



NM OIL CONSERVATION
ARTESIA DISTRICT

JAN 31 2019

RECEIVED

COG Operating, LLC

Eddy County, NM (NAD 27)

Sec 20, T19S, R28E

Bigfoot State Com #501H

Wellbore #1

30.015-45705

Plan: Design #2

QES Well Planning Report

23 January, 2019





Well Planning Report



Database: EDM 5000.1 Single User Db
Company: COG Operating, LLC
Project: Eddy County, NM (NAD 27)
Site: Sec 20, T19S, R28E
Well: Bigfoot State Com #501H
Wellbore: Wellbore #1
Design: Design #2

Local Co-ordinate Reference: Well Bigfoot State Com #501H
TVD Reference: KB=29' @ 3509.0usft (Noram #21)
MD Reference: KB=29' @ 3509.0usft (Noram #21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Project	Eddy County, NM (NAD 27)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Sec 20, T19S, R28E		
Site Position:		Northing:	597,367.00 usft
From:	Map	Easting:	539,602.30 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 38' 31.914 N
		Longitude:	104° 12' 16.837 W
		Grid Convergence:	0.07 °

Well	Bigfoot State Com #501H		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	Ground Level:
			3,480.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	User Defined	2/5/2019	7.35	60.36	47,878.00000000

Design	Design #2			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.0	0.0	0.0	93.18

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,100.0	1.00	180.00	2,100.0	-0.9	0.0	1.00	1.00	0.00	180.00	
6,622.7	1.00	180.00	6,622.0	-79.8	0.0	0.00	0.00	0.00	0.00	
7,498.3	88.00	116.30	7,190.1	-332.5	491.9	10.00	9.94	-7.28	-63.73	
8,838.9	88.00	89.47	7,237.8	-628.6	1,786.0	2.00	0.00	-2.00	-90.48	
17,015.4	88.00	89.47	7,523.0	-553.2	9,957.2	0.00	0.00	0.00	0.00	BSC #501 - PBHL - D

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North Reference:
Survey Calculation Method:

Well Bigfoot State Com #501H
 KB=29' @ 3509.0usft (Noram #21)
 KB=29' @ 3509.0usft (Noram #21)
 Grid
 Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
Rustler									
31.0	0.00	0.00	31.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
TOS									
125.0	0.00	0.00	125.0	0.0	0.0	0.0	0.00	0.00	0.00
BOS / Tansil									
175.0	0.00	0.00	175.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
Yates									
665.0	0.00	0.00	665.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
Seven Rivers									
1,016.0	0.00	0.00	1,016.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
Queen									
1,555.0	0.00	0.00	1,555.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
Grayburg									
1,894.0	0.00	0.00	1,894.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
Build 1°/100'									
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
EOB @ 1.00° Inc / 180.00° Azm									
2,100.0	1.00	180.00	2,100.0	-0.9	0.0	0.0	1.00	1.00	0.00
2,200.0	1.00	180.00	2,200.0	-2.6	0.0	0.1	0.00	0.00	0.00
2,300.0	1.00	180.00	2,300.0	-4.4	0.0	0.2	0.00	0.00	0.00
2,400.0	1.00	180.00	2,399.9	-6.1	0.0	0.3	0.00	0.00	0.00
2,500.0	1.00	180.00	2,499.9	-7.9	0.0	0.4	0.00	0.00	0.00
San Andres									
2,509.1	1.00	180.00	2,509.0	-8.0	0.0	0.4	0.00	0.00	0.00
Lovington Sand									
2,577.1	1.00	180.00	2,577.0	-9.2	0.0	0.5	0.00	0.00	0.00
2,600.0	1.00	180.00	2,599.9	-9.6	0.0	0.5	0.00	0.00	0.00
2,700.0	1.00	180.00	2,699.9	-11.3	0.0	0.6	0.00	0.00	0.00
2,800.0	1.00	180.00	2,799.9	-13.1	0.0	0.7	0.00	0.00	0.00
2,900.0	1.00	180.00	2,899.9	-14.8	0.0	0.8	0.00	0.00	0.00
3,000.0	1.00	180.00	2,999.9	-16.6	0.0	0.9	0.00	0.00	0.00
3,100.0	1.00	180.00	3,099.8	-18.3	0.0	1.0	0.00	0.00	0.00
3,200.0	1.00	180.00	3,199.8	-20.1	0.0	1.1	0.00	0.00	0.00



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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
3,300.0	1.00	180.00	3,299.8	-21.8	0.0	1.2	0.00	0.00	0.00
Bone Sprg (BSGL)									
3,308.2	1.00	180.00	3,308.0	-22.0	0.0	1.2	0.00	0.00	0.00
3,400.0	1.00	180.00	3,399.8	-23.6	0.0	1.3	0.00	0.00	0.00
3,500.0	1.00	180.00	3,499.8	-25.3	0.0	1.4	0.00	0.00	0.00
3,600.0	1.00	180.00	3,599.8	-27.1	0.0	1.5	0.00	0.00	0.00
3,700.0	1.00	180.00	3,699.8	-28.8	0.0	1.6	0.00	0.00	0.00
3,800.0	1.00	180.00	3,799.7	-30.5	0.0	1.7	0.00	0.00	0.00
U Avalon Sh									
3,825.3	1.00	180.00	3,825.0	-31.0	0.0	1.7	0.00	0.00	0.00
3,900.0	1.00	180.00	3,899.7	-32.3	0.0	1.8	0.00	0.00	0.00
L Avalon Sh									
3,982.3	1.00	180.00	3,982.0	-33.7	0.0	1.9	0.00	0.00	0.00
4,000.0	1.00	180.00	3,999.7	-34.0	0.0	1.9	0.00	0.00	0.00
Basal Avalon									
4,088.3	1.00	180.00	4,088.0	-35.6	0.0	2.0	0.00	0.00	0.00
4,100.0	1.00	180.00	4,099.7	-35.8	0.0	2.0	0.00	0.00	0.00
4,200.0	1.00	180.00	4,199.7	-37.5	0.0	2.1	0.00	0.00	0.00
4,300.0	1.00	180.00	4,299.7	-39.3	0.0	2.2	0.00	0.00	0.00
4,400.0	1.00	180.00	4,399.6	-41.0	0.0	2.3	0.00	0.00	0.00
4,500.0	1.00	180.00	4,499.6	-42.8	0.0	2.4	0.00	0.00	0.00
4,600.0	1.00	180.00	4,599.6	-44.5	0.0	2.5	0.00	0.00	0.00
4,700.0	1.00	180.00	4,699.6	-46.2	0.0	2.6	0.00	0.00	0.00
4,800.0	1.00	180.00	4,799.6	-48.0	0.0	2.7	0.00	0.00	0.00
4,900.0	1.00	180.00	4,899.6	-49.7	0.0	2.8	0.00	0.00	0.00
5,000.0	1.00	180.00	4,999.6	-51.5	0.0	2.9	0.00	0.00	0.00
5,100.0	1.00	180.00	5,099.5	-53.2	0.0	3.0	0.00	0.00	0.00
5,200.0	1.00	180.00	5,199.5	-55.0	0.0	3.0	0.00	0.00	0.00
5,300.0	1.00	180.00	5,299.5	-56.7	0.0	3.1	0.00	0.00	0.00
FBSG_sand									
5,320.5	1.00	180.00	5,320.0	-57.1	0.0	3.2	0.00	0.00	0.00
5,400.0	1.00	180.00	5,399.5	-58.5	0.0	3.2	0.00	0.00	0.00
5,500.0	1.00	180.00	5,499.5	-60.2	0.0	3.3	0.00	0.00	0.00
5,600.0	1.00	180.00	5,599.5	-62.0	0.0	3.4	0.00	0.00	0.00
5,700.0	1.00	180.00	5,699.4	-63.7	0.0	3.5	0.00	0.00	0.00
5,800.0	1.00	180.00	5,799.4	-65.4	0.0	3.6	0.00	0.00	0.00
5,900.0	1.00	180.00	5,899.4	-67.2	0.0	3.7	0.00	0.00	0.00
6,000.0	1.00	180.00	5,999.4	-68.9	0.0	3.8	0.00	0.00	0.00
6,100.0	1.00	180.00	6,099.4	-70.7	0.0	3.9	0.00	0.00	0.00
6,200.0	1.00	180.00	6,199.4	-72.4	0.0	4.0	0.00	0.00	0.00
6,300.0	1.00	180.00	6,299.4	-74.2	0.0	4.1	0.00	0.00	0.00
6,400.0	1.00	180.00	6,399.3	-75.9	0.0	4.2	0.00	0.00	0.00
6,500.0	1.00	180.00	6,499.3	-77.7	0.0	4.3	0.00	0.00	0.00
6,600.0	1.00	180.00	6,599.3	-79.4	0.0	4.4	0.00	0.00	0.00
Build 10°/100'									
6,622.7	1.00	180.00	6,622.0	-79.8	0.0	4.4	0.00	0.00	0.00
6,650.0	3.30	132.03	6,649.3	-80.6	0.6	5.1	10.00	8.41	-175.66
6,700.0	8.22	122.49	6,699.0	-83.5	4.7	9.3	10.00	9.85	-19.09
6,750.0	13.20	120.09	6,748.1	-88.2	12.6	17.5	10.00	9.96	-4.79
6,800.0	18.19	119.00	6,796.3	-94.9	24.4	29.6	10.00	9.98	-2.19
6,850.0	23.19	118.36	6,843.0	-103.4	39.9	45.6	10.00	9.99	-1.27
6,900.0	28.19	117.94	6,888.1	-113.6	59.0	65.2	10.00	9.99	-0.84
SBSG_sand									



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6,924.0	30.59	117.79	6,909.0	-119.1	69.4	75.9	10.00	9.99	-0.65
6,950.0	33.18	117.64	6,931.0	-125.5	81.6	88.4	10.00	10.00	-0.56
7,000.0	38.18	117.41	6,971.6	-138.9	107.4	115.0	10.00	10.00	-0.46
7,050.0	43.18	117.22	7,009.5	-153.9	136.4	144.7	10.00	10.00	-0.37
7,100.0	48.18	117.07	7,044.5	-170.2	168.2	177.4	10.00	10.00	-0.31
7,150.0	53.18	116.94	7,076.1	-187.8	202.7	212.8	10.00	10.00	-0.26
7,200.0	58.18	116.83	7,104.3	-206.4	239.5	250.6	10.00	10.00	-0.23
7,250.0	63.18	116.72	7,128.8	-226.1	278.4	290.5	10.00	10.00	-0.21
7,300.0	68.18	116.63	7,149.4	-246.5	319.1	332.3	10.00	10.00	-0.19
7,350.0	73.18	116.54	7,165.9	-267.6	361.3	375.6	10.00	10.00	-0.18
7,400.0	78.17	116.46	7,178.3	-289.2	404.6	420.0	10.00	10.00	-0.17
7,450.0	83.17	116.38	7,186.4	-311.2	448.8	465.4	10.00	10.00	-0.16
EOC @ 88.00° Inc / 116.30° Azm / 7190.1' TVD - Turn 2°/100'									
7,498.3	88.00	116.30	7,190.1	-332.5	491.9	509.6	10.00	10.00	-0.16
7,500.0	88.00	116.27	7,190.2	-333.3	493.5	511.2	2.00	-0.02	-2.00
7,600.0	87.98	114.26	7,193.7	-375.9	583.8	603.8	2.00	-0.02	-2.00
7,700.0	87.97	112.26	7,197.2	-415.4	675.6	697.6	2.00	-0.01	-2.00
7,800.0	87.96	110.26	7,200.8	-451.6	768.8	792.6	2.00	-0.01	-2.00
7,900.0	87.95	108.26	7,204.3	-484.6	863.1	888.7	2.00	-0.01	-2.00
8,000.0	87.95	106.26	7,207.9	-514.2	958.5	985.6	2.00	-0.01	-2.00
8,100.0	87.94	104.26	7,211.5	-540.5	1,054.9	1,083.3	2.00	0.00	-2.00
8,200.0	87.94	102.26	7,215.1	-563.5	1,152.2	1,181.7	2.00	0.00	-2.00
8,300.0	87.95	100.26	7,218.7	-583.0	1,250.2	1,280.6	2.00	0.00	-2.00
8,400.0	87.95	98.25	7,222.2	-599.0	1,348.9	1,380.0	2.00	0.00	-2.00
8,500.0	87.96	96.25	7,225.8	-611.7	1,448.0	1,479.7	2.00	0.01	-2.00
8,600.0	87.97	94.25	7,229.4	-620.8	1,547.5	1,579.6	2.00	0.01	-2.00
8,700.0	87.98	92.25	7,232.9	-626.5	1,647.3	1,679.5	2.00	0.01	-2.00
8,800.0	87.99	90.25	7,236.4	-628.6	1,747.2	1,779.4	2.00	0.01	-2.00
EOT @ 89.47° Azm									
8,838.9	88.00	89.47	7,237.8	-628.6	1,786.0	1,818.1	2.00	0.02	-2.00
8,900.0	88.00	89.47	7,239.9	-628.0	1,847.1	1,879.1	0.00	0.00	0.00
9,000.0	88.00	89.47	7,243.4	-627.1	1,947.0	1,978.8	0.00	0.00	0.00
9,100.0	88.00	89.47	7,246.9	-626.1	2,047.0	2,078.6	0.00	0.00	0.00
9,200.0	88.00	89.47	7,250.4	-625.2	2,146.9	2,178.3	0.00	0.00	0.00
9,300.0	88.00	89.47	7,253.8	-624.3	2,246.9	2,278.0	0.00	0.00	0.00
SBSG_sand base									
9,304.3	88.00	89.47	7,254.0	-624.3	2,251.2	2,282.3	0.00	0.00	0.00
9,400.0	88.00	89.47	7,257.3	-623.4	2,346.8	2,377.8	0.00	0.00	0.00
9,500.0	88.00	89.47	7,260.8	-622.5	2,446.7	2,477.5	0.00	0.00	0.00
9,600.0	88.00	89.47	7,264.3	-621.5	2,546.7	2,577.2	0.00	0.00	0.00
9,700.0	88.00	89.47	7,267.8	-620.6	2,646.6	2,676.9	0.00	0.00	0.00
9,800.0	88.00	89.47	7,271.3	-619.7	2,746.5	2,776.7	0.00	0.00	0.00
9,900.0	88.00	89.47	7,274.8	-618.8	2,846.5	2,876.4	0.00	0.00	0.00
10,000.0	88.00	89.47	7,278.3	-617.9	2,946.4	2,976.1	0.00	0.00	0.00
10,100.0	88.00	89.47	7,281.8	-616.9	3,046.3	3,075.9	0.00	0.00	0.00
10,200.0	88.00	89.47	7,285.2	-616.0	3,146.3	3,175.6	0.00	0.00	0.00
10,300.0	88.00	89.47	7,288.7	-615.1	3,246.2	3,275.3	0.00	0.00	0.00
10,400.0	88.00	89.47	7,292.2	-614.2	3,346.1	3,375.1	0.00	0.00	0.00
10,500.0	88.00	89.47	7,295.7	-613.2	3,446.1	3,474.8	0.00	0.00	0.00
10,600.0	88.00	89.47	7,299.2	-612.3	3,546.0	3,574.5	0.00	0.00	0.00
10,700.0	88.00	89.47	7,302.7	-611.4	3,645.9	3,674.2	0.00	0.00	0.00
10,800.0	88.00	89.47	7,306.2	-610.5	3,745.9	3,774.0	0.00	0.00	0.00
10,900.0	88.00	89.47	7,309.7	-609.6	3,845.8	3,873.7	0.00	0.00	0.00

Database: EDM 5000.1 Single User Db
Company: COG Operating, LLC
Project: Eddy County, NM (NAD 27)
Site: Sec 20, T19S, R28E
Well: Bigfoot State Com #501H
Wellbore: Wellbore #1
Design: Design #2

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:

Well Bigfoot State Com #501H
 KB=29' @ 3509.0usft (Noram #21)
 KB=29' @ 3509.0usft (Noram #21)
 Grid
 Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
11,000.0	88.00	89.47	7,313.2	-608.6	3,945.7	3,973.4	0.00	0.00	0.00
11,100.0	88.00	89.47	7,316.6	-607.7	4,045.7	4,073.2	0.00	0.00	0.00
11,200.0	88.00	89.47	7,320.1	-606.8	4,145.6	4,172.9	0.00	0.00	0.00
11,300.0	88.00	89.47	7,323.6	-605.9	4,245.5	4,272.6	0.00	0.00	0.00
11,400.0	88.00	89.47	7,327.1	-604.9	4,345.5	4,372.4	0.00	0.00	0.00
11,500.0	88.00	89.47	7,330.6	-604.0	4,445.4	4,472.1	0.00	0.00	0.00
11,600.0	88.00	89.47	7,334.1	-603.1	4,545.4	4,571.8	0.00	0.00	0.00
11,700.0	88.00	89.47	7,337.6	-602.2	4,645.3	4,671.5	0.00	0.00	0.00
11,800.0	88.00	89.47	7,341.1	-601.3	4,745.2	4,771.3	0.00	0.00	0.00
11,900.0	88.00	89.47	7,344.6	-600.3	4,845.2	4,871.0	0.00	0.00	0.00
12,000.0	88.00	89.47	7,348.0	-599.4	4,945.1	4,970.7	0.00	0.00	0.00
12,100.0	88.00	89.47	7,351.5	-598.5	5,045.0	5,070.5	0.00	0.00	0.00
12,200.0	88.00	89.47	7,355.0	-597.6	5,145.0	5,170.2	0.00	0.00	0.00
12,300.0	88.00	89.47	7,358.5	-596.7	5,244.9	5,269.9	0.00	0.00	0.00
12,400.0	88.00	89.47	7,362.0	-595.7	5,344.8	5,369.7	0.00	0.00	0.00
12,500.0	88.00	89.47	7,365.5	-594.8	5,444.8	5,469.4	0.00	0.00	0.00
12,600.0	88.00	89.47	7,369.0	-593.9	5,544.7	5,569.1	0.00	0.00	0.00
12,700.0	88.00	89.47	7,372.5	-593.0	5,644.6	5,668.8	0.00	0.00	0.00
12,800.0	88.00	89.47	7,375.9	-592.0	5,744.6	5,768.6	0.00	0.00	0.00
12,900.0	88.00	89.47	7,379.4	-591.1	5,844.5	5,868.3	0.00	0.00	0.00
13,000.0	88.00	89.47	7,382.9	-590.2	5,944.4	5,968.0	0.00	0.00	0.00
13,100.0	88.00	89.47	7,386.4	-589.3	6,044.4	6,067.8	0.00	0.00	0.00
13,200.0	88.00	89.47	7,389.9	-588.4	6,144.3	6,167.5	0.00	0.00	0.00
13,300.0	88.00	89.47	7,393.4	-587.4	6,244.2	6,267.2	0.00	0.00	0.00
13,400.0	88.00	89.47	7,396.9	-586.5	6,344.2	6,366.9	0.00	0.00	0.00
13,500.0	88.00	89.47	7,400.4	-585.6	6,444.1	6,466.7	0.00	0.00	0.00
13,600.0	88.00	89.47	7,403.9	-584.7	6,544.1	6,566.4	0.00	0.00	0.00
13,700.0	88.00	89.47	7,407.3	-583.8	6,644.0	6,666.1	0.00	0.00	0.00
13,800.0	88.00	89.47	7,410.8	-582.8	6,743.9	6,765.9	0.00	0.00	0.00
13,900.0	88.00	89.47	7,414.3	-581.9	6,843.9	6,865.6	0.00	0.00	0.00
14,000.0	88.00	89.47	7,417.8	-581.0	6,943.8	6,965.3	0.00	0.00	0.00
14,100.0	88.00	89.47	7,421.3	-580.1	7,043.7	7,065.1	0.00	0.00	0.00
14,200.0	88.00	89.47	7,424.8	-579.1	7,143.7	7,164.8	0.00	0.00	0.00
14,300.0	88.00	89.47	7,428.3	-578.2	7,243.6	7,264.5	0.00	0.00	0.00
14,400.0	88.00	89.47	7,431.8	-577.3	7,343.5	7,364.2	0.00	0.00	0.00
14,500.0	88.00	89.47	7,435.3	-576.4	7,443.5	7,464.0	0.00	0.00	0.00
14,600.0	88.00	89.47	7,438.7	-575.5	7,543.4	7,563.7	0.00	0.00	0.00
14,700.0	88.00	89.47	7,442.2	-574.5	7,643.3	7,663.4	0.00	0.00	0.00
14,800.0	88.00	89.47	7,445.7	-573.6	7,743.3	7,763.2	0.00	0.00	0.00
14,900.0	88.00	89.47	7,449.2	-572.7	7,843.2	7,862.9	0.00	0.00	0.00
15,000.0	88.00	89.47	7,452.7	-571.8	7,943.1	7,962.6	0.00	0.00	0.00
15,100.0	88.00	89.47	7,456.2	-570.9	8,043.1	8,062.4	0.00	0.00	0.00
15,200.0	88.00	89.47	7,459.7	-569.9	8,143.0	8,162.1	0.00	0.00	0.00
15,300.0	88.00	89.47	7,463.2	-569.0	8,242.9	8,261.8	0.00	0.00	0.00
15,400.0	88.00	89.47	7,466.6	-568.1	8,342.9	8,361.5	0.00	0.00	0.00
15,500.0	88.00	89.47	7,470.1	-567.2	8,442.8	8,461.3	0.00	0.00	0.00
15,600.0	88.00	89.47	7,473.6	-566.2	8,542.7	8,561.0	0.00	0.00	0.00
15,700.0	88.00	89.47	7,477.1	-565.3	8,642.7	8,660.7	0.00	0.00	0.00
15,800.0	88.00	89.47	7,480.6	-564.4	8,742.6	8,760.5	0.00	0.00	0.00
15,900.0	88.00	89.47	7,484.1	-563.5	8,842.6	8,860.2	0.00	0.00	0.00
16,000.0	88.00	89.47	7,487.6	-562.6	8,942.5	8,959.9	0.00	0.00	0.00
16,100.0	88.00	89.47	7,491.1	-561.6	9,042.4	9,059.7	0.00	0.00	0.00
16,200.0	88.00	89.47	7,494.6	-560.7	9,142.4	9,159.4	0.00	0.00	0.00
16,300.0	88.00	89.47	7,498.0	-559.8	9,242.3	9,259.1	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Bigfoot State Com #501H
Company:	COG Operating, LLC	TVD Reference:	KB=29' @ 3509.0usft (Noram #21)
Project:	Eddy County, NM (NAD 27)	MD Reference:	KB=29' @ 3509.0usft (Noram #21)
Site:	Sec 20, T19S, R28E	North Reference:	Grid
Well:	Bigfoot State Com #501H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
16,400.0	88.00	89.47	7,501.5	-558.9	9,342.2	9,358.8	0.00	0.00	0.00	
16,500.0	88.00	89.47	7,505.0	-557.9	9,442.2	9,458.6	0.00	0.00	0.00	
16,600.0	88.00	89.47	7,508.5	-557.0	9,542.1	9,558.3	0.00	0.00	0.00	
16,700.0	88.00	89.47	7,512.0	-556.1	9,642.0	9,658.0	0.00	0.00	0.00	
16,800.0	88.00	89.47	7,515.5	-555.2	9,742.0	9,757.8	0.00	0.00	0.00	
16,900.0	88.00	89.47	7,519.0	-554.3	9,841.9	9,857.5	0.00	0.00	0.00	
17,000.0	88.00	89.47	7,522.5	-553.3	9,941.8	9,957.2	0.00	0.00	0.00	
TD @ 17015.4' MD / 7523.0' TVD										
17,015.4	88.00	89.47	7,523.0	-553.2	9,957.2	9,972.6	0.00	0.00	0.00	

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
BSC #501 - LTP	0.00	0.00	0.0	-553.6	9,907.2	596,813.40	549,509.50	32° 38' 26.302 N	104° 10' 20.979 W	
- hit/miss target										
- Shape										
- Point										
- plan misses target center by 7516.7usft at 16703.0usft MD (7512.1 TVD, -556.1 N, 9645.0 E)										
BSC #501 - FTP	0.00	0.00	0.0	-647.8	-311.7	596,719.20	539,290.60	32° 38' 25.507 N	104° 12' 20.492 W	
- plan misses target center by 718.9usft at 0.0usft MD (0.0 TVD, 0.0 N, 0.0 E)										
- Point										
BSC #501 - PBHL - D#2	0.00	0.00	7,523.0	-553.2	9,957.2	596,813.80	549,559.50	32° 38' 26.305 N	104° 10' 20.395 W	
- plan hits target center										
- Point										

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
31.0	31.0	Rustler				
125.0	125.0	TOS				
175.0	175.0	BOS / Tansil				
665.0	665.0	Yates				
1,016.0	1,016.0	Seven Rivers				
1,555.0	1,555.0	Queen				
1,894.0	1,894.0	Grayburg				
2,509.1	2,509.0	San Andres				
2,577.1	2,577.0	Lovington Sand				
3,308.2	3,308.0	Bone Sprg (BSGL)				
3,825.3	3,825.0	U Avalon Sh				
3,982.3	3,982.0	L Avalon Sh				
4,088.3	4,088.0	Basal Avalon				
5,320.5	5,320.0	FBSG_sand				
6,924.0	6,909.0	SBSG_sand				
9,304.3	7,254.0	SBSG_sand base				

Sec 20, T19S, R28E
Bigfoot State Co #501H
Q181™ & WT-181™
Design #2

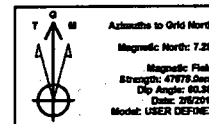
Company Name: COG Operating, LLC
Bigfoot State Co #501H
Eddy County, NM (NAD 27)
Rig: Moran 821
Created by: Keith Hock
Date: 9/27, January 23 2018

PROJECT DETAILS: Eddy County, NM (NAD 27)
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1886
Zone: New Mexico East 3001
System Datum: Mean Sea Level

WELL DETAILS: Bigfoot State Co #501H

Ground Level: 5480.0

+N-S	+E-W	North	East	Latitude	Longitude
0.0	0.0	687367.00	638802.30	32° 38' 51.914 N	104° 12' 18.527 W

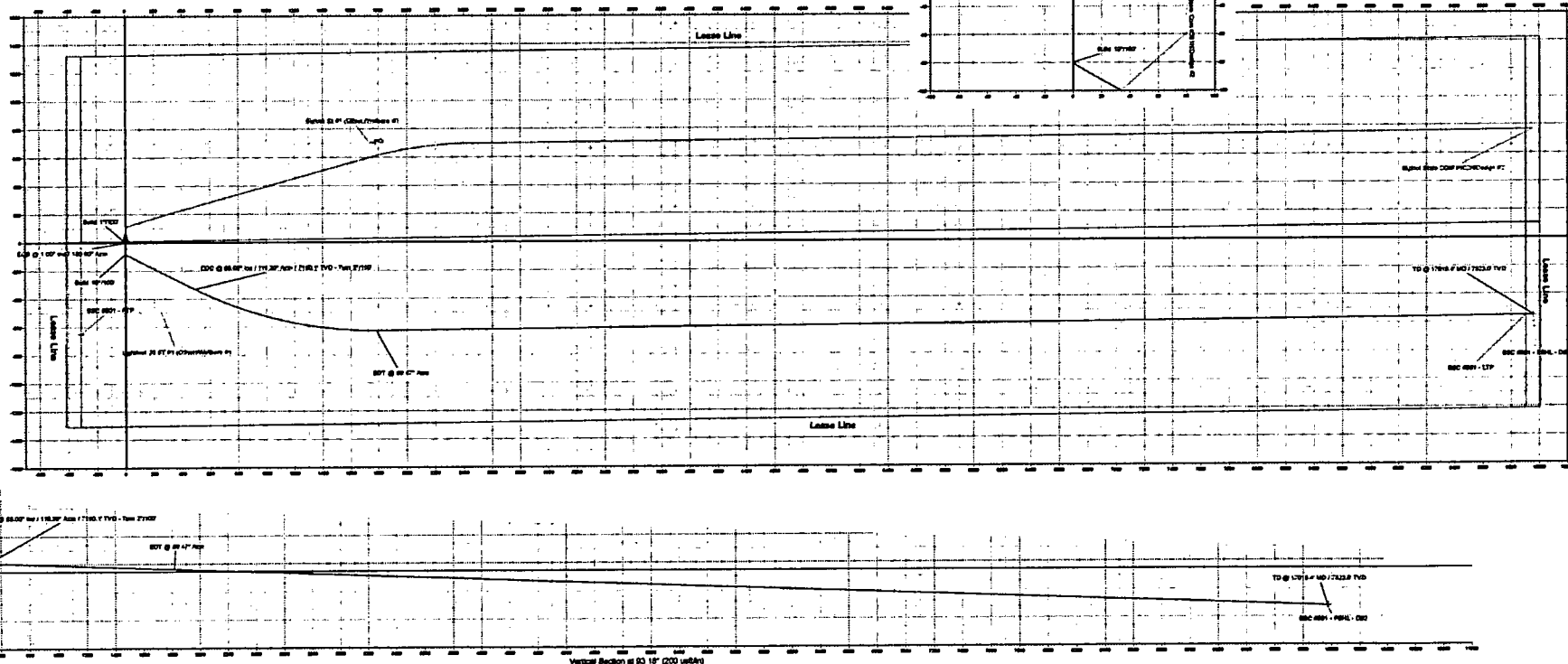
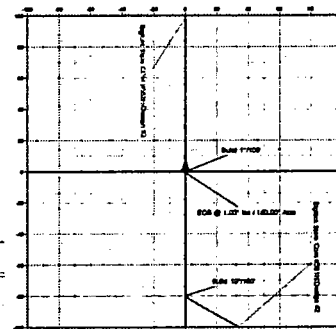


DESIGN TARGET DETAILS

Name	TYD	+N-S	+E-W	North	East	Latitude	Longitude
BSC #501 - PTP	0.0	-447.8	-311.7	386719.20	638299.80	32° 38' 25.507 N	104° 12' 20.492 W
BSC #501 - LTP	0.0	-453.6	-307.2	386813.60	640009.30	32° 38' 38.302 N	104° 10' 20.970 W
BSC #501 - PBL - D62	7523.8	-453.2	-307.2	386813.60	640009.30	32° 38' 38.302 N	104° 10' 20.970 W

SECTION DETAILS

MD	Inc	Az	TYD	+N-S	+E-W	Diag	TPace	VFact	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	Build 17100'
2000.0	0.00	0.00	2000.0	0.0	0.0	0.00	0.00	0.0	SOB @ 1.00' Inc / 100.00' Azm
2100.0	1.00	180.00	2100.0	-0.0	0.0	1.00	180.00	0.0	Build 197100'
6822.7	1.00	180.00	6822.8	-79.5	0.0	0.00	0.00	4.4	BOC @ 05.00' Inc / 118.30' Azm / 7180.1' TYD - Turn 27100'
7486.3	08.00	118.30	7180.1	-323.5	491.0	10.00	-43.73	90.8	BOY @ 08.47' Azm
6833.8	08.00	08.47	7237.8	-428.8	1786.0	2.00	-49.48	1818.1	TD @ 17015.4' MD / 7523.8' TYD
17015.4	08.00	08.47	7523.8	-453.2	8957.2	0.00	0.00	8772.8	



Vertical Section at 03 18' (200 scale)