



COG Operating L L C

Lea County, NM (NAD27 NME)

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

Columbus Fee 24H

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 24H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 24H	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	22,384.50	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 23H - Wellbore #1 - Plan #2	13,370.14	13,435.15	565.61	497.22	8.270	CC
Columbus Fee 23H - Wellbore #1 - Plan #2	22,384.53	22,443.10	660.07	288.74	1.778	ES, SF
Columbus Fee 2H - Wellbore #1 - Wellbore #1	6,448.95	6,449.96	58.54	33.01	2.293	CC
Columbus Fee 2H - Wellbore #1 - Wellbore #1	6,900.00	6,900.71	58.88	31.55	2.154	ES
Columbus Fee 2H - Wellbore #1 - Wellbore #1	8,700.00	8,701.11	67.33	32.84	1.952	SF
Redbull 35 FED #1H - Wellbore #1 - Actual Wellbore	16,412.43	16,497.30	291.16	88.72	1.438	Level 3, CC, ES, SF

Offset Design		Sec. 34, T 25 S. , R 33 E - Columbus Fee 23H - 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							Warning		
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor				
0.00	0.00	0.00	0.00	0.00	0.00	89.62	5.80	869.90	869.92							
100.00	100.00	99.00	99.00	0.08	0.08	89.62	5.80	869.90	869.92	869.76	0.17	5,256.465				
200.00	200.00	199.00	199.00	0.31	0.31	89.62	5.80	869.90	869.92	869.31	0.61	1,417.707				
300.00	300.00	299.00	299.00	0.53	0.53	89.62	5.80	869.90	869.92	868.86	1.06	818.254				
400.00	400.00	399.00	399.00	0.76	0.76	89.62	5.80	869.90	869.92	868.41	1.51	575.088				
500.00	500.00	499.00	499.00	0.98	0.98	89.62	5.80	869.90	869.92	867.96	1.96	443.338				
600.00	600.00	599.00	599.00	1.21	1.20	89.62	5.80	869.90	869.92	867.51	2.41	360.703				
700.00	700.00	699.00	699.00	1.43	1.43	89.62	5.80	869.90	869.92	867.06	2.86	304.033				
800.00	800.00	799.00	799.00	1.66	1.65	89.62	5.80	869.90	869.92	866.61	3.31	262.752				
900.00	900.00	899.00	899.00	1.88	1.88	89.62	5.80	869.90	869.92	866.16	3.76	231.341				
1,000.00	1,000.00	999.00	999.00	2.11	2.10	89.62	5.80	869.90	869.92	865.71	4.21	206.639				
1,100.00	1,100.00	1,099.00	1,099.00	2.33	2.33	89.62	5.80	869.90	869.92	865.26	4.66	186.702				
1,200.00	1,200.00	1,199.00	1,199.00	2.56	2.55	89.62	5.80	869.90	869.92	864.81	5.11	170.275				
1,300.00	1,300.00	1,299.00	1,299.00	2.78	2.78	89.62	5.80	869.90	869.92	864.36	5.56	156.504				
1,400.00	1,400.00	1,399.00	1,399.00	3.01	3.00	89.62	5.80	869.90	869.92	863.91	6.01	144.794				
1,500.00	1,500.00	1,499.00	1,499.00	3.23	3.23	89.62	5.80	869.90	869.92	863.46	6.46	134.714				
1,600.00	1,600.00	1,599.00	1,599.00	3.45	3.45	89.62	5.80	869.90	869.92	863.01	6.91	125.947				
1,700.00	1,700.00	1,699.00	1,699.00	3.68	3.68	89.62	5.80	869.90	869.92	862.56	7.36	118.251				
1,800.00	1,800.00	1,799.00	1,799.00	3.90	3.90	89.62	5.80	869.90	869.92	862.11	7.81	111.441				
1,900.00	1,900.00	1,899.00	1,899.00	4.13	4.13	89.62	5.80	869.90	869.92	861.67	8.26	105.373				
2,000.00	2,000.00	1,999.00	1,999.00	4.35	4.35	89.62	5.80	869.90	869.92	861.22	8.71	99.931				

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



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Reference Well:	Columbus Fee 24H	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 23H - 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)						
2,100.00	2,100.00	2,099.00	2,099.00	4.58	4.58	89.62	5.80	869.90	869.92	860.77	9.15	95.024		
2,200.00	2,200.00	2,199.00	2,199.00	4.80	4.80	89.62	5.80	869.90	869.92	860.32	9.60	90.577		
2,300.00	2,300.00	2,299.00	2,299.00	5.03	5.03	89.62	5.80	869.90	869.92	859.87	10.05	86.527		
2,400.00	2,400.00	2,399.00	2,399.00	5.25	5.25	89.62	5.80	869.90	869.92	859.42	10.50	82.823		
2,500.00	2,500.00	2,499.00	2,499.00	5.48	5.48	89.62	5.80	869.90	869.92	858.97	10.95	79.424		
2,600.00	2,600.00	2,599.00	2,599.00	5.70	5.70	89.62	5.80	869.90	869.92	858.52	11.40	76.293		
2,700.00	2,700.00	2,699.00	2,699.00	5.93	5.92	89.62	5.80	869.90	869.92	858.07	11.85	73.399		
2,800.00	2,800.00	2,799.00	2,799.00	6.15	6.15	89.62	5.80	869.90	869.92	857.62	12.30	70.717		
2,900.00	2,900.00	2,899.00	2,899.00	6.38	6.37	89.62	5.80	869.90	869.92	857.17	12.75	68.224		
3,000.00	3,000.00	2,999.00	2,999.00	6.60	6.60	89.62	5.80	869.90	869.92	856.72	13.20	65.901		
3,100.00	3,100.00	3,099.00	3,099.00	6.83	6.82	89.62	5.80	869.90	869.92	856.27	13.65	63.730		
3,200.00	3,200.00	3,199.00	3,199.00	7.05	7.05	89.62	5.80	869.90	869.92	855.82	14.10	61.698		
3,300.00	3,300.00	3,299.00	3,299.00	7.28	7.27	89.62	5.80	869.90	869.92	855.37	14.55	59.792		
3,400.00	3,400.00	3,399.00	3,399.00	7.50	7.50	89.62	5.80	869.90	869.92	854.92	15.00	58.000		
3,500.00	3,500.00	3,499.00	3,499.00	7.73	7.72	89.62	5.80	869.90	869.92	854.47	15.45	56.312		
3,600.00	3,600.00	3,599.00	3,599.00	7.95	7.95	89.62	5.80	869.90	869.92	854.02	15.90	54.720		
3,700.00	3,700.00	3,699.00	3,699.00	8.17	8.17	89.62	5.80	869.90	869.92	853.57	16.35	53.215		
3,800.00	3,800.00	3,799.00	3,799.00	8.40	8.40	89.62	5.80	869.90	869.92	853.12	16.80	51.791		
3,900.00	3,900.00	3,899.00	3,899.00	8.62	8.62	89.62	5.80	869.90	869.92	852.67	17.25	50.441		
4,000.00	4,000.00	3,999.00	3,999.00	8.85	8.85	89.62	5.80	869.90	869.92	852.23	17.70	49.160		
4,100.00	4,100.00	4,099.00	4,099.00	9.07	9.07	89.62	5.80	869.90	869.92	851.78	18.15	47.942		
4,200.00	4,200.00	4,199.00	4,199.00	9.30	9.30	89.62	5.80	869.90	869.92	851.33	18.59	46.783		
4,300.00	4,300.00	4,299.00	4,299.00	9.52	9.52	89.62	5.80	869.90	869.92	850.88	19.04	45.679		
4,400.00	4,400.00	4,399.00	4,399.00	9.75	9.75	89.62	5.80	869.90	869.92	850.43	19.49	44.625		
4,500.00	4,500.00	4,499.00	4,499.00	9.97	9.97	89.62	5.80	869.90	869.92	849.98	19.94	43.619		
4,600.00	4,600.00	4,599.00	4,599.00	10.20	10.20	89.62	5.80	869.90	869.92	849.53	20.39	42.658		
4,700.00	4,700.00	4,699.00	4,699.00	10.42	10.42	89.62	5.80	869.90	869.92	849.08	20.84	41.738		
4,800.00	4,800.00	4,799.00	4,799.00	10.65	10.64	89.62	5.80	869.90	869.92	848.63	21.29	40.857		
4,900.00	4,900.00	4,899.00	4,899.00	10.87	10.87	89.62	5.80	869.90	869.92	848.18	21.74	40.012		
5,000.00	5,000.00	4,999.00	4,999.00	11.10	11.09	89.62	5.80	869.90	869.92	847.73	22.19	39.201		
5,100.00	5,100.00	5,099.00	5,099.00	11.32	11.32	89.62	5.80	869.90	869.92	847.28	22.64	38.423		
5,200.00	5,200.00	5,199.00	5,199.00	11.55	11.54	89.62	5.80	869.90	869.92	846.83	23.09	37.675		
5,300.00	5,300.00	5,299.00	5,299.00	11.77	11.77	89.62	5.80	869.90	869.92	846.38	23.54	36.955		
5,400.00	5,400.00	5,399.00	5,399.00	12.00	11.99	89.62	5.80	869.90	869.92	845.93	23.99	36.263		
5,500.00	5,500.00	5,499.00	5,499.00	12.22	12.22	89.62	5.80	869.90	869.92	845.48	24.44	35.596		
5,600.00	5,600.00	5,599.00	5,599.00	12.45	12.44	89.62	5.80	869.90	869.92	845.03	24.89	34.953		
5,700.00	5,700.00	5,699.00	5,699.00	12.67	12.67	89.62	5.80	869.90	869.92	844.58	25.34	34.333		
5,800.00	5,800.00	5,799.00	5,799.00	12.89	12.89	89.62	5.80	869.90	869.92	844.13	25.79	33.734		
5,900.00	5,900.00	5,899.00	5,899.00	13.12	13.12	89.62	5.80	869.90	869.92	843.68	26.24	33.156		
6,000.00	6,000.00	5,999.00	5,999.00	13.34	13.34	89.62	5.80	869.90	869.92	843.23	26.69	32.598		
6,100.00	6,100.00	6,099.00	6,099.00	13.57	13.57	89.62	5.80	869.90	869.92	842.79	27.14	32.058		
6,200.00	6,200.00	6,199.00	6,199.00	13.79	13.79	89.62	5.80	869.90	869.92	842.34	27.59	31.535		
6,300.00	6,300.00	6,299.00	6,299.00	14.02	14.02	89.62	5.80	869.90	869.92	841.89	28.04	31.030		
6,400.00	6,400.00	6,399.00	6,399.00	14.24	14.24	89.62	5.80	869.90	869.92	841.44	28.48	30.540		
6,500.00	6,500.00	6,499.00	6,499.00	14.47	14.47	89.62	5.80	869.90	869.92	840.99	28.93	30.066		
6,600.00	6,600.00	6,599.00	6,599.00	14.69	14.69	89.62	5.80	869.90	869.92	840.54	29.38	29.606		
6,700.00	6,700.00	6,699.00	6,699.00	14.92	14.92	89.62	5.80	869.90	869.92	840.09	29.83	29.160		
6,800.00	6,800.00	6,799.00	6,799.00	15.14	15.14	89.62	5.80	869.90	869.92	839.64	30.28	28.727		
6,900.00	6,900.00	6,899.00	6,899.00	15.37	15.37	89.62	5.80	869.90	869.92	839.19	30.73	28.306		
7,000.00	7,000.00	6,999.00	6,999.00	15.59	15.59	89.62	5.80	869.90	869.92	838.74	31.18	27.898		
7,100.00	7,100.00	7,099.00	7,099.00	15.82	15.81	89.62	5.80	869.90	869.92	838.29	31.63	27.502		
7,200.00	7,200.00	7,199.00	7,199.00	16.04	16.04	89.62	5.80	869.90	869.92	837.84	32.08	27.117		

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Offset Design Sec. 34, T 25 S. , R 33 E - Columbus Fee 23H - Wellbore #1 - Plan #2													Offset Site Error:	0.00 ft
Survey Program: 0-MWD													Offset Well Error:	0.00 ft
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	Warning	
7,300.00	7,300.00	7,299.00	7,299.00	16.27	16.26	89.62	5.80	869.90	869.92	837.39	32.53	26.742		
7,400.00	7,400.00	7,399.00	7,399.00	16.49	16.49	89.62	5.80	869.90	869.92	836.94	32.98	26.377		
7,500.00	7,500.00	7,499.00	7,499.00	16.72	16.71	89.62	5.80	869.90	869.92	836.49	33.43	26.023		
7,600.00	7,600.00	7,599.00	7,599.00	16.94	16.94	89.62	5.80	869.90	869.92	836.04	33.88	25.677		
7,700.00	7,700.00	7,699.00	7,699.00	17.17	17.16	89.62	5.80	869.90	869.92	835.59	34.33	25.341		
7,800.00	7,800.00	7,799.00	7,799.00	17.39	17.39	89.62	5.80	869.90	869.92	835.14	34.78	25.014		
7,900.00	7,900.00	7,899.00	7,899.00	17.61	17.61	89.62	5.80	869.90	869.92	834.69	35.23	24.694		
8,000.00	8,000.00	7,999.00	7,999.00	17.84	17.84	89.62	5.80	869.90	869.92	834.24	35.68	24.383		
8,100.00	8,100.00	8,099.00	8,099.00	18.06	18.06	89.62	5.80	869.90	869.92	833.79	36.13	24.080		
8,200.00	8,200.00	8,199.00	8,199.00	18.29	18.29	89.62	5.80	869.90	869.92	833.34	36.58	23.784		
8,300.00	8,300.00	8,299.00	8,299.00	18.51	18.51	89.62	5.80	869.90	869.92	832.90	37.03	23.495		
8,400.00	8,400.00	8,399.00	8,399.00	18.74	18.74	89.62	5.80	869.90	869.92	832.45	37.48	23.213		
8,500.00	8,500.00	8,499.00	8,499.00	18.96	18.96	89.62	5.80	869.90	869.92	832.00	37.92	22.938		
8,600.00	8,600.00	8,599.00	8,599.00	19.19	19.19	89.62	5.80	869.90	869.92	831.55	38.37	22.669		
8,700.00	8,700.00	8,699.00	8,699.00	19.41	19.41	89.62	5.80	869.90	869.92	831.10	38.82	22.407		
8,800.00	8,800.00	8,799.00	8,799.00	19.64	19.64	89.62	5.80	869.90	869.92	830.65	39.27	22.150		
8,900.00	8,900.00	8,899.00	8,899.00	19.86	19.86	89.62	5.80	869.90	869.92	830.20	39.72	21.900		
9,000.00	9,000.00	8,999.00	8,999.00	20.09	20.09	89.62	5.80	869.90	869.92	829.75	40.17	21.655		
9,100.00	9,100.00	9,099.00	9,099.00	20.31	20.31	89.62	5.80	869.90	869.92	829.30	40.62	21.415		
9,200.00	9,200.00	9,199.00	9,199.00	20.54	20.53	89.62	5.80	869.90	869.92	828.85	41.07	21.181		
9,300.00	9,300.00	9,299.00	9,299.00	20.76	20.76	89.62	5.80	869.90	869.92	828.40	41.52	20.951		
9,400.00	9,400.00	9,399.00	9,399.00	20.99	20.98	89.62	5.80	869.90	869.92	827.95	41.97	20.727		
9,500.00	9,500.00	9,499.00	9,499.00	21.21	21.21	89.62	5.80	869.90	869.92	827.50	42.42	20.507		
9,600.00	9,600.00	9,599.00	9,599.00	21.44	21.43	89.62	5.80	869.90	869.92	827.05	42.87	20.292		
9,700.00	9,700.00	9,699.00	9,699.00	21.66	21.66	89.62	5.80	869.90	869.92	826.60	43.32	20.082		
9,800.00	9,800.00	9,799.00	9,799.00	21.89	21.88	89.62	5.80	869.90	869.92	826.15	43.77	19.875		
9,900.00	9,900.00	9,899.00	9,899.00	22.11	22.11	89.62	5.80	869.90	869.92	825.70	44.22	19.673		
10,000.00	10,000.00	9,999.00	9,999.00	22.34	22.33	89.62	5.80	869.90	869.92	825.25	44.67	19.475		
10,100.00	10,100.00	10,099.00	10,099.00	22.56	22.56	89.62	5.80	869.90	869.92	824.80	45.12	19.281		
10,200.00	10,200.00	10,199.00	10,199.00	22.78	22.78	89.62	5.80	869.90	869.92	824.35	45.57	19.091		
10,300.00	10,300.00	10,299.00	10,299.00	23.01	23.01	89.62	5.80	869.90	869.92	823.90	46.02	18.905		
10,400.00	10,400.00	10,399.00	10,399.00	23.23	23.23	89.62	5.80	869.90	869.92	823.46	46.47	18.722		
10,500.00	10,500.00	10,499.00	10,499.00	23.46	23.46	89.62	5.80	869.90	869.92	823.01	46.92	18.542		
10,600.00	10,600.00	10,599.00	10,599.00	23.68	23.68	89.62	5.80	869.90	869.92	822.56	47.36	18.366		
10,700.00	10,700.00	10,699.00	10,699.00	23.91	23.91	89.62	5.80	869.90	869.92	822.11	47.81	18.194		
10,800.00	10,800.00	10,799.00	10,799.00	24.13	24.13	89.62	5.80	869.90	869.92	821.66	48.26	18.024		
10,900.00	10,900.00	10,899.00	10,899.00	24.36	24.36	89.62	5.80	869.90	869.92	821.21	48.71	17.858		
11,000.00	11,000.00	10,999.00	10,999.00	24.58	24.58	89.62	5.80	869.90	869.92	820.76	49.16	17.695		
11,100.00	11,100.00	11,099.00	11,099.00	24.81	24.81	89.62	5.80	869.90	869.92	820.31	49.61	17.534		
11,200.00	11,200.00	11,199.00	11,199.00	25.03	25.03	89.62	5.80	869.90	869.92	819.86	50.06	17.377		
11,300.00	11,300.00	11,299.00	11,299.00	25.26	25.25	89.62	5.80	869.90	869.92	819.41	50.51	17.222		
11,400.00	11,400.00	11,399.00	11,399.00	25.48	25.48	89.62	5.80	869.90	869.92	818.96	50.96	17.070		
11,500.00	11,500.00	11,499.00	11,499.00	25.71	25.70	89.62	5.80	869.90	869.92	818.51	51.41	16.921		
11,600.00	11,600.00	11,599.00	11,599.00	25.93	25.93	89.62	5.80	869.90	869.92	818.06	51.86	16.774		
11,700.00	11,700.00	11,699.00	11,699.00	26.16	26.15	89.62	5.80	869.90	869.92	817.61	52.31	16.630		
11,800.00	11,800.00	11,799.00	11,799.00	26.38	26.38	89.62	5.80	869.90	869.92	817.16	52.76	16.488		
11,900.00	11,900.00	11,899.00	11,899.00	26.61	26.60	89.62	5.80	869.90	869.92	816.71	53.21	16.349		
12,000.00	11,999.97	12,052.14	12,051.79	26.81	26.90	-90.47	-0.21	867.54	869.15	815.44	53.72	16.180		
12,100.00	12,098.23	12,324.69	12,293.88	26.98	27.37	-87.92	-109.08	824.81	852.77	798.42	54.35	15.691		
12,200.00	12,190.69	12,513.63	12,405.60	27.14	27.86	-85.05	-249.49	769.70	822.53	767.53	55.00	14.954		
12,300.00	12,273.31	12,645.19	12,444.59	27.29	28.40	-83.59	-366.05	723.95	786.47	730.78	55.69	14.123		
12,400.00	12,342.48	12,737.20	12,450.95	27.50	28.87	-83.70	-451.38	690.50	748.80	692.43	56.37	13.284		

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 24H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 24H	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 23H - 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							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)	Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
12,500.00	12,395.17	12,800.00	12,450.66	27.78	29.22	-85.43	-510.34	668.87	713.91	656.91	57.00	12.525		
12,600.00	12,429.09	12,859.92	12,450.38	28.14	29.59	-87.64	-567.23	650.05	682.62	624.89	57.73	11.824		
12,700.00	12,442.75	12,930.21	12,450.05	28.60	30.05	-90.25	-634.67	630.26	654.71	596.06	58.65	11.164		
12,800.00	12,442.61	13,000.00	12,449.72	29.14	30.54	-90.82	-702.30	613.09	630.42	570.74	59.68	10.563		
12,900.00	12,442.15	13,076.68	12,449.36	29.79	31.14	-90.84	-777.29	597.08	609.85	548.93	60.93	10.009		
13,000.00	12,441.68	13,151.67	12,449.00	30.53	31.76	-90.85	-851.18	584.34	593.13	530.84	62.29	9.522		
13,100.00	12,441.22	13,227.54	12,448.65	31.36	32.42	-90.87	-926.40	574.42	580.30	516.52	63.78	9.098		
13,200.00	12,440.75	13,300.00	12,448.31	32.27	33.08	-90.88	-998.54	567.74	571.47	506.11	65.35	8.744		
13,300.00	12,440.29	13,381.04	12,447.93	33.26	33.86	-90.88	-1,079.47	563.52	566.60	499.49	67.12	8.442		
13,370.14	12,439.96	13,435.15	12,447.68	34.00	34.39	-90.88	-1,133.56	562.62	565.61	497.22	68.39	8.270 CC		
13,400.00	12,439.82	13,459.07	12,447.57	34.32	34.63	-90.88	-1,157.48	562.70	565.78	496.84	68.94	8.206		
13,500.00	12,439.36	13,559.06	12,447.10	35.44	35.64	-90.88	-1,257.47	563.49	566.83	495.76	71.08	7.975		
13,600.00	12,438.89	13,659.06	12,446.64	36.61	36.71	-90.88	-1,357.46	564.28	567.88	494.57	73.32	7.746		
13,700.00	12,438.42	13,759.05	12,446.18	37.84	37.83	-90.88	-1,457.45	565.07	568.93	493.27	75.66	7.519		
13,800.00	12,437.96	13,859.04	12,445.72	39.11	39.00	-90.88	-1,557.44	565.86	569.98	491.87	78.11	7.297		
13,900.00	12,437.49	13,959.04	12,445.25	40.43	40.22	-90.88	-1,657.43	566.66	571.03	490.38	80.65	7.080		
14,000.00	12,437.03	14,059.03	12,444.79	41.78	41.49	-90.87	-1,757.42	567.45	572.08	488.81	83.27	6.870		
14,100.00	12,436.56	14,159.03	12,444.33	43.17	42.79	-90.87	-1,857.41	568.24	573.13	487.17	85.96	6.667		
14,200.00	12,436.10	14,259.02	12,443.87	44.59	44.13	-90.87	-1,957.40	569.03	574.18	485.45	88.73	6.471		
14,300.00	12,435.63	14,359.02	12,443.40	46.04	45.51	-90.87	-2,057.39	569.82	575.23	483.68	91.55	6.283		
14,400.00	12,435.17	14,459.01	12,442.94	47.52	46.92	-90.87	-2,157.38	570.61	576.28	481.84	94.44	6.102		
14,500.00	12,434.70	14,559.01	12,442.48	49.02	48.35	-90.87	-2,257.37	571.40	577.33	479.96	97.37	5.929		
14,600.00	12,434.24	14,659.00	12,442.02	50.54	49.82	-90.87	-2,357.36	572.19	578.38	478.03	100.35	5.763		
14,700.00	12,433.77	14,758.99	12,441.55	52.08	51.30	-90.87	-2,457.35	572.99	579.43	476.05	103.38	5.605		
14,800.00	12,433.30	14,858.99	12,441.09	53.63	52.81	-90.86	-2,557.34	573.78	580.48	474.04	106.44	5.453		
14,900.00	12,432.84	14,958.98	12,440.63	55.21	54.33	-90.86	-2,657.34	574.57	581.53	471.98	109.54	5.309		
15,000.00	12,432.37	15,058.98	12,440.16	56.80	55.88	-90.86	-2,757.33	575.36	582.58	469.90	112.68	5.170		
15,100.00	12,431.91	15,158.97	12,439.70	58.40	57.44	-90.86	-2,857.32	576.15	583.63	467.79	115.84	5.038		
15,200.00	12,431.44	15,258.97	12,439.24	60.02	59.01	-90.86	-2,957.31	576.94	584.67	465.64	119.03	4.912		
15,300.00	12,430.98	15,358.96	12,438.78	61.64	60.60	-90.86	-3,057.30	577.73	585.72	463.48	122.25	4.791		
15,400.00	12,430.51	15,458.96	12,438.31	63.28	62.21	-90.86	-3,157.29	578.52	586.77	461.28	125.49	4.676		
15,500.00	12,430.05	15,558.95	12,437.85	64.93	63.82	-90.86	-3,257.28	579.32	587.82	459.07	128.75	4.565		
15,600.00	12,429.58	15,658.95	12,437.39	66.59	65.45	-90.85	-3,357.27	580.11	588.87	456.83	132.04	4.460		
15,700.00	12,429.12	15,758.94	12,436.93	68.25	67.09	-90.85	-3,457.26	580.90	589.92	454.58	135.34	4.359		
15,800.00	12,428.65	15,858.93	12,436.46	69.93	68.73	-90.85	-3,557.25	581.69	590.97	452.31	138.66	4.262		
15,900.00	12,428.18	15,958.93	12,436.00	71.61	70.39	-90.85	-3,657.24	582.48	592.02	450.02	142.00	4.169		
16,000.00	12,427.72	16,058.92	12,435.54	73.30	72.05	-90.85	-3,757.23	583.27	593.07	447.72	145.35	4.080		
16,100.00	12,427.25	16,158.92	12,435.08	74.99	73.73	-90.85	-3,857.22	584.06	594.12	445.40	148.72	3.995		
16,200.00	12,426.79	16,258.91	12,434.61	76.69	75.41	-90.85	-3,957.21	584.86	595.17	443.07	152.10	3.913		
16,300.00	12,426.32	16,358.91	12,434.15	78.40	77.09	-90.85	-4,057.20	585.65	596.22	440.73	155.49	3.834		
16,400.00	12,425.86	16,458.90	12,433.69	80.11	78.78	-90.84	-4,157.19	586.44	597.27	438.37	158.89	3.759		
16,500.00	12,425.39	16,558.90	12,433.23	81.83	80.48	-90.84	-4,257.18	587.23	598.32	436.01	162.31	3.686		
16,600.00	12,424.93	16,658.89	12,432.76	83.55	82.19	-90.84	-4,357.17	588.02	599.37	433.63	165.73	3.616		
16,700.00	12,424.46	16,758.88	12,432.30	85.27	83.89	-90.84	-4,457.16	588.81	600.42	431.25	169.17	3.549		
16,800.00	12,424.00	16,858.88	12,431.84	87.00	85.61	-90.84	-4,557.15	589.60	601.47	428.86	172.61	3.485		
16,900.00	12,423.53	16,958.87	12,431.38	88.73	87.33	-90.84	-4,657.14	590.39	602.52	426.45	176.06	3.422		
17,000.00	12,423.06	17,058.87	12,430.91	90.47	89.05	-90.84	-4,757.13	591.19	603.56	424.04	179.52	3.362		
17,100.00	12,422.60	17,158.86	12,430.45	92.21	90.78	-90.84	-4,857.12	591.98	604.61	421.62	182.99	3.304		
17,200.00	12,422.13	17,258.86	12,429.99	93.96	92.51	-90.83	-4,957.11	592.77	605.66	419.20	186.46	3.248		
17,300.00	12,421.67	17,358.85	12,429.53	95.70	94.24	-90.83	-5,057.10	593.56	606.71	416.77	189.94	3.194		
17,400.00	12,421.20	17,458.85	12,429.06	97.45	95.98	-90.83	-5,157.09	594.35	607.76	414.33	193.43	3.142		
17,500.00	12,420.74	17,558.84	12,428.60	99.20	97.72	-90.83	-5,257.08	595.14	608.81	411.89	196.93	3.092		

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 24H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 24H	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 23H - 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)						
17,600.00	12,420.27	17,658.84	12,428.14	100.96	99.47	-90.83	-5,357.07	595.93	609.86	409.44	200.43	3.043		
17,700.00	12,419.81	17,758.83	12,427.68	102.72	101.21	-90.83	-5,457.06	596.72	610.91	406.98	203.93	2.996		
17,800.00	12,419.34	17,858.82	12,427.21	104.47	102.97	-90.83	-5,557.05	597.52	611.96	404.52	207.44	2.950		
17,900.00	12,418.87	17,958.82	12,426.75	106.24	104.72	-90.83	-5,657.04	598.31	613.01	402.06	210.95	2.906		
18,000.00	12,418.41	18,058.81	12,426.29	108.00	106.47	-90.83	-5,757.03	599.10	614.06	399.59	214.47	2.863		
18,100.00	12,417.94	18,158.81	12,425.83	109.77	108.23	-90.82	-5,857.02	599.89	615.11	397.11	218.00	2.822		
18,200.00	12,417.48	18,258.80	12,425.36	111.53	109.99	-90.82	-5,957.01	600.68	616.16	394.63	221.53	2.781		
18,300.00	12,417.01	18,358.80	12,424.90	113.30	111.75	-90.82	-6,057.01	601.47	617.21	392.15	225.06	2.742		
18,400.00	12,416.55	18,458.79	12,424.44	115.08	113.52	-90.82	-6,157.00	602.26	618.26	389.66	228.59	2.705		
18,500.00	12,416.08	18,558.79	12,423.97	116.85	115.28	-90.82	-6,256.99	603.05	619.31	387.17	232.13	2.668		
18,600.00	12,415.62	18,658.78	12,423.51	118.62	117.05	-90.82	-6,356.98	603.85	620.36	384.68	235.68	2.632		
18,700.00	12,415.15	18,758.77	12,423.05	120.40	118.82	-90.82	-6,456.97	604.64	621.41	382.18	239.22	2.598		
18,800.00	12,414.69	18,858.77	12,422.59	122.18	120.60	-90.82	-6,556.96	605.43	622.45	379.68	242.77	2.564		
18,900.00	12,414.22	18,958.76	12,422.12	123.96	122.37	-90.82	-6,656.95	606.22	623.50	377.18	246.32	2.531		
19,000.00	12,413.75	19,058.76	12,421.66	125.74	124.14	-90.81	-6,756.94	607.01	624.55	374.67	249.88	2.499		
19,100.00	12,413.29	19,158.75	12,421.20	127.52	125.92	-90.81	-6,856.93	607.80	625.60	372.17	253.44	2.468		
19,200.00	12,412.82	19,258.75	12,420.74	129.30	127.70	-90.81	-6,956.92	608.59	626.65	369.65	257.00	2.438		
19,300.00	12,412.36	19,358.74	12,420.27	131.08	129.48	-90.81	-7,056.91	609.38	627.70	367.14	260.56	2.409		
19,400.00	12,411.89	19,458.74	12,419.81	132.87	131.26	-90.81	-7,156.90	610.18	628.75	364.62	264.13	2.380		
19,500.00	12,411.43	19,558.73	12,419.35	134.65	133.04	-90.81	-7,256.89	610.97	629.80	362.10	267.70	2.353		
19,600.00	12,410.96	19,658.73	12,418.89	136.44	134.82	-90.81	-7,356.88	611.76	630.85	359.58	271.27	2.326		
19,700.00	12,410.50	19,758.72	12,418.42	138.23	136.61	-90.81	-7,456.87	612.55	631.90	357.06	274.84	2.299		
19,800.00	12,410.03	19,858.71	12,417.96	140.02	138.40	-90.81	-7,556.86	613.34	632.95	354.54	278.41	2.273		
19,900.00	12,409.57	19,958.71	12,417.50	141.81	140.18	-90.80	-7,656.85	614.13	634.00	352.01	281.99	2.248		
20,000.00	12,409.10	20,058.70	12,417.04	143.60	141.97	-90.80	-7,756.84	614.92	635.05	349.48	285.57	2.224		
20,100.00	12,408.63	20,158.70	12,416.57	145.39	143.76	-90.80	-7,856.83	615.71	636.10	346.95	289.15	2.200		
20,200.00	12,408.17	20,258.69	12,416.11	147.18	145.55	-90.80	-7,956.82	616.51	637.15	344.41	292.73	2.177		
20,300.00	12,407.70	20,358.69	12,415.65	148.98	147.34	-90.80	-8,056.81	617.30	638.20	341.88	296.32	2.154		
20,400.00	12,407.24	20,458.68	12,415.19	150.77	149.13	-90.80	-8,156.80	618.09	639.25	339.34	299.90	2.132		
20,500.00	12,406.77	20,558.68	12,414.72	152.57	150.92	-90.80	-8,256.79	618.88	640.30	336.81	303.49	2.110		
20,600.00	12,406.31	20,658.67	12,414.26	154.36	152.72	-90.80	-8,356.78	619.67	641.35	334.27	307.08	2.089		
20,700.00	12,405.84	20,758.66	12,413.80	156.16	154.51	-90.80	-8,456.77	620.46	642.39	331.72	310.67	2.068		
20,800.00	12,405.38	20,858.66	12,413.34	157.96	156.31	-90.80	-8,556.76	621.25	643.44	329.18	314.26	2.047		
20,900.00	12,404.91	20,958.65	12,412.87	159.75	158.10	-90.79	-8,656.75	622.04	644.49	326.64	317.86	2.028		
21,000.00	12,404.44	21,058.65	12,412.41	161.55	159.90	-90.79	-8,756.74	622.84	645.54	324.09	321.45	2.008		
21,100.00	12,403.98	21,158.64	12,411.95	163.35	161.70	-90.79	-8,856.73	623.63	646.59	321.55	325.05	1.989		
21,200.00	12,403.51	21,258.64	12,411.49	165.15	163.49	-90.79	-8,956.72	624.42	647.64	319.00	328.64	1.971		
21,300.00	12,403.05	21,358.63	12,411.02	166.95	165.29	-90.79	-9,056.71	625.21	648.69	316.45	332.24	1.952		
21,400.00	12,402.58	21,458.63	12,410.56	168.75	167.09	-90.79	-9,156.70	626.00	649.74	313.90	335.84	1.935		
21,500.00	12,402.12	21,558.62	12,410.10	170.55	168.89	-90.79	-9,256.69	626.79	650.79	311.35	339.44	1.917		
21,600.00	12,401.65	21,658.61	12,409.64	172.35	170.69	-90.79	-9,356.68	627.58	651.84	308.80	343.04	1.900		
21,700.00	12,401.19	21,758.61	12,409.17	174.15	172.49	-90.79	-9,456.68	628.37	652.89	306.24	346.65	1.883		
21,800.00	12,400.72	21,858.60	12,408.71	175.96	174.29	-90.78	-9,556.67	629.17	653.94	303.69	350.25	1.867		
21,900.00	12,400.26	21,958.60	12,408.25	177.76	176.10	-90.78	-9,656.66	629.96	654.99	301.13	353.86	1.851		
22,000.00	12,399.79	22,058.59	12,407.78	179.56	177.90	-90.78	-9,756.65	630.75	656.04	298.57	357.46	1.835		
22,100.00	12,399.32	22,158.59	12,407.32	181.37	179.70	-90.78	-9,856.64	631.54	657.09	296.02	361.07	1.820		
22,200.00	12,398.86	22,258.58	12,406.86	183.17	181.51	-90.78	-9,956.63	632.33	658.14	293.46	364.68	1.805		
22,300.00	12,398.39	22,358.58	12,406.40	184.98	183.31	-90.78	-10,056.62	633.12	659.19	290.90	368.29	1.790		
22,384.53	12,398.00	22,443.10	12,406.01	186.50	184.84	-90.78	-10,141.14	633.79	660.07	288.74	371.34	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 24H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 24H	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												Offset Site Error:	0.00 ft
Sec. 34, T 25 S. , R 33 E - Columbus Fee 2H - Wellbore #1 - Wellbore #1												Offset Well Error:	0.00 ft
Survey Program: 100-VESSI_GYROFLEX, 8769-MWD													
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	-90.39	-0.70	-102.90	102.90				
100.00	100.00	100.74	100.74	0.08	0.08	-90.23	-0.42	-102.54	102.54	102.38	0.16	637.445	
200.00	200.00	200.91	200.90	0.31	0.25	-89.95	0.09	-101.73	101.74	101.18	0.56	182.933	
300.00	300.00	301.30	301.28	0.53	0.43	-89.68	0.56	-100.65	100.66	99.70	0.96	105.079	
400.00	400.00	401.49	401.47	0.76	0.60	-89.58	0.73	-99.26	99.28	97.92	1.36	72.968	
500.00	500.00	501.49	501.46	0.98	0.78	-89.65	0.59	-97.78	97.79	96.03	1.76	55.487	
600.00	600.00	601.20	601.15	1.21	0.96	-89.70	0.50	-96.44	96.44	94.28	2.16	44.567	
700.00	700.00	700.57	700.52	1.43	1.13	-89.78	0.37	-95.58	95.58	93.01	2.56	37.263	
800.00	800.00	801.07	801.02	1.66	1.31	-89.82	0.30	-94.76	94.76	91.79	2.97	31.927	
900.00	900.00	900.78	900.72	1.88	1.49	-89.89	0.19	-93.84	93.84	90.47	3.37	27.847	
1,000.00	1,000.00	1,001.04	1,000.98	2.11	1.67	-89.93	0.11	-92.93	92.94	89.16	3.77	24.633	
1,100.00	1,100.00	1,101.93	1,101.85	2.33	1.85	-89.73	0.43	-91.37	91.39	87.22	4.18	21.879	
1,200.00	1,200.00	1,202.57	1,202.46	2.56	2.03	-89.33	1.04	-88.95	88.99	84.41	4.58	19.425	
1,300.00	1,300.00	1,302.83	1,302.68	2.78	2.20	-88.99	1.52	-85.98	86.04	81.05	4.98	17.261	
1,400.00	1,400.00	1,402.40	1,402.21	3.01	2.38	-88.82	1.72	-83.09	83.14	77.75	5.39	15.434	
1,500.00	1,500.00	1,501.20	1,500.99	3.23	2.56	-88.36	2.32	-81.16	81.20	75.41	5.79	14.032	
1,600.00	1,600.00	1,600.62	1,600.40	3.45	2.73	-87.63	3.32	-80.27	80.34	74.16	6.19	12.987	
1,700.00	1,700.00	1,700.33	1,700.10	3.68	2.91	-86.73	4.56	-79.90	80.03	73.44	6.59	12.153	
1,716.53	1,716.53	1,716.78	1,716.54	3.72	2.93	-86.55	4.81	-79.87	80.02	73.37	6.65	12.031	
1,800.00	1,800.00	1,800.00	1,799.75	3.90	3.08	-85.51	6.28	-80.00	80.25	73.26	6.98	11.493	
1,900.00	1,900.00	1,899.87	1,899.60	4.13	3.25	-84.12	8.28	-80.35	80.78	73.40	7.38	10.946	
2,000.00	2,000.00	1,999.38	1,999.10	4.35	3.42	-83.06	9.85	-80.98	81.59	73.81	7.78	10.493	
2,100.00	2,100.00	2,099.41	2,099.12	4.58	3.59	-82.49	10.81	-81.96	82.68	74.51	8.17	10.118	
2,200.00	2,200.00	2,199.22	2,198.92	4.80	3.76	-81.94	11.75	-83.02	83.85	75.29	8.57	9.789	
2,300.00	2,300.00	2,299.14	2,298.82	5.03	3.93	-81.39	12.75	-84.22	85.19	76.23	8.96	9.505	
2,400.00	2,400.00	2,398.80	2,398.47	5.25	4.11	-80.75	13.95	-85.62	86.76	77.40	9.36	9.270	
2,500.00	2,500.00	2,499.15	2,498.79	5.48	4.28	-79.75	15.71	-86.92	88.33	78.57	9.76	9.052	
2,600.00	2,600.00	2,599.24	2,598.86	5.70	4.46	-78.47	17.92	-87.83	89.65	79.49	10.16	8.826	
2,700.00	2,700.00	2,699.51	2,699.09	5.93	4.63	-77.07	20.32	-88.48	90.78	80.23	10.56	8.598	
2,800.00	2,800.00	2,799.44	2,799.01	6.15	4.81	-76.02	22.18	-89.10	91.83	80.87	10.96	8.379	
2,900.00	2,900.00	2,900.05	2,899.61	6.38	4.98	-75.73	22.82	-89.73	92.58	81.23	11.36	8.152	
3,000.00	3,000.00	3,000.31	2,999.87	6.60	5.15	-75.89	22.64	-90.06	92.87	81.11	11.75	7.901	
3,100.00	3,100.00	3,100.80	3,100.36	6.83	5.32	-76.05	22.35	-90.01	92.74	80.59	12.15	7.633	
3,200.00	3,200.00	3,201.33	3,200.89	7.05	5.50	-76.18	21.99	-89.40	92.07	79.52	12.55	7.336	
3,300.00	3,300.00	3,302.62	3,302.16	7.28	5.68	-76.26	21.47	-87.76	90.38	77.42	12.95	6.978	
3,400.00	3,400.00	3,402.65	3,402.16	7.50	5.85	-76.01	21.25	-85.30	87.93	74.58	13.35	6.585	
3,500.00	3,500.00	3,501.46	3,500.95	7.73	6.03	-75.62	21.40	-83.45	86.16	72.41	13.75	6.265	
3,600.00	3,600.00	3,600.91	3,600.40	7.95	6.20	-75.27	21.71	-82.57	85.38	71.23	14.15	6.033	
3,700.00	3,700.00	3,701.23	3,700.72	8.17	6.38	-74.88	22.10	-81.78	84.72	70.17	14.55	5.821	
3,800.00	3,800.00	3,801.36	3,800.84	8.40	6.56	-74.39	22.55	-80.70	83.80	68.84	14.96	5.603	
3,900.00	3,900.00	3,901.99	3,901.45	8.62	6.73	-73.66	23.18	-79.06	82.40	67.04	15.36	5.365	
4,000.00	4,000.00	4,001.53	4,000.97	8.85	6.91	-72.88	23.82	-77.32	80.92	65.16	15.76	5.134	
4,100.00	4,100.00	4,100.60	4,100.04	9.07	7.09	-72.24	24.49	-76.47	80.30	64.14	16.16	4.969	
4,200.00	4,200.00	4,200.69	4,200.12	9.30	7.26	-71.63	25.28	-76.11	80.20	63.64	16.56	4.842	
4,300.00	4,300.00	4,301.34	4,300.77	9.52	7.44	-70.80	26.19	-75.21	79.64	62.68	16.96	4.694	
4,400.00	4,400.00	4,402.26	4,401.67	9.75	7.62	-69.76	27.00	-73.25	78.08	60.71	17.37	4.496	
4,500.00	4,500.00	4,502.66	4,502.03	9.97	7.80	-68.92	27.21	-70.59	75.68	57.91	17.77	4.259	
4,600.00	4,600.00	4,603.00	4,602.32	10.20	7.97	-68.61	26.51	-67.68	72.72	54.55	18.17	4.002	
4,700.00	4,700.00	4,702.23	4,701.51	10.42	8.15	-69.07	25.01	-65.41	70.04	51.47	18.57	3.772	
4,800.00	4,800.00	4,801.58	4,800.83	10.65	8.32	-70.59	22.71	-64.47	68.36	49.39	18.97	3.604	
4,900.00	4,900.00	4,901.64	4,900.86	10.87	8.49	-72.46	20.22	-63.99	67.11	47.75	19.36	3.466	
5,000.00	5,000.00	5,001.44	5,000.63	11.10	8.66	-74.17	18.00	-63.49	66.00	46.24	19.76	3.340	

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 24H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 24H	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		
5,100.00	5,100.00	5,101.32	5,100.49	11.32	8.84	-76.03	15.72	-63.21	65.14	44.98	20.16	3.232		
5,200.00	5,200.00	5,201.26	5,200.40	11.55	9.01	-77.96	13.45	-63.04	64.46	43.90	20.55	3.136		
5,300.00	5,300.00	5,301.16	5,300.27	11.77	9.18	-79.86	11.25	-62.93	63.93	42.98	20.95	3.051		
5,400.00	5,400.00	5,401.01	5,400.10	12.00	9.35	-81.77	9.11	-62.98	63.64	42.29	21.35	2.981		
5,500.00	5,500.00	5,501.10	5,500.17	12.22	9.53	-83.43	7.25	-63.01	63.42	41.68	21.75	2.917		
5,600.00	5,600.00	5,601.27	5,600.34	12.45	9.70	-84.56	5.97	-62.74	63.02	40.88	22.15	2.846		
5,700.00	5,700.00	5,701.51	5,700.56	12.67	9.87	-85.72	4.65	-62.12	62.30	39.75	22.54	2.763		
5,800.00	5,800.00	5,801.47	5,800.51	12.89	10.05	-86.98	3.23	-61.35	61.43	38.49	22.94	2.678		
5,900.00	5,900.00	5,901.47	5,900.50	13.12	10.22	-88.04	2.08	-60.57	60.61	37.26	23.34	2.596		
6,000.00	6,000.00	6,001.53	6,000.55	13.34	10.40	-89.23	0.80	-59.72	59.72	35.98	23.74	2.515		
6,100.00	6,100.00	6,101.19	6,100.20	13.57	10.57	-90.55	-0.57	-59.09	59.10	34.95	24.14	2.448		
6,200.00	6,200.00	6,201.05	6,200.05	13.79	10.75	-91.84	-1.90	-58.86	58.89	34.34	24.54	2.399		
6,300.00	6,300.00	6,301.06	6,300.05	14.02	10.92	-93.08	-3.16	-58.72	58.80	33.86	24.94	2.358		
6,400.00	6,400.00	6,401.18	6,400.17	14.24	11.10	-94.05	-4.14	-58.47	58.61	33.27	25.34	2.313		
6,448.95	6,448.95	6,449.96	6,448.95	14.35	11.18	-94.41	-4.50	-58.37	58.54	33.01	25.54	2.293 CC		
6,500.00	6,500.00	6,500.84	6,499.83	14.47	11.27	-94.75	-4.86	-58.42	58.62	32.88	25.74	2.277		
6,600.00	6,600.00	6,601.04	6,600.02	14.69	11.45	-95.29	-5.42	-58.50	58.75	32.61	26.14	2.248		
6,700.00	6,700.00	6,701.13	6,700.11	14.92	11.62	-95.81	-5.93	-58.34	58.64	32.10	26.54	2.210		
6,773.72	6,773.72	6,774.74	6,773.72	15.08	11.75	-96.25	-6.37	-58.23	58.57	31.74	26.83	2.183		
6,800.00	6,800.00	6,800.98	6,799.96	15.14	11.80	-96.40	-6.53	-58.22	58.58	31.64	26.94	2.175		
6,900.00	6,900.00	6,900.71	6,899.69	15.37	11.97	-97.04	-7.22	-58.44	58.88	31.55	27.34	2.154 ES		
7,000.00	7,000.00	7,000.84	6,999.81	15.59	12.14	-97.78	-8.03	-58.76	59.31	31.57	27.73	2.138		
7,100.00	7,100.00	7,100.68	7,099.64	15.82	12.32	-98.68	-9.02	-59.08	59.77	31.63	28.13	2.124		
7,200.00	7,200.00	7,200.79	7,199.75	16.04	12.49	-99.67	-10.12	-59.41	60.27	31.74	28.53	2.112		
7,300.00	7,300.00	7,300.50	7,299.45	16.27	12.66	-100.50	-11.10	-59.91	60.93	32.00	28.93	2.106		
7,400.00	7,400.00	7,400.55	7,399.50	16.49	12.84	-101.37	-12.18	-60.57	61.79	32.46	29.33	2.107		
7,500.00	7,500.00	7,500.00	7,498.93	16.72	13.01	-102.24	-13.36	-61.54	62.98	33.26	29.73	2.119		
7,600.00	7,600.00	7,599.89	7,598.80	16.94	13.18	-103.20	-14.78	-62.97	64.70	34.57	30.12	2.148		
7,700.00	7,700.00	7,700.06	7,698.95	17.17	13.36	-104.22	-16.32	-64.37	66.42	35.89	30.52	2.176		
7,800.00	7,800.00	7,800.56	7,799.44	17.39	13.53	-104.70	-17.16	-65.41	67.62	36.70	30.92	2.187		
7,900.00	7,900.00	7,900.91	7,899.79	17.61	13.71	-104.80	-17.42	-65.93	68.19	36.87	31.32	2.177		
8,000.00	8,000.00	8,000.96	7,999.84	17.84	13.88	-105.13	-17.87	-66.10	68.47	36.75	31.72	2.159		
8,100.00	8,100.00	8,101.38	8,100.26	18.06	14.06	-105.76	-18.57	-65.81	68.39	36.27	32.12	2.129		
8,200.00	8,200.00	8,201.14	8,200.02	18.29	14.23	-106.42	-19.28	-65.41	68.19	35.67	32.52	2.097		
8,300.00	8,300.00	8,301.32	8,300.19	18.51	14.41	-106.97	-19.85	-65.08	68.04	35.11	32.92	2.067		
8,400.00	8,400.00	8,401.31	8,400.18	18.74	14.59	-107.48	-20.35	-64.64	67.77	34.44	33.32	2.034		
8,500.00	8,500.00	8,501.31	8,500.18	18.96	14.76	-107.85	-20.69	-64.25	67.50	33.78	33.73	2.002		
8,583.81	8,583.81	8,584.95	8,583.81	19.15	14.91	-108.02	-20.85	-64.08	67.39	33.33	34.06	1.979		
8,600.00	8,600.00	8,601.11	8,599.97	19.19	14.94	-108.05	-20.89	-64.08	67.39	33.27	34.13	1.975		
8,692.31	8,692.31	8,693.44	8,692.31	19.40	15.06	-108.41	-21.26	-63.88	67.32	32.87	34.46	1.954		
8,700.00	8,700.00	8,701.11	8,699.98	19.41	15.07	-108.50	-21.36	-63.85	67.33	32.84	34.48	1.952 SF		
8,800.00	8,800.00	8,800.00	8,798.76	19.64	15.13	-111.60	-25.01	-63.16	67.94	33.18	34.77	1.954		
8,900.00	8,900.00	8,890.89	8,887.55	19.86	15.15	-125.30	-43.76	-61.81	76.75	41.74	35.01	2.192		
9,000.00	9,000.00	8,975.03	8,965.94	20.09	15.17	-140.58	-74.15	-60.95	101.85	66.59	35.26	2.888		
9,100.00	9,100.00	9,051.00	9,032.35	20.31	15.23	-151.45	-110.87	-60.33	143.20	107.67	35.54	4.029		
9,200.00	9,200.00	9,110.88	9,080.65	20.54	15.31	-157.62	-146.23	-60.21	198.12	162.27	35.85	5.526		
9,300.00	9,300.00	9,165.03	9,120.94	20.76	15.43	-161.29	-182.35	-61.76	262.92	226.74	36.19	7.265		
9,400.00	9,400.00	9,218.46	9,158.45	20.99	15.58	-163.72	-220.29	-64.34	333.19	296.62	36.56	9.112		
9,500.00	9,500.00	9,258.28	9,184.49	21.21	15.72	-165.45	-250.39	-65.01	408.00	371.08	36.93	11.048		
9,600.00	9,600.00	9,285.00	9,200.36	21.44	15.82	-166.72	-271.87	-64.18	487.59	450.34	37.26	13.087		
9,700.00	9,700.00	9,316.30	9,217.36	21.66	15.97	-168.16	-298.10	-62.52	570.71	533.08	37.63	15.165		
9,800.00	9,800.00	9,332.00	9,225.32	21.89	16.05	-168.81	-311.59	-61.65	656.61	618.68	37.93	17.310		

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 24H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 24H	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)	Offset Wellbore Centre ±E-W (ft)						
9,900.00	9,900.00	9,363.22	9,240.11	22.11	16.23	-170.00	-339.02	-59.79	744.29	705.95	38.34	19.414		
10,000.00	10,000.00	9,379.00	9,247.06	22.34	16.32	-170.55	-353.15	-58.77	833.72	795.07	38.65	21.569		
10,100.00	10,100.00	9,404.17	9,257.55	22.56	16.48	-171.32	-375.99	-57.40	924.33	885.29	39.04	23.676		
10,200.00	10,200.00	9,425.00	9,265.77	22.78	16.62	-171.83	-395.12	-56.69	1,015.93	976.53	39.40	25.785		
10,300.00	10,300.00	9,425.00	9,265.77	23.01	16.62	-171.83	-395.12	-56.69	1,108.59	1,068.96	39.62	27.977		
10,400.00	10,400.00	9,444.43	9,272.84	23.23	16.76	-172.24	-413.20	-56.28	1,201.83	1,161.84	39.99	30.053		
10,500.00	10,500.00	9,453.11	9,275.74	23.46	16.82	-172.41	-421.39	-56.13	1,295.97	1,255.69	40.28	32.175		
10,600.00	10,600.00	9,472.00	9,281.49	23.68	16.96	-172.75	-439.38	-55.89	1,390.92	1,350.27	40.64	34.223		
10,700.00	10,700.00	9,472.00	9,281.49	23.91	16.96	-172.75	-439.38	-55.89	1,486.05	1,445.18	40.87	36.363		
10,800.00	10,800.00	9,472.00	9,281.49	24.13	16.96	-172.75	-439.38	-55.89	1,581.79	1,540.70	41.09	38.494		
10,900.00	10,900.00	9,472.00	9,281.49	24.36	16.96	-172.75	-439.38	-55.89	1,678.02	1,636.70	41.32	40.614		
11,000.00	11,000.00	9,472.00	9,281.49	24.58	16.96	-172.75	-439.38	-55.89	1,774.67	1,733.13	41.54	42.721		
11,100.00	11,100.00	9,472.00	9,281.49	24.81	16.96	-172.75	-439.38	-55.89	1,871.67	1,829.91	41.77	44.813		
11,200.00	11,200.00	9,472.00	9,281.49	25.03	16.96	-172.75	-439.38	-55.89	1,968.97	1,926.98	41.99	46.891		
11,300.00	11,300.00	9,492.08	9,286.57	25.26	17.13	-173.07	-458.80	-55.76	2,065.79	2,023.41	42.38	48.741		
11,400.00	11,400.00	9,494.89	9,287.19	25.48	17.15	-173.11	-461.54	-55.76	2,163.36	2,120.73	42.63	50.746		
11,500.00	11,500.00	9,497.49	9,287.73	25.71	17.17	-173.15	-464.08	-55.75	2,261.11	2,218.23	42.88	52.735		
11,600.00	11,600.00	9,518.00	9,291.28	25.93	17.34	-173.43	-484.28	-55.82	2,359.62	2,316.35	43.27	54.529		
11,700.00	11,700.00	9,518.00	9,291.28	26.16	17.34	-173.43	-484.28	-55.82	2,457.55	2,414.06	43.50	56.499		
11,800.00	11,800.00	9,518.00	9,291.28	26.38	17.34	-173.43	-484.28	-55.82	2,555.64	2,511.92	43.72	58.452		
11,900.00	11,900.00	9,518.00	9,291.28	26.61	17.34	-173.43	-484.28	-55.82	2,653.88	2,609.93	43.95	60.388		
12,000.00	11,999.97	9,518.00	9,291.28	26.81	17.34	4.61	-484.28	-55.82	2,751.99	2,707.83	44.15	62.326		
12,100.00	12,098.23	9,518.00	9,291.28	26.98	17.34	2.55	-484.28	-55.82	2,845.83	2,801.51	44.32	64.208		
12,200.00	12,190.69	9,518.00	9,291.28	27.14	17.34	1.79	-484.28	-55.82	2,931.34	2,886.86	44.48	65.899		
12,300.00	12,273.31	9,518.00	9,291.28	27.29	17.34	1.42	-484.28	-55.82	3,005.64	2,961.00	44.63	67.342		
12,400.00	12,342.48	9,518.00	9,291.28	27.50	17.34	1.21	-484.28	-55.82	3,066.40	3,021.56	44.84	68.382		
12,500.00	12,395.17	9,557.86	9,295.73	27.78	17.72	1.09	-523.88	-56.44	3,110.39	3,064.90	45.49	68.368		
12,600.00	12,429.09	9,610.00	9,298.01	28.14	18.21	1.05	-575.92	-58.31	3,138.83	3,092.48	46.35	67.722		
12,700.00	12,442.75	9,610.00	9,298.01	28.60	18.21	1.03	-575.92	-58.31	3,147.32	3,100.52	46.80	67.247		
12,800.00	12,442.61	9,610.00	9,298.01	29.14	18.21	1.04	-575.92	-58.31	3,145.14	3,097.80	47.35	66.428		
12,900.00	12,442.15	9,718.80	9,298.80	29.79	19.26	1.13	-684.60	-63.54	3,144.04	3,095.00	49.04	64.107		
13,000.00	12,441.68	9,806.99	9,299.37	30.53	20.20	1.20	-772.67	-67.95	3,143.03	3,092.30	50.73	61.960		
13,100.00	12,441.22	9,891.00	9,299.48	31.36	21.22	1.28	-856.56	-72.52	3,142.52	3,089.95	52.58	59.768		
13,200.00	12,440.75	9,984.00	9,299.24	32.27	22.37	1.37	-949.43	-77.39	3,142.43	3,087.79	54.64	57.513		
13,202.32	12,440.74	9,984.00	9,299.24	32.30	22.37	1.37	-949.43	-77.39	3,142.43	3,087.77	54.66	57.489		
13,300.00	12,440.29	10,033.21	9,298.68	33.26	23.00	1.40	-998.59	-79.51	3,143.18	3,086.92	56.26	55.868		
13,400.00	12,439.82	10,077.00	9,297.54	34.32	23.56	1.43	-1,042.34	-81.04	3,145.53	3,087.65	57.88	54.345		
13,500.00	12,439.36	10,170.00	9,293.97	35.44	24.87	1.48	-1,135.22	-84.04	3,148.98	3,088.68	60.30	52.221		
13,600.00	12,438.89	10,229.38	9,291.11	36.61	25.72	1.50	-1,194.50	-85.78	3,153.30	3,090.97	62.33	50.590		
13,700.00	12,438.42	10,486.58	9,282.55	37.84	29.33	1.40	-1,451.38	-80.87	3,156.83	3,089.67	67.16	47.002		
13,800.00	12,437.96	10,701.01	9,285.47	39.11	32.41	1.18	-1,665.45	-69.31	3,154.86	3,083.34	71.52	44.113		
13,900.00	12,437.49	10,769.67	9,287.23	40.43	33.45	1.08	-1,733.88	-63.99	3,151.65	3,077.77	73.88	42.658		
14,000.00	12,437.03	10,939.78	9,292.10	41.78	36.07	0.88	-1,903.57	-53.43	3,148.50	3,070.65	77.85	40.443		
14,100.00	12,436.56	11,028.70	9,296.04	43.17	37.47	0.85	-1,992.38	-52.00	3,143.58	3,062.94	80.64	38.982		
14,200.00	12,436.10	11,088.35	9,298.19	44.59	38.44	0.84	-2,051.99	-51.10	3,139.54	3,056.50	83.03	37.810		
14,300.00	12,435.63	11,154.27	9,299.55	46.04	39.52	0.82	-2,117.88	-50.24	3,136.90	3,051.34	85.56	36.663		
14,400.00	12,435.17	11,259.17	9,301.87	47.52	41.19	0.78	-2,222.74	-48.44	3,134.18	3,045.47	88.71	35.331		
14,500.00	12,434.70	11,324.00	9,302.61	49.02	42.23	0.75	-2,287.56	-47.12	3,132.47	3,041.22	91.25	34.329		
14,600.00	12,434.24	11,534.56	9,306.46	50.54	45.62	0.73	-2,498.04	-46.24	3,131.00	3,034.84	96.15	32.562		
14,700.00	12,433.77	11,604.00	9,308.94	52.08	46.74	0.74	-2,567.43	-46.78	3,126.88	3,028.06	98.81	31.644		
14,800.00	12,433.30	11,680.83	9,311.03	53.63	48.03	0.75	-2,644.23	-47.59	3,123.63	3,021.96	101.67	30.724		
14,900.00	12,432.84	11,698.00	9,311.48	55.21	48.32	0.75	-2,661.40	-47.77	3,121.63	3,018.10	103.53	30.152		

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 24H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 24H	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	12,432.37	11,791.00	9,311.48	56.80	49.90	0.77	-2,754.37	-49.15	3,121.19	3,014.49	106.69	29.254		
15,007.12	12,432.34	11,791.00	9,311.48	56.91	49.90	0.77	-2,754.37	-49.15	3,121.18	3,014.37	106.81	29.222		
15,100.00	12,431.91	11,824.00	9,310.66	58.40	50.44	0.78	-2,787.36	-49.64	3,122.43	3,013.58	108.84	28.687		
15,200.00	12,431.44	12,015.57	9,310.14	60.02	53.56	0.74	-2,978.89	-47.98	3,121.61	3,008.03	113.58	27.484		
15,236.51	12,431.27	12,029.39	9,310.16	60.61	53.79	0.73	-2,992.71	-47.73	3,121.38	3,006.97	114.40	27.284		
15,300.00	12,430.98	12,072.00	9,309.59	61.64	54.50	0.72	-3,035.31	-47.03	3,121.74	3,005.60	116.14	26.879		
15,400.00	12,430.51	12,144.82	9,308.06	63.28	55.72	0.68	-3,108.08	-45.29	3,123.13	3,004.13	119.00	26.244		
15,500.00	12,430.05	12,325.78	9,308.53	64.93	58.71	0.53	-3,288.88	-37.63	3,121.77	2,998.13	123.64	25.249		
15,600.00	12,429.58	12,435.86	9,309.40	66.59	60.55	0.43	-3,398.82	-32.33	3,120.49	2,993.35	127.14	24.544		
15,700.00	12,429.12	12,528.02	9,310.40	68.25	62.07	0.36	-3,490.91	-28.87	3,118.92	2,988.59	130.32	23.932		
15,800.00	12,428.65	12,673.05	9,313.50	69.93	64.48	0.34	-3,635.90	-27.92	3,116.09	2,981.69	134.40	23.185		
15,900.00	12,428.18	12,726.00	9,314.49	71.61	65.36	0.35	-3,688.83	-28.37	3,113.86	2,976.89	136.97	22.734		
15,993.62	12,427.75	12,778.12	9,314.74	73.19	66.26	0.35	-3,740.95	-28.86	3,113.10	2,973.66	139.45	22.325		
16,000.00	12,427.72	12,781.15	9,314.72	73.30	66.31	0.35	-3,743.97	-28.89	3,113.11	2,973.50	139.61	22.299		
16,100.00	12,427.25	12,857.01	9,313.63	74.99	67.60	0.36	-3,819.83	-29.35	3,113.97	2,971.38	142.59	21.838		
16,200.00	12,426.79	12,956.79	9,312.69	76.69	69.28	0.35	-3,919.60	-29.23	3,114.44	2,968.47	145.97	21.336		
16,300.00	12,426.32	13,095.46	9,310.74	78.40	71.60	0.37	-4,058.25	-30.77	3,115.65	2,965.65	150.00	20.771		
16,400.00	12,425.86	13,381.00	9,320.38	80.11	76.30	0.41	-4,343.51	-33.51	3,110.87	2,954.46	156.41	19.889		
16,500.00	12,425.39	13,433.16	9,323.14	81.83	77.19	0.43	-4,395.59	-34.59	3,105.22	2,946.21	159.01	19.528		
16,600.00	12,424.93	13,474.00	9,324.60	83.55	77.88	0.45	-4,436.39	-35.78	3,101.32	2,939.89	161.43	19.212		
16,700.00	12,424.46	13,546.98	9,326.19	85.27	79.13	0.49	-4,509.31	-38.25	3,098.75	2,934.35	164.41	18.848		
16,800.00	12,424.00	13,597.60	9,326.65	87.00	80.00	0.52	-4,559.89	-40.07	3,097.48	2,930.47	167.01	18.547		
16,816.35	12,423.92	13,604.80	9,326.63	87.28	80.13	0.53	-4,567.09	-40.36	3,097.44	2,930.02	167.41	18.502		
16,900.00	12,423.53	13,661.00	9,325.81	88.73	81.09	0.57	-4,623.22	-42.80	3,098.12	2,928.29	169.83	18.243		
17,000.00	12,423.06	13,871.02	9,325.81	90.47	84.64	0.60	-4,833.15	-45.11	3,098.25	2,923.14	175.11	17.693		
17,100.00	12,422.60	13,941.00	9,326.85	92.21	85.84	0.57	-4,903.09	-43.32	3,096.18	2,918.13	178.05	17.390		
17,200.00	12,422.13	13,988.84	9,326.92	93.96	86.67	0.54	-4,950.91	-42.05	3,095.37	2,914.74	180.62	17.137		
17,208.60	12,422.09	13,993.90	9,326.90	94.11	86.76	0.54	-4,955.98	-41.91	3,095.36	2,914.50	180.86	17.114		
17,300.00	12,421.67	14,034.00	9,326.52	95.70	87.45	0.52	-4,996.06	-40.80	3,095.97	2,912.81	183.16	16.903		
17,400.00	12,421.20	14,097.89	9,325.02	97.45	88.57	0.48	-5,059.90	-38.98	3,097.97	2,911.95	186.02	16.654		
17,500.00	12,420.74	14,179.71	9,321.80	99.20	89.98	0.43	-5,141.62	-36.69	3,101.36	2,912.18	189.18	16.394		
17,600.00	12,420.27	14,283.15	9,317.92	100.96	91.73	0.38	-5,244.96	-34.31	3,104.62	2,911.93	192.69	16.112		
17,700.00	12,419.81	14,560.80	9,316.40	102.72	96.39	0.35	-5,522.51	-33.12	3,104.06	2,904.95	199.11	15.590		
17,800.00	12,419.34	14,712.79	9,320.54	104.47	98.98	0.31	-5,674.43	-31.44	3,100.90	2,897.44	203.46	15.241		
17,900.00	12,418.87	14,783.00	9,322.66	106.24	100.19	0.28	-5,744.58	-29.72	3,097.35	2,890.93	206.42	15.005		
18,000.00	12,418.41	14,836.47	9,323.62	108.00	101.12	0.24	-5,798.01	-28.15	3,095.03	2,885.91	209.12	14.800		
18,091.10	12,417.99	14,877.00	9,323.89	109.61	101.83	0.21	-5,838.52	-26.61	3,094.15	2,882.71	211.43	14.634		
18,100.00	12,417.94	14,877.00	9,323.89	109.77	101.83	0.21	-5,838.52	-26.61	3,094.16	2,882.57	211.59	14.623		
18,200.00	12,417.48	14,970.00	9,323.16	111.53	103.45	0.12	-5,931.39	-21.90	3,094.47	2,879.49	214.98	14.394		
18,300.00	12,417.01	15,114.67	9,324.35	113.30	105.92	-0.02	-6,075.87	-14.70	3,092.69	2,873.47	219.23	14.107		
18,354.85	12,416.76	15,158.00	9,324.15	114.28	106.66	-0.04	-6,119.18	-13.79	3,092.61	2,871.67	220.94	13.998		
18,400.00	12,416.55	15,158.00	9,324.15	115.08	106.66	-0.04	-6,119.18	-13.79	3,092.70	2,870.96	221.74	13.948		
18,500.00	12,416.08	15,208.30	9,323.05	116.85	107.54	-0.05	-6,169.47	-13.12	3,094.42	2,870.03	224.39	13.791		
18,600.00	12,415.62	15,505.36	9,324.48	118.62	112.57	-0.03	-6,466.35	-14.95	3,092.91	2,861.71	231.20	13.378		
18,700.00	12,415.15	15,586.44	9,326.89	120.40	113.96	-0.01	-6,547.38	-16.60	3,089.45	2,855.09	234.36	13.182		
18,800.00	12,414.69	15,627.00	9,327.98	122.18	114.66	0.00	-6,587.92	-17.13	3,086.82	2,849.98	236.84	13.033		
18,900.00	12,414.22	15,720.00	9,328.71	123.96	116.27	0.02	-6,680.91	-18.11	3,085.57	2,845.34	240.23	12.844		
18,933.43	12,414.06	15,720.00	9,328.71	124.55	116.27	0.02	-6,680.91	-18.11	3,085.39	2,844.57	240.82	12.812		
19,000.00	12,413.75	15,746.84	9,328.33	125.74	116.74	0.02	-6,707.74	-18.48	3,085.90	2,843.42	242.47	12.727		
19,100.00	12,413.29	15,813.00	9,326.60	127.52	117.88	0.05	-6,773.85	-20.13	3,087.95	2,842.55	245.40	12.583		
19,200.00	12,412.82	16,042.68	9,326.28	129.30	121.77	0.09	-7,003.45	-22.95	3,086.83	2,835.76	251.07	12.295		
19,300.00	12,412.36	16,215.69	9,329.55	131.08	124.73	0.04	-7,176.40	-20.58	3,084.94	2,829.12	255.82	12.059		

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 24H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 24H	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
19,400.00	12,411.89	16,282.00	9,331.76	132.87	125.86	0.03	-7,242.67	-20.26	3,081.19	2,822.46	258.73	11.909	
19,500.00	12,411.43	16,347.56	9,333.23	134.65	127.01	0.02	-7,308.21	-20.11	3,078.55	2,816.89	261.66	11.765	
19,600.00	12,410.96	16,405.73	9,333.72	136.44	128.02	0.02	-7,366.37	-19.88	3,077.25	2,812.78	264.46	11.636	
19,643.27	12,410.76	16,430.44	9,333.68	137.22	128.45	0.01	-7,391.08	-19.71	3,077.11	2,811.44	265.67	11.582	
19,700.00	12,410.50	16,469.00	9,333.32	138.23	129.13	0.00	-7,429.64	-19.37	3,077.34	2,809.98	267.36	11.510	
19,800.00	12,410.03	16,510.38	9,332.43	140.02	129.85	-0.01	-7,471.01	-18.85	3,078.95	2,809.07	269.87	11.409	
19,900.00	12,409.57	16,562.00	9,330.40	141.81	130.76	-0.03	-7,522.58	-17.99	3,082.31	2,809.74	272.57	11.308	
20,000.00	12,409.10	16,652.00	9,325.50	143.60	135.66	-0.06	-7,612.46	-16.70	3,084.01	2,804.76	279.26	11.044	
20,100.00	12,408.63	16,910.94	9,326.11	145.39	136.66	-0.03	-7,671.36	-18.58	3,082.54	2,800.49	282.05	10.929	
20,156.84	12,408.37	16,945.00	9,326.07	146.41	137.24	-0.01	-7,905.41	-19.70	3,082.33	2,798.67	283.65	10.866	
20,200.00	12,408.17	16,945.00	9,326.07	147.18	137.24	-0.01	-7,905.41	-19.70	3,082.61	2,798.19	284.43	10.838	
20,300.00	12,407.70	17,039.00	9,324.27	148.98	138.87	0.05	-7,999.32	-23.23	3,084.07	2,796.22	287.85	10.714	
20,400.00	12,407.24	17,166.16	9,322.51	150.77	141.05	0.08	-8,126.44	-25.11	3,084.94	2,793.11	291.82	10.571	
20,500.00	12,406.77	17,227.00	9,321.15	152.57	142.10	0.08	-8,187.26	-25.29	3,086.53	2,791.86	294.66	10.475	
20,600.00	12,406.31	17,363.89	9,319.34	154.36	144.45	0.03	-8,324.11	-23.33	3,087.20	2,788.38	298.82	10.331	
20,700.00	12,405.84	17,428.11	9,318.02	156.16	145.56	0.00	-8,388.30	-21.77	3,088.69	2,786.97	301.72	10.237	
20,800.00	12,405.38	17,539.47	9,316.18	157.96	147.48	-0.04	-8,499.62	-19.80	3,089.83	2,784.39	305.43	10.116	
20,900.00	12,404.91	17,601.00	9,314.38	159.75	148.53	-0.05	-8,561.12	-19.34	3,092.18	2,783.89	308.29	10.030	
21,000.00	12,404.44	17,847.89	9,314.56	161.55	152.74	-0.11	-8,807.95	-16.80	3,090.23	2,775.94	314.29	9.832	
21,100.00	12,403.98	17,975.00	9,317.01	163.35	154.91	-0.11	-8,935.03	-16.89	3,087.85	2,769.59	318.26	9.702	
21,200.00	12,403.51	18,069.00	9,319.22	165.15	156.52	-0.11	-9,029.00	-17.55	3,085.03	2,763.36	321.67	9.591	
21,300.00	12,403.05	18,115.38	9,319.61	166.95	157.33	-0.10	-9,075.38	-18.03	3,083.48	2,759.20	324.28	9.509	
21,400.00	12,402.58	18,256.00	9,320.45	168.75	159.76	-0.09	-9,215.99	-19.18	3,082.62	2,754.11	328.51	9.384	
21,500.00	12,402.12	18,319.55	9,321.30	170.55	160.84	-0.09	-9,279.53	-19.03	3,080.88	2,749.48	331.39	9.297	
21,569.04	12,401.80	18,351.00	9,321.36	171.79	161.38	-0.10	-9,310.98	-18.68	3,080.51	2,747.33	333.18	9.246	
21,600.00	12,401.65	18,376.20	9,321.23	172.35	161.82	-0.11	-9,336.17	-18.34	3,080.53	2,746.36	334.17	9.218	
21,700.00	12,401.19	18,445.00	9,320.05	174.15	163.03	-0.13	-9,404.96	-17.53	3,081.67	2,744.49	337.18	9.140	
21,800.00	12,400.72	18,701.12	9,323.40	175.96	167.41	-0.27	-9,660.90	-10.64	3,078.95	2,735.58	343.37	8.967	
21,900.00	12,400.26	18,887.36	9,332.68	177.76	170.61	-0.35	-9,846.85	-6.73	3,073.21	2,724.84	348.37	8.822	
22,000.00	12,399.79	18,949.68	9,336.18	179.56	171.69	-0.37	-9,909.06	-5.90	3,067.20	2,715.96	351.25	8.732	
22,100.00	12,399.32	19,008.00	9,338.45	181.37	172.70	-0.37	-9,967.34	-5.76	3,062.76	2,708.69	354.07	8.650	
22,200.00	12,398.86	19,051.21	9,339.43	183.17	173.45	-0.37	-10,010.53	-5.98	3,059.88	2,703.25	356.62	8.580	
22,300.00	12,398.39	19,101.00	9,339.83	184.98	174.32	-0.37	-10,060.32	-6.40	3,058.63	2,699.33	359.30	8.513	
22,331.61	12,398.25	19,119.89	9,339.79	185.55	174.65	-0.36	-10,079.21	-6.61	3,058.56	2,698.36	360.20	8.491	
22,384.53	12,398.00	19,149.93	9,339.53	186.50	175.18	-0.36	-10,109.25	-6.98	3,058.75	2,697.07	361.68	8.457	

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 24H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3353.00ft (Scandrill Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3353.00ft (Scandrill Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 24H	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		Distance							Warning			
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore +N/-S (ft)	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	125.78	-3,107.85	4,313.04	5,316.12							
100.00	100.00	90.93	90.93	0.08	0.11	125.78	-3,107.86	4,313.03	5,316.10	5,315.91	0.19	N/A				
200.00	200.00	191.96	191.96	0.31	0.23	125.78	-3,107.87	4,312.98	5,316.08	5,315.54	0.54	9,895.412				
230.70	230.70	220.70	220.70	0.38	0.27	125.78	-3,107.88	4,312.97	5,316.07	5,315.42	0.65	8,219.709				
300.00	300.00	283.79	283.79	0.53	0.36	125.78	-3,107.86	4,313.02	5,316.11	5,315.21	0.90	5,928.768				
400.00	400.00	374.82	374.82	0.76	0.50	125.77	-3,107.77	4,313.32	5,316.31	5,315.05	1.26	4,228.324				
500.00	500.00	447.95	447.95	0.98	0.62	125.77	-3,107.72	4,313.78	5,316.80	5,315.20	1.60	3,316.436				
600.00	600.00	514.23	514.22	1.21	0.74	125.77	-3,107.93	4,314.53	5,317.91	5,315.97	1.94	2,736.438				
700.00	700.00	600.00	599.98	1.43	0.89	125.76	-3,108.61	4,315.98	5,319.71	5,317.39	2.32	2,295.431				
800.00	800.00	650.79	650.75	1.66	1.01	125.76	-3,109.16	4,317.11	5,322.00	5,319.34	2.66	1,998.756				
900.00	900.00	722.74	722.68	1.88	1.18	125.76	-3,110.01	4,319.05	5,324.88	5,321.82	3.06	1,741.261				
1,000.00	1,000.00	800.00	799.88	2.11	1.36	125.75	-3,111.01	4,321.59	5,328.29	5,324.82	3.47	1,537.243				
1,100.00	1,100.00	894.39	894.20	2.33	1.60	125.74	-3,112.29	4,324.96	5,331.98	5,328.04	3.93	1,356.607				
1,200.00	1,200.00	996.34	996.08	2.56	1.86	125.73	-3,113.68	4,328.55	5,335.63	5,331.21	4.41	1,208.904				
1,300.00	1,300.00	1,113.74	1,113.40	2.78	2.16	125.72	-3,115.23	4,332.46	5,339.10	5,334.16	4.94	1,080.222				
1,400.00	1,400.00	1,237.32	1,236.93	3.01	2.48	125.71	-3,116.74	4,336.12	5,342.23	5,336.74	5.49	973.314				
1,500.00	1,500.00	1,376.15	1,375.71	3.23	2.85	125.70	-3,118.14	4,339.39	5,344.73	5,338.65	6.08	879.567				
1,600.00	1,600.00	1,513.96	1,513.50	3.45	3.21	125.69	-3,119.13	4,341.71	5,346.51	5,339.85	6.66	802.473				
1,700.00	1,700.00	1,643.87	1,643.39	3.68	3.55	125.69	-3,119.66	4,343.11	5,347.62	5,340.39	7.23	739.835				
1,800.00	1,800.00	1,760.90	1,760.42	3.90	3.86	125.69	-3,119.98	4,343.91	5,348.33	5,340.57	7.76	689.196				
1,900.00	1,900.00	1,868.94	1,868.46	4.13	4.14	125.69	-3,120.18	4,344.36	5,348.78	5,340.51	8.27	646.903				
2,000.00	2,000.00	1,972.45	1,971.97	4.35	4.41	125.69	-3,120.31	4,344.74	5,349.15	5,340.39	8.76	610.337				
2,100.00	2,100.00	2,077.97	2,077.49	4.58	4.69	125.68	-3,120.38	4,345.07	5,349.44	5,340.18	9.27	577.331				
2,200.00	2,200.00	2,184.22	2,183.74	4.80	4.97	125.68	-3,120.43	4,345.26	5,349.62	5,339.85	9.77	547.589				
2,300.00	2,300.00	2,285.40	2,284.92	5.03	5.20	125.68	-3,120.40	4,345.41	5,349.72	5,339.49	10.23	522.996				
2,400.00	2,400.00	2,385.70	2,385.21	5.25	5.43	125.68	-3,120.20	4,345.66	5,349.81	5,339.13	10.68	500.876				
2,500.00	2,500.00	2,479.50	2,479.01	5.48	5.63	125.67	-3,119.88	4,346.06	5,349.95	5,338.84	11.10	481.808				
2,600.00	2,600.00	2,572.22	2,571.73	5.70	5.82	125.67	-3,119.46	4,346.66	5,350.22	5,338.70	11.52	464.345				
2,700.00	2,700.00	2,665.04	2,664.55	5.93	6.03	125.66	-3,118.94	4,347.50	5,350.63	5,338.68	11.95	447.661				
2,800.00	2,800.00	2,757.90	2,757.40	6.15	6.24	125.64	-3,118.26	4,348.61	5,351.17	5,338.78	12.39	431.965				
2,900.00	2,900.00	2,859.61	2,859.09	6.38	6.47	125.63	-3,117.33	4,350.07	5,351.80	5,338.96	12.84	416.751				
3,000.00	3,000.00	2,968.65	2,968.12	6.60	6.71	125.61	-3,116.15	4,351.57	5,352.30	5,338.99	13.31	402.109				
3,100.00	3,100.00	3,056.93	3,056.38	6.83	6.91	125.59	-3,115.09	4,352.83	5,352.76	5,339.02	13.74	389.642				
3,200.00	3,200.00	3,136.83	3,136.26	7.05	7.10	125.57	-3,114.07	4,354.36	5,353.58	5,339.43	14.15	378.402				
3,300.00	3,300.00	3,218.54	3,217.94	7.28	7.29	125.55	-3,112.99	4,356.32	5,354.76	5,340.20	14.57	367.636				
3,400.00	3,400.00	3,307.14	3,306.50	7.50	7.51	125.52	-3,111.80	4,358.76	5,356.22	5,341.21	15.01	356.824				
3,500.00	3,500.00	3,400.00	3,399.31	7.73	7.74	125.50	-3,110.53	4,361.57	5,357.88	5,342.42	15.47	346.410				
3,600.00	3,600.00	3,494.87	3,494.12	7.95	7.98	125.47	-3,109.25	4,364.56	5,359.67	5,343.73	15.93	336.399				
3,700.00	3,700.00	3,594.55	3,593.74	8.17	8.24	125.43	-3,107.95	4,367.68	5,361.46	5,345.05	16.41	326.713				
3,800.00	3,800.00	3,691.86	3,691.01	8.40	8.49	125.41	-3,106.84	4,370.64	5,363.28	5,346.39	16.89	317.602				
3,900.00	3,900.00	3,789.06	3,788.16	8.62	8.74	125.38	-3,106.06	4,373.43	5,365.15	5,347.79	17.36	308.995				
4,000.00	4,000.00	3,877.39	3,876.46	8.85	8.97	125.36	-3,105.62	4,375.90	5,367.15	5,349.33	17.82	301.180				
4,100.00	4,100.00	3,964.61	3,963.63	9.07	9.20	125.35	-3,105.41	4,378.44	5,369.38	5,351.11	18.28	293.808				
4,200.00	4,200.00	4,073.66	4,072.64	9.30	9.47	125.33	-3,105.57	4,381.46	5,371.73	5,352.96	18.77	286.163				
4,300.00	4,300.00	4,197.67	4,196.63	9.52	9.77	125.32	-3,106.65	4,383.68	5,373.70	5,354.40	19.30	278.480				
4,400.00	4,400.00	4,289.69	4,288.63	9.75	9.98	125.33	-3,107.87	4,384.85	5,375.50	5,355.77	19.73	272.490				
4,500.00	4,500.00	4,381.09	4,380.01	9.97	10.18	125.33	-3,109.18	4,386.12	5,377.47	5,357.31	20.16	266.789				
4,600.00	4,600.00	4,468.55	4,467.45	10.20	10.39	125.33	-3,110.48	4,387.51	5,379.62	5,359.03	20.59	261.316				
4,700.00	4,700.00	4,554.98	4,553.86	10.42	10.59	125.33	-3,111.71	4,389.18	5,382.02	5,361.01	21.02	256.075				
4,800.00	4,800.00	4,635.35	4,634.20	10.65	10.79	125.33	-3,112.83	4,391.02	5,384.71	5,363.27	21.44	251.183				
4,900.00	4,900.00	4,709.12	4,707.94	10.87	10.97	125.33	-3,114.06	4,392.98	5,387.84	5,366.00	21.85	246.631				
5,000.00	5,000.00	4,800.00	4,798.75	11.10	11.20	125.33	-3,115.91	4,395.77	5,391.50	5,369.21	22.30	241.807				

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 24H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 24H	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			Distance						Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore +N/-S (ft)	Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
5,100.00	5,100.00	4,941.35	4,940.02	11.32	11.55	125.33	-3,118.66	4,399.68	5,394.97	5,372.10	22.87	235.906		
5,200.00	5,200.00	5,066.21	5,064.84	11.55	11.85	125.33	-3,120.52	4,402.05	5,397.34	5,373.95	23.40	230.669		
5,300.00	5,300.00	5,163.34	5,161.94	11.77	12.09	125.33	-3,122.00	4,403.79	5,399.69	5,375.83	23.86	226.317		
5,400.00	5,400.00	5,264.32	5,262.90	12.00	12.33	125.34	-3,123.62	4,405.58	5,402.07	5,377.74	24.33	222.047		
5,500.00	5,500.00	5,367.64	5,366.19	12.22	12.58	125.34	-3,125.23	4,407.38	5,404.39	5,379.58	24.80	217.888		
5,600.00	5,600.00	5,468.70	5,467.22	12.45	12.83	125.34	-3,126.78	4,409.10	5,406.66	5,381.39	25.27	213.919		
5,700.00	5,700.00	5,568.72	5,567.22	12.67	13.07	125.35	-3,128.31	4,410.80	5,408.93	5,383.19	25.74	210.112		
5,800.00	5,800.00	5,662.24	5,660.71	12.89	13.30	125.35	-3,129.78	4,412.40	5,411.24	5,385.05	26.20	206.566		
5,900.00	5,900.00	5,752.79	5,751.24	13.12	13.52	125.35	-3,131.34	4,414.05	5,413.72	5,387.08	26.64	203.202		
6,000.00	6,000.00	5,850.51	5,848.92	13.34	13.76	125.36	-3,133.17	4,415.89	5,416.34	5,389.23	27.10	199.840		
6,100.00	6,100.00	5,956.05	5,954.42	13.57	14.01	125.36	-3,135.20	4,417.75	5,418.89	5,391.31	27.58	196.466		
6,200.00	6,200.00	6,055.32	6,053.66	13.79	14.25	125.37	-3,137.14	4,419.40	5,421.38	5,393.33	28.05	193.300		
6,300.00	6,300.00	6,150.10	6,148.41	14.02	14.48	125.37	-3,138.94	4,421.09	5,423.94	5,395.44	28.50	190.305		
6,400.00	6,400.00	6,243.86	6,242.14	14.24	14.71	125.38	-3,140.70	4,422.91	5,426.60	5,397.65	28.96	187.413		
6,500.00	6,500.00	6,336.50	6,334.73	14.47	14.94	125.38	-3,142.57	4,424.75	5,429.39	5,399.98	29.41	184.621		
6,600.00	6,600.00	6,430.71	6,428.91	14.69	15.17	125.39	-3,144.64	4,426.67	5,432.32	5,402.45	29.86	181.901		
6,700.00	6,700.00	6,528.39	6,526.54	14.92	15.41	125.40	-3,146.90	4,428.63	5,435.30	5,404.98	30.33	179.227		
6,800.00	6,800.00	6,624.88	6,622.98	15.14	15.64	125.41	-3,149.25	4,430.56	5,438.33	5,407.55	30.79	176.646		
6,900.00	6,900.00	6,718.10	6,716.15	15.37	15.87	125.41	-3,151.48	4,432.55	5,441.47	5,410.22	31.24	174.173		
7,000.00	7,000.00	6,800.00	6,798.01	15.59	16.08	125.42	-3,153.38	4,434.47	5,444.74	5,413.07	31.67	171.928		
7,100.00	7,100.00	6,899.76	6,897.70	15.82	16.33	125.42	-3,155.78	4,436.94	5,448.15	5,416.01	32.14	169.493		
7,200.00	7,200.00	6,988.70	6,986.58	16.04	16.55	125.43	-3,158.15	4,439.21	5,451.78	5,419.19	32.59	167.276		
7,300.00	7,300.00	7,088.62	7,086.43	16.27	16.80	125.44	-3,160.97	4,441.80	5,455.53	5,422.46	33.07	164.990		
7,400.00	7,400.00	7,190.14	7,187.88	16.49	17.05	125.45	-3,163.82	4,444.40	5,459.24	5,425.70	33.54	162.750		
7,500.00	7,500.00	7,277.45	7,275.13	16.72	17.27	125.45	-3,166.29	4,446.72	5,463.05	5,429.06	33.99	160.731		
7,600.00	7,600.00	7,363.22	7,360.82	16.94	17.49	125.46	-3,168.79	4,449.22	5,467.11	5,432.68	34.43	158.788		
7,700.00	7,700.00	7,450.29	7,447.81	17.17	17.71	125.46	-3,171.42	4,451.96	5,471.43	5,436.55	34.88	156.882		
7,800.00	7,800.00	7,538.32	7,535.75	17.39	17.94	125.47	-3,174.24	4,454.85	5,475.96	5,440.64	35.33	155.016		
7,900.00	7,900.00	7,628.65	7,625.97	17.61	18.16	125.48	-3,177.34	4,457.91	5,480.71	5,444.93	35.78	153.180		
8,000.00	8,000.00	7,724.37	7,721.57	17.84	18.41	125.49	-3,180.82	4,461.13	5,485.56	5,449.31	36.25	151.342		
8,100.00	8,100.00	7,820.10	7,817.18	18.06	18.65	125.50	-3,184.49	4,464.31	5,490.49	5,453.78	36.71	149.554		
8,200.00	8,200.00	7,915.92	7,912.87	18.29	18.89	125.51	-3,188.29	4,467.49	5,495.50	5,458.32	37.18	147.817		
8,300.00	8,300.00	8,013.47	8,010.29	18.51	19.13	125.53	-3,192.24	4,470.76	5,500.58	5,462.93	37.65	146.109		
8,400.00	8,400.00	8,123.61	8,120.28	18.74	19.41	125.55	-3,196.80	4,474.26	5,505.57	5,467.42	38.14	144.334		
8,500.00	8,500.00	8,240.25	8,236.77	18.96	19.69	125.57	-3,201.75	4,477.58	5,510.36	5,471.70	38.65	142.554		
8,600.00	8,600.00	16,205.00	12,133.68	19.19	114.36	176.02	-4,143.60	288.44	5,459.88	5,326.33	133.55	40.883		
8,700.00	8,700.00	16,205.00	12,133.68	19.41	114.36	176.02	-4,143.60	288.44	5,395.51	5,261.73	133.78	40.333		
8,800.00	8,800.00	16,205.00	12,133.68	19.64	114.36	176.02	-4,143.60	288.44	5,332.24	5,198.24	134.00	39.793		
8,900.00	8,900.00	16,205.00	12,133.68	19.86	114.36	176.02	-4,143.60	288.44	5,270.11	5,135.88	134.22	39.263		
9,000.00	9,000.00	16,205.00	12,133.68	20.09	114.36	176.02	-4,143.60	288.44	5,209.16	5,074.71	134.45	38.744		
9,100.00	9,100.00	16,205.00	12,133.68	20.31	114.36	176.02	-4,143.60	288.44	5,149.42	5,014.75	134.67	38.236		
9,200.00	9,200.00	16,205.00	12,133.68	20.54	114.36	176.02	-4,143.60	288.44	5,090.96	4,956.06	134.90	37.739		
9,300.00	9,300.00	16,205.00	12,133.68	20.76	114.36	176.02	-4,143.60	288.44	5,033.80	4,898.67	135.12	37.253		
9,400.00	9,400.00	16,205.00	12,133.68	20.99	114.36	176.02	-4,143.60	288.44	4,977.99	4,842.64	135.35	36.779		
9,500.00	9,500.00	16,205.00	12,133.68	21.21	114.36	176.02	-4,143.60	288.44	4,923.58	4,788.01	135.57	36.317		
9,600.00	9,600.00	15,867.61	12,156.08	21.44	105.50	171.37	-4,092.69	620.97	4,870.37	4,743.44	126.93	38.370		
9,700.00	9,700.00	15,860.64	12,156.51	21.66	105.31	171.28	-4,091.38	627.81	4,818.43	4,691.45	126.97	37.948		
9,800.00	9,800.00	15,853.78	12,156.94	21.89	105.13	171.18	-4,090.09	634.53	4,768.01	4,640.99	127.02	37.537		
9,900.00	9,900.00	15,847.04	12,157.35	22.11	104.96	171.09	-4,088.83	641.14	4,719.16	4,592.09	127.07	37.139		
10,000.00	10,000.00	15,840.41	12,157.75	22.34	104.79	171.00	-4,087.59	647.64	4,671.93	4,544.81	127.12	36.752		
10,100.00	10,100.00	15,833.88	12,158.14	22.56	104.61	170.91	-4,086.37	654.04	4,626.38	4,499.20	127.17	36.378		
10,200.00	10,200.00	15,826.74	12,158.58	22.78	104.43	170.81	-4,085.03	661.04	4,582.54	4,455.33	127.21	36.023		

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 24H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 24H	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 (°)	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)				
10,300.00	10,300.00	15,817.59	12,159.10	23.01	104.19	170.68	-4,083.32	670.01	4,540.48	4,413.28	127.20	35.696		
10,400.00	10,400.00	15,808.75	12,159.61	23.23	103.96	170.56	-4,081.66	678.68	4,500.23	4,373.04	127.19	35.381		
10,500.00	10,500.00	15,800.19	12,160.09	23.46	103.73	170.44	-4,080.05	687.07	4,461.85	4,334.65	127.19	35.079		
10,600.00	10,600.00	15,791.91	12,160.55	23.68	103.52	170.33	-4,078.49	695.19	4,425.38	4,298.18	127.20	34.790		
10,700.00	10,700.00	15,783.89	12,160.99	23.91	103.31	170.22	-4,076.98	703.06	4,390.88	4,263.67	127.22	34.515		
10,800.00	10,800.00	15,776.12	12,161.41	24.13	103.11	170.11	-4,075.51	710.68	4,358.40	4,231.16	127.24	34.254		
10,900.00	10,900.00	15,768.59	12,161.81	24.36	102.91	170.00	-4,074.09	718.06	4,327.97	4,200.70	127.27	34.007		
11,000.00	11,000.00	15,761.28	12,162.19	24.58	102.72	169.90	-4,072.70	725.22	4,299.64	4,172.34	127.30	33.775		
11,100.00	11,100.00	15,754.20	12,162.56	24.81	102.53	169.81	-4,071.36	732.17	4,273.45	4,146.11	127.34	33.559		
11,200.00	11,200.00	15,747.32	12,162.91	25.03	102.35	169.71	-4,070.05	738.92	4,249.46	4,122.07	127.39	33.359		
11,300.00	11,300.00	15,740.63	12,163.24	25.26	102.18	169.62	-4,068.78	745.47	4,227.68	4,100.24	127.44	33.175		
11,400.00	11,400.00	15,734.14	12,163.56	25.48	102.01	169.53	-4,067.54	751.84	4,208.16	4,080.66	127.49	33.007		
11,500.00	11,500.00	15,733.00	12,163.62	25.71	101.98	169.51	-4,067.33	752.96	4,190.92	4,063.24	127.69	32.822		
11,600.00	11,600.00	15,724.96	12,164.01	25.93	101.77	169.40	-4,065.79	760.84	4,176.01	4,048.31	127.70	32.701		
11,700.00	11,700.00	15,720.65	12,164.22	26.16	101.66	169.34	-4,064.98	765.07	4,163.44	4,035.63	127.81	32.574		
11,800.00	11,800.00	15,716.41	12,164.42	26.38	101.55	169.28	-4,064.17	769.22	4,153.24	4,025.31	127.93	32.465		
11,900.00	11,900.00	15,712.25	12,164.61	26.61	101.44	169.22	-4,063.38	773.30	4,145.42	4,017.37	128.04	32.375		
12,000.00	11,999.97	15,708.37	12,164.79	26.81	101.34	-11.04	-4,062.64	777.10	4,138.77	4,010.62	128.15	32.296		
12,100.00	12,098.23	15,707.35	12,164.84	26.98	101.31	-11.54	-4,062.45	778.11	4,118.55	3,990.26	128.29	32.103		
12,200.00	12,190.69	15,709.88	12,164.72	27.14	101.38	-12.52	-4,062.93	775.63	4,080.96	3,952.44	128.52	31.754		
12,300.00	12,273.31	15,715.81	12,164.45	27.29	101.53	-14.20	-4,064.06	769.82	4,027.18	3,898.36	128.82	31.262		
12,400.00	12,342.48	15,724.84	12,164.02	27.50	101.77	-17.06	-4,065.77	760.95	3,958.94	3,829.67	129.27	30.626		
12,500.00	12,395.17	15,737.80	12,163.38	27.78	102.11	-22.23	-4,068.24	748.25	3,878.53	3,748.65	129.88	29.861		
12,600.00	12,429.09	15,756.25	12,162.45	28.14	102.59	-33.07	-4,071.75	730.16	3,788.77	3,658.04	130.73	28.982		
12,700.00	12,442.75	15,776.69	12,161.38	28.60	103.12	-61.66	-4,075.62	710.12	3,693.01	3,561.30	131.72	28.037		
12,800.00	12,442.61	15,797.98	12,160.22	29.14	103.68	-69.90	-4,079.63	689.24	3,595.21	3,462.39	132.82	27.069		
12,900.00	12,442.15	15,819.13	12,159.01	29.79	104.23	-69.25	-4,083.60	668.51	3,497.38	3,363.37	134.02	26.097		
13,000.00	12,441.68	15,838.29	12,157.87	30.53	104.73	-68.63	-4,087.19	649.72	3,399.57	3,264.31	135.26	25.134		
13,100.00	12,441.22	15,855.85	12,156.81	31.36	105.19	-68.03	-4,090.48	632.50	3,301.78	3,165.24	136.55	24.180		
13,200.00	12,440.75	15,873.46	12,155.72	32.27	105.65	-67.40	-4,093.79	615.24	3,204.03	3,066.11	137.92	23.231		
13,300.00	12,440.29	15,891.14	12,154.60	33.26	106.11	-66.74	-4,097.11	597.91	3,106.31	2,966.94	139.37	22.288		
13,400.00	12,439.82	15,908.87	12,153.45	34.32	106.58	-66.04	-4,100.45	580.53	3,008.63	2,867.74	140.89	21.354		
13,500.00	12,439.36	15,928.57	12,152.15	35.44	107.09	-65.22	-4,104.16	561.23	2,910.99	2,768.46	142.53	20.424		
13,600.00	12,438.89	16,181.24	12,134.91	36.61	113.73	-48.95	-4,141.03	312.03	2,812.37	2,662.03	150.35	18.706		
13,700.00	12,438.42	16,190.18	12,134.43	37.84	113.97	-48.11	-4,141.98	303.16	2,713.56	2,561.76	151.81	17.875		
13,800.00	12,437.96	16,205.00	12,133.68	39.11	114.36	-46.66	-4,143.60	288.44	2,614.81	2,461.34	153.47	17.037		
13,900.00	12,437.49	16,209.75	12,133.45	40.43	114.49	-46.19	-4,144.12	283.73	2,516.10	2,361.19	154.92	16.242		
14,000.00	12,437.03	16,222.23	12,132.86	41.78	114.82	-44.90	-4,145.48	271.33	2,417.45	2,260.85	156.60	15.437		
14,100.00	12,436.56	16,234.66	12,132.31	43.17	115.15	-43.56	-4,146.84	258.99	2,318.86	2,160.54	158.32	14.647		
14,200.00	12,436.10	16,247.04	12,131.79	44.59	115.47	-42.17	-4,148.19	246.70	2,220.32	2,060.26	160.07	13.871		
14,300.00	12,435.63	16,259.37	12,131.30	46.04	115.80	-40.74	-4,149.53	234.45	2,121.86	1,960.02	161.84	13.111		
14,400.00	12,435.17	16,271.65	12,130.84	47.52	116.13	-39.26	-4,150.86	222.25	2,023.49	1,859.84	163.64	12.365		
14,500.00	12,434.70	16,283.87	12,130.41	49.02	116.45	-37.72	-4,152.19	210.11	1,925.21	1,759.74	165.47	11.635		
14,600.00	12,434.24	16,296.05	12,130.01	50.54	116.77	-36.13	-4,153.50	198.01	1,827.04	1,659.73	167.31	10.920		
14,700.00	12,433.77	16,310.45	12,129.56	52.08	117.15	-34.18	-4,155.05	183.69	1,729.00	1,559.77	169.23	10.217		
14,800.00	12,433.30	16,324.83	12,129.14	53.63	117.54	-32.14	-4,156.56	169.41	1,631.10	1,459.93	171.17	9.529		
14,900.00	12,432.84	16,338.72	12,128.76	55.21	117.90	-30.08	-4,158.00	155.60	1,533.37	1,360.25	173.11	8.858		
15,000.00	12,432.37	16,352.15	12,128.41	56.80	118.26	-28.02	-4,159.37	142.24	1,435.85	1,260.79	175.06	8.202		
15,100.00	12,431.91	16,365.14	12,128.09	58.40	118.60	-25.95	-4,160.67	129.31	1,338.60	1,161.59	177.01	7.562		
15,200.00	12,431.44	16,377.72	12,127.79	60.02	118.94	-23.88	-4,161.91	116.80	1,241.68	1,062.72	178.95	6.938		
15,300.00	12,430.98	16,389.91	12,127.53	61.64	119.26	-21.82	-4,163.09	104.67	1,145.18	964.27	180.91	6.330		
15,400.00	12,430.51	16,400.53	12,127.30	63.28	119.54	-19.97	-4,164.11	94.10	1,049.22	866.40	182.83	5.739		

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 24H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3353.00ft (Scandrill Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3353.00ft (Scandrill Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 24H	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													Offset Site Error:	0.00 ft
Sec. 34, T 25 S. , R 33 E - Redbull 35 FED #1H - Wellbore #1 - Actual Wellbore													Offset Well Error:	0.00 ft
Survey Program: 200-NS-GYRO-MS, 11615-MWD														
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)						
15,500.00	12,430.05	16,410.73	12,127.08	64.93	119.81	-18.16	-4,165.07	83.95	954.00	769.25	184.74	5.164		
15,600.00	12,429.58	16,420.77	12,126.84	66.59	120.08	-16.34	-4,166.02	73.96	859.74	673.07	186.67	4.606		
15,700.00	12,429.12	16,430.66	12,126.61	68.25	120.34	-14.51	-4,166.94	64.12	766.81	578.22	188.60	4.066		
15,800.00	12,428.65	16,440.40	12,126.36	69.93	120.60	-12.69	-4,167.84	54.42	675.77	485.24	190.53	3.547		
15,900.00	12,428.18	16,449.99	12,126.11	71.61	120.86	-10.87	-4,168.72	44.87	587.49	395.02	192.47	3.052		
16,000.00	12,427.72	16,459.45	12,125.86	73.30	121.11	-9.06	-4,169.59	35.46	503.43	309.03	194.41	2.590		
16,100.00	12,427.25	16,468.76	12,125.60	74.99	121.36	-7.26	-4,170.43	26.19	426.11	229.76	196.35	2.170		
16,200.00	12,426.79	16,477.94	12,125.34	76.69	121.60	-5.47	-4,171.25	17.05	359.89	161.60	198.29	1.815		
16,300.00	12,426.32	16,487.01	12,125.08	78.40	121.84	-3.70	-4,172.06	8.02	311.94	111.70	200.24	1.558		
16,400.00	12,425.86	16,496.17	12,124.80	80.11	122.09	-1.90	-4,172.87	-1.10	291.42	89.22	202.20	1.441 Level 3		
16,412.43	12,425.80	16,497.30	12,124.77	80.32	122.12	-1.68	-4,172.97	-2.23	291.16	88.72	202.44	1.438 Level 3, CC, ES, SF		
16,500.00	12,425.39	16,505.22	12,124.54	81.83	122.33	-0.13	-4,173.67	-10.12	303.94	99.78	204.15	1.489 Level 3		
16,600.00	12,424.93	16,514.18	12,124.27	83.55	122.57	1.62	-4,174.45	-19.03	345.93	139.82	206.11	1.678		
16,700.00	12,424.46	16,523.04	12,124.01	85.27	122.80	3.35	-4,175.22	-27.85	408.41	200.33	208.07	1.963		
16,800.00	12,424.00	16,531.80	12,123.75	87.00	123.04	5.05	-4,175.98	-36.58	483.49	273.46	210.04	2.302		
16,900.00	12,423.53	16,540.47	12,123.49	88.73	123.27	6.72	-4,176.73	-45.21	566.20	354.20	212.00	2.671		
17,000.00	12,423.06	16,549.04	12,123.24	90.47	123.49	8.35	-4,177.46	-53.75	653.64	439.67	213.97	3.055		
17,100.00	12,422.60	16,557.53	12,122.98	92.21	123.72	9.96	-4,178.18	-62.20	744.15	528.22	215.93	3.446		
17,200.00	12,422.13	16,565.92	12,122.73	93.96	123.94	11.53	-4,178.90	-70.56	836.73	618.84	217.90	3.840		
17,300.00	12,421.67	16,574.22	12,122.49	95.70	124.17	13.06	-4,179.59	-78.83	930.78	710.91	219.87	4.233		
17,400.00	12,421.20	16,583.30	12,122.22	97.45	124.41	14.71	-4,180.36	-87.87	1,025.87	804.02	221.86	4.624		
17,500.00	12,420.74	16,594.72	12,121.89	99.20	124.71	16.75	-4,181.33	-99.25	1,121.74	897.83	223.91	5.010		
17,600.00	12,420.27	16,606.71	12,121.57	100.96	125.03	18.84	-4,182.38	-111.19	1,218.19	992.20	225.99	5.390		
17,700.00	12,419.81	16,619.32	12,121.25	102.72	125.37	20.98	-4,183.51	-123.74	1,315.09	1,087.00	228.08	5.766		
17,800.00	12,419.34	16,632.58	12,120.94	104.47	125.72	23.16	-4,184.73	-136.94	1,412.33	1,182.13	230.19	6.135		
17,900.00	12,418.87	16,646.55	12,120.63	106.24	126.09	25.39	-4,186.06	-150.84	1,509.84	1,277.51	232.33	6.499		
18,000.00	12,418.41	16,661.29	12,120.33	108.00	126.48	27.64	-4,187.49	-165.51	1,607.57	1,373.09	234.48	6.856		
18,100.00	12,417.94	16,674.00	12,120.10	109.77	126.82	29.51	-4,188.76	-178.16	1,705.48	1,468.89	236.59	7.209		
18,200.00	12,417.48	16,684.21	12,119.92	111.53	127.09	30.97	-4,189.78	-188.31	1,803.55	1,564.92	238.63	7.558		
18,300.00	12,417.01	16,692.69	12,119.78	113.30	127.32	32.14	-4,190.63	-196.75	1,901.78	1,661.15	240.62	7.904		
18,400.00	12,416.55	16,701.02	12,119.63	115.08	127.54	33.26	-4,191.45	-205.03	2,000.14	1,757.52	242.62	8.244		
18,500.00	12,416.08	16,709.19	12,119.49	116.85	127.76	34.34	-4,192.25	-213.17	2,098.61	1,854.01	244.61	8.579		
18,600.00	12,415.62	16,717.22	12,119.35	118.62	127.97	35.36	-4,193.02	-221.16	2,197.19	1,950.59	246.60	8.910		
18,700.00	12,415.15	16,725.11	12,119.21	120.40	128.19	36.35	-4,193.78	-229.01	2,295.86	2,047.27	248.58	9.236		
18,800.00	12,414.69	16,732.86	12,119.07	122.18	128.39	37.29	-4,194.51	-236.73	2,394.60	2,144.03	250.57	9.557		
18,900.00	12,414.22	16,740.48	12,118.94	123.96	128.59	38.19	-4,195.23	-244.31	2,493.41	2,240.86	252.55	9.873		
19,000.00	12,413.75	16,747.96	12,118.81	125.74	128.79	39.06	-4,195.93	-251.76	2,592.29	2,337.76	254.53	10.185		
19,100.00	12,413.29	16,755.32	12,118.68	127.52	128.99	39.89	-4,196.61	-259.08	2,691.23	2,434.72	256.51	10.492		
19,200.00	12,412.82	16,768.00	12,118.46	129.30	129.33	41.27	-4,197.77	-271.71	2,790.22	2,531.59	258.63	10.789		
19,300.00	12,412.36	16,768.00	12,118.46	131.08	129.33	41.27	-4,197.77	-271.71	2,889.24	2,628.83	260.41	11.095		
19,400.00	12,411.89	16,768.00	12,118.46	132.87	129.33	41.27	-4,197.77	-271.71	2,988.33	2,726.14	262.20	11.397		
19,500.00	12,411.43	16,783.07	12,118.18	134.65	129.73	42.84	-4,199.12	-286.71	3,087.43	2,823.04	264.39	11.678		
19,600.00	12,410.96	16,789.64	12,118.05	136.44	129.91	43.50	-4,199.70	-293.26	3,186.58	2,920.23	266.35	11.964		
19,700.00	12,410.50	16,796.10	12,117.92	138.23	130.08	44.13	-4,200.27	-299.69	3,285.77	3,017.46	268.31	12.246		
19,800.00	12,410.03	16,802.46	12,117.78	140.02	130.25	44.74	-4,200.82	-306.03	3,384.98	3,114.71	270.27	12.525		
19,900.00	12,409.57	16,808.73	12,117.64	141.81	130.42	45.32	-4,201.36	-312.27	3,484.22	3,212.00	272.23	12.799		
20,000.00	12,409.10	16,814.89	12,117.50	143.60	130.58	45.89	-4,201.89	-318.41	3,583.49	3,309.31	274.18	13.070		
20,100.00	12,408.63	16,820.96	12,117.35	145.39	130.74	46.43	-4,202.41	-324.45	3,682.79	3,406.65	276.14	13.337		
20,200.00	12,408.17	16,826.94	12,117.20	147.18	130.90	46.96	-4,202.91	-330.41	3,782.11	3,504.02	278.09	13.600		
20,300.00	12,407.70	16,832.82	12,117.05	148.98	131.06	47.46	-4,203.41	-336.27	3,881.45	3,601.41	280.04	13.860		
20,400.00	12,407.24	16,838.62	12,116.90	150.77	131.21	47.95	-4,203.89	-342.04	3,980.81	3,698.82	281.99	14.117		
20,500.00	12,406.77	16,844.33	12,116.75	152.57	131.37	48.42	-4,204.36	-347.73	4,080.19	3,796.25	283.93	14.370		

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 24H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Reference Site:	Sec. 34, T 25 S. , R 33 E	MD Reference:	KB=26' @ 3353.00ft (Scandril Freedom)
Site Error:	0.00 ft	North Reference:	Grid
Reference Well:	Columbus Fee 24H	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		Distance									
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning		
20,600.00	12,406.31	16,861.00	12,116.27	154.36	131.81	49.74	-4,205.71	-364.34	4,179.61	3,893.43	286.18	14.605			
20,700.00	12,405.84	16,861.00	12,116.27	156.16	131.81	49.74	-4,205.71	-364.34	4,279.01	3,991.03	287.97	14.859			
20,800.00	12,405.38	16,861.00	12,116.27	157.96	131.81	49.74	-4,205.71	-364.34	4,378.43	4,088.66	289.77	15.110			
20,900.00	12,404.91	16,868.28	12,116.06	159.75	132.01	50.29	-4,206.29	-371.60	4,477.88	4,186.12	291.76	15.348			
21,000.00	12,404.44	16,875.56	12,115.86	161.55	132.20	50.83	-4,206.87	-378.85	4,577.33	4,283.58	293.75	15.582			
21,100.00	12,403.98	16,882.78	12,115.68	163.35	132.39	51.36	-4,207.44	-386.04	4,676.80	4,381.05	295.75	15.814			
21,200.00	12,403.51	16,889.94	12,115.51	165.15	132.59	51.87	-4,208.01	-393.18	4,776.27	4,478.54	297.74	16.042			
21,300.00	12,403.05	16,897.05	12,115.35	166.95	132.78	52.36	-4,208.57	-400.27	4,875.76	4,576.03	299.73	16.267			
21,400.00	12,402.58	16,904.11	12,115.21	168.75	132.96	52.84	-4,209.12	-407.30	4,975.25	4,673.54	301.71	16.490			
21,500.00	12,402.12	16,911.11	12,115.08	170.55	133.15	53.31	-4,209.67	-414.28	5,074.76	4,771.05	303.70	16.710			
21,600.00	12,401.65	16,918.06	12,114.96	172.35	133.34	53.77	-4,210.21	-421.20	5,174.27	4,868.58	305.69	16.927			
21,700.00	12,401.19	16,924.95	12,114.85	174.15	133.52	54.21	-4,210.75	-428.08	5,273.79	4,966.11	307.68	17.141			
21,800.00	12,400.72	16,931.79	12,114.75	175.96	133.70	54.64	-4,211.28	-434.90	5,373.32	5,063.65	309.66	17.352			
21,900.00	12,400.26	16,938.58	12,114.67	177.76	133.89	55.06	-4,211.80	-441.67	5,472.85	5,161.20	311.65	17.561			
22,000.00	12,399.79	16,945.32	12,114.60	179.56	134.07	55.47	-4,212.32	-448.39	5,572.39	5,258.76	313.63	17.767			
22,100.00	12,399.32	16,952.01	12,114.53	181.37	134.25	55.87	-4,212.83	-455.06	5,671.94	5,356.33	315.61	17.971			
22,200.00	12,398.86	16,958.65	12,114.48	183.17	134.42	56.26	-4,213.33	-461.68	5,771.49	5,453.90	317.59	18.173			
22,300.00	12,398.39	16,965.24	12,114.44	184.98	134.60	56.64	-4,213.83	-468.25	5,871.06	5,551.48	319.58	18.371			
22,384.53	12,398.00	16,970.77	12,114.42	186.50	134.75	56.95	-4,214.25	-473.76	5,955.22	5,633.97	321.25	18.538			

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 24H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #2

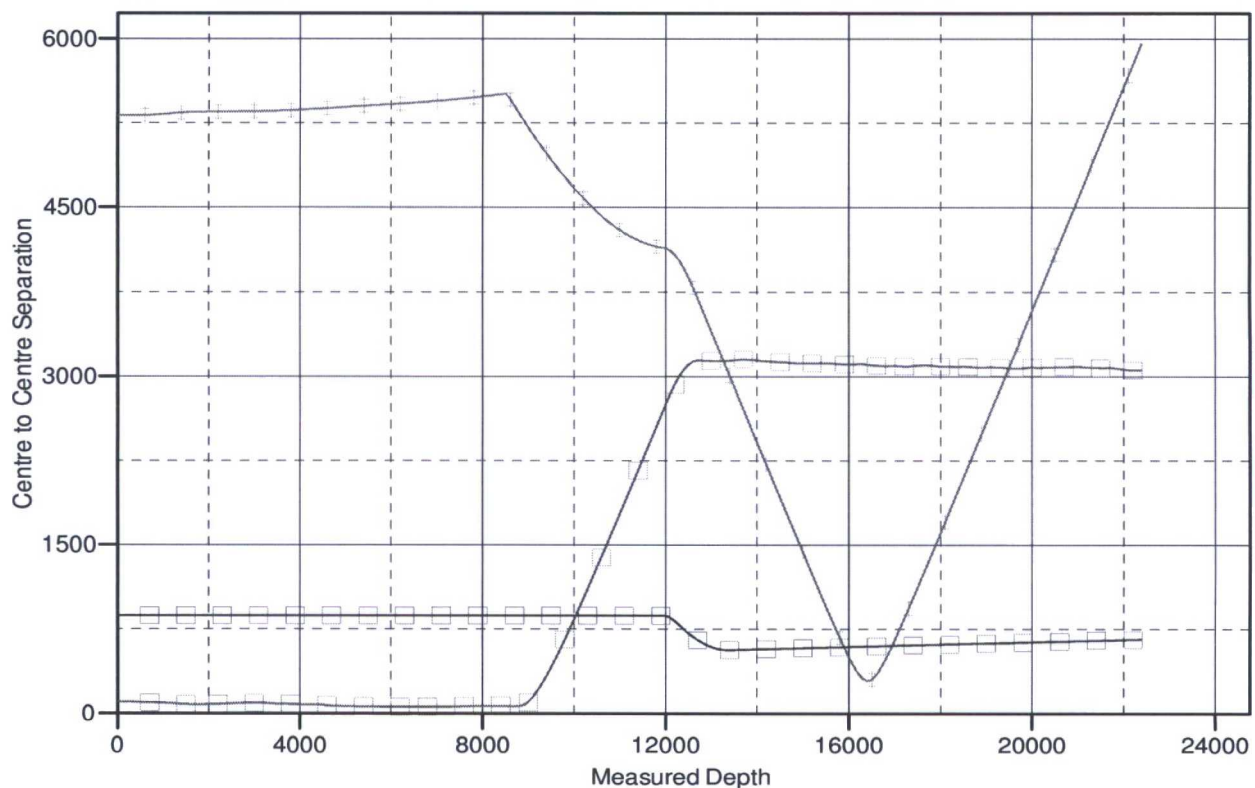
Local Co-ordinate Reference: Well Columbus Fee 24H
TVD Reference: KB=26' @ 3353.00ft (Scandril Freedom)
MD Reference: KB=26' @ 3353.00ft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM 5000.1 Multi User Db
Offset TVD Reference: Offset Datum

Reference Depths are relative to KB=26' @ 3353.00ft (Scandril Freedom) Coordinates are relative to: Columbus Fee 24H

Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.41°

Ladder Plot



LEGEND

35 FED #1H, Wellbore #1, Actual Wellbore V0 Columbus Fee 23H, Wellbore #1, Plan #2 V0 Columbus Fee 24H, Wellbore #1, Wellbore

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 24H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #2

Local Co-ordinate Reference: Well Columbus Fee 24H
TVD Reference: KB=26' @ 3353.00ft (Scandril Freedom)
MD Reference: KB=26' @ 3353.00ft (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

Reference Depths are relative to KB=26' @ 3353.00ft (Scandril Freedom) Coordinates are relative to: Columbus Fee 24H

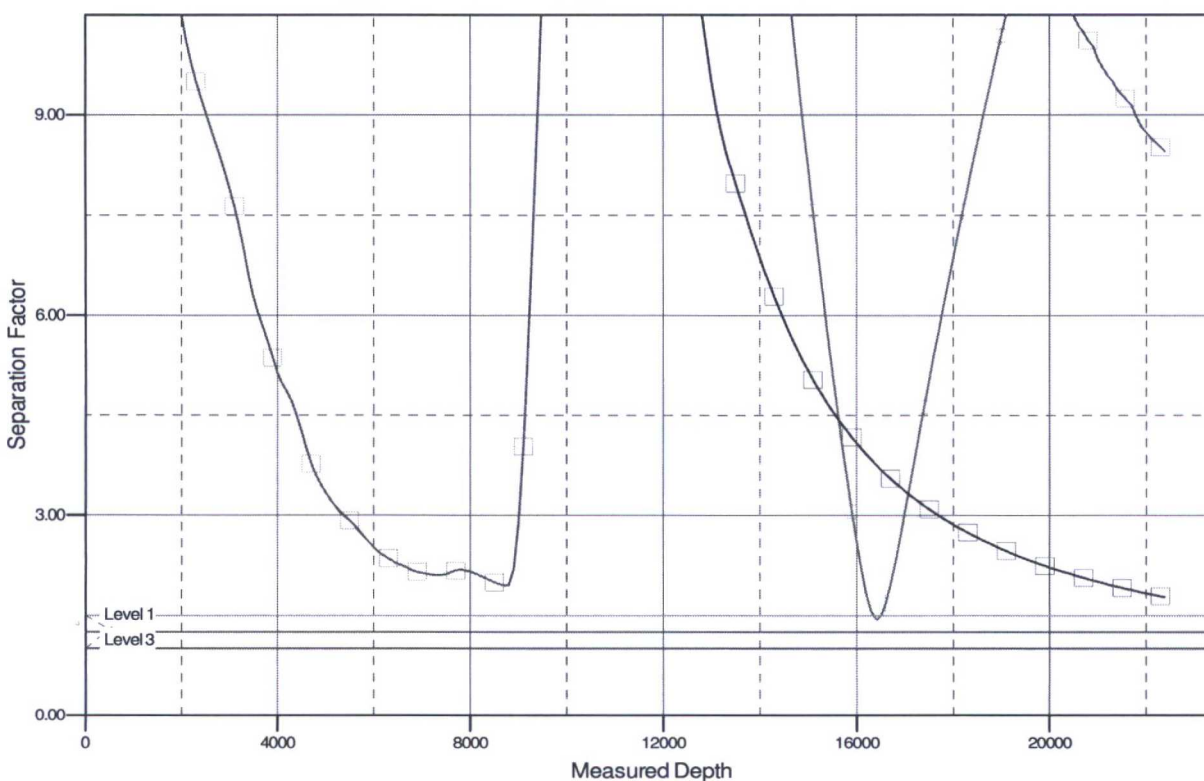
Offset Depths are relative to Offset Datum

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

|| 35 FED #1H, Wellbore #1, Actual Wellbore V0

— Columbus Fee 23H, Wellbore #1, Plan #2 V0

— Columbus Fee 2H, Wellbore #1, Wellbore