



COG Operating LLC

Lea County, NM (NAD-27 2015)

Pan Head Fee #11H

SHL: 195' FNL, 600' FWL, Sec 11, T17S, R32E, Unit D

PP: 330' FNL, 594' FWL, Sec 11, T17S, R32E, Unit D

BHL: 989' FNL, 330' FWL, Sec 14, T17S, R32E, Unit D

Plan: Design #2

Standard Planning Report

04 May, 2016



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Pan Head Fee #11H
Company:	COG Operating LLC	TVD Reference:	KB @ 4186.00usft (United 43)
Project:	Lea County, NM (NAD-27 2015)	MD Reference:	KB @ 4186.00usft (United 43)
Site:	Pan Head Fee #11H	North Reference:	Grid
Well:	SHL: 195' FNL, 600' FWL, Sec 11, T17S, R32E, Unit D	Survey Calculation Method:	Minimum Curvature
Wellbore:	BHL: 989' FNL, 330' FWL, Sec 14, T17S, R32E, Unit D		
Design:	Design #2		

Project	Lea County, NM (NAD-27 2015)		
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	Pan Head Fee #11H, Sec 11, T-17S, R-32E, Unit D		
Site Position:		Northing:	675,514.10 usft
From:	Map	Easting:	681,209.30 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in
		Latitude:	32° 51' 20.450 N
		Longitude:	103° 44' 35.649 W
		Grid Convergence:	0.32 °

Well	SHL: 195' FNL, 600' FWL, Sec 11, T17S, R32E, Unit D		
Well Position	+N/-S	0.00 usft	Northing: 675,514.10 usft
	+E/-W	0.00 usft	Easting: 681,209.30 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft
		Latitude:	32° 51' 20.450 N
		Longitude:	103° 44' 35.649 W
		Ground Level:	4,170.00 usft

Wellbore	BHL: 989' FNL, 330' FWL, Sec 14, T17S, R32E, Unit D				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	05/04/16	7.20	60.63	48,405

Design	Design #2			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	182.21

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
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5,329.13	0.00	0.00	5,329.13	0.00	0.00	0.00	0.00	0.00	0.00	
6,147.31	90.00	182.21	5,850.00	-520.48	-20.12	11.00	11.00	0.00	182.21	
11,700.57	90.00	182.21	5,850.00	-6,069.60	-234.60	0.00	0.00	0.00	0.00	PBHL (PHF 11H/OH F

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Site:	Pan Head Fee #11H	North Reference:	Grid
Well:	SHL: 195' FNL, 600' FWL, Sec 11, T17S, R32E, Unit D	Survey Calculation Method:	Minimum Curvature
Wellbore:	BHL: 989' FNL, 330' FWL, Sec 14, T17S, R32E, Unit D		
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)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00	
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00	
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00	
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,500.00	0.00	0.00	4,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,600.00	0.00	0.00	4,600.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,700.00	0.00	0.00	4,700.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,800.00	0.00	0.00	4,800.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,900.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	0.00	0.00	
5,000.00	0.00	0.00	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
5,100.00	0.00	0.00	5,100.00	0.00	0.00	0.00	0.00	0.00	0.00	

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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)
5,200.00	0.00	0.00	5,200.00	0.00	0.00	0.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,300.00	0.00	0.00	0.00	0.00	0.00	0.00
5,329.13	0.00	0.00	5,329.13	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 11.00									
5,350.00	2.30	182.21	5,349.99	-0.42	-0.02	0.42	11.00	11.00	0.00
5,400.00	7.80	182.21	5,399.78	-4.81	-0.19	4.81	11.00	11.00	0.00
5,450.00	13.30	182.21	5,448.92	-13.95	-0.54	13.96	11.00	11.00	0.00
5,500.00	18.80	182.21	5,496.95	-27.76	-1.07	27.78	11.00	11.00	0.00
5,550.00	24.30	182.21	5,543.44	-46.10	-1.78	46.13	11.00	11.00	0.00
5,600.00	29.80	182.21	5,587.96	-68.81	-2.66	68.86	11.00	11.00	0.00
5,650.00	35.30	182.21	5,630.09	-95.67	-3.70	95.75	11.00	11.00	0.00
5,700.00	40.80	182.21	5,669.45	-126.45	-4.89	126.55	11.00	11.00	0.00
5,750.00	46.30	182.21	5,705.68	-160.86	-6.22	160.98	11.00	11.00	0.00
5,800.00	51.80	182.21	5,738.44	-198.58	-7.68	198.73	11.00	11.00	0.00
5,850.00	57.30	182.21	5,767.43	-239.26	-9.25	239.44	11.00	11.00	0.00
5,900.00	62.80	182.21	5,792.38	-282.54	-10.92	282.75	11.00	11.00	0.00
5,950.00	68.30	182.21	5,813.07	-328.00	-12.68	328.24	11.00	11.00	0.00
6,000.00	73.80	182.21	5,829.31	-375.24	-14.50	375.52	11.00	11.00	0.00
6,050.00	79.30	182.21	5,840.94	-423.81	-16.38	424.12	11.00	11.00	0.00
6,100.00	84.80	182.21	5,847.85	-473.27	-18.29	473.62	11.00	11.00	0.00
6,147.31	90.00	182.21	5,850.00	-520.48	-20.12	520.87	11.00	11.00	0.00
Start 5553.26 hold at 6147.31 MD									
6,200.00	90.00	182.21	5,850.00	-573.13	-22.15	573.56	0.00	0.00	0.00
6,300.00	90.00	182.21	5,850.00	-673.06	-26.01	673.56	0.00	0.00	0.00
6,400.00	90.00	182.21	5,850.00	-772.98	-29.88	773.56	0.00	0.00	0.00
6,500.00	90.00	182.21	5,850.00	-872.91	-33.74	873.56	0.00	0.00	0.00
6,600.00	90.00	182.21	5,850.00	-972.83	-37.60	973.56	0.00	0.00	0.00
6,700.00	90.00	182.21	5,850.00	-1,072.76	-41.46	1,073.56	0.00	0.00	0.00
6,800.00	90.00	182.21	5,850.00	-1,172.68	-45.33	1,173.56	0.00	0.00	0.00
6,900.00	90.00	182.21	5,850.00	-1,272.61	-49.19	1,273.56	0.00	0.00	0.00
7,000.00	90.00	182.21	5,850.00	-1,372.53	-53.05	1,373.56	0.00	0.00	0.00
7,100.00	90.00	182.21	5,850.00	-1,472.46	-56.91	1,473.56	0.00	0.00	0.00
7,200.00	90.00	182.21	5,850.00	-1,572.39	-60.78	1,573.56	0.00	0.00	0.00
7,300.00	90.00	182.21	5,850.00	-1,672.31	-64.64	1,673.56	0.00	0.00	0.00
7,400.00	90.00	182.21	5,850.00	-1,772.24	-68.50	1,773.56	0.00	0.00	0.00
7,500.00	90.00	182.21	5,850.00	-1,872.16	-72.36	1,873.56	0.00	0.00	0.00
7,600.00	90.00	182.21	5,850.00	-1,972.09	-76.22	1,973.56	0.00	0.00	0.00
7,700.00	90.00	182.21	5,850.00	-2,072.01	-80.09	2,073.56	0.00	0.00	0.00
7,800.00	90.00	182.21	5,850.00	-2,171.94	-83.95	2,173.56	0.00	0.00	0.00
7,900.00	90.00	182.21	5,850.00	-2,271.86	-87.81	2,273.56	0.00	0.00	0.00
8,000.00	90.00	182.21	5,850.00	-2,371.79	-91.67	2,373.56	0.00	0.00	0.00
8,100.00	90.00	182.21	5,850.00	-2,471.71	-95.54	2,473.56	0.00	0.00	0.00
8,200.00	90.00	182.21	5,850.00	-2,571.64	-99.40	2,573.56	0.00	0.00	0.00
8,300.00	90.00	182.21	5,850.00	-2,671.56	-103.26	2,673.56	0.00	0.00	0.00
8,400.00	90.00	182.21	5,850.00	-2,771.49	-107.12	2,773.56	0.00	0.00	0.00
8,500.00	90.00	182.21	5,850.00	-2,871.42	-110.98	2,873.56	0.00	0.00	0.00
8,600.00	90.00	182.21	5,850.00	-2,971.34	-114.85	2,973.56	0.00	0.00	0.00
8,700.00	90.00	182.21	5,850.00	-3,071.27	-118.71	3,073.56	0.00	0.00	0.00
8,800.00	90.00	182.21	5,850.00	-3,171.19	-122.57	3,173.56	0.00	0.00	0.00
8,900.00	90.00	182.21	5,850.00	-3,271.12	-126.43	3,273.56	0.00	0.00	0.00
9,000.00	90.00	182.21	5,850.00	-3,371.04	-130.30	3,373.56	0.00	0.00	0.00
9,100.00	90.00	182.21	5,850.00	-3,470.97	-134.16	3,473.56	0.00	0.00	0.00

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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)
9,200.00	90.00	182.21	5,850.00	-3,570.89	-138.02	3,573.56	0.00	0.00	0.00
9,300.00	90.00	182.21	5,850.00	-3,670.82	-141.88	3,673.56	0.00	0.00	0.00
9,400.00	90.00	182.21	5,850.00	-3,770.74	-145.75	3,773.56	0.00	0.00	0.00
9,500.00	90.00	182.21	5,850.00	-3,870.67	-149.61	3,873.56	0.00	0.00	0.00
9,600.00	90.00	182.21	5,850.00	-3,970.59	-153.47	3,973.56	0.00	0.00	0.00
9,700.00	90.00	182.21	5,850.00	-4,070.52	-157.33	4,073.56	0.00	0.00	0.00
9,800.00	90.00	182.21	5,850.00	-4,170.45	-161.19	4,173.56	0.00	0.00	0.00
9,900.00	90.00	182.21	5,850.00	-4,270.37	-165.06	4,273.56	0.00	0.00	0.00
10,000.00	90.00	182.21	5,850.00	-4,370.30	-168.92	4,373.56	0.00	0.00	0.00
10,100.00	90.00	182.21	5,850.00	-4,470.22	-172.78	4,473.56	0.00	0.00	0.00
10,200.00	90.00	182.21	5,850.00	-4,570.15	-176.64	4,573.56	0.00	0.00	0.00
10,300.00	90.00	182.21	5,850.00	-4,670.07	-180.51	4,673.56	0.00	0.00	0.00
10,400.00	90.00	182.21	5,850.00	-4,770.00	-184.37	4,773.56	0.00	0.00	0.00
10,500.00	90.00	182.21	5,850.00	-4,869.92	-188.23	4,873.56	0.00	0.00	0.00
10,600.00	90.00	182.21	5,850.00	-4,969.85	-192.09	4,973.56	0.00	0.00	0.00
10,700.00	90.00	182.21	5,850.00	-5,069.77	-195.96	5,073.56	0.00	0.00	0.00
10,800.00	90.00	182.21	5,850.00	-5,169.70	-199.82	5,173.56	0.00	0.00	0.00
10,900.00	90.00	182.21	5,850.00	-5,269.62	-203.68	5,273.56	0.00	0.00	0.00
11,000.00	90.00	182.21	5,850.00	-5,369.55	-207.54	5,373.56	0.00	0.00	0.00
11,100.00	90.00	182.21	5,850.00	-5,469.48	-211.40	5,473.56	0.00	0.00	0.00
11,200.00	90.00	182.21	5,850.00	-5,569.40	-215.27	5,573.56	0.00	0.00	0.00
11,300.00	90.00	182.21	5,850.00	-5,669.33	-219.13	5,673.56	0.00	0.00	0.00
11,400.00	90.00	182.21	5,850.00	-5,769.25	-222.99	5,773.56	0.00	0.00	0.00
11,500.00	90.00	182.21	5,850.00	-5,869.18	-226.85	5,873.56	0.00	0.00	0.00
11,600.00	90.00	182.21	5,850.00	-5,969.10	-230.72	5,973.56	0.00	0.00	0.00
11,700.57	90.00	182.21	5,850.00	-6,069.60	-234.60	6,074.13	0.00	0.00	0.00
TD at 11700.57									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
KOP (PHF 11H/OH Plan - plan hits target center - Shape - Point	0.00	0.00	5,329.13	0.00	0.00	675,514.10	681,209.30	32° 51' 20.450 N	103° 44' 35.649 W
PP (PHF 11H/OH Plan 2 - plan hits target center - Shape - Point	0.00	0.00	5,679.11	-135.00	-5.22	675,379.10	681,204.08	32° 51' 19.114 N	103° 44' 35.719 W
EOC (PHF 11H/OH Plan - plan hits target center - Shape - Point	0.00	0.00	5,850.00	-520.48	-20.12	674,993.62	681,189.18	32° 51' 15.301 N	103° 44' 35.919 W
PBHL (PHF 11H/OH Pla - plan hits target center - Shape - Point	0.00	0.00	5,850.00	-6,069.60	-234.60	669,444.50	680,974.70	32° 50' 20.405 N	103° 44' 38.796 W

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Site Pan Head Fee #11H
Company:	COG Operating LLC	TVD Reference:	KB @ 4186.00usft (United 43)
Project:	Lea County, NM (NAD-27 2015)	MD Reference:	KB @ 4186.00usft (United 43)
Site:	Pan Head Fee #11H	North Reference:	Grid
Well:	SHL: 195' FNL, 600' FWL, Sec 11, T17S, R32E, Unit D	Survey Calculation Method:	Minimum Curvature
Wellbore:	BHL: 989' FNL, 330' FWL, Sec 14, T17S, R32E, Unit D		
Design:	Design #2		

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,329.13	5,329.13	0.00	0.00	Start Build 11.00
6,147.31	5,850.00	-520.48	-20.12	Start 5553.26 hold at 6147.31 MD
11,700.57	5,850.00	-6,069.60	-234.60	TD at 11700.57