

Schlumberger

Final PVA

Cimarex Energy Co.

H&P 381

CIMAREX

Borehole:

Original Borehole

Well:

Cimarex Cottonberry 20 Federal 2H

Field:

NM Eddy County (NAD 83)

Structure:

Cimarex Cottonberry 20 Federal 2H

Gravity & Magnetic Parameters

Mode: NOAA 2015
MagDec: 7.201°

Date: 18-Oct-2015
Gravity PS: 999.9999 (0.0000000000)

Surface Location
Lat: N 32° 7' 33.00"
Long: W 104° 12' 38.96"

North: 46005.88105
Easting: 97926.84105
Scale: 0.89999174

Miscellaneous

Site: Cimarex Cottonberry 20
Plan: Cimarex Cottonberry 20 Federal 2H Survey MWD Bit to Surface

Remarks: RKB = 2015.12.15 (see above MWD)

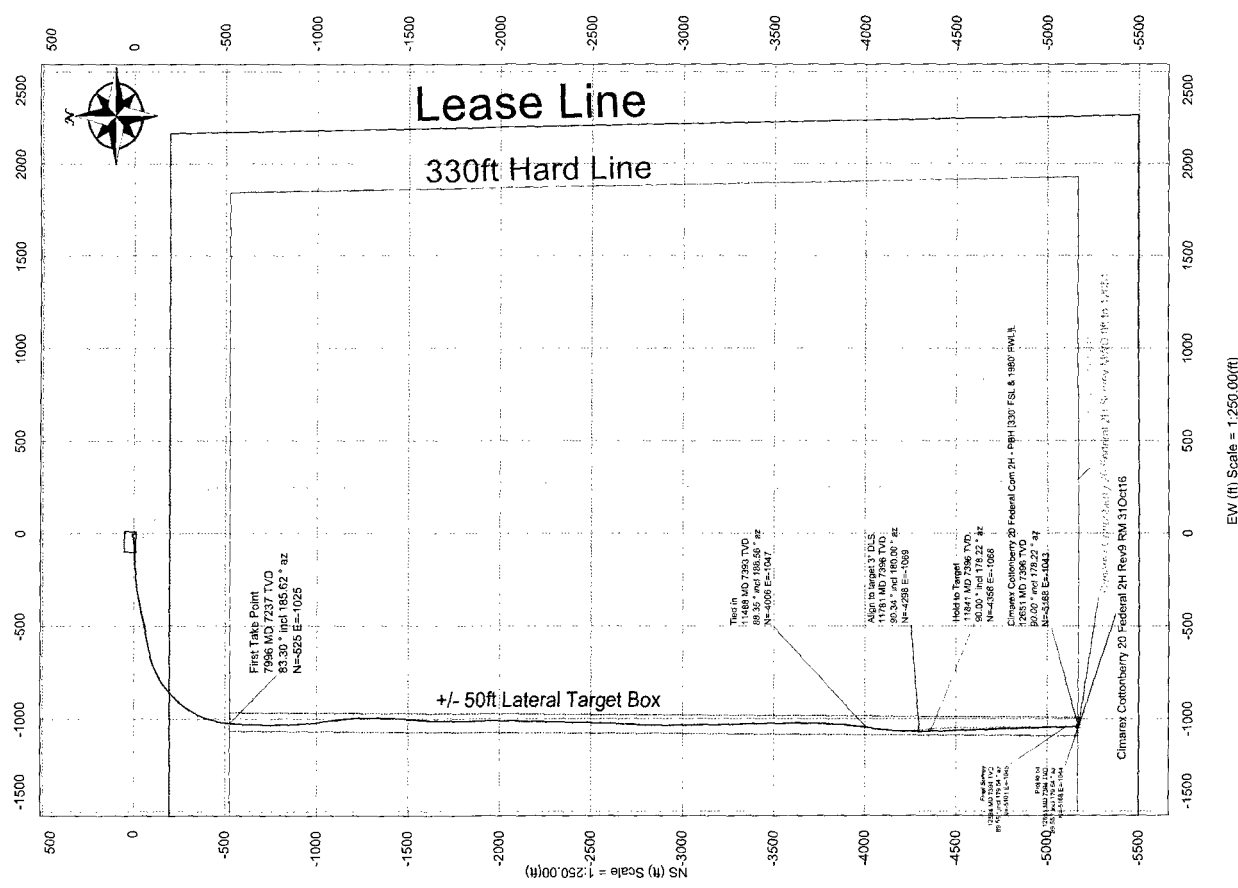
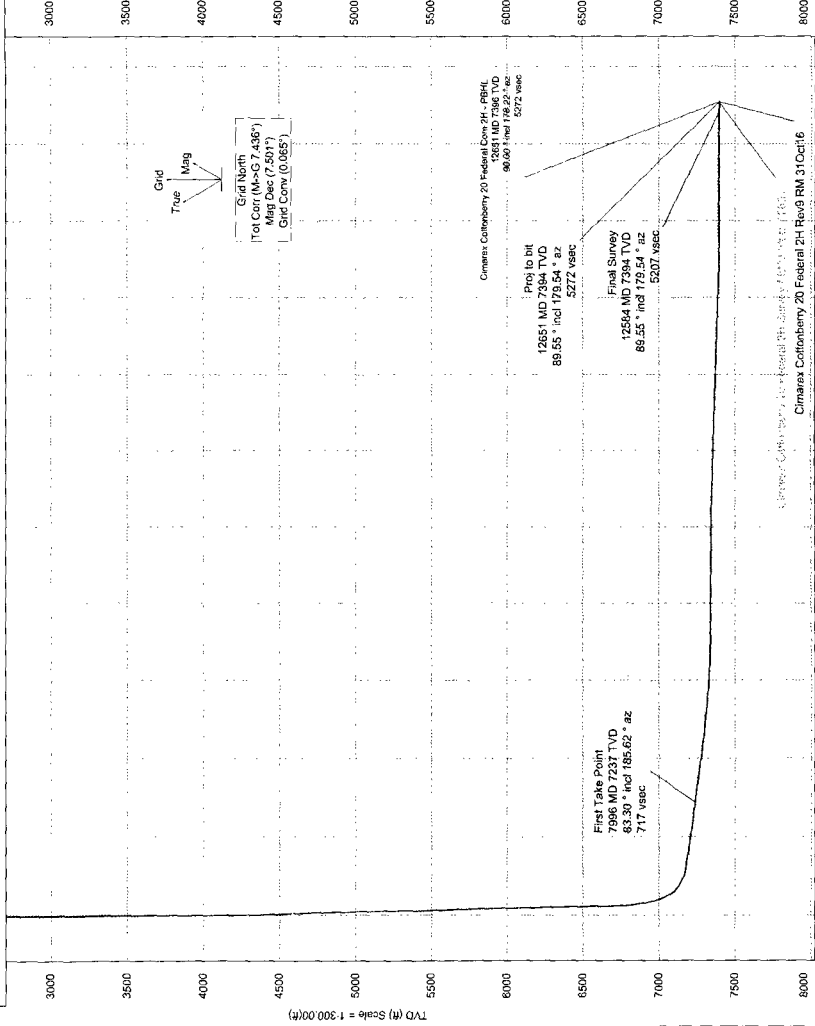
Drawn by: [blank]
Checked by: [blank]
Date: [blank]

Entry Number: [blank]
Drawing of: [blank]

Scale: 1" = 100' (Horizontal)
Scale: 1" = 100' (Vertical)

Critical Points

Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)	DLS
SHL Cimarex Cottonberry Federal Com 2H (195' FSL, 2165' FEL) Begin Extreme MWD Surveys	0.00	0.00	265.00	0.00	0.00	0.00	0.00	
Final Extreme	118.00	0.88	325.74	118.00	-0.63	0.75	-0.51	0.75
First Take Point	6440.00	6.13	275.13	6430.23	54.10	-10.78	-220.08	0.87
First Survey	7996.30	83.30	185.62	7236.58	717.41	-525.02	-1025.06	8.63
Proj to bit	12584.00	89.55	179.54	7393.78	5206.71	-5100.86	-1044.68	0.79
	12651.00	89.55	179.54	7394.30	5272.28	-5167.85	-1044.15	0.00



30-015-43455

Cimarex Cottonberry 20 Federal 2H Survey MWD Off to 12651ft Survey Report (Def Survey)

Report Date: November 03, 2016 - 11:31 AM
Client: Cimarex Energy Co.
Field: NM Eddy County (NAD 83)
Structure / Slot: Cimarex Cottonberry 20 Federal 2H / Cimarex Cottonberry 20 Federal 2H
Well: Cimarex Cottonberry 20 Federal 2H
Borehole: Original Borehole
UWI / API#: Unknown / 30-015-43455
Survey Name: Cimarex Cottonberry 20 Federal 2H Survey MWD Off to 12651ft
Survey Date: October 18, 2016
Tort / AHD / DDI / ERD Ratio: 276.873 ° / 5946.575 ft / 6.450 / 0.804
Coordinate Reference System: NAD83 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 7' 23.79630", W 104° 12' 38.89901"
Location Grid N/E Y/X: N 408605.680 ftUS, E 579268.840 ftUS
CRS Grid Convergence Angle: 0.0652 °
Grid Scale Factor: 0.99991074
Version / Patch: 2.10.254.0

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 191.409 ° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: RKB = 25ft
TVD Reference Elevation: 3161.800 ft above MSL
Seabed / Ground Elevation: 3136.800 ft above MSL
Magnetic Declination: 7.501 °
Total Gravity Field Strength: 998.4478mgn (9.80665 Based)
Gravity Model: GARM
Total Magnetic Field Strength: 48104.031 nT
Magnetic Dip Angle: 59.890 °
Declination Date: October 18, 2016
Magnetic Declination Model: HDGM 2016
North Reference: Grid North
Grid Convergence Used: 0.0652 °
Total Corr Mag North->Grid North: 7.4361 °
Local Coord Referenced To: Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL Cimarex Cottonberry Federal Com 2H [195' FSL, 2165' FEL]	0.00	0.00	265.00	0.00	0.00	0.00	0.00	N/A	408605.68	579268.84	N 32 7 23.80	W 104 12 38.90
	118.00	0.88	325.74	118.00	-0.63	0.75	-0.51	0.75	408606.43	579268.33	N 32 7 23.80	W 104 12 38.90
	147.00	0.88	3.24	146.99	-1.01	1.16	-0.62	1.95	408606.84	579268.22	N 32 7 23.81	W 104 12 38.91
	270.00	0.49	356.19	269.98	-2.45	2.62	-0.60	0.32	408608.30	579268.24	N 32 7 23.82	W 104 12 38.91
	356.00	0.62	350.20	355.98	-3.24	3.45	-0.71	0.17	408609.13	579268.13	N 32 7 23.83	W 104 12 38.91
	416.00	0.40	329.04	415.98	-3.70	3.95	-0.87	0.48	408609.63	579267.97	N 32 7 23.84	W 104 12 38.91
	594.00	0.62	305.78	593.97	-4.55	5.04	-1.97	0.17	408610.72	579266.87	N 32 7 23.85	W 104 12 38.92
	654.00	0.71	339.97	653.97	-5.01	5.58	-2.36	0.67	408611.26	579266.48	N 32 7 23.85	W 104 12 38.93
	837.00	0.31	310.09	744.96	-5.79	6.52	-3.04	0.44	408612.20	579265.80	N 32 7 23.86	W 104 12 38.93
	928.00	0.49	323.23	836.95	-6.27	7.13	-3.68	0.55	408612.81	579265.16	N 32 7 23.87	W 104 12 38.94
	1019.00	0.71	304.85	927.95	-6.72	7.67	-4.03	0.20	408613.35	579264.81	N 32 7 23.87	W 104 12 38.95
	1110.00	0.62	303.75	1018.95	-7.23	8.32	-4.69	0.37	408614.00	579264.15	N 32 7 23.88	W 104 12 38.95
	1201.00	0.40	255.01	1109.94	-7.64	8.92	-5.56	0.10	408614.60	579263.28	N 32 7 23.88	W 104 12 38.96
	1291.00	0.09	8.94	1200.94	-7.69	9.11	-6.28	0.51	408614.79	579262.56	N 32 7 23.89	W 104 12 38.97
	1382.00	0.62	64.82	1381.93	-7.98	9.38	-6.11	0.49	408614.78	579262.27	N 32 7 23.89	W 104 12 38.98
	1476.00	0.40	58.38	1475.93	-8.51	9.77	-5.37	0.24	408615.06	579262.73	N 32 7 23.89	W 104 12 38.97
	1571.00	1.19	84.07	1570.92	-9.03	10.04	-4.11	0.89	408615.45	579263.47	N 32 7 23.89	W 104 12 38.96
	1666.00	1.41	86.98	1665.90	-9.62	10.21	-1.96	0.24	408615.72	579264.73	N 32 7 23.90	W 104 12 38.95
	1760.00	1.02	97.91	1759.88	-9.96	10.15	0.02	0.48	408615.89	579266.88	N 32 7 23.90	W 104 12 38.92
	1855.00	0.80	259.55	1854.87	-9.76	9.92	0.21	1.89	408615.83	579268.86	N 32 7 23.90	W 104 12 38.90
	1919.00	0.71	272.68	1918.87	-9.53	9.85	-0.63	0.30	408615.59	579269.05	N 32 7 23.89	W 104 12 38.90
									408615.53	579268.21	N 32 7 23.89	W 104 12 38.91

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 ° ' '')
	2042.00	0.62	251.71	2041.86	-9.09	9.68	-2.02	0.21	408615.36	579266.82	N 32° 7' 23.89"	W 104° 12' 38.92"
	2137.00	0.71	257.83	2136.85	-8.60	9.39	-3.09	0.12	408615.07	579265.75	N 32° 7' 23.89"	W 104° 12' 38.93"
	2232.00	0.60	259.80	2231.84	-8.18	9.18	-4.15	0.12	408614.86	579264.69	N 32° 7' 23.89"	W 104° 12' 38.95"
	2326.00	0.49	263.74	2325.84	-7.88	9.05	-5.03	0.12	408614.73	579263.81	N 32° 7' 23.89"	W 104° 12' 38.96"
	2420.00	0.49	262.55	2419.84	-7.62	8.96	-5.83	0.01	408614.63	579263.01	N 32° 7' 23.88"	W 104° 12' 38.97"
	2515.00	0.80	301.85	2514.83	-7.72	9.25	-6.80	0.55	408614.93	579262.04	N 32° 7' 23.89"	W 104° 12' 38.98"
	2609.00	0.40	261.66	2608.83	-7.84	9.55	-7.68	0.59	408615.23	579261.16	N 32° 7' 23.89"	W 104° 12' 38.99"
	2704.00	0.31	283.70	2703.82	-7.74	9.56	-8.26	0.17	408615.24	579260.58	N 32° 7' 23.89"	W 104° 12' 38.99"
	2799.00	0.31	249.11	2798.11	-7.61	9.53	-8.75	0.19	408615.21	579260.09	N 32° 7' 23.89"	W 104° 12' 39.00"
	2893.00	0.40	272.37	2892.82	-7.43	9.46	-9.31	0.18	408615.14	579259.53	N 32° 7' 23.89"	W 104° 12' 39.01"
	2988.00	0.40	267.35	2987.82	-7.29	9.45	-9.98	0.04	408615.13	579258.86	N 32° 7' 23.89"	W 104° 12' 39.01"
	3083.00	0.62	272.46	3082.82	-7.13	9.46	-10.82	0.24	408615.14	579258.02	N 32° 7' 23.89"	W 104° 12' 39.02"
	3177.00	0.49	279.60	3176.81	-7.04	9.55	-11.73	0.16	408615.23	579257.12	N 32° 7' 23.89"	W 104° 12' 39.04"
	3272.00	0.71	268.76	3271.81	-6.90	9.61	-12.71	0.26	408615.28	579256.13	N 32° 7' 23.89"	W 104° 12' 39.05"
	3366.00	0.71	251.13	3365.80	-6.48	9.40	-13.85	0.23	408615.08	579254.99	N 32° 7' 23.89"	W 104° 12' 39.06"
	3461.00	0.80	252.50	3460.79	-5.86	9.01	-15.04	0.10	408614.69	579253.80	N 32° 7' 23.89"	W 104° 12' 39.07"
	3555.00	0.80	249.11	3554.78	-5.19	8.58	-16.28	0.05	408614.26	579252.56	N 32° 7' 23.88"	W 104° 12' 39.09"
	3650.00	0.71	241.48	3649.77	-4.46	8.07	-17.41	0.14	408613.74	579251.43	N 32° 7' 23.88"	W 104° 12' 39.10"
	3745.00	0.62	252.72	3744.77	-3.84	7.63	-18.42	0.17	408613.31	579250.42	N 32° 7' 23.87"	W 104° 12' 39.11"
	3840.00	0.49	234.17	3839.76	-3.29	7.24	-19.24	0.23	408612.92	579249.60	N 32° 7' 23.87"	W 104° 12' 39.12"
	3934.00	0.62	222.53	3933.76	-2.56	6.63	-19.91	0.18	408612.31	579248.93	N 32° 7' 23.86"	W 104° 12' 39.13"
	4029.00	0.49	191.55	4028.75	-1.72	5.85	-20.34	0.34	408611.53	579248.50	N 32° 7' 23.85"	W 104° 12' 39.14"
	4124.00	0.40	212.31	4123.75	-1.00	5.18	-20.60	0.19	408610.86	579247.91	N 32° 7' 23.85"	W 104° 12' 39.14"
	4218.00	0.49	202.39	4217.75	-0.30	4.53	-20.93	0.13	408610.21	579247.18	N 32° 7' 23.84"	W 104° 12' 39.14"
	4313.00	2.61	251.31	4312.71	1.19	3.46	-23.13	2.44	408609.14	579245.71	N 32° 7' 23.83"	W 104° 12' 39.17"
	4408.00	5.04	260.25	4407.49	3.78	2.06	-29.29	2.63	408607.74	579239.55	N 32° 7' 23.82"	W 104° 12' 39.24"
	4502.00	5.35	259.24	4501.11	6.92	0.54	-37.67	0.34	408606.22	579231.18	N 32° 7' 23.80"	W 104° 12' 39.34"
	4597.00	5.04	258.32	4595.72	10.23	-1.13	-46.11	0.34	408604.55	579222.74	N 32° 7' 23.79"	W 104° 12' 39.44"
	4692.00	5.92	268.05	4690.28	13.00	-2.14	-55.09	1.34	408603.54	579213.76	N 32° 7' 23.78"	W 104° 12' 39.54"
	4787.00	5.83	267.97	4784.78	15.25	-2.48	-64.81	0.10	408603.20	579204.04	N 32° 7' 23.77"	W 104° 12' 39.65"
	4881.00	5.52	265.85	4878.32	17.57	-2.98	-74.09	0.40	408602.70	579194.76	N 32° 7' 23.77"	W 104° 12' 39.76"
	4976.00	5.40	262.30	4972.89	20.26	-3.91	-83.07	0.38	408601.77	579185.77	N 32° 7' 23.76"	W 104° 12' 39.87"
	5070.00	6.32	271.27	5066.40	22.62	-4.38	-92.63	1.38	408601.30	579176.22	N 32° 7' 23.75"	W 104° 12' 39.98"
	5165.00	7.64	269.38	5160.70	24.86	-4.34	-104.17	1.41	408601.34	579164.68	N 32° 7' 23.75"	W 104° 12' 40.11"
	5260.00	5.35	272.06	5255.08	26.89	-4.25	-114.92	2.43	408601.44	579153.93	N 32° 7' 23.76"	W 104° 12' 40.24"
	5354.00	5.04	287.80	5348.70	27.15	-2.83	-123.23	1.55	408602.85	579145.62	N 32° 7' 23.77"	W 104° 12' 40.33"
	5448.00	5.13	263.56	5442.34	27.97	-2.03	-131.34	2.27	408603.65	579137.52	N 32° 7' 23.78"	W 104° 12' 40.43"
	5543.00	4.50	257.90	5537.00	30.76	-3.29	-139.20	0.83	408602.39	579129.65	N 32° 7' 23.77"	W 104° 12' 40.52"
	5637.00	6.05	253.73	5630.60	34.53	-5.45	-147.56	1.70	408600.23	579121.29	N 32° 7' 23.74"	W 104° 12' 40.61"
	5732.00	5.83	261.44	5725.09	38.51	-7.57	-157.14	0.87	408598.11	579111.72	N 32° 7' 23.72"	W 104° 12' 40.73"
	5827.00	5.92	271.36	5819.60	41.01	-8.18	-166.81	1.07	408597.50	579102.05	N 32° 7' 23.72"	W 104° 12' 40.84"
	5921.00	4.11	269.68	5913.23	42.54	-8.08	-175.02	1.93	408597.60	579093.83	N 32° 7' 23.72"	W 104° 12' 40.93"
	6016.00	5.13	268.05	6007.92	44.21	-8.24	-182.67	1.08	408597.44	579086.18	N 32° 7' 23.72"	W 104° 12' 41.02"
	6110.00	4.42	269.38	6101.60	45.94	-8.43	-190.49	0.76	408597.26	579078.36	N 32° 7' 23.72"	W 104° 12' 41.11"
	6205.00	4.51	254.92	6196.31	48.37	-9.44	-197.76	1.19	408596.24	579071.10	N 32° 7' 23.71"	W 104° 12' 41.20"
	6299.00	5.52	264.66	6289.95	51.32	-10.82	-205.83	1.40	408594.86	579063.03	N 32° 7' 23.69"	W 104° 12' 41.29"
	6440.00	6.13	275.13	6430.23	54.10	-10.78	-220.08	0.87	408594.90	579048.78	N 32° 7' 23.69"	W 104° 12' 41.46"
	6535.00	5.65	272.61	6524.73	55.37	-10.11	-229.81	0.57	408595.57	579039.05	N 32° 7' 23.70"	W 104° 12' 41.57"
	6629.00	5.22	273.58	6618.30	56.66	-9.63	-238.70	0.47	408596.05	579030.17	N 32° 7' 23.70"	W 104° 12' 41.67"
	6723.00	5.20	269.22	6711.92	58.14	-9.42	-247.22	0.42	408596.26	579021.64	N 32° 7' 23.71"	W 104° 12' 41.77"
	6755.00	8.01	262.57	6743.70	59.17	-9.73	-250.89	9.09	408595.95	579017.98	N 32° 7' 23.70"	W 104° 12' 41.82"
	6786.00	11.96	261.87	6774.23	60.94	-10.47	-256.21	12.75	408595.22	579012.65	N 32° 7' 23.70"	W 104° 12' 41.88"
	6818.00	15.67	260.75	6805.29	63.57	-11.63	-263.76	11.62	408594.05	579005.10	N 32° 7' 23.68"	W 104° 12' 41.97"
	6865.00	20.47	259.82	6849.96	66.84	-14.10	-278.12	10.23	408591.58	578990.74	N 32° 7' 23.66"	W 104° 12' 42.13"
	6912.00	24.99	260.06	6893.30	75.48	-17.27	-296.00	9.62	408588.41	578972.87	N 32° 7' 23.63"	W 104° 12' 42.34"
	6959.00	31.05	260.59	6934.77	83.41	-20.97	-317.76	12.90	408584.71	578951.11	N 32° 7' 23.59"	W 104° 12' 42.59"
	7007.00	36.61	260.79	6974.63	92.86	-25.29	-344.12	11.59	408580.39	578924.75	N 32° 7' 23.55"	W 104° 12' 42.90"
	7054.00	43.25	259.56	7010.65	103.80	-30.46	-373.82	14.23	408575.23	578895.05	N 32° 7' 23.50"	W 104° 12' 43.25"

Final Extreme

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 ° ' ")
	7101.00	49.57	257.67	7043.04	117.01	-37.20	-407.17	13.76	408568.48	578861.71	N 32° 7' 23.43"	W 104° 12' 43.63"
	7148.00	56.72	256.99	7071.22	132.35	-45.45	-443.83	15.26	408560.23	578825.05	N 32° 7' 23.35"	W 104° 12' 44.06"
	7195.00	63.35	258.13	7094.68	148.79	-54.21	-483.57	14.26	408551.48	578785.31	N 32° 7' 23.27"	W 104° 12' 44.52"
	7242.00	70.74	259.18	7113.00	165.51	-62.70	-525.98	15.86	408542.98	578742.91	N 32° 7' 23.18"	W 104° 12' 45.02"
	7290.00	75.53	259.85	7126.92	182.63	-71.06	-571.13	10.07	408534.63	578697.76	N 32° 7' 23.10"	W 104° 12' 45.54"
	7337.00	77.27	259.70	7137.97	199.47	-79.17	-616.09	3.72	408526.52	578652.81	N 32° 7' 23.02"	W 104° 12' 46.06"
	7384.00	76.52	255.12	7148.63	218.08	-89.14	-660.75	9.62	408516.55	578608.15	N 32° 7' 22.92"	W 104° 12' 46.58"
	7432.00	76.88	249.61	7159.68	240.75	-103.29	-705.25	11.20	408502.40	578563.66	N 32° 7' 22.78"	W 104° 12' 47.10"
	7479.00	80.60	244.57	7168.86	266.74	-121.23	-747.68	13.16	408484.46	578521.23	N 32° 7' 22.61"	W 104° 12' 47.59"
	7526.00	83.72	238.61	7175.28	296.54	-143.38	-788.60	14.21	408462.31	578480.31	N 32° 7' 22.61"	W 104° 12' 48.07"
	7573.00	83.62	233.26	7180.46	329.83	-169.54	-827.29	11.32	408436.16	578441.63	N 32° 7' 22.13"	W 104° 12' 48.52"
	7620.00	82.75	227.31	7186.05	366.14	-199.34	-863.17	12.71	408406.36	578405.75	N 32° 7' 21.83"	W 104° 12' 48.94"
	7668.00	82.10	223.59	7192.38	405.56	-232.71	-897.07	7.80	408372.99	578371.85	N 32° 7' 21.50"	W 104° 12' 49.33"
	7715.00	82.13	217.84	7198.83	446.14	-267.98	-927.43	12.12	408337.72	578341.50	N 32° 7' 21.15"	W 104° 12' 49.69"
	7762.00	81.30	211.91	7205.61	488.78	-306.12	-954.01	12.61	408299.59	578314.92	N 32° 7' 20.78"	W 104° 12' 50.00"
	7809.00	80.84	205.56	7212.91	533.08	-346.81	-976.32	13.38	408258.90	578292.61	N 32° 7' 20.38"	W 104° 12' 50.26"
	7856.00	81.89	200.82	7219.97	578.56	-389.51	-994.61	10.22	408216.20	578274.32	N 32° 7' 19.95"	W 104° 12' 50.47"
	7903.00	83.13	195.10	7226.10	624.83	-433.82	-1008.97	12.35	408171.90	578259.96	N 32° 7' 19.51"	W 104° 12' 50.64"
	7951.00	83.90	189.51	7231.53	672.50	-480.40	-1019.13	11.68	408125.32	578249.80	N 32° 7' 19.05"	W 104° 12' 50.76"
First Take Point	7996.30	83.30	185.62	7236.58	717.41	-525.02	-1025.06	8.63	408080.71	578243.88	N 32° 7' 18.61"	W 104° 12' 50.82"
	8045.00	82.68	181.43	7242.53	765.28	-573.25	-1028.03	8.63	408032.48	578240.91	N 32° 7' 18.14"	W 104° 12' 50.86"
	8140.00	82.54	182.20	7254.75	858.17	-667.41	-1031.01	0.82	407938.33	578237.92	N 32° 7' 17.20"	W 104° 12' 50.90"
	8234.00	81.22	180.02	7268.03	949.72	-760.44	-1032.82	2.89	407845.31	578236.12	N 32° 7' 16.28"	W 104° 12' 50.92"
	8276.00	81.27	179.79	7274.42	990.40	-801.95	-1032.75	0.55	407803.80	578236.19	N 32° 7' 15.87"	W 104° 12' 50.92"
	8371.00	83.66	176.68	7286.88	1082.08	-896.07	-1029.84	4.11	407709.69	578239.09	N 32° 7' 14.94"	W 104° 12' 50.89"
	8465.00	84.49	173.36	7296.59	1171.76	-989.20	-1021.72	3.62	407616.57	578247.21	N 32° 7' 14.02"	W 104° 12' 50.79"
	8560.00	84.42	172.59	7305.77	1261.46	-1083.05	-1010.16	0.81	407522.73	578258.77	N 32° 7' 13.09"	W 104° 12' 50.66"
	8654.00	84.63	175.57	7314.74	1350.78	-1176.11	-1000.51	3.16	407429.68	578268.42	N 32° 7' 12.17"	W 104° 12' 50.55"
	8749.00	85.25	179.02	7323.12	1442.54	-1270.62	-996.05	3.68	407335.18	578272.88	N 32° 7' 11.23"	W 104° 12' 50.50"
	8843.00	85.80	181.22	7330.45	1534.43	-1364.32	-996.24	2.41	407241.48	578272.69	N 32° 7' 10.31"	W 104° 12' 50.50"
	8938.00	86.94	184.62	7336.47	1628.19	-1458.99	-1001.07	3.77	407146.82	578267.86	N 32° 7' 9.37"	W 104° 12' 50.56"
	9032.00	89.76	184.02	7339.18	1721.42	-1552.68	-1008.15	3.07	407053.14	578260.78	N 32° 7' 8.44"	W 104° 12' 50.64"
	9127.00	89.86	181.14	7339.49	1815.28	-1647.57	-1012.43	3.03	406958.26	578256.50	N 32° 7' 7.50"	W 104° 12' 50.69"
	9222.00	89.83	180.67	7339.75	1908.69	-1742.56	-1013.93	0.50	406863.28	578255.00	N 32° 7' 6.56"	W 104° 12' 50.71"
	9316.00	89.90	179.41	7339.97	2000.85	-1836.56	-1013.99	1.34	406769.29	578254.94	N 32° 7' 5.63"	W 104° 12' 50.71"
	9411.00	89.83	178.81	7340.19	2093.66	-1931.54	-1011.57	0.64	406674.31	578256.41	N 32° 7' 4.69"	W 104° 12' 50.70"
	9505.00	89.45	180.04	7340.78	2185.61	-2025.54	-1012.52	1.37	406580.33	578257.36	N 32° 7' 3.76"	W 104° 12' 50.69"
	9600.00	89.76	182.35	7341.44	2279.10	-2120.51	-1013.56	2.45	406485.37	578255.38	N 32° 7' 2.82"	W 104° 12' 50.71"
	9694.00	89.72	180.66	7341.87	2371.69	-2214.47	-1016.02	1.80	406391.41	578252.91	N 32° 7' 1.89"	W 104° 12' 50.74"
	9789.00	89.62	181.54	7342.41	2465.16	-2309.45	-1017.85	0.93	406296.44	578251.08	N 32° 7' 0.95"	W 104° 12' 50.76"
	9884.00	89.83	180.87	7342.87	2558.65	-2404.43	-1019.85	0.74	406201.47	578249.09	N 32° 7' 0.02"	W 104° 12' 50.79"
	9978.00	88.32	181.06	7344.39	2651.08	-2498.40	-1021.43	1.62	406107.51	578247.50	N 32° 6' 59.09"	W 104° 12' 50.81"
	10073.00	88.18	182.76	7347.29	2744.73	-2593.30	-1024.59	1.79	406012.62	578244.34	N 32° 6' 58.15"	W 104° 12' 50.85"
	10167.00	88.21	182.59	7350.25	2837.59	-2687.15	-1028.98	0.18	405918.78	578239.96	N 32° 6' 57.22"	W 104° 12' 50.90"
	10261.00	88.14	182.95	7353.24	2930.48	-2780.99	-1033.52	0.39	405824.94	578235.42	N 32° 6' 56.29"	W 104° 12' 50.95"
	10356.00	88.35	180.50	7356.15	3024.08	-2875.90	-1036.38	2.59	405730.05	578232.56	N 32° 6' 55.35"	W 104° 12' 50.99"
	10450.00	88.25	178.69	7358.94	3116.04	-2969.85	-1035.71	1.93	405636.10	578233.22	N 32° 6' 54.42"	W 104° 12' 50.98"
	10545.00	88.18	179.24	7361.90	3208.76	-3064.79	-1034.00	0.58	405541.17	578234.94	N 32° 6' 53.48"	W 104° 12' 50.96"
	10639.00	88.07	179.63	7364.98	3300.67	-3158.73	-1033.07	0.43	405447.24	578235.86	N 32° 6' 52.55"	W 104° 12' 50.95"
	10734.00	88.35	178.41	7367.94	3393.41	-3253.67	-1031.45	1.32	405352.31	578237.49	N 32° 6' 51.61"	W 104° 12' 50.93"
	10828.00	88.08	178.89	7370.87	3485.04	-3347.60	-1029.23	0.59	405258.39	578239.70	N 32° 6' 50.68"	W 104° 12' 50.91"
	10923.00	88.21	178.74	7373.95	3577.71	-3442.53	-1027.27	0.21	405163.47	578241.66	N 32° 6' 49.74"	W 104° 12' 50.89"
	11017.00	88.25	179.34	7376.85	3669.48	-3536.47	-1025.70	0.64	405069.53	578243.24	N 32° 6' 48.81"	W 104° 12' 50.87"
	11111.00	88.18	180.12	7379.78	3761.49	-3630.42	-1025.25	0.83	404975.59	578243.68	N 32° 6' 47.88"	W 104° 12' 50.87"
	11205.00	88.04	181.65	7382.88	3853.86	-3724.36	-1026.70	1.63	404881.66	578242.23	N 32° 6' 46.95"	W 104° 12' 50.89"
	11300.00	87.90	182.01	7386.24	3947.47	-3819.25	-1029.74	0.41	404786.78	578239.20	N 32° 6' 46.02"	W 104° 12' 50.92"
	11394.00	87.87	185.32	7389.71	4040.54	-3912.98	-1035.74	3.52	404693.06	578233.20	N 32° 6' 45.09"	W 104° 12' 50.99"

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 ° ' ")
	11488.00	88.35	188.56	7392.81	4134.19	-4006.23	-1047.09	3.48	404599.82	578221.85	N 32 6 44.17	W 104 12 51.13
	11583.00	88.55	185.43	7394.56	4228.88	-4100.49	-1058.66	3.53	404505.56	578210.28	N 32 6 43.23	W 104 12 51.26
	11677.00	91.65	180.46	7393.57	4321.82	-4194.33	-1063.48	5.74	404411.74	578205.45	N 32 6 42.30	W 104 12 51.32
	11772.00	91.48	176.34	7390.97	4414.32	-4289.23	-1060.83	4.34	404316.84	578208.10	N 32 6 41.36	W 104 12 51.29
	11866.00	90.10	176.54	7389.68	4505.12	-4383.04	-1055.00	1.48	404223.04	578213.94	N 32 6 40.44	W 104 12 51.22
	11961.00	89.42	177.88	7390.08	4597.18	-4477.92	-1050.21	1.40	404128.17	578218.73	N 32 6 39.50	W 104 12 51.17
	12055.00	89.59	180.38	7390.89	4688.98	-4571.89	-1048.62	2.88	404034.21	578220.32	N 32 6 38.57	W 104 12 51.15
	12150.00	89.69	179.49	7391.49	4782.08	-4666.89	-1048.51	0.94	403939.22	578220.43	N 32 6 37.63	W 104 12 51.15
	12244.00	89.79	179.05	7391.91	4873.97	-4760.88	-1047.31	0.48	403845.23	578221.63	N 32 6 36.70	W 104 12 51.14
	12339.00	89.62	179.07	7392.40	4966.78	-4855.87	-1045.75	0.18	403750.26	578223.18	N 32 6 35.76	W 104 12 51.12
	12434.00	89.76	179.98	7392.92	5059.74	-4950.86	-1044.96	0.97	403655.27	578223.97	N 32 6 34.82	W 104 12 51.11
	12528.00	89.66	179.97	7393.39	5151.87	-5044.86	-1044.92	0.11	403561.28	578224.01	N 32 6 33.89	W 104 12 51.11
Final Survey	12584.00	89.55	179.54	7393.78	5206.71	-5100.86	-1044.68	0.79	403505.29	578224.25	N 32 6 33.33	W 104 12 51.11
Prod to bit	12651.00	89.55	179.54	7394.30	5272.28	-5167.85	-1044.15	0.00	403438.30	578224.79	N 32 6 32.67	W 104 12 51.11

Survey Type: Def Survey

Survey Error Model: ISCSA 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	25.000	1/98.425	30.000	NAL_MWD_PLUS_0.5_DEG- Depth Only	Original Borehole / Cimarex Cottonberry 20 Federal 2H Survey MWD Off to 12651ft
	1	25.000	25.000	Act Sins	30.000	NAL_MWD_PLUS_0.5_DEG- Depth Only	Original Borehole / Cimarex Cottonberry 20 Federal 2H Survey MWD Off to 12651ft
	1	25.000	12651.000	Act Sins	30.000	NAL_MWD_PLUS_0.5_DEG	Original Borehole / Cimarex Cottonberry 20 Federal 2H Survey

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ARTESIA DISTRICT
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