

HOBBS OCD

AUG 19 2016

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COG OPERATING LLC

LEA COUNTY, NM

LUSK BSS

LUSK DEEP UNIT A #33H

Wellbore #1

Plan: DWD Plan #1

Standard Planning Report

07 July, 2016

COG Operating LLC

Planning Report

Database:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Company:	COG OPERATING, LLC	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Project:	LEA COUNTY, NM	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site:	LUSK BSS	North Reference:	Grid
Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	DWD Plan #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	LUSK BSS		
Site Position:		Northing:	546,609.70 usft
From:	Map	Easting:	583,312.20 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 30' 8.821 N
		Longitude:	104° 3' 47.146 W
		Grid Convergence:	0.15 °

Well	LUSK DEEP UNIT A #33H		
Well Position	+N/-S	55,482.6 usft	Northing:
	+E/-W	80,752.7 usft	Easting:
Position Uncertainty	0.0 usft		Wellhead Elevation:
			Latitude:
			Longitude:
			Ground Level:

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	WMM2015	6/2/2016	7.22
			Dip Angle (°)
			60.42
			Field Strength (nT)
			48,268

Design	DWD Plan #1		
Audit Notes:			
Version:	Phase:	PROTOTYPE	Tie On Depth:
			0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0.0	0.0	0.0
			Direction (°)
			187.87

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	
950.0	0.00	0.00	950.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,249.4	5.99	252.99	1,248.8	-4.6	-14.9	2.00	2.00	0.00	252.99	
8,836.0	5.99	252.99	8,794.0	-236.1	-771.7	0.00	0.00	0.00	0.00	
9,565.0	89.18	179.54	9,255.0	-706.9	-813.6	12.00	11.41	-10.08	-73.62	Lusk Deep Unit A
14,456.7	89.18	179.54	9,325.0	-5,598.0	-774.1	0.00	0.00	0.00	0.00	Lusk Deep Unit A

COG Operating LLC

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Site:	LUSK BSS	North Reference:	Grid
Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	DWD Plan #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
Lusk Deep Unit A #33H - SHL									
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
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
950.0	0.00	0.00	950.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	1.00	252.99	1,000.0	-0.1	-0.4	0.2	2.00	2.00	0.00
1,100.0	3.00	252.99	1,099.9	-1.1	-3.8	1.7	2.00	2.00	0.00
1,200.0	5.00	252.99	1,199.7	-3.2	-10.4	4.6	2.00	2.00	0.00
1,249.4	5.99	252.99	1,248.8	-4.6	-14.9	6.6	2.00	2.00	0.00
1,300.0	5.99	252.99	1,299.2	-6.1	-20.0	8.8	0.00	0.00	0.00
1,400.0	5.99	252.99	1,398.6	-9.2	-30.0	13.2	0.00	0.00	0.00
1,500.0	5.99	252.99	1,498.1	-12.2	-39.9	17.6	0.00	0.00	0.00
1,600.0	5.99	252.99	1,597.5	-15.3	-49.9	22.0	0.00	0.00	0.00
1,700.0	5.99	252.99	1,697.0	-18.3	-59.9	26.4	0.00	0.00	0.00
1,800.0	5.99	252.99	1,796.5	-21.4	-69.9	30.7	0.00	0.00	0.00
1,900.0	5.99	252.99	1,895.9	-24.4	-79.8	35.1	0.00	0.00	0.00
2,000.0	5.99	252.99	1,995.4	-27.5	-89.8	39.5	0.00	0.00	0.00
2,100.0	5.99	252.99	2,094.8	-30.5	-99.8	43.9	0.00	0.00	0.00
2,200.0	5.99	252.99	2,194.3	-33.6	-109.8	48.3	0.00	0.00	0.00
2,300.0	5.99	252.99	2,293.7	-36.6	-119.7	52.7	0.00	0.00	0.00
2,400.0	5.99	252.99	2,393.2	-39.7	-129.7	57.1	0.00	0.00	0.00
2,500.0	5.99	252.99	2,492.6	-42.7	-139.7	61.5	0.00	0.00	0.00
2,600.0	5.99	252.99	2,592.1	-45.8	-149.7	65.8	0.00	0.00	0.00
2,700.0	5.99	252.99	2,691.5	-48.8	-159.6	70.2	0.00	0.00	0.00
2,800.0	5.99	252.99	2,791.0	-51.9	-169.6	74.6	0.00	0.00	0.00
2,900.0	5.99	252.99	2,890.5	-54.9	-179.6	79.0	0.00	0.00	0.00
3,000.0	5.99	252.99	2,989.9	-58.0	-189.6	83.4	0.00	0.00	0.00
3,100.0	5.99	252.99	3,089.4	-61.0	-199.5	87.8	0.00	0.00	0.00
3,200.0	5.99	252.99	3,188.8	-64.1	-209.5	92.2	0.00	0.00	0.00
3,300.0	5.99	252.99	3,288.3	-67.1	-219.5	96.6	0.00	0.00	0.00
3,400.0	5.99	252.99	3,387.7	-70.2	-229.5	101.0	0.00	0.00	0.00
3,500.0	5.99	252.99	3,487.2	-73.3	-239.4	105.3	0.00	0.00	0.00
3,600.0	5.99	252.99	3,586.6	-76.3	-249.4	109.7	0.00	0.00	0.00
3,700.0	5.99	252.99	3,686.1	-79.4	-259.4	114.1	0.00	0.00	0.00
3,800.0	5.99	252.99	3,785.5	-82.4	-269.4	118.5	0.00	0.00	0.00
3,900.0	5.99	252.99	3,885.0	-85.5	-279.3	122.9	0.00	0.00	0.00
4,000.0	5.99	252.99	3,984.5	-88.5	-289.3	127.3	0.00	0.00	0.00
4,100.0	5.99	252.99	4,083.9	-91.6	-299.3	131.7	0.00	0.00	0.00
4,200.0	5.99	252.99	4,183.4	-94.6	-309.3	136.1	0.00	0.00	0.00
4,300.0	5.99	252.99	4,282.8	-97.7	-319.2	140.5	0.00	0.00	0.00
4,400.0	5.99	252.99	4,382.3	-100.7	-329.2	144.8	0.00	0.00	0.00
4,500.0	5.99	252.99	4,481.7	-103.8	-339.2	149.2	0.00	0.00	0.00
4,600.0	5.99	252.99	4,581.2	-106.8	-349.2	153.6	0.00	0.00	0.00
4,700.0	5.99	252.99	4,680.6	-109.9	-359.1	158.0	0.00	0.00	0.00
4,800.0	5.99	252.99	4,780.1	-112.9	-369.1	162.4	0.00	0.00	0.00

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Wellbore:	Wellbore #1		
Design:	DWD Plan #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)
4,900.0	5.99	252.99	4,879.5	-116.0	-379.1	166.8	0.00	0.00	0.00
5,000.0	5.99	252.99	4,979.0	-119.0	-389.1	171.2	0.00	0.00	0.00
5,100.0	5.99	252.99	5,078.5	-122.1	-399.0	175.6	0.00	0.00	0.00
5,200.0	5.99	252.99	5,177.9	-125.1	-409.0	180.0	0.00	0.00	0.00
5,300.0	5.99	252.99	5,277.4	-128.2	-419.0	184.3	0.00	0.00	0.00
5,400.0	5.99	252.99	5,376.8	-131.2	-428.9	188.7	0.00	0.00	0.00
5,500.0	5.99	252.99	5,476.3	-134.3	-438.9	193.1	0.00	0.00	0.00
5,600.0	5.99	252.99	5,575.7	-137.3	-448.9	197.5	0.00	0.00	0.00
5,700.0	5.99	252.99	5,675.2	-140.4	-458.9	201.9	0.00	0.00	0.00
5,800.0	5.99	252.99	5,774.6	-143.4	-468.8	206.3	0.00	0.00	0.00
5,900.0	5.99	252.99	5,874.1	-146.5	-478.8	210.7	0.00	0.00	0.00
6,000.0	5.99	252.99	5,973.5	-149.5	-488.8	215.1	0.00	0.00	0.00
6,100.0	5.99	252.99	6,073.0	-152.6	-498.8	219.4	0.00	0.00	0.00
6,200.0	5.99	252.99	6,172.4	-155.6	-508.7	223.8	0.00	0.00	0.00
6,300.0	5.99	252.99	6,271.9	-158.7	-518.7	228.2	0.00	0.00	0.00
6,400.0	5.99	252.99	6,371.4	-161.7	-528.7	232.6	0.00	0.00	0.00
6,500.0	5.99	252.99	6,470.8	-164.8	-538.7	237.0	0.00	0.00	0.00
6,600.0	5.99	252.99	6,570.3	-167.9	-548.6	241.4	0.00	0.00	0.00
6,700.0	5.99	252.99	6,669.7	-170.9	-558.6	245.8	0.00	0.00	0.00
6,800.0	5.99	252.99	6,769.2	-174.0	-568.6	250.2	0.00	0.00	0.00
6,900.0	5.99	252.99	6,868.6	-177.0	-578.6	254.6	0.00	0.00	0.00
7,000.0	5.99	252.99	6,968.1	-180.1	-588.5	258.9	0.00	0.00	0.00
7,100.0	5.99	252.99	7,067.5	-183.1	-598.5	263.3	0.00	0.00	0.00
7,200.0	5.99	252.99	7,167.0	-186.2	-608.5	267.7	0.00	0.00	0.00
7,300.0	5.99	252.99	7,266.4	-189.2	-618.5	272.1	0.00	0.00	0.00
7,400.0	5.99	252.99	7,365.9	-192.3	-628.4	276.5	0.00	0.00	0.00
7,500.0	5.99	252.99	7,465.4	-195.3	-638.4	280.9	0.00	0.00	0.00
7,600.0	5.99	252.99	7,564.8	-198.4	-648.4	285.3	0.00	0.00	0.00
7,700.0	5.99	252.99	7,664.3	-201.4	-658.4	289.7	0.00	0.00	0.00
7,800.0	5.99	252.99	7,763.7	-204.5	-668.3	294.1	0.00	0.00	0.00
7,900.0	5.99	252.99	7,863.2	-207.5	-678.3	298.4	0.00	0.00	0.00
8,000.0	5.99	252.99	7,962.6	-210.6	-688.3	302.8	0.00	0.00	0.00
8,100.0	5.99	252.99	8,062.1	-213.6	-698.3	307.2	0.00	0.00	0.00
8,200.0	5.99	252.99	8,161.5	-216.7	-708.2	311.6	0.00	0.00	0.00
8,300.0	5.99	252.99	8,261.0	-219.7	-718.2	316.0	0.00	0.00	0.00
8,400.0	5.99	252.99	8,360.4	-222.8	-728.2	320.4	0.00	0.00	0.00
8,500.0	5.99	252.99	8,459.9	-225.8	-738.2	324.8	0.00	0.00	0.00
8,600.0	5.99	252.99	8,559.4	-228.9	-748.1	329.2	0.00	0.00	0.00
8,700.0	5.99	252.99	8,658.8	-231.9	-758.1	333.6	0.00	0.00	0.00
8,800.0	5.99	252.99	8,758.3	-235.0	-768.1	337.9	0.00	0.00	0.00
8,836.0	5.99	252.99	8,794.0	-236.1	-771.7	339.5	0.00	0.00	0.00
8,900.0	10.98	210.66	8,857.4	-242.3	-778.0	346.6	12.00	7.80	-66.09
9,000.0	22.10	193.79	8,953.2	-268.9	-787.4	374.2	12.00	11.12	-16.87
9,100.0	33.81	188.09	9,041.4	-314.9	-795.8	420.9	12.00	11.71	-5.70
9,200.0	45.66	185.10	9,118.1	-378.3	-802.9	484.6	12.00	11.85	-3.00
9,300.0	57.56	183.12	9,180.1	-456.3	-808.4	562.7	12.00	11.90	-1.98
9,400.0	69.49	181.61	9,224.6	-545.6	-812.0	651.6	12.00	11.92	-1.51
9,500.0	81.42	180.32	9,249.7	-642.2	-813.6	747.5	12.00	11.94	-1.29
9,565.0	89.18	179.54	9,255.0	-706.9	-813.6	811.6	12.00	11.94	-1.21
Lusk Deep Unit A #33H - FTP									
9,600.0	89.18	179.54	9,255.5	-741.9	-813.3	846.3	0.00	0.00	0.00
9,700.0	89.18	179.54	9,256.9	-841.9	-812.5	945.2	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)
9,800.0	89.18	179.54	9,258.4	-941.9	-811.7	1,044.2	0.00	0.00	0.00
9,900.0	89.18	179.54	9,259.8	-1,041.9	-810.9	1,143.1	0.00	0.00	0.00
10,000.0	89.18	179.54	9,261.2	-1,141.9	-810.1	1,242.0	0.00	0.00	0.00
10,100.0	89.18	179.54	9,262.7	-1,241.8	-809.2	1,341.0	0.00	0.00	0.00
10,200.0	89.18	179.54	9,264.1	-1,341.8	-808.4	1,439.9	0.00	0.00	0.00
10,300.0	89.18	179.54	9,265.5	-1,441.8	-807.6	1,538.8	0.00	0.00	0.00
10,400.0	89.18	179.54	9,267.0	-1,541.8	-806.8	1,637.8	0.00	0.00	0.00
10,500.0	89.18	179.54	9,268.4	-1,641.8	-806.0	1,736.7	0.00	0.00	0.00
10,600.0	89.18	179.54	9,269.8	-1,741.8	-805.2	1,835.6	0.00	0.00	0.00
10,700.0	89.18	179.54	9,271.2	-1,841.8	-804.4	1,934.6	0.00	0.00	0.00
10,800.0	89.18	179.54	9,272.7	-1,941.8	-803.6	2,033.5	0.00	0.00	0.00
10,900.0	89.18	179.54	9,274.1	-2,041.7	-802.8	2,132.4	0.00	0.00	0.00
11,000.0	89.18	179.54	9,275.5	-2,141.7	-802.0	2,231.4	0.00	0.00	0.00
11,100.0	89.18	179.54	9,277.0	-2,241.7	-801.2	2,330.3	0.00	0.00	0.00
11,200.0	89.18	179.54	9,278.4	-2,341.7	-800.4	2,429.2	0.00	0.00	0.00
11,300.0	89.18	179.54	9,279.8	-2,441.7	-799.6	2,528.2	0.00	0.00	0.00
11,400.0	89.18	179.54	9,281.3	-2,541.7	-798.8	2,627.1	0.00	0.00	0.00
11,500.0	89.18	179.54	9,282.7	-2,641.7	-798.0	2,726.0	0.00	0.00	0.00
11,600.0	89.18	179.54	9,284.1	-2,741.6	-797.2	2,825.0	0.00	0.00	0.00
11,700.0	89.18	179.54	9,285.6	-2,841.6	-796.3	2,923.9	0.00	0.00	0.00
11,800.0	89.18	179.54	9,287.0	-2,941.6	-795.5	3,022.8	0.00	0.00	0.00
11,900.0	89.18	179.54	9,288.4	-3,041.6	-794.7	3,121.8	0.00	0.00	0.00
12,000.0	89.18	179.54	9,289.8	-3,141.6	-793.9	3,220.7	0.00	0.00	0.00
12,100.0	89.18	179.54	9,291.3	-3,241.6	-793.1	3,319.6	0.00	0.00	0.00
12,200.0	89.18	179.54	9,292.7	-3,341.6	-792.3	3,418.6	0.00	0.00	0.00
12,300.0	89.18	179.54	9,294.1	-3,441.6	-791.5	3,517.5	0.00	0.00	0.00
12,400.0	89.18	179.54	9,295.6	-3,541.5	-790.7	3,616.4	0.00	0.00	0.00
12,500.0	89.18	179.54	9,297.0	-3,641.5	-789.9	3,715.4	0.00	0.00	0.00
12,600.0	89.18	179.54	9,298.4	-3,741.5	-789.1	3,814.3	0.00	0.00	0.00
12,700.0	89.18	179.54	9,299.9	-3,841.5	-788.3	3,913.3	0.00	0.00	0.00
12,800.0	89.18	179.54	9,301.3	-3,941.5	-787.5	4,012.2	0.00	0.00	0.00
12,900.0	89.18	179.54	9,302.7	-4,041.5	-786.7	4,111.1	0.00	0.00	0.00
13,000.0	89.18	179.54	9,304.2	-4,141.5	-785.9	4,210.1	0.00	0.00	0.00
13,100.0	89.18	179.54	9,305.6	-4,241.4	-785.1	4,309.0	0.00	0.00	0.00
13,200.0	89.18	179.54	9,307.0	-4,341.4	-784.3	4,407.9	0.00	0.00	0.00
13,300.0	89.18	179.54	9,308.5	-4,441.4	-783.4	4,506.9	0.00	0.00	0.00
13,400.0	89.18	179.54	9,309.9	-4,541.4	-782.6	4,605.8	0.00	0.00	0.00
13,500.0	89.18	179.54	9,311.3	-4,641.4	-781.8	4,704.7	0.00	0.00	0.00
13,600.0	89.18	179.54	9,312.7	-4,741.4	-781.0	4,803.7	0.00	0.00	0.00
13,700.0	89.18	179.54	9,314.2	-4,841.4	-780.2	4,902.6	0.00	0.00	0.00
13,800.0	89.18	179.54	9,315.6	-4,941.3	-779.4	5,001.5	0.00	0.00	0.00
13,900.0	89.18	179.54	9,317.0	-5,041.3	-778.6	5,100.5	0.00	0.00	0.00
14,000.0	89.18	179.54	9,318.5	-5,141.3	-777.8	5,199.4	0.00	0.00	0.00
14,100.0	89.18	179.54	9,319.9	-5,241.3	-777.0	5,298.3	0.00	0.00	0.00
14,200.0	89.18	179.54	9,321.3	-5,341.3	-776.2	5,397.3	0.00	0.00	0.00
14,300.0	89.18	179.54	9,322.8	-5,441.3	-775.4	5,496.2	0.00	0.00	0.00
14,400.0	89.18	179.54	9,324.2	-5,541.3	-774.6	5,595.1	0.00	0.00	0.00
14,456.7	89.18	179.54	9,325.0	-5,598.0	-774.1	5,651.3	0.00	0.00	0.00

Lusk Deep Unit A #33H - BHL

COG Operating LLC

Planning Report

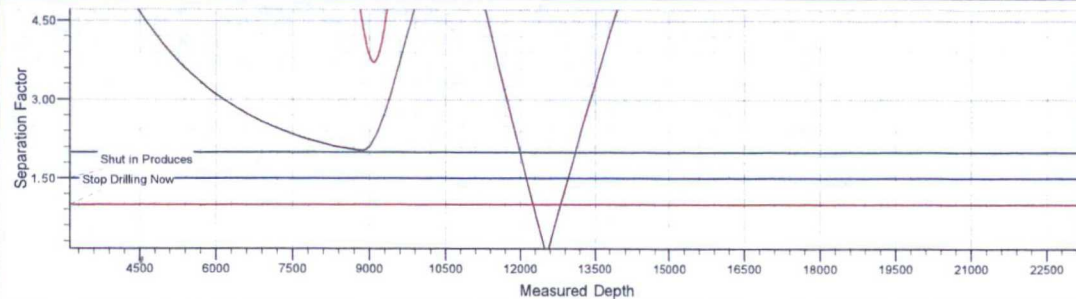
Database:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Company:	COG OPERATING, LLC	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Project:	LEA COUNTY, NM	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site:	LUSK BSS	North Reference:	Grid
Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	DWD Plan #1		

Design Targets

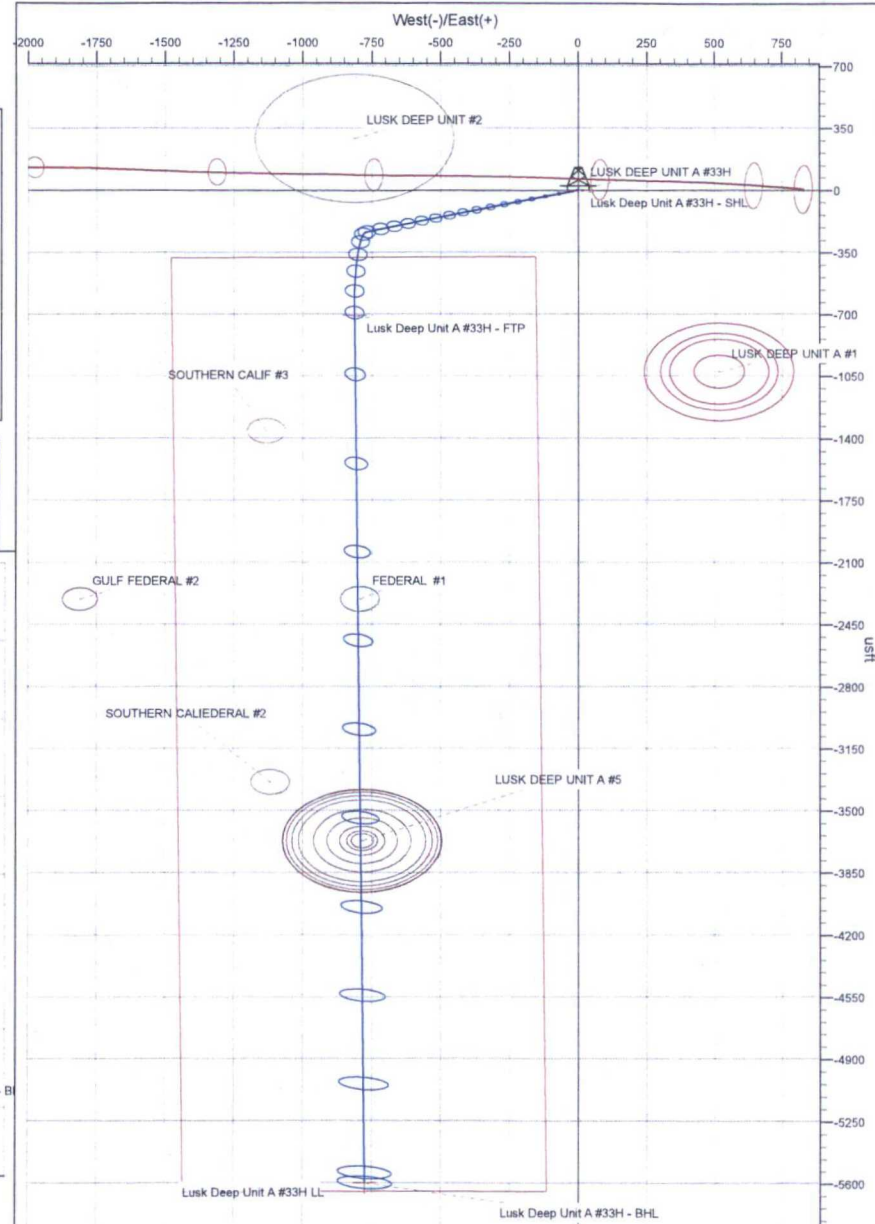
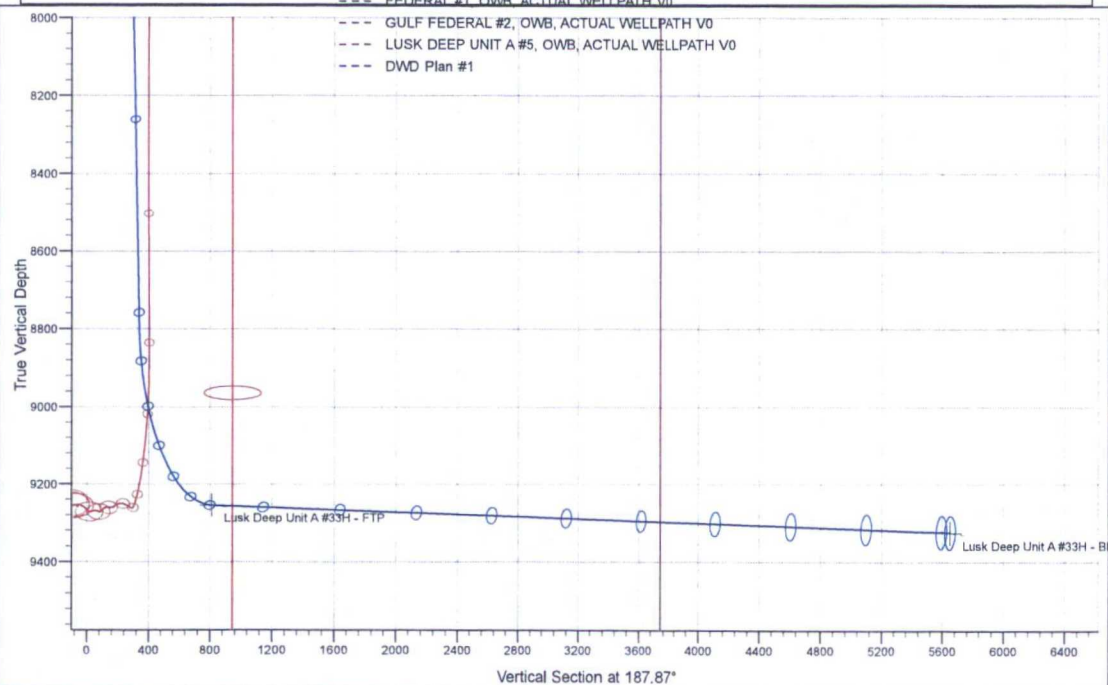
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Lusk Deep Unit A - plan hits target center - Point	0.00	0.00	0.0	0.0	0.0	602,092.30	664,064.90	32° 39' 14.836 N	103° 48' 0.961 W
Lusk Deep Unit A - plan hits target center - Point	0.00	0.00	9,255.0	-706.9	-813.6	601,385.41	663,251.34	32° 39' 7.882 N	103° 48' 10.518 W
Lusk Deep Unit A - plan hits target center - Point	0.00	0.00	9,325.0	-5,598.0	-774.1	596,494.30	663,290.80	32° 38' 19.481 N	103° 48' 10.342 W



Project: LEA COUNTY, NM
 Site: LUSK BSS
 Well: LUSK DEEP UNIT A #33H
 Wellbore: Wellbore #1
 Design: DWD Plan #1



- LUSK DEEP UNIT #2, OWB, ACTUAL WELLPATH V0
- LUSK DEEP UNIT A #28H, OWB, ACTUAL WELLPATH V0
- LUSK DEEP UNIT A #1, OWB, ACTUAL WELLPATH V0
- SOUTHERN CALIFEDERAL #2, OWB, ACTUAL WELLPATH V0
- SOUTHERN CALIF #3, OWB, ACTUAL WELLPATH V0
- FEDERAL #1, OWB, ACTUAL WELLPATH V0
- GULF FEDERAL #2, OWB, ACTUAL WELLPATH V0
- LUSK DEEP UNIT A #5, OWB, ACTUAL WELLPATH V0
- DWD Plan #1



HOBBS OCD

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COG OPERATING LLC

LEA COUNTY, NM

LUSK BSS

LUSK DEEP UNIT A #33H

Wellbore #1

DWD Plan #1

Anticollision Report

07 July, 2016

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Reference	DWD Plan #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 10,000.0 usft	Error Surface:	Circular Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program	Date 7/7/2016			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	14,456.7	DWD Plan #1 (Wellbore #1)	MWD	OWSG MWD - Standard

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
LUSK BSS						
FEDERAL #1 - OWB - ACTUAL WELLPATH	2,881.3	2,715.0	2,339.5	2,259.1	29.105	CC, ES
FEDERAL #1 - OWB - ACTUAL WELLPATH	3,100.0	2,715.0	2,349.7	2,268.5	28.925	SF
GULF FEDERAL #2 - OWB - ACTUAL WELLPATH	2,779.8	2,500.0	2,800.8	2,726.4	37.630	CC
GULF FEDERAL #2 - OWB - ACTUAL WELLPATH	2,800.0	2,500.0	2,800.9	2,726.4	37.591	ES
GULF FEDERAL #2 - OWB - ACTUAL WELLPATH	3,200.0	2,500.0	2,832.2	2,756.1	37.230	SF
LUSK DEEP UNIT #2 - OWB - ACTUAL WELLPATH	7,736.8	7,698.8	517.6	289.1	2.266	CC
LUSK DEEP UNIT #2 - OWB - ACTUAL WELLPATH	8,836.0	8,792.0	530.1	269.1	2.031	ES
LUSK DEEP UNIT #2 - OWB - ACTUAL WELLPATH	8,850.0	8,806.0	530.6	269.2	2.030	SF
LUSK DEEP UNIT A #1 - OWB - ACTUAL WELLPATH	950.0	946.0	1,149.8	1,132.2	65.547	CC
LUSK DEEP UNIT A #1 - OWB - ACTUAL WELLPATH	9,900.0	9,256.6	1,328.5	1,097.4	5.749	ES
LUSK DEEP UNIT A #1 - OWB - ACTUAL WELLPATH	10,000.0	9,258.0	1,332.6	1,100.8	5.747	SF
LUSK DEEP UNIT A #28H - OWB - ACTUAL WELLPATH	9,083.9	11,895.2	463.7	338.8	3.712	CC, ES, SF
LUSK DEEP UNIT A #5 - OWB - ACTUAL WELLPATH	12,527.2	9,259.2	5.6	-273.0	0.020	Stop Drilling Now, CC, ES,
SOUTHERN CALIFEDERAL #2 - OWB - ACTUAL WELLP	2,973.9	2,736.0	3,416.1	3,334.8	42.026	CC
SOUTHERN CALIFEDERAL #2 - OWB - ACTUAL WELLP	3,000.0	2,736.0	3,416.2	3,334.8	41.974	ES
SOUTHERN CALIFEDERAL #2 - OWB - ACTUAL WELLP	14,456.7	2,736.0	6,942.0	6,772.0	40.852	SF
SOUTHERN CALIF #3 - OWB - ACTUAL WELLPATH	2,856.2	2,695.0	1,623.1	1,543.3	20.348	CC, ES
SOUTHERN CALIF #3 - OWB - ACTUAL WELLPATH	3,000.0	2,695.0	1,629.4	1,549.1	20.285	SF

Offset Design LUSK BSS - FEDERAL #1 - OWB - ACTUAL WELLPATH												Offset Site Error:	0.0 usft
Survey Program: 2715-INC-ONLY												Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance				Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)		Minimum Separation (usft)	Separation Factor
0.0	0.0	0.0	0.0	0.0	3.0	-161.03	-2,307.7	-793.2	2,440.3				
100.0	100.0	74.0	74.0	0.1	3.6	-161.03	-2,307.7	-793.2	2,440.2	2,436.5	3.70	660.017	
200.0	200.0	174.0	174.0	0.5	5.4	-161.03	-2,307.7	-793.2	2,440.2	2,434.3	5.89	414.069	
300.0	300.0	274.0	274.0	0.9	7.7	-161.03	-2,307.7	-793.2	2,440.2	2,431.7	8.53	286.212	
400.0	400.0	374.0	374.0	1.2	10.1	-161.03	-2,307.7	-793.2	2,440.2	2,428.9	11.30	215.873	
500.0	500.0	474.0	474.0	1.6	12.6	-161.03	-2,307.7	-793.2	2,440.2	2,426.1	14.14	172.530	
600.0	600.0	574.0	574.0	1.9	15.1	-161.03	-2,307.7	-793.2	2,440.2	2,423.2	17.01	143.417	
700.0	700.0	674.0	674.0	2.3	17.6	-161.03	-2,307.7	-793.2	2,440.2	2,420.3	19.90	122.601	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - FEDERAL #1 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 2715-INC-ONLY													Offset Well Error:	3.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
800.0	800.0	774.0	774.0	2.7	20.2	-161.03		-2,307.7	-793.2	2,440.2	2,417.4	22.80	107.009	
900.0	900.0	874.0	874.0	3.0	22.7	-161.03		-2,307.7	-793.2	2,440.2	2,414.5	25.71	94.908	
950.0	950.0	924.0	924.0	3.2	24.0	-161.03		-2,307.7	-793.2	2,440.2	2,413.0	27.17	89.822	
1,000.0	1,000.0	974.0	974.0	3.4	25.3	-54.03		-2,307.7	-793.2	2,439.9	2,411.3	28.62	85.259	
1,100.0	1,099.9	1,073.9	1,073.9	3.7	27.8	-54.13		-2,307.7	-793.2	2,437.9	2,406.4	31.51	77.361	
1,200.0	1,199.7	1,173.7	1,173.7	4.0	30.4	-54.33		-2,307.7	-793.2	2,433.8	2,399.4	34.41	70.723	
1,249.4	1,248.8	1,222.8	1,222.8	4.2	31.6	-54.47		-2,307.7	-793.2	2,431.1	2,395.2	35.85	67.820	
1,300.0	1,299.2	1,273.2	1,273.2	4.4	32.9	-54.57		-2,307.7	-793.2	2,428.0	2,390.7	37.32	65.064	
1,400.0	1,398.6	1,372.6	1,372.6	4.8	35.5	-54.77		-2,307.7	-793.2	2,421.9	2,381.7	40.23	60.204	
1,500.0	1,498.1	1,472.1	1,472.1	5.1	38.0	-54.97		-2,307.7	-793.2	2,415.9	2,372.8	43.15	55.993	
1,600.0	1,597.5	1,571.5	1,571.5	5.5	40.6	-55.17		-2,307.7	-793.2	2,409.9	2,363.8	46.07	52.310	
1,700.0	1,697.0	1,671.0	1,671.0	5.9	43.1	-55.38		-2,307.7	-793.2	2,403.9	2,354.9	49.00	49.063	
1,800.0	1,796.5	1,770.5	1,770.5	6.3	45.7	-55.58		-2,307.7	-793.2	2,398.0	2,346.1	51.93	46.179	
1,900.0	1,895.9	1,869.9	1,869.9	6.6	48.2	-55.79		-2,307.7	-793.2	2,392.1	2,337.2	54.86	43.601	
2,000.0	1,995.4	1,969.4	1,969.4	7.0	50.8	-55.99		-2,307.7	-793.2	2,386.2	2,328.4	57.80	41.285	
2,100.0	2,094.8	2,068.8	2,068.8	7.4	53.3	-56.20		-2,307.7	-793.2	2,380.4	2,319.7	60.74	39.191	
2,200.0	2,194.3	2,168.3	2,168.3	7.8	55.9	-56.41		-2,307.7	-793.2	2,374.6	2,310.9	63.68	37.290	
2,300.0	2,293.7	2,267.7	2,267.7	8.2	58.5	-56.62		-2,307.7	-793.2	2,368.8	2,302.2	66.62	35.556	
2,400.0	2,393.2	2,367.2	2,367.2	8.5	61.0	-56.83		-2,307.7	-793.2	2,363.1	2,293.5	69.57	33.969	
2,500.0	2,492.6	2,466.6	2,466.6	8.9	63.6	-57.04		-2,307.7	-793.2	2,357.4	2,284.8	72.51	32.511	
2,600.0	2,592.1	2,566.1	2,566.1	9.3	66.1	-57.25		-2,307.7	-793.2	2,351.7	2,276.2	75.46	31.166	
2,700.0	2,691.5	2,665.5	2,665.5	9.7	68.7	-57.46		-2,307.7	-793.2	2,346.0	2,267.6	78.40	29.923	
2,800.0	2,791.0	2,715.0	2,715.0	10.1	70.0	-57.57		-2,307.7	-793.2	2,340.9	2,260.9	80.06	29.238	
2,881.3	2,871.9	2,715.0	2,715.0	10.4	70.0	-57.57		-2,307.7	-793.2	2,339.5	2,259.1	80.38	29.105 CC, ES	
2,900.0	2,890.5	2,715.0	2,715.0	10.5	70.0	-57.57		-2,307.7	-793.2	2,339.6	2,259.1	80.45	29.080	
3,000.0	2,989.9	2,715.0	2,715.0	10.9	70.0	-57.57		-2,307.7	-793.2	2,342.5	2,261.7	80.84	28.976	
3,100.0	3,089.4	2,715.0	2,715.0	11.3	70.0	-57.57		-2,307.7	-793.2	2,349.7	2,268.5	81.24	28.925 SF	
3,200.0	3,188.8	2,715.0	2,715.0	11.7	70.0	-57.57		-2,307.7	-793.2	2,361.1	2,279.5	81.63	28.926	
3,300.0	3,288.3	2,715.0	2,715.0	12.1	70.0	-57.57		-2,307.7	-793.2	2,376.7	2,294.7	82.02	28.978	
3,400.0	3,387.7	2,715.0	2,715.0	12.4	70.0	-57.57		-2,307.7	-793.2	2,396.3	2,313.9	82.41	29.078	
3,500.0	3,487.2	2,715.0	2,715.0	12.8	70.0	-57.57		-2,307.7	-793.2	2,420.0	2,337.1	82.80	29.225	
3,600.0	3,586.6	2,715.0	2,715.0	13.2	70.0	-57.57		-2,307.7	-793.2	2,447.4	2,364.2	83.20	29.418	
3,700.0	3,686.1	2,715.0	2,715.0	13.6	70.0	-57.57		-2,307.7	-793.2	2,478.6	2,395.0	83.59	29.653	
3,800.0	3,785.5	2,715.0	2,715.0	14.0	70.0	-57.57		-2,307.7	-793.2	2,513.4	2,429.5	83.98	29.928	
3,900.0	3,885.0	2,715.0	2,715.0	14.4	70.0	-57.57		-2,307.7	-793.2	2,551.7	2,467.3	84.37	30.242	
4,000.0	3,984.5	2,715.0	2,715.0	14.8	70.0	-57.57		-2,307.7	-793.2	2,593.2	2,508.5	84.77	30.592	
4,100.0	4,083.9	2,715.0	2,715.0	15.2	70.0	-57.57		-2,307.7	-793.2	2,637.9	2,552.8	85.16	30.975	
4,200.0	4,183.4	2,715.0	2,715.0	15.6	70.0	-57.57		-2,307.7	-793.2	2,685.6	2,600.0	85.56	31.390	
4,300.0	4,282.8	2,715.0	2,715.0	16.0	70.0	-57.57		-2,307.7	-793.2	2,736.1	2,650.1	85.95	31.833	
4,400.0	4,382.3	2,715.0	2,715.0	16.4	70.0	-57.57		-2,307.7	-793.2	2,789.2	2,702.9	86.34	32.304	
4,500.0	4,481.7	2,715.0	2,715.0	16.8	70.0	-57.57		-2,307.7	-793.2	2,844.9	2,758.2	86.74	32.799	
4,600.0	4,581.2	2,715.0	2,715.0	17.2	70.0	-57.57		-2,307.7	-793.2	2,903.0	2,815.8	87.13	33.317	
4,700.0	4,680.6	2,715.0	2,715.0	17.6	70.0	-57.57		-2,307.7	-793.2	2,963.3	2,875.8	87.53	33.856	
4,800.0	4,780.1	2,715.0	2,715.0	18.0	70.0	-57.57		-2,307.7	-793.2	3,025.7	2,937.8	87.92	34.413	
4,900.0	4,879.5	2,715.0	2,715.0	18.4	70.0	-57.57		-2,307.7	-793.2	3,090.1	3,001.7	88.32	34.989	
5,000.0	4,979.0	2,715.0	2,715.0	18.7	70.0	-57.57		-2,307.7	-793.2	3,156.3	3,067.6	88.71	35.580	
5,100.0	5,078.5	2,715.0	2,715.0	19.1	70.0	-57.57		-2,307.7	-793.2	3,224.3	3,135.2	89.11	36.185	
5,200.0	5,177.9	2,715.0	2,715.0	19.5	70.0	-57.57		-2,307.7	-793.2	3,293.9	3,204.4	89.50	36.803	
5,300.0	5,277.4	2,715.0	2,715.0	19.9	70.0	-57.57		-2,307.7	-793.2	3,365.0	3,275.1	89.90	37.433	
5,400.0	5,376.8	2,715.0	2,715.0	20.3	70.0	-57.57		-2,307.7	-793.2	3,437.6	3,347.3	90.29	38.073	
5,500.0	5,476.3	2,715.0	2,715.0	20.7	70.0	-57.57		-2,307.7	-793.2	3,511.5	3,420.9	90.69	38.722	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - FEDERAL #1 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 2715-INC-ONLY													Offset Well Error:	3.0 usft
Reference	Offset	Semi Major Axis		Distance		Warning								
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,600.0	5,575.7	2,715.0	2,715.0	21.1	70.0	-57.57	-2,307.7	-793.2	3,586.7	3,495.7	91.08	39.379		
5,700.0	5,675.2	2,715.0	2,715.0	21.5	70.0	-57.57	-2,307.7	-793.2	3,663.1	3,571.6	91.48	40.044		
5,800.0	5,774.6	2,715.0	2,715.0	21.9	70.0	-57.57	-2,307.7	-793.2	3,740.6	3,648.7	91.87	40.715		
5,900.0	5,874.1	2,715.0	2,715.0	22.3	70.0	-57.57	-2,307.7	-793.2	3,819.1	3,726.9	92.27	41.392		
6,000.0	5,973.5	2,715.0	2,715.0	22.7	70.0	-57.57	-2,307.7	-793.2	3,898.7	3,806.0	92.66	42.074		
6,100.0	6,073.0	2,715.0	2,715.0	23.1	70.0	-57.57	-2,307.7	-793.2	3,979.1	3,886.1	93.06	42.759		
6,200.0	6,172.4	2,715.0	2,715.0	23.5	70.0	-57.57	-2,307.7	-793.2	4,060.4	3,967.0	93.45	43.448		
6,300.0	6,271.9	2,715.0	2,715.0	23.9	70.0	-57.57	-2,307.7	-793.2	4,142.6	4,048.7	93.85	44.140		
6,400.0	6,371.4	2,715.0	2,715.0	24.3	70.0	-57.57	-2,307.7	-793.2	4,225.5	4,131.2	94.25	44.835		
6,500.0	6,470.8	2,715.0	2,715.0	24.7	70.0	-57.57	-2,307.7	-793.2	4,309.1	4,214.5	94.64	45.531		
6,600.0	6,570.3	2,715.0	2,715.0	25.1	70.0	-57.57	-2,307.7	-793.2	4,393.4	4,298.4	95.04	46.229		
6,700.0	6,669.7	2,715.0	2,715.0	25.5	70.0	-57.57	-2,307.7	-793.2	4,478.4	4,382.9	95.43	46.927		
6,800.0	6,769.2	2,715.0	2,715.0	25.9	70.0	-57.57	-2,307.7	-793.2	4,563.9	4,468.1	95.83	47.626		
6,900.0	6,868.6	2,715.0	2,715.0	26.3	70.0	-57.57	-2,307.7	-793.2	4,650.1	4,553.9	96.22	48.326		
7,000.0	6,968.1	2,715.0	2,715.0	26.7	70.0	-57.57	-2,307.7	-793.2	4,736.8	4,640.2	96.62	49.025		
7,100.0	7,067.5	2,715.0	2,715.0	27.1	70.0	-57.57	-2,307.7	-793.2	4,824.0	4,727.0	97.02	49.724		
7,200.0	7,167.0	2,715.0	2,715.0	27.4	70.0	-57.57	-2,307.7	-793.2	4,911.7	4,814.3	97.41	50.422		
7,300.0	7,266.4	2,715.0	2,715.0	27.8	70.0	-57.57	-2,307.7	-793.2	4,999.8	4,902.0	97.81	51.119		
7,400.0	7,365.9	2,715.0	2,715.0	28.2	70.0	-57.57	-2,307.7	-793.2	5,088.4	4,990.2	98.20	51.815		
7,500.0	7,465.4	2,715.0	2,715.0	28.6	70.0	-57.57	-2,307.7	-793.2	5,177.4	5,078.8	98.60	52.510		
7,600.0	7,564.8	2,715.0	2,715.0	29.0	70.0	-57.57	-2,307.7	-793.2	5,266.8	5,167.8	99.00	53.203		
7,700.0	7,664.3	2,715.0	2,715.0	29.4	70.0	-57.57	-2,307.7	-793.2	5,356.6	5,257.2	99.39	53.894		
7,800.0	7,763.7	2,715.0	2,715.0	29.8	70.0	-57.57	-2,307.7	-793.2	5,446.7	5,346.9	99.79	54.583		
7,900.0	7,863.2	2,715.0	2,715.0	30.2	70.0	-57.57	-2,307.7	-793.2	5,537.2	5,437.0	100.18	55.271		
8,000.0	7,962.6	2,715.0	2,715.0	30.6	70.0	-57.57	-2,307.7	-793.2	5,628.0	5,527.4	100.58	55.956		
8,100.0	8,062.1	2,715.0	2,715.0	31.0	70.0	-57.57	-2,307.7	-793.2	5,719.1	5,618.1	100.98	56.638		
8,200.0	8,161.5	2,715.0	2,715.0	31.4	70.0	-57.57	-2,307.7	-793.2	5,810.5	5,709.1	101.37	57.319		
8,300.0	8,261.0	2,715.0	2,715.0	31.8	70.0	-57.57	-2,307.7	-793.2	5,902.2	5,800.4	101.77	57.996		
8,400.0	8,360.4	2,715.0	2,715.0	32.2	70.0	-57.57	-2,307.7	-793.2	5,994.1	5,891.9	102.16	58.671		
8,500.0	8,459.9	2,715.0	2,715.0	32.6	70.0	-57.57	-2,307.7	-793.2	6,086.3	5,983.7	102.56	59.344		
8,600.0	8,559.4	2,715.0	2,715.0	33.0	70.0	-57.57	-2,307.7	-793.2	6,178.7	6,075.8	102.96	60.013		
8,700.0	8,658.8	2,715.0	2,715.0	33.4	70.0	-57.57	-2,307.7	-793.2	6,271.4	6,168.1	103.35	60.680		
8,800.0	8,758.3	2,715.0	2,715.0	33.8	70.0	-57.57	-2,307.7	-793.2	6,364.3	6,260.5	103.75	61.343		
8,836.0	8,794.0	2,715.0	2,715.0	33.9	70.0	-57.57	-2,307.7	-793.2	6,397.7	6,293.9	103.89	61.581		
8,850.0	8,808.0	2,715.0	2,715.0	34.0	70.0	-44.68	-2,307.7	-793.2	6,410.7	6,306.8	103.95	61.673		
8,875.0	8,832.8	2,715.0	2,715.0	34.1	70.0	-28.82	-2,307.7	-793.2	6,433.5	6,329.5	104.05	61.832		
8,900.0	8,857.4	2,715.0	2,715.0	34.2	70.0	-19.63	-2,307.7	-793.2	6,455.7	6,351.6	104.15	61.985		
8,925.0	8,881.8	2,715.0	2,715.0	34.3	70.0	-14.12	-2,307.7	-793.2	6,477.4	6,373.1	104.25	62.131		
8,950.0	8,906.0	2,715.0	2,715.0	34.4	70.0	-10.60	-2,307.7	-793.2	6,498.3	6,394.0	104.36	62.270		
8,975.0	8,929.8	2,715.0	2,715.0	34.5	70.0	-8.24	-2,307.7	-793.2	6,518.6	6,414.2	104.46	62.402		
9,000.0	8,953.2	2,715.0	2,715.0	34.6	70.0	-6.57	-2,307.7	-793.2	6,538.2	6,433.6	104.57	62.527		
9,025.0	8,976.1	2,715.0	2,715.0	34.7	70.0	-5.35	-2,307.7	-793.2	6,556.9	6,452.3	104.67	62.643		
9,050.0	8,998.5	2,715.0	2,715.0	34.8	70.0	-4.43	-2,307.7	-793.2	6,574.9	6,470.1	104.78	62.752		
9,075.0	9,020.2	2,715.0	2,715.0	34.9	70.0	-3.71	-2,307.7	-793.2	6,591.9	6,487.0	104.88	62.851		
9,100.0	9,041.4	2,715.0	2,715.0	35.0	70.0	-3.15	-2,307.7	-793.2	6,608.0	6,503.0	104.99	62.942		
9,125.0	9,061.8	2,715.0	2,715.0	35.1	70.0	-2.70	-2,307.7	-793.2	6,623.2	6,518.1	105.09	63.024		
9,150.0	9,081.4	2,715.0	2,715.0	35.2	70.0	-2.32	-2,307.7	-793.2	6,637.4	6,532.2	105.19	63.096		
9,175.0	9,100.2	2,715.0	2,715.0	35.3	70.0	-2.02	-2,307.7	-793.2	6,650.5	6,545.2	105.30	63.159		
9,200.0	9,118.1	2,715.0	2,715.0	35.4	70.0	-1.76	-2,307.7	-793.2	6,662.6	6,557.2	105.40	63.211		
9,225.0	9,135.1	2,715.0	2,715.0	35.5	70.0	-1.54	-2,307.7	-793.2	6,673.6	6,568.1	105.51	63.253		

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - FEDERAL #1 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 2715-INC-ONLY													Offset Well Error:	3.0 usft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Separation Factor		Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (")	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
9,250.0	9,151.2	2,715.0	2,715.0	35.7	70.0	-1.35	-2,307.7	-793.2	6,683.6	6,578.0	105.61	63.284		
9,275.0	9,166.2	2,715.0	2,715.0	35.8	70.0	-1.18	-2,307.7	-793.2	6,692.4	6,586.6	105.72	63.304		
9,300.0	9,180.1	2,715.0	2,715.0	35.9	70.0	-1.03	-2,307.7	-793.2	6,700.0	6,594.2	105.82	63.313		
9,325.0	9,193.0	2,715.0	2,715.0	36.0	70.0	-0.90	-2,307.7	-793.2	6,706.5	6,600.6	105.93	63.310		
9,350.0	9,204.7	2,715.0	2,715.0	36.1	70.0	-0.79	-2,307.7	-793.2	6,711.8	6,605.8	106.04	63.295		
9,375.0	9,215.2	2,715.0	2,715.0	36.2	70.0	-0.68	-2,307.7	-793.2	6,715.9	6,609.8	106.15	63.268		
9,400.0	9,224.6	2,715.0	2,715.0	36.3	70.0	-0.59	-2,307.7	-793.2	6,718.8	6,612.6	106.26	63.229		
9,425.0	9,232.8	2,715.0	2,715.0	36.4	70.0	-0.50	-2,307.7	-793.2	6,720.5	6,614.2	106.38	63.178		
9,450.0	9,239.7	2,715.0	2,715.0	36.5	70.0	-0.41	-2,307.7	-793.2	6,721.0	6,614.6	106.49	63.114		
9,475.0	9,245.3	2,715.0	2,715.0	36.6	70.0	-0.33	-2,307.7	-793.2	6,720.3	6,613.7	106.61	63.037		
9,500.0	9,249.7	2,715.0	2,715.0	36.8	70.0	-0.26	-2,307.7	-793.2	6,718.4	6,611.7	106.73	62.949		
9,525.0	9,252.8	2,715.0	2,715.0	36.9	70.0	-0.18	-2,307.7	-793.2	6,715.3	6,608.5	106.85	62.848		
9,550.0	9,254.6	2,715.0	2,715.0	37.0	70.0	-0.11	-2,307.7	-793.2	6,711.0	6,604.0	106.97	62.735		
9,565.0	9,255.0	2,715.0	2,715.0	37.1	70.0	-0.07	-2,307.7	-793.2	6,707.8	6,600.8	107.05	62.662		
9,600.0	9,255.5	2,715.0	2,715.0	37.3	70.0	-0.07	-2,307.7	-793.2	6,700.1	6,592.8	107.23	62.484		
9,700.0	9,256.9	2,715.0	2,715.0	37.8	70.0	-0.07	-2,307.7	-793.2	6,678.8	6,571.0	107.78	61.964		
9,800.0	9,258.4	2,715.0	2,715.0	38.4	70.0	-0.07	-2,307.7	-793.2	6,659.0	6,550.6	108.40	61.427		
9,900.0	9,259.8	2,715.0	2,715.0	39.1	70.0	-0.07	-2,307.7	-793.2	6,640.6	6,531.5	109.09	60.875		
10,000.0	9,261.2	2,715.0	2,715.0	39.9	70.0	-0.07	-2,307.7	-793.2	6,623.7	6,513.8	109.83	60.311		
10,100.0	9,262.7	2,715.0	2,715.0	40.7	70.0	-0.07	-2,307.7	-793.2	6,608.2	6,497.6	110.62	59.738		
10,200.0	9,264.1	2,715.0	2,715.0	41.5	70.0	-0.07	-2,307.7	-793.2	6,594.2	6,482.8	111.47	59.159		
10,300.0	9,265.5	2,715.0	2,715.0	42.4	70.0	-0.07	-2,307.7	-793.2	6,581.7	6,469.4	112.36	58.576		
10,400.0	9,267.0	2,715.0	2,715.0	43.3	70.0	-0.07	-2,307.7	-793.2	6,570.8	6,457.4	113.31	57.991		
10,500.0	9,268.4	2,715.0	2,715.0	44.3	70.0	-0.07	-2,307.7	-793.2	6,561.3	6,447.0	114.29	57.408		
10,600.0	9,269.8	2,715.0	2,715.0	45.4	70.0	-0.07	-2,307.7	-793.2	6,553.3	6,438.0	115.32	56.829		
10,700.0	9,271.2	2,715.0	2,715.0	46.4	70.0	-0.07	-2,307.7	-793.2	6,546.9	6,430.5	116.38	56.254		
10,800.0	9,272.7	2,715.0	2,715.0	47.5	70.0	-0.07	-2,307.7	-793.2	6,541.9	6,424.4	117.48	55.686		
10,900.0	9,274.1	2,715.0	2,715.0	48.7	70.0	-0.07	-2,307.7	-793.2	6,538.5	6,419.9	118.61	55.125		
11,000.0	9,275.5	2,715.0	2,715.0	49.8	70.0	-0.07	-2,307.7	-793.2	6,536.7	6,416.9	119.77	54.575		
11,072.5	9,276.6	2,715.0	2,715.0	50.7	70.0	-0.07	-2,307.7	-793.2	6,536.2	6,415.6	120.64	54.181		
11,100.0	9,277.0	2,715.0	2,715.0	51.0	70.0	-0.07	-2,307.7	-793.2	6,536.3	6,415.3	120.97	54.035		
11,200.0	9,278.4	2,715.0	2,715.0	52.2	70.0	-0.07	-2,307.7	-793.2	6,537.5	6,415.3	122.18	53.506		
11,300.0	9,279.8	2,715.0	2,715.0	53.5	70.0	-0.07	-2,307.7	-793.2	6,540.2	6,416.8	123.43	52.989		
11,400.0	9,281.3	2,715.0	2,715.0	54.7	70.0	-0.07	-2,307.7	-793.2	6,544.4	6,419.8	124.69	52.486		
11,500.0	9,282.7	2,715.0	2,715.0	56.0	70.0	-0.07	-2,307.7	-793.2	6,550.2	6,424.2	125.98	51.995		
11,600.0	9,284.1	2,715.0	2,715.0	57.3	70.0	-0.07	-2,307.7	-793.2	6,557.5	6,430.2	127.28	51.519		
11,700.0	9,285.6	2,715.0	2,715.0	58.6	70.0	-0.07	-2,307.7	-793.2	6,566.3	6,437.7	128.61	51.056		
11,800.0	9,287.0	2,715.0	2,715.0	60.0	70.0	-0.07	-2,307.7	-793.2	6,576.6	6,446.7	129.95	50.608		
11,900.0	9,288.4	2,715.0	2,715.0	61.4	70.0	-0.07	-2,307.7	-793.2	6,588.4	6,457.1	131.31	50.174		
12,000.0	9,289.8	2,715.0	2,715.0	62.7	70.0	-0.07	-2,307.7	-793.2	6,601.7	6,469.0	132.69	49.754		
12,100.0	9,291.3	2,715.0	2,715.0	64.1	70.0	-0.07	-2,307.7	-793.2	6,616.5	6,482.4	134.08	49.349		
12,200.0	9,292.7	2,715.0	2,715.0	65.5	70.0	-0.07	-2,307.7	-793.2	6,632.8	6,497.3	135.48	48.958		
12,300.0	9,294.1	2,715.0	2,715.0	66.9	70.0	-0.07	-2,307.7	-793.2	6,650.5	6,513.6	136.89	48.582		
12,400.0	9,295.6	2,715.0	2,715.0	68.4	70.0	-0.07	-2,307.7	-793.2	6,669.7	6,531.4	138.32	48.220		
12,500.0	9,297.0	2,715.0	2,715.0	69.8	70.0	-0.07	-2,307.7	-793.2	6,690.3	6,550.6	139.76	47.871		
12,600.0	9,298.4	2,715.0	2,715.0	71.2	70.0	-0.07	-2,307.7	-793.2	6,712.4	6,571.2	141.20	47.536		
12,700.0	9,299.9	2,715.0	2,715.0	72.7	70.0	-0.07	-2,307.7	-793.2	6,735.8	6,593.2	142.66	47.215		
12,800.0	9,301.3	2,715.0	2,715.0	74.2	70.0	-0.07	-2,307.7	-793.2	6,760.7	6,616.6	144.13	46.907		
12,900.0	9,302.7	2,715.0	2,715.0	75.6	70.0	-0.07	-2,307.7	-793.2	6,786.9	6,641.3	145.60	46.612		
13,000.0	9,304.2	2,715.0	2,715.0	77.1	70.0	-0.07	-2,307.7	-793.2	6,814.5	6,667.4	147.09	46.330		
13,100.0	9,305.6	2,715.0	2,715.0	78.6	70.0	-0.07	-2,307.7	-793.2	6,843.5	6,694.9	148.58	46.060		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - FEDERAL #1 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 2715-INC-ONLY													Offset Well Error:	3.0 usft
Reference	Offset	Semi Major Axis		Distance		Warning								
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (")	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
13,200.0	9,307.0	2,715.0	2,715.0	80.1	70.0	-0.07	-2,307.7	-793.2	6,873.8	6,723.7	150.08	45.802		
13,300.0	9,308.5	2,715.0	2,715.0	81.6	70.0	-0.07	-2,307.7	-793.2	6,905.4	6,753.8	151.58	45.555		
13,400.0	9,309.9	2,715.0	2,715.0	83.1	70.0	-0.07	-2,307.7	-793.2	6,938.3	6,785.2	153.09	45.320		
13,500.0	9,311.3	2,715.0	2,715.0	84.7	70.0	-0.07	-2,307.7	-793.2	6,972.5	6,817.9	154.61	45.097		
13,600.0	9,312.7	2,715.0	2,715.0	86.2	70.0	-0.07	-2,307.7	-793.2	7,007.9	6,851.8	156.14	44.883		
13,700.0	9,314.2	2,715.0	2,715.0	87.7	70.0	-0.07	-2,307.7	-793.2	7,044.6	6,886.9	157.66	44.681		
13,800.0	9,315.6	2,715.0	2,715.0	89.2	70.0	-0.07	-2,307.7	-793.2	7,082.5	6,923.3	159.20	44.488		
13,900.0	9,317.0	2,715.0	2,715.0	90.8	70.0	-0.07	-2,307.7	-793.2	7,121.6	6,960.9	160.74	44.306		
14,000.0	9,318.5	2,715.0	2,715.0	92.3	70.0	-0.07	-2,307.7	-793.2	7,161.9	6,999.6	162.28	44.132		
14,100.0	9,319.9	2,715.0	2,715.0	93.9	70.0	-0.07	-2,307.7	-793.2	7,203.4	7,039.5	163.83	43.968		
14,200.0	9,321.3	2,715.0	2,715.0	95.4	70.0	-0.07	-2,307.7	-793.2	7,245.9	7,080.6	165.38	43.813		
14,300.0	9,322.8	2,715.0	2,715.0	97.0	70.0	-0.07	-2,307.7	-793.2	7,289.7	7,122.7	166.94	43.666		
14,400.0	9,324.2	2,715.0	2,715.0	98.5	70.0	-0.07	-2,307.7	-793.2	7,334.5	7,166.0	168.50	43.528		
14,456.7	9,325.0	2,715.0	2,715.0	99.4	70.0	-0.07	-2,307.7	-793.2	7,360.4	7,191.0	169.39	43.453		

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Output Calculation Method:	2.00 sigma
Well Error:	0.0 usft	Output errors are at	EDM_Users
Reference Wellbore	Wellbore #1	Database:	Offset Datum
Reference Design:	DWD Plan #1	Offset TVD Reference:	

Offset Design LUSK BSS - GULF FEDERAL #2 - OWB - ACTUAL WELLPATH														Offset Site Error:	0.0 usft
Survey Program: 2500-INC-ONLY														Offset Well Error:	3.0 usft
Measured Depth (usft)	Vertical Reference Depth (usft)	Measured Depth (usft)	Vertical Offset Depth (usft)	Semi Major Reference (usft)	Semi Major Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
0.0	0.0	0.0	0.0	0.1	3.0	-141.90	-2,308.0	-1,809.9	2,933.3	2,929.5	3.55	825.396			
100.0	100.0	63.0	63.0	0.1	3.4	-141.90	-2,308.0	-1,809.9	2,933.0	2,927.4	5.66	518.289			
200.0	200.0	163.0	163.0	0.5	5.2	-141.90	-2,308.0	-1,809.9	2,933.0	2,924.8	8.26	354.927			
300.0	300.0	263.0	263.0	0.9	7.4	-141.90	-2,308.0	-1,809.9	2,933.0	2,922.0	11.03	265.900			
400.0	400.0	363.0	363.0	1.2	9.8	-141.90	-2,308.0	-1,809.9	2,933.0	2,919.2	13.86	211.549			
500.0	500.0	463.0	463.0	1.6	12.3	-141.90	-2,308.0	-1,809.9	2,933.0	2,916.3	16.73	175.295			
600.0	600.0	563.0	563.0	1.9	14.8	-141.90	-2,308.0	-1,809.9	2,933.0	2,913.4	19.62	149.504			
700.0	700.0	663.0	663.0	2.3	17.3	-141.90	-2,308.0	-1,809.9	2,933.0	2,910.5	22.52	130.261			
800.0	800.0	763.0	763.0	2.7	19.9	-141.90	-2,308.0	-1,809.9	2,933.0	2,907.6	25.42	115.372			
900.0	900.0	863.0	863.0	3.0	22.4	-141.90	-2,308.0	-1,809.9	2,933.0	2,906.1	26.88	109.126			
950.0	950.0	913.0	913.0	3.2	23.7	-141.90	-2,308.0	-1,809.9	2,933.0	2,904.3	28.33	103.526			
1,000.0	1,000.0	963.0	963.0	3.4	25.0	-34.90	-2,308.0	-1,809.9	2,932.7	2,898.6	31.22	93.839			
1,100.0	1,099.9	1,062.9	1,062.9	3.7	27.5	-34.97	-2,308.0	-1,809.9	2,929.8	2,890.0	34.12	85.700			
1,200.0	1,199.7	1,162.7	1,162.7	4.0	30.1	-35.11	-2,308.0	-1,809.9	2,924.1	2,884.7	35.55	82.139			
1,249.4	1,248.8	1,211.8	1,211.8	4.2	31.3	-35.21	-2,308.0	-1,809.9	2,920.2	2,878.9	37.02	78.760			
1,300.0	1,299.2	1,262.2	1,262.2	4.4	32.6	-35.27	-2,308.0	-1,809.9	2,915.9	2,867.4	39.93	72.806			
1,400.0	1,398.6	1,361.6	1,361.6	4.8	35.2	-35.39	-2,308.0	-1,809.9	2,907.4	2,856.0	42.85	67.651			
1,500.0	1,498.1	1,461.1	1,461.1	5.1	37.7	-35.51	-2,308.0	-1,809.9	2,898.9	2,844.6	45.77	63.147			
1,600.0	1,597.5	1,560.5	1,560.5	5.5	40.3	-35.63	-2,308.0	-1,809.9	2,890.4	2,833.2	48.70	59.177			
1,700.0	1,697.0	1,660.0	1,660.0	5.9	42.8	-35.75	-2,308.0	-1,809.9	2,881.9	2,821.8	51.63	55.655			
1,800.0	1,796.5	1,759.5	1,759.5	6.3	45.4	-35.87	-2,308.0	-1,809.9	2,873.4	2,810.4	54.56	52.507			
1,900.0	1,895.9	1,858.9	1,858.9	6.6	47.9	-35.99	-2,308.0	-1,809.9	2,864.9	2,799.0	57.50	49.680			
2,000.0	1,995.4	1,958.4	1,958.4	7.0	50.5	-36.11	-2,308.0	-1,809.9	2,856.5	2,787.6	60.44	47.125			
2,100.0	2,094.8	2,057.8	2,057.8	7.4	53.0	-36.24	-2,308.0	-1,809.9	2,848.0	2,776.2	63.38	44.806			
2,200.0	2,194.3	2,157.3	2,157.3	7.8	55.6	-36.36	-2,308.0	-1,809.9	2,839.6	2,764.9	66.32	42.692			
2,300.0	2,293.7	2,256.7	2,256.7	8.2	58.2	-36.49	-2,308.0	-1,809.9	2,831.2	2,753.6	69.26	40.757			
2,400.0	2,393.2	2,356.2	2,356.2	8.5	60.7	-36.61	-2,308.0	-1,809.9	2,822.8	2,742.2	72.20	38.979			
2,500.0	2,492.6	2,455.6	2,455.6	8.9	63.3	-36.74	-2,308.0	-1,809.9	2,814.4	2,732.9	73.73	38.065			
2,600.0	2,592.1	2,500.0	2,500.0	9.3	64.4	-36.80	-2,308.0	-1,809.9	2,806.6	2,727.9	74.12	37.803			
2,700.0	2,691.5	2,500.0	2,500.0	9.7	64.4	-36.80	-2,308.0	-1,809.9	2,802.0	2,726.4	74.43	37.630 CC			
2,779.8	2,770.9	2,500.0	2,500.0	10.0	64.4	-36.80	-2,308.0	-1,809.9	2,800.8	2,726.4	74.51	37.591 ES			
2,800.0	2,791.0	2,500.0	2,500.0	10.1	64.4	-36.80	-2,308.0	-1,809.9	2,800.9	2,728.5	74.90	37.429			
2,900.0	2,890.5	2,500.0	2,500.0	10.5	64.4	-36.80	-2,308.0	-1,809.9	2,803.4	2,734.2	75.29	37.315			
3,000.0	2,989.9	2,500.0	2,500.0	10.9	64.4	-36.80	-2,308.0	-1,809.9	2,809.5	2,743.4	75.68	37.249			
3,100.0	3,089.4	2,500.0	2,500.0	11.3	64.4	-36.80	-2,308.0	-1,809.9	2,819.1	2,756.1	76.07	37.230 SF			
3,200.0	3,188.8	2,500.0	2,500.0	11.7	64.4	-36.80	-2,308.0	-1,809.9	2,832.2	2,772.3	76.46	37.255			
3,300.0	3,288.3	2,500.0	2,500.0	12.1	64.4	-36.80	-2,308.0	-1,809.9	2,848.7	2,791.8	76.86	37.325			
3,400.0	3,387.7	2,500.0	2,500.0	12.4	64.4	-36.80	-2,308.0	-1,809.9	2,868.7	2,814.7	77.25	37.437			
3,500.0	3,487.2	2,500.0	2,500.0	12.8	64.4	-36.80	-2,308.0	-1,809.9	2,891.9	2,840.8	77.64	37.589			
3,600.0	3,586.6	2,500.0	2,500.0	13.2	64.4	-36.80	-2,308.0	-1,809.9	2,918.4	2,870.1	78.03	37.780			
3,700.0	3,686.1	2,500.0	2,500.0	13.6	64.4	-36.80	-2,308.0	-1,809.9	2,948.1	2,902.4	78.43	38.008			
3,800.0	3,785.5	2,500.0	2,500.0	14.0	64.4	-36.80	-2,308.0	-1,809.9	2,980.8	2,937.7	78.82	38.271			
3,900.0	3,885.0	2,500.0	2,500.0	14.4	64.4	-36.80	-2,308.0	-1,809.9	3,016.5	2,975.9	79.21	38.567			
4,000.0	3,984.5	2,500.0	2,500.0	14.8	64.4	-36.80	-2,308.0	-1,809.9	3,055.1	3,016.8	79.61	38.895			
4,100.0	4,083.9	2,500.0	2,500.0	15.2	64.4	-36.80	-2,308.0	-1,809.9	3,096.4	3,060.3	80.00	39.253			
4,200.0	4,183.4	2,500.0	2,500.0	15.6	64.4	-36.80	-2,308.0	-1,809.9	3,140.3	3,106.4	80.40	39.639			
4,300.0	4,282.8	2,500.0	2,500.0	16.0	64.4	-36.80	-2,308.0	-1,809.9	3,186.8	3,154.9	80.79	40.050			
4,400.0	4,382.3	2,500.0	2,500.0	16.4	64.4	-36.80	-2,308.0	-1,809.9	3,235.7	3,205.7	81.18	40.487			
4,500.0	4,481.7	2,500.0	2,500.0	16.8	64.4	-36.80	-2,308.0	-1,809.9	3,286.9	3,258.7	81.58	40.946			
4,600.0	4,581.2	2,500.0	2,500.0	17.2	64.4	-36.80	-2,308.0	-1,809.9	3,340.3	3,313.9	81.97	41.426			
4,700.0	4,680.6	2,500.0	2,500.0	17.6	64.4	-36.80	-2,308.0	-1,809.9	3,395.8						

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - GULF FEDERAL #2 - OWB - ACTUAL WELLPATH														Offset Site Error:	0.0 usft
Survey Program: 2500-INC-ONLY														Offset Well Error:	3.0 usft
Measured Depth (usft)	Vertical Reference Depth (usft)	Measured Depth (usft)	Vertical Offset Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
4,800.0	4,780.1	2,500.0	2,500.0	18.0	64.4	-36.80	-2,308.0	-1,809.9	3,453.4	3,371.0	82.37	41.926			
4,900.0	4,879.5	2,500.0	2,500.0	18.4	64.4	-36.80	-2,308.0	-1,809.9	3,512.8	3,430.0	82.76	42.444			
5,000.0	4,979.0	2,500.0	2,500.0	18.7	64.4	-36.80	-2,308.0	-1,809.9	3,574.0	3,490.9	83.16	42.979			
5,100.0	5,078.5	2,500.0	2,500.0	19.1	64.4	-36.80	-2,308.0	-1,809.9	3,637.0	3,553.5	83.55	43.530			
5,200.0	5,177.9	2,500.0	2,500.0	19.5	64.4	-36.80	-2,308.0	-1,809.9	3,701.6	3,617.7	83.95	44.095			
5,300.0	5,277.4	2,500.0	2,500.0	19.9	64.4	-36.80	-2,308.0	-1,809.9	3,767.7	3,683.4	84.34	44.672			
5,400.0	5,376.8	2,500.0	2,500.0	20.3	64.4	-36.80	-2,308.0	-1,809.9	3,835.4	3,750.6	84.74	45.262			
5,500.0	5,476.3	2,500.0	2,500.0	20.7	64.4	-36.80	-2,308.0	-1,809.9	3,904.3	3,819.2	85.13	45.862			
5,600.0	5,575.7	2,500.0	2,500.0	21.1	64.4	-36.80	-2,308.0	-1,809.9	3,974.7	3,889.1	85.53	46.472			
5,700.0	5,675.2	2,500.0	2,500.0	21.5	64.4	-36.80	-2,308.0	-1,809.9	4,046.2	3,960.3	85.92	47.092			
5,800.0	5,774.6	2,500.0	2,500.0	21.9	64.4	-36.80	-2,308.0	-1,809.9	4,119.0	4,032.7	86.32	47.719			
5,900.0	5,874.1	2,500.0	2,500.0	22.3	64.4	-36.80	-2,308.0	-1,809.9	4,192.9	4,106.1	86.71	48.353			
6,000.0	5,973.5	2,500.0	2,500.0	22.7	64.4	-36.80	-2,308.0	-1,809.9	4,267.8	4,180.7	87.11	48.994			
6,100.0	6,073.0	2,500.0	2,500.0	23.1	64.4	-36.80	-2,308.0	-1,809.9	4,343.7	4,256.2	87.50	49.640			
6,200.0	6,172.4	2,500.0	2,500.0	23.5	64.4	-36.80	-2,308.0	-1,809.9	4,420.7	4,332.8	87.90	50.292			
6,300.0	6,271.9	2,500.0	2,500.0	23.9	64.4	-36.80	-2,308.0	-1,809.9	4,498.5	4,410.2	88.30	50.948			
6,400.0	6,371.4	2,500.0	2,500.0	24.3	64.4	-36.80	-2,308.0	-1,809.9	4,577.1	4,488.5	88.69	51.608			
6,500.0	6,470.8	2,500.0	2,500.0	24.7	64.4	-36.80	-2,308.0	-1,809.9	4,656.6	4,567.5	89.09	52.271			
6,600.0	6,570.3	2,500.0	2,500.0	25.1	64.4	-36.80	-2,308.0	-1,809.9	4,736.9	4,647.4	89.48	52.937			
6,700.0	6,669.7	2,500.0	2,500.0	25.5	64.4	-36.80	-2,308.0	-1,809.9	4,817.9	4,728.0	89.88	53.605			
6,800.0	6,769.2	2,500.0	2,500.0	25.9	64.4	-36.80	-2,308.0	-1,809.9	4,899.6	4,809.4	90.27	54.275			
6,900.0	6,868.6	2,500.0	2,500.0	26.3	64.4	-36.80	-2,308.0	-1,809.9	4,982.0	4,891.3	90.67	54.947			
7,000.0	6,968.1	2,500.0	2,500.0	26.7	64.4	-36.80	-2,308.0	-1,809.9	5,065.0	4,974.0	91.07	55.619			
7,100.0	7,067.5	2,500.0	2,500.0	27.1	64.4	-36.80	-2,308.0	-1,809.9	5,148.6	5,057.2	91.46	56.293			
7,200.0	7,167.0	2,500.0	2,500.0	27.4	64.4	-36.80	-2,308.0	-1,809.9	5,232.8	5,141.0	91.86	56.967			
7,300.0	7,266.4	2,500.0	2,500.0	27.8	64.4	-36.80	-2,308.0	-1,809.9	5,317.6	5,225.3	92.25	57.641			
7,400.0	7,365.9	2,500.0	2,500.0	28.2	64.4	-36.80	-2,308.0	-1,809.9	5,402.8	5,310.2	92.65	58.315			
7,500.0	7,465.4	2,500.0	2,500.0	28.6	64.4	-36.80	-2,308.0	-1,809.9	5,488.6	5,395.5	93.05	58.988			
7,600.0	7,564.8	2,500.0	2,500.0	29.0	64.4	-36.80	-2,308.0	-1,809.9	5,574.8	5,481.4	93.44	59.661			
7,700.0	7,664.3	2,500.0	2,500.0	29.4	64.4	-36.80	-2,308.0	-1,809.9	5,661.5	5,567.7	93.84	60.333			
7,800.0	7,763.7	2,500.0	2,500.0	29.8	64.4	-36.80	-2,308.0	-1,809.9	5,748.6	5,654.4	94.23	61.004			
7,900.0	7,863.2	2,500.0	2,500.0	30.2	64.4	-36.80	-2,308.0	-1,809.9	5,836.2	5,741.5	94.63	61.674			
8,000.0	7,962.6	2,500.0	2,500.0	30.6	64.4	-36.80	-2,308.0	-1,809.9	5,924.1	5,829.1	95.03	62.342			
8,100.0	8,062.1	2,500.0	2,500.0	31.0	64.4	-36.80	-2,308.0	-1,809.9	6,012.4	5,917.0	95.42	63.008			
8,200.0	8,161.5	2,500.0	2,500.0	31.4	64.4	-36.80	-2,308.0	-1,809.9	6,101.0	6,005.2	95.82	63.673			
8,300.0	8,261.0	2,500.0	2,500.0	31.8	64.4	-36.80	-2,308.0	-1,809.9	6,190.1	6,093.8	96.21	64.336			
8,400.0	8,360.4	2,500.0	2,500.0	32.2	64.4	-36.80	-2,308.0	-1,809.9	6,279.4	6,182.8	96.61	64.997			
8,500.0	8,459.9	2,500.0	2,500.0	32.6	64.4	-36.80	-2,308.0	-1,809.9	6,369.1	6,272.1	97.01	65.656			
8,600.0	8,559.4	2,500.0	2,500.0	33.0	64.4	-36.80	-2,308.0	-1,809.9	6,459.0	6,361.6	97.40	66.312			
8,700.0	8,658.8	2,500.0	2,500.0	33.4	64.4	-36.80	-2,308.0	-1,809.9	6,549.3	6,451.5	97.80	66.967			
8,800.0	8,758.3	2,500.0	2,500.0	33.8	64.4	-36.80	-2,308.0	-1,809.9	6,639.8	6,541.6	98.20	67.618			
8,836.0	8,794.0	2,500.0	2,500.0	33.9	64.4	-36.80	-2,308.0	-1,809.9	6,672.4	6,574.1	98.34	67.852			
8,850.0	8,808.0	2,500.0	2,500.0	34.0	64.4	-24.87	-2,308.0	-1,809.9	6,685.1	6,586.7	98.39	67.943			
8,875.0	8,832.8	2,500.0	2,500.0	34.1	64.4	-10.57	-2,308.0	-1,809.9	6,707.3	6,608.8	98.49	68.098			
8,900.0	8,857.4	2,500.0	2,500.0	34.2	64.4	-2.74	-2,308.0	-1,809.9	6,729.0	6,630.4	98.60	68.248			
8,925.0	8,881.8	2,500.0	2,500.0	34.3	64.4	1.59	-2,308.0	-1,809.9	6,750.1	6,651.4	98.70	68.391			
8,950.0	8,906.0	2,500.0	2,500.0	34.4	64.4	4.08	-2,308.0	-1,809.9	6,770.6	6,671.8	98.80	68.527			
8,975.0	8,929.8	2,500.0	2,500.0	34.5	64.4	5.56	-2,308.0	-1,809.9	6,790.5	6,691.6	98.91	68.655			
9,000.0	8,953.2	2,500.0	2,500.0	34.6	64.4	6.46	-2,308.0	-1,809.9	6,809.6	6,710.6	99.01	68.775			
9,025.0	8,976.1	2,500.0	2,500.0	34.7	64.4	7.01	-2,308.0	-1,809.9	6,828.0	6,728.9	99.12	68.888			

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - GULF FEDERAL #2 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 2500-INC-ONLY													Offset Well Error:	3.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
9,050.0	8,998.5	2,500.0	2,500.0	34.8	64.4	7.35	-2,308.0	-1,809.9	6,845.5	6,746.3	99.22	68.992		
9,075.0	9,020.2	2,500.0	2,500.0	34.9	64.4	7.55	-2,308.0	-1,809.9	6,862.2	6,762.9	99.33	69.088		
9,100.0	9,041.4	2,500.0	2,500.0	35.0	64.4	7.66	-2,308.0	-1,809.9	6,878.1	6,778.6	99.43	69.174		
9,125.0	9,061.8	2,500.0	2,500.0	35.1	64.4	7.72	-2,308.0	-1,809.9	6,893.0	6,793.4	99.54	69.251		
9,150.0	9,081.4	2,500.0	2,500.0	35.2	64.4	7.75	-2,308.0	-1,809.9	6,906.9	6,807.2	99.64	69.318		
9,175.0	9,100.2	2,500.0	2,500.0	35.3	64.4	7.75	-2,308.0	-1,809.9	6,919.8	6,820.1	99.74	69.376		
9,200.0	9,118.1	2,500.0	2,500.0	35.4	64.4	7.75	-2,308.0	-1,809.9	6,931.7	6,831.9	99.85	69.422		
9,225.0	9,135.1	2,500.0	2,500.0	35.5	64.4	7.74	-2,308.0	-1,809.9	6,942.6	6,842.7	99.95	69.459		
9,250.0	9,151.2	2,500.0	2,500.0	35.7	64.4	7.73	-2,308.0	-1,809.9	6,952.4	6,852.4	100.06	69.484		
9,275.0	9,166.2	2,500.0	2,500.0	35.8	64.4	7.72	-2,308.0	-1,809.9	6,961.1	6,860.9	100.16	69.497		
9,300.0	9,180.1	2,500.0	2,500.0	35.9	64.4	7.73	-2,308.0	-1,809.9	6,968.7	6,868.4	100.27	69.499		
9,325.0	9,193.0	2,500.0	2,500.0	36.0	64.4	7.74	-2,308.0	-1,809.9	6,975.1	6,874.8	100.38	69.489		
9,350.0	9,204.7	2,500.0	2,500.0	36.1	64.4	7.76	-2,308.0	-1,809.9	6,980.4	6,880.0	100.49	69.467		
9,375.0	9,215.2	2,500.0	2,500.0	36.2	64.4	7.79	-2,308.0	-1,809.9	6,984.6	6,884.0	100.60	69.432		
9,400.0	9,224.6	2,500.0	2,500.0	36.3	64.4	7.83	-2,308.0	-1,809.9	6,987.6	6,886.9	100.71	69.384		
9,425.0	9,232.8	2,500.0	2,500.0	36.4	64.4	7.89	-2,308.0	-1,809.9	6,989.4	6,888.5	100.82	69.324		
9,450.0	9,239.7	2,500.0	2,500.0	36.5	64.4	7.96	-2,308.0	-1,809.9	6,990.0	6,889.0	100.94	69.251		
9,475.0	9,245.3	2,500.0	2,500.0	36.6	64.4	8.05	-2,308.0	-1,809.9	6,989.4	6,888.4	101.05	69.165		
9,500.0	9,249.7	2,500.0	2,500.0	36.8	64.4	8.15	-2,308.0	-1,809.9	6,987.7	6,886.5	101.17	69.066		
9,525.0	9,252.8	2,500.0	2,500.0	36.9	64.4	8.28	-2,308.0	-1,809.9	6,984.8	6,883.5	101.30	68.954		
9,550.0	9,254.6	2,500.0	2,500.0	37.0	64.4	8.42	-2,308.0	-1,809.9	6,980.7	6,879.2	101.42	68.830		
9,565.0	9,255.0	2,500.0	2,500.0	37.1	64.4	8.52	-2,308.0	-1,809.9	6,977.7	6,876.2	101.49	68.749		
9,600.0	9,255.5	2,500.0	2,500.0	37.3	64.4	8.52	-2,308.0	-1,809.9	6,970.2	6,868.6	101.67	68.555		
9,700.0	9,256.9	2,500.0	2,500.0	37.8	64.4	8.52	-2,308.0	-1,809.9	6,950.0	6,847.7	102.23	67.983		
9,800.0	9,258.4	2,500.0	2,500.0	38.4	64.4	8.52	-2,308.0	-1,809.9	6,931.1	6,828.2	102.85	67.390		
9,900.0	9,259.8	2,500.0	2,500.0	39.1	64.4	8.52	-2,308.0	-1,809.9	6,913.5	6,810.0	103.53	66.777		
10,000.0	9,261.2	2,500.0	2,500.0	39.9	64.4	8.52	-2,308.0	-1,809.9	6,897.4	6,793.2	104.27	66.149		
10,100.0	9,262.7	2,500.0	2,500.0	40.7	64.4	8.52	-2,308.0	-1,809.9	6,882.8	6,777.7	105.07	65.509		
10,200.0	9,264.1	2,500.0	2,500.0	41.5	64.4	8.52	-2,308.0	-1,809.9	6,869.5	6,763.6	105.91	64.860		
10,300.0	9,265.5	2,500.0	2,500.0	42.4	64.4	8.52	-2,308.0	-1,809.9	6,857.7	6,750.9	106.81	64.205		
10,400.0	9,267.0	2,500.0	2,500.0	43.3	64.4	8.52	-2,308.0	-1,809.9	6,847.3	6,739.5	107.75	63.547		
10,500.0	9,268.4	2,500.0	2,500.0	44.3	64.4	8.52	-2,308.0	-1,809.9	6,838.4	6,729.6	108.74	62.889		
10,600.0	9,269.8	2,500.0	2,500.0	45.4	64.4	8.52	-2,308.0	-1,809.9	6,830.9	6,721.1	109.76	62.233		
10,700.0	9,271.2	2,500.0	2,500.0	46.4	64.4	8.52	-2,308.0	-1,809.9	6,824.8	6,714.0	110.83	61.581		
10,800.0	9,272.7	2,500.0	2,500.0	47.5	64.4	8.52	-2,308.0	-1,809.9	6,820.3	6,708.3	111.93	60.936		
10,900.0	9,274.1	2,500.0	2,500.0	48.7	64.4	8.52	-2,308.0	-1,809.9	6,817.2	6,704.1	113.06	60.298		
11,000.0	9,275.5	2,500.0	2,500.0	49.8	64.4	8.52	-2,308.0	-1,809.9	6,815.5	6,701.3	114.22	59.670		
11,061.7	9,276.4	2,500.0	2,500.0	50.5	64.4	8.52	-2,308.0	-1,809.9	6,815.2	6,700.3	114.95	59.286		
11,100.0	9,277.0	2,500.0	2,500.0	51.0	64.4	8.52	-2,308.0	-1,809.9	6,815.3	6,699.9	115.41	59.053		
11,200.0	9,278.4	2,500.0	2,500.0	52.2	64.4	8.52	-2,308.0	-1,809.9	6,816.6	6,700.0	116.63	58.447		
11,300.0	9,279.8	2,500.0	2,500.0	53.5	64.4	8.52	-2,308.0	-1,809.9	6,819.4	6,701.5	117.87	57.855		
11,400.0	9,281.3	2,500.0	2,500.0	54.7	64.4	8.52	-2,308.0	-1,809.9	6,823.6	6,704.5	119.14	57.276		
11,500.0	9,282.7	2,500.0	2,500.0	56.0	64.4	8.52	-2,308.0	-1,809.9	6,829.3	6,708.9	120.42	56.711		
11,600.0	9,284.1	2,500.0	2,500.0	57.3	64.4	8.52	-2,308.0	-1,809.9	6,836.5	6,714.7	121.73	56.161		
11,700.0	9,285.6	2,500.0	2,500.0	58.6	64.4	8.52	-2,308.0	-1,809.9	6,845.1	6,722.0	123.06	55.626		
11,800.0	9,287.0	2,500.0	2,500.0	60.0	64.4	8.52	-2,308.0	-1,809.9	6,855.1	6,730.7	124.40	55.106		
11,900.0	9,288.4	2,500.0	2,500.0	61.4	64.4	8.52	-2,308.0	-1,809.9	6,866.6	6,740.8	125.76	54.602		
12,000.0	9,289.8	2,500.0	2,500.0	62.7	64.4	8.52	-2,308.0	-1,809.9	6,879.5	6,752.4	127.13	54.113		
12,100.0	9,291.3	2,500.0	2,500.0	64.1	64.4	8.52	-2,308.0	-1,809.9	6,893.9	6,765.4	128.52	53.640		
12,200.0	9,292.7	2,500.0	2,500.0	65.5	64.4	8.52	-2,308.0	-1,809.9	6,909.6	6,779.7	129.92	53.182		
12,300.0	9,294.1	2,500.0	2,500.0	66.9	64.4	8.52	-2,308.0	-1,809.9	6,926.8	6,795.5	131.34	52.740		

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - GULF FEDERAL #2 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 2500-INC-ONLY													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore +N/-S (usft)	Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
12,400.0	9,295.6	2,500.0	2,500.0	68.4	64.4	8.52	-2,308.0	-1,809.9	6,945.4	6,812.6	132.77	52.313		
12,500.0	9,297.0	2,500.0	2,500.0	69.8	64.4	8.52	-2,308.0	-1,809.9	6,965.4	6,831.2	134.20	51.902		
12,600.0	9,298.4	2,500.0	2,500.0	71.2	64.4	8.52	-2,308.0	-1,809.9	6,986.7	6,851.0	135.65	51.505		
12,700.0	9,299.9	2,500.0	2,500.0	72.7	64.4	8.52	-2,308.0	-1,809.9	7,009.4	6,872.3	137.11	51.123		
12,800.0	9,301.3	2,500.0	2,500.0	74.2	64.4	8.52	-2,308.0	-1,809.9	7,033.4	6,894.9	138.57	50.755		
12,900.0	9,302.7	2,500.0	2,500.0	75.6	64.4	8.52	-2,308.0	-1,809.9	7,058.8	6,918.8	140.05	50.402		
13,000.0	9,304.2	2,500.0	2,500.0	77.1	64.4	8.52	-2,308.0	-1,809.9	7,085.5	6,944.0	141.53	50.062		
13,100.0	9,305.6	2,500.0	2,500.0	78.6	64.4	8.52	-2,308.0	-1,809.9	7,113.5	6,970.5	143.02	49.736		
13,200.0	9,307.0	2,500.0	2,500.0	80.1	64.4	8.52	-2,308.0	-1,809.9	7,142.8	6,998.3	144.52	49.423		
13,300.0	9,308.5	2,500.0	2,500.0	81.6	64.4	8.52	-2,308.0	-1,809.9	7,173.4	7,027.4	146.03	49.123		
13,400.0	9,309.9	2,500.0	2,500.0	83.1	64.4	8.52	-2,308.0	-1,809.9	7,205.2	7,057.7	147.54	48.836		
13,500.0	9,311.3	2,500.0	2,500.0	84.7	64.4	8.52	-2,308.0	-1,809.9	7,238.3	7,089.2	149.06	48.560		
13,600.0	9,312.7	2,500.0	2,500.0	86.2	64.4	8.52	-2,308.0	-1,809.9	7,272.6	7,122.0	150.58	48.297		
13,700.0	9,314.2	2,500.0	2,500.0	87.7	64.4	8.52	-2,308.0	-1,809.9	7,308.1	7,156.0	152.11	48.044		
13,800.0	9,315.6	2,500.0	2,500.0	89.2	64.4	8.52	-2,308.0	-1,809.9	7,344.8	7,191.1	153.65	47.804		
13,900.0	9,317.0	2,500.0	2,500.0	90.8	64.4	8.52	-2,308.0	-1,809.9	7,382.6	7,227.5	155.18	47.573		
14,000.0	9,318.5	2,500.0	2,500.0	92.3	64.4	8.52	-2,308.0	-1,809.9	7,421.7	7,264.9	156.73	47.354		
14,100.0	9,319.9	2,500.0	2,500.0	93.9	64.4	8.52	-2,308.0	-1,809.9	7,461.8	7,303.5	158.28	47.144		
14,200.0	9,321.3	2,500.0	2,500.0	95.4	64.4	8.52	-2,308.0	-1,809.9	7,503.1	7,343.3	159.83	46.944		
14,300.0	9,322.8	2,500.0	2,500.0	97.0	64.4	8.52	-2,308.0	-1,809.9	7,545.5	7,384.1	161.39	46.754		
14,400.0	9,324.2	2,500.0	2,500.0	98.5	64.4	8.52	-2,308.0	-1,809.9	7,588.9	7,426.0	162.95	46.573		
14,456.7	9,325.0	2,500.0	2,500.0	99.4	64.4	8.52	-2,308.0	-1,809.9	7,614.0	7,450.2	163.83	46.474		

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - LUSK DEEP UNIT #2 - OWB - ACTUAL WELLPATH														Offset Site Error:	0.0 usft
Survey Program: 13974-INC-ONLY														Offset Well Error:	3.0 usft
Measured Depth (usft)	Reference Vertical Depth (usft)	Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
0.0	0.0	0.0	0.0	0.0	3.0	-70.23	292.4	-813.4	864.4						
100.0	100.0	98.0	98.0	0.1	3.9	-70.23	292.4	-813.4	864.4	860.3	4.07	212.462			
200.0	200.0	198.0	198.0	0.5	5.9	-70.23	292.4	-813.4	864.4	858.0	6.43	134.419			
300.0	300.0	298.0	298.0	0.9	8.3	-70.23	292.4	-813.4	864.4	855.3	9.12	94.773			
400.0	400.0	398.0	398.0	1.2	10.7	-70.23	292.4	-813.4	864.4	852.5	11.93	72.476			
500.0	500.0	498.0	498.0	1.6	13.2	-70.23	292.4	-813.4	864.4	849.6	14.78	58.468			
600.0	600.0	598.0	598.0	1.9	15.7	-70.23	292.4	-813.4	864.4	846.7	17.67	48.922			
700.0	700.0	698.0	698.0	2.3	18.3	-70.23	292.4	-813.4	864.4	843.8	20.57	42.024			
800.0	800.0	798.0	798.0	2.7	20.8	-70.23	292.4	-813.4	864.4	840.9	23.48	36.815			
900.0	900.0	898.0	898.0	3.0	23.4	-70.23	292.4	-813.4	864.4	838.0	26.40	32.746			
950.0	950.0	948.0	948.0	3.2	24.7	-70.23	292.4	-813.4	864.4	836.5	27.86	31.030			
1,000.0	1,000.0	998.0	998.0	3.4	25.9	36.80	292.4	-813.4	864.0	834.7	29.31	29.477			
1,100.0	1,099.9	1,097.9	1,097.9	3.7	28.5	36.97	292.4	-813.4	861.2	829.0	32.22	26.733			
1,200.0	1,199.7	1,197.7	1,197.7	4.0	31.1	37.32	292.4	-813.4	855.7	820.6	35.13	24.361			
1,249.4	1,248.8	1,246.8	1,246.8	4.2	32.3	37.56	292.4	-813.4	851.9	815.4	36.56	23.301			
1,300.0	1,299.2	1,297.2	1,297.2	4.4	33.6	37.78	292.4	-813.4	847.7	809.7	38.04	22.287			
1,400.0	1,398.6	1,396.6	1,396.6	4.8	36.2	38.21	292.4	-813.4	839.5	798.5	40.96	20.497			
1,500.0	1,498.1	1,496.1	1,496.1	5.1	38.8	38.66	292.4	-813.4	831.3	787.4	43.88	18.943			
1,600.0	1,597.5	1,595.5	1,595.5	5.5	41.3	39.11	292.4	-813.4	823.2	776.4	46.82	17.583			
1,700.0	1,697.0	1,695.0	1,695.0	5.9	43.9	39.57	292.4	-813.4	815.1	765.3	49.75	16.383			
1,800.0	1,796.5	1,794.5	1,794.5	6.3	46.4	40.04	292.4	-813.4	807.1	754.4	52.69	15.317			
1,900.0	1,895.9	1,893.9	1,893.9	6.6	49.0	40.52	292.4	-813.4	799.1	743.4	55.63	14.363			
2,000.0	1,995.4	1,993.4	1,993.4	7.0	51.6	41.01	292.4	-813.4	791.2	732.6	58.58	13.506			
2,100.0	2,094.8	2,092.8	2,092.8	7.4	54.1	41.51	292.4	-813.4	783.3	721.8	61.53	12.731			
2,200.0	2,194.3	2,192.3	2,192.3	7.8	56.7	42.02	292.4	-813.4	775.5	711.0	64.47	12.028			
2,300.0	2,293.7	2,291.7	2,291.7	8.2	59.3	42.54	292.4	-813.4	767.8	700.3	67.43	11.387			
2,400.0	2,393.2	2,391.2	2,391.2	8.5	61.8	43.07	292.4	-813.4	760.1	689.7	70.38	10.800			
2,500.0	2,492.6	2,490.6	2,490.6	8.9	64.4	43.61	292.4	-813.4	752.5	679.2	73.33	10.262			
2,600.0	2,592.1	2,590.1	2,590.1	9.3	67.0	44.16	292.4	-813.4	745.0	668.7	76.28	9.765			
2,700.0	2,691.5	2,689.5	2,689.5	9.7	69.5	44.73	292.4	-813.4	737.5	658.2	79.24	9.307			
2,800.0	2,791.0	2,789.0	2,789.0	10.1	72.1	45.30	292.4	-813.4	730.1	647.9	82.19	8.882			
2,900.0	2,890.5	2,888.5	2,888.5	10.5	74.7	45.89	292.4	-813.4	722.8	637.6	85.15	8.488			
3,000.0	2,989.9	2,987.9	2,987.9	10.9	77.2	46.49	292.4	-813.4	715.5	627.4	88.11	8.121			
3,100.0	3,089.4	3,087.4	3,087.4	11.3	79.8	47.10	292.4	-813.4	708.4	617.3	91.07	7.779			
3,200.0	3,188.8	3,186.8	3,186.8	11.7	82.4	47.72	292.4	-813.4	701.3	607.3	94.02	7.459			
3,300.0	3,288.3	3,286.3	3,286.3	12.1	84.9	48.35	292.4	-813.4	694.3	597.3	96.98	7.159			
3,400.0	3,387.7	3,385.7	3,385.7	12.4	87.5	49.00	292.4	-813.4	687.4	587.4	99.94	6.878			
3,500.0	3,487.2	3,485.2	3,485.2	12.8	90.1	49.66	292.4	-813.4	680.6	577.7	102.90	6.614			
3,600.0	3,586.6	3,584.6	3,584.6	13.2	92.6	50.34	292.4	-813.4	673.8	568.0	105.86	6.365			
3,700.0	3,686.1	3,684.1	3,684.1	13.6	95.2	51.02	292.4	-813.4	667.2	558.4	108.82	6.131			
3,800.0	3,785.5	3,783.5	3,783.5	14.0	97.8	51.72	292.4	-813.4	660.7	548.9	111.78	5.910			
3,900.0	3,885.0	3,883.0	3,883.0	14.4	100.3	52.44	292.4	-813.4	654.2	539.5	114.74	5.702			
4,000.0	3,984.5	3,982.5	3,982.5	14.8	102.9	53.17	292.4	-813.4	647.9	530.2	117.70	5.505			
4,100.0	4,083.9	4,081.9	4,081.9	15.2	105.5	53.91	292.4	-813.4	641.7	521.0	120.66	5.318			
4,200.0	4,183.4	4,181.4	4,181.4	15.6	108.0	54.67	292.4	-813.4	635.6	512.0	123.63	5.141			
4,300.0	4,282.8	4,280.8	4,280.8	16.0	110.6	55.44	292.4	-813.4	629.6	503.0	126.59	4.974			
4,400.0	4,382.3	4,380.3	4,380.3	16.4	113.2	56.22	292.4	-813.4	623.7	494.2	129.55	4.814			
4,500.0	4,481.7	4,479.7	4,479.7	16.8	115.7	57.03	292.4	-813.4	617.9	485.4	132.51	4.663			
4,600.0	4,581.2	4,579.2	4,579.2	17.2	118.3	57.84	292.4	-813.4	612.3	476.8	135.47	4.520			
4,700.0	4,680.6	4,678.6	4,678.6	17.6	120.9	58.67	292.4	-813.4	606.8	468.4	138.43	4.383			
4,800.0	4,780.1	4,778.1	4,778.1	18.0	123.4	59.52	292.4	-813.4	601.4	460.0	141.40	4.253			

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - LUSK DEEP UNIT #2 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 13974-INC-ONLY													Offset Well Error:	3.0 usft
Reference	Offset	Semi Major Axis		Distance		Warning								
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
4,900.0	4,879.5	4,877.5	4,877.5	18.4	126.0	60.38	292.4	-813.4	596.2	451.8	144.36	4.130		
5,000.0	4,979.0	4,977.0	4,977.0	18.7	128.6	61.25	292.4	-813.4	591.1	443.7	147.32	4.012		
5,100.0	5,078.5	5,076.5	5,076.5	19.1	131.1	62.14	292.4	-813.4	586.1	435.8	150.29	3.900		
5,200.0	5,177.9	5,175.9	5,175.9	19.5	133.7	63.05	292.4	-813.4	581.3	428.0	153.25	3.793		
5,300.0	5,277.4	5,275.4	5,275.4	19.9	136.3	63.97	292.4	-813.4	576.6	420.4	156.21	3.691		
5,400.0	5,376.8	5,374.8	5,374.8	20.3	138.8	64.90	292.4	-813.4	572.1	412.9	159.17	3.594		
5,500.0	5,476.3	5,474.3	5,474.3	20.7	141.4	65.85	292.4	-813.4	567.7	405.6	162.14	3.501		
5,600.0	5,575.7	5,573.7	5,573.7	21.1	144.0	66.81	292.4	-813.4	563.5	398.4	165.10	3.413		
5,700.0	5,675.2	5,673.2	5,673.2	21.5	146.5	67.79	292.4	-813.4	559.5	391.4	168.06	3.329		
5,800.0	5,774.6	5,772.6	5,772.6	21.9	149.1	68.78	292.4	-813.4	555.6	384.6	171.03	3.249		
5,900.0	5,874.1	5,872.1	5,872.1	22.3	151.7	69.79	292.4	-813.4	551.9	377.9	173.99	3.172		
6,000.0	5,973.5	5,971.5	5,971.5	22.7	154.3	70.81	292.4	-813.4	548.3	371.4	176.95	3.099		
6,100.0	6,073.0	6,071.0	6,071.0	23.1	156.8	71.84	292.4	-813.4	545.0	365.1	179.92	3.029		
6,200.0	6,172.4	6,170.4	6,170.4	23.5	159.4	72.88	292.4	-813.4	541.8	358.9	182.88	2.963		
6,300.0	6,271.9	6,269.9	6,269.9	23.9	162.0	73.93	292.4	-813.4	538.8	353.0	185.84	2.899		
6,400.0	6,371.4	6,369.4	6,369.4	24.3	164.5	75.00	292.4	-813.4	536.0	347.2	188.81	2.839		
6,500.0	6,470.8	6,468.8	6,468.8	24.7	167.1	76.08	292.4	-813.4	533.4	341.6	191.77	2.781		
6,600.0	6,570.3	6,568.3	6,568.3	25.1	169.7	77.16	292.4	-813.4	531.0	336.2	194.74	2.727		
6,700.0	6,669.7	6,667.7	6,667.7	25.5	172.2	78.26	292.4	-813.4	528.7	331.0	197.70	2.674		
6,800.0	6,769.2	6,767.2	6,767.2	25.9	174.8	79.37	292.4	-813.4	526.7	326.0	200.66	2.625		
6,900.0	6,868.6	6,866.6	6,866.6	26.3	177.4	80.48	292.4	-813.4	524.9	321.2	203.63	2.578		
7,000.0	6,968.1	6,966.1	6,966.1	26.7	179.9	81.60	292.4	-813.4	523.2	316.6	206.59	2.533		
7,100.0	7,067.5	7,065.5	7,065.5	27.1	182.5	82.73	292.4	-813.4	521.8	312.2	209.56	2.490		
7,200.0	7,167.0	7,165.0	7,165.0	27.4	185.1	83.86	292.4	-813.4	520.6	308.1	212.52	2.450		
7,300.0	7,266.4	7,264.4	7,264.4	27.8	187.6	85.00	292.4	-813.4	519.6	304.1	215.48	2.411		
7,400.0	7,365.9	7,363.9	7,363.9	28.2	190.2	86.14	292.4	-813.4	518.7	300.3	218.45	2.375		
7,500.0	7,465.4	7,463.4	7,463.4	28.6	192.8	87.28	292.4	-813.4	518.1	296.7	221.41	2.340		
7,600.0	7,564.8	7,562.8	7,562.8	29.0	195.3	88.43	292.4	-813.4	517.7	293.4	224.38	2.307		
7,700.0	7,664.3	7,662.3	7,662.3	29.4	197.9	89.58	292.4	-813.4	517.6	290.2	227.34	2.277		
7,736.8	7,700.8	7,698.8	7,698.8	29.6	198.9	90.00	292.4	-813.4	517.6	289.1	228.43	2.266 CC		
7,800.0	7,763.7	7,761.7	7,761.7	29.8	200.5	90.73	292.4	-813.4	517.6	287.3	230.31	2.247		
7,900.0	7,863.2	7,861.2	7,861.2	30.2	203.0	91.87	292.4	-813.4	517.8	284.6	233.27	2.220		
8,000.0	7,962.6	7,960.6	7,960.6	30.6	205.6	93.02	292.4	-813.4	518.3	282.0	236.23	2.194		
8,100.0	8,062.1	8,060.1	8,060.1	31.0	208.2	94.16	292.4	-813.4	518.9	279.7	239.20	2.169		
8,200.0	8,161.5	8,159.5	8,159.5	31.4	210.8	95.30	292.4	-813.4	519.8	277.6	242.16	2.147		
8,300.0	8,261.0	8,259.0	8,259.0	31.8	213.3	96.44	292.4	-813.4	520.9	275.7	245.13	2.125		
8,400.0	8,360.4	8,358.4	8,358.4	32.2	215.9	97.57	292.4	-813.4	522.2	274.1	248.09	2.105		
8,500.0	8,459.9	8,457.9	8,457.9	32.6	218.5	98.70	292.4	-813.4	523.6	272.6	251.06	2.086		
8,600.0	8,559.4	8,557.4	8,557.4	33.0	221.0	99.82	292.4	-813.4	525.3	271.3	254.02	2.068		
8,700.0	8,658.8	8,656.8	8,656.8	33.4	223.6	100.93	292.4	-813.4	527.2	270.2	256.99	2.052		
8,800.0	8,758.3	8,756.3	8,756.3	33.8	226.2	102.03	292.4	-813.4	529.3	269.4	259.95	2.036		
8,836.0	8,794.0	8,792.0	8,792.0	33.9	227.1	102.43	292.4	-813.4	530.1	269.1	261.02	2.031 ES		
8,850.0	8,808.0	8,806.0	8,806.0	34.0	227.4	116.57	292.4	-813.4	530.6	269.2	261.43	2.030 SF		
8,875.0	8,832.8	8,830.8	8,830.8	34.1	228.1	134.31	292.4	-813.4	532.6	270.4	262.17	2.031		
8,900.0	8,857.4	8,855.4	8,855.4	34.2	228.7	145.05	292.4	-813.4	535.9	273.0	262.91	2.038		
8,925.0	8,881.8	8,879.8	8,879.8	34.3	229.4	151.85	292.4	-813.4	540.4	276.8	263.65	2.050		
8,950.0	8,906.0	8,904.0	8,904.0	34.4	230.0	156.48	292.4	-813.4	543.3	281.9	264.37	2.066		
8,975.0	8,929.8	8,927.8	8,927.8	34.5	230.6	159.80	292.4	-813.4	545.3	288.4	265.09	2.086		
9,000.0	8,953.2	8,951.2	8,951.2	34.6	231.2	162.32	292.4	-813.4	546.9	296.1	265.80	2.114		
9,025.0	8,976.1	8,974.1	8,974.1	34.7	231.8	164.29	292.4	-813.4	547.5	296.5	266.50	2.144		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Output Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - LUSK DEEP UNIT #2 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 13974-INC-ONLY													Offset Well Error:	3.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning	
9,050.0	8,998.5	8,996.5	8,996.5	34.8	232.4	165.88	292.4	-813.4	582.3	315.1	267.85	2.180		
9,075.0	9,020.2	9,018.2	9,018.2	34.9	232.9	167.20	292.4	-813.4	594.3	326.5	267.85	2.219		
9,100.0	9,041.4	9,039.4	9,039.4	35.0	233.5	168.31	292.4	-813.4	607.5	339.0	268.50	2.263		
9,125.0	9,061.8	9,059.8	9,059.8	35.1	234.0	169.26	292.4	-813.4	621.7	352.6	269.13	2.310		
9,150.0	9,081.4	9,079.4	9,079.4	35.2	234.5	170.08	292.4	-813.4	637.1	367.3	269.74	2.362		
9,175.0	9,100.2	9,098.2	9,098.2	35.3	235.0	170.81	292.4	-813.4	653.4	383.1	270.33	2.417		
9,200.0	9,118.1	9,116.1	9,116.1	35.4	235.5	171.45	292.4	-813.4	670.7	399.8	270.90	2.476		
9,225.0	9,135.1	9,133.1	9,133.1	35.5	235.9	172.03	292.4	-813.4	689.0	417.5	271.44	2.538		
9,250.0	9,151.2	9,149.2	9,149.2	35.7	236.3	172.56	292.4	-813.4	708.1	436.1	271.96	2.604		
9,275.0	9,166.2	9,164.2	9,164.2	35.8	236.7	173.04	292.4	-813.4	728.0	455.5	272.45	2.672		
9,300.0	9,180.1	9,178.1	9,178.1	35.9	237.1	173.48	292.4	-813.4	748.7	475.8	272.92	2.743		
9,325.0	9,193.0	9,191.0	9,191.0	36.0	237.4	173.91	292.4	-813.4	770.1	496.7	273.36	2.817		
9,350.0	9,204.7	9,202.7	9,202.7	36.1	237.7	174.31	292.4	-813.4	792.2	518.4	273.77	2.894		
9,375.0	9,215.2	9,213.2	9,213.2	36.2	238.0	174.72	292.4	-813.4	814.8	540.6	274.15	2.972		
9,400.0	9,224.6	9,222.6	9,222.6	36.3	238.2	175.14	292.4	-813.4	838.0	563.4	274.51	3.053		
9,425.0	9,232.8	9,230.8	9,230.8	36.4	238.4	175.59	292.4	-813.4	861.6	586.7	274.83	3.135		
9,450.0	9,239.7	9,237.7	9,237.7	36.5	238.6	176.13	292.4	-813.4	885.6	610.5	275.12	3.219		
9,475.0	9,245.3	9,243.3	9,243.3	36.6	238.7	176.84	292.4	-813.4	909.9	634.6	275.39	3.304		
9,500.0	9,249.7	9,247.7	9,247.7	36.8	238.9	177.91	292.4	-813.4	934.6	658.9	275.62	3.391		
9,525.0	9,252.8	9,250.8	9,250.8	36.9	238.9	179.97	292.4	-813.4	959.4	683.5	275.82	3.478		
9,550.0	9,254.6	9,252.6	9,252.6	37.0	239.0	-173.55	292.4	-813.4	984.3	708.3	275.99	3.566		
9,565.0	9,255.0	9,253.0	9,253.0	37.1	239.0	-150.24	292.4	-813.4	999.3	723.2	276.08	3.619		
9,600.0	9,255.5	9,253.5	9,253.5	37.3	239.0	-151.08	292.4	-813.4	1,034.3	758.0	276.27	3.744		
9,700.0	9,256.9	9,254.9	9,254.9	37.8	239.0	-151.26	292.4	-813.4	1,134.3	857.4	276.86	4.097		
9,800.0	9,258.4	9,256.4	9,256.4	38.4	239.1	-155.16	292.4	-813.4	1,234.3	956.7	277.52	4.447		
9,900.0	9,259.8	9,257.8	9,257.8	39.1	239.1	-156.82	292.4	-813.4	1,334.2	1,056.0	278.24	4.795		
10,000.0	9,261.2	9,259.2	9,259.2	39.9	239.2	-158.28	292.4	-813.4	1,434.2	1,155.2	279.01	5.140		
10,100.0	9,262.7	9,260.7	9,260.7	40.7	239.2	-159.57	292.4	-813.4	1,534.2	1,254.4	279.85	5.482		
10,200.0	9,264.1	9,262.1	9,262.1	41.5	239.2	-160.73	292.4	-813.4	1,634.2	1,353.5	280.73	5.821		
10,300.0	9,265.5	9,263.5	9,263.5	42.4	239.3	-161.76	292.4	-813.4	1,734.2	1,452.5	281.66	6.157		
10,400.0	9,267.0	9,265.0	9,265.0	43.3	239.3	-162.70	292.4	-813.4	1,834.2	1,551.5	282.64	6.489		
10,500.0	9,268.4	9,266.4	9,266.4	44.3	239.3	-163.54	292.4	-813.4	1,934.2	1,650.5	283.67	6.819		
10,600.0	9,269.8	9,267.8	9,267.8	45.4	239.4	-164.31	292.4	-813.4	2,034.2	1,749.4	284.73	7.144		
10,700.0	9,271.2	9,269.2	9,269.2	46.4	239.4	-165.01	292.4	-813.4	2,134.2	1,848.3	285.83	7.467		
10,800.0	9,272.7	9,270.7	9,270.7	47.5	239.4	-165.65	292.4	-813.4	2,234.1	1,947.2	286.96	7.785		
10,900.0	9,274.1	9,272.1	9,272.1	48.7	239.5	-166.24	292.4	-813.4	2,334.1	2,046.0	288.13	8.101		
11,000.0	9,275.5	9,273.5	9,273.5	49.8	239.5	-166.79	292.4	-813.4	2,434.1	2,144.8	289.33	8.413		
11,100.0	9,277.0	9,275.0	9,275.0	51.0	239.6	-167.29	292.4	-813.4	2,534.1	2,243.6	290.56	8.721		
11,200.0	9,278.4	9,276.4	9,276.4	52.2	239.6	-167.76	292.4	-813.4	2,634.1	2,342.3	291.82	9.027		
11,300.0	9,279.8	9,277.8	9,277.8	53.5	239.6	-168.20	292.4	-813.4	2,734.1	2,441.0	293.09	9.328		
11,400.0	9,281.3	9,279.3	9,279.3	54.7	239.7	-168.60	292.4	-813.4	2,834.1	2,539.7	294.40	9.627		
11,500.0	9,282.7	9,280.7	9,280.7	56.0	239.7	-168.98	292.4	-813.4	2,934.1	2,638.3	295.72	9.922		
11,600.0	9,284.1	9,282.1	9,282.1	57.3	239.7	-169.33	292.4	-813.4	3,034.1	2,737.0	297.06	10.213		
11,700.0	9,285.6	9,283.6	9,283.6	58.6	239.8	-169.67	292.4	-813.4	3,134.0	2,835.6	298.43	10.502		
11,800.0	9,287.0	9,285.0	9,285.0	60.0	239.8	-169.98	292.4	-813.4	3,234.0	2,934.2	299.81	10.787		
11,900.0	9,288.4	9,286.4	9,286.4	61.4	239.9	-170.27	292.4	-813.4	3,334.0	3,032.8	301.20	11.069		
12,000.0	9,289.8	9,287.8	9,287.8	62.7	239.9	-170.55	292.4	-813.4	3,434.0	3,131.4	302.62	11.348		
12,100.0	9,291.3	9,289.3	9,289.3	64.1	239.9	-170.82	292.4	-813.4	3,534.0	3,230.0	304.04	11.623		
12,200.0	9,292.7	9,290.7	9,290.7	65.5	240.0	-171.06	292.4	-813.4	3,634.0	3,328.5	305.48	11.896		
12,300.0	9,294.1	9,292.1	9,292.1	66.9	240.0	-171.30	292.4	-813.4	3,734.0	3,427.1	306.93	12.166		
12,400.0	9,295.6	9,293.6	9,293.6	68.4	240.0	-171.52	292.4	-813.4	3,834.0	3,525.6	308.40	12.432		

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - LUSK DEEP UNIT #2 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 13974-INC-ONLY													Offset Well Error:	3.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
12,500.0	9,297.0	9,295.0	9,295.0	69.8	240.1	-171.74		292.4	-813.4	3,934.0	3,624.1	309.87	12.696	
12,600.0	9,298.4	9,296.4	9,296.4	71.2	240.1	-171.94		292.4	-813.4	4,034.0	3,722.6	311.35	12.956	
12,700.0	9,299.9	9,297.9	9,297.9	72.7	240.1	-172.13		292.4	-813.4	4,133.9	3,821.1	312.85	13.214	
12,800.0	9,301.3	9,299.3	9,299.3	74.2	240.2	-172.31		292.4	-813.4	4,233.9	3,919.6	314.35	13.469	
12,900.0	9,302.7	9,300.7	9,300.7	75.6	240.2	-172.49		292.4	-813.4	4,333.9	4,018.1	315.87	13.721	
13,000.0	9,304.2	9,302.2	9,302.2	77.1	240.3	-172.66		292.4	-813.4	4,433.9	4,116.5	317.39	13.970	
13,100.0	9,305.6	9,303.6	9,303.6	78.6	240.3	-172.82		292.4	-813.4	4,533.9	4,215.0	318.91	14.217	
13,200.0	9,307.0	9,305.0	9,305.0	80.1	240.3	-172.97		292.4	-813.4	4,633.9	4,313.4	320.45	14.461	
13,300.0	9,308.5	9,306.5	9,306.5	81.6	240.4	-173.12		292.4	-813.4	4,733.9	4,411.9	321.99	14.702	
13,400.0	9,309.9	9,307.9	9,307.9	83.1	240.4	-173.26		292.4	-813.4	4,833.9	4,510.3	323.54	14.941	
13,500.0	9,311.3	9,309.3	9,309.3	84.7	240.4	-173.39		292.4	-813.4	4,933.9	4,608.8	325.09	15.177	
13,600.0	9,312.7	9,310.7	9,310.7	86.2	240.5	-173.52		292.4	-813.4	5,033.8	4,707.2	326.66	15.410	
13,700.0	9,314.2	9,312.2	9,312.2	87.7	240.5	-173.65		292.4	-813.4	5,133.8	4,805.6	328.22	15.641	
13,800.0	9,315.6	9,313.6	9,313.6	89.2	240.6	-173.77		292.4	-813.4	5,233.8	4,904.0	329.79	15.870	
13,900.0	9,317.0	9,315.0	9,315.0	90.8	240.6	-173.89		292.4	-813.4	5,333.8	5,002.4	331.37	16.096	
14,000.0	9,318.5	9,316.5	9,316.5	92.3	240.6	-174.00		292.4	-813.4	5,433.8	5,100.9	332.95	16.320	
14,100.0	9,319.9	9,317.9	9,317.9	93.9	240.7	-174.10		292.4	-813.4	5,533.8	5,199.3	334.54	16.542	
14,200.0	9,321.3	9,319.3	9,319.3	95.4	240.7	-174.21		292.4	-813.4	5,633.8	5,297.7	336.12	16.761	
14,300.0	9,322.8	9,320.8	9,320.8	97.0	240.7	-174.31		292.4	-813.4	5,733.8	5,396.1	337.72	16.978	
14,400.0	9,324.2	9,322.2	9,322.2	98.5	240.8	-174.41		292.4	-813.4	5,833.8	5,494.5	339.32	17.193	
14,456.7	9,325.0	9,323.0	9,323.0	99.4	240.8	-174.46		292.4	-813.4	5,890.5	5,550.3	340.22	17.314	

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Output Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - LUSK DEEP UNIT A #1 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 2132-INC-ONLY													Offset Well Error:	3.0 usft
Reference	Offset	Semi Major Axis		Distance		Warning								
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.0	0.0	0.0	0.0	0.0	3.0	153.25	-1,026.7	517.6	1,149.8					
100.0	100.0	96.0	96.0	0.1	3.3	153.25	-1,026.7	517.6	1,149.8	1,146.3	3.46	331.896		
200.0	200.0	196.0	196.0	0.5	4.2	153.25	-1,026.7	517.6	1,149.8	1,145.1	4.68	245.694		
300.0	300.0	296.0	296.0	0.9	5.3	153.25	-1,026.7	517.6	1,149.8	1,143.6	6.18	186.095		
400.0	400.0	396.0	396.0	1.2	6.6	153.25	-1,026.7	517.6	1,149.8	1,142.0	7.82	147.122		
500.0	500.0	496.0	496.0	1.6	7.9	153.25	-1,026.7	517.6	1,149.8	1,140.3	9.52	120.731		
600.0	600.0	596.0	596.0	1.9	9.3	153.25	-1,026.7	517.6	1,149.8	1,138.5	11.27	101.999		
700.0	700.0	696.0	696.0	2.3	10.8	153.25	-1,026.7	517.6	1,149.8	1,136.7	13.05	88.130		
800.0	800.0	796.0	796.0	2.7	12.2	153.25	-1,026.7	517.6	1,149.8	1,134.9	14.84	77.497		
900.0	900.0	896.0	896.0	3.0	13.6	153.25	-1,026.7	517.6	1,149.8	1,133.1	16.64	69.107		
950.0	950.0	946.0	946.0	3.2	14.4	153.25	-1,026.7	517.6	1,149.8	1,132.2	17.54	65.547 CC		
1,000.0	1,000.0	996.0	996.0	3.4	15.1	-99.76	-1,026.7	517.6	1,149.8	1,131.4	18.44	62.353		
1,100.0	1,099.9	1,095.9	1,095.9	3.7	16.5	-99.92	-1,026.7	517.6	1,150.4	1,130.2	20.24	56.853		
1,200.0	1,199.7	1,195.7	1,195.7	4.0	18.0	-100.24	-1,026.7	517.6	1,151.7	1,129.6	22.04	52.258		
1,249.4	1,248.8	1,244.8	1,244.8	4.2	18.7	-100.45	-1,026.7	517.6	1,152.5	1,129.6	22.93	50.261		
1,300.0	1,299.2	1,295.2	1,295.2	4.4	19.4	-100.71	-1,026.7	517.6	1,153.5	1,129.6	23.85	48.367		
1,400.0	1,398.6	1,394.6	1,394.6	4.8	20.9	-101.22	-1,026.7	517.6	1,155.5	1,129.8	25.67	45.016		
1,500.0	1,498.1	1,494.1	1,494.1	5.1	22.4	-101.72	-1,026.7	517.6	1,157.6	1,130.1	27.50	42.100		
1,600.0	1,597.5	1,593.5	1,593.5	5.5	23.8	-102.22	-1,026.7	517.6	1,159.8	1,130.4	29.33	39.543		
1,700.0	1,697.0	1,693.0	1,693.0	5.9	25.3	-102.72	-1,026.7	517.6	1,162.0	1,130.8	31.17	37.283		
1,800.0	1,796.5	1,792.5	1,792.5	6.3	26.8	-103.22	-1,026.7	517.6	1,164.4	1,131.4	33.01	35.274		
1,900.0	1,895.9	1,891.9	1,891.9	6.6	28.2	-103.72	-1,026.7	517.6	1,166.8	1,132.0	34.86	33.476		
2,000.0	1,895.4	1,891.4	1,891.4	7.0	29.7	-104.21	-1,026.7	517.6	1,169.3	1,132.6	36.70	31.859		
2,100.0	2,094.8	2,090.8	2,090.8	7.4	31.2	-104.70	-1,026.7	517.6	1,172.0	1,133.4	38.55	30.397		
2,200.0	2,194.3	2,190.3	2,190.3	7.8	33.1	-105.19	-1,026.7	517.6	1,174.7	1,133.8	40.87	28.739		
2,300.0	2,293.7	2,289.7	2,289.7	8.2	35.4	-105.68	-1,026.7	517.6	1,177.5	1,133.9	43.52	27.053		
2,400.0	2,393.2	2,389.2	2,389.2	8.5	37.6	-106.16	-1,026.7	517.6	1,180.3	1,134.2	46.18	25.561		
2,500.0	2,492.6	2,488.6	2,488.6	8.9	39.9	-106.65	-1,026.7	517.6	1,183.3	1,134.5	48.83	24.232		
2,600.0	2,592.1	2,588.1	2,588.1	9.3	42.2	-107.13	-1,026.7	517.6	1,186.3	1,134.8	51.49	23.041		
2,700.0	2,691.5	2,687.5	2,687.5	9.7	44.4	-107.60	-1,026.7	517.6	1,189.5	1,135.3	54.15	21.968		
2,800.0	2,791.0	2,787.0	2,787.0	10.1	46.7	-108.08	-1,026.7	517.6	1,192.7	1,135.9	56.80	20.996		
2,900.0	2,890.5	2,886.5	2,886.5	10.5	49.0	-108.55	-1,026.7	517.6	1,196.0	1,136.5	59.46	20.112		
3,000.0	2,989.9	2,985.9	2,985.9	10.9	51.2	-109.02	-1,026.7	517.6	1,199.3	1,137.2	62.12	19.305		
3,100.0	3,089.4	3,085.4	3,085.4	11.3	53.5	-109.49	-1,026.7	517.6	1,202.8	1,138.0	64.79	18.566		
3,200.0	3,188.8	3,184.8	3,184.8	11.7	55.8	-109.95	-1,026.7	517.6	1,206.3	1,138.9	67.45	17.885		
3,300.0	3,288.3	3,284.3	3,284.3	12.1	58.1	-110.42	-1,026.7	517.6	1,210.0	1,139.8	70.11	17.258		
3,400.0	3,387.7	3,383.7	3,383.7	12.4	60.3	-110.88	-1,026.7	517.6	1,213.7	1,140.9	72.77	16.677		
3,500.0	3,487.2	3,483.2	3,483.2	12.8	62.6	-111.33	-1,026.7	517.6	1,217.4	1,142.0	75.44	16.138		
3,600.0	3,586.6	3,582.6	3,582.6	13.2	64.9	-111.79	-1,026.7	517.6	1,221.3	1,143.2	78.10	15.637		
3,700.0	3,686.1	3,682.1	3,682.1	13.6	67.1	-112.24	-1,026.7	517.6	1,225.2	1,144.4	80.77	15.170		
3,800.0	3,785.5	3,781.5	3,781.5	14.0	69.2	-112.69	-1,026.7	517.6	1,229.2	1,146.0	83.23	14.768		
3,900.0	3,885.0	3,881.3	3,881.3	14.4	71.3	-113.13	-1,026.7	517.6	1,233.3	1,147.6	85.70	14.390		
4,000.0	3,984.5	3,980.8	3,980.8	14.8	73.4	-113.57	-1,026.7	517.6	1,237.4	1,149.3	88.17	14.035		
4,100.0	4,083.9	4,080.2	4,079.9	15.2	75.4	-114.01	-1,026.7	517.6	1,241.7	1,151.0	90.64	13.699		
4,200.0	4,183.4	4,179.7	4,179.4	15.6	77.5	-114.45	-1,026.7	517.6	1,246.0	1,152.9	93.11	13.382		
4,300.0	4,282.8	4,279.1	4,278.8	16.0	79.6	-114.88	-1,026.7	517.6	1,250.3	1,154.8	95.58	13.082		
4,400.0	4,382.3	4,378.6	4,378.3	16.4	81.7	-115.31	-1,026.7	517.6	1,254.8	1,156.7	98.05	12.798		
4,500.0	4,481.7	4,478.0	4,477.7	16.8	83.8	-115.74	-1,026.7	517.6	1,259.3	1,158.7	100.56	12.523		
4,600.0	4,581.2	4,577.5	4,577.2	17.2	86.3	-116.16	-1,026.7	517.6	1,263.9	1,160.4	103.47	12.215		
4,700.0	4,680.6	4,677.0	4,676.6	17.6	88.8	-116.58	-1,026.7	517.6	1,268.5	1,162.2	106.37	11.926		
4,800.0	4,780.1	4,776.4	4,776.1	18.0	91.7	-117.07	-1,026.7	517.6	1,273.4	1,163.7	109.67	11.611		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - LUSK DEEP UNIT A #1 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 2132-INC-ONLY													Offset Well Error:	3.0 usft
Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance		Minimum Separation (usft)	Separation Factor	Warning	
				Reference (usft)	Offset (usft)				Between Centres (usft)	Between Ellipses (usft)				
4,900.0	4,879.5	4,875.9	4,875.5	18.4	93.6	-117.82	-1,026.7	517.6	1,278.1	1,166.0	112.00	11.411		
5,000.0	4,979.0	4,975.4	4,975.0	18.7	95.7	-117.43	-1,026.7	517.6	1,282.9	1,168.5	114.44	11.210		
5,100.0	5,078.5	5,074.8	5,074.5	19.1	97.7	-118.24	-1,026.7	517.6	1,287.8	1,171.0	116.82	11.024		
5,200.0	5,177.9	5,174.3	5,173.9	19.5	99.7	-118.64	-1,026.7	517.6	1,292.8	1,173.6	119.19	10.846		
5,300.0	5,277.4	5,285.0	5,284.6	19.9	101.9	-119.09	-1,026.7	517.6	1,297.9	1,176.1	121.79	10.657		
5,400.0	5,376.8	5,373.2	5,372.8	20.3	103.9	-119.44	-1,026.7	517.6	1,303.0	1,178.8	124.23	10.489		
5,500.0	5,476.3	5,472.7	5,472.3	20.7	106.2	-119.84	-1,026.7	517.6	1,308.2	1,181.2	126.92	10.307		
5,600.0	5,575.7	5,572.1	5,571.7	21.1	108.5	-120.23	-1,026.7	517.6	1,313.4	1,183.8	129.58	10.136		
5,700.0	5,675.2	5,671.6	5,671.2	21.5	110.7	-120.62	-1,026.7	517.6	1,318.7	1,186.5	132.18	9.977		
5,800.0	5,774.6	5,771.0	5,770.6	21.9	112.9	-121.01	-1,026.7	517.6	1,324.1	1,189.3	134.77	9.825		
5,900.0	5,874.1	5,870.5	5,870.1	22.3	115.1	-121.39	-1,026.7	517.6	1,329.5	1,192.1	137.37	9.679		
6,000.0	5,973.5	5,969.9	5,969.5	22.7	117.3	-121.77	-1,026.7	517.6	1,335.0	1,195.0	139.96	9.538		
6,100.0	6,073.0	6,069.4	6,069.0	23.1	119.5	-122.15	-1,026.7	517.6	1,340.5	1,198.0	142.55	9.404		
6,200.0	6,172.4	6,168.8	6,168.4	23.5	121.7	-122.53	-1,026.7	517.6	1,346.1	1,201.0	145.15	9.274		
6,300.0	6,271.9	6,268.3	6,267.9	23.9	123.9	-122.90	-1,026.7	517.6	1,351.8	1,204.1	147.74	9.150		
6,400.0	6,371.4	6,367.8	6,367.4	24.3	126.1	-123.27	-1,026.7	517.6	1,357.5	1,207.2	150.34	9.030		
6,500.0	6,470.8	6,467.2	6,466.8	24.7	128.3	-123.63	-1,026.7	517.6	1,363.3	1,210.4	152.93	8.914		
6,600.0	6,570.3	6,566.7	6,566.3	25.1	130.4	-123.99	-1,026.7	517.6	1,369.1	1,213.6	155.52	8.803		
6,700.0	6,669.7	6,666.1	6,665.7	25.5	132.6	-124.35	-1,026.7	517.6	1,375.0	1,216.9	158.12	8.696		
6,800.0	6,769.2	6,765.6	6,765.2	25.9	134.8	-124.71	-1,026.7	517.6	1,380.9	1,220.2	160.71	8.593		
6,900.0	6,868.6	6,865.0	6,864.6	26.3	137.0	-125.06	-1,026.7	517.6	1,386.9	1,223.6	163.31	8.493		
7,000.0	6,968.1	6,964.5	6,964.1	26.7	139.2	-125.41	-1,026.7	517.6	1,393.0	1,227.1	165.90	8.396		
7,100.0	7,067.5	7,063.9	7,063.5	27.1	141.4	-125.76	-1,026.7	517.6	1,399.0	1,230.5	168.50	8.303		
7,200.0	7,167.0	7,163.4	7,163.0	27.4	143.6	-126.10	-1,026.7	517.6	1,405.2	1,234.1	171.09	8.213		
7,300.0	7,266.4	7,263.1	7,262.4	27.8	145.8	-126.44	-1,026.7	517.6	1,411.4	1,237.7	173.67	8.127		
7,400.0	7,365.9	7,362.6	7,361.9	28.2	147.7	-126.78	-1,026.7	517.6	1,417.6	1,241.7	175.97	8.056		
7,500.0	7,465.4	7,462.0	7,461.4	28.6	149.6	-127.12	-1,026.7	517.6	1,423.9	1,245.7	178.26	7.988		
7,600.0	7,564.8	7,561.5	7,560.8	29.0	151.5	-127.45	-1,026.7	517.6	1,430.3	1,249.7	180.56	7.921		
7,700.0	7,664.3	7,660.9	7,660.3	29.4	153.4	-127.78	-1,026.7	517.6	1,436.6	1,253.8	182.86	7.857		
7,800.0	7,763.7	7,760.4	7,759.7	29.8	155.3	-128.10	-1,026.7	517.6	1,443.1	1,257.9	185.15	7.794		
7,900.0	7,863.2	7,859.9	7,859.2	30.2	157.4	-128.43	-1,026.7	517.6	1,449.6	1,261.9	187.62	7.726		
8,000.0	7,962.6	7,959.3	7,958.6	30.6	159.8	-128.75	-1,026.7	517.6	1,456.1	1,265.7	190.42	7.647		
8,100.0	8,062.1	8,058.8	8,058.1	31.0	162.2	-129.06	-1,026.7	517.6	1,462.7	1,269.4	193.22	7.570		
8,200.0	8,161.5	8,158.2	8,157.5	31.4	164.6	-129.38	-1,026.7	517.6	1,469.3	1,273.3	196.02	7.496		
8,300.0	8,261.0	8,257.7	8,257.0	31.8	167.0	-129.69	-1,026.7	517.6	1,475.9	1,277.1	198.82	7.424		
8,400.0	8,360.4	8,357.1	8,356.4	32.2	169.4	-130.00	-1,026.7	517.6	1,482.6	1,281.0	201.62	7.354		
8,500.0	8,459.9	8,456.6	8,455.9	32.6	171.8	-130.31	-1,026.7	517.6	1,489.4	1,285.0	204.41	7.286		
8,600.0	8,559.4	8,556.0	8,555.4	33.0	174.2	-130.61	-1,026.7	517.6	1,496.2	1,289.0	207.21	7.220		
8,700.0	8,658.8	8,655.5	8,654.8	33.4	176.6	-130.91	-1,026.7	517.6	1,503.0	1,293.0	210.01	7.157		
8,800.0	8,758.3	8,754.9	8,754.3	33.8	179.0	-131.21	-1,026.7	517.6	1,509.9	1,297.1	212.81	7.095		
8,836.0	8,794.0	8,790.7	8,790.0	33.9	179.9	-131.32	-1,026.7	517.6	1,512.4	1,298.5	213.82	7.073		
8,850.0	8,808.0	8,804.7	8,804.0	34.0	180.2	-117.28	-1,026.7	517.6	1,513.2	1,299.0	214.21	7.064		
8,875.0	8,832.8	8,829.4	8,828.8	34.1	180.8	-99.83	-1,026.7	517.6	1,514.2	1,299.3	214.91	7.046		
8,900.0	8,857.4	8,854.1	8,853.4	34.2	181.4	-89.48	-1,026.7	517.6	1,514.5	1,299.8	215.61	7.024		
8,925.0	8,881.8	8,878.5	8,877.8	34.3	182.0	-83.17	-1,026.7	517.6	1,514.1	1,297.8	216.30	7.000		
8,950.0	8,906.0	8,902.6	8,902.0	34.4	182.6	-79.15	-1,026.7	517.6	1,513.1	1,296.1	216.99	6.973		
8,975.0	8,929.8	8,926.4	8,925.8	34.5	183.0	-76.92	-1,026.7	517.6	1,511.4	1,293.7	217.67	6.943		
9,000.0	8,953.2	8,950.0	8,949.3	34.6	184.0	-74.93	-1,026.7	517.6	1,509.1	1,290.5	218.58	6.904		
9,025.0	8,976.1	8,972.8	8,972.1	34.7	184.3	-73.71	-1,026.7	517.6	1,506.1	1,287.0	219.05	6.876		
9,050.0	8,998.5	8,995.2	8,994.5	34.8	185.0	-73.09	-1,026.7	517.6	1,502.6	1,282.8	219.79	6.836		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - LUSK DEEP UNIT A #1 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 2132-INC-ONLY													Offset Well Error:	3.0 usft
Reference	Vertical	Measured	Vertical	Reference	Offset	Highside	Offset Wellbore Centre	Distance	Between	Between	Minimum	Separation	Warning	
Depth (usft)	Depth (usft)	Depth (usft)	Depth (usft)	(usft)	(usft)	Toolface (°)	+N/-S (usft)	+E/-W (usft)	Centres (usft)	Ellipses (usft)	Separation (usft)	Factor		
9,075.0	9,020.2	9,017.0	9,016.2	34.9	185.6	-72.83	-1,026.7	517.6	1,498.5	1,278.0	220.51	6.796		
9,100.0	9,041.4	9,038.1	9,037.4	35.0	186.2	-72.86	-1,026.7	517.6	1,493.9	1,272.7	221.21	6.753		
9,125.0	9,061.8	9,058.5	9,057.8	35.1	186.8	-73.12	-1,026.7	517.6	1,488.8	1,266.9	221.89	6.710		
9,150.0	9,081.4	9,078.1	9,077.4	35.2	187.3	-73.57	-1,026.7	517.6	1,483.3	1,260.8	222.55	6.665		
9,175.0	9,100.2	9,096.9	9,096.2	35.3	187.8	-74.19	-1,026.7	517.6	1,477.4	1,254.2	223.18	6.620		
9,200.0	9,118.1	9,135.0	9,134.2	35.4	188.9	-75.50	-1,026.7	517.6	1,471.3	1,246.9	224.36	6.558		
9,225.0	9,135.1	9,135.0	9,134.2	35.5	188.9	-75.89	-1,026.7	517.6	1,464.6	1,240.1	224.46	6.525		
9,250.0	9,151.2	9,147.9	9,147.2	35.7	189.2	-76.76	-1,026.7	517.6	1,457.7	1,232.8	224.89	6.482		
9,275.0	9,166.2	9,162.9	9,162.2	35.8	189.6	-77.78	-1,026.7	517.6	1,450.7	1,225.3	225.38	6.437		
9,300.0	9,180.1	9,176.9	9,176.1	35.9	190.0	-78.86	-1,026.7	517.6	1,443.5	1,217.6	225.84	6.392		
9,325.0	9,193.0	9,189.7	9,189.0	36.0	190.3	-79.98	-1,026.7	517.6	1,436.2	1,209.9	226.27	6.347		
9,350.0	9,204.7	9,201.4	9,200.7	36.1	190.6	-81.12	-1,026.7	517.6	1,428.8	1,202.1	226.67	6.303		
9,375.0	9,215.2	9,212.0	9,211.2	36.2	190.9	-82.26	-1,026.7	517.6	1,421.4	1,194.3	227.05	6.260		
9,400.0	9,224.6	9,221.4	9,220.6	36.3	191.1	-83.40	-1,026.7	517.6	1,414.0	1,186.6	227.39	6.218		
9,425.0	9,232.8	9,229.5	9,228.8	36.4	191.3	-84.51	-1,026.7	517.6	1,406.7	1,179.0	227.71	6.177		
9,450.0	9,239.7	9,236.4	9,235.7	36.5	191.5	-85.58	-1,026.7	517.6	1,399.5	1,171.5	228.00	6.138		
9,475.0	9,245.3	9,242.1	9,241.3	36.6	191.6	-86.61	-1,026.7	517.6	1,392.5	1,164.2	228.26	6.100		
9,500.0	9,249.7	9,246.4	9,245.7	36.8	191.7	-87.59	-1,026.7	517.6	1,385.7	1,157.2	228.49	6.064		
9,525.0	9,252.8	9,249.5	9,248.8	36.9	191.8	-88.49	-1,026.7	517.6	1,379.0	1,150.4	228.69	6.030		
9,550.0	9,254.6	9,251.3	9,250.6	37.0	191.8	-89.33	-1,026.7	517.6	1,372.7	1,143.8	228.86	5.998		
9,565.0	9,255.0	9,251.8	9,251.0	37.1	191.9	-89.80	-1,026.7	517.6	1,369.0	1,140.1	228.95	5.980		
9,600.0	9,255.5	9,252.3	9,251.5	37.3	191.9	-89.82	-1,026.7	517.6	1,361.0	1,131.9	229.14	5.940		
9,700.0	9,256.9	9,253.7	9,252.9	37.8	191.9	-89.88	-1,026.7	517.6	1,342.8	1,113.1	229.73	5.845		
9,800.0	9,258.4	9,255.1	9,254.4	38.4	191.9	-89.94	-1,026.7	517.6	1,332.0	1,101.6	230.39	5.781		
9,895.5	9,259.7	9,256.5	9,255.7	39.1	192.0	-90.00	-1,026.7	517.6	1,328.5	1,097.5	231.07	5.749		
9,900.0	9,259.8	9,256.6	9,255.8	39.1	192.0	-90.00	-1,026.7	517.6	1,328.5	1,097.4	231.10	5.749 ES		
10,000.0	9,261.2	9,258.0	9,257.2	39.9	192.0	-90.06	-1,026.7	517.6	1,332.6	1,100.8	231.88	5.747 SF		
10,100.0	9,262.7	9,259.4	9,258.7	40.7	192.1	-90.13	-1,026.7	517.6	1,344.2	1,111.5	232.71	5.776		
10,200.0	9,264.1	9,260.8	9,260.1	41.5	192.1	-90.19	-1,026.7	517.6	1,363.0	1,129.4	233.59	5.835		
10,300.0	9,265.5	9,262.3	9,261.5	42.4	192.1	-90.25	-1,026.7	517.6	1,388.7	1,154.2	234.53	5.921		
10,400.0	9,267.0	9,263.7	9,263.0	43.3	192.2	-90.31	-1,026.7	517.6	1,421.1	1,185.6	235.50	6.034		
10,500.0	9,268.4	9,265.1	9,264.4	44.3	192.2	-90.37	-1,026.7	517.6	1,459.6	1,223.0	236.53	6.171		
10,600.0	9,269.8	9,266.6	9,265.8	45.4	192.2	-90.43	-1,026.7	517.6	1,503.7	1,266.1	237.59	6.329		
10,700.0	9,271.2	9,268.0	9,267.2	46.4	192.3	-90.50	-1,026.7	517.6	1,553.1	1,314.4	238.69	6.507		
10,800.0	9,272.7	9,269.4	9,268.7	47.5	192.3	-90.56	-1,026.7	517.6	1,607.2	1,367.3	239.82	6.701		
10,900.0	9,274.1	9,270.9	9,270.1	48.7	192.3	-90.62	-1,026.7	517.6	1,665.5	1,424.5	240.99	6.911		
11,000.0	9,275.5	9,272.3	9,271.5	49.8	192.4	-90.68	-1,026.7	517.6	1,727.6	1,485.4	242.19	7.133		
11,100.0	9,277.0	9,273.7	9,273.0	51.0	192.4	-90.74	-1,026.7	517.6	1,793.2	1,549.8	243.42	7.367		
11,200.0	9,278.4	9,275.2	9,274.4	52.2	192.4	-90.80	-1,026.7	517.6	1,861.8	1,617.1	244.67	7.609		
11,300.0	9,279.8	9,276.6	9,275.8	53.5	192.5	-90.87	-1,026.7	517.6	1,933.2	1,687.2	245.95	7.860		
11,400.0	9,281.3	9,278.0	9,277.3	54.7	192.5	-90.93	-1,026.7	517.6	2,007.0	1,759.7	247.25	8.117		
11,500.0	9,282.7	9,279.5	9,278.7	56.0	192.6	-90.99	-1,026.7	517.6	2,083.0	1,834.4	248.57	8.380		
11,600.0	9,284.1	9,280.9	9,280.1	57.3	192.6	-91.05	-1,026.7	517.6	2,160.9	1,911.0	249.92	8.647		
11,700.0	9,285.6	9,282.3	9,281.6	58.6	192.6	-91.11	-1,026.7	517.6	2,240.6	1,989.4	251.28	8.917		
11,800.0	9,287.0	9,283.7	9,283.0	60.0	192.7	-91.18	-1,026.7	517.6	2,321.9	2,069.3	252.66	9.190		
11,900.0	9,288.4	9,285.2	9,284.4	61.4	192.7	-91.24	-1,026.7	517.6	2,404.6	2,150.6	254.05	9.465		
12,000.0	9,289.8	9,286.6	9,285.8	62.7	192.7	-91.30	-1,026.7	517.6	2,488.6	2,233.1	255.46	9.741		
12,100.0	9,291.3	9,288.0	9,287.3	64.1	192.8	-91.36	-1,026.7	517.6	2,573.7	2,316.8	256.89	10.019		
12,200.0	9,292.7	9,289.5	9,288.7	65.5	192.8	-91.42	-1,026.7	517.6	2,659.8	2,401.5	258.33	10.296		
12,300.0	9,294.1	9,290.9	9,290.1	66.9	192.8	-91.48	-1,026.7	517.6	2,746.9	2,487.1	259.78	10.574		
12,400.0	9,295.6	9,292.3	9,291.6	68.4	192.9	-91.55	-1,026.7	517.6	2,834.8	2,573.6	261.24	10.851		

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - LUSK DEEP UNIT A #1 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 2132-INC-ONLY													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Minimum Separation (usft)	Separation Factor	Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Between Centres (usft)	Between Ellipses (usft)				Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	
12,500.0	9,297.0	9,293.8	9,293.0	69.8	192.9	-91.61	-1,026.7	517.6	2,923.5	2,660.8	262.71	11.128		
12,600.0	9,298.4	9,295.2	9,294.4	71.2	193.0	-91.67	-1,026.7	517.6	3,012.9	2,748.7	264.20	11.404		
12,700.0	9,299.9	9,296.6	9,295.9	72.7	193.0	-91.73	-1,026.7	517.6	3,103.0	2,837.3	265.69	11.679		
12,800.0	9,301.3	9,298.1	9,297.3	74.2	193.0	-91.79	-1,026.7	517.6	3,193.6	2,926.4	267.19	11.953		
12,900.0	9,302.7	9,299.5	9,298.7	75.6	193.1	-91.85	-1,026.7	517.6	3,284.8	3,016.1	268.70	12.225		
13,000.0	9,304.2	9,300.9	9,300.2	77.1	193.1	-91.92	-1,026.7	517.6	3,376.5	3,106.3	270.22	12.495		
13,100.0	9,305.6	9,302.3	9,301.6	78.6	193.1	-91.98	-1,026.7	517.6	3,468.7	3,196.9	271.75	12.764		
13,200.0	9,307.0	9,303.8	9,303.0	80.1	193.2	-92.04	-1,026.7	517.6	3,561.2	3,287.9	273.29	13.031		
13,300.0	9,308.5	9,305.2	9,304.5	81.6	193.2	-92.10	-1,026.7	517.6	3,654.2	3,379.4	274.83	13.296		
13,400.0	9,309.9	9,306.6	9,305.9	83.1	193.2	-92.16	-1,026.7	517.6	3,747.5	3,471.1	276.37	13.560		
13,500.0	9,311.3	9,308.1	9,307.3	84.7	193.3	-92.22	-1,026.7	517.6	3,841.2	3,563.2	277.93	13.821		
13,600.0	9,312.7	9,309.5	9,308.7	86.2	193.3	-92.28	-1,026.7	517.6	3,935.1	3,655.7	279.49	14.080		
13,700.0	9,314.2	9,310.9	9,310.2	87.7	193.4	-92.35	-1,026.7	517.6	4,029.4	3,748.4	281.05	14.337		
13,800.0	9,315.6	9,312.4	9,311.6	89.2	193.4	-92.41	-1,026.7	517.6	4,123.9	3,841.3	282.62	14.592		
13,900.0	9,317.0	9,313.8	9,313.0	90.8	193.4	-92.47	-1,026.7	517.6	4,218.7	3,934.5	284.20	14.844		
14,000.0	9,318.5	9,315.2	9,314.5	92.3	193.5	-92.53	-1,026.7	517.6	4,313.7	4,028.0	285.78	15.095		
14,100.0	9,319.9	9,316.7	9,315.9	93.9	193.5	-92.59	-1,026.7	517.6	4,409.0	4,121.6	287.36	15.343		
14,200.0	9,321.3	9,318.1	9,317.3	95.4	193.5	-92.65	-1,026.7	517.6	4,504.4	4,215.5	288.95	15.589		
14,300.0	9,322.8	9,319.5	9,318.8	97.0	193.6	-92.72	-1,026.7	517.6	4,600.1	4,309.5	290.55	15.833		
14,400.0	9,324.2	9,321.0	9,320.2	98.5	193.6	-92.78	-1,026.7	517.6	4,695.9	4,403.7	292.14	16.074		
14,456.7	9,325.0	9,321.8	9,321.0	99.4	193.6	-92.81	-1,026.7	517.6	4,750.3	4,457.3	293.05	16.210		

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - LUSK DEEP UNIT A #28H - OWB - ACTUAL WELLPATH													Offset Site Error: 0.0 usft
Survey Program: 100-MWD													Offset Well Error: 3.0 usft
Reference	Vertical	Measured	Vertical	Semi Major Axis		Highside	Distance		Between	Between	Minimum	Separation	Warning
Depth (usft)	Depth (usft)	Depth (usft)	Depth (usft)	(usft)	(usft)	Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Centres (usft)	Ellipses (usft)	Separation (usft)	Factor	
0.0	0.0	0.0	0.0	0.0	3.0	-89.19	53.9	-3,814.5	3,814.9	3,811.8	3.15	1,212.495	
100.0	100.0	90.0	90.0	0.1	3.0	-89.19	54.0	-3,814.5	3,814.9	3,811.8	3.54	1,078.284	
200.0	200.0	189.2	189.2	0.5	3.0	-89.18	54.4	-3,814.6	3,815.0	3,811.4	3.96	962.865	
300.0	300.0	279.4	279.4	0.9	3.1	-89.18	54.7	-3,814.7	3,815.2	3,811.2	4.42	864.006	
400.0	400.0	369.0	369.0	1.2	3.2	-89.18	54.9	-3,815.2	3,815.6	3,811.2	4.92	775.571	
500.0	500.0	473.1	473.1	1.6	3.3	-89.17	55.0	-3,815.8	3,816.2	3,811.3	5.47	697.422	
600.0	600.0	584.8	584.8	1.9	3.5	-89.17	55.1	-3,816.2	3,816.6	3,811.1	6.02	633.576	
700.0	700.0	680.9	680.9	2.3	3.7	-89.17	55.2	-3,816.4	3,816.8	3,810.8	6.59	579.244	
800.0	800.0	774.2	774.2	2.7	3.9	-89.17	55.3	-3,816.7	3,817.2	3,810.6	7.32	521.373	
900.0	900.0	930.9	930.9	3.0	4.3	-89.16	55.9	-3,816.4	3,817.0	3,809.7	7.68	497.193	
950.0	950.0	1,002.0	1,002.0	3.2	4.5	-89.16	56.0	-3,815.5	3,816.4	3,808.7			
1,000.0	1,000.0	1,060.3	1,060.3	3.4	4.6	17.86	55.8	-3,814.5	3,815.1	3,807.1	8.00	477.079	
1,100.0	1,099.9	1,171.4	1,171.3	3.7	4.9	17.89	54.7	-3,812.4	3,809.9	3,801.2	8.63	441.570	
1,200.0	1,199.7	1,275.2	1,275.1	4.0	5.2	17.95	52.8	-3,810.2	3,801.1	3,791.8	9.26	410.553	
1,249.4	1,248.8	1,325.5	1,325.4	4.2	5.4	18.00	52.0	-3,809.1	3,795.5	3,785.9	9.57	396.436	
1,300.0	1,299.2	1,377.0	1,376.8	4.4	5.5	18.01	51.1	-3,807.9	3,789.3	3,779.4	9.90	382.682	
1,400.0	1,398.6	1,500.8	1,500.6	4.8	5.9	18.04	49.3	-3,804.8	3,776.9	3,766.3	10.63	355.386	
1,500.0	1,498.1	1,618.7	1,618.4	5.1	6.2	18.09	48.3	-3,801.1	3,763.9	3,752.5	11.35	331.542	
1,600.0	1,597.5	1,749.9	1,749.6	5.5	6.6	18.15	47.7	-3,796.1	3,750.1	3,738.0	12.13	309.089	
1,700.0	1,697.0	1,854.8	1,854.4	5.9	7.0	18.20	47.6	-3,791.4	3,735.8	3,722.9	12.84	290.928	
1,800.0	1,796.5	1,943.5	1,943.0	6.3	7.3	18.25	48.0	-3,787.6	3,721.6	3,708.1	13.50	275.596	
1,900.0	1,895.9	2,043.2	2,042.6	6.6	7.6	18.31	48.7	-3,783.5	3,707.7	3,693.4	14.21	260.954	
2,000.0	1,995.4	2,173.0	2,172.2	7.0	8.0	18.41	50.3	-3,777.6	3,693.2	3,678.2	15.02	245.916	
2,100.0	2,094.8	2,304.7	2,303.7	7.4	8.4	18.51	52.3	-3,770.3	3,677.9	3,662.1	15.84	232.167	
2,200.0	2,194.3	2,447.9	2,446.6	7.8	8.9	18.62	54.4	-3,761.0	3,661.5	3,644.8	16.71	219.076	
2,300.0	2,293.7	2,578.8	2,577.1	8.2	9.4	18.72	55.8	-3,751.0	3,644.1	3,626.6	17.55	207.638	
2,400.0	2,393.2	2,683.8	2,681.8	8.5	9.8	18.79	56.5	-3,742.4	3,626.2	3,607.9	18.30	198.116	
2,500.0	2,492.6	2,781.6	2,779.3	8.9	10.1	18.84	56.2	-3,734.5	3,608.2	3,589.1	19.03	189.551	
2,600.0	2,592.1	2,891.9	2,889.2	9.3	10.5	18.90	55.6	-3,725.3	3,590.1	3,570.3	19.81	181.201	
2,700.0	2,691.5	3,000.0	2,996.8	9.7	10.9	18.98	56.6	-3,715.8	3,571.5	3,550.9	20.59	173.480	
2,800.0	2,791.0	3,076.6	3,073.2	10.1	11.1	19.04	57.7	-3,709.2	3,553.1	3,531.9	21.25	167.196	
2,900.0	2,890.5	3,100.0	3,096.4	10.5	11.2	19.06	58.0	-3,707.3	3,536.0	3,514.3	21.73	162.761	
3,000.0	2,989.9	3,162.6	3,158.9	10.9	11.5	19.10	58.4	-3,703.2	3,520.0	3,497.7	22.34	157.593	
3,100.0	3,089.4	3,200.0	3,196.3	11.3	11.6	19.13	58.5	-3,701.7	3,506.0	3,483.2	22.86	153.375	
3,200.0	3,188.8	3,282.6	3,278.8	11.7	11.9	19.17	58.4	-3,699.1	3,493.1	3,469.6	23.54	148.412	
3,300.0	3,288.3	3,364.2	3,360.4	12.1	12.2	19.22	58.5	-3,697.0	3,480.8	3,456.5	24.21	143.762	
3,400.0	3,387.7	3,440.3	3,436.5	12.4	12.4	19.27	58.6	-3,695.5	3,468.9	3,444.0	24.87	139.494	
3,500.0	3,487.2	3,516.0	3,512.2	12.8	12.7	19.32	58.8	-3,694.6	3,457.8	3,432.3	25.52	135.487	
3,600.0	3,586.6	3,612.8	3,609.0	13.2	13.0	19.39	59.6	-3,693.7	3,447.1	3,420.8	26.25	131.333	
3,700.0	3,686.1	3,755.8	3,752.0	13.6	13.5	19.50	61.6	-3,691.6	3,435.9	3,408.8	27.13	126.629	
3,800.0	3,785.5	3,858.6	3,854.7	14.0	13.9	19.61	64.0	-3,689.0	3,423.6	3,395.7	27.89	122.776	
3,900.0	3,885.0	3,941.3	3,937.3	14.4	14.2	19.70	66.4	-3,687.3	3,411.8	3,383.3	28.57	119.439	
4,000.0	3,984.5	4,029.3	4,025.2	14.8	14.5	19.79	68.9	-3,685.7	3,400.4	3,371.1	29.26	116.198	
4,100.0	4,083.9	4,116.8	4,112.8	15.2	14.8	19.88	70.9	-3,684.6	3,389.4	3,359.4	29.96	113.127	
4,200.0	4,183.4	4,227.7	4,223.6	15.6	15.1	19.98	72.8	-3,683.0	3,378.3	3,347.5	30.74	109.898	
4,300.0	4,282.8	4,327.9	4,323.8	16.0	15.5	20.07	74.3	-3,681.5	3,367.0	3,335.6	31.48	106.944	
4,400.0	4,382.3	4,427.0	4,422.8	16.4	15.8	20.17	76.3	-3,679.9	3,355.8	3,323.5	32.22	104.138	
4,500.0	4,481.7	4,517.3	4,513.2	16.8	16.2	20.26	78.5	-3,678.6	3,344.6	3,311.7	32.93	101.557	
4,600.0	4,581.2	4,600.0	4,595.8	17.2	16.4	20.34	80.3	-3,677.7	3,333.9	3,300.3	33.62	99.178	
4,700.0	4,680.6	4,685.9	4,681.7	17.6	16.7	20.43	81.9	-3,677.2	3,323.7	3,289.4	34.30	96.886	
4,800.0	4,780.1	4,771.5	4,767.3	18.0	17.0	20.50	82.9	-3,677.1	3,313.8	3,278.8	34.99	94.700	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - LUSK DEEP UNIT A #28H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100-MWD													Offset Well Error:	3.0 usft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Separation Factor		Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
4,900.0	4,879.5	4,863.8	4,859.6	18.4	17.3	20.56	83.3	-3,677.4	3,304.3	3,268.6	35.70	92.565		
5,000.0	4,979.0	4,959.8	4,955.6	18.7	17.7	20.62	83.1	-3,677.8	3,295.0	3,258.6	36.41	90.503		
5,100.0	5,078.5	5,066.9	5,062.6	19.1	18.0	20.69	82.9	-3,678.2	3,285.6	3,248.5	37.15	88.434		
5,200.0	5,177.9	5,168.1	5,163.9	19.5	18.3	20.74	82.4	-3,678.4	3,276.0	3,238.1	37.88	86.478		
5,300.0	5,277.4	5,313.4	5,309.2	19.9	18.8	20.82	81.5	-3,677.9	3,265.9	3,227.1	38.77	84.244		
5,400.0	5,376.8	5,424.8	5,420.6	20.3	19.2	20.88	80.6	-3,676.4	3,254.7	3,215.2	39.55	82.295		
5,500.0	5,476.3	5,525.4	5,521.2	20.7	19.6	20.95	80.4	-3,674.7	3,243.4	3,203.1	40.30	80.487		
5,600.0	5,575.7	5,625.7	5,621.4	21.1	19.9	21.03	81.0	-3,673.0	3,232.0	3,190.9	41.04	78.744		
5,700.0	5,675.2	5,730.6	5,726.4	21.5	20.3	21.12	82.2	-3,671.2	3,220.6	3,178.8	41.81	77.028		
5,800.0	5,774.6	5,842.3	5,838.0	21.9	20.7	21.22	83.2	-3,668.8	3,208.7	3,166.1	42.60	75.320		
5,900.0	5,874.1	5,936.1	5,931.8	22.3	21.0	21.30	84.0	-3,666.7	3,196.8	3,153.5	43.33	73.780		
6,000.0	5,973.5	6,021.5	6,017.2	22.7	21.3	21.37	84.5	-3,665.0	3,185.2	3,141.2	44.03	72.348		
6,100.0	6,073.0	6,100.0	6,095.6	23.1	21.6	21.44	85.2	-3,663.9	3,174.2	3,129.5	44.70	71.012		
6,200.0	6,172.4	12,252.0	9,251.2	23.5	99.9	156.82	79.6	-426.2	3,096.8	2,973.4	123.39	25.098		
6,300.0	6,271.9	12,252.0	9,251.2	23.9	99.9	156.82	79.6	-426.2	2,998.2	2,874.4	123.79	24.221		
6,400.0	6,371.4	12,252.0	9,251.2	24.3	99.9	156.82	79.6	-426.2	2,899.7	2,775.6	124.18	23.351		
6,500.0	6,470.8	12,252.0	9,251.2	24.7	99.9	156.82	79.6	-426.2	2,801.4	2,676.8	124.58	22.487		
6,600.0	6,570.3	12,252.0	9,251.2	25.1	99.9	156.82	79.6	-426.2	2,703.1	2,578.1	124.97	21.629		
6,700.0	6,669.7	12,223.5	9,252.2	25.5	99.1	154.65	79.9	-454.7	2,604.7	2,480.1	124.57	20.909		
6,800.0	6,769.2	12,215.3	9,252.5	25.9	98.9	153.98	80.0	-462.9	2,506.5	2,381.8	124.74	20.095		
6,900.0	6,868.6	12,206.8	9,252.9	26.3	98.6	153.28	80.2	-471.4	2,408.4	2,283.5	124.89	19.284		
7,000.0	6,968.1	12,198.0	9,253.3	26.7	98.4	152.54	80.3	-480.2	2,310.5	2,185.4	125.04	18.477		
7,100.0	7,067.5	12,188.9	9,253.7	27.1	98.1	151.75	80.4	-489.2	2,212.6	2,087.5	125.19	17.675		
7,200.0	7,167.0	12,179.6	9,254.2	27.4	97.9	150.91	80.6	-498.6	2,115.0	1,989.6	125.32	16.876		
7,300.0	7,266.4	12,169.9	9,254.7	27.8	97.6	150.02	80.7	-508.2	2,017.4	1,892.0	125.45	16.082		
7,400.0	7,365.9	12,159.9	9,255.2	28.2	97.3	149.08	80.9	-518.2	1,920.0	1,794.5	125.56	15.292		
7,500.0	7,465.4	12,149.6	9,255.8	28.6	97.0	148.07	81.1	-528.5	1,822.9	1,697.2	125.67	14.505		
7,600.0	7,564.8	12,139.0	9,256.3	29.0	96.3	147.04	81.6	-533.0	1,726.0	1,600.6	125.77	13.767		
7,700.0	7,664.3	12,128.0	9,257.3	29.4	96.3	146.04	81.6	-533.0	1,629.3	1,503.5	125.77	12.954		
7,800.0	7,763.7	12,117.7	9,258.7	29.8	95.7	145.08	82.1	-537.3	1,532.8	1,407.3	125.52	12.212		
7,900.0	7,863.2	12,073.6	9,260.2	30.2	94.9	139.66	82.8	-604.3	1,436.6	1,311.5	125.13	11.481		
8,000.0	7,962.6	12,048.7	9,261.3	30.6	94.2	136.50	83.4	-629.2	1,340.6	1,215.8	124.83	10.739		
8,100.0	8,062.1	12,026.4	9,262.1	31.0	93.6	133.50	84.0	-651.5	1,245.0	1,120.4	124.61	9.991		
8,200.0	8,161.5	12,006.4	9,262.6	31.4	93.0	130.67	84.5	-671.5	1,149.9	1,025.4	124.45	9.240		
8,300.0	8,261.0	11,988.3	9,263.0	31.8	92.5	128.01	85.1	-689.6	1,055.4	931.1	124.34	8.488		
8,400.0	8,360.4	11,971.9	9,263.3	32.2	92.1	125.52	85.6	-706.0	961.9	837.6	124.28	7.740		
8,500.0	8,459.9	11,956.9	9,263.5	32.6	91.7	123.19	86.0	-721.0	869.6	745.4	124.26	6.999		
8,600.0	8,559.4	11,943.2	9,263.6	33.0	91.3	121.00	86.5	-734.7	779.0	654.8	124.27	6.269		
8,700.0	8,658.8	11,931.1	9,263.6	33.4	90.9	119.06	86.9	-746.7	690.9	566.5	124.33	5.557		
8,800.0	8,758.3	11,920.5	9,263.6	33.8	90.6	117.32	87.2	-757.3	606.2	481.8	124.43	4.872		
8,836.0	8,794.0	11,916.8	9,263.6	33.9	90.5	116.70	87.3	-761.1	576.9	452.4	124.47	4.635		
8,850.0	8,808.0	11,915.3	9,263.6	34.0	90.5	130.08	87.4	-762.5	565.8	441.3	124.49	4.545		
8,875.0	8,832.8	11,912.8	9,263.6	34.1	90.4	146.61	87.5	-765.1	547.0	422.5	124.52	4.393		
8,900.0	8,857.4	11,910.3	9,263.6	34.2	90.4	156.30	87.5	-767.5	529.6	405.1	124.55	4.252		
8,925.0	8,881.8	11,907.9	9,263.6	34.3	90.3	162.19	87.6	-769.9	513.9	389.3	124.59	4.124		
8,950.0	8,906.0	11,905.7	9,263.6	34.4	90.2	166.00	87.7	-772.2	499.9	375.3	124.63	4.011		
8,975.0	8,929.8	11,903.5	9,263.6	34.5	90.2	168.60	87.8	-774.3	488.0	363.3	124.67	3.914		
9,000.0	8,953.2	11,901.4	9,263.6	34.6	90.1	170.47	87.8	-776.4	478.3	353.6	124.72	3.835		
9,025.0	8,976.1	11,899.4	9,263.6	34.7	90.1	171.86	87.9	-778.4	471.0	346.2	124.77	3.775		
9,050.0	8,998.5	11,897.6	9,263.6	34.8	90.0	172.93	87.9	-780.3	466.1	341.3	124.82	3.734		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	2.00 sigma
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - LUSK DEEP UNIT A #28H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100-MWD													Offset Well Error:	3.0 usft
Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
				Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
9,075.0	9,020.2	11,895.8	9,263.6	34.9	90.0	173.77	88.0	-782.0	463.8	339.8	124.88	3.714		
9,083.9	9,027.8	11,895.2	9,263.6	35.0	89.9	174.04	88.0	-782.6	463.7	338.8	124.90	3.712	CC, ES, SF	
9,100.0	9,041.4	11,894.2	9,263.6	35.0	89.9	174.47	88.0	-783.6	464.2	339.3	124.94	3.716		
9,125.0	9,061.8	11,892.7	9,263.6	35.1	89.9	175.05	88.1	-785.1	467.2	342.2	125.00	3.738		
9,150.0	9,081.4	11,891.3	9,263.6	35.2	89.8	175.54	88.1	-786.5	472.8	347.8	125.07	3.781		
9,175.0	9,100.2	11,890.1	9,263.6	35.3	89.8	175.99	88.2	-787.5	480.9	355.7	125.14	3.843		
9,200.0	9,118.1	11,888.9	9,263.6	35.4	89.8	176.39	88.2	-788.9	491.3	366.1	125.21	3.924		
9,225.0	9,135.1	11,888.0	9,263.6	35.5	89.7	176.78	88.2	-789.9	503.8	378.5	125.29	4.021		
9,250.0	9,151.2	11,887.1	9,263.6	35.7	89.7	177.15	88.3	-790.7	518.3	393.0	125.37	4.134		
9,275.0	9,166.2	11,886.4	9,263.6	35.8	89.7	177.54	88.3	-791.4	534.6	409.2	125.46	4.261		
9,300.0	9,180.1	11,885.8	9,263.6	35.9	89.7	177.95	88.3	-792.0	552.5	426.9	125.55	4.401		
9,325.0	9,193.0	11,885.4	9,263.6	36.0	89.7	178.39	88.3	-792.4	571.7	446.1	125.64	4.550		
9,350.0	9,204.7	11,885.1	9,263.6	36.1	89.7	178.91	88.3	-792.7	592.2	466.4	125.74	4.709		
9,375.0	9,215.2	11,885.0	9,263.6	36.2	89.7	179.52	88.3	-792.8	613.6	487.8	125.85	4.876		
9,400.0	9,224.6	11,885.0	9,263.6	36.3	89.7	-179.71	88.3	-792.8	635.9	510.0	125.96	5.049		
9,425.0	9,232.8	11,885.1	9,263.6	36.4	89.7	-178.71	88.3	-792.7	659.0	532.9	126.08	5.227		
9,450.0	9,239.7	11,885.4	9,263.6	36.5	89.7	-177.35	88.3	-792.4	682.6	556.4	126.20	5.409		
9,475.0	9,245.3	11,885.8	9,263.6	36.6	89.7	-175.34	88.3	-792.0	706.7	580.4	126.33	5.594		
9,500.0	9,249.7	11,886.4	9,263.6	36.8	89.7	-172.11	88.3	-791.4	731.1	604.7	126.47	5.781		
9,525.0	9,252.8	11,887.1	9,263.6	36.9	89.7	-166.15	88.3	-790.7	755.8	629.2	126.61	5.970		
9,550.0	9,254.6	11,888.0	9,263.6	37.0	89.7	-152.22	88.2	-789.8	780.7	654.0	126.76	6.159		
9,565.0	9,255.0	11,888.6	9,263.6	37.1	89.8	-132.33	88.2	-789.2	795.7	668.8	126.85	6.272		
9,600.0	9,255.5	11,890.0	9,263.6	37.3	89.8	-131.04	88.2	-787.8	830.6	703.6	127.07	6.537		
9,700.0	9,256.9	11,894.1	9,263.6	37.8	89.9	-127.69	88.0	-783.7	930.5	802.8	127.74	7.285		
9,800.0	9,258.4	11,898.2	9,263.6	38.4	90.0	-124.74	87.9	-779.6	1,030.4	901.9	128.47	8.020		
9,900.0	9,259.8	11,902.4	9,263.6	39.1	90.1	-122.15	87.8	-775.4	1,130.3	1,001.0	129.27	8.744		
10,000.0	9,261.2	11,906.6	9,263.6	39.9	90.3	-119.85	87.7	-771.2	1,230.2	1,100.0	130.12	9.454		
10,100.0	9,262.7	11,910.9	9,263.6	40.7	90.4	-117.82	87.5	-766.9	1,330.1	1,199.0	131.04	10.150		
10,200.0	9,264.1	11,915.2	9,263.6	41.5	90.5	-116.00	87.4	-762.6	1,430.0	1,298.0	132.01	10.833		
10,300.0	9,265.5	11,919.6	9,263.6	42.4	90.6	-114.37	87.2	-758.2	1,529.9	1,396.8	133.02	11.501		
10,400.0	9,267.0	11,924.1	9,263.6	43.3	90.7	-112.91	87.1	-753.8	1,629.8	1,495.7	134.09	12.154		
10,500.0	9,268.4	11,928.5	9,263.6	44.3	90.9	-111.59	86.9	-749.3	1,729.7	1,594.5	135.20	12.794		
10,600.0	9,269.8	11,933.1	9,263.6	45.4	91.0	-110.39	86.8	-744.7	1,829.6	1,693.2	136.35	13.418		
10,700.0	9,271.2	11,935.0	9,263.6	46.4	91.0	-109.92	86.7	-742.8	1,929.5	1,792.0	137.47	14.036		
10,800.0	9,272.7	11,935.0	9,263.6	47.5	91.0	-109.92	86.7	-742.8	2,029.4	1,890.8	138.57	14.646		
10,900.0	9,274.1	11,935.0	9,263.6	48.7	91.0	-109.92	86.7	-742.8	2,129.3	1,989.6	139.70	15.242		
11,000.0	9,275.5	11,947.9	9,263.6	49.8	91.4	-107.22	86.3	-729.9	2,229.2	2,088.0	141.22	15.785		
11,100.0	9,277.0	11,951.4	9,263.5	51.0	91.5	-106.60	86.2	-726.5	2,329.1	2,186.6	142.51	16.344		
11,200.0	9,278.4	11,954.9	9,263.5	52.2	91.6	-106.02	86.1	-723.0	2,429.0	2,285.2	143.82	16.889		
11,300.0	9,279.8	11,958.3	9,263.5	53.5	91.7	-105.49	86.0	-719.6	2,528.9	2,383.8	145.16	17.422		
11,400.0	9,281.3	11,961.6	9,263.4	54.7	91.8	-104.99	85.9	-716.2	2,628.9	2,482.3	146.52	17.942		
11,500.0	9,282.7	11,965.0	9,263.4	56.0	91.9	-104.52	85.8	-712.9	2,728.8	2,580.9	147.90	18.450		
11,600.0	9,284.1	11,968.3	9,263.4	57.3	92.0	-104.09	85.7	-709.6	2,828.7	2,679.4	149.30	18.947		
11,700.0	9,285.6	11,971.5	9,263.3	58.6	92.1	-103.68	85.6	-706.3	2,928.6	2,777.9	150.71	19.432		
11,800.0	9,287.0	11,974.8	9,263.3	60.0	92.2	-103.29	85.5	-703.1	3,028.5	2,876.4	152.15	19.905		
11,900.0	9,288.4	11,978.0	9,263.2	61.4	92.2	-102.93	85.4	-699.9	3,128.5	2,974.9	153.59	20.368		
12,000.0	9,289.8	11,981.1	9,263.2	62.7	92.3	-102.58	85.3	-696.8	3,228.4	3,073.3	155.06	20.821		
12,100.0	9,291.3	11,984.2	9,263.1	64.1	92.4	-102.26	85.2	-693.6	3,328.3	3,171.8	156.53	21.263		
12,200.0	9,292.7	11,987.3	9,263.1	65.5	92.5	-101.95	85.1	-690.6	3,428.2	3,270.2	158.02	21.695		
12,300.0	9,294.1	11,990.3	9,263.0	66.9	92.6	-101.66	85.0	-687.5	3,528.1	3,368.6	159.52	22.117		
12,400.0	9,295.6	11,993.3	9,262.9	68.4	92.7	-101.38	84.9	-684.5	3,628.1	3,467.1	161.03	22.530		

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - LUSK DEEP UNIT A #28H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100-MVD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
12,500.0	9,297.0	11,996.3	9,262.9	69.8	92.8	-101.12	84.8	-681.5	3,728.0	3,565.5	162.55	22.934		
12,600.0	9,298.4	11,999.3	9,262.8	71.2	92.8	-100.86	84.7	-678.6	3,827.9	3,663.9	164.08	23.330		
12,700.0	9,299.9	12,002.2	9,262.7	72.7	92.9	-100.62	84.7	-675.7	3,927.9	3,762.3	165.62	23.716		
12,800.0	9,301.3	12,005.1	9,262.7	74.2	93.0	-100.39	84.6	-672.8	4,027.8	3,860.6	167.17	24.095		
12,900.0	9,302.7	12,007.9	9,262.6	75.6	93.1	-100.17	84.5	-670.0	4,127.7	3,959.0	168.72	24.465		
13,000.0	9,304.2	12,010.7	9,262.5	77.1	93.2	-99.96	84.4	-667.2	4,227.7	4,057.4	170.28	24.827		
13,100.0	9,305.6	12,013.5	9,262.5	78.6	93.2	-99.76	84.3	-664.4	4,327.6	4,155.7	171.85	25.182		
13,200.0	9,307.0	12,016.3	9,262.4	80.1	93.3	-99.56	84.3	-661.6	4,427.5	4,254.1	173.43	25.530		
13,300.0	9,308.5	12,019.0	9,262.3	81.6	93.4	-99.38	84.2	-658.9	4,527.5	4,352.5	175.01	25.870		
13,400.0	9,309.9	12,021.7	9,262.2	83.1	93.5	-99.20	84.1	-656.2	4,627.4	4,450.8	176.60	26.203		
13,500.0	9,311.3	12,024.4	9,262.1	84.7	93.5	-99.02	84.0	-653.5	4,727.3	4,549.2	178.19	26.530		
13,600.0	9,312.7	12,027.0	9,262.0	86.2	93.6	-98.86	84.0	-650.9	4,827.3	4,647.5	179.79	26.850		
13,700.0	9,314.2	12,029.6	9,262.0	87.7	93.7	-98.70	83.9	-648.3	4,927.2	4,745.8	181.39	27.164		
13,800.0	9,315.6	12,032.2	9,261.9	89.2	93.8	-98.54	83.8	-645.7	5,027.2	4,844.2	182.99	27.472		
13,900.0	9,317.0	12,034.8	9,261.8	90.8	93.8	-98.39	83.7	-643.1	5,127.1	4,942.5	184.60	27.773		
14,000.0	9,318.5	12,037.3	9,261.7	92.3	93.9	-98.25	83.7	-640.6	5,227.0	5,040.8	186.22	28.069		
14,100.0	9,319.9	12,039.8	9,261.6	93.9	94.0	-98.11	83.6	-638.1	5,327.0	5,139.1	187.84	28.360		
14,200.0	9,321.3	12,042.3	9,261.5	95.4	94.0	-97.97	83.5	-635.6	5,426.9	5,237.5	189.46	28.644		
14,300.0	9,322.8	12,044.8	9,261.4	97.0	94.1	-97.84	83.5	-633.1	5,526.9	5,335.8	191.08	28.924		
14,400.0	9,324.2	12,047.2	9,261.3	98.5	94.2	-97.71	83.4	-630.7	5,626.8	5,434.1	192.71	29.198		
14,456.7	9,325.0	12,048.6	9,261.3	99.4	94.2	-97.64	83.4	-629.3	5,683.5	5,489.9	193.64	29.351		

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - LUSK DEEP UNIT A #5 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 405-INC-ONLY													Offset Well Error:	3.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Semi Major Axis	Highside Toolface (")	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	3.0	-167.94		-3,668.6	-784.1	3,751.7				
100.0	100.0	61.0	61.0	0.1	3.0	-167.94		-3,668.6	-784.1	3,751.5	3,748.3	3.19	1,175.322	
200.0	200.0	161.0	161.0	0.5	3.3	-167.94		-3,668.6	-784.1	3,751.5	3,747.7	3.83	980.758	
300.0	300.0	261.0	261.0	0.9	3.8	-167.94		-3,668.6	-784.1	3,751.5	3,746.9	4.65	806.545	
400.0	400.0	361.0	361.0	1.2	4.4	-167.94		-3,668.6	-784.1	3,751.5	3,745.9	5.61	668.801	
500.0	500.0	461.0	461.0	1.6	5.5	-167.94		-3,668.6	-784.1	3,751.5	3,744.4	7.10	528.714	
600.0	600.0	561.0	561.0	1.9	7.1	-167.94		-3,668.6	-784.1	3,751.5	3,742.4	9.08	413.321	
700.0	700.0	661.0	661.0	2.3	8.9	-167.94		-3,668.6	-784.1	3,751.5	3,740.4	11.15	336.564	
800.0	800.0	761.0	761.0	2.7	10.6	-167.94		-3,668.6	-784.1	3,751.5	3,738.2	13.26	282.865	
900.0	900.0	861.0	861.0	3.0	12.4	-167.94		-3,668.6	-784.1	3,751.5	3,736.1	15.41	243.524	
950.0	950.0	911.0	911.0	3.2	13.3	-167.94		-3,668.6	-784.1	3,751.5	3,735.0	16.48	227.600	
1,000.0	1,000.0	961.0	961.0	3.4	14.2	-60.93		-3,668.6	-784.1	3,751.3	3,733.7	17.56	213.647	
1,100.0	1,099.9	1,060.9	1,060.9	3.7	16.0	-61.01		-3,668.6	-784.1	3,749.6	3,729.9	19.71	190.262	
1,200.0	1,199.7	1,160.7	1,160.7	4.0	17.8	-61.16		-3,668.6	-784.1	3,746.2	3,724.4	21.87	171.314	
1,249.4	1,248.8	1,209.8	1,209.8	4.2	18.7	-61.27		-3,668.6	-784.1	3,743.9	3,721.0	22.94	163.226	
1,300.0	1,299.2	1,260.2	1,260.2	4.4	19.6	-61.34		-3,668.6	-784.1	3,741.4	3,717.4	24.04	155.653	
1,400.0	1,398.6	1,359.6	1,359.6	4.8	21.5	-61.48		-3,668.6	-784.1	3,736.4	3,710.2	26.22	142.522	
1,500.0	1,498.1	1,459.1	1,459.1	5.1	23.3	-61.62		-3,668.6	-784.1	3,731.4	3,703.0	28.43	131.249	
1,600.0	1,597.5	1,591.0	1,591.0	5.5	25.9	-61.80		-3,668.6	-784.1	3,726.6	3,695.2	31.35	118.852	
1,700.0	1,697.0	1,658.0	1,658.0	5.9	27.4	-61.90		-3,668.6	-784.1	3,721.5	3,688.2	33.27	111.864	
1,800.0	1,796.5	1,800.0	1,800.0	6.3	30.7	-62.10		-3,668.6	-784.1	3,716.8	3,679.9	36.91	100.701	
1,900.0	1,895.9	1,856.9	1,856.9	6.6	32.2	-62.18		-3,668.6	-784.1	3,711.7	3,672.8	38.82	95.614	
2,000.0	1,995.4	1,956.4	1,956.4	7.0	34.9	-62.32		-3,668.6	-784.1	3,706.8	3,664.9	41.88	88.519	
2,100.0	2,094.8	2,164.0	2,163.9	7.4	40.5	-62.62		-3,668.6	-784.1	3,703.5	3,655.7	47.85	77.402	
2,200.0	2,194.3	2,164.0	2,163.9	7.8	40.5	-62.62		-3,668.6	-784.1	3,697.1	3,648.9	48.23	76.653	
2,300.0	2,293.7	2,313.0	2,312.9	8.2	44.6	-62.83		-3,668.6	-784.1	3,692.7	3,640.0	52.78	69.970	
2,400.0	2,393.2	2,354.3	2,354.2	8.5	45.6	-62.89		-3,668.6	-784.1	3,687.5	3,633.3	54.18	68.056	
2,500.0	2,492.6	2,453.8	2,453.6	8.9	48.0	-63.04		-3,668.6	-784.1	3,682.7	3,625.8	56.95	64.671	
2,600.0	2,592.1	2,553.2	2,553.1	9.3	50.4	-63.18		-3,668.6	-784.1	3,678.0	3,618.3	59.71	61.599	
2,700.0	2,691.5	2,652.7	2,652.5	9.7	52.9	-63.33		-3,668.6	-784.1	3,673.3	3,610.6	62.66	58.620	
2,800.0	2,791.0	2,757.0	2,756.8	10.1	56.0	-63.48		-3,668.6	-784.1	3,668.6	3,602.5	66.12	55.482	
2,900.0	2,890.5	2,883.0	2,882.8	10.5	59.4	-63.66		-3,668.6	-784.1	3,664.1	3,594.2	69.89	52.426	
3,000.0	2,989.9	2,951.1	2,950.9	10.9	61.1	-63.76		-3,668.6	-784.1	3,659.3	3,587.3	71.98	50.835	
3,100.0	3,089.4	3,050.6	3,050.4	11.3	63.6	-63.91		-3,668.6	-784.1	3,654.7	3,579.8	74.87	48.812	
3,200.0	3,188.8	3,150.0	3,149.8	11.7	66.2	-64.06		-3,668.6	-784.1	3,650.1	3,572.2	77.85	46.886	
3,300.0	3,288.3	3,249.5	3,249.3	12.1	68.8	-64.20		-3,668.6	-784.1	3,645.5	3,564.7	80.83	45.101	
3,400.0	3,387.7	3,355.0	3,354.7	12.4	71.5	-64.36		-3,668.6	-784.1	3,640.9	3,557.0	83.97	43.362	
3,500.0	3,487.2	3,481.0	3,480.7	12.8	74.7	-64.55		-3,668.6	-784.1	3,636.6	3,549.0	87.52	41.552	
3,600.0	3,586.6	3,547.9	3,547.6	13.2	76.5	-64.64		-3,668.6	-784.1	3,631.9	3,542.2	89.73	40.478	
3,700.0	3,686.1	3,763.0	3,762.7	13.6	82.3	-64.97		-3,668.6	-784.1	3,629.3	3,533.3	95.95	37.826	
3,800.0	3,785.5	3,763.0	3,762.7	14.0	82.3	-64.97		-3,668.6	-784.1	3,623.0	3,526.7	96.34	37.606	
3,900.0	3,885.0	3,846.3	3,846.0	14.4	84.7	-65.09		-3,668.6	-784.1	3,618.6	3,519.5	99.08	36.520	
4,000.0	3,984.5	4,047.0	4,046.6	14.8	90.3	-65.39		-3,668.6	-784.1	3,615.6	3,510.5	105.14	34.390	
4,100.0	4,083.9	4,047.0	4,046.6	15.2	90.3	-65.39		-3,668.6	-784.1	3,609.8	3,504.3	105.53	34.207	
4,200.0	4,183.4	4,144.7	4,144.4	15.6	93.2	-65.54		-3,668.6	-784.1	3,605.4	3,496.7	108.79	33.142	
4,300.0	4,282.8	4,329.0	4,328.6	16.0	98.6	-65.82		-3,668.6	-784.1	3,602.1	3,487.5	114.59	31.436	
4,400.0	4,382.3	4,343.7	4,343.3	16.4	99.0	-65.84		-3,668.6	-784.1	3,596.8	3,481.4	115.41	31.165	
4,500.0	4,481.7	4,487.0	4,486.5	16.8	103.2	-66.06		-3,668.6	-784.1	3,592.8	3,472.8	120.02	29.935	
4,600.0	4,581.2	4,542.6	4,542.2	17.2	104.8	-66.14		-3,668.6	-784.1	3,588.3	3,466.3	122.00	29.413	
4,700.0	4,680.6	4,642.1	4,641.6	17.6	107.7	-66.29		-3,668.6	-784.1	3,584.1	3,458.8	125.22	28.622	
4,800.0	4,780.1	4,741.6	4,741.1	18.0	110.5	-66.45		-3,668.6	-784.1	3,579.9	3,451.4	128.44	27.871	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - LUSK DEEP UNIT A #5 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 405-INC-ONLY													Offset Well Error:	3.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
4,900.0	4,879.5	4,841.0	4,840.5	18.4	113.3	-66.60	-3,668.6	-784.1	3,575.7	3,444.0	131.66	27.158		
5,000.0	4,979.0	4,940.5	4,940.0	18.7	116.1	-66.75	-3,668.6	-784.1	3,571.5	3,436.7	134.89	26.478		
5,100.0	5,078.5	5,095.0	5,094.4	19.1	120.5	-66.99	-3,668.6	-784.1	3,567.8	3,428.2	139.68	25.544		
5,200.0	5,177.9	5,139.5	5,138.9	19.5	121.7	-67.06	-3,668.6	-784.1	3,563.3	3,422.1	141.19	25.237		
5,300.0	5,277.4	5,238.9	5,238.4	19.9	124.2	-67.21	-3,668.6	-784.1	3,559.2	3,415.1	144.10	24.700		
5,400.0	5,376.8	5,400.0	5,399.4	20.3	128.2	-67.46	-3,668.6	-784.1	3,555.7	3,407.2	148.56	23.934		
5,500.0	5,476.3	5,437.9	5,437.3	20.7	128.9	-67.52	-3,668.6	-784.1	3,551.2	3,401.6	149.63	23.733		
5,600.0	5,575.7	5,537.4	5,536.7	21.1	130.7	-67.68	-3,668.6	-784.1	3,547.2	3,395.4	151.80	23.368		
5,700.0	5,675.2	5,636.8	5,636.2	21.5	132.4	-67.83	-3,668.6	-784.1	3,543.2	3,389.3	153.96	23.014		
5,800.0	5,774.6	5,736.3	5,735.6	21.9	134.2	-67.99	-3,668.6	-784.1	3,539.3	3,383.2	156.12	22.670		
5,900.0	5,874.1	5,835.7	5,835.1	22.3	136.0	-68.14	-3,668.6	-784.1	3,535.4	3,377.1	158.26	22.340		
6,000.0	5,973.5	5,935.2	5,934.5	22.7	137.6	-68.30	-3,668.6	-784.1	3,531.5	3,371.1	160.33	22.026		
6,100.0	6,073.0	6,034.6	6,034.0	23.1	139.3	-68.46	-3,668.6	-784.1	3,527.6	3,365.2	162.41	21.721		
6,200.0	6,172.4	6,134.1	6,133.4	23.5	141.0	-68.61	-3,668.6	-784.1	3,523.8	3,359.3	164.48	21.423		
6,300.0	6,271.9	6,255.0	6,254.3	23.9	143.0	-68.81	-3,668.6	-784.1	3,520.0	3,353.1	166.92	21.088		
6,400.0	6,371.4	6,333.0	6,332.4	24.3	144.6	-68.93	-3,668.6	-784.1	3,516.2	3,347.3	168.88	20.820		
6,500.0	6,470.8	6,432.5	6,431.8	24.7	146.6	-69.09	-3,668.6	-784.1	3,512.4	3,341.2	171.28	20.507		
6,600.0	6,570.3	6,531.9	6,531.3	25.1	148.6	-69.25	-3,668.6	-784.1	3,508.7	3,335.0	173.67	20.203		
6,700.0	6,669.7	6,631.4	6,630.7	25.5	150.6	-69.40	-3,668.6	-784.1	3,505.0	3,328.9	176.07	19.907		
6,800.0	6,769.2	6,730.8	6,730.2	25.9	152.6	-69.56	-3,668.6	-784.1	3,501.3	3,322.9	178.46	19.619		
6,900.0	6,868.6	6,830.3	6,829.6	26.3	154.6	-69.72	-3,668.6	-784.1	3,497.7	3,316.8	180.86	19.340		
7,000.0	6,968.1	6,929.8	6,929.1	26.7	156.6	-69.88	-3,668.6	-784.1	3,494.1	3,310.8	183.22	19.070		
7,100.0	7,067.5	7,029.2	7,028.5	27.1	158.5	-70.04	-3,668.6	-784.1	3,490.5	3,305.0	185.52	18.814		
7,200.0	7,167.0	7,128.7	7,128.0	27.4	160.4	-70.20	-3,668.6	-784.1	3,486.9	3,299.1	187.82	18.565		
7,300.0	7,266.4	7,228.1	7,227.4	27.8	162.3	-70.36	-3,668.6	-784.1	3,483.4	3,293.3	190.12	18.322		
7,400.0	7,365.9	7,327.6	7,326.9	28.2	164.3	-70.52	-3,668.6	-784.1	3,479.9	3,287.4	192.52	18.076		
7,500.0	7,465.4	7,427.0	7,426.4	28.6	166.4	-70.69	-3,668.6	-784.1	3,476.4	3,281.4	195.02	17.826		
7,600.0	7,564.8	7,526.5	7,525.8	29.0	168.5	-70.85	-3,668.6	-784.1	3,472.9	3,275.4	197.52	17.583		
7,700.0	7,664.3	7,626.0	7,625.3	29.4	170.6	-71.01	-3,668.6	-784.1	3,469.5	3,269.5	200.02	17.346		
7,800.0	7,763.7	7,725.4	7,724.7	29.8	172.7	-71.17	-3,668.6	-784.1	3,466.1	3,263.6	202.52	17.115		
7,900.0	7,863.2	7,907.0	7,906.3	30.2	176.5	-71.47	-3,668.6	-784.1	3,463.7	3,257.0	206.76	16.752		
8,000.0	7,962.6	7,924.3	7,923.6	30.6	176.9	-71.50	-3,668.6	-784.1	3,459.4	3,251.8	207.56	16.667		
8,100.0	8,062.1	8,023.8	8,023.1	31.0	179.2	-71.66	-3,668.6	-784.1	3,456.1	3,245.8	210.26	16.437		
8,200.0	8,161.5	8,123.2	8,122.5	31.4	181.5	-71.82	-3,668.6	-784.1	3,452.8	3,239.8	212.96	16.214		
8,300.0	8,261.0	8,222.7	8,222.0	31.8	183.9	-71.99	-3,668.6	-784.1	3,449.6	3,233.9	215.66	15.995		
8,400.0	8,360.4	8,322.1	8,321.4	32.2	186.2	-72.15	-3,668.6	-784.1	3,446.3	3,228.0	218.36	15.783		
8,500.0	8,459.9	8,421.6	8,420.9	32.6	188.5	-72.32	-3,668.6	-784.1	3,443.1	3,222.1	221.06	15.576		
8,600.0	8,559.4	8,530.0	8,529.2	33.0	191.0	-72.49	-3,668.6	-784.1	3,440.0	3,216.0	223.96	15.360		
8,700.0	8,658.8	8,620.6	8,619.8	33.4	192.9	-72.65	-3,668.6	-784.1	3,436.8	3,210.5	226.28	15.188		
8,800.0	8,758.3	8,720.0	8,719.3	33.8	195.0	-72.81	-3,668.6	-784.1	3,433.7	3,204.9	228.78	15.009		
8,836.0	8,794.0	8,755.8	8,755.0	33.9	195.8	-72.87	-3,668.6	-784.1	3,432.6	3,202.9	229.68	14.945		
8,850.0	8,808.0	8,769.8	8,769.0	34.0	196.0	-58.90	-3,668.6	-784.1	3,432.0	3,201.9	230.03	14.919		
8,875.0	8,832.8	8,794.5	8,793.8	34.1	196.6	-41.46	-3,668.6	-784.1	3,429.8	3,199.1	230.66	14.870		
8,900.0	8,857.4	8,819.2	8,818.4	34.2	197.1	-31.03	-3,668.6	-784.1	3,426.3	3,195.1	231.28	14.815		
8,925.0	8,881.8	8,843.6	8,842.8	34.3	197.6	-24.52	-3,668.6	-784.1	3,421.6	3,189.7	231.90	14.754		
8,950.0	8,906.0	8,867.7	8,867.0	34.4	198.1	-20.18	-3,668.6	-784.1	3,415.6	3,183.1	232.52	14.690		
8,975.0	8,929.8	8,891.5	8,890.8	34.5	198.6	-17.14	-3,668.6	-784.1	3,408.3	3,175.2	233.13	14.620		
9,000.0	8,953.2	8,914.9	8,914.2	34.6	199.1	-14.90	-3,668.6	-784.1	3,399.8	3,166.0	233.73	14.546		
9,025.0	8,976.1	8,937.8	8,937.1	34.7	199.6	-13.20	-3,668.6	-784.1	3,390.0	3,155.7	234.32	14.468		
9,050.0	8,998.5	9,000.0	8,999.2	34.8	200.9	-11.94	-3,668.6	-784.1	3,379.3	3,143.6	235.74	14.335		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - LUSK DEEP UNIT A #5 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 405-INC-ONLY													Offset Well Error:	3.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
9,075.0	9,020.2	9,000.0	8,999.2	34.9	200.9	-10.84	-3,668.6	-784.1	3,367.1	3,131.2	235.84	14.277		
9,100.0	9,041.4	9,003.1	9,002.4	35.0	201.0	-9.95	-3,668.6	-784.1	3,353.8	3,117.8	236.04	14.209		
9,125.0	9,061.8	9,023.5	9,022.8	35.1	201.6	-9.24	-3,668.6	-784.1	3,339.5	3,102.8	236.71	14.108		
9,150.0	9,081.4	9,043.2	9,042.4	35.2	202.1	-8.65	-3,668.6	-784.1	3,324.1	3,086.8	237.37	14.004		
9,175.0	9,100.2	9,062.0	9,061.2	35.3	202.7	-8.15	-3,668.6	-784.1	3,307.8	3,069.8	238.00	13.898		
9,200.0	9,118.1	9,079.9	9,079.1	35.4	203.2	-7.74	-3,668.6	-784.1	3,290.4	3,051.8	238.61	13.790		
9,225.0	9,135.1	9,190.0	9,189.2	35.5	206.3	-7.63	-3,668.6	-784.1	3,273.5	3,031.7	241.81	13.538		
9,250.0	9,151.2	9,190.0	9,189.2	35.7	206.3	-7.30	-3,668.6	-784.1	3,254.0	3,012.1	241.91	13.451		
9,275.0	9,166.2	9,190.0	9,189.2	35.8	206.3	-7.01	-3,668.6	-784.1	3,233.7	2,991.7	242.02	13.362		
9,300.0	9,180.1	9,190.0	9,189.2	35.9	206.3	-6.76	-3,668.6	-784.1	3,212.8	2,970.7	242.12	13.269		
9,325.0	9,193.0	9,190.0	9,189.2	36.0	206.3	-6.55	-3,668.6	-784.1	3,191.2	2,949.0	242.23	13.174		
9,350.0	9,204.7	9,190.0	9,189.2	36.1	206.3	-6.36	-3,668.6	-784.1	3,169.1	2,926.7	242.34	13.077		
9,375.0	9,215.2	9,190.0	9,189.2	36.2	206.3	-6.20	-3,668.6	-784.1	3,146.4	2,903.9	242.45	12.978		
9,400.0	9,224.6	9,190.0	9,189.2	36.3	206.3	-6.06	-3,668.6	-784.1	3,123.2	2,880.6	242.56	12.876		
9,425.0	9,232.8	9,194.6	9,193.8	36.4	206.4	-5.97	-3,668.6	-784.1	3,099.6	2,856.8	242.81	12.765		
9,450.0	9,239.7	9,201.5	9,200.7	36.5	206.6	-5.92	-3,668.6	-784.1	3,075.6	2,832.4	243.14	12.650		
9,475.0	9,245.3	9,207.1	9,206.3	36.6	206.8	-5.89	-3,668.6	-784.1	3,051.2	2,807.8	243.42	12.535		
9,500.0	9,249.7	9,211.5	9,210.7	36.8	206.9	-5.91	-3,668.6	-784.1	3,026.6	2,782.9	243.67	12.421		
9,525.0	9,252.8	9,214.6	9,213.8	36.9	207.0	-5.98	-3,668.6	-784.1	3,001.8	2,757.9	243.89	12.308		
9,550.0	9,254.6	9,216.4	9,215.6	37.0	207.1	-6.28	-3,668.6	-784.1	2,976.9	2,732.8	244.07	12.197		
9,565.0	9,255.0	9,216.8	9,216.0	37.1	207.1	-7.48	-3,668.6	-784.1	2,961.9	2,717.8	244.16	12.131		
9,600.0	9,255.5	9,217.3	9,216.5	37.3	207.1	-7.57	-3,668.6	-784.1	2,926.9	2,682.5	244.35	11.978		
9,700.0	9,256.9	9,218.7	9,217.9	37.8	207.1	-7.84	-3,668.6	-784.1	2,826.9	2,581.9	244.95	11.541		
9,800.0	9,258.4	9,220.2	9,219.4	38.4	207.2	-8.12	-3,668.6	-784.1	2,726.9	2,481.3	245.61	11.102		
9,900.0	9,259.8	9,221.6	9,220.8	39.1	207.2	-8.42	-3,668.6	-784.1	2,626.9	2,380.6	246.34	10.664		
10,000.0	9,261.2	9,223.0	9,222.2	39.9	207.3	-8.75	-3,668.6	-784.1	2,526.9	2,279.8	247.12	10.226		
10,100.0	9,262.7	9,224.5	9,223.7	40.7	207.3	-9.11	-3,668.6	-784.1	2,426.9	2,179.0	247.96	9.788		
10,200.0	9,264.1	9,225.9	9,225.1	41.5	207.3	-9.49	-3,668.6	-784.1	2,326.9	2,078.1	248.85	9.351		
10,300.0	9,265.5	9,227.3	9,226.5	42.4	207.4	-9.91	-3,668.6	-784.1	2,227.0	1,977.2	249.79	8.915		
10,400.0	9,267.0	9,228.8	9,228.0	43.3	207.4	-10.36	-3,668.6	-784.1	2,127.0	1,876.2	250.77	8.482		
10,500.0	9,268.4	9,230.2	9,229.4	44.3	207.5	-10.86	-3,668.6	-784.1	2,027.0	1,775.2	251.80	8.050		
10,600.0	9,269.8	9,231.6	9,230.8	45.4	207.5	-11.41	-3,668.6	-784.1	1,927.0	1,674.1	252.87	7.620		
10,700.0	9,271.2	9,233.0	9,232.2	46.4	207.6	-12.02	-3,668.6	-784.1	1,827.0	1,573.0	253.98	7.194		
10,800.0	9,272.7	9,234.5	9,233.7	47.5	207.6	-12.69	-3,668.6	-784.1	1,727.0	1,471.9	255.12	6.769		
10,900.0	9,274.1	9,235.9	9,235.1	48.7	207.6	-13.45	-3,668.6	-784.1	1,627.0	1,370.7	256.29	6.348		
11,000.0	9,275.5	9,237.3	9,236.5	49.8	207.7	-14.29	-3,668.6	-784.1	1,527.0	1,269.5	257.50	5.930		
11,100.0	9,277.0	9,238.8	9,238.0	51.0	207.7	-15.25	-3,668.6	-784.1	1,427.0	1,168.3	258.73	5.515		
11,200.0	9,278.4	9,240.2	9,239.4	52.2	207.8	-16.34	-3,668.6	-784.1	1,327.1	1,067.1	259.99	5.104		
11,300.0	9,279.8	9,241.6	9,240.8	53.5	207.8	-17.59	-3,668.6	-784.1	1,227.1	965.8	261.28	4.696		
11,400.0	9,281.3	9,243.1	9,242.3	54.7	207.9	-19.04	-3,668.6	-784.1	1,127.1	864.5	262.59	4.292		
11,500.0	9,282.7	9,244.5	9,243.7	56.0	207.9	-20.75	-3,668.6	-784.1	1,027.1	763.2	263.92	3.892		
11,600.0	9,284.1	9,245.9	9,245.1	57.3	207.9	-22.76	-3,668.6	-784.1	927.1	661.8	265.27	3.495		
11,700.0	9,285.6	9,247.4	9,246.6	58.6	208.0	-25.19	-3,668.6	-784.1	827.1	560.5	266.64	3.102		
11,800.0	9,287.0	9,248.8	9,248.0	60.0	208.0	-28.15	-3,668.6	-784.1	727.1	459.1	268.02	2.713		
11,900.0	9,288.4	9,250.2	9,249.4	61.4	208.1	-31.81	-3,668.6	-784.1	627.1	357.7	269.43	2.328		
12,000.0	9,289.8	9,251.6	9,250.8	62.7	208.1	-36.43	-3,668.6	-784.1	527.1	256.3	270.84	1.946 Advise and Monitor		
12,100.0	9,291.3	9,253.1	9,252.3	64.1	208.2	-42.33	-3,668.6	-784.1	427.2	154.9	272.28	1.569 Advise and Monitor		
12,200.0	9,292.7	9,254.5	9,253.7	65.5	208.2	-49.94	-3,668.6	-784.1	327.2	53.5	273.72	1.195 Shut in Produces		
12,300.0	9,294.1	9,255.9	9,255.1	66.9	208.2	-59.72	-3,668.6	-784.1	227.2	-48.0	275.18	0.826 Stop Drilling Now		
12,400.0	9,295.6	9,257.4	9,256.6	68.4	208.3	-71.90	-3,668.6	-784.1	127.3	-149.4	276.65	0.460 Stop Drilling Now		
12,500.0	9,297.0	9,258.8	9,258.0	69.8	208.3	-86.00	-3,668.6	-784.1	27.7	-250.4	278.13	0.100 Stop Drilling Now		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - LUSK DEEP UNIT A #5 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 405-INC-ONLY													Offset Well Error:	3.0 usft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Separation Factor		Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
12,527.2	9,297.4	9,259.2	9,258.4	70.2	208.3	-90.00	-3,668.6	-784.1	5.6	-273.0	278.53	0.020	Stop Drilling Now, CC, ES, SF	
12,600.0	9,298.4	9,260.2	9,259.4	71.2	208.4	-100.60	-3,668.6	-784.1	73.0	-206.6	279.62	0.261	Stop Drilling Now	
12,700.0	9,299.9	9,261.7	9,260.9	72.7	208.4	-113.95	-3,668.6	-784.1	172.9	-108.2	281.12	0.615	Stop Drilling Now	
12,800.0	9,301.3	9,263.1	9,262.3	74.2	208.5	-125.04	-3,668.6	-784.1	272.9	-9.8	282.63	0.965	Stop Drilling Now	
12,900.0	9,302.7	9,264.5	9,263.7	75.6	208.5	-133.78	-3,668.6	-784.1	372.8	88.7	284.15	1.312	Shut in Produces	
13,000.0	9,304.2	9,266.0	9,265.2	77.1	208.6	-140.55	-3,668.6	-784.1	472.8	187.1	285.68	1.655	Advise and Monitor	
13,100.0	9,305.6	9,267.4	9,266.6	78.6	208.6	-145.82	-3,668.6	-784.1	572.8	285.6	287.21	1.994	Advise and Monitor	
13,200.0	9,307.0	9,268.8	9,268.0	80.1	208.6	-149.96	-3,668.6	-784.1	672.8	384.0	288.75	2.330		
13,300.0	9,308.5	9,270.3	9,269.5	81.6	208.7	-153.28	-3,668.6	-784.1	772.8	482.5	290.30	2.662		
13,400.0	9,309.9	9,271.7	9,270.9	83.1	208.7	-155.98	-3,668.6	-784.1	872.8	580.9	291.86	2.990		
13,500.0	9,311.3	9,273.1	9,272.3	84.7	208.8	-158.20	-3,668.6	-784.1	972.7	679.3	293.42	3.315		
13,600.0	9,312.7	9,274.5	9,273.7	86.2	208.8	-160.07	-3,668.6	-784.1	1,072.7	777.7	294.98	3.637		
13,700.0	9,314.2	9,276.0	9,275.2	87.7	208.9	-161.65	-3,668.6	-784.1	1,172.7	876.2	296.56	3.954		
13,800.0	9,315.6	9,277.4	9,276.6	89.2	208.9	-163.00	-3,668.6	-784.1	1,272.7	974.6	298.13	4.269		
13,900.0	9,317.0	9,278.8	9,278.0	90.8	208.9	-164.18	-3,668.6	-784.1	1,372.7	1,073.0	299.72	4.580		
14,000.0	9,318.5	9,280.3	9,279.5	92.3	209.0	-165.20	-3,668.6	-784.1	1,472.7	1,171.4	301.30	4.888		
14,100.0	9,319.9	9,281.7	9,280.9	93.9	209.0	-166.11	-3,668.6	-784.1	1,572.7	1,269.8	302.89	5.192		
14,200.0	9,321.3	9,283.1	9,282.3	95.4	209.1	-166.91	-3,668.6	-784.1	1,672.7	1,368.2	304.49	5.493		
14,300.0	9,322.8	9,284.6	9,283.8	97.0	209.1	-167.62	-3,668.6	-784.1	1,772.7	1,466.6	306.09	5.791		
14,400.0	9,324.2	9,286.0	9,285.2	98.5	209.2	-168.26	-3,668.6	-784.1	1,872.6	1,564.9	307.69	6.086		
14,456.7	9,325.0	9,286.8	9,286.0	99.4	209.2	-168.60	-3,668.6	-784.1	1,929.4	1,620.8	308.61	6.252		

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - SOUTHERN CALIEDERAL #2 - OWB - ACTUAL WELLPATH														Offset Site Error:	0.0 usft
Survey Program: 2736-INC-ONLY														Offset Well Error:	3.0 usft
Reference	Offset	Semi Major Axis		Distance		Warning									
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor			
0.0	0.0	0.0	0.0	0.0	3.0	-161.50	-3,338.5	-1,117.0	3,520.6						
100.0	100.0	66.0	66.0	0.1	3.4	-161.50	-3,338.5	-1,117.0	3,520.4	3,516.8	3.59	980.292			
200.0	200.0	166.0	166.0	0.5	5.2	-161.50	-3,338.5	-1,117.0	3,520.4	3,514.7	5.72	615.084			
300.0	300.0	266.0	266.0	0.9	7.5	-161.50	-3,338.5	-1,117.0	3,520.4	3,512.1	8.34	422.266			
400.0	400.0	366.0	366.0	1.2	9.9	-161.50	-3,338.5	-1,117.0	3,520.4	3,509.3	11.11	316.933			
500.0	500.0	466.0	466.0	1.6	12.4	-161.50	-3,338.5	-1,117.0	3,520.4	3,506.5	13.94	252.465			
600.0	600.0	566.0	566.0	1.9	14.9	-161.50	-3,338.5	-1,117.0	3,520.4	3,503.6	16.81	209.381			
700.0	700.0	666.0	666.0	2.3	17.4	-161.50	-3,338.5	-1,117.0	3,520.4	3,500.7	19.70	178.689			
800.0	800.0	766.0	766.0	2.7	19.9	-161.50	-3,338.5	-1,117.0	3,520.4	3,497.8	22.60	155.765			
900.0	900.0	866.0	866.0	3.0	22.5	-161.50	-3,338.5	-1,117.0	3,520.4	3,494.9	25.51	138.013			
950.0	950.0	916.0	916.0	3.2	23.8	-161.50	-3,338.5	-1,117.0	3,520.4	3,493.5	26.96	130.562			
1,000.0	1,000.0	966.0	966.0	3.4	25.1	-54.50	-3,338.5	-1,117.0	3,520.2	3,491.7	28.41	123.886			
1,100.0	1,099.9	1,065.9	1,065.9	3.7	27.6	-54.58	-3,338.5	-1,117.0	3,518.1	3,486.8	31.31	112.366			
1,200.0	1,199.7	1,165.7	1,165.7	4.0	30.2	-54.74	-3,338.5	-1,117.0	3,514.1	3,479.9	34.21	102.723			
1,249.4	1,248.8	1,214.8	1,214.8	4.2	31.4	-54.85	-3,338.5	-1,117.0	3,511.4	3,475.7	35.64	98.518			
1,300.0	1,299.2	1,265.2	1,265.2	4.4	32.7	-54.92	-3,338.5	-1,117.0	3,508.3	3,471.2	37.11	94.531			
1,400.0	1,398.6	1,364.6	1,364.6	4.8	35.3	-55.06	-3,338.5	-1,117.0	3,502.3	3,462.3	40.02	87.505			
1,500.0	1,498.1	1,464.1	1,464.1	5.1	37.8	-55.19	-3,338.5	-1,117.0	3,496.3	3,453.4	42.94	81.419			
1,600.0	1,597.5	1,563.5	1,563.5	5.5	40.4	-55.33	-3,338.5	-1,117.0	3,490.4	3,444.5	45.87	76.099			
1,700.0	1,697.0	1,663.0	1,663.0	5.9	42.9	-55.48	-3,338.5	-1,117.0	3,484.4	3,435.6	48.79	71.411			
1,800.0	1,796.5	1,762.5	1,762.5	6.3	45.5	-55.62	-3,338.5	-1,117.0	3,478.5	3,426.8	51.72	67.250			
1,900.0	1,895.9	1,861.9	1,861.9	6.6	48.0	-55.76	-3,338.5	-1,117.0	3,472.6	3,417.9	54.66	63.532			
2,000.0	1,995.4	1,961.4	1,961.4	7.0	50.6	-55.90	-3,338.5	-1,117.0	3,466.7	3,409.1	57.60	60.190			
2,100.0	2,094.8	2,060.8	2,060.8	7.4	53.1	-56.04	-3,338.5	-1,117.0	3,460.8	3,400.3	60.53	57.171			
2,200.0	2,194.3	2,160.3	2,160.3	7.8	55.7	-56.19	-3,338.5	-1,117.0	3,455.0	3,391.5	63.48	54.431			
2,300.0	2,293.7	2,259.7	2,259.7	8.2	58.3	-56.33	-3,338.5	-1,117.0	3,449.2	3,382.8	66.42	51.932			
2,400.0	2,393.2	2,359.2	2,359.2	8.5	60.8	-56.47	-3,338.5	-1,117.0	3,443.4	3,374.0	69.36	49.644			
2,500.0	2,492.6	2,458.6	2,458.6	8.9	63.4	-56.62	-3,338.5	-1,117.0	3,437.6	3,365.3	72.31	47.542			
2,600.0	2,592.1	2,558.1	2,558.1	9.3	65.9	-56.76	-3,338.5	-1,117.0	3,431.9	3,356.6	75.25	45.605			
2,700.0	2,691.5	2,657.5	2,657.5	9.7	68.5	-56.91	-3,338.5	-1,117.0	3,426.1	3,347.9	78.20	43.813			
2,800.0	2,791.0	2,736.0	2,736.0	10.1	70.5	-57.02	-3,338.5	-1,117.0	3,420.5	3,339.9	80.61	42.435			
2,900.0	2,890.5	2,736.0	2,736.0	10.5	70.5	-57.02	-3,338.5	-1,117.0	3,416.9	3,335.9	81.00	42.185			
2,973.9	2,964.0	2,736.0	2,736.0	10.8	70.5	-57.02	-3,338.5	-1,117.0	3,416.1	3,334.8	81.29	42.026 CC			
3,000.0	2,989.9	2,736.0	2,736.0	10.9	70.5	-57.02	-3,338.5	-1,117.0	3,416.2	3,334.8	81.39	41.974 ES			
3,100.0	3,089.4	2,736.0	2,736.0	11.3	70.5	-57.02	-3,338.5	-1,117.0	3,418.4	3,336.6	81.78	41.801			
3,200.0	3,188.8	2,736.0	2,736.0	11.7	70.5	-57.02	-3,338.5	-1,117.0	3,423.6	3,341.4	82.17	41.665			
3,300.0	3,288.3	2,736.0	2,736.0	12.1	70.5	-57.02	-3,338.5	-1,117.0	3,431.6	3,349.1	82.56	41.564			
3,400.0	3,387.7	2,736.0	2,736.0	12.4	70.5	-57.02	-3,338.5	-1,117.0	3,442.6	3,359.6	82.95	41.500			
3,500.0	3,487.2	2,736.0	2,736.0	12.8	70.5	-57.02	-3,338.5	-1,117.0	3,456.4	3,373.0	83.35	41.470			
3,600.0	3,586.6	2,736.0	2,736.0	13.2	70.5	-57.02	-3,338.5	-1,117.0	3,473.0	3,389.2	83.74	41.474			
3,700.0	3,686.1	2,736.0	2,736.0	13.6	70.5	-57.02	-3,338.5	-1,117.0	3,492.4	3,408.3	84.13	41.511			
3,800.0	3,785.5	2,736.0	2,736.0	14.0	70.5	-57.02	-3,338.5	-1,117.0	3,514.5	3,430.0	84.52	41.580			
3,900.0	3,885.0	2,736.0	2,736.0	14.4	70.5	-57.02	-3,338.5	-1,117.0	3,539.4	3,454.5	84.92	41.680			
4,000.0	3,984.5	2,736.0	2,736.0	14.8	70.5	-57.02	-3,338.5	-1,117.0	3,566.9	3,481.5	85.31	41.810			
4,100.0	4,083.9	2,736.0	2,736.0	15.2	70.5	-57.02	-3,338.5	-1,117.0	3,596.9	3,511.2	85.70	41.969			
4,200.0	4,183.4	2,736.0	2,736.0	15.6	70.5	-57.02	-3,338.5	-1,117.0	3,629.5	3,543.4	86.10	42.155			
4,300.0	4,282.8	2,736.0	2,736.0	16.0	70.5	-57.02	-3,338.5	-1,117.0	3,664.4	3,578.0	86.49	42.367			
4,400.0	4,382.3	2,736.0	2,736.0	16.4	70.5	-57.02	-3,338.5	-1,117.0	3,701.8	3,614.9	86.89	42.605			
4,500.0	4,481.7	2,736.0	2,736.0	16.8	70.5	-57.02	-3,338.5	-1,117.0	3,741.5	3,654.2	87.28	42.867			
4,600.0	4,581.2	2,736.0	2,736.0	17.2	70.5	-57.02	-3,338.5	-1,117.0	3,783.4	3,695.7	87.68	43.152			
4,700.0	4,680.6	2,736.0	2,736.0	17.6	70.5	-57.02	-3,338.5	-1,117.0	3,827.4	3,739.3	88.07	43.459			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - SOUTHERN CALIEDERAL #2 - OWB - ACTUAL WELLPATH														Offset Site Error:	0.0 usft
Survey Program: 2736-INC-ONLY														Offset Well Error:	3.0 usft
Reference	Offset	Semi Major Axis		Distance		Minimum		Separation		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor			
4,800.0	4,780.1	2,736.0	2,736.0	18.0	70.5	-57.02	-3,338.5	-1,117.0	3,873.5	3,785.1	88.46	43.786			
4,900.0	4,879.5	2,736.0	2,736.0	18.4	70.5	-57.02	-3,338.5	-1,117.0	3,921.7	3,832.8	88.86	44.134			
5,000.0	4,979.0	2,736.0	2,736.0	18.7	70.5	-57.02	-3,338.5	-1,117.0	3,971.7	3,882.5	89.25	44.499			
5,100.0	5,078.5	2,736.0	2,736.0	19.1	70.5	-57.02	-3,338.5	-1,117.0	4,023.7	3,934.0	89.65	44.883			
5,200.0	5,177.9	2,736.0	2,736.0	19.5	70.5	-57.02	-3,338.5	-1,117.0	4,077.4	3,987.3	90.04	45.282			
5,300.0	5,277.4	2,736.0	2,736.0	19.9	70.5	-57.02	-3,338.5	-1,117.0	4,132.8	4,042.4	90.44	45.698			
5,400.0	5,376.8	2,736.0	2,736.0	20.3	70.5	-57.02	-3,338.5	-1,117.0	4,189.9	4,099.1	90.83	46.128			
5,500.0	5,476.3	2,736.0	2,736.0	20.7	70.5	-57.02	-3,338.5	-1,117.0	4,248.6	4,157.4	91.23	46.571			
5,600.0	5,575.7	2,736.0	2,736.0	21.1	70.5	-57.02	-3,338.5	-1,117.0	4,308.8	4,217.2	91.62	47.027			
5,700.0	5,675.2	2,736.0	2,736.0	21.5	70.5	-57.02	-3,338.5	-1,117.0	4,370.5	4,278.5	92.02	47.495			
5,800.0	5,774.6	2,736.0	2,736.0	21.9	70.5	-57.02	-3,338.5	-1,117.0	4,433.6	4,341.1	92.41	47.975			
5,900.0	5,874.1	2,736.0	2,736.0	22.3	70.5	-57.02	-3,338.5	-1,117.0	4,498.0	4,405.2	92.81	48.464			
6,000.0	5,973.5	2,736.0	2,736.0	22.7	70.5	-57.02	-3,338.5	-1,117.0	4,563.6	4,470.4	93.21	48.963			
6,100.0	6,073.0	2,736.0	2,736.0	23.1	70.5	-57.02	-3,338.5	-1,117.0	4,630.6	4,537.0	93.60	49.471			
6,200.0	6,172.4	2,736.0	2,736.0	23.5	70.5	-57.02	-3,338.5	-1,117.0	4,698.6	4,604.7	94.00	49.987			
6,300.0	6,271.9	2,736.0	2,736.0	23.9	70.5	-57.02	-3,338.5	-1,117.0	4,767.9	4,673.5	94.39	50.511			
6,400.0	6,371.4	2,736.0	2,736.0	24.3	70.5	-57.02	-3,338.5	-1,117.0	4,838.2	4,743.4	94.79	51.042			
6,500.0	6,470.8	2,736.0	2,736.0	24.7	70.5	-57.02	-3,338.5	-1,117.0	4,909.5	4,814.3	95.18	51.579			
6,600.0	6,570.3	2,736.0	2,736.0	25.1	70.5	-57.02	-3,338.5	-1,117.0	4,981.8	4,886.2	95.58	52.122			
6,700.0	6,669.7	2,736.0	2,736.0	25.5	70.5	-57.02	-3,338.5	-1,117.0	5,055.0	4,959.1	95.97	52.670			
6,800.0	6,769.2	2,736.0	2,736.0	25.9	70.5	-57.02	-3,338.5	-1,117.0	5,129.2	5,032.8	96.37	53.224			
6,900.0	6,868.6	2,736.0	2,736.0	26.3	70.5	-57.02	-3,338.5	-1,117.0	5,204.2	5,107.4	96.77	53.781			
7,000.0	6,968.1	2,736.0	2,736.0	26.7	70.5	-57.02	-3,338.5	-1,117.0	5,280.1	5,182.9	97.16	54.343			
7,100.0	7,067.5	2,736.0	2,736.0	27.1	70.5	-57.02	-3,338.5	-1,117.0	5,356.7	5,259.1	97.56	54.908			
7,200.0	7,167.0	2,736.0	2,736.0	27.4	70.5	-57.02	-3,338.5	-1,117.0	5,434.1	5,336.2	97.95	55.476			
7,300.0	7,266.4	2,736.0	2,736.0	27.8	70.5	-57.02	-3,338.5	-1,117.0	5,512.2	5,413.9	98.35	56.047			
7,400.0	7,365.9	2,736.0	2,736.0	28.2	70.5	-57.02	-3,338.5	-1,117.0	5,591.1	5,492.3	98.75	56.621			
7,500.0	7,465.4	2,736.0	2,736.0	28.6	70.5	-57.02	-3,338.5	-1,117.0	5,670.6	5,571.4	99.14	57.196			
7,600.0	7,564.8	2,736.0	2,736.0	29.0	70.5	-57.02	-3,338.5	-1,117.0	5,750.7	5,651.1	99.54	57.774			
7,700.0	7,664.3	2,736.0	2,736.0	29.4	70.5	-57.02	-3,338.5	-1,117.0	5,831.4	5,731.5	99.93	58.353			
7,800.0	7,763.7	2,736.0	2,736.0	29.8	70.5	-57.02	-3,338.5	-1,117.0	5,912.8	5,812.4	100.33	58.933			
7,900.0	7,863.2	2,736.0	2,736.0	30.2	70.5	-57.02	-3,338.5	-1,117.0	5,994.7	5,893.9	100.73	59.514			
8,000.0	7,962.6	2,736.0	2,736.0	30.6	70.5	-57.02	-3,338.5	-1,117.0	6,077.1	5,976.0	101.12	60.097			
8,100.0	8,062.1	2,736.0	2,736.0	31.0	70.5	-57.02	-3,338.5	-1,117.0	6,160.1	6,058.6	101.52	60.679			
8,200.0	8,161.5	2,736.0	2,736.0	31.4	70.5	-57.02	-3,338.5	-1,117.0	6,243.5	6,141.6	101.91	61.262			
8,300.0	8,261.0	2,736.0	2,736.0	31.8	70.5	-57.02	-3,338.5	-1,117.0	6,327.5	6,225.2	102.31	61.846			
8,400.0	8,360.4	2,736.0	2,736.0	32.2	70.5	-57.02	-3,338.5	-1,117.0	6,411.9	6,309.2	102.71	62.429			
8,500.0	8,459.9	2,736.0	2,736.0	32.6	70.5	-57.02	-3,338.5	-1,117.0	6,496.7	6,393.6	103.10	63.012			
8,600.0	8,559.4	2,736.0	2,736.0	33.0	70.5	-57.02	-3,338.5	-1,117.0	6,582.0	6,478.5	103.50	63.595			
8,700.0	8,658.8	2,736.0	2,736.0	33.4	70.5	-57.02	-3,338.5	-1,117.0	6,667.7	6,563.8	103.90	64.177			
8,800.0	8,758.3	2,736.0	2,736.0	33.8	70.5	-57.02	-3,338.5	-1,117.0	6,753.7	6,649.4	104.29	64.758			
8,836.0	8,794.0	2,736.0	2,736.0	33.9	70.5	-57.02	-3,338.5	-1,117.0	6,784.8	6,680.3	104.43	64.967			
8,850.0	8,808.0	2,736.0	2,736.0	34.0	70.5	-43.81	-3,338.5	-1,117.0	6,796.8	6,692.3	104.49	65.048			
8,875.0	8,832.8	2,736.0	2,736.0	34.1	70.5	-27.54	-3,338.5	-1,117.0	6,817.7	6,713.1	104.59	65.185			
8,900.0	8,857.4	2,736.0	2,736.0	34.2	70.5	-18.08	-3,338.5	-1,117.0	6,838.0	6,733.3	104.69	65.315			
8,925.0	8,881.8	2,736.0	2,736.0	34.3	70.5	-12.38	-3,338.5	-1,117.0	6,857.5	6,752.7	104.80	65.436			
8,950.0	8,906.0	2,736.0	2,736.0	34.4	70.5	-8.75	-3,338.5	-1,117.0	6,876.2	6,771.3	104.90	65.550			
8,975.0	8,929.8	2,736.0	2,736.0	34.5	70.5	-6.29	-3,338.5	-1,117.0	6,894.1	6,789.1	105.00	65.655			
9,000.0	8,953.2	2,736.0	2,736.0	34.6	70.5	-4.56	-3,338.5	-1,117.0	6,911.1	6,806.0	105.11	65.752			
9,025.0	8,976.1	2,736.0	2,736.0	34.7	70.5	-3.30	-3,338.5	-1,117.0	6,927.2	6,821.9	105.21	65.839			

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - SOUTHERN CALIEDERAL #2 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 2736-INC-ONLY													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
9,050.0	8,998.5	2,736.0	2,736.0	34.8	70.5	-2.34	-3,338.5	-1,117.0	6,942.3	6,837.0	105.32	65.917		
9,075.0	9,020.2	2,736.0	2,736.0	34.9	70.5	-1.61	-3,338.5	-1,117.0	6,956.5	6,851.0	105.42	65.986		
9,100.0	9,041.4	2,736.0	2,736.0	35.0	70.5	-1.03	-3,338.5	-1,117.0	6,969.6	6,864.1	105.53	66.045		
9,125.0	9,061.8	2,736.0	2,736.0	35.1	70.5	-0.56	-3,338.5	-1,117.0	6,981.7	6,876.1	105.63	66.095		
9,150.0	9,081.4	2,736.0	2,736.0	35.2	70.5	-0.17	-3,338.5	-1,117.0	6,992.7	6,887.0	105.74	66.134		
9,175.0	9,100.2	2,736.0	2,736.0	35.3	70.5	0.16	-3,338.5	-1,117.0	7,002.7	6,896.8	105.84	66.162		
9,200.0	9,118.1	2,736.0	2,736.0	35.4	70.5	0.43	-3,338.5	-1,117.0	7,011.4	6,905.5	105.95	66.180		
9,225.0	9,135.1	2,736.0	2,736.0	35.5	70.5	0.67	-3,338.5	-1,117.0	7,019.1	6,913.1	106.05	66.187		
9,250.0	9,151.2	2,736.0	2,736.0	35.7	70.5	0.88	-3,338.5	-1,117.0	7,025.6	6,919.4	106.15	66.183		
9,275.0	9,166.2	2,736.0	2,736.0	35.8	70.5	1.07	-3,338.5	-1,117.0	7,030.9	6,924.7	106.26	66.167		
9,300.0	9,180.1	2,736.0	2,736.0	35.9	70.5	1.24	-3,338.5	-1,117.0	7,035.0	6,928.7	106.37	66.140		
9,325.0	9,193.0	2,736.0	2,736.0	36.0	70.5	1.40	-3,338.5	-1,117.0	7,038.0	6,931.5	106.47	66.101		
9,350.0	9,204.7	2,736.0	2,736.0	36.1	70.5	1.56	-3,338.5	-1,117.0	7,039.7	6,933.1	106.58	66.049		
9,375.0	9,215.2	2,736.0	2,736.0	36.2	70.5	1.70	-3,338.5	-1,117.0	7,040.2	6,933.6	106.69	65.986		
9,400.0	9,224.6	2,736.0	2,736.0	36.3	70.5	1.84	-3,338.5	-1,117.0	7,039.6	6,932.8	106.80	65.911		
9,425.0	9,232.8	2,736.0	2,736.0	36.4	70.5	1.99	-3,338.5	-1,117.0	7,037.7	6,930.8	106.92	65.823		
9,450.0	9,239.7	2,736.0	2,736.0	36.5	70.5	2.13	-3,338.5	-1,117.0	7,034.6	6,927.6	107.03	65.723		
9,475.0	9,245.3	2,736.0	2,736.0	36.6	70.5	2.27	-3,338.5	-1,117.0	7,030.3	6,923.2	107.15	65.611		
9,500.0	9,249.7	2,736.0	2,736.0	36.8	70.5	2.42	-3,338.5	-1,117.0	7,024.8	6,917.6	107.27	65.487		
9,525.0	9,252.8	2,736.0	2,736.0	36.9	70.5	2.58	-3,338.5	-1,117.0	7,018.2	6,910.8	107.39	65.351		
9,550.0	9,254.6	2,736.0	2,736.0	37.0	70.5	2.74	-3,338.5	-1,117.0	7,010.4	6,902.9	107.52	65.203		
9,565.0	9,255.0	2,736.0	2,736.0	37.1	70.5	2.85	-3,338.5	-1,117.0	7,005.2	6,897.6	107.59	65.109		
9,600.0	9,255.5	2,736.0	2,736.0	37.3	70.5	2.85	-3,338.5	-1,117.0	6,992.6	6,884.8	107.77	64.884		
9,700.0	9,256.9	2,736.0	2,736.0	37.8	70.5	2.85	-3,338.5	-1,117.0	6,957.5	6,849.1	108.33	64.226		
9,800.0	9,258.4	2,736.0	2,736.0	38.4	70.5	2.85	-3,338.5	-1,117.0	6,923.6	6,814.6	108.95	63.550		
9,900.0	9,259.8	2,736.0	2,736.0	39.1	70.5	2.85	-3,338.5	-1,117.0	6,891.0	6,781.4	109.63	62.858		
10,000.0	9,261.2	2,736.0	2,736.0	39.9	70.5	2.85	-3,338.5	-1,117.0	6,859.7	6,749.3	110.37	62.153		
10,100.0	9,262.7	2,736.0	2,736.0	40.7	70.5	2.85	-3,338.5	-1,117.0	6,829.7	6,718.6	111.16	61.439		
10,200.0	9,264.1	2,736.0	2,736.0	41.5	70.5	2.85	-3,338.5	-1,117.0	6,801.1	6,689.1	112.01	60.719		
10,300.0	9,265.5	2,736.0	2,736.0	42.4	70.5	2.85	-3,338.5	-1,117.0	6,773.8	6,660.9	112.91	59.996		
10,400.0	9,267.0	2,736.0	2,736.0	43.3	70.5	2.85	-3,338.5	-1,117.0	6,747.9	6,634.1	113.85	59.272		
10,500.0	9,268.4	2,736.0	2,736.0	44.3	70.5	2.85	-3,338.5	-1,117.0	6,723.4	6,608.6	114.83	58.549		
10,600.0	9,269.8	2,736.0	2,736.0	45.4	70.5	2.85	-3,338.5	-1,117.0	6,700.3	6,584.5	115.86	57.831		
10,700.0	9,271.2	2,736.0	2,736.0	46.4	70.5	2.85	-3,338.5	-1,117.0	6,678.6	6,561.7	116.92	57.120		
10,800.0	9,272.7	2,736.0	2,736.0	47.5	70.5	2.85	-3,338.5	-1,117.0	6,658.4	6,540.4	118.02	56.416		
10,900.0	9,274.1	2,736.0	2,736.0	48.7	70.5	2.85	-3,338.5	-1,117.0	6,639.6	6,520.4	119.15	55.722		
11,000.0	9,275.5	2,736.0	2,736.0	49.8	70.5	2.85	-3,338.5	-1,117.0	6,622.2	6,501.9	120.32	55.040		
11,100.0	9,277.0	2,736.0	2,736.0	51.0	70.5	2.85	-3,338.5	-1,117.0	6,606.3	6,484.8	121.51	54.369		
11,200.0	9,278.4	2,736.0	2,736.0	52.2	70.5	2.85	-3,338.5	-1,117.0	6,591.9	6,469.2	122.73	53.713		
11,300.0	9,279.8	2,736.0	2,736.0	53.5	70.5	2.85	-3,338.5	-1,117.0	6,579.0	6,455.0	123.97	53.070		
11,400.0	9,281.3	2,736.0	2,736.0	54.7	70.5	2.85	-3,338.5	-1,117.0	6,567.6	6,442.3	125.23	52.443		
11,500.0	9,282.7	2,736.0	2,736.0	56.0	70.5	2.85	-3,338.5	-1,117.0	6,557.6	6,431.1	126.52	51.831		
11,600.0	9,284.1	2,736.0	2,736.0	57.3	70.5	2.85	-3,338.5	-1,117.0	6,549.2	6,421.4	127.83	51.235		
11,700.0	9,285.6	2,736.0	2,736.0	58.6	70.5	2.85	-3,338.5	-1,117.0	6,542.3	6,413.2	129.15	50.656		
11,800.0	9,287.0	2,736.0	2,736.0	60.0	70.5	2.85	-3,338.5	-1,117.0	6,537.0	6,406.5	130.50	50.093		
11,900.0	9,288.4	2,736.0	2,736.0	61.4	70.5	2.85	-3,338.5	-1,117.0	6,533.1	6,401.3	131.85	49.548		
12,000.0	9,289.8	2,736.0	2,736.0	62.7	70.5	2.85	-3,338.5	-1,117.0	6,530.8	6,397.6	133.23	49.019		
12,100.0	9,291.3	2,736.0	2,736.0	64.1	70.5	2.85	-3,338.5	-1,117.0	6,530.0	6,395.4	134.62	48.508		
12,101.0	9,291.3	2,736.0	2,736.0	64.1	70.5	2.85	-3,338.5	-1,117.0	6,530.0	6,395.4	134.63	48.503		
12,200.0	9,292.7	2,736.0	2,736.0	65.5	70.5	2.85	-3,338.5	-1,117.0	6,530.8	6,394.8	136.02	48.013		
12,300.0	9,294.1	2,736.0	2,736.0	66.9	70.5	2.85	-3,338.5	-1,117.0	6,533.1	6,395.6	137.44	47.536		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - SOUTHERN CALIEDERAL #2 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 2736-INC-ONLY													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance				Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			Minimum Separation (usft)	
12,400.0	9,295.6	2,736.0	2,736.0	68.4	70.5	2.85	-3,338.5	-1,117.0	6,536.9	6,398.0	138.86	47.075		
12,500.0	9,297.0	2,736.0	2,736.0	69.8	70.5	2.85	-3,338.5	-1,117.0	6,542.2	6,401.9	140.30	46.630		
12,600.0	9,298.4	2,736.0	2,736.0	71.2	70.5	2.85	-3,338.5	-1,117.0	6,549.1	6,407.3	141.75	46.203		
12,700.0	9,299.9	2,736.0	2,736.0	72.7	70.5	2.85	-3,338.5	-1,117.0	6,557.5	6,414.2	143.20	45.791		
12,800.0	9,301.3	2,736.0	2,736.0	74.2	70.5	2.85	-3,338.5	-1,117.0	6,567.3	6,422.7	144.67	45.395		
12,900.0	9,302.7	2,736.0	2,736.0	75.6	70.5	2.85	-3,338.5	-1,117.0	6,578.7	6,432.6	146.15	45.015		
13,000.0	9,304.2	2,736.0	2,736.0	77.1	70.5	2.85	-3,338.5	-1,117.0	6,591.6	6,444.0	147.63	44.650		
13,100.0	9,305.6	2,736.0	2,736.0	78.6	70.5	2.85	-3,338.5	-1,117.0	6,606.0	6,456.9	149.12	44.300		
13,200.0	9,307.0	2,736.0	2,736.0	80.1	70.5	2.85	-3,338.5	-1,117.0	6,621.9	6,471.3	150.62	43.964		
13,300.0	9,308.5	2,736.0	2,736.0	81.6	70.5	2.85	-3,338.5	-1,117.0	6,639.2	6,487.1	152.13	43.643		
13,400.0	9,309.9	2,736.0	2,736.0	83.1	70.5	2.85	-3,338.5	-1,117.0	6,658.0	6,504.3	153.64	43.336		
13,500.0	9,311.3	2,736.0	2,736.0	84.7	70.5	2.85	-3,338.5	-1,117.0	6,678.2	6,523.1	155.15	43.042		
13,600.0	9,312.7	2,736.0	2,736.0	86.2	70.5	2.85	-3,338.5	-1,117.0	6,699.9	6,543.2	156.68	42.762		
13,700.0	9,314.2	2,736.0	2,736.0	87.7	70.5	2.85	-3,338.5	-1,117.0	6,723.0	6,564.8	158.21	42.495		
13,800.0	9,315.6	2,736.0	2,736.0	89.2	70.5	2.85	-3,338.5	-1,117.0	6,747.4	6,587.7	159.74	42.240		
13,900.0	9,317.0	2,736.0	2,736.0	90.8	70.5	2.85	-3,338.5	-1,117.0	6,773.3	6,612.0	161.28	41.997		
14,000.0	9,318.5	2,736.0	2,736.0	92.3	70.5	2.85	-3,338.5	-1,117.0	6,800.6	6,637.7	162.82	41.766		
14,100.0	9,319.9	2,736.0	2,736.0	93.9	70.5	2.85	-3,338.5	-1,117.0	6,829.2	6,664.8	164.37	41.547		
14,200.0	9,321.3	2,736.0	2,736.0	95.4	70.5	2.85	-3,338.5	-1,117.0	6,859.1	6,693.2	165.93	41.338		
14,300.0	9,322.8	2,736.0	2,736.0	97.0	70.5	2.85	-3,338.5	-1,117.0	6,890.4	6,722.9	167.48	41.141		
14,400.0	9,324.2	2,736.0	2,736.0	98.5	70.5	2.85	-3,338.5	-1,117.0	6,922.9	6,753.9	169.04	40.954		
14,456.7	9,325.0	2,736.0	2,736.0	99.4	70.5	2.85	-3,338.5	-1,117.0	6,942.0	6,772.0	169.93	40.852 SF		

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - SOUTHERN CALIF #3 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 2695-HNC-ONLY													Offset Well Error:	3.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
				Reference (usft)	Offset (usft)		+N/S (usft)	+E/W (usft)	Between Centres (usft)	Between Ellipses (usft)				
0.0	0.0	0.0	0.0	0.0	3.0	-140.20	-1,358.0	-1,131.5	1,767.7					
100.0	100.0	84.0	84.0	0.1	3.7	-140.20	-1,358.0	-1,131.5	1,767.6	1,763.8	3.84	460.126		
200.0	200.0	184.0	184.0	0.5	5.6	-140.20	-1,358.0	-1,131.5	1,767.6	1,761.5	6.11	289.350		
300.0	300.0	284.0	284.0	0.9	7.9	-140.20	-1,358.0	-1,131.5	1,767.6	1,758.8	8.76	201.707		
400.0	400.0	384.0	384.0	1.2	10.3	-140.20	-1,358.0	-1,131.5	1,767.6	1,756.0	11.55	153.043		
500.0	500.0	484.0	484.0	1.6	12.8	-140.20	-1,358.0	-1,131.5	1,767.6	1,753.2	14.39	122.806		
600.0	600.0	584.0	584.0	1.9	15.3	-140.20	-1,358.0	-1,131.5	1,767.6	1,750.3	17.27	102.371		
700.0	700.0	684.0	684.0	2.3	17.9	-140.20	-1,358.0	-1,131.5	1,767.6	1,747.4	20.16	87.692		
800.0	800.0	784.0	784.0	2.7	20.4	-140.20	-1,358.0	-1,131.5	1,767.6	1,744.5	23.06	76.660		
900.0	900.0	884.0	884.0	3.0	23.0	-140.20	-1,358.0	-1,131.5	1,767.6	1,741.6	25.97	68.074		
950.0	950.0	934.0	934.0	3.2	24.2	-140.20	-1,358.0	-1,131.5	1,767.6	1,740.2	27.42	64.460		
1,000.0	1,000.0	984.0	984.0	3.4	25.5	-33.20	-1,358.0	-1,131.5	1,767.2	1,738.4	28.87	61.207		
1,100.0	1,099.9	1,083.9	1,083.9	3.7	28.1	-33.29	-1,358.0	-1,131.5	1,764.3	1,732.5	31.77	55.537		
1,200.0	1,199.7	1,183.7	1,183.7	4.0	30.6	-33.48	-1,358.0	-1,131.5	1,758.5	1,723.8	34.67	50.723		
1,249.4	1,248.8	1,232.8	1,232.8	4.2	31.9	-33.61	-1,358.0	-1,131.5	1,754.5	1,718.4	36.10	48.601		
1,300.0	1,299.2	1,283.2	1,283.2	4.4	33.2	-33.71	-1,358.0	-1,131.5	1,750.1	1,712.6	37.57	46.580		
1,400.0	1,398.6	1,382.6	1,382.6	4.8	35.7	-33.90	-1,358.0	-1,131.5	1,741.5	1,701.0	40.48	43.016		
1,500.0	1,498.1	1,482.1	1,482.1	5.1	38.3	-34.09	-1,358.0	-1,131.5	1,732.8	1,689.4	43.40	39.924		
1,600.0	1,597.5	1,581.5	1,581.5	5.5	40.8	-34.28	-1,358.0	-1,131.5	1,724.1	1,677.8	46.33	37.218		
1,700.0	1,697.0	1,681.0	1,681.0	5.9	43.4	-34.48	-1,358.0	-1,131.5	1,715.5	1,666.3	49.25	34.831		
1,800.0	1,796.5	1,780.5	1,780.5	6.3	45.9	-34.68	-1,358.0	-1,131.5	1,706.9	1,654.7	52.18	32.710		
1,900.0	1,895.9	1,879.9	1,879.9	6.6	48.5	-34.88	-1,358.0	-1,131.5	1,698.3	1,643.2	55.12	30.813		
2,000.0	1,995.4	1,979.4	1,979.4	7.0	51.0	-35.08	-1,358.0	-1,131.5	1,689.8	1,631.7	58.06	29.106		
2,100.0	2,094.8	2,078.8	2,078.8	7.4	53.6	-35.28	-1,358.0	-1,131.5	1,681.2	1,620.2	60.99	27.564		
2,200.0	2,194.3	2,178.3	2,178.3	7.8	56.2	-35.49	-1,358.0	-1,131.5	1,672.7	1,608.8	63.93	26.163		
2,300.0	2,293.7	2,277.7	2,277.7	8.2	58.7	-35.70	-1,358.0	-1,131.5	1,664.2	1,597.3	66.88	24.885		
2,400.0	2,393.2	2,377.2	2,377.2	8.5	61.3	-35.91	-1,358.0	-1,131.5	1,655.7	1,585.9	69.82	23.714		
2,500.0	2,492.6	2,476.6	2,476.6	8.9	63.8	-36.12	-1,358.0	-1,131.5	1,647.3	1,574.5	72.77	22.638		
2,600.0	2,492.1	2,476.1	2,476.1	9.3	66.4	-36.34	-1,358.0	-1,131.5	1,638.9	1,563.1	75.71	21.646		
2,700.0	2,491.5	2,475.5	2,475.5	9.7	68.9	-36.55	-1,358.0	-1,131.5	1,630.5	1,551.8	78.66	20.728		
2,800.0	2,491.0	2,475.0	2,475.0	10.1	69.4	-36.59	-1,358.0	-1,131.5	1,624.0	1,544.5	79.55	20.416		
2,856.2	2,846.9	2,695.0	2,695.0	10.3	69.4	-36.59	-1,358.0	-1,131.5	1,623.1	1,543.3	79.77	20.348 CC, ES		
2,900.0	2,890.5	2,695.0	2,695.0	10.5	69.4	-36.59	-1,358.0	-1,131.5	1,623.7	1,543.7	79.94	20.312		
3,000.0	2,889.9	2,695.0	2,695.0	10.9	69.4	-36.59	-1,358.0	-1,131.5	1,629.4	1,549.1	80.33	20.285 SF		
3,100.0	3,089.4	2,695.0	2,695.0	11.3	69.4	-36.59	-1,358.0	-1,131.5	1,641.3	1,560.5	80.72	20.333		
3,200.0	3,188.8	2,695.0	2,695.0	11.7	69.4	-36.59	-1,358.0	-1,131.5	1,659.1	1,578.0	81.11	20.454		
3,300.0	3,288.3	2,695.0	2,695.0	12.1	69.4	-36.59	-1,358.0	-1,131.5	1,682.6	1,601.1	81.50	20.645		
3,400.0	3,387.7	2,695.0	2,695.0	12.4	69.4	-36.59	-1,358.0	-1,131.5	1,711.7	1,629.8	81.89	20.902		
3,500.0	3,487.2	2,695.0	2,695.0	12.8	69.4	-36.59	-1,358.0	-1,131.5	1,746.1	1,663.8	82.29	21.219		
3,600.0	3,586.6	2,695.0	2,695.0	13.2	69.4	-36.59	-1,358.0	-1,131.5	1,785.4	1,702.7	82.68	21.594		
3,700.0	3,686.1	2,695.0	2,695.0	13.6	69.4	-36.59	-1,358.0	-1,131.5	1,829.3	1,746.2	83.07	22.020		
3,800.0	3,785.5	2,695.0	2,695.0	14.0	69.4	-36.59	-1,358.0	-1,131.5	1,877.5	1,794.0	83.46	22.495		
3,900.0	3,885.0	2,695.0	2,695.0	14.4	69.4	-36.59	-1,358.0	-1,131.5	1,929.7	1,845.9	83.86	23.012		
4,000.0	3,984.5	2,695.0	2,695.0	14.8	69.4	-36.59	-1,358.0	-1,131.5	1,985.6	1,901.3	84.25	23.567		
4,100.0	4,083.9	2,695.0	2,695.0	15.2	69.4	-36.59	-1,358.0	-1,131.5	2,044.8	1,960.2	84.65	24.157		
4,200.0	4,183.4	2,695.0	2,695.0	15.6	69.4	-36.59	-1,358.0	-1,131.5	2,107.1	2,022.1	85.04	24.778		
4,300.0	4,282.8	2,695.0	2,695.0	16.0	69.4	-36.59	-1,358.0	-1,131.5	2,172.3	2,086.8	85.43	25.427		
4,400.0	4,382.3	2,695.0	2,695.0	16.4	69.4	-36.59	-1,358.0	-1,131.5	2,240.0	2,154.2	85.83	26.099		
4,500.0	4,481.7	2,695.0	2,695.0	16.8	69.4	-36.59	-1,358.0	-1,131.5	2,310.0	2,223.8	86.22	26.792		
4,600.0	4,581.2	2,695.0	2,695.0	17.2	69.4	-36.59	-1,358.0	-1,131.5	2,382.2	2,295.6	86.62	27.503		
4,700.0	4,680.6	2,695.0	2,695.0	17.6	69.4	-36.59	-1,358.0	-1,131.5	2,456.4	2,369.4	87.01	28.231		

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - SOUTHERN CALIF #3 - OWB - ACTUAL WELLPATH													Offset Site Error: 0.0 usft
Survey Program: 2695-INC-ONLY													Offset Well Error: 3.0 usft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Separation Factor		Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
4,800.0	4,780.1	2,695.0	2,695.0	18.0	69.4	-36.59	-1,358.0	-1,131.5	2,532.3	2,444.9	87.40	28.972	
4,900.0	4,879.5	2,695.0	2,695.0	18.4	69.4	-36.59	-1,358.0	-1,131.5	2,609.8	2,522.0	87.80	29.725	
5,000.0	4,979.0	2,695.0	2,695.0	18.7	69.4	-36.59	-1,358.0	-1,131.5	2,688.9	2,600.7	88.19	30.488	
5,100.0	5,078.5	2,695.0	2,695.0	19.1	69.4	-36.59	-1,358.0	-1,131.5	2,769.3	2,680.7	88.59	31.260	
5,200.0	5,177.9	2,695.0	2,695.0	19.5	69.4	-36.59	-1,358.0	-1,131.5	2,850.9	2,761.9	88.98	32.038	
5,300.0	5,277.4	2,695.0	2,695.0	19.9	69.4	-36.59	-1,358.0	-1,131.5	2,933.7	2,844.3	89.38	32.823	
5,400.0	5,376.8	2,695.0	2,695.0	20.3	69.4	-36.59	-1,358.0	-1,131.5	3,017.5	2,927.7	89.77	33.612	
5,500.0	5,476.3	2,695.0	2,695.0	20.7	69.4	-36.59	-1,358.0	-1,131.5	3,102.2	3,012.1	90.17	34.404	
5,600.0	5,575.7	2,695.0	2,695.0	21.1	69.4	-36.59	-1,358.0	-1,131.5	3,187.9	3,097.3	90.56	35.200	
5,700.0	5,675.2	2,695.0	2,695.0	21.5	69.4	-36.59	-1,358.0	-1,131.5	3,274.3	3,183.4	90.96	35.998	
5,800.0	5,774.6	2,695.0	2,695.0	21.9	69.4	-36.59	-1,358.0	-1,131.5	3,361.6	3,270.2	91.36	36.797	
5,900.0	5,874.1	2,695.0	2,695.0	22.3	69.4	-36.59	-1,358.0	-1,131.5	3,449.5	3,357.7	91.75	37.596	
6,000.0	5,973.5	2,695.0	2,695.0	22.7	69.4	-36.59	-1,358.0	-1,131.5	3,538.0	3,445.9	92.15	38.396	
6,100.0	6,073.0	2,695.0	2,695.0	23.1	69.4	-36.59	-1,358.0	-1,131.5	3,627.2	3,534.6	92.54	39.195	
6,200.0	6,172.4	2,695.0	2,695.0	23.5	69.4	-36.59	-1,358.0	-1,131.5	3,716.9	3,623.9	92.94	39.993	
6,300.0	6,271.9	2,695.0	2,695.0	23.9	69.4	-36.59	-1,358.0	-1,131.5	3,807.1	3,713.7	93.33	40.790	
6,400.0	6,371.4	2,695.0	2,695.0	24.3	69.4	-36.59	-1,358.0	-1,131.5	3,897.8	3,804.0	93.73	41.586	
6,500.0	6,470.8	2,695.0	2,695.0	24.7	69.4	-36.59	-1,358.0	-1,131.5	3,988.9	3,894.8	94.12	42.379	
6,600.0	6,570.3	2,695.0	2,695.0	25.1	69.4	-36.59	-1,358.0	-1,131.5	4,080.5	3,985.9	94.52	43.170	
6,700.0	6,669.7	2,695.0	2,695.0	25.5	69.4	-36.59	-1,358.0	-1,131.5	4,172.4	4,077.5	94.92	43.959	
6,800.0	6,769.2	2,695.0	2,695.0	25.9	69.4	-36.59	-1,358.0	-1,131.5	4,264.7	4,169.4	95.31	44.745	
6,900.0	6,868.6	2,695.0	2,695.0	26.3	69.4	-36.59	-1,358.0	-1,131.5	4,357.3	4,261.6	95.71	45.528	
7,000.0	6,968.1	2,695.0	2,695.0	26.7	69.4	-36.59	-1,358.0	-1,131.5	4,450.3	4,354.2	96.10	46.307	
7,100.0	7,067.5	2,695.0	2,695.0	27.1	69.4	-36.59	-1,358.0	-1,131.5	4,543.6	4,447.1	96.50	47.084	
7,200.0	7,167.0	2,695.0	2,695.0	27.4	69.4	-36.59	-1,358.0	-1,131.5	4,637.1	4,540.2	96.89	47.857	
7,300.0	7,266.4	2,695.0	2,695.0	27.8	69.4	-36.59	-1,358.0	-1,131.5	4,730.9	4,633.6	97.29	48.626	
7,400.0	7,365.9	2,695.0	2,695.0	28.2	69.4	-36.59	-1,358.0	-1,131.5	4,824.9	4,727.3	97.69	49.392	
7,500.0	7,465.4	2,695.0	2,695.0	28.6	69.4	-36.59	-1,358.0	-1,131.5	4,919.2	4,821.2	98.08	50.154	
7,600.0	7,564.8	2,695.0	2,695.0	29.0	69.4	-36.59	-1,358.0	-1,131.5	5,013.7	4,915.3	98.48	50.912	
7,700.0	7,664.3	2,695.0	2,695.0	29.4	69.4	-36.59	-1,358.0	-1,131.5	5,108.5	5,009.6	98.87	51.666	
7,800.0	7,763.7	2,695.0	2,695.0	29.8	69.4	-36.59	-1,358.0	-1,131.5	5,203.4	5,104.1	99.27	52.416	
7,900.0	7,863.2	2,695.0	2,695.0	30.2	69.4	-36.59	-1,358.0	-1,131.5	5,298.5	5,198.8	99.67	53.162	
8,000.0	7,962.6	2,695.0	2,695.0	30.6	69.4	-36.59	-1,358.0	-1,131.5	5,393.8	5,293.7	100.06	53.904	
8,100.0	8,062.1	2,695.0	2,695.0	31.0	69.4	-36.59	-1,358.0	-1,131.5	5,489.2	5,388.7	100.46	54.641	
8,200.0	8,161.5	2,695.0	2,695.0	31.4	69.4	-36.59	-1,358.0	-1,131.5	5,584.8	5,484.0	100.86	55.375	
8,300.0	8,261.0	2,695.0	2,695.0	31.8	69.4	-36.59	-1,358.0	-1,131.5	5,680.6	5,579.3	101.25	56.104	
8,400.0	8,360.4	2,695.0	2,695.0	32.2	69.4	-36.59	-1,358.0	-1,131.5	5,776.5	5,674.8	101.65	56.828	
8,500.0	8,459.9	2,695.0	2,695.0	32.6	69.4	-36.59	-1,358.0	-1,131.5	5,872.5	5,770.5	102.04	57.549	
8,600.0	8,559.4	2,695.0	2,695.0	33.0	69.4	-36.59	-1,358.0	-1,131.5	5,968.7	5,866.2	102.44	58.265	
8,700.0	8,658.8	2,695.0	2,695.0	33.4	69.4	-36.59	-1,358.0	-1,131.5	6,065.0	5,962.1	102.84	58.977	
8,800.0	8,758.3	2,695.0	2,695.0	33.8	69.4	-36.59	-1,358.0	-1,131.5	6,161.4	6,058.2	103.23	59.685	
8,836.0	8,794.0	2,695.0	2,695.0	33.9	69.4	-36.59	-1,358.0	-1,131.5	6,196.1	6,092.7	103.37	59.938	
8,850.0	8,808.0	2,695.0	2,695.0	34.0	69.4	-26.03	-1,358.0	-1,131.5	6,209.6	6,106.2	103.43	60.036	
8,875.0	8,832.8	2,695.0	2,695.0	34.1	69.4	-13.40	-1,358.0	-1,131.5	6,233.4	6,129.9	103.53	60.208	
8,900.0	8,857.4	2,695.0	2,695.0	34.2	69.4	-6.60	-1,358.0	-1,131.5	6,256.8	6,153.2	103.63	60.375	
8,925.0	8,881.8	2,695.0	2,695.0	34.3	69.4	-2.90	-1,358.0	-1,131.5	6,279.9	6,176.1	103.74	60.536	
8,950.0	8,906.0	2,695.0	2,695.0	34.4	69.4	-0.78	-1,358.0	-1,131.5	6,302.4	6,198.6	103.84	60.693	
8,975.0	8,929.8	2,695.0	2,695.0	34.5	69.4	0.48	-1,358.0	-1,131.5	6,324.4	6,220.4	103.94	60.844	
9,000.0	8,953.2	2,695.0	2,695.0	34.6	69.4	1.25	-1,358.0	-1,131.5	6,345.8	6,241.8	104.05	60.988	
9,025.0	8,976.1	2,695.0	2,695.0	34.7	69.4	1.75	-1,358.0	-1,131.5	6,366.6	6,262.4	104.15	61.126	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - SOUTHERN CALIF #3 - OWB - ACTUAL WELLPATH													Offset Site Error:
Survey Program: 2695-INC-ONLY													Offset Well Error:
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Minimum Separation (usft)	Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Between Centres (usft)	Between Ellipses (usft)					
9,050.0	8,998.5	2,695.0	2,695.0	34.8	69.4	2.06	-1,358.0	-1,131.5	6,386.6	6,282.4	104.26	61.257	
9,075.0	9,020.2	2,695.0	2,695.0	34.9	69.4	2.27	-1,358.0	-1,131.5	6,406.0	6,301.6	104.36	61.381	
9,100.0	9,041.4	2,695.0	2,695.0	35.0	69.4	2.40	-1,358.0	-1,131.5	6,424.5	6,320.0	104.47	61.497	
9,125.0	9,061.8	2,695.0	2,695.0	35.1	69.4	2.49	-1,358.0	-1,131.5	6,442.2	6,337.6	104.57	61.605	
9,150.0	9,081.4	2,695.0	2,695.0	35.2	69.4	2.55	-1,358.0	-1,131.5	6,459.0	6,354.4	104.68	61.704	
9,175.0	9,100.2	2,695.0	2,695.0	35.3	69.4	2.58	-1,358.0	-1,131.5	6,475.0	6,370.2	104.78	61.795	
9,200.0	9,118.1	2,695.0	2,695.0	35.4	69.4	2.60	-1,358.0	-1,131.5	6,489.9	6,385.0	104.89	61.876	
9,225.0	9,135.1	2,695.0	2,695.0	35.5	69.4	2.62	-1,358.0	-1,131.5	6,503.9	6,398.9	104.99	61.947	
9,250.0	9,151.2	2,695.0	2,695.0	35.7	69.4	2.62	-1,358.0	-1,131.5	6,516.9	6,411.8	105.10	62.009	
9,275.0	9,166.2	2,695.0	2,695.0	35.8	69.4	2.63	-1,358.0	-1,131.5	6,528.8	6,423.6	105.20	62.060	
9,300.0	9,180.1	2,695.0	2,695.0	35.9	69.4	2.63	-1,358.0	-1,131.5	6,539.6	6,434.3	105.31	62.100	
9,325.0	9,193.0	2,695.0	2,695.0	36.0	69.4	2.63	-1,358.0	-1,131.5	6,549.4	6,444.0	105.41	62.130	
9,350.0	9,204.7	2,695.0	2,695.0	36.1	69.4	2.64	-1,358.0	-1,131.5	6,558.0	6,452.5	105.52	62.148	
9,375.0	9,215.2	2,695.0	2,695.0	36.2	69.4	2.65	-1,358.0	-1,131.5	6,565.5	6,459.9	105.63	62.154	
9,400.0	9,224.6	2,695.0	2,695.0	36.3	69.4	2.66	-1,358.0	-1,131.5	6,571.9	6,466.1	105.75	62.148	
9,425.0	9,232.8	2,695.0	2,695.0	36.4	69.4	2.67	-1,358.0	-1,131.5	6,577.0	6,471.2	105.86	62.130	
9,450.0	9,239.7	2,695.0	2,695.0	36.5	69.4	2.69	-1,358.0	-1,131.5	6,581.0	6,475.0	105.97	62.100	
9,475.0	9,245.3	2,695.0	2,695.0	36.6	69.4	2.71	-1,358.0	-1,131.5	6,583.8	6,477.7	106.09	62.058	
9,500.0	9,249.7	2,695.0	2,695.0	36.8	69.4	2.73	-1,358.0	-1,131.5	6,585.4	6,479.2	106.21	62.003	
9,525.0	9,252.8	2,695.0	2,695.0	36.9	69.4	2.76	-1,358.0	-1,131.5	6,585.8	6,479.5	106.33	61.936	
9,550.0	9,254.6	2,695.0	2,695.0	37.0	69.4	2.80	-1,358.0	-1,131.5	6,585.0	6,478.6	106.46	61.856	
9,565.0	9,255.0	2,695.0	2,695.0	37.1	69.4	2.82	-1,358.0	-1,131.5	6,584.0	6,477.5	106.53	61.803	
9,600.0	9,255.5	2,695.0	2,695.0	37.3	69.4	2.82	-1,358.0	-1,131.5	6,581.1	6,474.4	106.71	61.672	
9,700.0	9,256.9	2,695.0	2,695.0	37.8	69.4	2.82	-1,358.0	-1,131.5	6,574.0	6,466.7	107.27	61.286	
9,800.0	9,258.4	2,695.0	2,695.0	38.4	69.4	2.82	-1,358.0	-1,131.5	6,568.4	6,460.5	107.89	60.881	
9,900.0	9,259.8	2,695.0	2,695.0	39.1	69.4	2.82	-1,358.0	-1,131.5	6,564.3	6,455.7	108.57	60.462	
10,000.0	9,261.2	2,695.0	2,695.0	39.9	69.4	2.82	-1,358.0	-1,131.5	6,561.7	6,452.4	109.31	60.029	
10,100.0	9,262.7	2,695.0	2,695.0	40.7	69.4	2.82	-1,358.0	-1,131.5	6,560.6	6,450.5	110.10	59.586	
10,119.8	9,262.9	2,695.0	2,695.0	40.8	69.4	2.82	-1,358.0	-1,131.5	6,560.6	6,450.3	110.27	59.496	
10,200.0	9,264.1	2,695.0	2,695.0	41.5	69.4	2.82	-1,358.0	-1,131.5	6,561.1	6,450.1	110.95	59.135	
10,300.0	9,265.5	2,695.0	2,695.0	42.4	69.4	2.82	-1,358.0	-1,131.5	6,563.0	6,451.2	111.85	58.679	
10,400.0	9,267.0	2,695.0	2,695.0	43.3	69.4	2.82	-1,358.0	-1,131.5	6,566.6	6,453.8	112.79	58.220	
10,500.0	9,268.4	2,695.0	2,695.0	44.3	69.4	2.82	-1,358.0	-1,131.5	6,571.6	6,457.8	113.77	57.760	
10,600.0	9,269.8	2,695.0	2,695.0	45.4	69.4	2.82	-1,358.0	-1,131.5	6,578.1	6,463.3	114.80	57.301	
10,700.0	9,271.2	2,695.0	2,695.0	46.4	69.4	2.82	-1,358.0	-1,131.5	6,586.2	6,470.3	115.86	56.844	
10,800.0	9,272.7	2,695.0	2,695.0	47.5	69.4	2.82	-1,358.0	-1,131.5	6,595.7	6,478.8	116.96	56.392	
10,900.0	9,274.1	2,695.0	2,695.0	48.7	69.4	2.82	-1,358.0	-1,131.5	6,606.8	6,488.7	118.10	55.945	
11,000.0	9,275.5	2,695.0	2,695.0	49.8	69.4	2.82	-1,358.0	-1,131.5	6,619.4	6,500.1	119.26	55.505	
11,100.0	9,277.0	2,695.0	2,695.0	51.0	69.4	2.82	-1,358.0	-1,131.5	6,633.4	6,512.9	120.45	55.072	
11,200.0	9,278.4	2,695.0	2,695.0	52.2	69.4	2.82	-1,358.0	-1,131.5	6,648.9	6,527.2	121.67	54.649	
11,300.0	9,279.8	2,695.0	2,695.0	53.5	69.4	2.82	-1,358.0	-1,131.5	6,665.9	6,543.0	122.91	54.235	
11,400.0	9,281.3	2,695.0	2,695.0	54.7	69.4	2.82	-1,358.0	-1,131.5	6,684.3	6,560.1	124.17	53.830	
11,500.0	9,282.7	2,695.0	2,695.0	56.0	69.4	2.82	-1,358.0	-1,131.5	6,704.2	6,578.7	125.46	53.437	
11,600.0	9,284.1	2,695.0	2,695.0	57.3	69.4	2.82	-1,358.0	-1,131.5	6,725.5	6,598.7	126.77	53.054	
11,700.0	9,285.6	2,695.0	2,695.0	58.6	69.4	2.82	-1,358.0	-1,131.5	6,748.2	6,620.1	128.09	52.682	
11,800.0	9,287.0	2,695.0	2,695.0	60.0	69.4	2.82	-1,358.0	-1,131.5	6,772.3	6,642.9	129.44	52.322	
11,900.0	9,288.4	2,695.0	2,695.0	61.4	69.4	2.82	-1,358.0	-1,131.5	6,797.8	6,667.0	130.80	51.973	
12,000.0	9,289.8	2,695.0	2,695.0	62.7	69.4	2.82	-1,358.0	-1,131.5	6,824.7	6,692.5	132.17	51.636	
12,100.0	9,291.3	2,695.0	2,695.0	64.1	69.4	2.82	-1,358.0	-1,131.5	6,852.9	6,719.4	133.56	51.310	
12,200.0	9,292.7	2,695.0	2,695.0	65.5	69.4	2.82	-1,358.0	-1,131.5	6,882.5	6,747.5	134.96	50.996	
12,300.0	9,294.1	2,695.0	2,695.0	66.9	69.4	2.82	-1,358.0	-1,131.5	6,913.4	6,777.0	136.38	50.693	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Offset Design LUSK BSS - SOUTHERN CALIF #3 - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 2695-INC-ONLY													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Minimum Separation (usft)	Separation Factor	Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Between Centres (usft)	Between Ellipses (usft)						
12,400.0	9,295.6	2,695.0	2,695.0	68.4	69.4	2.82	-1,358.0	-1,131.5	6,945.5	6,807.7	137.80	50.402		
12,500.0	9,297.0	2,695.0	2,695.0	69.8	69.4	2.82	-1,358.0	-1,131.5	6,979.0	6,839.8	139.24	50.122		
12,600.0	9,298.4	2,695.0	2,695.0	71.2	69.4	2.82	-1,358.0	-1,131.5	7,013.7	6,873.1	140.69	49.853		
12,700.0	9,299.9	2,695.0	2,695.0	72.7	69.4	2.82	-1,358.0	-1,131.5	7,049.7	6,907.6	142.15	49.595		
12,800.0	9,301.3	2,695.0	2,695.0	74.2	69.4	2.82	-1,358.0	-1,131.5	7,086.9	6,943.3	143.61	49.348		
12,900.0	9,302.7	2,695.0	2,695.0	75.6	69.4	2.82	-1,358.0	-1,131.5	7,125.4	6,980.3	145.09	49.111		
13,000.0	9,304.2	2,695.0	2,695.0	77.1	69.4	2.82	-1,358.0	-1,131.5	7,165.0	7,018.4	146.57	48.884		
13,100.0	9,305.6	2,695.0	2,695.0	78.6	69.4	2.82	-1,358.0	-1,131.5	7,205.7	7,057.7	148.06	48.667		
13,200.0	9,307.0	2,695.0	2,695.0	80.1	69.4	2.82	-1,358.0	-1,131.5	7,247.7	7,098.1	149.56	48.460		
13,300.0	9,308.5	2,695.0	2,695.0	81.6	69.4	2.82	-1,358.0	-1,131.5	7,290.7	7,139.7	151.07	48.262		
13,400.0	9,309.9	2,695.0	2,695.0	83.1	69.4	2.82	-1,358.0	-1,131.5	7,334.9	7,182.3	152.58	48.073		
13,500.0	9,311.3	2,695.0	2,695.0	84.7	69.4	2.82	-1,358.0	-1,131.5	7,380.2	7,226.1	154.10	47.894		
13,600.0	9,312.7	2,695.0	2,695.0	86.2	69.4	2.82	-1,358.0	-1,131.5	7,426.5	7,270.9	155.62	47.722		
13,700.0	9,314.2	2,695.0	2,695.0	87.7	69.4	2.82	-1,358.0	-1,131.5	7,473.9	7,316.7	157.15	47.560		
13,800.0	9,315.6	2,695.0	2,695.0	89.2	69.4	2.82	-1,358.0	-1,131.5	7,522.3	7,363.6	158.68	47.405		
13,900.0	9,317.0	2,695.0	2,695.0	90.8	69.4	2.82	-1,358.0	-1,131.5	7,571.7	7,411.5	160.22	47.258		
14,000.0	9,318.5	2,695.0	2,695.0	92.3	69.4	2.82	-1,358.0	-1,131.5	7,622.2	7,460.4	161.77	47.119		
14,100.0	9,319.9	2,695.0	2,695.0	93.9	69.4	2.82	-1,358.0	-1,131.5	7,673.5	7,510.2	163.31	46.986		
14,200.0	9,321.3	2,695.0	2,695.0	95.4	69.4	2.82	-1,358.0	-1,131.5	7,725.9	7,561.0	164.87	46.861		
14,300.0	9,322.8	2,695.0	2,695.0	97.0	69.4	2.82	-1,358.0	-1,131.5	7,779.2	7,612.7	166.42	46.743		
14,400.0	9,324.2	2,695.0	2,695.0	98.5	69.4	2.82	-1,358.0	-1,131.5	7,833.3	7,665.4	167.98	46.632		
14,456.7	9,325.0	2,695.0	2,695.0	99.4	69.4	2.82	-1,358.0	-1,131.5	7,864.5	7,695.6	168.87	46.571		

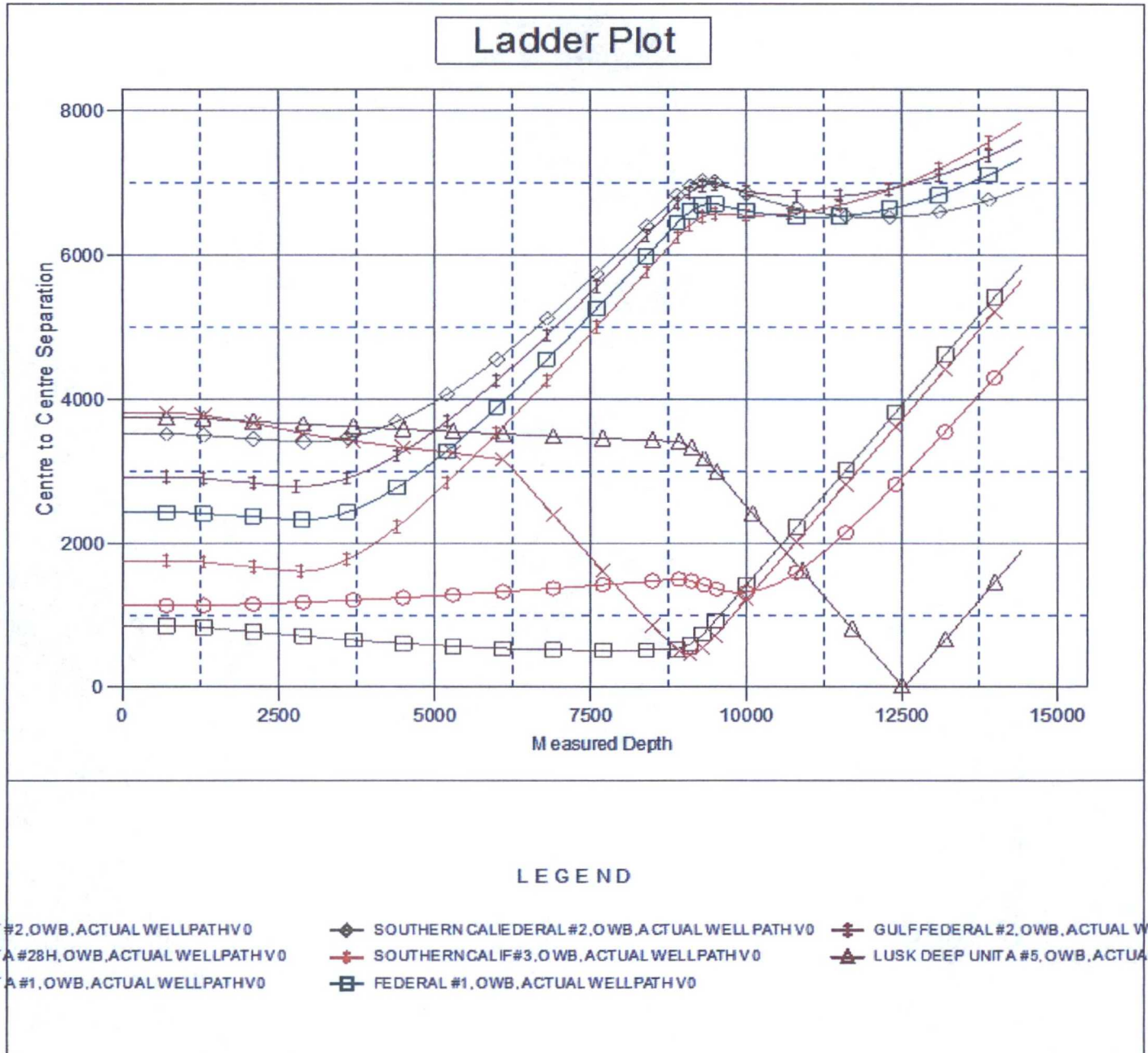
COG Operating LLC

Anticollision Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Reference Depths are relative to 3585 + 20 = 3605' RKB @ 3605.0usft
 Offset Depths are relative to Offset Datum
 Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: LUSK DEEP UNIT A #33H
 Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
 Grid Convergence at Surface is: 0.29°



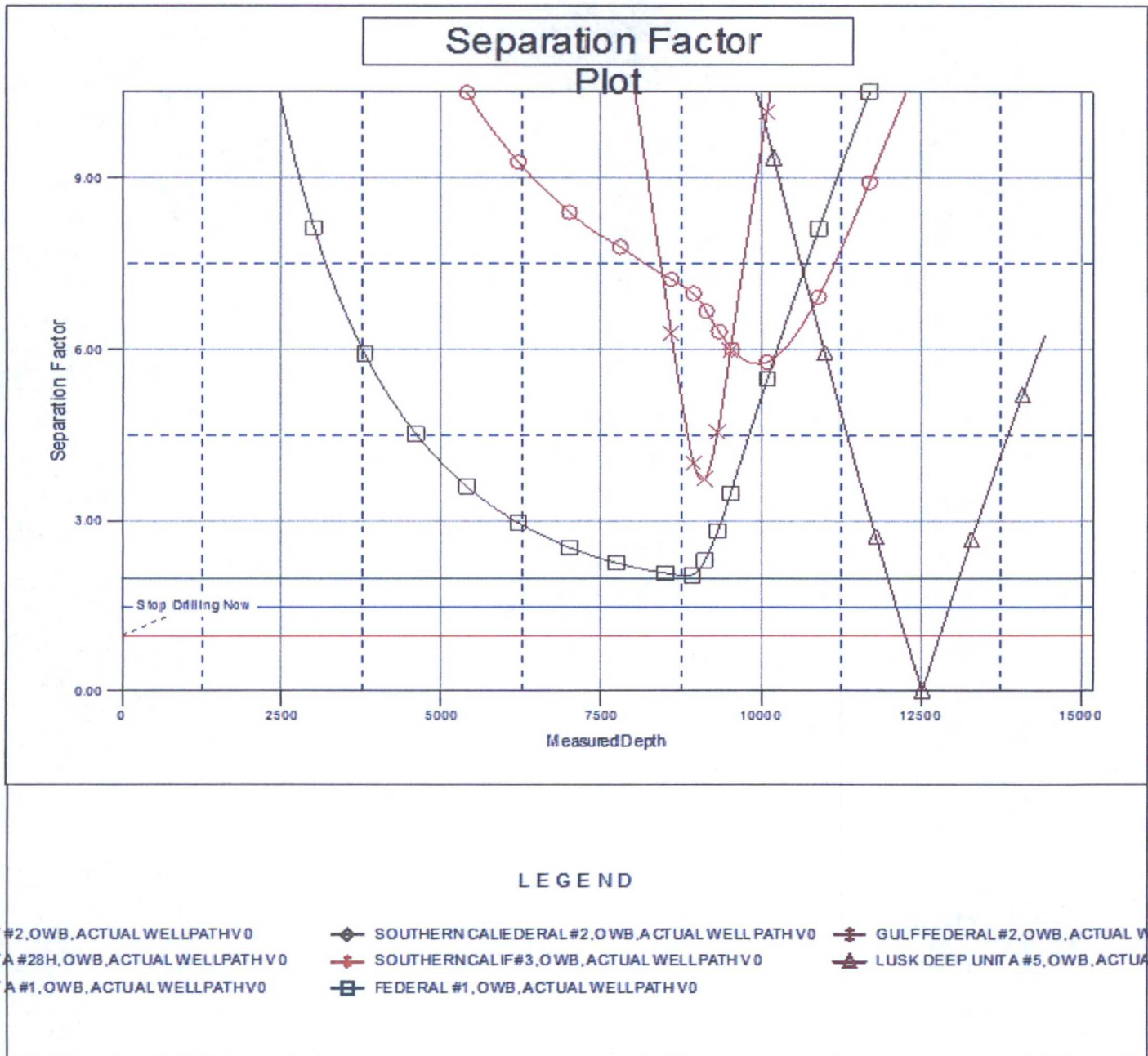
COG Operating LLC

Anticollision Report

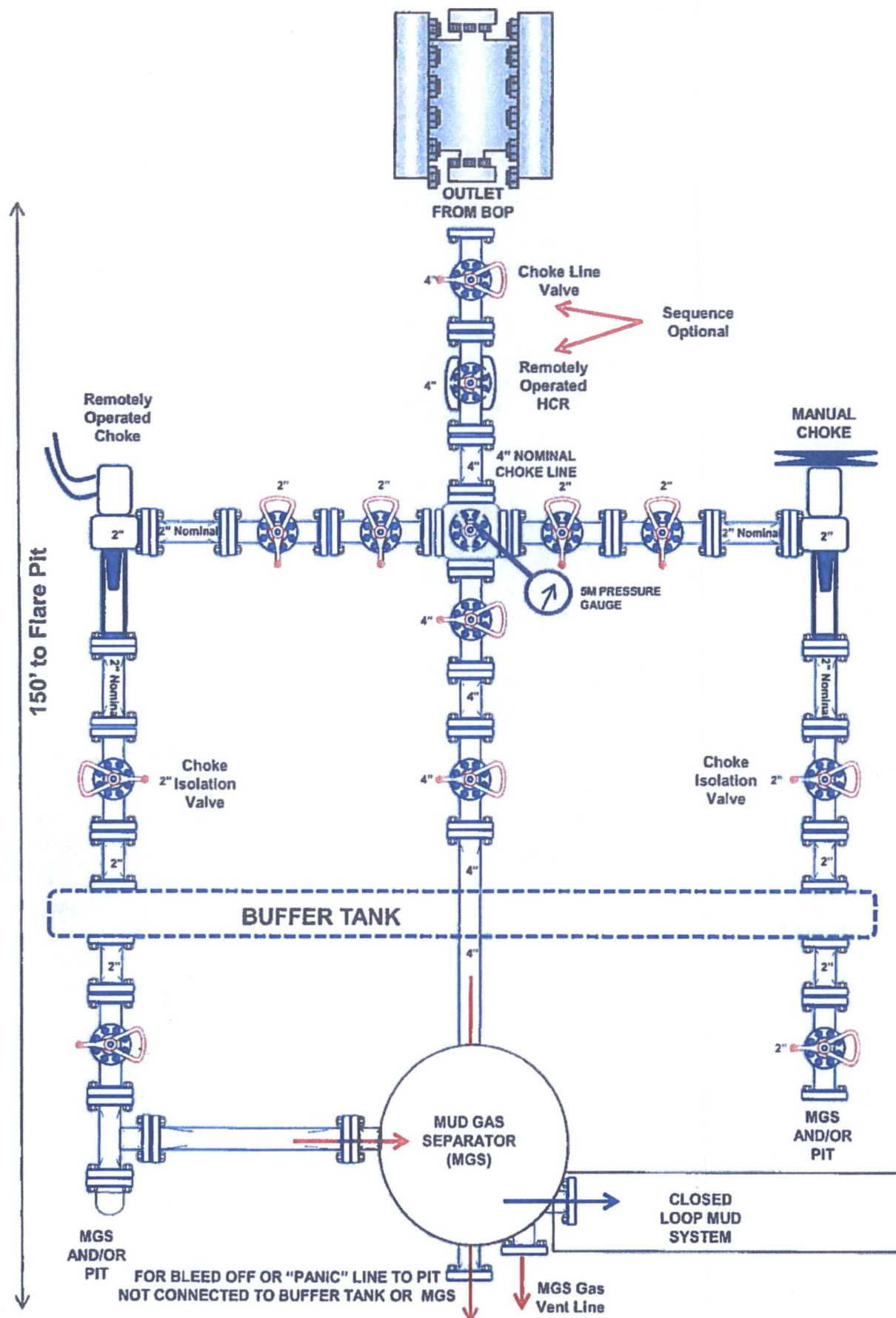
Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well LUSK DEEP UNIT A #33H
Project:	LEA COUNTY, NM	TVD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Reference Site:	LUSK BSS	MD Reference:	3585 + 20 = 3605' RKB @ 3605.0usft (PATRIOT #2)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	LUSK DEEP UNIT A #33H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM_Users
Reference Design:	DWD Plan #1	Offset TVD Reference:	Offset Datum

Reference Depths are relative to 3585 + 20 = 3605' RKB @ 3605.0usft
 Offset Depths are relative to Offset Datum
 Central Meridian is 104° 20' 0.000 W

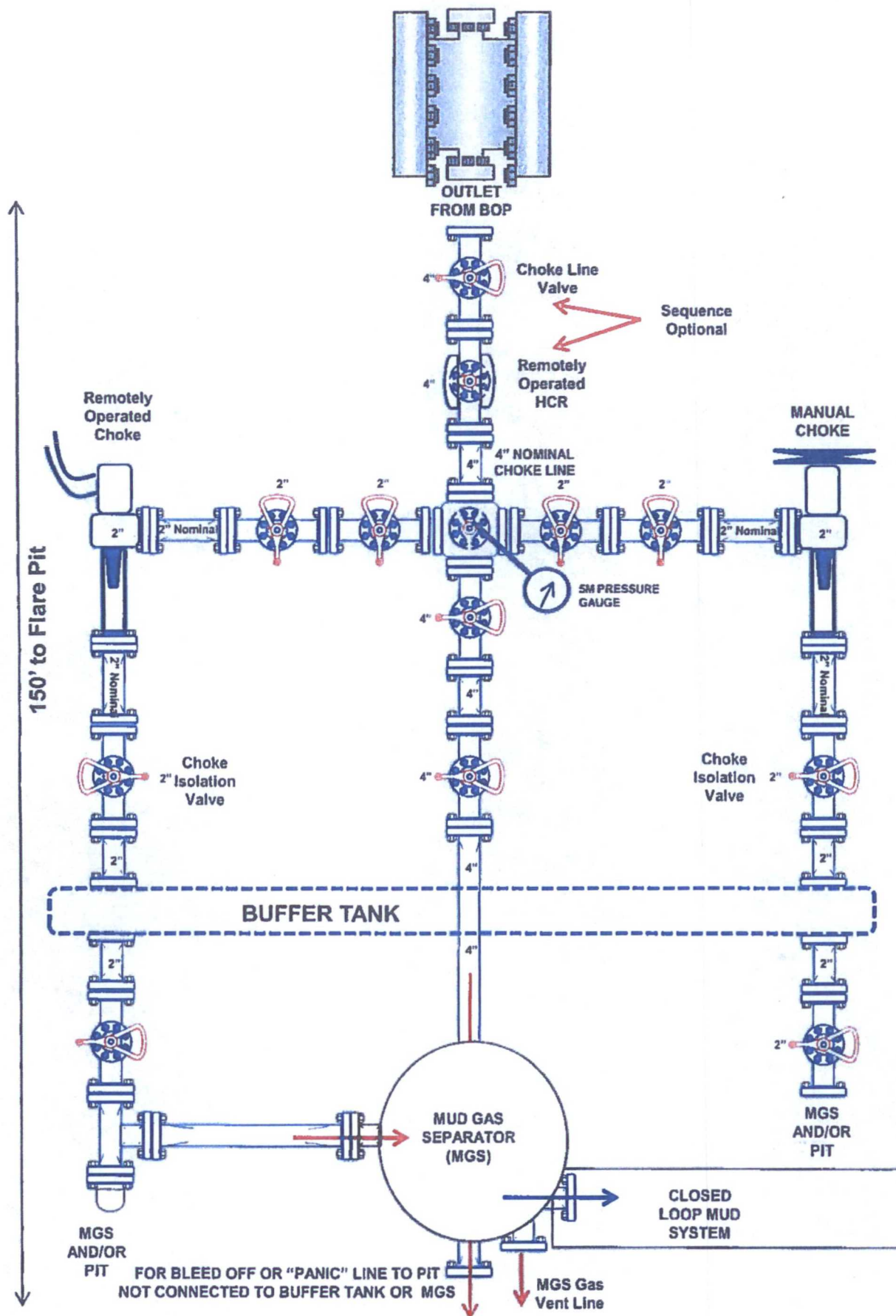
Coordinates are relative to: LUSK DEEP UNIT A #33H
 Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
 Grid Convergence at Surface is: 0.29°



2M Choke Manifold Equipment (WITH MGS + CLOSED LOOP)



3M Choke Manifold Equipment (WITH MGS + CLOSED LOOP)





COG Operating LLC
2208 West Main
Artesia, NM 88210

Well Site Layout Production Facility Layout

Lusk Deep Unit A #33H
Section 18. T19S. R32E

Exhibit 3

Legend

● = Wellhead

North



340'

Topsoil will be stockpiled on the west side.

Reclaimed Area

80'

340'

Access Road to tank Battery
at the Lusk Deep Unit A #25H
location.

