



HOBBS OCD
NOV 01 2018
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COG Operating, LLC

Lea County, NM
Sec 9, T25-S, R35-E
Fez Federal Com #604H

Wellbore #1

Plan: Design #1

QES Well Planning Report

28 February, 2018





Well Planning Report

QES

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Fez Federal Com #604H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3292.0usft (Noram #21)
Project:	Lea County, NM	MD Reference:	Well @ 3292.0usft (Noram #21)
Site:	Sec 9, T25-S, R35-E	North Reference:	Grid
Well:	Fez Federal Com #604H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Project:	Lea County, NM		
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 9, T25-S, R35-E
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Site Position:	Map	Northing:	419,852.10 usft	Latitude:	32° 8' 2.515 N
From:		Easting:	795,067.30 usft	Longitude:	103° 22' 47.797 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.51 °

Well:	Fez Federal Com #604H
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Well Position	+N/-S	-4,515.1 usft	Northing:	415,336.99 usft	Latitude:	32° 8' 17.812 N
	+E/-W	300.2 usft	Easting:	795,367.51 usft	Longitude:	103° 22' 44.771 W
Position Uncertainty		0.0 usft	Wellhead Elevation:		Ground Level:	3,283.0 usft

Wellbore	Wellbore #1
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	2/21/2018	6.78	60.01	47,838.33118513

Design:	Design #1
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Audit Notes:	
Version:	Phase: PLAN Tie On Depth: 0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	359.57

Plan Sections	
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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	
11,844.8	0.00	0.00	11,844.8	0.0	0.0	0.00	0.00	0.00	0.00	
12,596.3	90.18	359.57	12,322.2	479.0	-3.6	12.00	12.00	0.00	359.57	
22,220.5	90.18	359.57	12,292.0	10,102.9	-75.6	0.00	0.00	0.00	0.00	0.00 PBHL- Fez Fed Coi



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Well:	Fez Federal Com #604H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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
100.0	0.00	0.00	100.0	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
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
Rustler									
873.0	0.00	0.00	873.0	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
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
TOS									
1,214.0	0.00	0.00	1,214.0	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
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
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	0.00
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	0.00
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	0.00
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	0.00
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	0.00
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	0.00
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	0.00
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	0.00
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	0.00
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	0.00
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	0.00



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Wellbore:	Wellbore #1		
Design:	Design #1		

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)
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.0	0.00	0.00	0.00
BOS (Fletcher)									
5,009.0	0.00	0.00	5,009.0	0.0	0.0	0.0	0.00	0.00	0.00
5,100.0	0.00	0.00	5,100.0	0.0	0.0	0.0	0.00	0.00	0.00
5,200.0	0.00	0.00	5,200.0	0.0	0.0	0.0	0.00	0.00	0.00
5,300.0	0.00	0.00	5,300.0	0.0	0.0	0.0	0.00	0.00	0.00
LMAR (Top Delaware)									
5,340.0	0.00	0.00	5,340.0	0.0	0.0	0.0	0.00	0.00	0.00
BLCN									
5,372.0	0.00	0.00	5,372.0	0.0	0.0	0.0	0.00	0.00	0.00
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	0.00
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	0.00
5,600.0	0.00	0.00	5,600.0	0.0	0.0	0.0	0.00	0.00	0.00
5,700.0	0.00	0.00	5,700.0	0.0	0.0	0.0	0.00	0.00	0.00
5,800.0	0.00	0.00	5,800.0	0.0	0.0	0.0	0.00	0.00	0.00
5,900.0	0.00	0.00	5,900.0	0.0	0.0	0.0	0.00	0.00	0.00
6,000.0	0.00	0.00	6,000.0	0.0	0.0	0.0	0.00	0.00	0.00
6,100.0	0.00	0.00	6,100.0	0.0	0.0	0.0	0.00	0.00	0.00
6,200.0	0.00	0.00	6,200.0	0.0	0.0	0.0	0.00	0.00	0.00
6,300.0	0.00	0.00	6,300.0	0.0	0.0	0.0	0.00	0.00	0.00
CYCN									
6,311.0	0.00	0.00	6,311.0	0.0	0.0	0.0	0.00	0.00	0.00
6,400.0	0.00	0.00	6,400.0	0.0	0.0	0.0	0.00	0.00	0.00
6,500.0	0.00	0.00	6,500.0	0.0	0.0	0.0	0.00	0.00	0.00
6,600.0	0.00	0.00	6,600.0	0.0	0.0	0.0	0.00	0.00	0.00
6,700.0	0.00	0.00	6,700.0	0.0	0.0	0.0	0.00	0.00	0.00
6,800.0	0.00	0.00	6,800.0	0.0	0.0	0.0	0.00	0.00	0.00
6,900.0	0.00	0.00	6,900.0	0.0	0.0	0.0	0.00	0.00	0.00
7,000.0	0.00	0.00	7,000.0	0.0	0.0	0.0	0.00	0.00	0.00
7,100.0	0.00	0.00	7,100.0	0.0	0.0	0.0	0.00	0.00	0.00
7,200.0	0.00	0.00	7,200.0	0.0	0.0	0.0	0.00	0.00	0.00
7,300.0	0.00	0.00	7,300.0	0.0	0.0	0.0	0.00	0.00	0.00
7,400.0	0.00	0.00	7,400.0	0.0	0.0	0.0	0.00	0.00	0.00
7,500.0	0.00	0.00	7,500.0	0.0	0.0	0.0	0.00	0.00	0.00
7,600.0	0.00	0.00	7,600.0	0.0	0.0	0.0	0.00	0.00	0.00
7,700.0	0.00	0.00	7,700.0	0.0	0.0	0.0	0.00	0.00	0.00
BYCN									
7,771.0	0.00	0.00	7,771.0	0.0	0.0	0.0	0.00	0.00	0.00
7,800.0	0.00	0.00	7,800.0	0.0	0.0	0.0	0.00	0.00	0.00
7,900.0	0.00	0.00	7,900.0	0.0	0.0	0.0	0.00	0.00	0.00
8,000.0	0.00	0.00	8,000.0	0.0	0.0	0.0	0.00	0.00	0.00
8,100.0	0.00	0.00	8,100.0	0.0	0.0	0.0	0.00	0.00	0.00
8,200.0	0.00	0.00	8,200.0	0.0	0.0	0.0	0.00	0.00	0.00
8,300.0	0.00	0.00	8,300.0	0.0	0.0	0.0	0.00	0.00	0.00
8,400.0	0.00	0.00	8,400.0	0.0	0.0	0.0	0.00	0.00	0.00
8,500.0	0.00	0.00	8,500.0	0.0	0.0	0.0	0.00	0.00	0.00
8,600.0	0.00	0.00	8,600.0	0.0	0.0	0.0	0.00	0.00	0.00
8,700.0	0.00	0.00	8,700.0	0.0	0.0	0.0	0.00	0.00	0.00
8,800.0	0.00	0.00	8,800.0	0.0	0.0	0.0	0.00	0.00	0.00
8,900.0	0.00	0.00	8,900.0	0.0	0.0	0.0	0.00	0.00	0.00
9,000.0	0.00	0.00	9,000.0	0.0	0.0	0.0	0.00	0.00	0.00
Bone Sprg (BSGL)									
9,002.0	0.00	0.00	9,002.0	0.0	0.0	0.0	0.00	0.00	0.00



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QES

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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)
9,100.0	0.00	0.00	9,100.0	0.0	0.0	0.0	0.00	0.00	0.00
9,200.0	0.00	0.00	9,200.0	0.0	0.0	0.0	0.00	0.00	0.00
U Avalon Sh									
9,219.0	0.00	0.00	9,219.0	0.0	0.0	0.0	0.00	0.00	0.00
9,300.0	0.00	0.00	9,300.0	0.0	0.0	0.0	0.00	0.00	0.00
9,400.0	0.00	0.00	9,400.0	0.0	0.0	0.0	0.00	0.00	0.00
9,500.0	0.00	0.00	9,500.0	0.0	0.0	0.0	0.00	0.00	0.00
L Avalon Sh									
9,583.0	0.00	0.00	9,583.0	0.0	0.0	0.0	0.00	0.00	0.00
9,600.0	0.00	0.00	9,600.0	0.0	0.0	0.0	0.00	0.00	0.00
9,700.0	0.00	0.00	9,700.0	0.0	0.0	0.0	0.00	0.00	0.00
9,800.0	0.00	0.00	9,800.0	0.0	0.0	0.0	0.00	0.00	0.00
9,900.0	0.00	0.00	9,900.0	0.0	0.0	0.0	0.00	0.00	0.00
10,000.0	0.00	0.00	10,000.0	0.0	0.0	0.0	0.00	0.00	0.00
10,100.0	0.00	0.00	10,100.0	0.0	0.0	0.0	0.00	0.00	0.00
10,200.0	0.00	0.00	10,200.0	0.0	0.0	0.0	0.00	0.00	0.00
10,300.0	0.00	0.00	10,300.0	0.0	0.0	0.0	0.00	0.00	0.00
FBSG_sand									
10,400.0	0.00	0.00	10,400.0	0.0	0.0	0.0	0.00	0.00	0.00
10,500.0	0.00	0.00	10,500.0	0.0	0.0	0.0	0.00	0.00	0.00
10,600.0	0.00	0.00	10,600.0	0.0	0.0	0.0	0.00	0.00	0.00
10,700.0	0.00	0.00	10,700.0	0.0	0.0	0.0	0.00	0.00	0.00
10,800.0	0.00	0.00	10,800.0	0.0	0.0	0.0	0.00	0.00	0.00
10,900.0	0.00	0.00	10,900.0	0.0	0.0	0.0	0.00	0.00	0.00
SBSG_sand									
10,920.0	0.00	0.00	10,920.0	0.0	0.0	0.0	0.00	0.00	0.00
11,000.0	0.00	0.00	11,000.0	0.0	0.0	0.0	0.00	0.00	0.00
11,100.0	0.00	0.00	11,100.0	0.0	0.0	0.0	0.00	0.00	0.00
11,200.0	0.00	0.00	11,200.0	0.0	0.0	0.0	0.00	0.00	0.00
11,300.0	0.00	0.00	11,300.0	0.0	0.0	0.0	0.00	0.00	0.00
SBSG_sand base									
11,394.0	0.00	0.00	11,394.0	0.0	0.0	0.0	0.00	0.00	0.00
11,400.0	0.00	0.00	11,400.0	0.0	0.0	0.0	0.00	0.00	0.00
11,500.0	0.00	0.00	11,500.0	0.0	0.0	0.0	0.00	0.00	0.00
11,600.0	0.00	0.00	11,600.0	0.0	0.0	0.0	0.00	0.00	0.00
11,700.0	0.00	0.00	11,700.0	0.0	0.0	0.0	0.00	0.00	0.00
11,800.0	0.00	0.00	11,800.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP 12°/100'									
11,844.8	0.00	0.00	11,844.8	0.0	0.0	0.0	0.00	0.00	0.00
11,850.0	0.63	359.57	11,850.0	0.0	0.0	0.0	12.00	12.00	0.00
11,875.0	3.63	359.57	11,875.0	1.0	0.0	1.0	12.00	12.00	0.00
11,900.0	6.63	359.57	11,899.9	3.2	0.0	3.2	12.00	12.00	0.00
11,925.0	9.63	359.57	11,924.6	6.7	-0.1	6.7	12.00	12.00	0.00
11,950.0	12.63	359.57	11,949.2	11.5	-0.1	11.5	12.00	12.00	0.00
11,975.0	15.63	359.57	11,973.4	17.6	-0.1	17.6	12.00	12.00	0.00
TBSG_sand									
11,978.8	16.08	359.57	11,977.0	18.7	-0.1	18.7	12.00	12.00	0.00
12,000.0	18.63	359.57	11,997.3	25.0	-0.2	25.0	12.00	12.00	0.00
12,025.0	21.63	359.57	12,020.8	33.6	-0.3	33.6	12.00	12.00	0.00
12,050.0	24.63	359.57	12,043.7	43.4	-0.3	43.4	12.00	12.00	0.00
12,075.0	27.63	359.57	12,066.2	54.4	-0.4	54.4	12.00	12.00	0.00
12,100.0	30.63	359.57	12,088.0	66.6	-0.5	66.6	12.00	12.00	0.00
12,125.0	33.63	359.57	12,109.2	79.9	-0.6	79.9	12.00	12.00	0.00



Well Planning Report

QES

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Faz Federal Com #604H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3292.0usft (Noram #21)
Project:	Lea County, NM	MD Reference:	Well @ 3292.0usft (Noram #21)
Site:	Sec 9, T25-S, R35-E	North Reference:	Grid
Well:	Faz Federal Com #604H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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)
12,150.0	36.63	359.57	12,129.6	94.3	-0.7	94.3	12.00	12.00	0.00
12,175.0	39.63	359.57	12,149.3	109.7	-0.8	109.7	12.00	12.00	0.00
12,200.0	42.63	359.57	12,168.1	126.2	-0.9	126.2	12.00	12.00	0.00
12,225.0	45.63	359.57	12,186.1	143.6	-1.1	143.6	12.00	12.00	0.00
12,250.0	48.63	359.57	12,203.1	161.9	-1.2	161.9	12.00	12.00	0.00
12,275.0	51.63	359.57	12,219.1	181.1	-1.4	181.1	12.00	12.00	0.00
12,300.0	54.63	359.57	12,234.1	201.1	-1.5	201.1	12.00	12.00	0.00
12,325.0	57.63	359.57	12,248.0	221.8	-1.7	221.8	12.00	12.00	0.00
12,350.0	60.63	359.57	12,260.9	243.3	-1.8	243.3	12.00	12.00	0.00
12,375.0	63.63	359.57	12,272.5	265.4	-2.0	265.4	12.00	12.00	0.00
12,400.0	66.63	359.57	12,283.1	288.0	-2.2	288.0	12.00	12.00	0.00
12,425.0	69.63	359.57	12,292.4	311.2	-2.3	311.2	12.00	12.00	0.00
12,450.0	72.63	359.57	12,300.5	334.9	-2.5	334.9	12.00	12.00	0.00
12,475.0	75.63	359.57	12,307.3	358.9	-2.7	358.9	12.00	12.00	0.00
12,500.0	78.63	359.57	12,312.9	383.3	-2.9	383.3	12.00	12.00	0.00
12,525.0	81.63	359.57	12,317.1	407.9	-3.1	407.9	12.00	12.00	0.00
12,550.0	84.63	359.57	12,320.1	432.7	-3.2	432.8	12.00	12.00	0.00
12,575.0	87.63	359.57	12,321.8	457.7	-3.4	457.7	12.00	12.00	0.00
EOC @ 90.18° INC / 359.57° AZI / 12322.0' TVD									
12,596.3	90.18	359.57	12,322.2	479.0	-3.6	479.0	12.00	12.00	0.00
12,600.0	90.18	359.57	12,322.2	482.7	-3.6	482.7	0.00	0.00	0.00
12,700.0	90.18	359.57	12,321.9	582.7	-4.4	582.7	0.00	0.00	0.00
12,800.0	90.18	359.57	12,321.6	682.7	-5.1	682.7	0.00	0.00	0.00
12,900.0	90.18	359.57	12,321.3	782.7	-5.9	782.7	0.00	0.00	0.00
13,000.0	90.18	359.57	12,321.0	882.7	-6.6	882.7	0.00	0.00	0.00
13,100.0	90.18	359.57	12,320.7	982.7	-7.4	982.7	0.00	0.00	0.00
13,200.0	90.18	359.57	12,320.3	1,082.7	-8.1	1,082.7	0.00	0.00	0.00
13,300.0	90.18	359.57	12,320.0	1,182.7	-8.9	1,182.7	0.00	0.00	0.00
13,400.0	90.18	359.57	12,319.7	1,282.7	-9.6	1,282.7	0.00	0.00	0.00
13,500.0	90.18	359.57	12,319.4	1,382.6	-10.3	1,382.7	0.00	0.00	0.00
13,600.0	90.18	359.57	12,319.1	1,482.6	-11.1	1,482.7	0.00	0.00	0.00
13,700.0	90.18	359.57	12,318.8	1,582.6	-11.8	1,582.7	0.00	0.00	0.00
13,800.0	90.18	359.57	12,318.5	1,682.6	-12.6	1,682.7	0.00	0.00	0.00
13,900.0	90.18	359.57	12,318.1	1,782.6	-13.3	1,782.7	0.00	0.00	0.00
14,000.0	90.18	359.57	12,317.8	1,882.6	-14.1	1,882.7	0.00	0.00	0.00
14,100.0	90.18	359.57	12,317.5	1,982.6	-14.8	1,982.7	0.00	0.00	0.00
14,200.0	90.18	359.57	12,317.2	2,082.6	-15.6	2,082.7	0.00	0.00	0.00
14,300.0	90.18	359.57	12,316.9	2,182.6	-16.3	2,182.7	0.00	0.00	0.00
14,400.0	90.18	359.57	12,316.6	2,282.6	-17.1	2,282.7	0.00	0.00	0.00
14,500.0	90.18	359.57	12,316.3	2,382.6	-17.8	2,382.7	0.00	0.00	0.00
14,600.0	90.18	359.57	12,315.9	2,482.6	-18.6	2,482.7	0.00	0.00	0.00
14,700.0	90.18	359.57	12,315.6	2,582.6	-19.3	2,582.7	0.00	0.00	0.00
14,800.0	90.18	359.57	12,315.3	2,682.6	-20.1	2,682.7	0.00	0.00	0.00
14,900.0	90.18	359.57	12,315.0	2,782.6	-20.8	2,782.7	0.00	0.00	0.00
15,000.0	90.18	359.57	12,314.7	2,882.6	-21.6	2,882.7	0.00	0.00	0.00
15,100.0	90.18	359.57	12,314.4	2,982.6	-22.3	2,982.7	0.00	0.00	0.00
15,200.0	90.18	359.57	12,314.1	3,082.6	-23.1	3,082.7	0.00	0.00	0.00
15,300.0	90.18	359.57	12,313.7	3,182.6	-23.8	3,182.7	0.00	0.00	0.00
15,400.0	90.18	359.57	12,313.4	3,282.6	-24.6	3,282.7	0.00	0.00	0.00
15,500.0	90.18	359.57	12,313.1	3,382.6	-25.3	3,382.7	0.00	0.00	0.00
15,600.0	90.18	359.57	12,312.8	3,482.6	-26.1	3,482.7	0.00	0.00	0.00
15,700.0	90.18	359.57	12,312.5	3,582.6	-26.8	3,582.7	0.00	0.00	0.00
15,800.0	90.18	359.57	12,312.2	3,682.6	-27.6	3,682.7	0.00	0.00	0.00
15,900.0	90.18	359.57	12,311.9	3,782.6	-28.3	3,782.7	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Fez Federal Com #804H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3292.0usft (Noram #21)
Project:	Lea County, NM	MD Reference:	Well @ 3292.0usft (Noram #21)
Site:	Sec 9, T25-S, R35-E	North Reference:	Grid
Well:	Fez Federal Com #804H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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)
16,000.0	90.18	359.57	12,311.5	3,882.6	-29.1	3,882.7	0.00	0.00	0.00
16,100.0	90.18	359.57	12,311.2	3,982.6	-29.8	3,982.7	0.00	0.00	0.00
16,200.0	90.18	359.57	12,310.9	4,082.6	-30.6	4,082.7	0.00	0.00	0.00
16,300.0	90.18	359.57	12,310.6	4,182.6	-31.3	4,182.7	0.00	0.00	0.00
16,400.0	90.18	359.57	12,310.3	4,282.6	-32.0	4,282.7	0.00	0.00	0.00
16,500.0	90.18	359.57	12,310.0	4,382.5	-32.8	4,382.7	0.00	0.00	0.00
16,600.0	90.18	359.57	12,309.7	4,482.5	-33.5	4,482.7	0.00	0.00	0.00
16,700.0	90.18	359.57	12,309.3	4,582.5	-34.3	4,582.7	0.00	0.00	0.00
16,800.0	90.18	359.57	12,309.0	4,682.5	-35.0	4,682.7	0.00	0.00	0.00
16,900.0	90.18	359.57	12,308.7	4,782.5	-35.8	4,782.7	0.00	0.00	0.00
17,000.0	90.18	359.57	12,308.4	4,882.5	-36.5	4,882.7	0.00	0.00	0.00
17,100.0	90.18	359.57	12,308.1	4,982.5	-37.3	4,982.7	0.00	0.00	0.00
17,200.0	90.18	359.57	12,307.8	5,082.5	-38.0	5,082.7	0.00	0.00	0.00
17,300.0	90.18	359.57	12,307.5	5,182.5	-38.8	5,182.7	0.00	0.00	0.00
17,400.0	90.18	359.57	12,307.1	5,282.5	-39.5	5,282.7	0.00	0.00	0.00
17,500.0	90.18	359.57	12,306.8	5,382.5	-40.3	5,382.7	0.00	0.00	0.00
17,600.0	90.18	359.57	12,306.5	5,482.5	-41.0	5,482.7	0.00	0.00	0.00
17,700.0	90.18	359.57	12,306.2	5,582.5	-41.8	5,582.7	0.00	0.00	0.00
17,800.0	90.18	359.57	12,305.9	5,682.5	-42.5	5,682.7	0.00	0.00	0.00
17,900.0	90.18	359.57	12,305.6	5,782.5	-43.3	5,782.7	0.00	0.00	0.00
18,000.0	90.18	359.57	12,305.3	5,882.5	-44.0	5,882.7	0.00	0.00	0.00
18,100.0	90.18	359.57	12,304.9	5,982.5	-44.8	5,982.7	0.00	0.00	0.00
18,200.0	90.18	359.57	12,304.6	6,082.5	-45.5	6,082.7	0.00	0.00	0.00
18,300.0	90.18	359.57	12,304.3	6,182.5	-46.3	6,182.7	0.00	0.00	0.00
18,400.0	90.18	359.57	12,304.0	6,282.5	-47.0	6,282.7	0.00	0.00	0.00
18,500.0	90.18	359.57	12,303.7	6,382.5	-47.8	6,382.7	0.00	0.00	0.00
18,600.0	90.18	359.57	12,303.4	6,482.5	-48.5	6,482.7	0.00	0.00	0.00
18,700.0	90.18	359.57	12,303.1	6,582.5	-49.3	6,582.7	0.00	0.00	0.00
18,800.0	90.18	359.57	12,302.7	6,682.5	-50.0	6,682.7	0.00	0.00	0.00
18,900.0	90.18	359.57	12,302.4	6,782.5	-50.8	6,782.7	0.00	0.00	0.00
19,000.0	90.18	359.57	12,302.1	6,882.5	-51.5	6,882.7	0.00	0.00	0.00
19,100.0	90.18	359.57	12,301.8	6,982.5	-52.3	6,982.7	0.00	0.00	0.00
19,200.0	90.18	359.57	12,301.5	7,082.5	-53.0	7,082.7	0.00	0.00	0.00
19,300.0	90.18	359.57	12,301.2	7,182.5	-53.8	7,182.7	0.00	0.00	0.00
19,400.0	90.18	359.57	12,300.9	7,282.5	-54.5	7,282.7	0.00	0.00	0.00
19,500.0	90.18	359.57	12,300.5	7,382.5	-55.2	7,382.7	0.00	0.00	0.00
19,600.0	90.18	359.57	12,300.2	7,482.4	-56.0	7,482.7	0.00	0.00	0.00
19,700.0	90.18	359.57	12,299.9	7,582.4	-56.7	7,582.7	0.00	0.00	0.00
19,800.0	90.18	359.57	12,299.6	7,682.4	-57.5	7,682.7	0.00	0.00	0.00
19,900.0	90.18	359.57	12,299.3	7,782.4	-58.2	7,782.7	0.00	0.00	0.00
20,000.0	90.18	359.57	12,299.0	7,882.4	-59.0	7,882.7	0.00	0.00	0.00
20,100.0	90.18	359.57	12,298.7	7,982.4	-59.7	7,982.7	0.00	0.00	0.00
20,200.0	90.18	359.57	12,298.3	8,082.4	-60.5	8,082.7	0.00	0.00	0.00
20,300.0	90.18	359.57	12,298.0	8,182.4	-61.2	8,182.7	0.00	0.00	0.00
20,400.0	90.18	359.57	12,297.7	8,282.4	-62.0	8,282.7	0.00	0.00	0.00
20,500.0	90.18	359.57	12,297.4	8,382.4	-62.7	8,382.7	0.00	0.00	0.00
20,600.0	90.18	359.57	12,297.1	8,482.4	-63.5	8,482.7	0.00	0.00	0.00
20,700.0	90.18	359.57	12,296.8	8,582.4	-64.2	8,582.7	0.00	0.00	0.00
20,800.0	90.18	359.57	12,296.5	8,682.4	-65.0	8,682.7	0.00	0.00	0.00
20,900.0	90.18	359.57	12,296.1	8,782.4	-65.7	8,782.7	0.00	0.00	0.00
21,000.0	90.18	359.57	12,295.8	8,882.4	-66.5	8,882.7	0.00	0.00	0.00
21,100.0	90.18	359.57	12,295.5	8,982.4	-67.2	8,982.6	0.00	0.00	0.00
21,200.0	90.18	359.57	12,295.2	9,082.4	-68.0	9,082.6	0.00	0.00	0.00
21,300.0	90.18	359.57	12,294.9	9,182.4	-68.7	9,182.6	0.00	0.00	0.00



Well Planning Report

QES

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Fez Federal Com #604H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3292.0usft (Noram #21)
Project:	Lea County, NM	MD Reference:	Well @ 3292.0usft (Noram #21)
Site:	Sec 9, T25-S, R35-E	North Reference:	Grid
Well:	Fez Federal Com #604H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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)
21,400.0	90.18	359.57	12,294.6	9,282.4	-69.5	9,282.6	0.00	0.00	0.00
21,500.0	90.18	359.57	12,294.3	9,382.4	-70.2	9,382.6	0.00	0.00	0.00
21,600.0	90.18	359.57	12,293.9	9,482.4	-71.0	9,482.6	0.00	0.00	0.00
21,700.0	90.18	359.57	12,293.6	9,582.4	-71.7	9,582.6	0.00	0.00	0.00
21,800.0	90.18	359.57	12,293.3	9,682.4	-72.5	9,682.6	0.00	0.00	0.00
21,900.0	90.18	359.57	12,293.0	9,782.4	-73.2	9,782.6	0.00	0.00	0.00
22,000.0	90.18	359.57	12,292.7	9,882.4	-74.0	9,882.6	0.00	0.00	0.00
22,100.0	90.18	359.57	12,292.4	9,982.4	-74.7	9,982.6	0.00	0.00	0.00
22,200.0	90.18	359.57	12,292.1	10,082.4	-75.5	10,082.6	0.00	0.00	0.00
TD @ 22220.5' MD, 12292.0' TVD									
22,220.5	90.18	359.57	12,292.0	10,102.9	-75.6	10,103.1	0.00	0.00	0.00
22,220.5	90.18	359.57	12,292.0	10,102.9	-75.6	10,103.2	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
- hit/miss target									
- Shape									
LTP - Fez Fed Com #	0.00	0.00	12,292.0	9,973.0	-74.5	425,309.98	795,293.03	32° 9' 56.502 N	103° 22' 44.609 W
- plan misses target center by 0.4usft at 22090.6usft MD (12292.4 TVD, 9973.0 N, -74.6 E)									
- Point									
PBHL - Fez Fed Com :	0.00	0.00	12,292.0	10,102.9	-75.6	425,439.90	795,291.90	32° 9' 57.788 N	103° 22' 44.609 W
- plan hits target center									
- Point									
FTP - Fez Fed Com #	0.00	0.00	12,322.0	49.8	-0.4	415,386.83	795,367.06	32° 8' 18.305 N	103° 22' 44.771 W
- plan misses target center by 163.4usft at 12248.8usft MD (12202.3 TVD, 161.0 N, -1.2 E)									
- Point									

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
873.0	873.0	Rustler			
1,214.0	1,214.0	TOS			
5,009.0	5,009.0	BOS (Fletcher)			
5,340.0	5,340.0	LMAR (Top Delaware)			
5,372.0	5,372.0	BLCN			
6,311.0	6,311.0	CYCN			
7,771.0	7,771.0	BYCN			
9,002.0	9,002.0	Bone Sprg (BSGL)			
9,219.0	9,219.0	U Avalon Sh			
9,583.0	9,583.0	L Avalon Sh			
10,400.0	10,400.0	FBSG_sand			
10,920.0	10,920.0	SBSG_sand			
11,394.0	11,394.0	SBSG_sand base			
11,978.8	11,977.0	TBSG_sand			



Well Planning Report

QES

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Fez Federal Com #604H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3292.0usft (Noram #21)
Project:	Lea County, NM	MD Reference:	Well @ 3292.0usft (Noram #21)
Site:	Sec 9, T25-S, R35-E	North Reference:	Grid
Well:	Fez Federal Com #604H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
11,844.8	11,844.8	0.0	0.0	KOP 12°/100'
12,596.3	12,322.2	479.0	-3.6	EOC @ 90.18° INC / 359.57° AZI / 12322.0' TVD
22,220.5	12,292.0	10,102.9	-75.6	TD @ 22220.5' MD, 12292.0' TVD

Sec 9, T38-S, R3E-E
 Fed Federal Com #804H
 Q180° & WT-180°
 Design #1

Company Name: CDS Operating, LLC
 Fed Federal Com #804H
 Loc County, NM
 Proj: Hiram #21
 Created By: Keith Hirsch
 Date: 9.21, February 28 2010



PROJECT DETAILS: Loc County, NM

Geodetic System: US State Plane 1977 (NAD 83 datum)
 Datum: NAD 1927 (NADCON CONJUS)
 Elevation: Clarke 1866
 Zone: New Mexico East 5001
 System Datum: Mean Sea Level

WELL DETAILS: Fed Federal Com #804H

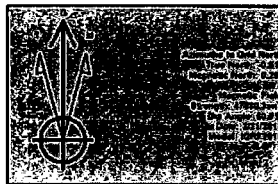
2292.8					
W-8	W-9	Northings	Eastings	Latitude	Longitude
0.0	0.0	418338.06	796367.01	32° 8' 17.873 N	102° 22' 44.771 W

DESIGN TARGET DETAILS

Name	TVD	W-8	W-9	Northings	Eastings	Latitude	Longitude
LTP - Fed Fed Com #804H	12292.8	9972.0	-74.6	436360.06	796379.04	32° 8' 58.803 N	102° 22' 44.888 W
PMU - Fed Fed Com #804H	12292.8	19182.9	-76.6	436426.80	796391.00	32° 8' 57.708 N	102° 22' 44.888 W
FTF - Fed Fed Com #804H	12292.8	48.0	-6.6	418338.06	796367.01	32° 8' 17.873 N	102° 22' 44.771 W

SECTION DETAILS

MD	Inc	Alt	TVD	W-8	W-9	Shs	W-8	W-9	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
11844.0	0.00	0.00	11844.0	0.0	0.0	0.00	0.00	0.0	KCP 127110'
12094.5	00.10	004.27	12222.2	470.0	0.0	12.00	983.67	470.0	BOC @ 00.10' INC / 130 67' ALT / 12122.2' TVD
22228.0	00.10	004.27	12292.8	10182.9	-76.6	0.00	0.00	10182.9	TD @ 22228.0' MD, 12292.8' TVD



QES
 DIRECTIONAL DRILLING



Vertical Section at 329 37° (TVD section)