



CONCHO

COG OPERATING LLC

LEA COUNTY, NM

BULLDOG

STOVE PIPE FED COM #21H

OWB

PWP0

HOBBS OCD
MAY 30 2017
RECEIVED

Anticollision Report

09 January, 2017



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: STOVE PIPE FED COM #21H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well STOVE PIPE FED COM #21H
TVD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)
MD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Reference	PWP0		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 10,000.0 usft	Error Surface:	Major Axis
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date 1/9/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.0	22,526.9	PWP0 (OWB)	MWD	OWSG MWD - Standard	

Summary					
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design					
BULLDOG					
STOVE PIPE FED COM #1H - OWB - PWP0	12,009.4	12,009.4	40.6	-45.2	0.473 Stop Drilling Now, CC, ES,

Offset Design BULLDOG - STOVE PIPE FED COM #1H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Minimum Separation (usft)	Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)				Between Centres (usft)	Between Ellipses (usft)
0.0	0.0	0.0	0.0	3.0	3.0	-106.29	-11.4	-39.0	40.6				
100.0	100.0	100.0	100.0	3.0	3.0	-106.29	-11.4	-39.0	40.6	34.6	6.01	6.766	
200.0	200.0	200.0	200.0	3.0	3.0	-106.29	-11.4	-39.0	40.6	34.6	6.08	6.685	
300.0	300.0	300.0	300.0	3.1	3.1	-106.29	-11.4	-39.0	40.6	34.4	6.23	6.519	
400.0	400.0	400.0	400.0	3.2	3.2	-106.29	-11.4	-39.0	40.6	34.2	6.46	6.286	
500.0	500.0	500.0	500.0	3.4	3.4	-106.29	-11.4	-39.0	40.6	33.9	6.76	6.007	
600.0	600.0	600.0	600.0	3.6	3.6	-106.29	-11.4	-39.0	40.6	33.5	7.12	5.704	
700.0	700.0	700.0	700.0	3.8	3.8	-106.29	-11.4	-39.0	40.6	33.1	7.53	5.393	
800.0	800.0	800.0	800.0	4.0	4.0	-106.29	-11.4	-39.0	40.6	32.6	7.99	5.087	
900.0	900.0	900.0	900.0	4.2	4.2	-106.29	-11.4	-39.0	40.6	32.2	8.48	4.792	
1,000.0	1,000.0	1,000.0	1,000.0	4.5	4.5	-106.29	-11.4	-39.0	40.6	31.6	9.00	4.515	
1,100.0	1,100.0	1,100.0	1,100.0	4.8	4.8	-106.29	-11.4	-39.0	40.6	31.1	9.55	4.257	
1,200.0	1,200.0	1,200.0	1,200.0	5.1	5.1	-106.29	-11.4	-39.0	40.6	30.5	10.11	4.018	
1,300.0	1,300.0	1,300.0	1,300.0	5.3	5.3	-106.29	-11.4	-39.0	40.6	29.9	10.70	3.798	
1,400.0	1,400.0	1,400.0	1,400.0	5.6	5.6	-106.29	-11.4	-39.0	40.6	29.3	11.30	3.596	
1,500.0	1,500.0	1,500.0	1,500.0	6.0	6.0	-106.29	-11.4	-39.0	40.6	28.7	11.91	3.411	
1,600.0	1,600.0	1,600.0	1,600.0	6.3	6.3	-106.29	-11.4	-39.0	40.6	28.1	12.54	3.241	
1,700.0	1,700.0	1,700.0	1,700.0	6.6	6.6	-106.29	-11.4	-39.0	40.6	27.5	13.17	3.085	
1,800.0	1,800.0	1,800.0	1,800.0	6.9	6.9	-106.29	-11.4	-39.0	40.6	26.8	13.81	2.941	
1,900.0	1,900.0	1,900.0	1,900.0	7.2	7.2	-106.29	-11.4	-39.0	40.6	26.2	14.46	2.809	
2,000.0	2,000.0	2,000.0	2,000.0	7.6	7.6	-106.29	-11.4	-39.0	40.6	25.5	15.12	2.688	
2,100.0	2,100.0	2,100.0	2,100.0	7.9	7.9	-106.29	-11.4	-39.0	40.6	24.9	15.78	2.575	
2,200.0	2,200.0	2,200.0	2,200.0	8.2	8.2	-106.29	-11.4	-39.0	40.6	24.2	16.44	2.471	
2,300.0	2,300.0	2,300.0	2,300.0	8.6	8.6	-106.29	-11.4	-39.0	40.6	23.5	17.11	2.374	
2,400.0	2,400.0	2,400.0	2,400.0	8.9	8.9	-106.29	-11.4	-39.0	40.6	22.8	17.79	2.284	
2,500.0	2,500.0	2,500.0	2,500.0	9.2	9.2	-106.29	-11.4	-39.0	40.6	22.2	18.46	2.201	

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



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North Reference: Grid
Survey Calculation Method: Minimum Curvature
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Database: EDM_Users
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Offset Design BULLDOG - STOVE PIPE FED COM #1H - OWB - PWP0											Offset Site Error: 0.0 usft		
Survey Program: 0-MWD											Offset Well Error: 3.0 usft		
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
2,600.0	2,600.0	2,600.0	2,600.0	9.6	9.6	-106.29	-11.4	-39.0	40.6	21.5	19.14	2.123	
2,700.0	2,700.0	2,700.0	2,700.0	9.9	9.9	-106.29	-11.4	-39.0	40.6	20.8	19.82	2.050	
2,800.0	2,800.0	2,800.0	2,800.0	10.3	10.3	-106.29	-11.4	-39.0	40.6	20.1	20.51	1.981	Advise and Monitor
2,900.0	2,900.0	2,900.0	2,900.0	10.6	10.6	-106.29	-11.4	-39.0	40.6	19.4	21.20	1.917	Advise and Monitor
3,000.0	3,000.0	3,000.0	3,000.0	10.9	10.9	-106.29	-11.4	-39.0	40.6	18.7	21.88	1.857	Advise and Monitor
3,100.0	3,100.0	3,100.0	3,100.0	11.3	11.3	-106.29	-11.4	-39.0	40.6	18.1	22.57	1.800	Advise and Monitor
3,200.0	3,200.0	3,200.0	3,200.0	11.6	11.6	-106.29	-11.4	-39.0	40.6	17.4	23.27	1.746	Advise and Monitor
3,300.0	3,300.0	3,300.0	3,300.0	12.0	12.0	-106.29	-11.4	-39.0	40.6	16.7	23.96	1.696	Advise and Monitor
3,400.0	3,400.0	3,400.0	3,400.0	12.3	12.3	-106.29	-11.4	-39.0	40.6	16.0	24.65	1.648	Advise and Monitor
3,500.0	3,500.0	3,500.0	3,500.0	12.7	12.7	-106.29	-11.4	-39.0	40.6	15.3	25.35	1.603	Advise and Monitor
3,600.0	3,600.0	3,600.0	3,600.0	13.0	13.0	-106.29	-11.4	-39.0	40.6	14.6	26.05	1.560	Advise and Monitor
3,700.0	3,700.0	3,700.0	3,700.0	13.4	13.4	-106.29	-11.4	-39.0	40.6	13.9	26.75	1.519	Advise and Monitor
3,800.0	3,800.0	3,800.0	3,800.0	13.7	13.7	-106.29	-11.4	-39.0	40.6	13.2	27.45	1.480	Shut in Produces
3,900.0	3,900.0	3,900.0	3,900.0	14.1	14.1	-106.29	-11.4	-39.0	40.6	12.5	28.15	1.444	Shut in Produces
4,000.0	4,000.0	4,000.0	4,000.0	14.4	14.4	-106.29	-11.4	-39.0	40.6	11.8	28.85	1.409	Shut in Produces
4,100.0	4,100.0	4,100.0	4,100.0	14.8	14.8	-106.29	-11.4	-39.0	40.6	11.1	29.55	1.375	Shut in Produces
4,200.0	4,200.0	4,200.0	4,200.0	15.1	15.1	-106.29	-11.4	-39.0	40.6	10.4	30.25	1.343	Shut in Produces
4,300.0	4,300.0	4,300.0	4,300.0	15.5	15.5	-106.29	-11.4	-39.0	40.6	9.7	30.95	1.313	Shut in Produces
4,400.0	4,400.0	4,400.0	4,400.0	15.8	15.8	-106.29	-11.4	-39.0	40.6	9.0	31.66	1.284	Shut in Produces
4,500.0	4,500.0	4,500.0	4,500.0	16.2	16.2	-106.29	-11.4	-39.0	40.6	8.3	32.36	1.256	Shut in Produces
4,600.0	4,600.0	4,600.0	4,600.0	16.5	16.5	-106.29	-11.4	-39.0	40.6	7.6	33.07	1.229	Shut in Produces
4,700.0	4,700.0	4,700.0	4,700.0	16.9	16.9	-106.29	-11.4	-39.0	40.6	6.9	33.77	1.203	Shut in Produces
4,800.0	4,800.0	4,800.0	4,800.0	17.2	17.2	-106.29	-11.4	-39.0	40.6	6.2	34.48	1.179	Shut in Produces
4,900.0	4,900.0	4,900.0	4,900.0	17.6	17.6	-106.29	-11.4	-39.0	40.6	5.4	35.18	1.155	Shut in Produces
5,000.0	5,000.0	5,000.0	5,000.0	17.9	17.9	-106.29	-11.4	-39.0	40.6	4.7	35.89	1.132	Shut in Produces
5,100.0	5,100.0	5,100.0	5,100.0	18.3	18.3	-106.29	-11.4	-39.0	40.6	4.0	36.60	1.110	Shut in Produces
5,200.0	5,200.0	5,200.0	5,200.0	18.7	18.7	-106.29	-11.4	-39.0	40.6	3.3	37.30	1.089	Shut in Produces
5,300.0	5,300.0	5,300.0	5,300.0	19.0	19.0	-106.29	-11.4	-39.0	40.6	2.6	38.01	1.069	Shut in Produces
5,400.0	5,400.0	5,400.0	5,400.0	19.4	19.4	-106.29	-11.4	-39.0	40.6	1.9	38.72	1.049	Shut in Produces
5,500.0	5,500.0	5,500.0	5,500.0	19.7	19.7	-106.29	-11.4	-39.0	40.6	1.2	39.43	1.031	Shut in Produces
5,600.0	5,600.0	5,600.0	5,600.0	20.1	20.1	-106.29	-11.4	-39.0	40.6	0.5	40.14	1.012	Shut in Produces
5,700.0	5,700.0	5,700.0	5,700.0	20.4	20.4	-106.29	-11.4	-39.0	40.6	-0.2	40.85	0.995	Stop Drilling Now
5,800.0	5,800.0	5,800.0	5,800.0	20.8	20.8	-106.29	-11.4	-39.0	40.6	-0.9	41.56	0.978	Stop Drilling Now
5,900.0	5,900.0	5,900.0	5,900.0	21.1	21.1	-106.29	-11.4	-39.0	40.6	-1.6	42.27	0.961	Stop Drilling Now
6,000.0	6,000.0	6,000.0	6,000.0	21.5	21.5	-106.29	-11.4	-39.0	40.6	-2.3	42.98	0.945	Stop Drilling Now
6,100.0	6,100.0	6,100.0	6,100.0	21.8	21.8	-106.29	-11.4	-39.0	40.6	-3.1	43.69	0.930	Stop Drilling Now
6,200.0	6,200.0	6,200.0	6,200.0	22.2	22.2	-106.29	-11.4	-39.0	40.6	-3.8	44.40	0.915	Stop Drilling Now
6,300.0	6,300.0	6,300.0	6,300.0	22.6	22.6	-106.29	-11.4	-39.0	40.6	-4.5	45.11	0.901	Stop Drilling Now
6,400.0	6,400.0	6,400.0	6,400.0	22.9	22.9	-106.29	-11.4	-39.0	40.6	-5.2	45.82	0.887	Stop Drilling Now
6,500.0	6,500.0	6,500.0	6,500.0	23.3	23.3	-106.29	-11.4	-39.0	40.6	-5.9	46.53	0.873	Stop Drilling Now
6,600.0	6,600.0	6,600.0	6,600.0	23.6	23.6	-106.29	-11.4	-39.0	40.6	-6.6	47.24	0.860	Stop Drilling Now
6,700.0	6,700.0	6,700.0	6,700.0	24.0	24.0	-106.29	-11.4	-39.0	40.6	-7.3	47.95	0.847	Stop Drilling Now
6,800.0	6,800.0	6,800.0	6,800.0	24.3	24.3	-106.29	-11.4	-39.0	40.6	-8.0	48.66	0.835	Stop Drilling Now
6,900.0	6,900.0	6,900.0	6,900.0	24.7	24.7	-106.29	-11.4	-39.0	40.6	-8.7	49.37	0.823	Stop Drilling Now
7,000.0	7,000.0	7,000.0	7,000.0	25.0	25.0	-106.29	-11.4	-39.0	40.6	-9.5	50.08	0.811	Stop Drilling Now
7,100.0	7,100.0	7,100.0	7,100.0	25.4	25.4	-106.29	-11.4	-39.0	40.6	-10.2	50.80	0.800	Stop Drilling Now
7,200.0	7,200.0	7,200.0	7,200.0	25.8	25.8	-106.29	-11.4	-39.0	40.6	-10.9	51.51	0.789	Stop Drilling Now
7,300.0	7,300.0	7,300.0	7,300.0	26.1	26.1	-106.29	-11.4	-39.0	40.6	-11.6	52.22	0.778	Stop Drilling Now
7,400.0	7,400.0	7,400.0	7,400.0	26.5	26.5	-106.29	-11.4	-39.0	40.6	-12.3	52.93	0.768	Stop Drilling Now
7,500.0	7,500.0	7,500.0	7,500.0	26.8	26.8	-106.29	-11.4	-39.0	40.6	-13.0	53.64	0.757	Stop Drilling Now
7,600.0	7,600.0	7,600.0	7,600.0	27.2	27.2	-106.29	-11.4	-39.0	40.6	-13.7	54.36	0.747	Stop Drilling Now
7,700.0	7,700.0	7,700.0	7,700.0	27.5	27.5	-106.29	-11.4	-39.0	40.6	-14.4	55.07	0.738	Stop Drilling Now

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North Reference: Grid
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Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - STOVE PIPE FED COM #1H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis		Highside Tooface (")	Distance		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)						
7,800.0	7,800.0	7,800.0	7,800.0	27.9	27.9	-106.29	-11.4	-39.0	40.6	-15.2	55.78	0.728	Stop Drilling Now
7,900.0	7,900.0	7,900.0	7,900.0	28.2	28.2	-106.29	-11.4	-39.0	40.6	-15.9	56.50	0.719	Stop Drilling Now
8,000.0	8,000.0	8,000.0	8,000.0	28.6	28.6	-106.29	-11.4	-39.0	40.6	-16.6	57.21	0.710	Stop Drilling Now
8,100.0	8,100.0	8,100.0	8,100.0	29.0	29.0	-106.29	-11.4	-39.0	40.6	-17.3	57.92	0.702	Stop Drilling Now
8,200.0	8,200.0	8,200.0	8,200.0	29.3	29.3	-106.29	-11.4	-39.0	40.6	-18.0	58.63	0.693	Stop Drilling Now
8,300.0	8,300.0	8,300.0	8,300.0	29.7	29.7	-106.29	-11.4	-39.0	40.6	-18.7	59.35	0.685	Stop Drilling Now
8,400.0	8,400.0	8,400.0	8,400.0	30.0	30.0	-106.29	-11.4	-39.0	40.6	-19.4	60.06	0.677	Stop Drilling Now
8,500.0	8,500.0	8,500.0	8,500.0	30.4	30.4	-106.29	-11.4	-39.0	40.6	-20.1	60.77	0.669	Stop Drilling Now
8,600.0	8,600.0	8,600.0	8,600.0	30.7	30.7	-106.29	-11.4	-39.0	40.6	-20.9	61.49	0.661	Stop Drilling Now
8,700.0	8,700.0	8,700.0	8,700.0	31.1	31.1	-106.29	-11.4	-39.0	40.6	-21.6	62.20	0.653	Stop Drilling Now
8,800.0	8,800.0	8,800.0	8,800.0	31.5	31.5	-106.29	-11.4	-39.0	40.6	-22.3	62.92	0.646	Stop Drilling Now
8,900.0	8,900.0	8,900.0	8,900.0	31.8	31.8	-106.29	-11.4	-39.0	40.6	-23.0	63.63	0.639	Stop Drilling Now
9,000.0	9,000.0	9,000.0	9,000.0	32.2	32.2	-106.29	-11.4	-39.0	40.6	-23.7	64.34	0.631	Stop Drilling Now
9,100.0	9,100.0	9,100.0	9,100.0	32.5	32.5	-106.29	-11.4	-39.0	40.6	-24.4	65.06	0.625	Stop Drilling Now
9,200.0	9,200.0	9,200.0	9,200.0	32.9	32.9	-106.29	-11.4	-39.0	40.6	-25.1	65.77	0.618	Stop Drilling Now
9,300.0	9,300.0	9,300.0	9,300.0	33.2	33.2	-106.29	-11.4	-39.0	40.6	-25.9	66.48	0.611	Stop Drilling Now
9,400.0	9,400.0	9,400.0	9,400.0	33.6	33.6	-106.29	-11.4	-39.0	40.6	-26.6	67.20	0.605	Stop Drilling Now
9,500.0	9,500.0	9,500.0	9,500.0	34.0	34.0	-106.29	-11.4	-39.0	40.6	-27.3	67.91	0.598	Stop Drilling Now
9,600.0	9,600.0	9,600.0	9,600.0	34.3	34.3	-106.29	-11.4	-39.0	40.6	-28.0	68.63	0.592	Stop Drilling Now
9,700.0	9,700.0	9,700.0	9,700.0	34.7	34.7	-106.29	-11.4	-39.0	40.6	-28.7	69.34	0.586	Stop Drilling Now
9,800.0	9,800.0	9,800.0	9,800.0	35.0	35.0	-106.29	-11.4	-39.0	40.6	-29.4	70.06	0.580	Stop Drilling Now
9,900.0	9,900.0	9,900.0	9,900.0	35.4	35.4	-106.29	-11.4	-39.0	40.6	-30.1	70.77	0.574	Stop Drilling Now
10,000.0	10,000.0	10,000.0	10,000.0	35.7	35.7	-106.29	-11.4	-39.0	40.6	-30.9	71.48	0.568	Stop Drilling Now
10,100.0	10,100.0	10,100.0	10,100.0	36.1	36.1	-106.29	-11.4	-39.0	40.6	-31.6	72.20	0.563	Stop Drilling Now
10,200.0	10,200.0	10,200.0	10,200.0	36.5	36.5	-106.29	-11.4	-39.0	40.6	-32.3	72.91	0.557	Stop Drilling Now
10,300.0	10,300.0	10,300.0	10,300.0	36.8	36.8	-106.29	-11.4	-39.0	40.6	-33.0	73.63	0.552	Stop Drilling Now
10,400.0	10,400.0	10,400.0	10,400.0	37.2	37.2	-106.29	-11.4	-39.0	40.6	-33.7	74.34	0.547	Stop Drilling Now
10,500.0	10,500.0	10,500.0	10,500.0	37.5	37.5	-106.29	-11.4	-39.0	40.6	-34.4	75.06	0.541	Stop Drilling Now
10,600.0	10,600.0	10,600.0	10,600.0	37.9	37.9	-106.29	-11.4	-39.0	40.6	-35.1	75.77	0.536	Stop Drilling Now
10,700.0	10,700.0	10,700.0	10,700.0	38.2	38.2	-106.29	-11.4	-39.0	40.6	-35.9	76.49	0.531	Stop Drilling Now
10,800.0	10,800.0	10,800.0	10,800.0	38.6	38.6	-106.29	-11.4	-39.0	40.6	-36.6	77.20	0.526	Stop Drilling Now
10,900.0	10,900.0	10,900.0	10,900.0	39.0	39.0	-106.29	-11.4	-39.0	40.6	-37.3	77.92	0.521	Stop Drilling Now
11,000.0	11,000.0	11,000.0	11,000.0	39.3	39.3	-106.29	-11.4	-39.0	40.6	-38.0	78.63	0.517	Stop Drilling Now
11,100.0	11,100.0	11,100.0	11,100.0	39.7	39.7	-106.29	-11.4	-39.0	40.6	-38.7	79.35	0.512	Stop Drilling Now
11,200.0	11,200.0	11,200.0	11,200.0	40.0	40.0	-106.29	-11.4	-39.0	40.6	-39.4	80.06	0.508	Stop Drilling Now
11,300.0	11,300.0	11,300.0	11,300.0	40.4	40.4	-106.29	-11.4	-39.0	40.6	-40.1	80.78	0.503	Stop Drilling Now
11,400.0	11,400.0	11,400.0	11,400.0	40.7	40.7	-106.29	-11.4	-39.0	40.6	-40.9	81.49	0.499	Stop Drilling Now
11,500.0	11,500.0	11,500.0	11,500.0	41.1	41.1	-106.29	-11.4	-39.0	40.6	-41.6	82.21	0.494	Stop Drilling Now
11,600.0	11,600.0	11,600.0	11,600.0	41.5	41.5	-106.29	-11.4	-39.0	40.6	-42.3	82.92	0.490	Stop Drilling Now
11,700.0	11,700.0	11,700.0	11,700.0	41.8	41.8	-106.29	-11.4	-39.0	40.6	-43.0	83.64	0.486	Stop Drilling Now
11,800.0	11,800.0	11,800.0	11,800.0	42.2	42.2	-106.29	-11.4	-39.0	40.6	-43.7	84.35	0.482	Stop Drilling Now
11,900.0	11,900.0	11,900.0	11,900.0	42.5	42.5	-106.29	-11.4	-39.0	40.6	-44.4	85.07	0.478	Stop Drilling Now
12,000.0	12,000.0	12,000.0	12,000.0	42.9	42.9	-106.29	-11.4	-39.0	40.6	-45.1	85.78	0.474	Stop Drilling Now
12,009.4	12,009.4	12,009.4	12,009.4	42.9	42.9	-106.29	-11.4	-39.0	40.6	-45.2	85.85	0.473	Stop Drilling Now, CC, ES, SF
12,100.0	12,100.0	12,097.6	12,097.4	43.2	43.2	-111.13	-15.3	-39.5	42.4	-44.0	86.47	0.491	Stop Drilling Now
12,200.0	12,200.0	12,189.2	12,186.6	43.6	43.5	-130.01	-35.4	-42.2	56.7	-30.5	87.11	0.650	Stop Drilling Now
12,251.5	12,251.5	12,232.6	12,227.1	43.8	43.6	-138.96	-50.7	-44.2	71.6	-15.8	87.42	0.819	Stop Drilling Now
12,275.0	12,275.0	12,251.5	12,244.3	43.9	43.7	57.48	-58.6	-45.2	79.8	-7.7	87.55	0.912	Stop Drilling Now
12,300.0	12,299.9	12,271.3	12,262.0	44.0	43.7	54.24	-67.5	-46.4	89.0	1.3	87.69	1.015	Shut in Produces
12,325.0	12,324.7	12,290.8	12,279.0	44.0	43.8	51.76	-77.0	-47.6	98.4	10.6	87.83	1.121	Shut in Produces
12,350.0	12,349.3	12,310.0	12,295.3	44.1	43.8	49.87	-87.0	-49.0	108.0	20.1	87.96	1.228	Shut in Produces
12,375.0	12,373.6	12,328.9	12,311.0	44.2	43.9	48.41	-97.4	-50.3	117.7	29.6	88.09	1.336	Shut in Produces

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



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: STOVE PIPE FED COM #21H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well STOVE PIPE FED COM #21H
TVD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)
MD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - STOVE PIPE FED COM #1H - OWB - PWP0														Offset Site Error: 0.0 usft
Survey Program: 0-MWD														Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Minimum Separation (usft)	Separation Factor	Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Between Centres (usft)	Between Ellipses (usft)				Reference	Offset	
12,400.0	12,397.6	12,347.5	12,326.0	44.3	44.0	47.31	-108.3	-51.8	127.5	39.2	88.22	1,445	Shut in Produces	
12,425.0	12,421.2	12,365.9	12,340.4	44.3	44.0	46.46	-119.6	-53.2	137.2	48.8	88.34	1,553	Advise and Monitor	
12,450.0	12,444.3	12,383.9	12,354.1	44.4	44.1	45.83	-131.3	-54.8	146.9	58.4	88.47	1,661	Advise and Monitor	
12,475.0	12,466.9	12,401.7	12,367.1	44.5	44.1	45.36	-143.2	-56.4	156.6	68.0	88.59	1,768	Advise and Monitor	
12,500.0	12,488.9	12,419.3	12,379.6	44.6	44.1	45.02	-155.5	-58.0	166.2	77.5	88.71	1,874	Advise and Monitor	
12,525.0	12,510.3	12,436.6	12,391.4	44.6	44.2	44.79	-168.1	-59.6	175.8	87.0	88.83	1,979	Advise and Monitor	
12,550.0	12,530.9	12,453.6	12,402.6	44.7	44.2	44.64	-180.9	-61.3	185.3	96.4	88.94	2,084		
12,575.0	12,550.8	12,470.5	12,413.2	44.8	44.3	44.57	-193.9	-63.0	194.8	105.7	89.06	2,187		
12,600.0	12,569.9	12,487.2	12,423.2	44.8	44.3	44.55	-207.1	-64.8	204.1	114.9	89.17	2,289		
12,625.0	12,588.1	12,503.7	12,432.6	44.9	44.4	44.58	-220.5	-66.5	213.4	124.1	89.29	2,390		
12,650.0	12,605.3	12,520.0	12,441.5	45.0	44.4	44.65	-234.0	-68.3	222.6	133.2	89.40	2,490		
12,675.0	12,621.6	12,536.1	12,449.8	45.1	44.5	44.76	-247.7	-70.1	231.7	142.1	89.51	2,588		
12,700.0	12,636.9	12,552.1	12,457.6	45.1	44.5	44.89	-261.6	-71.9	240.6	151.0	89.63	2,685		
12,725.0	12,651.1	12,567.9	12,464.8	45.2	44.5	45.05	-275.6	-73.8	249.5	159.8	89.74	2,781		
12,750.0	12,664.3	12,583.6	12,471.5	45.3	44.6	45.23	-289.6	-75.6	258.3	168.5	89.85	2,875		
12,775.0	12,676.3	12,600.0	12,478.0	45.3	44.6	45.48	-304.5	-77.6	267.0	177.0	89.97	2,968		
12,800.0	12,687.1	12,614.7	12,483.4	45.4	44.7	45.65	-318.1	-79.4	275.6	185.5	90.08	3,059		
12,825.0	12,696.7	12,630.1	12,488.6	45.5	44.7	45.88	-332.5	-81.3	284.0	193.8	90.20	3,149		
12,850.0	12,705.1	12,645.4	12,493.3	45.6	44.7	46.13	-346.9	-83.2	292.4	202.0	90.32	3,237		
12,875.0	12,712.3	12,660.7	12,497.5	45.7	44.8	46.39	-361.4	-85.1	300.6	210.1	90.44	3,324		
12,900.0	12,718.2	12,675.0	12,501.0	45.7	44.8	46.61	-375.2	-86.9	308.7	218.1	90.56	3,409		
12,925.0	12,722.9	12,691.0	12,504.5	45.8	44.9	46.95	-390.7	-88.9	316.7	226.0	90.69	3,492		
12,950.0	12,726.2	12,706.1	12,507.2	45.9	44.9	47.25	-405.4	-90.9	324.5	233.7	90.81	3,573		
12,975.0	12,728.3	12,721.1	12,509.5	46.0	44.9	47.57	-420.2	-92.8	332.2	241.3	90.94	3,653		
13,001.6	12,729.0	12,737.2	12,511.4	46.1	45.0	47.91	-435.9	-94.9	340.2	249.2	91.07	3,736		
13,100.0	12,728.9	12,807.3	12,514.0	46.5	45.2	52.36	-505.4	-103.9	371.9	280.3	91.64	4,059		
13,200.0	12,728.6	12,927.2	12,513.4	46.9	45.5	56.43	-624.9	-112.8	398.7	306.2	92.44	4,313		
13,300.0	12,728.1	13,036.1	12,512.3	47.4	45.9	58.32	-733.8	-113.6	414.8	321.5	93.32	4,445		
13,400.0	12,727.3	13,135.4	12,511.3	47.9	46.3	59.30	-833.1	-113.6	424.6	330.4	94.25	4,505		
13,500.0	12,726.4	13,235.3	12,510.2	48.4	46.8	59.69	-933.0	-113.6	428.4	333.1	95.26	4,497		
13,518.0	12,726.2	13,253.3	12,510.0	48.5	46.9	59.70	-951.0	-113.6	428.4	333.0	95.45	4,489		
13,600.0	12,725.3	13,335.3	12,509.2	49.0	47.4	59.68	-1,033.0	-113.6	428.1	331.8	96.35	4,443		
13,700.0	12,724.2	13,435.3	12,508.1	49.6	47.9	59.65	-1,133.0	-113.6	427.7	330.2	97.54	4,385		
13,800.0	12,723.1	13,535.3	12,507.0	50.2	48.6	59.62	-1,233.0	-113.6	427.3	328.5	98.82	4,324		
13,900.0	12,722.1	13,635.3	12,506.0	50.9	49.3	59.59	-1,333.0	-113.6	427.0	326.8	100.20	4,261		
14,000.0	12,721.0	13,735.3	12,504.9	51.7	50.0	59.56	-1,433.0	-113.6	426.6	324.9	101.67	4,196		
14,100.0	12,719.9	13,835.3	12,503.8	52.5	50.8	59.54	-1,533.0	-113.6	426.2	323.0	103.22	4,129		
14,200.0	12,718.8	13,935.3	12,502.8	53.3	51.6	59.51	-1,633.0	-113.5	425.8	320.9	104.86	4,061		
14,300.0	12,717.7	14,035.3	12,501.7	54.1	52.4	59.48	-1,732.9	-113.5	425.4	318.8	106.57	3,992		
14,400.0	12,716.7	14,135.3	12,500.6	55.0	53.3	59.45	-1,832.9	-113.5	425.0	316.6	108.36	3,922		
14,500.0	12,715.6	14,235.3	12,499.6	56.0	54.3	59.42	-1,932.9	-113.5	424.6	314.4	110.22	3,852		
14,600.0	12,714.5	14,335.3	12,498.5	56.9	55.2	59.39	-2,032.9	-113.5	424.2	312.1	112.15	3,783		
14,700.0	12,713.4	14,435.3	12,497.4	57.9	56.2	59.36	-2,132.9	-113.5	423.8	309.7	114.14	3,713		
14,800.0	12,712.4	14,535.3	12,496.4	59.0	57.2	59.33	-2,232.9	-113.5	423.5	307.3	116.19	3,644		
14,900.0	12,711.3	14,635.3	12,495.3	60.0	58.3	59.30	-2,332.9	-113.5	423.1	304.8	118.30	3,576		
15,000.0	12,710.2	14,735.3	12,494.2	61.1	59.4	59.28	-2,432.9	-113.5	422.7	302.2	120.47	3,509		
15,100.0	12,709.1	14,835.3	12,493.2	62.2	60.5	59.25	-2,532.9	-113.5	422.3	299.6	122.69	3,442		
15,200.0	12,708.0	14,935.3	12,492.1	63.3	61.6	59.22	-2,632.9	-113.5	421.9	297.0	124.95	3,377		
15,300.0	12,707.0	15,035.3	12,491.0	64.5	62.8	59.19	-2,732.9	-113.5	421.5	294.3	127.27	3,312		
15,400.0	12,705.9	15,135.3	12,490.0	65.7	64.0	59.16	-2,832.9	-113.5	421.1	291.5	129.62	3,249		
15,500.0	12,704.8	15,235.3	12,488.9	66.9	65.2	59.13	-2,932.9	-113.4	420.7	288.7	132.02	3,187		
15,600.0	12,703.7	15,335.3	12,487.8	68.1	66.4	59.10	-3,032.9	-113.4	420.4	285.9	134.46	3,126		

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



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: STOVE PIPE FED COM #21H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well STOVE PIPE FED COM #21H
TVD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)
MD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - STOVE PIPE FED COM #1H - OWB - PWP0													Offset Site Error: 0.0 usft
Survey Program: 0-MWD													Offset Well Error: 3.0 usft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toothface (")	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
15,700.0	12,702.6	15,435.3	12,486.8	69.3	67.6	59.07	-3,132.9	-113.4	420.0	283.0	136.93	3.067	
15,800.0	12,701.6	15,535.3	12,485.7	70.6	68.9	59.04	-3,232.8	-113.4	419.6	280.1	139.44	3.009	
15,900.0	12,700.5	15,635.3	12,484.6	71.8	70.2	59.01	-3,332.8	-113.4	419.2	277.2	141.98	2.952	
16,000.0	12,699.4	15,735.3	12,483.6	73.1	71.4	58.98	-3,432.8	-113.4	418.8	274.3	144.56	2.897	
16,100.0	12,698.3	15,835.3	12,482.5	74.4	72.7	58.95	-3,532.8	-113.4	418.4	271.3	147.16	2.843	
16,200.0	12,697.3	15,935.3	12,481.5	75.7	74.1	58.92	-3,632.8	-113.4	418.0	268.2	149.79	2.791	
16,300.0	12,696.2	16,035.3	12,480.4	77.1	75.4	58.89	-3,732.8	-113.4	417.7	265.2	152.45	2.740	
16,400.0	12,695.1	16,135.3	12,479.3	78.4	76.7	58.86	-3,832.8	-113.4	417.3	262.1	155.14	2.690	
16,500.0	12,694.0	16,235.3	12,478.3	79.7	78.1	58.83	-3,932.8	-113.4	416.9	259.0	157.85	2.641	
16,600.0	12,692.9	16,335.3	12,477.2	81.1	79.5	58.80	-4,032.8	-113.4	416.5	255.9	160.58	2.594	
16,700.0	12,691.9	16,435.3	12,476.1	82.5	80.9	58.77	-4,132.8	-113.4	416.1	252.8	163.33	2.548	
16,800.0	12,690.8	16,535.3	12,475.1	83.9	82.2	58.74	-4,232.8	-113.3	415.7	249.6	166.11	2.503	
16,900.0	12,689.7	16,635.3	12,474.0	85.3	83.6	58.71	-4,332.8	-113.3	415.3	246.4	168.90	2.459	
17,000.0	12,688.6	16,735.3	12,472.9	86.7	85.1	58.68	-4,432.8	-113.3	415.0	243.2	171.72	2.417	
17,100.0	12,687.5	16,835.3	12,471.9	88.1	86.5	58.65	-4,532.8	-113.3	414.6	240.0	174.55	2.375	
17,200.0	12,686.5	16,935.3	12,470.8	89.5	87.9	58.62	-4,632.8	-113.3	414.2	236.8	177.39	2.335	
17,300.0	12,685.4	17,035.3	12,469.7	90.9	89.3	58.59	-4,732.7	-113.3	413.8	233.5	180.26	2.296	
17,400.0	12,684.3	17,135.3	12,468.7	92.4	90.8	58.56	-4,832.7	-113.3	413.4	230.3	183.14	2.257	
17,500.0	12,683.2	17,235.3	12,467.6	93.8	92.2	58.53	-4,932.7	-113.3	413.0	227.0	186.03	2.220	
17,600.0	12,682.1	17,335.3	12,466.5	95.3	93.7	58.50	-5,032.7	-113.3	412.6	223.7	188.94	2.184	
17,700.0	12,681.1	17,435.3	12,465.5	96.7	95.2	58.47	-5,132.7	-113.3	412.3	220.4	191.86	2.149	
17,800.0	12,680.0	17,535.3	12,464.4	98.2	96.6	58.44	-5,232.7	-113.3	411.9	217.1	194.79	2.114	
17,900.0	12,678.9	17,635.3	12,463.3	99.6	98.1	58.41	-5,332.7	-113.3	411.5	213.7	197.74	2.081	
18,000.0	12,677.8	17,735.3	12,462.3	101.1	99.6	58.38	-5,432.7	-113.3	411.1	210.4	200.70	2.048	
18,100.0	12,676.8	17,835.3	12,461.2	102.6	101.1	58.35	-5,532.7	-113.2	410.7	207.1	203.67	2.017	
18,200.0	12,675.7	17,935.3	12,460.1	104.1	102.6	58.32	-5,632.7	-113.2	410.3	203.7	206.65	1.986 Advise and Monitor	
18,300.0	12,674.6	18,035.2	12,459.1	105.6	104.1	58.28	-5,732.7	-113.2	410.0	200.3	209.64	1.956 Advise and Monitor	
18,400.0	12,673.5	18,135.2	12,458.0	107.1	105.6	58.25	-5,832.7	-113.2	409.6	196.9	212.64	1.926 Advise and Monitor	
18,500.0	12,672.4	18,235.2	12,456.9	108.6	107.1	58.22	-5,932.7	-113.2	409.2	193.5	215.65	1.897 Advise and Monitor	
18,600.0	12,671.4	18,335.2	12,455.9	110.1	108.6	58.19	-6,032.7	-113.2	408.8	190.1	218.67	1.870 Advise and Monitor	
18,700.0	12,670.3	18,435.2	12,454.8	111.6	110.1	58.16	-6,132.7	-113.2	408.4	186.7	221.69	1.842 Advise and Monitor	
18,800.0	12,669.2	18,535.2	12,453.8	113.1	111.6	58.13	-6,232.6	-113.2	408.0	183.3	224.73	1.816 Advise and Monitor	
18,900.0	12,668.1	18,635.2	12,452.7	114.6	113.1	58.10	-6,332.6	-113.2	407.7	179.9	227.77	1.790 Advise and Monitor	
19,000.0	12,667.0	18,735.2	12,451.6	116.1	114.7	58.07	-6,432.6	-113.2	407.3	176.4	230.82	1.764 Advise and Monitor	
19,100.0	12,666.0	18,835.2	12,450.6	117.7	116.2	58.03	-6,532.6	-113.2	406.9	173.0	233.88	1.740 Advise and Monitor	
19,200.0	12,664.9	18,935.2	12,449.5	119.2	117.7	58.00	-6,632.6	-113.2	406.5	169.6	236.94	1.716 Advise and Monitor	
19,300.0	12,663.8	19,035.2	12,448.4	120.7	119.3	57.97	-6,732.6	-113.2	406.1	166.1	240.02	1.692 Advise and Monitor	
19,400.0	12,662.7	19,135.2	12,447.4	122.3	120.8	57.94	-6,832.6	-113.1	405.7	162.6	243.09	1.669 Advise and Monitor	
19,500.0	12,661.7	19,235.2	12,446.3	123.8	122.4	57.91	-6,932.6	-113.1	405.4	159.2	246.18	1.647 Advise and Monitor	
19,600.0	12,660.6	19,335.2	12,445.2	125.4	123.9	57.88	-7,032.6	-113.1	405.0	155.7	249.27	1.625 Advise and Monitor	
19,700.0	12,659.5	19,435.2	12,444.2	126.9	125.5	57.84	-7,132.6	-113.1	404.6	152.2	252.37	1.603 Advise and Monitor	
19,800.0	12,658.4	19,535.2	12,443.1	128.5	127.0	57.81	-7,232.6	-113.1	404.2	148.7	255.47	1.582 Advise and Monitor	
19,900.0	12,657.3	19,635.2	12,442.0	130.0	128.6	57.78	-7,332.6	-113.1	403.8	145.3	258.58	1.562 Advise and Monitor	
20,000.0	12,656.3	19,735.2	12,441.0	131.6	130.1	57.75	-7,432.6	-113.1	403.4	141.8	261.69	1.542 Advise and Monitor	
20,100.0	12,655.2	19,835.2	12,439.9	133.1	131.7	57.72	-7,532.6	-113.1	403.1	138.3	264.81	1.522 Advise and Monitor	
20,200.0	12,654.1	19,935.2	12,438.8	134.7	133.3	57.69	-7,632.6	-113.1	402.7	134.8	267.93	1.503 Advise and Monitor	
20,300.0	12,653.0	20,035.2	12,437.8	136.2	134.8	57.65	-7,732.5	-113.1	402.3	131.2	271.06	1.484 Shut in Produces	
20,400.0	12,651.9	20,135.2	12,436.7	137.8	136.4	57.62	-7,832.5	-113.1	401.9	127.7	274.19	1.466 Shut in Produces	
20,500.0	12,650.9	20,235.2	12,435.6	139.4	138.0	57.59	-7,932.5	-113.1	401.5	124.2	277.32	1.448 Shut in Produces	
20,600.0	12,649.8	20,335.2	12,434.6	140.9	139.5	57.56	-8,032.5	-113.0	401.2	120.7	280.47	1.430 Shut in Produces	
20,700.0	12,648.7	20,435.2	12,433.5	142.5	141.1	57.52	-8,132.5	-113.0	400.8	117.2	283.61	1.413 Shut in Produces	
20,800.0	12,647.6	20,535.2	12,432.4	144.1	142.7	57.49	-8,232.5	-113.0	400.4	113.6	286.76	1.396 Shut in Produces	

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



COG Operating LLC

Anticollision Report

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: STOVE PIPE FED COM #21H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well STOVE PIPE FED COM #21H
TVD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)
MD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Offset Design BULLDOG - STOVE PIPE FED COM #1H - OWB - PWP0													Offset Site Error:	0.0 usft
Survey Program: 0-MWD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
20,900.0	12,646.6	20,635.2	12,431.4	145.6	144.3	57.46	-8,332.5	-113.0	400.0	110.1	289.91	1.380	Shut in Produces	
21,000.0	12,645.5	20,735.2	12,430.3	147.2	145.8	57.43	-8,432.5	-113.0	399.6	106.6	293.07	1.364	Shut in Produces	
21,100.0	12,644.4	20,835.2	12,429.2	148.8	147.4	57.39	-8,532.5	-113.0	399.3	103.0	296.23	1.348	Shut in Produces	
21,200.0	12,643.3	20,935.2	12,428.2	150.4	149.0	57.36	-8,632.5	-113.0	398.9	99.5	299.39	1.332	Shut in Produces	
21,300.0	12,642.2	21,035.2	12,427.1	152.0	150.6	57.33	-8,732.5	-113.0	398.5	95.9	302.56	1.317	Shut in Produces	
21,400.0	12,641.2	21,135.2	12,426.1	153.5	152.2	57.30	-8,832.5	-113.0	398.1	92.4	305.73	1.302	Shut in Produces	
21,500.0	12,640.1	21,235.2	12,425.0	155.1	153.8	57.26	-8,932.5	-113.0	397.7	88.8	308.90	1.288	Shut in Produces	
21,600.0	12,639.0	21,335.2	12,423.9	156.7	155.4	57.23	-9,032.5	-113.0	397.4	85.3	312.07	1.273	Shut in Produces	
21,700.0	12,637.9	21,435.2	12,422.9	158.3	157.0	57.20	-9,132.5	-113.0	397.0	81.7	315.25	1.259	Shut in Produces	
21,800.0	12,636.8	21,535.2	12,421.8	159.9	158.6	57.16	-9,232.4	-113.0	396.6	78.2	318.44	1.245	Shut in Produces	
21,900.0	12,635.8	21,635.2	12,420.7	161.5	160.1	57.13	-9,332.4	-112.9	396.2	74.6	321.62	1.232	Shut in Produces	
22,000.0	12,634.7	21,735.2	12,419.7	163.1	161.7	57.10	-9,432.4	-112.9	395.8	71.0	324.81	1.219	Shut in Produces	
22,100.0	12,633.6	21,835.2	12,418.6	164.7	163.3	57.06	-9,532.4	-112.9	395.5	67.5	328.00	1.206	Shut in Produces	
22,200.0	12,632.5	21,935.2	12,417.5	166.3	164.9	57.03	-9,632.4	-112.9	395.1	63.9	331.19	1.193	Shut in Produces	
22,300.0	12,631.4	22,035.2	12,416.5	167.8	166.5	57.00	-9,732.4	-112.9	394.7	60.3	334.38	1.180	Shut in Produces	
22,400.0	12,630.4	22,135.2	12,415.4	169.4	168.1	56.96	-9,832.4	-112.9	394.3	56.7	337.58	1.168	Shut in Produces	
22,500.0	12,629.3	22,235.2	12,414.3	171.0	169.7	56.93	-9,932.4	-112.9	393.9	53.2	340.78	1.156	Shut in Produces	
22,526.9	12,629.0	22,262.1	12,414.0	171.5	170.2	56.92	-9,959.3	-112.9	393.8	52.2	341.64	1.153	Shut in Produces	

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

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Reference Site: BULLDOG
Site Error: 0.0 usft
Reference Well: STOVE PIPE FED COM #21H
Well Error: 3.0 usft
Reference Wellbore: OWB
Reference Design: PWP0

Local Co-ordinate Reference: Well STOVE PIPE FED COM #21H
TVD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)
MD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: EDM_Users
Offset TVD Reference: Offset Datum

Reference Depths are relative to RKB=3295+29 @ 3324.0usft (NORAM
 Offset Depths are relative to Offset Datum
 Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: STOVE PIPE FED COM #21H
 Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
 Grid Convergence at Surface is: 0.50°



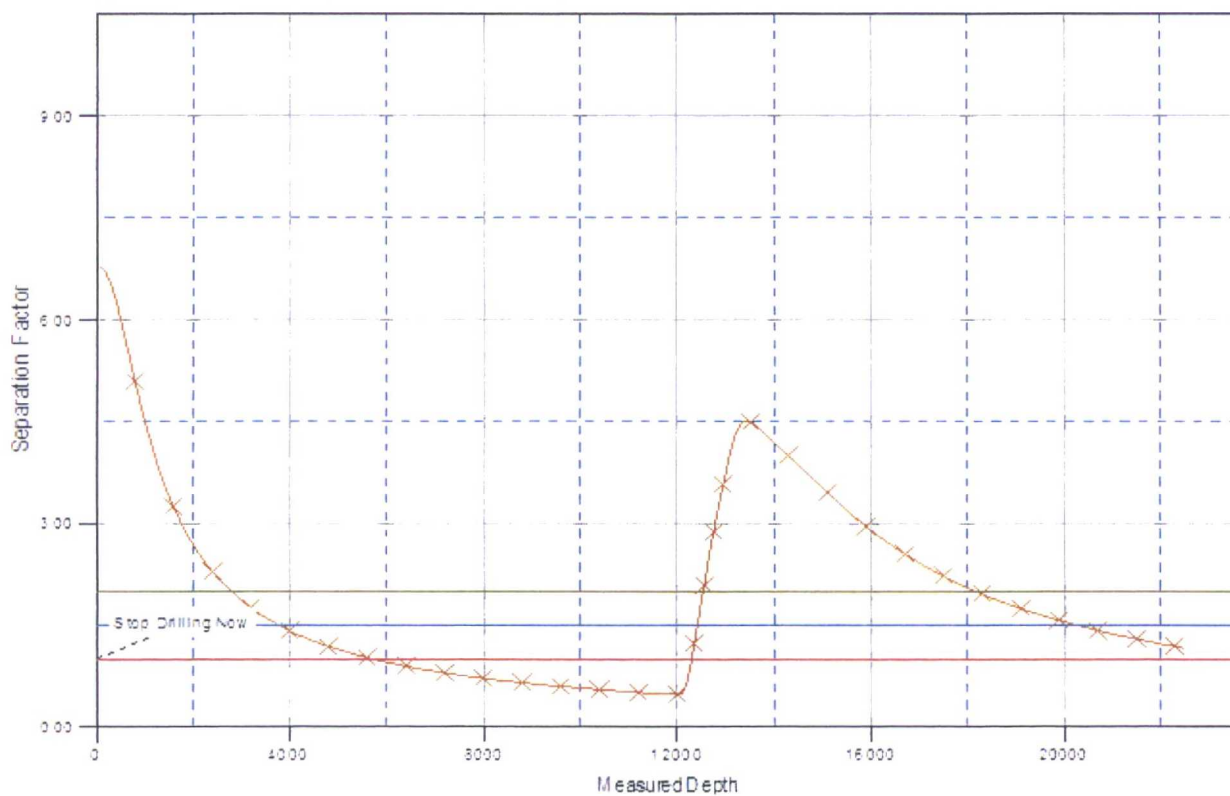
Company: COG OPERATING LLC
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Reference Depths are relative to RKB=3295+29 @ 3324.0usft (NORAM
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: STOVE PIPE FED COM #21H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.50°

Separation Factor Plot



LEGEND

—x— STOVE PIPE FED COM - OWB PWP0