CONCHO

COG OPERATING LLC

LEA COUNTY, NM
AVALON SHALE
WINDWARD FEDERAL #10H

OWB
PWP0

Anticollision Report

01 September, 2016

Company:	COG OPERATING LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #10H
Project:	LEA COUNTY, NM	**TVD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Reference Site:	AVALON SHALE	**MD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #10H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**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:**	Circular Conic
Warning Levels Evaluated at:	2.00 **Sigma**	**Casing Method:**	Not applied

Survey Tool Program **Date** 9/1/2016

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	8,722.5	PWP0 (OWB)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4
8,722.5	19,330.2	PWP0 (OWB)	MWD	OWSG MWD - Standard

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
AVALON SHALE						
PADUCA 30 FEDERAL #1 - OWB - ACUTUAL WELLPAT	10,799.3	9,164.9	262.4	-6.9	0.974	Stop Drilling Now, CC
PADUCA 30 FEDERAL #1 - OWB - ACUTUAL WELLPAT	10,800.0	9,164.9	262.4	-6.9	0.974	Stop Drilling Now, ES, SF
WINDWARD FEDERAL #9H - OWB - PWP0	8,722.5	8,722.7	50.0	26.4	2.118	CC
WINDWARD FEDERAL #9H - OWB - PWP0	8,725.0	8,725.2	50.0	26.4	2.118	ES
WINDWARD FEDERAL #9H - OWB - PWP0	19,330.2	19,390.8	690.0	347.2	2.013	SF
DEEP BSS						
WINDWARD FEDERAL #3H - OWB - ACTUAL WELLPA	0.0	1.1	150.9			
WINDWARD FEDERAL #3H - OWB - ACTUAL WELLPA	8,725.0	8,726.4	159.6	145.0	10.949	ES
WINDWARD FEDERAL #3H - OWB - ACTUAL WELLPA	19,100.0	20,366.0	1,379.4	1,041.4	4.081	SF

Offset Design AVALON SHALE - PADUCA 30 FEDERAL #1 - OWB - ACUTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 285-INC-ONLY — **Offset Well Error:** 3.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	3.0	3.0	-179.42	-1,770.2	-17.9	1,770.7				
100.0	100.0	63.2	63.2	3.0	3.1	-179.42	-1,770.2	-17.9	1,770.3	1,764.3	6.05	292.510	
200.0	200.0	163.2	163.2	3.0	3.3	-179.42	-1,770.2	-17.9	1,770.3	1,764.0	6.34	279.424	
300.0	300.0	263.2	263.2	3.0	3.8	-179.42	-1,770.2	-17.9	1,770.3	1,763.5	6.82	259.741	
400.0	400.0	363.2	363.2	3.0	5.0	-179.42	-1,770.2	-17.9	1,770.3	1,762.3	8.01	221.145	
500.0	500.0	463.2	463.2	3.1	6.5	-179.42	-1,770.2	-17.9	1,770.3	1,760.7	9.59	184.561	
600.0	600.0	563.2	563.2	3.1	8.2	-179.42	-1,770.2	-17.9	1,770.3	1,759.0	11.30	156.660	
700.0	700.0	663.2	663.2	3.1	10.0	-179.42	-1,770.2	-17.9	1,770.3	1,757.3	13.07	135.433	
800.0	800.0	763.2	763.2	3.2	11.8	-179.42	-1,770.2	-17.9	1,770.3	1,755.4	14.95	118.430	
900.0	900.0	863.2	863.2	3.2	13.7	-179.42	-1,770.2	-17.9	1,770.3	1,753.4	16.94	104.497	
1,000.0	1,000.0	963.2	963.2	3.2	15.7	-179.42	-1,770.2	-17.9	1,770.3	1,751.4	18.95	93.403	
1,100.0	1,100.0	1,070.0	1,070.0	3.3	17.8	-179.42	-1,770.2	-17.9	1,770.4	1,749.2	21.11	83.845	
1,135.8	1,135.8	1,099.0	1,099.0	3.3	18.4	-179.42	-1,770.2	-17.9	1,770.3	1,748.6	21.73	81.458	
1,200.0	1,200.0	1,163.2	1,163.2	3.4	19.7	-179.42	-1,770.2	-17.9	1,770.3	1,747.2	23.10	76.638	
1,300.0	1,300.0	1,263.2	1,263.2	3.4	21.8	-179.42	-1,770.2	-17.9	1,770.3	1,745.1	25.24	70.153	
1,400.0	1,400.0	1,363.2	1,363.2	3.5	23.9	-179.42	-1,770.2	-17.9	1,770.3	1,743.0	27.38	64.662	
1,500.0	1,500.0	1,463.2	1,463.2	3.5	26.0	-179.42	-1,770.2	-17.9	1,770.3	1,740.8	29.53	59.954	

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

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Reference Well:	WINDWARD FEDERAL #10H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design AVALON SHALE - PADUCA 30 FEDERAL #1 - OWB - ACUTUAL WELLPATH — Offset Site Error: 0.0 usft

Survey Program: 285-INC-ONLY — Offset Well Error: 3.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
1,600.0	1,600.0	1,563.2	1,563.2	3.6	28.1	-179.42	-1,770.2	-17.9	1,770.3	1,738.6	31.70	55.846	
1,700.0	1,700.0	1,663.2	1,663.2	3.7	30.2	-179.42	-1,770.2	-17.9	1,770.3	1,736.5	33.88	52.258	
1,800.0	1,800.0	1,763.2	1,763.2	3.8	32.3	-179.42	-1,770.2	-17.9	1,770.3	1,734.3	36.06	49.097	
1,900.0	1,900.0	1,863.2	1,863.2	3.9	34.4	-179.42	-1,770.2	-17.9	1,770.3	1,732.1	38.24	46.291	
2,000.0	2,000.0	1,990.0	1,989.9	3.9	37.1	-179.42	-1,770.2	-17.9	1,770.5	1,729.5	41.05	43.135	
2,045.5	2,045.5	2,008.8	2,008.7	4.0	37.6	-179.42	-1,770.2	-17.9	1,770.3	1,728.7	41.62	42.534	
2,100.0	2,100.0	2,063.3	2,063.2	4.0	39.2	-179.42	-1,770.2	-17.9	1,770.3	1,727.1	43.23	40.953	
2,200.0	2,200.0	2,163.3	2,163.2	4.1	42.1	-179.42	-1,770.2	-17.9	1,770.3	1,724.2	46.18	38.336	
2,300.0	2,300.0	2,263.3	2,263.2	4.2	44.9	-179.42	-1,770.2	-17.9	1,770.3	1,721.2	49.13	36.031	
2,400.0	2,400.0	2,390.0	2,389.9	4.3	48.6	-179.42	-1,770.2	-17.9	1,770.5	1,717.7	52.86	33.497	
2,445.5	2,445.5	2,408.8	2,408.7	4.3	49.2	-179.42	-1,770.2	-17.9	1,770.3	1,716.8	53.59	33.038	
2,500.0	2,500.0	2,463.3	2,463.2	4.4	51.2	-179.42	-1,770.2	-17.9	1,770.3	1,714.7	55.63	31.826	
2,600.0	2,600.0	2,563.3	2,563.2	4.5	54.9	-179.42	-1,770.2	-17.9	1,770.3	1,711.0	59.37	29.818	
2,700.0	2,700.0	2,700.0	2,699.8	4.6	59.9	-179.42	-1,770.2	-17.9	1,770.7	1,706.3	64.46	27.470	
2,748.8	2,748.8	2,712.2	2,712.0	4.6	60.4	-179.42	-1,770.2	-17.9	1,770.3	1,705.3	65.00	27.235	
2,800.0	2,800.0	2,768.0	2,767.7	4.7	62.6	-179.42	-1,770.2	-17.9	1,770.3	1,703.0	67.31	26.299	
2,834.9	2,834.9	2,798.4	2,798.1	4.7	63.9	-179.42	-1,770.2	-17.9	1,770.3	1,701.7	68.66	25.785	
2,900.0	2,900.0	2,863.5	2,863.2	4.8	66.7	-179.42	-1,770.2	-17.9	1,770.3	1,698.8	71.53	24.751	
3,000.0	3,000.0	2,963.6	2,963.2	4.9	70.9	-179.42	-1,770.2	-17.9	1,770.3	1,694.5	75.83	23.347	
3,100.0	3,100.0	3,063.6	3,063.2	5.0	75.3	-179.42	-1,770.2	-17.9	1,770.3	1,690.1	80.28	22.053	
3,200.0	3,200.0	3,190.0	3,189.5	5.1	80.7	-179.42	-1,770.2	-17.9	1,770.5	1,684.7	85.85	20.624	
3,245.2	3,245.2	3,208.9	3,208.4	5.2	81.5	-179.42	-1,770.2	-17.9	1,770.3	1,683.6	86.70	20.419	
3,300.0	3,300.0	3,263.8	3,263.2	5.2	83.9	-179.42	-1,770.2	-17.9	1,770.3	1,681.3	89.09	19.872	
3,400.0	3,400.0	3,363.8	3,363.2	5.3	88.1	-179.42	-1,770.2	-17.9	1,770.3	1,676.9	93.44	18.946	
3,500.0	3,500.0	3,463.9	3,463.2	5.4	92.3	-179.42	-1,770.2	-17.9	1,770.3	1,672.6	97.76	18.109	
3,600.0	3,600.0	3,563.9	3,563.2	5.5	96.6	-179.42	-1,770.2	-17.9	1,770.3	1,668.2	102.17	17.327	
3,700.0	3,700.0	3,664.0	3,663.2	5.7	100.9	-179.42	-1,770.2	-17.9	1,770.3	1,663.7	106.60	16.608	
3,800.0	3,800.0	3,764.1	3,763.2	5.8	105.3	-179.42	-1,770.2	-17.9	1,770.3	1,659.3	111.04	15.943	
3,900.0	3,900.0	3,885.0	3,884.1	5.9	110.7	-179.42	-1,770.2	-17.9	1,770.5	1,653.9	116.55	15.191	
3,925.9	3,925.9	3,890.0	3,889.1	5.9	110.9	-179.42	-1,770.2	-17.9	1,770.3	1,653.5	116.80	15.157	
4,000.0	4,000.0	3,979.0	3,978.0	6.0	114.9	-179.42	-1,770.2	-17.9	1,770.4	1,649.5	120.87	14.648	
4,014.0	4,014.0	3,979.0	3,978.0	6.0	114.9	-179.42	-1,770.2	-17.9	1,770.3	1,649.5	120.88	14.645	
4,100.0	4,100.0	4,105.0	4,103.9	6.1	120.2	-179.42	-1,770.2	-17.9	1,770.8	1,644.5	126.32	14.019	
4,156.2	4,156.2	4,120.5	4,119.4	6.2	120.8	-179.42	-1,770.2	-17.9	1,770.3	1,643.4	126.98	13.942	
4,200.0	4,200.0	4,164.3	4,163.2	6.2	122.5	-179.42	-1,770.2	-17.9	1,770.3	1,641.6	128.72	13.753	
4,300.0	4,300.0	4,264.3	4,263.2	6.3	126.4	-179.42	-1,770.2	-17.9	1,770.3	1,637.6	132.69	13.342	
4,400.0	4,400.0	4,385.0	4,383.8	6.5	130.4	-179.42	-1,770.2	-17.9	1,770.5	1,633.6	136.88	12.935	
4,442.0	4,442.0	4,406.4	4,405.2	6.5	131.1	-179.42	-1,770.2	-17.9	1,770.3	1,632.7	137.62	12.864	
4,500.0	4,500.0	4,464.4	4,463.2	6.6	133.0	-179.42	-1,770.2	-17.9	1,770.3	1,630.8	139.57	12.684	
4,600.0	4,600.0	4,573.0	4,571.8	6.7	136.5	-179.42	-1,770.2	-17.9	1,770.4	1,627.1	143.21	12.362	
4,636.5	4,636.5	4,600.9	4,599.7	6.7	137.4	-179.42	-1,770.2	-17.9	1,770.3	1,626.2	144.16	12.280	
4,700.0	4,700.0	4,664.4	4,663.2	6.8	139.5	-179.42	-1,770.2	-17.9	1,770.3	1,624.0	146.30	12.101	
4,800.0	4,800.0	4,810.0	4,808.7	6.9	144.2	-179.42	-1,770.2	-17.9	1,770.9	1,619.8	151.14	11.717	
4,861.2	4,861.2	4,825.7	4,824.4	7.0	144.7	-179.42	-1,770.2	-17.9	1,770.3	1,618.7	151.67	11.673	
4,900.0	4,900.0	4,864.5	4,863.2	7.0	145.8	-179.42	-1,770.2	-17.9	1,770.3	1,617.5	152.83	11.584	
5,000.0	5,000.0	4,964.5	4,963.2	7.2	148.6	-179.42	-1,770.2	-17.9	1,770.3	1,614.5	155.82	11.362	
5,100.0	5,100.0	5,064.6	5,063.2	7.3	151.5	-179.42	-1,770.2	-17.9	1,770.3	1,611.5	158.80	11.148	
5,200.0	5,200.0	5,164.6	5,163.2	7.4	154.3	-179.42	-1,770.2	-17.9	1,770.3	1,608.7	161.67	10.950	
5,300.0	5,300.0	5,264.6	5,263.2	7.5	157.0	-179.42	-1,770.2	-17.9	1,770.3	1,605.8	164.53	10.760	
5,400.0	5,400.0	5,364.6	5,363.2	7.6	159.8	-179.42	-1,770.2	-17.9	1,770.3	1,602.9	167.40	10.576	
5,500.0	5,500.0	5,464.6	5,463.2	7.8	162.5	-179.42	-1,770.2	-17.9	1,770.3	1,600.1	170.26	10.398	
5,600.0	5,600.0	5,564.6	5,563.2	7.9	165.1	-179.42	-1,770.2	-17.9	1,770.3	1,597.3	173.01	10.233	

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Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design AVALON SHALE - PADUCA 30 FEDERAL #1 - OWB - ACUTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 285-INC-ONLY — **Offset Well Error:** 3.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,700.0	5,700.0	5,664.6	5,663.2	8.0	167.7	-179.42	-1,770.2	-17.9	1,770.3	1,594.6	175.75	10.073	
5,800.0	5,800.0	5,764.6	5,763.2	8.1	170.4	-179.42	-1,770.2	-17.9	1,770.3	1,591.8	178.50	9.918	
5,900.0	5,900.0	5,864.6	5,863.2	8.3	173.0	-179.42	-1,770.2	-17.9	1,770.3	1,589.1	181.24	9.768	
6,000.0	6,000.0	5,964.7	5,963.2	8.4	175.5	-179.42	-1,770.2	-17.9	1,770.3	1,586.4	183.89	9.627	
6,100.0	6,100.0	6,064.7	6,063.2	8.5	177.9	-179.42	-1,770.2	-17.9	1,770.3	1,583.9	186.39	9.498	
6,200.0	6,200.0	6,164.7	6,163.2	8.6	180.3	-179.42	-1,770.2	-17.9	1,770.3	1,581.4	188.89	9.372	
6,300.0	6,300.0	6,264.7	6,263.2	8.8	182.6	-179.42	-1,770.2	-17.9	1,770.3	1,578.9	191.39	9.250	
6,400.0	6,400.0	6,364.7	6,363.2	8.9	185.0	-179.42	-1,770.2	-17.9	1,770.3	1,576.4	193.90	9.130	
6,500.0	6,500.0	6,464.7	6,463.2	9.0	187.4	-179.42	-1,770.2	-17.9	1,770.3	1,573.9	196.40	9.014	
6,600.0	6,600.0	6,564.7	6,563.2	9.1	189.8	-179.42	-1,770.2	-17.9	1,770.3	1,571.4	198.91	8.900	
6,700.0	6,700.0	6,664.8	6,663.2	9.3	192.2	-179.42	-1,770.2	-17.9	1,770.3	1,568.9	201.41	8.790	
6,800.0	6,800.0	6,764.8	6,763.2	9.4	194.5	-179.42	-1,770.2	-17.9	1,770.3	1,566.4	203.92	8.681	
6,900.0	6,900.0	6,864.8	6,863.2	9.5	196.9	-179.42	-1,770.2	-17.9	1,770.3	1,563.9	206.43	8.576	
7,000.0	7,000.0	6,964.8	6,963.2	9.6	199.3	-179.42	-1,770.2	-17.9	1,770.3	1,561.4	208.94	8.473	
7,100.0	7,100.0	7,064.8	7,063.2	9.8	201.7	-179.42	-1,770.2	-17.9	1,770.3	1,558.9	211.44	8.373	
7,200.0	7,200.0	7,164.8	7,163.2	9.9	203.7	-179.42	-1,770.2	-17.9	1,770.3	1,556.8	213.59	8.289	
7,300.0	7,300.0	7,264.8	7,263.2	10.0	205.7	-179.42	-1,770.2	-17.9	1,770.3	1,554.6	215.74	8.206	
7,400.0	7,400.0	7,364.8	7,363.2	10.1	207.8	-179.42	-1,770.2	-17.9	1,770.3	1,552.4	217.89	8.125	
7,500.0	7,500.0	7,464.8	7,463.2	10.3	209.8	-179.42	-1,770.2	-17.9	1,770.3	1,550.3	220.02	8.046	
7,600.0	7,600.0	7,564.8	7,563.2	10.4	211.6	-179.42	-1,770.2	-17.9	1,770.3	1,548.4	221.94	7.977	
7,700.0	7,700.0	7,664.8	7,663.2	10.5	213.4	-179.42	-1,770.2	-17.9	1,770.3	1,546.5	223.86	7.908	
7,800.0	7,800.0	7,764.8	7,763.2	10.6	215.1	-179.42	-1,770.2	-17.9	1,770.3	1,544.6	225.78	7.841	
7,900.0	7,900.0	7,864.8	7,863.2	10.8	216.9	-179.42	-1,770.2	-17.9	1,770.3	1,542.6	227.70	7.775	
8,000.0	8,000.0	7,964.9	7,963.2	10.9	218.7	-179.42	-1,770.2	-17.9	1,770.3	1,540.8	229.57	7.712	
8,100.0	8,100.0	8,064.9	8,063.2	11.0	220.4	-179.42	-1,770.2	-17.9	1,770.3	1,539.0	231.39	7.651	
8,200.0	8,200.0	8,164.9	8,163.2	11.1	222.1	-179.42	-1,770.2	-17.9	1,770.3	1,537.1	233.20	7.591	
8,300.0	8,300.0	8,264.9	8,263.2	11.3	223.8	-179.42	-1,770.2	-17.9	1,770.3	1,535.3	235.02	7.533	
8,400.0	8,400.0	8,364.9	8,363.2	11.4	225.4	-179.42	-1,770.2	-17.9	1,770.3	1,533.6	236.78	7.477	
8,500.0	8,500.0	8,464.9	8,463.2	11.5	227.0	-179.42	-1,770.2	-17.9	1,770.3	1,531.8	238.49	7.423	
8,600.0	8,600.0	8,564.9	8,563.2	11.6	228.6	-179.42	-1,770.2	-17.9	1,770.3	1,530.1	240.21	7.370	
8,700.0	8,700.0	8,664.9	8,663.2	11.8	230.1	-179.42	-1,770.2	-17.9	1,770.3	1,528.4	241.92	7.318	
8,722.5	8,722.5	8,687.4	8,685.7	11.8	230.5	-179.42	-1,770.2	-17.9	1,770.3	1,528.0	242.31	7.306	
8,725.0	8,725.0	8,689.9	8,688.2	11.8	230.5	19.88	-1,770.2	-17.9	1,770.3	1,528.0	242.35	7.305	
8,750.0	8,750.0	8,720.0	8,718.3	11.8	231.0	19.92	-1,770.2	-17.9	1,769.6	1,526.8	242.83	7.288	
8,775.0	8,774.9	8,739.8	8,738.1	11.8	231.3	20.02	-1,770.2	-17.9	1,767.6	1,524.5	243.12	7.270	
8,800.0	8,799.7	8,764.5	8,762.9	11.8	231.7	20.19	-1,770.2	-17.9	1,764.4	1,520.9	243.50	7.246	
8,825.0	8,824.2	8,789.1	8,787.4	11.8	232.0	20.43	-1,770.2	-17.9	1,760.0	1,516.2	243.87	7.217	
8,850.0	8,848.5	8,813.4	8,811.7	11.8	232.4	20.74	-1,770.2	-17.9	1,754.4	1,510.2	244.24	7.183	
8,875.0	8,872.4	8,837.3	8,835.6	11.8	232.8	21.13	-1,770.2	-17.9	1,747.6	1,503.0	244.61	7.145	
8,900.0	8,895.9	8,860.8	8,859.1	11.9	233.1	21.60	-1,770.2	-17.9	1,739.7	1,494.7	244.97	7.102	
8,925.0	8,919.0	8,883.9	8,882.2	11.9	233.5	22.15	-1,770.2	-17.9	1,730.6	1,485.3	245.33	7.054	
8,950.0	8,941.5	8,906.4	8,904.7	11.9	233.8	22.80	-1,770.2	-17.9	1,720.4	1,474.7	245.68	7.003	
8,975.0	8,963.4	8,928.3	8,926.6	11.9	234.1	23.55	-1,770.2	-17.9	1,709.1	1,463.1	246.02	6.947	
9,000.0	8,984.6	8,949.5	8,947.8	11.9	234.4	24.42	-1,770.2	-17.9	1,696.8	1,450.5	246.36	6.888	
9,025.0	9,005.2	8,970.0	8,968.4	11.9	234.7	25.41	-1,770.2	-17.9	1,683.5	1,436.8	246.69	6.824	
9,050.0	9,024.9	8,989.8	8,988.1	12.0	235.0	26.55	-1,770.2	-17.9	1,669.2	1,422.2	247.01	6.758	
9,075.0	9,043.8	9,008.7	9,007.0	12.0	235.3	27.85	-1,770.2	-17.9	1,654.0	1,406.7	247.31	6.688	
9,100.0	9,061.9	9,026.8	9,025.1	12.0	235.6	29.33	-1,770.2	-17.9	1,637.9	1,390.3	247.61	6.615	
9,125.0	9,079.0	9,043.9	9,042.2	12.1	235.8	31.01	-1,770.2	-17.9	1,620.9	1,373.0	247.90	6.539	
9,150.0	9,095.1	9,060.0	9,058.3	12.1	236.1	32.94	-1,770.2	-17.9	1,603.2	1,355.1	248.17	6.460	
9,175.0	9,110.3	9,075.1	9,073.5	12.1	236.3	35.13	-1,770.2	-17.9	1,584.8	1,336.4	248.43	6.379	
9,200.0	9,124.3	9,089.2	9,087.5	12.2	236.5	37.63	-1,770.2	-17.9	1,565.7	1,317.0	248.68	6.296	

Company:	COG OPERATING LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #10H
Project:	LEA COUNTY, NM	**TVD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Reference Site:	AVALON SHALE	**MD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #10H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design AVALON SHALE - PADUCA 30 FEDERAL #1 - OWB - ACUTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 285-INC-ONLY — **Offset Well Error:** 3.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
9,225.0	9,137.3	9,102.1	9,100.5	12.2	236.7	40.47	-1,770.2	-17.9	1,546.0	1,297.1	248.91	6.211	
9,250.0	9,149.1	9,113.9	9,112.3	12.2	236.9	43.70	-1,770.2	-17.9	1,525.7	1,276.6	249.13	6.124	
9,275.0	9,159.7	9,124.6	9,122.9	12.3	237.0	47.35	-1,770.2	-17.9	1,505.0	1,255.6	249.34	6.036	
9,300.0	9,169.2	9,134.0	9,132.4	12.3	237.2	51.46	-1,770.2	-17.9	1,483.8	1,234.2	249.53	5.946	
9,325.0	9,177.4	9,142.3	9,140.6	12.4	237.3	56.05	-1,770.2	-17.9	1,462.2	1,212.5	249.71	5.856	
9,350.0	9,184.4	9,149.2	9,147.6	12.5	237.4	61.11	-1,770.2	-17.9	1,440.4	1,190.5	249.87	5.764	
9,375.0	9,190.1	9,154.9	9,153.3	12.5	237.5	66.60	-1,770.2	-17.9	1,418.3	1,168.3	250.03	5.673	
9,400.0	9,194.5	9,159.4	9,157.7	12.6	237.6	72.43	-1,770.2	-17.9	1,396.1	1,145.9	250.18	5.580	
9,425.0	9,197.6	9,162.5	9,160.8	12.7	237.6	78.47	-1,770.2	-17.9	1,373.7	1,123.4	250.33	5.488	
9,450.0	9,199.5	9,164.3	9,162.7	12.8	237.6	84.58	-1,770.2	-17.9	1,351.4	1,100.9	250.47	5.395	
9,472.6	9,200.0	9,164.9	9,163.2	13.0	237.6	90.00	-1,770.2	-17.9	1,331.2	1,080.6	250.61	5.312	
9,500.0	9,200.0	9,164.9	9,163.2	13.2	237.6	90.00	-1,770.2	-17.9	1,306.7	1,055.9	250.80	5.210	
9,600.0	9,200.0	9,164.9	9,163.2	14.1	237.6	90.00	-1,770.2	-17.9	1,216.3	964.5	251.77	4.831	
9,700.0	9,200.0	9,164.9	9,163.2	15.4	237.6	90.00	-1,770.2	-17.9	1,124.4	871.4	253.03	4.444	
9,800.0	9,200.0	9,164.9	9,163.2	16.7	237.6	90.00	-1,770.2	-17.9	1,031.1	776.7	254.39	4.053	
9,900.0	9,200.0	9,164.9	9,163.2	18.1	237.6	90.00	-1,770.2	-17.9	936.6	680.8	255.78	3.662	
9,944.7	9,200.0	9,164.9	9,163.2	18.7	237.6	90.00	-1,770.2	-17.9	894.0	637.6	256.39	3.487	
10,000.0	9,200.0	9,164.9	9,163.2	19.5	237.6	90.00	-1,770.2	-17.9	841.3	584.1	257.15	3.272	
10,100.0	9,200.0	9,164.9	9,163.2	20.9	237.6	90.00	-1,770.2	-17.9	746.9	488.4	258.57	2.889	
10,200.0	9,200.0	9,164.9	9,163.2	22.4	237.6	90.00	-1,770.2	-17.9	654.2	394.2	260.03	2.516	
10,300.0	9,200.0	9,164.9	9,163.2	23.9	237.6	90.00	-1,770.2	-17.9	564.1	302.5	261.53	2.157	
10,400.0	9,200.0	9,164.9	9,163.2	25.4	237.6	90.00	-1,770.2	-17.9	477.8	214.8	263.05	1.816	Advise and Monitor
10,500.0	9,200.0	9,164.9	9,163.2	26.9	237.6	90.00	-1,770.2	-17.9	398.0	133.4	264.59	1.504	Advise and Monitor
10,600.0	9,200.0	9,164.9	9,163.2	28.5	237.6	90.00	-1,770.2	-17.9	329.5	63.3	266.15	1.238	Shut in Produces
10,700.0	9,200.0	9,164.9	9,163.2	30.1	237.6	90.00	-1,770.2	-17.9	280.5	12.8	267.72	1.048	Shut in Produces
10,799.3	9,200.0	9,164.9	9,163.2	31.6	237.6	90.00	-1,770.2	-17.9	262.4	-6.9	269.29	0.974	Stop Drilling Now, CC
10,800.0	9,200.0	9,164.9	9,163.2	31.7	237.6	90.00	-1,770.2	-17.9	262.4	-6.9	269.30	0.974	Stop Drilling Now, ES, SF
10,900.0	9,200.0	9,164.9	9,163.2	33.2	237.6	90.00	-1,770.2	-17.9	281.0	10.1	270.89	1.037	Shut in Produces
11,000.0	9,200.0	9,164.9	9,163.2	34.8	237.6	90.00	-1,770.2	-17.9	330.3	57.8	272.48	1.212	Shut in Produces
11,100.0	9,200.0	9,164.9	9,163.2	36.4	237.6	90.00	-1,770.2	-17.9	399.0	125.0	274.09	1.456	Shut in Produces
11,200.0	9,200.0	9,164.9	9,163.2	38.1	237.6	90.00	-1,770.2	-17.9	478.9	203.2	275.70	1.737	Advise and Monitor
11,300.0	9,200.0	9,164.9	9,163.2	39.7	237.6	90.00	-1,770.2	-17.9	565.2	287.9	277.31	2.038	
11,400.0	9,200.0	9,164.9	9,163.2	41.3	237.6	90.00	-1,770.2	-17.9	655.5	376.5	278.93	2.350	
11,500.0	9,200.0	9,164.9	9,163.2	42.9	237.6	90.00	-1,770.2	-17.9	748.2	467.6	280.55	2.667	
11,600.0	9,200.0	9,164.9	9,163.2	44.5	237.6	90.00	-1,770.2	-17.9	842.6	560.4	282.18	2.986	
11,700.0	9,200.0	9,164.9	9,163.2	46.2	237.6	90.00	-1,770.2	-17.9	938.1	654.3	283.81	3.305	
11,800.0	9,200.0	9,164.9	9,163.2	47.8	237.6	90.00	-1,770.2	-17.9	1,034.5	749.1	285.44	3.624	
11,900.0	9,200.0	9,164.9	9,163.2	49.4	237.6	90.00	-1,770.2	-17.9	1,131.5	844.4	287.07	3.942	
12,000.0	9,200.0	9,164.9	9,163.2	51.1	237.6	90.00	-1,770.2	-17.9	1,229.0	940.3	288.71	4.257	
12,100.0	9,200.0	9,164.9	9,163.2	52.7	237.6	90.00	-1,770.2	-17.9	1,326.9	1,036.5	290.34	4.570	
12,200.0	9,200.0	9,164.9	9,163.2	54.3	237.6	90.00	-1,770.2	-17.9	1,425.0	1,133.0	291.98	4.881	
12,300.0	9,200.0	9,164.9	9,163.2	56.0	237.6	90.00	-1,770.2	-17.9	1,523.4	1,229.8	293.62	5.188	
12,400.0	9,200.0	9,164.9	9,163.2	57.6	237.6	90.00	-1,770.2	-17.9	1,622.0	1,326.8	295.27	5.493	
12,500.0	9,200.0	9,164.9	9,163.2	59.3	237.6	90.00	-1,770.2	-17.9	1,720.8	1,423.9	296.91	5.796	
12,600.0	9,200.0	9,164.9	9,163.2	60.9	237.6	90.00	-1,770.2	-17.9	1,819.7	1,521.1	298.56	6.095	
12,700.0	9,200.0	9,164.9	9,163.2	62.6	237.6	90.00	-1,770.2	-17.9	1,918.7	1,618.5	300.20	6.391	
12,800.0	9,200.0	9,164.9	9,163.2	64.2	237.6	90.00	-1,770.2	-17.9	2,017.8	1,716.0	301.85	6.685	
12,900.0	9,200.0	9,164.9	9,163.2	65.9	237.6	90.00	-1,770.2	-17.9	2,117.0	1,813.5	303.50	6.975	
13,000.0	9,200.0	9,164.9	9,163.2	67.5	237.6	90.00	-1,770.2	-17.9	2,216.3	1,911.1	305.14	7.263	
13,100.0	9,200.0	9,164.9	9,163.2	69.2	237.6	90.00	-1,770.2	-17.9	2,315.6	2,008.8	306.79	7.548	
13,200.0	9,200.0	9,164.9	9,163.2	70.8	237.6	90.00	-1,770.2	-17.9	2,415.0	2,106.5	308.44	7.829	
13,300.0	9,200.0	9,164.9	9,163.2	72.5	237.6	90.00	-1,770.2	-17.9	2,514.4	2,204.3	310.10	8.108	

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

Company:	COG OPERATING LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #10H
Project:	LEA COUNTY, NM	**TVD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Reference Site:	AVALON SHALE	**MD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #10H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design AVALON SHALE - PADUCA 30 FEDERAL #1 - OWB - ACUTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 285-INC-ONLY — **Offset Well Error:** 3.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
13,400.0	9,200.0	9,164.9	9,163.2	74.1	237.6	90.00	-1,770.2	-17.9	2,613.9	2,302.1	311.75	8.385	
13,500.0	9,200.0	9,164.9	9,163.2	75.8	237.6	90.00	-1,770.2	-17.9	2,713.4	2,400.0	313.40	8.658	
13,600.0	9,200.0	9,164.9	9,163.2	77.4	237.6	90.00	-1,770.2	-17.9	2,812.9	2,497.9	315.05	8.928	
13,700.0	9,200.0	9,164.9	9,163.2	79.1	237.6	90.00	-1,770.2	-17.9	2,912.5	2,595.8	316.71	9.196	
13,800.0	9,200.0	9,164.9	9,163.2	80.7	237.6	90.00	-1,770.2	-17.9	3,012.1	2,693.8	318.36	9.461	
13,900.0	9,200.0	9,164.9	9,163.2	82.4	237.6	90.00	-1,770.2	-17.9	3,111.8	2,791.7	320.01	9.724	
14,000.0	9,200.0	9,164.9	9,163.2	84.0	237.6	90.00	-1,770.2	-17.9	3,211.4	2,889.7	321.67	9.984	
14,100.0	9,200.0	9,164.9	9,163.2	85.7	237.6	90.00	-1,770.2	-17.9	3,311.1	2,987.8	323.33	10.241	
14,200.0	9,200.0	9,164.9	9,163.2	87.3	237.6	90.00	-1,770.2	-17.9	3,410.8	3,085.8	324.98	10.495	
14,300.0	9,200.0	9,164.9	9,163.2	89.0	237.6	90.00	-1,770.2	-17.9	3,510.5	3,183.9	326.64	10.747	
14,400.0	9,200.0	9,164.9	9,163.2	90.6	237.6	90.00	-1,770.2	-17.9	3,610.2	3,281.9	328.29	10.997	
14,500.0	9,200.0	9,164.9	9,163.2	92.3	237.6	90.00	-1,770.2	-17.9	3,710.0	3,380.0	329.95	11.244	
14,600.0	9,200.0	9,164.9	9,163.2	94.0	237.6	90.00	-1,770.2	-17.9	3,809.7	3,478.1	331.61	11.489	
14,700.0	9,200.0	9,164.9	9,163.2	95.6	237.6	90.00	-1,770.2	-17.9	3,909.5	3,576.2	333.26	11.731	
14,800.0	9,200.0	9,164.9	9,163.2	97.3	237.6	90.00	-1,770.2	-17.9	4,009.3	3,674.3	334.92	11.971	
14,900.0	9,200.0	9,164.9	9,163.2	98.9	237.6	90.00	-1,770.2	-17.9	4,109.1	3,772.5	336.58	12.208	
15,000.0	9,200.0	9,164.9	9,163.2	100.6	237.6	90.00	-1,770.2	-17.9	4,208.9	3,870.6	338.24	12.443	
15,100.0	9,200.0	9,164.9	9,163.2	102.3	237.6	90.00	-1,770.2	-17.9	4,308.7	3,968.8	339.90	12.676	
15,200.0	9,200.0	9,164.9	9,163.2	103.9	237.6	90.00	-1,770.2	-17.9	4,408.5	4,066.9	341.55	12.907	
15,300.0	9,200.0	9,164.9	9,163.2	105.6	237.6	90.00	-1,770.2	-17.9	4,508.3	4,165.1	343.21	13.136	
15,400.0	9,200.0	9,164.9	9,163.2	107.2	237.6	90.00	-1,770.2	-17.9	4,608.1	4,263.3	344.87	13.362	
15,500.0	9,200.0	9,164.9	9,163.2	108.9	237.6	90.00	-1,770.2	-17.9	4,708.0	4,361.5	346.53	13.586	
15,600.0	9,200.0	9,164.9	9,163.2	110.5	237.6	90.00	-1,770.2	-17.9	4,807.8	4,459.6	348.19	13.808	
15,700.0	9,200.0	9,164.9	9,163.2	112.2	237.6	90.00	-1,770.2	-17.9	4,907.7	4,557.8	349.85	14.028	
15,800.0	9,200.0	9,164.9	9,163.2	113.9	237.6	90.00	-1,770.2	-17.9	5,007.5	4,656.0	351.51	14.246	
15,900.0	9,200.0	9,164.9	9,163.2	115.5	237.6	90.00	-1,770.2	-17.9	5,107.4	4,754.2	353.17	14.462	
16,000.0	9,200.0	9,164.9	9,163.2	117.2	237.6	90.00	-1,770.2	-17.9	5,207.3	4,852.5	354.83	14.675	
16,100.0	9,200.0	9,164.9	9,163.2	118.8	237.6	90.00	-1,770.2	-17.9	5,307.2	4,950.7	356.49	14.887	
16,200.0	9,200.0	9,164.9	9,163.2	120.5	237.6	90.00	-1,770.2	-17.9	5,407.0	5,048.9	358.15	15.097	
16,300.0	9,200.0	9,164.9	9,163.2	122.2	237.6	90.00	-1,770.2	-17.9	5,506.9	5,147.1	359.81	15.305	
16,400.0	9,200.0	9,164.9	9,163.2	123.8	237.6	90.00	-1,770.2	-17.9	5,606.8	5,245.3	361.47	15.511	
16,500.0	9,200.0	9,164.9	9,163.2	125.5	237.6	90.00	-1,770.2	-17.9	5,706.7	5,343.6	363.13	15.715	
16,600.0	9,200.0	9,164.9	9,163.2	127.1	237.6	90.00	-1,770.2	-17.9	5,806.6	5,441.8	364.79	15.917	
16,700.0	9,200.0	9,164.9	9,163.2	128.8	237.6	90.00	-1,770.2	-17.9	5,906.5	5,540.0	366.45	16.118	
16,800.0	9,200.0	9,164.9	9,163.2	130.5	237.6	90.00	-1,770.2	-17.9	6,006.4	5,638.3	368.12	16.317	
16,900.0	9,200.0	9,164.9	9,163.2	132.1	237.6	90.00	-1,770.2	-17.9	6,106.3	5,736.5	369.78	16.513	
17,000.0	9,200.0	9,164.9	9,163.2	133.8	237.6	90.00	-1,770.2	-17.9	6,206.2	5,834.8	371.44	16.709	
17,100.0	9,200.0	9,164.9	9,163.2	135.5	237.6	90.00	-1,770.2	-17.9	6,306.1	5,933.0	373.10	16.902	
17,200.0	9,200.0	9,164.9	9,163.2	137.1	237.6	90.00	-1,770.2	-17.9	6,406.0	6,031.3	374.76	17.094	
17,300.0	9,200.0	9,164.9	9,163.2	138.8	237.6	90.00	-1,770.2	-17.9	6,506.0	6,129.5	376.42	17.284	
17,400.0	9,200.0	9,164.9	9,163.2	140.4	237.6	90.00	-1,770.2	-17.9	6,605.9	6,227.8	378.08	17.472	
17,500.0	9,200.0	9,164.9	9,163.2	142.1	237.6	90.00	-1,770.2	-17.9	6,705.8	6,326.1	379.75	17.659	
17,600.0	9,200.0	9,164.9	9,163.2	143.8	237.6	90.00	-1,770.2	-17.9	6,805.7	6,424.3	381.41	17.844	
17,700.0	9,200.0	9,164.9	9,163.2	145.4	237.6	90.00	-1,770.2	-17.9	6,905.7	6,522.6	383.07	18.027	
17,800.0	9,200.0	9,164.9	9,163.2	147.1	237.6	90.00	-1,770.2	-17.9	7,005.6	6,620.9	384.73	18.209	
17,900.0	9,200.0	9,164.9	9,163.2	148.8	237.6	90.00	-1,770.2	-17.9	7,105.5	6,719.1	386.39	18.389	
18,000.0	9,200.0	9,164.9	9,163.2	150.4	237.6	90.00	-1,770.2	-17.9	7,205.4	6,817.4	388.06	18.568	
18,100.0	9,200.0	9,164.9	9,163.2	152.1	237.6	90.00	-1,770.2	-17.9	7,305.4	6,915.7	389.72	18.745	
18,200.0	9,200.0	9,164.9	9,163.2	153.7	237.6	90.00	-1,770.2	-17.9	7,405.3	7,013.9	391.38	18.921	
18,300.0	9,200.0	9,164.9	9,163.2	155.4	237.6	90.00	-1,770.2	-17.9	7,505.3	7,112.2	393.04	19.095	
18,400.0	9,200.0	9,164.9	9,163.2	157.1	237.6	90.00	-1,770.2	-17.9	7,605.2	7,210.5	394.71	19.268	
18,500.0	9,200.0	9,164.9	9,163.2	158.7	237.6	90.00	-1,770.2	-17.9	7,705.1	7,308.8	396.37	19.439	

Company:	COG OPERATING LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #10H
Project:	LEA COUNTY, NM	**TVD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Reference Site:	AVALON SHALE	**MD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #10H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design AVALON SHALE - PADUCA 30 FEDERAL #1 - OWB - ACUTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 285-INC-ONLY — **Offset Well Error:** 3.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
18,600.0	9,200.0	9,164.9	9,163.2	160.4	237.6	90.00	-1,770.2	-17.9	7,805.1	7,407.1	398.03	19.609	
18,700.0	9,200.0	9,164.9	9,163.2	162.0	237.6	90.00	-1,770.2	-17.9	7,905.0	7,505.3	399.69	19.778	
18,800.0	9,200.0	9,164.9	9,163.2	163.7	237.6	90.00	-1,770.2	-17.9	8,005.0	7,603.6	401.36	19.945	
18,900.0	9,200.0	9,164.9	9,163.2	165.4	237.6	90.00	-1,770.2	-17.9	8,104.9	7,701.9	403.02	20.111	
19,000.0	9,200.0	9,164.9	9,163.2	167.0	237.6	90.00	-1,770.2	-17.9	8,204.9	7,800.2	404.68	20.275	
19,100.0	9,200.0	9,164.9	9,163.2	168.7	237.6	90.00	-1,770.2	-17.9	8,304.8	7,898.5	406.34	20.438	
19,200.0	9,200.0	9,164.9	9,163.2	170.4	237.6	90.00	-1,770.2	-17.9	8,404.8	7,996.8	408.01	20.600	
19,300.0	9,200.0	9,164.9	9,163.2	172.0	237.6	90.00	-1,770.2	-17.9	8,504.7	8,095.0	409.67	20.760	
19,330.2	9,200.0	9,164.9	9,163.2	172.5	237.6	90.00	-1,770.2	-17.9	8,534.9	8,124.7	410.17	20.808	

Company:	COG OPERATING LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #10H
Project:	LEA COUNTY, NM	**TVD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Reference Site:	AVALON SHALE	**MD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #10H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design AVALON SHALE - WINDWARD FEDERAL #9H - OWB - PWP0 — **Offset Site Error:** 0.0 usft

Survey Program: 0-Standard Keeper 104, 8728-MWD — **Offset Well Error:** 3.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.0	0.0	0.2	0.2	3.0	3.0	-90.57	-0.5	-50.0	50.0				
100.0	100.0	100.2	100.2	3.0	3.0	-90.57	-0.5	-50.0	50.0	44.0	6.00	8.333	
200.0	200.0	200.2	200.2	3.0	3.0	-90.57	-0.5	-50.0	50.0	44.0	6.01	8.319	
300.0	300.0	300.2	300.2	3.0	3.0	-90.57	-0.5	-50.0	50.0	44.0	6.03	8.289	
400.0	400.0	400.2	400.2	3.0	3.0	-90.57	-0.5	-50.0	50.0	43.9	6.07	8.244	
500.0	500.0	500.2	500.2	3.1	3.1	-90.57	-0.5	-50.0	50.0	43.9	6.11	8.184	
600.0	600.0	600.2	600.2	3.1	3.1	-90.57	-0.5	-50.0	50.0	43.8	6.16	8.111	
700.0	700.0	700.2	700.2	3.1	3.1	-90.57	-0.5	-50.0	50.0	43.8	6.23	8.025	
800.0	800.0	800.2	800.2	3.2	3.2	-90.57	-0.5	-50.0	50.0	43.7	6.31	7.928	
900.0	900.0	900.2	900.2	3.2	3.2	-90.57	-0.5	-50.0	50.0	43.6	6.39	7.821	
1,000.0	1,000.0	1,000.2	1,000.2	3.2	3.2	-90.57	-0.5	-50.0	50.0	43.5	6.49	7.706	
1,100.0	1,100.0	1,100.2	1,100.2	3.3	3.3	-90.57	-0.5	-50.0	50.0	43.4	6.59	7.583	
1,200.0	1,200.0	1,200.2	1,200.2	3.4	3.4	-90.57	-0.5	-50.0	50.0	43.3	6.71	7.455	
1,300.0	1,300.0	1,300.2	1,300.2	3.4	3.4	-90.57	-0.5	-50.0	50.0	43.2	6.83	7.322	
1,400.0	1,400.0	1,400.2	1,400.2	3.5	3.5	-90.57	-0.5	-50.0	50.0	43.0	6.96	7.185	
1,500.0	1,500.0	1,500.2	1,500.2	3.5	3.5	-90.57	-0.5	-50.0	50.0	42.9	7.10	7.046	
1,600.0	1,600.0	1,600.2	1,600.2	3.6	3.6	-90.57	-0.5	-50.0	50.0	42.8	7.24	6.906	
1,700.0	1,700.0	1,700.2	1,700.2	3.7	3.7	-90.57	-0.5	-50.0	50.0	42.6	7.39	6.765	
1,800.0	1,800.0	1,800.2	1,800.2	3.8	3.8	-90.57	-0.5	-50.0	50.0	42.5	7.55	6.624	
1,900.0	1,900.0	1,900.2	1,900.2	3.9	3.9	-90.57	-0.5	-50.0	50.0	42.3	7.71	6.484	
2,000.0	2,000.0	2,000.2	2,000.2	3.9	3.9	-90.57	-0.5	-50.0	50.0	42.1	7.88	6.346	
2,100.0	2,100.0	2,100.2	2,100.2	4.0	4.0	-90.57	-0.5	-50.0	50.0	41.9	8.05	6.209	
2,200.0	2,200.0	2,200.2	2,200.2	4.1	4.1	-90.57	-0.5	-50.0	50.0	41.8	8.23	6.075	
2,300.0	2,300.0	2,300.2	2,300.2	4.2	4.2	-90.57	-0.5	-50.0	50.0	41.6	8.41	5.943	
2,400.0	2,400.0	2,400.2	2,400.2	4.3	4.3	-90.57	-0.5	-50.0	50.0	41.4	8.60	5.814	
2,500.0	2,500.0	2,500.2	2,500.2	4.4	4.4	-90.57	-0.5	-50.0	50.0	41.2	8.79	5.687	
2,600.0	2,600.0	2,600.2	2,600.2	4.5	4.5	-90.57	-0.5	-50.0	50.0	41.0	8.99	5.564	
2,700.0	2,700.0	2,700.2	2,700.2	4.6	4.6	-90.57	-0.5	-50.0	50.0	40.8	9.18	5.444	
2,800.0	2,800.0	2,800.2	2,800.2	4.7	4.7	-90.57	-0.5	-50.0	50.0	40.6	9.39	5.328	
2,900.0	2,900.0	2,900.2	2,900.2	4.8	4.8	-90.57	-0.5	-50.0	50.0	40.4	9.59	5.214	
3,000.0	3,000.0	3,000.2	3,000.2	4.9	4.9	-90.57	-0.5	-50.0	50.0	40.2	9.80	5.104	
3,100.0	3,100.0	3,100.2	3,100.2	5.0	5.0	-90.57	-0.5	-50.0	50.0	40.0	10.01	4.997	
3,200.0	3,200.0	3,200.2	3,200.2	5.1	5.1	-90.57	-0.5	-50.0	50.0	39.8	10.22	4.893	
3,300.0	3,300.0	3,300.2	3,300.2	5.2	5.2	-90.57	-0.5	-50.0	50.0	39.6	10.43	4.793	
3,400.0	3,400.0	3,400.2	3,400.2	5.3	5.3	-90.57	-0.5	-50.0	50.0	39.4	10.65	4.695	
3,500.0	3,500.0	3,500.2	3,500.2	5.4	5.4	-90.57	-0.5	-50.0	50.0	39.1	10.87	4.600	
3,600.0	3,600.0	3,600.2	3,600.2	5.5	5.5	-90.57	-0.5	-50.0	50.0	38.9	11.09	4.509	
3,700.0	3,700.0	3,700.2	3,700.2	5.7	5.7	-90.57	-0.5	-50.0	50.0	38.7	11.31	4.420	
3,800.0	3,800.0	3,800.2	3,800.2	5.8	5.8	-90.57	-0.5	-50.0	50.0	38.5	11.54	4.334	
3,900.0	3,900.0	3,900.2	3,900.2	5.9	5.9	-90.57	-0.5	-50.0	50.0	38.2	11.76	4.251	
4,000.0	4,000.0	4,000.2	4,000.2	6.0	6.0	-90.57	-0.5	-50.0	50.0	38.0	11.99	4.170	
4,100.0	4,100.0	4,100.2	4,100.2	6.1	6.1	-90.57	-0.5	-50.0	50.0	37.8	12.22	4.092	
4,200.0	4,200.0	4,200.2	4,200.2	6.2	6.2	-90.57	-0.5	-50.0	50.0	37.6	12.45	4.016	
4,300.0	4,300.0	4,300.2	4,300.2	6.3	6.3	-90.57	-0.5	-50.0	50.0	37.3	12.68	3.943	
4,400.0	4,400.0	4,400.2	4,400.2	6.5	6.5	-90.57	-0.5	-50.0	50.0	37.1	12.91	3.872	
4,500.0	4,500.0	4,500.2	4,500.2	6.6	6.6	-90.57	-0.5	-50.0	50.0	36.9	13.15	3.803	
4,600.0	4,600.0	4,600.2	4,600.2	6.7	6.7	-90.57	-0.5	-50.0	50.0	36.6	13.38	3.736	
4,700.0	4,700.0	4,700.2	4,700.2	6.8	6.8	-90.57	-0.5	-50.0	50.0	36.4	13.62	3.671	
4,800.0	4,800.0	4,800.2	4,800.2	6.9	6.9	-90.57	-0.5	-50.0	50.0	36.1	13.86	3.608	
4,900.0	4,900.0	4,900.2	4,900.2	7.0	7.0	-90.57	-0.5	-50.0	50.0	35.9	14.10	3.547	
5,000.0	5,000.0	5,000.2	5,000.2	7.2	7.2	-90.57	-0.5	-50.0	50.0	35.7	14.33	3.488	
5,100.0	5,100.0	5,100.2	5,100.2	7.3	7.3	-90.57	-0.5	-50.0	50.0	35.4	14.57	3.431	

Company:	COG OPERATING LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #10H
Project:	LEA COUNTY, NM	**TVD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Reference Site:	AVALON SHALE	**MD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #10H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design AVALON SHALE - WINDWARD FEDERAL #9H - OWB - PWP0 — **Offset Site Error:** 0.0 usft

Survey Program: 0-Standard Keeper 104, 8728-MWD — **Offset Well Error:** 3.0 usft

Reference		Offset		Semi Major Axis			Offset Wellbore Centre		Distance				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,200.0	5,200.0	5,200.2	5,200.2	7.4	7.4	-90.57	-0.5	-50.0	50.0	35.2	14.81	3.375	
5,300.0	5,300.0	5,300.2	5,300.2	7.5	7.5	-90.57	-0.5	-50.0	50.0	34.9	15.06	3.321	
5,400.0	5,400.0	5,400.2	5,400.2	7.6	7.6	-90.57	-0.5	-50.0	50.0	34.7	15.30	3.268	
5,500.0	5,500.0	5,500.2	5,500.2	7.8	7.8	-90.57	-0.5	-50.0	50.0	34.5	15.54	3.217	
5,600.0	5,600.0	5,600.2	5,600.2	7.9	7.9	-90.57	-0.5	-50.0	50.0	34.2	15.79	3.168	
5,700.0	5,700.0	5,700.2	5,700.2	8.0	8.0	-90.57	-0.5	-50.0	50.0	34.0	16.03	3.119	
5,800.0	5,800.0	5,800.2	5,800.2	8.1	8.1	-90.57	-0.5	-50.0	50.0	33.7	16.27	3.073	
5,900.0	5,900.0	5,900.2	5,900.2	8.3	8.3	-90.57	-0.5	-50.0	50.0	33.5	16.52	3.027	
6,000.0	6,000.0	6,000.2	6,000.2	8.4	8.4	-90.57	-0.5	-50.0	50.0	33.2	16.77	2.982	
6,100.0	6,100.0	6,100.2	6,100.2	8.5	8.5	-90.57	-0.5	-50.0	50.0	33.0	17.01	2.939	
6,200.0	6,200.0	6,200.2	6,200.2	8.6	8.6	-90.57	-0.5	-50.0	50.0	32.7	17.26	2.897	
6,300.0	6,300.0	6,300.2	6,300.2	8.8	8.8	-90.57	-0.5	-50.0	50.0	32.5	17.51	2.856	
6,400.0	6,400.0	6,400.2	6,400.2	8.9	8.9	-90.57	-0.5	-50.0	50.0	32.2	17.75	2.816	
6,500.0	6,500.0	6,500.2	6,500.2	9.0	9.0	-90.57	-0.5	-50.0	50.0	32.0	18.00	2.777	
6,600.0	6,600.0	6,600.2	6,600.2	9.1	9.1	-90.57	-0.5	-50.0	50.0	31.8	18.25	2.740	
6,700.0	6,700.0	6,700.2	6,700.2	9.3	9.3	-90.57	-0.5	-50.0	50.0	31.5	18.50	2.703	
6,800.0	6,800.0	6,800.2	6,800.2	9.4	9.4	-90.57	-0.5	-50.0	50.0	31.3	18.75	2.667	
6,900.0	6,900.0	6,900.2	6,900.2	9.5	9.5	-90.57	-0.5	-50.0	50.0	31.0	19.00	2.632	
7,000.0	7,000.0	7,000.2	7,000.2	9.6	9.6	-90.57	-0.5	-50.0	50.0	30.8	19.25	2.597	
7,100.0	7,100.0	7,100.2	7,100.2	9.8	9.8	-90.57	-0.5	-50.0	50.0	30.5	19.50	2.564	
7,200.0	7,200.0	7,200.2	7,200.2	9.9	9.9	-90.57	-0.5	-50.0	50.0	30.2	19.75	2.531	
7,300.0	7,300.0	7,300.2	7,300.2	10.0	10.0	-90.57	-0.5	-50.0	50.0	30.0	20.00	2.500	
7,400.0	7,400.0	7,400.2	7,400.2	10.1	10.1	-90.57	-0.5	-50.0	50.0	29.7	20.26	2.469	
7,500.0	7,500.0	7,500.2	7,500.2	10.3	10.3	-90.57	-0.5	-50.0	50.0	29.5	20.51	2.438	
7,600.0	7,600.0	7,600.2	7,600.2	10.4	10.4	-90.57	-0.5	-50.0	50.0	29.2	20.76	2.409	
7,700.0	7,700.0	7,700.2	7,700.2	10.5	10.5	-90.57	-0.5	-50.0	50.0	29.0	21.01	2.380	
7,800.0	7,800.0	7,800.2	7,800.2	10.6	10.6	-90.57	-0.5	-50.0	50.0	28.7	21.27	2.351	
7,900.0	7,900.0	7,900.2	7,900.2	10.8	10.8	-90.57	-0.5	-50.0	50.0	28.5	21.52	2.324	
8,000.0	8,000.0	8,000.2	8,000.2	10.9	10.9	-90.57	-0.5	-50.0	50.0	28.2	21.77	2.297	
8,100.0	8,100.0	8,100.2	8,100.2	11.0	11.0	-90.57	-0.5	-50.0	50.0	28.0	22.03	2.270	
8,200.0	8,200.0	8,200.2	8,200.2	11.1	11.1	-90.57	-0.5	-50.0	50.0	27.7	22.28	2.244	
8,300.0	8,300.0	8,300.2	8,300.2	11.3	11.3	-90.57	-0.5	-50.0	50.0	27.5	22.53	2.219	
8,400.0	8,400.0	8,400.2	8,400.2	11.4	11.4	-90.57	-0.5	-50.0	50.0	27.2	22.79	2.194	
8,500.0	8,500.0	8,500.2	8,500.2	11.5	11.5	-90.57	-0.5	-50.0	50.0	27.0	23.04	2.170	
8,600.0	8,600.0	8,600.2	8,600.2	11.6	11.6	-90.57	-0.5	-50.0	50.0	26.7	23.30	2.146	
8,700.0	8,700.0	8,700.2	8,700.2	11.8	11.8	-90.57	-0.5	-50.0	50.0	26.5	23.55	2.123	
8,722.5	8,722.5	8,722.7	8,722.7	11.8	11.8	-90.57	-0.5	-50.0	50.0	26.4	23.61	2.118	CC
8,725.0	8,725.0	8,725.2	8,725.2	11.8	11.8	108.73	-0.5	-50.0	50.0	26.4	23.61	2.118	ES
8,750.0	8,750.0	8,749.1	8,749.1	11.8	11.8	109.00	-0.9	-50.2	50.5	26.9	23.63	2.137	
8,775.0	8,774.9	8,772.8	8,772.8	11.8	11.8	109.29	-2.4	-51.0	52.0	28.4	23.64	2.201	
8,800.0	8,799.7	8,796.5	8,796.2	11.8	11.8	109.58	-4.9	-52.4	54.6	30.9	23.65	2.308	
8,825.0	8,824.2	8,819.9	8,819.3	11.8	11.8	109.83	-8.3	-54.3	58.1	34.5	23.66	2.457	
8,850.0	8,848.5	8,843.2	8,842.0	11.8	11.8	110.02	-12.8	-56.7	62.7	39.0	23.67	2.648	
8,875.0	8,872.4	8,866.2	8,864.2	11.8	11.9	110.12	-18.1	-59.5	68.2	44.5	23.69	2.879	
8,900.0	8,895.9	8,888.9	8,885.8	11.9	11.9	110.13	-24.2	-62.9	74.7	51.0	23.71	3.149	
8,925.0	8,919.0	8,911.2	8,906.7	11.9	11.9	110.02	-31.2	-66.7	82.1	58.3	23.74	3.457	
8,950.0	8,941.5	8,933.2	8,926.9	11.9	11.9	109.81	-38.8	-70.8	90.3	66.6	23.77	3.801	
8,975.0	8,963.4	8,954.8	8,946.3	11.9	11.9	109.48	-47.1	-75.3	99.5	75.7	23.80	4.179	
9,000.0	8,984.6	8,975.0	8,964.1	11.9	11.9	109.01	-55.6	-79.9	109.4	85.6	23.84	4.590	
9,025.0	9,005.2	8,996.7	8,982.6	11.9	11.9	108.50	-65,4	-85.3	120.1	96.2	23.88	5.031	
9,050.0	9,024.9	9,017.0	8,999.6	12.0	12.0	107.86	-75.3	-90.6	131.6	107.6	23.92	5.500	
9,075.0	9,043.8	9,036.8	9,015.6	12.0	12.0	107.11	-85.5	-96.2	143.7	119.7	23.97	5.996	

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

Company:	COG OPERATING LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #10H
Project:	LEA COUNTY, NM	**TVD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Reference Site:	AVALON SHALE	**MD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #10H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design AVALON SHALE - WINDWARD FEDERAL #9H - OWB - PWP0 — Offset Site Error: 0.0 usft

Survey Program: 0-Standard Keeper 104, 8728-MWD — Offset Well Error: 3.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
9,100.0	9,061.9	9,056.2	9,030.9	12.0	12.0	106.27	-96.1	-101.9	156.5	132.5	24.02	6.516	
9,125.0	9,079.0	9,075.0	9,045.1	12.1	12.0	105.32	-106.8	-107.7	169.9	145.9	24.07	7.059	
9,150.0	9,095.1	9,093.8	9,058.9	12.1	12.0	104.30	-118.0	-113.8	183.9	159.8	24.13	7.621	
9,175.0	9,110.3	9,111.9	9,071.7	12.1	12.1	103.17	-129.3	-119.9	198.4	174.2	24.19	8.202	
9,200.0	9,124.3	9,129.6	9,083.7	12.2	12.1	101.96	-140.7	-126.1	213.4	189.2	24.26	8.799	
9,225.0	9,137.3	9,146.9	9,095.0	12.2	12.1	100.67	-152.3	-132.4	228.9	204.6	24.32	9.409	
9,250.0	9,149.1	9,163.9	9,105.7	12.2	12.2	99.29	-163.9	-138.7	244.7	220.4	24.40	10.032	
9,275.0	9,159.7	9,180.6	9,115.6	12.3	12.2	97.84	-175.6	-145.1	261.0	236.5	24.47	10.664	
9,300.0	9,169.2	9,196.9	9,124.9	12.3	12.2	96.31	-187.4	-151.5	277.6	253.0	24.56	11.304	
9,325.0	9,177.4	9,212.9	9,133.5	12.4	12.2	94.72	-199.3	-157.9	294.5	269.8	24.65	11.948	
9,350.0	9,184.4	9,228.6	9,141.6	12.5	12.3	93.07	-211.2	-164.4	311.6	286.9	24.74	12.594	
9,375.0	9,190.1	9,244.2	9,149.1	12.5	12.3	91.37	-223.1	-170.9	329.0	304.1	24.85	13.239	
9,400.0	9,194.5	9,259.4	9,156.0	12.6	12.4	89.63	-235.1	-177.4	346.6	321.6	24.97	13.879	
9,425.0	9,197.6	9,275.0	9,162.7	12.7	12.4	87.89	-247.4	-184.1	364.3	339.2	25.11	14.508	
9,450.0	9,199.5	9,289.5	9,168.4	12.8	12.4	86.06	-259.1	-190.4	382.2	357.0	25.27	15.124	
9,472.6	9,200.0	9,302.9	9,173.4	13.0	12.5	84.43	-270.0	-196.3	398.5	373.0	25.44	15.662	
9,500.0	9,200.0	9,319.5	9,179.1	13.2	12.5	85.86	-283.8	-203.8	418.2	392.5	25.68	16.282	
9,600.0	9,200.0	9,386.4	9,196.3	14.1	12.8	89.38	-340.5	-234.6	487.9	461.0	26.90	18.136	
9,700.0	9,200.0	9,461.8	9,204.7	15.4	13.2	90.60	-406.3	-270.3	553.1	524.6	28.58	19.356	
9,800.0	9,200.0	9,590.2	9,205.0	16.7	14.3	90.52	-521.2	-327.7	610.3	579.3	31.02	19.676	
9,900.0	9,200.0	9,752.4	9,204.9	18.1	16.1	90.44	-672.8	-385.1	652.6	618.4	34.23	19.064	
9,944.7	9,200.0	9,831.5	9,204.9	18.7	17.1	90.42	-748.7	-406.8	665.8	630.0	35.82	18.586	
10,000.0	9,200.0	9,933.2	9,204.8	19.5	18.4	90.40	-848.1	-428.4	678.0	640.2	37.87	17.905	
10,100.0	9,200.0	10,123.3	9,204.7	20.9	20.7	90.37	-1,036.9	-449.9	690.0	648.4	41.67	16.561	
10,200.0	9,200.0	10,260.6	9,204.6	22.4	22.4	90.36	-1,174.1	-450.9	691.1	646.3	44.83	15.416	
10,300.0	9,200.0	10,360.6	9,204.4	23.9	23.7	90.35	-1,274.1	-450.2	691.1	643.5	47.61	14.516	
10,400.0	9,200.0	10,460.6	9,204.3	25.4	25.1	90.34	-1,374.1	-449.5	691.1	640.6	50.46	13.695	
10,500.0	9,200.0	10,560.6	9,204.2	26.9	26.4	90.33	-1,474.1	-448.7	691.1	637.7	53.38	12.946	
10,600.0	9,200.0	10,660.6	9,204.1	28.5	27.8	90.33	-1,574.1	-448.0	691.1	634.7	56.35	12.263	
10,700.0	9,200.0	10,760.6	9,204.0	30.1	29.3	90.32	-1,674.1	-447.3	691.0	631.7	59.37	11.640	
10,800.0	9,200.0	10,860.6	9,203.9	31.7	30.8	90.31	-1,774.1	-446.5	691.0	628.6	62.42	11.071	
10,900.0	9,200.0	10,960.6	9,203.8	33.2	32.3	90.30	-1,874.1	-445.8	691.0	625.5	65.50	10.551	
11,000.0	9,200.0	11,060.6	9,203.7	34.8	33.8	90.29	-1,974.1	-445.0	691.0	622.4	68.60	10.073	
11,100.0	9,200.0	11,160.6	9,203.6	36.4	35.3	90.28	-2,074.1	-444.3	691.0	619.3	71.73	9.633	
11,200.0	9,200.0	11,260.6	9,203.5	38.1	36.8	90.27	-2,174.1	-443.6	691.0	616.1	74.88	9.228	
11,300.0	9,200.0	11,360.6	9,203.4	39.7	38.4	90.27	-2,274.1	-442.8	691.0	612.9	78.04	8.854	
11,400.0	9,200.0	11,460.6	9,203.3	41.3	39.9	90.26	-2,374.1	-442.1	691.0	609.7	81.22	8.507	
11,500.0	9,200.0	11,560.6	9,203.2	42.9	41.5	90.25	-2,474.1	-441.3	690.9	606.5	84.41	8.186	
11,600.0	9,200.0	11,660.6	9,203.1	44.5	43.1	90.24	-2,574.1	-440.6	690.9	603.3	87.61	7.886	
11,700.0	9,200.0	11,760.6	9,203.0	46.2	44.7	90.23	-2,674.1	-439.9	690.9	600.1	90.82	7.607	
11,800.0	9,200.0	11,860.6	9,202.9	47.8	46.3	90.22	-2,774.1	-439.1	690.9	596.9	94.04	7.347	
11,900.0	9,200.0	11,960.6	9,202.8	49.4	47.8	90.21	-2,874.1	-438.4	690.9	593.6	97.27	7.103	
12,000.0	9,200.0	12,060.6	9,202.7	51.1	49.4	90.20	-2,974.1	-437.7	690.9	590.4	100.51	6.874	
12,100.0	9,200.0	12,160.6	9,202.6	52.7	51.0	90.20	-3,074.1	-436.9	690.9	587.1	103.75	6.659	
12,200.0	9,200.0	12,260.6	9,202.5	54.3	52.7	90.19	-3,174.1	-436.2	690.8	583.9	107.00	6.457	
12,300.0	9,200.0	12,360.6	9,202.4	56.0	54.3	90.18	-3,274.1	-435.4	690.8	580.6	110.25	6.266	
12,400.0	9,200.0	12,460.6	9,202.3	57.6	55.9	90.17	-3,374.1	-434.7	690.8	577.3	113.51	6.086	
12,500.0	9,200.0	12,560.6	9,202.1	59.3	57.5	90.16	-3,474.1	-434.0	690.8	574.0	116.77	5.916	
12,600.0	9,200.0	12,660.6	9,202.0	60.9	59.1	90.15	-3,574.1	-433.2	690.8	570.8	120.04	5.755	
12,700.0	9,200.0	12,760.6	9,201.9	62.6	60.7	90.14	-3,674.1	-432.5	690.8	567.5	123.31	5.602	
12,800.0	9,200.0	12,860.6	9,201.8	64.2	62.4	90.14	-3,774.1	-431.7	690.8	564.2	126.58	5.457	
12,900.0	9,200.0	12,960.6	9,201.7	65.9	64.0	90.13	-3,874.1	-431.0	690.8	560.9	129.86	5.319	

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

Company:	COG OPERATING LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #10H
Project:	LEA COUNTY, NM	**TVD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Reference Site:	AVALON SHALE	**MD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #10H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design AVALON SHALE - WINDWARD FEDERAL #9H - OWB - PWP0 — **Offset Site Error:** 0.0 usft

Survey Program: 0-Standard Keeper 104, 8728-MWD — **Offset Well Error:** 3.0 usft

Reference		Offset		Semi Major Axis			Offset Wellbore Centre		Distance				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
13,000.0	9,200.0	13,060.6	9,201.6	67.5	65.6	90.12	-3,974.1	-430.3	690.7	557.6	133.13	5.188	
13,100.0	9,200.0	13,160.6	9,201.5	69.2	67.3	90.11	-4,074.1	-429.5	690.7	554.3	136.42	5.063	
13,200.0	9,200.0	13,260.6	9,201.4	70.8	68.9	90.10	-4,174.1	-428.8	690.7	551.0	139.70	4.944	
13,300.0	9,200.0	13,360.6	9,201.3	72.5	70.5	90.09	-4,274.0	-428.1	690.7	547.7	142.99	4.831	
13,400.0	9,200.0	13,460.6	9,201.2	74.1	72.2	90.08	-4,374.0	-427.3	690.7	544.4	146.27	4.722	
13,500.0	9,200.0	13,560.6	9,201.1	75.8	73.8	90.07	-4,474.0	-426.6	690.7	541.1	149.56	4.618	
13,600.0	9,200.0	13,660.6	9,201.0	77.4	75.4	90.07	-4,574.0	-425.8	690.7	537.8	152.86	4.518	
13,700.0	9,200.0	13,760.6	9,200.9	79.1	77.1	90.06	-4,674.0	-425.1	690.7	534.5	156.15	4.423	
13,800.0	9,200.0	13,860.6	9,200.8	80.7	78.7	90.05	-4,774.0	-424.4	690.6	531.2	159.45	4.332	
13,900.0	9,200.0	13,960.6	9,200.7	82.4	80.4	90.04	-4,874.0	-423.6	690.6	527.9	162.74	4.244	
14,000.0	9,200.0	14,060.6	9,200.6	84.0	82.0	90.03	-4,974.0	-422.9	690.6	524.6	166.04	4.159	
14,100.0	9,200.0	14,160.6	9,200.5	85.7	83.7	90.02	-5,074.0	-422.1	690.6	521.3	169.34	4.078	
14,200.0	9,200.0	14,260.6	9,200.4	87.3	85.3	90.01	-5,174.0	-421.4	690.6	518.0	172.64	4.000	
14,300.0	9,200.0	14,360.6	9,200.3	89.0	87.0	90.01	-5,274.0	-420.7	690.6	514.6	175.94	3.925	
14,400.0	9,200.0	14,460.6	9,200.2	90.6	88.6	90.00	-5,374.0	-419.9	690.6	511.3	179.25	3.853	
14,500.0	9,200.0	14,560.6	9,200.1	92.3	90.2	89.99	-5,474.0	-419.2	690.6	508.0	182.55	3.783	
14,600.0	9,200.0	14,660.6	9,200.0	94.0	91.9	89.98	-5,574.0	-418.5	690.5	504.7	185.86	3.715	
14,700.0	9,200.0	14,760.6	9,199.8	95.6	93.5	89.97	-5,674.0	-417.7	690.5	501.4	189.16	3.650	
14,800.0	9,200.0	14,860.6	9,199.7	97.3	95.2	89.96	-5,774.0	-417.0	690.5	498.0	192.47	3.588	
14,900.0	9,200.0	14,960.6	9,199.6	98.9	96.8	89.95	-5,874.0	-416.2	690.5	494.7	195.78	3.527	
15,000.0	9,200.0	15,060.6	9,199.5	100.6	98.5	89.94	-5,974.0	-415.5	690.5	491.4	199.09	3.468	
15,100.0	9,200.0	15,160.6	9,199.4	102.3	100.1	89.94	-6,074.0	-414.8	690.5	488.1	202.39	3.412	
15,200.0	9,200.0	15,260.6	9,199.3	103.9	101.8	89.93	-6,174.0	-414.0	690.5	484.8	205.70	3.357	
15,300.0	9,200.0	15,360.6	9,199.2	105.6	103.4	89.92	-6,274.0	-413.3	690.5	481.4	209.02	3.303	
15,400.0	9,200.0	15,460.6	9,199.1	107.2	105.1	89.91	-6,374.0	-412.5	690.4	478.1	212.33	3.252	
15,500.0	9,200.0	15,560.6	9,199.0	108.9	106.8	89.90	-6,474.0	-411.8	690.4	474.8	215.64	3.202	
15,600.0	9,200.0	15,660.6	9,198.9	110.5	108.4	89.89	-6,574.0	-411.1	690.4	471.5	218.95	3.153	
15,700.0	9,200.0	15,760.6	9,198.8	112.2	110.1	89.88	-6,674.0	-410.3	690.4	468.1	222.26	3.106	
15,800.0	9,200.0	15,860.6	9,198.7	113.9	111.7	89.88	-6,774.0	-409.6	690.4	464.8	225.58	3.061	
15,900.0	9,200.0	15,960.6	9,198.6	115.5	113.4	89.87	-6,874.0	-408.9	690.4	461.5	228.89	3.016	
16,000.0	9,200.0	16,060.6	9,198.5	117.2	115.0	89.86	-6,974.0	-408.1	690.4	458.2	232.21	2.973	
16,100.0	9,200.0	16,160.6	9,198.4	118.8	116.7	89.85	-7,074.0	-407.4	690.4	454.8	235.52	2.931	
16,200.0	9,200.0	16,260.6	9,198.3	120.5	118.3	89.84	-7,174.0	-406.6	690.3	451.5	238.84	2.890	
16,300.0	9,200.0	16,360.6	9,198.2	122.2	120.0	89.83	-7,274.0	-405.9	690.3	448.2	242.15	2.851	
16,400.0	9,200.0	16,460.6	9,198.1	123.8	121.6	89.82	-7,374.0	-405.2	690.3	444.9	245.47	2.812	
16,500.0	9,200.0	16,560.6	9,198.0	125.5	123.3	89.81	-7,474.0	-404.4	690.3	441.5	248.79	2.775	
16,600.0	9,200.0	16,660.6	9,197.9	127.1	125.0	89.81	-7,574.0	-403.7	690.3	438.2	252.10	2.738	
16,700.0	9,200.0	16,760.6	9,197.8	128.8	126.6	89.80	-7,674.0	-402.9	690.3	434.9	255.42	2.703	
16,800.0	9,200.0	16,860.6	9,197.6	130.5	128.3	89.79	-7,774.0	-402.2	690.3	431.5	258.74	2.668	
16,900.0	9,200.0	16,960.6	9,197.5	132.1	129.9	89.78	-7,873.9	-401.5	690.3	428.2	262.06	2.634	
17,000.0	9,200.0	17,060.6	9,197.4	133.8	131.6	89.77	-7,973.9	-400.7	690.2	424.9	265.38	2.601	
17,100.0	9,200.0	17,160.6	9,197.3	135.5	133.2	89.76	-8,073.9	-400.0	690.2	421.5	268.69	2.569	
17,200.0	9,200.0	17,260.6	9,197.2	137.1	134.9	89.75	-8,173.9	-399.3	690.2	418.2	272.01	2.537	
17,300.0	9,200.0	17,360.6	9,197.1	138.8	136.6	89.74	-8,273.9	-398.5	690.2	414.9	275.33	2.507	
17,400.0	9,200.0	17,460.6	9,197.0	140.4	138.2	89.74	-8,373.9	-397.8	690.2	411.5	278.65	2.477	
17,500.0	9,200.0	17,560.6	9,196.9	142.1	139.9	89.73	-8,473.9	-397.0	690.2	408.2	281.97	2.448	
17,600.0	9,200.0	17,660.6	9,196.8	143.8	141.5	89.72	-8,573.9	-396.3	690.2	404.9	285.29	2.419	
17,700.0	9,200.0	17,760.6	9,196.7	145.4	143.2	89.71	-8,673.9	-395.6	690.2	401.5	288.61	2.391	
17,800.0	9,200.0	17,860.6	9,196.6	147.1	144.8	89.70	-8,773.9	-394.8	690.1	398.2	291.93	2.364	
17,900.0	9,200.0	17,960.6	9,196.5	148.8	146.5	89.69	-8,873.9	-394.1	690.1	394.9	295.26	2.337	
18,000.0	9,200.0	18,060.6	9,196.4	150.4	148.2	89.68	-8,973.9	-393.4	690.1	391.5	298.58	2.311	
18,100.0	9,200.0	18,160.6	9,196.3	152.1	149.8	89.68	-9,073.9	-392.6	690.1	388.2	301.90	2.286	

Company:	COG OPERATING LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #10H
Project:	LEA COUNTY, NM	**TVD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Reference Site:	AVALON SHALE	**MD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #10H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design AVALON SHALE - WINDWARD FEDERAL #9H - OWB - PWP0 — **Offset Site Error:** 0.0 usft

Survey Program: 0-Standard Keeper 104, 8728-MWD — **Offset Well Error:** 3.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
18,200.0	9,200.0	18,260.6	9,196.2	153.7	151.5	89.67	-9,173.9	-391.9	690.1	384.9	305.22	2.261	
18,300.0	9,200.0	18,360.6	9,196.1	155.4	153.1	89.66	-9,273.9	-391.1	690.1	381.5	308.54	2.237	
18,400.0	9,200.0	18,460.6	9,196.0	157.1	154.8	89.65	-9,373.9	-390.4	690.1	378.2	311.86	2.213	
18,500.0	9,200.0	18,560.6	9,195.9	158.7	156.5	89.64	-9,473.9	-389.7	690.1	374.9	315.19	2.189	
18,600.0	9,200.0	18,660.6	9,195.8	160.4	158.1	89.63	-9,573.9	-388.9	690.1	371.5	318.51	2.167	
18,700.0	9,200.0	18,760.6	9,195.7	162.0	159.8	89.62	-9,673.9	-388.2	690.0	368.2	321.83	2.144	
18,800.0	9,200.0	18,860.6	9,195.6	163.7	161.4	89.61	-9,773.9	-387.4	690.0	364.9	325.15	2.122	
18,900.0	9,200.0	18,960.6	9,195.5	165.4	163.1	89.61	-9,873.9	-386.7	690.0	361.5	328.48	2.101	
19,000.0	9,200.0	19,060.6	9,195.3	167.0	164.8	89.60	-9,973.9	-386.0	690.0	358.2	331.80	2.080	
19,100.0	9,200.0	19,160.6	9,195.2	168.7	166.4	89.59	-10,073.9	-385.2	690.0	354.9	335.12	2.059	
19,200.0	9,200.0	19,260.6	9,195.1	170.4	168.1	89.58	-10,173.9	-384.5	690.0	351.5	338.45	2.039	
19,300.0	9,200.0	19,360.6	9,195.0	172.0	169.7	89.57	-10,273.9	-383.8	690.0	348.2	341.77	2.019	
19,330.2	9,200.0	19,390.8	9,195.0	172.5	170.2	89.57	-10,304.1	-383.5	690.0	347.2	342.77	2.013	SF

Company:	COG OPERATING LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #10H
Project:	LEA COUNTY, NM	**TVD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Reference Site:	AVALON SHALE	**MD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #10H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design DEEP BSS - WINDWARD FEDERAL #3H - OWB - ACTUAL WELLPATH — Offset Site Error: 0.0 usft

Survey Program: 100-GYD_DP_MS, 9931-MWD — Offset Well Error: 2.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.0	0.0	1.1	1.1	3.0	2.0	-82.92	18.6	-149.7	150.9				
100.0	100.0	100.1	100.1	3.0	2.0	-82.83	18.9	-150.0	151.2	146.2	5.00	30.222	
200.0	200.0	200.0	200.0	3.0	2.0	-82.73	19.2	-150.5	151.7	146.7	5.02	30.239	
300.0	300.0	299.5	299.5	3.0	2.0	-82.70	19.4	-151.3	152.5	147.5	5.04	30.261	
400.0	400.0	399.7	399.7	3.0	2.0	-82.66	19.6	-152.3	153.5	148.5	5.07	30.285	
500.0	500.0	499.4	499.4	3.1	2.0	-82.61	19.9	-153.2	154.5	149.4	5.10	30.278	
600.0	600.0	599.2	599.2	3.1	2.1	-82.69	19.8	-154.4	155.7	150.6	5.14	30.267	
700.0	700.0	699.5	699.5	3.1	2.1	-82.82	19.6	-155.6	156.8	151.6	5.19	30.215	
800.0	800.0	799.8	799.8	3.2	2.1	-82.84	19.7	-156.5	157.8	152.5	5.24	30.101	
900.0	900.0	900.2	900.1	3.2	2.1	-82.82	19.8	-157.3	158.5	153.2	5.30	29.915	
1,000.0	1,000.0	1,000.9	1,000.8	3.2	2.1	-82.86	19.7	-157.7	158.9	153.5	5.36	29.641	
1,100.0	1,100.0	1,100.8	1,100.7	3.3	2.1	-82.91	19.6	-157.9	159.1	153.7	5.43	29.313	
1,200.0	1,200.0	1,200.8	1,200.8	3.4	2.1	-82.99	19.5	-158.1	159.3	153.8	5.50	28.973	
1,300.0	1,300.0	1,301.1	1,301.0	3.4	2.2	-83.07	19.2	-158.2	159.4	153.8	5.57	28.612	
1,400.0	1,400.0	1,401.7	1,401.6	3.5	2.2	-83.14	19.0	-158.1	159.3	153.6	5.64	28.233	
1,500.0	1,500.0	1,501.7	1,501.7	3.5	2.2	-83.17	18.9	-157.8	158.9	153.2	5.72	27.807	
1,600.0	1,600.0	1,601.9	1,601.8	3.6	2.2	-83.17	18.9	-157.4	158.5	152.7	5.79	27.365	
1,700.0	1,700.0	1,701.5	1,701.4	3.7	2.2	-83.11	19.0	-157.0	158.2	152.3	5.87	26.933	
1,800.0	1,800.0	1,801.4	1,801.4	3.8	2.2	-83.03	19.2	-156.8	158.0	152.0	5.96	26.516	
1,900.0	1,900.0	1,901.4	1,901.3	3.9	2.2	-82.90	19.5	-156.6	157.8	151.8	6.05	26.099	
2,000.0	2,000.0	2,001.2	2,001.2	3.9	2.2	-82.72	20.0	-156.5	157.7	151.6	6.14	25.686	
2,100.0	2,100.0	2,101.2	2,101.1	4.0	2.2	-82.53	20.5	-156.4	157.7	151.5	6.24	25.283	
2,129.4	2,129.4	2,130.5	2,130.5	4.1	2.2	-82.47	20.7	-156.3	157.7	151.4	6.27	25.166	
2,200.0	2,200.0	2,201.1	2,201.1	4.1	2.2	-82.29	21.2	-156.3	157.7	151.4	6.34	24.885	
2,300.0	2,300.0	2,301.1	2,301.0	4.2	2.2	-82.11	21.7	-156.3	157.7	151.3	6.44	24.493	
2,400.0	2,400.0	2,400.9	2,400.8	4.3	2.2	-82.01	21.9	-156.3	157.9	151.3	6.55	24.115	
2,500.0	2,500.0	2,500.7	2,500.6	4.4	2.3	-81.82	22.5	-156.5	158.1	151.5	6.65	23.758	
2,600.0	2,600.0	2,600.9	2,600.8	4.5	2.3	-81.64	23.0	-156.7	158.4	151.6	6.77	23.405	
2,700.0	2,700.0	2,700.5	2,700.5	4.6	2.3	-81.52	23.4	-156.9	158.6	151.8	6.88	23.061	
2,800.0	2,800.0	2,801.0	2,801.0	4.7	2.3	-81.40	23.7	-157.1	158.9	151.9	6.99	22.715	
2,900.0	2,900.0	2,901.0	2,901.0	4.8	2.3	-81.30	24.1	-157.1	158.9	151.8	7.11	22.355	
3,000.0	3,000.0	3,001.0	3,001.0	4.9	2.3	-81.16	24.4	-157.1	159.0	151.8	7.23	22.001	
3,100.0	3,100.0	3,101.1	3,101.1	5.0	2.3	-81.03	24.8	-157.1	159.1	151.7	7.35	21.650	
3,200.0	3,200.0	3,201.1	3,201.1	5.1	2.4	-80.83	25.4	-157.1	159.1	151.6	7.47	21.303	
3,300.0	3,300.0	3,301.2	3,301.2	5.2	2.4	-80.60	26.0	-156.9	159.1	151.5	7.59	20.959	
3,313.5	3,313.5	3,314.6	3,314.6	5.2	2.4	-80.57	26.1	-156.9	159.1	151.5	7.61	20.913	
3,400.0	3,400.0	3,400.8	3,400.8	5.3	2.4	-80.39	26.6	-156.9	159.2	151.5	7.71	20.635	
3,500.0	3,500.0	3,500.0	3,499.9	5.4	2.4	-80.28	26.9	-157.4	159.6	151.8	7.84	20.375	
3,600.0	3,600.0	3,600.3	3,600.2	5.5	2.4	-80.33	26.9	-158.0	160.3	152.3	7.96	20.143	
3,700.0	3,700.0	3,700.6	3,700.6	5.7	2.4	-80.35	26.9	-158.5	160.7	152.7	8.08	19.890	
3,800.0	3,800.0	3,800.8	3,800.8	5.8	2.4	-80.29	27.2	-158.7	161.0	152.8	8.21	19.609	
3,900.0	3,900.0	3,900.9	3,900.8	5.9	2.5	-80.23	27.3	-158.9	161.2	152.8	8.34	19.324	
4,000.0	4,000.0	4,001.2	4,001.1	6.0	2.5	-80.25	27.3	-158.9	161.3	152.8	8.46	19.067	
4,100.0	4,100.0	4,101.6	4,101.6	6.1	2.5	-80.30	27.1	-158.8	161.1	152.6	8.57	18.799	
4,154.3	4,154.3	4,155.5	4,155.4	6.2	2.5	-80.32	27.1	-158.8	161.0	152.4	8.63	18.656	
4,200.0	4,200.0	4,200.8	4,200.7	6.2	2.5	-80.34	27.0	-158.8	161.1	152.4	8.68	18.550	
4,300.0	4,300.0	4,301.0	4,300.9	6.3	2.5	-80.32	27.1	-159.0	161.3	152.5	8.81	18.307	
4,400.0	4,400.0	4,401.1	4,401.0	6.5	2.5	-80.21	27.4	-159.0	161.4	152.4	8.94	18.045	
4,500.0	4,500.0	4,501.1	4,501.0	6.6	2.5	-80.11	27.7	-159.0	161.4	152.3	9.08	17.786	
4,600.0	4,600.0	4,601.1	4,601.0	6.7	2.5	-79.99	28.1	-159.0	161.5	152.3	9.21	17.533	
4,700.0	4,700.0	4,701.1	4,701.1	6.8	2.5	-79.86	28.4	-159.0	161.5	152.2	9.35	17.285	
4,800.0	4,800.0	4,801.2	4,801.1	6.9	2.6	-79.74	28.8	-159.0	161.5	152.1	9.48	17.040	

Company:	COG OPERATING LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #10H
Project:	LEA COUNTY, NM	**TVD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Reference Site:	AVALON SHALE	**MD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #10H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design DEEP BSS - WINDWARD FEDERAL #3H - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 100-GYD_DP_MS, 9931-MWD — **Offset Well Error:** 2.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
4,810.8	4,810.8	4,812.0	4,811.9	6.9	2.6	-79.73	28.8	-159.0	161.5	152.1	9.50	17.013	
4,900.0	4,900.0	4,901.1	4,901.0	7.0	2.6	-79.62	29.1	-158.9	161.6	152.0	9.62	16.801	
5,000.0	5,000.0	5,001.3	5,001.2	7.2	2.6	-79.49	29.5	-158.8	161.6	151.8	9.75	16.566	
5,100.0	5,100.0	5,101.5	5,101.4	7.3	2.6	-79.38	29.7	-158.6	161.4	151.5	9.89	16.329	
5,157.5	5,157.5	5,158.7	5,158.6	7.4	2.6	-79.34	29.9	-158.6	161.4	151.4	9.96	16.198	
5,200.0	5,200.0	5,200.9	5,200.9	7.4	2.6	-79.30	30.0	-158.6	161.4	151.4	10.02	16.110	
5,300.0	5,300.0	5,300.5	5,300.4	7.5	2.6	-79.28	30.1	-158.8	161.7	151.5	10.15	15.924	
5,400.0	5,400.0	5,401.0	5,401.0	7.6	2.6	-79.35	29.9	-159.1	161.9	151.6	10.28	15.753	
5,500.0	5,500.0	5,501.3	5,501.2	7.8	2.6	-79.44	29.7	-159.2	161.9	151.5	10.40	15.571	
5,600.0	5,600.0	5,601.2	5,601.1	7.9	2.6	-79.54	29.4	-159.2	161.9	151.4	10.52	15.389	
5,660.3	5,660.3	5,661.5	5,661.4	8.0	2.6	-79.60	29.2	-159.2	161.9	151.3	10.59	15.281	
5,700.0	5,700.0	5,701.2	5,701.1	8.0	2.6	-79.65	29.1	-159.2	161.9	151.2	10.64	15.212	
5,800.0	5,800.0	5,801.0	5,800.9	8.1	2.6	-79.76	28.8	-159.4	161.9	151.2	10.77	15.042	
5,900.0	5,900.0	5,901.0	5,901.0	8.3	2.6	-79.85	28.6	-159.5	162.1	151.2	10.89	14.876	
6,000.0	6,000.0	6,001.2	6,001.1	8.4	2.6	-79.94	28.3	-159.6	162.1	151.1	11.02	14.711	
6,100.0	6,100.0	6,101.6	6,101.5	8.5	2.6	-80.06	28.0	-159.5	162.0	150.8	11.14	14.537	
6,200.0	6,200.0	6,201.7	6,201.6	8.6	2.6	-80.09	27.8	-159.3	161.7	150.4	11.26	14.352	
6,300.0	6,300.0	6,301.5	6,301.4	8.8	2.6	-80.02	28.0	-159.0	161.4	150.0	11.39	14.164	
6,400.0	6,400.0	6,401.6	6,401.5	8.9	2.7	-79.94	28.2	-158.7	161.2	149.6	11.53	13.981	
6,500.0	6,500.0	6,501.4	6,501.3	9.0	2.7	-79.85	28.4	-158.4	161.0	149.3	11.66	13.803	
6,600.0	6,600.0	6,601.6	6,601.5	9.1	2.7	-79.78	28.5	-158.2	160.8	149.0	11.80	13.629	
6,700.0	6,700.0	6,701.7	6,701.6	9.3	2.7	-79.73	28.6	-157.9	160.5	148.5	11.93	13.455	
6,800.0	6,800.0	6,801.7	6,801.6	9.4	2.7	-79.70	28.6	-157.6	160.1	148.1	12.06	13.283	
6,900.0	6,900.0	6,901.8	6,901.7	9.5	2.7	-79.72	28.5	-157.2	159.8	147.6	12.18	13.114	
6,998.0	6,998.0	6,999.2	6,999.1	9.6	2.7	-79.79	28.3	-157.1	159.6	147.3	12.31	12.969	
7,000.0	7,000.0	7,001.2	7,001.1	9.6	2.7	-79.79	28.3	-157.1	159.6	147.3	12.31	12.967	
7,100.0	7,100.0	7,101.0	7,101.0	9.8	2.7	-79.90	28.0	-157.2	159.6	147.2	12.44	12.838	
7,200.0	7,200.0	7,201.0	7,200.9	9.9	2.7	-80.00	27.7	-157.3	159.7	147.2	12.56	12.714	
7,300.0	7,300.0	7,300.8	7,300.7	10.0	2.7	-80.08	27.6	-157.5	159.9	147.2	12.70	12.598	
7,400.0	7,400.0	7,401.0	7,400.9	10.1	2.7	-80.15	27.4	-157.8	160.1	147.3	12.83	12.483	
7,500.0	7,500.0	7,500.9	7,500.8	10.3	2.7	-80.25	27.1	-158.0	160.3	147.3	12.96	12.368	
7,600.0	7,600.0	7,600.8	7,600.7	10.4	2.7	-80.31	27.0	-158.2	160.5	147.4	13.09	12.258	
7,700.0	7,700.0	7,700.8	7,700.7	10.5	2.7	-80.30	27.1	-158.4	160.7	147.5	13.23	12.147	
7,800.0	7,800.0	7,801.0	7,800.9	10.6	2.7	-80.24	27.3	-158.6	160.9	147.5	13.37	12.032	
7,900.0	7,900.0	7,900.7	7,900.7	10.8	2.8	-80.16	27.5	-158.7	161.1	147.6	13.51	11.920	
8,000.0	8,000.0	8,000.8	8,000.7	10.9	2.8	-80.18	27.5	-159.0	161.3	147.7	13.65	11.820	
8,100.0	8,100.0	8,101.9	8,101.8	11.0	2.8	-80.24	27.3	-158.9	161.2	147.5	13.77	11.705	
8,200.0	8,200.0	8,201.9	8,201.8	11.1	2.8	-80.32	27.0	-158.5	160.8	146.9	13.90	11.568	
8,300.0	8,300.0	8,301.8	8,301.7	11.3	2.8	-80.44	26.6	-158.2	160.4	146.4	14.03	11.436	
8,400.0	8,400.0	8,401.4	8,401.3	11.4	2.8	-80.57	26.2	-158.0	160.2	146.0	14.16	11.314	
8,500.0	8,500.0	8,501.5	8,501.4	11.5	2.8	-80.74	25.8	-157.9	160.0	145.7	14.28	11.200	
8,600.0	8,600.0	8,601.6	8,601.5	11.6	2.8	-80.89	25.3	-157.8	159.8	145.4	14.41	11.084	
8,700.0	8,700.0	8,701.3	8,701.2	11.8	2.8	-80.98	25.0	-157.6	159.6	145.0	14.54	10.974	
8,722.5	8,722.5	8,723.9	8,723.8	11.8	2.8	-81.00	25.0	-157.6	159.6	145.0	14.57	10.950	
8,724.1	8,724.1	8,725.5	8,725.4	11.8	2.8	118.30	25.0	-157.6	159.6	145.0	14.57	10.949	
8,725.0	8,725.0	8,726.4	8,726.4	11.8	2.8	118.31	25.0	-157.6	159.6	145.0	14.57	10.949 ES	
8,750.0	8,750.0	8,751.5	8,751.5	11.8	2.8	118.49	24.9	-157.6	159.9	145.3	14.60	10.955	
8,775.0	8,774.9	8,776.6	8,776.5	11.8	2.8	119.02	24.8	-157.5	160.8	146.2	14.66	10.972	
8,800.0	8,799.7	8,801.5	8,801.4	11.8	2.8	119.85	24.7	-157.4	162.4	147.7	14.76	11.001	
8,825.0	8,824.2	8,825.9	8,825.8	11.8	2.8	120.96	24.5	-157.4	164.7	149.8	14.91	11.051	
8,850.0	8,848.5	8,850.0	8,849.9	11.8	2.8	122.29	24.4	-157.4	167.9	152.8	15.08	11.130	
8,875.0	8,872.4	8,873.8	8,873.7	11.8	2.8	123.82	24.3	-157.4	171.9	156.6	15.29	11.245	

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

Company:	COG OPERATING LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #10H
Project:	LEA COUNTY, NM	**TVD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Reference Site:	AVALON SHALE	**MD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #10H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design DEEP BSS - WINDWARD FEDERAL #3H - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 100-GYD_DP_MS, 9931-MWD — **Offset Well Error:** 2.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
8,900.0	8,895.9	8,897.2	8,897.1	11.9	2.8	125.46	24.2	-157.4	176.9	161.4	15.51	11.403	
8,925.0	8,919.0	8,920.2	8,920.1	11.9	2.8	127.18	24.1	-157.4	182.9	167.2	15.76	11.608	
8,950.0	8,941.5	8,942.7	8,942.6	11.9	2.8	128.91	23.9	-157.5	190.1	174.1	16.02	11.865	
8,975.0	8,963.4	8,964.6	8,964.5	11.9	2.8	130.59	23.8	-157.5	198.4	182.1	16.29	12.177	
9,000.0	8,984.6	8,985.9	8,985.8	11.9	2.8	132.19	23.6	-157.6	207.9	191.3	16.57	12.544	
9,025.0	9,005.2	9,006.5	9,006.4	11.9	2.8	133.65	23.5	-157.7	218.5	201.7	16.85	12.968	
9,050.0	9,024.9	9,026.1	9,026.0	12.0	2.8	134.95	23.3	-157.8	230.5	213.3	17.14	13.448	
9,075.0	9,043.8	9,044.9	9,044.8	12.0	2.8	136.06	23.2	-157.9	243.6	226.1	17.42	13.983	
9,100.0	9,061.9	9,062.8	9,062.7	12.0	2.8	136.97	23.1	-157.9	257.9	240.2	17.70	14.570	
9,125.0	9,079.0	9,079.8	9,079.7	12.1	2.8	137.65	23.0	-158.0	273.3	255.3	17.97	15.207	
9,150.0	9,095.1	9,095.7	9,095.6	12.1	2.8	138.07	23.0	-158.1	289.8	271.6	18.24	15.890	
9,175.0	9,110.3	9,111.1	9,111.0	12.1	2.8	138.28	23.0	-158.2	307.4	288.9	18.50	16.617	
9,200.0	9,124.3	9,125.7	9,125.5	12.2	2.8	138.21	22.9	-158.2	325.9	307.1	18.75	17.382	
9,225.0	9,137.3	9,139.1	9,139.0	12.2	2.8	137.81	22.8	-158.3	345.2	326.2	18.99	18.184	
9,250.0	9,149.1	9,151.4	9,151.3	12.2	2.8	137.03	22.7	-158.3	365.4	346.2	19.21	19.020	
9,275.0	9,159.7	9,162.6	9,162.5	12.3	2.8	135.80	22.7	-158.4	386.3	366.9	19.42	19.887	
9,300.0	9,169.2	9,172.6	9,172.5	12.3	2.8	134.02	22.6	-158.4	407.9	388.2	19.62	20.783	
9,325.0	9,177.4	9,181.3	9,181.2	12.4	2.8	131.59	22.5	-158.4	430.0	410.2	19.81	21.705	
9,350.0	9,184.4	9,188.8	9,188.7	12.5	2.8	128.32	22.4	-158.4	452.7	432.7	19.99	22.649	
9,375.0	9,190.1	9,195.1	9,195.0	12.5	2.8	123.99	22.4	-158.4	475.8	455.7	20.15	23.611	
9,400.0	9,194.5	9,200.0	9,199.9	12.6	2.8	118.34	22.3	-158.4	499.3	479.0	20.31	24.585	
9,425.0	9,197.6	9,203.4	9,203.3	12.7	2.8	111.00	22.3	-158.4	523.1	502.6	20.46	25.566	
9,450.0	9,199.5	9,205.5	9,205.4	12.8	2.8	101.83	22.2	-158.4	547.1	526.5	20.61	26.543	
9,472.6	9,200.0	9,206.3	9,206.2	13.0	2.8	92.04	22.2	-158.4	568.9	548.2	20.75	27.415	
9,500.0	9,200.0	9,206.6	9,206.5	13.2	2.8	92.01	22.2	-158.4	595.5	574.5	20.94	28.433	
9,600.0	9,200.0	9,207.7	9,207.6	14.1	2.8	91.89	22.2	-158.4	691.7	669.8	21.91	31.574	
9,700.0	9,200.0	9,208.8	9,208.7	15.4	2.8	91.78	22.2	-158.4	787.2	764.0	23.17	33.975	
9,800.0	9,200.0	9,210.0	9,209.9	16.7	2.8	91.68	22.2	-158.4	881.7	857.2	24.54	35.930	
9,900.0	9,200.0	9,211.3	9,211.1	18.1	2.8	91.59	22.2	-158.4	975.2	949.2	25.93	37.615	
9,944.7	9,200.0	9,211.8	9,211.7	18.7	2.8	91.56	22.2	-158.4	1,016.5	990.0	26.54	38.302	
10,000.0	9,200.0	9,212.5	9,212.4	19.5	2.8	91.66	22.2	-158.4	1,067.9	1,040.5	27.30	39.110	
10,100.0	9,200.0	9,213.8	9,213.7	20.9	2.8	91.85	22.1	-158.4	1,161.5	1,132.8	28.73	40.435	
10,200.0	9,200.0	9,215.2	9,215.1	22.4	2.8	92.05	22.1	-158.4	1,256.2	1,226.0	30.19	41.607	
10,300.0	9,200.0	9,216.5	9,216.4	23.9	2.8	92.25	22.1	-158.4	1,351.6	1,319.9	31.69	42.650	
10,400.0	9,200.0	9,217.9	9,217.8	25.4	2.8	92.45	22.1	-158.4	1,447.6	1,414.4	33.21	43.585	
10,500.0	9,200.0	11,848.6	10,627.4	26.9	25.9	165.52	-1,511.3	-125.8	1,473.7	1,420.9	52.82	27.901	
10,600.0	9,200.0	11,939.7	10,626.7	28.5	27.4	165.72	-1,602.2	-119.7	1,471.4	1,415.5	55.90	26.322	
10,700.0	9,200.0	12,031.7	10,626.3	30.1	28.9	165.92	-1,694.0	-113.5	1,469.5	1,410.5	59.01	24.902	
10,800.0	9,200.0	12,123.2	10,626.6	31.7	30.5	166.13	-1,785.2	-107.5	1,468.4	1,406.3	62.13	23.636	
10,900.0	9,200.0	12,253.4	10,626.0	33.2	32.7	166.36	-1,915.2	-100.2	1,466.9	1,401.0	65.90	22.260	
11,000.0	9,200.0	12,334.7	10,624.6	34.8	34.0	166.51	-1,996.4	-95.4	1,464.1	1,395.2	68.86	21.262	
11,100.0	9,200.0	12,423.2	10,625.3	36.4	35.5	166.75	-2,084.6	-88.7	1,463.3	1,391.3	71.96	20.335	
11,200.0	9,200.0	12,589.0	10,622.4	38.1	38.3	167.17	-2,249.9	-75.7	1,459.7	1,383.4	76.37	19.114	
11,300.0	9,200.0	12,656.0	10,620.3	39.7	39.4	167.34	-2,316.6	-70.4	1,455.3	1,376.2	79.12	18.394	
11,376.0	9,200.0	12,686.8	10,620.2	40.9	40.0	167.42	-2,347.3	-67.9	1,454.0	1,373.1	80.87	17.980	
11,400.0	9,200.0	12,695.4	10,620.4	41.3	40.1	167.45	-2,355.8	-67.2	1,454.1	1,372.7	81.40	17.863	
11,500.0	9,200.0	12,750.0	10,623.9	42.9	41.0	167.66	-2,410.1	-62.1	1,457.7	1,373.8	83.95	17.364	
11,600.0	9,200.0	12,788.4	10,627.8	44.5	41.7	167.82	-2,448.1	-58.5	1,464.7	1,378.5	86.23	16.987	
11,700.0	9,200.0	12,893.6	10,638.9	46.2	43.5	168.23	-2,552.4	-49.5	1,473.5	1,383.9	89.64	16.439	
11,800.0	9,200.0	13,029.9	10,649.2	47.8	45.8	168.50	-2,688.2	-43.5	1,480.2	1,386.6	93.56	15.821	
11,900.0	9,200.0	13,126.0	10,655.3	49.4	47.4	168.62	-2,784.0	-40.9	1,485.9	1,389.1	96.79	15.352	
12,000.0	9,200.0	13,265.1	10,661.5	51.1	49.7	168.60	-2,922.9	-41.5	1,490.5	1,389.8	100.72	14.799	

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

Company:	COG OPERATING LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #10H
Project:	LEA COUNTY, NM	**TVD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Reference Site:	AVALON SHALE	**MD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #10H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design DEEP BSS - WINDWARD FEDERAL #3H - OWB - ACTUAL WELLPATH — Offset Site Error: 0.0 usft

Survey Program: 100-GYD_DP_MS, 9931-MWD — Offset Well Error: 2.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
12,100.0	9,200.0	13,382.0	10,663.4	52.7	51.6	168.43	-3,039.7	-45.6	1,492.9	1,388.7	104.26	14.319	
12,200.0	9,200.0	13,501.9	10,663.9	54.3	53.5	168.19	-3,159.5	-51.4	1,494.5	1,386.7	107.84	13.858	
12,300.0	9,200.0	13,651.8	10,659.3	56.0	55.9	167.87	-3,309.1	-57.7	1,491.9	1,380.0	111.92	13.330	
12,400.0	9,200.0	13,744.7	10,657.2	57.6	57.5	167.84	-3,402.0	-57.3	1,489.9	1,374.8	115.10	12.944	
12,500.0	9,200.0	13,825.1	10,656.0	59.3	58.8	167.88	-3,482.5	-55.5	1,488.1	1,370.0	118.08	12.602	
12,531.6	9,200.0	13,845.5	10,656.0	59.8	59.2	167.90	-3,502.9	-54.9	1,488.0	1,369.1	118.94	12.510	
12,600.0	9,200.0	13,892.9	10,656.6	60.9	59.9	167.94	-3,550.2	-53.6	1,488.5	1,367.7	120.86	12.316	
12,700.0	9,200.0	13,979.1	10,658.8	62.6	61.4	168.03	-3,636.3	-51.0	1,490.5	1,366.5	123.95	12.025	
12,800.0	9,200.0	14,256.0	10,650.5	64.2	66.1	168.56	-3,912.2	-33.2	1,485.5	1,355.2	130.26	11.404	
12,900.0	9,200.0	14,312.8	10,646.7	65.9	67.0	168.69	-3,968.7	-28.7	1,477.5	1,344.6	132.88	11.119	
13,000.0	9,200.0	14,392.9	10,643.8	67.5	68.4	168.94	-4,048.4	-21.0	1,472.0	1,336.2	135.89	10.833	
13,100.0	9,200.0	14,521.3	10,638.1	69.2	70.6	169.37	-4,176.0	-7.9	1,465.9	1,326.1	139.73	10.491	
13,200.0	9,200.0	14,595.4	10,634.3	70.8	71.8	169.59	-4,249.6	-0.8	1,459.3	1,316.7	142.64	10.231	
13,300.0	9,200.0	14,680.3	10,631.6	72.5	73.3	169.80	-4,334.3	5.6	1,454.8	1,309.1	145.73	9.983	
13,400.0	9,200.0	14,790.5	10,627.6	74.1	75.1	170.05	-4,444.1	13.7	1,450.1	1,300.9	149.25	9.716	
13,500.0	9,200.0	14,900.1	10,622.9	75.8	77.0	170.32	-4,553.3	22.1	1,444.7	1,292.0	152.76	9.457	
13,600.0	9,200.0	15,003.3	10,618.2	77.4	78.8	170.60	-4,655.9	30.9	1,438.9	1,282.7	156.17	9.214	
13,700.0	9,200.0	15,065.8	10,615.9	79.1	79.8	170.76	-4,718.3	35.6	1,434.2	1,275.3	158.88	9.027	
13,800.0	9,200.0	15,148.6	10,614.7	80.7	81.2	170.89	-4,801.0	39.9	1,431.9	1,270.0	161.94	8.843	
13,900.0	9,200.0	15,236.2	10,613.3	82.4	82.7	171.03	-4,888.4	44.1	1,429.9	1,264.8	165.06	8.662	
13,956.2	9,200.0	15,274.6	10,613.3	83.3	83.3	171.08	-4,926.8	45.8	1,429.5	1,262.9	166.64	8.578	
14,000.0	9,200.0	15,311.2	10,613.7	84.0	84.0	171.14	-4,963.4	47.4	1,429.7	1,261.7	167.98	8.511	
14,100.0	9,200.0	15,420.3	10,614.7	85.7	85.8	171.29	-5,072.3	52.0	1,430.1	1,258.6	171.47	8.340	
14,200.0	9,200.0	15,531.9	10,614.5	87.3	87.7	171.47	-5,183.9	57.3	1,429.2	1,254.2	175.01	8.167	
14,300.0	9,200.0	15,637.3	10,614.0	89.0	89.4	171.64	-5,289.1	62.3	1,428.3	1,249.8	178.44	8.004	
14,400.0	9,200.0	15,733.5	10,613.3	90.6	91.1	171.78	-5,385.2	66.7	1,426.9	1,245.2	181.71	7.853	
14,500.0	9,200.0	15,834.5	10,613.0	92.3	92.8	171.96	-5,486.1	72.1	1,426.0	1,240.9	185.07	7.705	
14,600.0	9,200.0	15,942.3	10,612.2	94.0	94.6	172.16	-5,593.7	77.9	1,424.6	1,236.1	188.55	7.556	
14,700.0	9,200.0	16,047.6	10,610.9	95.6	96.4	172.35	-5,698.9	83.6	1,422.8	1,230.8	191.99	7.411	
14,800.0	9,200.0	16,154.2	10,609.4	97.3	98.2	172.54	-5,805.2	89.4	1,420.7	1,225.3	195.44	7.269	
14,900.0	9,200.0	16,263.3	10,606.2	98.9	100.0	172.73	-5,914.2	95.4	1,417.1	1,218.2	198.94	7.123	
15,000.0	9,200.0	16,330.4	10,605.5	100.6	101.1	172.90	-5,981.0	100.2	1,415.3	1,213.6	201.74	7.016	
15,100.0	9,200.0	16,434.9	10,605.2	102.3	102.9	173.20	-6,085.3	108.4	1,414.1	1,208.9	205.17	6.892	
15,151.9	9,200.0	16,472.2	10,605.3	103.1	103.6	173.31	-6,122.4	111.3	1,413.8	1,207.1	206.67	6.841	
15,200.0	9,200.0	16,512.0	10,605.8	103.9	104.2	173.42	-6,162.1	114.5	1,414.1	1,205.9	208.15	6.794	
15,300.0	9,200.0	16,581.4	10,607.7	105.6	105.4	173.64	-6,231.3	120.1	1,415.9	1,204.9	210.99	6.711	
15,400.0	9,200.0	16,676.7	10,611.6	107.2	107.0	173.95	-6,326.1	128.2	1,419.0	1,204.8	214.27	6.623	
15,500.0	9,200.0	16,765.9	10,615.3	108.9	108.6	174.25	-6,414.9	135.9	1,422.4	1,204.9	217.45	6.541	
15,600.0	9,200.0	16,891.2	10,620.5	110.5	110.7	174.69	-6,539.5	147.2	1,425.9	1,204.6	221.25	6.445	
15,700.0	9,200.0	17,026.2	10,621.5	112.2	113.0	174.91	-6,674.4	153.6	1,426.0	1,200.8	225.19	6.333	
15,800.0	9,200.0	17,141.7	10,621.4	113.9	114.9	175.12	-6,789.8	159.7	1,425.6	1,196.8	228.80	6.231	
15,900.0	9,200.0	17,265.0	10,618.7	115.5	117.0	175.28	-6,912.9	164.7	1,423.1	1,190.6	232.53	6.120	
16,000.0	9,200.0	17,359.0	10,616.2	117.2	118.6	175.39	-7,006.8	168.4	1,420.2	1,184.4	235.77	6.024	
16,100.0	9,200.0	17,439.6	10,614.9	118.8	119.9	175.51	-7,087.3	172.0	1,418.3	1,179.5	238.78	5.940	
16,200.0	9,200.0	17,573.8	10,612.1	120.5	122.2	175.69	-7,221.4	177.6	1,415.9	1,173.3	242.70	5.834	
16,300.0	9,200.0	17,682.6	10,607.8	122.2	124.0	175.81	-7,330.0	181.7	1,411.8	1,165.6	246.18	5.735	
16,400.0	9,200.0	17,776.2	10,604.2	123.8	125.6	175.95	-7,423.4	186.1	1,407.7	1,158.3	249.42	5.644	
16,500.0	9,200.0	17,875.3	10,600.9	125.5	127.3	176.11	-7,522.4	191.0	1,404.1	1,151.3	252.75	5.555	
16,600.0	9,200.0	17,971.1	10,597.5	127.1	128.9	176.26	-7,617.9	195.5	1,400.2	1,144.2	256.02	5.469	
16,700.0	9,200.0	18,059.9	10,595.1	128.8	130.4	176.38	-7,706.6	199.3	1,397.3	1,138.1	259.18	5.391	
16,800.0	9,200.0	18,138.3	10,593.4	130.5	131.7	176.47	-7,785.0	202.2	1,395.1	1,132.9	262.15	5.322	
16,835.8	9,200.0	18,159.5	10,593.3	131.1	132.0	176.49	-7,806.2	202.9	1,394.9	1,131.8	263.10	5.302	

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

Company:	COG OPERATING LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #10H
Project:	LEA COUNTY, NM	**TVD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Reference Site:	AVALON SHALE	**MD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #10H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design DEEP BSS - WINDWARD FEDERAL #3H - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 100-GYD_DP_MS, 9931-MWD — **Offset Well Error:** 2.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
16,900.0	9,200.0	18,205.0	10,593.9	132.1	132.8	176.53	-7,851.7	204.1	1,395.4	1,130.5	264.93	5.267	
17,000.0	9,200.0	18,299.0	10,595.6	133.8	134.4	176.60	-7,945.6	206.4	1,397.2	1,129.0	268.16	5.210	
17,100.0	9,200.0	18,393.0	10,597.3	135.5	135.9	176.68	-8,039.6	208.9	1,398.9	1,127.5	271.40	5.154	
17,200.0	9,200.0	18,500.3	10,599.5	137.1	137.7	176.78	-8,146.8	212.1	1,400.8	1,126.0	274.86	5.097	
17,300.0	9,200.0	18,623.1	10,600.7	138.8	139.8	176.92	-8,269.5	216.4	1,401.6	1,123.0	278.58	5.031	
17,400.0	9,200.0	18,737.6	10,600.2	140.4	141.7	177.06	-8,383.9	220.7	1,401.0	1,118.8	282.16	4.965	
17,500.0	9,200.0	18,850.7	10,598.7	142.1	143.6	177.22	-8,496.9	225.4	1,399.5	1,113.8	285.73	4.898	
17,600.0	9,200.0	18,928.7	10,597.8	143.8	144.9	177.33	-8,574.8	228.8	1,398.2	1,109.5	288.70	4.843	
17,620.9	9,200.0	18,944.1	10,597.8	144.1	145.2	177.36	-8,590.2	229.6	1,398.1	1,108.8	289.31	4.833	
17,700.0	9,200.0	19,014.6	10,598.2	145.4	146.4	177.49	-8,660.7	233.3	1,398.5	1,106.7	291.81	4.792	
17,800.0	9,200.0	19,115.6	10,599.1	147.1	148.1	177.74	-8,761.4	240.0	1,399.2	1,104.0	295.19	4.740	
17,900.0	9,200.0	19,232.5	10,599.5	148.8	150.1	178.04	-8,878.0	248.3	1,399.2	1,100.4	298.84	4.682	
18,000.0	9,200.0	19,356.6	10,597.6	150.4	152.2	178.36	-9,001.8	257.0	1,397.5	1,094.9	302.61	4.618	
18,100.0	9,200.0	19,453.0	10,595.8	152.1	153.8	178.63	-9,097.9	264.4	1,395.4	1,089.5	305.91	4.561	
18,200.0	9,200.0	19,547.6	10,593.9	153.7	155.4	178.93	-9,192.1	272.3	1,393.2	1,084.0	309.18	4.506	
18,277.5	9,200.0	19,602.2	10,593.5	155.0	156.4	179.09	-9,246.5	276.8	1,392.6	1,081.2	311.40	4.472	
18,300.0	9,200.0	19,619.4	10,593.6	155.4	156.7	179.15	-9,263.7	278.1	1,392.6	1,080.6	312.07	4.463	
18,400.0	9,200.0	19,727.0	10,593.5	157.1	158.5	179.46	-9,371.0	286.6	1,392.5	1,076.9	315.57	4.413	
18,407.6	9,200.0	19,732.6	10,593.5	157.2	158.6	179.48	-9,376.5	287.0	1,392.5	1,076.7	315.79	4.409	
18,500.0	9,200.0	19,804.0	10,594.2	158.7	159.8	179.68	-9,447.7	292.4	1,393.3	1,074.8	318.54	4.374	
18,600.0	9,200.0	19,943.0	10,593.2	160.4	162.2	-179.98	-9,586.4	301.6	1,392.3	1,069.7	322.56	4.316	
18,700.0	9,200.0	20,040.2	10,592.6	162.0	163.8	-179.83	-9,683.5	306.1	1,391.6	1,065.7	325.86	4.270	
18,800.0	9,200.0	20,184.5	10,588.8	163.7	166.2	-179.58	-9,827.6	313.1	1,389.0	1,059.1	329.95	4.210	
18,900.0	9,200.0	20,305.0	10,582.6	165.4	168.3	-179.36	-9,947.7	319.4	1,383.8	1,050.2	333.65	4.148	
19,000.0	9,200.0	20,366.0	10,579.1	167.0	169.3	-179.24	-10,008.5	322.7	1,378.7	1,042.3	336.34	4.099	
19,039.9	9,200.0	20,366.0	10,579.1	167.7	169.3	-179.24	-10,008.5	322.7	1,378.1	1,041.1	337.00	4.089	
19,100.0	9,200.0	20,366.0	10,579.1	168.7	169.3	-179.24	-10,008.5	322.7	1,379.4	1,041.4	338.00	4.081 SF	
19,200.0	9,200.0	20,366.0	10,579.1	170.4	169.3	-179.24	-10,008.5	322.7	1,387.4	1,047.7	339.66	4.085	
19,300.0	9,200.0	20,366.0	10,579.1	172.0	169.3	-179.24	-10,008.5	322.7	1,402.4	1,061.1	341.33	4.109	
19,330.2	9,200.0	20,366.0	10,579.1	172.5	169.3	-179.24	-10,008.5	322.7	1,408.3	1,066.5	341.83	4.120	

Company:	COG OPERATING LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #10H
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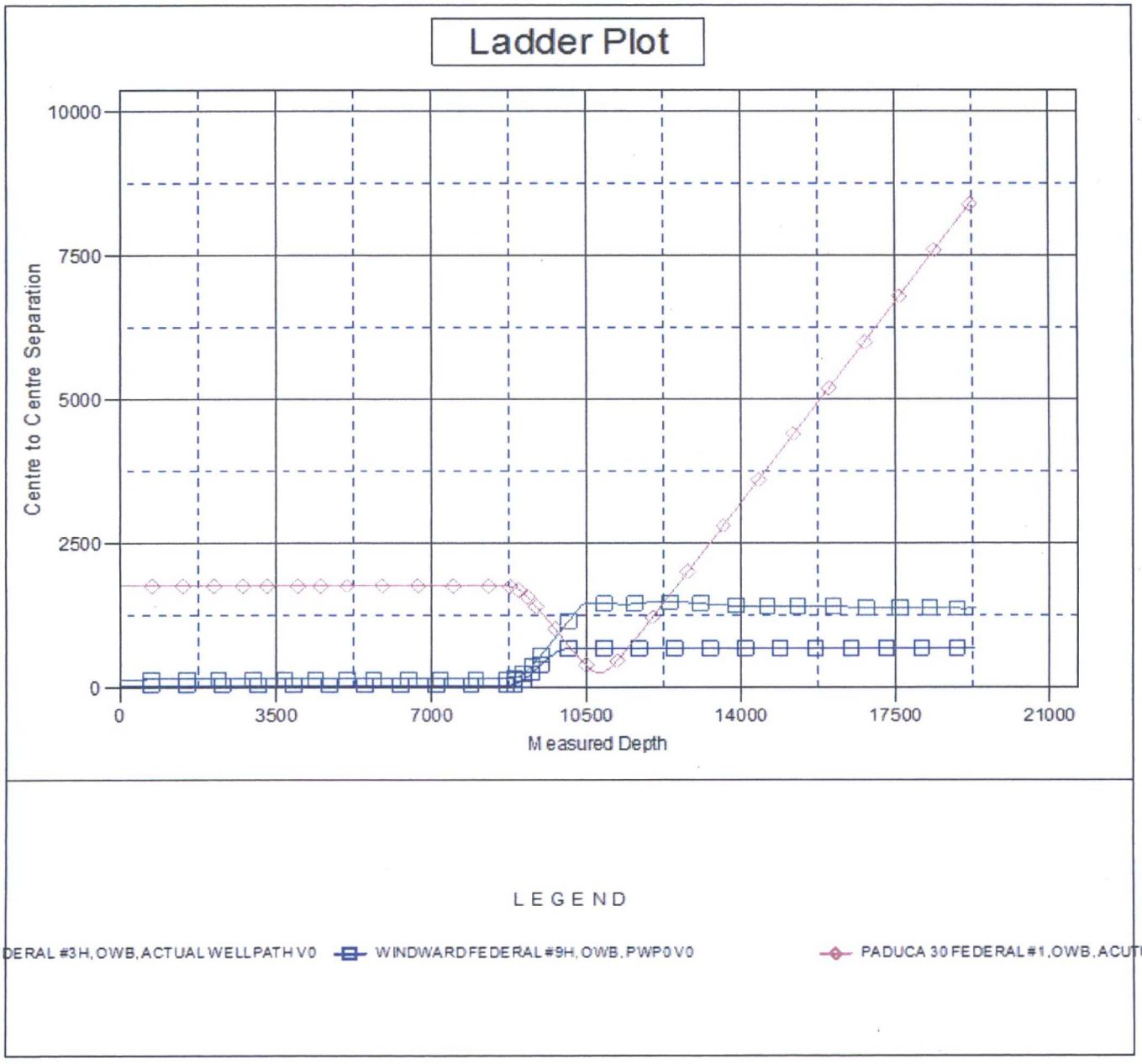
Reference Site:	AVALON SHALE	**MD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #10H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to RKB=3550.8+26 @ 3576.8usft (McVa
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: WINDWARD FEDERAL #10H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.33°



Company:	COG OPERATING LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #10H
Project:	LEA COUNTY, NM	**TVD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Reference Site:	AVALON SHALE	**MD Reference:**	RKB=3550.8+26 @ 3576.8usft (McVay 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #10H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	3.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to RKB=3550.8+26 @ 3576.8usft (McVa
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: WINDWARD FEDERAL #10H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.33°