

NM OIL CONSERVATION
ARTESIA DISTRICT

AUG 28 2018

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30-015-44600

Nabors M55

Chisholm Energy Holdings

Eddy County, NM (NAD 83) Cottonwood Fee SWD

API#

Cottonwood Fee SWD 1

Wellbore #1

Design: Actuals

Sperry Drilling Services Combo Report

07 August, 2018

Well Coordinates: 32
-104

North American Datum 1983
New Mexico Eastern Zone
371,532.00 N
542,703.30 E

Ground Level: 3,483.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Centered on Well Cottonwood Fee SWD 1
GE 3483 + 22 @ 3505.00usft (Nabors M55)

N

Grid

API US Survey Feet

Version: 5000.1 Build: 81E

Report Version: Midcon Combo v1.13

HALLIBURTON

Design Report for Cottonwood Fee SWD 1 - Actuals

Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Toolface Angle (°)	Comments
				Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)				
0.00	0.00	0.00	0.00	0.00 N	0.00 E	371,532.00	542,703.30	0.00	0.00	0.00	
147.00	1.86	125.00	146.97	1.37 S	1.95 E	371,530.63	542,705.25	1.27	0.10	125.00	
177.00	1.86	128.30	176.96	1.95 S	2.74 E	371,530.05	542,706.04	0.36	0.17	91.65	
237.00	1.77	123.70	236.93	3.07 S	4.27 E	371,528.93	542,707.57	0.29	0.28	-123.99	
297.00	1.84	104.93	296.90	3.83 S	5.97 E	371,528.17	542,709.27	0.99	0.00	-92.69	
355.00	2.75	90.74	354.85	4.09 S	8.26 E	371,527.91	542,711.56	1.84	-1.02	-39.20	
413.00	3.36	86.52	412.77	4.00 S	11.35 E	371,528.00	542,714.65	1.12	-2.75	-22.35	
507.00	4.01	81.72	506.58	3.36 S	17.35 E	371,528.64	542,720.65	0.76	-6.53	-27.80	
589.00	3.61	79.30	588.39	2.47 S	22.73 E	371,529.53	542,726.03	0.53	-10.18	-159.30	
627.00	3.44	79.18	626.32	2.03 S	25.02 E	371,529.97	542,728.32	0.45	-11.79	-177.57	
657.00	2.83	76.76	656.28	1.69 S	26.63 E	371,530.31	542,729.93	2.08	-12.94	-168.97	
691.00	2.35	80.41	690.24	1.39 S	28.13 E	371,530.61	542,731.43	1.49	-14.01	162.85	
723.00	2.17	85.29	722.22	1.23 S	29.38 E	371,530.77	542,732.68	0.82	-14.82	135.51	
754.00	1.81	86.99	753.20	1.15 S	30.46 E	371,530.85	542,733.76	1.18	-15.46	171.54	
786.00	1.39	77.31	785.19	1.04 S	31.34 E	371,530.96	542,734.64	1.56	-16.03	-152.01	
818.00	1.11	76.83	817.18	0.89 S	32.02 E	371,531.11	542,735.32	0.88	-16.53	-178.10	
850.00	0.85	64.24	849.17	0.71 S	32.54 E	371,531.29	542,735.84	1.05	-16.95	-146.55	
944.00	0.32	169.69	943.17	0.67 S	33.21 E	371,531.33	542,736.51	1.05	-17.35	161.75	
1,039.00	1.13	228.72	1,038.16	1.55 S	32.55 E	371,530.45	542,735.85	1.06	-16.26	74.90	
1,134.00	2.20	240.39	1,133.12	3.07 S	30.26 E	371,528.93	542,733.56	1.18	-13.75	23.47	
1,228.00	2.15	232.68	1,227.05	5.03 S	27.29 E	371,526.97	542,730.59	0.32	-10.49	-103.53	
1,323.00	1.84	225.09	1,322.00	7.18 S	24.80 E	371,524.82	542,728.10	0.43	-7.33	-143.31	
1,418.00	1.39	219.28	1,416.96	9.15 S	22.99 E	371,522.85	542,726.29	0.50	-4.70	-162.89	
1,513.00	1.30	223.37	1,511.93	10.83 S	21.52 E	371,521.17	542,724.82	0.14	-2.49	135.18	
1,608.00	1.20	241.28	1,606.91	12.09 S	19.90 E	371,519.91	542,723.20	0.42	-0.56	113.20	
1,618.00	1.22	232.87	1,616.91	12.20 S	19.73 E	371,519.80	542,723.03	1.79	-0.37	-87.79	
1,710.00	0.99	242.12	1,708.89	13.17 S	18.24 E	371,518.83	542,721.54	0.32	1.24	146.77	
1,805.00	0.94	240.93	1,803.88	13.93 S	16.84 E	371,518.07	542,720.14	0.06	2.64	-158.75	
1,900.00	0.88	245.30	1,898.87	14.61 S	15.49 E	371,517.39	542,718.79	0.10	3.94	133.01	
1,994.00	0.73	242.56	1,992.88	15.19 S	14.31 E	371,516.81	542,717.61	0.16	5.07	-166.97	
2,088.00	0.80	238.75	2,086.85	15.81 S	13.21 E	371,516.19	542,716.51	0.09	6.18	-37.92	
2,183.00	0.59	217.62	2,181.84	16.54 S	12.35 E	371,515.46	542,715.65	0.35	7.26	-139.57	
2,277.00	0.91	215.64	2,275.83	17.53 S	11.62 E	371,514.47	542,714.92	0.34	8.49	-5.62	
2,372.00	0.85	221.10	2,370.82	18.67 S	10.72 E	371,513.33	542,714.02	0.11	9.94	128.29	
2,467.00	1.01	196.93	2,465.81	20.00 S	10.01 E	371,512.00	542,713.31	0.44	11.44	-80.19	
2,561.00	1.01	201.11	2,559.79	21.57 S	9.47 E	371,510.43	542,712.77	0.08	13.05	92.09	

Design Report for Cottonwood Fee SWD 1 - Actuals

Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Toolface Angle (°)	Comments
				Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)				
2,656.00	1.15	219.30	2,654.78	23.09 S	8.56 E	371,508.91	542,711.86	0.39	14.82	77.05	
2,751.00	0.98	222.00	2,749.76	24.43 S	7.42 E	371,507.57	542,710.72	0.19	16.57	164.90	
2,845.00	1.06	223.37	2,843.75	25.66 S	6.28 E	371,506.34	542,709.58	0.09	18.22	17.64	
2,940.00	0.87	216.91	2,938.73	26.87 S	5.24 E	371,505.13	542,708.54	0.23	19.80	-153.41	
3,034.00	0.96	223.37	3,032.72	28.02 S	4.28 E	371,503.98	542,707.58	0.15	21.28	52.16	
3,130.00	1.10	232.60	3,128.71	29.16 S	2.99 E	371,502.84	542,706.29	0.23	22.94	54.52	
3,224.00	0.98	216.16	3,222.69	30.36 S	1.80 E	371,501.64	542,705.10	0.34	24.59	-119.99	
3,318.00	0.96	212.20	3,316.68	31.67 S	0.91 E	371,500.33	542,704.21	0.07	26.18	-108.59	
3,413.00	1.06	230.66	3,411.66	32.90 S	0.20 W	371,499.10	542,703.10	0.36	27.81	82.28	
3,507.00	1.19	226.47	3,505.64	34.13 S	1.58 W	371,497.87	542,701.72	0.16	29.59	-34.43	
3,602.00	1.13	227.54	3,600.62	35.44 S	2.98 W	371,496.56	542,700.32	0.07	31.45	160.68	
3,697.00	1.26	224.01	3,695.60	36.82 S	4.40 W	371,495.18	542,698.90	0.16	33.38	-31.30	
3,792.00	1.18	218.46	3,790.58	38.34 S	5.73 W	371,493.66	542,697.57	0.15	35.38	-126.85	
3,887.00	1.19	220.51	3,885.56	39.86 S	6.98 W	371,492.14	542,696.32	0.05	37.33	77.75	
3,981.00	1.36	211.57	3,979.54	41.55 S	8.20 W	371,490.45	542,695.10	0.28	39.41	-54.01	
4,076.00	1.56	210.79	4,074.51	43.62 S	9.45 W	371,488.38	542,693.85	0.21	41.83	-6.06	
4,171.00	1.03	203.90	4,169.48	45.51 S	10.46 W	371,486.49	542,692.84	0.58	43.96	-167.05	
4,265.00	0.95	208.66	4,263.47	46.97 S	11.18 W	371,485.03	542,692.12	0.12	45.58	136.57	
4,360.00	0.30	186.23	4,358.46	47.91 S	11.58 W	371,484.09	542,691.72	0.72	46.59	-170.34	
4,455.00	0.31	181.02	4,453.46	48.41 S	11.61 W	371,483.59	542,691.69	0.03	47.03	-72.79	
4,550.00	0.16	99.99	4,548.46	48.69 S	11.49 W	371,483.31	542,691.81	0.34	47.19	-150.99	
4,644.00	0.19	198.50	4,642.46	48.86 S	11.41 W	371,483.14	542,691.89	0.28	47.29	135.03	
4,738.00	0.19	144.25	4,736.46	49.13 S	11.37 W	371,482.87	542,691.93	0.18	47.50	-117.12	
4,833.00	0.19	171.96	4,831.46	49.42 S	11.25 W	371,482.58	542,692.05	0.10	47.68	103.85	
4,928.00	0.77	208.88	4,926.46	50.13 S	11.54 W	371,481.87	542,691.76	0.66	48.44	47.38	
5,022.00	0.62	221.65	5,020.45	51.07 S	12.18 W	371,480.93	542,691.12	0.23	49.57	140.00	
5,117.00	0.37	76.84	5,115.45	51.38 S	12.23 W	371,480.62	542,691.07	1.00	49.86	-167.06	
5,211.00	0.59	58.80	5,209.44	51.06 S	11.52 W	371,480.94	542,691.78	0.28	49.20	-43.73	
5,305.00	0.75	1.36	5,303.44	50.19 S	11.09 W	371,481.81	542,692.21	0.70	48.24	-106.42	
5,401.00	1.37	331.65	5,399.42	48.55 S	11.62 W	371,483.45	542,691.68	0.84	47.15	-57.06	
5,497.00	1.60	317.13	5,495.39	48.56 S	13.08 W	371,485.44	542,690.22	0.46	46.26	-65.96	
5,592.00	2.09	283.63	5,590.34	45.18 S	15.66 W	371,486.82	542,687.64	1.22	46.49	-82.70	
5,686.00	2.51	252.57	5,684.27	45.38 S	19.29 W	371,486.62	542,684.01	1.39	48.62	-87.54	
5,781.00	2.85	255.71	5,779.18	46.55 S	23.40 W	371,485.45	542,679.90	0.21	51.82	46.85	
5,875.00	1.43	272.37	5,873.12	47.04 S	26.68 W	371,484.96	542,676.62	1.43	54.00	162.24	
5,970.00	1.10	274.01	5,968.09	46.92 S	28.77 W	371,485.08	542,674.53	0.35	55.03	174.56	
6,064.00	0.68	250.12	6,062.08	47.05 S	30.20 W	371,484.95	542,673.10	0.59	55.91	-150.07	

Design Report for Cottonwood Fee SWD 1 - Actuals

Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate ("/100usft)	Vertical Section (usft)	Toolface Angle (°)	Comments
				Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)				
6,159.00	0.57	228.09	6,157.08	47.56 S	31.08 W	371,484.44	542,672.22	0.28	56.81	-125.34	
6,253.00	0.14	90.01	6,251.07	47.87 S	31.31 W	371,484.13	542,671.99	0.72	57.20	-172.10	
6,348.00	0.88	64.40	6,348.07	47.55 S	30.54 W	371,484.45	542,672.76	0.80	56.52	-30.20	
6,443.00	0.99	49.69	6,441.06	48.71 S	29.26 W	371,485.29	542,674.04	0.28	55.11	-72.85	
6,538.00	2.40	25.80	6,536.01	44.39 S	27.76 W	371,487.61	542,675.54	1.63	52.35	-38.90	
6,632.00	1.90	47.69	6,629.95	41.57 S	25.76 W	371,490.43	542,677.54	1.01	48.89	131.96	
6,727.00	1.41	19.52	6,724.91	39.40 S	24.20 W	371,492.60	542,679.10	0.98	46.23	-134.62	
6,821.00	1.23	335.82	6,818.89	37.39 S	24.23 W	371,494.61	542,679.07	1.06	44.55	-121.50	
6,915.00	0.83	281.34	6,912.87	36.34 S	25.31 W	371,495.66	542,677.99	1.07	44.25	-137.90	
7,010.00	0.22	171.79	7,007.87	36.38 S	25.96 W	371,495.62	542,677.34	0.98	44.64	-167.08	
7,105.00	1.04	98.02	7,102.87	36.68 S	25.08 W	371,495.32	542,678.22	1.05	44.42	-85.95	
7,200.00	0.87	123.22	7,197.85	37.20 S	23.62 W	371,494.80	542,679.68	0.47	44.06	124.31	
7,294.00	0.96	167.43	7,291.84	38.38 S	22.85 W	371,493.64	542,680.45	0.74	44.63	105.20	
7,388.00	0.82	159.23	7,385.83	39.76 S	22.44 W	371,492.24	542,680.86	0.20	45.58	-141.76	
7,477.00	1.23	189.87	7,474.82	41.29 S	22.38 W	371,490.71	542,680.92	0.75	46.84	69.18	
7,571.00	1.60	212.40	7,568.79	43.40 S	23.26 W	371,488.60	542,680.04	0.70	49.08	67.98	
7,666.00	2.00	223.75	7,663.74	45.71 S	25.11 W	371,486.29	542,678.19	0.56	52.04	47.48	
7,760.00	2.02	233.76	7,757.68	47.88 S	27.58 W	371,484.12	542,675.72	0.37	55.19	91.75	
7,854.00	1.88	229.69	7,851.63	49.85 S	30.09 W	371,482.15	542,673.21	0.21	58.21	-137.33	
7,918.00	2.50	225.70	7,915.58	51.51 S	31.89 W	371,480.49	542,671.41	1.00	60.58	-15.82	
8,011.00	2.73	214.68	8,008.49	54.75 S	34.61 W	371,477.25	542,668.69	0.59	64.77	-70.99	
8,105.00	2.72	218.56	8,102.38	58.33 S	37.27 W	371,473.67	542,666.03	0.20	69.22	95.04	
8,185.00	0.87	236.53	8,182.34	60.15 S	38.96 W	371,471.85	542,664.34	2.39	71.66	171.93	
8,280.00	1.30	323.28	8,277.33	59.68 S	40.21 W	371,472.32	542,663.09	1.60	71.94	121.52	
8,374.00	1.93	7.47	8,371.29	57.26 S	40.64 W	371,474.74	542,662.66	1.43	70.14	86.42	
8,469.00	1.16	343.03	8,466.26	54.75 S	40.71 W	371,477.25	542,662.59	1.05	68.07	-151.23	
8,563.00	0.85	50.42	8,560.25	53.40 S	40.45 W	371,478.60	542,662.85	1.22	66.79	136.72	
8,658.00	0.37	243.09	8,655.24	53.09 S	40.18 W	371,478.91	542,663.12	1.28	66.38	-176.17	
8,753.00	1.10	67.75	8,750.24	52.88 S	39.61 W	371,479.12	542,663.69	1.55	65.90	-176.51	
8,847.00	1.26	56.41	8,844.22	51.97 S	37.91 W	371,480.03	542,665.39	0.30	64.21	-61.34	
8,942.00	0.18	11.13	8,939.21	51.25 S	37.02 W	371,480.75	542,666.28	1.20	63.12	-173.56	
9,037.00	1.56	307.05	9,034.20	50.32 S	38.02 W	371,481.68	542,665.28	1.57	62.88	-70.32	
9,131.00	2.01	292.64	9,128.15	48.91 S	40.56 W	371,483.09	542,662.74	0.67	63.07	-52.28	
9,226.00	0.91	237.61	9,223.12	48.88 S	42.74 W	371,483.32	542,660.56	1.75	64.04	-153.39	
9,321.00	0.21	197.76	9,318.12	49.25 S	43.43 W	371,482.75	542,659.87	0.80	64.89	-169.81	
9,416.00	1.28	341.90	9,413.11	48.40 S	43.81 W	371,483.60	542,659.49	1.53	64.39	148.99	
9,510.00	2.44	27.08	9,507.06	45.62 S	43.22 W	371,486.38	542,660.08	1.90	61.73	75.72	

Design Report for Cottonwood Fee SWD 1 - Actuals

Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Toolface Angle (°)	Comments
				Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)				
9,605.00	2.72	62.06	9,601.97	42.77 S	40.31 W	371,489.23	542,662.99	1.66	57.76	97.70	
9,700.00	2.10	67.18	9,696.89	41.04 S	36.72 W	371,490.96	542,666.58	0.69	54.36	163.40	
9,794.00	1.80	70.69	9,790.84	39.88 S	33.74 W	371,492.12	542,669.56	0.34	51.78	160.04	
9,889.00	1.22	66.86	9,885.80	38.99 S	31.40 W	371,493.01	542,671.90	0.62	49.77	-172.04	
9,984.00	0.83	85.29	9,980.79	38.54 S	29.78 W	371,493.46	542,673.52	0.53	48.51	148.76	
10,079.00	0.65	88.78	10,075.78	38.47 S	28.56 W	371,493.53	542,674.74	0.20	47.80	167.68	
10,173.00	0.68	111.52	10,169.77	38.66 S	27.51 W	371,493.34	542,675.79	0.28	47.39	94.97	
10,270.00	0.63	125.66	10,266.77	39.18 S	26.54 W	371,492.82	542,676.76	0.17	47.31	114.18	
10,364.00	0.45	165.61	10,360.76	39.84 S	26.03 W	371,492.16	542,677.27	0.43	47.59	134.61	
10,459.00	0.50	186.92	10,455.76	40.61 S	25.98 W	371,491.39	542,677.32	0.19	48.21	85.03	
10,554.00	1.22	230.24	10,550.75	41.67 S	26.81 W	371,490.33	542,676.49	0.97	49.55	65.15	
10,649.00	1.80	220.34	10,645.72	43.46 S	28.55 W	371,488.54	542,674.75	0.67	51.99	-29.22	
10,743.00	1.66	163.69	10,739.68	45.89 S	29.13 W	371,486.11	542,674.17	1.75	54.35	-122.61	
10,838.00	1.83	184.98	10,834.64	48.72 S	28.87 W	371,483.28	542,674.43	0.70	56.60	86.11	
10,933.00	1.96	201.52	10,929.58	51.74 S	29.60 W	371,480.26	542,673.70	0.59	59.54	84.99	
11,028.00	0.81	248.41	11,024.56	53.50 S	30.82 W	371,478.50	542,672.48	1.61	61.68	157.19	
11,123.00	0.43	11.94	11,119.55	53.40 S	31.37 W	371,478.60	542,671.93	1.17	61.89	161.11	
11,218.00	1.05	70.38	11,214.55	52.76 S	30.48 W	371,479.24	542,672.82	0.95	60.86	82.39	
11,312.00	2.25	83.50	11,308.51	52.26 S	27.83 W	371,479.74	542,675.47	1.33	59.02	24.10	
11,407.00	2.59	111.94	11,403.43	52.85 S	23.99 W	371,479.15	542,679.31	1.30	57.44	88.71	
11,501.00	0.96	105.35	11,497.38	53.85 S	21.26 W	371,478.15	542,682.04	1.74	56.81	-176.15	
11,596.00	1.30	273.72	11,592.37	53.99 S	21.57 W	371,478.01	542,681.73	2.37	57.10	173.31	
11,691.00	1.53	271.00	11,687.34	53.90 S	23.91 W	371,478.10	542,679.39	0.25	58.29	-17.64	
12,950.00	0.77	183.86	12,946.15	62.05 S	41.29 W	371,469.95	542,662.01	0.13	74.52	-152.72	
13,000.00	0.77	183.86	12,996.15	62.72 S	41.33 W	371,469.28	542,661.97	0.00	75.11	0.00	Projection to TD - 13000.00' MD

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
13,000.00	12,996.15	-62.72	-41.33	Projection to TD - 13000.00' MD

Design Report for Cottonwood Fee SWD 1 - Actuals

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	212.65	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
147.00	11,691.00	HAL MWD	MWD
11,747.00	13,000.00	Projection to TD	Blind (OWSG)

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (°)	+N/-S (°)	+E/-W (°)	Northing (°)	Easting (°)	Latitude	Longitude
()									

Directional Difficulty Index

Average Dogleg over Survey:	0.65 °/100usft	Maximum Dogleg over Survey:	2.39 °/100usft at 8,185.00 usft
Net Tortousity applicable to Plans:	0.65 °/100usft	Directional Difficulty Index:	4.379

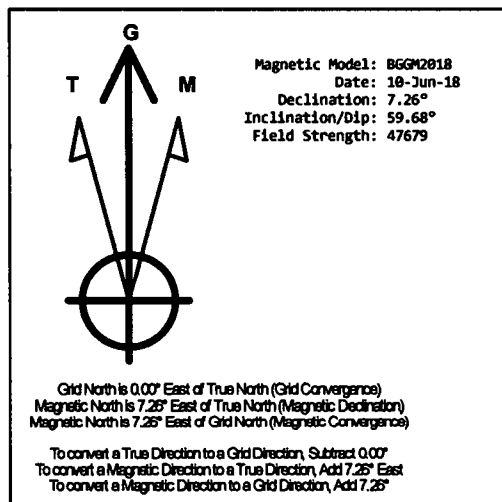
Audit Info

North Reference Sheet for Cottonwood Fee SWD - Cottonwood Fee SWD 1 - Wellbore #1

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.
Vertical Depths are relative to GE 3483 + 22 @ 3505.00usft (Nabors M55). Northing and Easting are relative to Cottonwood Fee SWD 1
Coordinate System is US State Plane 1983, New Mexico Eastern Zone using datum North American Datum 1983, ellipsoid GRS 1980
Projection method is Transverse Mercator (Gauss-Kruger)
Central Meridian is 104° 20' 0.000 W", Longitude Origin: 0° 0' 0.000 E", Latitude Origin: 0° 0' 0.000 N"
False Easting: 541,337.50usft, False Northing: 0.00usft, Scale Reduction: 0.99990909

Grid Coordinates of Well: 371,532.00 usft N, 542,703.30 usft E
Geographical Coordinates of Well: 32° 01' 17.12" N, 104° 19' 44.13" W
Grid Convergence at Surface is: 0.00°

Based upon Minimum Curvature type calculations, at a Measured Depth of 13,000.00usft
the Bottom Hole Displacement is 75.11usft in the Direction of 213.38° (Grid).
Magnetic Convergence at surface is: -7.26° (10 June 2018, , BGGM2018)



Chisholm Energy Holdings

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SURFACE LOCATION

US State Plane 1983
New Mexico Eastern Zone
Elevation: GE 3483 + 22 @ 3505.00usft (Nabors M55)
Northing 371532.00 Easting 542703.30 Latitude 32° 1' 17.117 N Longitude 104° 19' 44.135 W

Project: Eddy County, NM (NAD 83)
Site: Cottonwood Fee SWD
Well: Cottonwood Fee SWD 1
Wellbore: Wellbore #1
Design: Actuals
Rig: Nabors M55



Azimuths to Grid North
True North: 0.00°
Magnetic North: 7.26°

Magnetic Field
Strength: 47678.8snT
Dip Angle: 59.68°
Date: 6/10/2018
Model: BGGM2018

