

OCD – HOBBS
10/03/2016
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COG OPERATING LLC

LEA COUNTY, NM

LUDEMAN

FASCINATOR FEE COM #1H

OWB

DWD Plan 4 - neg vs step out

Anticollision Report

19 September, 2016

COG Operating LLC

Anticollision Report

Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Site LUDEMAN
Project:	LEA COUNTY, NM	TVD Reference:	WELL @ 3342.0usft (Original Well Elev)
Reference Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	FASCINATOR FEE COM #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	DWD Plan 4 - neg vs step out	Offset TVD Reference:	Offset Datum

Reference	DWD Plan 4 - neg vs step out		
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	9/15/2016		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	20,345.2	DWD Plan 4 - neg vs step out (OWB)	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						
LUDEMAN						
FASCINATOR FEE COM #1H - OWB - DWD Plan 2 - str	1,050.0	1,050.0	0.0	-7.1	0.000	Stop Drilling Now, CC, SF
FASCINATOR FEE COM #1H - OWB - DWD Plan 2 - str	20,345.2	20,178.3	0.2	-272.6	0.001	Stop Drilling Now, ES
FASCINATOR FEE COM #1H - OWB - DWD Plan 3 - lan	1,050.0	1,050.0	0.0	-7.1	0.000	Stop Drilling Now, CC, SF
FASCINATOR FEE COM #1H - OWB - DWD Plan 3 - lan	20,345.2	20,365.3	0.5	-272.2	0.002	Stop Drilling Now, ES
FASCINATOR FEE COM #2H - OWB - ACTUAL WELLP	691.8	693.8	882.0	875.8	144.286	CC
FASCINATOR FEE COM #2H - OWB - ACTUAL WELLP	1,054.8	1,058.3	882.4	874.4	111.123	ES
FASCINATOR FEE COM #2H - OWB - ACTUAL WELLP	20,100.0	19,840.0	1,280.3	1,015.2	4.829	SF

Offset Design		LUDEMAN - FASCINATOR FEE COM #1H - OWB - DWD Plan 2 - straight shot											Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 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	0.0	0.00	21,385.9	-6,925.5	0.0					
100.0	100.0	100.0	100.0	0.1	0.1	0.00	21,385.9	-6,925.5	0.0	-0.3	0.27	0.000	Stop Drilling Now	
200.0	200.0	200.0	200.0	0.5	0.5	0.00	21,385.9	-6,925.5	0.0	-1.0	0.98	0.000	Stop Drilling Now	
300.0	300.0	300.0	300.0	0.8	0.8	0.00	21,385.9	-6,925.5	0.0	-1.7	1.70	0.000	Stop Drilling Now	
400.0	400.0	400.0	400.0	1.2	1.2	0.00	21,385.9	-6,925.5	0.0	-2.4	2.42	0.000	Stop Drilling Now	
500.0	500.0	500.0	500.0	1.6	1.6	0.00	21,385.9	-6,925.5	0.0	-3.1	3.13	0.000	Stop Drilling Now	
600.0	600.0	600.0	600.0	1.9	1.9	0.00	21,385.9	-6,925.5	0.0	-3.8	3.85	0.000	Stop Drilling Now	
700.0	700.0	700.0	700.0	2.3	2.3	0.00	21,385.9	-6,925.5	0.0	-4.6	4.57	0.000	Stop Drilling Now	
800.0	800.0	800.0	800.0	2.6	2.6	0.00	21,385.9	-6,925.5	0.0	-5.3	5.28	0.000	Stop Drilling Now	
900.0	900.0	900.0	900.0	3.0	3.0	0.00	21,385.9	-6,925.5	0.0	-6.0	6.00	0.000	Stop Drilling Now	
1,000.0	1,000.0	1,000.0	1,000.0	3.4	3.4	0.00	21,385.9	-6,925.5	0.0	-6.7	6.72	0.000	Stop Drilling Now	
1,050.0	1,050.0	1,050.0	1,050.0	3.5	3.5	0.00	21,385.9	-6,925.5	0.0	-7.1	7.08	0.000	Stop Drilling Now, CC, SF	
1,077.0	1,077.0	1,077.0	1,077.0	3.6	3.6	180.00	21,385.9	-6,925.5	0.1	-7.1	7.27	0.017	Stop Drilling Now	
1,100.0	1,100.0	1,100.0	1,100.0	3.7	3.7	-180.00	21,385.9	-6,925.5	0.4	-7.0	7.43	0.059	Stop Drilling Now	
1,200.0	1,199.9	1,199.9	1,199.9	4.1	4.1	180.00	21,385.9	-6,925.5	3.9	-4.2	8.13	0.483	Stop Drilling Now	
1,229.2	1,229.1	1,229.1	1,229.1	4.2	4.2	-180.00	21,385.9	-6,925.5	5.6	-2.7	8.33	0.672	Stop Drilling Now	
1,300.0	1,299.7	1,299.7	1,299.7	4.4	4.4	180.00	21,385.9	-6,925.5	10.0	1.2	8.83	1.136	Shut in Produces	
1,400.0	1,399.5	1,399.5	1,399.5	4.7	4.8	-180.00	21,385.9	-6,925.5	16.3	6.7	9.54	1.707	Advise and Monitor	
1,500.0	1,499.4	1,499.4	1,499.4	5.1	5.1	180.00	21,385.9	-6,925.5	22.5	12.3	10.25	2.199		
1,600.0	1,599.2	1,599.2	1,599.2	5.5	5.5	180.00	21,385.9	-6,925.5	28.8	17.8	10.96	2.626		
1,700.0	1,699.0	1,699.0	1,699.0	5.8	5.9	-180.00	21,385.9	-6,925.5	35.0	23.4	11.67	3.001		

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

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Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	DWD Plan 4 - neg vs step out	Offset TVD Reference:	Offset Datum

Offset Design LUDEMAN - FASCINATOR FEE COM #1H - OWB - DWD Plan 2 - straight shot												Offset Site Error:	0.0 usft
Survey Program: 0-MWD												Offset Well Error:	0.0 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	
1,800.0	1,798.8	1,798.8	1,798.8	6.2	6.2	-180.00	21,385.9	-6,925.5	41.3	28.9	12.39	3.332	
1,900.0	1,898.6	1,898.6	1,898.6	6.5	6.6	180.00	21,385.9	-6,925.5	47.5	34.4	13.11	3.626	
2,000.0	1,998.4	1,998.4	1,998.4	6.9	6.9	-180.00	21,385.9	-6,925.5	53.8	40.0	13.83	3.889	
2,100.0	2,098.2	2,098.2	2,098.2	7.3	7.3	-180.00	21,385.9	-6,925.5	60.0	45.5	14.55	4.126	
2,200.0	2,198.0	2,198.0	2,198.0	7.6	7.7	180.00	21,385.9	-6,925.5	66.3	51.0	15.27	4.341	
2,300.0	2,297.8	2,297.8	2,297.8	8.0	8.0	180.00	21,385.9	-6,925.5	72.5	56.5	15.99	4.536	
2,400.0	2,397.6	2,397.6	2,397.6	8.3	8.4	-180.00	21,385.9	-6,925.5	78.8	62.1	16.72	4.713	
2,500.0	2,497.4	2,497.4	2,497.4	8.7	8.7	180.00	21,385.9	-6,925.5	85.0	67.6	17.44	4.876	
2,600.0	2,597.2	2,597.2	2,597.2	9.1	9.1	180.00	21,385.9	-6,925.5	91.3	73.1	18.16	5.026	
2,700.0	2,697.0	2,697.0	2,697.0	9.4	9.4	-180.00	21,385.9	-6,925.5	97.5	78.6	18.89	5.164	
2,800.0	2,796.8	2,796.8	2,796.8	9.8	9.8	-180.00	21,385.9	-6,925.5	103.8	84.2	19.61	5.292	
2,900.0	2,896.6	2,896.6	2,896.6	10.2	10.2	180.00	21,385.9	-6,925.5	110.0	89.7	20.34	5.411	
3,000.0	2,996.4	2,996.4	2,996.4	10.5	10.5	180.00	21,385.9	-6,925.5	116.3	95.2	21.06	5.521	
3,100.0	3,096.2	3,096.2	3,096.2	10.9	10.9	-180.00	21,385.9	-6,925.5	122.5	100.7	21.79	5.624	
3,200.0	3,196.0	3,196.0	3,196.0	11.3	11.2	180.00	21,385.9	-6,925.5	128.8	106.3	22.52	5.720	
3,300.0	3,295.8	3,295.8	3,295.8	11.7	11.6	180.00	21,385.9	-6,925.5	135.0	111.8	23.24	5.810	
3,400.0	3,395.6	3,395.6	3,395.6	12.0	11.9	-180.00	21,385.9	-6,925.5	141.3	117.3	23.97	5.895	
3,500.0	3,495.4	3,495.4	3,495.4	12.4	12.3	-180.00	21,385.9	-6,925.5	147.5	122.8	24.70	5.974	
3,600.0	3,595.2	3,595.2	3,595.2	12.8	12.7	180.00	21,385.9	-6,925.5	153.8	128.4	25.42	6.049	
3,700.0	3,695.1	3,695.1	3,695.1	13.1	13.0	-180.00	21,385.9	-6,925.5	160.0	133.9	26.15	6.120	
3,800.0	3,794.9	3,794.9	3,794.9	13.5	13.4	-180.00	21,385.9	-6,925.5	166.3	139.4	26.88	6.187	
3,900.0	3,894.7	3,894.7	3,894.7	13.9	13.7	180.00	21,385.9	-6,925.5	172.5	144.9	27.60	6.250	
4,000.0	3,994.5	3,994.5	3,994.5	14.2	14.1	180.00	21,385.9	-6,925.5	178.8	150.5	28.33	6.311	
4,100.0	4,094.3	4,094.3	4,094.3	14.6	14.5	-180.00	21,385.9	-6,925.5	185.0	156.0	29.06	6.368	
4,200.0	4,194.1	4,194.1	4,194.1	15.0	14.8	-180.00	21,385.9	-6,925.5	191.3	161.5	29.79	6.422	
4,300.0	4,293.9	4,293.9	4,293.9	15.3	15.2	180.00	21,385.9	-6,925.5	197.5	167.0	30.52	6.473	
4,400.0	4,393.7	4,393.7	4,393.7	15.7	15.5	-180.00	21,385.9	-6,925.5	203.8	172.6	31.24	6.523	
4,500.0	4,493.5	4,493.5	4,493.5	16.1	15.9	-180.00	21,385.9	-6,925.5	210.0	178.1	31.97	6.570	
4,600.0	4,593.3	4,593.3	4,593.3	16.5	16.2	180.00	21,385.9	-6,925.5	216.3	183.6	32.70	6.614	
4,700.0	4,693.1	4,693.1	4,693.1	16.8	16.6	180.00	21,385.9	-6,925.5	222.5	189.1	33.43	6.657	
4,800.0	4,792.9	4,792.9	4,792.9	17.2	17.0	-180.00	21,385.9	-6,925.5	228.8	194.6	34.16	6.698	
4,900.0	4,892.7	4,892.7	4,892.7	17.6	17.3	180.00	21,385.9	-6,925.5	235.0	200.2	34.89	6.738	
5,000.0	4,992.5	4,992.5	4,992.5	17.9	17.7	180.00	21,385.9	-6,925.5	241.3	205.7	35.61	6.775	
5,100.0	5,092.3	5,092.3	5,092.3	18.3	18.0	-180.00	21,385.9	-6,925.5	247.6	211.2	36.34	6.811	
5,200.0	5,192.1	5,192.1	5,192.1	18.7	18.4	-180.00	21,385.9	-6,925.5	253.8	216.7	37.07	6.846	
5,300.0	5,291.9	5,291.9	5,291.9	19.1	18.7	180.00	21,385.9	-6,925.5	260.1	222.3	37.80	6.880	
5,400.0	5,391.7	5,391.7	5,391.7	19.4	19.1	-180.00	21,385.9	-6,925.5	266.3	227.8	38.53	6.912	
5,500.0	5,491.5	5,491.5	5,491.5	19.8	19.5	-180.00	21,385.9	-6,925.5	272.6	233.3	39.26	6.943	
5,600.0	5,591.3	5,591.3	5,591.3	20.2	19.8	180.00	21,385.9	-6,925.5	278.8	238.8	39.99	6.972	
5,700.0	5,691.1	5,691.1	5,691.1	20.5	20.2	180.00	21,385.9	-6,925.5	285.1	244.3	40.72	7.001	
5,800.0	5,790.9	5,790.9	5,790.9	20.9	20.5	-180.00	21,385.9	-6,925.5	291.3	249.9	41.45	7.029	
5,900.0	5,890.7	5,890.7	5,890.7	21.3	20.9	180.00	21,385.9	-6,925.5	297.6	255.4	42.17	7.055	
6,000.0	5,990.6	5,990.6	5,990.6	21.7	21.2	180.00	21,385.9	-6,925.5	303.8	260.9	42.90	7.081	
6,100.0	6,090.4	6,090.4	6,090.4	22.0	21.6	-180.00	21,385.9	-6,925.5	310.1	266.4	43.63	7.106	
6,200.0	6,190.2	6,190.2	6,190.2	22.4	22.0	-180.00	21,385.9	-6,925.5	316.3	271.9	44.36	7.130	
6,300.0	6,290.0	6,290.0	6,290.0	22.8	22.3	180.00	21,385.9	-6,925.5	322.6	277.5	45.09	7.154	
6,400.0	6,389.8	6,389.8	6,389.8	23.1	22.7	180.00	21,385.9	-6,925.5	328.8	283.0	45.82	7.176	
6,500.0	6,489.6	6,489.6	6,489.6	23.5	23.0	-180.00	21,385.9	-6,925.5	335.1	288.5	46.55	7.198	
6,600.0	6,589.4	6,589.4	6,589.4	23.9	23.4	180.00	21,385.9	-6,925.5	341.3	294.0	47.28	7.219	
6,700.0	6,689.2	6,689.2	6,689.2	24.3	23.8	180.00	21,385.9	-6,925.5	347.6	299.6	48.01	7.240	
6,800.0	6,789.0	6,789.0	6,789.0	24.6	24.1	-180.00	21,385.9	-6,925.5	353.8	305.1	48.74	7.260	
6,900.0	6,888.8	6,888.8	6,888.8	25.0	24.5	-180.00	21,385.9	-6,925.5	360.1	310.6	49.47	7.279	

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

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Anticollision Report

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Reference Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
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Reference Design:	DWD Plan 4 - neg vs step out	Offset TVD Reference:	Offset Datum

Offset Design LUDEMAN - FASCINATOR FEE COM #1H - OWB - DWD Plan 2 - straight shot												Offset Site Error:	0.0 usft
Survey Program: 0-MWD												Offset Well Error:	0.0 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	
7,000.0	6,988.6	6,988.6	6,988.6	25.4	24.8	180.00	21,385.9	-6,925.5	366.3	316.1	50.20	7.298	
7,100.0	7,088.4	7,088.4	7,088.4	25.7	25.2	-180.00	21,385.9	-6,925.5	372.6	321.6	50.92	7.316	
7,200.0	7,188.2	7,188.2	7,188.2	26.1	25.5	-180.00	21,385.9	-6,925.5	378.8	327.2	51.65	7.334	
7,300.0	7,288.0	7,288.0	7,288.0	26.5	25.9	180.00	21,385.9	-6,925.5	385.1	332.7	52.38	7.351	
7,400.0	7,387.8	7,387.8	7,387.8	26.9	26.3	180.00	21,385.9	-6,925.5	391.3	338.2	53.11	7.368	
7,500.0	7,487.6	7,487.6	7,487.6	27.2	26.6	-180.00	21,385.9	-6,925.5	397.6	343.7	53.84	7.384	
7,600.0	7,587.4	7,587.4	7,587.4	27.6	27.0	180.00	21,385.9	-6,925.5	403.8	349.2	54.57	7.400	
7,700.0	7,687.2	7,687.2	7,687.2	28.0	27.3	180.00	21,385.9	-6,925.5	410.1	354.8	55.30	7.415	
7,800.0	7,787.0	7,787.0	7,787.0	28.3	27.7	-180.00	21,385.9	-6,925.5	416.3	360.3	56.03	7.430	
7,900.0	7,886.8	7,886.8	7,886.8	28.7	28.0	-180.00	21,385.9	-6,925.5	422.6	365.8	56.76	7.445	
8,000.0	7,986.6	7,986.6	7,986.6	29.1	28.4	180.00	21,385.9	-6,925.5	428.8	371.3	57.49	7.459	
8,100.0	8,086.4	8,086.4	8,086.4	29.5	28.8	180.00	21,385.9	-6,925.5	435.1	376.8	58.22	7.473	
8,200.0	8,186.3	8,186.3	8,186.3	29.8	29.1	-180.00	21,385.9	-6,925.5	441.3	382.4	58.95	7.487	
8,300.0	8,286.1	8,286.1	8,286.1	30.2	29.5	180.00	21,385.9	-6,925.5	447.6	387.9	59.68	7.500	
8,400.0	8,385.9	8,385.9	8,385.9	30.6	29.8	180.00	21,385.9	-6,925.5	453.8	393.4	60.41	7.513	
8,500.0	8,485.7	8,485.7	8,485.7	30.9	30.2	-180.00	21,385.9	-6,925.5	460.1	398.9	61.14	7.525	
8,600.0	8,585.5	8,585.5	8,585.5	31.3	30.6	180.00	21,385.9	-6,925.5	466.3	404.5	61.87	7.538	
8,700.0	8,685.3	8,685.3	8,685.3	31.7	30.9	180.00	21,385.9	-6,925.5	472.6	410.0	62.60	7.550	
8,800.0	8,785.1	8,785.1	8,785.1	32.1	31.3	-180.00	21,385.9	-6,925.5	478.8	415.5	63.33	7.561	
8,900.0	8,884.9	8,884.9	8,884.9	32.4	31.6	-180.00	21,385.9	-6,925.5	485.1	421.0	64.06	7.573	
9,000.0	8,984.7	8,984.7	8,984.7	32.8	32.0	180.00	21,385.9	-6,925.5	491.3	426.5	64.78	7.584	
9,100.0	9,084.5	9,084.5	9,084.5	33.2	32.3	180.00	21,385.9	-6,925.5	497.6	432.1	65.51	7.595	
9,200.0	9,184.3	9,184.3	9,184.3	33.5	32.7	-180.00	21,385.9	-6,925.5	503.8	437.6	66.24	7.606	
9,300.0	9,284.1	9,284.1	9,284.1	33.9	33.1	180.00	21,385.9	-6,925.5	510.1	443.1	66.97	7.616	
9,400.0	9,383.9	9,383.9	9,383.9	34.3	33.4	180.00	21,385.9	-6,925.5	516.3	448.6	67.70	7.626	
9,500.0	9,483.7	9,483.7	9,483.7	34.7	33.8	-180.00	21,385.9	-6,925.5	522.6	454.1	68.43	7.636	
9,600.0	9,583.5	9,583.5	9,583.5	35.0	34.1	-180.00	21,385.9	-6,925.5	528.8	459.7	69.16	7.646	
9,700.0	9,683.3	9,683.3	9,683.3	35.4	34.5	180.00	21,385.9	-6,925.5	535.1	465.2	69.89	7.656	
9,800.0	9,783.1	9,783.1	9,783.1	35.8	34.8	-180.00	21,385.9	-6,925.5	541.3	470.7	70.62	7.665	
9,900.0	9,882.9	9,882.9	9,882.9	36.1	35.2	-180.00	21,385.9	-6,925.5	547.6	476.2	71.35	7.674	
10,000.0	9,982.7	9,982.7	9,982.7	36.5	35.6	180.00	21,385.9	-6,925.5	553.8	481.7	72.08	7.683	
10,100.0	10,082.5	10,082.5	10,082.5	36.9	35.9	180.00	21,385.9	-6,925.5	560.1	487.3	72.81	7.692	
10,200.0	10,182.3	10,182.3	10,182.3	37.3	36.3	-180.00	21,385.9	-6,925.5	566.3	492.8	73.54	7.701	
10,300.0	10,282.1	10,282.1	10,282.1	37.6	36.6	180.00	21,385.9	-6,925.5	572.6	498.3	74.27	7.709	
10,400.0	10,382.0	10,382.0	10,382.0	38.0	37.0	180.00	21,385.9	-6,925.5	578.8	503.8	75.00	7.718	
10,500.0	10,481.8	10,481.8	10,481.8	38.4	37.3	-180.00	21,385.9	-6,925.5	585.1	509.4	75.73	7.726	
10,600.0	10,581.6	10,581.6	10,581.6	38.8	37.7	-180.00	21,385.9	-6,925.5	591.3	514.9	76.46	7.734	
10,700.0	10,681.4	10,681.4	10,681.4	39.1	38.1	180.00	21,385.9	-6,925.5	597.6	520.4	77.19	7.742	
10,800.0	10,781.2	10,781.2	10,781.2	39.5	38.4	180.00	21,385.9	-6,925.5	603.8	525.9	77.92	7.749	
10,900.0	10,881.0	10,881.0	10,881.0	39.9	38.8	-180.00	21,385.9	-6,925.5	610.1	531.4	78.65	7.757	
11,000.0	10,980.8	10,980.8	10,980.8	40.2	39.1	180.00	21,385.9	-6,925.5	616.3	537.0	79.38	7.764	
11,100.0	11,080.6	11,080.6	11,080.6	40.6	39.5	180.00	21,385.9	-6,925.5	622.6	542.5	80.11	7.772	
11,200.0	11,180.4	11,180.4	11,180.4	41.0	39.9	-180.00	21,385.9	-6,925.5	628.8	548.0	80.84	7.779	
11,300.0	11,280.2	11,280.2	11,280.2	41.4	40.2	180.00	21,385.9	-6,925.5	635.1	553.5	81.57	7.786	
11,400.0	11,380.0	11,380.0	11,380.0	41.7	40.6	180.00	21,385.9	-6,925.5	641.3	559.0	82.30	7.793	
11,500.0	11,479.8	11,479.8	11,479.8	42.1	40.9	-180.00	21,385.9	-6,925.5	647.6	564.6	83.03	7.800	
11,600.0	11,579.6	11,579.6	11,579.6	42.5	41.3	-180.00	21,385.9	-6,925.5	653.8	570.1	83.76	7.806	
11,700.0	11,679.4	11,679.4	11,679.4	42.8	41.6	180.00	21,385.9	-6,925.5	660.1	575.6	84.49	7.813	
11,800.0	11,779.2	11,779.2	11,779.2	43.2	42.0	180.00	21,385.9	-6,925.5	666.3	581.1	85.22	7.819	
11,900.0	11,879.0	11,879.0	11,879.0	43.6	42.4	-180.00	21,385.9	-6,925.5	672.6	586.6	85.95	7.826	
12,000.0	11,978.8	11,978.8	11,978.8	44.0	42.7	180.00	21,385.9	-6,925.5	678.8	592.2	86.68	7.832	
12,108.4	12,087.0	12,087.0	12,087.0	44.4	43.1	180.00	21,385.9	-6,925.5	685.6	598.1	87.47	7.839	

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:	Site LUDEMAN
Project:	LEA COUNTY, NM	TVD Reference:	WELL @ 3342.0usft (Original Well Elev)
Reference Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	FASCINATOR FEE COM #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	DWD Plan 4 - neg vs step out	Offset TVD Reference:	Offset Datum

Offset Design LUDEMAN - FASCINATOR FEE COM #1H - OWB - DWD Plan 2 - straight shot												Offset Site Error:	0.0 usft
Survey Program: 0-MWD												Offset Well Error:	0.0 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	
12,125.0	12,103.6	12,100.0	12,100.0	44.4	43.1	-147.89	21,386.0	-6,925.5	686.6	599.0	87.58	7.840	
12,150.0	12,128.5	12,121.6	12,121.6	44.5	43.2	-115.52	21,386.8	-6,925.4	687.9	600.2	87.74	7.840	
12,175.0	12,153.3	12,141.7	12,141.6	44.6	43.3	-101.22	21,388.4	-6,925.3	689.1	601.2	87.90	7.840	
12,200.0	12,178.0	12,161.9	12,161.7	44.7	43.4	-94.09	21,390.9	-6,925.1	690.1	602.1	88.06	7.838	
12,225.0	12,202.5	12,182.1	12,181.6	44.8	43.4	-89.97	21,394.2	-6,924.8	691.0	602.8	88.21	7.834	
12,250.0	12,226.6	12,200.0	12,199.1	44.8	43.5	-87.33	21,397.9	-6,924.5	691.7	603.3	88.35	7.829	
12,275.0	12,250.4	12,222.6	12,221.0	44.9	43.6	-85.55	21,403.4	-6,924.1	692.2	603.7	88.50	7.822	
12,300.0	12,273.7	12,242.9	12,240.4	45.0	43.6	-84.29	21,409.2	-6,923.6	692.6	603.9	88.64	7.813	
12,325.0	12,296.6	12,263.2	12,259.6	45.1	43.7	-83.38	21,415.9	-6,923.0	692.8	604.0	88.78	7.804	
12,350.0	12,318.9	12,283.7	12,278.6	45.1	43.8	-82.73	21,423.5	-6,922.4	692.8	603.9	88.90	7.793	
12,375.0	12,340.6	12,304.2	12,297.3	45.2	43.8	-82.27	21,431.8	-6,921.8	692.7	603.6	89.03	7.780	
12,400.0	12,361.6	12,325.0	12,315.9	45.2	43.9	-81.96	21,441.1	-6,921.0	692.4	603.2	89.15	7.766	
12,425.0	12,381.9	12,345.4	12,333.7	45.3	44.0	-81.78	21,451.0	-6,920.2	691.9	602.7	89.27	7.751	
12,450.0	12,401.4	12,366.1	12,351.4	45.3	44.0	-81.70	21,461.8	-6,919.3	691.3	601.9	89.38	7.735	
12,475.0	12,420.1	12,386.9	12,368.6	45.4	44.1	-81.70	21,473.4	-6,918.4	690.6	601.1	89.49	7.717	
12,500.0	12,437.9	12,407.8	12,385.4	45.4	44.2	-81.79	21,485.8	-6,917.3	689.7	600.1	89.59	7.698	
12,525.0	12,454.7	12,428.9	12,401.8	45.5	44.2	-81.94	21,499.0	-6,916.3	688.6	598.9	89.69	7.678	
12,550.0	12,470.5	12,450.0	12,417.6	45.5	44.3	-82.16	21,513.0	-6,915.1	687.4	597.7	89.78	7.657	
12,575.0	12,485.4	12,471.3	12,432.8	45.5	44.4	-82.43	21,527.8	-6,913.9	686.1	596.3	89.87	7.634	
12,600.0	12,499.1	12,492.7	12,447.5	45.5	44.4	-82.75	21,543.3	-6,912.6	684.7	594.7	89.96	7.611	
12,625.0	12,511.7	12,514.2	12,461.5	45.6	44.5	-83.13	21,559.6	-6,911.3	683.1	593.1	90.04	7.587	
12,650.0	12,523.2	12,535.9	12,474.9	45.6	44.5	-83.55	21,576.6	-6,909.9	681.5	591.3	90.12	7.562	
12,675.0	12,533.5	12,557.7	12,487.6	45.6	44.6	-84.02	21,594.3	-6,908.5	679.7	589.5	90.20	7.536	
12,700.0	12,542.6	12,579.7	12,499.6	45.6	44.7	-84.52	21,612.7	-6,907.0	677.8	587.6	90.27	7.509	
12,725.0	12,550.5	12,601.9	12,510.7	45.6	44.7	-85.07	21,631.9	-6,905.4	675.9	585.5	90.35	7.481	
12,750.0	12,557.1	12,625.0	12,521.4	45.6	44.8	-85.66	21,652.2	-6,903.8	673.8	583.4	90.43	7.452	
12,775.0	12,562.5	12,646.9	12,530.6	45.7	44.8	-86.27	21,672.0	-6,902.1	671.7	581.2	90.51	7.422	
12,800.0	12,566.6	12,669.7	12,539.2	45.7	44.9	-86.92	21,693.1	-6,900.4	669.6	579.0	90.59	7.391	
12,825.0	12,569.4	12,692.7	12,546.8	45.7	45.0	-87.60	21,714.7	-6,898.7	667.4	576.7	90.68	7.359	
12,850.0	12,570.9	12,715.9	12,553.4	45.8	45.0	-88.32	21,736.9	-6,896.8	665.1	574.3	90.78	7.327	
12,877.1	12,571.0	12,741.4	12,559.5	45.8	45.1	-89.12	21,761.6	-6,894.8	662.6	571.7	90.89	7.290	
12,900.0	12,570.5	12,763.3	12,563.6	45.8	45.1	-89.52	21,783.0	-6,893.1	660.5	569.5	90.98	7.259	
13,000.0	12,568.1	12,862.1	12,569.8	46.1	45.4	-90.27	21,881.1	-6,885.1	651.6	560.1	91.47	7.123	
13,100.0	12,565.8	12,961.7	12,567.5	46.4	45.7	-90.27	21,980.3	-6,877.0	642.7	550.6	92.09	6.979	
13,200.0	12,563.4	13,061.3	12,565.1	46.8	46.0	-90.27	22,079.6	-6,868.9	633.8	541.0	92.82	6.828	
13,300.0	12,561.1	13,160.9	12,562.7	47.2	46.4	-90.27	22,178.8	-6,860.8	625.0	531.3	93.67	6.672	
13,400.0	12,558.8	13,260.5	12,560.4	47.7	46.9	-90.27	22,278.1	-6,852.7	616.1	521.5	94.62	6.511	
13,500.0	12,556.4	13,360.1	12,558.0	48.3	47.4	-90.27	22,377.3	-6,844.6	607.2	511.5	95.68	6.347	
13,600.0	12,554.1	13,459.7	12,555.7	48.9	48.0	-90.27	22,476.6	-6,836.5	598.4	501.5	96.83	6.179	
13,700.0	12,551.8	13,559.3	12,553.3	49.5	48.6	-90.27	22,575.8	-6,828.4	589.5	491.4	98.09	6.010	
13,800.0	12,549.4	13,658.9	12,550.9	50.2	49.2	-90.27	22,675.1	-6,820.3	580.6	481.2	99.43	5.839	
13,900.0	12,547.1	13,758.5	12,548.6	50.9	49.9	-90.27	22,774.3	-6,812.2	571.7	470.9	100.87	5.668	
14,000.0	12,544.7	13,858.1	12,546.2	51.7	50.7	-90.27	22,873.6	-6,804.1	562.9	460.5	102.38	5.498	
14,100.0	12,542.4	13,957.7	12,543.8	52.5	51.4	-90.27	22,972.8	-6,796.0	554.0	450.0	103.99	5.328	
14,200.0	12,540.1	14,057.4	12,541.5	53.4	52.3	-90.27	23,072.1	-6,787.8	545.1	439.5	105.66	5.159	
14,300.0	12,537.7	14,157.0	12,539.1	54.3	53.1	-90.27	23,171.3	-6,779.7	536.3	428.8	107.42	4.992	
14,400.0	12,535.4	14,256.6	12,536.7	55.2	54.0	-90.27	23,270.6	-6,771.6	527.4	418.1	109.24	4.828	
14,500.0	12,533.0	14,356.2	12,534.4	56.2	54.9	-90.27	23,369.8	-6,763.5	518.5	407.4	111.13	4.666	
14,600.0	12,530.7	14,455.8	12,532.0	57.2	55.9	-90.27	23,469.1	-6,755.4	509.6	396.6	113.09	4.507	
14,700.0	12,528.4	14,555.4	12,529.6	58.2	56.9	-90.27	23,568.3	-6,747.3	500.8	385.7	115.10	4.351	
14,800.0	12,526.0	14,655.0	12,527.3	59.3	57.9	-90.27	23,667.6	-6,739.2	491.9	374.7	117.18	4.198	
14,900.0	12,523.7	14,754.6	12,524.9	60.3	59.0	-90.27	23,766.8	-6,731.1	483.0	363.7	119.31	4.049	

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:	Site LUDEMAN
Project:	LEA COUNTY, NM	TVD Reference:	WELL @ 3342.0usft (Original Well Elev)
Reference Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	FASCINATOR FEE COM #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	DWD Plan 4 - neg vs step out	Offset TVD Reference:	Offset Datum

Offset Design LUDEMAN - FASCINATOR FEE COM #1H - OWB - DWD Plan 2 - straight shot													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 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		
15,000.0	12,521.4	14,854.2	12,522.6	61.4	60.0	-90.27	23,866.0	-6,723.0	474.2	352.7	121.49	3.903		
15,100.0	12,519.0	14,953.8	12,520.2	62.6	61.1	-90.26	23,965.3	-6,714.9	465.3	341.6	123.72	3.761		
15,200.0	12,516.7	15,053.4	12,517.8	63.7	62.3	-90.26	24,064.5	-6,706.8	456.4	330.4	126.00	3.622		
15,300.0	12,514.3	15,153.0	12,515.5	64.9	63.4	-90.26	24,163.8	-6,698.7	447.5	319.2	128.32	3.488		
15,400.0	12,512.0	15,252.6	12,513.1	66.1	64.6	-90.26	24,263.0	-6,690.6	438.7	308.0	130.68	3.357		
15,500.0	12,509.7	15,352.2	12,510.7	67.3	65.8	-90.26	24,362.3	-6,682.5	429.8	296.7	133.08	3.230		
15,600.0	12,507.3	15,451.8	12,508.4	68.6	67.0	-90.26	24,461.5	-6,674.4	420.9	285.4	135.52	3.106		
15,700.0	12,505.0	15,551.4	12,506.0	69.8	68.2	-90.26	24,560.8	-6,666.3	412.1	274.1	138.00	2.986		
15,800.0	12,502.6	15,651.0	12,503.6	71.1	69.4	-90.26	24,660.0	-6,658.2	403.2	262.7	140.50	2.870		
15,900.0	12,500.3	15,750.6	12,501.3	72.4	70.7	-90.26	24,759.3	-6,650.1	394.3	251.3	143.05	2.757		
16,000.0	12,498.0	15,850.3	12,498.9	73.7	71.9	-90.26	24,858.5	-6,642.0	385.4	239.8	145.62	2.647		
16,100.0	12,495.6	15,949.9	12,496.6	75.0	73.2	-90.26	24,957.8	-6,633.9	376.6	228.4	148.22	2.541		
16,200.0	12,493.3	16,049.5	12,494.2	76.3	74.5	-90.26	25,057.0	-6,625.8	367.7	216.9	150.84	2.438		
16,300.0	12,491.0	16,149.1	12,491.8	77.7	75.8	-90.26	25,156.3	-6,617.7	358.8	205.3	153.50	2.338		
16,400.0	12,488.6	16,248.7	12,489.5	79.0	77.2	-90.26	25,255.5	-6,609.6	350.0	193.8	156.17	2.241		
16,500.0	12,486.3	16,348.3	12,487.1	80.4	78.5	-90.26	25,354.8	-6,601.5	341.1	182.2	158.87	2.147		
16,600.0	12,483.9	16,447.9	12,484.7	81.8	79.8	-90.26	25,454.0	-6,593.4	332.2	170.6	161.59	2.056		
16,700.0	12,481.6	16,547.5	12,482.4	83.1	81.2	-90.26	25,553.3	-6,585.3	323.3	159.0	164.34	1.968 Advise and Monitor		
16,800.0	12,479.3	16,647.1	12,480.0	84.5	82.6	-90.26	25,652.5	-6,577.2	314.5	147.4	167.10	1.882 Advise and Monitor		
16,900.0	12,476.9	16,746.7	12,477.6	86.0	83.9	-90.25	25,751.7	-6,569.1	305.6	135.7	169.88	1.799 Advise and Monitor		
17,000.0	12,474.6	16,846.3	12,475.3	87.4	85.3	-90.25	25,851.0	-6,561.0	296.7	124.0	172.68	1.718 Advise and Monitor		
17,100.0	12,472.2	16,945.9	12,472.9	88.8	86.7	-90.25	25,950.2	-6,552.9	287.9	112.4	175.50	1.640 Advise and Monitor		
17,200.0	12,469.9	17,045.5	12,470.5	90.2	88.1	-90.25	26,049.5	-6,544.8	279.0	100.6	178.33	1.564 Advise and Monitor		
17,300.0	12,467.6	17,145.1	12,468.2	91.7	89.5	-90.25	26,148.7	-6,536.7	270.1	88.9	181.18	1.491 Shut in Produces		
17,400.0	12,465.2	17,244.7	12,465.8	93.1	90.9	-90.25	26,248.0	-6,528.6	261.2	77.2	184.05	1.419 Shut in Produces		
17,500.0	12,462.9	17,344.3	12,463.5	94.6	92.4	-90.25	26,347.2	-6,520.5	252.4	65.4	186.93	1.350 Shut in Produces		
17,600.0	12,460.6	17,443.9	12,461.1	96.0	93.8	-90.25	26,446.5	-6,512.4	243.5	53.7	189.82	1.283 Shut in Produces		
17,700.0	12,458.2	17,543.6	12,458.7	97.5	95.2	-90.24	26,545.7	-6,504.3	234.6	41.9	192.72	1.217 Shut in Produces		
17,800.0	12,455.9	17,643.2	12,456.4	99.0	96.7	-90.24	26,645.0	-6,496.2	225.8	30.1	195.64	1.154 Shut in Produces		
17,900.0	12,453.5	17,742.8	12,454.0	100.5	98.1	-90.24	26,744.2	-6,488.1	216.9	18.3	198.57	1.092 Shut in Produces		
18,000.0	12,451.2	17,842.4	12,451.6	101.9	99.6	-90.24	26,843.5	-6,480.0	208.0	6.5	201.51	1.032 Shut in Produces		
18,100.0	12,448.9	17,942.0	12,449.3	103.4	101.0	-90.24	26,942.7	-6,471.9	199.1	-5.3	204.46	0.974 Stop Drilling Now		
18,200.0	12,446.5	18,041.6	12,446.9	104.9	102.5	-90.24	27,042.0	-6,463.8	190.3	-17.2	207.42	0.917 Stop Drilling Now		
18,300.0	12,444.2	18,141.2	12,444.5	106.4	104.0	-90.23	27,141.2	-6,455.7	181.4	-29.0	210.40	0.862 Stop Drilling Now		
18,400.0	12,441.8	18,240.8	12,442.2	107.9	105.4	-90.23	27,240.5	-6,447.6	172.5	-40.9	213.38	0.809 Stop Drilling Now		
18,500.0	12,439.5	18,340.4	12,439.8	109.4	106.9	-90.23	27,339.7	-6,439.5	163.7	-52.7	216.37	0.756 Stop Drilling Now		
18,600.0	12,437.2	18,440.0	12,437.5	111.0	108.4	-90.22	27,439.0	-6,431.4	154.8	-64.6	219.37	0.706 Stop Drilling Now		
18,700.0	12,434.8	18,539.6	12,435.1	112.5	109.9	-90.22	27,538.2	-6,423.3	145.9	-76.5	222.37	0.656 Stop Drilling Now		
18,800.0	12,432.5	18,639.2	12,432.7	114.0	111.4	-90.22	27,637.5	-6,415.2	137.0	-88.3	225.39	0.608 Stop Drilling Now		
18,900.0	12,430.2	18,738.8	12,430.4	115.5	112.9	-90.21	27,736.7	-6,407.1	128.2	-100.2	228.41	0.561 Stop Drilling Now		
19,000.0	12,427.8	18,838.4	12,428.0	117.1	114.4	-90.21	27,835.9	-6,398.9	119.3	-112.1	231.44	0.515 Stop Drilling Now		
19,100.0	12,425.5	18,938.0	12,425.6	118.6	115.9	-90.20	27,935.2	-6,390.8	110.4	-124.1	234.48	0.471 Stop Drilling Now		
19,200.0	12,423.1	19,037.6	12,423.3	120.1	117.4	-90.19	28,034.4	-6,382.7	101.6	-136.0	237.53	0.428 Stop Drilling Now		
19,300.0	12,420.8	19,137.2	12,420.9	121.7	118.9	-90.18	28,133.7	-6,374.6	92.7	-147.9	240.58	0.385 Stop Drilling Now		
19,400.0	12,418.5	19,236.8	12,418.5	123.2	120.4	-90.17	28,232.9	-6,366.5	83.8	-159.8	243.64	0.344 Stop Drilling Now		
19,500.0	12,416.1	19,336.5	12,416.2	124.8	121.9	-90.16	28,332.2	-6,358.4	74.9	-171.8	246.70	0.304 Stop Drilling Now		
19,600.0	12,413.8	19,436.1	12,413.8	126.3	123.4	-90.14	28,431.4	-6,350.3	66.1	-183.7	249.77	0.265 Stop Drilling Now		
19,700.0	12,411.4	19,535.7	12,411.4	127.9	125.0	-90.12	28,530.7	-6,342.2	57.2	-195.6	252.84	0.226 Stop Drilling Now		
19,800.0	12,409.1	19,635.3	12,409.1	129.4	126.5	-90.09	28,629.9	-6,334.1	48.3	-207.6	255.93	0.189 Stop Drilling Now		
19,900.0	12,406.8	19,734.9	12,406.7	131.0	128.0	-90.05	28,729.2	-6,326.0	39.5	-219.6	259.01	0.152 Stop Drilling Now		
20,000.0	12,404.4	19,834.5	12,404.4	132.6	129.5	-89.98	28,828.4	-6,317.9	30.6	-231.5	262.10	0.117 Stop Drilling Now		
20,100.0	12,402.1	19,934.1	12,402.0	134.1	131.1	-89.85	28,927.7	-6,309.8	21.7	-243.5	265.20	0.082 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:	Site LUDEMAN
Project:	LEA COUNTY, NM	TVD Reference:	WELL @ 3342.0usft (Original Well Elev)
Reference Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	FASCINATOR FEE COM #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	DWD Plan 4 - neg vs step out	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.0 usft
LUDEMAN - FASCINATOR FEE COM #1H - OWB - DWD Plan 2 - straight shot												Offset Well Error:	0.0 usft
Survey Program: 0-MWD													
Reference		Offset		Semi Major Axis		Distance							
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
20,200.0	12,399.8	20,033.7	12,399.6	135.7	132.6	-89.55	29,026.9	-6,301.7	12.8	-255.5	268.30	0.048	Stop Drilling Now
20,300.0	12,397.4	20,133.3	12,397.3	137.3	134.2	-87.92	29,126.2	-6,293.6	4.0	-267.4	271.41	0.015	Stop Drilling Now
20,344.8	12,396.4	20,178.0	12,396.2	138.0	134.8	2.32	29,170.7	-6,290.0	0.2	-272.6	272.80	0.001	Stop Drilling Now
20,345.2	12,396.4	20,178.3	12,396.2	138.0	134.8	12.57	29,171.0	-6,290.0	0.2	-272.6	272.81	0.001	Stop Drilling Now, ES

COG Operating LLC

Anticollision Report

Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Site LUDEMAN
Project:	LEA COUNTY, NM	TVD Reference:	WELL @ 3342.0usft (Original Well Elev)
Reference Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	FASCINATOR FEE COM #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	DWD Plan 4 - neg vs step out	Offset TVD Reference:	Offset Datum

Offset Design LUDEMAN - FASCINATOR FEE COM #1H - OWB - DWD Plan 3 - land and turn													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 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	0.0	0.00	21,385.9	-6,925.5	0.0					
100.0	100.0	100.0	100.0	0.1	0.1	0.00	21,385.9	-6,925.5	0.0	-0.3	0.27	0.000	Stop Drilling Now	
200.0	200.0	200.0	200.0	0.5	0.5	0.00	21,385.9	-6,925.5	0.0	-1.0	0.98	0.000	Stop Drilling Now	
300.0	300.0	300.0	300.0	0.8	0.8	0.00	21,385.9	-6,925.5	0.0	-1.7	1.70	0.000	Stop Drilling Now	
400.0	400.0	400.0	400.0	1.2	1.2	0.00	21,385.9	-6,925.5	0.0	-2.4	2.42	0.000	Stop Drilling Now	
500.0	500.0	500.0	500.0	1.6	1.6	0.00	21,385.9	-6,925.5	0.0	-3.1	3.13	0.000	Stop Drilling Now	
600.0	600.0	600.0	600.0	1.9	1.9	0.00	21,385.9	-6,925.5	0.0	-3.8	3.85	0.000	Stop Drilling Now	
700.0	700.0	700.0	700.0	2.3	2.3	0.00	21,385.9	-6,925.5	0.0	-4.6	4.57	0.000	Stop Drilling Now	
800.0	800.0	800.0	800.0	2.6	2.6	0.00	21,385.9	-6,925.5	0.0	-5.3	5.28	0.000	Stop Drilling Now	
900.0	900.0	900.0	900.0	3.0	3.0	0.00	21,385.9	-6,925.5	0.0	-6.0	6.00	0.000	Stop Drilling Now	
1,000.0	1,000.0	1,000.0	1,000.0	3.4	3.4	0.00	21,385.9	-6,925.5	0.0	-6.7	6.72	0.000	Stop Drilling Now	
1,050.0	1,050.0	1,050.0	1,050.0	3.5	3.5	0.00	21,385.9	-6,925.5	0.0	-7.1	7.08	0.000	Stop Drilling Now, CC, SF	
1,077.0	1,077.0	1,077.0	1,077.0	3.6	3.6	180.00	21,385.9	-6,925.5	0.1	-7.1	7.27	0.017	Stop Drilling Now	
1,100.0	1,100.0	1,100.0	1,100.0	3.7	3.7	-180.00	21,385.9	-6,925.5	0.4	-7.0	7.43	0.059	Stop Drilling Now	
1,200.0	1,199.9	1,199.9	1,199.9	4.1	4.1	180.00	21,385.9	-6,925.5	3.9	-4.2	8.13	0.483	Stop Drilling Now	
1,229.2	1,229.1	1,229.1	1,229.1	4.2	4.2	-180.00	21,385.9	-6,925.5	5.6	-2.7	8.33	0.672	Stop Drilling Now	
1,300.0	1,299.7	1,299.7	1,299.7	4.4	4.4	180.00	21,385.9	-6,925.5	10.0	1.2	8.83	1.136	Shut in Produces	
1,400.0	1,399.5	1,399.5	1,399.5	4.7	4.8	-180.00	21,385.9	-6,925.5	16.3	6.7	9.54	1.707	Advise and Monitor	
1,500.0	1,499.4	1,499.4	1,499.4	5.1	5.1	180.00	21,385.9	-6,925.5	22.5	12.3	10.25	2.199		
1,600.0	1,599.2	1,599.2	1,599.2	5.5	5.5	180.00	21,385.9	-6,925.5	28.8	17.8	10.96	2.626		
1,700.0	1,699.0	1,699.0	1,699.0	5.8	5.9	-180.00	21,385.9	-6,925.5	35.0	23.4	11.67	3.001		
1,800.0	1,798.8	1,798.8	1,798.8	6.2	6.2	-180.00	21,385.9	-6,925.5	41.3	28.9	12.39	3.332		
1,900.0	1,898.6	1,898.6	1,898.6	6.5	6.6	180.00	21,385.9	-6,925.5	47.5	34.4	13.11	3.626		
2,000.0	1,998.4	1,998.4	1,998.4	6.9	6.9	-180.00	21,385.9	-6,925.5	53.8	40.0	13.83	3.889		
2,100.0	2,098.2	2,098.2	2,098.2	7.3	7.3	-180.00	21,385.9	-6,925.5	60.0	45.5	14.55	4.126		
2,200.0	2,198.0	2,198.0	2,198.0	7.6	7.7	180.00	21,385.9	-6,925.5	66.3	51.0	15.27	4.341		
2,300.0	2,297.8	2,297.8	2,297.8	8.0	8.0	180.00	21,385.9	-6,925.5	72.5	56.5	15.99	4.536		
2,400.0	2,397.6	2,397.6	2,397.6	8.3	8.4	-180.00	21,385.9	-6,925.5	78.8	62.1	16.72	4.713		
2,500.0	2,497.4	2,497.4	2,497.4	8.7	8.7	180.00	21,385.9	-6,925.5	85.0	67.6	17.44	4.876		
2,600.0	2,597.2	2,597.2	2,597.2	9.1	9.1	180.00	21,385.9	-6,925.5	91.3	73.1	18.16	5.026		
2,700.0	2,697.0	2,697.0	2,697.0	9.4	9.4	-180.00	21,385.9	-6,925.5	97.5	78.6	18.89	5.164		
2,800.0	2,796.8	2,796.8	2,796.8	9.8	9.8	-180.00	21,385.9	-6,925.5	103.8	84.2	19.61	5.292		
2,900.0	2,896.6	2,896.6	2,896.6	10.2	10.2	180.00	21,385.9	-6,925.5	110.0	89.7	20.34	5.411		
3,000.0	2,996.4	2,996.4	2,996.4	10.5	10.5	180.00	21,385.9	-6,925.5	116.3	95.2	21.06	5.521		
3,100.0	3,096.2	3,096.2	3,096.2	10.9	10.9	-180.00	21,385.9	-6,925.5	122.5	100.7	21.79	5.624		
3,200.0	3,196.0	3,196.0	3,196.0	11.3	11.2	180.00	21,385.9	-6,925.5	128.8	106.3	22.52	5.720		
3,300.0	3,295.8	3,295.8	3,295.8	11.7	11.6	180.00	21,385.9	-6,925.5	135.0	111.8	23.24	5.810		
3,400.0	3,395.6	3,395.6	3,395.6	12.0	11.9	-180.00	21,385.9	-6,925.5	141.3	117.3	23.97	5.895		
3,500.0	3,495.4	3,495.4	3,495.4	12.4	12.3	-180.00	21,385.9	-6,925.5	147.5	122.8	24.70	5.974		
3,600.0	3,595.2	3,595.2	3,595.2	12.8	12.7	180.00	21,385.9	-6,925.5	153.8	128.4	25.42	6.049		
3,700.0	3,695.1	3,695.1	3,695.1	13.1	13.0	-180.00	21,385.9	-6,925.5	160.0	133.9	26.15	6.120		
3,800.0	3,794.9	3,794.9	3,794.9	13.5	13.4	-180.00	21,385.9	-6,925.5	166.3	139.4	26.88	6.187		
3,900.0	3,894.7	3,894.7	3,894.7	13.9	13.7	180.00	21,385.9	-6,925.5	172.5	144.9	27.60	6.250		
4,000.0	3,994.5	3,994.5	3,994.5	14.2	14.1	180.00	21,385.9	-6,925.5	178.8	150.5	28.33	6.311		
4,100.0	4,094.3	4,094.3	4,094.3	14.6	14.5	-180.00	21,385.9	-6,925.5	185.0	156.0	29.06	6.368		
4,200.0	4,194.1	4,194.1	4,194.1	15.0	14.8	-180.00	21,385.9	-6,925.5	191.3	161.5	29.79	6.422		
4,300.0	4,293.9	4,293.9	4,293.9	15.3	15.2	180.00	21,385.9	-6,925.5	197.5	167.0	30.52	6.473		
4,400.0	4,393.7	4,393.7	4,393.7	15.7	15.5	-180.00	21,385.9	-6,925.5	203.8	172.6	31.24	6.523		
4,500.0	4,493.5	4,493.5	4,493.5	16.1	15.9	-180.00	21,385.9	-6,925.5	210.0	178.1	31.97	6.570		
4,600.0	4,593.3	4,593.3	4,593.3	16.5	16.2	180.00	21,385.9	-6,925.5	216.3	183.6	32.70	6.614		
4,700.0	4,693.1	4,693.1	4,693.1	16.8	16.6	180.00	21,385.9	-6,925.5	222.5	189.1	33.43	6.657		
4,800.0	4,792.9	4,792.9	4,792.9	17.2	17.0	-180.00	21,385.9	-6,925.5	228.8	194.6	34.16	6.698		

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:	Site LUDEMAN
Project:	LEA COUNTY, NM	TVD Reference:	WELL @ 3342.0usft (Original Well Elev)
Reference Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	FASCINATOR FEE COM #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	DWD Plan 4 - neg vs step out	Offset TVD Reference:	Offset Datum

Offset Design LUDEMAN - FASCINATOR FEE COM #1H - OWB - DWD Plan 3 - land and turn												Offset Site Error:	0.0 usft
Survey Program: 0-MWD												Offset Well Error:	0.0 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	4,892.7	4,892.7	4,892.7	17.6	17.3	180.00	21,385.9	-6,925.5	235.0	200.2	34.89	6.738	
5,000.0	4,992.5	4,992.5	4,992.5	17.9	17.7	180.00	21,385.9	-6,925.5	241.3	205.7	35.61	6.775	
5,100.0	5,092.3	5,092.3	5,092.3	18.3	18.0	-180.00	21,385.9	-6,925.5	247.6	211.2	36.34	6.811	
5,200.0	5,192.1	5,192.1	5,192.1	18.7	18.4	-180.00	21,385.9	-6,925.5	253.8	216.7	37.07	6.846	
5,300.0	5,291.9	5,291.9	5,291.9	19.1	18.7	180.00	21,385.9	-6,925.5	260.1	222.3	37.80	6.880	
5,400.0	5,391.7	5,391.7	5,391.7	19.4	19.1	-180.00	21,385.9	-6,925.5	266.3	227.8	38.53	6.912	
5,500.0	5,491.5	5,491.5	5,491.5	19.8	19.5	-180.00	21,385.9	-6,925.5	272.6	233.3	39.26	6.943	
5,600.0	5,591.3	5,591.3	5,591.3	20.2	19.8	180.00	21,385.9	-6,925.5	278.8	238.8	39.99	6.972	
5,700.0	5,691.1	5,691.1	5,691.1	20.5	20.2	180.00	21,385.9	-6,925.5	285.1	244.3	40.72	7.001	
5,800.0	5,790.9	5,790.9	5,790.9	20.9	20.5	-180.00	21,385.9	-6,925.5	291.3	249.9	41.45	7.029	
5,900.0	5,890.7	5,890.7	5,890.7	21.3	20.9	180.00	21,385.9	-6,925.5	297.6	255.4	42.17	7.055	
6,000.0	5,990.6	5,990.6	5,990.6	21.7	21.2	180.00	21,385.9	-6,925.5	303.8	260.9	42.90	7.081	
6,100.0	6,090.4	6,090.4	6,090.4	22.0	21.6	-180.00	21,385.9	-6,925.5	310.1	266.4	43.63	7.106	
6,200.0	6,190.2	6,190.2	6,190.2	22.4	22.0	-180.00	21,385.9	-6,925.5	316.3	271.9	44.36	7.130	
6,300.0	6,290.0	6,290.0	6,290.0	22.8	22.3	180.00	21,385.9	-6,925.5	322.6	277.5	45.09	7.154	
6,400.0	6,389.8	6,389.8	6,389.8	23.1	22.7	180.00	21,385.9	-6,925.5	328.8	283.0	45.82	7.176	
6,500.0	6,489.6	6,489.6	6,489.6	23.5	23.0	-180.00	21,385.9	-6,925.5	335.1	288.5	46.55	7.198	
6,600.0	6,589.4	6,589.4	6,589.4	23.9	23.4	180.00	21,385.9	-6,925.5	341.3	294.0	47.28	7.219	
6,700.0	6,689.2	6,689.2	6,689.2	24.3	23.8	180.00	21,385.9	-6,925.5	347.6	299.6	48.01	7.240	
6,800.0	6,789.0	6,789.0	6,789.0	24.6	24.1	-180.00	21,385.9	-6,925.5	353.8	305.1	48.74	7.260	
6,900.0	6,888.8	6,888.8	6,888.8	25.0	24.5	-180.00	21,385.9	-6,925.5	360.1	310.6	49.47	7.279	
7,000.0	6,988.6	6,988.6	6,988.6	25.4	24.8	180.00	21,385.9	-6,925.5	366.3	316.1	50.20	7.298	
7,100.0	7,088.4	7,088.4	7,088.4	25.7	25.2	-180.00	21,385.9	-6,925.5	372.6	321.6	50.92	7.316	
7,200.0	7,188.2	7,188.2	7,188.2	26.1	25.5	-180.00	21,385.9	-6,925.5	378.8	327.2	51.65	7.334	
7,300.0	7,288.0	7,288.0	7,288.0	26.5	25.9	180.00	21,385.9	-6,925.5	385.1	332.7	52.38	7.351	
7,400.0	7,387.8	7,387.8	7,387.8	26.9	26.3	180.00	21,385.9	-6,925.5	391.3	338.2	53.11	7.368	
7,500.0	7,487.6	7,487.6	7,487.6	27.2	26.6	-180.00	21,385.9	-6,925.5	397.6	343.7	53.84	7.384	
7,600.0	7,587.4	7,587.4	7,587.4	27.6	27.0	180.00	21,385.9	-6,925.5	403.8	349.2	54.57	7.400	
7,700.0	7,687.2	7,687.2	7,687.2	28.0	27.3	180.00	21,385.9	-6,925.5	410.1	354.8	55.30	7.415	
7,800.0	7,787.0	7,787.0	7,787.0	28.3	27.7	-180.00	21,385.9	-6,925.5	416.3	360.3	56.03	7.430	
7,900.0	7,886.8	7,886.8	7,886.8	28.7	28.0	-180.00	21,385.9	-6,925.5	422.6	365.8	56.76	7.445	
8,000.0	7,986.6	7,986.6	7,986.6	29.1	28.4	180.00	21,385.9	-6,925.5	428.8	371.3	57.49	7.459	
8,100.0	8,086.4	8,086.4	8,086.4	29.5	28.8	180.00	21,385.9	-6,925.5	435.1	376.8	58.22	7.473	
8,200.0	8,186.3	8,186.3	8,186.3	29.8	29.1	-180.00	21,385.9	-6,925.5	441.3	382.4	58.95	7.487	
8,300.0	8,286.1	8,286.1	8,286.1	30.2	29.5	180.00	21,385.9	-6,925.5	447.6	387.9	59.68	7.500	
8,400.0	8,385.9	8,385.9	8,385.9	30.6	29.8	180.00	21,385.9	-6,925.5	453.8	393.4	60.41	7.513	
8,500.0	8,485.7	8,485.7	8,485.7	30.9	30.2	-180.00	21,385.9	-6,925.5	460.1	398.9	61.14	7.525	
8,600.0	8,585.5	8,585.5	8,585.5	31.3	30.6	180.00	21,385.9	-6,925.5	466.3	404.5	61.87	7.538	
8,700.0	8,685.3	8,685.3	8,685.3	31.7	30.9	180.00	21,385.9	-6,925.5	472.6	410.0	62.60	7.550	
8,800.0	8,785.1	8,785.1	8,785.1	32.1	31.3	-180.00	21,385.9	-6,925.5	478.8	415.5	63.33	7.561	
8,900.0	8,884.9	8,884.9	8,884.9	32.4	31.6	-180.00	21,385.9	-6,925.5	485.1	421.0	64.06	7.573	
9,000.0	8,984.7	8,984.7	8,984.7	32.8	32.0	180.00	21,385.9	-6,925.5	491.3	426.5	64.78	7.584	
9,100.0	9,084.5	9,084.5	9,084.5	33.2	32.3	180.00	21,385.9	-6,925.5	497.6	432.1	65.51	7.595	
9,200.0	9,184.3	9,184.3	9,184.3	33.5	32.7	-180.00	21,385.9	-6,925.5	503.8	437.6	66.24	7.606	
9,300.0	9,284.1	9,284.1	9,284.1	33.9	33.1	180.00	21,385.9	-6,925.5	510.1	443.1	66.97	7.616	
9,400.0	9,383.9	9,383.9	9,383.9	34.3	33.4	180.00	21,385.9	-6,925.5	516.3	448.6	67.70	7.626	
9,500.0	9,483.7	9,483.7	9,483.7	34.7	33.8	-180.00	21,385.9	-6,925.5	522.6	454.1	68.43	7.636	
9,600.0	9,583.5	9,583.5	9,583.5	35.0	34.1	-180.00	21,385.9	-6,925.5	528.8	459.7	69.16	7.646	
9,700.0	9,683.3	9,683.3	9,683.3	35.4	34.5	180.00	21,385.9	-6,925.5	535.1	465.2	69.89	7.656	
9,800.0	9,783.1	9,783.1	9,783.1	35.8	34.8	-180.00	21,385.9	-6,925.5	541.3	470.7	70.62	7.665	
9,900.0	9,882.9	9,882.9	9,882.9	36.1	35.2	-180.00	21,385.9	-6,925.5	547.6	476.2	71.35	7.674	
10,000.0	9,982.7	9,982.7	9,982.7	36.5	35.6	180.00	21,385.9	-6,925.5	553.8	481.7	72.08	7.683	

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:	Site LUDEMAN
Project:	LEA COUNTY, NM	TVD Reference:	WELL @ 3342.0usft (Original Well Elev)
Reference Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	FASCINATOR FEE COM #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	DWD Plan 4 - neg vs step out	Offset TVD Reference:	Offset Datum

Offset Design LUDEMAN - FASCINATOR FEE COM #1H - OWB - DWD Plan 3 - land and turn													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 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		
10,100.0	10,082.5	10,082.5	10,082.5	36.9	35.9	180.00	21,385.9	-6,925.5	560.1	487.3	72.81	7.692		
10,200.0	10,182.3	10,182.3	10,182.3	37.3	36.3	-180.00	21,385.9	-6,925.5	566.3	492.8	73.54	7.701		
10,300.0	10,282.1	10,282.1	10,282.1	37.6	36.6	180.00	21,385.9	-6,925.5	572.6	498.3	74.27	7.709		
10,400.0	10,382.0	10,382.0	10,382.0	38.0	37.0	180.00	21,385.9	-6,925.5	578.8	503.8	75.00	7.718		
10,500.0	10,481.8	10,481.8	10,481.8	38.4	37.3	-180.00	21,385.9	-6,925.5	585.1	509.4	75.73	7.726		
10,600.0	10,581.6	10,581.6	10,581.6	38.8	37.7	-180.00	21,385.9	-6,925.5	591.3	514.9	76.46	7.734		
10,700.0	10,681.4	10,681.4	10,681.4	39.1	38.1	180.00	21,385.9	-6,925.5	597.6	520.4	77.19	7.742		
10,800.0	10,781.2	10,781.2	10,781.2	39.5	38.4	180.00	21,385.9	-6,925.5	603.8	525.9	77.92	7.749		
10,900.0	10,881.0	10,881.0	10,881.0	39.9	38.8	-180.00	21,385.9	-6,925.5	610.1	531.4	78.65	7.757		
11,000.0	10,980.8	10,980.8	10,980.8	40.2	39.1	180.00	21,385.9	-6,925.5	616.3	537.0	79.38	7.764		
11,100.0	11,080.6	11,080.6	11,080.6	40.6	39.5	180.00	21,385.9	-6,925.5	622.6	542.5	80.11	7.772		
11,200.0	11,180.4	11,180.4	11,180.4	41.0	39.9	-180.00	21,385.9	-6,925.5	628.8	548.0	80.84	7.779		
11,300.0	11,280.2	11,280.2	11,280.2	41.4	40.2	180.00	21,385.9	-6,925.5	635.1	553.5	81.57	7.786		
11,400.0	11,380.0	11,380.0	11,380.0	41.7	40.6	180.00	21,385.9	-6,925.5	641.3	559.0	82.30	7.793		
11,500.0	11,479.8	11,479.8	11,479.8	42.1	40.9	-180.00	21,385.9	-6,925.5	647.6	564.6	83.03	7.800		
11,600.0	11,579.6	11,579.6	11,579.6	42.5	41.3	-180.00	21,385.9	-6,925.5	653.8	570.1	83.76	7.806		
11,700.0	11,679.4	11,679.4	11,679.4	42.8	41.6	180.00	21,385.9	-6,925.5	660.1	575.6	84.49	7.813		
11,800.0	11,779.2	11,779.2	11,779.2	43.2	42.0	180.00	21,385.9	-6,925.5	666.3	581.1	85.22	7.819		
11,900.0	11,879.0	11,879.0	11,879.0	43.6	42.4	-180.00	21,385.9	-6,925.5	672.6	586.6	85.95	7.826		
12,000.0	11,978.8	11,978.8	11,978.8	44.0	42.7	180.00	21,385.9	-6,925.5	678.8	592.2	86.68	7.832		
12,108.4	12,087.0	12,087.0	12,087.0	44.4	43.1	180.00	21,385.9	-6,925.5	685.6	598.1	87.47	7.839		
12,125.0	12,103.6	12,123.9	12,123.9	44.4	43.2	-147.89	21,386.6	-6,924.8	686.4	598.8	87.66	7.831		
12,150.0	12,128.5	12,197.8	12,197.0	44.5	43.5	-115.29	21,394.4	-6,917.9	686.0	598.0	88.01	7.794		
12,175.0	12,153.3	12,269.3	12,265.4	44.6	43.7	-100.45	21,409.8	-6,904.1	683.4	595.1	88.34	7.737		
12,200.0	12,178.0	12,336.5	12,326.2	44.7	44.0	-92.57	21,431.1	-6,885.1	679.0	590.4	88.64	7.660		
12,225.0	12,202.5	12,398.4	12,378.0	44.8	44.2	-87.56	21,456.1	-6,862.7	672.8	583.9	88.92	7.566		
12,250.0	12,226.6	12,454.4	12,421.0	44.8	44.3	-83.98	21,482.9	-6,838.7	665.2	576.0	89.18	7.459		
12,275.0	12,250.4	12,504.8	12,455.7	44.9	44.5	-81.25	21,510.1	-6,814.4	656.2	566.8	89.41	7.339		
12,300.0	12,273.7	12,550.1	12,483.5	45.0	44.6	-79.12	21,536.7	-6,790.6	646.2	556.5	89.63	7.209		
12,325.0	12,296.6	12,590.6	12,505.5	45.1	44.8	-77.43	21,562.1	-6,767.8	635.2	545.4	89.83	7.071		
12,350.0	12,318.9	12,627.2	12,522.7	45.1	44.9	-76.10	21,586.1	-6,746.3	623.4	533.4	90.02	6.925		
12,375.0	12,340.6	12,660.4	12,536.2	45.2	45.0	-75.07	21,608.7	-6,726.1	611.0	520.8	90.20	6.774		
12,400.0	12,361.6	12,690.7	12,546.6	45.2	45.1	-74.30	21,629.9	-6,707.2	598.0	507.6	90.37	6.617		
12,425.0	12,381.9	12,718.5	12,554.5	45.3	45.2	-73.75	21,649.8	-6,689.4	584.5	494.0	90.53	6.457		
12,450.0	12,401.4	12,744.2	12,560.5	45.3	45.3	-73.39	21,668.4	-6,672.7	570.6	479.9	90.68	6.293		
12,475.0	12,420.1	12,768.2	12,564.9	45.4	45.4	-73.21	21,686.0	-6,657.0	556.3	465.5	90.82	6.126		
12,500.0	12,437.9	12,790.7	12,567.9	45.4	45.5	-73.17	21,702.6	-6,642.1	541.7	450.8	90.95	5.956		
12,525.0	12,454.7	12,812.0	12,569.7	45.5	45.6	-73.26	21,718.4	-6,628.0	526.8	435.7	91.07	5.785		
12,550.0	12,470.5	12,832.2	12,570.6	45.5	45.7	-73.46	21,733.5	-6,614.5	511.7	420.5	91.19	5.611		
12,575.0	12,485.4	12,843.3	12,570.8	45.5	45.7	-74.49	21,741.7	-6,607.1	496.4	405.1	91.26	5.439		
12,600.0	12,499.1	12,860.4	12,570.8	45.5	45.8	-75.06	21,754.6	-6,595.8	481.1	389.7	91.36	5.265		
12,625.0	12,511.7	12,873.0	12,570.8	45.6	45.9	-76.09	21,764.1	-6,587.5	465.8	374.4	91.44	5.094		
12,650.0	12,523.2	12,886.1	12,570.7	45.6	45.9	-77.16	21,774.1	-6,579.0	450.6	359.1	91.52	4.924		
12,675.0	12,533.5	12,900.0	12,570.7	45.6	46.0	-78.25	21,784.7	-6,570.2	435.5	343.9	91.60	4.754		
12,700.0	12,542.6	12,913.8	12,570.7	45.6	46.1	-79.43	21,795.4	-6,561.4	420.4	328.8	91.69	4.586		
12,725.0	12,550.5	12,928.4	12,570.7	45.6	46.1	-80.67	21,806.8	-6,552.3	405.4	313.7	91.77	4.418		
12,750.0	12,557.1	12,943.3	12,570.6	45.6	46.2	-81.99	21,818.5	-6,543.1	390.5	298.6	91.87	4.251		
12,775.0	12,562.5	12,958.7	12,570.6	45.7	46.3	-83.42	21,830.7	-6,533.7	375.6	283.6	91.96	4.084		
12,800.0	12,566.6	12,974.4	12,570.5	45.7	46.4	-84.97	21,843.3	-6,524.3	360.8	268.8	92.07	3.919		
12,825.0	12,569.4	13,000.0	12,570.4	45.7	46.5	-86.46	21,864.0	-6,509.2	346.3	254.1	92.23	3.755		
12,850.0	12,570.9	13,000.0	12,570.4	45.8	46.5	-88.61	21,864.0	-6,509.2	331.6	239.4	92.26	3.594		
12,877.1	12,571.0	13,024.9	12,570.3	45.8	46.6	-90.79	21,884.4	-6,494.9	315.9	223.4	92.44	3.417		

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:	Site LUDEMAN
Project:	LEA COUNTY, NM	TVD Reference:	WELL @ 3342.0usft (Original Well Elev)
Reference Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	FASCINATOR FEE COM #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	DWD Plan 4 - neg vs step out	Offset TVD Reference:	Offset Datum

Offset Design LUDEMAN - FASCINATOR FEE COM #1H - OWB - DWD Plan 3 - land and turn													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 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		
12,900.0	12,570.5	13,040.4	12,570.3	45.8	46.7	-90.87	21,897.2	-6,486.2	302.9	210.3	92.57	3.272		
13,000.0	12,568.1	13,110.8	12,569.8	46.1	47.1	-91.29	21,956.5	-6,448.4	248.5	155.3	93.21	2.666		
13,100.0	12,565.8	13,185.7	12,569.3	46.4	47.6	-91.87	22,021.6	-6,411.3	198.4	104.4	93.97	2.111		
13,200.0	12,563.4	13,265.1	12,568.5	46.8	48.1	-92.72	22,092.6	-6,375.9	153.1	58.3	94.85	1.614 Advise and Monitor		
13,300.0	12,561.1	13,348.9	12,567.5	47.2	48.6	-94.04	22,169.6	-6,342.7	113.0	17.2	95.81	1.179 Shut in Produces		
13,400.0	12,558.8	13,436.9	12,566.3	47.7	49.1	-96.25	22,252.3	-6,312.9	78.5	-18.4	96.86	0.811 Stop Drilling Now		
13,500.0	12,556.4	13,528.6	12,564.8	48.3	49.7	-100.33	22,340.3	-6,287.2	50.1	-47.9	97.99	0.512 Stop Drilling Now		
13,600.0	12,554.1	13,623.6	12,563.1	48.9	50.3	-109.08	22,433.0	-6,266.6	28.5	-70.7	99.17	0.287 Stop Drilling Now		
13,700.0	12,551.8	13,721.0	12,561.2	49.5	50.9	-130.50	22,529.3	-6,251.9	14.6	-85.8	100.41	0.145 Stop Drilling Now		
13,800.0	12,549.4	13,820.2	12,559.0	50.2	51.5	-167.49	22,628.1	-6,243.7	9.8	-91.9	101.69	0.096 Stop Drilling Now		
13,900.0	12,547.1	13,920.1	12,556.5	50.9	52.1	179.41	22,728.0	-6,242.2	9.5	-93.5	103.00	0.092 Stop Drilling Now		
14,000.0	12,544.7	14,020.1	12,554.1	51.7	52.7	179.41	22,828.0	-6,243.0	9.3	-95.1	104.38	0.089 Stop Drilling Now		
14,100.0	12,542.4	14,120.1	12,551.6	52.5	53.3	179.40	22,927.9	-6,243.7	9.2	-96.6	105.84	0.087 Stop Drilling Now		
14,200.0	12,540.1	14,220.1	12,549.1	53.4	54.0	179.39	23,027.9	-6,244.4	9.0	-98.3	107.37	0.084 Stop Drilling Now		
14,300.0	12,537.7	14,320.1	12,546.6	54.3	54.7	179.38	23,127.9	-6,245.2	8.9	-100.1	108.99	0.082 Stop Drilling Now		
14,400.0	12,535.4	14,420.1	12,544.2	55.2	55.5	179.37	23,227.8	-6,245.9	8.8	-101.9	110.68	0.079 Stop Drilling Now		
14,500.0	12,533.0	14,520.1	12,541.7	56.2	56.3	179.36	23,327.8	-6,246.7	8.6	-103.8	112.45	0.077 Stop Drilling Now		
14,600.0	12,530.7	14,620.1	12,539.2	57.2	57.1	179.35	23,427.8	-6,247.4	8.5	-105.8	114.29	0.074 Stop Drilling Now		
14,700.0	12,528.4	14,720.1	12,536.7	58.2	58.0	179.34	23,527.7	-6,248.1	8.3	-107.8	116.19	0.072 Stop Drilling Now		
14,800.0	12,526.0	14,820.1	12,534.2	59.3	58.9	179.32	23,627.7	-6,248.9	8.2	-109.9	118.15	0.069 Stop Drilling Now		
14,900.0	12,523.7	14,920.1	12,531.8	60.3	59.8	179.31	23,727.7	-6,249.6	8.1	-112.1	120.18	0.067 Stop Drilling Now		
15,000.0	12,521.4	15,020.1	12,529.3	61.4	60.8	179.30	23,827.6	-6,250.4	7.9	-114.3	122.26	0.065 Stop Drilling Now		
15,100.0	12,519.0	15,120.1	12,526.8	62.6	61.8	179.29	23,927.6	-6,251.1	7.8	-116.6	124.40	0.063 Stop Drilling Now		
15,200.0	12,516.7	15,220.1	12,524.3	63.7	62.9	179.27	24,027.6	-6,251.8	7.7	-118.9	126.59	0.060 Stop Drilling Now		
15,300.0	12,514.3	15,320.1	12,521.8	64.9	63.9	179.26	24,127.5	-6,252.6	7.5	-121.3	128.83	0.058 Stop Drilling Now		
15,400.0	12,512.0	15,420.1	12,519.4	66.1	65.0	179.25	24,227.5	-6,253.3	7.4	-123.7	131.12	0.056 Stop Drilling Now		
15,500.0	12,509.7	15,520.1	12,516.9	67.3	66.1	179.23	24,327.5	-6,254.1	7.2	-126.2	133.45	0.054 Stop Drilling Now		
15,600.0	12,507.3	15,620.1	12,514.4	68.6	67.3	179.22	24,427.4	-6,254.8	7.1	-128.7	135.82	0.052 Stop Drilling Now		
15,700.0	12,505.0	15,720.1	12,511.9	69.8	68.4	179.20	24,527.4	-6,255.5	7.0	-131.3	138.24	0.050 Stop Drilling Now		
15,800.0	12,502.6	15,820.1	12,509.5	71.1	69.6	179.19	24,627.4	-6,256.3	6.8	-133.9	140.69	0.048 Stop Drilling Now		
15,900.0	12,500.3	15,920.1	12,507.0	72.4	70.8	179.17	24,727.3	-6,257.0	6.7	-136.5	143.17	0.047 Stop Drilling Now		
16,000.0	12,498.0	16,020.1	12,504.5	73.7	72.0	179.15	24,827.3	-6,257.8	6.5	-139.2	145.70	0.045 Stop Drilling Now		
16,100.0	12,495.6	16,120.1	12,502.0	75.0	73.3	179.13	24,927.3	-6,258.5	6.4	-141.9	148.25	0.043 Stop Drilling Now		
16,200.0	12,493.3	16,220.1	12,499.5	76.3	74.5	179.11	25,027.2	-6,259.2	6.3	-144.6	150.83	0.041 Stop Drilling Now		
16,300.0	12,491.0	16,320.1	12,497.1	77.7	75.8	179.09	25,127.2	-6,260.0	6.1	-147.3	153.45	0.040 Stop Drilling Now		
16,400.0	12,488.6	16,420.1	12,494.6	79.0	77.1	179.07	25,227.2	-6,260.7	6.0	-150.1	156.09	0.038 Stop Drilling Now		
16,500.0	12,486.3	16,520.1	12,492.1	80.4	78.4	179.05	25,327.1	-6,261.5	5.8	-152.9	158.75	0.037 Stop Drilling Now		
16,600.0	12,483.9	16,620.1	12,489.6	81.8	79.7	179.03	25,427.1	-6,262.2	5.7	-155.7	161.45	0.035 Stop Drilling Now		
16,700.0	12,481.6	16,720.1	12,487.2	83.1	81.0	179.00	25,527.1	-6,262.9	5.6	-158.6	164.16	0.034 Stop Drilling Now		
16,800.0	12,479.3	16,820.1	12,484.7	84.5	82.4	178.98	25,627.0	-6,263.7	5.4	-161.5	166.90	0.032 Stop Drilling Now		
16,900.0	12,476.9	16,920.1	12,482.2	86.0	83.7	178.95	25,727.0	-6,264.4	5.3	-164.4	169.66	0.031 Stop Drilling Now		
17,000.0	12,474.6	17,020.1	12,479.7	87.4	85.1	178.92	25,827.0	-6,265.2	5.1	-167.3	172.44	0.030 Stop Drilling Now		
17,100.0	12,472.2	17,120.1	12,477.2	88.8	86.4	178.89	25,926.9	-6,265.9	5.0	-170.2	175.24	0.029 Stop Drilling Now		
17,200.0	12,469.9	17,220.1	12,474.8	90.2	87.8	178.86	26,026.9	-6,266.6	4.9	-173.2	178.05	0.027 Stop Drilling Now		
17,300.0	12,467.6	17,320.1	12,472.3	91.7	89.2	178.82	26,126.9	-6,267.4	4.7	-176.2	180.89	0.026 Stop Drilling Now		
17,400.0	12,465.2	17,420.1	12,469.8	93.1	90.6	178.79	26,226.8	-6,268.1	4.6	-179.2	183.74	0.025 Stop Drilling Now		
17,500.0	12,462.9	17,520.1	12,467.3	94.6	92.0	178.75	26,326.8	-6,268.9	4.4	-182.2	186.61	0.024 Stop Drilling Now		
17,600.0	12,460.6	17,620.1	12,464.9	96.0	93.5	178.71	26,426.8	-6,269.6	4.3	-185.2	189.49	0.023 Stop Drilling Now		
17,700.0	12,458.2	17,720.1	12,462.4	97.5	94.9	178.67	26,526.7	-6,270.3	4.2	-188.2	192.39	0.022 Stop Drilling Now		
17,800.0	12,455.9	17,820.1	12,459.9	99.0	96.3	178.62	26,626.7	-6,271.1	4.0	-191.3	195.30	0.021 Stop Drilling Now		
17,900.0	12,453.5	17,920.1	12,457.4	100.5	97.8	178.57	26,726.7	-6,271.8	3.9	-194.3	198.22	0.020 Stop Drilling Now		
18,000.0	12,451.2	18,020.1	12,454.9	101.9	99.2	178.52	26,826.6	-6,272.6	3.7	-197.4	201.16	0.019 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:	Site LUDEMAN
Project:	LEA COUNTY, NM	TVD Reference:	WELL @ 3342.0usft (Original Well Elev)
Reference Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	FASCINATOR FEE COM #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	DWD Plan 4 - neg vs step out	Offset TVD Reference:	Offset Datum

Offset Design LUDEMAN - FASCINATOR FEE COM #1H - OWB - DWD Plan 3 - land and turn													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	0.0 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	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)						
18,100.0	12,448.9	18,120.1	12,452.5	103.4	100.7	178.46	26,926.6	-6,273.3	3.6	-200.5	204.11	0.018	Stop Drilling Now	
18,200.0	12,446.5	18,220.1	12,450.0	104.9	102.1	178.40	27,026.6	-6,274.0	3.5	-203.6	207.07	0.017	Stop Drilling Now	
18,300.0	12,444.2	18,320.1	12,447.5	106.4	103.6	178.33	27,126.5	-6,274.8	3.3	-206.7	210.04	0.016	Stop Drilling Now	
18,400.0	12,441.8	18,420.1	12,445.0	107.9	105.1	178.26	27,226.5	-6,275.5	3.2	-209.8	213.02	0.015	Stop Drilling Now	
18,500.0	12,439.5	18,520.1	12,442.5	109.4	106.6	178.18	27,326.5	-6,276.3	3.0	-213.0	216.02	0.014	Stop Drilling Now	
18,600.0	12,437.2	18,620.1	12,440.1	111.0	108.1	178.09	27,426.4	-6,277.0	2.9	-216.1	219.02	0.013	Stop Drilling Now	
18,700.0	12,434.8	18,720.1	12,437.6	112.5	109.5	177.99	27,526.4	-6,277.7	2.8	-219.3	222.03	0.012	Stop Drilling Now	
18,800.0	12,432.5	18,820.1	12,435.1	114.0	111.0	177.89	27,626.4	-6,278.5	2.6	-222.4	225.05	0.012	Stop Drilling Now	
18,900.0	12,430.2	18,920.1	12,432.6	115.5	112.5	177.77	27,726.3	-6,279.2	2.5	-225.6	228.08	0.011	Stop Drilling Now	
19,000.0	12,427.8	19,020.1	12,430.2	117.1	114.1	177.64	27,826.3	-6,280.0	2.3	-228.8	231.12	0.010	Stop Drilling Now	
19,100.0	12,425.5	19,120.1	12,427.7	118.6	115.6	177.49	27,926.3	-6,280.7	2.2	-232.0	234.16	0.009	Stop Drilling Now	
19,200.0	12,423.1	19,220.1	12,425.2	120.1	117.1	177.32	28,026.2	-6,281.4	2.1	-235.1	237.22	0.009	Stop Drilling Now	
19,300.0	12,420.8	19,320.1	12,422.7	121.7	118.6	177.12	28,126.2	-6,282.2	1.9	-238.3	240.28	0.008	Stop Drilling Now	
19,400.0	12,418.5	19,420.1	12,420.2	123.2	120.1	176.90	28,226.2	-6,282.9	1.8	-241.6	243.35	0.007	Stop Drilling Now	
19,500.0	12,416.1	19,520.1	12,417.8	124.8	121.6	176.64	28,326.1	-6,283.7	1.7	-244.8	246.42	0.007	Stop Drilling Now	
19,600.0	12,413.8	19,620.1	12,415.3	126.3	123.2	176.32	28,426.1	-6,284.4	1.5	-248.0	249.50	0.006	Stop Drilling Now	
19,700.0	12,411.4	19,720.1	12,412.8	127.9	124.7	175.95	28,526.1	-6,285.1	1.4	-251.2	252.59	0.005	Stop Drilling Now	
19,800.0	12,409.1	19,820.1	12,410.3	129.4	126.2	175.49	28,626.0	-6,285.9	1.2	-254.5	255.68	0.005	Stop Drilling Now	
19,900.0	12,406.8	19,920.1	12,407.9	131.0	127.8	174.92	28,726.0	-6,286.6	1.1	-257.7	258.78	0.004	Stop Drilling Now	
20,000.0	12,404.4	20,020.1	12,405.4	132.6	129.3	174.17	28,826.0	-6,287.3	1.0	-260.9	261.89	0.004	Stop Drilling Now	
20,100.0	12,402.1	20,120.1	12,402.9	134.1	130.9	173.18	28,925.9	-6,288.1	0.8	-264.2	265.00	0.003	Stop Drilling Now	
20,200.0	12,399.8	20,220.1	12,400.4	135.7	132.4	171.77	29,025.9	-6,288.8	0.7	-267.4	268.11	0.003	Stop Drilling Now	
20,300.0	12,397.4	20,320.1	12,397.9	137.3	134.0	169.65	29,125.9	-6,289.6	0.5	-270.7	271.23	0.002	Stop Drilling Now	
20,330.8	12,396.7	20,351.0	12,397.2	137.7	134.5	168.76	29,156.7	-6,289.8	0.5	-271.7	272.20	0.002	Stop Drilling Now	
20,345.2	12,396.4	20,365.3	12,396.8	138.0	134.7	168.29	29,171.0	-6,289.9	0.5	-272.2	272.64	0.002	Stop Drilling Now, ES	

COG Operating LLC

Anticollision Report

Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Site LUDEMAN
Project:	LEA COUNTY, NM	TVD Reference:	WELL @ 3342.0usft (Original Well Elev)
Reference Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	FASCINATOR FEE COM #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	DWD Plan 4 - neg vs step out	Offset TVD Reference:	Offset Datum

Offset Design LUDEMAN - FASCINATOR FEE COM #2H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100-PHX_SPT_GTD, 900-MWD													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	2.2	2.2	0.0	3.0	-90.06	21,384.9	-7,815.4	889.9					
100.0	100.0	113.0	113.0	0.1	3.0	-90.07	21,384.7	-7,814.7	889.2	886.1	3.14	283.247		
200.0	200.0	216.8	216.8	0.5	3.1	-90.10	21,384.4	-7,813.1	887.7	884.2	3.55	250.005		
300.0	300.0	317.4	317.4	0.8	3.2	-90.12	21,384.1	-7,811.4	886.0	882.0	4.01	220.966		
400.0	400.0	416.1	416.1	1.2	3.3	-90.15	21,383.5	-7,809.7	884.3	879.8	4.51	196.102		
500.0	500.0	509.3	509.2	1.6	3.5	-90.18	21,383.1	-7,808.6	883.1	878.1	5.03	175.404		
600.0	600.0	608.8	608.7	1.9	3.7	-90.20	21,382.8	-7,807.8	882.3	876.7	5.60	157.520		
691.8	691.8	693.8	693.8	2.3	3.9	-90.21	21,382.7	-7,807.5	882.0	875.8	6.11	144.286 CC		
700.0	700.0	701.5	701.5	2.3	3.9	-90.21	21,382.6	-7,807.5	882.0	875.8	6.16	143.196		
800.0	800.0	800.0	799.9	2.6	4.1	-90.24	21,382.3	-7,807.7	882.2	875.4	6.73	131.148		
900.0	900.0	901.0	901.0	3.0	4.2	-90.24	21,382.1	-7,807.9	882.4	875.1	7.22	122.139		
1,000.0	1,000.0	1,002.3	1,002.2	3.4	4.3	-90.23	21,382.3	-7,807.9	882.4	874.7	7.70	114.565		
1,050.0	1,050.0	1,053.4	1,053.3	3.5	4.4	-90.22	21,382.5	-7,807.9	882.4	874.5	7.92	111.389		
1,054.8	1,054.8	1,058.3	1,058.2	3.6	4.4	165.47	21,382.5	-7,807.9	882.4	874.4	7.94	111.123 ES		
1,100.0	1,100.0	1,104.8	1,104.7	3.7	4.4	165.49	21,382.6	-7,807.8	882.7	874.6	8.12	108.715		
1,200.0	1,199.9	1,210.3	1,210.2	4.1	4.5	165.55	21,383.0	-7,807.2	885.5	877.0	8.53	103.761		
1,229.2	1,229.1	1,241.6	1,241.6	4.2	4.5	165.58	21,383.1	-7,806.8	886.8	878.2	8.66	102.379		
1,300.0	1,299.7	1,317.7	1,317.6	4.4	4.6	165.67	21,383.3	-7,805.7	890.1	881.1	8.97	99.180		
1,400.0	1,399.5	1,422.4	1,422.3	4.7	4.7	165.80	21,383.6	-7,803.5	894.0	884.6	9.46	94.537		
1,500.0	1,499.4	1,520.0	1,519.9	5.1	4.8	165.91	21,383.9	-7,801.0	897.6	887.6	9.94	90.277		
1,600.0	1,599.2	1,617.4	1,617.2	5.5	5.0	166.02	21,384.1	-7,798.8	901.4	890.9	10.47	86.118		
1,700.0	1,699.0	1,709.0	1,708.8	5.8	5.2	166.12	21,384.3	-7,797.6	906.1	895.1	10.99	82.478		
1,800.0	1,798.8	1,814.7	1,814.5	6.2	5.4	166.24	21,384.6	-7,796.4	911.0	899.5	11.56	78.778		
1,900.0	1,898.6	1,920.2	1,920.0	6.5	5.6	166.37	21,385.1	-7,794.4	915.3	903.1	12.15	75.315		
2,000.0	1,998.4	2,023.6	2,023.4	6.9	5.9	166.49	21,385.6	-7,792.0	919.0	906.3	12.76	72.038		
2,100.0	2,098.2	2,123.0	2,122.7	7.3	6.1	166.62	21,386.1	-7,789.4	922.5	909.1	13.36	69.033		
2,200.0	2,198.0	2,215.8	2,215.6	7.6	6.3	166.73	21,386.4	-7,787.5	926.5	912.6	13.97	66.344		
2,300.0	2,297.8	2,311.8	2,311.5	8.0	6.6	166.83	21,386.7	-7,786.2	931.3	916.7	14.58	63.857		
2,400.0	2,397.6	2,413.5	2,413.2	8.3	6.9	166.94	21,387.0	-7,784.8	936.0	920.8	15.23	61.469		
2,500.0	2,497.4	2,519.1	2,518.7	8.7	7.2	167.04	21,387.2	-7,783.1	940.4	924.5	15.89	59.187		
2,600.0	2,597.2	2,628.7	2,628.3	9.1	7.5	167.14	21,387.1	-7,780.3	944.0	927.4	16.57	56.964		
2,700.0	2,697.0	2,730.1	2,729.7	9.4	7.8	167.21	21,386.9	-7,777.0	946.8	929.6	17.24	54.928		
2,800.0	2,796.8	2,829.1	2,828.7	9.8	8.1	167.28	21,386.6	-7,773.8	949.7	931.8	17.90	53.056		
2,900.0	2,896.6	2,922.4	2,921.9	10.2	8.4	167.35	21,386.4	-7,771.2	953.0	934.4	18.55	51.367		
3,000.0	2,996.4	3,014.8	3,014.3	10.5	8.7	167.44	21,386.5	-7,769.3	957.0	937.8	19.20	49.834		
3,100.0	3,096.2	3,117.3	3,116.8	10.9	9.0	167.54	21,386.7	-7,767.5	961.4	941.5	19.89	48.331		
3,200.0	3,196.0	3,222.0	3,221.5	11.3	9.3	167.61	21,386.5	-7,765.2	965.4	944.8	20.59	46.884		
3,300.0	3,295.8	3,325.2	3,324.6	11.7	9.6	167.67	21,385.9	-7,762.6	968.9	947.6	21.29	45.514		
3,400.0	3,395.6	3,426.5	3,425.8	12.0	10.0	167.70	21,385.1	-7,759.6	972.1	950.1	21.98	44.224		
3,500.0	3,495.4	3,519.3	3,518.6	12.4	10.3	167.74	21,384.5	-7,757.3	975.6	953.0	22.65	43.075		
3,600.0	3,595.2	3,612.9	3,612.2	12.8	10.6	167.80	21,384.1	-7,755.6	979.9	956.6	23.32	42.016		
3,700.0	3,695.1	3,711.0	3,710.3	13.1	10.9	167.87	21,383.9	-7,754.2	984.6	960.6	24.01	41.001		
3,800.0	3,794.9	3,809.5	3,808.8	13.5	11.2	167.95	21,384.0	-7,753.0	989.5	964.8	24.71	40.047		
3,900.0	3,894.7	3,909.3	3,908.6	13.9	11.5	168.02	21,383.9	-7,751.8	994.4	969.0	25.41	39.137		
4,000.0	3,994.5	4,008.5	4,007.8	14.2	11.9	168.08	21,383.7	-7,750.6	999.3	973.2	26.11	38.278		
4,100.0	4,094.3	4,106.5	4,105.8	14.6	12.2	168.14	21,383.4	-7,749.6	1,004.4	977.6	26.80	37.473		
4,200.0	4,194.1	4,209.1	4,208.3	15.0	12.5	168.20	21,383.1	-7,748.7	1,009.6	982.1	27.52	36.690		
4,300.0	4,293.9	4,318.1	4,317.4	15.3	12.9	168.26	21,382.6	-7,746.8	1,014.0	985.8	28.25	35.890		
4,400.0	4,393.7	4,426.4	4,425.7	15.7	13.3	168.30	21,381.9	-7,744.1	1,017.6	988.6	28.99	35.101		
4,500.0	4,493.5	4,534.4	4,533.6	16.1	13.6	168.32	21,380.6	-7,740.6	1,020.4	990.7	29.73	34.324		
4,600.0	4,593.3	4,630.8	4,629.8	16.5	14.0	168.31	21,379.1	-7,737.2	1,022.9	992.5	30.43	33.619		
4,700.0	4,693.1	4,730.0	4,729.0	16.8	14.3	168.30	21,377.5	-7,734.1	1,025.9	994.7	31.14	32.948		

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:	Site LUDEMAN
Project:	LEA COUNTY, NM	TVD Reference:	WELL @ 3342.0usft (Original Well Elev)
Reference Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	FASCINATOR FEE COM #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	DWD Plan 4 - neg vs step out	Offset TVD Reference:	Offset Datum

Offset Design LUDEMAN - FASCINATOR FEE COM #2H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100-PHX_SPT_GTD, 900-MWD													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		
4,800.0	4,792.9	4,830.9	4,829.9	17.2	14.7	168.29	21,375.9	-7,731.0	1,028.8	997.0	31.85	32.298		
4,900.0	4,892.7	4,935.7	4,934.6	17.6	15.0	168.28	21,374.3	-7,727.2	1,031.3	998.7	32.59	31.649		
5,000.0	4,992.5	5,039.3	5,038.1	17.9	15.4	168.29	21,373.0	-7,723.1	1,033.4	1,000.1	33.32	31.018		
5,100.0	5,092.3	5,141.5	5,140.2	18.3	15.7	168.31	21,371.8	-7,718.7	1,035.2	1,001.1	34.04	30.407		
5,200.0	5,192.1	5,241.0	5,239.6	18.7	16.1	168.35	21,371.1	-7,714.3	1,036.9	1,002.1	34.76	29.827		
5,300.0	5,291.9	5,337.5	5,336.0	19.1	16.4	168.42	21,370.8	-7,710.2	1,038.7	1,003.2	35.47	29.283		
5,400.0	5,391.7	5,432.1	5,430.6	19.4	16.7	168.47	21,370.4	-7,706.7	1,041.1	1,004.9	36.17	28.780		
5,500.0	5,491.5	5,529.4	5,527.8	19.8	17.1	168.52	21,369.9	-7,703.4	1,043.8	1,006.9	36.89	28.298		
5,600.0	5,591.3	5,628.2	5,626.5	20.2	17.4	168.57	21,369.6	-7,700.2	1,046.7	1,009.1	37.60	27.837		
5,700.0	5,691.1	5,729.2	5,727.4	20.5	17.8	168.63	21,369.2	-7,697.0	1,049.6	1,011.3	38.33	27.386		
5,800.0	5,790.9	5,829.6	5,827.8	20.9	18.1	168.69	21,368.9	-7,693.7	1,052.5	1,013.4	39.05	26.951		
5,900.0	5,890.7	5,929.5	5,927.7	21.3	18.5	168.76	21,368.7	-7,690.4	1,055.3	1,015.5	39.78	26.532		
6,000.0	5,990.6	6,029.5	6,027.6	21.7	18.8	168.83	21,368.7	-7,687.1	1,058.1	1,017.6	40.50	26.128		
6,100.0	6,090.4	6,129.4	6,127.5	22.0	19.2	168.89	21,368.4	-7,683.8	1,061.0	1,019.7	41.22	25.737		
6,200.0	6,190.2	6,229.4	6,227.4	22.4	19.5	168.94	21,368.0	-7,680.5	1,063.8	1,021.8	41.95	25.360		
6,300.0	6,290.0	6,329.4	6,327.3	22.8	19.9	169.00	21,367.7	-7,677.2	1,066.6	1,023.9	42.67	24.996		
6,400.0	6,389.8	6,429.3	6,427.2	23.1	20.3	169.06	21,367.4	-7,673.9	1,069.4	1,026.0	43.40	24.644		
6,500.0	6,489.6	6,529.0	6,526.8	23.5	20.6	169.13	21,367.3	-7,670.6	1,072.3	1,028.1	44.12	24.303		
6,600.0	6,589.4	6,628.2	6,626.0	23.9	21.0	169.20	21,367.3	-7,667.3	1,075.1	1,030.3	44.84	23.976		
6,700.0	6,689.2	6,727.2	6,724.9	24.3	21.3	169.27	21,367.3	-7,664.2	1,078.1	1,032.5	45.57	23.661		
6,800.0	6,789.0	6,827.2	6,824.8	24.6	21.7	169.35	21,367.4	-7,661.1	1,081.1	1,034.8	46.29	23.355		
6,900.0	6,888.8	6,927.8	6,925.4	25.0	22.0	169.42	21,367.4	-7,657.9	1,084.1	1,037.1	47.02	23.057		
7,000.0	6,988.6	7,030.8	7,028.4	25.4	22.4	169.50	21,367.4	-7,654.4	1,086.9	1,039.2	47.76	22.760		
7,100.0	7,088.4	7,129.6	7,127.1	25.7	22.7	169.57	21,367.4	-7,650.9	1,089.6	1,041.1	48.48	22.474		
7,200.0	7,188.2	7,221.0	7,218.5	26.1	23.1	169.62	21,367.1	-7,648.2	1,092.7	1,043.5	49.18	22.221		
7,300.0	7,288.0	7,315.5	7,313.0	26.5	23.4	169.65	21,366.6	-7,646.1	1,096.6	1,046.8	49.88	21.985		
7,400.0	7,387.8	7,417.5	7,414.9	26.9	23.8	169.68	21,365.9	-7,644.0	1,100.6	1,050.0	50.61	21.745		
7,500.0	7,487.6	7,517.7	7,515.1	27.2	24.1	169.72	21,365.2	-7,641.7	1,104.4	1,053.1	51.34	21.512		
7,600.0	7,587.4	7,615.7	7,613.1	27.6	24.5	169.75	21,364.6	-7,639.5	1,108.3	1,056.3	52.06	21.290		
7,700.0	7,687.2	7,714.4	7,711.8	28.0	24.8	169.78	21,364.0	-7,637.5	1,112.4	1,059.7	52.78	21.077		
7,800.0	7,787.0	7,813.9	7,811.2	28.3	25.2	169.81	21,363.3	-7,635.6	1,116.6	1,063.1	53.50	20.869		
7,900.0	7,886.8	7,913.9	7,911.2	28.7	25.5	169.83	21,362.4	-7,633.7	1,120.8	1,066.5	54.23	20.667		
8,000.0	7,986.6	8,014.3	8,011.6	29.1	25.9	169.86	21,361.7	-7,631.7	1,124.9	1,069.9	54.96	20.469		
8,100.0	8,086.4	8,113.3	8,110.5	29.5	26.2	169.89	21,361.1	-7,629.7	1,129.0	1,073.4	55.68	20.278		
8,200.0	8,186.3	8,211.8	8,209.0	29.8	26.6	169.90	21,360.1	-7,627.9	1,133.3	1,076.9	56.40	20.095		
8,300.0	8,286.1	8,313.2	8,310.4	30.2	26.9	169.90	21,358.9	-7,626.1	1,137.6	1,080.5	57.13	19.913		
8,400.0	8,385.9	8,415.3	8,412.5	30.6	27.3	169.90	21,357.6	-7,624.1	1,141.7	1,083.8	57.86	19.731		
8,500.0	8,485.7	8,515.2	8,512.4	30.9	27.6	169.93	21,356.9	-7,622.0	1,145.7	1,087.1	58.59	19.555		
8,600.0	8,585.5	8,615.2	8,612.3	31.3	28.0	170.01	21,357.4	-7,619.8	1,149.7	1,090.4	59.31	19.384		
8,700.0	8,685.3	8,718.5	8,715.6	31.7	28.4	170.14	21,358.6	-7,617.3	1,153.5	1,093.5	60.05	19.210		
8,800.0	8,785.1	8,820.0	8,817.1	32.1	28.7	170.27	21,359.9	-7,614.6	1,157.1	1,096.3	60.78	19.038		
8,900.0	8,884.9	8,915.9	8,912.9	32.4	29.1	170.39	21,361.2	-7,612.1	1,160.9	1,099.4	61.49	18.879		
9,000.0	8,984.7	9,013.1	9,010.1	32.8	29.4	170.51	21,362.5	-7,610.0	1,164.9	1,102.7	62.20	18.728		
9,100.0	9,084.5	9,114.3	9,111.3	33.2	29.8	170.63	21,363.6	-7,607.8	1,169.1	1,106.1	62.93	18.576		
9,200.0	9,184.3	9,213.7	9,210.6	33.5	30.1	170.73	21,364.5	-7,605.6	1,173.1	1,109.4	63.66	18.428		
9,300.0	9,284.1	9,310.3	9,307.2	33.9	30.5	170.83	21,365.4	-7,603.6	1,177.3	1,113.0	64.37	18.289		
9,400.0	9,383.9	9,407.7	9,404.6	34.3	30.8	170.92	21,366.2	-7,601.9	1,181.8	1,116.7	65.09	18.157		
9,500.0	9,483.7	9,506.1	9,503.0	34.7	31.1	171.01	21,366.9	-7,600.4	1,186.5	1,120.7	65.81	18.029		
9,600.0	9,583.5	9,600.2	9,597.0	35.0	31.5	171.09	21,367.5	-7,599.1	1,191.4	1,124.9	66.51	17.913		
9,700.0	9,683.3	9,690.3	9,687.2	35.4	31.8	171.16	21,368.0	-7,598.5	1,197.0	1,129.8	67.19	17.816		
9,800.0	9,783.1	9,792.8	9,789.6	35.8	32.1	171.23	21,368.6	-7,598.5	1,203.2	1,135.3	67.91	17.717		
9,900.0	9,882.9	9,910.6	9,907.4	36.1	32.5	171.30	21,368.8	-7,597.1	1,208.2	1,139.6	68.69	17.590		

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:	Site LUDEMAN
Project:	LEA COUNTY, NM	TVD Reference:	WELL @ 3342.0usft (Original Well Elev)
Reference Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	FASCINATOR FEE COM #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	DWD Plan 4 - neg vs step out	Offset TVD Reference:	Offset Datum

Offset Design LUDEMAN - FASCINATOR FEE COM #2H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100-PHX_SPT_GTD, 900-MWD													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		
10,000.0	9,982.7	10,010.1	10,006.9	36.5	32.9	171.34	21,368.5	-7,595.2	1,212.5	1,143.0	69.41	17.468		
10,100.0	10,082.5	10,106.3	10,103.1	36.9	33.2	171.36	21,367.9	-7,593.6	1,217.0	1,146.8	70.13	17.354		
10,200.0	10,182.3	10,206.6	10,203.4	37.3	33.6	171.40	21,367.5	-7,592.1	1,221.6	1,150.8	70.85	17.242		
10,300.0	10,282.1	10,307.5	10,304.3	37.6	33.9	171.45	21,367.7	-7,590.5	1,226.2	1,154.6	71.58	17.130		
10,400.0	10,382.0	10,416.4	10,413.1	38.0	34.3	171.56	21,368.8	-7,588.2	1,230.4	1,158.0	72.34	17.008		
10,500.0	10,481.8	10,526.0	10,522.7	38.4	34.7	171.73	21,371.1	-7,584.9	1,233.8	1,160.7	73.10	16.878		
10,600.0	10,581.6	10,638.1	10,634.7	38.8	35.1	171.86	21,372.4	-7,580.7	1,236.4	1,162.5	73.88	16.736		
10,700.0	10,681.4	10,736.7	10,733.2	39.1	35.5	171.91	21,372.1	-7,576.5	1,238.3	1,163.7	74.60	16.598		
10,800.0	10,781.2	10,825.9	10,822.4	39.5	35.8	171.93	21,371.4	-7,573.3	1,240.9	1,165.6	75.29	16.480		
10,900.0	10,881.0	10,916.0	10,912.4	39.9	36.1	171.94	21,370.6	-7,570.9	1,244.3	1,168.3	75.99	16.375		
11,000.0	10,980.8	11,006.9	11,003.3	40.2	36.4	171.96	21,370.0	-7,569.1	1,248.5	1,171.8	76.69	16.281		
11,100.0	11,080.6	11,101.2	11,097.6	40.6	36.8	171.99	21,369.6	-7,567.9	1,253.4	1,176.0	77.39	16.195		
11,200.0	11,180.4	11,200.7	11,197.0	41.0	37.1	172.01	21,369.2	-7,566.8	1,258.4	1,180.3	78.12	16.109		
11,300.0	11,280.2	11,297.9	11,294.3	41.4	37.5	172.03	21,368.6	-7,565.8	1,263.5	1,184.6	78.83	16.028		
11,400.0	11,380.0	11,392.9	11,389.2	41.7	37.8	172.01	21,367.4	-7,565.2	1,268.9	1,189.4	79.53	15.954		
11,500.0	11,479.8	11,493.7	11,490.0	42.1	38.2	171.97	21,365.4	-7,564.9	1,274.6	1,194.3	80.25	15.882		
11,600.0	11,579.6	11,600.3	11,596.6	42.5	38.5	171.94	21,363.9	-7,564.1	1,279.9	1,198.9	80.99	15.802		
11,700.0	11,679.4	11,706.0	11,702.3	42.8	38.9	171.95	21,363.0	-7,562.7	1,284.6	1,202.9	81.74	15.716		
11,800.0	11,779.2	11,811.4	11,807.7	43.2	39.3	171.99	21,362.6	-7,560.8	1,289.0	1,206.5	82.49	15.627		
11,900.0	11,879.0	11,909.5	11,905.8	43.6	39.6	172.03	21,362.6	-7,558.8	1,293.2	1,210.0	83.21	15.541		
12,000.0	11,978.8	12,008.7	12,005.0	44.0	40.0	172.08	21,362.6	-7,556.9	1,297.5	1,213.5	83.94	15.458		
12,108.4	12,087.0	12,095.0	12,091.2	44.4	40.3	172.17	21,363.8	-7,555.8	1,303.0	1,218.4	84.64	15.395		
12,125.0	12,103.6	12,095.0	12,091.2	44.4	40.3	-155.70	21,363.8	-7,555.8	1,304.1	1,219.4	84.70	15.396		
12,150.0	12,128.5	12,116.8	12,113.0	44.5	40.3	-123.26	21,364.8	-7,555.9	1,305.7	1,220.8	84.86	15.386		
12,175.0	12,153.3	12,131.9	12,128.0	44.6	40.4	-108.87	21,365.8	-7,556.0	1,307.3	1,222.3	85.00	15.380		
12,200.0	12,178.0	12,142.0	12,138.1	44.7	40.4	-101.63	21,366.6	-7,556.2	1,309.0	1,223.9	85.12	15.378		
12,225.0	12,202.5	12,159.8	12,155.9	44.8	40.5	-97.42	21,368.2	-7,556.6	1,310.7	1,225.4	85.26	15.373		
12,250.0	12,226.6	12,173.2	12,169.2	44.8	40.5	-94.65	21,369.7	-7,557.0	1,312.4	1,227.1	85.38	15.372		
12,275.0	12,250.4	12,190.0	12,185.8	44.9	40.6	-92.74	21,371.9	-7,557.6	1,314.2	1,228.7	85.51	15.370		
12,300.0	12,273.7	12,190.0	12,185.8	45.0	40.6	-91.17	21,371.9	-7,557.6	1,316.2	1,230.6	85.58	15.379		
12,325.0	12,296.6	12,190.0	12,185.8	45.1	40.6	-89.88	21,371.9	-7,557.6	1,318.4	1,232.7	85.65	15.393		
12,350.0	12,318.9	12,213.7	12,209.1	45.1	40.7	-89.12	21,376.0	-7,558.9	1,320.2	1,234.5	85.79	15.390		
12,375.0	12,340.6	12,237.0	12,231.6	45.2	40.7	-88.51	21,381.7	-7,560.7	1,322.7	1,236.8	85.92	15.395		
12,400.0	12,361.6	12,237.0	12,231.6	45.2	40.7	-87.72	21,381.7	-7,560.7	1,324.9	1,239.0	85.98	15.411		
12,425.0	12,381.9	12,237.0	12,231.6	45.3	40.7	-86.99	21,381.7	-7,560.7	1,327.4	1,241.4	86.03	15.430		
12,450.0	12,401.4	12,237.0	12,231.6	45.3	40.7	-86.30	21,381.7	-7,560.7	1,330.2	1,244.1	86.08	15.453		
12,475.0	12,420.1	12,256.8	12,250.4	45.4	40.8	-86.02	21,387.6	-7,562.7	1,332.8	1,246.6	86.18	15.466		
12,500.0	12,437.9	12,265.3	12,258.4	45.4	40.8	-85.58	21,390.3	-7,563.7	1,335.6	1,249.4	86.24	15.487		
12,525.0	12,454.7	12,286.0	12,277.5	45.5	40.9	-85.43	21,397.7	-7,566.5	1,338.7	1,252.4	86.34	15.506		
12,550.0	12,470.5	12,286.0	12,277.5	45.5	40.9	-84.88	21,397.7	-7,566.5	1,341.7	1,255.3	86.37	15.535		
12,575.0	12,485.4	12,286.0	12,277.5	45.5	40.9	-84.33	21,397.7	-7,566.5	1,344.9	1,258.5	86.40	15.567		
12,600.0	12,499.1	12,299.6	12,289.8	45.5	40.9	-84.12	21,403.0	-7,568.5	1,348.2	1,261.7	86.46	15.594		
12,625.0	12,511.7	12,308.3	12,297.7	45.6	40.9	-83.81	21,406.7	-7,569.9	1,351.5	1,265.0	86.50	15.625		
12,650.0	12,523.2	12,317.0	12,305.3	45.6	41.0	-83.51	21,410.5	-7,571.3	1,355.0	1,268.5	86.54	15.657		
12,675.0	12,533.5	12,333.0	12,319.2	45.6	41.0	-83.42	21,418.0	-7,574.1	1,358.6	1,272.0	86.60	15.688		
12,700.0	12,542.6	12,333.0	12,319.2	45.6	41.0	-82.91	21,418.0	-7,574.1	1,362.3	1,275.7	86.62	15.727		
12,725.0	12,550.5	12,333.0	12,319.2	45.6	41.0	-82.39	21,418.0	-7,574.1	1,366.1	1,279.5	86.64	15.768		
12,750.0	12,557.1	12,636.8	12,493.4	45.6	41.7	-86.68	21,655.5	-7,598.2	1,367.1	1,279.7	87.37	15.647		
12,775.0	12,562.5	12,653.5	12,498.5	45.7	41.8	-86.80	21,671.4	-7,597.7	1,366.3	1,278.8	87.44	15.625		
12,800.0	12,566.6	12,665.0	12,501.8	45.7	41.8	-86.93	21,682.4	-7,597.3	1,365.4	1,277.9	87.50	15.605		
12,825.0	12,569.4	12,684.6	12,506.9	45.7	41.9	-87.13	21,701.3	-7,596.8	1,364.6	1,277.0	87.58	15.581		
12,850.0	12,570.9	12,699.5	12,510.5	45.8	41.9	-87.32	21,715.8	-7,596.5	1,363.8	1,276.2	87.66	15.558		

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:	Site LUDEMAN
Project:	LEA COUNTY, NM	TVD Reference:	WELL @ 3342.0usft (Original Well Elev)
Reference Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	FASCINATOR FEE COM #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	DWD Plan 4 - neg vs step out	Offset TVD Reference:	Offset Datum

Offset Design LUDEMAN - FASCINATOR FEE COM #2H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100-PHX_SPT_GTD, 900-MWD													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		
12,877.1	12,571.0	12,712.0	12,513.1	45.8	41.9	-87.51	21,728.0	-7,596.3	1,363.1	1,275.3	87.74	15.536		
12,900.0	12,570.5	12,731.6	12,516.7	45.8	42.0	-87.68	21,747.2	-7,596.1	1,362.5	1,274.6	87.84	15.511		
13,000.0	12,568.1	12,807.0	12,523.4	46.1	42.2	-88.04	21,822.3	-7,596.2	1,361.4	1,273.1	88.30	15.418		
13,100.0	12,565.8	12,925.0	12,520.7	46.4	42.6	-88.04	21,940.3	-7,595.8	1,360.2	1,271.2	89.02	15.280		
13,200.0	12,563.4	13,024.1	12,517.0	46.8	43.0	-87.98	22,039.2	-7,594.7	1,358.5	1,268.7	89.81	15.126		
13,300.0	12,561.1	13,133.0	12,512.6	47.2	43.5	-87.90	22,148.1	-7,593.4	1,356.6	1,265.8	90.76	14.947		
13,400.0	12,558.8	13,243.6	12,505.9	47.7	44.1	-87.72	22,258.4	-7,591.1	1,353.9	1,262.1	91.85	14.741		
13,500.0	12,556.4	13,384.0	12,496.6	48.3	45.0	-87.45	22,398.4	-7,585.5	1,349.4	1,256.2	93.25	14.471		
13,600.0	12,554.1	13,503.1	12,490.8	48.9	45.8	-87.30	22,517.1	-7,577.9	1,342.3	1,247.7	94.64	14.184		
13,700.0	12,551.8	13,597.8	12,488.3	49.5	46.4	-87.28	22,611.6	-7,571.5	1,334.9	1,239.0	95.95	13.913		
13,800.0	12,549.4	13,687.5	12,489.1	50.2	47.1	-87.39	22,701.1	-7,566.3	1,328.2	1,230.9	97.31	13.648		
13,900.0	12,547.1	13,802.2	12,489.5	50.9	48.0	-87.51	22,815.6	-7,559.6	1,321.5	1,222.6	98.96	13.355		
14,000.0	12,544.7	13,903.0	12,487.1	51.7	48.9	-87.49	22,916.1	-7,552.5	1,313.8	1,213.2	100.58	13.062		
14,100.0	12,542.4	13,985.0	12,484.4	52.5	49.6	-87.45	22,997.9	-7,547.2	1,306.7	1,204.6	102.12	12.796		
14,200.0	12,540.1	14,072.3	12,481.7	53.4	50.4	-87.41	23,085.0	-7,542.9	1,301.0	1,197.2	103.78	12.537		
14,300.0	12,537.7	14,166.5	12,479.1	54.3	51.3	-87.38	23,179.1	-7,538.9	1,296.0	1,190.5	105.56	12.277		
14,400.0	12,535.4	14,265.1	12,476.5	55.2	52.2	-87.36	23,277.6	-7,534.9	1,291.3	1,183.8	107.46	12.017		
14,500.0	12,533.0	14,353.1	12,473.7	56.2	53.1	-87.32	23,365.5	-7,531.7	1,286.9	1,177.6	109.31	11.773		
14,600.0	12,530.7	14,443.0	12,470.7	57.2	54.1	-87.27	23,455.3	-7,529.3	1,283.6	1,172.3	111.25	11.538		
14,700.0	12,528.4	14,527.7	12,468.3	58.2	55.0	-87.25	23,539.9	-7,527.8	1,281.1	1,167.9	113.18	11.319		
14,800.0	12,526.0	14,612.5	12,466.6	59.3	55.9	-87.26	23,624.7	-7,527.4	1,279.9	1,164.8	115.16	11.115		
14,866.2	12,524.5	14,670.5	12,465.8	60.0	56.5	-87.28	23,682.8	-7,527.7	1,279.7	1,163.2	116.52	10.983		
14,900.0	12,523.7	14,699.3	12,465.4	60.3	56.9	-87.29	23,711.5	-7,528.0	1,279.8	1,162.6	117.21	10.919		
15,000.0	12,521.4	14,795.2	12,463.1	61.4	58.0	-87.29	23,807.4	-7,529.5	1,280.6	1,161.2	119.41	10.725		
15,100.0	12,519.0	14,917.4	12,459.3	62.6	59.4	-87.25	23,929.5	-7,530.2	1,280.5	1,158.5	121.97	10.498		
15,200.0	12,516.7	15,006.9	12,455.0	63.7	60.5	-87.15	24,018.9	-7,529.9	1,279.6	1,155.4	124.20	10.303		
15,211.4	12,516.4	15,015.8	12,454.6	63.9	60.6	-87.14	24,027.8	-7,529.9	1,279.6	1,155.1	124.44	10.283		
15,300.0	12,514.3	15,090.9	12,450.8	64.9	61.5	-87.05	24,102.8	-7,530.9	1,280.1	1,153.7	126.40	10.128		
15,400.0	12,512.0	15,188.4	12,445.5	66.1	62.7	-86.92	24,200.2	-7,532.7	1,281.4	1,152.6	128.81	9.949		
15,500.0	12,509.7	15,291.3	12,439.5	67.3	64.0	-86.76	24,302.9	-7,534.4	1,282.5	1,151.2	131.32	9.767		
15,600.0	12,507.3	15,388.0	12,433.5	68.6	65.2	-86.60	24,399.4	-7,536.0	1,283.6	1,149.9	133.79	9.594		
15,700.0	12,505.0	15,489.6	12,426.9	69.8	66.5	-86.41	24,500.7	-7,537.8	1,285.0	1,148.6	136.36	9.423		
15,800.0	12,502.6	15,581.4	12,421.6	71.1	67.7	-86.27	24,592.4	-7,539.5	1,286.3	1,147.5	138.83	9.265		
15,900.0	12,500.3	15,672.9	12,416.9	72.4	69.0	-86.16	24,683.8	-7,542.1	1,288.5	1,147.2	141.33	9.117		
16,000.0	12,498.0	15,783.2	12,410.5	73.7	70.4	-86.00	24,793.8	-7,545.2	1,290.9	1,146.7	144.11	8.957		
16,100.0	12,495.6	15,900.6	12,404.6	75.0	72.0	-85.86	24,911.0	-7,547.0	1,291.9	1,144.8	147.02	8.787		
16,200.0	12,493.3	16,018.0	12,399.1	76.3	73.6	-85.74	25,028.3	-7,547.3	1,291.5	1,141.6	149.95	8.613		
16,300.0	12,491.0	16,107.4	12,394.0	77.7	74.9	-85.60	25,117.5	-7,547.2	1,290.9	1,138.4	152.52	8.464		
16,318.2	12,490.5	16,123.2	12,393.0	77.9	75.1	-85.58	25,133.3	-7,547.2	1,290.9	1,137.9	152.99	8.438		
16,400.0	12,488.6	16,194.0	12,389.0	79.0	76.1	-85.48	25,204.0	-7,547.9	1,291.3	1,136.2	155.08	8.326		
16,500.0	12,486.3	16,300.2	12,382.7	80.4	77.5	-85.30	25,310.0	-7,549.1	1,292.0	1,134.1	157.93	8.181		
16,600.0	12,483.9	16,393.1	12,377.2	81.8	78.9	-85.16	25,402.7	-7,550.1	1,292.7	1,132.0	160.62	8.048		
16,700.0	12,481.6	16,471.9	12,373.9	83.1	80.0	-85.10	25,481.5	-7,551.9	1,294.4	1,131.2	163.13	7.935		
16,800.0	12,479.3	16,564.0	12,369.5	84.5	81.3	-85.01	25,573.4	-7,555.3	1,297.4	1,131.6	165.85	7.823		
16,900.0	12,476.9	16,689.9	12,359.7	86.0	83.1	-84.72	25,698.8	-7,558.6	1,299.9	1,130.8	169.07	7.688		
17,000.0	12,474.6	16,797.6	12,349.9	87.4	84.7	-84.40	25,806.1	-7,559.7	1,300.8	1,128.7	172.05	7.561		
17,100.0	12,472.2	16,903.4	12,343.2	88.8	86.2	-84.21	25,911.6	-7,560.5	1,301.2	1,126.2	175.01	7.435		
17,200.0	12,469.9	17,007.6	12,337.0	90.2	87.7	-84.05	26,015.7	-7,560.9	1,301.2	1,123.2	177.97	7.312		
17,288.5	12,467.8	17,094.6	12,331.7	91.5	89.0	-83.90	26,102.5	-7,561.0	1,301.0	1,120.5	180.52	7.207		
17,300.0	12,467.6	17,104.6	12,331.2	91.7	89.2	-83.89	26,112.5	-7,561.1	1,301.0	1,120.2	180.83	7.195		
17,400.0	12,465.2	17,199.1	12,329.2	93.1	90.6	-83.90	26,207.0	-7,562.3	1,301.5	1,117.9	183.67	7.086		
17,500.0	12,462.9	17,301.8	12,329.1	94.6	92.1	-84.00	26,309.6	-7,563.6	1,301.9	1,115.2	186.64	6.975		

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:	Site LUDEMAN
Project:	LEA COUNTY, NM	TVD Reference:	WELL @ 3342.0usft (Original Well Elev)
Reference Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	FASCINATOR FEE COM #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	DWD Plan 4 - neg vs step out	Offset TVD Reference:	Offset Datum

Offset Design LUDEMAN - FASCINATOR FEE COM #2H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100-PHX_SPT_GTD, 900-MWD													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		
17,600.0	12,460.6	17,426.6	12,331.0	96.0	93.9	-84.22	26,434.5	-7,564.8	1,301.8	1,111.8	189.95	6.853		
17,700.0	12,458.2	17,533.2	12,335.2	97.5	95.5	-84.51	26,540.9	-7,564.1	1,299.7	1,106.7	193.01	6.734		
17,800.0	12,455.9	17,626.6	12,340.7	99.0	96.9	-84.84	26,634.2	-7,563.8	1,297.9	1,102.0	195.88	6.626		
17,900.0	12,453.5	17,739.0	12,346.1	100.5	98.6	-85.19	26,746.5	-7,563.1	1,296.0	1,096.9	199.04	6.511		
18,000.0	12,451.2	17,837.9	12,349.2	101.9	100.1	-85.42	26,845.3	-7,561.9	1,293.6	1,091.6	202.01	6.403		
18,100.0	12,448.9	17,942.8	12,350.7	103.4	101.6	-85.58	26,950.2	-7,560.4	1,291.1	1,086.0	205.08	6.295		
18,200.0	12,446.5	18,048.1	12,353.1	104.9	103.2	-85.79	27,055.4	-7,558.1	1,287.9	1,079.7	208.17	6.187		
18,300.0	12,444.2	18,132.5	12,358.4	106.4	104.5	-86.11	27,139.6	-7,557.1	1,285.3	1,074.3	210.95	6.093		
18,400.0	12,441.8	18,213.9	12,364.5	107.9	105.8	-86.46	27,220.8	-7,557.3	1,284.1	1,070.4	213.69	6.009		
18,487.8	12,439.8	18,296.3	12,369.9	109.3	107.0	-86.79	27,303.0	-7,558.1	1,283.9	1,067.7	216.28	5.937		
18,500.0	12,439.5	18,307.8	12,370.5	109.4	107.2	-86.83	27,314.5	-7,558.3	1,283.9	1,067.3	216.64	5.927		
18,600.0	12,437.2	18,403.7	12,375.6	111.0	108.7	-87.16	27,410.2	-7,559.6	1,284.2	1,064.6	219.63	5.847		
18,700.0	12,434.8	18,520.4	12,376.9	112.5	110.5	-87.33	27,526.9	-7,560.3	1,283.9	1,060.9	222.94	5.759		
18,800.0	12,432.5	18,622.1	12,376.0	114.0	112.0	-87.40	27,628.6	-7,560.0	1,282.8	1,056.8	226.02	5.676		
18,900.0	12,430.2	18,721.2	12,374.3	115.5	113.5	-87.42	27,727.7	-7,559.9	1,281.9	1,052.8	229.07	5.596		
19,000.0	12,427.8	18,819.1	12,372.2	117.1	115.1	-87.43	27,825.5	-7,559.6	1,280.9	1,048.7	232.12	5.518		
19,074.4	12,426.1	18,883.4	12,371.7	118.2	116.0	-87.48	27,889.8	-7,559.9	1,280.6	1,046.3	234.25	5.467		
19,100.0	12,425.5	18,904.5	12,371.8	118.6	116.4	-87.50	27,911.0	-7,560.1	1,280.6	1,045.6	234.97	5.450		
19,200.0	12,423.1	18,994.4	12,374.5	120.1	117.8	-87.72	28,000.8	-7,561.8	1,281.6	1,043.7	237.91	5.387		
19,300.0	12,420.8	19,101.5	12,378.2	121.7	119.4	-88.00	28,107.8	-7,563.5	1,282.2	1,041.1	241.12	5.318		
19,400.0	12,418.5	19,188.0	12,381.5	123.2	120.8	-88.24	28,194.3	-7,565.3	1,283.2	1,039.2	244.02	5.259		
19,500.0	12,416.1	19,268.4	12,381.1	124.8	122.1	-88.31	28,274.6	-7,567.8	1,285.7	1,038.8	246.83	5.209		
19,600.0	12,413.8	19,350.0	12,379.8	126.3	123.3	-88.34	28,356.1	-7,571.7	1,289.6	1,040.0	249.66	5.166		
19,700.0	12,411.4	19,515.5	12,375.1	127.9	125.9	-88.30	28,521.4	-7,576.1	1,291.4	1,037.6	253.82	5.088		
19,800.0	12,409.1	19,676.7	12,367.7	129.4	128.5	-88.14	28,682.4	-7,572.6	1,288.6	1,030.7	257.89	4.997		
19,900.0	12,406.8	19,776.5	12,363.0	131.0	130.0	-88.02	28,782.0	-7,568.1	1,283.4	1,022.4	261.00	4.917		
20,000.0	12,404.4	19,840.0	12,360.0	132.6	131.0	-87.95	28,845.4	-7,565.2	1,278.8	1,015.2	263.55	4.852		
20,030.0	12,403.7	19,840.0	12,360.0	133.0	131.0	-87.95	28,845.4	-7,565.2	1,278.4	1,014.4	264.02	4.842		
20,100.0	12,402.1	19,840.0	12,360.0	134.1	131.0	-87.95	28,845.4	-7,565.2	1,280.3	1,015.2	265.11	4.829 SF		
20,200.0	12,399.8	19,840.0	12,360.0	135.7	131.0	-87.95	28,845.4	-7,565.2	1,289.7	1,023.0	266.68	4.836		
20,300.0	12,397.4	19,840.0	12,360.0	137.3	131.0	-87.95	28,845.4	-7,565.2	1,306.6	1,038.4	268.25	4.871		
20,345.2	12,396.4	19,840.0	12,360.0	138.0	131.0	-87.95	28,845.4	-7,565.2	1,316.7	1,047.7	268.96	4.895		

COG Operating LLC

Anticollision Report

Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Site LUDEMAN
Project:	LEA COUNTY, NM	TVD Reference:	WELL @ 3342.0usft (Original Well Elev)
Reference Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	FASCINATOR FEE COM #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	DWD Plan 4 - neg vs step out	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 3342.0usft (Original Well Ele
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: LUDEMAN
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.50°



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: LUDEMAN
Site Error: 0.0 usft
Reference Well: FASCINATOR FEE COM #1H
Well Error: 0.0 usft
Reference Wellbore: OWB
Reference Design: DWD Plan 4 - neg vs step out

Local Co-ordinate Reference: Site LUDEMAN
TVD Reference: WELL @ 3342.0usft (Original Well Elev)
MD Reference: WELL @ 3342.0usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Reference Depths are relative to WELL @ 3342.0usft (Original Well Ele
 Offset Depths are relative to Offset Datum
 Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: LUDEMAN
 Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
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