



COG Operating L L C

Lea County, NM (NAD27 NME)

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

Columbus Fee 23H

Wellbore #1

Plan #2

Anticollision Report

11 November, 2016





Integrity Directional Services, LLC
Anticollision Report



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Columbus Fee 23H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3352.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3352.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 23H	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 #2	Offset TVD Reference:	Offset Datum

Reference	Plan #2		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.00ft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 10,000.00 ft	Error Surface:	Circular Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date	11/11/2016		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.00	22,444.38	Plan #2 (Wellbore #1)	MWD	MWD - Standard	

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						
Columbus Fee 24H - Wellbore #1 - Plan #2	13,438.70	13,373.70	565.44	496.97	8.259	CC
Columbus Fee 24H - Wellbore #1 - Plan #2	22,444.38	22,378.89	660.05	288.79	1.778	ES, SF
Columbus Fee 2H - Wellbore #1 - Wellbore #1	6,800.00	6,800.00	928.20	901.27	34.459	CC
Columbus Fee 2H - Wellbore #1 - Wellbore #1	8,900.00	8,903.75	933.03	898.01	26.649	ES
Columbus Fee 2H - Wellbore #1 - Wellbore #1	22,444.38	19,142.96	3,133.84	2,773.93	8.707	SF
Redbull 35 FED #1H - Wellbore #1 - Actual Wellbore	16,399.19	15,885.73	270.58	86.83	1.473	Level 3, CC
Redbull 35 FED #1H - Wellbore #1 - Actual Wellbore	16,400.00	15,885.88	270.58	86.82	1.472	Level 3, ES, SF

Offset Design		Sec. 34, T 25 S. , R 33 E - Columbus Fee 24H - Wellbore #1 - Plan #2										Offset Site Error:		0.00 ft
Survey Program: 0-MWD												Offset Well Error:		0.00 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)				
0.00	0.00	1.00	1.00	0.00	0.00	-90.38	-5.80	-869.90	869.92					
100.00	100.00	101.00	101.00	0.08	0.09	-90.38	-5.80	-869.90	869.92	869.75	0.17	5,160.447		
200.00	200.00	201.00	201.00	0.31	0.31	-90.38	-5.80	-869.90	869.92	869.30	0.62	1,407.396		
300.00	300.00	301.00	301.00	0.53	0.53	-90.38	-5.80	-869.90	869.92	868.85	1.07	814.808		
400.00	400.00	401.00	401.00	0.76	0.76	-90.38	-5.80	-869.90	869.92	868.40	1.52	573.384		
500.00	500.00	501.00	501.00	0.98	0.98	-90.38	-5.80	-869.90	869.92	867.95	1.97	442.325		
600.00	600.00	601.00	601.00	1.21	1.21	-90.38	-5.80	-869.90	869.92	867.50	2.42	360.032		
700.00	700.00	701.00	701.00	1.43	1.43	-90.38	-5.80	-869.90	869.92	867.06	2.87	303.556		
800.00	800.00	801.00	801.00	1.66	1.66	-90.38	-5.80	-869.90	869.92	866.61	3.32	262.396		
900.00	900.00	901.00	901.00	1.88	1.88	-90.38	-5.80	-869.90	869.92	866.16	3.76	231.065		
1,000.00	1,000.00	1,001.00	1,001.00	2.11	2.11	-90.38	-5.80	-869.90	869.92	865.71	4.21	206.418		
1,100.00	1,100.00	1,101.00	1,101.00	2.33	2.33	-90.38	-5.80	-869.90	869.92	865.26	4.66	186.522		
1,200.00	1,200.00	1,201.00	1,201.00	2.56	2.56	-90.38	-5.80	-869.90	869.92	864.81	5.11	170.125		
1,300.00	1,300.00	1,301.00	1,301.00	2.78	2.78	-90.38	-5.80	-869.90	869.92	864.36	5.56	156.377		
1,400.00	1,400.00	1,401.00	1,401.00	3.01	3.01	-90.38	-5.80	-869.90	869.92	863.91	6.01	144.686		
1,500.00	1,500.00	1,501.00	1,501.00	3.23	3.23	-90.38	-5.80	-869.90	869.92	863.46	6.46	134.621		
1,600.00	1,600.00	1,601.00	1,601.00	3.45	3.46	-90.38	-5.80	-869.90	869.92	863.01	6.91	125.865		
1,700.00	1,700.00	1,701.00	1,701.00	3.68	3.68	-90.38	-5.80	-869.90	869.92	862.56	7.36	118.178		
1,800.00	1,800.00	1,801.00	1,801.00	3.90	3.91	-90.38	-5.80	-869.90	869.92	862.11	7.81	111.377		
1,900.00	1,900.00	1,901.00	1,901.00	4.13	4.13	-90.38	-5.80	-869.90	869.92	861.66	8.26	105.315		
2,000.00	2,000.00	2,001.00	2,001.00	4.35	4.36	-90.38	-5.80	-869.90	869.92	861.21	8.71	99.880		

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



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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 #2	Offset TVD Reference:	Offset Datum

Offset Design Sec. 34, T 25 S. , R 33 E - Columbus Fee 24H - Wellbore #1 - Plan #2											Offset Site Error:		0.00 ft
Survey Program: 0-MWD											Offset Well Error:		0.00 ft
Reference		Offset		Semi Major Axis			Distance		Minimum Separation	Separation Factor	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)
2,100.00	2,100.00	2,101.00	2,101.00	4.58	4.58	-90.38	-5.80	-869.90	869.92	860.76	9.16	94.978	
2,200.00	2,200.00	2,201.00	2,201.00	4.80	4.81	-90.38	-5.80	-869.90	869.92	860.31	9.61	90.534	
2,300.00	2,300.00	2,301.00	2,301.00	5.03	5.03	-90.38	-5.80	-869.90	869.92	859.86	10.06	86.488	
2,400.00	2,400.00	2,401.00	2,401.00	5.25	5.26	-90.38	-5.80	-869.90	869.92	859.41	10.51	82.788	
2,500.00	2,500.00	2,501.00	2,501.00	5.48	5.48	-90.38	-5.80	-869.90	869.92	858.96	10.96	79.392	
2,600.00	2,600.00	2,601.00	2,601.00	5.70	5.70	-90.38	-5.80	-869.90	869.92	858.51	11.41	76.263	
2,700.00	2,700.00	2,701.00	2,701.00	5.93	5.93	-90.38	-5.80	-869.90	869.92	858.06	11.86	73.371	
2,800.00	2,800.00	2,801.00	2,801.00	6.15	6.15	-90.38	-5.80	-869.90	869.92	857.62	12.31	70.691	
2,900.00	2,900.00	2,901.00	2,901.00	6.38	6.38	-90.38	-5.80	-869.90	869.92	857.17	12.76	68.200	
3,000.00	3,000.00	3,001.00	3,001.00	6.60	6.60	-90.38	-5.80	-869.90	869.92	856.72	13.21	65.878	
3,100.00	3,100.00	3,101.00	3,101.00	6.83	6.83	-90.38	-5.80	-869.90	869.92	856.27	13.65	63.709	
3,200.00	3,200.00	3,201.00	3,201.00	7.05	7.05	-90.38	-5.80	-869.90	869.92	855.82	14.10	61.679	
3,300.00	3,300.00	3,301.00	3,301.00	7.28	7.28	-90.38	-5.80	-869.90	869.92	855.37	14.55	59.774	
3,400.00	3,400.00	3,401.00	3,401.00	7.50	7.50	-90.38	-5.80	-869.90	869.92	854.92	15.00	57.983	
3,500.00	3,500.00	3,501.00	3,501.00	7.73	7.73	-90.38	-5.80	-869.90	869.92	854.47	15.45	56.296	
3,600.00	3,600.00	3,601.00	3,601.00	7.95	7.95	-90.38	-5.80	-869.90	869.92	854.02	15.90	54.704	
3,700.00	3,700.00	3,701.00	3,701.00	8.17	8.18	-90.38	-5.80	-869.90	869.92	853.57	16.35	53.201	
3,800.00	3,800.00	3,801.00	3,801.00	8.40	8.40	-90.38	-5.80	-869.90	869.92	853.12	16.80	51.777	
3,900.00	3,900.00	3,901.00	3,901.00	8.62	8.63	-90.38	-5.80	-869.90	869.92	852.67	17.25	50.428	
4,000.00	4,000.00	4,001.00	4,001.00	8.85	8.85	-90.38	-5.80	-869.90	869.92	852.22	17.70	49.147	
4,100.00	4,100.00	4,101.00	4,101.00	9.07	9.08	-90.38	-5.80	-869.90	869.92	851.77	18.15	47.930	
4,200.00	4,200.00	4,201.00	4,201.00	9.30	9.30	-90.38	-5.80	-869.90	869.92	851.32	18.60	46.771	
4,300.00	4,300.00	4,301.00	4,301.00	9.52	9.53	-90.38	-5.80	-869.90	869.92	850.87	19.05	45.668	
4,400.00	4,400.00	4,401.00	4,401.00	9.75	9.75	-90.38	-5.80	-869.90	869.92	850.42	19.50	44.615	
4,500.00	4,500.00	4,501.00	4,501.00	9.97	9.98	-90.38	-5.80	-869.90	869.92	849.97	19.95	43.609	
4,600.00	4,600.00	4,601.00	4,601.00	10.20	10.20	-90.38	-5.80	-869.90	869.92	849.52	20.40	42.648	
4,700.00	4,700.00	4,701.00	4,701.00	10.42	10.42	-90.38	-5.80	-869.90	869.92	849.07	20.85	41.729	
4,800.00	4,800.00	4,801.00	4,801.00	10.65	10.65	-90.38	-5.80	-869.90	869.92	848.62	21.30	40.848	
4,900.00	4,900.00	4,901.00	4,901.00	10.87	10.87	-90.38	-5.80	-869.90	869.92	848.17	21.75	40.004	
5,000.00	5,000.00	5,001.00	5,001.00	11.10	11.10	-90.38	-5.80	-869.90	869.92	847.73	22.20	39.193	
5,100.00	5,100.00	5,101.00	5,101.00	11.32	11.32	-90.38	-5.80	-869.90	869.92	847.28	22.65	38.415	
5,200.00	5,200.00	5,201.00	5,201.00	11.55	11.55	-90.38	-5.80	-869.90	869.92	846.83	23.09	37.668	
5,300.00	5,300.00	5,301.00	5,301.00	11.77	11.77	-90.38	-5.80	-869.90	869.92	846.38	23.54	36.948	
5,400.00	5,400.00	5,401.00	5,401.00	12.00	12.00	-90.38	-5.80	-869.90	869.92	845.93	23.99	36.256	
5,500.00	5,500.00	5,501.00	5,501.00	12.22	12.22	-90.38	-5.80	-869.90	869.92	845.48	24.44	35.589	
5,600.00	5,600.00	5,601.00	5,601.00	12.45	12.45	-90.38	-5.80	-869.90	869.92	845.03	24.89	34.947	
5,700.00	5,700.00	5,701.00	5,701.00	12.67	12.67	-90.38	-5.80	-869.90	869.92	844.58	25.34	34.327	
5,800.00	5,800.00	5,801.00	5,801.00	12.89	12.90	-90.38	-5.80	-869.90	869.92	844.13	25.79	33.728	
5,900.00	5,900.00	5,901.00	5,901.00	13.12	13.12	-90.38	-5.80	-869.90	869.92	843.68	26.24	33.151	
6,000.00	6,000.00	6,001.00	6,001.00	13.34	13.35	-90.38	-5.80	-869.90	869.92	843.23	26.69	32.592	
6,100.00	6,100.00	6,101.00	6,101.00	13.57	13.57	-90.38	-5.80	-869.90	869.92	842.78	27.14	32.053	
6,200.00	6,200.00	6,201.00	6,201.00	13.79	13.80	-90.38	-5.80	-869.90	869.92	842.33	27.59	31.530	
6,300.00	6,300.00	6,301.00	6,301.00	14.02	14.02	-90.38	-5.80	-869.90	869.92	841.88	28.04	31.025	
6,400.00	6,400.00	6,401.00	6,401.00	14.24	14.25	-90.38	-5.80	-869.90	869.92	841.43	28.49	30.535	
6,500.00	6,500.00	6,501.00	6,501.00	14.47	14.47	-90.38	-5.80	-869.90	869.92	840.98	28.94	30.061	
6,600.00	6,600.00	6,601.00	6,601.00	14.69	14.70	-90.38	-5.80	-869.90	869.92	840.53	29.39	29.601	
6,700.00	6,700.00	6,701.00	6,701.00	14.92	14.92	-90.38	-5.80	-869.90	869.92	840.08	29.84	29.155	
6,800.00	6,800.00	6,801.00	6,801.00	15.14	15.14	-90.38	-5.80	-869.90	869.92	839.63	30.29	28.722	
6,900.00	6,900.00	6,901.00	6,901.00	15.37	15.37	-90.38	-5.80	-869.90	869.92	839.18	30.74	28.302	
7,000.00	7,000.00	7,001.00	7,001.00	15.59	15.59	-90.38	-5.80	-869.90	869.92	838.73	31.19	27.894	
7,100.00	7,100.00	7,101.00	7,101.00	15.82	15.82	-90.38	-5.80	-869.90	869.92	838.29	31.64	27.498	
7,200.00	7,200.00	7,201.00	7,201.00	16.04	16.04	-90.38	-5.80	-869.90	869.92	837.84	32.09	27.113	

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Survey Program: 0-MWD													Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)						
7,300.00	7,300.00	7,301.00	7,301.00	16.27	16.27	-90.38	-5.80	-869.90	869.92	837.39	32.53	26.738		
7,400.00	7,400.00	7,401.00	7,401.00	16.49	16.49	-90.38	-5.80	-869.90	869.92	836.94	32.98	26.374		
7,500.00	7,500.00	7,501.00	7,501.00	16.72	16.72	-90.38	-5.80	-869.90	869.92	836.49	33.43	26.019		
7,600.00	7,600.00	7,601.00	7,601.00	16.94	16.94	-90.38	-5.80	-869.90	869.92	836.04	33.88	25.674		
7,700.00	7,700.00	7,701.00	7,701.00	17.17	17.17	-90.38	-5.80	-869.90	869.92	835.59	34.33	25.338		
7,800.00	7,800.00	7,801.00	7,801.00	17.39	17.39	-90.38	-5.80	-869.90	869.92	835.14	34.78	25.010		
7,900.00	7,900.00	7,901.00	7,901.00	17.61	17.62	-90.38	-5.80	-869.90	869.92	834.69	35.23	24.691		
8,000.00	8,000.00	8,001.00	8,001.00	17.84	17.84	-90.38	-5.80	-869.90	869.92	834.24	35.68	24.380		
8,100.00	8,100.00	8,101.00	8,101.00	18.06	18.07	-90.38	-5.80	-869.90	869.92	833.79	36.13	24.077		
8,200.00	8,200.00	8,201.00	8,201.00	18.29	18.29	-90.38	-5.80	-869.90	869.92	833.34	36.58	23.781		
8,300.00	8,300.00	8,301.00	8,301.00	18.51	18.52	-90.38	-5.80	-869.90	869.92	832.89	37.03	23.492		
8,400.00	8,400.00	8,401.00	8,401.00	18.74	18.74	-90.38	-5.80	-869.90	869.92	832.44	37.48	23.210		
8,500.00	8,500.00	8,501.00	8,501.00	18.96	18.97	-90.38	-5.80	-869.90	869.92	831.99	37.93	22.935		
8,600.00	8,600.00	8,601.00	8,601.00	19.19	19.19	-90.38	-5.80	-869.90	869.92	831.54	38.38	22.667		
8,700.00	8,700.00	8,701.00	8,701.00	19.41	19.42	-90.38	-5.80	-869.90	869.92	831.09	38.83	22.404		
8,800.00	8,800.00	8,801.00	8,801.00	19.64	19.64	-90.38	-5.80	-869.90	869.92	830.64	39.28	22.148		
8,900.00	8,900.00	8,901.00	8,901.00	19.86	19.86	-90.38	-5.80	-869.90	869.92	830.19	39.73	21.897		
9,000.00	9,000.00	9,001.00	9,001.00	20.09	20.09	-90.38	-5.80	-869.90	869.92	829.74	40.18	21.652		
9,100.00	9,100.00	9,101.00	9,101.00	20.31	20.31	-90.38	-5.80	-869.90	869.92	829.29	40.63	21.413		
9,200.00	9,200.00	9,201.00	9,201.00	20.54	20.54	-90.38	-5.80	-869.90	869.92	828.85	41.08	21.178		
9,300.00	9,300.00	9,301.00	9,301.00	20.76	20.76	-90.38	-5.80	-869.90	869.92	828.40	41.53	20.949		
9,400.00	9,400.00	9,401.00	9,401.00	20.99	20.99	-90.38	-5.80	-869.90	869.92	827.95	41.98	20.725		
9,500.00	9,500.00	9,501.00	9,501.00	21.21	21.21	-90.38	-5.80	-869.90	869.92	827.50	42.42	20.505		
9,600.00	9,600.00	9,601.00	9,601.00	21.44	21.44	-90.38	-5.80	-869.90	869.92	827.05	42.87	20.290		
9,700.00	9,700.00	9,701.00	9,701.00	21.66	21.66	-90.38	-5.80	-869.90	869.92	826.60	43.32	20.080		
9,800.00	9,800.00	9,801.00	9,801.00	21.89	21.89	-90.38	-5.80	-869.90	869.92	826.15	43.77	19.873		
9,900.00	9,900.00	9,901.00	9,901.00	22.11	22.11	-90.38	-5.80	-869.90	869.92	825.70	44.22	19.671		
10,000.00	10,000.00	10,001.00	10,001.00	22.34	22.34	-90.38	-5.80	-869.90	869.92	825.25	44.67	19.473		
10,100.00	10,100.00	10,101.00	10,101.00	22.56	22.56	-90.38	-5.80	-869.90	869.92	824.80	45.12	19.279		
10,200.00	10,200.00	10,201.00	10,201.00	22.78	22.79	-90.38	-5.80	-869.90	869.92	824.35	45.57	19.089		
10,300.00	10,300.00	10,301.00	10,301.00	23.01	23.01	-90.38	-5.80	-869.90	869.92	823.90	46.02	18.903		
10,400.00	10,400.00	10,401.00	10,401.00	23.23	23.24	-90.38	-5.80	-869.90	869.92	823.45	46.47	18.720		
10,500.00	10,500.00	10,501.00	10,501.00	23.46	23.46	-90.38	-5.80	-869.90	869.92	823.00	46.92	18.541		
10,600.00	10,600.00	10,601.00	10,601.00	23.68	23.69	-90.38	-5.80	-869.90	869.92	822.55	47.37	18.365		
10,700.00	10,700.00	10,701.00	10,701.00	23.91	23.91	-90.38	-5.80	-869.90	869.92	822.10	47.82	18.192		
10,800.00	10,800.00	10,801.00	10,801.00	24.13	24.14	-90.38	-5.80	-869.90	869.92	821.65	48.27	18.023		
10,900.00	10,900.00	10,901.00	10,901.00	24.36	24.36	-90.38	-5.80	-869.90	869.92	821.20	48.72	17.856		
11,000.00	11,000.00	11,001.00	11,001.00	24.58	24.58	-90.38	-5.80	-869.90	869.92	820.75	49.17	17.693		
11,100.00	11,100.00	11,101.00	11,101.00	24.81	24.81	-90.38	-5.80	-869.90	869.92	820.30	49.62	17.533		
11,200.00	11,200.00	11,201.00	11,201.00	25.03	25.03	-90.38	-5.80	-869.90	869.92	819.85	50.07	17.375		
11,300.00	11,300.00	11,301.00	11,301.00	25.26	25.26	-90.38	-5.80	-869.90	869.92	819.40	50.52	17.221		
11,400.00	11,400.00	11,401.00	11,401.00	25.48	25.48	-90.38	-5.80	-869.90	869.92	818.96	50.97	17.069		
11,500.00	11,500.00	11,501.00	11,501.00	25.71	25.71	-90.38	-5.80	-869.90	869.92	818.51	51.42	16.920		
11,600.00	11,600.00	11,601.00	11,601.00	25.93	25.93	-90.38	-5.80	-869.90	869.92	818.06	51.86	16.773		
11,700.00	11,700.00	11,701.00	11,701.00	26.16	26.16	-90.38	-5.80	-869.90	869.92	817.61	52.31	16.629		
11,800.00	11,800.00	11,801.00	11,801.00	26.38	26.38	-90.38	-5.80	-869.90	869.92	817.16	52.76	16.487		
11,900.00	11,900.00	11,901.00	11,901.00	26.61	26.61	-90.38	-5.80	-869.90	869.92	816.71	53.21	16.348		
12,000.00	11,999.99	12,000.39	12,000.36	26.82	26.81	68.18	-7.07	-869.91	869.66	816.03	53.63	16.216		
12,100.00	12,098.53	12,098.14	12,096.44	26.99	26.98	68.65	-24.10	-869.95	863.91	809.95	53.96	16.009		
12,200.00	12,191.60	12,194.61	12,185.92	27.15	27.13	69.90	-59.71	-870.04	850.88	796.59	54.28	15.674		
12,300.00	12,275.15	12,289.37	12,265.11	27.32	27.27	71.95	-111.47	-870.17	831.12	776.52	54.59	15.224		
12,400.00	12,345.52	12,382.31	12,331.36	27.53	27.46	74.81	-176.44	-870.34	805.48	750.49	54.99	14.648		

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 23H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3352.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3352.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 23H	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 #2	Offset TVD Reference:	Offset Datum

Offset Design Sec. 34, T 25 S. , R 33 E - Columbus Fee 24H - Wellbore #1 - Plan #2													Offset Site Error:	0.00 ft
Survey Program: 0-MWD													Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Minimum Separation (ft)	Separation Factor	Warning			
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Between Centres (ft)	Between Ellipses (ft)				Offset	Reference	Offset
12,500.00	12,399.63	12,473.70	12,383.05	27.82	27.70	78.46	-251.64	-870.54	775.05	719.53	55.51	13.961		
12,600.00	12,435.11	12,564.12	12,419.19	28.19	28.00	82.84	-334.37	-870.75	741.14	684.94	56.20	13.188		
12,700.00	12,450.43	12,654.42	12,439.10	28.67	28.38	87.82	-422.32	-870.98	705.23	648.19	57.05	12.362		
12,800.00	12,450.66	12,746.64	12,442.86	29.22	28.85	89.30	-514.37	-871.21	670.24	612.18	58.06	11.543		
12,900.00	12,450.19	12,841.97	12,442.42	29.84	29.41	89.26	-609.70	-871.46	640.09	580.84	59.25	10.803		
13,000.00	12,449.72	12,938.75	12,441.97	30.54	30.07	89.23	-706.48	-871.71	614.96	554.34	60.62	10.145		
13,100.00	12,449.25	13,036.71	12,441.51	31.32	30.83	89.19	-804.44	-871.96	594.94	532.78	62.16	9.571		
13,200.00	12,448.78	13,135.59	12,441.05	32.17	31.68	89.17	-903.31	-872.22	580.06	516.21	63.86	9.084		
13,300.00	12,448.31	13,235.11	12,440.59	33.08	32.62	89.14	-1,002.83	-872.48	570.39	504.69	65.70	8.682		
13,400.00	12,447.84	13,335.00	12,440.12	34.04	33.63	89.12	-1,102.72	-872.73	565.93	498.26	67.67	8.363		
13,438.70	12,447.66	13,373.70	12,439.94	34.42	34.04	89.12	-1,141.42	-872.83	565.44	496.97	68.46	8.259 CC		
13,500.00	12,447.38	13,434.99	12,439.66	35.04	34.71	89.11	-1,202.71	-872.99	566.18	496.44	69.75	8.118		
13,600.00	12,446.91	13,534.99	12,439.19	36.06	35.85	89.12	-1,302.70	-873.25	567.23	495.32	71.91	7.888		
13,700.00	12,446.45	13,634.98	12,438.73	37.15	37.04	89.12	-1,402.70	-873.51	568.28	494.09	74.19	7.660		
13,800.00	12,445.99	13,734.98	12,438.26	38.29	38.28	89.12	-1,502.69	-873.77	569.33	492.75	76.58	7.435		
13,900.00	12,445.53	13,834.97	12,437.80	39.49	39.57	89.12	-1,602.68	-874.03	570.38	491.32	79.06	7.214		
14,000.00	12,445.06	13,934.97	12,437.33	40.73	40.90	89.12	-1,702.68	-874.28	571.43	489.80	81.63	7.000		
14,100.00	12,444.60	14,034.96	12,436.87	42.01	42.27	89.12	-1,802.67	-874.54	572.48	488.20	84.28	6.793		
14,200.00	12,444.14	14,134.96	12,436.40	43.33	43.67	89.12	-1,902.66	-874.80	573.53	486.53	87.00	6.592		
14,300.00	12,443.68	14,234.95	12,435.93	44.69	45.10	89.13	-2,002.66	-875.06	574.58	484.79	89.79	6.399		
14,400.00	12,443.21	14,334.94	12,435.47	46.08	46.56	89.13	-2,102.65	-875.32	575.63	482.99	92.64	6.214		
14,500.00	12,442.75	14,434.94	12,435.00	47.50	48.04	89.13	-2,202.64	-875.57	576.68	481.13	95.54	6.036		
14,600.00	12,442.29	14,534.93	12,434.54	48.95	49.55	89.13	-2,302.63	-875.83	577.73	479.23	98.50	5.866		
14,700.00	12,441.83	14,634.93	12,434.07	50.42	51.07	89.13	-2,402.63	-876.09	578.78	477.28	101.49	5.703		
14,800.00	12,441.36	14,734.92	12,433.61	51.91	52.62	89.13	-2,502.62	-876.35	579.83	475.29	104.53	5.547		
14,900.00	12,440.90	14,834.92	12,433.14	53.43	54.18	89.13	-2,602.61	-876.61	580.88	473.26	107.61	5.398		
15,000.00	12,440.44	14,934.91	12,432.68	54.96	55.76	89.13	-2,702.61	-876.87	581.92	471.20	110.73	5.256		
15,100.00	12,439.98	15,034.91	12,432.21	56.51	57.36	89.14	-2,802.60	-877.12	582.97	469.10	113.87	5.120		
15,200.00	12,439.51	15,134.90	12,431.75	58.08	58.96	89.14	-2,902.59	-877.38	584.02	466.98	117.05	4.990		
15,300.00	12,439.05	15,234.90	12,431.28	59.66	60.58	89.14	-3,002.59	-877.64	585.07	464.83	120.25	4.866		
15,400.00	12,438.59	15,334.89	12,430.81	61.26	62.22	89.14	-3,102.58	-877.90	586.12	462.65	123.48	4.747		
15,500.00	12,438.12	15,434.88	12,430.35	62.87	63.86	89.14	-3,202.57	-878.16	587.17	460.45	126.73	4.633		
15,600.00	12,437.66	15,534.88	12,429.88	64.49	65.51	89.14	-3,302.57	-878.41	588.22	458.22	130.00	4.525		
15,700.00	12,437.20	15,634.87	12,429.42	66.12	67.17	89.14	-3,402.56	-878.67	589.27	455.98	133.29	4.421		
15,800.00	12,436.74	15,734.87	12,428.95	67.76	68.84	89.14	-3,502.55	-878.93	590.32	453.72	136.60	4.322		
15,900.00	12,436.27	15,834.86	12,428.49	69.41	70.51	89.15	-3,602.54	-879.19	591.37	451.44	139.93	4.226		
16,000.00	12,435.81	15,934.86	12,428.02	71.07	72.20	89.15	-3,702.54	-879.45	592.42	449.15	143.27	4.135		
16,100.00	12,435.35	16,034.85	12,427.56	72.74	73.89	89.15	-3,802.53	-879.71	593.47	446.84	146.63	4.047		
16,200.00	12,434.89	16,134.85	12,427.09	74.41	75.58	89.15	-3,902.52	-879.96	594.52	444.52	150.00	3.963		
16,300.00	12,434.42	16,234.84	12,426.63	76.10	77.29	89.15	-4,002.52	-880.22	595.57	442.18	153.38	3.883		
16,400.00	12,433.96	16,334.83	12,426.16	77.79	78.99	89.15	-4,102.51	-880.48	596.62	439.84	156.78	3.805		
16,500.00	12,433.50	16,434.83	12,425.69	79.48	80.71	89.15	-4,202.50	-880.74	597.67	437.48	160.19	3.731		
16,600.00	12,433.04	16,534.82	12,425.23	81.18	82.43	89.15	-4,302.50	-881.00	598.72	435.11	163.61	3.659		
16,700.00	12,432.57	16,634.82	12,424.76	82.89	84.15	89.16	-4,402.49	-881.25	599.77	432.73	167.03	3.591		
16,800.00	12,432.11	16,734.81	12,424.30	84.60	85.87	89.16	-4,502.48	-881.51	600.81	430.34	170.47	3.524		
16,900.00	12,431.65	16,834.81	12,423.83	86.31	87.60	89.16	-4,602.48	-881.77	601.86	427.95	173.92	3.461		
17,000.00	12,431.19	16,934.80	12,423.37	88.03	89.34	89.16	-4,702.47	-882.03	602.91	425.54	177.37	3.399		
17,100.00	12,430.72	17,034.80	12,422.90	89.76	91.08	89.16	-4,802.46	-882.29	603.96	423.13	180.84	3.340		
17,200.00	12,430.26	17,134.79	12,422.44	91.49	92.82	89.16	-4,902.45	-882.55	605.01	420.71	184.31	3.283		
17,300.00	12,429.80	17,234.79	12,421.97	93.22	94.56	89.16	-5,002.45	-882.80	606.06	418.28	187.78	3.227		
17,400.00	12,429.34	17,334.78	12,421.51	94.96	96.31	89.16	-5,102.44	-883.06	607.11	415.84	191.27	3.174		
17,500.00	12,428.87	17,434.77	12,421.04	96.70	98.06	89.17	-5,202.43	-883.32	608.16	413.40	194.76	3.123		

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
Project: Lea County, NM (NAD27 NME)
Reference Site: Sec. 34, T 25 S. , R 33 E
Site Error: 0.00 ft
Reference Well: Columbus Fee 23H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #2

Local Co-ordinate Reference: Well Columbus Fee 23H
TVD Reference: KB=26' @ 3352.00ft (Scandril Freedom)
MD Reference: KB=26' @ 3352.00ft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM 5000.1 Multi User Db
Offset TVD Reference: Offset Datum

Offset Design Sec. 34, T 25 S. , R 33 E - Columbus Fee 24H - Wellbore #1 - Plan #2													Offset Site Error:	0.00 ft
Survey Program: 0-MWD													Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)						
17,600.00	12,428.41	17,534.77	12,420.57	98.44	99.81	89.17	-5,302.43	-883.58	609.21	410.96	198.25	3.073		
17,700.00	12,427.95	17,634.76	12,420.11	100.19	101.57	89.17	-5,402.42	-883.84	610.26	408.50	201.75	3.025		
17,800.00	12,427.48	17,734.76	12,419.64	101.93	103.33	89.17	-5,502.41	-884.10	611.31	406.05	205.26	2.978		
17,900.00	12,427.02	17,834.75	12,419.18	103.69	105.09	89.17	-5,602.41	-884.35	612.36	403.59	208.77	2.933		
18,000.00	12,426.56	17,934.75	12,418.71	105.44	106.85	89.17	-5,702.40	-884.61	613.41	401.12	212.29	2.889		
18,100.00	12,426.10	18,034.74	12,418.25	107.20	108.61	89.17	-5,802.39	-884.87	614.46	398.65	215.81	2.847		
18,200.00	12,425.63	18,134.74	12,417.78	108.96	110.38	89.17	-5,902.39	-885.13	615.51	396.17	219.34	2.806		
18,300.00	12,425.17	18,234.73	12,417.32	110.72	112.15	89.17	-6,002.38	-885.39	616.56	393.69	222.87	2.766		
18,400.00	12,424.71	18,334.72	12,416.85	112.48	113.92	89.18	-6,102.37	-885.64	617.61	391.21	226.40	2.728		
18,500.00	12,424.25	18,434.72	12,416.39	114.25	115.69	89.18	-6,202.36	-885.90	618.66	388.72	229.94	2.691		
18,600.00	12,423.78	18,534.71	12,415.92	116.01	117.46	89.18	-6,302.36	-886.16	619.71	386.23	233.48	2.654		
18,700.00	12,423.32	18,634.71	12,415.45	117.78	119.24	89.18	-6,402.35	-886.42	620.75	383.73	237.02	2.619		
18,800.00	12,422.86	18,734.70	12,414.99	119.55	121.02	89.18	-6,502.34	-886.68	621.80	381.23	240.57	2.585		
18,900.00	12,422.40	18,834.70	12,414.52	121.33	122.79	89.18	-6,602.34	-886.94	622.85	378.73	244.12	2.551		
19,000.00	12,421.93	18,934.69	12,414.06	123.10	124.57	89.18	-6,702.33	-887.19	623.90	376.23	247.67	2.519		
19,100.00	12,421.47	19,034.69	12,413.59	124.88	126.35	89.18	-6,802.32	-887.45	624.95	373.72	251.23	2.488		
19,200.00	12,421.01	19,134.68	12,413.13	126.65	128.14	89.18	-6,902.32	-887.71	626.00	371.21	254.79	2.457		
19,300.00	12,420.55	19,234.68	12,412.66	128.43	129.92	89.19	-7,002.31	-887.97	627.05	368.70	258.35	2.427		
19,400.00	12,420.08	19,334.67	12,412.20	130.21	131.70	89.19	-7,102.30	-888.23	628.10	366.19	261.92	2.398		
19,500.00	12,419.62	19,434.66	12,411.73	131.99	133.49	89.19	-7,202.30	-888.48	629.15	363.67	265.48	2.370		
19,600.00	12,419.16	19,534.66	12,411.27	133.78	135.27	89.19	-7,302.29	-888.74	630.20	361.15	269.05	2.342		
19,700.00	12,418.70	19,634.65	12,410.80	135.56	137.06	89.19	-7,402.28	-889.00	631.25	358.63	272.62	2.315		
19,800.00	12,418.23	19,734.65	12,410.33	137.35	138.85	89.19	-7,502.27	-889.26	632.30	356.10	276.20	2.289		
19,900.00	12,417.77	19,834.64	12,409.87	139.13	140.64	89.19	-7,602.27	-889.52	633.35	353.58	279.77	2.264		
20,000.00	12,417.31	19,934.64	12,409.40	140.92	142.43	89.19	-7,702.26	-889.78	634.40	351.05	283.35	2.239		
20,100.00	12,416.85	20,034.63	12,408.94	142.71	144.22	89.19	-7,802.25	-890.03	635.45	348.52	286.93	2.215		
20,200.00	12,416.38	20,134.63	12,408.47	144.50	146.01	89.20	-7,902.25	-890.29	636.50	345.99	290.51	2.191		
20,300.00	12,415.92	20,234.62	12,408.01	146.29	147.81	89.20	-8,002.24	-890.55	637.55	343.45	294.09	2.168		
20,400.00	12,415.46	20,334.61	12,407.54	148.08	149.60	89.20	-8,102.23	-890.81	638.60	340.92	297.68	2.145		
20,500.00	12,414.99	20,434.61	12,407.08	149.87	151.39	89.20	-8,202.23	-891.07	639.64	338.38	301.26	2.123		
20,600.00	12,414.53	20,534.60	12,406.61	151.66	153.19	89.20	-8,302.22	-891.32	640.69	335.84	304.85	2.102		
20,700.00	12,414.07	20,634.60	12,406.15	153.46	154.98	89.20	-8,402.21	-891.58	641.74	333.30	308.44	2.081		
20,800.00	12,413.61	20,734.59	12,405.68	155.25	156.78	89.20	-8,502.21	-891.84	642.79	330.76	312.03	2.060		
20,900.00	12,413.14	20,834.59	12,405.21	157.05	158.58	89.20	-8,602.20	-892.10	643.84	328.22	315.63	2.040		
21,000.00	12,412.68	20,934.58	12,404.75	158.84	160.38	89.20	-8,702.19	-892.36	644.89	325.67	319.22	2.020		
21,100.00	12,412.22	21,034.58	12,404.28	160.64	162.17	89.20	-8,802.18	-892.62	645.94	323.13	322.81	2.001		
21,200.00	12,411.76	21,134.57	12,403.82	162.44	163.97	89.21	-8,902.18	-892.87	646.99	320.58	326.41	1.982		
21,300.00	12,411.29	21,234.56	12,403.35	164.24	165.77	89.21	-9,002.17	-893.13	648.04	318.03	330.01	1.964		
21,400.00	12,410.83	21,334.56	12,402.89	166.04	167.57	89.21	-9,102.16	-893.39	649.09	315.48	333.61	1.946		
21,500.00	12,410.37	21,434.55	12,402.42	167.84	169.37	89.21	-9,202.16	-893.65	650.14	312.93	337.21	1.928		
21,600.00	12,409.91	21,534.55	12,401.96	169.64	171.17	89.21	-9,302.15	-893.91	651.19	310.38	340.81	1.911		
21,700.00	12,409.44	21,634.54	12,401.49	171.44	172.97	89.21	-9,402.14	-894.17	652.24	307.83	344.41	1.894		
21,800.00	12,408.98	21,734.54	12,401.03	173.24	174.78	89.21	-9,502.14	-894.42	653.29	305.27	348.02	1.877		
21,900.00	12,408.52	21,834.53	12,400.56	175.04	176.58	89.21	-9,602.13	-894.68	654.34	302.72	351.62	1.861		
22,000.00	12,408.06	21,934.53	12,400.09	176.84	178.38	89.21	-9,702.12	-894.94	655.39	300.16	355.23	1.845		
22,100.00	12,407.59	22,034.52	12,399.63	178.65	180.19	89.21	-9,802.12	-895.20	656.44	297.60	358.83	1.829		
22,200.00	12,407.13	22,134.52	12,399.16	180.45	181.99	89.22	-9,902.11	-895.46	657.49	295.05	362.44	1.814		
22,300.00	12,406.67	22,234.51	12,398.70	182.25	183.79	89.22	-10,002.10	-895.71	658.53	292.49	366.05	1.799		
22,400.00	12,406.21	22,334.50	12,398.23	184.06	185.60	89.22	-10,102.09	-895.97	659.58	289.93	369.66	1.784		
22,444.38	12,406.00	22,378.89	12,398.03	184.86	186.40	89.22	-10,146.47	-896.09	660.05	288.79	371.26	1.778 ES, SF		

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 23H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3352.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3352.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 23H	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 #2	Offset TVD Reference:	Offset Datum

Offset Design Sec. 34, T 25 S. , R 33 E - Columbus Fee 2H - Wellbore #1 - Wellbore #1												Offset Site Error:	0.00 ft
Survey Program: 100-VESSI_GYROFLEX, 8769-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	1.08	1.08	0.00	0.00	-90.38	-6.50	-972.80	972.82				
100.00	100.00	108.16	108.16	0.08	0.09	-90.36	-6.18	-972.38	972.43	972.26	0.17	5,615.759	
200.00	200.00	209.97	209.97	0.31	0.26	-90.33	-5.67	-971.55	971.61	971.04	0.57	1,698.279	
300.00	300.00	313.69	313.67	0.53	0.45	-90.31	-5.19	-970.39	970.48	969.50	0.98	989.912	
400.00	400.00	415.37	415.34	0.76	0.63	-90.30	-5.09	-968.96	969.08	967.69	1.39	699.658	
500.00	500.00	515.06	515.03	0.98	0.80	-90.31	-5.23	-967.48	967.59	965.81	1.79	541.635	
600.00	600.00	611.90	611.86	1.21	0.98	-90.31	-5.31	-966.21	966.29	964.11	2.18	442.643	
700.00	700.00	706.59	706.54	1.43	1.14	-90.32	-5.44	-965.44	965.47	962.90	2.58	374.853	
800.00	800.00	811.14	811.09	1.66	1.33	-90.33	-5.49	-964.55	964.62	961.63	2.99	323.052	
900.00	900.00	908.67	908.61	1.88	1.50	-90.34	-5.63	-963.68	963.73	960.34	3.38	284.793	
1,000.00	1,000.00	1,012.23	1,012.17	2.11	1.69	-90.34	-5.68	-962.71	962.79	959.00	3.79	253.850	
1,100.00	1,100.00	1,122.09	1,122.01	2.33	1.88	-90.31	-5.27	-960.85	961.09	956.88	4.21	228.121	
1,200.00	1,200.00	1,228.68	1,228.56	2.56	2.07	-90.27	-4.59	-958.11	958.52	953.89	4.63	207.128	
1,300.00	1,300.00	1,329.86	1,329.70	2.78	2.25	-90.25	-4.22	-955.06	955.50	950.46	5.03	189.861	
1,400.00	1,400.00	1,423.69	1,423.49	3.01	2.42	-90.24	-4.03	-952.46	952.73	947.31	5.42	175.644	
1,500.00	1,500.00	1,512.38	1,512.16	3.23	2.58	-90.20	-3.37	-950.93	951.00	945.19	5.81	163.792	
1,600.00	1,600.00	1,606.16	1,605.94	3.45	2.74	-90.15	-2.42	-950.14	950.16	943.96	6.20	153.352	
1,700.00	1,700.00	1,703.11	1,702.88	3.68	2.91	-90.07	-1.19	-949.79	949.80	943.21	6.59	144.128	
1,724.90	1,724.90	1,726.60	1,726.36	3.74	2.95	-90.05	-0.83	-949.77	949.77	943.08	6.69	142.042	
1,800.00	1,800.00	1,800.00	1,799.75	3.90	3.08	-89.97	0.48	-949.90	949.90	942.92	6.98	136.043	
1,900.00	1,900.00	1,898.46	1,898.19	4.13	3.25	-89.85	2.45	-950.25	950.26	942.88	7.38	128.808	
2,000.00	2,000.00	1,992.36	1,992.08	4.35	3.41	-89.76	3.97	-950.82	950.87	943.11	7.76	122.479	
2,100.00	2,100.00	2,091.99	2,091.70	4.58	3.58	-89.70	4.95	-951.79	951.85	943.69	8.16	116.672	
2,200.00	2,200.00	2,190.47	2,190.17	4.80	3.75	-89.65	5.85	-952.82	952.90	944.35	8.55	111.430	
2,300.00	2,300.00	2,289.33	2,289.01	5.03	3.92	-89.59	6.86	-954.00	954.10	945.15	8.95	106.652	
2,400.00	2,400.00	2,386.78	2,386.45	5.25	4.09	-89.52	7.97	-955.34	955.48	946.14	9.34	102.318	
2,500.00	2,500.00	2,490.90	2,490.55	5.48	4.27	-89.42	9.75	-956.73	956.84	947.09	9.74	98.201	
2,600.00	2,600.00	2,593.27	2,592.89	5.70	4.45	-89.28	11.98	-957.69	957.79	947.65	10.15	94.388	
2,700.00	2,700.00	2,696.36	2,695.94	5.93	4.63	-89.14	14.44	-958.36	958.49	947.93	10.55	90.825	
2,800.00	2,800.00	2,793.93	2,793.50	6.15	4.80	-89.03	16.31	-958.96	959.13	948.18	10.95	87.600	
2,900.00	2,900.00	2,896.95	2,896.51	6.38	4.98	-88.98	17.02	-959.61	959.77	948.42	11.35	84.547	
3,000.00	3,000.00	2,999.40	2,998.96	6.60	5.15	-88.99	16.84	-959.96	960.11	948.36	11.75	81.702	
3,100.00	3,100.00	3,104.79	3,104.35	6.83	5.33	-89.01	16.54	-959.90	960.05	947.89	12.16	78.969	
3,200.00	3,200.00	3,211.52	3,211.08	7.05	5.52	-89.04	16.15	-959.20	959.39	946.83	12.57	76.338	
3,300.00	3,300.00	3,324.29	3,323.82	7.28	5.71	-89.07	15.55	-957.16	957.56	944.57	12.99	73.715	
3,400.00	3,400.00	3,423.23	3,422.74	7.50	5.89	-89.07	15.48	-954.70	955.07	941.68	13.39	71.334	
3,500.00	3,500.00	3,512.07	3,511.56	7.73	6.04	-89.06	15.61	-953.23	953.42	939.65	13.77	69.238	
3,600.00	3,600.00	3,607.47	3,606.96	7.95	6.21	-89.04	15.95	-952.43	952.58	938.42	14.16	67.256	
3,700.00	3,700.00	3,710.79	3,710.27	8.17	6.40	-89.02	16.33	-951.59	951.78	937.21	14.57	65.320	
3,800.00	3,800.00	3,813.93	3,813.41	8.40	6.58	-88.99	16.83	-950.45	950.68	935.70	14.98	63.470	
3,900.00	3,900.00	3,919.69	3,919.14	8.62	6.77	-88.94	17.49	-948.62	948.95	933.56	15.39	61.659	
4,000.00	4,000.00	4,013.86	4,013.31	8.85	6.93	-88.90	18.11	-947.06	947.31	931.53	15.78	60.026	
4,100.00	4,100.00	4,104.07	4,103.50	9.07	7.09	-88.87	18.72	-946.36	946.55	930.38	16.17	58.552	
4,200.00	4,200.00	4,206.14	4,205.57	9.30	7.27	-88.82	19.53	-945.99	946.20	929.63	16.57	57.098	
4,300.00	4,300.00	4,315.71	4,315.14	9.52	7.47	-88.76	20.52	-944.90	945.23	928.24	16.99	55.634	
4,400.00	4,400.00	4,425.80	4,425.20	9.75	7.66	-88.70	21.33	-942.55	943.10	925.69	17.41	54.170	
4,500.00	4,500.00	4,528.46	4,527.82	9.97	7.84	-88.70	21.31	-939.77	940.39	922.58	17.82	52.784	
4,600.00	4,600.00	4,626.82	4,626.13	10.20	8.02	-88.75	20.42	-936.91	937.47	919.25	18.21	51.471	
4,700.00	4,700.00	4,715.35	4,714.63	10.42	8.17	-88.84	18.96	-935.11	935.40	916.81	18.59	50.311	
4,800.00	4,800.00	4,805.39	4,804.64	10.65	8.33	-88.97	16.81	-934.36	934.52	915.54	18.97	49.256	
4,900.00	4,900.00	4,907.78	4,907.00	10.87	8.50	-89.12	14.28	-933.85	933.98	914.61	19.37	48.208	
5,000.00	5,000.00	5,005.48	5,004.67	11.10	8.67	-89.26	12.11	-933.38	933.46	913.70	19.77	47.223	

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
Project: Lea County, NM (NAD27 NME)
Reference Site: Sec. 34, T 25 S. , R 33 E
Site Error: 0.00 ft
Reference Well: Columbus Fee 23H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #2

Local Co-ordinate Reference: Well Columbus Fee 23H
TVD Reference: KB=26' @ 3352.00ft (Scandril Freedom)
MD Reference: KB=26' @ 3352.00ft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM 5000.1 Multi User Db
Offset TVD Reference: Offset Datum

Offset Design Sec. 34, T 25 S. , R 33 E - Columbus Fee 2H - Wellbore #1 - Wellbore #1													Offset Site Error: 0.00 ft	
Survey Program: 100-VESSI_GYROFLEX, 8769-MWD													Offset Well Error: 0.00 ft	
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)				
5,100.00	5,100.00	5,103.81	5,102.98	11.32	8.84	-89.39	9.86	-933.11	933.16	913.00	20.16	46.285		
5,200.00	5,200.00	5,203.56	5,202.70	11.55	9.01	-89.53	7.60	-932.93	932.97	912.41	20.56	45.382		
5,300.00	5,300.00	5,302.38	5,301.50	11.77	9.18	-89.67	5.43	-932.83	932.85	911.89	20.95	44.520		
5,328.04	5,328.04	5,329.93	5,329.04	11.83	9.23	-89.70	4.83	-932.83	932.84	911.78	21.06	44.286		
5,400.00	5,400.00	5,400.65	5,399.75	12.00	9.35	-89.80	3.31	-932.88	932.89	911.54	21.35	43.700		
5,500.00	5,500.00	5,502.84	5,501.92	12.22	9.53	-89.91	1.43	-932.91	932.91	911.16	21.75	42.894		
5,600.00	5,600.00	5,606.25	5,605.31	12.45	9.71	-89.99	0.12	-932.62	932.63	910.47	22.15	42.098		
5,700.00	5,700.00	5,709.20	5,708.26	12.67	9.89	-90.08	-1.28	-931.96	931.99	909.43	22.56	41.315		
5,800.00	5,800.00	5,809.10	5,808.14	12.89	10.06	-90.16	-2.66	-931.19	931.22	908.26	22.96	40.563		
5,900.00	5,900.00	5,909.38	5,908.41	13.12	10.24	-90.23	-3.81	-930.41	930.44	907.09	23.36	39.834		
6,000.00	6,000.00	6,009.86	6,008.88	13.34	10.41	-90.32	-5.11	-929.54	929.59	905.83	23.76	39.126		
6,100.00	6,100.00	6,105.06	6,104.07	13.57	10.58	-90.40	-6.42	-928.98	929.01	904.86	24.15	38.468		
6,200.00	6,200.00	6,203.13	6,202.13	13.79	10.75	-90.48	-7.72	-928.75	928.79	904.24	24.55	37.839		
6,300.00	6,300.00	6,303.30	6,302.29	14.02	10.93	-90.55	-8.99	-928.62	928.66	903.72	24.95	37.228		
6,400.00	6,400.00	6,404.93	6,403.91	14.24	11.10	-90.62	-9.97	-928.36	928.41	903.07	25.35	36.628		
6,455.93	6,455.93	6,457.95	6,456.93	14.37	11.20	-90.64	-10.36	-928.27	928.33	902.76	25.57	36.312		
6,500.00	6,500.00	6,500.00	6,498.98	14.47	11.27	-90.66	-10.65	-928.32	928.38	902.64	25.74	36.071		
6,600.00	6,600.00	6,602.69	6,601.67	14.69	11.45	-90.69	-11.22	-928.40	928.47	902.33	26.14	35.517		
6,700.00	6,700.00	6,704.13	6,703.11	14.92	11.63	-90.73	-11.75	-928.23	928.31	901.77	26.54	34.973		
6,776.18	6,776.18	6,778.65	6,777.63	15.09	11.76	-90.75	-12.20	-928.12	928.21	901.36	26.85	34.576		
6,800.00	6,800.00	6,800.00	6,798.98	15.14	11.79	-90.76	-12.32	-928.12	928.20	901.27	26.94	34.459	CC	
6,900.00	6,900.00	6,897.93	6,896.91	15.37	11.96	-90.80	-13.00	-928.33	928.43	901.10	27.33	33.969		
7,000.00	7,000.00	6,999.96	6,998.94	15.59	12.14	-90.85	-13.82	-928.66	928.77	901.03	27.73	33.489		
7,100.00	7,100.00	7,097.96	7,096.92	15.82	12.31	-90.91	-14.79	-928.97	929.10	900.97	28.13	33.030		
7,200.00	7,200.00	7,199.60	7,198.56	16.04	12.49	-90.98	-15.91	-929.31	929.45	900.92	28.53	32.578		
7,300.00	7,300.00	7,295.18	7,294.13	16.27	12.65	-91.04	-16.85	-929.77	929.95	901.03	28.92	32.155		
7,400.00	7,400.00	7,396.34	7,395.29	16.49	12.83	-91.10	-17.93	-930.45	930.64	901.32	29.32	31.739		
7,500.00	7,500.00	7,489.91	7,488.85	16.72	12.99	-91.17	-19.04	-931.31	931.59	901.88	29.71	31.357		
7,600.00	7,600.00	7,587.85	7,586.76	16.94	13.16	-91.25	-20.38	-932.70	933.03	902.92	30.10	30.994		
7,700.00	7,700.00	7,689.59	7,688.48	17.17	13.34	-91.35	-21.97	-934.14	934.48	903.98	30.50	30.634		
7,800.00	7,800.00	7,794.47	7,793.36	17.39	13.52	-91.41	-22.94	-935.26	935.57	904.66	30.91	30.267		
7,900.00	7,900.00	7,899.54	7,898.42	17.61	13.70	-91.42	-23.22	-935.83	936.12	904.80	31.32	29.891		
8,000.00	8,000.00	8,001.45	8,000.33	17.84	13.88	-91.45	-23.67	-936.00	936.30	904.58	31.72	29.517		
8,100.00	8,100.00	8,107.37	8,106.24	18.06	14.07	-91.49	-24.42	-935.68	936.01	903.88	32.13	29.131		
8,200.00	8,200.00	8,204.07	8,202.94	18.29	14.24	-91.54	-25.09	-935.30	935.64	903.12	32.53	28.766		
8,300.00	8,300.00	8,306.14	8,305.01	18.51	14.42	-91.57	-25.68	-934.96	935.32	902.39	32.93	28.402		
8,400.00	8,400.00	8,405.98	8,404.85	18.74	14.59	-91.60	-26.18	-934.52	934.90	901.56	33.33	28.048		
8,500.00	8,500.00	8,505.13	8,504.00	18.96	14.77	-91.62	-26.49	-934.14	934.52	900.79	33.73	27.705		
8,600.00	8,600.00	8,602.38	8,601.25	19.19	14.94	-91.64	-26.69	-933.98	934.36	900.23	34.13	27.378		
8,700.00	8,700.00	8,705.93	8,704.79	19.41	15.07	-91.67	-27.23	-933.73	934.13	899.64	34.49	27.087		
8,800.00	8,800.00	8,810.32	8,809.01	19.64	15.13	-91.97	-32.05	-932.93	933.52	898.75	34.77	26.848		
8,892.42	8,892.42	8,897.05	8,893.42	19.85	15.15	-93.16	-51.42	-931.60	933.02	898.03	34.99	26.663		
8,900.00	8,900.00	8,903.75	8,899.78	19.86	15.15	-93.29	-53.52	-931.49	933.03	898.01	35.01	26.649	ES	
9,000.00	9,000.00	8,977.00	8,967.73	20.09	15.17	-94.96	-80.78	-930.85	934.94	899.67	35.26	26.514		
9,100.00	9,100.00	9,051.00	9,032.35	20.31	15.23	-97.15	-116.67	-930.23	940.03	904.49	35.54	26.450		
9,200.00	9,200.00	9,098.00	9,070.54	20.54	15.29	-98.80	-144.05	-930.01	950.10	914.27	35.83	26.520		
9,300.00	9,300.00	9,145.00	9,106.40	20.76	15.38	-100.61	-174.39	-930.89	966.87	930.73	36.14	26.754		
9,400.00	9,400.00	9,192.00	9,140.15	20.99	15.50	-102.51	-207.03	-933.01	990.66	954.18	36.48	27.154		
9,500.00	9,500.00	9,267.49	9,190.12	21.21	15.75	-105.74	-263.48	-934.75	1,019.72	982.76	36.96	27.587		
9,600.00	9,600.00	9,311.34	9,214.76	21.44	15.95	-107.81	-299.68	-932.69	1,053.04	1,015.66	37.38	28.168		
9,700.00	9,700.00	9,332.00	9,225.32	21.66	16.05	-108.81	-317.39	-931.55	1,093.06	1,055.35	37.71	28.987		
9,800.00	9,800.00	9,365.80	9,241.27	21.89	16.24	-110.48	-347.12	-929.53	1,139.22	1,101.09	38.13	29.879		

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 23H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3352.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3352.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 23H	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 #2	Offset TVD Reference:	Offset Datum

Offset Design Sec. 34, T 25 S. , R 33 E - Columbus Fee 2H - Wellbore #1 - Wellbore #1													Offset Site Error:	0.00 ft
Survey Program: 100-VESSI_GYROFLEX, 8769-MWD													Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Minimum Separation (ft)	Separation Factor	Warning			
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)						
9,900.00	9,900.00	9,379.00	9,247.06	22.11	16.32	-111.13	-358.95	-928.67	1,191.19	1,152.76	38.43	30.998		
10,000.00	10,000.00	9,401.34	9,256.40	22.34	16.46	-112.24	-379.21	-927.42	1,248.33	1,209.54	38.80	32.176		
10,100.00	10,100.00	9,425.00	9,265.77	22.56	16.62	-113.40	-400.92	-926.60	1,310.32	1,271.14	39.17	33.448		
10,200.00	10,200.00	9,425.00	9,265.77	22.78	16.62	-113.40	-400.92	-926.60	1,376.22	1,336.82	39.40	34.930		
10,300.00	10,300.00	9,425.00	9,265.77	23.01	16.62	-113.40	-400.92	-926.60	1,446.04	1,406.41	39.62	36.494		
10,400.00	10,400.00	9,447.14	9,273.76	23.23	16.78	-114.47	-421.55	-926.13	1,518.59	1,478.57	40.01	37.954		
10,500.00	10,500.00	9,472.00	9,281.49	23.46	16.96	-115.68	-445.18	-925.79	1,594.52	1,554.10	40.42	39.451		
10,600.00	10,600.00	9,472.00	9,281.49	23.68	16.96	-115.68	-445.18	-925.79	1,672.24	1,631.60	40.64	41.145		
10,700.00	10,700.00	9,472.00	9,281.49	23.91	16.96	-115.68	-445.18	-925.79	1,752.22	1,711.36	40.87	42.876		
10,800.00	10,800.00	9,472.00	9,281.49	24.13	16.96	-115.68	-445.18	-925.79	1,834.17	1,793.08	41.09	44.636		
10,900.00	10,900.00	9,472.00	9,281.49	24.36	16.96	-115.68	-445.18	-925.79	1,917.83	1,876.52	41.32	46.418		
11,000.00	11,000.00	9,472.00	9,281.49	24.58	16.96	-115.68	-445.18	-925.79	2,003.00	1,961.45	41.54	48.217		
11,100.00	11,100.00	9,472.00	9,281.49	24.81	16.96	-115.68	-445.18	-925.79	2,089.47	2,047.71	41.77	50.028		
11,200.00	11,200.00	9,472.00	9,281.49	25.03	16.96	-115.68	-445.18	-925.79	2,177.11	2,135.12	41.99	51.847		
11,300.00	11,300.00	9,472.00	9,281.49	25.26	16.96	-115.68	-445.18	-925.79	2,265.77	2,223.55	42.22	53.671		
11,400.00	11,400.00	9,494.40	9,287.08	25.48	17.15	-116.76	-466.86	-925.66	2,354.46	2,311.83	42.63	55.234		
11,500.00	11,500.00	9,496.91	9,287.61	25.71	17.17	-116.89	-469.32	-925.66	2,444.63	2,401.75	42.87	57.021		
11,600.00	11,600.00	9,518.00	9,291.28	25.93	17.34	-117.90	-490.08	-925.72	2,536.13	2,492.85	43.27	58.608		
11,700.00	11,700.00	9,518.00	9,291.28	26.16	17.34	-117.90	-490.08	-925.72	2,627.52	2,584.03	43.50	60.406		
11,800.00	11,800.00	9,518.00	9,291.28	26.38	17.34	-117.90	-490.08	-925.72	2,719.53	2,675.81	43.72	62.200		
11,900.00	11,900.00	9,518.00	9,291.28	26.61	17.34	-117.90	-490.08	-925.72	2,812.08	2,768.13	43.95	63.988		
12,000.00	11,999.99	9,518.00	9,291.28	26.82	17.34	35.91	-490.08	-925.72	2,904.91	2,860.75	44.16	65.786		
12,100.00	12,098.53	9,518.00	9,291.28	26.99	17.34	24.68	-490.08	-925.72	2,992.86	2,948.53	44.33	67.516		
12,200.00	12,191.60	9,518.00	9,291.28	27.15	17.34	18.98	-490.08	-925.72	3,071.46	3,026.96	44.49	69.031		
12,300.00	12,275.15	9,518.00	9,291.28	27.32	17.34	15.76	-490.08	-925.72	3,138.09	3,093.43	44.66	70.266		
12,400.00	12,345.52	9,518.00	9,291.28	27.53	17.34	13.86	-490.08	-925.72	3,190.66	3,145.79	44.87	71.106		
12,500.00	12,399.63	9,518.00	9,291.28	27.82	17.34	12.76	-490.08	-925.72	3,227.62	3,182.46	45.16	71.475		
12,600.00	12,435.11	9,564.67	9,296.26	28.19	17.78	11.91	-536.46	-926.52	3,245.88	3,199.91	45.97	70.603		
12,700.00	12,450.43	9,610.00	9,298.01	28.67	18.21	11.61	-581.72	-928.21	3,248.16	3,201.28	46.87	69.295		
12,800.00	12,450.66	9,610.00	9,298.01	29.22	18.21	11.92	-581.72	-928.21	3,237.06	3,189.63	47.42	68.257		
12,900.00	12,450.19	9,624.87	9,298.10	29.84	18.35	12.07	-596.58	-928.91	3,229.35	3,181.16	48.18	67.021		
13,000.00	12,449.72	9,727.82	9,298.87	30.54	19.35	11.85	-699.40	-933.89	3,223.77	3,173.87	49.89	64.613		
13,100.00	12,449.25	9,813.03	9,299.39	31.32	20.27	11.74	-784.50	-938.16	3,219.53	3,167.93	51.59	62.400		
13,200.00	12,448.78	9,891.00	9,299.48	32.17	21.22	11.67	-862.36	-942.43	3,216.97	3,163.58	53.39	60.252		
13,300.00	12,448.31	9,984.00	9,299.24	33.08	22.37	11.61	-955.23	-947.29	3,215.81	3,160.38	55.45	57.999		
13,314.01	12,448.24	9,984.00	9,299.24	33.21	22.37	11.61	-955.23	-947.29	3,215.81	3,160.23	55.58	57.859		
13,400.00	12,447.84	10,040.78	9,298.53	34.04	23.10	11.56	-1,011.95	-949.70	3,216.55	3,159.41	57.14	56.296		
13,500.00	12,447.38	10,099.84	9,296.75	35.04	23.88	11.54	-1,070.95	-951.67	3,219.67	3,160.75	58.92	54.643		
13,600.00	12,446.91	10,170.00	9,293.97	36.06	24.87	11.58	-1,141.02	-953.94	3,223.93	3,163.00	60.93	52.912		
13,700.00	12,446.45	10,244.94	9,290.28	37.15	25.94	11.62	-1,215.84	-956.06	3,229.04	3,165.95	63.09	51.178		
13,800.00	12,445.99	10,684.22	9,284.92	38.29	32.15	11.39	-1,654.51	-940.35	3,228.86	3,158.42	70.44	45.836		
13,900.00	12,445.53	10,763.00	9,287.09	39.49	33.35	11.31	-1,733.04	-934.45	3,224.35	3,151.51	72.84	44.268		
14,000.00	12,445.06	10,856.92	9,289.23	40.73	34.81	11.20	-1,826.65	-927.17	3,220.30	3,144.76	75.54	42.633		
14,100.00	12,444.60	10,984.87	9,294.16	42.01	36.77	11.16	-1,954.39	-922.59	3,215.45	3,136.66	78.79	40.812		
14,200.00	12,444.14	11,044.00	9,296.67	43.33	37.71	11.16	-2,013.47	-921.66	3,210.86	3,129.81	81.04	39.618		
14,300.00	12,443.68	11,112.55	9,298.80	44.69	38.84	11.16	-2,081.97	-920.68	3,207.36	3,123.83	83.53	38.397		
14,400.00	12,443.21	11,228.32	9,301.17	46.08	40.70	11.16	-2,197.71	-918.94	3,204.82	3,118.04	86.78	36.931		
14,500.00	12,442.75	11,286.64	9,302.31	47.50	41.63	11.15	-2,256.01	-917.79	3,202.23	3,113.10	89.13	35.926		
14,600.00	12,442.29	11,354.84	9,302.71	48.95	42.74	11.14	-2,324.19	-916.47	3,200.92	3,109.24	91.69	34.912		
14,700.00	12,441.83	11,553.81	9,307.25	50.42	45.93	11.18	-2,523.08	-916.25	3,198.27	3,101.93	96.35	33.195		
14,800.00	12,441.36	11,615.30	9,309.25	51.91	46.93	11.21	-2,584.53	-916.80	3,194.92	3,096.08	98.84	32.324		
14,900.00	12,440.90	11,698.00	9,311.48	53.43	48.32	11.25	-2,667.20	-917.67	3,192.21	3,090.46	101.75	31.373		

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 23H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3352.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3352.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 23H	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 #2	Offset TVD Reference:	Offset Datum

Offset Design Sec. 34, T 25 S. , R 33 E - Columbus Fee 2H - Wellbore #1 - Wellbore #1													Offset Site Error: 0.00 ft	
Survey Program: 100-VESSI_GYROFLEX, 8769-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		
15,000.00	12,440.44	11,737.84	9,312.08	54.96	49.00	11.26	-2,707.03	-918.16	3,190.80	3,086.84	103.96	30.693		
15,015.56	12,440.37	11,743.36	9,312.09	55.20	49.09	11.26	-2,712.54	-918.24	3,190.77	3,086.47	104.29	30.594		
15,100.00	12,439.98	11,791.00	9,311.48	56.51	49.90	11.28	-2,760.17	-919.05	3,191.56	3,085.15	106.41	29.993		
15,200.00	12,439.51	11,979.00	9,309.59	58.08	52.96	11.30	-2,948.13	-918.55	3,193.02	3,081.98	111.04	28.755		
15,300.00	12,439.05	12,033.16	9,310.15	59.66	53.85	11.29	-3,002.27	-917.57	3,191.68	3,078.16	113.52	28.116		
15,312.22	12,438.99	12,037.74	9,310.12	59.86	53.93	11.29	-3,006.85	-917.49	3,191.67	3,077.88	113.79	28.049		
15,400.00	12,438.59	12,072.00	9,309.59	61.26	54.50	11.28	-3,041.11	-916.93	3,192.42	3,076.67	115.76	27.579		
15,500.00	12,438.12	12,299.23	9,308.27	62.87	58.27	11.17	-3,268.15	-908.79	3,191.86	3,070.72	121.14	26.350		
15,600.00	12,437.66	12,390.21	9,308.96	64.49	59.79	11.11	-3,359.02	-904.41	3,189.87	3,065.59	124.28	25.668		
15,700.00	12,437.20	12,490.16	9,310.02	66.12	61.45	11.05	-3,458.87	-899.93	3,187.65	3,060.09	127.57	24.988		
15,800.00	12,436.74	12,630.91	9,312.33	67.76	63.77	11.04	-3,599.56	-897.61	3,185.61	3,054.08	131.53	24.219		
15,900.00	12,436.27	12,693.21	9,313.94	69.41	64.81	11.06	-3,661.85	-897.97	3,182.89	3,048.66	134.22	23.713		
16,000.00	12,435.81	12,726.00	9,314.49	71.07	65.36	11.07	-3,694.63	-898.27	3,181.59	3,045.15	136.43	23.320		
16,006.34	12,435.78	12,751.36	9,314.73	71.18	65.80	11.08	-3,719.99	-898.52	3,181.38	3,044.41	136.98	23.226		
16,100.00	12,435.35	12,819.00	9,314.25	72.74	66.96	11.10	-3,787.62	-899.08	3,181.71	3,042.01	139.70	22.775		
16,200.00	12,434.89	12,912.00	9,313.11	74.41	68.53	11.11	-3,880.61	-899.16	3,182.58	3,039.64	142.94	22.265		
16,300.00	12,434.42	12,976.70	9,312.39	76.10	69.61	11.12	-3,945.31	-899.25	3,183.47	3,037.76	145.71	21.848		
16,400.00	12,433.96	13,141.09	9,310.82	77.79	72.35	11.18	-4,109.67	-901.15	3,184.54	3,034.41	150.13	21.212		
16,500.00	12,433.50	13,381.00	9,320.38	79.48	76.30	11.29	-4,349.31	-903.41	3,178.61	3,022.83	155.78	20.405		
16,600.00	12,433.04	13,442.57	9,323.53	81.18	77.35	11.33	-4,410.78	-904.73	3,173.95	3,015.43	158.53	20.022		
16,700.00	12,432.57	13,492.25	9,325.08	82.89	78.19	11.37	-4,460.42	-906.29	3,171.15	3,010.07	161.08	19.687		
16,800.00	12,432.11	13,567.00	9,326.46	84.60	79.48	11.43	-4,535.11	-908.85	3,169.65	3,005.58	164.08	19.318		
16,851.49	12,431.87	13,567.00	9,326.46	85.48	79.48	11.43	-4,535.11	-908.85	3,169.41	3,004.46	164.96	19.213		
16,900.00	12,431.65	13,603.12	9,326.64	86.31	80.10	11.46	-4,571.21	-910.19	3,169.47	3,003.06	166.41	19.046		
17,000.00	12,431.19	13,661.00	9,325.81	88.03	81.09	11.51	-4,629.02	-912.70	3,171.21	3,002.08	169.13	18.750		
17,100.00	12,430.72	13,901.59	9,326.40	89.76	85.16	11.58	-4,869.50	-914.24	3,170.43	2,995.51	174.92	18.125		
17,200.00	12,430.26	13,960.84	9,326.94	91.49	86.18	11.57	-4,928.73	-912.70	3,168.72	2,991.05	177.67	17.835		
17,300.00	12,429.80	14,034.00	9,326.52	93.22	87.45	11.54	-5,001.86	-910.71	3,168.34	2,987.66	180.68	17.536		
17,307.15	12,429.76	14,034.00	9,326.52	93.35	87.45	11.54	-5,001.86	-910.71	3,168.33	2,987.53	180.80	17.524		
17,400.00	12,429.34	14,073.85	9,325.73	94.96	88.15	11.52	-5,041.68	-909.58	3,169.21	2,986.10	183.11	17.308		
17,500.00	12,428.87	14,127.00	9,323.93	96.70	89.08	11.50	-5,094.78	-908.03	3,171.64	2,985.87	185.77	17.073		
17,600.00	12,428.41	14,235.38	9,319.71	98.44	90.92	11.45	-5,203.04	-905.34	3,174.67	2,985.30	189.36	16.765		
17,700.00	12,427.95	14,502.00	9,315.06	100.19	95.40	11.43	-5,469.53	-902.74	3,177.48	2,981.90	195.58	16.246		
17,800.00	12,427.48	14,595.00	9,317.00	101.93	96.97	11.46	-5,562.51	-903.07	3,175.20	2,976.30	198.90	15.964		
17,900.00	12,427.02	14,746.76	9,321.67	103.69	99.56	11.45	-5,714.16	-900.51	3,171.20	2,967.95	203.25	15.602		
18,000.00	12,426.56	14,810.49	9,323.24	105.44	100.67	11.44	-5,777.85	-898.88	3,167.99	2,961.88	206.11	15.371		
18,100.00	12,426.10	14,877.00	9,323.89	107.20	101.83	11.41	-5,844.32	-896.51	3,165.98	2,956.96	209.02	15.147		
18,200.00	12,425.63	14,936.93	9,323.63	108.96	102.87	11.37	-5,904.18	-893.66	3,165.12	2,953.30	211.83	14.942		
18,300.00	12,425.17	15,097.17	9,324.21	110.72	105.62	11.25	-6,064.17	-885.19	3,163.17	2,946.83	216.34	14.621		
18,400.00	12,424.71	15,158.00	9,324.15	112.48	106.66	11.23	-6,124.98	-883.69	3,162.13	2,942.99	219.14	14.430		
18,430.45	12,424.57	15,158.00	9,324.15	113.02	106.66	11.23	-6,124.98	-883.69	3,161.98	2,942.30	219.68	14.394		
18,500.00	12,424.25	15,158.00	9,324.15	114.25	106.66	11.23	-6,124.98	-883.69	3,162.75	2,941.84	220.91	14.317		
18,600.00	12,423.78	15,252.00	9,321.44	116.01	108.30	11.21	-6,218.93	-882.38	3,165.00	2,940.69	224.31	14.110		
18,700.00	12,423.32	15,533.00	9,325.35	117.78	113.04	11.32	-6,499.77	-885.48	3,161.78	2,930.96	230.83	13.698		
18,800.00	12,422.86	15,612.34	9,327.59	119.55	114.41	11.37	-6,579.06	-886.87	3,159.01	2,925.04	233.96	13.502		
18,900.00	12,422.40	15,665.19	9,328.69	121.33	115.32	11.39	-6,631.90	-887.43	3,156.97	2,920.32	236.65	13.340		
18,964.95	12,422.10	15,694.45	9,328.85	122.48	115.83	11.40	-6,661.16	-887.74	3,156.57	2,918.26	238.31	13.246		
19,000.00	12,421.93	15,720.00	9,328.71	123.10	116.27	11.41	-6,686.71	-888.01	3,156.70	2,917.32	239.37	13.187		
19,100.00	12,421.47	15,759.83	9,328.08	124.88	116.96	11.43	-6,726.53	-888.62	3,158.04	2,916.20	241.84	13.058		
19,200.00	12,421.01	16,000.00	9,325.47	126.65	121.03	11.54	-6,966.58	-893.37	3,160.91	2,913.23	247.69	12.762		
19,300.00	12,420.55	16,068.38	9,326.54	128.43	122.21	11.54	-7,034.95	-892.48	3,158.93	2,908.28	250.64	12.603		
19,400.00	12,420.08	16,245.27	9,330.60	130.21	125.24	11.54	-7,211.76	-890.29	3,155.91	2,900.46	255.45	12.354		

CC - Min centre to center distance or covergent 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 23H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3352.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3352.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 23H	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 #2	Offset TVD Reference:	Offset Datum

Offset Design Sec. 34, T 25 S. , R 33 E - Columbus Fee 2H - Wellbore #1 - Wellbore #1													Offset Site Error:	0.00 ft
Survey Program: 100-VESSI_GYROFLEX, 8769-MWD													Offset Well Error:	0.00 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)						
19,500.00	12,419.62	16,310.78	9,332.52	131.99	126.36	11.55	-7,277.24	-890.11	3,152.70	2,894.34	258.36	12.203		
19,600.00	12,419.16	16,376.00	9,333.57	133.78	127.50	11.57	-7,342.45	-889.92	3,150.73	2,889.45	261.28	12.059		
19,700.00	12,418.70	16,429.15	9,333.69	135.56	128.43	11.57	-7,395.59	-889.63	3,150.03	2,886.04	263.99	11.932		
19,702.22	12,418.69	16,430.45	9,333.68	135.60	128.45	11.57	-7,396.89	-889.62	3,150.03	2,885.98	264.06	11.929		
19,800.00	12,418.23	16,469.00	9,333.32	137.35	129.13	11.57	-7,435.44	-889.27	3,150.75	2,884.28	266.48	11.824		
19,900.00	12,417.77	16,531.86	9,331.70	139.13	130.23	11.56	-7,498.28	-888.42	3,152.90	2,883.54	269.36	11.705		
20,000.00	12,417.31	16,679.92	9,326.41	140.92	132.77	11.52	-7,646.21	-885.91	3,156.05	2,882.36	273.69	11.531		
20,100.00	12,416.85	16,852.00	9,325.50	142.71	135.66	11.55	-7,818.26	-886.60	3,156.29	2,877.92	278.36	11.339		
20,181.60	12,416.47	16,909.38	9,326.10	144.17	136.64	11.60	-7,875.60	-888.43	3,155.81	2,875.01	280.80	11.238		
20,200.00	12,416.38	16,919.78	9,326.13	144.50	136.81	11.60	-7,886.00	-888.77	3,155.84	2,874.53	281.31	11.218		
20,300.00	12,415.92	16,973.00	9,325.81	146.29	137.73	11.64	-7,939.19	-890.57	3,156.83	2,872.81	284.02	11.115		
20,400.00	12,415.46	17,039.00	9,324.27	148.08	138.87	11.69	-8,005.12	-893.13	3,159.45	2,872.49	286.95	11.010		
20,500.00	12,414.99	17,182.79	9,322.27	149.87	141.34	11.74	-8,148.86	-895.04	3,160.43	2,869.22	291.21	10.853		
20,600.00	12,414.53	17,320.00	9,319.61	151.66	143.70	11.74	-8,286.03	-894.30	3,162.17	2,866.81	295.36	10.706		
20,700.00	12,414.07	17,391.73	9,318.89	153.46	144.94	11.72	-8,357.74	-892.55	3,162.51	2,864.11	298.39	10.598		
20,800.00	12,413.61	17,507.00	9,316.67	155.25	146.92	11.69	-8,472.96	-890.14	3,163.71	2,861.54	302.17	10.470		
20,900.00	12,413.14	17,561.18	9,315.67	157.05	147.85	11.68	-8,527.12	-889.48	3,165.05	2,860.15	304.90	10.381		
21,000.00	12,412.68	17,811.42	9,313.89	158.84	152.11	11.67	-8,777.29	-886.95	3,165.90	2,854.94	310.96	10.181		
21,100.00	12,412.22	17,881.00	9,314.96	160.64	153.30	11.68	-8,846.86	-886.63	3,163.94	2,850.00	313.95	10.078		
21,200.00	12,411.76	18,013.38	9,318.17	162.44	155.57	11.71	-8,979.20	-886.98	3,161.18	2,843.17	318.01	9.941		
21,300.00	12,411.29	18,069.00	9,319.22	164.24	156.52	11.74	-9,034.80	-887.45	3,159.21	2,838.45	320.76	9.849		
21,400.00	12,410.83	18,134.77	9,319.66	166.04	157.67	11.76	-9,100.57	-888.14	3,158.48	2,834.77	323.71	9.757		
21,500.00	12,410.37	18,283.52	9,320.93	167.84	160.23	11.81	-9,249.30	-889.11	3,157.46	2,829.40	328.06	9.625		
21,600.00	12,409.91	18,351.00	9,321.36	169.64	161.38	11.81	-9,316.78	-888.58	3,156.35	2,825.33	331.02	9.535		
21,631.88	12,409.76	18,351.00	9,321.36	170.21	161.38	11.81	-9,316.78	-888.58	3,156.29	2,824.69	331.59	9.519		
21,700.00	12,409.44	18,400.65	9,320.95	171.44	162.25	11.80	-9,366.42	-887.93	3,156.52	2,822.83	333.69	9.460		
21,800.00	12,408.98	18,669.29	9,322.31	173.24	166.87	11.74	-9,634.91	-881.59	3,156.10	2,816.00	340.10	9.280		
21,900.00	12,408.52	18,837.54	9,329.63	175.04	169.76	11.71	-9,802.92	-877.27	3,151.34	2,806.55	344.80	9.140		
22,000.00	12,408.06	18,914.00	9,334.27	176.84	171.06	11.72	-9,879.24	-876.23	3,144.89	2,796.99	347.91	9.039		
22,100.00	12,407.59	18,969.74	9,337.09	178.65	172.03	11.73	-9,934.91	-875.67	3,139.57	2,788.89	350.68	8.953		
22,200.00	12,407.13	19,008.00	9,338.45	180.45	172.70	11.75	-9,973.14	-875.66	3,135.97	2,782.82	353.15	8.880		
22,300.00	12,406.67	19,066.97	9,339.65	182.25	173.73	11.76	-10,032.09	-875.99	3,133.94	2,777.96	355.98	8.804		
22,371.41	12,406.34	19,101.00	9,339.83	183.54	174.32	11.78	-10,066.12	-876.31	3,133.50	2,775.63	357.86	8.756		
22,400.00	12,406.21	19,118.26	9,339.79	184.06	174.62	11.78	-10,083.38	-876.49	3,133.54	2,774.86	358.68	8.736		
22,444.38	12,406.00	19,142.96	9,339.61	184.86	175.06	11.79	-10,108.08	-876.79	3,133.84	2,773.93	359.91	8.707 SF		

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
Project: Lea County, NM (NAD27 NME)
Reference Site: Sec. 34, T 25 S. , R 33 E
Site Error: 0.00 ft
Reference Well: Columbus Fee 23H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #2

Local Co-ordinate Reference: Well Columbus Fee 23H
TVD Reference: KB=26' @ 3352.00ft (Scandril Freedom)
MD Reference: KB=26' @ 3352.00ft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM 5000.1 Multi User Db
Offset TVD Reference: Offset Datum

Offset Design Sec. 34, T 25 S. , R 33 E - Redbull 35 FED #1H - 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		Minimum		Separation		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)	Offset Wellbore Centre +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	132.12	-3,113.65	3,443.14	4,642.21				
100.00	100.00	91.67	91.67	0.08	0.11	132.12	-3,113.66	3,443.12	4,642.19	4,642.00	0.19	N/A	
200.00	200.00	192.41	192.41	0.31	0.23	132.12	-3,113.67	3,443.08	4,642.17	4,641.63	0.54	8,632.215	
229.29	229.29	220.29	220.29	0.37	0.27	132.12	-3,113.68	3,443.06	4,642.16	4,641.52	0.64	7,220.036	
300.00	300.00	286.22	286.22	0.53	0.37	132.12	-3,113.66	3,443.13	4,642.20	4,641.30	0.90	5,156.286	
400.00	400.00	379.46	379.46	0.76	0.51	132.12	-3,113.56	3,443.44	4,642.38	4,641.11	1.26	3,672.059	
500.00	500.00	453.98	453.98	0.98	0.63	132.12	-3,113.53	3,443.93	4,642.86	4,641.24	1.61	2,877.208	
600.00	600.00	523.20	523.19	1.21	0.75	132.11	-3,113.78	3,444.76	4,643.98	4,642.02	1.96	2,370.606	
700.00	700.00	600.00	599.98	1.43	0.89	132.11	-3,114.41	3,446.08	4,645.78	4,643.47	2.32	2,004.637	
800.00	800.00	667.40	667.35	1.66	1.05	132.10	-3,115.15	3,447.62	4,648.17	4,645.47	2.70	1,720.253	
900.00	900.00	743.09	743.01	1.88	1.23	132.09	-3,116.06	3,449.77	4,651.09	4,647.99	3.11	1,497.303	
1,000.00	1,000.00	825.15	825.02	2.11	1.42	132.08	-3,117.15	3,452.59	4,654.52	4,650.99	3.53	1,318.629	
1,100.00	1,100.00	926.67	926.46	2.33	1.68	132.06	-3,118.53	3,456.20	4,658.07	4,654.06	4.01	1,160.978	
1,200.00	1,200.00	1,031.77	1,031.49	2.56	1.95	132.04	-3,119.96	3,459.87	4,661.57	4,657.07	4.51	1,034.691	
1,300.00	1,300.00	1,146.24	1,145.88	2.78	2.25	132.03	-3,121.44	3,463.57	4,664.84	4,659.81	5.03	927.978	
1,400.00	1,400.00	1,269.39	1,268.98	3.01	2.57	132.01	-3,122.90	3,467.06	4,667.75	4,662.17	5.57	837.630	
1,500.00	1,500.00	1,400.26	1,399.81	3.23	2.91	132.00	-3,124.14	3,469.96	4,670.03	4,663.89	6.14	760.641	
1,600.00	1,600.00	1,530.70	1,530.23	3.45	3.25	131.99	-3,125.02	3,472.03	4,671.66	4,664.95	6.71	696.593	
1,700.00	1,700.00	1,653.36	1,652.88	3.68	3.57	131.98	-3,125.49	3,473.28	4,672.67	4,665.42	7.25	644.236	
1,800.00	1,800.00	1,767.16	1,766.68	3.90	3.87	131.98	-3,125.79	3,474.04	4,673.34	4,665.56	7.78	600.942	
1,900.00	1,900.00	1,873.43	1,872.95	4.13	4.15	131.98	-3,125.99	3,474.48	4,673.77	4,665.49	8.28	564.461	
2,000.00	2,000.00	1,976.63	1,976.15	4.35	4.42	131.98	-3,126.11	3,474.86	4,674.12	4,665.35	8.78	532.651	
2,100.00	2,100.00	2,081.28	2,080.80	4.58	4.70	131.97	-3,126.18	3,475.17	4,674.39	4,665.12	9.27	504.005	
2,200.00	2,200.00	2,186.35	2,185.87	4.80	4.97	131.97	-3,126.23	3,475.36	4,674.56	4,664.78	9.77	478.216	
2,300.00	2,300.00	2,288.17	2,287.69	5.03	5.21	131.97	-3,126.20	3,475.51	4,674.64	4,664.41	10.24	456.720	
2,400.00	2,400.00	2,389.50	2,389.02	5.25	5.44	131.97	-3,125.99	3,475.77	4,674.70	4,664.01	10.69	437.316	
2,500.00	2,500.00	2,484.88	2,484.40	5.48	5.64	131.96	-3,125.65	3,476.18	4,674.78	4,663.67	11.12	420.579	
2,600.00	2,600.00	2,579.57	2,579.08	5.70	5.84	131.95	-3,125.23	3,476.82	4,674.98	4,663.45	11.54	405.202	
2,700.00	2,700.00	2,674.73	2,674.24	5.93	6.05	131.94	-3,124.68	3,477.71	4,675.29	4,663.32	11.97	390.440	
2,800.00	2,800.00	2,770.01	2,769.51	6.15	6.26	131.92	-3,123.96	3,478.88	4,675.70	4,663.28	12.42	376.603	
2,900.00	2,900.00	2,874.15	2,873.63	6.38	6.50	131.90	-3,122.98	3,480.37	4,676.14	4,663.27	12.87	363.216	
3,000.00	3,000.00	2,982.36	2,981.82	6.60	6.74	131.88	-3,121.79	3,481.85	4,676.43	4,663.09	13.34	350.524	
3,100.00	3,100.00	3,089.91	3,089.36	6.83	6.94	131.86	-3,120.72	3,483.15	4,676.72	4,662.95	13.77	339.687	
3,200.00	3,200.00	3,193.42	3,192.84	7.05	7.14	131.84	-3,119.66	3,484.82	4,677.36	4,663.17	14.19	329.709	
3,300.00	3,300.00	3,240.13	3,239.52	7.28	7.34	131.81	-3,118.51	3,486.99	4,678.34	4,663.72	14.62	320.014	
3,400.00	3,400.00	3,330.89	3,330.24	7.50	7.57	131.78	-3,117.28	3,489.55	4,679.54	4,664.47	15.07	310.521	
3,500.00	3,500.00	3,423.71	3,423.01	7.73	7.80	131.74	-3,116.01	3,492.42	4,680.93	4,665.40	15.53	301.469	
3,600.00	3,600.00	3,523.15	3,522.38	7.95	8.05	131.70	-3,114.67	3,495.55	4,682.39	4,666.38	16.00	292.571	
3,700.00	3,700.00	3,621.74	3,620.92	8.17	8.31	131.67	-3,113.41	3,498.62	4,683.86	4,667.38	16.48	284.207	
3,800.00	3,800.00	3,717.48	3,716.61	8.40	8.55	131.63	-3,112.41	3,501.49	4,685.40	4,668.45	16.95	276.374	
3,900.00	3,900.00	3,812.16	3,811.25	8.62	8.80	131.61	-3,111.72	3,504.16	4,687.04	4,669.62	17.42	269.005	
4,000.00	4,000.00	3,900.16	3,899.21	8.85	9.03	131.58	-3,111.34	3,506.65	4,688.87	4,670.99	17.88	262.235	
4,100.00	4,100.00	4,000.00	3,999.01	9.07	9.29	131.56	-3,111.19	3,509.59	4,690.97	4,672.60	18.37	255.381	
4,200.00	4,200.00	4,097.80	4,096.78	9.30	9.53	131.54	-3,111.50	3,512.10	4,693.10	4,674.27	18.83	249.235	
4,300.00	4,300.00	4,208.87	4,207.83	9.52	9.80	131.53	-3,112.59	3,513.91	4,694.97	4,675.65	19.32	242.986	
4,400.00	4,400.00	4,301.25	4,300.19	9.75	10.01	131.54	-3,113.83	3,515.10	4,696.82	4,677.07	19.75	237.776	
4,500.00	4,500.00	4,400.00	4,398.92	9.97	10.23	131.54	-3,115.26	3,516.50	4,698.84	4,678.64	20.20	232.633	
4,600.00	4,600.00	4,483.03	4,481.93	10.20	10.42	131.54	-3,116.49	3,517.87	4,701.04	4,680.42	20.62	227.972	
4,700.00	4,700.00	4,572.21	4,571.08	10.42	10.64	131.53	-3,117.74	3,519.65	4,703.47	4,682.42	21.06	223.353	
4,800.00	4,800.00	4,652.46	4,651.30	10.65	10.83	131.53	-3,118.90	3,521.55	4,706.20	4,684.72	21.48	219.097	
4,900.00	4,900.00	4,728.66	4,727.46	10.87	11.02	131.53	-3,120.23	3,523.65	4,709.42	4,687.53	21.89	215.097	
5,000.00	5,000.00	4,810.41	4,809.15	11.10	11.23	131.52	-3,121.94	3,526.21	4,713.15	4,690.82	22.32	211.141	

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 23H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3352.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3352.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 23H	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 #2	Offset TVD Reference:	Offset Datum

Offset Design Sec. 34, T 25 S. , R 33 E - Redbull 35 FED #1H - 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		Highside Toolface (°)	Distance		Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore +N/-S (ft)	Centre +E/-W (ft)						
5,100.00	5,100.00	4,974.81	4,973.47	11.32	11.63	131.51	-3,124.99	3,530.48	4,716.32	4,693.37	22.95	205.491		
5,200.00	5,200.00	5,082.22	5,080.85	11.55	11.89	131.51	-3,126.56	3,532.43	4,718.64	4,695.20	23.44	201.328		
5,300.00	5,300.00	5,179.32	5,177.92	11.77	12.13	131.51	-3,128.06	3,534.17	4,721.01	4,697.11	23.90	197.550		
5,400.00	5,400.00	5,281.01	5,279.59	12.00	12.37	131.51	-3,129.68	3,535.97	4,723.39	4,699.02	24.37	193.829		
5,500.00	5,500.00	5,383.96	5,382.50	12.22	12.62	131.51	-3,131.29	3,537.76	4,725.72	4,700.88	24.84	190.223		
5,600.00	5,600.00	5,484.39	5,482.91	12.45	12.87	131.51	-3,132.82	3,539.46	4,728.01	4,702.69	25.31	186.785		
5,700.00	5,700.00	5,584.37	5,582.86	12.67	13.11	131.51	-3,134.35	3,541.16	4,730.29	4,704.51	25.78	183.478		
5,800.00	5,800.00	5,677.08	5,675.55	12.89	13.34	131.51	-3,135.83	3,542.76	4,732.64	4,706.41	26.23	180.412		
5,900.00	5,900.00	5,768.44	5,766.88	13.12	13.56	131.51	-3,137.43	3,544.44	4,735.17	4,708.49	26.68	177.479		
6,000.00	6,000.00	5,868.14	5,866.54	13.34	13.80	131.52	-3,139.30	3,546.31	4,737.83	4,710.68	27.15	174.533		
6,100.00	6,100.00	5,972.24	5,970.61	13.57	14.05	131.52	-3,141.31	3,548.12	4,740.41	4,712.79	27.62	171.625		
6,200.00	6,200.00	6,070.48	6,068.81	13.79	14.29	131.52	-3,143.23	3,549.76	4,742.95	4,714.87	28.08	168.889		
6,300.00	6,300.00	6,166.58	6,164.88	14.02	14.52	131.53	-3,145.05	3,551.50	4,745.57	4,717.03	28.54	166.270		
6,400.00	6,400.00	6,260.63	6,258.90	14.24	14.75	131.53	-3,146.83	3,553.34	4,748.28	4,719.29	29.00	163.753		
6,500.00	6,500.00	6,353.60	6,351.82	14.47	14.98	131.53	-3,148.73	3,555.20	4,751.14	4,721.69	29.45	161.327		
6,600.00	6,600.00	6,448.78	6,446.96	14.69	15.22	131.53	-3,150.85	3,557.13	4,754.13	4,724.22	29.91	158.958		
6,700.00	6,700.00	6,546.18	6,544.32	14.92	15.45	131.54	-3,153.13	3,559.09	4,757.19	4,726.82	30.37	156.643		
6,800.00	6,800.00	6,642.50	6,640.60	15.14	15.69	131.54	-3,155.47	3,561.02	4,760.30	4,729.47	30.83	154.404		
6,900.00	6,900.00	6,737.50	6,735.54	15.37	15.92	131.55	-3,157.73	3,563.09	4,763.51	4,732.22	31.29	152.239		
7,000.00	7,000.00	6,830.63	6,828.62	15.59	16.15	131.55	-3,159.88	3,565.32	4,766.84	4,735.09	31.75	150.157		
7,100.00	7,100.00	6,920.15	6,918.08	15.82	16.38	131.55	-3,162.11	3,567.55	4,770.35	4,738.16	32.19	148.171		
7,200.00	7,200.00	7,010.92	7,008.80	16.04	16.61	131.56	-3,164.58	3,569.89	4,774.08	4,741.44	32.65	146.233		
7,300.00	7,300.00	7,112.19	7,109.99	16.27	16.86	131.56	-3,167.43	3,572.51	4,777.89	4,744.76	33.12	144.240		
7,400.00	7,400.00	7,200.00	7,197.73	16.49	17.08	131.56	-3,169.90	3,574.75	4,781.68	4,748.11	33.57	142.446		
7,500.00	7,500.00	7,299.44	7,297.10	16.72	17.33	131.57	-3,172.73	3,577.44	4,785.59	4,751.54	34.04	140.569		
7,600.00	7,600.00	7,387.21	7,384.79	16.94	17.55	131.57	-3,175.30	3,580.05	4,789.77	4,755.28	34.49	138.871		
7,700.00	7,700.00	7,475.96	7,473.46	17.17	17.78	131.57	-3,178.02	3,582.89	4,794.19	4,759.25	34.94	137.206		
7,800.00	7,800.00	7,564.87	7,562.27	17.39	18.00	131.58	-3,180.93	3,585.84	4,798.84	4,763.45	35.39	135.588		
7,900.00	7,900.00	7,657.61	7,654.90	17.61	18.24	131.58	-3,184.17	3,588.99	4,803.70	4,767.85	35.85	133.984		
8,000.00	8,000.00	7,752.85	7,750.02	17.84	18.48	131.59	-3,187.69	3,592.18	4,808.66	4,772.34	36.32	132.404		
8,100.00	8,100.00	7,848.51	7,845.55	18.06	18.72	131.59	-3,191.41	3,595.35	4,813.72	4,776.94	36.78	130.865		
8,200.00	8,200.00	7,944.58	7,941.50	18.29	18.96	131.60	-3,195.24	3,598.55	4,818.86	4,781.61	37.25	129.366		
8,300.00	8,300.00	8,045.39	8,042.16	18.51	19.21	131.61	-3,199.35	3,601.91	4,824.05	4,786.33	37.73	127.871		
8,400.00	8,400.00	8,152.66	8,149.29	18.74	19.48	131.63	-3,203.82	3,605.22	4,829.14	4,790.92	38.22	126.362		
8,500.00	8,500.00	8,269.48	8,265.96	18.96	19.76	131.65	-3,208.79	3,608.42	4,834.01	4,795.28	38.72	124.832		
8,600.00	8,600.00	8,393.87	8,390.21	19.19	20.06	131.67	-3,214.00	3,611.11	4,838.41	4,799.17	39.25	123.287		
8,700.00	8,700.00	8,498.48	8,494.71	19.41	20.30	131.69	-3,218.35	3,612.97	4,842.50	4,802.79	39.71	121.942		
8,800.00	8,800.00	8,601.97	8,598.10	19.64	20.54	131.72	-3,222.66	3,614.70	4,846.52	4,806.34	40.17	120.636		
8,900.00	8,900.00	8,700.83	8,696.86	19.86	20.76	131.74	-3,226.81	3,616.28	4,850.51	4,809.88	40.63	119.395		
9,000.00	9,000.00	8,800.00	8,795.93	20.09	20.99	131.77	-3,231.06	3,617.82	4,854.52	4,813.45	41.08	118.179		
9,100.00	9,100.00	8,924.61	8,920.42	20.31	21.27	131.80	-3,236.26	3,619.47	4,858.29	4,816.71	41.58	116.840		
9,200.00	9,200.00	9,060.29	9,055.99	20.54	21.56	131.84	-3,241.42	3,620.66	4,861.50	4,819.40	42.10	115.479		
9,300.00	9,300.00	9,212.50	9,208.13	20.76	21.87	131.87	-3,246.02	3,621.12	4,863.75	4,821.11	42.63	114.083		
9,400.00	9,400.00	14,797.85	12,188.22	20.99	77.84	168.38	-3,882.55	798.19	4,851.36	4,752.54	98.82	49.092		
9,500.00	9,500.00	14,795.15	12,188.27	21.21	77.77	168.34	-3,881.97	800.83	4,794.40	4,695.42	98.98	48.439		
9,600.00	9,600.00	14,792.47	12,188.32	21.44	77.70	168.31	-3,881.40	803.44	4,738.86	4,639.73	99.14	47.802		
9,700.00	9,700.00	14,789.82	12,188.36	21.66	77.63	168.27	-3,880.83	806.03	4,684.80	4,585.51	99.29	47.182		
9,800.00	9,800.00	14,787.21	12,188.41	21.89	77.57	168.23	-3,880.27	808.58	4,632.26	4,532.81	99.45	46.578		
9,900.00	9,900.00	14,784.61	12,188.46	22.11	77.50	168.19	-3,879.71	811.11	4,581.31	4,481.70	99.61	45.992		
10,000.00	10,000.00	14,782.05	12,188.50	22.34	77.43	168.15	-3,879.16	813.62	4,531.98	4,432.21	99.77	45.425		
10,100.00	10,100.00	14,779.51	12,188.55	22.56	77.37	168.12	-3,878.61	816.10	4,484.35	4,384.42	99.93	44.875		
10,200.00	10,200.00	14,777.00	12,188.59	22.78	77.31	168.08	-3,878.07	818.55	4,438.45	4,338.36	100.09	44.344		

CC - Min centre to center distance or covergent 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 23H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3352.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3352.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 23H	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 #2	Offset TVD Reference:	Offset Datum

Offset Design Sec. 34, T 25 S. , R 33 E - Redbull 35 FED #1H - 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		Highside Toolface (°)	Distance					Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)		Separation Factor
10,300.00	10,300.00	14,774.52	12,188.64	23.01	77.24	168.05	-3,877.54	820.97	4,394.35	4,294.10	100.25	43.833	
10,400.00	10,400.00	14,772.06	12,188.68	23.23	77.18	168.01	-3,877.01	823.38	4,352.10	4,251.69	100.41	43.341	
10,500.00	10,500.00	14,769.62	12,188.72	23.46	77.12	167.97	-3,876.49	825.75	4,311.76	4,211.18	100.58	42.870	
10,600.00	10,600.00	14,767.21	12,188.76	23.68	77.06	167.94	-3,875.97	828.11	4,273.37	4,172.63	100.74	42.419	
10,700.00	10,700.00	14,764.83	12,188.81	23.91	77.00	167.91	-3,875.45	830.43	4,237.00	4,136.09	100.91	41.990	
10,800.00	10,800.00	14,762.47	12,188.85	24.13	76.94	167.87	-3,874.94	832.74	4,202.69	4,101.62	101.07	41.582	
10,900.00	10,900.00	14,760.13	12,188.89	24.36	76.88	167.84	-3,874.44	835.02	4,170.49	4,069.26	101.24	41.196	
11,000.00	11,000.00	14,757.81	12,188.93	24.58	76.82	167.80	-3,873.94	837.28	4,140.46	4,039.06	101.40	40.833	
11,100.00	11,100.00	14,755.52	12,188.97	24.81	76.76	167.77	-3,873.44	839.52	4,112.65	4,011.08	101.57	40.492	
11,200.00	11,200.00	14,753.25	12,189.00	25.03	76.70	167.74	-3,872.95	841.73	4,087.08	3,985.35	101.73	40.174	
11,300.00	11,300.00	14,751.01	12,189.04	25.26	76.65	167.71	-3,872.46	843.93	4,063.82	3,961.92	101.90	39.880	
11,400.00	11,400.00	14,748.78	12,189.08	25.48	76.59	167.67	-3,871.98	846.10	4,042.90	3,940.83	102.07	39.609	
11,500.00	11,500.00	14,746.58	12,189.11	25.71	76.53	167.64	-3,871.50	848.25	4,024.35	3,922.11	102.24	39.362	
11,600.00	11,600.00	14,744.40	12,189.15	25.93	76.48	167.61	-3,871.03	850.38	4,008.22	3,905.81	102.41	39.139	
11,700.00	11,700.00	14,742.23	12,189.19	26.16	76.42	167.58	-3,870.56	852.49	3,994.52	3,891.94	102.58	38.941	
11,800.00	11,800.00	14,740.09	12,189.22	26.38	76.37	167.55	-3,870.10	854.58	3,983.28	3,880.53	102.75	38.767	
11,900.00	11,900.00	14,737.97	12,189.26	26.61	76.31	167.52	-3,869.63	856.65	3,974.53	3,871.61	102.92	38.618	
12,000.00	11,999.99	14,736.40	12,189.28	26.82	76.27	-34.07	-3,869.29	858.18	3,967.67	3,864.58	103.09	38.487	
12,100.00	12,098.53	14,745.78	12,189.13	26.99	76.51	-35.11	-3,871.33	849.03	3,950.77	3,847.27	103.50	38.172	
12,200.00	12,191.60	14,769.51	12,188.73	27.15	77.12	-37.07	-3,876.46	825.86	3,919.60	3,815.33	104.27	37.592	
12,300.00	12,275.15	14,806.23	12,188.06	27.32	78.05	-40.25	-3,884.34	790.00	3,875.00	3,769.64	105.37	36.776	
12,400.00	12,345.52	14,871.71	12,186.62	27.53	79.72	-44.81	-3,898.11	726.00	3,818.16	3,710.91	107.25	35.599	
12,500.00	12,399.63	14,933.22	12,184.82	27.82	81.30	-52.04	-3,910.59	665.80	3,750.60	3,641.49	109.12	34.373	
12,600.00	12,435.11	14,978.21	12,183.62	28.19	82.45	-63.13	-3,919.70	621.76	3,674.83	3,564.18	110.65	33.212	
12,700.00	12,450.43	15,022.43	12,182.65	28.67	83.59	-78.38	-3,928.74	578.49	3,593.66	3,481.40	112.26	32.013	
12,800.00	12,450.66	15,059.51	12,182.04	29.22	84.54	-82.34	-3,936.48	542.23	3,509.79	3,396.03	113.76	30.853	
12,900.00	12,450.19	15,138.53	12,180.74	29.84	86.57	-81.25	-3,952.95	464.95	3,423.27	3,306.86	116.41	29.407	
13,000.00	12,449.72	15,188.00	12,179.51	30.54	87.85	-79.99	-3,962.82	416.49	3,333.88	3,215.49	118.39	28.160	
13,100.00	12,449.25	15,214.70	12,178.79	31.32	88.53	-78.51	-3,968.23	390.36	3,242.44	3,122.58	119.86	27.052	
13,200.00	12,448.78	15,238.58	12,178.14	32.17	89.15	-76.59	-3,973.15	367.00	3,149.20	3,027.88	121.32	25.957	
13,300.00	12,448.31	15,263.00	12,177.46	33.08	89.78	-73.93	-3,978.26	343.13	3,054.37	2,931.51	122.86	24.860	
13,400.00	12,447.84	15,285.65	12,176.86	34.04	90.36	-70.13	-3,983.04	321.00	2,958.12	2,833.72	124.40	23.778	
13,500.00	12,447.38	15,308.73	12,176.32	35.04	90.96	-66.87	-3,987.90	298.44	2,860.77	2,734.77	126.00	22.705	
13,600.00	12,446.91	15,330.88	12,175.86	36.06	91.53	-66.04	-3,992.56	276.79	2,763.27	2,635.67	127.60	21.657	
13,700.00	12,446.45	15,352.94	12,175.47	37.15	92.10	-65.16	-3,997.19	255.23	2,665.78	2,536.53	129.25	20.625	
13,800.00	12,445.99	15,371.92	12,175.16	38.29	92.59	-64.36	-4,001.17	236.67	2,568.32	2,437.44	130.88	19.623	
13,900.00	12,445.53	15,390.11	12,174.84	39.49	93.06	-63.55	-4,005.00	218.89	2,470.92	2,338.37	132.55	18.642	
14,000.00	12,445.06	15,408.41	12,174.48	40.73	93.53	-62.68	-4,008.86	201.01	2,373.58	2,239.32	134.26	17.679	
14,100.00	12,444.60	15,426.83	12,174.10	42.01	94.01	-61.75	-4,012.76	183.01	2,276.30	2,140.28	136.02	16.735	
14,200.00	12,444.14	15,445.37	12,173.67	43.33	94.49	-60.76	-4,016.70	164.90	2,179.10	2,041.27	137.82	15.811	
14,300.00	12,443.68	15,470.37	12,173.06	44.69	95.14	-59.31	-4,022.00	140.47	2,081.96	1,942.13	139.83	14.889	
14,400.00	12,443.21	15,499.78	12,172.29	46.08	95.90	-57.44	-4,028.11	111.72	1,984.81	1,842.82	141.98	13.979	
14,500.00	12,442.75	15,527.84	12,171.51	47.50	96.63	-55.46	-4,033.82	84.26	1,887.65	1,743.52	144.13	13.097	
14,600.00	12,442.29	15,553.87	12,170.75	48.95	97.31	-53.44	-4,039.00	58.75	1,790.52	1,644.27	146.25	12.243	
14,700.00	12,441.83	15,576.30	12,170.04	50.42	97.89	-51.53	-4,043.39	36.77	1,693.45	1,545.14	148.31	11.418	
14,800.00	12,441.36	15,598.15	12,169.30	51.91	98.46	-49.51	-4,047.62	15.34	1,596.48	1,446.11	150.37	10.617	
14,900.00	12,440.90	15,619.46	12,168.53	53.43	99.02	-47.37	-4,051.69	-5.56	1,499.65	1,347.21	152.45	9.837	
15,000.00	12,440.44	15,640.24	12,167.73	54.96	99.56	-45.10	-4,055.61	-25.95	1,402.99	1,248.47	154.52	9.080	
15,100.00	12,439.98	15,657.63	12,167.02	56.51	100.01	-43.06	-4,058.87	-43.02	1,306.56	1,150.04	156.53	8.347	
15,200.00	12,439.51	15,674.44	12,166.31	58.08	100.45	-40.97	-4,062.03	-59.51	1,210.46	1,051.93	158.53	7.635	
15,300.00	12,439.05	15,691.36	12,165.57	59.66	100.89	-38.72	-4,065.22	-76.11	1,114.78	954.22	160.56	6.943	
15,400.00	12,438.59	15,708.40	12,164.79	61.26	101.34	-36.32	-4,068.45	-92.83	1,019.62	857.03	162.60	6.271	

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
Project: Lea County, NM (NAD27 NME)
Reference Site: Sec. 34, T 25 S. , R 33 E
Site Error: 0.00 ft
Reference Well: Columbus Fee 23H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #2

Local Co-ordinate Reference: Well Columbus Fee 23H
TVD Reference: KB=26' @ 3352.00ft (Scandril Freedom)
MD Reference: KB=26' @ 3352.00ft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM 5000.1 Multi User Db
Offset TVD Reference: Offset Datum

Offset Design Sec. 34, T 25 S. , R 33 E - Redbull 35 FED #1H - 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		Highside Toolface (°)	Distance		Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		+N/-S (ft)	+E/-W (ft)						
15,500.00	12,438.12	15,725.57	12,163.98	62.87	101.79	-33.76	-4,071.71	-109.66	925.15	760.50	164.65	5.619		
15,600.00	12,437.66	15,743.42	12,163.11	64.49	102.25	-30.93	-4,075.11	-127.16	831.59	664.85	166.74	4.987		
15,700.00	12,437.20	15,761.61	12,162.18	66.12	102.73	-27.89	-4,078.56	-145.00	739.27	570.42	168.85	4.378		
15,800.00	12,436.74	15,779.67	12,161.22	67.76	103.20	-24.71	-4,081.98	-162.71	648.71	477.75	170.96	3.795		
15,900.00	12,436.27	15,797.61	12,160.24	69.41	103.67	-21.40	-4,085.36	-180.29	560.79	387.71	173.08	3.240		
16,000.00	12,435.81	15,815.41	12,159.22	71.07	104.13	-17.99	-4,088.71	-197.75	476.97	301.77	175.20	2.722		
16,100.00	12,435.35	15,833.06	12,158.19	72.74	104.59	-14.49	-4,092.01	-215.06	399.85	222.52	177.33	2.255		
16,200.00	12,434.89	15,850.60	12,157.13	74.41	105.05	-10.93	-4,095.30	-232.26	334.10	154.63	179.47	1.862		
16,300.00	12,434.42	15,868.21	12,156.05	76.10	105.51	-7.30	-4,098.60	-249.52	287.64	106.03	181.61	1.584		
16,399.19	12,433.97	15,885.73	12,154.94	77.77	105.97	-3.66	-4,101.89	-266.69	270.58	86.83	183.74	1.473 Level 3, CC		
16,400.00	12,433.96	15,885.88	12,154.93	77.79	105.97	-3.63	-4,101.92	-266.83	270.58	86.82	183.76	1.472 Level 3, ES, SF		
16,500.00	12,433.50	15,903.61	12,153.80	79.48	106.44	0.06	-4,105.26	-284.21	288.18	102.26	185.92	1.550		
16,600.00	12,433.04	15,922.00	12,152.59	81.18	106.92	3.85	-4,108.72	-302.23	335.03	146.93	188.10	1.781		
16,700.00	12,432.57	15,938.84	12,151.47	82.89	107.36	7.27	-4,111.89	-318.73	401.00	210.75	190.25	2.108		
16,800.00	12,432.11	15,955.98	12,150.31	84.60	107.81	10.66	-4,115.09	-335.54	478.26	285.85	192.41	2.486		
16,900.00	12,431.65	15,972.85	12,149.15	86.31	108.25	13.90	-4,118.21	-352.07	562.19	367.63	194.56	2.890		
17,000.00	12,431.19	15,989.45	12,148.00	88.03	108.68	16.98	-4,121.25	-368.35	650.23	453.51	196.72	3.305		
17,100.00	12,430.72	16,005.78	12,146.85	89.76	109.11	19.89	-4,124.23	-384.36	740.92	542.04	198.87	3.726		
17,200.00	12,430.26	16,022.00	12,145.70	91.49	109.54	22.66	-4,127.16	-400.28	833.40	632.37	201.03	4.146		
17,300.00	12,429.80	16,022.00	12,145.70	93.22	109.54	22.66	-4,127.16	-400.28	927.29	724.53	202.76	4.573		
17,400.00	12,429.34	16,022.00	12,145.70	94.96	109.54	22.66	-4,127.16	-400.28	1,022.34	817.84	204.49	4.999		
17,500.00	12,428.87	16,047.87	12,143.85	96.70	110.22	26.81	-4,131.52	-425.70	1,117.65	910.74	206.91	5.402		
17,600.00	12,428.41	16,055.01	12,143.34	98.44	110.41	27.90	-4,132.61	-432.75	1,213.89	1,005.04	208.85	5.812		
17,700.00	12,427.95	16,061.56	12,142.87	100.19	110.58	28.88	-4,133.58	-439.21	1,310.61	1,099.85	210.76	6.218		
17,800.00	12,427.48	16,067.59	12,142.44	101.93	110.74	29.76	-4,134.43	-445.16	1,407.73	1,195.06	212.67	6.619		
17,900.00	12,427.02	16,073.15	12,142.04	103.69	110.88	30.56	-4,135.18	-450.65	1,505.18	1,290.61	214.57	7.015		
18,000.00	12,426.56	16,078.29	12,141.67	105.44	111.02	31.29	-4,135.86	-455.74	1,602.90	1,386.44	216.46	7.405		
18,100.00	12,426.10	16,083.07	12,141.33	107.20	111.14	31.95	-4,136.47	-460.46	1,700.85	1,482.51	218.34	7.790		
18,200.00	12,425.63	16,111.00	12,139.33	108.96	111.88	35.62	-4,139.59	-488.15	1,799.39	1,578.56	220.83	8.148		
18,300.00	12,425.17	16,111.00	12,139.33	110.72	111.88	35.62	-4,139.59	-488.15	1,897.57	1,674.98	222.60	8.525		
18,400.00	12,424.71	16,111.00	12,139.33	112.48	111.88	35.62	-4,139.59	-488.15	1,995.93	1,771.57	224.36	8.896		
18,500.00	12,424.25	16,111.00	12,139.33	114.25	111.88	35.62	-4,139.59	-488.15	2,094.45	1,868.32	226.12	9.262		
18,600.00	12,423.78	16,111.00	12,139.33	116.01	111.88	35.62	-4,139.59	-488.15	2,193.09	1,965.20	227.89	9.623		
18,700.00	12,423.32	16,111.00	12,139.33	117.78	111.88	35.62	-4,139.59	-488.15	2,291.86	2,062.20	229.66	9.979		
18,800.00	12,422.86	16,111.00	12,139.33	119.55	111.88	35.62	-4,139.59	-488.15	2,390.73	2,159.30	231.43	10.330		
18,900.00	12,422.40	16,114.37	12,139.09	121.33	111.97	36.03	-4,139.92	-491.49	2,489.68	2,256.39	233.29	10.672		
19,000.00	12,421.93	16,128.57	12,138.11	123.10	112.34	37.75	-4,141.35	-505.59	2,588.69	2,353.24	235.44	10.995		
19,100.00	12,421.47	16,143.27	12,137.15	124.88	112.73	39.43	-4,142.85	-520.18	2,687.71	2,450.10	237.61	11.312		
19,200.00	12,421.01	16,158.49	12,136.21	126.65	113.13	41.09	-4,144.42	-535.29	2,786.76	2,546.97	239.79	11.622		
19,300.00	12,420.55	16,174.26	12,135.29	128.43	113.55	42.72	-4,146.08	-550.95	2,885.81	2,643.83	241.98	11.926		
19,400.00	12,420.08	16,190.62	12,134.40	130.21	113.98	44.32	-4,147.83	-567.18	2,984.88	2,740.69	244.19	12.223		
19,500.00	12,419.62	16,206.52	12,133.60	131.99	114.40	45.80	-4,149.56	-582.97	3,083.96	2,837.56	246.40	12.516		
19,600.00	12,419.16	16,216.64	12,133.12	133.78	114.67	46.70	-4,150.67	-593.02	3,183.05	2,934.60	248.45	12.812		
19,700.00	12,418.70	16,226.72	12,132.66	135.56	114.94	47.56	-4,151.77	-603.03	3,282.16	3,031.66	250.50	13.103		
19,800.00	12,418.23	16,236.76	12,132.22	137.35	115.20	48.40	-4,152.87	-613.00	3,381.30	3,128.75	252.55	13.389		
19,900.00	12,417.77	16,246.77	12,131.80	139.13	115.47	49.20	-4,153.96	-622.94	3,480.46	3,225.86	254.60	13.670		
20,000.00	12,417.31	16,256.74	12,131.40	140.92	115.73	49.98	-4,155.04	-632.84	3,579.63	3,322.98	256.65	13.947		
20,100.00	12,416.85	16,266.67	12,131.02	142.71	115.99	50.73	-4,156.12	-642.71	3,678.83	3,420.12	258.70	14.220		
20,200.00	12,416.38	16,276.57	12,130.66	144.50	116.26	51.45	-4,157.20	-652.54	3,778.03	3,517.28	260.75	14.489		
20,300.00	12,415.92	16,286.43	12,130.32	146.29	116.52	52.15	-4,158.26	-662.34	3,877.26	3,614.45	262.81	14.753		
20,400.00	12,415.46	16,296.25	12,130.00	148.08	116.78	52.82	-4,159.33	-672.10	3,976.50	3,711.64	264.86	15.014		
20,500.00	12,414.99	16,298.00	12,129.94	149.87	116.82	52.94	-4,159.51	-673.83	4,075.76	3,809.06	266.70	15.282		

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 23H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3352.00ft (Scandrill Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3352.00ft (Scandrill Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 23H	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 #2	Offset TVD Reference:	Offset Datum

Offset Design Sec. 34, T 25 S. , R 33 E - Redbull 35 FED #1H - 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		Highside Toolface (°)	Distance						Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
20,600.00	12,414.53	16,298.00	12,129.94	151.66	116.82	52.94	-4,159.51	-673.83	4,175.05	3,906.56	268.49	15.550		
20,700.00	12,414.07	16,316.56	12,129.38	153.46	117.32	54.15	-4,161.50	-692.28	4,274.32	4,003.54	270.77	15.786		
20,800.00	12,413.61	16,322.93	12,129.20	155.25	117.48	54.55	-4,162.16	-698.61	4,373.63	4,100.89	272.74	16.036		
20,900.00	12,413.14	16,329.19	12,129.02	157.05	117.65	54.94	-4,162.82	-704.83	4,472.96	4,198.26	274.70	16.283		
21,000.00	12,412.68	16,335.35	12,128.85	158.84	117.81	55.31	-4,163.46	-710.96	4,572.30	4,295.64	276.66	16.527		
21,100.00	12,412.22	16,341.40	12,128.69	160.64	117.97	55.67	-4,164.08	-716.98	4,671.66	4,393.04	278.62	16.767		
21,200.00	12,411.76	16,347.36	12,128.53	162.44	118.13	56.02	-4,164.68	-722.90	4,771.03	4,490.46	280.57	17.005		
21,300.00	12,411.29	16,353.22	12,128.38	164.24	118.29	56.36	-4,165.28	-728.73	4,870.42	4,587.89	282.53	17.239		
21,400.00	12,410.83	16,358.98	12,128.24	166.04	118.44	56.68	-4,165.86	-734.46	4,969.82	4,685.34	284.48	17.470		
21,500.00	12,410.37	16,364.66	12,128.10	167.84	118.59	57.00	-4,166.42	-740.11	5,069.24	4,782.81	286.43	17.698		
21,600.00	12,409.91	16,370.24	12,127.97	169.64	118.74	57.30	-4,166.98	-745.66	5,168.66	4,880.29	288.38	17.923		
21,700.00	12,409.44	16,392.00	12,127.48	171.44	119.32	58.44	-4,169.09	-767.31	5,268.15	4,977.39	290.75	18.119		
21,800.00	12,408.98	16,392.00	12,127.48	173.24	119.32	58.44	-4,169.09	-767.31	5,367.57	5,075.02	292.56	18.347		
21,900.00	12,408.52	16,392.00	12,127.48	175.04	119.32	58.44	-4,169.09	-767.31	5,467.02	5,172.67	294.36	18.573		
22,000.00	12,408.06	16,392.00	12,127.48	176.84	119.32	58.44	-4,169.09	-767.31	5,566.49	5,270.33	296.16	18.796		
22,100.00	12,407.59	16,392.00	12,127.48	178.65	119.32	58.44	-4,169.09	-767.31	5,665.98	5,368.02	297.96	19.016		
22,200.00	12,407.13	16,392.00	12,127.48	180.45	119.32	58.44	-4,169.09	-767.31	5,765.48	5,465.72	299.77	19.233		
22,300.00	12,406.67	16,409.77	12,127.10	182.25	119.79	59.32	-4,170.78	-784.99	5,864.97	5,562.92	302.04	19.418		
22,400.00	12,406.21	16,415.68	12,126.96	184.06	119.95	59.60	-4,171.34	-790.88	5,964.48	5,660.47	304.00	19.620		
22,444.38	12,406.00	16,418.28	12,126.90	184.86	120.02	59.72	-4,171.58	-793.47	6,008.64	5,703.77	304.87	19.709		

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



Integrity Directional Services, LLC
Anticollision Report



Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Reference Site: Sec. 34, T 25 S. , R 33 E
Site Error: 0.00 ft
Reference Well: Columbus Fee 23H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #2

Local Co-ordinate Reference: Well Columbus Fee 23H
TVD Reference: KB=26' @ 3352.00ft (Scandrill Freedom)
MD Reference: KB=26' @ 3352.00ft (Scandrill Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM 5000.1 Multi User Db
Offset TVD Reference: Offset Datum

Reference Depths are relative to KB=26' @ 3352.00ft (Scandrill Freedom) Coordinates are relative to: Columbus Fee 23H

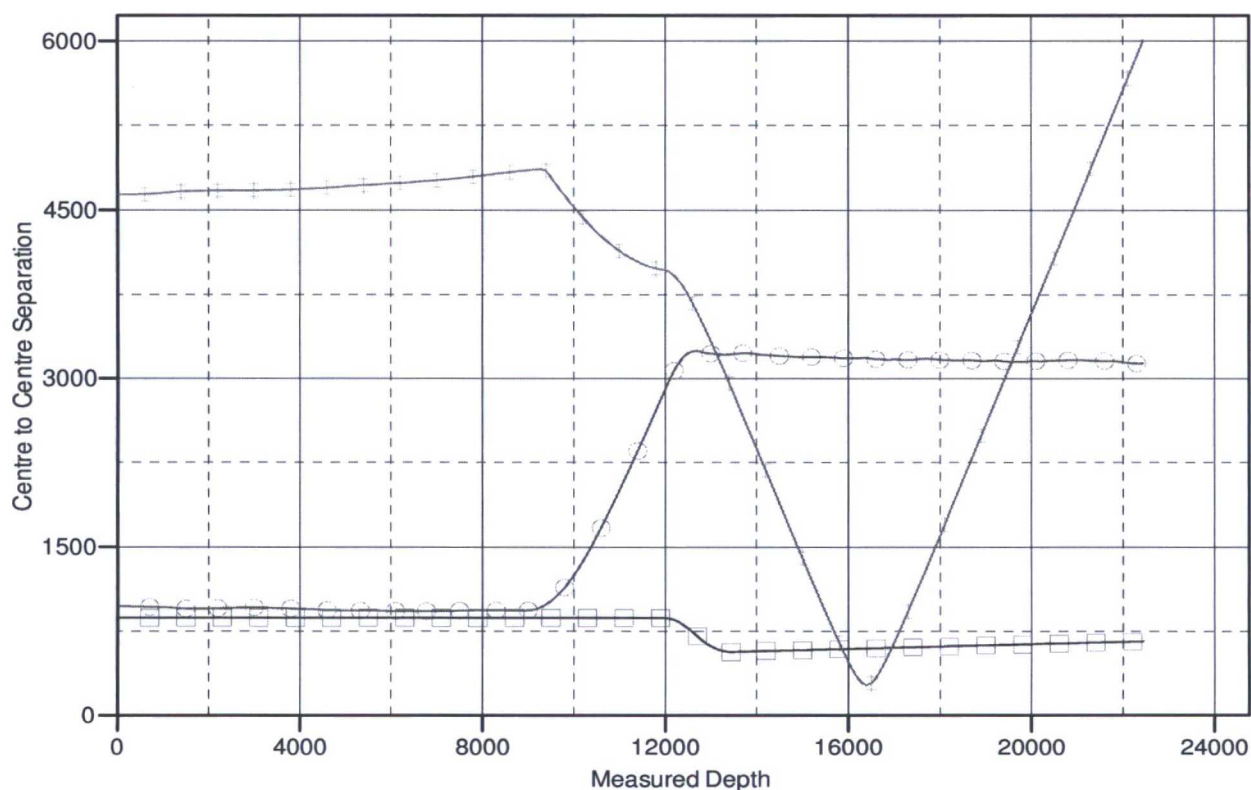
Offset Depths are relative to Offset Datum

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°

Ladder Plot



LEGEND

bus Fee 24H, Wellbore #1, Plan #2 V0

—○— Columbus Fee 2H, Wellbore #1, Wellbore #1 V0

—◆— Redbull 35 FED #1H, Wellbore #1, Actual



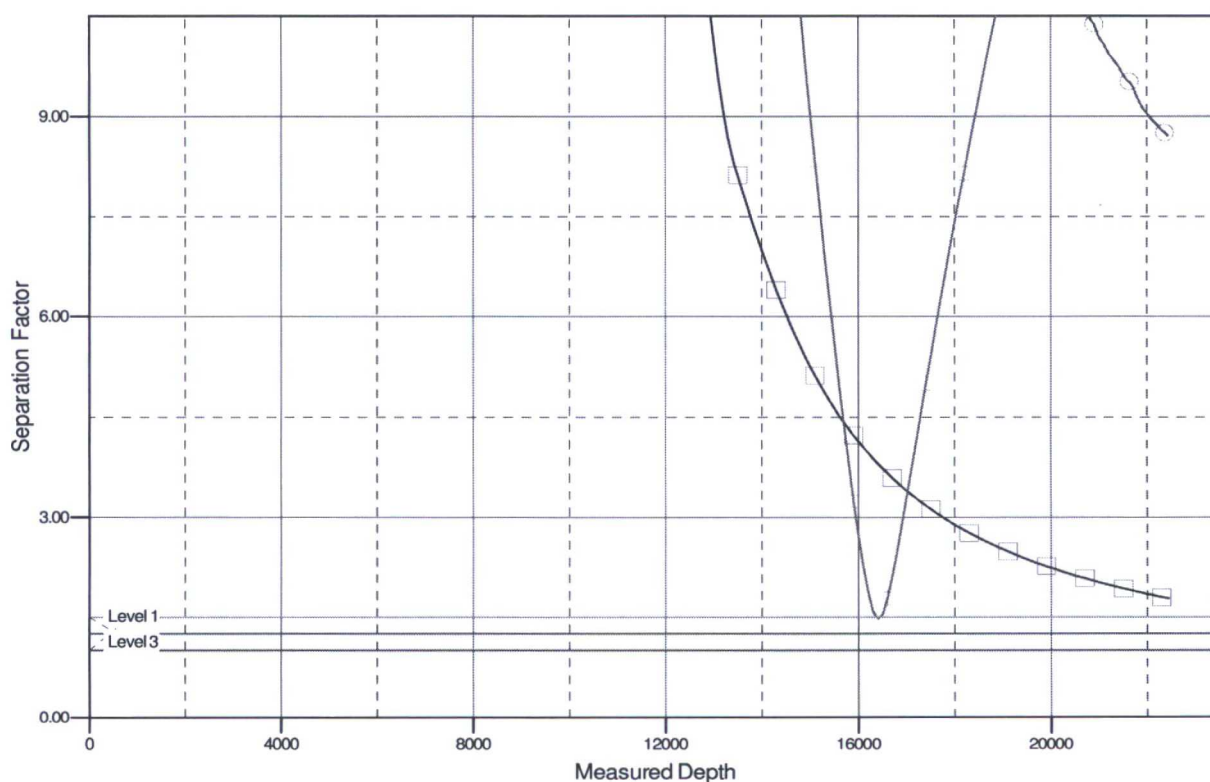
Integrity Directional Services, LLC
Anticollision Report



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Columbus Fee 23H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3352.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3352.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 23H	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 #2	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB=26' @ 3352.00ft (Scandril Freedom) Coordinates are relative to: Columbus Fee 23H
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°

Separation Factor Plot



LEGEND

bus Fee 24H, Wellbore #1, Plan #2 V0

—●— Columbus Fee 2H, Wellbore #1, Wellbore #1 V0

—●— Redbull 35 FED #1H, Wellbore #1, Actual