



CONCHO

COG Operating L L C

Lea County, NM (NAD27 NME)

Sec. 31, T 25 S., R 35 E

Square Bill Federal Com 22H

Wellbore #1

Plan #1

HOBBS OCD
SEP 26 2017
RECEIVED

Anticollision Report

13 March, 2017





Integrity Directional Services, LLC

Anticollision Report



Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Reference Site: Sec. 31, T 25 S., R 35 E
Site Error: 0.00 ft
Reference Well: Square Bill Federal Com 22H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
TVD Reference: KB=26' @ 3299.60ft (McVay 8)
MD Reference: KB=26' @ 3299.60ft (McVay 8)
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	Plan #1
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method:	MD Interval 100.00ft
Depth Range:	Unlimited
Results Limited by:	Maximum center-center distance of 10,000.00 ft
Warning Levels Evaluated at:	2.00 Sigma
Error Model:	ISCWSA
Scan Method:	Closest Approach 3D
Error Surface:	Circular Conic
Casing Method:	Not applied

Survey Tool Program Date 3/13/2017

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.00	19,998.73	Plan #1 (Wellbore #1)	MWD	MWD - Standard

Summary

Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Sec. 31, T 25 S., R 35 E						
Square Bill Federal Com 1H - Wellbore #1 - Plan #1	4,966.40	4,967.20	32.90	10.86	1.492	Level 3, CC
Square Bill Federal Com 1H - Wellbore #1 - Plan #1	5,000.00	5,000.79	32.90	10.71	1.482	Level 3, ES
Square Bill Federal Com 1H - Wellbore #1 - Plan #1	19,998.73	19,620.25	411.59	133.75	1.481	Level 3, SF
Square Bill Federal Com 21H - Wellbore #1 - Plan #1	4,966.40	4,967.20	66.00	43.96	2.994	CC
Square Bill Federal Com 21H - Wellbore #1 - Plan #1	5,000.00	5,000.00	66.01	43.81	2.974	ES
Square Bill Federal Com 21H - Wellbore #1 - Plan #1	19,998.73	19,907.35	661.17	383.16	2.378	SF
Square Bill Federal Com 23H - Wellbore #1 - Plan #1	4,966.43	4,967.13	33.10	11.06	1.502	CC
Square Bill Federal Com 23H - Wellbore #1 - Plan #1	5,000.00	5,000.69	33.10	10.91	1.491	Level 3, ES, SF

Offset Design Sec. 31, T 25 S., R 35 E - Square Bill Federal Com 1H - Wellbore #1 - Plan #1

Survey Program: 0-MWD												Offset Site Error:	0.00 ft
Reference												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)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.00	0.00	0.80	0.80	0.00	0.00	89.65	0.20	32.90	32.90				
100.00	100.00	100.80	100.80	0.08	0.08	89.65	0.20	32.90	32.90	32.73	0.17	195.691	
200.00	200.00	200.80	200.80	0.31	0.31	89.65	0.20	32.90	32.90	32.28	0.62	53.267	
300.00	300.00	300.80	300.80	0.53	0.53	89.65	0.20	32.90	32.90	31.83	1.07	30.829	
400.00	400.00	400.80	400.80	0.76	0.76	89.65	0.20	32.90	32.90	31.38	1.52	21.692	
500.00	500.00	500.80	500.80	0.98	0.98	89.65	0.20	32.90	32.90	30.93	1.97	16.733	
600.00	600.00	600.80	600.80	1.21	1.21	89.65	0.20	32.90	32.90	30.48	2.42	13.619	
700.00	700.00	700.80	700.80	1.43	1.43	89.65	0.20	32.90	32.90	30.04	2.87	11.482	
800.00	800.00	800.80	800.80	1.66	1.66	89.65	0.20	32.90	32.90	29.59	3.31	9.925	
900.00	900.00	900.80	900.80	1.88	1.88	89.65	0.20	32.90	32.90	29.14	3.76	8.740	
1,000.00	1,000.00	1,000.80	1,000.80	2.11	2.11	89.65	0.20	32.90	32.90	28.69	4.21	7.808	
1,100.00	1,100.00	1,100.80	1,100.80	2.33	2.33	89.65	0.20	32.90	32.90	28.24	4.66	7.055	
1,200.00	1,200.00	1,200.80	1,200.80	2.56	2.56	89.65	0.20	32.90	32.90	27.79	5.11	6.435	
1,300.00	1,300.00	1,300.80	1,300.80	2.78	2.78	89.65	0.20	32.90	32.90	27.34	5.56	5.915	
1,400.00	1,400.00	1,400.80	1,400.80	3.01	3.01	89.65	0.20	32.90	32.90	26.89	6.01	5.472	
1,500.00	1,500.00	1,500.80	1,500.80	3.23	3.23	89.65	0.20	32.90	32.90	26.44	6.46	5.092	
1,600.00	1,600.00	1,600.80	1,600.80	3.45	3.46	89.65	0.20	32.90	32.90	25.99	6.91	4.761	
1,700.00	1,700.00	1,700.80	1,700.80	3.68	3.68	89.65	0.20	32.90	32.90	25.54	7.36	4.470	
1,800.00	1,800.00	1,800.80	1,800.80	3.90	3.91	89.65	0.20	32.90	32.90	25.09	7.81	4.213	
1,900.00	1,900.00	1,900.80	1,900.80	4.13	4.13	89.65	0.20	32.90	32.90	24.64	8.26	3.983	

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. 31, T 25 S., R 35 E
Site Error: 0.00 ft
Reference Well: Square Bill Federal Com 22H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
TVD Reference: KB=26' @ 3299.60ft (McVay 8)
MD Reference: KB=26' @ 3299.60ft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM 5000.1 Multi User Db
Offset TVD Reference: Offset Datum

Offset Design Sec. 31, T 25 S., R 35 E - Square Bill Federal Com 1H - Wellbore #1 - Plan #1													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)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
2,000.00	2,000.00	2,000.80	2,000.80	4.35	4.36	89.65	0.20	32.90	32.90	24.19	8.71	3.778		
2,100.00	2,100.00	2,100.80	2,100.80	4.58	4.58	89.65	0.20	32.90	32.90	23.74	9.16	3.592		
2,200.00	2,200.00	2,200.80	2,200.80	4.80	4.81	89.65	0.20	32.90	32.90	23.29	9.61	3.424		
2,300.00	2,300.00	2,300.80	2,300.80	5.03	5.03	89.65	0.20	32.90	32.90	22.84	10.06	3.271		
2,400.00	2,400.00	2,400.80	2,400.80	5.25	5.25	89.65	0.20	32.90	32.90	22.39	10.51	3.131		
2,500.00	2,500.00	2,500.80	2,500.80	5.48	5.48	89.65	0.20	32.90	32.90	21.94	10.96	3.003		
2,600.00	2,600.00	2,600.80	2,600.80	5.70	5.70	89.65	0.20	32.90	32.90	21.49	11.41	2.884		
2,700.00	2,700.00	2,700.80	2,700.80	5.93	5.93	89.65	0.20	32.90	32.90	21.04	11.86	2.775		
2,800.00	2,800.00	2,800.80	2,800.80	6.15	6.15	89.65	0.20	32.90	32.90	20.60	12.31	2.674		
2,900.00	2,900.00	2,900.80	2,900.80	6.38	6.38	89.65	0.20	32.90	32.90	20.15	12.76	2.579		
3,000.00	3,000.00	3,000.80	3,000.80	6.60	6.60	89.65	0.20	32.90	32.90	19.70	13.20	2.492		
3,100.00	3,100.00	3,100.80	3,100.80	6.83	6.83	89.65	0.20	32.90	32.90	19.25	13.65	2.410		
3,200.00	3,200.00	3,200.80	3,200.80	7.05	7.05	89.65	0.20	32.90	32.90	18.80	14.10	2.333		
3,300.00	3,300.00	3,300.80	3,300.80	7.28	7.28	89.65	0.20	32.90	32.90	18.35	14.55	2.261		
3,400.00	3,400.00	3,400.80	3,400.80	7.50	7.50	89.65	0.20	32.90	32.90	17.90	15.00	2.193		
3,500.00	3,500.00	3,500.80	3,500.80	7.73	7.73	89.65	0.20	32.90	32.90	17.45	15.45	2.129		
3,600.00	3,600.00	3,600.80	3,600.80	7.95	7.95	89.65	0.20	32.90	32.90	17.00	15.90	2.069		
3,700.00	3,700.00	3,700.80	3,700.80	8.17	8.18	89.65	0.20	32.90	32.90	16.55	16.35	2.012		
3,800.00	3,800.00	3,800.80	3,800.80	8.40	8.40	89.65	0.20	32.90	32.90	16.10	16.80	1.958		
3,900.00	3,900.00	3,900.80	3,900.80	8.62	8.63	89.65	0.20	32.90	32.90	15.65	17.25	1.907		
4,000.00	4,000.00	4,000.80	4,000.80	8.85	8.85	89.65	0.20	32.90	32.90	15.20	17.70	1.859		
4,100.00	4,100.00	4,100.80	4,100.80	9.07	9.08	89.65	0.20	32.90	32.90	14.75	18.15	1.813		
4,200.00	4,200.00	4,200.80	4,200.80	9.30	9.30	89.65	0.20	32.90	32.90	14.30	18.60	1.769		
4,300.00	4,300.00	4,300.80	4,300.80	9.52	9.53	89.65	0.20	32.90	32.90	13.85	19.05	1.727		
4,400.00	4,400.00	4,400.80	4,400.80	9.75	9.75	89.65	0.20	32.90	32.90	13.40	19.50	1.687		
4,500.00	4,500.00	4,500.80	4,500.80	9.97	9.97	89.65	0.20	32.90	32.90	12.95	19.95	1.649		
4,600.00	4,600.00	4,600.80	4,600.80	10.20	10.20	89.65	0.20	32.90	32.90	12.50	20.40	1.613		
4,700.00	4,700.00	4,700.80	4,700.80	10.42	10.42	89.65	0.20	32.90	32.90	12.05	20.85	1.578		
4,800.00	4,800.00	4,800.80	4,800.80	10.65	10.65	89.65	0.20	32.90	32.90	11.60	21.30	1.545		
4,900.00	4,900.00	4,900.80	4,900.80	10.87	10.87	89.65	0.20	32.90	32.90	11.16	21.75	1.513		
4,966.40	4,966.40	4,967.20	4,967.20	11.02	11.02	89.65	0.20	32.90	32.90	10.86	22.04	1.492 Level 3, CC		
5,000.00	5,000.00	5,000.79	5,000.79	11.10	11.10	89.65	0.20	32.90	32.90	10.71	22.20	1.482 Level 3, ES		
5,100.00	5,100.00	5,100.00	5,099.98	11.32	11.31	88.50	0.91	34.50	34.52	11.88	22.63	1.525		
5,200.00	5,200.00	5,199.33	5,199.22	11.55	11.52	86.10	2.62	38.36	38.49	15.42	23.07	1.668		
5,300.00	5,300.00	5,299.23	5,299.03	11.77	11.73	84.09	4.38	42.36	42.62	19.12	23.50	1.813		
5,400.00	5,400.00	5,399.14	5,398.84	12.00	11.94	82.44	6.15	46.35	46.80	22.86	23.94	1.955		
5,500.00	5,500.00	5,499.04	5,498.65	12.22	12.16	81.06	7.92	50.34	51.01	26.63	24.38	2.092		
5,600.00	5,600.00	5,598.95	5,598.46	12.45	12.37	79.90	9.68	54.34	55.24	30.43	24.81	2.226		
5,700.00	5,700.00	5,598.85	5,598.26	12.67	12.58	78.90	11.45	58.33	59.50	34.24	25.25	2.356		
5,800.00	5,800.00	5,798.76	5,798.07	12.89	12.80	78.03	13.21	62.32	63.77	38.07	25.69	2.482		
5,900.00	5,900.00	5,898.66	5,897.88	13.12	13.01	77.27	14.98	66.31	68.05	41.91	26.13	2.604		
6,000.00	6,000.00	5,998.57	5,997.69	13.34	13.23	76.60	16.75	70.31	72.34	45.77	26.57	2.722		
6,100.00	6,100.00	6,098.47	6,097.50	13.57	13.45	76.01	18.51	74.30	76.64	49.63	27.02	2.837		
6,200.00	6,200.00	6,198.37	6,197.31	13.79	13.66	75.48	20.28	78.29	80.95	53.49	27.46	2.948		
6,300.00	6,300.00	6,298.28	6,297.12	14.02	13.88	75.00	22.05	82.29	85.27	57.37	27.90	3.056		
6,400.00	6,400.00	6,398.18	6,396.93	14.24	14.10	74.57	23.81	86.28	89.59	61.24	28.35	3.161		
6,500.00	6,500.00	6,498.09	6,496.74	14.47	14.32	74.18	25.58	90.27	93.91	65.12	28.79	3.262		
6,600.00	6,600.00	6,597.99	6,596.55	14.69	14.54	73.82	27.35	94.26	98.24	69.01	29.23	3.360		
6,700.00	6,700.00	6,697.90	6,696.35	14.92	14.76	73.50	29.11	98.26	102.57	72.89	29.68	3.456		
6,800.00	6,800.00	6,797.80	6,796.16	15.14	14.98	73.20	30.88	102.25	106.91	76.78	30.13	3.549		
6,900.00	6,900.00	6,897.71	6,895.97	15.37	15.20	72.92	32.64	106.24	111.25	80.68	30.57	3.639		
7,000.00	7,000.00	6,997.61	6,995.78	15.59	15.43	72.66	34.41	110.24	115.59	84.57	31.02	3.726		

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. 31, T 25 S., R 35 E
Site Error: 0.00 ft
Reference Well: Square Bill Federal Com 22H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
TVD Reference: KB=26' @ 3299.60ft (McVay 8)
MD Reference: KB=26' @ 3299.60ft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM 5000.1 Multi User Db
Offset TVD Reference: Offset Datum

Offset Design Sec. 31, T 25 S., R 35 E - Square Bill Federal Com 1H - Wellbore #1 - Plan #1													Offset Site Error:	0.00 ft
Survey Program: 0-MWD													Offset Well Error:	0.00 ft
Reference													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		
7,100.00	7,100.00	7,097.51	7,095.59	15.82	15.65	72.43	36.18	114.23	119.93	88.47	31.47	3.811		
7,200.00	7,200.00	7,197.42	7,195.40	16.04	15.87	72.21	37.94	118.22	124.28	92.36	31.91	3.894		
7,300.00	7,300.00	7,297.32	7,295.21	16.27	16.10	72.00	39.71	122.21	128.62	96.26	32.36	3.975		
7,400.00	7,400.00	7,397.23	7,395.02	16.49	16.32	71.81	41.48	126.21	132.97	100.16	32.81	4.053		
7,500.00	7,500.00	7,497.13	7,494.83	16.72	16.54	71.63	43.24	130.20	137.32	104.06	33.26	4.129		
7,600.00	7,600.00	7,597.04	7,594.64	16.94	16.77	71.46	45.01	134.19	141.67	107.96	33.71	4.203		
7,700.00	7,700.00	7,696.94	7,694.44	17.17	16.99	71.30	46.77	138.18	146.02	111.87	34.16	4.275		
7,800.00	7,800.00	7,796.85	7,794.25	17.39	17.22	71.15	48.54	142.18	150.38	115.77	34.61	4.345		
7,900.00	7,900.00	7,896.75	7,894.06	17.61	17.44	71.01	50.31	146.17	154.73	119.67	35.06	4.414		
8,000.00	8,000.00	7,996.65	7,993.87	17.84	17.67	70.87	52.07	150.16	159.09	123.58	35.51	4.480		
8,100.00	8,100.00	8,096.56	8,093.68	18.06	17.89	70.75	53.84	154.16	163.44	127.48	35.96	4.545		
8,200.00	8,200.00	8,196.46	8,193.49	18.29	18.12	70.63	55.61	158.15	167.80	131.39	36.41	4.609		
8,300.00	8,300.00	8,296.37	8,293.30	18.51	18.35	70.51	57.37	162.14	172.16	135.30	36.86	4.670		
8,400.00	8,400.00	8,396.27	8,393.11	18.74	18.57	70.41	59.14	166.13	176.51	139.20	37.31	4.731		
8,500.00	8,500.00	8,496.18	8,492.92	18.96	18.80	70.30	60.90	170.13	180.87	143.11	37.76	4.789		
8,600.00	8,600.00	8,596.08	8,592.73	19.19	19.03	70.20	62.67	174.12	185.23	147.01	38.22	4.847		
8,700.00	8,700.00	8,695.99	8,692.53	19.41	19.26	70.11	64.44	178.11	189.59	150.92	38.67	4.903		
8,800.00	8,800.00	8,795.89	8,792.34	19.64	19.48	70.02	66.20	182.11	193.95	154.83	39.12	4.958		
8,900.00	8,900.00	8,895.79	8,892.15	19.86	19.71	69.94	67.97	186.10	198.31	158.74	39.57	5.011		
9,000.00	9,000.00	8,995.70	8,991.96	20.09	19.94	69.85	69.74	190.09	202.67	162.65	40.03	5.063		
9,100.00	9,100.00	9,095.60	9,091.77	20.31	20.17	69.78	71.50	194.08	207.03	166.55	40.48	5.114		
9,200.00	9,200.00	9,195.51	9,191.58	20.54	20.40	69.70	73.27	198.08	211.40	170.46	40.93	5.164		
9,300.00	9,300.00	9,295.41	9,291.39	20.76	20.63	69.63	75.03	202.07	215.76	174.37	41.39	5.213		
9,400.00	9,400.00	9,395.32	9,391.20	20.99	20.85	69.56	76.80	206.06	220.12	178.28	41.84	5.261		
9,500.00	9,500.00	9,495.22	9,491.01	21.21	21.08	69.49	78.57	210.06	224.48	182.19	42.29	5.308		
9,600.00	9,600.00	9,595.13	9,590.82	21.44	21.31	69.43	80.33	214.05	228.84	186.10	42.75	5.353		
9,700.00	9,700.00	9,695.03	9,690.62	21.66	21.54	69.37	82.10	218.04	233.21	190.00	43.20	5.398		
9,800.00	9,800.00	9,794.93	9,790.43	21.89	21.77	69.31	83.87	222.03	237.57	193.91	43.66	5.442		
9,900.00	9,900.00	9,894.84	9,890.24	22.11	22.00	69.25	85.63	226.03	241.94	197.82	44.11	5.485		
10,000.00	10,000.00	9,994.74	9,990.05	22.34	22.23	69.20	87.40	230.02	246.30	201.73	44.57	5.527		
10,100.00	10,100.00	10,094.65	10,089.86	22.56	22.46	69.14	89.17	234.01	250.66	205.64	45.02	5.568		
10,200.00	10,200.00	10,194.55	10,189.67	22.78	22.69	69.09	90.93	238.01	255.03	209.55	45.48	5.608		
10,300.00	10,300.00	10,294.46	10,289.48	23.01	22.92	69.04	92.70	242.00	259.39	213.46	45.93	5.647		
10,400.00	10,400.00	10,394.36	10,389.29	23.23	23.15	68.99	94.46	245.99	263.76	217.37	46.39	5.686		
10,500.00	10,500.00	10,494.27	10,489.10	23.46	23.38	68.95	96.23	249.98	268.12	221.28	46.84	5.724		
10,600.00	10,600.00	10,594.17	10,588.91	23.68	23.61	68.90	98.00	253.98	272.49	225.19	47.30	5.761		
10,700.00	10,700.00	10,694.08	10,688.71	23.91	23.85	68.86	99.76	257.97	276.85	229.10	47.75	5.798		
10,800.00	10,800.00	10,793.98	10,788.52	24.13	24.08	68.82	101.53	261.96	281.22	233.01	48.21	5.833		
10,900.00	10,900.00	10,893.88	10,888.33	24.36	24.31	68.77	103.30	265.96	285.58	236.92	48.67	5.868		
11,000.00	11,000.00	10,993.79	10,988.14	24.58	24.54	68.73	105.06	269.95	289.95	240.83	49.12	5.903		
11,100.00	11,100.00	11,093.69	11,087.95	24.81	24.77	68.70	106.83	273.94	294.31	244.74	49.58	5.936		
11,200.00	11,200.00	11,193.60	11,187.76	25.03	25.00	68.66	108.59	277.93	298.68	248.65	50.03	5.970		
11,300.00	11,300.00	11,293.50	11,287.57	25.26	25.23	68.62	110.36	281.93	303.05	252.56	50.49	6.002		
11,400.00	11,400.00	11,393.41	11,387.38	25.48	25.46	68.59	112.13	285.92	307.41	256.47	50.95	6.034		
11,500.00	11,500.00	11,493.31	11,487.19	25.71	25.70	68.55	113.89	289.91	311.78	260.38	51.40	6.065		
11,600.00	11,600.00	11,593.22	11,587.00	25.93	25.93	68.52	115.66	293.90	316.15	264.29	51.86	6.096		
11,700.00	11,700.00	11,693.12	11,686.80	26.16	26.16	68.49	117.43	297.90	320.51	268.20	52.32	6.126		
11,800.00	11,800.00	11,793.02	11,786.61	26.38	26.39	68.45	119.19	301.89	324.88	272.11	52.77	6.156		
11,900.00	11,900.00	11,892.93	11,886.42	26.61	26.62	68.42	120.96	305.88	329.25	276.02	53.23	6.185		
12,000.00	12,000.00	11,987.90	11,981.30	26.83	26.84	68.33	123.04	309.68	333.79	280.12	53.68	6.219		
12,100.00	12,100.00	12,066.03	12,058.51	27.06	27.03	66.81	133.95	312.69	342.79	288.71	54.09	6.338		
12,200.00	12,200.00	12,138.84	12,127.98	27.28	27.21	63.77	155.33	315.32	358.96	304.47	54.49	6.587		

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. 31, T 25 S., R 35 E
 Site Error: 0.00 ft
 Reference Well: Square Bill Federal Com 22H
 Well Error: 0.00 ft
 Reference Wellbore: Wellbore #1
 Reference Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
 TVD Reference: KB=26' @ 3299.60ft (McVay 8)
 MD Reference: KB=26' @ 3299.60ft (McVay 8)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at 2.00 sigma
 Database: EDM 5000.1 Multi User Db
 Offset TVD Reference: Offset Datum

Offset Design Sec. 31, T 25 S., R 35 E - Square Bill Federal Com 1H - Wellbore #1 - Plan #1												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)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)					
12,300.00	12,299.60	12,206.07	12,188.58	27.51	27.39	59.16	184.25	317.53	380.49	325.60	6.931		
12,400.00	12,395.62	12,275.00	12,245.86	27.72	27.58	54.70	222.43	319.53	400.46	345.16	7.242		
12,500.00	12,483.87	12,336.00	12,291.51	27.92	27.76	51.65	262.79	321.06	417.09	361.41	7.491		
12,600.00	12,560.50	12,400.00	12,333.48	28.14	27.97	49.60	311.03	322.37	429.34	373.23	7.652		
12,700.00	12,622.15	12,462.90	12,368.09	28.41	28.21	48.56	363.49	323.36	436.52	379.91	7.711		
12,800.00	12,666.13	12,525.00	12,395.21	28.74	28.48	48.47	419.30	324.02	438.30	381.08	7.660		
12,900.00	12,690.53	12,589.24	12,415.42	29.14	28.80	49.34	480.23	324.36	434.64	376.69	7.501		
13,000.00	12,694.47	12,650.00	12,426.85	29.63	29.14	50.97	539.86	324.36	425.95	367.18	7.248		
13,100.00	12,690.68	12,718.14	12,430.56	30.21	29.56	51.66	607.84	323.99	420.64	360.88	6.976		
13,115.88	12,690.08	12,728.60	12,430.27	30.31	29.63	51.67	618.30	323.90	420.56	360.62	7.016		
13,200.00	12,686.89	12,809.64	12,426.16	30.88	30.19	51.56	699.23	323.11	421.21	360.14	6.897		
13,300.00	12,683.10	12,909.63	12,421.06	31.65	30.97	51.42	799.08	322.14	422.04	359.42	6.740		
13,400.00	12,679.31	13,009.62	12,415.95	32.51	31.83	51.28	898.94	321.17	422.86	358.53	6.573		
13,500.00	12,675.52	13,109.61	12,410.84	33.44	32.77	51.14	998.79	320.20	423.69	357.48	6.399		
13,600.00	12,671.73	13,209.60	12,405.74	34.44	33.79	51.01	1,098.65	319.23	424.52	356.29	6.222		
13,700.00	12,667.94	13,309.59	12,400.63	35.51	34.87	50.87	1,198.51	318.26	425.36	354.98	6.044		
13,800.00	12,664.15	13,409.58	12,395.52	36.64	36.01	50.73	1,298.36	317.29	426.19	353.54	5.866		
13,900.00	12,660.36	13,509.57	12,390.41	37.82	37.21	50.59	1,398.22	316.32	427.03	352.00	5.692		
14,000.00	12,656.57	13,609.57	12,385.31	39.05	38.45	50.46	1,498.07	315.35	427.87	350.36	5.520		
14,100.00	12,652.78	13,709.56	12,380.20	40.33	39.74	50.32	1,597.93	314.38	428.71	348.64	5.354		
14,200.00	12,648.99	13,809.55	12,375.09	41.65	41.07	50.19	1,697.79	313.41	429.56	346.83	5.193		
14,300.00	12,645.20	13,909.54	12,369.99	43.01	42.44	50.05	1,797.64	312.44	430.41	344.96	5.037		
14,400.00	12,641.41	14,009.53	12,364.88	44.40	43.84	49.92	1,897.50	311.47	431.26	343.01	4.887		
14,500.00	12,637.61	14,110.02	12,359.75	45.82	45.27	49.78	1,997.85	310.49	432.11	341.01	4.744		
14,600.00	12,633.82	14,220.79	12,356.43	47.27	46.72	49.67	2,108.56	309.41	431.60	339.61	4.592		
14,700.00	12,630.03	14,323.11	12,356.11	48.74	48.11	50.24	2,210.87	308.42	429.36	332.51	4.433		
14,800.00	12,626.24	14,423.05	12,355.90	50.24	49.61	50.61	2,310.81	307.45	427.08	327.23	4.277		
14,900.00	12,622.45	14,522.98	12,355.69	51.76	51.13	50.98	2,410.74	306.48	424.82	321.93	4.129		
15,000.00	12,618.66	14,622.92	12,355.48	53.30	52.66	51.36	2,510.67	305.50	422.57	316.61	3.988		
15,100.00	12,614.87	14,722.85	12,355.27	54.85	54.22	51.74	2,610.60	304.53	420.35	311.28	3.854		
15,200.00	12,611.08	14,822.79	12,355.06	56.42	55.79	52.12	2,710.53	303.56	418.14	305.92	3.726		
15,300.00	12,607.29	14,922.73	12,354.85	58.01	57.38	52.51	2,810.46	302.59	415.95	300.56	3.605		
15,400.00	12,603.50	15,022.66	12,354.64	59.61	58.98	52.91	2,910.39	301.62	413.79	295.19	3.489		
15,500.00	12,599.72	15,122.60	12,354.43	61.21	60.60	53.30	3,010.32	300.65	411.65	289.83	3.379		
15,599.00	12,597.87	15,221.58	12,354.23	62.54	62.21	53.47	3,109.30	299.68	410.67	285.92	3.292		
15,600.00	12,597.94	15,222.58	12,354.22	62.55	62.23	53.46	3,110.30	299.68	410.71	285.94	3.292		
15,700.00	12,597.76	15,322.58	12,354.01	64.18	63.87	53.46	3,210.30	298.70	410.73	282.69	3.208		
15,800.00	12,597.58	15,422.58	12,353.80	65.82	65.51	53.46	3,310.29	297.73	410.75	279.42	3.128		
15,900.00	12,597.40	15,522.58	12,353.59	67.47	67.17	53.45	3,410.29	296.76	410.77	276.13	3.051		
16,000.00	12,597.22	15,622.58	12,353.38	69.13	68.84	53.45	3,510.28	295.79	410.79	272.82	2.977		
16,100.00	12,597.04	15,722.58	12,353.17	70.80	70.51	53.45	3,610.28	294.81	410.81	269.50	2.907		
16,200.00	12,596.86	15,822.58	12,352.96	72.47	72.19	53.44	3,710.27	293.84	410.83	266.16	2.840		
16,300.00	12,596.68	15,922.58	12,352.75	74.16	73.88	53.44	3,810.27	292.87	410.85	262.81	2.775		
16,400.00	12,596.50	16,022.58	12,352.55	75.85	75.58	53.44	3,910.26	291.90	410.87	259.45	2.713		
16,500.00	12,596.32	16,122.58	12,352.34	77.54	77.28	53.43	4,010.26	290.93	410.89	256.07	2.654		
16,600.00	12,596.14	16,222.58	12,352.13	79.24	78.99	53.43	4,110.25	289.95	410.91	252.68	2.597		
16,700.00	12,595.96	16,322.58	12,351.92	80.95	80.70	53.43	4,210.25	288.98	410.93	249.28	2.542		
16,800.00	12,595.78	16,422.58	12,351.71	82.66	82.42	53.43	4,310.24	288.01	410.95	245.87	2.489		
16,900.00	12,595.60	16,522.58	12,351.50	84.38	84.14	53.42	4,410.24	287.04	410.97	242.45	2.439		
17,000.00	12,595.41	16,622.58	12,351.29	86.10	85.86	53.42	4,510.23	286.07	410.99	239.02	2.390		
17,100.00	12,595.23	16,722.58	12,351.08	87.83	87.59	53.42	4,610.23	285.09	411.01	235.59	2.343		
17,200.00	12,595.05	16,822.58	12,350.87	89.56	89.33	53.41	4,710.22	284.12	411.03	232.14	2.298		

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. 31, T 25 S., R 35 E
Site Error: 0.00 ft
Reference Well: Square Bill Federal Com 22H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
TVD Reference: KB=26' @ 3299.60ft (McVay 8)
MD Reference: KB=26' @ 3299.60ft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM 5000.1 Multi User Db
Offset TVD Reference: Offset Datum

Offset Design Sec. 31, T 25 S., R 35 E - Square Bill Federal Com 1H - Wellbore #1 - Plan #1													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 Tooface (")	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
17,300.00	12,594.87	16,922.58	12,350.66	91.29	91.07	53.41	4,810.22	283.15	411.05	228.69	182.36	2.254		
17,400.00	12,594.69	17,022.58	12,350.45	93.03	92.81	53.41	4,910.21	282.18	411.07	225.23	185.84	2.212		
17,500.00	12,594.51	17,122.58	12,350.24	94.77	94.55	53.40	5,010.21	281.21	411.09	221.76	189.33	2.171		
17,600.00	12,594.33	17,222.58	12,350.03	96.52	96.30	53.40	5,110.20	280.23	411.11	218.29	192.82	2.132		
17,700.00	12,594.15	17,322.58	12,349.82	98.26	98.05	53.40	5,210.20	279.26	411.13	214.81	196.32	2.094		
17,800.00	12,593.97	17,422.58	12,349.61	100.01	99.81	53.40	5,310.19	278.29	411.15	211.33	199.82	2.058		
17,900.00	12,593.79	17,522.58	12,349.40	101.77	101.56	53.39	5,410.19	277.32	411.17	207.84	203.33	2.022		
18,000.00	12,593.61	17,622.58	12,349.19	103.52	103.32	53.39	5,510.18	276.34	411.19	204.34	206.84	1.988		
18,100.00	12,593.43	17,722.58	12,348.98	105.28	105.08	53.39	5,610.18	275.37	411.21	200.85	210.36	1.955		
18,200.00	12,593.25	17,822.58	12,348.77	107.04	106.85	53.38	5,710.17	274.40	411.23	197.34	213.89	1.923		
18,300.00	12,593.07	17,922.58	12,348.56	108.80	108.61	53.38	5,810.17	273.43	411.25	193.83	217.41	1.892		
18,400.00	12,592.89	18,022.58	12,348.35	110.57	110.38	53.38	5,910.16	272.46	411.27	190.32	220.95	1.861		
18,500.00	12,592.71	18,122.58	12,348.14	112.34	112.15	53.37	6,010.16	271.48	411.29	186.80	224.48	1.832		
18,600.00	12,592.53	18,222.58	12,347.93	114.10	113.92	53.37	6,110.15	270.51	411.31	183.28	228.02	1.804		
18,700.00	12,592.35	18,322.58	12,347.72	115.87	115.69	53.37	6,210.15	269.54	411.33	179.76	231.57	1.776		
18,800.00	12,592.16	18,422.58	12,347.51	117.65	117.47	53.37	6,310.14	268.57	411.35	176.23	235.11	1.750		
18,900.00	12,591.98	18,522.58	12,347.30	119.42	119.24	53.36	6,410.14	267.60	411.37	172.70	238.67	1.724		
19,000.00	12,591.80	18,622.58	12,347.09	121.20	121.02	53.36	6,510.13	266.62	411.39	169.17	242.22	1.698		
19,100.00	12,591.62	18,722.58	12,346.88	122.97	122.80	53.36	6,610.13	265.65	411.41	165.63	245.78	1.674		
19,200.00	12,591.44	18,822.58	12,346.67	124.75	124.58	53.35	6,710.12	264.68	411.43	162.09	249.33	1.650		
19,300.00	12,591.26	18,922.58	12,346.46	126.53	126.36	53.35	6,810.12	263.71	411.45	158.55	252.90	1.627		
19,400.00	12,591.08	19,022.58	12,346.25	128.31	128.15	53.35	6,910.11	262.74	411.47	155.00	256.46	1.604		
19,500.00	12,590.90	19,122.58	12,346.04	130.10	129.93	53.34	7,010.11	261.76	411.49	151.46	260.03	1.582		
19,600.00	12,590.72	19,222.58	12,345.83	131.88	131.72	53.34	7,110.10	260.79	411.51	147.91	263.60	1.561		
19,700.00	12,590.54	19,322.58	12,345.62	133.67	133.51	53.34	7,210.10	259.82	411.53	144.35	267.17	1.540		
19,800.00	12,590.36	19,422.58	12,345.41	135.45	135.29	53.34	7,310.09	258.85	411.55	140.80	270.75	1.520		
19,900.00	12,590.18	19,522.58	12,345.21	137.24	137.08	53.33	7,410.09	257.87	411.57	137.24	274.32	1.500		
19,955.75	12,590.08	19,578.34	12,345.09	138.24	138.08	53.33	7,465.84	257.33	411.58	135.26	276.32	1.490 Level 3		
19,998.73	12,590.00	19,620.25	12,345.00	139.01	138.83	53.33	7,507.75	256.93	411.59	133.75	277.84	1.481 Level 3, SF		

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



Integrity Directional Services, LLC

Anticollision Report

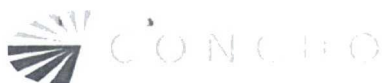


Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Reference Site: Sec. 31, T 25 S., R 35 E
Site Error: 0.00 ft
Reference Well: Square Bill Federal Com 22H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
TVD Reference: KB=26' @ 3299.60ft (McVay 8)
MD Reference: KB=26' @ 3299.60ft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM 5000.1 Multi User Db
Offset TVD Reference: Offset Datum

Offset Design Sec. 31, T 25 S., R 35 E - Square Bill Federal Com 21H - Wellbore #1 - Plan #1													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 +N/-S (ft)	Centre +E/-W (ft)						
0.00	0.00	0.80	0.80	0.00	0.00	89.65	0.40	66.00	66.00					
100.00	100.00	100.80	100.80	0.08	0.08	89.65	0.40	66.00	66.00	65.83	0.17	392.573		
200.00	200.00	200.80	200.80	0.31	0.31	89.65	0.40	66.00	66.00	65.38	0.62	106.858		
300.00	300.00	300.80	300.80	0.53	0.53	89.65	0.40	66.00	66.00	64.93	1.07	61.846		
400.00	400.00	400.80	400.80	0.76	0.76	89.65	0.40	66.00	66.00	64.48	1.52	43.516		
500.00	500.00	500.80	500.80	0.98	0.98	89.65	0.40	66.00	66.00	64.04	1.97	33.567		
600.00	600.00	600.80	600.80	1.21	1.21	89.65	0.40	66.00	66.00	63.59	2.42	27.321		
700.00	700.00	700.80	700.80	1.43	1.43	89.65	0.40	66.00	66.00	63.14	2.87	23.035		
800.00	800.00	800.80	800.80	1.66	1.66	89.65	0.40	66.00	66.00	62.69	3.31	19.911		
900.00	900.00	900.80	900.80	1.88	1.88	89.65	0.40	66.00	66.00	62.24	3.76	17.533		
1,000.00	1,000.00	1,000.80	1,000.80	2.11	2.11	89.65	0.40	66.00	66.00	61.79	4.21	15.663		
1,100.00	1,100.00	1,100.80	1,100.80	2.33	2.33	89.65	0.40	66.00	66.00	61.34	4.66	14.153		
1,200.00	1,200.00	1,200.80	1,200.80	2.56	2.56	89.65	0.40	66.00	66.00	60.89	5.11	12.909		
1,300.00	1,300.00	1,300.80	1,300.80	2.78	2.78	89.65	0.40	66.00	66.00	60.44	5.56	11.865		
1,400.00	1,400.00	1,400.80	1,400.80	3.01	3.01	89.65	0.40	66.00	66.00	59.99	6.01	10.978		
1,500.00	1,500.00	1,500.80	1,500.80	3.23	3.23	89.65	0.40	66.00	66.00	59.54	6.46	10.214		
1,600.00	1,600.00	1,600.80	1,600.80	3.45	3.46	89.65	0.40	66.00	66.00	59.09	6.91	9.550		
1,700.00	1,700.00	1,700.80	1,700.80	3.68	3.68	89.65	0.40	66.00	66.00	58.64	7.36	8.967		
1,800.00	1,800.00	1,800.80	1,800.80	3.90	3.91	89.65	0.40	66.00	66.00	58.19	7.81	8.451		
1,900.00	1,900.00	1,900.80	1,900.80	4.13	4.13	89.65	0.40	66.00	66.00	57.74	8.26	7.991		
2,000.00	2,000.00	2,000.80	2,000.80	4.35	4.36	89.65	0.40	66.00	66.00	57.29	8.71	7.578		
2,100.00	2,100.00	2,100.80	2,100.80	4.58	4.58	89.65	0.40	66.00	66.00	56.84	9.16	7.206		
2,200.00	2,200.00	2,200.80	2,200.80	4.80	4.81	89.65	0.40	66.00	66.00	56.39	9.61	6.869		
2,300.00	2,300.00	2,300.80	2,300.80	5.03	5.03	89.65	0.40	66.00	66.00	55.94	10.06	6.562		
2,400.00	2,400.00	2,400.80	2,400.80	5.25	5.25	89.65	0.40	66.00	66.00	55.49	10.51	6.281		
2,500.00	2,500.00	2,500.80	2,500.80	5.48	5.48	89.65	0.40	66.00	66.00	55.04	10.96	6.024		
2,600.00	2,600.00	2,600.80	2,600.80	5.70	5.70	89.65	0.40	66.00	66.00	54.59	11.41	5.786		
2,700.00	2,700.00	2,700.80	2,700.80	5.93	5.93	89.65	0.40	66.00	66.00	54.15	11.86	5.567		
2,800.00	2,800.00	2,800.80	2,800.80	6.15	6.15	89.65	0.40	66.00	66.00	53.70	12.31	5.364		
2,900.00	2,900.00	2,900.80	2,900.80	6.38	6.38	89.65	0.40	66.00	66.00	53.25	12.76	5.175		
3,000.00	3,000.00	3,000.80	3,000.80	6.60	6.60	89.65	0.40	66.00	66.00	52.80	13.20	4.998		
3,100.00	3,100.00	3,100.80	3,100.80	6.83	6.83	89.65	0.40	66.00	66.00	52.35	13.65	4.834		
3,200.00	3,200.00	3,200.80	3,200.80	7.05	7.05	89.65	0.40	66.00	66.00	51.90	14.10	4.680		
3,300.00	3,300.00	3,300.80	3,300.80	7.28	7.28	89.65	0.40	66.00	66.00	51.45	14.55	4.535		
3,400.00	3,400.00	3,400.80	3,400.80	7.50	7.50	89.65	0.40	66.00	66.00	51.00	15.00	4.399		
3,500.00	3,500.00	3,500.80	3,500.80	7.73	7.73	89.65	0.40	66.00	66.00	50.55	15.45	4.271		
3,600.00	3,600.00	3,600.80	3,600.80	7.95	7.95	89.65	0.40	66.00	66.00	50.10	15.90	4.151		
3,700.00	3,700.00	3,700.80	3,700.80	8.17	8.18	89.65	0.40	66.00	66.00	49.65	16.35	4.036		
3,800.00	3,800.00	3,800.80	3,800.80	8.40	8.40	89.65	0.40	66.00	66.00	49.20	16.80	3.928		
3,900.00	3,900.00	3,900.80	3,900.80	8.62	8.63	89.65	0.40	66.00	66.00	48.75	17.25	3.826		
4,000.00	4,000.00	4,000.80	4,000.80	8.85	8.85	89.65	0.40	66.00	66.00	48.30	17.70	3.729		
4,100.00	4,100.00	4,100.80	4,100.80	9.07	9.08	89.65	0.40	66.00	66.00	47.85	18.15	3.637		
4,200.00	4,200.00	4,200.80	4,200.80	9.30	9.30	89.65	0.40	66.00	66.00	47.40	18.60	3.549		
4,300.00	4,300.00	4,300.80	4,300.80	9.52	9.53	89.65	0.40	66.00	66.00	46.95	19.05	3.465		
4,400.00	4,400.00	4,400.80	4,400.80	9.75	9.75	89.65	0.40	66.00	66.00	46.50	19.50	3.385		
4,500.00	4,500.00	4,500.80	4,500.80	9.97	9.97	89.65	0.40	66.00	66.00	46.05	19.95	3.309		
4,600.00	4,600.00	4,600.80	4,600.80	10.20	10.20	89.65	0.40	66.00	66.00	45.60	20.40	3.236		
4,700.00	4,700.00	4,700.80	4,700.80	10.42	10.42	89.65	0.40	66.00	66.00	45.15	20.85	3.166		
4,800.00	4,800.00	4,800.80	4,800.80	10.65	10.65	89.65	0.40	66.00	66.00	44.71	21.30	3.099		
4,900.00	4,900.00	4,900.80	4,900.80	10.87	10.87	89.65	0.40	66.00	66.00	44.26	21.75	3.035		
4,966.40	4,966.40	4,967.20	4,967.20	11.02	11.02	89.65	0.40	66.00	66.00	43.96	22.04	2.994 CC		
5,000.00	5,000.00	5,000.00	5,000.00	11.10	11.10	89.65	0.40	66.00	66.01	43.81	22.19	2.974 ES		

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



Integrity Directional Services, LLC

Anticollision Report

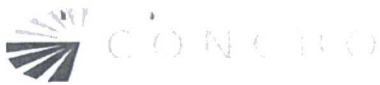


Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Reference Site: Sec. 31, T 25 S., R 35 E
Site Error: 0.00 ft
Reference Well: Square Bill Federal Com 22H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
TVD Reference: KB=26' @ 3299.60ft (McVay 8)
MD Reference: KB=26' @ 3299.60ft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM 5000.1 Multi User Db
Offset TVD Reference: Offset Datum

Offset Design Sec. 31, T 25 S., R 35 E - Square Bill Federal Com 21H - Wellbore #1 - Plan #1													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)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
5,100.00	5,100.00	5,098.54	5,098.52	11.32	11.31	89.35	0.77	67.65	67.70	45.07	22.63	2.992		
5,200.00	5,200.00	5,196.07	5,195.92	11.55	11.51	88.53	1.86	72.55	72.73	49.68	23.05	3.155		
5,300.00	5,300.00	5,294.95	5,294.50	11.77	11.71	87.47	3.54	80.05	80.38	56.89	23.48	3.423		
5,400.00	5,400.00	5,394.63	5,393.86	12.00	11.92	86.56	5.27	87.80	88.23	64.31	23.92	3.689		
5,500.00	5,500.00	5,494.31	5,493.23	12.22	12.14	85.81	7.00	95.55	96.10	71.75	24.36	3.946		
5,600.00	5,600.00	5,594.00	5,592.59	12.45	12.35	85.17	8.73	103.30	103.99	79.19	24.80	4.194		
5,700.00	5,700.00	5,693.68	5,691.96	12.67	12.57	84.62	10.47	111.04	111.89	86.65	25.24	4.434		
5,800.00	5,800.00	5,793.36	5,791.33	12.89	12.78	84.14	12.20	118.79	119.79	94.11	25.68	4.665		
5,900.00	5,900.00	5,893.04	5,890.69	13.12	13.00	83.72	13.93	126.54	127.70	101.58	26.12	4.889		
6,000.00	6,000.00	5,992.73	5,990.06	13.34	13.22	83.35	15.66	134.29	135.62	109.05	26.57	5.105		
6,100.00	6,100.00	6,092.41	6,089.42	13.57	13.45	83.02	17.39	142.03	143.55	116.53	27.02	5.313		
6,200.00	6,200.00	6,192.09	6,188.79	13.79	13.67	82.72	19.12	149.78	151.47	124.01	27.47	5.515		
6,300.00	6,300.00	6,291.77	6,288.15	14.02	13.90	82.46	20.85	157.53	159.40	131.49	27.92	5.710		
6,400.00	6,400.00	6,391.46	6,387.52	14.24	14.12	82.22	22.58	165.28	167.34	138.97	28.37	5.899		
6,500.00	6,500.00	6,491.14	6,486.89	14.47	14.35	82.00	24.32	173.02	175.28	146.46	28.82	6.082		
6,600.00	6,600.00	6,590.82	6,586.25	14.69	14.58	81.80	26.05	180.77	183.22	153.94	29.28	6.258		
6,700.00	6,700.00	6,690.50	6,685.62	14.92	14.81	81.62	27.78	188.52	191.16	161.43	29.73	6.430		
6,800.00	6,800.00	6,790.19	6,784.98	15.14	15.05	81.45	29.51	196.27	199.10	168.91	30.19	6.595		
6,900.00	6,900.00	6,889.87	6,884.35	15.37	15.28	81.29	31.24	204.01	207.05	176.40	30.65	6.756		
7,000.00	7,000.00	6,889.55	6,883.71	15.59	15.51	81.15	32.97	211.76	214.99	183.89	31.10	6.912		
7,100.00	7,100.00	7,089.23	7,083.08	15.82	15.75	81.02	34.70	219.51	222.94	191.38	31.56	7.063		
7,200.00	7,200.00	7,188.92	7,182.45	16.04	15.98	80.89	36.43	227.26	230.89	198.86	32.03	7.210		
7,300.00	7,300.00	7,288.60	7,281.81	16.27	16.22	80.78	38.17	235.00	238.84	206.35	32.49	7.352		
7,400.00	7,400.00	7,388.28	7,381.18	16.49	16.46	80.67	39.90	242.75	246.79	213.84	32.95	7.490		
7,500.00	7,500.00	7,487.96	7,480.54	16.72	16.70	80.56	41.63	250.50	254.74	221.33	33.41	7.624		
7,600.00	7,600.00	7,587.64	7,579.91	16.94	16.94	80.47	43.36	258.25	262.69	228.82	33.88	7.754		
7,700.00	7,700.00	7,687.33	7,679.28	17.17	17.18	80.38	45.09	265.99	270.64	236.30	34.34	7.881		
7,800.00	7,800.00	7,787.01	7,778.64	17.39	17.42	80.29	46.82	273.74	278.60	243.79	34.81	8.004		
7,900.00	7,900.00	7,886.69	7,878.01	17.61	17.66	80.21	48.55	281.49	286.55	251.28	35.27	8.124		
8,000.00	8,000.00	7,986.37	7,977.37	17.84	17.90	80.14	50.28	289.24	294.51	258.77	35.74	8.240		
8,100.00	8,100.00	8,086.06	8,076.74	18.06	18.14	80.07	52.02	296.98	302.46	266.25	36.21	8.353		
8,200.00	8,200.00	8,185.74	8,176.10	18.29	18.39	80.00	53.75	304.73	310.42	273.74	36.68	8.464		
8,300.00	8,300.00	8,285.42	8,275.47	18.51	18.63	79.93	55.48	312.48	318.37	281.23	37.14	8.571		
8,400.00	8,400.00	8,385.10	8,374.84	18.74	18.88	79.87	57.21	320.22	326.33	288.72	37.61	8.676		
8,500.00	8,500.00	8,484.79	8,474.20	18.96	19.12	79.81	58.94	327.97	334.29	296.20	38.08	8.778		
8,600.00	8,600.00	8,584.47	8,573.57	19.19	19.37	79.76	60.67	335.72	342.24	303.69	38.55	8.877		
8,700.00	8,700.00	8,684.15	8,672.93	19.41	19.61	79.70	62.40	343.47	350.20	311.18	39.03	8.974		
8,800.00	8,800.00	8,783.83	8,772.30	19.64	19.86	79.65	64.13	351.21	358.16	318.66	39.50	9.068		
8,900.00	8,900.00	8,883.52	8,871.66	19.86	20.11	79.60	65.87	358.96	366.12	326.15	39.97	9.160		
9,000.00	9,000.00	8,983.20	8,971.03	20.09	20.35	79.56	67.60	366.71	374.07	333.63	40.44	9.250		
9,100.00	9,100.00	9,082.88	9,070.40	20.31	20.60	79.51	69.33	374.46	382.03	341.12	40.91	9.337		
9,200.00	9,200.00	9,182.56	9,169.76	20.54	20.85	79.47	71.06	382.20	389.99	348.60	41.39	9.423		
9,300.00	9,300.00	9,282.25	9,269.13	20.76	21.10	79.43	72.79	389.95	397.95	356.09	41.86	9.507		
9,400.00	9,400.00	9,381.93	9,368.49	20.99	21.35	79.39	74.52	397.70	405.91	363.57	42.33	9.588		
9,500.00	9,500.00	9,481.61	9,467.86	21.21	21.60	79.35	76.25	405.45	413.87	371.06	42.81	9.668		
9,600.00	9,600.00	9,581.29	9,567.23	21.44	21.85	79.31	77.99	413.19	421.83	378.54	43.28	9.746		
9,700.00	9,700.00	9,680.97	9,666.59	21.66	22.10	79.28	79.72	420.94	429.79	386.03	43.76	9.822		
9,800.00	9,800.00	9,780.66	9,765.96	21.89	22.35	79.24	81.45	428.69	437.75	393.51	44.23	9.896		
9,900.00	9,900.00	9,880.34	9,865.32	22.11	22.60	79.21	83.18	436.44	445.71	401.00	44.71	9.969		
10,000.00	10,000.00	9,980.02	9,964.69	22.34	22.85	79.18	84.91	444.18	453.67	408.48	45.19	10.040		
10,100.00	10,100.00	10,079.70	10,064.05	22.56	23.10	79.15	86.64	451.93	461.63	415.96	45.66	10.110		
10,200.00	10,200.00	10,179.39	10,163.42	22.78	23.35	79.12	88.37	459.68	469.59	423.45	46.14	10.178		

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. 31, T 25 S., R 35 E
Site Error: 0.00 ft
Reference Well: Square Bill Federal Com 22H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
TVD Reference: KB=26' @ 3299.60ft (McVay 8)
MD Reference: KB=26' @ 3299.60ft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM 5000.1 Multi User Db
Offset TVD Reference: Offset Datum

Offset Design Sec. 31, T 25 S., R 35 E - Square Bill Federal Com 21H - Wellbore #1 - Plan #1													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		
10,300.00	10,300.00	10,279.07	10,262.79	23.01	23.61	79.09	90.10	467.43	477.55	430.93	46.62	10.244		
10,400.00	10,400.00	10,378.75	10,362.15	23.23	23.86	79.06	91.84	475.17	485.51	438.42	47.09	10.310		
10,500.00	10,500.00	10,478.43	10,461.52	23.46	24.11	79.03	93.57	482.92	493.47	445.90	47.57	10.373		
10,600.00	10,600.00	10,578.12	10,560.88	23.68	24.36	79.01	95.30	490.67	501.43	453.38	48.05	10.436		
10,700.00	10,700.00	10,677.80	10,660.25	23.91	24.62	78.98	97.03	498.42	509.39	460.86	48.53	10.497		
10,800.00	10,800.00	10,777.48	10,759.61	24.13	24.87	78.96	98.76	506.16	517.35	468.35	49.00	10.557		
10,900.00	10,900.00	10,877.16	10,858.98	24.36	25.13	78.94	100.49	513.91	525.31	475.83	49.48	10.616		
11,000.00	11,000.00	10,976.85	10,958.35	24.58	25.38	78.91	102.22	521.66	533.27	483.31	49.96	10.674		
11,100.00	11,100.00	11,076.53	11,057.71	24.81	25.63	78.89	103.95	529.41	541.23	490.79	50.44	10.730		
11,200.00	11,200.00	11,176.21	11,157.08	25.03	25.89	78.87	105.69	537.15	549.20	498.28	50.92	10.786		
11,300.00	11,300.00	11,275.89	11,256.44	25.26	26.14	78.85	107.42	544.90	557.16	505.76	51.40	10.840		
11,400.00	11,400.00	11,375.58	11,355.81	25.48	26.40	78.83	109.15	552.65	565.12	513.24	51.88	10.893		
11,500.00	11,500.00	11,475.26	11,455.17	25.71	26.65	78.81	110.88	560.40	573.08	520.72	52.36	10.945		
11,600.00	11,600.00	11,574.94	11,554.54	25.93	26.91	78.79	112.61	568.14	581.04	528.20	52.84	10.997		
11,700.00	11,700.00	11,674.62	11,653.91	26.16	27.16	78.77	114.34	575.89	589.00	535.68	53.32	11.047		
11,800.00	11,800.00	11,774.30	11,753.27	26.38	27.42	78.75	116.07	583.64	596.96	543.17	53.80	11.096		
11,900.00	11,900.00	11,873.99	11,852.64	26.61	27.67	78.73	117.80	591.39	604.93	550.65	54.28	11.145		
12,000.00	12,000.00	11,973.67	11,952.00	26.83	27.93	78.72	119.54	599.13	612.89	558.13	54.76	11.192		
12,100.00	12,100.00	12,073.35	12,051.37	27.06	28.19	78.70	121.27	606.88	620.85	565.61	55.24	11.239		
12,200.00	12,200.00	12,173.03	12,150.74	27.28	28.44	78.68	123.00	614.63	628.81	573.09	55.72	11.285		
12,300.00	12,299.60	12,269.08	12,246.47	27.51	28.69	79.16	124.87	622.09	635.51	579.32	56.19	11.309		
12,400.00	12,395.62	12,350.00	12,326.36	27.72	28.90	79.71	135.48	628.26	640.53	583.90	56.62	11.312		
12,500.00	12,483.87	12,432.08	12,404.40	27.92	29.12	80.61	159.88	634.20	644.89	587.85	57.04	11.306		
12,600.00	12,560.50	12,517.00	12,479.52	28.14	29.35	81.85	198.83	639.81	648.66	591.17	57.49	11.282		
12,700.00	12,622.15	12,605.15	12,548.96	28.41	29.61	83.40	252.68	644.88	651.94	593.92	58.01	11.238		
12,800.00	12,666.13	12,697.40	12,609.79	28.74	29.90	85.23	321.72	649.19	654.80	596.16	58.63	11.168		
12,900.00	12,690.53	12,794.75	12,658.39	29.14	30.25	87.28	405.81	652.44	657.27	597.88	59.39	11.066		
13,000.00	12,694.47	12,898.31	12,690.31	29.63	30.71	89.53	504.09	654.29	659.30	598.97	60.33	10.928		
13,100.00	12,690.68	13,010.34	12,700.25	30.21	31.31	90.76	615.43	654.35	660.38	598.87	61.51	10.736		
13,200.00	12,686.89	13,111.23	12,696.01	30.88	31.95	90.72	716.22	653.37	660.37	597.54	62.83	10.510		
13,300.00	12,683.10	13,211.22	12,691.75	31.65	32.68	90.68	816.12	652.39	660.36	596.02	64.34	10.264		
13,400.00	12,679.31	13,311.22	12,687.49	32.51	33.51	90.64	916.02	651.41	660.35	594.34	66.01	10.003		
13,500.00	12,675.52	13,411.22	12,683.23	33.44	34.41	90.60	1,015.93	650.43	660.34	592.49	67.85	9.733		
13,600.00	12,671.73	13,511.22	12,678.98	34.44	35.39	90.56	1,115.83	649.45	660.33	590.50	69.83	9.457		
13,700.00	12,667.94	13,611.22	12,674.72	35.51	36.43	90.52	1,215.73	648.47	660.32	588.38	71.94	9.179		
13,800.00	12,664.15	13,711.22	12,670.46	36.64	37.54	90.48	1,315.64	647.49	660.32	586.14	74.17	8.902		
13,900.00	12,660.36	13,811.22	12,666.20	37.82	38.69	90.44	1,415.54	646.51	660.31	583.79	76.52	8.630		
14,000.00	12,656.57	13,911.22	12,661.94	39.05	39.90	90.40	1,515.44	645.54	660.30	581.34	78.96	8.363		
14,100.00	12,652.78	14,011.22	12,657.68	40.33	41.16	90.36	1,615.35	644.56	660.29	578.80	81.49	8.102		
14,200.00	12,648.99	14,111.21	12,653.43	41.65	42.46	90.32	1,715.25	643.58	660.28	576.17	84.11	7.850		
14,300.00	12,645.20	14,211.21	12,649.17	43.01	43.79	90.28	1,815.15	642.60	660.28	573.48	86.80	7.607		
14,400.00	12,641.41	14,311.21	12,644.91	44.40	45.16	90.24	1,915.06	641.62	660.27	570.71	89.56	7.372		
14,500.00	12,637.61	14,411.21	12,640.65	45.82	46.56	90.19	2,014.96	640.64	660.26	567.88	92.38	7.147		
14,600.00	12,633.82	14,511.21	12,636.39	47.27	47.99	90.15	2,114.86	639.66	660.26	565.00	95.26	6.931		
14,700.00	12,630.03	14,611.21	12,632.14	48.74	49.45	90.11	2,214.77	638.68	660.25	562.06	98.19	6.724		
14,800.00	12,626.24	14,711.21	12,627.88	50.24	50.93	90.07	2,314.67	637.70	660.25	559.08	101.17	6.526		
14,900.00	12,622.45	14,811.21	12,623.62	51.76	52.43	90.03	2,414.57	636.73	660.24	556.05	104.19	6.337		
15,000.00	12,618.66	14,911.21	12,619.36	53.30	53.95	89.99	2,514.48	635.75	660.24	552.99	107.25	6.156		
15,100.00	12,614.87	15,011.20	12,615.10	54.85	55.49	89.95	2,614.38	634.77	660.23	549.89	110.34	5.983		
15,200.00	12,611.08	15,111.20	12,610.85	56.42	57.05	89.91	2,714.28	633.79	660.23	546.76	113.47	5.818		
15,300.00	12,607.29	15,211.20	12,606.59	58.01	58.62	89.87	2,814.19	632.81	660.22	543.59	116.63	5.661		
15,400.00	12,603.50	15,311.20	12,602.33	59.61	60.21	89.83	2,914.09	631.83	660.22	540.40	119.82	5.510		

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. 31, T 25 S., R 35 E
Site Error: 0.00 ft
Reference Well: Square Bill Federal Com 22H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
TVD Reference: KB=26' @ 3299.60ft (McVay 8)
MD Reference: KB=26' @ 3299.60ft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM 5000.1 Multi User Db
Offset TVD Reference: Offset Datum

Offset Design													Sec. 31, T 25 S., R 35 E - Square Bill Federal Com 21H - Wellbore #1 - Plan #1		Offset Site Error:		0.00 ft	
Survey Program: 0-MWD													Offset Well Error:		0.00 ft			
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning					
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)								
15,500.00	12,599.72	15,411.24	12,598.43	61.21	61.72	89.82	3,014.04	630.85	660.22	537.28	122.94	5.370						
15,600.00	12,597.94	15,511.29	12,597.51	62.55	63.05	89.89	3,114.08	629.87	660.21	534.61	125.60	5.257						
15,700.00	12,597.76	15,611.28	12,598.25	64.18	64.54	89.97	3,214.07	628.89	660.20	531.48	128.72	5.129						
15,800.00	12,597.58	15,711.28	12,598.99	65.82	66.17	90.05	3,314.06	627.91	660.20	528.21	131.99	5.002						
15,900.00	12,597.40	15,811.28	12,599.73	67.47	67.80	90.13	3,414.05	626.93	660.20	524.92	135.27	4.880						
16,000.00	12,597.22	15,911.27	12,600.47	69.13	69.45	90.21	3,514.04	625.95	660.20	521.61	138.58	4.764						
16,094.34	12,597.05	16,005.61	12,601.17	70.70	71.01	90.29	3,608.37	625.03	660.19	518.48	141.72	4.659						
16,100.00	12,597.04	16,011.27	12,601.21	70.80	71.11	90.29	3,614.02	624.97	660.19	518.29	141.90	4.652						
16,200.00	12,596.86	16,111.26	12,601.95	72.47	72.77	90.37	3,714.01	623.99	660.20	514.95	145.24	4.545						
16,300.00	12,596.68	16,211.26	12,602.69	74.16	74.44	90.45	3,814.00	623.01	660.20	511.60	148.60	4.443						
16,400.00	12,596.50	16,311.25	12,603.42	75.85	76.12	90.53	3,913.99	622.03	660.20	508.24	151.96	4.344						
16,500.00	12,596.32	16,411.25	12,604.16	77.54	77.80	90.61	4,013.98	621.05	660.21	504.86	155.35	4.250						
16,600.00	12,596.14	16,511.25	12,604.90	79.24	79.49	90.69	4,113.97	620.07	660.21	501.47	158.74	4.159						
16,700.00	12,595.96	16,611.24	12,605.64	80.95	81.19	90.77	4,213.95	619.09	660.22	498.07	162.14	4.072						
16,800.00	12,595.78	16,711.24	12,606.38	82.66	82.90	90.85	4,313.94	618.12	660.23	494.67	165.56	3.988						
16,900.00	12,595.60	16,811.23	12,607.12	84.38	84.60	90.93	4,413.93	617.14	660.24	491.25	168.98	3.907						
17,000.00	12,595.41	16,911.23	12,607.86	86.10	86.32	91.01	4,513.92	616.16	660.25	487.83	172.42	3.829						
17,100.00	12,595.23	17,011.23	12,608.60	87.83	88.03	91.09	4,613.91	615.18	660.26	484.40	175.86	3.754						
17,200.00	12,595.05	17,111.22	12,609.34	89.56	89.76	91.17	4,713.89	614.20	660.27	480.96	179.32	3.682						
17,300.00	12,594.87	17,211.22	12,610.08	91.29	91.48	91.25	4,813.88	613.22	660.29	477.51	182.78	3.613						
17,400.00	12,594.69	17,311.21	12,610.81	93.03	93.21	91.33	4,913.87	612.24	660.30	474.06	186.24	3.545						
17,500.00	12,594.51	17,411.21	12,611.55	94.77	94.95	91.41	5,013.86	611.26	660.32	470.60	189.72	3.481						
17,600.00	12,594.33	17,511.20	12,612.29	96.52	96.68	91.49	5,113.85	610.28	660.34	467.14	193.20	3.418						
17,700.00	12,594.15	17,611.20	12,613.03	98.26	98.42	91.57	5,213.84	609.30	660.36	463.67	196.69	3.357						
17,800.00	12,593.97	17,711.20	12,613.77	100.01	100.17	91.65	5,313.82	608.32	660.38	460.20	200.18	3.299						
17,900.00	12,593.79	17,811.19	12,614.51	101.77	101.91	91.73	5,413.81	607.34	660.40	456.72	203.68	3.242						
18,000.00	12,593.61	17,911.19	12,615.25	103.52	103.66	91.81	5,513.80	606.36	660.43	453.24	207.19	3.188						
18,100.00	12,593.43	18,011.18	12,615.99	105.28	105.42	91.89	5,613.79	605.38	660.45	449.76	210.70	3.135						
18,200.00	12,593.25	18,111.18	12,616.73	107.04	107.17	91.97	5,713.78	604.40	660.48	446.27	214.21	3.083						
18,300.00	12,593.07	18,211.17	12,617.47	108.80	108.93	92.05	5,813.77	603.42	660.51	442.77	217.73	3.034						
18,400.00	12,592.89	18,311.17	12,618.20	110.57	110.69	92.13	5,913.75	602.44	660.53	439.28	221.26	2.985						
18,500.00	12,592.71	18,411.17	12,618.94	112.34	112.45	92.21	6,013.74	601.46	660.57	435.78	224.78	2.939						
18,600.00	12,592.53	18,511.16	12,619.68	114.10	114.21	92.29	6,113.73	600.48	660.60	432.28	228.32	2.893						
18,700.00	12,592.35	18,611.16	12,620.42	115.87	115.98	92.37	6,213.72	599.50	660.63	428.78	231.85	2.849						
18,800.00	12,592.16	18,711.15	12,621.16	117.65	117.75	92.45	6,313.71	598.52	660.66	425.27	235.39	2.807						
18,900.00	12,591.98	18,811.15	12,621.90	119.42	119.51	92.53	6,413.69	597.54	660.70	421.76	238.94	2.765						
19,000.00	12,591.80	18,911.15	12,622.64	121.20	121.29	92.61	6,513.68	596.56	660.74	418.25	242.48	2.725						
19,100.00	12,591.62	19,011.14	12,623.38	122.97	123.06	92.68	6,613.67	595.58	660.77	414.74	246.03	2.686						
19,200.00	12,591.44	19,111.14	12,624.12	124.75	124.83	92.76	6,713.66	594.60	660.81	411.23	249.59	2.648						
19,300.00	12,591.26	19,211.13	12,624.86	126.53	126.61	92.84	6,813.65	593.62	660.85	407.71	253.14	2.611						
19,400.00	12,591.08	19,311.13	12,625.59	128.31	128.39	92.92	6,913.64	592.64	660.89	404.19	256.70	2.575						
19,500.00	12,590.90	19,411.12	12,626.33	130.10	130.16	93.00	7,013.62	591.66	660.94	400.68	260.26	2.540						
19,600.00	12,590.72	19,511.12	12,627.07	131.88	131.95	93.08	7,113.61	590.68	660.98	397.16	263.83	2.505						
19,700.00	12,590.54	19,611.12	12,627.81	133.67	133.73	93.16	7,213.60	589.70	661.03	393.63	267.39	2.472						
19,800.00	12,590.36	19,711.11	12,628.55	135.45	135.51	93.24	7,313.59	588.72	661.07	390.11	270.96	2.440						
19,900.00	12,590.18	19,811.11	12,629.29	137.24	137.29	93.32	7,413.58	587.74	661.12	386.59	274.53	2.408						
19,951.74	12,590.09	19,862.85	12,629.67	138.17	138.22	93.36	7,465.32	587.24	661.15	384.77	276.38	2.392						
19,998.73	12,590.00	19,907.35	12,630.00	139.01	139.01	93.40	7,509.82	586.80	661.17	383.16	278.02	2.378 SF						

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. 31, T 25 S., R 35 E
Site Error: 0.00 ft
Reference Well: Square Bill Federal Com 22H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
TVD Reference: KB=26' @ 3299.60ft (McVay 8)
MD Reference: KB=26' @ 3299.60ft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM 5000.1 Multi User Db
Offset TVD Reference: Offset Datum

Offset Design Sec. 31, T 25 S., R 35 E - Square Bill Federal Com 23H - Wellbore #1 - Plan #1													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 Tooface (")	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
0.00	0.00	0.70	0.70	0.00	0.00	-90.52	-0.30	-33.10	33.10					
100.00	100.00	100.70	100.70	0.08	0.08	-90.52	-0.30	-33.10	33.10	32.93	0.17	197.149		
200.00	200.00	200.70	200.70	0.31	0.31	-90.52	-0.30	-33.10	33.10	32.48	0.62	53.611		
300.00	300.00	300.70	300.70	0.53	0.53	-90.52	-0.30	-33.10	33.10	32.03	1.07	31.024		
400.00	400.00	400.70	400.70	0.76	0.76	-90.52	-0.30	-33.10	33.10	31.58	1.52	21.828		
500.00	500.00	500.70	500.70	0.98	0.98	-90.52	-0.30	-33.10	33.10	31.14	1.97	16.837		
600.00	600.00	600.70	600.70	1.21	1.21	-90.52	-0.30	-33.10	33.10	30.69	2.42	13.703		
700.00	700.00	700.70	700.70	1.43	1.43	-90.52	-0.30	-33.10	33.10	30.24	2.87	11.553		
800.00	800.00	800.70	800.70	1.66	1.66	-90.52	-0.30	-33.10	33.10	29.79	3.31	9.986		
900.00	900.00	900.70	900.70	1.88	1.88	-90.52	-0.30	-33.10	33.10	29.34	3.76	8.794		
1,000.00	1,000.00	1,000.70	1,000.70	2.11	2.11	-90.52	-0.30	-33.10	33.10	28.89	4.21	7.856		
1,100.00	1,100.00	1,100.70	1,100.70	2.33	2.33	-90.52	-0.30	-33.10	33.10	28.44	4.66	7.098		
1,200.00	1,200.00	1,200.70	1,200.70	2.56	2.56	-90.52	-0.30	-33.10	33.10	27.99	5.11	6.474		
1,300.00	1,300.00	1,300.70	1,300.70	2.78	2.78	-90.52	-0.30	-33.10	33.10	27.54	5.56	5.951		
1,400.00	1,400.00	1,400.70	1,400.70	3.01	3.01	-90.52	-0.30	-33.10	33.10	27.09	6.01	5.506		
1,500.00	1,500.00	1,500.70	1,500.70	3.23	3.23	-90.52	-0.30	-33.10	33.10	26.64	6.46	5.123		
1,600.00	1,600.00	1,600.70	1,600.70	3.45	3.46	-90.52	-0.30	-33.10	33.10	26.19	6.91	4.790		
1,700.00	1,700.00	1,700.70	1,700.70	3.68	3.68	-90.52	-0.30	-33.10	33.10	25.74	7.36	4.497		
1,800.00	1,800.00	1,800.70	1,800.70	3.90	3.91	-90.52	-0.30	-33.10	33.10	25.29	7.81	4.238		
1,900.00	1,900.00	1,900.70	1,900.70	4.13	4.13	-90.52	-0.30	-33.10	33.10	24.84	8.26	4.008		
2,000.00	2,000.00	2,000.70	2,000.70	4.35	4.36	-90.52	-0.30	-33.10	33.10	24.39	8.71	3.801		
2,100.00	2,100.00	2,100.70	2,100.70	4.58	4.58	-90.52	-0.30	-33.10	33.10	23.94	9.16	3.614		
2,200.00	2,200.00	2,200.70	2,200.70	4.80	4.80	-90.52	-0.30	-33.10	33.10	23.49	9.61	3.445		
2,300.00	2,300.00	2,300.70	2,300.70	5.03	5.03	-90.52	-0.30	-33.10	33.10	23.04	10.06	3.291		
2,400.00	2,400.00	2,400.70	2,400.70	5.25	5.25	-90.52	-0.30	-33.10	33.10	22.59	10.51	3.150		
2,500.00	2,500.00	2,500.70	2,500.70	5.48	5.48	-90.52	-0.30	-33.10	33.10	22.14	10.96	3.021		
2,600.00	2,600.00	2,600.70	2,600.70	5.70	5.70	-90.52	-0.30	-33.10	33.10	21.70	11.41	2.902		
2,700.00	2,700.00	2,700.70	2,700.70	5.93	5.93	-90.52	-0.30	-33.10	33.10	21.25	11.86	2.792		
2,800.00	2,800.00	2,800.70	2,800.70	6.15	6.15	-90.52	-0.30	-33.10	33.10	20.80	12.31	2.690		
2,900.00	2,900.00	2,900.70	2,900.70	6.38	6.38	-90.52	-0.30	-33.10	33.10	20.35	12.75	2.595		
3,000.00	3,000.00	3,000.70	3,000.70	6.60	6.60	-90.52	-0.30	-33.10	33.10	19.90	13.20	2.507		
3,100.00	3,100.00	3,100.70	3,100.70	6.83	6.83	-90.52	-0.30	-33.10	33.10	19.45	13.65	2.424		
3,200.00	3,200.00	3,200.70	3,200.70	7.05	7.05	-90.52	-0.30	-33.10	33.10	19.00	14.10	2.347		
3,300.00	3,300.00	3,300.70	3,300.70	7.28	7.28	-90.52	-0.30	-33.10	33.10	18.55	14.55	2.275		
3,400.00	3,400.00	3,400.70	3,400.70	7.50	7.50	-90.52	-0.30	-33.10	33.10	18.10	15.00	2.206		
3,500.00	3,500.00	3,500.70	3,500.70	7.73	7.73	-90.52	-0.30	-33.10	33.10	17.65	15.45	2.142		
3,600.00	3,600.00	3,600.70	3,600.70	7.95	7.95	-90.52	-0.30	-33.10	33.10	17.20	15.90	2.082		
3,700.00	3,700.00	3,700.70	3,700.70	8.17	8.18	-90.52	-0.30	-33.10	33.10	16.75	16.35	2.024		
3,800.00	3,800.00	3,800.70	3,800.70	8.40	8.40	-90.52	-0.30	-33.10	33.10	16.30	16.80	1.970		
3,900.00	3,900.00	3,900.70	3,900.70	8.62	8.63	-90.52	-0.30	-33.10	33.10	15.85	17.25	1.919		
4,000.00	4,000.00	4,000.70	4,000.70	8.85	8.85	-90.52	-0.30	-33.10	33.10	15.40	17.70	1.870		
4,100.00	4,100.00	4,100.70	4,100.70	9.07	9.08	-90.52	-0.30	-33.10	33.10	14.95	18.15	1.824		
4,200.00	4,200.00	4,200.70	4,200.70	9.30	9.30	-90.52	-0.30	-33.10	33.10	14.50	18.60	1.780		
4,300.00	4,300.00	4,300.70	4,300.70	9.52	9.52	-90.52	-0.30	-33.10	33.10	14.05	19.05	1.738		
4,400.00	4,400.00	4,400.70	4,400.70	9.75	9.75	-90.52	-0.30	-33.10	33.10	13.60	19.50	1.698		
4,500.00	4,500.00	4,500.70	4,500.70	9.97	9.97	-90.52	-0.30	-33.10	33.10	13.15	19.95	1.659		
4,600.00	4,600.00	4,600.70	4,600.70	10.20	10.20	-90.52	-0.30	-33.10	33.10	12.70	20.40	1.623		
4,700.00	4,700.00	4,700.70	4,700.70	10.42	10.42	-90.52	-0.30	-33.10	33.10	12.26	20.85	1.588		
4,800.00	4,800.00	4,800.70	4,800.70	10.65	10.65	-90.52	-0.30	-33.10	33.10	11.81	21.30	1.554		
4,900.00	4,900.00	4,900.70	4,900.70	10.87	10.87	-90.52	-0.30	-33.10	33.10	11.36	21.75	1.522		
4,966.43	4,966.43	4,967.13	4,967.13	11.02	11.02	-90.52	-0.30	-33.10	33.10	11.06	22.04	1.502 CC		
5,000.00	5,000.00	5,000.69	5,000.69	11.10	11.10	-90.52	-0.30	-33.10	33.10	10.91	22.19	1.491 Level 3, 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
Project: Lea County, NM (NAD27 NME)
Reference Site: Sec. 31, T 25 S., R 35 E
Site Error: 0.00 ft
Reference Well: Square Bill Federal Com 22H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
TVD Reference: KB=26' @ 3299.60ft (McVay 8)
MD Reference: KB=26' @ 3299.60ft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM 5000.1 Multi User Db
Offset TVD Reference: Offset Datum

Offset Design													Sec. 31, T 25 S., R 35 E - Square Bill Federal Com 23H - Wellbore #1 - Plan #1		Offset Site Error:		0.00 ft	
Survey Program: 0-MWD															Offset Well Error:		0.00 ft	
Reference		Offset		Semi Major Axis		Distance												
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning					
5,100.00	5,100.00	5,100.00	5,099.98	11.32	11.31	-89.94	0.04	-34.81	34.82	12.19	22.63	1.539						
5,200.00	5,200.00	5,198.14	5,197.98	11.55	11.51	-88.53	1.02	-39.82	39.93	16.87	23.06	1.732						
5,300.00	5,300.00	5,297.18	5,296.70	11.77	11.72	-86.92	2.57	-47.69	47.93	24.44	23.49	2.040						
5,400.00	5,400.00	5,396.83	5,395.99	12.00	11.93	-85.72	4.18	-55.93	56.29	32.36	23.92	2.353						
5,500.00	5,500.00	5,496.47	5,495.28	12.22	12.14	-84.83	5.80	-64.18	64.67	40.31	24.36	2.655						
5,600.00	5,600.00	5,596.11	5,594.57	12.45	12.35	-84.15	7.42	-72.42	73.06	48.26	24.80	2.946						
5,700.00	5,700.00	5,695.76	5,693.85	12.67	12.57	-83.60	9.04	-80.67	81.46	56.22	25.24	3.227						
5,800.00	5,800.00	5,795.40	5,793.14	12.89	12.79	-83.16	10.66	-88.91	89.87	64.18	25.69	3.499						
5,900.00	5,900.00	5,895.05	5,892.43	13.12	13.01	-82.80	12.28	-97.15	98.28	72.15	26.13	3.761						
6,000.00	6,000.00	5,994.69	5,991.72	13.34	13.23	-82.49	13.90	-105.40	106.69	80.11	26.58	4.014						
6,100.00	6,100.00	6,094.33	6,091.01	13.57	13.46	-82.22	15.52	-113.64	115.11	88.08	27.03	4.259						
6,200.00	6,200.00	6,193.98	6,190.30	13.79	13.68	-82.00	17.14	-121.89	123.52	96.05	27.48	4.495						
6,300.00	6,300.00	6,293.62	6,289.59	14.02	13.91	-81.80	18.76	-130.13	131.94	104.01	27.93	4.724						
6,400.00	6,400.00	6,393.27	6,388.88	14.24	14.14	-81.62	20.38	-138.38	140.37	111.98	28.38	4.945						
6,500.00	6,500.00	6,492.91	6,488.17	14.47	14.37	-81.47	22.00	-146.62	148.79	119.95	28.84	5.159						
6,600.00	6,600.00	6,592.55	6,587.46	14.69	14.60	-81.33	23.62	-154.86	157.21	127.92	29.30	5.366						
6,700.00	6,700.00	6,692.20	6,686.75	14.92	14.84	-81.20	25.24	-163.11	165.64	135.88	29.75	5.567						
6,800.00	6,800.00	6,791.84	6,786.03	15.14	15.07	-81.09	26.86	-171.35	174.06	143.85	30.21	5.761						
6,900.00	6,900.00	6,891.49	6,885.32	15.37	15.31	-80.99	28.47	-179.60	182.49	151.81	30.67	5.949						
7,000.00	7,000.00	6,991.13	6,984.61	15.59	15.54	-80.90	30.09	-187.84	190.91	159.78	31.14	6.132						
7,100.00	7,100.00	7,090.77	7,083.90	15.82	15.78	-80.81	31.71	-196.08	199.34	167.74	31.60	6.309						
7,200.00	7,200.00	7,190.42	7,183.19	16.04	16.02	-80.73	33.33	-204.33	207.77	175.71	32.06	6.480						
7,300.00	7,300.00	7,290.06	7,282.48	16.27	16.26	-80.66	34.95	-212.57	216.20	183.67	32.53	6.647						
7,400.00	7,400.00	7,389.70	7,381.77	16.49	16.50	-80.60	36.57	-220.82	224.62	191.63	32.99	6.808						
7,500.00	7,500.00	7,489.35	7,481.06	16.72	16.74	-80.53	38.19	-229.06	233.05	199.59	33.46	6.965						
7,600.00	7,600.00	7,588.99	7,580.35	16.94	16.99	-80.48	39.81	-237.31	241.48	207.55	33.93	7.118						
7,700.00	7,700.00	7,688.64	7,679.64	17.17	17.23	-80.42	41.43	-245.55	249.91	215.52	34.39	7.266						
7,800.00	7,800.00	7,788.28	7,778.93	17.39	17.47	-80.37	43.05	-253.79	258.34	223.47	34.86	7.410						
7,900.00	7,900.00	7,887.92	7,878.21	17.61	17.72	-80.33	44.67	-262.04	266.77	231.43	35.33	7.550						
8,000.00	8,000.00	7,987.57	7,977.50	17.84	17.96	-80.28	46.29	-270.28	275.20	239.39	35.80	7.686						
8,100.00	8,100.00	8,087.21	8,076.79	18.06	18.21	-80.24	47.91	-278.53	283.63	247.35	36.27	7.819						
8,200.00	8,200.00	8,186.86	8,176.08	18.29	18.46	-80.20	49.53	-286.77	292.06	255.31	36.75	7.948						
8,300.00	8,300.00	8,286.50	8,275.37	18.51	18.70	-80.16	51.15	-295.01	300.48	263.27	37.22	8.073						
8,400.00	8,400.00	8,386.14	8,374.66	18.74	18.95	-80.13	52.76	-303.26	308.91	271.22	37.69	8.196						
8,500.00	8,500.00	8,485.79	8,473.95	18.96	19.20	-80.10	54.38	-311.50	317.34	279.18	38.17	8.315						
8,600.00	8,600.00	8,585.43	8,573.24	19.19	19.45	-80.07	56.00	-319.75	325.77	287.13	38.64	8.431						
8,700.00	8,700.00	8,685.08	8,672.53	19.41	19.70	-80.04	57.62	-327.99	334.20	295.09	39.11	8.544						
8,800.00	8,800.00	8,784.72	8,771.82	19.64	19.95	-80.01	59.24	-336.24	342.63	303.04	39.59	8.655						
8,900.00	8,900.00	8,884.36	8,871.10	19.86	20.20	-79.98	60.86	-344.48	351.06	311.00	40.07	8.762						
9,000.00	9,000.00	8,984.01	8,970.39	20.09	20.45	-79.96	62.48	-352.72	359.49	318.95	40.54	8.867						
9,100.00	9,100.00	9,083.65	9,069.68	20.31	20.71	-79.93	64.10	-360.97	367.93	326.91	41.02	8.970						
9,200.00	9,200.00	9,183.29	9,168.97	20.54	20.96	-79.91	65.72	-369.21	376.36	334.86	41.50	9.070						
9,300.00	9,300.00	9,282.94	9,268.26	20.76	21.21	-79.88	67.34	-377.46	384.79	342.81	41.97	9.167						
9,400.00	9,400.00	9,382.58	9,367.55	20.99	21.47	-79.86	68.96	-385.70	393.22	350.76	42.45	9.263						
9,500.00	9,500.00	9,482.23	9,466.84	21.21	21.72	-79.84	70.58	-393.94	401.65	358.72	42.93	9.356						
9,600.00	9,600.00	9,581.87	9,566.13	21.44	21.97	-79.82	72.20	-402.19	410.08	366.67	43.41	9.447						
9,700.00	9,700.00	9,681.51	9,665.42	21.66	22.23	-79.80	73.82	-410.43	418.51	374.62	43.89	9.536						
9,800.00	9,800.00	9,781.16	9,764.71	21.89	22.48	-79.79	75.43	-418.68	426.94	382.57	44.37	9.623						
9,900.00	9,900.00	9,880.80	9,864.00	22.11	22.74	-79.77	77.05	-426.92	435.37	390.52	44.85	9.708						
10,000.00	10,000.00	9,980.45	9,963.28	22.34	22.99	-79.75	78.67	-435.17	443.80	398.47	45.33	9.791						
10,100.00	10,100.00	10,080.09	10,062.57	22.56	23.25	-79.74	80.29	-443.41	452.23	406.42	45.81	9.872						
10,200.00	10,200.00	10,179.73	10,161.86	22.78	23.51	-79.72	81.91	-451.65	460.66	414.37	46.29	9.952						

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. 31, T 25 S., R 35 E
Site Error: 0.00 ft
Reference Well: Square Bill Federal Com 22H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
TVD Reference: KB=26' @ 3299.60ft (McVay 8)
MD Reference: KB=26' @ 3299.60ft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM 5000.1 Multi User Db
Offset TVD Reference: Offset Datum

Offset Design Sec. 31, T 25 S., R 35 E - Square Bill Federal Com 23H - Wellbore #1 - Plan #1													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)						
10,300.00	10,300.00	10,279.38	10,261.15	23.01	23.76	-79.71	83.53	-459.90	469.09	422.32	46.77	10.029		
10,400.00	10,400.00	10,379.02	10,360.44	23.23	24.02	-79.69	85.15	-468.14	477.52	430.27	47.25	10.106		
10,500.00	10,500.00	10,478.67	10,459.73	23.46	24.28	-79.68	86.77	-476.39	485.95	438.22	47.74	10.180		
10,600.00	10,600.00	10,578.31	10,559.02	23.68	24.53	-79.66	88.39	-484.63	494.39	446.17	48.22	10.253		
10,700.00	10,700.00	10,677.95	10,658.31	23.91	24.79	-79.65	90.01	-492.88	502.82	454.12	48.70	10.325		
10,800.00	10,800.00	10,777.60	10,757.60	24.13	25.05	-79.64	91.63	-501.12	511.25	462.07	49.18	10.395		
10,900.00	10,900.00	10,877.24	10,856.89	24.36	25.31	-79.63	93.25	-509.36	519.68	470.01	49.67	10.464		
11,000.00	11,000.00	10,976.88	10,956.18	24.58	25.57	-79.61	94.87	-517.61	528.11	477.96	50.15	10.531		
11,100.00	11,100.00	11,076.53	11,055.46	24.81	25.82	-79.60	96.49	-525.85	536.54	485.91	50.63	10.597		
11,200.00	11,200.00	11,176.17	11,154.75	25.03	26.08	-79.59	98.11	-534.10	544.97	493.86	51.12	10.661		
11,300.00	11,300.00	11,275.82	11,254.04	25.26	26.34	-79.58	99.72	-542.34	553.40	501.80	51.60	10.725		
11,400.00	11,400.00	11,375.46	11,353.33	25.48	26.60	-79.57	101.34	-550.58	561.83	509.75	52.08	10.787		
11,500.00	11,500.00	11,475.10	11,452.62	25.71	26.86	-79.56	102.96	-558.83	570.27	517.70	52.57	10.848		
11,600.00	11,600.00	11,574.75	11,551.91	25.93	27.12	-79.55	104.58	-567.07	578.70	525.64	53.05	10.908		
11,700.00	11,700.00	11,674.39	11,651.20	26.16	27.38	-79.54	106.20	-575.32	587.13	533.59	53.54	10.967		
11,800.00	11,800.00	11,774.04	11,750.49	26.38	27.64	-79.53	107.82	-583.56	595.56	541.54	54.02	11.024		
11,900.00	11,900.00	11,873.68	11,849.78	26.61	27.90	-79.52	109.44	-591.81	603.99	549.48	54.51	11.081		
12,000.00	12,000.00	11,973.32	11,949.07	26.83	28.16	-79.51	111.06	-600.05	612.42	557.43	54.99	11.136		
12,100.00	12,100.00	12,072.97	12,048.35	27.06	28.42	-79.51	112.68	-608.29	620.85	565.37	55.48	11.191		
12,200.00	12,200.00	12,172.61	12,147.64	27.28	28.68	-79.50	114.30	-616.54	629.28	573.32	55.96	11.244		
12,300.00	12,299.60	12,263.23	12,237.89	27.51	28.92	-78.64	117.09	-624.05	636.67	580.25	56.43	11.283		
12,400.00	12,395.62	12,343.35	12,316.42	27.72	29.14	-78.75	130.98	-630.72	642.74	585.88	56.86	11.304		
12,500.00	12,483.87	12,425.00	12,392.90	27.92	29.36	-79.26	158.47	-637.39	647.82	590.54	57.28	11.309		
12,600.00	12,560.50	12,508.12	12,464.80	28.14	29.60	-80.14	199.45	-643.85	651.91	594.17	57.74	11.291		
12,700.00	12,622.15	12,593.95	12,530.45	28.41	29.86	-81.39	254.23	-649.96	655.06	596.80	58.26	11.243		
12,800.00	12,666.13	12,683.01	12,587.09	28.74	30.15	-82.98	322.57	-655.48	657.36	598.47	58.89	11.163		
12,900.00	12,690.53	12,776.12	12,631.71	29.14	30.50	-84.86	403.98	-660.18	658.90	599.25	59.64	11.047		
13,000.00	12,694.47	12,874.21	12,660.77	29.63	30.94	-86.99	497.43	-663.72	659.76	599.20	60.57	10.893		
13,100.00	12,690.68	12,979.54	12,670.11	30.21	31.51	-88.15	602.10	-665.78	660.22	598.51	61.71	10.698		
13,200.00	12,686.89	13,079.83	12,667.14	30.88	32.14	-88.22	702.35	-666.76	660.19	597.17	63.03	10.475		
13,300.00	12,683.10	13,179.83	12,664.16	31.65	32.87	-88.29	802.29	-667.73	660.17	595.65	64.52	10.231		
13,400.00	12,679.31	13,279.82	12,661.18	32.51	33.69	-88.37	902.24	-668.71	660.15	593.95	66.20	9.973		
13,500.00	12,675.52	13,379.82	12,658.20	33.44	34.59	-88.44	1,002.19	-669.68	660.12	592.10	68.03	9.704		
13,600.00	12,671.73	13,479.82	12,655.22	34.44	35.56	-88.51	1,102.14	-670.66	660.10	590.10	70.00	9.430		
13,700.00	12,667.94	13,579.81	12,652.25	35.51	36.60	-88.58	1,202.08	-671.63	660.08	587.97	72.11	9.154		
13,800.00	12,664.15	13,679.81	12,649.27	36.64	37.70	-88.65	1,302.03	-672.61	660.06	585.72	74.34	8.879		
13,900.00	12,660.36	13,779.81	12,646.29	37.82	38.86	-88.72	1,401.98	-673.58	660.05	583.36	76.68	8.608		
14,000.00	12,656.57	13,879.80	12,643.31	39.05	40.07	-88.79	1,501.93	-674.56	660.03	580.91	79.12	8.342		
14,100.00	12,652.78	13,979.80	12,640.33	40.33	41.32	-88.86	1,601.87	-675.53	660.01	578.36	81.65	8.083		
14,200.00	12,648.99	14,079.80	12,637.35	41.65	42.62	-88.93	1,701.82	-676.51	660.00	575.73	84.27	7.832		
14,300.00	12,645.20	14,179.79	12,634.37	43.01	43.95	-89.00	1,801.77	-677.48	659.98	573.02	86.96	7.590		
14,400.00	12,641.41	14,279.79	12,631.39	44.40	45.32	-89.07	1,901.72	-678.46	659.97	570.25	89.72	7.356		
14,500.00	12,637.61	14,379.97	12,628.91	45.82	46.66	-89.18	2,001.86	-679.44	659.95	567.47	92.48	7.136		
14,600.00	12,633.82	14,479.96	12,626.19	47.27	48.06	-89.45	2,101.84	-680.41	659.91	564.59	95.33	6.923		
14,700.00	12,630.03	14,579.91	12,627.48	48.74	49.51	-89.72	2,201.78	-681.39	659.89	561.64	98.25	6.716		
14,800.00	12,626.24	14,679.86	12,626.77	50.24	50.98	-89.99	2,301.73	-682.36	659.88	558.66	101.22	6.519		
14,802.61	12,626.14	14,682.47	12,626.75	50.28	51.02	-89.99	2,304.34	-682.39	659.88	558.58	101.30	6.514		
14,900.00	12,622.45	14,779.81	12,626.07	51.76	52.48	-90.25	2,401.67	-683.34	659.89	555.65	104.24	6.331		
15,000.00	12,618.66	14,879.77	12,625.36	53.30	54.00	-90.52	2,501.62	-684.31	659.91	552.62	107.29	6.151		
15,100.00	12,614.87	14,979.72	12,624.65	54.85	55.53	-90.79	2,601.56	-685.29	659.95	549.57	110.38	5.979		
15,200.00	12,611.08	15,079.67	12,623.95	56.42	57.08	-91.06	2,701.51	-686.26	660.00	546.49	113.51	5.815		
15,300.00	12,607.29	15,179.62	12,623.24	58.01	58.65	-91.32	2,801.45	-687.24	660.06	543.40	116.66	5.658		

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. 31, T 25 S., R 35 E
Site Error: 0.00 ft
Reference Well: Square Bill Federal Com 22H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
TVD Reference: KB=26' @ 3299.60ft (McVay 8)
MD Reference: KB=26' @ 3299.60ft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM 5000.1 Multi User Db
Offset TVD Reference: Offset Datum

Offset Design													Sec. 31, T 25 S., R 35 E - Square Bill Federal Com 23H - Wellbore #1 - Plan #1		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				
15,400.00	12,603.50	15,279.58	12,622.53	59.61	60.23	-91.59	2,901.40	-688.21	660.14	540.30	119.85	5.508				
15,500.00	12,599.72	15,379.53	12,621.83	61.21	61.83	-91.86	3,001.34	-689.19	660.23	537.19	123.04	5.366				
15,600.00	12,597.94	15,479.52	12,621.12	62.55	63.44	-91.95	3,101.33	-690.16	660.27	534.28	125.99	5.241				
15,700.00	12,597.76	15,579.52	12,620.41	64.18	65.06	-91.91	3,201.32	-691.14	660.25	531.01	129.24	5.109				
15,800.00	12,597.58	15,679.51	12,619.70	65.82	66.69	-91.86	3,301.31	-692.11	660.24	527.72	132.51	4.982				
15,900.00	12,597.40	15,779.51	12,619.00	67.47	68.34	-91.81	3,401.30	-693.09	660.22	524.41	135.81	4.861				
16,000.00	12,597.22	15,879.51	12,618.29	69.13	69.99	-91.77	3,501.29	-694.07	660.20	521.09	139.12	4.746				
16,100.00	12,597.04	15,979.51	12,617.58	70.80	71.65	-91.72	3,601.28	-695.04	660.19	517.74	142.44	4.635				
16,200.00	12,596.86	16,079.51	12,616.88	72.47	73.31	-91.68	3,701.27	-696.02	660.17	514.38	145.79	4.528				
16,300.00	12,596.68	16,179.51	12,616.17	74.16	74.99	-91.63	3,801.27	-696.99	660.16	511.01	149.15	4.426				
16,400.00	12,596.50	16,279.51	12,615.46	75.85	76.67	-91.59	3,901.26	-697.97	660.14	507.63	152.52	4.328				
16,500.00	12,596.32	16,379.50	12,614.76	77.54	78.36	-91.54	4,001.25	-698.94	660.13	504.23	155.90	4.234				
16,600.00	12,596.14	16,479.50	12,614.05	79.24	80.05	-91.49	4,101.24	-699.92	660.12	500.82	159.30	4.144				
16,700.00	12,595.96	16,579.50	12,613.34	80.95	81.76	-91.45	4,201.23	-700.89	660.10	497.40	162.71	4.057				
16,800.00	12,595.78	16,679.50	12,612.63	82.66	83.46	-91.40	4,301.22	-701.87	660.09	493.97	166.13	3.973				
16,900.00	12,595.60	16,779.50	12,611.93	84.38	85.17	-91.36	4,401.21	-702.85	660.08	490.52	169.55	3.893				
17,000.00	12,595.41	16,879.50	12,611.22	86.10	86.89	-91.31	4,501.21	-703.82	660.07	487.07	172.99	3.816				
17,100.00	12,595.23	16,979.50	12,610.51	87.83	88.61	-91.27	4,601.20	-704.80	660.05	483.62	176.44	3.741				
17,200.00	12,595.05	17,079.50	12,609.81	89.56	90.33	-91.22	4,701.19	-705.77	660.04	480.15	179.89	3.669				
17,300.00	12,594.87	17,179.49	12,609.10	91.29	92.06	-91.17	4,801.18	-706.75	660.03	476.68	183.36	3.600				
17,400.00	12,594.69	17,279.49	12,608.39	93.03	93.79	-91.13	4,901.17	-707.72	660.02	473.20	186.83	3.533				
17,500.00	12,594.51	17,379.49	12,607.69	94.77	95.53	-91.08	5,001.16	-708.70	660.01	469.71	190.30	3.468				
17,600.00	12,594.33	17,479.49	12,606.98	96.52	97.27	-91.04	5,101.15	-709.67	660.00	466.22	193.79	3.406				
17,700.00	12,594.15	17,579.49	12,606.27	98.26	99.01	-90.99	5,201.14	-710.65	660.00	462.72	197.28	3.346				
17,800.00	12,593.97	17,679.49	12,605.56	100.01	100.76	-90.95	5,301.14	-711.63	659.99	459.22	200.77	3.287				
17,900.00	12,593.79	17,779.49	12,604.86	101.77	102.51	-90.90	5,401.13	-712.60	659.98	455.71	204.27	3.231				
18,000.00	12,593.61	17,879.48	12,604.15	103.52	104.26	-90.85	5,501.12	-713.58	659.97	452.19	207.78	3.176				
18,100.00	12,593.43	17,979.48	12,603.44	105.28	106.01	-90.81	5,601.11	-714.55	659.96	448.67	211.29	3.123				
18,200.00	12,593.25	18,079.48	12,602.74	107.04	107.77	-90.76	5,701.10	-715.53	659.96	445.15	214.81	3.072				
18,300.00	12,593.07	18,179.48	12,602.03	108.80	109.53	-90.72	5,801.09	-716.50	659.95	441.62	218.33	3.023				
18,400.00	12,592.89	18,279.48	12,601.32	110.57	111.29	-90.67	5,901.08	-717.48	659.94	438.09	221.85	2.975				
18,500.00	12,592.71	18,379.48	12,600.62	112.34	113.05	-90.63	6,001.08	-718.45	659.94	434.55	225.38	2.928				
18,600.00	12,592.53	18,479.48	12,599.91	114.10	114.81	-90.58	6,101.07	-719.43	659.93	431.02	228.92	2.883				
18,700.00	12,592.35	18,579.47	12,599.20	115.87	116.58	-90.53	6,201.06	-720.41	659.93	427.47	232.46	2.839				
18,800.00	12,592.16	18,679.47	12,598.49	117.65	118.35	-90.49	6,301.05	-721.38	659.92	423.93	236.00	2.796				
18,900.00	12,591.98	18,779.47	12,597.79	119.42	120.12	-90.44	6,401.04	-722.36	659.92	420.38	239.54	2.755				
19,000.00	12,591.80	18,879.47	12,597.08	121.20	121.89	-90.40	6,501.03	-723.33	659.92	416.83	243.09	2.715				
19,100.00	12,591.62	18,979.47	12,596.37	122.97	123.67	-90.35	6,601.02	-724.31	659.91	413.27	246.64	2.676				
19,200.00	12,591.44	19,079.47	12,595.67	124.75	125.44	-90.31	6,701.02	-725.28	659.91	409.72	250.20	2.638				
19,300.00	12,591.26	19,179.47	12,594.96	126.53	127.22	-90.26	6,801.01	-726.26	659.91	406.16	253.75	2.601				
19,400.00	12,591.08	19,279.46	12,594.25	128.31	129.00	-90.21	6,901.00	-727.23	659.91	402.60	257.31	2.565				
19,500.00	12,590.90	19,379.46	12,593.55	130.10	130.78	-90.17	7,000.99	-728.21	659.91	399.03	260.87	2.530				
19,600.00	12,590.72	19,479.46	12,592.84	131.88	132.56	-90.12	7,100.98	-729.18	659.91	395.47	264.44	2.495				
19,700.00	12,590.54	19,579.46	12,592.13	133.67	134.34	-90.08	7,200.97	-730.16	659.91	391.90	268.01	2.462				
19,768.37	12,590.42	19,647.83	12,591.65	134.89	135.56	-90.05	7,269.33	-730.83	659.91	389.46	270.45	2.440				
19,800.00	12,590.36	19,679.46	12,591.42	135.45	136.12	-90.03	7,300.96	-731.14	659.91	388.33	271.58	2.430				
19,900.00	12,590.18	19,779.46	12,590.72	137.24	137.91	-89.99	7,400.95	-732.11	659.91	384.76	275.15	2.398				
19,998.73	12,590.00	19,878.18	12,590.02	139.01	139.67	-89.94	7,499.67	-733.07	659.91	381.23	278.68	2.368				

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

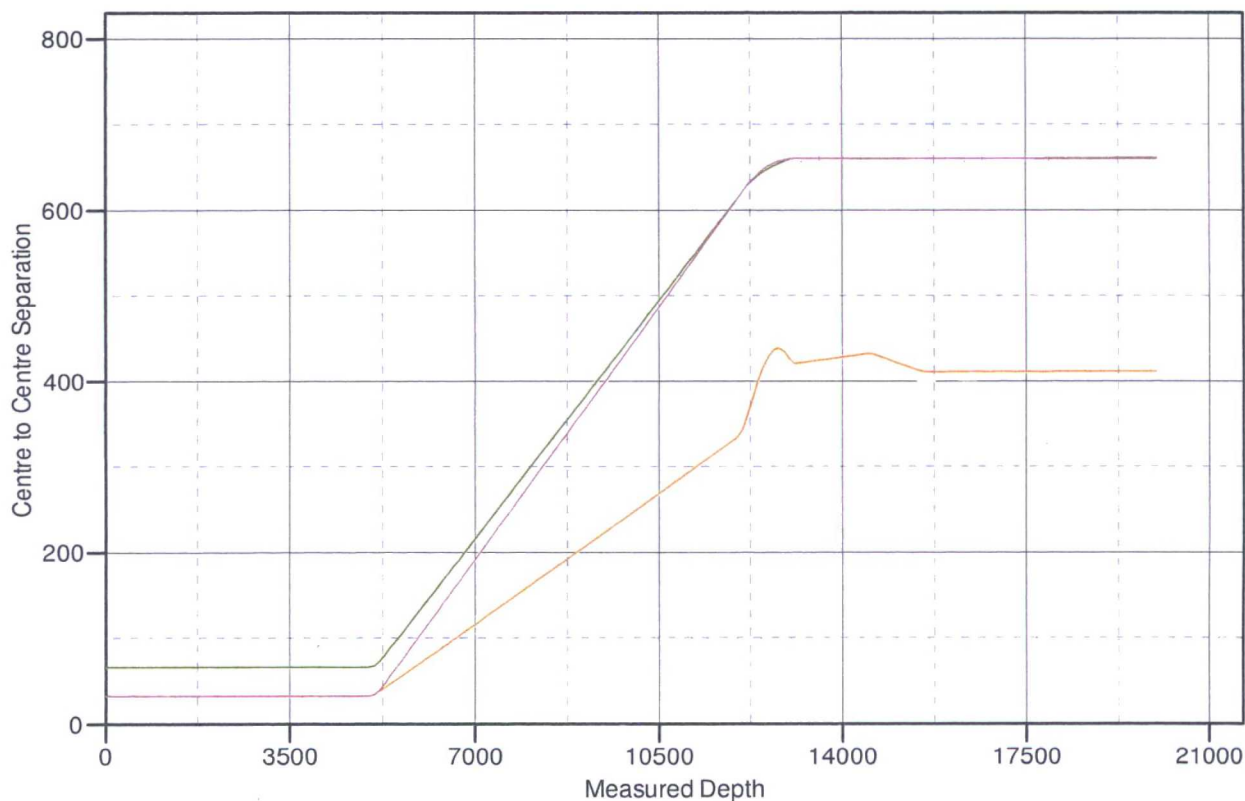
Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Reference Site: Sec. 31, T 25 S., R 35 E
Site Error: 0.00 ft
Reference Well: Square Bill Federal Com 22H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
TVD Reference: KB=26' @ 3299.60ft (McVay 8)
MD Reference: KB=26' @ 3299.60ft (McVay 8)
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' @ 3299.60ft (McVay 8)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Square Bill Federal Com 22H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.50°

Ladder Plot



LEGEND

Bill Federal Com 1H, Wellbore #1, Plan #1 V0  Square Bill Federal Com 21H, Wellbore #1, Plan #1 V0  Square Bill Federal Com 23H, Wellbore #

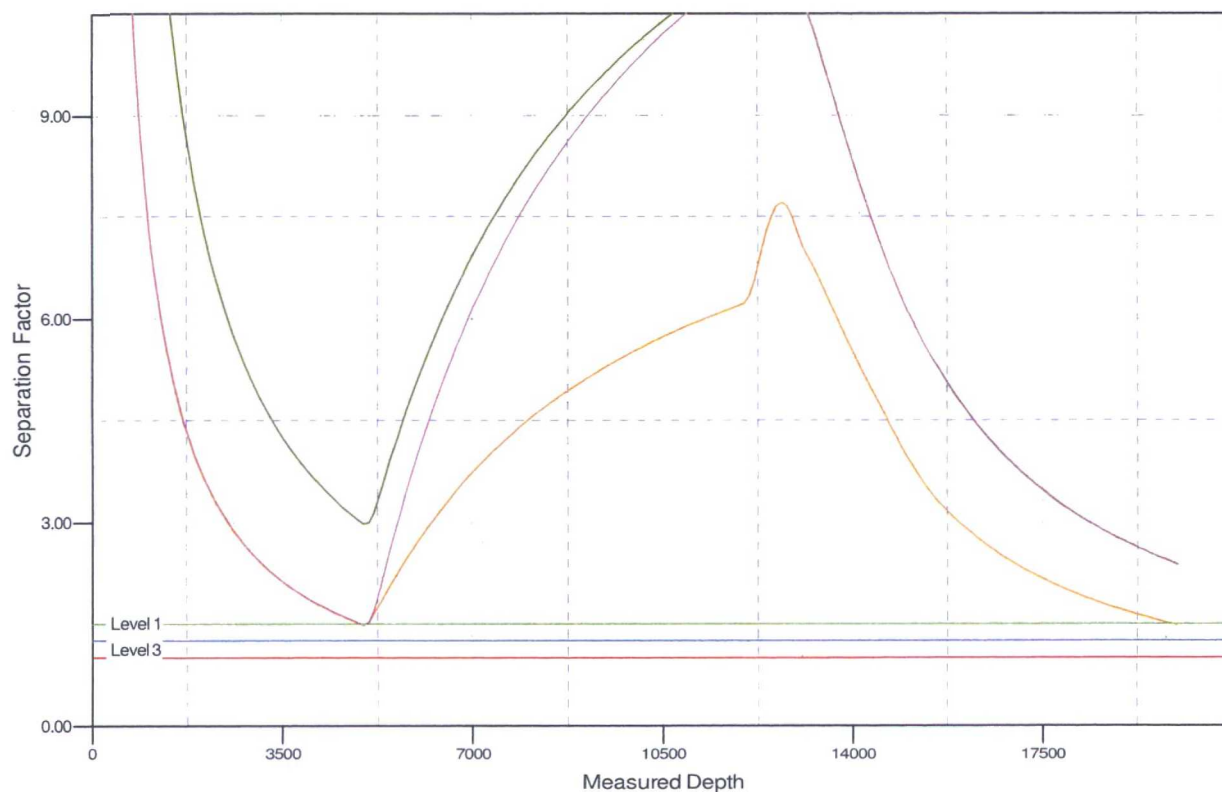
Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Reference Site: Sec. 31, T 25 S., R 35 E
Site Error: 0.00 ft
Reference Well: Square Bill Federal Com 22H
Well Error: 0.00 ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
TVD Reference: KB=26' @ 3299.60ft (McVay 8)
MD Reference: KB=26' @ 3299.60ft (McVay 8)
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' @ 3299.60ft (McVay 8)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Square Bill Federal Com 22H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.50°

Separation Factor Plot



LEGEND

Bill Federal Com 1H, Wellbore #1, Plan #1 V0  Square Bill Federal Com 21H, Wellbore #1, Plan #1 V0  Square Bill Federal Com 23H, Wellbore #