

30-025-42942

COG Production L L C

Lea County, NM (NAD27 NME)

Sec. 17, T 26 S. , R 33 E

Vast State 2H

Wellbore #1

Plan#1

OCD – HOBBS

05/25/2016

RECEIVED

Anticollision Report

25 May, 2016

Integrity Directional Services, LLC

Anticollision Report

Company:	COG Production L L C	Local Co-ordinate Reference:	Well Vast State 2H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Reference Site:	Sec. 17, T 26 S. , R 33 E	MD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Site Error:	5.00 ft	North Reference:	Grid
Reference Well:	Vast State 2H	Survey Calculation Method:	Minimum Curvature
Well Error:	5.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Multi User Db
Reference Design:	Plan#1	Offset TVD Reference:	Offset Datum

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

Survey Tool Program		Date	5/25/2016		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.00	14,352.76	Plan#1 (Wellbore #1)	MWD	MWD - Standard	

Summary						
Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance		Separation	Warning
			Between Centres (ft)	Between Ellipses (ft)	Factor	
Sec. 17, T 26 S. , R 33 E						
Vast State 3H - Wellbore #1 - Wellbore #1	14,296.57	14,220.00	658.79	476.24	3.609	CC
Vast State 3H - Wellbore #1 - Wellbore #1	14,300.00	14,220.00	658.80	476.19	3.608	ES
Vast State 3H - Wellbore #1 - Wellbore #1	14,352.82	14,220.00	661.19	477.64	3.602	SF

Offset Design	Sec. 17, T 26 S. , R 33 E - Vast State 3H - Wellbore #1 - Wellbore #1												Offset Site Error:	0.00 ft
Survey Program:	100-MWD, 4927-MWD												Offset Well Error:	5.00 ft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Warning						
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
0.00	0.00	10.78	10.78	5.00	5.00	-90.29	-6.40	-1,269.70	1,269.72					
100.00	100.00	115.43	115.43	5.00	5.00	-90.29	-6.32	-1,269.35	1,269.37	1,259.37	10.00	126.910		
154.18	154.18	164.19	164.19	5.00	5.00	-90.29	-6.34	-1,269.24	1,269.26	1,259.25	10.01	126.810		
200.00	200.00	206.73	206.73	5.01	5.01	-90.29	-6.43	-1,269.32	1,269.34	1,259.32	10.02	126.692		
300.00	300.00	315.92	315.92	5.03	5.03	-90.29	-6.48	-1,269.12	1,269.15	1,259.09	10.06	126.194		
400.00	400.00	412.73	412.72	5.06	5.05	-90.28	-6.24	-1,268.81	1,268.83	1,258.71	10.11	125.480		
500.00	500.00	512.52	512.51	5.10	5.09	-90.29	-6.34	-1,268.58	1,268.60	1,258.42	10.18	124.558		
569.71	569.71	579.72	579.72	5.13	5.12	-90.30	-6.56	-1,268.52	1,268.53	1,258.29	10.25	123.814		
600.00	600.00	609.10	609.10	5.15	5.13	-90.30	-6.66	-1,268.53	1,268.55	1,258.27	10.27	123.464		
700.00	700.00	707.51	707.51	5.20	5.18	-90.31	-6.93	-1,268.66	1,268.68	1,258.30	10.38	122.186		
800.00	800.00	807.05	807.04	5.27	5.24	-90.32	-7.13	-1,268.90	1,268.92	1,258.41	10.51	120.734		
900.00	900.00	914.35	914.35	5.34	5.31	-90.32	-7.16	-1,268.77	1,268.80	1,258.14	10.66	119.060		
1,000.00	1,000.00	1,010.62	1,010.62	5.43	5.38	-90.33	-7.28	-1,268.60	1,268.62	1,257.81	10.81	117.347		
1,012.79	1,012.79	1,023.49	1,023.49	5.44	5.39	96.99	-7.31	-1,268.59	1,268.62	1,257.79	10.83	117.131		
1,057.00	1,057.00	1,067.96	1,067.96	5.47	5.43	97.01	-7.41	-1,268.56	1,268.66	1,257.76	10.90	116.380		
1,100.00	1,099.99	1,114.74	1,114.73	5.50	5.47	97.05	-7.51	-1,268.50	1,268.71	1,257.74	10.97	115.651		
1,200.00	1,199.97	1,235.29	1,235.27	5.58	5.57	97.12	-8.37	-1,266.78	1,267.47	1,256.32	11.15	113.658		
1,300.00	1,299.95	1,334.66	1,334.61	5.66	5.67	97.15	-9.51	-1,264.81	1,265.75	1,254.42	11.33	111.715		
1,400.00	1,399.93	1,434.65	1,434.57	5.76	5.77	97.17	-11.08	-1,262.88	1,264.06	1,252.54	11.52	109.683		
1,500.00	1,499.91	1,535.40	1,535.28	5.86	5.88	97.18	-12.88	-1,260.86	1,262.32	1,250.59	11.73	107.578		
1,600.00	1,599.89	1,634.61	1,634.47	5.96	5.99	97.21	-14.16	-1,258.88	1,260.57	1,248.62	11.95	105.455		
1,700.00	1,699.87	1,734.26	1,734.09	6.08	6.11	97.24	-15.44	-1,256.99	1,258.93	1,246.74	12.19	103.310		
1,800.00	1,799.85	1,834.87	1,834.68	6.20	6.24	97.29	-16.29	-1,254.98	1,257.18	1,244.75	12.43	101.136		
1,900.00	1,899.83	1,932.26	1,932.04	6.32	6.36	97.32	-17.61	-1,253.16	1,255.57	1,242.88	12.68	99.004		

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

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

Offset Design												Offset Site Error:	0.00 ft
Survey Program: 100-MWD, 4927-MWD												Offset Well Error:	5.00 ft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
2,000.00	1,999.81	2,028.66	2,028.42	6.45	6.49	97.35	-18.80	-1,251.56	1,254.16	1,241.22	12.94	96.907	
2,100.00	2,099.79	2,124.76	2,124.51	6.59	6.62	97.40	-19.76	-1,250.36	1,253.16	1,239.95	13.21	94.862	
2,200.00	2,199.77	2,227.00	2,226.72	6.73	6.76	97.42	-21.20	-1,249.01	1,252.09	1,238.59	13.50	92.773	
2,300.00	2,299.75	2,325.60	2,325.31	6.88	6.91	97.46	-22.40	-1,247.79	1,251.12	1,237.33	13.78	90.761	
2,400.00	2,399.73	2,426.62	2,426.31	7.03	7.06	97.48	-23.97	-1,246.38	1,249.97	1,235.88	14.08	88.746	
2,500.00	2,499.71	2,518.74	2,518.41	7.18	7.19	97.50	-25.14	-1,245.50	1,249.26	1,234.88	14.38	86.883	
2,600.00	2,599.69	2,618.13	2,617.81	7.34	7.35	97.56	-26.01	-1,244.87	1,248.89	1,234.20	14.69	85.018	
2,700.00	2,699.67	2,721.64	2,721.31	7.51	7.51	97.62	-26.68	-1,243.99	1,248.30	1,233.29	15.01	83.151	
2,800.00	2,799.65	2,820.04	2,819.70	7.67	7.66	97.67	-27.48	-1,243.21	1,247.76	1,232.43	15.33	81.374	
2,900.00	2,899.63	2,923.74	2,923.38	7.84	7.83	97.70	-28.85	-1,242.14	1,246.98	1,231.31	15.67	79.579	
3,000.00	2,999.61	3,018.16	3,017.79	8.01	7.99	97.71	-30.45	-1,241.31	1,246.36	1,230.36	16.00	77.911	
3,071.77	3,071.37	3,085.09	3,084.70	8.14	8.10	97.72	-31.66	-1,241.01	1,246.22	1,229.99	16.23	76.763	
3,100.00	3,099.59	3,112.55	3,112.16	8.19	8.14	97.72	-32.17	-1,240.95	1,246.24	1,229.91	16.33	76.314	
3,200.00	3,199.57	3,213.91	3,213.49	8.36	8.32	97.70	-34.53	-1,240.67	1,246.21	1,229.53	16.68	74.715	
3,211.22	3,210.79	3,224.54	3,224.12	8.38	8.33	97.70	-34.81	-1,240.64	1,246.20	1,229.48	16.72	74.544	
3,300.00	3,299.55	3,310.04	3,309.60	8.54	8.48	97.69	-36.83	-1,240.58	1,246.36	1,229.34	17.02	73.216	
3,400.00	3,399.53	3,419.66	3,419.18	8.73	8.67	97.66	-39.53	-1,240.15	1,246.22	1,228.83	17.39	71.652	
3,500.00	3,499.51	3,530.32	3,529.82	8.91	8.86	97.69	-41.16	-1,238.94	1,245.39	1,227.62	17.77	70.097	
3,600.00	3,599.49	3,643.69	3,643.16	9.10	9.05	97.78	-41.35	-1,236.30	1,243.31	1,225.17	18.15	68.505	
3,700.00	3,699.47	3,738.06	3,737.49	9.28	9.22	97.91	-40.54	-1,233.76	1,240.91	1,222.41	18.50	67.066	
3,800.00	3,799.45	3,822.25	3,821.66	9.47	9.37	98.04	-39.36	-1,232.39	1,239.57	1,220.73	18.84	65.789	
3,858.11	3,857.56	3,871.63	3,871.04	9.58	9.46	98.11	-38.81	-1,232.07	1,239.37	1,220.33	19.04	65.091	
3,900.00	3,899.43	3,907.45	3,906.86	9.67	9.52	98.15	-38.56	-1,232.06	1,239.48	1,220.29	19.18	64.607	
4,000.00	3,999.41	4,000.00	3,999.40	9.86	9.69	98.24	-38.40	-1,232.75	1,240.48	1,220.94	19.54	63.473	
4,100.00	4,099.39	4,091.44	4,090.84	10.05	9.85	98.32	-38.52	-1,234.01	1,242.14	1,222.23	19.90	62.409	
4,200.00	4,199.37	4,192.14	4,191.52	10.25	10.03	98.40	-38.65	-1,235.50	1,243.90	1,223.62	20.28	61.337	
4,300.00	4,299.35	4,302.32	4,301.70	10.45	10.23	98.49	-39.01	-1,236.68	1,245.26	1,224.58	20.67	60.234	
4,400.00	4,399.33	4,419.86	4,419.23	10.64	10.44	98.56	-39.83	-1,236.51	1,245.38	1,224.29	21.08	59.065	
4,500.00	4,499.31	4,529.48	4,528.84	10.84	10.64	98.63	-40.50	-1,235.32	1,244.59	1,223.10	21.49	57.926	
4,600.00	4,599.30	4,643.20	4,642.52	11.05	10.85	98.66	-42.06	-1,232.82	1,242.64	1,220.74	21.90	56.744	
4,700.00	4,699.28	4,747.29	4,746.55	11.25	11.05	98.67	-43.89	-1,229.86	1,240.06	1,217.76	22.30	55.612	
4,800.00	4,799.26	4,845.87	4,845.08	11.45	11.17	98.69	-45.53	-1,226.96	1,237.38	1,214.76	22.62	54.704	
4,900.00	4,899.24	4,948.68	4,947.83	11.65	11.25	98.71	-47.20	-1,224.08	1,234.84	1,211.94	22.90	53.912	
5,000.00	4,999.22	5,082.00	5,081.01	11.86	11.27	98.74	-49.36	-1,218.27	1,230.77	1,207.65	23.13	53.221	
5,100.00	5,099.20	5,200.78	5,199.51	12.06	11.29	98.79	-50.67	-1,210.26	1,224.28	1,200.93	23.35	52.421	
5,200.00	5,199.18	5,309.62	5,308.02	12.27	11.32	98.85	-51.80	-1,201.89	1,216.87	1,193.28	23.59	51.580	
5,300.00	5,299.16	5,447.60	5,445.34	12.48	11.38	98.86	-54.74	-1,188.85	1,207.74	1,183.88	23.85	50.629	
5,400.00	5,399.14	5,572.05	5,568.73	12.69	11.45	98.78	-59.13	-1,173.29	1,195.39	1,171.25	24.13	49.534	
5,500.00	5,499.12	5,674.83	5,670.50	12.89	11.52	98.70	-63.09	-1,159.47	1,182.14	1,157.73	24.41	48.423	
5,600.00	5,599.10	5,784.67	5,779.19	13.10	11.61	98.62	-67.26	-1,144.11	1,168.37	1,143.66	24.71	47.279	
5,700.00	5,699.08	5,891.59	5,884.84	13.31	11.70	98.59	-70.28	-1,128.00	1,153.52	1,128.50	25.02	46.105	
5,800.00	5,799.06	5,983.86	5,976.07	13.52	11.79	98.60	-72.31	-1,114.32	1,138.94	1,113.63	25.32	44.990	
5,900.00	5,899.04	6,085.57	6,076.65	13.74	11.89	98.60	-74.59	-1,099.41	1,124.53	1,098.90	25.63	43.878	
6,000.00	5,999.02	6,190.88	6,180.70	13.95	12.02	98.58	-77.30	-1,083.43	1,109.59	1,083.63	25.96	42.734	
6,100.00	6,099.00	6,293.82	6,282.35	14.16	12.15	98.56	-80.08	-1,067.36	1,094.22	1,067.91	26.31	41.584	
6,200.00	6,198.98	6,397.91	6,385.05	14.37	12.31	98.53	-83.01	-1,050.70	1,078.45	1,051.77	26.68	40.425	
6,300.00	6,298.96	6,500.86	6,486.55	14.59	12.47	98.49	-86.11	-1,033.73	1,062.19	1,035.14	27.05	39.264	
6,400.00	6,398.94	6,592.25	6,576.66	14.80	12.61	98.45	-88.85	-1,018.72	1,046.01	1,018.60	27.41	38.163	
6,500.00	6,498.92	6,672.64	6,656.08	15.01	12.73	98.45	-90.64	-1,006.47	1,031.05	1,003.31	27.74	37.169	
6,600.00	6,598.90	6,763.41	6,746.01	15.23	12.86	98.51	-91.69	-994.17	1,017.73	989.65	28.08	36.238	
6,700.00	6,698.88	6,861.94	6,843.63	15.44	13.01	98.56	-92.96	-980.90	1,004.54	976.09	28.45	35.311	
6,800.00	6,798.86	6,961.75	6,942.54	15.66	13.16	98.61	-94.31	-967.55	991.42	962.60	28.82	34.401	

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

Offset Design													Offset Site Error:	0.00 ft
Survey Program: 100-MWD, 4927-MWD													Offset Well Error:	5.00 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		
6,900.00	6,898.84	7,062.64	7,042.49	15.87	13.33	98.67	-95.67	-953.88	978.14	948.94	29.21	33.491		
7,000.00	6,998.82	7,164.93	7,143.79	16.09	13.52	98.71	-97.25	-939.78	964.63	935.02	29.61	32.581		
7,100.00	7,098.80	7,265.68	7,243.52	16.31	13.71	98.74	-99.07	-925.62	950.83	920.82	30.01	31.680		
7,200.00	7,198.78	7,363.43	7,340.29	16.52	13.89	98.76	-100.98	-911.90	937.05	906.64	30.41	30.814		
7,300.00	7,298.76	7,476.84	7,452.39	16.74	14.11	98.73	-104.08	-895.01	922.37	891.51	30.85	29.894		
7,400.00	7,398.74	7,575.68	7,549.96	16.96	14.33	98.64	-107.77	-879.69	907.08	875.80	31.29	28.993		
7,500.00	7,498.72	7,673.29	7,646.32	17.17	14.54	98.53	-111.80	-864.63	891.85	860.13	31.72	28.119		
7,600.00	7,598.70	7,769.87	7,741.68	17.39	14.75	98.39	-116.10	-849.95	876.85	844.70	32.15	27.278		
7,700.00	7,698.68	7,864.90	7,835.54	17.61	14.96	98.24	-120.44	-835.75	862.12	829.55	32.57	26.472		
7,800.00	7,798.66	7,960.08	7,929.65	17.83	15.16	98.10	-124.59	-822.14	848.02	815.03	32.99	25.704		
7,900.00	7,898.64	8,059.62	8,028.08	18.05	15.39	97.94	-128.93	-807.93	833.97	800.53	33.44	24.943		
8,000.00	7,998.62	8,158.65	8,126.00	18.27	15.62	97.78	-133.41	-793.81	819.94	786.06	33.88	24.200		
8,100.00	8,098.60	8,257.74	8,223.97	18.49	15.84	97.61	-137.73	-779.64	805.87	771.54	34.33	23.474		
8,200.00	8,198.58	8,345.07	8,310.37	18.71	16.04	97.47	-141.51	-767.52	792.26	757.52	34.75	22.802		
8,300.00	8,298.56	8,428.04	8,392.71	18.92	16.21	97.36	-144.52	-757.82	780.80	745.66	35.14	22.221		
8,400.00	8,398.54	8,513.26	8,477.48	19.14	16.37	97.31	-146.93	-749.35	771.12	735.61	35.52	21.712		
8,500.00	8,498.52	8,594.78	8,558.73	19.36	16.51	97.32	-148.36	-742.97	763.57	727.69	35.87	21.286		
8,600.00	8,598.50	8,672.00	8,635.84	19.58	16.62	97.38	-149.16	-738.98	758.67	722.46	36.21	20.955		
8,700.00	8,698.48	8,761.00	8,724.81	19.81	16.73	97.46	-149.87	-736.71	756.33	719.80	36.53	20.702		
8,800.00	8,798.46	8,872.94	8,836.61	20.03	16.85	97.92	-145.99	-734.44	754.70	717.82	36.88	20.463		
8,885.01	8,883.46	9,001.00	8,959.88	20.21	17.04	100.52	-114.76	-723.84	747.80	710.55	37.25	20.075		
8,900.00	8,898.45	9,010.94	8,968.96	20.24	17.05	-97.79	-110.86	-722.82	746.54	709.25	37.29	20.019		
8,925.00	8,923.43	9,024.25	8,980.98	20.28	17.07	-88.16	-105.27	-721.59	744.72	707.38	37.35	19.940		
8,950.00	8,948.32	9,037.99	8,993.20	20.32	17.08	-86.99	-99.08	-720.49	743.24	705.83	37.40	19.871		
8,975.00	8,973.06	9,052.40	9,005.83	20.36	17.10	-86.38	-92.22	-719.49	742.05	704.59	37.46	19.812		
9,000.00	8,997.59	9,068.81	9,019.99	20.39	17.11	-85.88	-83.99	-718.53	741.13	703.63	37.51	19.760		
9,025.00	9,021.83	9,090.60	9,038.40	20.43	17.13	-85.33	-72.40	-717.32	740.32	702.76	37.56	19.712		
9,050.00	9,045.71	9,112.32	9,056.28	20.46	17.15	-84.84	-60.12	-716.11	739.53	701.92	37.61	19.663		
9,075.00	9,069.17	9,135.01	9,074.49	20.49	17.17	-84.38	-46.65	-714.83	738.74	701.08	37.66	19.615		
9,100.00	9,092.15	9,158.64	9,092.99	20.52	17.20	-83.95	-32.01	-713.48	737.92	700.20	37.72	19.564		
9,125.00	9,114.59	9,208.80	9,129.81	20.55	17.28	-82.95	1.76	-709.28	736.49	698.66	37.82	19.471		
9,150.00	9,136.42	9,231.75	9,145.62	20.58	17.32	-82.60	18.21	-706.87	734.65	696.75	37.90	19.386		
9,175.00	9,157.58	9,252.00	9,159.21	20.61	17.36	-82.37	33.07	-704.72	732.75	694.77	37.97	19.297		
9,200.00	9,178.01	9,266.89	9,168.92	20.64	17.39	-82.27	44.26	-703.23	730.94	692.91	38.03	19.219		
9,225.00	9,197.67	9,280.25	9,177.35	20.67	17.42	-82.20	54.55	-702.06	729.37	691.28	38.10	19.146		
9,250.00	9,216.48	9,299.00	9,188.75	20.71	17.47	-82.06	69.38	-700.69	728.06	689.89	38.18	19.071		
9,275.00	9,234.41	9,299.00	9,188.75	20.75	17.47	-82.18	69.38	-700.69	726.99	688.77	38.22	19.022		
9,300.00	9,251.41	9,318.27	9,199.83	20.80	17.50	-82.04	85.10	-699.66	726.06	687.76	38.30	18.956		
9,325.00	9,267.42	9,330.32	9,206.38	20.85	17.53	-81.99	95.20	-699.23	725.47	687.09	38.38	18.902		
9,350.00	9,282.41	9,346.00	9,214.48	20.90	17.57	-81.90	108.63	-698.92	725.16	686.68	38.48	18.847		
9,375.00	9,296.32	9,362.14	9,222.40	20.96	17.61	-81.83	122.70	-698.74	724.98	686.41	38.57	18.795		
9,400.00	9,309.14	9,385.22	9,233.19	21.03	17.67	-81.75	143.09	-698.45	724.72	686.01	38.70	18.726		
9,425.00	9,320.81	9,418.11	9,247.51	21.11	17.77	-81.72	172.69	-697.78	724.21	685.34	38.88	18.629		
9,450.00	9,331.31	9,454.31	9,261.79	21.19	17.90	-81.74	205.92	-696.26	723.12	684.03	39.09	18.498		
9,475.00	9,340.60	9,487.84	9,272.49	21.28	18.06	-81.76	237.60	-694.03	721.51	682.17	39.33	18.344		
9,500.00	9,348.67	9,512.34	9,278.58	21.37	18.18	-81.82	261.24	-692.01	719.57	680.01	39.56	18.190		
9,525.00	9,355.49	9,534.00	9,282.76	21.48	18.31	-81.90	282.40	-690.07	717.46	677.68	39.79	18.033		
9,550.00	9,361.04	9,555.71	9,286.08	21.59	18.44	-82.01	303.77	-688.10	715.29	675.26	40.03	17.869		
9,575.00	9,365.31	9,575.31	9,288.55	21.71	18.57	-82.17	323.13	-686.41	713.12	672.85	40.28	17.706		
9,600.00	9,368.29	9,581.00	9,289.18	21.84	18.61	-82.39	328.77	-685.93	711.13	670.69	40.44	17.584		
9,625.00	9,369.96	9,604.87	9,291.25	21.97	18.77	-82.62	352.48	-684.20	709.10	668.36	40.74	17.407		
9,650.00	9,370.32	9,629.00	9,292.40	22.11	18.94	-82.89	376.55	-682.97	707.53	666.48	41.05	17.236		

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 Production L L C	Local Co-ordinate Reference:	Well Vast State 2H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Reference Site:	Sec. 17, T 26 S. , R 33 E	MD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Site Error:	5.00 ft	North Reference:	Grid
Reference Well:	Vast State 2H	Survey Calculation Method:	Minimum Curvature
Well Error:	5.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Multi User Db
Reference Design:	Plan#1	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.00 ft
Survey Program: 100-MWD, 4927-MWD												Offset Well Error:	5.00 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	
9,662.78	9,370.00	9,629.00	9,292.40	22.19	18.94	-83.00	376.55	-682.97	706.63	665.51	41.13	17.182	
9,700.00	9,368.58	9,649.60	9,292.64	22.42	19.09	-83.07	397.14	-682.26	704.79	663.29	41.51	16.979	
9,800.00	9,364.74	9,744.28	9,290.64	23.14	19.81	-83.18	491.77	-680.17	701.61	658.66	42.95	16.337	
9,900.00	9,360.90	9,850.66	9,289.44	23.97	20.70	-83.38	598.11	-677.42	697.95	653.29	44.67	15.626	
10,000.00	9,357.06	9,949.48	9,289.74	24.91	21.62	-83.68	696.88	-674.59	693.87	647.34	46.53	14.912	
10,100.00	9,353.22	10,043.32	9,290.77	25.95	22.58	-84.04	790.70	-672.53	690.39	641.87	48.52	14.228	
10,200.00	9,349.39	10,143.84	9,291.83	27.06	23.71	-84.42	891.19	-670.57	687.19	636.41	50.77	13.534	
10,300.00	9,345.55	10,236.19	9,290.88	28.26	24.84	-84.62	983.52	-669.16	684.62	631.53	53.09	12.895	
10,400.00	9,341.71	10,331.97	9,287.70	29.51	26.06	-84.65	1,079.24	-668.40	683.02	627.44	55.58	12.290	
10,500.00	9,337.87	10,439.70	9,283.22	30.83	27.48	-84.60	1,186.88	-667.12	681.10	622.79	58.31	11.681	
10,600.00	9,334.03	10,543.05	9,278.63	32.19	28.87	-84.52	1,290.10	-664.64	677.99	616.93	61.06	11.103	
10,700.00	9,330.20	10,638.25	9,275.73	33.60	30.17	-84.57	1,385.23	-662.96	675.39	611.61	63.78	10.590	
10,800.00	9,326.36	10,734.39	9,272.61	35.05	31.53	-84.60	1,481.31	-661.69	673.25	606.67	66.58	10.112	
10,900.00	9,322.52	10,824.89	9,270.34	36.53	32.82	-84.69	1,571.78	-661.41	672.05	602.70	69.35	9.691	
10,917.98	9,321.83	10,840.47	9,270.06	36.80	33.04	-84.72	1,587.36	-661.53	672.02	602.18	69.84	9.622	
11,000.00	9,318.68	10,919.47	9,269.03	38.04	34.17	-84.90	1,666.34	-662.77	672.48	600.26	72.21	9.312	
11,100.00	9,314.84	11,025.43	9,268.14	39.58	35.73	-85.17	1,772.29	-663.79	672.40	597.10	75.30	8.929	
11,200.00	9,311.01	11,130.61	9,266.83	41.14	37.32	-85.40	1,877.47	-664.02	671.64	593.18	78.46	8.560	
11,300.00	9,307.17	11,233.15	9,265.10	42.72	38.92	-85.57	1,979.99	-663.48	670.18	588.53	81.64	8.209	
11,400.00	9,303.33	11,336.28	9,262.89	44.32	40.55	-85.71	2,083.09	-662.58	668.41	583.53	84.87	7.875	
11,500.00	9,299.49	11,439.76	9,261.31	45.94	42.16	-85.90	2,186.55	-661.17	666.11	578.01	88.10	7.561	
11,600.00	9,295.65	11,530.53	9,259.19	47.57	43.57	-86.01	2,277.29	-660.24	664.21	573.07	91.14	7.288	
11,700.00	9,291.82	11,631.00	9,253.99	49.22	45.19	-85.88	2,377.61	-659.32	662.62	568.21	94.41	7.019	
11,800.00	9,287.98	11,725.00	9,249.07	50.88	46.69	-85.76	2,471.48	-658.91	661.54	563.96	97.57	6.780	
11,806.04	9,287.75	11,728.68	9,248.90	50.98	46.75	-85.76	2,475.15	-658.93	661.53	563.80	97.73	6.769	
11,900.00	9,284.14	11,819.00	9,243.99	52.55	48.18	-85.64	2,565.33	-660.05	662.07	561.34	100.73	6.573	
12,000.00	9,280.30	11,913.57	9,239.79	54.23	49.68	-85.60	2,659.78	-661.95	663.34	559.42	103.91	6.384	
12,100.00	9,276.47	12,016.86	9,237.09	55.92	51.32	-85.71	2,763.02	-664.00	664.45	557.20	107.24	6.196	
12,200.00	9,272.63	12,116.42	9,234.48	57.62	52.93	-85.83	2,862.53	-665.83	665.43	554.88	110.55	6.019	
12,300.00	9,268.79	12,222.58	9,231.47	59.32	54.67	-85.92	2,968.63	-667.40	666.06	552.07	113.99	5.843	
12,400.00	9,264.95	12,324.77	9,227.19	61.03	56.37	-85.89	3,070.73	-667.59	665.49	548.09	117.40	5.668	
12,416.65	9,264.31	12,339.51	9,226.71	61.32	56.61	-85.89	3,085.46	-667.68	665.47	547.54	117.93	5.643	
12,500.00	9,261.11	12,418.79	9,225.14	62.75	57.92	-86.02	3,164.72	-668.84	665.92	545.25	120.67	5.519	
12,600.00	9,257.28	12,520.34	9,223.32	64.48	59.59	-86.21	3,266.25	-670.19	666.33	542.26	124.07	5.371	
12,700.00	9,253.44	12,621.67	9,221.87	66.21	61.27	-86.42	3,367.56	-671.50	666.70	539.22	127.48	5.230	
12,800.00	9,249.60	12,719.33	9,219.86	67.94	62.89	-86.57	3,465.19	-672.55	666.90	536.06	130.84	5.097	
12,900.00	9,245.76	12,814.75	9,218.21	69.68	64.46	-86.75	3,560.58	-674.29	667.82	533.68	134.15	4.978	
13,000.00	9,241.92	12,913.88	9,218.15	71.43	66.10	-87.07	3,659.68	-676.63	669.20	531.68	137.53	4.866	
13,100.00	9,238.09	13,017.93	9,217.58	73.18	67.84	-87.37	3,763.70	-678.78	670.35	529.33	141.01	4.754	
13,200.00	9,234.25	13,125.54	9,217.19	74.93	69.62	-87.69	3,871.31	-680.03	670.59	526.04	144.55	4.639	
13,300.00	9,230.41	13,227.98	9,216.11	76.68	71.36	-87.94	3,973.74	-680.39	670.06	522.01	148.04	4.526	
13,400.00	9,226.57	13,333.89	9,213.91	78.44	73.18	-88.09	4,079.63	-680.11	668.96	517.33	151.63	4.412	
13,500.00	9,222.73	13,443.67	9,210.43	80.20	75.08	-88.15	4,189.33	-678.38	666.59	511.30	155.29	4.293	
13,600.00	9,218.90	13,541.09	9,206.73	81.97	76.76	-88.14	4,286.65	-675.90	663.28	504.56	158.72	4.179	
13,700.00	9,215.06	13,632.61	9,203.97	83.74	78.30	-88.20	4,378.13	-675.17	661.65	499.61	162.04	4.083	
13,800.00	9,211.22	13,729.83	9,199.98	85.51	79.95	-88.18	4,475.26	-674.26	659.97	494.51	165.46	3.989	
13,837.40	9,209.79	13,760.77	9,198.70	86.17	80.48	-88.17	4,506.18	-674.35	659.79	493.14	166.65	3.959	
13,900.00	9,207.38	13,816.68	9,196.58	87.28	81.41	-88.17	4,562.04	-675.16	660.20	491.51	168.69	3.914	
14,000.00	9,203.55	13,916.88	9,193.53	89.05	83.08	-88.24	4,662.17	-677.19	661.43	489.30	172.14	3.842	
14,100.00	9,199.71	14,025.69	9,190.30	90.83	84.92	-88.33	4,770.92	-678.38	661.73	485.98	175.75	3.765	
14,200.00	9,195.87	14,135.25	9,187.57	92.61	86.77	-88.45	4,880.45	-678.14	660.70	481.32	179.38	3.683	
14,296.57	9,192.16	14,220.00	9,185.08	94.33	88.23	-88.51	4,965.15	-677.01	658.79	476.24	182.55	3.609 CC	

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 Production L L C	Local Co-ordinate Reference:	Well Vast State 2H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Reference Site:	Sec. 17, T 26 S. , R 33 E	MD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Site Error:	5.00 ft	North Reference:	Grid
Reference Well:	Vast State 2H	Survey Calculation Method:	Minimum Curvature
Well Error:	5.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Multi User Db
Reference Design:	Plan#1	Offset TVD Reference:	Offset Datum

Offset Design Sec. 17, T 26 S. , R 33 E - Vast State 3H - Wellbore #1 - Wellbore #1												Offset Site Error:	0.00 ft
Survey Program: 100-MWD, 4927-MWD												Offset Well Error:	5.00 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
14,300.00	9,192.03	14,220.00	9,185.08	94.39	88.23	-88.51	4,965.15	-677.01	658.80	476.19	182.61	3.608 ES	
14,352.82	9,190.00	14,220.00	9,185.08	95.33	88.23	-88.51	4,965.15	-677.01	661.19	477.64	183.55	3.602 SF	
14,353.66	9,189.97	14,220.00	9,185.08	95.34	88.23	-88.51	4,965.15	-677.01	661.26	477.70	183.57	3.602	

Integrity Directional Services, LLC

Anticollision Report

Company:	COG Production L L C	Local Co-ordinate Reference:	Well Vast State 2H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Reference Site:	Sec. 17, T 26 S. , R 33 E	MD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Site Error:	5.00 ft	North Reference:	Grid
Reference Well:	Vast State 2H	Survey Calculation Method:	Minimum Curvature
Well Error:	5.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Multi User Db
Reference Design:	Plan#1	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB=20' @ 3279.00ft (Patriot 2)

Offset Depths are relative to Offset Datum

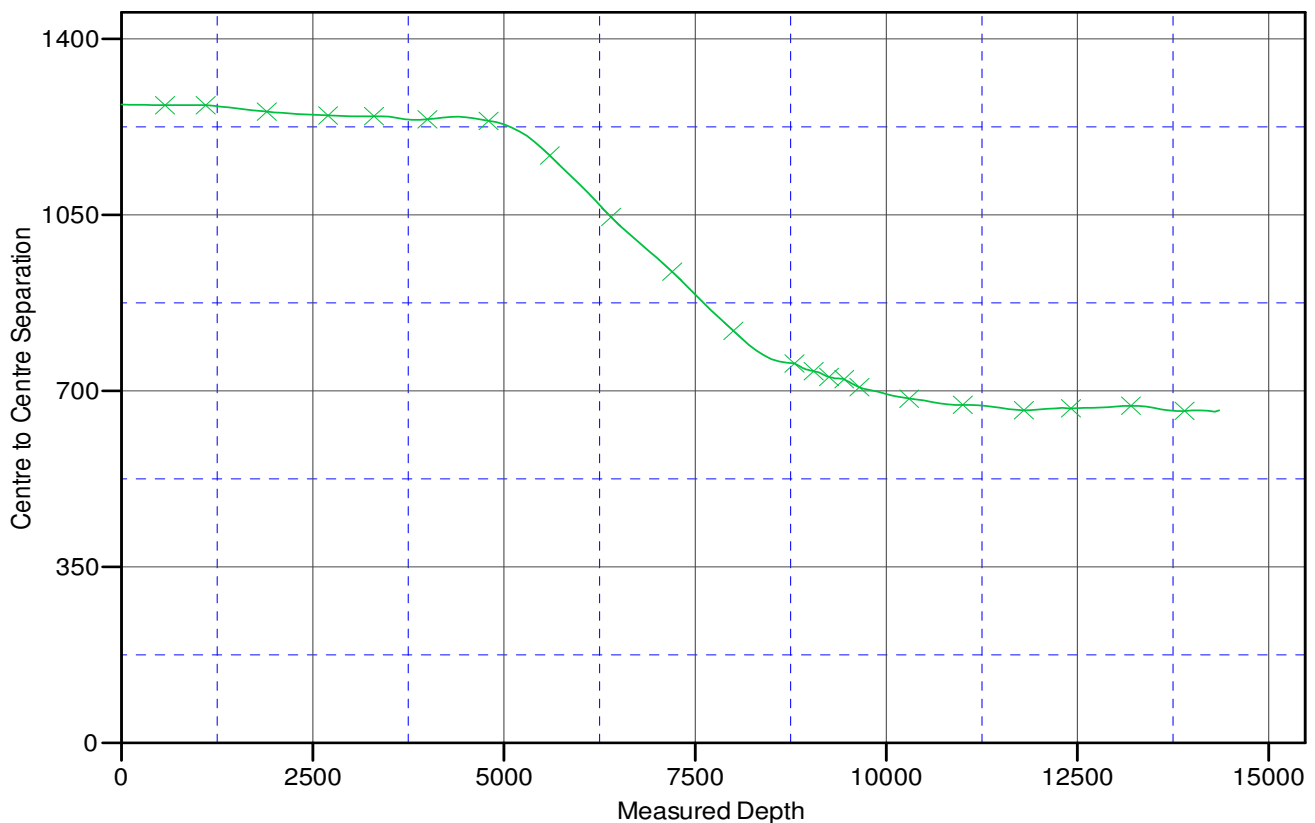
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Vast State 2H

Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30

Grid Convergence at Surface is: 0.40°

Ladder Plot



LEGEND

✕ Vast State 3H, Wellbore #1, Wellbore #1 V0

Integrity Directional Services, LLC

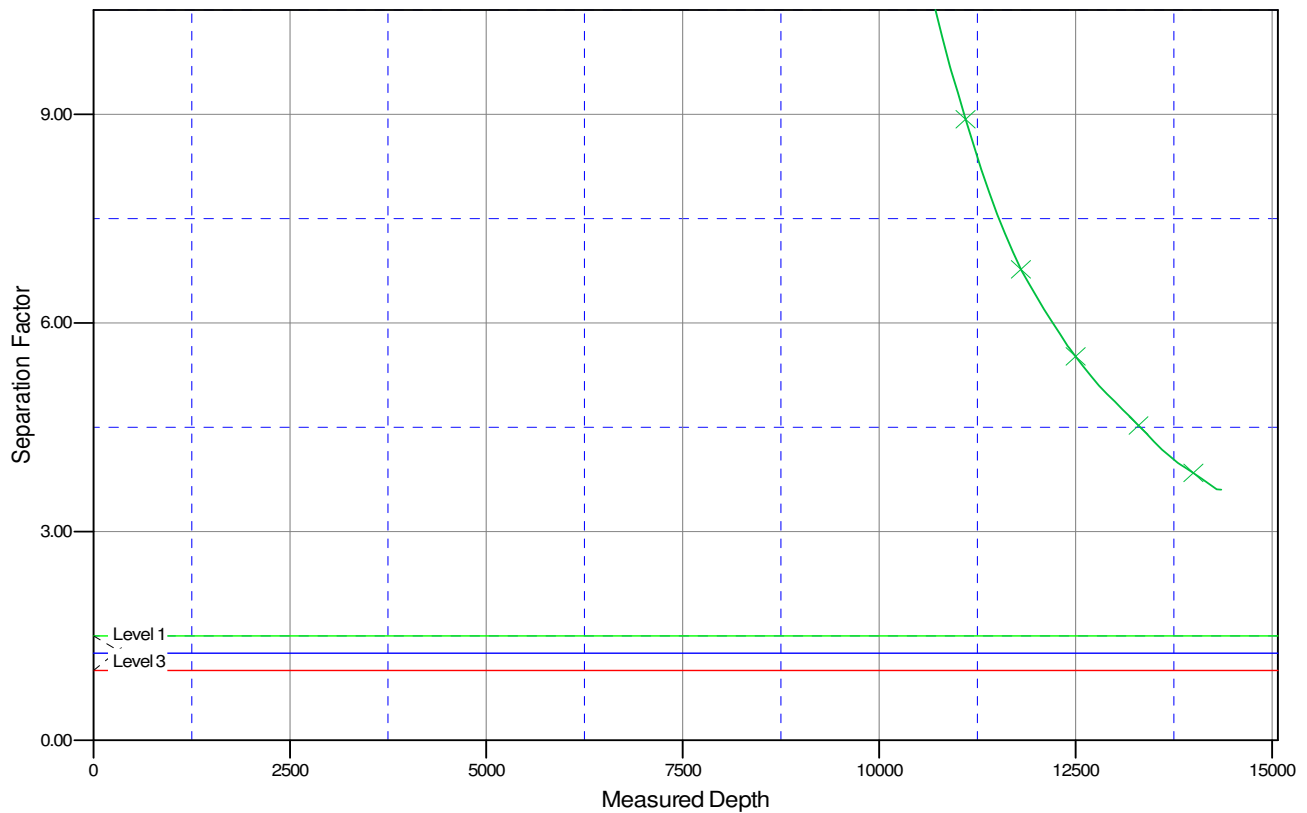
Anticollision Report

Company:	COG Production L L C	Local Co-ordinate Reference:	Well Vast State 2H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Reference Site:	Sec. 17, T 26 S. , R 33 E	MD Reference:	KB=20' @ 3279.00ft (Patriot 2)
Site Error:	5.00 ft	North Reference:	Grid
Reference Well:	Vast State 2H	Survey Calculation Method:	Minimum Curvature
Well Error:	5.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.1 Multi User Db
Reference Design:	Plan#1	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB=20' @ 3279.00ft (Patriot 2)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Vast State 2H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.40°

Separation Factor Plot



LEGEND

✕ Vast State 3H, Wellbore #1, Wellbore #1 V0