



COG Operating L L C

Lea County, NM (NAD27 NME)

Sec. 34, T 25 S. , R 33 E

Columbus Fee 2H

Wellbore #1

Plan #1

OCD – HOBBS
07/29/2016
RECEIVED

Anticollision Report

26 July, 2016





Integrity Directional Services, LLC

Anticollision Report



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Columbus Fee 2H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3353.00ft (Scan Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3353.00ft (Scan Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 2H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Multi User Db
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Reference	Plan #1
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method:	Stations
Depth Range:	Unlimited
Results Limited by:	Maximum center-center distance of 10,000.00 ft
Warning Levels Evaluated at:	2.00 Sigma
Error Model:	ISCWSA
Scan Method:	Closest Approach 3D
Error Surface:	Circular Conic
Casing Method:	Not applied

Survey Tool Program		Date	7/26/2016		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.00	19,382.06	Plan #1 (Wellbore #1)	MWD	MWD - Standard	

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Sec. 34, T 25 S. , R 33 E						
Redbull 35 FED #1H (+12000'TVD) - Wellbore #1 - Actual	13,288.51	16,633.24	2,816.08	2,611.37	13.756	CC
Redbull 35 FED #1H (+12000'TVD) - Wellbore #1 - Actual	13,300.00	16,633.97	2,816.10	2,611.17	13.742	ES
Redbull 35 FED #1H (+12000'TVD) - Wellbore #1 - Actual	14,100.00	16,692.66	2,929.98	2,709.28	13.276	SF

Offset Design	Sec. 34, T 25 S. , R 33 E - Redbull 35 FED #1H (+12000'TVD) - Wellbore #1 - Actual Wellbore											Offset Site Error:	0.00 ft
Survey Program:	200-NS-GYRO-MS, 11615-MWD											Offset Well Error:	0.00 ft
Reference	Offset	Semi Major Axis		Distance				Warning					
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
0.00	0.00	0.00	0.00	0.00	0.00	125.13	-3,107.15	4,415.94	5,399.54				
100.00	100.00	90.96	90.96	0.08	0.11	125.13	-3,107.16	4,415.93	5,399.52	5,399.33	0.19	N/A	
200.00	200.00	192.02	192.02	0.31	0.23	125.13	-3,107.17	4,415.88	5,399.49	5,398.96	0.54	N/A	
230.74	230.74	220.74	220.74	0.38	0.27	125.13	-3,107.18	4,415.87	5,399.49	5,398.84	0.65	8,347.030	
300.00	300.00	283.61	283.61	0.53	0.36	125.13	-3,107.16	4,415.92	5,399.53	5,398.63	0.90	6,023.534	
400.00	400.00	374.39	374.39	0.76	0.50	125.13	-3,107.07	4,416.21	5,399.73	5,398.47	1.26	4,296.853	
500.00	500.00	447.35	447.35	0.98	0.62	125.13	-3,107.02	4,416.68	5,400.22	5,398.62	1.60	3,370.672	
600.00	600.00	513.30	513.29	1.21	0.73	125.12	-3,107.23	4,417.42	5,401.33	5,399.39	1.94	2,781.687	
700.00	700.00	600.00	599.98	1.43	0.89	125.12	-3,107.91	4,418.89	5,403.12	5,400.81	2.32	2,331.425	
800.00	800.00	649.02	648.98	1.66	1.00	125.12	-3,108.44	4,419.97	5,405.40	5,402.75	2.66	2,033.287	
900.00	900.00	720.56	720.49	1.88	1.17	125.11	-3,109.28	4,421.89	5,408.28	5,405.22	3.05	1,771.541	
1,000.00	1,000.00	800.00	799.88	2.11	1.36	125.11	-3,110.31	4,424.49	5,411.68	5,408.21	3.47	1,561.301	
1,100.00	1,100.00	890.68	890.49	2.33	1.59	125.10	-3,111.54	4,427.73	5,415.37	5,411.45	3.92	1,381.135	
1,200.00	1,200.00	992.67	992.42	2.56	1.85	125.09	-3,112.93	4,431.32	5,419.04	5,414.63	4.40	1,230.391	
1,300.00	1,300.00	1,109.90	1,109.57	2.78	2.15	125.08	-3,114.48	4,435.24	5,422.53	5,417.60	4.93	1,099.314	
1,400.00	1,400.00	1,233.44	1,233.04	3.01	2.47	125.07	-3,116.00	4,438.91	5,425.68	5,420.20	5.48	990.353	
1,500.00	1,500.00	1,373.27	1,372.82	3.23	2.84	125.06	-3,117.41	4,442.23	5,428.21	5,422.14	6.07	894.413	
1,600.00	1,600.00	1,512.03	1,511.56	3.45	3.20	125.05	-3,118.42	4,444.58	5,430.01	5,423.35	6.66	815.627	
1,700.00	1,700.00	1,642.85	1,642.37	3.68	3.55	125.05	-3,118.96	4,446.00	5,431.12	5,423.90	7.23	751.666	
1,800.00	1,800.00	1,760.28	1,759.80	3.90	3.85	125.05	-3,119.28	4,446.80	5,431.84	5,424.08	7.76	700.105	
1,900.00	1,900.00	1,868.53	1,868.04	4.13	4.14	125.05	-3,119.48	4,447.26	5,432.29	5,424.02	8.27	657.088	
2,000.00	2,000.00	1,972.08	1,971.60	4.35	4.41	125.05	-3,119.61	4,447.64	5,432.66	5,423.90	8.76	619.934	
2,100.00	2,100.00	2,077.70	2,077.22	4.58	4.69	125.04	-3,119.68	4,447.97	5,432.95	5,423.69	9.27	586.389	
2,200.00	2,200.00	2,184.09	2,183.61	4.80	4.97	125.04	-3,119.73	4,448.16	5,433.13	5,423.36	9.77	556.157	

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



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Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.00 ft
Survey Program: 200-NS-GYRO-MS, 11615-MWD												Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
2,300.00	2,300.00	2,285.19	2,284.71	5.03	5.20	125.04	-3,119.70	4,448.31	5,433.23	5,423.00	10.23	531.184	
2,400.00	2,400.00	2,385.37	2,384.89	5.25	5.43	125.04	-3,119.50	4,448.56	5,433.33	5,422.64	10.68	508.731	
2,500.00	2,500.00	2,478.99	2,478.50	5.48	5.63	125.03	-3,119.18	4,448.95	5,433.47	5,422.37	11.10	489.377	
2,600.00	2,600.00	2,571.48	2,570.99	5.70	5.82	125.03	-3,118.77	4,449.56	5,433.75	5,422.23	11.52	471.658	
2,700.00	2,700.00	2,664.04	2,663.55	5.93	6.02	125.02	-3,118.25	4,450.39	5,434.17	5,422.22	11.95	454.737	
2,800.00	2,800.00	2,756.62	2,756.12	6.15	6.23	125.01	-3,117.57	4,451.50	5,434.72	5,422.34	12.39	438.812	
2,900.00	2,900.00	2,858.00	2,857.49	6.38	6.46	124.99	-3,116.65	4,452.95	5,435.37	5,422.53	12.84	423.377	
3,000.00	3,000.00	2,967.14	2,966.61	6.60	6.71	124.97	-3,115.47	4,454.45	5,435.89	5,422.58	13.31	408.492	
3,100.00	3,100.00	3,055.57	3,055.02	6.83	6.91	124.95	-3,114.40	4,455.71	5,436.37	5,422.63	13.73	395.819	
3,200.00	3,200.00	3,135.06	3,134.49	7.05	7.09	124.93	-3,113.39	4,457.22	5,437.20	5,423.05	14.14	384.425	
3,300.00	3,300.00	3,216.16	3,215.56	7.28	7.28	124.91	-3,112.33	4,459.16	5,438.41	5,423.85	14.56	373.531	
3,400.00	3,400.00	3,304.51	3,303.87	7.50	7.50	124.89	-3,111.14	4,461.58	5,439.88	5,424.88	15.00	362.555	
3,500.00	3,500.00	3,400.00	3,399.31	7.73	7.74	124.86	-3,109.83	4,464.47	5,441.58	5,426.11	15.47	351.821	
3,600.00	3,600.00	3,491.64	3,490.89	7.95	7.97	124.83	-3,108.59	4,467.36	5,443.39	5,427.46	15.92	341.830	
3,700.00	3,700.00	3,591.34	3,590.54	8.17	8.23	124.80	-3,107.29	4,470.48	5,445.21	5,428.81	16.40	331.981	
3,800.00	3,800.00	3,688.90	3,688.04	8.40	8.48	124.77	-3,106.17	4,473.45	5,447.06	5,430.18	16.88	322.710	
3,900.00	3,900.00	3,786.26	3,785.36	8.62	8.73	124.75	-3,105.38	4,476.25	5,448.96	5,431.60	17.36	313.953	
4,000.00	4,000.00	3,874.83	3,873.90	8.85	8.96	124.73	-3,104.93	4,478.73	5,450.97	5,433.16	17.81	305.999	
4,100.00	4,100.00	3,961.95	3,960.98	9.07	9.19	124.72	-3,104.71	4,481.26	5,453.22	5,434.95	18.27	298.509	
4,200.00	4,200.00	4,070.64	4,069.62	9.30	9.47	124.70	-3,104.85	4,484.29	5,455.59	5,436.83	18.76	290.744	
4,300.00	4,300.00	4,196.09	4,195.05	9.52	9.77	124.69	-3,105.93	4,486.56	5,457.56	5,438.27	19.29	282.882	
4,400.00	4,400.00	4,288.45	4,287.39	9.75	9.98	124.70	-3,107.15	4,487.73	5,459.36	5,439.64	19.72	276.781	
4,500.00	4,500.00	4,379.73	4,378.66	9.97	10.18	124.70	-3,108.46	4,489.00	5,461.32	5,441.17	20.15	270.990	
4,600.00	4,600.00	4,467.00	4,465.90	10.20	10.39	124.70	-3,109.75	4,490.38	5,463.47	5,442.89	20.58	265.437	
4,700.00	4,700.00	4,553.11	4,551.99	10.42	10.59	124.70	-3,110.98	4,492.05	5,465.87	5,444.86	21.01	260.119	
4,800.00	4,800.00	4,633.48	4,632.33	10.65	10.79	124.70	-3,112.10	4,493.88	5,468.54	5,447.11	21.43	255.149	
4,900.00	4,900.00	4,706.98	4,705.80	10.87	10.97	124.70	-3,113.33	4,495.82	5,471.67	5,449.83	21.84	250.529	
5,000.00	5,000.00	4,800.00	4,798.75	11.10	11.20	124.70	-3,115.21	4,498.67	5,475.32	5,453.03	22.30	245.567	
5,100.00	5,100.00	4,937.08	4,935.75	11.32	11.54	124.70	-3,117.88	4,502.49	5,478.81	5,455.95	22.86	239.683	
5,200.00	5,200.00	5,064.43	5,063.06	11.55	11.85	124.70	-3,119.79	4,504.92	5,481.19	5,457.80	23.39	234.295	
5,300.00	5,300.00	5,161.56	5,160.17	11.77	12.08	124.71	-3,121.28	4,506.66	5,483.54	5,459.68	23.85	229.872	
5,400.00	5,400.00	5,262.46	5,261.04	12.00	12.33	124.71	-3,122.89	4,508.45	5,485.91	5,461.58	24.32	225.535	
5,500.00	5,500.00	5,365.83	5,364.38	12.22	12.58	124.71	-3,124.51	4,510.25	5,488.23	5,463.43	24.80	221.307	
5,600.00	5,600.00	5,466.96	5,465.48	12.45	12.82	124.72	-3,126.05	4,511.97	5,490.50	5,465.23	25.27	217.273	
5,700.00	5,700.00	5,566.99	5,565.48	12.67	13.07	124.72	-3,127.59	4,513.67	5,492.77	5,467.03	25.74	213.403	
5,800.00	5,800.00	5,660.61	5,659.08	12.89	13.30	124.72	-3,129.06	4,515.27	5,495.07	5,468.88	26.19	209.798	
5,900.00	5,900.00	5,751.07	5,749.51	13.12	13.52	124.73	-3,130.61	4,516.91	5,497.54	5,470.90	26.64	206.381	
6,000.00	6,000.00	5,848.52	5,846.93	13.34	13.75	124.73	-3,132.43	4,518.75	5,500.15	5,473.06	27.10	202.968	
6,100.00	6,100.00	5,954.23	5,952.61	13.57	14.01	124.74	-3,134.46	4,520.62	5,502.70	5,475.13	27.58	199.536	
6,200.00	6,200.00	6,053.66	6,052.00	13.79	14.25	124.74	-3,136.41	4,522.27	5,505.18	5,477.14	28.04	196.316	
6,300.00	6,300.00	6,148.29	6,146.60	14.02	14.48	124.75	-3,138.21	4,523.96	5,507.74	5,479.24	28.50	193.275	
6,400.00	6,400.00	6,242.00	6,240.27	14.24	14.71	124.75	-3,139.97	4,525.77	5,510.39	5,481.44	28.95	190.337	
6,500.00	6,500.00	6,334.59	6,332.83	14.47	14.94	124.76	-3,141.83	4,527.61	5,513.18	5,483.77	29.40	187.500	
6,600.00	6,600.00	6,428.69	6,426.88	14.69	15.17	124.76	-3,143.89	4,529.52	5,516.09	5,486.23	29.86	184.736	
6,700.00	6,700.00	6,526.40	6,524.55	14.92	15.40	124.77	-3,146.15	4,531.49	5,519.07	5,488.75	30.32	182.018	
6,800.00	6,800.00	6,622.95	6,621.05	15.14	15.64	124.78	-3,148.50	4,533.42	5,522.09	5,491.31	30.78	179.394	
6,900.00	6,900.00	6,715.96	6,714.02	15.37	15.87	124.79	-3,150.73	4,535.40	5,525.21	5,493.97	31.24	176.884	
7,000.00	7,000.00	6,800.00	6,798.01	15.59	16.08	124.79	-3,152.68	4,537.37	5,528.47	5,496.80	31.67	174.571	
7,100.00	7,100.00	6,897.47	6,895.42	15.82	16.32	124.80	-3,155.02	4,539.78	5,531.88	5,499.74	32.14	172.129	
7,200.00	7,200.00	6,986.34	6,984.23	16.04	16.54	124.80	-3,157.39	4,542.05	5,535.49	5,502.91	32.59	169.875	
7,300.00	7,300.00	7,085.94	7,083.76	16.27	16.79	124.81	-3,160.19	4,544.63	5,539.23	5,506.17	33.06	167.555	
7,400.00	7,400.00	7,187.50	7,185.24	16.49	17.05	124.82	-3,163.05	4,547.24	5,542.94	5,509.40	33.54	165.277	

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Anticollision Report



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Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Multi User Db
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.00 ft
Survey Program: 200-NS-GYRO-MS, 11615-MWD												Offset Well Error:	0.00 ft
Sec. 34, T 25 S. , R 33 E - Redbull 35 FED #1H (+12000'TVD) - Wellbore #1 - Actual Wellbore													
Reference		Offset		Semi Major Axis			Distance						
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
7,500.00	7,500.00	7,275.02	7,272.70	16.72	17.27	124.83	-3,165.52	4,549.55	5,546.73	5,512.74	33.98	163.223	
7,600.00	7,600.00	7,360.56	7,358.16	16.94	17.48	124.84	-3,168.01	4,552.04	5,550.77	5,516.35	34.42	161.250	
7,700.00	7,700.00	7,447.39	7,444.91	17.17	17.70	124.84	-3,170.63	4,554.77	5,555.07	5,520.21	34.87	159.314	
7,800.00	7,800.00	7,535.32	7,532.75	17.39	17.93	124.85	-3,173.45	4,557.65	5,559.59	5,524.28	35.32	157.417	
7,900.00	7,900.00	7,625.32	7,622.64	17.61	18.16	124.86	-3,176.52	4,560.69	5,564.32	5,528.55	35.77	155.553	
8,000.00	8,000.00	7,721.10	7,718.30	17.84	18.40	124.87	-3,180.00	4,563.93	5,569.17	5,532.93	36.24	153.684	
8,100.00	8,100.00	7,816.87	7,813.95	18.06	18.64	124.88	-3,183.67	4,567.10	5,574.08	5,537.38	36.70	151.864	
8,200.00	8,200.00	7,912.65	7,909.61	18.29	18.88	124.89	-3,187.46	4,570.28	5,579.07	5,541.90	37.17	150.098	
8,300.00	8,300.00	8,009.72	8,006.54	18.51	19.12	124.91	-3,191.39	4,573.54	5,584.13	5,546.49	37.64	148.366	
8,400.00	8,400.00	8,120.20	8,116.87	18.74	19.40	124.92	-3,195.96	4,577.05	5,589.11	5,550.98	38.14	146.557	
8,500.00	8,500.00	16,275.02	12,130.72	18.96	116.22	175.57	-4,150.53	321.80	5,530.39	5,395.21	135.18	40.912	
8,600.00	8,600.00	16,272.77	12,130.80	19.19	116.16	175.54	-4,150.28	324.03	5,465.08	5,329.74	135.34	40.379	
8,700.00	8,700.00	16,270.47	12,130.88	19.41	116.09	175.50	-4,150.03	326.32	5,400.83	5,265.32	135.51	39.856	
8,800.00	8,800.00	16,268.11	12,130.97	19.64	116.03	175.47	-4,149.78	328.67	5,337.67	5,202.00	135.67	39.343	
8,813.55	8,813.55	16,267.78	12,130.98	19.67	116.02	175.47	-4,149.74	328.99	5,329.21	5,193.51	135.69	39.274	
8,825.00	8,825.00	16,267.52	12,130.99	19.69	116.02	-4.19	-4,149.71	329.26	5,321.95	5,186.25	135.71	39.216	
8,850.00	8,849.96	16,267.00	12,131.01	19.73	116.00	-4.40	-4,149.66	329.77	5,305.45	5,169.72	135.74	39.087	
8,875.00	8,874.83	16,266.56	12,131.02	19.77	115.99	-4.63	-4,149.61	330.20	5,288.06	5,152.29	135.77	38.950	
8,900.00	8,899.53	16,266.21	12,131.04	19.82	115.98	-4.90	-4,149.57	330.55	5,269.81	5,134.01	135.80	38.806	
8,925.00	8,923.99	16,265.96	12,131.05	19.86	115.98	-5.22	-4,149.55	330.80	5,250.74	5,114.90	135.84	38.655	
8,950.00	8,948.15	16,265.79	12,131.05	19.90	115.97	-5.59	-4,149.53	330.97	5,230.90	5,095.03	135.87	38.498	
8,975.00	8,971.94	16,265.71	12,131.06	19.95	115.97	-6.03	-4,149.52	331.05	5,210.34	5,074.42	135.91	38.335	
9,000.00	8,995.30	16,265.73	12,131.06	19.99	115.97	-6.56	-4,149.52	331.03	5,189.10	5,053.14	135.96	38.167	
9,025.00	9,018.16	16,265.84	12,131.05	20.03	115.97	-7.21	-4,149.53	330.92	5,167.23	5,031.23	136.00	37.994	
9,050.00	9,040.45	16,266.04	12,131.04	20.07	115.98	-8.01	-4,149.56	330.72	5,144.78	5,008.74	136.05	37.816	
9,075.00	9,062.13	16,266.34	12,131.03	20.11	115.99	-9.04	-4,149.59	330.42	5,121.82	4,985.73	136.09	37.634	
9,100.00	9,083.12	16,266.74	12,131.02	20.15	116.00	-10.39	-4,149.63	330.03	5,098.39	4,962.25	136.14	37.449	
9,125.00	9,103.38	16,267.22	12,131.00	20.19	116.01	-12.23	-4,149.68	329.55	5,074.56	4,938.36	136.20	37.259	
9,150.00	9,122.84	16,267.80	12,130.98	20.24	116.02	-14.88	-4,149.75	328.97	5,050.38	4,914.12	136.26	37.063	
9,175.00	9,141.45	16,268.47	12,130.95	20.30	116.04	-19.00	-4,149.82	328.31	5,025.92	4,889.58	136.34	36.863	
9,200.00	9,159.17	16,269.23	12,130.93	20.36	116.06	-26.14	-4,149.90	327.55	5,001.24	4,864.82	136.42	36.660	
9,225.00	9,175.93	16,270.08	12,130.89	20.43	116.08	-40.62	-4,149.99	326.71	4,976.40	4,839.89	136.51	36.455	
9,250.00	9,191.71	16,271.01	12,130.86	20.50	116.11	-73.79	-4,150.09	325.78	4,951.47	4,814.86	136.61	36.246	
9,275.00	9,206.44	16,272.03	12,130.82	20.58	116.14	-120.39	-4,150.20	324.77	4,926.52	4,789.80	136.71	36.035	
9,300.00	9,220.10	16,273.13	12,130.78	20.66	116.17	-145.66	-4,150.32	323.68	4,901.61	4,764.78	136.83	35.823	
9,325.00	9,232.65	16,274.30	12,130.74	20.76	116.20	-156.86	-4,150.45	322.52	4,876.82	4,739.87	136.95	35.609	
9,350.00	9,244.05	16,275.55	12,130.70	20.86	116.23	-162.71	-4,150.59	321.28	4,852.22	4,715.13	137.09	35.395	
9,375.00	9,254.26	16,276.87	12,130.65	20.97	116.26	-166.23	-4,150.73	319.96	4,827.87	4,690.64	137.23	35.181	
9,400.00	9,263.27	16,278.25	12,130.60	21.08	116.30	-168.56	-4,150.88	318.59	4,803.85	4,666.46	137.38	34.967	
9,425.00	9,271.05	16,279.70	12,130.55	21.21	116.34	-170.21	-4,151.04	317.15	4,780.23	4,642.68	137.55	34.753	
9,450.00	9,277.57	16,281.21	12,130.50	21.34	116.38	-171.43	-4,151.20	315.65	4,757.07	4,619.35	137.72	34.542	
9,475.00	9,282.82	16,282.76	12,130.45	21.48	116.42	-172.37	-4,151.37	314.11	4,734.46	4,596.56	137.90	34.332	
9,500.00	9,286.79	16,298.00	12,129.94	21.63	116.82	-173.44	-4,153.01	298.97	4,712.49	4,574.04	138.45	34.036	
9,525.00	9,289.46	16,298.00	12,129.94	21.79	116.82	-173.98	-4,153.01	298.97	4,691.16	4,552.55	138.61	33.844	
9,550.00	9,290.82	16,298.00	12,129.94	21.95	116.82	-174.42	-4,153.01	298.97	4,670.58	4,531.81	138.77	33.656	
9,560.39	9,291.00	16,298.00	12,129.94	22.02	116.82	-174.58	-4,153.01	298.97	4,662.27	4,523.43	138.84	33.580	
9,600.00	9,291.26	16,298.00	12,129.94	22.30	116.82	-174.58	-4,153.01	298.97	4,630.90	4,491.78	139.12	33.287	
9,700.00	9,291.92	16,298.00	12,129.94	23.08	116.82	-174.58	-4,153.01	298.97	4,552.28	4,412.37	139.91	32.538	
9,800.00	9,292.59	16,309.49	12,129.59	23.98	117.13	-174.81	-4,154.25	287.55	4,474.49	4,333.38	141.11	31.709	
9,900.00	9,293.25	16,320.70	12,129.26	24.98	117.43	-175.03	-4,155.43	276.41	4,397.59	4,255.18	142.41	30.880	
10,000.00	9,293.91	16,331.59	12,128.95	26.08	117.71	-175.25	-4,156.57	265.58	4,321.60	4,177.81	143.79	30.055	
10,100.00	9,294.57	16,342.17	12,128.67	27.25	118.00	-175.46	-4,157.66	255.06	4,246.58	4,101.34	145.24	29.238	

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



Integrity Directional Services, LLC

Anticollision Report



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Columbus Fee 2H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3353.00ft (Scan Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3353.00ft (Scan Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 2H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Multi User Db
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.00 ft
Survey Program: 200-NS-GYRO-MS, 11615-MWD												Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis			Distance						
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,200.00	9,295.23	16,352.46	12,128.40	28.49	118.27	-175.67	-4,158.70	244.83	4,172.59	4,025.84	146.75	28.433	
10,300.00	9,295.90	16,362.46	12,128.15	29.79	118.53	-175.87	-4,159.70	234.88	4,099.68	3,951.36	148.32	27.641	
10,400.00	9,296.56	16,372.19	12,127.92	31.14	118.79	-176.06	-4,160.67	225.20	4,027.91	3,877.98	149.93	26.865	
10,500.00	9,297.22	16,381.66	12,127.71	32.54	119.04	-176.26	-4,161.59	215.78	3,957.34	3,805.76	151.58	26.107	
10,600.00	9,297.88	16,390.88	12,127.51	33.98	119.29	-176.44	-4,162.48	206.60	3,888.04	3,734.77	153.27	25.368	
10,700.00	9,298.54	16,406.16	12,127.18	35.46	119.69	-176.75	-4,163.94	191.40	3,820.08	3,664.93	155.15	24.622	
10,800.00	9,299.20	16,421.90	12,126.82	36.96	120.11	-177.06	-4,165.42	175.74	3,753.51	3,596.43	157.08	23.896	
10,900.00	9,299.87	16,437.21	12,126.44	38.50	120.52	-177.37	-4,166.85	160.49	3,688.42	3,529.40	159.02	23.195	
11,000.00	9,300.53	16,452.13	12,126.06	40.06	120.92	-177.67	-4,168.22	145.64	3,624.88	3,463.90	160.98	22.518	
11,100.00	9,301.19	16,466.66	12,125.66	41.64	121.30	-177.97	-4,169.54	131.18	3,562.98	3,400.03	162.94	21.866	
11,200.00	9,301.85	16,480.81	12,125.26	43.24	121.68	-178.25	-4,170.81	117.09	3,502.81	3,337.88	164.92	21.239	
11,300.00	9,302.51	16,491.72	12,124.94	44.86	121.97	-178.47	-4,171.78	106.23	3,444.45	3,277.62	166.83	20.646	
11,400.00	9,303.17	16,500.74	12,124.67	46.50	122.21	-178.66	-4,172.58	97.25	3,388.03	3,219.32	168.71	20.082	
11,500.00	9,303.84	16,509.66	12,124.40	48.15	122.45	-178.84	-4,173.36	88.37	3,333.63	3,163.04	170.59	19.542	
11,600.00	9,304.50	16,518.46	12,124.14	49.81	122.68	-179.01	-4,174.13	79.60	3,281.35	3,108.86	172.49	19.024	
11,700.00	9,305.16	16,527.16	12,123.88	51.48	122.91	-179.19	-4,174.88	70.94	3,231.30	3,056.91	174.39	18.529	
11,800.00	9,305.82	16,535.75	12,123.63	53.16	123.14	-179.36	-4,175.62	62.39	3,183.58	3,007.28	176.30	18.058	
11,900.00	9,306.48	16,544.24	12,123.38	54.85	123.37	-179.54	-4,176.35	53.93	3,138.31	2,960.09	178.22	17.609	
12,000.00	9,307.15	16,552.63	12,123.13	56.55	123.59	-179.71	-4,177.07	45.58	3,095.58	2,915.44	180.14	17.184	
12,100.00	9,307.81	16,560.92	12,122.88	58.26	123.81	-179.87	-4,177.77	37.32	3,055.51	2,873.44	182.07	16.782	
12,200.00	9,308.47	16,569.11	12,122.64	59.98	124.03	-179.96	-4,178.46	29.16	3,018.20	2,834.20	184.01	16.403	
12,300.00	9,309.13	16,577.20	12,122.40	61.70	124.24	-179.80	-4,179.14	21.10	2,983.76	2,797.81	185.94	16.047	
12,400.00	9,309.79	16,580.00	12,122.32	63.42	124.32	-179.74	-4,179.38	18.32	2,952.28	2,764.54	187.74	15.725	
12,500.00	9,310.45	16,580.00	12,122.32	65.16	124.32	-179.74	-4,179.38	18.32	2,923.89	2,734.41	189.48	15.431	
12,600.00	9,311.12	16,580.00	12,122.32	66.90	124.32	-179.74	-4,179.38	18.32	2,898.67	2,707.45	191.22	15.159	
12,700.00	9,311.78	16,598.87	12,121.78	68.64	124.82	-179.36	-4,180.99	-0.48	2,876.62	2,683.16	193.46	14.869	
12,800.00	9,312.44	16,604.35	12,121.63	70.39	124.97	-179.24	-4,181.47	-5.93	2,857.93	2,662.57	195.35	14.630	
12,900.00	9,313.10	16,609.96	12,121.49	72.14	125.12	-179.13	-4,181.97	-11.52	2,842.62	2,645.36	197.25	14.411	
13,000.00	9,313.76	16,615.73	12,121.34	73.89	125.27	-179.01	-4,182.49	-17.26	2,830.75	2,631.58	199.16	14.213	
13,100.00	9,314.43	16,621.65	12,121.19	75.65	125.43	-178.89	-4,183.02	-23.16	2,822.35	2,621.27	201.08	14.036	
13,200.00	9,315.09	16,627.73	12,121.05	77.41	125.59	-178.77	-4,183.58	-29.21	2,817.46	2,614.46	203.00	13.879	
13,288.51	9,315.67	16,633.24	12,120.92	78.97	125.74	-178.66	-4,184.09	-34.70	2,816.08	2,611.37	204.71	13.756 CC	
13,300.00	9,315.75	16,633.97	12,120.90	79.18	125.76	-178.64	-4,184.16	-35.42	2,816.10	2,611.17	204.93	13.742 ES	
13,400.00	9,316.41	16,640.39	12,120.76	80.94	125.93	-178.51	-4,184.77	-41.81	2,818.28	2,611.40	206.87	13.623	
13,500.00	9,317.07	16,646.99	12,120.62	82.71	126.10	-178.38	-4,185.40	-48.38	2,823.97	2,615.15	208.82	13.524	
13,600.00	9,317.73	16,653.78	12,120.48	84.49	126.28	-178.24	-4,186.05	-55.13	2,833.16	2,622.39	210.77	13.442	
13,700.00	9,318.40	16,660.76	12,120.34	86.26	126.47	-178.10	-4,186.74	-62.08	2,845.82	2,633.08	212.73	13.378	
13,800.00	9,319.06	16,674.00	12,120.10	88.04	126.82	-177.83	-4,188.06	-75.26	2,861.90	2,647.04	214.86	13.320	
13,900.00	9,319.72	16,674.00	12,120.10	89.82	126.82	-177.83	-4,188.06	-75.26	2,881.32	2,664.68	216.64	13.300	
14,000.00	9,320.38	16,684.20	12,119.92	91.60	127.09	-177.63	-4,189.08	-85.40	2,904.04	2,685.35	218.69	13.279	
14,100.00	9,321.04	16,692.66	12,119.78	93.38	127.32	-177.46	-4,189.92	-93.81	2,929.98	2,709.28	220.70	13.276 SF	
14,200.00	9,321.70	16,700.94	12,119.63	95.17	127.54	-177.29	-4,190.74	-102.06	2,959.04	2,736.33	222.71	13.287	
14,300.00	9,322.37	16,709.06	12,119.49	96.95	127.76	-177.12	-4,191.53	-110.13	2,991.14	2,766.43	224.71	13.311	
14,400.00	9,323.03	16,717.02	12,119.35	98.74	127.97	-176.96	-4,192.30	-118.05	3,026.18	2,799.47	226.71	13.348	
14,500.00	9,323.69	16,724.82	12,119.22	100.53	128.18	-176.80	-4,193.05	-125.82	3,064.06	2,835.36	228.71	13.397	
14,600.00	9,324.35	16,732.47	12,119.08	102.32	128.38	-176.65	-4,193.78	-133.44	3,104.68	2,873.98	230.70	13.458	
14,700.00	9,325.01	16,739.98	12,118.95	104.11	128.58	-176.50	-4,194.48	-140.91	3,147.94	2,915.24	232.69	13.528	
14,800.00	9,325.68	16,747.34	12,118.82	105.90	128.78	-176.35	-4,195.17	-148.24	3,193.72	2,959.03	234.68	13.609	
14,900.00	9,326.34	16,754.57	12,118.70	107.70	128.97	-176.20	-4,195.84	-155.43	3,241.92	3,005.25	236.67	13.698	
15,000.00	9,327.00	16,768.00	12,118.46	109.49	129.33	-175.93	-4,197.07	-168.81	3,292.44	3,053.61	238.82	13.786	
15,100.00	9,327.66	16,768.88	12,118.45	111.29	129.35	-175.91	-4,197.15	-169.69	3,345.15	3,104.51	240.64	13.901	
15,200.00	9,328.32	16,778.66	12,118.27	113.09	129.61	-175.72	-4,198.03	-179.42	3,399.98	3,157.28	242.70	14.009	

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



Integrity Directional Services, LLC

Anticollision Report



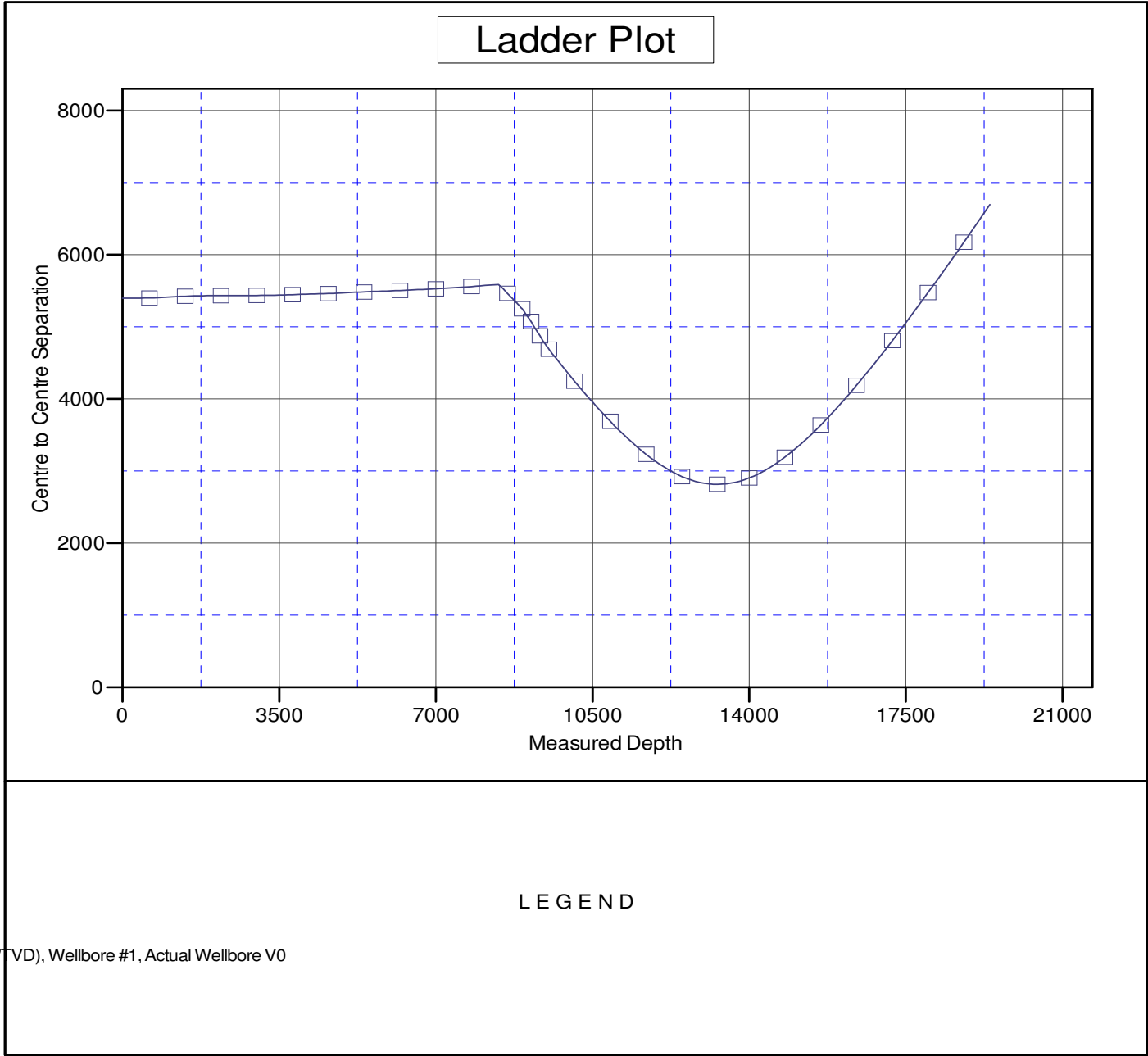
Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Columbus Fee 2H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3353.00ft (Scan Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3353.00ft (Scan Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 2H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Multi User Db
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.00 ft
Survey Program: 200-NS-GYRO-MS, 11615-MWD													Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
15,300.00	9,328.98	16,788.17	12,118.08	114.89	129.87	175.52	-4,198.87	-188.89	3,456.81	3,212.05	244.75	14.124		
15,400.00	9,329.65	16,797.44	12,117.89	116.68	130.11	175.34	-4,199.69	-198.12	3,515.54	3,268.74	246.80	14.245		
15,500.00	9,330.31	16,806.47	12,117.69	118.48	130.36	175.15	-4,200.47	-207.12	3,576.08	3,327.24	248.84	14.371		
15,600.00	9,330.97	16,815.27	12,117.49	120.29	130.59	174.98	-4,201.22	-215.88	3,638.35	3,387.47	250.88	14.503		
15,700.00	9,331.63	16,823.85	12,117.28	122.09	130.82	174.80	-4,201.95	-224.43	3,702.25	3,449.34	252.91	14.639		
15,800.00	9,332.29	16,832.22	12,117.07	123.89	131.04	174.63	-4,202.65	-232.77	3,767.71	3,512.77	254.93	14.779		
15,900.00	9,332.96	16,840.38	12,116.85	125.69	131.26	174.47	-4,203.33	-240.90	3,834.64	3,577.68	256.96	14.923		
16,000.00	9,333.62	16,848.35	12,116.64	127.50	131.47	174.31	-4,203.99	-248.84	3,902.96	3,643.99	258.97	15.071		
16,100.00	9,334.28	16,856.12	12,116.41	129.30	131.68	174.15	-4,204.62	-256.58	3,972.62	3,711.64	260.99	15.222		
16,200.00	9,334.94	16,861.00	12,116.27	131.11	131.81	174.05	-4,205.01	-261.44	4,043.54	3,780.62	262.92	15.379		
16,300.00	9,335.60	16,861.00	12,116.27	132.91	131.81	174.05	-4,205.01	-261.44	4,115.66	3,850.93	264.73	15.547		
16,400.00	9,336.26	16,861.00	12,116.27	134.72	131.81	174.05	-4,205.01	-261.44	4,188.93	3,922.39	266.53	15.716		
16,500.00	9,336.93	16,861.00	12,116.27	136.53	131.81	174.05	-4,205.01	-261.44	4,263.28	3,994.94	268.34	15.888		
16,600.00	9,337.59	16,861.00	12,116.27	138.34	131.81	174.05	-4,205.01	-261.44	4,338.67	4,068.52	270.15	16.060		
16,700.00	9,338.25	16,861.00	12,116.27	140.14	131.81	174.05	-4,205.01	-261.44	4,415.03	4,143.07	271.96	16.234		
16,800.00	9,338.91	16,861.00	12,116.27	141.95	131.81	174.05	-4,205.01	-261.44	4,492.32	4,218.56	273.77	16.409		
16,900.00	9,339.57	16,890.55	12,115.50	143.76	132.60	173.46	-4,207.36	-290.89	4,570.32	4,293.96	276.36	16.537		
17,000.00	9,340.24	16,894.49	12,115.41	145.57	132.71	173.38	-4,207.67	-294.81	4,649.28	4,371.00	278.28	16.707		
17,100.00	9,340.90	16,898.41	12,115.32	147.38	132.81	173.30	-4,207.98	-298.72	4,729.04	4,448.84	280.19	16.878		
17,200.00	9,341.56	16,902.31	12,115.24	149.19	132.92	173.22	-4,208.28	-302.61	4,809.54	4,527.43	282.11	17.048		
17,300.00	9,342.22	16,906.20	12,115.17	151.00	133.02	173.14	-4,208.59	-306.48	4,890.76	4,606.74	284.02	17.220		
17,400.00	9,342.88	16,910.06	12,115.09	152.81	133.12	173.06	-4,208.89	-310.34	4,972.66	4,686.72	285.94	17.391		
17,500.00	9,343.54	16,913.91	12,115.03	154.63	133.23	172.99	-4,209.19	-314.17	5,055.20	4,767.35	287.85	17.562		
17,600.00	9,344.21	16,917.74	12,114.96	156.44	133.33	172.91	-4,209.49	-317.99	5,138.36	4,848.59	289.77	17.733		
17,700.00	9,344.87	16,921.56	12,114.90	158.25	133.43	172.83	-4,209.78	-321.79	5,222.10	4,930.42	291.68	17.903		
17,800.00	9,345.53	16,925.35	12,114.84	160.06	133.53	172.76	-4,210.08	-325.58	5,306.40	5,012.81	293.60	18.074		
17,900.00	9,346.19	16,929.13	12,114.79	161.88	133.63	172.68	-4,210.37	-329.35	5,391.24	5,095.72	295.51	18.244		
18,000.00	9,346.85	16,932.90	12,114.74	163.69	133.73	172.61	-4,210.66	-333.10	5,476.58	5,179.15	297.43	18.413		
18,100.00	9,347.51	16,936.64	12,114.69	165.51	133.83	172.53	-4,210.95	-336.83	5,562.40	5,263.06	299.34	18.582		
18,200.00	9,348.18	16,940.37	12,114.65	167.32	133.93	172.46	-4,211.24	-340.55	5,648.69	5,347.43	301.25	18.751		
18,300.00	9,348.84	16,944.08	12,114.61	169.13	134.03	172.38	-4,211.52	-344.25	5,735.41	5,432.25	303.17	18.918		
18,400.00	9,349.50	16,947.78	12,114.57	170.95	134.13	172.31	-4,211.80	-347.93	5,822.56	5,517.48	305.08	19.085		
18,500.00	9,350.16	16,951.46	12,114.54	172.76	134.23	172.23	-4,212.08	-351.60	5,910.11	5,603.12	306.99	19.252		
18,600.00	9,350.82	16,981.00	12,114.39	174.58	135.02	171.64	-4,214.32	-381.06	5,998.15	5,688.55	309.60	19.374		
18,700.00	9,351.49	16,981.00	12,114.39	176.40	135.02	171.64	-4,214.32	-381.06	6,086.43	5,775.01	311.42	19.544		
18,800.00	9,352.15	16,981.00	12,114.39	178.21	135.02	171.64	-4,214.32	-381.06	6,175.06	5,861.83	313.23	19.714		
18,900.00	9,352.81	16,981.00	12,114.39	180.03	135.02	171.64	-4,214.32	-381.06	6,264.04	5,948.99	315.05	19.883		
19,000.00	9,353.47	16,981.00	12,114.39	181.84	135.02	171.64	-4,214.32	-381.06	6,353.34	6,036.48	316.86	20.051		
19,100.00	9,354.13	16,981.00	12,114.39	183.66	135.02	171.64	-4,214.32	-381.06	6,442.96	6,124.28	318.68	20.218		
19,200.00	9,354.79	16,981.00	12,114.39	185.48	135.02	171.64	-4,214.32	-381.06	6,532.88	6,212.38	320.50	20.384		
19,300.00	9,355.46	16,981.00	12,114.39	187.29	135.02	171.64	-4,214.32	-381.06	6,623.09	6,300.77	322.31	20.549		
19,382.20	9,356.00	16,989.10	12,114.37	188.79	135.24	171.48	-4,214.93	-389.14	6,697.45	6,373.42	324.03	20.670		
19,382.57	9,356.00	16,989.15	12,114.37	188.79	135.24	171.48	-4,214.93	-389.19	6,697.78	6,373.75	324.03	20.670		



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Columbus Fee 2H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3353.00ft (Scan Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3353.00ft (Scan Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 2H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Multi User Db
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB=26' @ 3353.00ft (Scan Freedom) Coordinates are relative to: Columbus Fee 2H
Offset Depths are relative to Offset Datum Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Central Meridian is 104° 20' 0.000 W Grid Convergence at Surface is: 0.41°





Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Columbus Fee 2H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3353.00ft (Scan Freedom)
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Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 2H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Multi User Db
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB=26' @ 3353.00ft (Scan Freedom) Coordinates are relative to: Columbus Fee 2H
Offset Depths are relative to Offset Datum Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Central Meridian is 104° 20' 0.000 W Grid Convergence at Surface is: 0.41°

