552.00	44.18	343.90	9516.13	61.80	61.90	15.13	18.50	404578.26	772484.69	N 32 6 36.23	W 103 35 12.42	13.74	63.72
	9585.95	44.53	345.01	9540.40	84.71	84.77	8.77	2.51	404601.12	772478.33	N 32 6 36.46	W 103 35 12.50	5.91	85.22
	9649.00	45.20	347.04	9585.09	127.93	127.92	-1.96	2.51	404644.28	772467.60	N 32 6 36.89	W 103 35 12.62	359.12	127.94
	9719.00	48.63	355.40	9632.95	178.43	178.37	-9.65	10.00	404694.72	772459.91	N 32 6 37.39	W 103 35 12.70	356.90	178.63
	9767.00	51.29	359.95	9663.83	215.14	215.07	-11.11	9.13	404731.42	772458.45	N 32 6 37.75	W 103 35 12.72	357.04	215.36
	9814.00	51.98	357.59	9693.01	251.98	251.91	-11.90	4.20	404768.26	772457.66	N 32 6 38.11	W 103 35 12.72	357.29	252.19
	9862.00	52.16	357.33	9722.51	289.81	289.73	-13.58	0.57	404806.08	772455.98	N 32 6 38.49	W 103 35 12.74	357.32	290.05
	9909.00	51.18	356.94	9751.66	326.65	326.55	-15.42	2.18	404842.90	772454.14	N 32 6 38.85	W 103 35 12.76	357.30	326.92

Comments	MD (ft)	Incl (°)	Azlm Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (*/100ft)	Northing (RUS)	Easting (RUS)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')	Closure Azimuth (°)	Closure (ft)
	9956.00	52.58	357.68	9780.67	363.59	363.49	-17.16	3.23	404879.84	772452.40	N 32 6 39.22	W 103 35 12.78	357.30	363.89
	10002.00	56.80	358.30	9807.26	401.10	400.99	-18.47	9.24	404917.34	772451.09	N 32 6 39.59	W 103 35 12.79	357.36	401.42
	10050.00	58.88	357.90	9832.80	441.72	441.60	-19.82	4.39	404957.95	772449.75	N 32 6 39.99	W 103 35 12.80	357.43	442.05
	10097.00	60.83	357.21	9856.41	482.34	482.21	-21.55	4.34	404998.55	772448.01	N 32 6 40.39	W 103 35 12.82	357.44	482.69
	10144.00	64.89	359.69	9877.84	524.14	524.00	-22.67	9.83	405040.35	772446.89	N 32 6 40.81	W 103 35 12.83	357.52	524.49
	10190.00	66.82	0.49	9896.66	566.11	565.98	-22.60	4.49	405082.32	772446.96	N 32 6 41.22	W 103 35 12.82	357.71	566.43
	10236.00	67.75	359.66	9915.19	610.39	610.25	-22.54	2.51	405126.59	772447.02	N 32 6 41.66	W 103 35 12.82	357.88	610.67
	10285.00	69.96	359.27	9932.15	654.22	654.08	-22.95	4.77	405170.42	772446.61	N 32 6 42.09	W 103 35 12.82	357.99	654.49
	10332.00	73.87	359.49	9946.74	698.89	698.75	-23.43	8.33	405215.09	772446.13	N 32 6 42.54	W 103 35 12.82	358.08	699.14
	10378.00	73.12	359.13	9959.80	742.99	742.85	-23.96	1.79	405259.19	772445.60	N 32 6 42.97	W 103 35 12.82	358.15	743.24
	10426.00	76.60	3.45	9972.34	789.29	789.15	-22.91	11.31	405305.49	772446.65	N 32 6 43.43	W 103 35 12.81	358.34	789.49
	10472.00	79.28	5.14	9981.95	834.12	834.01	-19.54	6.84	405350.34	772450.02	N 32 6 43.87	W 103 35 12.77	358.66	834.24
	10520.00	79.80	3.77	9990.67	881.15	881.06	-15.87	3.01	405397.40	772453.69	N 32 6 44.34	W 103 35 12.72	358.97	881.21
	10567.00	81.19	0.78	9998.43	927.45	927.38	-14.03	6.94	405443.71	772455.53	N 32 6 44.80	W 103 35 12.69	359.13	927.48
	10615.00	82.59	1.29	10005.20	974.95	974.89	-13.17	3.10	405491.22	772456.39	N 32 6 45.27	W 103 35 12.68	359.23	974.98
	10709.00	89.66	359.74	10011.55	1068.66	1068.61	-12.34	7.70	405584.93	772457.22	N 32 6 46.19	W 103 35 12.66	359.34	1068.68
	10803.00	89.97	0.90	10011.86	1162.65	1162.60	-11.81	1.28	405678.93	772457.75	N 32 6 47.13	W 103 35 12.65	359.42	1162.66
	10897.00	90.83	0.58	10011.20	1256.63	1256.59	-10.60	0.98	405772.91	772458.96	N 32 6 48.06	W 103 35 12.63	359.52	1256.64
	10991.00	89.69	1.12	10010.77	1350.61	1350.58	-9.20	1.34	405866.90	772460.36	N 32 6 48.98	W 103 35 12.60	359.61	1350.61
	11085.00	86.52	1.65	10013.88	1444.50	1444.49	-8.33	3.42	405960.80	772462.63	N 32 6 49.91	W 103 35 12.57	359.72	1444.50
	11179.00	89.52	2.09	10017.13	1538.36	1538.37	-3.87	3.23	406054.68	772465.69	N 32 6 50.84	W 103 35 12.53	359.86	1538.37
	11274.00	88.25	1.15	10018.98	1633.28	1633.31	-1.18	1.66	406149.62	772468.38	N 32 6 51.78	W 103 35 12.49	359.96	1633.31
	11369.00	87.21	2.01	10022.74	1728.15	1728.20	1.43	1.42	406244.50	772470.99	N 32 6 52.72	W 103 35 12.45	0.05	1728.20
	11498.00	89.24	359.87	10026.74	1857.05	1857.11	3.32	2.40	406373.41	772472.88	N 32 6 54.00	W 103 35 12.42	0.10	1857.11
	11687.00	88.28	359.60	10030.83	2046.00	2046.06	2.12	0.51	406562.35	772471.68	N 32 6 55.07	W 103 35 12.42	0.06	2046.06
	11781.00	88.97	0.79	10033.08	2139.97	2140.03	2.44	1.46	406656.32	772472.00	N 32 6 56.80	W 103 35 12.40	0.07	2140.03
	11875.00	91.55	1.81	10032.66	2233.92	2233.99	4.57	2.95	406750.28	772474.13	N 32 6 57.73	W 103 35 12.37	0.12	2234.00
	11969.00	92.48	2.79	10029.35	2327.75	2327.86	8.34	1.44	406844.14	772477.90	N 32 6 58.65	W 103 35 12.32	0.21	2327.87
	12026.00	93.88	1.26	10026.19	2384.61	2384.73	10.35	3.84	406901.01	772479.91	N 32 6 59.22	W 103 35 12.29	0.25	2384.75
	12065.00	95.68	1.05	10022.94	2423.46	2423.58	11.14	4.65	406939.87	772480.70	N 32 6 59.60	W 103 35 12.28	0.26	2423.61
	12096.00	94.65	359.77	10020.15	2454.33	2454.46	11.36	5.29	406970.74	772480.92	N 32 6 59.91	W 103 35 12.28	0.27	2454.48
	12127.00	92.17	359.63	10018.30	2485.27	2485.40	11.19	8.01	407001.68	772480.75	N 32 7 0.21	W 103 35 12.28	0.26	2485.42
	12158.00	89.69	359.55	10017.80	2516.27	2516.39	10.97	8.00	407032.67	772480.53	N 32 7 0.52	W 103 35 12.28	0.25	2516.42
	12252.00	87.59	356.02	10020.03	2610.17	2610.28	7.34	4.37	407126.55	772476.90	N 32 7 1.45	W 103 35 12.31	0.16	2610.29
	12347.00	86.04	355.50	10025.31	2704.81	2704.87	0.33	1.72	407221.14	772469.89	N 32 7 2.39	W 103 35 12.38	0.01	2704.87
	12441.00	87.32	354.36	10030.75	2798.33	2798.34	-7.96	1.82	407314.61	772461.60	N 32 7 3.31	W 103 35 12.47	359.84	2798.35
	12630.00	86.56	352.24	10040.84	2985.90	2985.77	-29.98	1.19	407502.03	772439.58	N 32 7 5.17	W 103 35 12.71	359.42	2985.92
	12724.00	92.72	356.59	10041.44	3079.44	3079.25	-39.12	8.02	407595.51	772430.44	N 32 7 6.09	W 103 35 12.81	359.27	3079.50
	12818.00	93.68	359.96	10038.19	3173.25	3173.05	-41.95	3.72	407689.31	772427.62	N 32 7 7.02	W 103 35 12.84	359.24	3173.32
	12912.00	89.31	359.92	10033.73	3267.20	3266.99	-42.04	4.85	407783.25	772427.52	N 32 7 7.95	W 103 35 12.83	359.26	3267.26
	13006.00	88.04	0.48	10035.91	3361.16	3360.96	-41.72	1.48	407877.22	772427.85	N 32 7 8.88	W 103 35 12.82	359.29	3361.22
	13100.00	88.45	359.62	10038.79	3455.12	3454.92	-41.63	1.01	407971.17	772427.93	N 32 7 9.81	W 103 35 12.81	359.31	3455.17
	13195.00	88.80	0.34	10041.07	3550.09	3549.89	-41.67	0.84	408066.14	772427.89	N 32 7 10.75	W 103 35 12.80	359.33	3550.14
	13290.00	91.86	2.37	10040.52	3645.03	3644.85	-39.42	3.87	408161.09	772430.14	N 32 7 11.69	W 103 35 12.77	359.38	3645.06
	13384.00	89.72	1.63	10039.22	3738.93	3738.77	-36.14	2.41	408255.02	772433.42	N 32 7 12.62	W 103 35 12.72	359.45	3738.95
	13479.00	87.45	0.59	10041.57	3833.86	3833.72	-34.30	2.63	408349.96	772435.26	N 32 7 13.56	W 103 35 12.70	359.49	3833.87
	13573.00	89.55	359.08	10044.03	3927.82	3927.68	-34.57	2.75	408443.92	772434.99	N 32 7 14.49	W 103 35 12.69	359.50	3927.83
	13667.00	89.35	359.04	10044.93	4021.81	4021.66	-36.11	0.22	408537.90	772433.45	N 32 7 15.42	W 103 35 12.70	359.49	4021.82
	13762.00	90.10	359.56	10045.39	4116.81	4116.65	-37.28	0.96	408632.88	772432.29	N 32 7 16.36	W 103 35 12.71	359.48	4116.82
	13856.00	91.31	1.67	10044.23	4210.78	4210.63	-36.27	2.59	408726.86	772433.29	N 32 7 17.29	W 103 35 12.69	359.51	4210.79
	13951.00	88.31	1.07	10044.55	4305.72	4305.59	-34.00	3.22	408821.82	772435.57	N 32 7 18.23	W 103 35 12.65	359.55	4305.73
	14046.00	88.42	358.77	10047.26	4400.68	4400.55	-34.13	2.42	408916.77	772435.43	N 32 7 19.17	W 103 35 12.65	359.56	4400.68
	14140.00	88.42	355.67	10049.85	4494.55	4494.39	-38.69	3.30	409010.61	772430.88	N 32 7 20.10	W 103 35 12.69	359.51	4494.56
	14235.00	89.83	352.84	10051.30	4589.11	4588.89	-48.19	3.33	409105.11	772421.37	N 32 7 21.03	W 103 35 12.80	359.40	4589.14
	14282.00	89.59	353.81	10051.54	4635.82	4635.57	-53.66	2.13	409151.78	772415.91	N 32 7 21.49	W 103 35 12.86	359.34	4635.88
	14329.00	89.48	356.64	10051.92	4682.68	4682.40	-57.57	6.03	409198.61	772411.99	N 32 7 21.96	W 103 35 12.90	359.30	4682.76
	14376.00	89.52	358.67	10052.33	4729.65	4729.36	-59.49	4.32	409245.57	772410.07	N 32 7 22.42	W 103 35 12.92	359.28	4729.73
	14423.00	89.48	1.06	10052.74	4776.64	4776.35	-59.60	5.09	409292.56	772409.96	N 32 7 22.89	W 103 35 12.91	359.29	4776.73
	14517.00	88.83	1.56	10054.13	4870.59	4870.32	-57.45	0.87	409386.52	772412.11	N 32 7 23.82	W 103 35 12.88	359.32	4870.66
Section Line Crossing [315' FEL]	14536.83	88.99	1.61	10054.50	4890.40	4890.14	-56.90	0.88	409406.34	772412.66	N 32 7 24.01	W 103 35 12.87	359.33	4890.47
	14612.00	89.62	1.82	10055.41	4965.52	4965.27	-54.65	0.88	409481.47	772414.91	N 32 7 24.76	W 103 35 12.84	359.37	4965.57
	14706.00	89.59	1.54	10056.06	5059.45	5059.22	-51.90	0.30	409575.42	772417.67	N 32 7 25.69	W 103 35 12.80	359.41	5059.49
	14800.00	87.90	0.60	10058.12	5153.40	5153.18	-50.14	2.06	409669.38	772419.42	N 32 7 26.61	W 103 35 12.77	359.44	5153.42
	14895.00	89.52	1.69	10060.26	5248.34	5248.13	-48.24	2.06	409764.33	772421.32	N 32 7 27.55	W 103 35 12.74	359.47	5248.36
	14990.00	88.69	0.98	10061.74	5343.28	5343.09	-46.03	1.15	409859.29	772423.53	N 32 7 28.49	W 103 35 12.71	359.51	5343.29
	15084.00	89.35	1.41	10063.35	5437.23	5437.06	-44.07	0.84	409953.25	772425.49	N 32 7 29.42	W 103 35 12.68	359.54	5437.24
	15178.00	89.79	2.17	10064.05	5531.16	5531.01	-41.13	0.93	410047.19	772428.43	N 32 7 30.35			

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)
	15272.00	90.14	1.50	10064.11	5625.09	5624.96	-38.12	0.80	410141.14	772431.44	N 32 7 31.28	W 103 35 12.60	359.61	5625.09
	15367.00	90.24	1.33	10063.80	5720.04	5719.93	-35.78	0.21	410236.11	772433.78	N 32 7 32.22	W 103 35 12.56	359.64	5720.04
	15461.00	90.38	359.60	10063.29	5814.03	5813.92	-35.01	1.85	410330.10	772434.55	N 32 7 33.15	W 103 35 12.54	359.65	5814.03
	15555.00	89.90	359.29	10063.06	5908.03	5907.92	-35.92	0.61	410424.09	772433.64	N 32 7 34.08	W 103 35 12.55	359.65	5908.03
	15742.00	90.00	359.00	10063.22	6095.02	6094.90	-38.72	0.16	410611.06	772430.85	N 32 7 35.93	W 103 35 12.56	359.64	6095.02
	15837.00	90.28	358.86	10062.99	6190.01	6189.88	-40.49	0.33	410706.04	772429.07	N 32 7 36.87	W 103 35 12.58	359.63	6190.01
	15931.00	89.86	358.96	10062.87	6284.01	6283.88	-42.28	0.46	410800.02	772427.28	N 32 7 37.80	W 103 35 12.59	359.61	6284.01
	16025.00	90.48	359.29	10062.60	6378.00	6377.85	-43.71	0.75	410894.01	772425.85	N 32 7 38.73	W 103 35 12.60	359.61	6378.00
	16119.00	92.44	359.34	10060.20	6471.96	6471.81	-44.84	2.09	410987.96	772424.72	N 32 7 39.66	W 103 35 12.61	359.60	6471.96
	16213.00	88.28	358.35	10059.61	6565.93	6565.77	-48.73	4.55	411081.92	772422.83	N 32 7 40.59	W 103 35 12.62	359.59	6565.93
	16308.00	89.90	359.22	10061.12	6660.91	6660.73	-48.74	1.94	411178.88	772420.82	N 32 7 41.53	W 103 35 12.64	359.58	6660.91
	16402.00	90.17	358.76	10061.06	6754.90	6754.71	-50.40	0.57	411270.86	772419.16	N 32 7 42.46	W 103 35 12.65	359.57	6754.90
	16496.00	90.24	358.98	10060.73	6848.89	6848.70	-52.26	0.25	411364.84	772417.31	N 32 7 43.39	W 103 35 12.66	359.56	6848.89
	16591.00	89.97	359.08	10060.55	6943.88	6943.68	-53.86	0.30	411459.82	772415.70	N 32 7 44.33	W 103 35 12.67	359.56	6943.89
	16685.00	90.24	358.72	10060.38	7037.88	7037.66	-55.67	0.48	411553.80	772413.89	N 32 7 45.26	W 103 35 12.69	359.55	7037.88
	16779.00	90.38	359.11	10059.87	7131.87	7131.65	-57.45	0.44	411647.78	772412.11	N 32 7 46.19	W 103 35 12.70	359.54	7131.88
	16873.00	90.07	358.77	10059.50	7225.86	7225.63	-59.19	0.49	411741.76	772410.37	N 32 7 47.12	W 103 35 12.71	359.53	7225.87
	16968.00	89.45	358.67	10059.90	7320.85	7320.60	-61.31	0.66	411836.73	772408.25	N 32 7 48.06	W 103 35 12.73	359.52	7320.86
	17157.00	90.10	359.05	10060.64	7509.83	7509.56	-65.07	0.40	412025.68	772404.49	N 32 7 49.93	W 103 35 12.76	359.50	7509.84
	17251.00	90.07	359.66	10060.50	7603.83	7603.56	-66.13	0.65	412119.68	772403.43	N 32 7 50.86	W 103 35 12.76	359.50	7603.84
	17344.00	89.24	358.98	10061.06	7696.82	7696.55	-67.23	1.15	412212.66	772402.33	N 32 7 51.78	W 103 35 12.77	359.50	7696.84
	17439.00	88.97	358.23	10062.55	7791.79	7791.51	-69.54	0.84	412307.62	772400.02	N 32 7 52.72	W 103 35 12.79	359.49	7791.82
	17533.00	89.66	0.71	10063.67	7885.78	7885.49	-70.41	2.74	412401.60	772399.15	N 32 7 53.65	W 103 35 12.79	359.49	7885.80
	17628.00	89.72	1.14	10064.18	7980.75	7980.47	-68.88	0.46	412496.58	772400.68	N 32 7 54.59	W 103 35 12.76	359.51	7980.77
	17810.00	89.00	1.58	10066.22	8162.66	8162.41	-64.56	0.46	412678.51	772405.00	N 32 7 56.39	W 103 35 12.70	359.55	8162.66
	17902.00	89.69	1.95	10067.27	8254.59	8254.36	-61.73	0.85	412770.46	772407.84	N 32 7 57.30	W 103 35 12.66	359.57	8254.59
	17992.00	89.86	1.74	10067.62	8344.52	8344.31	-58.83	0.30	412860.41	772410.73	N 32 7 58.19	W 103 35 12.62	359.60	8344.52
	18084.00	89.78	1.48	10067.93	8436.46	8436.27	-56.24	0.30	412952.37	772413.32	N 32 7 59.10	W 103 35 12.58	359.62	8436.46
	18175.00	89.69	1.69	10068.36	8527.41	8527.24	-53.73	0.24	413043.33	772415.83	N 32 8 0.00	W 103 35 12.54	359.64	8527.41
	18266.00	89.86	2.08	10068.72	8618.34	8618.19	-50.73	0.47	413134.28	772418.83	N 32 8 0.90	W 103 35 12.50	359.66	8618.34
	18356.00	90.14	2.23	10068.72	8708.25	8708.12	-47.35	0.35	413224.21	772422.21	N 32 8 1.79	W 103 35 12.45	359.69	8708.25
	18447.00	90.07	359.94	10068.55	8799.10	8799.10	-45.63	2.52	413315.18	772423.93	N 32 8 2.69	W 103 35 12.43	359.70	8799.22
	18538.00	90.38	359.22	10068.20	8890.21	8890.10	-46.29	0.86	413406.18	772423.27	N 32 8 3.59	W 103 35 12.43	359.70	8890.22
	18720.00	90.00	359.52	10067.59	9072.21	9072.09	-48.29	0.27	413588.16	772421.27	N 32 8 5.39	W 103 35 12.44	359.69	9072.21
	18901.00	90.21	359.46	10067.26	9253.21	9253.08	-49.91	0.12	413769.14	772419.66	N 32 8 7.18	W 103 35 12.44	359.69	9253.21
	18991.00	90.62	359.39	10066.61	9343.20	9343.07	-50.81	0.46	413859.13	772418.75	N 32 8 8.07	W 103 35 12.44	359.69	9343.21
	19082.00	90.28	359.50	10065.90	9434.20	9434.06	-51.69	0.39	413950.12	772417.87	N 32 8 8.97	W 103 35 12.45	359.69	9434.21
	19264.00	89.97	358.67	10065.50	9616.19	9616.04	-54.60	0.49	414132.09	772414.96	N 32 8 10.78	W 103 35 12.47	359.67	9616.19
	19356.00	90.62	359.83	10065.02	9708.19	9708.03	-55.80	1.45	414224.08	772413.76	N 32 8 11.69	W 103 35 12.47	359.67	9708.19
	19447.00	90.07	359.31	10064.48	9799.18	9799.02	-56.48	0.83	414315.07	772413.08	N 32 8 12.59	W 103 35 12.47	359.67	9799.19
	19537.00	89.76	359.10	10064.61	9889.18	9889.01	-57.73	0.42	414405.06	772411.83	N 32 8 13.48	W 103 35 12.48	359.67	9889.18
	19628.00	90.34	359.43	10064.53	9980.18	9980.01	-58.90	0.73	414496.05	772410.66	N 32 8 14.38	W 103 35 12.49	359.66	9980.18
	19679.00	90.10	359.31	10064.33	10031.18	10031.00	-59.46	0.53	414547.04	772410.10	N 32 8 14.88	W 103 35 12.49	359.66	10031.18
Final Survey														
Last Legal Take Point [100'	19715.00	90.10	359.31	10064.27	10067.18	10067.00	-59.89	0.00	414583.04	772409.67	N 32 8 15.24	W 103 35 12.49	359.66	10067.18
FNL, 325.40' FEL]														
TD,PTB [99.5' FNL,325' FEL]	19719.00	90.10	359.31	10064.27	10071.18	10071.00	-59.94	0.00	414587.04	772409.62	N 32 8 15.28	W 103 35 12.49	359.66	10071.18

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	ST01 / Final Surveys - Cimarex Vaca Draw 20-17 Federal #73H ST01 Off- 19719ft (Surcon
	1	26.000	26.000	Act Stns	17.500	13.375	NAL_MWD_IFR1+MS-Depth Only	ST01 / Final Surveys - Cimarex Vaca Draw 20-17 Federal #73H ST01 Off- 19719ft (Surcon
	1	26.000	1069.000	Act Stns	17.500	13.375	NAL_MWD_IFR1+MS	ST01 / Final Surveys - Cimarex Vaca Draw 20-17 Federal #73H
	1	1069.000	4939.000	Act Stns	12.250	9.625	NAL_MWD_IFR1+MS	ST01 / Final Surveys - Cimarex Vaca Draw 20-17 Federal #73H

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)
		1	4939.000	9552.000	Act Stns	8.750	7.000	NAL_MWD_IFR1+MS	ST01 / Final Surveys - Cimarex Vaca Draw 20-17 Federal #73H					
		1	9552.000	19719.000	Act Stns	6.000	4.500	NAL_MWD_IFR1+MS	ST01 / Final Surveys - Cimarex Vaca Draw 20-17 Federal #73H					