

30-015-43658

Schlumberger

Cimarex Cottonberry 20 Federal 4H MWD Off to 11975ft Survey Geodetic

Report
(Def Survey)

Report Date: February 20, 2017 - 10:46 AM
Client: Cimarex
Field: NMI Eddy County (NAD 83)
Structure / Slot: Cimarex Cottonberry 20 Federal 4H / Cimarex Cottonberry 20 Federal 4H
Well: Cimarex Cottonberry 20 Federal 4H
Borehole: Original Wellbore
UWI / API#: Unknown / 30-015-43658
Survey Name: Cimarex Cottonberry 20 Federal 4H MWD Off to 11975ft
Survey Date: February 12, 2017
Tort / AHD / DDI / ERD Ratio: 186.966 / 4805.410 ft / 6.156 / 0.640
Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 7' 18.58985" W 104° 12' 21.79439"
Location Grid N/E Y/X: N 408081.280 ftUS, E 580740.330 ftUS
CRS Grid Convergence Angle: 0.0677°
Grid Scale Factor: 0.99991087
Version / Patch: 2.10.254.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 178.428° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: RKB
TVD Reference Elevation: 3165.500 ft above MSL
Seabed / Ground Elevation: 3138.500 ft above MSL
Magnetic Declination: 7.465°
Total Gravity Field Strength: 998.4472mgm (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 48071.042 nT
Magnetic Dip Angle: 59.886°
Declination Date: February 12, 2017
Magnetic Declination Model: HDGM 2016
North Reference: Grid North
Grid Convergence Used: 0.0677°
Total Corr Mag North->Grid North: 7.3972°
Local Coord Referenced To: Structure Reference Point

Provide signature page for survey

NM OIL CONSERVATION
ARTESIA DISTRICT

JUN 22 2017

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Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (ft/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')
SHL [330' FNL, 700 FELI] Begin Extreme MWD Surveys	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	408081.28	580740.33	N 32° 7' 18.59"	W 104° 12' 21.79"
169.00	0.88		331.60	188.99	-1.16	1.14	-0.62	0.52	408082.42	580739.71	N 32° 7' 18.60"	W 104° 12' 21.80"
216.00	0.88		322.17	215.99	-1.77	1.74	-1.01	0.31	408083.02	580739.32	N 32° 7' 18.61"	W 104° 12' 21.81"
248.00	1.02		334.29	247.98	-2.23	2.19	-1.28	0.76	408083.47	580739.05	N 32° 7' 18.61"	W 104° 12' 21.81"
297.00	1.02		332.71	296.98	-3.02	2.98	-1.67	0.06	408084.26	580738.66	N 32° 7' 18.62"	W 104° 12' 21.81"
389.00	1.10		330.81	388.96	-4.54	4.47	-2.48	0.09	408085.75	580737.85	N 32° 7' 18.63"	W 104° 12' 21.82"
512.00	1.10		316.58	511.94	-6.47	6.36	-3.87	0.22	408087.64	580736.46	N 32° 7' 18.65"	W 104° 12' 21.84"
605.00	1.41		316.58	604.92	-7.98	7.84	-5.27	0.33	408089.12	580735.06	N 32° 7' 18.67"	W 104° 12' 21.86"
665.00	1.41		313.36	664.90	-9.05	8.88	-6.31	0.13	408090.16	580734.02	N 32° 7' 18.68"	W 104° 12' 21.87"
756.00	1.59		307.54	755.87	-10.64	10.42	-8.13	0.26	408091.70	580732.20	N 32° 7' 18.69"	W 104° 12' 21.89"
847.00	1.81		307.63	846.83	-12.35	12.07	-10.27	0.24	408093.35	580730.07	N 32° 7' 18.71"	W 104° 12' 21.91"
938.00	0.40		343.94	937.81	-13.56	13.25	-11.49	1.66	408094.53	580728.84	N 32° 7' 18.72"	W 104° 12' 21.93"
1029.00	0.22		48.51	1028.81	-13.98	13.67	-11.45	0.40	408094.95	580728.88	N 32° 7' 18.73"	W 104° 12' 21.93"
1120.00	0.22		14.80	1119.81	-14.26	13.96	-11.27	0.14	408095.24	580729.06	N 32° 7' 18.73"	W 104° 12' 21.93"
1211.00	0.22		355.97	1210.80	-14.60	14.30	-11.24	0.08	408095.58	580729.09	N 32° 7' 18.73"	W 104° 12' 21.92"
1301.00	0.31		42.21	1300.80	-14.95	14.65	-11.09	0.25	408095.93	580729.24	N 32° 7' 18.73"	W 104° 12' 21.92"
1390.00	0.62		74.87	1389.80	-15.24	14.96	-10.46	0.45	408096.24	580729.87	N 32° 7' 18.74"	W 104° 12' 21.92"
1481.00	1.30		82.30	1480.79	-15.48	15.22	-8.86	0.76	408096.50	580731.37	N 32° 7' 18.74"	W 104° 12' 21.90"
1576.00	1.59		79.80	1575.76	-15.78	15.60	-6.80	0.31	408096.88	580733.73	N 32° 7' 18.74"	W 104° 12' 21.87"
1670.00	2.30		83.59	1669.70	-16.13	16.04	-3.44	0.77	408097.32	580736.89	N 32° 7' 18.75"	W 104° 12' 21.83"
1765.00	1.59		91.22	1764.65	-16.23	16.23	-0.23	0.29	408097.51	580740.10	N 32° 7' 18.75"	W 104° 12' 21.83"
1859.00	1.81		94.26	1858.61	-16.01	16.09	2.55	0.25	408097.37	580742.88	N 32° 7' 18.75"	W 104° 12' 21.76"
1921.00	1.81		91.61	1920.58	-15.86	15.99	4.51	0.13	408097.27	580744.84	N 32° 7' 18.75"	W 104° 12' 21.74"
2043.00	1.90		90.51	2042.51	-15.68	15.92	8.46	0.08	408097.20	580748.79	N 32° 7' 18.75"	W 104° 12' 21.70"
2137.00	1.72		87.34	2136.46	-15.65	15.97	11.43	0.22	408097.25	580751.75	N 32° 7' 18.75"	W 104° 12' 21.66"

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 ° °')
	2232.00	1.59	83.42	2231.42	-15.79	16.19	14.16	0.18	408097.47	580754.49	N 32 7 18.75	W 104 12 21.63
	2327.00	1.59	79.89	2326.39	-16.10	16.57	16.77	0.10	408097.85	580757.09	N 32 7 18.75	W 104 12 21.60
	2422.00	1.72	73.99	2421.35	-16.65	17.19	19.43	0.23	408098.47	580759.76	N 32 7 18.76	W 104 12 21.57
	2516.00	1.81	77.11	2515.30	-17.30	17.91	22.24	0.14	408099.19	580762.57	N 32 7 18.77	W 104 12 21.54
	2611.00	0.80	308.64	2610.29	-18.02	18.66	23.18	2.52	408099.94	580763.51	N 32 7 18.77	W 104 12 21.52
	2705.00	1.02	304.94	2704.28	-18.94	19.55	21.98	0.24	408100.83	580762.31	N 32 7 18.78	W 104 12 21.51
	2800.00	0.80	299.13	2799.27	-19.78	20.36	20.71	0.25	408101.64	580761.04	N 32 7 18.79	W 104 12 21.55
	2885.00	0.80	292.69	2894.26	-20.39	20.94	19.52	0.09	408102.22	580759.85	N 32 7 18.80	W 104 12 21.57
	2989.00	0.88	294.98	2988.25	-20.99	21.50	18.26	0.09	408102.77	580758.59	N 32 7 18.80	W 104 12 21.58
	3084.00	0.88	284.67	3083.23	-21.52	21.99	16.89	0.17	408103.27	580757.22	N 32 7 18.81	W 104 12 21.60
	3178.00	1.02	291.59	3177.22	-22.05	22.48	15.42	0.19	408103.76	580755.75	N 32 7 18.81	W 104 12 21.61
	3273.00	0.88	281.94	3272.21	-22.55	22.94	13.92	0.22	408104.22	580754.25	N 32 7 18.82	W 104 12 21.63
	3367.00	0.88	287.36	3366.20	-22.95	23.31	12.52	0.09	408104.58	580752.85	N 32 7 18.82	W 104 12 21.65
	3462.00	1.10	288.37	3461.18	-23.50	23.81	10.66	0.23	408105.09	580751.29	N 32 7 18.83	W 104 12 21.67
	3556.00	1.10	273.83	3555.17	-23.89	24.16	9.20	0.30	408105.43	580749.53	N 32 7 18.83	W 104 12 21.69
	3651.00	1.19	272.82	3650.15	-24.06	24.27	7.31	0.10	408105.54	580747.64	N 32 7 18.83	W 104 12 21.71
	3746.00	1.41	263.92	3745.12	-24.04	24.19	5.16	0.31	408105.47	580745.49	N 32 7 18.83	W 104 12 21.73
	3841.00	1.41	271.63	3840.09	-24.01	24.10	2.83	0.20	408105.38	580743.16	N 32 7 18.83	W 104 12 21.76
	3935.00	1.19	268.41	3934.07	-24.08	24.11	0.70	0.25	408105.38	580741.03	N 32 7 18.83	W 104 12 21.79
	4030.00	1.19	267.31	4029.05	-24.06	23.77	-3.06	0.31	408105.05	580737.27	N 32 7 18.83	W 104 12 21.83
	4124.00	1.02	254.97	4123.03	-23.84	23.38	-4.70	0.06	408104.65	580735.63	N 32 7 18.82	W 104 12 21.85
	4219.00	1.02	258.19	4218.02	-23.50	22.97	-6.32	0.08	408104.25	580734.01	N 32 7 18.82	W 104 12 21.87
	4313.00	1.02	253.78	4312.00	-23.14	22.36	-7.97	0.18	408103.84	580732.37	N 32 7 18.81	W 104 12 21.89
	4408.00	1.10	245.54	4406.99	-22.57	22.36	-9.33	0.37	408102.87	580731.00	N 32 7 18.80	W 104 12 21.90
	4503.00	0.80	234.21	4501.97	-21.84	21.59	-10.42	0.10	408102.13	580729.91	N 32 7 18.80	W 104 12 21.92
	4597.00	0.80	237.12	4595.96	-21.13	20.85	-11.58	0.04	408101.09	580728.75	N 32 7 18.79	W 104 12 21.93
	4692.00	1.10	221.48	4690.95	-20.12	19.81	-12.61	0.25	408099.81	580727.72	N 32 7 18.77	W 104 12 21.94
	4787.00	0.88	215.97	4785.94	-18.87	18.54	-13.46	0.27	408098.42	580726.87	N 32 7 18.76	W 104 12 21.95
	4882.00	1.10	207.86	4880.92	-17.50	17.14	-14.31	0.00	408096.82	580725.31	N 32 7 18.74	W 104 12 21.96
	4976.00	1.10	207.77	4974.91	-15.93	15.54	-15.02	0.19	408095.15	580724.69	N 32 7 18.73	W 104 12 21.97
	5071.00	1.10	198.34	5069.89	-12.40	13.87	-16.61	0.35	408091.22	580722.47	N 32 7 18.65	W 104 12 22.02
	5165.00	1.33	198.34	5163.87	-12.40	11.98	-17.86	0.45	408087.12	580721.26	N 32 7 18.65	W 104 12 22.02
	5260.00	1.41	211.87	5258.84	-10.39	9.94	-19.07	0.21	408085.61	580719.78	N 32 7 18.63	W 104 12 22.03
	5355.00	1.59	208.88	5353.81	-8.28	7.79	-20.55	0.45	408083.98	580717.90	N 32 7 18.62	W 104 12 22.06
	5450.00	1.19	215.57	5448.78	-6.36	5.84	-23.76	0.24	408082.90	580716.58	N 32 7 18.61	W 104 12 22.07
	5544.00	1.41	231.84	5542.76	-4.89	4.33	-25.48	0.32	408081.96	580715.11	N 32 7 18.60	W 104 12 22.08
	5639.00	1.59	226.72	5637.72	-3.32	2.70	-25.23	0.79	408080.82	580714.85	N 32 7 18.60	W 104 12 22.09
	5734.00	0.49	244.75	5732.71	-1.76	1.09	-24.34	1.03	408083.71	580717.54	N 32 7 18.62	W 104 12 22.06
	5829.00	0.88	208.26	5827.70	-2.28	1.63	-22.79	0.33	408083.70	580719.29	N 32 7 18.61	W 104 12 22.04
	5923.00	0.88	265.63	5921.70	-1.38	0.68	-19.55	0.26	408083.59	580720.78	N 32 7 18.61	W 104 12 22.02
	6018.00	1.19	28.86	6016.69	-2.19	1.49	-16.23	0.07	408083.63	580722.10	N 32 7 18.61	W 104 12 22.01
	6113.00	0.80	83.90	6111.68	-3.09	2.43	-15.21	0.68	408085.18	580725.12	N 32 7 18.63	W 104 12 21.97
	6207.00	1.10	88.92	6205.66	-3.14	2.51	-15.04	0.45	408087.14	580725.59	N 32 7 18.65	W 104 12 21.97
	6302.00	1.02	97.56	6300.65	-3.00	2.42	-15.48	0.92	408090.55	580724.85	N 32 7 18.68	W 104 12 21.97
	6396.00	0.80	90.42	6394.63	-2.84	2.31	-15.46	3.21	408090.08	580724.87	N 32 7 18.68	W 104 12 21.97
	6491.00	0.80	85.62	6489.63	-2.85	2.35	-14.40	10.92	408087.10	580725.94	N 32 7 18.65	W 104 12 21.96
	6585.00	1.20	87.60	6583.61	-3.23	2.78	-14.22	12.22	408086.66	580726.11	N 32 7 18.64	W 104 12 21.96
	6680.00	1.10	35.47	6678.59	-4.31	3.90	-12.56	12.22	408083.02	580727.77	N 32 7 18.61	W 104 12 21.94
	6774.00	1.50	357.69	6772.57	-6.26	5.86	-7.41	13.86	408073.43	580732.92	N 32 7 18.51	W 104 12 21.88
	6869.00	1.19	345.22	6867.54	-8.47	8.06						
Last Extreme Survey	6869.00	0.31	319.57	6867.54	-9.69	9.27						
	7019.00	1.33	169.52	7017.53	-9.22	8.80						
	7066.00	6.43	158.40	7064.41	-6.21	5.82						
First Legal Take Point	7070.00	6.91	157.58	7068.38	-5.77	5.39						
	7097.00	10.17	154.08	7095.08	-2.08	1.74						
	7144.00	16.63	150.35	7140.78	7.64	-7.85						

Comments	MID (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')
	7192.00	22.11	152.15	7186.04	21.81	-21.82	0.21	11.48	408059.47	580740.54	N 32 7 18.26	W 104 12 21.79
	7223.00	25.20	153.44	7214.43	33.03	-32.88	5.89	10.11	408048.40	580746.22	N 32 7 18.26	W 104 12 21.73
	7255.00	26.53	152.33	7234.23	45.62	-45.30	12.25	4.42	408035.98	580752.58	N 32 7 18.14	W 104 12 21.65
	7286.00	29.11	155.07	7270.64	58.76	-58.28	18.65	9.29	408023.01	580758.98	N 32 7 18.01	W 104 12 21.58
	7318.00	32.76	157.07	7258.09	73.98	-73.31	25.30	11.85	408007.97	580765.63	N 32 7 17.86	W 104 12 21.50
	7349.00	36.73	159.22	7233.56	90.55	-89.71	31.86	13.40	407991.58	580772.19	N 32 7 17.70	W 104 12 21.43
	7381.00	40.43	161.70	7348.57	109.53	-108.52	38.52	12.53	407972.77	580778.85	N 32 7 17.52	W 104 12 21.35
	7412.00	43.78	165.59	7371.57	129.62	-128.46	44.35	13.68	407952.84	580784.67	N 32 7 17.32	W 104 12 21.28
	7443.00	47.93	166.80	7393.16	151.36	-150.06	49.65	13.69	407931.24	580789.97	N 32 7 17.10	W 104 12 21.22
	7475.00	52.01	168.99	7413.73	175.36	-173.92	55.20	12.76	407907.38	580795.52	N 32 7 16.87	W 104 12 21.15
	7507.00	56.13	168.04	7432.51	200.80	-199.21	60.79	13.15	407882.09	580801.12	N 32 7 16.62	W 104 12 21.09
	7538.00	59.83	170.08	7448.94	226.73	-225.01	65.77	13.17	407866.29	580806.10	N 32 7 16.36	W 104 12 21.03
	7570.00	64.04	171.11	7453.99	254.70	-252.86	70.38	13.46	407828.44	580810.70	N 32 7 16.09	W 104 12 20.98
	7601.00	68.44	171.31	7476.48	282.84	-280.89	74.71	14.21	407800.41	580815.04	N 32 7 15.81	W 104 12 20.93
	7633.00	72.21	171.95	7487.25	312.75	-310.70	79.10	11.93	407770.61	580819.42	N 32 7 15.51	W 104 12 20.88
	7664.00	76.07	172.20	7495.72	342.36	-340.23	83.21	12.48	407741.08	580823.53	N 32 7 15.22	W 104 12 20.83
	7711.00	82.79	173.69	7504.34	388.35	-386.06	88.87	14.63	407695.26	580829.19	N 32 7 14.77	W 104 12 20.77
	7759.00	86.28	176.85	7508.08	436.11	-433.72	92.81	13.19	407647.60	580833.13	N 32 7 14.30	W 104 12 20.72
	7852.00	93.68	177.36	7506.49	529.03	-526.56	97.51	5.83	407554.77	580837.83	N 32 7 13.38	W 104 12 20.67
	7899.00	94.62	178.11	7503.09	575.90	-573.40	99.36	2.56	407507.94	580839.68	N 32 7 12.91	W 104 12 20.65
	7933.00	94.55	180.26	7495.57	669.59	-667.08	100.69	2.38	407414.26	580841.01	N 32 7 11.99	W 104 12 20.63
	8088.00	93.34	182.18	7489.03	764.25	-761.83	98.67	2.28	407319.52	580838.99	N 32 7 11.05	W 104 12 20.66
	8182.00	92.79	184.39	7484.01	857.77	-855.53	93.29	2.42	407225.83	580833.61	N 32 7 10.12	W 104 12 20.72
	8277.00	92.24	185.05	7479.84	952.10	-950.12	85.48	0.90	407131.25	580825.51	N 32 7 9.19	W 104 12 20.81
	8371.00	91.96	183.34	7476.39	1045.56	-1043.80	78.61	1.84	407037.58	580818.94	N 32 7 8.26	W 104 12 20.89
	8466.00	91.48	180.66	7473.54	1140.33	-1138.69	75.30	2.86	406942.69	580815.62	N 32 7 7.32	W 104 12 20.93
	8564.00	90.58	179.30	7471.79	1234.27	-1232.67	75.33	1.69	406848.72	580815.66	N 32 7 6.39	W 104 12 20.94
	8654.00	91.65	178.72	7468.94	1328.25	-1326.66	77.76	0.25	406754.74	580816.62	N 32 7 5.46	W 104 12 20.93
	8749.00	93.03	177.74	7465.10	1423.23	-1421.63	80.66	1.41	406659.78	580818.08	N 32 7 4.52	W 104 12 20.91
	8843.00	93.75	176.11	7459.54	1517.14	-1515.50	85.69	1.80	406565.92	580820.98	N 32 7 3.59	W 104 12 20.88
	8937.00	93.13	175.65	7453.84	1610.94	-1609.20	88.66	1.89	406472.23	580826.01	N 32 7 2.67	W 104 12 20.82
	9032.00	92.86	174.48	7448.93	1705.68	-1703.78	92.51	0.81	406377.65	580832.83	N 32 7 1.73	W 104 12 20.74
	9126.00	92.82	173.88	7444.22	1894.33	-1892.20	103.61	0.93	406284.01	580839.27	N 32 7 0.80	W 104 12 20.67
	9211.00	92.44	172.45	7439.91	1988.23	-1986.05	106.62	0.73	406095.41	580846.94	N 32 6 58.94	W 104 12 20.58
	9315.00	92.41	171.56	7435.91	2082.13	-2079.95	108.25	1.18	406001.52	580848.57	N 32 6 58.01	W 104 12 20.56
	9409.00	92.41	180.49	7431.89	2177.01	-2174.86	108.21	0.98	405906.62	580848.53	N 32 6 57.07	W 104 12 20.57
	9504.00	91.72	181.19	7428.50	2270.87	-2268.79	106.83	1.05	405812.70	580847.15	N 32 6 55.14	W 104 12 20.58
	9598.00	91.00	181.66	7426.24	2365.71	-2363.73	104.47	0.91	405717.76	580844.79	N 32 6 53.33	W 104 12 20.67
	9693.00	91.21	181.67	7424.43	2459.54	-2457.68	101.74	0.22	405623.83	580842.06	N 32 6 54.27	W 104 12 20.65
	9787.00	91.79	181.14	7421.95	2554.38	-2552.61	99.41	0.83	405528.90	580839.73	N 32 6 53.33	W 104 12 20.67
	9882.00	92.51	181.22	7418.38	2649.20	-2647.53	97.46	0.76	405434.00	580837.78	N 32 6 52.39	W 104 12 20.70
	9977.00	93.06	181.17	7413.81	2742.98	-2741.39	95.50	0.59	405340.14	580835.82	N 32 6 51.46	W 104 12 20.72
	10071.00	93.06	181.34	7408.74	2837.73	-2836.24	93.42	0.18	405245.30	580833.74	N 32 6 50.52	W 104 12 20.75
	10166.00	93.07	181.26	7404.95	2908.54	-2907.12	91.81	0.11	405174.43	580832.13	N 32 6 49.82	W 104 12 20.77
	10237.00	92.46	180.72	7401.37	2976.38	-2975.01	90.64	0.81	405106.54	580830.97	N 32 6 48.15	W 104 12 20.78
	10305.00	92.44	179.27	7398.97	3027.30	-3025.95	90.64	3.02	405055.60	580830.97	N 32 6 48.65	W 104 12 20.78
	10356.00	91.93	176.76	7395.38	3121.22	-3119.82	93.90	2.72	404961.74	580834.22	N 32 6 47.72	W 104 12 20.75
	10450.00	91.62	174.57	7392.44	3216.06	-3214.50	101.08	2.33	404867.08	580841.40	N 32 6 46.88	W 104 12 20.66
	10545.00	90.86	173.09	7390.41	3309.73	-3307.93	111.18	1.77	404773.65	580831.50	N 32 6 45.76	W 104 12 20.55
	10639.00	90.07	172.82	7389.63	3404.30	-3402.21	122.83	0.88	404679.38	580863.15	N 32 6 44.92	W 104 12 20.41
	10734.00	88.66	175.89	7390.86	3514.99	-3512.65	133.74	3.04	404568.95	580874.06	N 32 6 43.83	W 104 12 20.29
	10845.00	87.37	180.26	7394.12	3608.91	-3606.51	136.90	4.84	404475.10	580877.22	N 32 6 42.90	W 104 12 20.25
	10939.00	86.02	181.48	7399.60	3703.66	-3701.34	135.46	1.91	404380.28	580875.78	N 32 6 41.96	W 104 12 20.27
	11034.00	86.53	179.86	7403.71	3797.39	-3795.13	134.36	1.80	404286.50	580874.68	N 32 6 41.03	W 104 12 20.28
	11128.00	87.37	179.33	7410.76	3892.23	-3889.99	135.03	1.05	404191.64	580875.35	N 32 6 40.10	W 104 12 20.28
	11233.00	86.59	180.06	7415.71	3986.08	-3983.86	135.53	1.14	404097.78	580875.85	N 32 6 39.17	W 104 12 20.27
	11317.00	88.10	182.21	7420.11	4080.86	-4078.73	133.65	2.76	404002.92	580873.97	N 32 6 38.23	W 104 12 20.30

Comments	MD (ft)	Incl (°)	Azim Grd (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northng (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	11506.00	88.82	182.34	7422.64	4174.61	-4172.62	129.92	0.78	403909.04	580870.24	N 32 6 37.30	W 104 12 20.34
	11601.00	87.26	180.57	7425.89	4269.42	-4267.53	127.51	2.48	403814.14	580867.83	N 32 6 36.36	W 104 12 20.37
	11695.00	88.26	179.78	7429.56	4363.30	-4361.45	127.23	1.36	403720.22	580867.54	N 32 6 35.43	W 104 12 20.38
	11790.00	87.14	179.21	7433.38	4458.21	-4456.37	128.06	1.32	403625.31	580866.38	N 32 6 34.49	W 104 12 20.37
	11884.00	86.19	178.93	7438.85	4552.04	-4550.20	129.59	1.05	403531.50	580866.90	N 32 6 33.56	W 104 12 20.35
Final survey	11911.00	86.25	178.97	7440.63	4578.98	-4577.14	130.08	0.27	403504.56	580870.40	N 32 6 33.30	W 104 12 20.34
Project to bit	11975.00	86.25	178.97	7444.81	4642.84	-4640.99	131.23	0.00	403440.71	580871.55	N 32 6 32.66	W 104 12 20.33

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	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	27.000	1/98.425	30.000	30.000	NAL_MMWD_PLUS_0.5_DEG- Depth Only	Original Wellbore / Cimarex Cottonberry 20 Federal 4H MMWD 0ft to 11975ft
	1	27.000	27.000	Act Sins	30.000	30.000	NAL_MMWD_PLUS_0.5_DEG- Depth Only	Original Wellbore / Cimarex Cottonberry 20 Federal 4H MMWD 0ft to 11975ft
	1	27.000	11975.000	Act Sins	30.000	30.000	NAL_MMWD_PLUS_0.5_DEG	Original Wellbore / Cimarex Cottonberry 20 Federal 4H MMWD

Borehole:

Original Wellbore

Well:

Cimarex Cottonberry 20 Federal 4H

Field:

NM Eddy County (NAD 83)

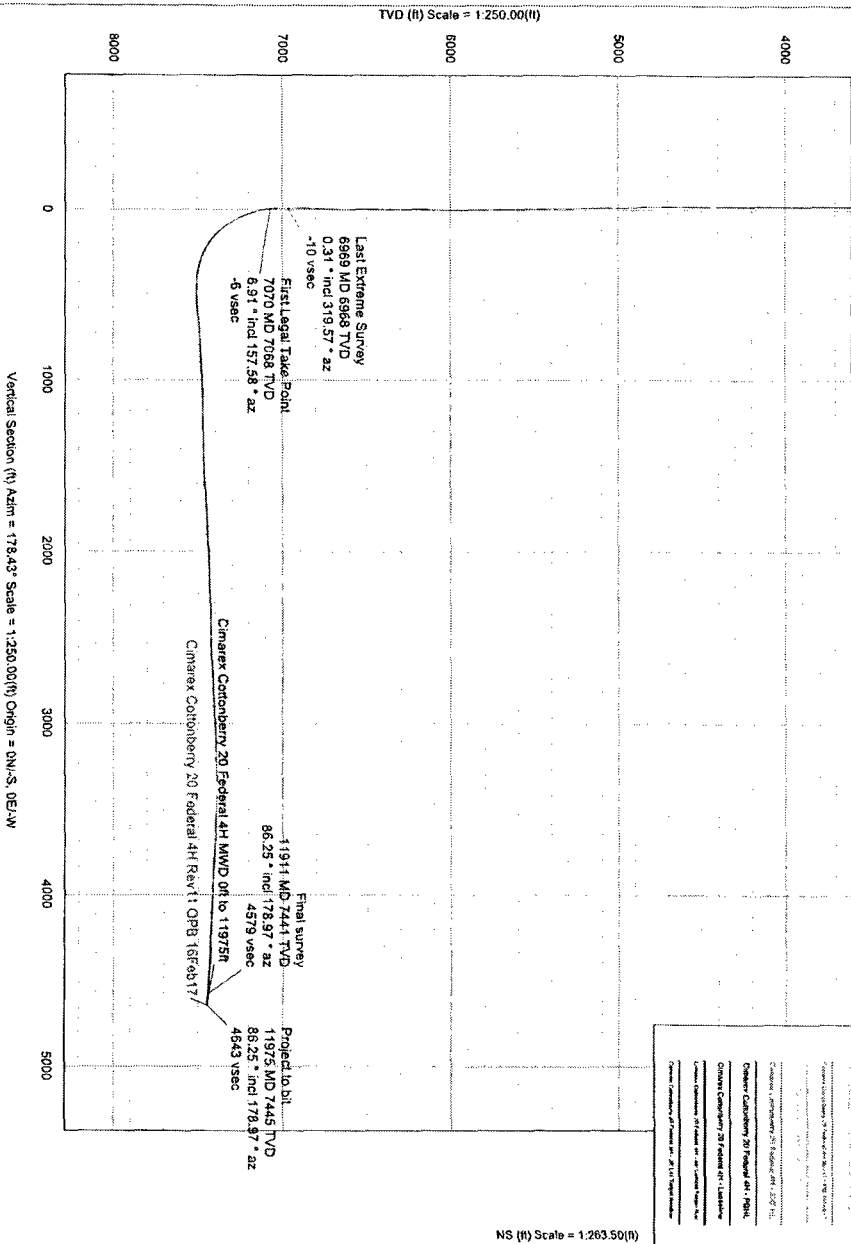
Structure:

Cimarex Cottonberry 20 Federal 4H

Company & Project Name	Client	Date	Survey Location	Location Name	Location Zone	Grid Contour	Scale Factor
Model: H0001 2015	Op: 59 440'	Date: 12-03-2017	Lat: N 32 7 14.25	UACD New Survey Area	Estimate Zone: US Feet	Grid Contour: 5.817'	Scale Factor: 0.9991197
Model: 7 457	Op: 48071 12017	Op: 07/17/15	Long: W 104 12 21.75	UACD New Survey Area	Estimate Zone: US Feet	Grid Contour: 5.817'	Scale Factor: 0.9991197

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL (330' FNL, 700 FEL)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Begin Extreme MWD Surveys	169.00	0.88	331.60	168.99	-1.16	1.14	-0.62	0.52
Last Extreme Survey	6969.00	0.31	319.57	6967.54	-9.69	9.27	-15.48	0.92
First Legal Take Point	7070.00	6.91	157.58	7066.38	-5.77	5.39	-14.22	12.22
Final survey	11911.00	86.25	178.97	7440.63	4578.98	-4577.14	130.08	0.27
Project to bit	11975.00	86.25	178.97	7444.81	4642.84	-4640.99	131.23	0.00



True North
Grid North
Grid Contour (0.068')

CONTROLLED	
Drawn by	
Checked by	
Reviewed by	
Approved by	
Date	

