COG PRODUCTION LLC

LEA COUNTY, NM
AVALON SHALE
WINDWARD FEDERAL #6H

OWB

Plan: PWP0

Standard Planning Report - Geographic

19 October, 2016

COG PRODUCTION LLC

Planning Report - Geographic

Database:	EDM_Users	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Company:	COG PRODUCTION LLC	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Project:	LEA COUNTY, NM	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site:	AVALON SHALE	**North Reference:**	Grid
Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	PWP0		

Project	LEA COUNTY, NM		
Map System:	US State Plane 1927 (Exact solution)	**System Datum:**	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	AVALON SHALE				
Site Position:		**Northing:**	419,780.50 usft	**Latitude:**	32° 9' 6.058 N
From:	Map	**Easting:**	741,734.30 usft	**Longitude:**	103° 33' 8.114 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.42 °

Well	WINDWARD FEDERAL #6H					
Well Position	**+N/-S**	0.0 usft	**Northing:**	435,165.50 usft	**Latitude:**	32° 11' 41.651 N
	+E/-W	0.0 usft	**Easting:**	689,517.60 usft	**Longitude:**	103° 43' 14.453 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**	0.0 usft	**Ground Level:**	3,538.3 usft

Wellbore	OWB			
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	WMM2015	6/22/2016	7.14	60.02	47,997

Design	PWP0				
Audit Notes:					
Version:		**Phase:**	PLAN	**Tie On Depth:**	0.0
Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**	
	9,197.0	0.0	0.0	177.22	

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
8,719.5	0.00	0.01	8,719.5	0.0	0.0	0.00	0.00	0.00	0.01	
9,469.5	90.00	149.70	9,197.0	-412.2	240.9	12.00	12.00	0.00	149.70	
10,218.2	90.00	179.65	9,197.0	-1,126.1	436.5	4.00	0.00	4.00	90.00	
19,208.6	90.00	179.65	9,197.0	-10,116.4	491.7	0.00	0.00	0.00	0.00	PBHL-Windward

Database:	EDM_Users	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Company:	COG PRODUCTION LLC	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Project:	LEA COUNTY, NM	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site:	AVALON SHALE	**North Reference:**	Grid
Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	PWP0		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
100.0	0.00	0.00	100.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
200.0	0.00	0.00	200.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
300.0	0.00	0.00	300.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
400.0	0.00	0.00	400.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
500.0	0.00	0.00	500.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
600.0	0.00	0.00	600.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
700.0	0.00	0.00	700.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
800.0	0.00	0.00	800.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
900.0	0.00	0.00	900.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
1,000.0	0.00	0.00	1,000.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
1,100.0	0.00	0.00	1,100.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
1,200.0	0.00	0.00	1,200.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
1,300.0	0.00	0.00	1,300.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
1,400.0	0.00	0.00	1,400.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
1,500.0	0.00	0.00	1,500.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
1,600.0	0.00	0.00	1,600.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
1,700.0	0.00	0.00	1,700.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
1,800.0	0.00	0.00	1,800.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
1,900.0	0.00	0.00	1,900.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
2,000.0	0.00	0.00	2,000.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
2,100.0	0.00	0.00	2,100.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
2,200.0	0.00	0.00	2,200.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
2,300.0	0.00	0.00	2,300.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
2,400.0	0.00	0.00	2,400.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
2,500.0	0.00	0.00	2,500.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
2,600.0	0.00	0.00	2,600.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
2,700.0	0.00	0.00	2,700.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
2,800.0	0.00	0.00	2,800.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
2,900.0	0.00	0.00	2,900.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
3,000.0	0.00	0.00	3,000.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
3,100.0	0.00	0.00	3,100.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
3,200.0	0.00	0.00	3,200.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
3,300.0	0.00	0.00	3,300.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
3,400.0	0.00	0.00	3,400.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
3,500.0	0.00	0.00	3,500.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
3,600.0	0.00	0.00	3,600.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
3,700.0	0.00	0.00	3,700.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
3,800.0	0.00	0.00	3,800.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
3,900.0	0.00	0.00	3,900.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
4,000.0	0.00	0.00	4,000.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
4,100.0	0.00	0.00	4,100.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
4,200.0	0.00	0.00	4,200.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
4,300.0	0.00	0.00	4,300.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
4,400.0	0.00	0.00	4,400.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
4,500.0	0.00	0.00	4,500.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
4,600.0	0.00	0.00	4,600.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
4,700.0	0.00	0.00	4,700.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
4,800.0	0.00	0.00	4,800.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
4,900.0	0.00	0.00	4,900.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
5,000.0	0.00	0.00	5,000.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
5,100.0	0.00	0.00	5,100.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
5,200.0	0.00	0.00	5,200.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W

Database:	EDM_Users	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Company:	COG PRODUCTION LLC	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Project:	LEA COUNTY, NM	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site:	AVALON SHALE	**North Reference:**	Grid
Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	PWP0		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,300.0	0.00	0.00	5,300.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
5,400.0	0.00	0.00	5,400.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
5,500.0	0.00	0.00	5,500.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
5,600.0	0.00	0.00	5,600.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
5,700.0	0.00	0.00	5,700.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
5,800.0	0.00	0.00	5,800.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
5,900.0	0.00	0.00	5,900.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
6,000.0	0.00	0.00	6,000.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
6,100.0	0.00	0.00	6,100.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
6,200.0	0.00	0.00	6,200.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
6,300.0	0.00	0.00	6,300.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
6,400.0	0.00	0.00	6,400.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
6,500.0	0.00	0.00	6,500.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
6,600.0	0.00	0.00	6,600.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
6,700.0	0.00	0.00	6,700.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
6,800.0	0.00	0.00	6,800.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
6,900.0	0.00	0.00	6,900.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
7,000.0	0.00	0.00	7,000.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
7,100.0	0.00	0.00	7,100.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
7,200.0	0.00	0.00	7,200.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
7,300.0	0.00	0.00	7,300.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
7,400.0	0.00	0.00	7,400.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
7,500.0	0.00	0.00	7,500.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
7,600.0	0.00	0.00	7,600.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
7,700.0	0.00	0.00	7,700.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
7,800.0	0.00	0.00	7,800.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
7,900.0	0.00	0.00	7,900.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
8,000.0	0.00	0.00	8,000.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
8,100.0	0.00	0.00	8,100.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
8,200.0	0.00	0.00	8,200.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
8,300.0	0.00	0.00	8,300.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
8,400.0	0.00	0.00	8,400.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
8,500.0	0.00	0.00	8,500.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
8,600.0	0.00	0.00	8,600.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
8,700.0	0.00	0.00	8,700.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
8,719.5	0.00	0.01	8,719.5	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
8,800.0	9.66	149.70	8,799.6	-5.8	3.4	435,159.65	689,521.01	32° 11' 41.593 N	103° 43' 14.414 W
8,900.0	21.66	149.70	8,895.7	-29.1	17.0	435,136.39	689,534.60	32° 11' 41.362 N	103° 43' 14.257 W
9,000.0	33.66	149.70	8,984.1	-69.1	40.4	435,096.38	689,557.98	32° 11' 40.964 N	103° 43' 13.987 W
9,100.0	45.66	149.70	9,061.0	-124.1	72.5	435,041.38	689,590.13	32° 11' 40.418 N	103° 43' 13.617 W
9,200.0	57.66	149.70	9,122.9	-191.7	112.0	434,973.78	689,629.63	32° 11' 39.747 N	103° 43' 13.162 W
9,300.0	69.66	149.70	9,167.2	-269.0	157.2	434,896.55	689,674.76	32° 11' 38.980 N	103° 43' 12.642 W
9,400.0	81.66	149.70	9,191.9	-352.4	206.0	434,813.05	689,723.55	32° 11' 38.151 N	103° 43' 12.080 W
9,469.5	90.00	149.70	9,197.0	-412.2	240.9	434,753.26	689,758.49	32° 11' 37.558 N	103° 43' 11.677 W
9,500.0	90.00	150.92	9,197.0	-438.7	256.0	434,726.76	689,773.60	32° 11' 37.294 N	103° 43' 11.503 W
9,600.0	90.00	154.92	9,197.0	-527.8	301.5	434,637.74	689,819.11	32° 11' 36.411 N	103° 43' 10.979 W
9,700.0	90.00	158.92	9,197.0	-619.7	340.7	434,545.77	689,858.30	32° 11' 35.499 N	103° 43' 10.529 W
9,800.0	90.00	162.92	9,197.0	-714.2	373.4	434,451.28	689,890.99	32° 11' 34.562 N	103° 43' 10.155 W
9,900.0	90.00	166.92	9,197.0	-810.8	399.4	434,354.74	689,917.00	32° 11' 33.605 N	103° 43' 9.859 W
10,000.0	90.00	170.92	9,197.0	-908.9	418.6	434,256.63	689,936.21	32° 11' 32.633 N	103° 43' 9.642 W
10,100.0	90.00	174.92	9,197.0	-1,008.1	430.9	434,157.41	689,948.53	32° 11' 31.650 N	103° 43' 9.505 W
10,200.0	90.00	178.92	9,197.0	-1,107.9	436.3	434,057.57	689,953.91	32° 11' 30.662 N	103° 43' 9.449 W
10,218.2	90.00	179.65	9,197.0	-1,126.1	436.5	434,039.36	689,954.13	32° 11' 30.482 N	103° 43' 9.448 W

Database:	EDM_Users	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Company:	COG PRODUCTION LLC	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Project:	LEA COUNTY, NM	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site:	AVALON SHALE	**North Reference:**	Grid
Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	PWP0		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,300.0	90.00	179.65	9,197.0	-1,207.9	437.0	433,957.58	689,954.64	32° 11' 29.672 N	103° 43' 9.447 W
10,400.0	90.00	179.65	9,197.0	-1,307.9	437.7	433,857.58	689,955.25	32° 11' 28.683 N	103° 43' 9.447 W
10,500.0	90.00	179.65	9,197.0	-1,407.9	438.3	433,757.58	689,955.86	32° 11' 27.693 N	103° 43' 9.446 W
10,600.0	90.00	179.65	9,197.0	-1,507.9	438.9	433,657.58	689,956.48	32° 11' 26.704 N	103° 43' 9.446 W
10,700.0	90.00	179.65	9,197.0	-1,607.9	439.5	433,557.59	689,957.09	32° 11' 25.714 N	103° 43' 9.445 W
10,800.0	90.00	179.65	9,197.0	-1,707.9	440.1	433,457.59	689,957.70	32° 11' 24.724 N	103° 43' 9.445 W
10,900.0	90.00	179.65	9,197.0	-1,807.9	440.7	433,357.59	689,958.32	32° 11' 23.735 N	103° 43' 9.444 W
11,000.0	90.00	179.65	9,197.0	-1,907.9	441.3	433,257.59	689,958.93	32° 11' 22.745 N	103° 43' 9.444 W
11,100.0	90.00	179.65	9,197.0	-2,007.9	441.9	433,157.59	689,959.54	32° 11' 21.756 N	103° 43' 9.443 W
11,200.0	90.00	179.65	9,197.0	-2,107.9	442.6	433,057.59	689,960.16	32° 11' 20.766 N	103° 43' 9.443 W
11,300.0	90.00	179.65	9,197.0	-2,207.9	443.2	432,957.60	689,960.77	32° 11' 19.776 N	103° 43' 9.442 W
11,400.0	90.00	179.65	9,197.0	-2,307.9	443.8	432,857.60	689,961.39	32° 11' 18.787 N	103° 43' 9.442 W
11,500.0	90.00	179.65	9,197.0	-2,407.9	444.4	432,757.60	689,962.00	32° 11' 17.797 N	103° 43' 9.441 W
11,600.0	90.00	179.65	9,197.0	-2,507.9	445.0	432,657.60	689,962.61	32° 11' 16.808 N	103° 43' 9.441 W
11,700.0	90.00	179.65	9,197.0	-2,607.9	445.6	432,557.60	689,963.23	32° 11' 15.818 N	103° 43' 9.440 W
11,800.0	90.00	179.65	9,197.0	-2,707.9	446.2	432,457.61	689,963.84	32° 11' 14.828 N	103° 43' 9.440 W
11,900.0	90.00	179.65	9,197.0	-2,807.9	446.9	432,357.61	689,964.45	32° 11' 13.839 N	103° 43' 9.439 W
12,000.0	90.00	179.65	9,197.0	-2,907.9	447.5	432,257.61	689,965.07	32° 11' 12.849 N	103° 43' 9.439 W
12,100.0	90.00	179.65	9,197.0	-3,007.9	448.1	432,157.61	689,965.68	32° 11' 11.860 N	103° 43' 9.438 W
12,200.0	90.00	179.65	9,197.0	-3,107.9	448.7	432,057.61	689,966.29	32° 11' 10.870 N	103° 43' 9.438 W
12,300.0	90.00	179.65	9,197.0	-3,207.9	449.3	431,957.62	689,966.91	32° 11' 9.880 N	103° 43' 9.437 W
12,400.0	90.00	179.65	9,197.0	-3,307.9	449.9	431,857.62	689,967.52	32° 11' 8.891 N	103° 43' 9.437 W
12,500.0	90.00	179.65	9,197.0	-3,407.9	450.5	431,757.62	689,968.13	32° 11' 7.901 N	103° 43' 9.436 W
12,600.0	90.00	179.65	9,197.0	-3,507.9	451.2	431,657.62	689,968.75	32° 11' 6.912 N	103° 43' 9.436 W
12,700.0	90.00	179.65	9,197.0	-3,607.9	451.8	431,557.62	689,969.36	32° 11' 5.922 N	103° 43' 9.435 W
12,800.0	90.00	179.65	9,197.0	-3,707.9	452.4	431,457.62	689,969.97	32° 11' 4.932 N	103° 43' 9.435 W
12,900.0	90.00	179.65	9,197.0	-3,807.9	453.0	431,357.63	689,970.59	32° 11' 3.943 N	103° 43' 9.434 W
13,000.0	90.00	179.65	9,197.0	-3,907.9	453.6	431,257.63	689,971.20	32° 11' 2.953 N	103° 43' 9.434 W
13,100.0	90.00	179.65	9,197.0	-4,007.9	454.2	431,157.63	689,971.82	32° 11' 1.964 N	103° 43' 9.433 W
13,200.0	90.00	179.65	9,197.0	-4,107.9	454.8	431,057.63	689,972.43	32° 11' 0.974 N	103° 43' 9.433 W
13,300.0	90.00	179.65	9,197.0	-4,207.9	455.4	430,957.63	689,973.04	32° 10' 59.984 N	103° 43' 9.432 W
13,400.0	90.00	179.65	9,197.0	-4,307.9	456.1	430,857.64	689,973.66	32° 10' 58.995 N	103° 43' 9.432 W
13,500.0	90.00	179.65	9,197.0	-4,407.9	456.7	430,757.64	689,974.27	32° 10' 58.005 N	103° 43' 9.431 W
13,600.0	90.00	179.65	9,197.0	-4,507.9	457.3	430,657.64	689,974.88	32° 10' 57.016 N	103° 43' 9.431 W
13,700.0	90.00	179.65	9,197.0	-4,607.9	457.9	430,557.64	689,975.50	32° 10' 56.026 N	103° 43' 9.430 W
13,800.0	90.00	179.65	9,197.0	-4,707.9	458.5	430,457.64	689,976.11	32° 10' 55.036 N	103° 43' 9.430 W
13,900.0	90.00	179.65	9,197.0	-4,807.9	459.1	430,357.65	689,976.72	32° 10' 54.047 N	103° 43' 9.429 W
14,000.0	90.00	179.65	9,197.0	-4,907.9	459.7	430,257.65	689,977.34	32° 10' 53.057 N	103° 43' 9.429 W
14,100.0	90.00	179.65	9,197.0	-5,007.9	460.4	430,157.65	689,977.95	32° 10' 52.068 N	103° 43' 9.428 W
14,200.0	90.00	179.65	9,197.0	-5,107.8	461.0	430,057.65	689,978.56	32° 10' 51.078 N	103° 43' 9.428 W
14,300.0	90.00	179.65	9,197.0	-5,207.8	461.6	429,957.65	689,979.18	32° 10' 50.088 N	103° 43' 9.427 W
14,400.0	90.00	179.65	9,197.0	-5,307.8	462.2	429,857.65	689,979.79	32° 10' 49.099 N	103° 43' 9.427 W
14,500.0	90.00	179.65	9,197.0	-5,407.8	462.8	429,757.66	689,980.41	32° 10' 48.109 N	103° 43' 9.426 W
14,600.0	90.00	179.65	9,197.0	-5,507.8	463.4	429,657.66	689,981.02	32° 10' 47.120 N	103° 43' 9.426 W
14,700.0	90.00	179.65	9,197.0	-5,607.8	464.0	429,557.66	689,981.63	32° 10' 46.130 N	103° 43' 9.425 W
14,800.0	90.00	179.65	9,197.0	-5,707.8	464.7	429,457.66	689,982.25	32° 10' 45.140 N	103° 43' 9.425 W
14,900.0	90.00	179.65	9,197.0	-5,807.8	465.3	429,357.66	689,982.86	32° 10' 44.151 N	103° 43' 9.424 W
15,000.0	90.00	179.65	9,197.0	-5,907.8	465.9	429,257.67	689,983.47	32° 10' 43.161 N	103° 43' 9.424 W
15,100.0	90.00	179.65	9,197.0	-6,007.8	466.5	429,157.67	689,984.09	32° 10' 42.172 N	103° 43' 9.423 W
15,200.0	90.00	179.65	9,197.0	-6,107.8	467.1	429,057.67	689,984.70	32° 10' 41.182 N	103° 43' 9.423 W
15,300.0	90.00	179.65	9,197.0	-6,207.8	467.7	428,957.67	689,985.31	32° 10' 40.192 N	103° 43' 9.422 W
15,400.0	90.00	179.65	9,197.0	-6,307.8	468.3	428,857.67	689,985.93	32° 10' 39.203 N	103° 43' 9.422 W
15,500.0	90.00	179.65	9,197.0	-6,407.8	468.9	428,757.68	689,986.54	32° 10' 38.213 N	103° 43' 9.421 W

Database:	EDM_Users	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Company:	COG PRODUCTION LLC	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Project:	LEA COUNTY, NM	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site:	AVALON SHALE	**North Reference:**	Grid
Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	PWP0		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
15,600.0	90.00	179.65	9,197.0	-6,507.8	469.6	428,657.68	689,987.15	32° 10' 37.223 N	103° 43' 9.421 W
15,700.0	90.00	179.65	9,197.0	-6,607.8	470.2	428,557.68	689,987.77	32° 10' 36.234 N	103° 43' 9.420 W
15,800.0	90.00	179.65	9,197.0	-6,707.8	470.8	428,457.68	689,988.38	32° 10' 35.244 N	103° 43' 9.420 W
15,900.0	90.00	179.65	9,197.0	-6,807.8	471.4	428,357.68	689,989.00	32° 10' 34.255 N	103° 43' 9.419 W
16,000.0	90.00	179.65	9,197.0	-6,907.8	472.0	428,257.68	689,989.61	32° 10' 33.265 N	103° 43' 9.419 W
16,100.0	90.00	179.65	9,197.0	-7,007.8	472.6	428,157.69	689,990.22	32° 10' 32.275 N	103° 43' 9.418 W
16,200.0	90.00	179.65	9,197.0	-7,107.8	03°	428,057.69	689,990.84	32° 10' 31.286 N	103° 43' 9.418 W
16,300.0	90.00	179.65	9,197.0	-7,207.8	473.9	427,957.69	689,991.45	32° 10' 30.296 N	103° 43' 9.417 W
16,400.0	90.00	179.65	9,197.0	-7,307.8	474.5	427,857.69	689,992.06	32° 10' 29.307 N	103° 43' 9.417 W
16,500.0	90.00	179.65	9,197.0	-7,407.8	475.1	427,757.69	689,992.68	32° 10' 28.317 N	103° 43' 9.416 W
16,600.0	90.00	179.65	9,197.0	-7,507.8	475.7	427,657.70	689,993.29	32° 10' 27.327 N	103° 43' 9.416 W
16,700.0	90.00	179.65	9,197.0	-7,607.8	476.3	427,557.70	689,993.90	32° 10' 26.338 N	103° 43' 9.415 W
16,800.0	90.00	179.65	9,197.0	-7,707.8	476.9	427,457.70	689,994.52	32° 10' 25.348 N	103° 43' 9.415 W
16,900.0	90.00	179.65	9,197.0	-7,807.8	477.5	427,357.70	689,995.13	32° 10' 24.359 N	103° 43' 9.414 W
17,000.0	90.00	179.65	9,197.0	-7,907.8	478.1	427,257.70	689,995.74	32° 10' 23.369 N	103° 43' 9.414 W
17,100.0	90.00	179.65	9,197.0	-8,007.8	478.8	427,157.71	689,996.36	32° 10' 22.379 N	103° 43' 9.413 W
17,200.0	90.00	179.65	9,197.0	-8,107.8	479.4	427,057.71	689,996.97	32° 10' 21.390 N	103° 43' 9.413 W
17,300.0	90.00	179.65	9,197.0	-8,207.8	480.0	426,957.71	689,997.58	32° 10' 20.400 N	103° 43' 9.412 W
17,400.0	90.00	179.65	9,197.0	-8,307.8	480.6	426,857.71	689,998.20	32° 10' 19.411 N	103° 43' 9.412 W
17,500.0	90.00	179.65	9,197.0	-8,407.8	481.2	426,757.71	689,998.81	32° 10' 18.421 N	103° 43' 9.411 W
17,600.0	90.00	179.65	9,197.0	-8,507.8	481.8	426,657.71	689,999.43	32° 10' 17.431 N	103° 43' 9.411 W
17,700.0	90.00	179.65	9,197.0	-8,607.8	482.4	426,557.72	690,000.04	32° 10' 16.442 N	103° 43' 9.410 W
17,800.0	90.00	179.65	9,197.0	-8,707.8	483.1	426,457.72	690,000.65	32° 10' 15.452 N	103° 43' 9.410 W
17,900.0	90.00	179.65	9,197.0	-8,807.8	483.7	426,357.72	690,001.27	32° 10' 14.463 N	103° 43' 9.409 W
18,000.0	90.00	179.65	9,197.0	-8,907.8	484.3	426,257.72	690,001.88	32° 10' 13.473 N	103° 43' 9.409 W
18,100.0	90.00	179.65	9,197.0	-9,007.8	484.9	426,157.72	690,002.49	32° 10' 12.483 N	103° 43' 9.408 W
18,200.0	90.00	179.65	9,197.0	-9,107.8	485.5	426,057.73	690,003.11	32° 10' 11.494 N	103° 43' 9.408 W
18,300.0	90.00	179.65	9,197.0	-9,207.8	486.1	425,957.73	690,003.72	32° 10' 10.504 N	103° 43' 9.407 W
18,400.0	90.00	179.65	9,197.0	-9,307.8	486.7	425,857.73	690,004.33	32° 10' 9.515 N	103° 43' 9.407 W
18,500.0	90.00	179.65	9,197.0	-9,407.8	487.4	425,757.73	690,004.95	32° 10' 8.525 N	103° 43' 9.406 W
18,600.0	90.00	179.65	9,197.0	-9,507.8	488.0	425,657.73	690,005.56	32° 10' 7.535 N	103° 43' 9.406 W
18,700.0	90.00	179.65	9,197.0	-9,607.8	488.6	425,557.74	690,006.17	32° 10' 6.546 N	103° 43' 9.405 W
18,800.0	90.00	179.65	9,197.0	-9,707.8	489.2	425,457.74	690,006.79	32° 10' 5.556 N	103° 43' 9.405 W
18,900.0	90.00	179.65	9,197.0	-9,807.8	489.8	425,357.74	690,007.40	32° 10' 4.567 N	103° 43' 9.404 W
19,000.0	90.00	179.65	9,197.0	-9,907.8	490.4	425,257.74	690,008.02	32° 10' 3.577 N	103° 43' 9.404 W
19,100.0	90.00	179.65	9,197.0	-10,007.8	491.0	425,157.74	690,008.63	32° 10' 2.587 N	103° 43' 9.403 W
19,200.0	90.00	179.65	9,197.0	-10,107.8	491.6	425,057.74	690,009.24	32° 10' 1.598 N	103° 43' 9.403 W
19,208.6	90.00	179.65	9,197.0	-10,116.4	491.7	425,049.10	690,009.30	32° 10' 1.512 N	103° 43' 9.403 W

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL-Windward - plan hits target center - Point	0.00	0.00	9,197.0	-10,116.4	491.7	425,049.10	690,009.30	32° 10' 1.512 N	103° 43' 9.403 W

Database:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Company:	NEW MEXICO BASIN	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Project:	LEA COUNTY, NM	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site:	AVALON SHALE	**North Reference:**	Grid
Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	DWD Plan 2		

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Winward Federal - plan hits target center - Point	0.00	0.01	0.0	0.0	0.0	435,165.50	689,517.60	32° 11' 41.651 N	103° 43' 14.453 W
Winward Federal - plan misses target center by 241.3usft at 9513.9usft MD (9197.0 TVD, -435.2 N, 287.9 E) - Point	0.00	0.01	9,197.0	-313.4	496.1	434,852.13	690,013.74	32° 11' 38.521 N	103° 43' 8.700 W
Winward Federal - plan misses target center by 0.1usft at 19415.3usft MD (9197.0 TVD, -10296.2 N, 572.7 E) - Point	0.00	0.00	9,197.0	-10,296.2	572.8	424,869.30	690,090.40	32° 9' 59.728 N	103° 43' 8.471 W

CONCHO

WELL DETAILS: *WINDWARD FEDERAL #5H*
Ground Level: 3538.3

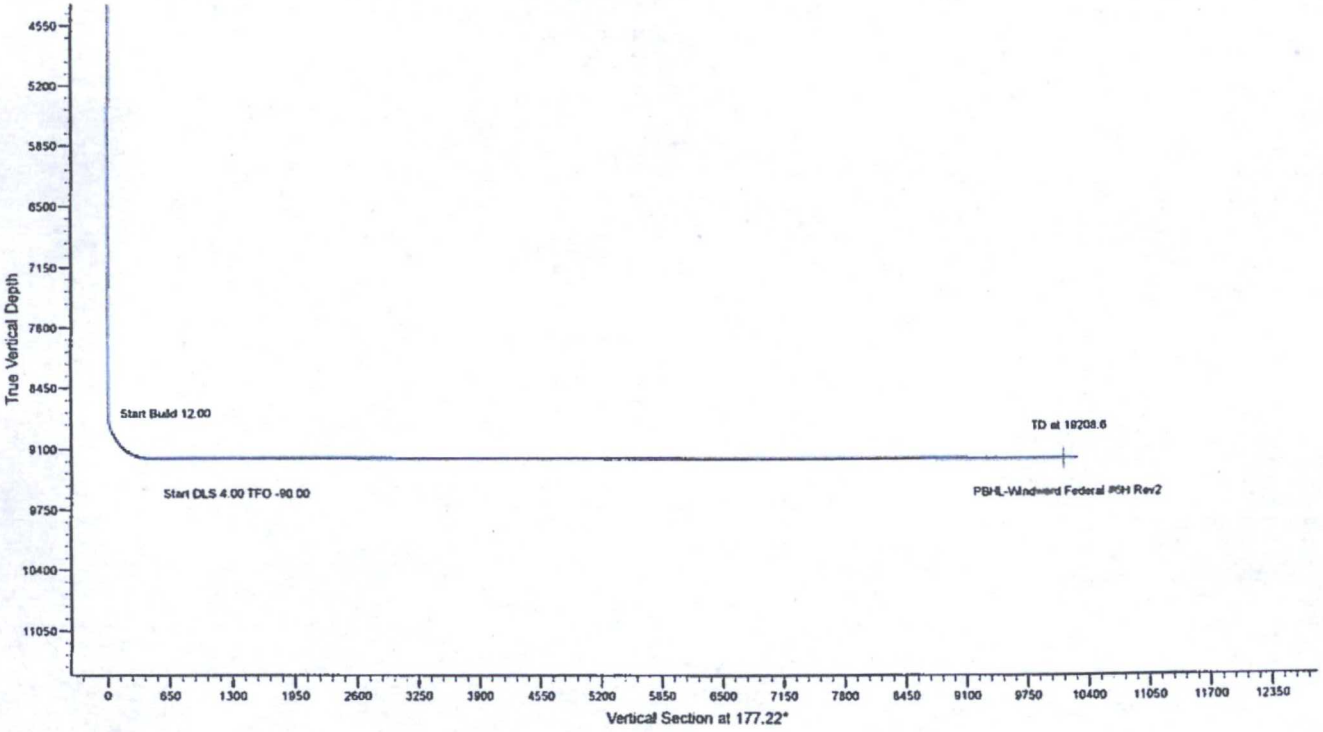
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	435165.50	689517.60	32° 11' 41.651 N	103° 43' 14.453 W	

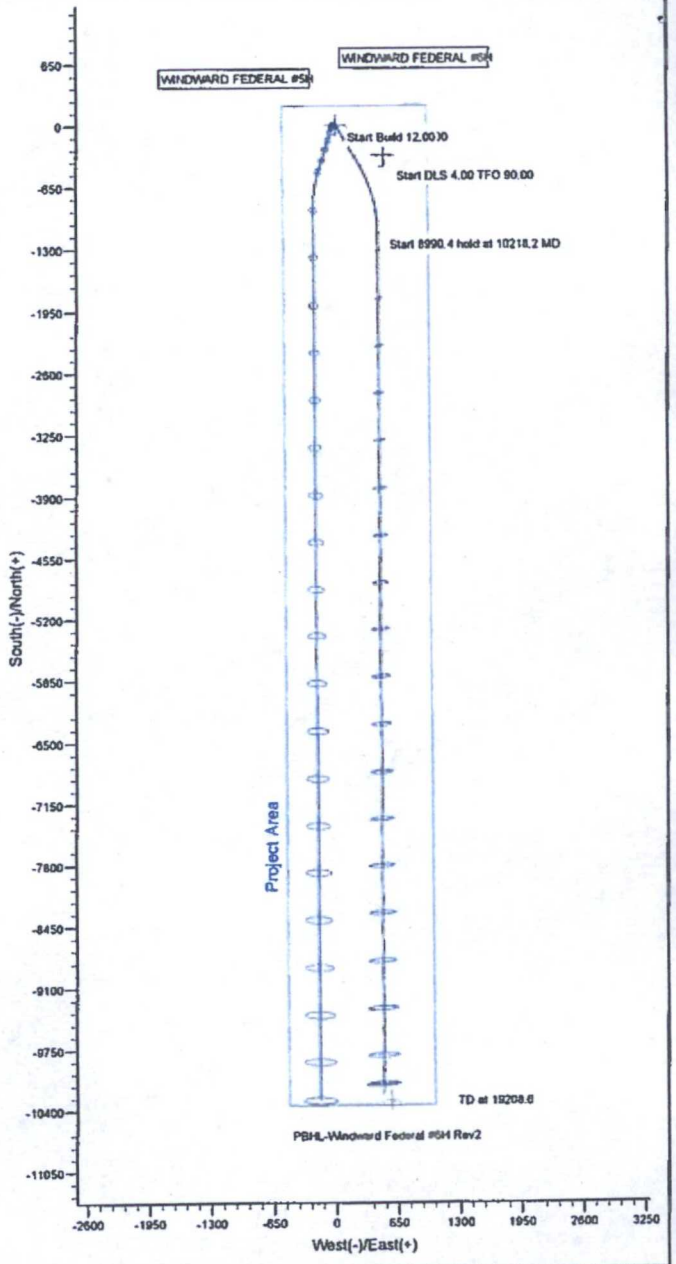
SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	8719.5	0.00	0.00	8719.5	0.0	0.0	0.00	0.00	0.0	
3	9469.5	90.00	149.70	9197.0	-412.2	240.9	12.00	149.70	423.4	
4	10218.2	90.00	179.65	9197.0	-1126.1	436.5	4.00	90.00	1146.0	
5	19208.6	90.00	179.65	9197.0	-10116.4	491.7	0.00	0.00	10126.3	

LEGEND

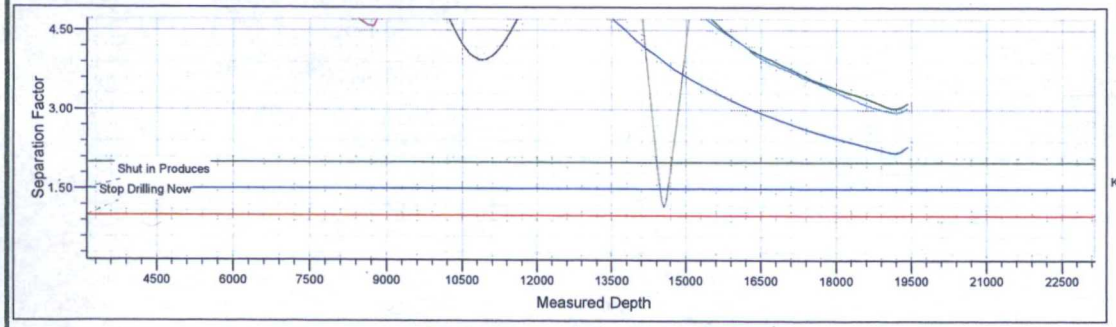
WINDWARD FEDERAL #5H, OWB, DWD Plan 4 - straight down land and turn V0
PWP0

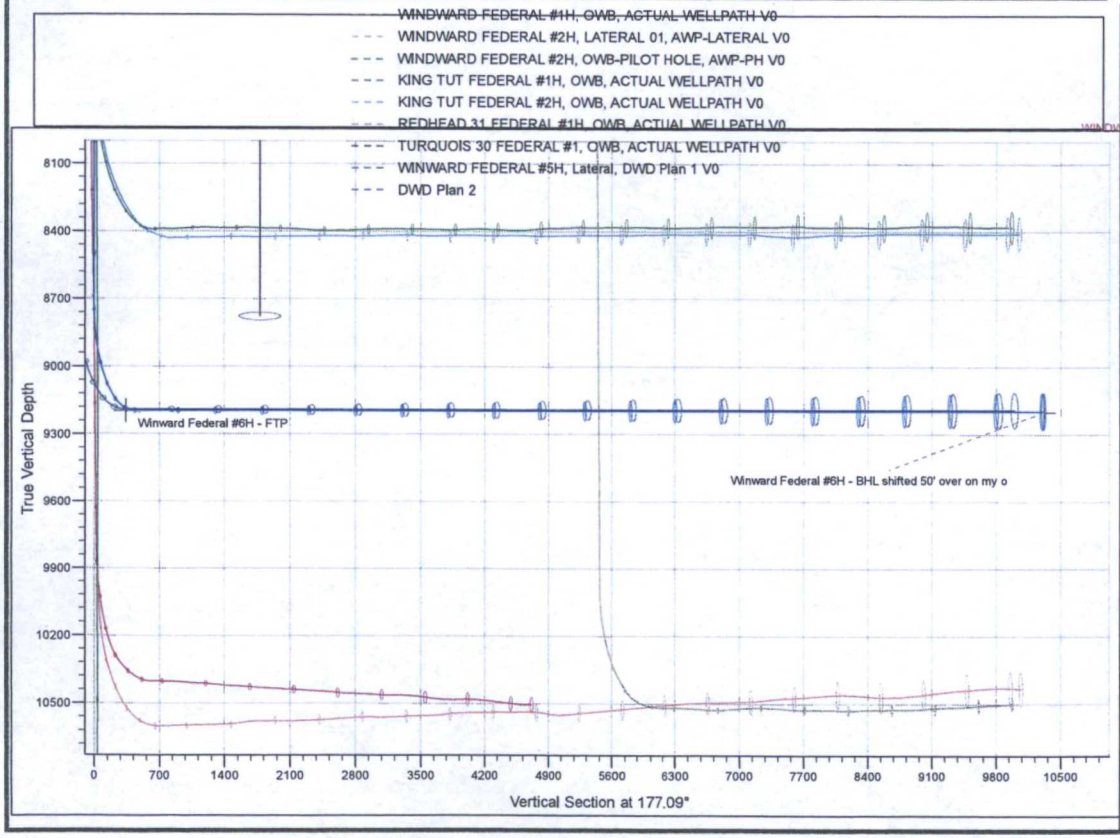


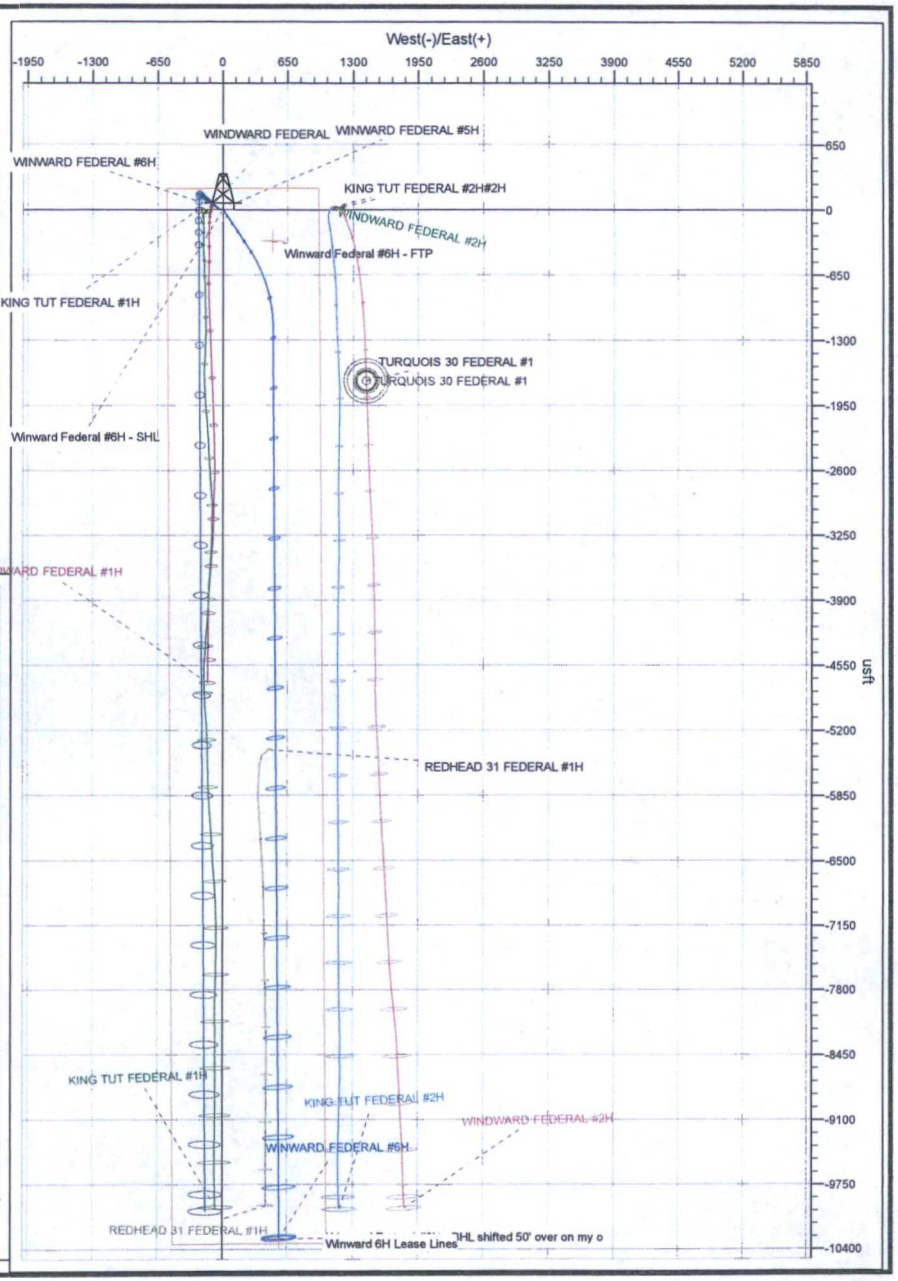


CONCHO

Project: LEA COUNTY, NM
Site: AVALON SHALE
Well: WINWARD FEDERAL #6H
Wellbore: Wellbore #1
Design: DWD Plan 2







COG PRODUCTION LLC

LEA COUNTY, NM
AVALON SHALE
WINDWARD FEDERAL #6H

OWB
PWP0

Anticollision Report

19 October, 2016

COG PRODUCTION LLC

Anticollision Report

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 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** 10/19/2016

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	8,600.0	PWP0 (OWB)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4
8,600.0	19,207.9	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						
WINDWARD FEDERAL #5H - OWB - DWD Plan 4 - stra	8,705.1	8,706.1	30.0	8.1	1.367	Shut In Produces, CC
WINDWARD FEDERAL #5H - OWB - DWD Plan 4 - stra	8,719.5	8,720.4	30.0	8.0	1.366	Shut In Produces, ES, SF
DEEP BSS						
WINDWARD FEDERAL #1H - OWB - ACTUAL WELLPA	4,848.2	4,850.1	112.9	98.2	7.685	CC
WINDWARD FEDERAL #1H - OWB - ACTUAL WELLPA	8,720.0	8,722.7	116.1	92.8	4.982	ES
WINDWARD FEDERAL #1H - OWB - ACTUAL WELLPA	8,725.0	8,727.9	116.1	92.8	4.980	SF
DELAWARE						
KING TUT FEDERAL #1H - OWB - ACTUAL WELLPATH	4,775.7	4,778.7	160.4	144.7	10.253	CC, ES
KING TUT FEDERAL #1H - OWB - ACTUAL WELLPATH	19,100.0	18,083.0	988.5	646.5	2.891	SF
KING TUT FEDERAL #1H - OWB - rev0	8,033.6	8,040.2	227.9	217.4	21.685	CC, ES
KING TUT FEDERAL #1H - OWB - rev0	19,208.6	18,199.7	1,026.1	855.9	6.029	SF

Offset Design AVALON SHALE - WINDWARD FEDERAL #5H - OWB - DWD Plan 4 - straight down land and turn — Offset Site Error: 0.0 usft

Survey Program: 0-Standard Keeper 104, 8000-MWD — Offset Well Error: 0.0 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	1.0	1.0	0.0	0.0	-90.38	-0.2	-30.0	30.0				
100.0	100.0	101.0	101.0	0.0	0.1	-90.38	-0.2	-30.0	30.0	29.9	0.09	335.989	
200.0	200.0	201.0	201.0	0.2	0.2	-90.38	-0.2	-30.0	30.0	29.6	0.36	82.701	
300.0	300.0	301.0	301.0	0.3	0.3	-90.38	-0.2	-30.0	30.0	29.4	0.63	47.891	
400.0	400.0	401.0	401.0	0.4	0.4	-90.38	-0.2	-30.0	30.0	29.1	0.89	33.704	
500.0	500.0	501.0	501.0	0.6	0.6	-90.38	-0.2	-30.0	30.0	28.8	1.15	26.002	
600.0	600.0	601.0	601.0	0.7	0.7	-90.38	-0.2	-30.0	30.0	28.6	1.42	21.165	
700.0	700.0	701.0	701.0	0.8	0.8	-90.38	-0.2	-30.0	30.0	28.3	1.68	17.845	
800.0	800.0	801.0	801.0	1.0	1.0	-90.38	-0.2	-30.0	30.0	28.1	1.94	15.426	
900.0	900.0	901.0	901.0	1.1	1.1	-90.38	-0.2	-30.0	30.0	27.8	2.21	13.584	
1,000.0	1,000.0	1,001.0	1,001.0	1.2	1.2	-90.38	-0.2	-30.0	30.0	27.5	2.47	12.135	
1,100.0	1,100.0	1,101.0	1,101.0	1.4	1.4	-90.38	-0.2	-30.0	30.0	27.3	2.74	10.966	

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

COG PRODUCTION LLC

Anticollision Report

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 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 #5H - OWB - DWD Plan 4 - straight down land and turn — Offset Site Error: 0.0 usft

Survey Program: 0-Standard Keeper 104, 8000-MWD — Offset Well Error: 0.0 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
1,200.0	1,200.0	1,201.0	1,201.0	1.5	1.5	-90.38	-0.2	-30.0	30.0	27.0	3.00	10.002	
1,300.0	1,300.0	1,301.0	1,301.0	1.6	1.6	-90.38	-0.2	-30.0	30.0	26.7	3.26	9.193	
1,400.0	1,400.0	1,401.0	1,401.0	1.8	1.8	-90.38	-0.2	-30.0	30.0	26.5	3.53	8.506	
1,500.0	1,500.0	1,501.0	1,501.0	1.9	1.9	-90.38	-0.2	-30.0	30.0	26.2	3.79	7.914	
1,600.0	1,600.0	1,601.0	1,601.0	2.0	2.0	-90.38	-0.2	-30.0	30.0	25.9	4.05	7.400	
1,700.0	1,700.0	1,701.0	1,701.0	2.2	2.2	-90.38	-0.2	-30.0	30.0	25.7	4.32	6.948	
1,800.0	1,800.0	1,801.0	1,801.0	2.3	2.3	-90.38	-0.2	-30.0	30.0	25.4	4.58	6.548	
1,900.0	1,900.0	1,901.0	1,901.0	2.4	2.4	-90.38	-0.2	-30.0	30.0	25.2	4.85	6.192	
2,000.0	2,000.0	2,001.0	2,001.0	2.6	2.6	-90.38	-0.2	-30.0	30.0	24.9	5.11	5.872	
2,100.0	2,100.0	2,101.0	2,101.0	2.7	2.7	-90.38	-0.2	-30.0	30.0	24.6	5.37	5.584	
2,200.0	2,200.0	2,201.0	2,201.0	2.8	2.8	-90.38	-0.2	-30.0	30.0	24.4	5.64	5.323	
2,300.0	2,300.0	2,301.0	2,301.0	2.9	3.0	-90.38	-0.2	-30.0	30.0	24.1	5.90	5.085	
2,400.0	2,400.0	2,401.0	2,401.0	3.1	3.1	-90.38	-0.2	-30.0	30.0	23.8	6.16	4.867	
2,500.0	2,500.0	2,501.0	2,501.0	3.2	3.2	-90.38	-0.2	-30.0	30.0	23.6	6.43	4.668	
2,600.0	2,600.0	2,601.0	2,601.0	3.3	3.3	-90.38	-0.2	-30.0	30.0	23.3	6.69	4.484	
2,700.0	2,700.0	2,701.0	2,701.0	3.5	3.5	-90.38	-0.2	-30.0	30.0	23.0	6.95	4.314	
2,800.0	2,800.0	2,801.0	2,801.0	3.6	3.6	-90.38	-0.2	-30.0	30.0	22.8	7.22	4.156	
2,900.0	2,900.0	2,901.0	2,901.0	3.7	3.7	-90.38	-0.2	-30.0	30.0	22.5	7.48	4.010	
3,000.0	3,000.0	3,001.0	3,001.0	3.9	3.9	-90.38	-0.2	-30.0	30.0	22.3	7.75	3.873	
3,100.0	3,100.0	3,101.0	3,101.0	4.0	4.0	-90.38	-0.2	-30.0	30.0	22.0	8.01	3.746	
3,200.0	3,200.0	3,201.0	3,201.0	4.1	4.1	-90.38	-0.2	-30.0	30.0	21.7	8.27	3.626	
3,300.0	3,300.0	3,301.0	3,301.0	4.3	4.3	-90.38	-0.2	-30.0	30.0	21.5	8.54	3.514	
3,400.0	3,400.0	3,401.0	3,401.0	4.4	4.4	-90.38	-0.2	-30.0	30.0	21.2	8.80	3.409	
3,500.0	3,500.0	3,501.0	3,501.0	4.5	4.5	-90.38	-0.2	-30.0	30.0	20.9	9.06	3.310	
3,600.0	3,600.0	3,601.0	3,601.0	4.7	4.7	-90.38	-0.2	-30.0	30.0	20.7	9.33	3.216	
3,700.0	3,700.0	3,701.0	3,701.0	4.8	4.8	-90.38	-0.2	-30.0	30.0	20.4	9.59	3.128	
3,800.0	3,800.0	3,801.0	3,801.0	4.9	4.9	-90.38	-0.2	-30.0	30.0	20.1	9.86	3.044	
3,900.0	3,900.0	3,901.0	3,901.0	5.1	5.1	-90.38	-0.2	-30.0	30.0	19.9	10.12	2.965	
4,000.0	4,000.0	4,001.0	4,001.0	5.2	5.2	-90.38	-0.2	-30.0	30.0	19.6	10.38	2.889	
4,100.0	4,100.0	4,101.0	4,101.0	5.3	5.3	-90.38	-0.2	-30.0	30.0	19.4	10.65	2.818	
4,200.0	4,200.0	4,201.0	4,201.0	5.5	5.5	-90.38	-0.2	-30.0	30.0	19.1	10.91	2.750	
4,300.0	4,300.0	4,301.0	4,301.0	5.6	5.6	-90.38	-0.2	-30.0	30.0	18.8	11.17	2.685	
4,400.0	4,400.0	4,401.0	4,401.0	5.7	5.7	-90.38	-0.2	-30.0	30.0	18.6	11.44	2.623	
4,500.0	4,500.0	4,501.0	4,501.0	5.8	5.9	-90.38	-0.2	-30.0	30.0	18.3	11.70	2.564	
4,600.0	4,600.0	4,601.0	4,601.0	6.0	6.0	-90.38	-0.2	-30.0	30.0	18.0	11.96	2.507	
4,700.0	4,700.0	4,701.0	4,701.0	6.1	6.1	-90.38	-0.2	-30.0	30.0	17.8	12.23	2.453	
4,800.0	4,800.0	4,801.0	4,801.0	6.2	6.2	-90.38	-0.2	-30.0	30.0	17.5	12.49	2.402	
4,900.0	4,900.0	4,901.0	4,901.0	6.4	6.4	-90.38	-0.2	-30.0	30.0	17.2	12.76	2.352	
5,000.0	5,000.0	5,001.0	5,001.0	6.5	6.5	-90.38	-0.2	-30.0	30.0	17.0	13.02	2.304	
5,100.0	5,100.0	5,101.0	5,101.0	6.6	6.6	-90.38	-0.2	-30.0	30.0	16.7	13.28	2.259	
5,200.0	5,200.0	5,201.0	5,201.0	6.8	6.8	-90.38	-0.2	-30.0	30.0	16.5	13.55	2.215	
5,300.0	5,300.0	5,301.0	5,301.0	6.9	6.9	-90.38	-0.2	-30.0	30.0	16.2	13.81	2.172	
5,400.0	5,400.0	5,401.0	5,401.0	7.0	7.0	-90.38	-0.2	-30.0	30.0	15.9	14.07	2.132	
5,500.0	5,500.0	5,501.0	5,501.0	7.2	7.2	-90.38	-0.2	-30.0	30.0	15.7	14.34	2.092	
5,600.0	5,600.0	5,601.0	5,601.0	7.3	7.3	-90.38	-0.2	-30.0	30.0	15.4	14.60	2.055	
5,700.0	5,700.0	5,701.0	5,701.0	7.4	7.4	-90.38	-0.2	-30.0	30.0	15.1	14.87	2.018	
5,800.0	5,800.0	5,801.0	5,801.0	7.6	7.6	-90.38	-0.2	-30.0	30.0	14.9	15.13	1.983	Advise and Monitor
5,900.0	5,900.0	5,901.0	5,901.0	7.7	7.7	-90.38	-0.2	-30.0	30.0	14.6	15.39	1.949	Advise and Monitor
6,000.0	6,000.0	6,001.0	6,001.0	7.8	7.8	-90.38	-0.2	-30.0	30.0	14.3	15.66	1.916	Advise and Monitor
6,100.0	6,100.0	6,101.0	6,101.0	8.0	8.0	-90.38	-0.2	-30.0	30.0	14.1	15.92	1.884	Advise and Monitor
6,200.0	6,200.0	6,201.0	6,201.0	8.1	8.1	-90.38	-0.2	-30.0	30.0	13.8	16.18	1.854	Advise and Monitor

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

COG PRODUCTION LLC

Anticollision Report

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 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 #5H - OWB - DWD Plan 4 - straight down land and turn — Offset Site Error: 0.0 usft

Survey Program: 0-Standard Keeper 104, 8000-MWD — Offset Well Error: 0.0 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
6,300.0	6,300.0	6,301.0	6,301.0	8.2	8.2	-90.38	-0.2	-30.0	30.0	13.6	16.45	1.824	Advise and Monitor
6,400.0	6,400.0	6,401.0	6,401.0	8.4	8.4	-90.38	-0.2	-30.0	30.0	13.3	16.71	1.795	Advise and Monitor
6,500.0	6,500.0	6,501.0	6,501.0	8.5	8.5	-90.38	-0.2	-30.0	30.0	13.0	16.97	1.767	Advise and Monitor
6,600.0	6,600.0	6,601.0	6,601.0	8.6	8.6	-90.38	-0.2	-30.0	30.0	12.8	17.24	1.740	Advise and Monitor
6,700.0	6,700.0	6,701.0	6,701.0	8.8	8.8	-90.38	-0.2	-30.0	30.0	12.5	17.50	1.714	Advise and Monitor
6,800.0	6,800.0	6,801.0	6,801.0	8.9	8.9	-90.38	-0.2	-30.0	30.0	12.2	17.77	1.689	Advise and Monitor
6,900.0	6,900.0	6,901.0	6,901.0	9.0	9.0	-90.38	-0.2	-30.0	30.0	12.0	18.03	1.664	Advise and Monitor
7,000.0	7,000.0	7,001.0	7,001.0	9.1	9.1	-90.38	-0.2	-30.0	30.0	11.7	18.29	1.640	Advise and Monitor
7,100.0	7,100.0	7,101.0	7,101.0	9.3	9.3	-90.38	-0.2	-30.0	30.0	11.4	18.56	1.617	Advise and Monitor
7,200.0	7,200.0	7,201.0	7,201.0	9.4	9.4	-90.38	-0.2	-30.0	30.0	11.2	18.82	1.594	Advise and Monitor
7,300.0	7,300.0	7,301.0	7,301.0	9.5	9.5	-90.38	-0.2	-30.0	30.0	10.9	19.08	1.572	Advise and Monitor
7,400.0	7,400.0	7,401.0	7,401.0	9.7	9.7	-90.38	-0.2	-30.0	30.0	10.7	19.35	1.551	Advise and Monitor
7,500.0	7,500.0	7,501.0	7,501.0	9.8	9.8	-90.38	-0.2	-30.0	30.0	10.4	19.61	1.530	Advise and Monitor
7,600.0	7,600.0	7,601.0	7,601.0	9.9	9.9	-90.38	-0.2	-30.0	30.0	10.1	19.88	1.509	Advise and Monitor
7,700.0	7,700.0	7,701.0	7,701.0	10.1	10.1	-90.38	-0.2	-30.0	30.0	9.9	20.14	1.490	Shut In Produces
7,800.0	7,800.0	7,801.0	7,801.0	10.2	10.2	-90.38	-0.2	-30.0	30.0	9.6	20.40	1.470	Shut In Produces
7,900.0	7,900.0	7,901.0	7,901.0	10.3	10.3	-90.38	-0.2	-30.0	30.0	9.3	20.67	1.452	Shut In Produces
8,000.0	8,000.0	8,001.0	8,001.0	10.5	10.4	-90.38	-0.2	-30.0	30.0	9.1	20.86	1.438	Shut In Produces
8,100.0	8,100.0	8,101.0	8,101.0	10.6	10.4	-90.38	-0.2	-30.0	30.0	9.0	21.01	1.428	Shut In Produces
8,200.0	8,200.0	8,201.0	8,201.0	10.7	10.4	-90.38	-0.2	-30.0	30.0	8.8	21.17	1.417	Shut In Produces
8,300.0	8,300.0	8,301.0	8,301.0	10.9	10.5	-90.38	-0.2	-30.0	30.0	8.7	21.33	1.406	Shut In Produces
8,400.0	8,400.0	8,401.0	8,401.0	11.0	10.5	-90.38	-0.2	-30.0	30.0	8.5	21.52	1.394	Shut In Produces
8,500.0	8,500.0	8,501.0	8,501.0	11.1	10.6	-90.38	-0.2	-30.0	30.0	8.3	21.71	1.382	Shut In Produces
8,600.0	8,600.0	8,601.0	8,601.0	11.2	10.7	-90.38	-0.2	-30.0	30.0	8.2	21.85	1.373	Shut In Produces
8,700.0	8,700.0	8,701.0	8,701.0	11.2	10.7	-90.38	-0.2	-30.0	30.0	8.1	21.94	1.367	Shut In Produces
8,705.1	8,705.1	8,706.1	8,706.1	11.2	10.7	-90.38	-0.2	-30.0	30.0	8.1	21.95	1.367	Shut In Produces, CC
8,719.5	8,719.5	8,720.4	8,720.4	11.2	10.8	-90.45	-0.2	-30.0	30.0	8.0	21.96	1.366	Shut In Produces, ES, SF
8,725.0	8,725.0	8,725.8	8,725.8	11.2	10.8	119.72	-0.3	-30.0	30.1	8.1	21.97	1.368	Shut In Produces
8,750.0	8,750.0	8,750.3	8,750.2	11.2	10.8	118.99	-1.5	-30.4	30.9	8.9	22.00	1.405	Shut In Produces
8,775.0	8,774.9	8,774.7	8,774.5	11.2	10.8	118.09	-3.8	-31.1	32.8	10.8	22.03	1.489	Shut In Produces
8,800.0	8,799.6	8,798.9	8,798.5	11.2	10.8	117.11	-7.3	-32.2	35.7	13.7	22.06	1.620	Advise and Monitor
8,825.0	8,824.1	8,822.9	8,822.0	11.2	10.9	116.12	-11.9	-33.7	39.7	17.6	22.10	1.797	Advise and Monitor
8,850.0	8,848.4	8,846.7	8,845.0	11.3	10.9	115.15	-17.5	-35.5	44.7	22.5	22.14	2.018	
8,875.0	8,872.3	8,870.1	8,867.4	11.3	10.9	114.22	-24.2	-37.5	50.6	28.4	22.18	2.282	
8,900.0	8,895.7	8,893.2	8,889.0	11.3	10.9	113.32	-31.7	-39.9	57.5	35.3	22.23	2.587	
8,925.0	8,918.7	8,915.9	8,909.9	11.3	11.0	112.45	-40.1	-42.6	65.3	43.0	22.28	2.932	
8,950.0	8,941.2	8,938.1	8,930.0	11.3	11.0	111.59	-49.2	-45.4	74.0	51.7	22.33	3.314	
8,975.0	8,963.0	8,959.9	8,949.3	11.3	11.0	110.71	-59.1	-48.5	83.5	61.1	22.38	3.731	
9,000.0	8,984.1	8,981.3	8,967.6	11.4	11.1	109.82	-69.5	-51.8	93.8	71.4	22.44	4.182	
9,025.0	9,004.6	9,002.2	8,985.1	11.4	11.1	108.89	-80.4	-55.2	104.9	82.4	22.50	4.663	
9,050.0	9,024.2	9,022.6	9,001.6	11.4	11.1	107.92	-91.8	-58.8	116.7	94.1	22.57	5.172	
9,075.0	9,043.1	9,042.5	9,017.3	11.5	11.2	106.90	-103.5	-62.5	129.2	106.5	22.63	5.707	
9,100.0	9,061.0	9,062.0	9,032.1	11.5	11.2	105.82	-115.6	-66.3	142.3	119.6	22.71	6.266	
9,125.0	9,078.0	9,081.0	9,046.0	11.6	11.2	104.68	-127.9	-70.2	156.0	133.2	22.78	6.845	
9,150.0	9,094.0	9,100.0	9,059.5	11.6	11.3	103.50	-140.6	-74.2	170.2	147.3	22.87	7.443	
9,175.0	9,109.0	9,117.7	9,071.4	11.7	11.3	102.21	-153.1	-78.1	184.9	162.0	22.95	8.057	
9,200.0	9,122.9	9,135.4	9,083.0	11.7	11.3	100.87	-166.0	-82.2	200.1	177.1	23.05	8.684	
9,225.0	9,135.7	9,152.7	9,093.7	11.8	11.3	99.47	-178.9	-86.2	215.8	192.6	23.15	9.321	
9,250.0	9,147.4	9,169.7	9,103.8	11.9	11.4	98.00	-191.9	-90.3	231.8	208.5	23.26	9.965	
9,275.0	9,157.9	9,186.3	9,113.2	12.0	11.4	96.47	-205.0	-94.5	248.1	224.8	23.38	10.613	

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

COG PRODUCTION LLC

Anticollision Report

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 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 #5H - OWB - DWD Plan 4 - straight down land and turn — Offset Site Error: 0.0 usft

Survey Program: 0-Standard Keeper 104, 8000-MWD — Offset Well Error: 0.0 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
9,300.0	9,167.2	9,202.6	9,121.9	12.1	11.4	94.89	-218.1	-98.6	264.8	241.3	23.52	11.260	
9,325.0	9,175.3	9,218.6	9,130.0	12.2	11.5	93.25	-231.3	-102.7	281.8	258.1	23.67	11.904	
9,350.0	9,182.1	9,234.3	9,137.5	12.4	11.5	91.57	-244.5	-106.9	299.0	275.1	23.84	12.540	
9,375.0	9,187.6	9,250.0	9,144.6	12.5	11.5	89.87	-257.8	-111.1	316.4	292.4	24.04	13.162	
9,400.0	9,191.9	9,265.1	9,150.9	12.7	11.5	88.10	-270.9	-115.2	334.0	309.7	24.26	13.768	
9,425.0	9,194.9	9,280.2	9,156.8	12.9	11.6	86.33	-284.2	-119.4	351.7	327.2	24.51	14.351	
9,450.0	9,196.6	9,295.2	9,162.3	13.2	11.6	84.55	-297.5	-123.6	369.6	344.8	24.79	14.910	
9,469.5	9,197.0	9,306.8	9,166.2	13.4	11.6	83.15	-307.9	-126.9	383.6	358.5	25.03	15.328	
9,500.0	9,197.0	9,325.0	9,171.7	13.8	11.7	84.71	-324.5	-132.1	405.4	379.9	25.43	15.941	
9,600.0	9,197.0	9,392.2	9,186.5	15.2	11.8	88.13	-386.9	-151.7	474.7	447.8	26.98	17.593	
9,700.0	9,197.0	9,468.0	9,192.0	16.7	12.1	89.19	-459.0	-174.4	539.6	510.8	28.82	18.725	
9,800.0	9,197.0	9,605.9	9,192.0	18.3	13.2	89.34	-592.4	-209.1	595.1	563.6	31.47	18.912	
9,900.0	9,197.0	9,766.5	9,192.0	19.9	15.0	89.43	-751.1	-233.1	635.3	600.4	34.90	18.206	
10,000.0	9,197.0	9,929.5	9,192.0	21.4	17.2	89.47	-913.9	-239.2	657.9	619.4	38.53	17.076	
10,100.0	9,197.0	10,028.8	9,192.0	22.8	18.5	89.48	-1,013.2	-238.5	669.5	628.1	41.33	16.198	
10,200.0	9,197.0	10,128.7	9,192.0	24.2	19.9	89.49	-1,113.1	-237.7	674.1	629.9	44.12	15.278	
10,218.2	9,197.0	10,146.9	9,192.0	24.4	20.2	89.49	-1,131.3	-237.6	674.1	629.5	44.63	15.107	
10,300.0	9,197.0	10,228.7	9,192.0	25.5	21.4	89.49	-1,213.1	-236.9	674.0	627.1	46.91	14.367	
10,400.0	9,197.0	10,328.7	9,192.0	26.9	22.9	89.49	-1,313.1	-236.2	673.9	624.1	49.78	13.538	
10,500.0	9,197.0	10,428.7	9,192.0	28.3	24.4	89.49	-1,413.1	-235.4	673.7	621.0	52.70	12.783	
10,600.0	9,197.0	10,528.7	9,192.0	29.7	25.9	89.49	-1,513.1	-234.6	673.6	617.9	55.68	12.098	
10,700.0	9,197.0	10,628.7	9,192.0	31.2	27.5	89.49	-1,613.1	-233.9	673.4	614.7	58.69	11.473	
10,800.0	9,197.0	10,728.7	9,192.0	32.7	29.0	89.49	-1,713.1	-233.1	673.3	611.5	61.75	10.904	
10,900.0	9,197.0	10,828.7	9,192.0	34.2	30.6	89.49	-1,813.1	-232.3	673.1	608.3	64.83	10.383	
11,000.0	9,197.0	10,928.7	9,192.0	35.7	32.2	89.49	-1,913.1	-231.6	672.9	605.0	67.93	9.906	
11,100.0	9,197.0	11,028.7	9,192.0	37.3	33.8	89.49	-2,013.1	-230.8	672.8	601.7	71.06	9.468	
11,200.0	9,197.0	11,128.7	9,192.0	38.8	35.4	89.49	-2,113.1	-230.0	672.6	598.4	74.21	9.064	
11,300.0	9,197.0	11,228.7	9,192.0	40.4	37.0	89.49	-2,213.1	-229.3	672.5	595.1	77.37	8.691	
11,400.0	9,197.0	11,328.7	9,192.0	41.9	38.6	89.49	-2,313.1	-228.5	672.3	591.8	80.55	8.347	
11,500.0	9,197.0	11,428.7	9,192.0	43.5	40.3	89.49	-2,413.1	-227.7	672.2	588.4	83.74	8.027	
11,600.0	9,197.0	11,528.7	9,192.0	45.1	41.9	89.49	-2,513.1	-227.0	672.0	585.1	86.94	7.729	
11,700.0	9,197.0	11,628.7	9,192.0	46.7	43.5	89.49	-2,613.1	-226.2	671.9	581.7	90.15	7.452	
11,800.0	9,197.0	11,728.7	9,192.0	48.2	45.1	89.49	-2,713.1	-225.4	671.7	578.3	93.37	7.194	
11,900.0	9,197.0	11,828.7	9,192.0	49.8	46.8	89.49	-2,813.0	-224.6	671.6	575.0	96.60	6.952	
12,000.0	9,197.0	11,928.7	9,192.0	51.4	48.4	89.49	-2,913.0	-223.9	671.4	571.6	99.84	6.725	
12,100.0	9,197.0	12,028.7	9,192.0	53.0	50.0	89.49	-3,013.0	-223.1	671.2	568.2	103.08	6.512	
12,200.0	9,197.0	12,128.7	9,192.0	54.7	51.7	89.49	-3,113.0	-222.3	671.1	564.8	106.32	6.312	
12,300.0	9,197.0	12,228.7	9,192.0	56.3	53.3	89.49	-3,213.0	-221.6	670.9	561.4	109.58	6.123	
12,400.0	9,197.0	12,328.7	9,192.0	57.9	54.9	89.49	-3,313.0	-220.8	670.8	557.9	112.83	5.945	
12,500.0	9,197.0	12,428.7	9,192.0	59.5	56.6	89.49	-3,413.0	-220.0	670.6	554.5	116.09	5.777	
12,600.0	9,197.0	12,528.7	9,192.0	61.1	58.2	89.49	-3,513.0	-219.3	670.5	551.1	119.36	5.617	
12,700.0	9,197.0	12,628.7	9,192.0	62.8	59.9	89.49	-3,613.0	-218.5	670.3	547.7	122.63	5.466	
12,800.0	9,197.0	12,728.7	9,192.0	64.4	61.5	89.49	-3,713.0	-217.7	670.2	544.3	125.90	5.323	
12,900.0	9,197.0	12,828.7	9,192.0	66.0	63.2	89.49	-3,813.0	-217.0	670.0	540.8	129.18	5.187	
13,000.0	9,197.0	12,928.7	9,192.0	67.6	64.8	89.49	-3,913.0	-216.2	669.9	537.4	132.45	5.057	
13,100.0	9,197.0	13,028.7	9,192.0	69.3	66.5	89.49	-4,013.0	-215.4	669.7	534.0	135.73	4.934	
13,200.0	9,197.0	13,128.7	9,192.0	70.9	68.1	89.49	-4,113.0	-214.7	669.5	530.5	139.02	4.816	
13,300.0	9,197.0	13,228.7	9,192.0	72.5	69.8	89.49	-4,213.0	-213.9	669.4	527.1	142.30	4.704	
13,400.0	9,197.0	13,328.7	9,192.0	74.2	71.4	89.49	-4,313.0	-213.1	669.2	523.6	145.59	4.597	
13,500.0	9,197.0	13,428.7	9,192.0	75.8	73.1	89.49	-4,413.0	-212.4	669.1	520.2	148.88	4.494	
13,600.0	9,197.0	13,528.7	9,192.0	77.4	74.7	89.48	-4,513.0	-211.6	668.9	516.8	152.17	4.396	

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

COG PRODUCTION LLC

Anticollision Report

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 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 #5H - OWB - DWD Plan 4 - straight down land and turn — Offset Site Error: 0.0 usft

Survey Program: 0-Standard Keeper 104, 8000-MWD — Offset Well Error: 0.0 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
13,700.0	9,197.0	13,628.7	9,192.0	79.1	76.4	89.48	-4,613.0	-210.8	668.8	513.3	155.46	4.302	
13,800.0	9,197.0	13,728.7	9,192.0	80.7	78.0	89.48	-4,713.0	-210.1	668.6	509.9	158.76	4.212	
13,900.0	9,197.0	13,828.7	9,192.0	82.4	79.7	89.48	-4,813.0	-209.3	668.5	506.4	162.05	4.125	
14,000.0	9,197.0	13,928.7	9,192.0	84.0	81.3	89.48	-4,913.0	-208.5	668.3	503.0	165.35	4.042	
14,100.0	9,197.0	14,028.7	9,192.0	85.7	83.0	89.48	-5,013.0	-207.8	668.2	499.5	168.65	3.962	
14,200.0	9,197.0	14,128.7	9,192.0	87.3	84.6	89.48	-5,113.0	-207.0	668.0	496.1	171.95	3.885	
14,300.0	9,197.0	14,228.7	9,192.0	88.9	86.3	89.48	-5,213.0	-206.2	667.8	492.6	175.25	3.811	
14,400.0	9,197.0	14,328.7	9,192.0	90.6	88.0	89.48	-5,313.0	-205.5	667.7	489.1	178.55	3.739	
14,500.0	9,197.0	14,428.7	9,192.0	92.2	89.6	89.48	-5,413.0	-204.7	667.5	485.7	181.86	3.671	
14,600.0	9,197.0	14,528.7	9,192.0	93.9	91.3	89.48	-5,513.0	-203.9	667.4	482.2	185.16	3.604	
14,700.0	9,197.0	14,628.7	9,192.0	95.5	92.9	89.48	-5,613.0	-203.1	667.2	478.8	188.47	3.540	
14,800.0	9,197.0	14,728.7	9,192.0	97.2	94.6	89.48	-5,713.0	-202.4	667.1	475.3	191.77	3.478	
14,900.0	9,197.0	14,828.7	9,192.0	98.8	96.2	89.48	-5,813.0	-201.6	666.9	471.8	195.08	3.419	
15,000.0	9,197.0	14,928.7	9,192.0	100.5	97.9	89.48	-5,913.0	-200.8	666.8	468.4	198.39	3.361	
15,100.0	9,197.0	15,028.7	9,192.0	102.1	99.6	89.48	-6,013.0	-200.1	666.6	464.9	201.70	3.305	
15,200.0	9,197.0	15,128.7	9,192.0	103.8	101.2	89.48	-6,112.9	-199.3	666.5	461.5	205.01	3.251	
15,300.0	9,197.0	15,228.7	9,192.0	105.4	102.9	89.48	-6,212.9	-198.5	666.3	458.0	208.32	3.199	
15,400.0	9,197.0	15,328.7	9,192.0	107.1	104.5	89.48	-6,312.9	-197.8	666.1	454.5	211.63	3.148	
15,500.0	9,197.0	15,428.7	9,192.0	108.7	106.2	89.48	-6,412.9	-197.0	666.0	451.1	214.94	3.099	
15,600.0	9,197.0	15,528.7	9,192.0	110.4	107.9	89.48	-6,512.9	-196.2	665.8	447.6	218.25	3.051	
15,700.0	9,197.0	15,628.7	9,192.0	112.0	109.5	89.48	-6,612.9	-195.5	665.7	444.1	221.56	3.004	
15,800.0	9,197.0	15,728.7	9,192.0	113.7	111.2	89.48	-6,712.9	-194.7	665.5	440.7	224.88	2.960	
15,900.0	9,197.0	15,828.7	9,192.0	115.4	112.8	89.48	-6,812.9	-193.9	665.4	437.2	228.19	2.916	
16,000.0	9,197.0	15,928.7	9,192.0	117.0	114.5	89.48	-6,912.9	-193.2	665.2	433.7	231.50	2.873	
16,100.0	9,197.0	16,028.7	9,192.0	118.7	116.2	89.48	-7,012.9	-192.4	665.1	430.3	234.82	2.832	
16,200.0	9,197.0	16,128.7	9,192.0	120.3	117.8	89.48	-7,112.9	-191.6	664.9	426.8	238.13	2.792	
16,300.0	9,197.0	16,228.7	9,192.0	122.0	119.5	89.48	-7,212.9	-190.9	664.8	423.3	241.45	2.753	
16,400.0	9,197.0	16,328.7	9,192.0	123.6	121.1	89.48	-7,312.9	-190.1	664.6	419.8	244.76	2.715	
16,500.0	9,197.0	16,428.7	9,192.0	125.3	122.8	89.48	-7,412.9	-189.3	664.5	416.4	248.08	2.678	
16,600.0	9,197.0	16,528.7	9,192.0	126.9	124.5	89.48	-7,512.9	-188.6	664.3	412.9	251.40	2.642	
16,700.0	9,197.0	16,628.7	9,192.0	128.6	126.1	89.48	-7,612.9	-187.8	664.1	409.4	254.71	2.607	
16,800.0	9,197.0	16,728.7	9,192.0	130.3	127.8	89.48	-7,712.9	-187.0	664.0	406.0	258.03	2.573	
16,900.0	9,197.0	16,828.7	9,192.0	131.9	129.4	89.48	-7,812.9	-186.3	663.8	402.5	261.35	2.540	
17,000.0	9,197.0	16,928.7	9,192.0	133.6	131.1	89.48	-7,912.9	-185.5	663.7	399.0	264.67	2.508	
17,100.0	9,197.0	17,028.7	9,192.0	135.2	132.8	89.48	-8,012.9	-184.7	663.5	395.5	267.99	2.476	
17,200.0	9,197.0	17,128.7	9,192.0	136.9	134.4	89.48	-8,112.9	-183.9	663.4	392.1	271.30	2.445	
17,300.0	9,197.0	17,228.7	9,192.0	138.5	136.1	89.48	-8,212.9	-183.2	663.2	388.6	274.62	2.415	
17,400.0	9,197.0	17,328.7	9,192.0	140.2	137.8	89.48	-8,312.9	-182.4	663.1	385.1	277.94	2.386	
17,500.0	9,197.0	17,428.7	9,192.0	141.8	139.4	89.48	-8,412.9	-181.6	662.9	381.6	281.26	2.357	
17,600.0	9,197.0	17,528.7	9,192.0	143.5	141.1	89.48	-8,512.9	-180.9	662.8	378.2	284.58	2.329	
17,700.0	9,197.0	17,628.7	9,192.0	145.2	142.7	89.48	-8,612.9	-180.1	662.6	374.7	287.90	2.301	
17,800.0	9,197.0	17,728.7	9,192.0	146.8	144.4	89.48	-8,712.9	-179.3	662.4	371.2	291.22	2.275	
17,900.0	9,197.0	17,828.7	9,192.0	148.5	146.1	89.48	-8,812.9	-178.6	662.3	367.7	294.54	2.249	
18,000.0	9,197.0	17,928.7	9,192.0	150.1	147.7	89.48	-8,912.9	-177.8	662.1	364.3	297.86	2.223	
18,100.0	9,197.0	18,028.7	9,192.0	151.8	149.4	89.48	-9,012.9	-177.0	662.0	360.8	301.18	2.198	
18,200.0	9,197.0	18,128.7	9,192.0	153.5	151.0	89.48	-9,112.9	-176.3	661.8	357.3	304.50	2.173	
18,300.0	9,197.0	18,228.7	9,192.0	155.1	152.7	89.48	-9,212.9	-175.5	661.7	353.8	307.83	2.150	
18,400.0	9,197.0	18,328.7	9,192.0	156.8	154.4	89.48	-9,312.8	-174.7	661.5	350.4	311.15	2.126	
18,500.0	9,197.0	18,428.7	9,192.0	158.4	156.0	89.48	-9,412.8	-174.0	661.4	346.9	314.47	2.103	
18,600.0	9,197.0	18,528.7	9,192.0	160.1	157.7	89.48	-9,512.8	-173.2	661.2	343.4	317.79	2.081	

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

COG PRODUCTION LLC

Anticollision Report

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 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 #5H - OWB - DWD Plan 4 - straight down land and turn

Offset Site Error: 0.0 usft

Survey Program: 0-Standard Keeper 104, 8000-MWD

Offset Well Error: 0.0 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
18,700.0	9,197.0	18,628.7	9,192.0	161.8	159.4	89.48	-9,612.8	-172.4	661.1	339.9	321.11	2.059	
18,800.0	9,197.0	18,728.7	9,192.0	163.4	161.0	89.48	-9,712.8	-171.7	660.9	336.5	324.43	2.037	
18,900.0	9,197.0	18,828.7	9,192.0	165.1	162.7	89.48	-9,812.8	-170.9	660.7	333.0	327.76	2.016	
19,000.0	9,197.0	18,928.7	9,192.0	166.7	164.3	89.48	-9,912.8	-170.1	660.6	329.5	331.08	1.995	Advise and Monitor
19,100.0	9,197.0	19,028.7	9,192.0	168.4	166.0	89.48	-10,012.8	-169.4	660.4	326.0	334.40	1.975	Advise and Monitor
19,208.6	9,197.0	19,137.3	9,192.0	170.2	167.8	89.48	-10,121.5	-168.5	660.3	322.3	338.01	1.953	Advise and Monitor

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 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 #1H - OWB - ACTUAL WELLPATH — Offset Site Error: 0.0 usft

Survey Program: 239-MWD, 761-MWD, 4844-MWD, 9817-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	1.0	1.0	0.0	2.0	-81.65	19.1	-130.2	131.6				
100.0	100.0	101.2	101.2	0.0	2.0	-81.53	19.4	-130.1	131.5	129.5	2.04	64.417	
200.0	200.0	201.3	201.3	0.2	2.0	-81.15	20.2	-129.8	131.3	129.1	2.19	59.939	
300.0	300.0	301.6	301.6	0.3	2.0	-80.68	21.2	-129.3	131.0	128.7	2.35	55.843	
400.0	400.0	401.9	401.9	0.4	2.1	-80.34	21.9	-128.6	130.4	127.9	2.53	51.648	
500.0	500.0	501.6	501.6	0.6	2.1	-79.99	22.6	-128.0	129.9	127.2	2.72	47.702	
600.0	600.0	601.7	601.7	0.7	2.2	-79.64	23.3	-127.3	129.4	126.5	2.94	44.016	
700.0	700.0	701.8	701.8	0.8	2.3	-79.28	24.0	-126.6	128.8	125.7	3.17	40.613	
800.0	800.0	801.8	801.7	1.0	2.4	-78.98	24.5	-125.8	128.1	124.8	3.35	38.206	
875.8	875.8	876.9	876.8	1.1	2.4	-78.79	24.9	-125.5	127.9	124.5	3.47	36.893	
900.0	900.0	900.8	900.7	1.1	2.4	-78.68	25.1	-125.5	127.9	124.4	3.51	36.494	
1,000.0	1,000.0	1,000.5	1,000.4	1.2	2.4	-78.38	25.8	-125.6	128.3	124.6	3.68	34.876	
1,100.0	1,100.0	1,099.6	1,099.6	1.4	2.5	-78.50	25.7	-126.5	129.1	125.2	3.87	33.377	
1,200.0	1,200.0	1,200.8	1,200.8	1.5	2.6	-79.07	24.6	-127.5	129.9	125.8	4.07	31.885	
1,300.0	1,300.0	1,302.5	1,302.4	1.6	2.7	-79.61	23.3	-127.2	129.4	125.1	4.29	30.145	
1,400.0	1,400.0	1,402.7	1,402.6	1.8	2.8	-79.72	22.9	-126.0	128.1	123.6	4.52	28.346	
1,500.0	1,500.0	1,501.6	1,501.5	1.9	2.9	-79.06	24.1	-124.8	127.2	122.4	4.76	26.726	
1,522.3	1,522.3	1,523.4	1,523.3	1.9	2.9	-78.87	24.5	-124.7	127.1	122.3	4.81	26.411	
1,600.0	1,600.0	1,599.6	1,599.5	2.0	3.0	-78.32	25.8	-125.0	127.6	122.6	5.01	25.476	
1,700.0	1,700.0	1,698.4	1,698.2	2.2	3.1	-77.90	27.1	-126.5	129.4	124.1	5.27	24.548	
1,800.0	1,800.0	1,798.6	1,798.5	2.3	3.3	-78.01	27.3	-128.7	131.6	126.0	5.55	23.722	
1,900.0	1,900.0	1,900.1	1,899.9	2.4	3.4	-78.57	26.4	-130.4	133.0	127.2	5.83	22.827	
2,000.0	2,000.0	2,002.1	2,001.9	2.6	3.6	-79.14	25.1	-130.7	133.1	127.0	6.12	21.763	
2,100.0	2,100.0	2,104.1	2,103.9	2.7	3.7	-79.46	24.1	-129.4	131.6	125.2	6.41	20.545	
2,200.0	2,200.0	2,204.0	2,203.8	2.8	3.9	-79.28	24.0	-127.0	129.3	122.6	6.70	19.292	
2,300.0	2,300.0	2,302.7	2,302.5	2.9	4.0	-78.65	25.1	-125.1	127.6	120.6	6.99	18.237	
2,370.5	2,370.5	2,371.8	2,371.5	3.0	4.2	-78.00	26.4	-124.3	127.1	119.9	7.20	17.643	
2,400.0	2,400.0	2,400.6	2,400.3	3.1	4.2	-77.75	27.0	-124.3	127.2	119.9	7.29	17.440	
2,500.0	2,500.0	2,499.8	2,499.5	3.2	4.4	-77.01	28.8	-124.8	128.1	120.5	7.60	16.858	
2,600.0	2,600.0	2,599.5	2,599.2	3.3	4.6	-76.59	30.0	-125.9	129.4	121.5	7.91	16.357	
2,700.0	2,700.0	2,699.3	2,699.0	3.5	4.7	-76.68	30.2	-127.4	130.9	122.7	8.22	15.914	
2,800.0	2,800.0	2,800.3	2,799.9	3.6	4.9	-77.20	29.3	-128.8	132.1	123.5	8.54	15.459	
2,900.0	2,900.0	2,901.6	2,901.2	3.7	5.1	-78.11	27.3	-129.6	132.5	123.6	8.86	14.946	
3,000.0	3,000.0	3,004.1	3,003.7	3.9	5.3	-78.90	25.3	-128.7	131.2	122.0	9.19	14.283	
3,100.0	3,100.0	3,104.5	3,104.0	4.0	5.5	-79.39	23.7	-126.7	128.9	119.4	9.50	13.567	
3,200.0	3,200.0	3,204.2	3,203.7	4.1	5.7	-79.53	23.0	-124.5	126.7	116.8	9.82	12.897	
3,300.0	3,300.0	3,303.8	3,303.3	4.3	5.9	-79.25	23.2	-122.4	124.6	114.5	10.14	12.291	
3,400.0	3,400.0	3,403.4	3,402.9	4.4	6.1	-78.64	24.2	-120.4	122.8	112.4	10.46	11.740	
3,500.0	3,500.0	3,505.2	3,504.7	4.5	6.3	-77.81	25.5	-118.2	121.0	110.2	10.79	11.214	
3,600.0	3,600.0	3,604.1	3,603.5	4.7	6.5	-77.44	25.6	-114.9	117.7	106.6	11.12	10.591	
3,666.4	3,666.4	3,668.0	3,667.4	4.8	6.6	-77.05	26.2	-114.1	117.0	105.7	11.33	10.330	
3,700.0	3,700.0	3,700.3	3,699.8	4.8	6.6	-76.79	26.8	-114.1	117.2	105.8	11.44	10.249	
3,800.0	3,800.0	3,798.7	3,798.1	4.9	6.8	-76.00	28.8	-115.7	119.2	107.5	11.76	10.138	
3,900.0	3,900.0	3,899.2	3,898.5	5.1	7.0	-75.66	30.1	-117.8	121.6	109.5	12.09	10.059	
4,000.0	4,000.0	4,000.2	3,999.5	5.2	7.2	-75.94	29.9	-119.6	123.3	110.8	12.43	9.920	
4,100.0	4,100.0	4,102.1	4,101.4	5.3	7.4	-76.90	28.0	-120.5	123.7	110.9	12.76	9.695	
4,200.0	4,200.0	4,204.3	4,203.5	5.5	7.6	-78.03	25.4	-119.8	122.5	109.4	13.10	9.355	
4,300.0	4,300.0	4,304.5	4,303.7	5.6	7.8	-78.94	23.1	-118.1	120.3	106.9	13.43	8.962	
4,400.0	4,400.0	4,404.3	4,403.5	5.7	8.0	-79.60	21.3	-116.2	118.2	104.4	13.76	8.590	
4,500.0	4,500.0	4,504.0	4,503.2	5.8	8.2	-79.46	21.2	-114.2	116.1	102.1	14.07	8.257	
4,600.0	4,600.0	4,603.4	4,602.6	6.0	8.3	-78.92	22.0	-112.4	114.5	100.2	14.30	8.008	

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

COG PRODUCTION LLC

Anticollision Report

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 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 #1H - OWB - ACTUAL WELLPATH — Offset Site Error: 0.0 usft

Survey Program: 239-MWD, 781-MWD, 4544-MWD, 9817-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
4,700.0	4,700.0	4,702.7	4,701.8	6.1	8.4	-78.36	22.9	-111.1	113.4	98.9	14.48	7.835	
4,800.0	4,800.0	4,802.2	4,801.3	6.2	8.4	-77.61	24.2	-110.4	113.0	98.4	14.62	7.729	
4,848.2	4,848.2	4,850.1	4,849.2	6.3	8.4	-77.23	25.0	-110.1	112.9	98.2	14.69	7.685	CC
4,900.0	4,900.0	4,901.3	4,900.4	6.4	8.4	-76.76	25.9	-110.0	113.1	98.3	14.77	7.654	
5,000.0	5,000.0	5,001.4	5,000.5	6.5	8.4	-75.71	28.1	-110.2	113.7	98.6	14.92	7.620	
5,100.0	5,100.0	5,101.8	5,100.8	6.6	8.4	-74.66	30.2	-109.9	114.0	98.9	15.08	7.560	
5,200.0	5,200.0	5,202.2	5,201.2	6.8	8.5	-73.65	32.1	-109.4	114.0	98.7	15.24	7.479	
5,300.0	5,300.0	5,302.4	5,301.4	6.9	8.5	-72.73	33.8	-108.6	113.7	98.3	15.41	7.379	
5,400.0	5,400.0	5,402.3	5,401.3	7.0	8.5	-71.96	35.1	-107.8	113.4	97.8	15.58	7.275	
5,436.1	5,436.1	5,438.1	5,437.1	7.1	8.6	-71.70	35.6	-107.6	113.3	97.7	15.65	7.242	
5,500.0	5,500.0	5,501.5	5,500.5	7.2	8.6	-71.19	36.6	-107.4	113.5	97.7	15.76	7.199	
5,600.0	5,600.0	5,601.6	5,600.6	7.3	8.6	-70.50	38.0	-107.3	113.9	97.9	15.94	7.142	
5,700.0	5,700.0	5,701.8	5,700.8	7.4	8.7	-69.65	39.7	-107.0	114.1	98.0	16.13	7.072	
5,800.0	5,800.0	5,801.7	5,800.7	7.6	8.8	-68.70	41.5	-106.5	114.3	98.0	16.33	7.003	
5,900.0	5,900.0	5,901.9	5,900.8	7.7	8.8	-67.83	43.2	-106.1	114.6	98.0	16.52	6.933	
6,000.0	6,000.0	6,001.9	6,000.8	7.8	8.9	-67.12	44.6	-105.6	114.6	97.9	16.73	6.854	
6,100.0	6,100.0	6,101.8	6,100.8	8.0	9.0	-66.61	45.6	-105.4	114.9	97.9	16.93	6.783	
6,200.0	6,200.0	6,201.6	6,200.5	8.1	9.1	-66.37	46.1	-105.5	115.1	98.0	17.15	6.714	
6,300.0	6,300.0	6,301.7	6,300.6	8.2	9.1	-66.36	46.4	-106.0	115.7	98.3	17.36	6.662	
6,400.0	6,400.0	6,402.3	6,401.2	8.4	9.2	-66.38	46.4	-106.1	115.8	98.2	17.58	6.585	
6,490.6	6,490.6	6,492.7	6,491.6	8.5	9.3	-66.53	46.0	-106.0	115.6	97.8	17.78	6.502	
6,500.0	6,500.0	6,502.0	6,501.0	8.5	9.3	-66.54	46.0	-106.1	115.6	97.8	17.80	6.495	
6,600.0	6,600.0	6,601.9	6,600.8	8.6	9.4	-66.75	45.7	-106.4	115.6	97.7	18.03	6.423	
6,700.0	6,700.0	6,701.4	6,700.3	8.8	9.5	-67.31	44.8	-107.1	116.1	97.9	18.25	6.362	
6,800.0	6,800.0	6,802.0	6,800.9	8.9	9.6	-67.65	44.3	-107.8	116.5	98.1	18.49	6.304	
6,900.0	6,900.0	6,901.2	6,900.1	9.0	9.7	-67.78	44.2	-108.2	116.9	98.2	18.72	6.245	
7,000.0	7,000.0	7,002.1	7,001.0	9.1	9.8	-68.14	43.7	-108.8	117.3	98.3	18.96	6.185	
7,015.6	7,015.6	7,017.7	7,016.6	9.2	9.8	-68.22	43.5	-108.9	117.3	98.3	19.00	6.172	
7,100.0	7,100.0	7,101.9	7,100.8	9.3	9.9	-68.55	42.9	-109.2	117.3	98.1	19.20	6.111	
7,200.0	7,200.0	7,202.2	7,201.1	9.4	10.0	-68.94	42.2	-109.6	117.4	98.0	19.45	6.039	
7,300.0	7,300.0	7,302.6	7,301.5	9.5	10.2	-69.44	41.1	-109.6	117.1	97.4	19.70	5.944	
7,343.3	7,343.3	7,345.4	7,344.3	9.6	10.2	-69.73	40.5	-109.8	117.0	97.2	19.80	5.908	
7,400.0	7,400.0	7,401.9	7,400.8	9.7	10.3	-70.21	39.6	-110.2	117.1	97.1	19.95	5.870	
7,500.0	7,500.0	7,502.3	7,501.2	9.8	10.4	-71.39	37.4	-111.0	117.1	96.9	20.20	5.795	
7,600.0	7,600.0	7,602.4	7,601.2	9.9	10.5	-72.67	34.8	-111.6	116.9	96.4	20.46	5.713	
7,700.0	7,700.0	7,702.4	7,701.2	10.1	10.7	-74.05	32.1	-112.2	116.7	96.0	20.72	5.631	
7,800.0	7,800.0	7,802.5	7,801.3	10.2	10.8	-75.52	29.1	-112.8	116.5	95.5	20.99	5.552	
7,900.0	7,900.0	7,902.4	7,901.1	10.3	10.9	-76.75	26.7	-113.2	116.3	95.1	21.25	5.473	
7,944.2	7,944.2	7,946.5	7,945.2	10.4	11.0	-77.28	25.6	-113.4	116.3	94.9	21.37	5.442	
8,000.0	8,000.0	8,002.1	8,000.8	10.5	11.1	-77.96	24.3	-113.8	116.3	94.8	21.52	5.406	
8,100.0	8,100.0	8,102.3	8,100.9	10.6	11.2	-79.22	21.8	-114.4	116.5	94.7	21.79	5.348	
8,200.0	8,200.0	8,202.5	8,201.1	10.7	11.3	-80.66	18.9	-114.9	116.5	94.4	22.06	5.281	
8,283.0	8,283.0	8,285.4	8,284.0	10.8	11.4	-82.29	15.6	-115.4	116.5	94.2	22.29	5.226	
8,300.0	8,300.0	8,302.5	8,301.0	10.9	11.5	-82.62	15.0	-115.5	116.5	94.1	22.33	5.215	
8,400.0	8,400.0	8,402.4	8,400.8	11.0	11.6	-84.53	11.1	-116.0	116.5	93.9	22.61	5.155	
8,500.0	8,500.0	8,503.0	8,501.4	11.1	11.8	-86.03	8.1	-116.2	116.5	93.6	22.88	5.091	
8,600.0	8,600.0	8,603.2	8,601.5	11.2	11.9	-87.39	5.3	-116.0	116.1	93.0	23.10	5.025	
8,653.6	8,653.6	8,656.3	8,654.6	11.2	12.0	-88.22	3.6	-115.9	116.0	92.8	23.19	5.001	
8,700.0	8,700.0	8,702.5	8,700.8	11.2	12.1	-88.91	2.2	-116.0	116.0	92.8	23.26	4.989	
8,719.5	8,719.5	8,722.3	8,720.6	11.2	12.1	-89.22	1.6	-116.0	116.1	92.8	23.30	4.982	

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

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 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 #1H - OWB - ACTUAL WELLPATH — Offset Site Error: 0.0 usft

Survey Program: 239-MWD, 761-MWD, 4644-MWD, 9817-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
8,720.0	8,720.0	8,722.7	8,721.0	11.2	12.1	121.07	1.6	-116.0	116.1	92.8	23.30	4.982 ES	
8,725.0	8,725.0	8,727.9	8,726.1	11.2	12.1	121.00	1.4	-116.0	116.1	92.8	23.31	4.980 SF	
8,750.0	8,750.0	8,753.2	8,751.5	11.2	12.1	120.92	0.5	-116.0	116.5	93.1	23.35	4.989	
8,775.0	8,774.9	8,778.6	8,776.9	11.2	12.2	121.31	-0.5	-115.8	117.5	94.1	23.40	5.022	
8,800.0	8,799.6	8,803.2	8,801.4	11.2	12.2	122.10	-1.5	-115.6	119.1	95.7	23.44	5.082	
8,825.0	8,824.1	8,827.0	8,825.2	11.2	12.3	123.25	-2.4	-115.6	121.7	98.2	23.49	5.181	
8,850.0	8,848.4	8,850.5	8,848.7	11.3	12.3	124.70	-3.3	-115.7	125.3	101.7	23.54	5.321	
8,875.0	8,872.3	8,873.7	8,871.8	11.3	12.3	126.37	-4.2	-116.0	129.9	106.3	23.59	5.506	
8,900.0	8,895.7	8,897.3	8,895.4	11.3	12.4	128.28	-5.1	-116.5	135.6	112.0	23.64	5.736	
8,925.0	8,918.7	8,921.1	8,919.3	11.3	12.4	130.37	-5.9	-116.8	142.3	118.6	23.70	6.005	
8,950.0	8,941.2	8,944.5	8,942.7	11.3	12.4	132.49	-6.8	-117.0	150.0	126.3	23.76	6.315	
8,975.0	8,963.0	8,967.4	8,965.5	11.3	12.5	134.57	-7.6	-117.1	158.9	135.0	23.82	6.670	
9,000.0	8,984.1	8,989.2	8,987.3	11.4	12.5	136.50	-8.4	-117.1	168.8	144.9	23.88	7.069	
9,025.0	9,004.6	9,010.1	9,008.2	11.4	12.5	138.25	-9.1	-117.1	180.0	156.0	23.94	7.517	
9,050.0	9,024.2	9,030.3	9,028.3	11.4	12.6	139.80	-9.8	-117.1	192.4	168.4	24.01	8.013	
9,075.0	9,043.1	9,049.6	9,047.7	11.5	12.6	141.14	-10.6	-117.1	206.0	181.9	24.08	8.554	
9,100.0	9,061.0	9,068.1	9,066.2	11.5	12.6	142.26	-11.3	-117.1	220.7	196.6	24.15	9.140	
9,125.0	9,078.0	9,085.5	9,083.6	11.6	12.7	143.11	-11.9	-117.1	236.6	212.4	24.22	9.767	
9,150.0	9,094.0	9,101.8	9,099.9	11.6	12.7	143.67	-12.6	-117.2	253.5	229.2	24.30	10.432	
9,175.0	9,109.0	9,117.2	9,115.1	11.7	12.7	143.97	-13.2	-117.2	271.5	247.1	24.38	11.133	
9,200.0	9,122.9	9,131.4	9,129.4	11.7	12.7	143.96	-13.7	-117.3	290.4	265.9	24.47	11.865	
9,225.0	9,135.7	9,144.6	9,142.6	11.8	12.8	143.63	-14.3	-117.4	310.1	285.6	24.57	12.624	
9,250.0	9,147.4	9,156.6	9,154.6	11.9	12.8	142.92	-14.7	-117.5	330.7	306.0	24.67	13.406	
9,275.0	9,157.9	9,168.0	9,166.0	12.0	12.8	141.84	-15.2	-117.6	352.0	327.2	24.78	14.204	
9,300.0	9,167.2	9,176.4	9,174.4	12.1	12.8	139.91	-15.5	-117.7	373.9	349.0	24.90	15.017	
9,325.0	9,175.3	9,184.1	9,182.0	12.2	12.8	137.33	-15.8	-117.8	396.5	371.5	25.04	15.835	
9,350.0	9,182.1	9,190.5	9,188.4	12.4	12.8	133.82	-16.0	-117.9	419.6	394.4	25.19	16.654	
9,375.0	9,187.6	9,195.7	9,193.6	12.5	12.8	129.06	-16.1	-118.0	443.1	417.7	25.37	17.465	
9,400.0	9,191.9	9,199.7	9,197.7	12.7	12.8	122.63	-16.3	-118.0	466.9	441.3	25.57	18.262	
9,425.0	9,194.9	9,202.6	9,200.5	12.9	12.8	114.04	-16.3	-118.1	491.0	465.2	25.79	19.038	
9,450.0	9,196.6	9,204.3	9,202.2	13.2	12.9	102.89	-16.4	-118.1	515.4	489.3	26.04	19.788	
9,469.5	9,197.0	9,204.9	9,202.8	13.4	12.9	92.52	-16.4	-118.1	534.4	508.1	26.26	20.351	
9,500.0	9,197.0	9,205.2	9,203.2	13.8	12.9	92.45	-16.4	-118.1	564.2	537.6	26.63	21.189	
9,600.0	9,197.0	9,206.5	9,204.4	15.2	12.9	92.26	-16.4	-118.1	661.5	633.5	28.02	23.611	
9,700.0	9,197.0	9,207.8	9,205.7	16.7	12.9	92.10	-16.5	-118.1	758.0	728.4	29.56	25.640	
9,800.0	9,197.0	9,209.1	9,207.0	18.3	12.9	91.96	-16.5	-118.1	853.5	822.4	31.15	27.400	
9,900.0	9,197.0	9,210.4	9,208.3	19.9	12.9	91.83	-16.5	-118.2	948.1	915.3	32.72	28.974	
10,000.0	9,197.0	9,211.7	9,209.6	21.4	12.9	91.72	-16.5	-118.2	1,041.4	1,007.2	34.24	30.415	
10,100.0	9,197.0	9,213.0	9,211.0	22.8	12.9	91.62	-16.6	-118.2	1,133.5	1,097.8	35.69	31.758	
10,200.0	9,197.0	9,214.4	9,212.3	24.2	12.9	91.54	-16.6	-118.2	1,224.2	1,187.1	37.07	33.027	
10,218.2	9,197.0	9,214.6	9,212.5	24.4	12.9	91.52	-16.6	-118.2	1,240.6	1,203.3	37.31	33.249	
10,300.0	9,197.0	9,215.7	9,213.6	25.5	12.9	91.63	-16.6	-118.2	1,314.4	1,276.0	38.40	34.227	
10,400.0	9,197.0	11,418.3	10,416.9	26.9	26.4	155.21	-1,279.2	-125.4	1,343.0	1,289.7	53.26	25.215	
10,500.0	9,197.0	11,536.3	10,421.4	28.3	28.1	155.46	-1,397.0	-120.5	1,345.1	1,288.7	56.40	23.850	
10,600.0	9,197.0	11,648.6	10,423.8	29.7	29.9	155.67	-1,509.2	-115.4	1,345.3	1,285.7	59.60	22.573	
10,700.0	9,197.0	11,724.0	10,425.9	31.2	31.0	155.81	-1,584.5	-112.3	1,346.4	1,284.2	62.21	21.642	
10,800.0	9,197.0	11,841.2	10,429.9	32.7	32.8	156.06	-1,701.5	-106.9	1,347.9	1,282.4	65.54	20.567	
10,900.0	9,197.0	11,948.0	10,432.3	34.2	34.6	156.30	-1,808.1	-101.1	1,348.0	1,279.3	68.79	19.598	
11,000.0	9,197.0	12,040.8	10,434.6	35.7	36.1	156.47	-1,900.8	-97.1	1,348.8	1,277.0	71.80	18.786	
11,100.0	9,197.0	12,135.0	10,436.6	37.3	37.6	156.64	-1,994.9	-93.2	1,349.4	1,274.5	74.86	18.027	
11,200.0	9,197.0	12,221.9	10,439.3	38.8	39.0	156.73	-2,081.8	-91.4	1,351.5	1,273.7	77.81	17.369	

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

COG PRODUCTION LLC

Anticollision Report

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 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 #1H - OWB - ACTUAL WELLPATH — Offset Site Error: 0.0 usft

Survey Program: 239-MWD, 761-MWD, 4644-MWD, 9817-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
11,300.0	9,197.0	12,330.5	10,441.2	40.4	40.8	156.81	-2,190.3	-89.5	1,352.7	1,271.5	81.14	16.672	
11,400.0	9,197.0	12,415.4	10,443.8	41.9	42.2	156.89	-2,275.1	-88.2	1,355.1	1,271.0	84.08	16.115	
11,500.0	9,197.0	12,532.6	10,447.2	43.5	44.1	157.00	-2,392.3	-85.9	1,357.2	1,269.6	87.63	15.489	
11,600.0	9,197.0	12,624.5	10,449.1	45.1	45.7	157.09	-2,484.2	-83.9	1,358.5	1,267.8	90.76	14.969	
11,700.0	9,197.0	12,704.1	10,451.6	46.7	47.0	157.14	-2,563.7	-83.1	1,361.3	1,267.7	93.64	14.537	
11,800.0	9,197.0	12,843.9	10,456.2	48.2	49.2	157.22	-2,703.4	-82.2	1,364.7	1,267.3	97.48	14.000	
11,900.0	9,197.0	12,913.3	10,456.6	49.8	50.4	157.17	-2,772.8	-83.3	1,366.2	1,266.0	100.21	13.633	
12,000.0	9,197.0	12,999.1	10,459.0	51.4	51.8	157.09	-2,858.5	-85.7	1,370.0	1,266.7	103.22	13.272	
12,100.0	9,197.0	13,123.2	10,461.4	53.0	53.9	156.98	-2,982.5	-88.9	1,373.1	1,266.2	106.92	12.842	
12,200.0	9,197.0	13,205.9	10,462.7	54.7	55.3	156.91	-3,065.2	-90.7	1,375.6	1,265.7	109.93	12.514	
12,300.0	9,197.0	13,329.5	10,464.9	56.3	57.3	156.80	-3,188.8	-93.7	1,378.5	1,264.9	113.62	12.133	
12,400.0	9,197.0	13,418.0	10,465.4	57.9	58.8	156.69	-3,277.2	-96.4	1,380.5	1,263.8	116.72	11.827	
12,500.0	9,197.0	13,493.8	10,466.2	59.5	60.1	156.54	-3,352.9	-100.3	1,383.8	1,264.2	119.58	11.572	
12,600.0	9,197.0	13,564.1	10,468.0	61.1	61.2	156.37	-3,423.0	-105.1	1,389.1	1,266.7	122.35	11.353	
12,700.0	9,197.0	13,639.0	10,471.3	62.8	62.4	156.19	-3,497.6	-110.9	1,396.5	1,271.3	125.19	11.154	
12,800.0	9,197.0	13,734.7	10,476.5	64.4	64.0	155.96	-3,592.9	-118.8	1,405.0	1,276.6	128.39	10.943	
12,900.0	9,197.0	13,864.1	10,482.2	66.0	66.2	155.65	-3,721.8	-128.8	1,412.5	1,280.3	132.21	10.684	
13,000.0	9,197.0	14,049.0	10,484.0	67.6	69.4	155.24	-3,906.2	-139.5	1,416.2	1,279.1	137.04	10.334	
13,100.0	9,197.0	14,140.8	10,482.6	69.3	71.0	155.11	-3,998.1	-142.0	1,416.3	1,276.1	140.23	10.100	
13,200.0	9,197.0	14,220.4	10,483.3	70.9	72.3	155.05	-4,077.6	-143.5	1,418.1	1,274.9	143.17	9.905	
13,300.0	9,197.0	14,303.6	10,485.2	72.5	73.6	155.01	-4,160.8	-144.8	1,421.1	1,274.9	146.16	9.722	
13,400.0	9,197.0	14,388.4	10,488.5	74.2	75.0	155.02	-4,245.5	-145.5	1,425.2	1,276.0	149.19	9.553	
13,500.0	9,197.0	14,476.5	10,493.0	75.8	76.5	155.07	-4,333.5	-145.9	1,430.3	1,278.0	152.28	9.393	
13,600.0	9,197.0	14,585.2	10,499.4	77.4	78.3	155.16	-4,442.0	-145.5	1,435.8	1,280.0	155.72	9.220	
13,700.0	9,197.0	14,708.3	10,503.9	79.1	80.3	155.19	-4,565.0	-146.1	1,439.5	1,280.1	159.42	9.030	
13,800.0	9,197.0	14,821.8	10,506.6	80.7	82.3	155.17	-4,678.5	-147.3	1,442.3	1,279.3	162.99	8.849	
13,900.0	9,197.0	14,872.0	10,507.4	82.4	83.1	155.15	-4,728.7	-147.8	1,445.5	1,280.0	165.50	8.734	
14,000.0	9,197.0	14,872.0	10,507.4	84.0	83.1	155.15	-4,728.7	-147.8	1,454.6	1,287.5	167.14	8.703	
14,100.0	9,197.0	14,872.0	10,507.4	85.7	83.1	155.15	-4,728.7	-147.8	1,470.5	1,301.8	168.78	8.713	
14,200.0	9,197.0	14,872.0	10,507.4	87.3	83.1	155.15	-4,728.7	-147.8	1,493.0	1,322.6	170.43	8.760	
14,300.0	9,197.0	14,872.0	10,507.4	88.9	83.1	155.15	-4,728.7	-147.8	1,521.7	1,349.6	172.07	8.843	
14,400.0	9,197.0	14,872.0	10,507.4	90.6	83.1	155.15	-4,728.7	-147.8	1,556.3	1,382.6	173.72	8.959	
14,500.0	9,197.0	14,872.0	10,507.4	92.2	83.1	155.15	-4,728.7	-147.8	1,596.5	1,421.1	175.37	9.104	
14,600.0	9,197.0	14,872.0	10,507.4	93.9	83.1	155.15	-4,728.7	-147.8	1,641.8	1,464.7	177.02	9.275	
14,700.0	9,197.0	14,872.0	10,507.4	95.5	83.1	155.15	-4,728.7	-147.8	1,691.7	1,513.1	178.66	9.469	
14,800.0	9,197.0	14,872.0	10,507.4	97.2	83.1	155.15	-4,728.7	-147.8	1,746.0	1,565.7	180.31	9.683	
14,900.0	9,197.0	14,872.0	10,507.4	98.8	83.1	155.15	-4,728.7	-147.8	1,804.2	1,622.2	181.96	9.915	
15,000.0	9,197.0	14,872.0	10,507.4	100.5	83.1	155.15	-4,728.7	-147.8	1,865.9	1,682.3	183.61	10.162	
15,100.0	9,197.0	14,872.0	10,507.4	102.1	83.1	155.15	-4,728.7	-147.8	1,930.9	1,745.6	185.26	10.422	
15,200.0	9,197.0	14,872.0	10,507.4	103.8	83.1	155.15	-4,728.7	-147.8	1,998.7	1,811.8	186.91	10.693	
15,300.0	9,197.0	14,872.0	10,507.4	105.4	83.1	155.15	-4,728.7	-147.8	2,069.2	1,880.6	188.56	10.973	
15,400.0	9,197.0	14,872.0	10,507.4	107.1	83.1	155.15	-4,728.7	-147.8	2,142.0	1,951.7	190.22	11.261	
15,500.0	9,197.0	14,872.0	10,507.4	108.7	83.1	155.15	-4,728.7	-147.8	2,216.9	2,025.0	191.87	11.554	
15,600.0	9,197.0	14,872.0	10,507.4	110.4	83.1	155.15	-4,728.7	-147.8	2,293.7	2,100.2	193.52	11.853	
15,700.0	9,197.0	14,872.0	10,507.4	112.0	83.1	155.15	-4,728.7	-147.8	2,372.3	2,177.1	195.17	12.155	
15,800.0	9,197.0	14,872.0	10,507.4	113.7	83.1	155.15	-4,728.7	-147.8	2,452.4	2,255.6	196.83	12.460	
15,900.0	9,197.0	14,872.0	10,507.4	115.4	83.1	155.15	-4,728.7	-147.8	2,533.9	2,335.5	198.48	12.767	
16,000.0	9,197.0	14,872.0	10,507.4	117.0	83.1	155.15	-4,728.7	-147.8	2,616.8	2,416.6	200.13	13.075	
16,100.0	9,197.0	14,872.0	10,507.4	118.7	83.1	155.15	-4,728.7	-147.8	2,700.7	2,499.0	201.79	13.384	
16,200.0	9,197.0	14,872.0	10,507.4	120.3	83.1	155.15	-4,728.7	-147.8	2,785.8	2,582.3	203.44	13.693	

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

COG PRODUCTION LLC

Anticollision Report

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 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 #1H - OWB - ACTUAL WELLPATH — Offset Site Error: 0.0 usft

Survey Program: 239-MWD, 761-MWD, 4644-MWD, 9817-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
16,300.0	9,197.0	14,872.0	10,507.4	122.0	83.1	155.15	-4,728.7	-147.8	2,871.8	2,666.7	205.10	14.002	
16,400.0	9,197.0	14,872.0	10,507.4	123.6	83.1	155.15	-4,728.7	-147.8	2,958.7	2,751.9	206.75	14.310	
16,500.0	9,197.0	14,872.0	10,507.4	125.3	83.1	155.15	-4,728.7	-147.8	3,046.4	2,838.0	208.41	14.617	
16,600.0	9,197.0	14,872.0	10,507.4	126.9	83.1	155.15	-4,728.7	-147.8	3,134.8	2,924.7	210.06	14.923	
16,700.0	9,197.0	14,872.0	10,507.4	128.6	83.1	155.15	-4,728.7	-147.8	3,223.9	3,012.2	211.72	15.227	
16,800.0	9,197.0	14,872.0	10,507.4	130.3	83.1	155.15	-4,728.7	-147.8	3,313.6	3,100.2	213.38	15.530	
16,900.0	9,197.0	14,872.0	10,507.4	131.9	83.1	155.15	-4,728.7	-147.8	3,403.9	3,188.9	215.03	15.830	
17,000.0	9,197.0	14,872.0	10,507.4	133.6	83.1	155.15	-4,728.7	-147.8	3,494.7	3,278.1	216.69	16.128	
17,100.0	9,197.0	14,872.0	10,507.4	135.2	83.1	155.15	-4,728.7	-147.8	3,586.1	3,367.7	218.35	16.424	
17,200.0	9,197.0	14,872.0	10,507.4	136.9	83.1	155.15	-4,728.7	-147.8	3,677.8	3,457.8	220.00	16.717	
17,300.0	9,197.0	14,872.0	10,507.4	138.5	83.1	155.15	-4,728.7	-147.8	3,770.0	3,548.4	221.66	17.008	
17,400.0	9,197.0	14,872.0	10,507.4	140.2	83.1	155.15	-4,728.7	-147.8	3,862.6	3,639.3	223.32	17.296	
17,500.0	9,197.0	14,872.0	10,507.4	141.8	83.1	155.15	-4,728.7	-147.8	3,955.5	3,730.5	224.97	17.582	
17,600.0	9,197.0	14,872.0	10,507.4	143.5	83.1	155.15	-4,728.7	-147.8	4,048.8	3,822.2	226.63	17.865	
17,700.0	9,197.0	14,872.0	10,507.4	145.2	83.1	155.15	-4,728.7	-147.8	4,142.4	3,914.1	228.29	18.145	
17,800.0	9,197.0	14,872.0	10,507.4	146.8	83.1	155.15	-4,728.7	-147.8	4,236.3	4,006.3	229.95	18.423	
17,900.0	9,197.0	14,872.0	10,507.4	148.5	83.1	155.15	-4,728.7	-147.8	4,330.4	4,098.8	231.61	18.697	
18,000.0	9,197.0	14,872.0	10,507.4	150.1	83.1	155.15	-4,728.7	-147.8	4,424.8	4,191.6	233.26	18.969	
18,100.0	9,197.0	14,872.0	10,507.4	151.8	83.1	155.15	-4,728.7	-147.8	4,519.5	4,284.5	234.92	19.238	
18,200.0	9,197.0	14,872.0	10,507.4	153.5	83.1	155.15	-4,728.7	-147.8	4,614.3	4,377.8	236.58	19.504	
18,300.0	9,197.0	14,872.0	10,507.4	155.1	83.1	155.15	-4,728.7	-147.8	4,709.4	4,471.2	238.24	19.768	
18,400.0	9,197.0	14,872.0	10,507.4	156.8	83.1	155.15	-4,728.7	-147.8	4,804.7	4,564.8	239.90	20.028	
18,500.0	9,197.0	14,872.0	10,507.4	158.4	83.1	155.15	-4,728.7	-147.8	4,900.2	4,658.6	241.56	20.286	
18,600.0	9,197.0	14,872.0	10,507.4	160.1	83.1	155.15	-4,728.7	-147.8	4,995.8	4,752.6	243.22	20.541	
18,700.0	9,197.0	14,872.0	10,507.4	161.8	83.1	155.15	-4,728.7	-147.8	5,091.7	4,846.8	244.88	20.793	
18,800.0	9,197.0	14,872.0	10,507.4	163.4	83.1	155.15	-4,728.7	-147.8	5,187.6	4,941.1	246.54	21.042	
18,900.0	9,197.0	14,872.0	10,507.4	165.1	83.1	155.15	-4,728.7	-147.8	5,283.8	5,035.6	248.20	21.289	
19,000.0	9,197.0	14,872.0	10,507.4	166.7	83.1	155.15	-4,728.7	-147.8	5,380.0	5,130.2	249.85	21.533	
19,100.0	9,197.0	14,872.0	10,507.4	168.4	83.1	155.15	-4,728.7	-147.8	5,476.4	5,224.9	251.51	21.774	
19,208.6	9,197.0	14,872.0	10,507.4	170.2	83.1	155.15	-4,728.7	-147.8	5,581.3	5,328.0	253.32	22.033	

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #1H - OWB - ACTUAL WELLPATH — Offset Site Error: 0.0 usft

Survey Program: 211-MWD, 4639-MWD, 7802-MWD — Offset Well Error: 0.0 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	2.0	2.0	0.0	0.0	-85.43	18.4	-230.2	230.9				
100.0	100.0	104.3	104.3	0.0	0.1	-85.39	18.5	-229.7	230.4	230.3	0.15	1,583.359	
200.0	200.0	206.5	206.5	0.2	0.2	-85.27	18.9	-228.1	229.0	228.6	0.39	584.980	
300.0	300.0	303.6	303.5	0.3	0.4	-85.15	19.2	-226.8	227.6	226.9	0.71	319.514	
400.0	400.0	403.6	403.6	0.4	0.6	-85.07	19.5	-226.2	227.1	226.0	1.05	215.954	
500.0	500.0	504.4	504.3	0.6	0.8	-85.02	19.6	-225.3	226.2	224.8	1.40	162.143	
600.0	600.0	605.1	605.1	0.7	1.0	-84.99	19.6	-224.1	225.0	223.3	1.74	129.469	
700.0	700.0	705.9	705.8	0.8	1.2	-84.98	19.5	-222.6	223.5	221.4	2.08	107.398	
800.0	800.0	805.9	805.9	1.0	1.5	-85.00	19.3	-220.8	221.6	219.2	2.42	91.480	
900.0	900.0	905.0	904.9	1.1	1.7	-85.05	19.0	-219.3	220.1	217.3	2.76	79.634	
1,000.0	1,000.0	1,004.4	1,004.3	1.2	1.9	-85.14	18.5	-218.2	219.0	215.9	3.11	70.503	
1,100.0	1,100.0	1,105.0	1,104.9	1.4	2.1	-85.28	17.9	-217.0	217.8	214.3	3.45	63.101	
1,200.0	1,200.0	1,205.7	1,205.5	1.5	2.3	-85.48	17.1	-215.6	216.3	212.5	3.80	56.967	
1,300.0	1,300.0	1,305.6	1,305.5	1.6	2.5	-85.71	16.1	-214.0	214.6	210.5	4.14	51.850	
1,400.0	1,400.0	1,405.5	1,405.3	1.8	2.7	-85.93	15.1	-212.5	213.0	208.6	4.48	47.539	
1,500.0	1,500.0	1,505.3	1,505.1	1.9	2.9	-86.13	14.3	-211.0	211.5	206.7	4.82	43.857	
1,600.0	1,600.0	1,605.1	1,604.9	2.0	3.1	-86.32	13.5	-209.6	210.1	204.9	5.17	40.677	
1,700.0	1,700.0	1,704.9	1,704.7	2.2	3.3	-86.50	12.7	-208.3	208.7	203.2	5.51	37.907	
1,800.0	1,800.0	1,804.7	1,804.5	2.3	3.6	-86.67	12.1	-207.1	207.5	201.6	5.85	35.474	
1,900.0	1,900.0	1,904.6	1,904.4	2.4	3.8	-86.82	11.5	-206.0	206.3	200.1	6.19	33.323	
2,000.0	2,000.0	2,004.4	2,004.2	2.6	4.0	-86.95	10.9	-204.9	205.2	198.7	6.53	31.409	
2,100.0	2,100.0	2,104.2	2,104.0	2.7	4.2	-87.07	10.4	-203.9	204.2	197.3	6.87	29.697	
2,200.0	2,200.0	2,204.3	2,204.1	2.8	4.4	-87.17	10.0	-202.9	203.2	195.9	7.22	28.154	
2,300.0	2,300.0	2,304.4	2,304.2	2.9	4.6	-87.27	9.6	-201.9	202.1	194.6	7.56	26.743	
2,400.0	2,400.0	2,404.5	2,404.3	3.1	4.8	-87.37	9.2	-200.8	201.0	193.1	7.90	25.447	
2,500.0	2,500.0	2,504.5	2,504.2	3.2	5.0	-87.46	8.8	-199.6	199.9	191.6	8.24	24.253	
2,600.0	2,600.0	2,602.9	2,602.7	3.3	5.2	-87.61	8.3	-198.9	199.1	190.5	8.58	23.213	
2,645.6	2,645.6	2,647.8	2,647.6	3.4	5.3	-87.72	7.9	-198.9	199.0	190.3	8.73	22.795	
2,700.0	2,700.0	2,701.4	2,701.2	3.5	5.4	-87.87	7.4	-199.0	199.2	190.2	8.92	22.338	
2,800.0	2,800.0	2,800.7	2,800.4	3.6	5.6	-88.24	6.1	-199.8	199.9	190.7	9.25	21.602	
2,900.0	2,900.0	2,902.9	2,902.6	3.7	5.9	-88.58	5.0	-200.1	200.2	190.6	9.60	20.847	
3,000.0	3,000.0	3,005.2	3,004.9	3.9	6.1	-88.82	4.1	-199.2	199.3	189.3	9.95	20.032	
3,100.0	3,100.0	3,106.8	3,106.5	4.0	6.3	-88.97	3.5	-197.2	197.3	187.0	10.29	19.168	
3,200.0	3,200.0	3,206.9	3,206.5	4.1	6.5	-89.17	2.8	-194.9	195.0	184.4	10.64	18.329	
3,300.0	3,300.0	3,306.9	3,306.5	4.3	6.7	-89.37	2.1	-192.6	192.7	181.7	10.98	17.540	
3,400.0	3,400.0	3,406.9	3,406.5	4.4	6.9	-89.54	1.5	-190.2	190.3	179.0	11.33	16.797	
3,500.0	3,500.0	3,506.9	3,506.5	4.5	7.1	-89.68	1.0	-187.9	187.9	176.2	11.67	16.096	
3,600.0	3,600.0	3,607.0	3,606.5	4.7	7.4	-89.83	0.6	-185.4	185.5	173.5	12.02	15.433	
3,700.0	3,700.0	3,707.0	3,706.5	4.8	7.6	-90.12	-0.4	-183.0	183.0	170.7	12.36	14.803	
3,800.0	3,800.0	3,806.2	3,805.7	4.9	7.8	-90.57	-1.8	-180.7	180.7	168.0	12.71	14.223	
3,900.0	3,900.0	3,906.6	3,906.0	5.1	8.0	-91.15	-3.6	-178.5	178.6	165.6	13.05	13.683	
4,000.0	4,000.0	4,006.3	4,005.7	5.2	8.2	-91.75	-5.4	-176.3	176.4	163.0	13.40	13.168	
4,100.0	4,100.0	4,106.4	4,105.7	5.3	8.4	-92.37	-7.2	-174.1	174.3	160.6	13.74	12.682	
4,200.0	4,200.0	4,206.5	4,205.8	5.5	8.6	-93.03	-9.1	-171.9	172.2	158.1	14.09	12.218	
4,300.0	4,300.0	4,306.6	4,305.9	5.6	8.9	-93.83	-11.3	-169.4	169.8	155.4	14.44	11.761	
4,400.0	4,400.0	4,406.3	4,405.5	5.7	9.1	-94.73	-13.8	-167.1	167.8	153.0	14.79	11.344	
4,500.0	4,500.0	4,506.2	4,505.4	5.8	9.3	-95.70	-16.4	-164.7	165.6	150.5	15.11	10.954	
4,600.0	4,600.0	4,607.1	4,606.1	6.0	9.4	-96.69	-19.0	-162.1	163.3	147.9	15.36	10.632	
4,700.0	4,700.0	4,705.5	4,704.5	6.1	9.4	-97.63	-21.4	-159.6	161.0	145.5	15.53	10.366	
4,775.7	4,775.7	4,778.7	4,777.7	6.2	9.4	-98.05	-22.5	-158.8	160.4	144.7	15.64	10.253	CC, ES
4,800.0	4,800.0	4,802.1	4,801.1	6.2	9.4	-98.13	-22.7	-158.8	160.4	144.8	15.67	10.235	

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

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #1H - OWB - ACTUAL WELLPATH — Offset Site Error: 0.0 usft

Survey Program: 211-MWD, 4839-MWD, 7802-MWD — Offset Well Error: 0.0 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
4,900.0	4,900.0	4,901.4	4,900.4	6.4	9.4	-98.30	-23.3	-159.8	161.5	145.6	15.82	10.207	
5,000.0	5,000.0	5,001.8	5,000.8	6.5	9.5	-98.54	-24.1	-160.5	162.3	146.4	15.97	10.167	
5,100.0	5,100.0	5,102.1	5,101.1	6.6	9.5	-98.75	-24.8	-161.1	163.0	146.9	16.12	10.108	
5,200.0	5,200.0	5,201.9	5,200.9	6.8	9.5	-98.97	-25.5	-161.6	163.6	147.3	16.28	10.045	
5,300.0	5,300.0	5,302.0	5,300.9	6.9	9.5	-99.18	-26.2	-162.1	164.2	147.8	16.45	9.984	
5,400.0	5,400.0	5,401.2	5,400.2	7.0	9.6	-99.38	-26.9	-162.9	165.1	148.5	16.61	9.937	
5,500.0	5,500.0	5,501.1	5,500.1	7.2	9.6	-99.54	-27.5	-163.9	166.2	149.4	16.78	9.903	
5,600.0	5,600.0	5,601.2	5,600.1	7.3	9.7	-99.71	-28.2	-164.9	167.3	150.4	16.96	9.866	
5,700.0	5,700.0	5,701.0	5,699.9	7.4	9.7	-99.85	-28.8	-166.0	168.5	151.4	17.14	9.830	
5,800.0	5,800.0	5,801.0	5,799.9	7.6	9.8	-100.03	-29.6	-167.2	169.8	152.5	17.33	9.803	
5,900.0	5,900.0	5,901.5	5,900.4	7.7	9.8	-100.15	-30.1	-168.1	170.8	153.3	17.51	9.753	
6,000.0	6,000.0	6,001.4	6,000.3	7.8	9.9	-100.31	-30.7	-169.0	171.8	154.1	17.71	9.703	
6,100.0	6,100.0	6,101.6	6,100.5	8.0	9.9	-100.32	-30.9	-169.9	172.7	154.8	17.90	9.646	
6,200.0	6,200.0	6,200.9	6,199.8	8.1	10.0	-100.37	-31.3	-170.8	173.7	155.6	18.10	9.593	
6,300.0	6,300.0	6,300.4	6,299.3	8.2	10.1	-100.44	-31.7	-172.3	175.2	156.9	18.31	9.568	
6,400.0	6,400.0	6,400.5	6,399.4	8.4	10.2	-100.56	-32.4	-173.7	176.7	158.2	18.52	9.542	
6,500.0	6,500.0	6,500.9	6,499.8	8.5	10.2	-100.70	-33.0	-174.9	178.1	159.3	18.73	9.506	
6,600.0	6,600.0	6,600.9	6,599.8	8.6	10.3	-100.65	-33.1	-176.2	179.3	160.3	18.95	9.462	
6,700.0	6,700.0	6,699.8	6,698.7	8.8	10.4	-100.65	-33.4	-177.6	180.8	161.6	19.16	9.432	
6,800.0	6,800.0	6,799.7	6,798.5	8.9	10.5	-100.66	-33.8	-179.5	182.7	163.3	19.39	9.422	
6,900.0	6,900.0	6,900.5	6,899.3	9.0	10.6	-100.57	-33.8	-181.2	184.3	164.7	19.61	9.399	
7,000.0	7,000.0	6,999.7	6,998.6	9.1	10.7	-100.45	-33.7	-182.9	186.0	166.2	19.84	9.376	
7,100.0	7,100.0	7,100.7	7,099.5	9.3	10.8	-100.39	-33.8	-184.4	187.5	167.4	20.07	9.341	
7,200.0	7,200.0	7,199.8	7,198.6	9.4	10.9	-100.29	-33.8	-186.1	189.2	168.9	20.31	9.315	
7,300.0	7,300.0	7,300.0	7,298.8	9.5	11.0	-100.25	-34.0	-187.8	190.8	170.3	20.55	9.288	
7,400.0	7,400.0	7,399.4	7,398.2	9.7	11.1	-100.23	-34.2	-189.6	192.7	171.9	20.79	9.268	
7,500.0	7,500.0	7,499.2	7,497.9	9.8	11.2	-100.22	-34.5	-191.6	194.7	173.7	21.03	9.258	
7,600.0	7,600.0	7,599.2	7,597.9	9.9	11.3	-100.23	-35.0	-193.7	196.8	175.5	21.28	9.248	
7,700.0	7,700.0	7,699.0	7,697.6	10.1	11.5	-100.34	-35.7	-195.7	198.9	177.4	21.54	9.237	
7,800.0	7,800.0	7,800.2	7,798.9	10.2	11.6	-101.00	-38.3	-197.2	201.0	179.2	21.76	9.237	
7,900.0	7,900.0	7,895.3	7,892.8	10.3	11.6	-104.75	-51.9	-197.1	204.0	182.1	21.91	9.309	
8,000.0	8,000.0	7,982.3	7,976.3	10.5	11.6	-111.29	-76.1	-195.4	211.3	189.2	22.09	9.564	
8,100.0	8,100.0	8,060.8	8,048.3	10.6	11.7	-118.82	-107.3	-195.0	229.0	206.7	22.31	10.263	
8,200.0	8,200.0	8,133.3	8,111.3	10.7	11.9	-126.27	-143.2	-195.1	258.4	235.9	22.58	11.446	
8,300.0	8,300.0	8,199.5	8,165.3	10.9	12.0	-133.05	-181.4	-194.2	298.8	275.9	22.89	13.055	
8,400.0	8,400.0	8,249.4	8,203.3	11.0	12.2	-137.81	-213.6	-193.7	350.2	327.0	23.20	15.094	
8,500.0	8,500.0	8,290.0	8,232.0	11.1	12.4	-141.29	-242.4	-194.3	411.5	388.0	23.51	17.504	
8,600.0	8,600.0	8,329.9	8,257.9	11.2	12.6	-144.40	-272.6	-195.2	480.4	456.6	23.79	20.197	
8,700.0	8,700.0	8,367.0	8,280.5	11.2	12.8	-147.07	-302.2	-195.7	554.3	530.3	24.02	23.078	
8,719.5	8,719.5	8,373.9	8,284.5	11.2	12.9	-147.54	-307.7	-195.8	569.2	545.2	24.07	23.650	
8,725.0	8,725.0	8,375.8	8,285.6	11.2	12.9	61.93	-309.3	-195.8	573.5	549.4	24.08	23.811	
8,750.0	8,750.0	8,384.8	8,290.7	11.2	12.9	58.34	-316.7	-195.8	592.5	568.4	24.15	24.536	
8,775.0	8,774.9	8,399.0	8,298.6	11.2	13.0	54.83	-328.5	-195.7	611.4	587.1	24.25	25.209	
8,800.0	8,799.6	8,399.0	8,298.6	11.2	13.0	52.17	-328.5	-195.7	629.9	605.7	24.26	25.964	
8,825.0	8,824.1	8,413.8	8,306.7	11.2	13.1	49.28	-341.0	-195.6	648.1	623.7	24.38	26.581	
8,850.0	8,848.4	8,430.0	8,315.2	11.3	13.3	46.72	-354.7	-195.4	665.9	641.4	24.51	27.165	
8,875.0	8,872.3	8,430.0	8,315.2	11.3	13.3	44.66	-354.7	-195.4	683.2	658.7	24.53	27.856	
8,900.0	8,895.7	8,442.0	8,321.2	11.3	13.4	42.65	-365.1	-195.2	700.2	675.5	24.64	28.414	
8,925.0	8,918.7	8,450.4	8,325.3	11.3	13.4	40.87	-372.3	-195.0	716.7	691.9	24.73	28.982	
8,950.0	8,941.2	8,461.0	8,330.4	11.3	13.5	39.28	-381.7	-194.7	732.7	707.8	24.84	29.502	

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

COG PRODUCTION LLC

Anticollision Report

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #1H - OWB - ACTUAL WELLPATH — Offset Site Error: 0.0 usft

Survey Program: 211-MWD, 4639-MWD, 7802-MWD — Offset Well Error: 0.0 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
8,975.0	8,963.0	8,461.0	8,330.4	11.3	13.5	37.79	-381.7	-194.7	748.3	723.4	24.86	30.100	
9,000.0	8,984.1	8,475.4	8,336.9	11.4	13.6	36.53	-394.6	-194.3	763.2	738.2	25.01	30.513	
9,025.0	9,004.6	8,493.0	8,344.3	11.4	13.8	35.46	-410.5	-193.7	777.8	752.6	25.20	30.869	
9,050.0	9,024.2	8,493.0	8,344.3	11.4	13.8	34.33	-410.5	-193.7	791.6	766.4	25.23	31.374	
9,075.0	9,043.1	8,493.0	8,344.3	11.5	13.8	33.26	-410.5	-193.7	805.1	779.8	25.27	31.860	
9,100.0	9,061.0	8,509.0	8,350.6	11.5	13.9	32.54	-425.2	-193.1	817.7	792.3	25.46	32.116	
9,125.0	9,078.0	8,524.0	8,356.1	11.6	14.1	31.92	-439.1	-192.6	830.0	804.3	25.65	32.357	
9,150.0	9,094.0	8,524.0	8,356.1	11.6	14.1	31.11	-439.1	-192.6	841.5	815.8	25.70	32.739	
9,175.0	9,109.0	8,536.4	8,360.3	11.7	14.2	30.60	-450.8	-192.1	852.4	826.5	25.89	32.928	
9,200.0	9,122.9	8,546.6	8,363.6	11.7	14.3	30.13	-460.4	-191.7	862.6	836.5	26.05	33.107	
9,225.0	9,135.7	8,556.0	8,366.5	11.8	14.4	29.71	-469.4	-191.2	872.1	845.9	26.22	33.259	
9,250.0	9,147.4	8,567.5	8,369.9	11.9	14.5	29.40	-480.4	-190.5	880.9	854.5	26.43	33.331	
9,275.0	9,157.9	8,578.2	8,372.8	12.0	14.7	29.13	-490.6	-189.8	889.0	862.4	26.64	33.372	
9,300.0	9,167.2	8,596.0	8,377.3	12.1	14.8	29.07	-507.8	-188.5	896.5	869.5	26.94	33.275	
9,325.0	9,175.3	8,596.0	8,377.3	12.2	14.8	28.67	-507.8	-188.5	903.1	876.0	27.07	33.367	
9,350.0	9,182.1	8,607.3	8,379.9	12.4	15.0	28.59	-518.7	-187.7	909.1	881.7	27.34	33.252	
9,375.0	9,187.6	8,615.6	8,381.6	12.5	15.1	28.48	-526.8	-187.1	914.4	886.8	27.60	33.129	
9,400.0	9,191.9	8,628.0	8,384.0	12.7	15.2	28.53	-539.0	-186.3	919.0	891.1	27.93	32.900	
9,425.0	9,194.9	8,628.0	8,384.0	12.9	15.2	28.30	-539.0	-186.3	923.0	894.8	28.15	32.782	
9,450.0	9,196.6	8,639.5	8,386.0	13.2	15.3	28.43	-550.3	-185.6	926.2	897.7	28.54	32.456	
9,469.5	9,197.0	8,645.4	8,386.9	13.4	15.4	28.48	-556.1	-185.3	928.3	899.5	28.82	32.209	
9,500.0	9,197.0	8,659.0	8,388.8	13.8	15.6	28.98	-569.6	-184.7	931.5	902.2	29.35	31.741	
9,600.0	9,197.0	8,690.0	8,391.6	15.2	16.0	30.22	-600.4	-183.7	944.8	913.6	31.11	30.365	
9,700.0	9,197.0	8,731.1	8,393.2	16.7	16.5	31.63	-641.5	-182.8	961.2	928.0	33.18	28.971	
9,800.0	9,197.0	8,793.0	8,392.8	18.3	17.3	33.23	-703.3	-182.4	979.3	943.7	35.57	27.534	
9,900.0	9,197.0	8,917.0	8,392.0	19.9	18.8	35.15	-827.4	-180.1	993.6	954.9	38.70	25.674	
10,000.0	9,197.0	9,008.2	8,392.3	21.4	20.0	36.20	-918.5	-177.8	1,003.3	961.9	41.40	24.233	
10,100.0	9,197.0	9,090.5	8,390.4	22.8	21.2	36.74	-1,000.8	-175.6	1,010.8	966.8	44.01	22.966	
10,200.0	9,197.0	9,196.2	8,387.3	24.2	22.7	36.84	-1,106.4	-172.0	1,014.3	967.4	46.94	21.609	
10,218.2	9,197.0	9,214.1	8,386.9	24.4	23.0	36.82	-1,124.2	-171.5	1,014.5	967.0	47.44	21.385	
10,300.0	9,197.0	9,295.3	8,385.8	25.5	24.2	36.76	-1,205.4	-170.4	1,015.0	965.3	49.69	20.425	
10,400.0	9,197.0	9,385.4	8,386.4	26.9	25.5	36.87	-1,295.5	-171.8	1,015.8	963.4	52.38	19.394	
10,500.0	9,197.0	9,474.3	8,387.0	28.3	26.8	37.09	-1,384.3	-175.8	1,018.3	963.2	55.12	18.476	
10,600.0	9,197.0	9,572.1	8,387.6	29.7	28.3	37.32	-1,482.1	-179.7	1,020.6	962.5	58.06	17.577	
10,700.0	9,197.0	9,665.2	8,386.0	31.2	29.8	37.44	-1,575.0	-183.2	1,024.6	963.6	60.99	16.798	
10,800.0	9,197.0	9,841.2	8,387.2	32.7	32.6	37.50	-1,751.0	-182.6	1,024.0	958.8	65.26	15.691	
10,900.0	9,197.0	9,945.7	8,389.4	34.2	34.3	37.39	-1,855.3	-177.8	1,019.9	951.4	68.48	14.894	
11,000.0	9,197.0	10,052.2	8,389.5	35.7	36.1	37.05	-1,961.5	-169.4	1,015.5	943.7	71.77	14.149	
11,100.0	9,197.0	10,164.3	8,391.0	37.3	37.9	36.73	-2,073.2	-160.5	1,009.9	934.8	75.15	13.438	
11,200.0	9,197.0	10,259.0	8,392.5	38.8	39.5	36.43	-2,167.6	-152.3	1,003.9	925.6	78.27	12.826	
11,300.0	9,197.0	10,362.5	8,395.2	40.4	41.2	36.24	-2,270.8	-145.7	998.4	916.9	81.53	12.246	
11,400.0	9,197.0	10,437.3	8,397.3	41.9	42.4	36.14	-2,345.5	-141.5	993.3	909.0	84.32	11.780	
11,500.0	9,197.0	10,552.2	8,398.4	43.5	44.3	35.99	-2,460.2	-136.8	990.7	902.9	87.82	11.281	
11,600.0	9,197.0	10,630.5	8,399.4	45.1	45.7	35.80	-2,538.4	-131.6	986.3	895.5	90.72	10.871	
11,700.0	9,197.0	10,736.8	8,398.2	46.7	47.5	35.52	-2,644.6	-125.7	984.4	890.2	94.12	10.459	
11,800.0	9,197.0	10,840.6	8,397.5	48.2	49.3	35.10	-2,747.9	-116.9	980.4	882.9	97.50	10.056	
11,900.0	9,197.0	10,930.0	8,396.0	49.8	50.8	34.72	-2,837.0	-109.3	977.2	876.6	100.62	9.711	
11,993.8	9,197.0	10,998.2	8,394.8	51.3	51.9	34.50	-2,905.0	-105.3	975.8	872.5	103.27	9.448	
12,000.0	9,197.0	11,002.4	8,394.7	51.4	52.0	34.49	-2,909.3	-105.1	975.8	872.3	103.45	9.433	
12,100.0	9,197.0	11,087.9	8,392.6	53.0	53.4	34.38	-2,994.7	-103.8	977.3	870.8	106.48	9.178	
12,200.0	9,197.0	11,193.5	8,392.2	54.7	55.2	34.46	-3,100.3	-105.0	978.6	868.7	109.85	8.908	

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

COG PRODUCTION LLC

Anticollision Report

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #1H - OWB - ACTUAL WELLPATH — Offset Site Error: 0.0 usft

Survey Program: 211-MWD, 4639-MWD, 7802-MWD — Offset Well Error: 0.0 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
12,300.0	9,197.0	11,287.4	8,391.9	56.3	56.8	34.53	-3,194.2	-106.1	979.8	866.8	113.04	8.668	
12,400.0	9,197.0	11,377.1	8,392.0	57.9	58.3	34.71	-3,283.8	-109.3	982.1	866.0	116.15	8.456	
12,500.0	9,197.0	11,482.2	8,392.3	59.5	60.0	35.00	-3,388.9	-114.4	985.0	865.5	119.51	8.242	
12,600.0	9,197.0	11,570.1	8,392.6	61.1	61.5	35.20	-3,476.6	-118.0	987.5	864.9	122.60	8.055	
12,700.0	9,197.0	11,679.2	8,392.2	62.6	63.3	35.51	-3,585.6	-123.9	991.4	865.3	126.05	7.865	
12,800.0	9,197.0	11,773.7	8,393.6	64.4	64.9	35.83	-3,679.9	-129.3	993.9	864.7	129.24	7.690	
12,900.0	9,197.0	11,889.9	8,394.8	66.0	66.8	36.20	-3,795.9	-135.7	996.7	863.9	132.81	7.505	
13,000.0	9,197.0	11,984.0	8,394.8	67.6	68.4	36.36	-3,890.0	-138.4	998.7	862.7	136.03	7.342	
13,100.0	9,197.0	12,062.8	8,394.2	69.3	69.7	36.50	-3,968.7	-141.6	1,002.1	863.1	139.00	7.209	
13,200.0	9,197.0	12,139.4	8,392.8	70.9	71.0	36.68	-4,045.1	-146.1	1,007.5	865.6	141.93	7.098	
13,300.0	9,197.0	12,266.2	8,391.2	72.5	73.1	37.12	-4,171.5	-156.2	1,013.8	868.1	145.68	6.959	
13,400.0	9,197.0	12,367.1	8,392.5	74.2	74.8	37.54	-4,272.1	-163.8	1,017.8	868.8	148.99	6.831	
13,500.0	9,197.0	12,475.4	8,394.8	75.8	76.6	38.01	-4,380.1	-172.0	1,021.1	868.7	152.43	6.699	
13,600.0	9,197.0	12,571.9	8,396.6	77.4	78.2	38.40	-4,476.3	-178.8	1,024.4	868.7	155.69	6.580	
13,700.0	9,197.0	12,675.8	8,396.8	79.1	80.0	38.67	-4,580.1	-184.2	1,027.8	868.7	159.10	6.460	
13,800.0	9,197.0	12,787.0	8,395.0	80.7	81.9	38.70	-4,691.3	-185.7	1,030.3	867.7	162.64	6.335	
13,900.0	9,197.0	12,895.6	8,391.5	82.4	83.8	38.51	-4,799.8	-183.3	1,031.9	865.7	166.16	6.210	
14,000.0	9,197.0	13,045.5	8,388.7	84.0	86.4	38.11	-4,949.4	-175.5	1,030.4	860.0	170.39	6.048	
14,100.0	9,197.0	13,135.5	8,388.1	85.7	87.9	37.84	-5,039.3	-169.5	1,027.2	853.6	173.60	5.917	
14,200.0	9,197.0	13,225.6	8,385.8	87.3	89.5	37.50	-5,129.0	-162.9	1,025.1	848.3	176.82	5.798	
14,300.0	9,197.0	13,333.7	8,383.8	88.9	91.4	37.17	-5,236.9	-156.4	1,023.4	843.1	180.33	5.675	
14,400.0	9,197.0	13,436.3	8,385.0	90.6	93.1	37.04	-5,339.4	-151.8	1,020.0	836.3	183.73	5.552	
14,500.0	9,197.0	13,517.4	8,384.9	92.2	94.5	36.93	-5,420.4	-149.1	1,018.5	831.7	186.77	5.453	
14,600.0	9,197.0	13,611.0	8,384.6	93.9	96.1	36.85	-5,514.1	-147.0	1,017.8	827.8	190.03	5.356	
14,611.1	9,197.0	13,620.6	8,384.5	94.1	96.3	36.85	-5,523.7	-146.8	1,017.8	827.4	190.38	5.346	
14,700.0	9,197.0	13,721.4	8,383.3	95.5	98.0	36.74	-5,624.4	-144.8	1,017.9	824.4	193.58	5.258	
14,800.0	9,197.0	13,833.2	8,385.1	97.2	100.0	36.67	-5,736.1	-141.3	1,015.1	817.9	197.16	5.149	
14,900.0	9,197.0	13,925.1	8,384.9	98.8	101.6	36.52	-5,828.0	-137.6	1,013.2	812.8	200.41	5.056	
15,000.0	9,197.0	14,037.1	8,383.9	100.5	103.5	36.26	-5,939.8	-131.8	1,011.3	807.3	204.01	4.957	
15,100.0	9,197.0	14,151.7	8,384.0	102.1	105.5	35.96	-6,054.2	-124.5	1,007.7	800.1	207.64	4.853	
15,200.0	9,197.0	14,260.9	8,385.8	103.8	107.4	35.71	-6,163.1	-117.1	1,002.8	791.6	211.18	4.748	
15,300.0	9,197.0	14,347.3	8,386.9	105.4	108.9	35.50	-6,249.3	-111.3	998.3	783.9	214.34	4.658	
15,400.0	9,197.0	14,430.0	8,386.0	107.1	110.4	35.22	-6,331.8	-105.4	995.3	777.9	217.45	4.577	
15,500.0	9,197.0	14,526.9	8,384.4	108.7	112.0	34.91	-6,428.5	-99.3	993.4	772.6	220.79	4.499	
15,600.0	9,197.0	14,644.8	8,384.2	110.4	114.1	34.61	-6,546.1	-92.4	990.5	766.0	224.48	4.412	
15,700.0	9,197.0	14,744.0	8,383.5	112.0	115.8	34.25	-6,645.1	-84.9	987.2	759.3	227.86	4.332	
15,800.0	9,197.0	14,839.3	8,383.7	113.7	117.5	33.98	-6,740.2	-78.4	983.5	752.4	231.18	4.255	
15,900.0	9,197.0	14,921.4	8,382.0	115.4	118.9	33.68	-6,822.1	-73.0	981.8	747.6	234.26	4.191	
16,000.0	9,197.0	15,031.1	8,380.7	117.0	120.8	33.36	-6,931.5	-66.7	980.0	742.2	237.82	4.121	
16,100.0	9,197.0	15,128.7	8,381.2	118.7	122.5	33.25	-7,029.1	-63.4	978.0	736.9	241.15	4.056	
16,200.0	9,197.0	15,223.6	8,382.7	120.3	124.1	33.27	-7,124.0	-62.3	976.4	732.0	244.44	3.994	
16,300.0	9,197.0	15,314.2	8,383.4	122.0	125.7	33.27	-7,214.5	-61.3	975.5	727.8	247.66	3.939	
16,328.1	9,197.0	15,338.8	8,383.5	122.4	126.1	33.28	-7,239.1	-61.3	975.5	726.9	248.56	3.925	
16,400.0	9,197.0	15,402.2	8,383.7	123.6	127.2	33.33	-7,302.6	-61.7	975.8	724.9	250.84	3.890	
16,500.0	9,197.0	15,494.0	8,382.7	125.3	128.8	33.33	-7,394.4	-61.9	977.2	723.1	254.08	3.846	
16,600.0	9,197.0	15,590.3	8,381.8	126.9	130.5	33.39	-7,490.6	-63.1	979.0	721.6	257.40	3.803	
16,700.0	9,197.0	15,690.7	8,379.8	128.6	132.2	33.40	-7,591.0	-64.0	981.4	720.6	260.79	3.763	
16,800.0	9,197.0	15,811.3	8,380.4	130.3	134.3	33.56	-7,711.6	-66.1	982.3	717.8	264.51	3.714	
16,863.0	9,197.0	15,873.4	8,382.1	131.3	135.3	33.72	-7,773.6	-67.9	982.2	715.5	266.61	3.684	
16,900.0	9,197.0	15,905.1	8,382.7	131.9	135.9	33.79	-7,805.3	-68.8	982.3	714.5	267.77	3.668	

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

COG PRODUCTION LLC

Anticollision Report

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #1H - OWB - ACTUAL WELLPATH — Offset Site Error: 0.0 usft

Survey Program: 211-MWD, 4639-MWD, 7802-MWD — Offset Well Error: 0.0 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
17,000.0	9,197.0	15,999.6	8,383.6	133.6	137.5	33.97	-7,899.8	-71.4	983.3	712.3	271.06	3.628	
17,100.0	9,197.0	16,105.6	8,383.7	135.2	139.3	34.07	-8,005.8	-72.7	984.3	709.7	274.55	3.585	
17,200.0	9,197.0	16,210.4	8,383.1	136.9	141.2	34.03	-8,110.5	-71.6	984.5	706.5	278.03	3.541	
17,300.0	9,197.0	16,312.5	8,382.0	138.5	142.9	33.91	-8,212.6	-69.3	984.5	703.0	281.46	3.498	
17,400.0	9,197.0	16,420.9	8,382.5	140.2	144.8	33.91	-8,321.1	-68.2	983.9	698.9	284.99	3.452	
17,500.0	9,197.0	16,522.4	8,384.9	141.8	146.5	34.05	-8,422.5	-68.9	982.6	694.2	288.39	3.407	
17,576.9	9,197.0	16,588.2	8,385.8	143.1	147.7	34.11	-8,488.3	-69.1	982.2	691.4	290.81	3.377	
17,600.0	9,197.0	16,608.6	8,385.8	143.5	148.0	34.11	-8,508.7	-69.0	982.2	690.6	291.55	3.369	
17,700.0	9,197.0	16,699.8	8,384.8	145.2	149.6	34.07	-8,599.9	-68.2	982.9	688.1	294.81	3.334	
17,800.0	9,197.0	16,799.3	8,384.0	146.8	151.4	34.08	-8,699.4	-68.3	984.1	685.9	298.19	3.300	
17,900.0	9,197.0	16,890.6	8,383.3	148.5	153.0	34.13	-8,790.7	-69.3	985.6	684.2	301.43	3.270	
18,000.0	9,197.0	16,975.5	8,380.8	150.1	154.4	34.08	-8,875.6	-69.6	988.6	684.0	304.57	3.246	
18,100.0	9,197.0	17,100.4	8,378.1	151.8	156.6	34.03	-9,000.4	-69.6	990.7	682.3	308.38	3.212	
18,200.0	9,197.0	17,201.2	8,379.1	153.5	158.3	34.21	-9,101.2	-72.0	991.5	679.7	311.76	3.180	
18,300.0	9,197.0	17,290.9	8,379.6	155.1	159.8	34.38	-9,190.8	-74.6	993.0	678.0	314.97	3.153	
18,400.0	9,197.0	17,391.5	8,378.7	156.8	161.6	34.49	-9,291.3	-76.8	995.4	677.0	318.36	3.127	
18,500.0	9,197.0	17,526.3	8,379.5	158.4	163.9	34.62	-9,426.2	-78.2	995.9	673.6	322.30	3.090	
18,600.0	9,197.0	17,623.7	8,381.7	160.1	165.5	34.72	-9,523.5	-78.2	994.4	668.7	325.64	3.054	
18,700.0	9,197.0	17,720.2	8,382.7	161.8	167.2	34.73	-9,620.1	-77.3	993.3	664.3	329.00	3.019	
18,800.0	9,197.0	17,824.0	8,383.0	163.4	169.1	34.67	-9,723.8	-75.2	992.2	659.8	332.48	2.984	
18,900.0	9,197.0	17,922.4	8,382.8	165.1	170.8	34.56	-9,822.1	-72.3	991.1	655.2	335.87	2.951	
19,000.0	9,197.0	18,033.8	8,382.9	166.7	172.7	34.41	-9,933.5	-68.4	989.4	650.0	339.47	2.915	
19,071.5	9,197.0	18,083.0	8,383.1	167.9	173.6	34.34	-9,982.6	-66.5	988.1	646.6	341.50	2.893	
19,100.0	9,197.0	18,083.0	8,383.1	168.4	173.6	34.34	-9,982.6	-66.5	988.5	646.5	341.98	2.891 SF	
19,208.6	9,197.0	18,083.0	8,383.1	170.2	173.6	34.34	-9,982.6	-66.5	997.6	653.8	343.78	2.902	

COG PRODUCTION LLC

Anticollision Report

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #1H - OWB - rev0 — Offset Site Error: 0.0 usft

Survey Program: 0- — Offset Well Error: 0.0 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	2.0	2.0	0.0	0.0	-85.43	18.4	-230.2	230.9				
100.0	100.0	102.0	102.0	0.0	0.0	-85.43	18.4	-230.2	230.9	230.9	0.04	5,862.595	
200.0	200.0	202.0	202.0	0.2	0.0	-85.43	18.4	-230.2	230.9	230.8	0.18	1,275.742	
300.0	300.0	302.0	302.0	0.3	0.0	-85.43	18.4	-230.2	230.9	230.6	0.31	738.139	
400.0	400.0	402.0	402.0	0.4	0.0	-85.43	18.4	-230.2	230.9	230.5	0.44	519.302	
500.0	500.0	502.0	502.0	0.6	0.0	-85.43	18.4	-230.2	230.9	230.4	0.58	400.551	
600.0	600.0	602.0	602.0	0.7	0.0	-85.43	18.4	-230.2	230.9	230.2	0.71	326.002	
700.0	700.0	702.0	702.0	0.8	0.0	-85.43	18.4	-230.2	230.9	230.1	0.84	274.849	
800.0	800.0	802.0	802.0	1.0	0.0	-85.43	18.4	-230.2	230.9	230.0	0.97	237.571	
900.0	900.0	902.0	902.0	1.1	0.0	-85.43	18.4	-230.2	230.9	229.8	1.10	209.198	
1,000.0	1,000.0	1,002.0	1,002.0	1.2	0.0	-85.43	18.4	-230.2	230.9	229.7	1.24	186.879	
1,100.0	1,100.0	1,102.0	1,102.0	1.4	0.0	-85.43	18.4	-230.2	230.9	229.6	1.37	168.863	
1,200.0	1,200.0	1,202.0	1,202.0	1.5	0.0	-85.43	18.4	-230.2	230.9	229.4	1.50	154.015	
1,300.0	1,300.0	1,302.0	1,302.0	1.6	0.0	-85.43	18.4	-230.2	230.9	229.3	1.63	141.567	
1,400.0	1,400.0	1,402.0	1,402.0	1.8	0.0	-85.43	18.4	-230.2	230.9	229.2	1.76	130.981	
1,500.0	1,500.0	1,502.0	1,502.0	1.9	0.0	-85.43	18.4	-230.2	230.9	229.0	1.89	121.868	
1,600.0	1,600.0	1,602.0	1,602.0	2.0	0.0	-85.43	18.4	-230.2	230.9	228.9	2.03	113.941	
1,700.0	1,700.0	1,702.0	1,702.0	2.2	0.0	-85.43	18.4	-230.2	230.9	228.8	2.16	106.982	
1,800.0	1,800.0	1,802.0	1,802.0	2.3	0.0	-85.43	18.4	-230.2	230.9	228.6	2.29	100.824	
1,900.0	1,900.0	1,902.0	1,902.0	2.4	0.0	-85.43	18.4	-230.2	230.9	228.5	2.42	95.336	
2,000.0	2,000.0	2,002.0	2,002.0	2.6	0.0	-85.43	18.4	-230.2	230.9	228.4	2.55	90.415	
2,100.0	2,100.0	2,102.0	2,102.0	2.7	0.0	-85.43	18.4	-230.2	230.9	228.2	2.69	85.977	
2,200.0	2,200.0	2,202.0	2,202.0	2.8	0.0	-85.43	18.4	-230.2	230.9	228.1	2.82	81.955	
2,300.0	2,300.0	2,302.0	2,302.0	2.9	0.0	-85.43	18.4	-230.2	230.9	228.0	2.95	78.291	
2,400.0	2,400.0	2,402.0	2,402.0	3.1	0.0	-85.43	18.4	-230.2	230.9	227.9	3.08	74.942	
2,500.0	2,500.0	2,502.0	2,502.0	3.2	0.0	-85.43	18.4	-230.2	230.9	227.7	3.21	71.867	
2,600.0	2,600.0	2,602.0	2,602.0	3.3	0.0	-85.43	18.4	-230.2	230.9	227.6	3.35	69.035	
2,700.0	2,700.0	2,702.0	2,702.0	3.5	0.0	-85.43	18.4	-230.2	230.9	227.5	3.48	66.417	
2,800.0	2,800.0	2,802.0	2,802.0	3.6	0.0	-85.43	18.4	-230.2	230.9	227.3	3.61	63.991	
2,900.0	2,900.0	2,902.0	2,902.0	3.7	0.0	-85.43	18.4	-230.2	230.9	227.2	3.74	61.735	
3,000.0	3,000.0	3,002.0	3,002.0	3.9	0.0	-85.43	18.4	-230.2	230.9	227.1	3.87	59.633	
3,100.0	3,100.0	3,102.0	3,102.0	4.0	0.0	-85.43	18.4	-230.2	230.9	226.9	4.00	57.670	
3,200.0	3,200.0	3,202.0	3,202.0	4.1	0.0	-85.43	18.4	-230.2	230.9	226.8	4.14	55.832	
3,300.0	3,300.0	3,302.0	3,302.0	4.3	0.0	-85.43	18.4	-230.2	230.9	226.7	4.27	54.107	
3,400.0	3,400.0	3,402.0	3,402.0	4.4	0.0	-85.43	18.4	-230.2	230.9	226.5	4.40	52.486	
3,500.0	3,500.0	3,502.0	3,502.0	4.5	0.0	-85.43	18.4	-230.2	230.9	226.4	4.53	50.959	
3,600.0	3,600.0	3,602.0	3,602.0	4.7	0.0	-85.43	18.4	-230.2	230.9	226.3	4.66	49.518	
3,700.0	3,700.0	3,702.0	3,702.0	4.8	0.0	-85.43	18.4	-230.2	230.9	226.1	4.80	48.157	
3,800.0	3,800.0	3,802.0	3,802.0	4.9	0.0	-85.43	18.4	-230.2	230.9	226.0	4.93	46.868	
3,900.0	3,900.0	3,902.0	3,902.0	5.1	0.0	-85.43	18.4	-230.2	230.9	225.9	5.06	45.647	
4,000.0	4,000.0	4,002.0	4,002.0	5.2	0.0	-85.43	18.4	-230.2	230.9	225.7	5.19	44.488	
4,100.0	4,100.0	4,102.0	4,102.0	5.3	0.0	-85.43	18.4	-230.2	230.9	225.6	5.32	43.386	
4,200.0	4,200.0	4,202.0	4,202.0	5.5	0.0	-85.43	18.4	-230.2	230.9	225.5	5.45	42.337	
4,300.0	4,300.0	4,302.0	4,302.0	5.6	0.0	-85.43	18.4	-230.2	230.9	225.3	5.59	41.338	
4,400.0	4,400.0	4,402.0	4,402.0	5.7	0.0	-85.43	18.4	-230.2	230.9	225.2	5.72	40.385	
4,500.0	4,500.0	4,502.0	4,502.0	5.8	0.0	-85.43	18.4	-230.2	230.9	225.1	5.85	39.475	
4,600.0	4,600.0	4,602.0	4,602.0	6.0	0.0	-85.43	18.4	-230.2	230.9	225.0	5.98	38.605	
4,700.0	4,700.0	4,702.0	4,702.0	6.1	0.0	-85.43	18.4	-230.2	230.9	224.8	6.11	37.772	
4,800.0	4,800.0	4,802.0	4,802.0	6.2	0.0	-85.43	18.4	-230.2	230.9	224.7	6.25	36.975	
4,900.0	4,900.0	4,902.0	4,902.0	6.4	0.0	-85.43	18.4	-230.2	230.9	224.6	6.38	36.211	
5,000.0	5,000.0	5,002.0	5,002.0	6.5	0.0	-85.43	18.4	-230.2	230.9	224.4	6.51	35.477	

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

COG PRODUCTION LLC

Anticollision Report

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #1H - OWB - rev0 — Offset Site Error: 0.0 usft

Survey Program: 0- — Offset Well Error: 0.0 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
5,100.0	5,100.0	5,102.0	5,102.0	6.6	0.0	-85.43	18.4	-230.2	230.9	224.3	6.64	34.773	
5,200.0	5,200.0	5,202.0	5,202.0	6.8	0.0	-85.43	18.4	-230.2	230.9	224.2	6.77	34.096	
5,300.0	5,300.0	5,302.0	5,302.0	6.9	0.0	-85.43	18.4	-230.2	230.9	224.0	6.90	33.445	
5,400.0	5,400.0	5,402.0	5,402.0	7.0	0.0	-85.43	18.4	-230.2	230.9	223.9	7.04	32.818	
5,500.0	5,500.0	5,502.0	5,502.0	7.2	0.0	-85.43	18.4	-230.2	230.9	223.8	7.17	32.215	
5,600.0	5,600.0	5,602.0	5,602.0	7.3	0.0	-85.43	18.4	-230.2	230.9	223.6	7.30	31.633	
5,700.0	5,700.0	5,702.0	5,702.0	7.4	0.0	-85.43	18.4	-230.2	230.9	223.5	7.43	31.072	
5,800.0	5,800.0	5,802.0	5,802.0	7.6	0.0	-85.43	18.4	-230.2	230.9	223.4	7.56	30.530	
5,900.0	5,900.0	5,902.0	5,902.0	7.7	0.0	-85.43	18.4	-230.2	230.9	223.2	7.70	30.007	
6,000.0	6,000.0	6,002.0	6,002.0	7.8	0.0	-85.43	18.4	-230.2	230.9	223.1	7.83	29.502	
6,100.0	6,100.0	6,102.0	6,102.0	8.0	0.0	-85.43	18.4	-230.2	230.9	223.0	7.96	29.013	
6,200.0	6,200.0	6,202.0	6,202.0	8.1	0.0	-85.43	18.4	-230.2	230.9	222.8	8.09	28.540	
6,300.0	6,300.0	6,302.0	6,302.0	8.2	0.0	-85.43	18.4	-230.2	230.9	222.7	8.22	28.083	
6,400.0	6,400.0	6,402.0	6,402.0	8.4	0.0	-85.43	18.4	-230.2	230.9	222.6	8.36	27.640	
6,500.0	6,500.0	6,502.0	6,502.0	8.5	0.0	-85.43	18.4	-230.2	230.9	222.4	8.49	27.210	
6,600.0	6,600.0	6,602.0	6,602.0	8.6	0.0	-85.43	18.4	-230.2	230.9	222.3	8.62	26.794	
6,700.0	6,700.0	6,702.0	6,702.0	8.8	0.0	-85.43	18.4	-230.2	230.9	222.2	8.75	26.390	
6,800.0	6,800.0	6,802.0	6,802.0	8.9	0.0	-85.43	18.4	-230.2	230.9	222.1	8.88	25.999	
6,900.0	6,900.0	6,902.0	6,902.0	9.0	0.0	-85.43	18.4	-230.2	230.9	221.9	9.01	25.619	
7,000.0	7,000.0	7,002.0	7,002.0	9.1	0.0	-85.43	18.4	-230.2	230.9	221.8	9.15	25.249	
7,100.0	7,100.0	7,102.0	7,102.0	9.3	0.0	-85.43	18.4	-230.2	230.9	221.7	9.28	24.890	
7,200.0	7,200.0	7,202.0	7,202.0	9.4	0.0	-85.43	18.4	-230.2	230.9	221.5	9.41	24.542	
7,300.0	7,300.0	7,302.0	7,302.0	9.5	0.0	-85.43	18.4	-230.2	230.9	221.4	9.54	24.203	
7,400.0	7,400.0	7,402.0	7,402.0	9.7	0.0	-85.43	18.4	-230.2	230.9	221.3	9.67	23.873	
7,500.0	7,500.0	7,502.0	7,502.0	9.8	0.0	-85.43	18.4	-230.2	230.9	221.1	9.81	23.552	
7,600.0	7,600.0	7,602.0	7,602.0	9.9	0.0	-85.43	18.4	-230.2	230.9	221.0	9.94	23.239	
7,700.0	7,700.0	7,702.0	7,702.0	10.1	0.0	-85.43	18.4	-230.2	230.9	220.9	10.07	22.935	
7,800.0	7,800.0	7,802.0	7,802.0	10.2	0.0	-85.43	18.4	-230.2	230.9	220.7	10.20	22.639	
7,900.0	7,900.0	7,906.5	7,906.3	10.3	0.0	-86.62	13.6	-229.8	230.2	219.9	10.33	22.283	
8,000.0	8,000.0	8,008.1	8,005.3	10.5	0.0	-92.10	-8.4	-228.0	228.2	217.7	10.46	21.802	
8,033.6	8,033.6	8,040.2	8,035.6	10.5	0.0	-94.75	-18.9	-227.1	227.9	217.4	10.51	21.685	CC, ES
8,100.0	8,100.0	8,100.0	8,090.3	10.6	0.0	-100.80	-42.9	-225.1	229.5	218.9	10.60	21.654	
8,200.0	8,200.0	8,178.4	8,157.7	10.7	0.0	-110.47	-82.6	-221.8	240.9	230.1	10.73	22.451	
8,300.0	8,300.0	8,244.7	8,209.9	10.9	0.0	-119.47	-123.4	-218.4	267.2	256.4	10.86	24.607	
8,400.0	8,400.0	8,300.0	8,249.7	11.0	0.0	-126.92	-161.7	-215.2	309.3	298.3	10.99	28.141	
8,500.0	8,500.0	8,350.0	8,282.3	11.1	0.0	-133.24	-199.5	-212.1	364.8	353.6	11.12	32.792	
8,600.0	8,600.0	8,383.8	8,302.4	11.2	0.0	-137.19	-226.6	-209.8	430.3	419.1	11.19	38.447	
8,700.0	8,700.0	8,415.9	8,319.9	11.2	0.0	-140.66	-253.3	-207.6	503.2	492.0	11.20	44.919	
8,719.5	8,719.5	8,421.5	8,322.9	11.2	0.0	-141.24	-258.1	-207.2	518.1	506.9	11.21	46.235	
8,725.0	8,725.0	8,423.1	8,323.7	11.2	0.0	68.17	-259.4	-207.1	522.3	511.1	11.21	46.608	
8,750.0	8,750.0	8,430.4	8,327.4	11.2	0.0	64.20	-265.7	-206.6	541.6	530.4	11.21	48.300	
8,775.0	8,774.9	8,437.9	8,331.1	11.2	0.0	60.46	-272.2	-206.1	560.7	549.5	11.22	49.975	
8,800.0	8,799.6	8,450.0	8,337.0	11.2	0.0	56.72	-282.8	-205.2	579.7	568.5	11.23	51.629	
8,825.0	8,824.1	8,450.0	8,337.0	11.2	0.0	53.92	-282.8	-205.2	598.5	587.3	11.24	53.250	
8,850.0	8,848.4	8,450.0	8,337.0	11.3	0.0	51.22	-282.8	-205.2	617.2	606.0	11.25	54.854	
8,875.0	8,872.3	8,470.0	8,346.1	11.3	0.0	48.12	-300.5	-203.7	635.2	623.9	11.27	56.380	
8,900.0	8,895.7	8,478.4	8,349.8	11.3	0.0	45.69	-308.0	-203.1	653.1	641.8	11.28	57.878	
8,925.0	8,918.7	8,500.0	8,358.6	11.3	0.0	43.33	-327.6	-201.4	670.8	659.5	11.30	59.349	
8,950.0	8,941.2	8,500.0	8,358.6	11.3	0.0	41.49	-327.6	-201.4	687.6	676.3	11.32	60.720	
8,975.0	8,963.0	8,500.0	8,358.6	11.3	0.0	39.76	-327.6	-201.4	704.2	692.8	11.35	62.051	

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

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #1H - OWB - rev0 — Offset Site Error: 0.0 usft

Survey Program: 0- — Offset Well Error: 0.0 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
9,000.0	8,984.1	8,500.0	8,358.6	11.4	0.0	38.14	-327.6	-201.4	720.5	709.1	11.38	63.337	
9,025.0	9,004.6	8,522.3	8,367.0	11.4	0.0	36.74	-348.2	-199.7	735.8	724.4	11.41	64.511	
9,050.0	9,024.2	8,531.3	8,370.2	11.4	0.0	35.46	-356.6	-199.0	750.8	739.3	11.44	65.634	
9,075.0	9,043.1	8,550.0	8,376.3	11.5	0.0	34.42	-374.2	-197.6	765.4	753.9	11.48	66.692	
9,100.0	9,061.0	8,550.0	8,376.3	11.5	0.0	33.32	-374.2	-197.6	779.1	767.6	11.52	67.644	
9,125.0	9,078.0	8,550.0	8,376.3	11.6	0.0	32.29	-374.2	-197.6	792.5	780.9	11.56	68.531	
9,150.0	9,094.0	8,568.0	8,381.7	11.6	0.0	31.61	-391.4	-196.1	805.1	793.4	11.62	69.307	
9,175.0	9,109.0	8,577.3	8,384.2	11.7	0.0	30.90	-400.3	-195.4	817.1	805.4	11.67	69.996	
9,200.0	9,122.9	8,600.0	8,389.8	11.7	0.0	30.51	-422.2	-193.6	828.8	817.0	11.74	70.603	
9,225.0	9,135.7	8,600.0	8,389.8	11.8	0.0	29.82	-422.2	-193.6	839.3	827.5	11.81	71.059	
9,250.0	9,147.4	8,600.0	8,389.8	11.9	0.0	29.16	-422.2	-193.6	849.4	837.5	11.89	71.415	
9,275.0	9,157.9	8,614.9	8,393.1	12.0	0.0	28.87	-436.6	-192.4	858.7	846.7	11.99	71.637	
9,300.0	9,167.2	8,624.3	8,394.9	12.1	0.0	28.54	-445.8	-191.6	867.5	855.4	12.10	71.720	
9,325.0	9,175.3	8,633.7	8,396.6	12.2	0.0	28.26	-455.1	-190.9	875.5	863.3	12.22	71.649	
9,350.0	9,182.1	8,650.0	8,399.1	12.4	0.0	28.20	-471.1	-189.5	882.9	870.5	12.36	71.414	
9,375.0	9,187.6	8,650.0	8,399.1	12.5	0.0	27.81	-471.1	-189.5	889.5	877.0	12.53	70.989	
9,400.0	9,191.9	8,650.0	8,399.1	12.7	0.0	27.46	-471.1	-189.5	895.6	882.9	12.72	70.397	
9,425.0	9,194.9	8,671.5	8,401.8	12.9	0.0	27.69	-492.3	-187.8	900.7	887.7	12.94	69.588	
9,450.0	9,196.6	8,680.9	8,402.7	13.2	0.0	27.68	-501.7	-187.0	905.2	892.0	13.19	68.615	
9,469.5	9,197.0	8,700.0	8,404.1	13.4	0.0	28.01	-520.7	-185.4	908.5	895.1	13.41	67.758	
9,500.0	9,197.0	8,700.0	8,404.1	13.8	0.0	28.17	-520.7	-185.4	912.9	899.1	13.77	66.272	
9,600.0	9,197.0	8,744.1	8,405.0	15.2	0.0	29.73	-564.7	-181.8	930.2	915.1	15.16	61.352	
9,700.0	9,197.0	8,817.8	8,404.9	16.7	0.0	31.69	-638.2	-177.6	948.4	931.7	16.71	56.770	
9,800.0	9,197.0	8,895.1	8,404.8	18.3	0.0	33.50	-715.5	-176.1	965.8	947.5	18.29	52.799	
9,900.0	9,197.0	8,991.8	8,404.5	19.9	0.0	35.20	-812.2	-175.5	980.7	960.8	19.86	49.381	
10,000.0	9,197.0	9,090.0	8,404.2	21.4	0.0	36.42	-910.4	-174.9	991.9	970.5	21.38	46.402	
10,100.0	9,197.0	9,189.3	8,404.0	22.8	0.0	37.18	-1,009.7	-174.3	999.2	976.3	22.83	43.773	
10,200.0	9,197.0	9,289.2	8,403.7	24.2	0.0	37.49	-1,109.6	-173.7	1,002.3	978.1	24.20	41.417	
10,218.2	9,197.0	9,307.4	8,403.7	24.4	0.0	37.49	-1,127.8	-173.6	1,002.4	977.9	24.44	41.008	
10,300.0	9,197.0	9,389.2	8,403.4	25.5	0.0	37.49	-1,209.6	-173.1	1,002.6	977.0	25.53	39.263	
10,400.0	9,197.0	9,489.2	8,403.2	26.9	0.0	37.48	-1,309.6	-172.5	1,002.8	975.9	26.90	37.271	
10,500.0	9,197.0	9,589.2	8,402.9	28.3	0.0	37.47	-1,409.6	-171.9	1,003.0	974.7	28.31	35.426	
10,600.0	9,197.0	9,689.2	8,402.6	29.7	0.0	37.46	-1,509.5	-171.2	1,003.2	973.4	29.75	33.722	
10,700.0	9,197.0	9,789.2	8,402.4	31.2	0.0	37.45	-1,609.5	-170.6	1,003.4	972.2	31.21	32.148	
10,800.0	9,197.0	9,889.2	8,402.1	32.7	0.0	37.44	-1,709.5	-170.0	1,003.6	970.9	32.70	30.695	
10,900.0	9,197.0	9,989.2	8,401.8	34.2	0.0	37.43	-1,809.5	-169.4	1,003.8	969.6	34.20	29.352	
11,000.0	9,197.0	10,089.2	8,401.6	35.7	0.0	37.42	-1,909.5	-168.8	1,004.0	968.3	35.72	28.110	
11,100.0	9,197.0	10,189.2	8,401.3	37.3	0.0	37.41	-2,009.5	-168.2	1,004.2	967.0	37.25	26.959	
11,200.0	9,197.0	10,289.2	8,401.1	38.8	0.0	37.40	-2,109.5	-167.6	1,004.4	965.7	38.80	25.891	
11,300.0	9,197.0	10,389.2	8,400.8	40.4	0.0	37.39	-2,209.5	-166.9	1,004.7	964.3	40.35	24.898	
11,400.0	9,197.0	10,489.2	8,400.5	41.9	0.0	37.38	-2,309.5	-166.3	1,004.9	963.0	41.91	23.974	
11,500.0	9,197.0	10,589.2	8,400.3	43.5	0.0	37.37	-2,409.5	-165.7	1,005.1	961.6	43.49	23.112	
11,600.0	9,197.0	10,689.2	8,400.0	45.1	0.0	37.37	-2,509.5	-165.1	1,005.3	960.2	45.07	22.307	
11,700.0	9,197.0	10,789.2	8,399.7	46.7	0.0	37.36	-2,609.5	-164.5	1,005.5	958.9	46.65	21.553	
11,800.0	9,197.0	10,889.2	8,399.5	48.2	0.0	37.35	-2,709.5	-163.9	1,005.7	957.5	48.25	20.846	
11,900.0	9,197.0	10,989.2	8,399.2	49.8	0.0	37.34	-2,809.5	-163.2	1,005.9	956.1	49.84	20.182	
12,000.0	9,197.0	11,089.2	8,398.9	51.4	0.0	37.33	-2,909.5	-162.6	1,006.1	954.7	51.44	19.558	
12,100.0	9,197.0	11,189.2	8,398.7	53.0	0.0	37.32	-3,009.5	-162.0	1,006.3	953.3	53.05	18.970	
12,200.0	9,197.0	11,289.2	8,398.4	54.7	0.0	37.31	-3,109.5	-161.4	1,006.6	951.9	54.66	18.415	
12,300.0	9,197.0	11,389.2	8,398.1	56.3	0.0	37.30	-3,209.5	-160.8	1,006.8	950.5	56.27	17.891	
12,400.0	9,197.0	11,489.2	8,397.9	57.9	0.0	37.29	-3,309.5	-160.2	1,007.0	949.1	57.89	17.395	

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

COG PRODUCTION LLC

Anticollision Report

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #1H - OWB - rev0 — Offset Site Error: 0.0 usft

Survey Program: 0- — Offset Well Error: 0.0 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
12,500.0	9,197.0	11,589.2	8,397.6	59.5	0.0	37.28	-3,409.5	-159.6	1,007.2	947.7	59.51	16.926	
12,600.0	9,197.0	11,689.2	8,397.3	61.1	0.0	37.27	-3,509.5	-158.9	1,007.4	946.3	61.13	16.480	
12,700.0	9,197.0	11,789.2	8,397.1	62.8	0.0	37.26	-3,609.5	-158.3	1,007.6	944.9	62.75	16.057	
12,800.0	9,197.0	11,889.2	8,396.8	64.4	0.0	37.25	-3,709.5	-157.7	1,007.8	943.4	64.38	15.655	
12,900.0	9,197.0	11,989.2	8,396.5	66.0	0.0	37.25	-3,809.5	-157.1	1,008.0	942.0	66.01	15.272	
13,000.0	9,197.0	12,089.2	8,396.3	67.6	0.0	37.24	-3,909.5	-156.5	1,008.2	940.6	67.64	14.907	
13,100.0	9,197.0	12,189.2	8,396.0	69.3	0.0	37.23	-4,009.5	-155.9	1,008.5	939.2	69.27	14.559	
13,200.0	9,197.0	12,289.2	8,395.7	70.9	0.0	37.22	-4,109.5	-155.3	1,008.7	937.8	70.90	14.226	
13,300.0	9,197.0	12,389.2	8,395.5	72.5	0.0	37.21	-4,209.5	-154.6	1,008.9	936.3	72.54	13.908	
13,400.0	9,197.0	12,489.2	8,395.2	74.2	0.0	37.20	-4,309.5	-154.0	1,009.1	934.9	74.17	13.605	
13,500.0	9,197.0	12,589.2	8,394.9	75.8	0.0	37.19	-4,409.5	-153.4	1,009.3	933.5	75.81	13.313	
13,600.0	9,197.0	12,689.2	8,394.7	77.4	0.0	37.18	-4,509.5	-152.8	1,009.5	932.1	77.45	13.034	
13,700.0	9,197.0	12,789.2	8,394.4	79.1	0.0	37.17	-4,609.5	-152.2	1,009.7	930.6	79.09	12.767	
13,800.0	9,197.0	12,889.2	8,394.1	80.7	0.0	37.16	-4,709.5	-151.6	1,009.9	929.2	80.73	12.510	
13,900.0	9,197.0	12,989.2	8,393.9	82.4	0.0	37.15	-4,809.5	-151.0	1,010.2	927.8	82.37	12.263	
14,000.0	9,197.0	13,089.2	8,393.6	84.0	0.0	37.14	-4,909.5	-150.3	1,010.4	926.3	84.02	12.026	
14,100.0	9,197.0	13,189.2	8,393.3	85.7	0.0	37.13	-5,009.5	-149.7	1,010.6	924.9	85.66	11.798	
14,200.0	9,197.0	13,289.2	8,393.1	87.3	0.0	37.13	-5,109.5	-149.1	1,010.8	923.5	87.30	11.578	
14,300.0	9,197.0	13,389.2	8,392.8	88.9	0.0	37.12	-5,209.5	-148.5	1,011.0	922.1	88.95	11.366	
14,400.0	9,197.0	13,489.2	8,392.5	90.6	0.0	37.11	-5,309.4	-147.9	1,011.2	920.6	90.60	11.162	
14,500.0	9,197.0	13,589.2	8,392.3	92.2	0.0	37.10	-5,409.4	-147.3	1,011.4	919.2	92.24	10.965	
14,600.0	9,197.0	13,689.2	8,392.0	93.9	0.0	37.09	-5,509.4	-146.6	1,011.6	917.7	93.89	10.775	
14,700.0	9,197.0	13,789.2	8,391.7	95.5	0.0	37.08	-5,609.4	-146.0	1,011.8	916.3	95.54	10.591	
14,800.0	9,197.0	13,889.2	8,391.5	97.2	0.0	37.07	-5,709.4	-145.4	1,012.1	914.9	97.19	10.413	
14,900.0	9,197.0	13,989.2	8,391.2	98.8	0.0	37.06	-5,809.4	-144.8	1,012.3	913.4	98.84	10.242	
15,000.0	9,197.0	14,089.2	8,390.9	100.5	0.0	37.05	-5,909.4	-144.2	1,012.5	912.0	100.49	10.076	
15,100.0	9,197.0	14,189.2	8,390.7	102.1	0.0	37.04	-6,009.4	-143.6	1,012.7	910.6	102.14	9.915	
15,200.0	9,197.0	14,289.2	8,390.4	103.8	0.0	37.03	-6,109.4	-143.0	1,012.9	909.1	103.79	9.759	
15,300.0	9,197.0	14,389.2	8,390.1	105.4	0.0	37.02	-6,209.4	-142.3	1,013.1	907.7	105.44	9.609	
15,400.0	9,197.0	14,489.2	8,389.9	107.1	0.0	37.02	-6,309.4	-141.7	1,013.3	906.2	107.09	9.462	
15,500.0	9,197.0	14,589.2	8,389.6	108.7	0.0	37.01	-6,409.4	-141.1	1,013.5	904.8	108.74	9.321	
15,600.0	9,197.0	14,689.2	8,389.3	110.4	0.0	37.00	-6,509.4	-140.5	1,013.8	903.4	110.40	9.183	
15,700.0	9,197.0	14,789.2	8,389.1	112.0	0.0	36.99	-6,609.4	-139.9	1,014.0	901.9	112.05	9.049	
15,800.0	9,197.0	14,889.2	8,388.8	113.7	0.0	36.98	-6,709.4	-139.3	1,014.2	900.5	113.70	8.920	
15,900.0	9,197.0	14,989.2	8,388.5	115.4	0.0	36.97	-6,809.4	-138.7	1,014.4	899.0	115.36	8.794	
16,000.0	9,197.0	15,089.2	8,388.3	117.0	0.0	36.96	-6,909.4	-138.0	1,014.6	897.6	117.01	8.671	
16,100.0	9,197.0	15,189.2	8,388.0	118.7	0.0	36.95	-7,009.4	-137.4	1,014.8	896.2	118.66	8.552	
16,200.0	9,197.0	15,289.2	8,387.7	120.3	0.0	36.94	-7,109.4	-136.8	1,015.0	894.7	120.32	8.436	
16,300.0	9,197.0	15,389.2	8,387.5	122.0	0.0	36.93	-7,209.4	-136.2	1,015.2	893.3	121.97	8.323	
16,400.0	9,197.0	15,489.2	8,387.2	123.6	0.0	36.92	-7,309.4	-135.6	1,015.5	891.8	123.63	8.214	
16,500.0	9,197.0	15,589.2	8,386.9	125.3	0.0	36.92	-7,409.4	-135.0	1,015.7	890.4	125.28	8.107	
16,600.0	9,197.0	15,689.2	8,386.7	126.9	0.0	36.91	-7,509.4	-134.4	1,015.9	888.9	126.94	8.003	
16,700.0	9,197.0	15,789.2	8,386.4	128.6	0.0	36.90	-7,609.4	-133.7	1,016.1	887.5	128.59	7.901	
16,800.0	9,197.0	15,889.2	8,386.1	130.3	0.0	36.89	-7,709.4	-133.1	1,016.3	886.1	130.25	7.803	
16,900.0	9,197.0	15,989.2	8,385.9	131.9	0.0	36.88	-7,809.4	-132.5	1,016.5	884.6	131.91	7.706	
17,000.0	9,197.0	16,089.2	8,385.6	133.6	0.0	36.87	-7,909.4	-131.9	1,016.7	883.2	133.56	7.612	
17,100.0	9,197.0	16,189.2	8,385.3	135.2	0.0	36.86	-8,009.4	-131.3	1,016.9	881.7	135.22	7.521	
17,200.0	9,197.0	16,289.2	8,385.1	136.9	0.0	36.85	-8,109.4	-130.7	1,017.2	880.3	136.88	7.431	
17,300.0	9,197.0	16,389.2	8,384.8	138.5	0.0	36.84	-8,209.4	-130.0	1,017.4	878.8	138.53	7.344	
17,400.0	9,197.0	16,489.2	8,384.6	140.2	0.0	36.83	-8,309.4	-129.4	1,017.6	877.4	140.19	7.258	

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM_Users
Reference Design:	PWP0	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #1H - OWB - rev0 — **Offset Site Error:** 0.0 usft; **Offset Well Error:** 0.0 usft

Survey Program: 0-

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
17,500.0	9,197.0	16,589.2	8,384.3	141.8	0.0	36.82	-8,409.4	-128.8	1,017.8	875.9	141.85	7.175	
17,600.0	9,197.0	16,689.2	8,384.0	143.5	0.0	36.82	-8,509.4	-128.2	1,018.0	874.5	143.51	7.094	
17,700.0	9,197.0	16,789.2	8,383.8	145.2	0.0	36.81	-8,609.4	-127.6	1,018.2	873.0	145.17	7.014	
17,800.0	9,197.0	16,889.2	8,383.5	146.8	0.0	36.80	-8,709.4	-127.0	1,018.4	871.6	146.82	6.936	
17,900.0	9,197.0	16,989.2	8,383.2	148.5	0.0	36.79	-8,809.4	-126.4	1,018.6	870.2	148.48	6.860	
18,000.0	9,197.0	17,089.2	8,383.0	150.1	0.0	36.78	-8,909.4	-125.7	1,018.9	868.7	150.14	6.786	
18,100.0	9,197.0	17,189.2	8,382.7	151.8	0.0	36.77	-9,009.4	-125.1	1,019.1	867.3	151.80	6.713	
18,200.0	9,197.0	17,289.2	8,382.4	153.5	0.0	36.76	-9,109.4	-124.5	1,019.3	865.8	153.46	6.642	
18,300.0	9,197.0	17,389.2	8,382.2	155.1	0.0	36.75	-9,209.3	-123.9	1,019.5	864.4	155.12	6.572	
18,400.0	9,197.0	17,489.2	8,381.9	156.8	0.0	36.74	-9,309.3	-123.3	1,019.7	862.9	156.77	6.504	
18,500.0	9,197.0	17,589.2	8,381.6	158.4	0.0	36.73	-9,409.3	-122.7	1,019.9	861.5	158.43	6.438	
18,600.0	9,197.0	17,689.2	8,381.4	160.1	0.0	36.73	-9,509.3	-122.1	1,020.1	860.0	160.09	6.372	
18,700.0	9,197.0	17,789.2	8,381.1	161.8	0.0	36.72	-9,609.3	-121.4	1,020.3	858.6	161.75	6.308	
18,800.0	9,197.0	17,889.2	8,380.8	163.4	0.0	36.71	-9,709.3	-120.8	1,020.6	857.1	163.41	6.245	
18,900.0	9,197.0	17,989.2	8,380.6	165.1	0.0	36.70	-9,809.3	-120.2	1,020.8	855.7	165.07	6.184	
19,000.0	9,197.0	18,089.2	8,380.3	166.7	0.0	36.69	-9,909.3	-119.6	1,021.0	854.3	166.73	6.124	
19,100.0	9,197.0	18,189.2	8,380.0	168.4	0.0	36.68	-10,009.3	-119.0	1,021.2	852.8	168.39	6.064	
19,208.6	9,197.0	18,199.7	8,380.0	170.2	0.0	36.68	-10,019.9	-118.9	1,026.1	855.9	170.19	6.029	SF

COG PRODUCTION, LLC

Anticollision Report

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #1H - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 211-MWD, 4639-MWD, 7802-MWD — **Offset Well Error:** 0.0 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	2.0	2.0	0.0	0.0	-85.43	18.4	-230.2	230.9				
100.0	100.0	104.3	104.3	0.1	0.1	-85.39	18.5	-229.7	230.4	230.3	0.16	1,404.197	
200.0	200.0	206.5	206.5	0.2	0.2	-85.27	18.9	-228.1	229.0	228.5	0.42	539.433	
300.0	300.0	303.6	303.5	0.4	0.4	-85.15	19.2	-226.8	227.6	226.8	0.77	295.720	
400.0	400.0	403.6	403.6	0.5	0.6	-85.07	19.5	-226.2	227.1	225.9	1.13	200.404	
500.0	500.0	504.4	504.3	0.7	0.8	-85.02	19.6	-225.3	226.2	224.7	1.50	150.708	
600.0	600.0	605.1	605.1	0.8	1.0	-84.99	19.6	-224.1	225.0	223.1	1.87	120.451	
700.0	700.0	705.9	705.8	1.0	1.2	-84.98	19.5	-222.6	223.5	221.2	2.24	99.980	
800.0	800.0	805.9	805.9	1.2	1.5	-85.00	19.3	-220.8	221.6	219.0	2.60	85.198	
900.0	900.0	905.0	904.9	1.3	1.7	-85.05	19.0	-219.3	220.1	217.1	2.97	74.188	
1,000.0	1,000.0	1,004.4	1,004.3	1.5	1.9	-85.14	18.5	-218.2	219.0	215.7	3.33	65.698	
1,100.0	1,100.0	1,105.0	1,104.9	1.6	2.1	-85.28	17.9	-217.0	217.8	214.1	3.70	58.816	
1,200.0	1,200.0	1,205.7	1,205.5	1.8	2.3	-85.48	17.1	-215.6	216.3	212.2	4.07	53.111	
1,300.0	1,300.0	1,305.6	1,305.5	1.9	2.5	-85.71	16.1	-214.0	214.6	210.2	4.44	48.346	
1,400.0	1,400.0	1,405.5	1,405.3	2.1	2.7	-85.93	15.1	-212.5	213.0	208.2	4.81	44.332	
1,500.0	1,500.0	1,505.3	1,505.1	2.2	2.9	-86.13	14.3	-211.0	211.5	206.4	5.17	40.901	
1,600.0	1,600.0	1,605.1	1,604.9	2.4	3.1	-86.32	13.5	-209.6	210.1	204.6	5.54	37.939	
1,700.0	1,700.0	1,704.9	1,704.7	2.6	3.3	-86.50	12.7	-208.3	208.7	202.8	5.90	35.357	
1,800.0	1,800.0	1,804.7	1,804.5	2.7	3.6	-86.67	12.1	-207.1	207.5	201.2	6.27	33.090	
1,900.0	1,900.0	1,904.6	1,904.4	2.9	3.8	-86.82	11.5	-206.0	206.3	199.7	6.64	31.085	
2,000.0	2,000.0	2,004.4	2,004.2	3.0	4.0	-86.95	10.9	-204.9	205.2	198.2	7.00	29.302	
2,100.0	2,100.0	2,104.2	2,104.0	3.2	4.2	-87.07	10.4	-203.9	204.2	196.8	7.37	27.706	
2,200.0	2,200.0	2,204.3	2,204.1	3.3	4.4	-87.17	10.0	-202.9	203.2	195.4	7.73	26.267	
2,300.0	2,300.0	2,304.4	2,304.2	3.5	4.6	-87.27	9.6	-201.9	202.1	194.0	8.10	24.951	
2,400.0	2,400.0	2,404.5	2,404.3	3.6	4.8	-87.37	9.2	-200.8	201.0	192.5	8.47	23.743	
2,500.0	2,500.0	2,504.5	2,504.2	3.8	5.0	-87.46	8.8	-199.6	199.9	191.0	8.83	22.630	
2,600.0	2,600.0	2,602.9	2,602.7	4.0	5.2	-87.61	8.3	-198.9	199.1	189.9	9.19	21.659	
2,645.6	2,645.6	2,647.8	2,647.6	4.0	5.3	-87.72	7.9	-198.9	199.0	189.7	9.36	21.269	
2,700.0	2,700.0	2,701.4	2,701.2	4.1	5.4	-87.87	7.4	-199.0	199.2	189.6	9.56	20.842	
2,800.0	2,800.0	2,800.7	2,800.4	4.3	5.6	-88.24	6.1	-199.8	199.9	190.0	9.92	20.156	
2,900.0	2,900.0	2,902.9	2,902.6	4.4	5.9	-88.58	5.0	-200.1	200.2	189.9	10.29	19.453	
3,000.0	3,000.0	3,005.2	3,004.9	4.6	6.1	-88.82	4.1	-199.2	199.3	188.6	10.66	18.693	
3,100.0	3,100.0	3,106.8	3,106.5	4.7	6.3	-88.97	3.5	-197.2	197.3	186.3	11.03	17.888	
3,200.0	3,200.0	3,206.9	3,206.5	4.9	6.5	-89.17	2.8	-194.9	195.0	183.6	11.40	17.105	
3,300.0	3,300.0	3,306.9	3,306.5	5.1	6.7	-89.37	2.1	-192.6	192.7	180.9	11.77	16.370	
3,400.0	3,400.0	3,406.9	3,406.5	5.2	6.9	-89.54	1.5	-190.2	190.3	178.2	12.14	15.677	
3,500.0	3,500.0	3,506.9	3,506.5	5.4	7.1	-89.68	1.0	-187.9	187.9	175.4	12.51	15.023	
3,600.0	3,600.0	3,607.0	3,606.5	5.5	7.4	-89.83	0.6	-185.4	185.5	172.6	12.88	14.404	
3,700.0	3,700.0	3,707.0	3,706.5	5.7	7.6	-90.12	-0.4	-183.0	183.0	169.8	13.25	13.817	
3,800.0	3,800.0	3,806.2	3,805.7	5.8	7.8	-90.57	-1.8	-180.7	180.7	167.1	13.61	13.276	
3,900.0	3,900.0	3,906.6	3,906.0	6.0	8.0	-91.15	-3.6	-178.5	178.6	164.6	13.99	12.772	
4,000.0	4,000.0	4,006.3	4,005.7	6.1	8.2	-91.75	-5.4	-176.3	176.4	162.1	14.35	12.292	
4,100.0	4,100.0	4,106.4	4,105.7	6.3	8.4	-92.37	-7.2	-174.1	174.3	159.6	14.72	11.839	
4,200.0	4,200.0	4,206.5	4,205.8	6.5	8.6	-93.03	-9.1	-171.9	172.2	157.1	15.09	11.405	
4,300.0	4,300.0	4,306.6	4,305.9	6.6	8.9	-93.83	-11.3	-169.4	169.8	154.4	15.47	10.979	
4,400.0	4,400.0	4,406.3	4,405.5	6.8	9.1	-94.73	-13.8	-167.1	167.8	151.9	15.84	10.591	
4,500.0	4,500.0	4,506.2	4,505.4	6.9	9.3	-95.70	-16.4	-164.7	165.6	149.4	16.19	10.226	
4,600.0	4,600.0	4,607.1	4,606.1	7.1	9.4	-96.69	-19.0	-162.1	163.3	146.8	16.46	9.921	
4,700.0	4,700.0	4,705.5	4,704.5	7.2	9.4	-97.63	-21.4	-159.6	161.0	144.3	16.66	9.666	
4,775.7	4,775.7	4,778.7	4,777.7	7.4	9.4	-98.05	-22.5	-158.8	160.4	143.6	16.78	9.555	CC, ES
4,800.0	4,800.0	4,802.1	4,801.1	7.4	9.4	-98.13	-22.7	-158.8	160.4	143.6	16.82	9.536	

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

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #1H - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 211-MWD, 4639-MWD, 7802-MWD — **Offset Well Error:** 0.0 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
4,900.0	4,900.0	4,901.4	4,900.4	7.6	9.4	-98.30	-23.3	-159.8	161.5	144.5	16.99	9.502	
5,000.0	5,000.0	5,001.8	5,000.8	7.7	9.5	-98.54	-24.1	-160.5	162.3	145.2	17.17	9.457	
5,100.0	5,100.0	5,102.1	5,101.1	7.9	9.5	-98.75	-24.8	-161.1	163.0	145.6	17.35	9.396	
5,200.0	5,200.0	5,201.9	5,200.9	8.0	9.5	-98.97	-25.5	-161.6	163.6	146.0	17.53	9.331	
5,300.0	5,300.0	5,302.0	5,300.9	8.2	9.5	-99.18	-26.2	-162.1	164.2	146.5	17.72	9.268	
5,400.0	5,400.0	5,401.2	5,400.2	8.3	9.6	-99.38	-26.9	-162.9	165.1	147.2	17.91	9.219	
5,500.0	5,500.0	5,501.1	5,500.1	8.5	9.6	-99.54	-27.5	-163.9	166.2	148.1	18.10	9.182	
5,600.0	5,600.0	5,601.2	5,600.1	8.6	9.7	-99.71	-28.2	-164.9	167.3	149.0	18.30	9.142	
5,700.0	5,700.0	5,701.0	5,699.9	8.8	9.7	-99.85	-28.8	-166.0	168.5	150.0	18.51	9.104	
5,800.0	5,800.0	5,801.0	5,799.9	9.0	9.8	-100.03	-29.6	-167.2	169.8	151.1	18.72	9.074	
5,900.0	5,900.0	5,901.5	5,900.4	9.1	9.8	-100.15	-30.1	-168.1	170.8	151.9	18.93	9.023	
6,000.0	6,000.0	6,001.4	6,000.3	9.3	9.9	-100.31	-30.7	-169.0	171.8	152.7	19.15	8.973	
6,100.0	6,100.0	6,101.6	6,100.5	9.4	9.9	-100.32	-30.9	-169.9	172.7	153.3	19.37	8.917	
6,200.0	6,200.0	6,200.9	6,199.8	9.6	10.0	-100.37	-31.3	-170.8	173.7	154.1	19.59	8.864	
6,300.0	6,300.0	6,300.4	6,299.3	9.7	10.1	-100.44	-31.7	-172.3	175.2	155.4	19.82	8.837	
6,400.0	6,400.0	6,400.5	6,399.4	9.9	10.2	-100.56	-32.4	-173.7	176.7	156.6	20.06	8.810	
6,500.0	6,500.0	6,500.9	6,499.8	10.0	10.2	-100.70	-33.0	-174.9	178.1	157.8	20.29	8.775	
6,600.0	6,600.0	6,600.9	6,599.8	10.2	10.3	-100.65	-33.1	-176.2	179.3	158.7	20.53	8.731	
6,700.0	6,700.0	6,699.8	6,698.7	10.4	10.4	-100.65	-33.4	-177.6	180.8	160.0	20.77	8.701	
6,800.0	6,800.0	6,799.7	6,798.5	10.5	10.5	-100.66	-33.8	-179.5	182.7	161.6	21.02	8.690	
6,900.0	6,900.0	6,900.5	6,899.3	10.7	10.6	-100.57	-33.8	-181.2	184.3	163.1	21.27	8.666	
7,000.0	7,000.0	6,999.7	6,998.6	10.8	10.7	-100.45	-33.7	-182.9	186.0	164.5	21.52	8.643	
7,100.0	7,100.0	7,100.7	7,099.5	11.0	10.8	-100.39	-33.8	-184.4	187.5	165.7	21.78	8.609	
7,200.0	7,200.0	7,199.8	7,198.6	11.1	10.9	-100.29	-33.8	-186.1	189.2	167.1	22.04	8.583	
7,300.0	7,300.0	7,300.0	7,298.8	11.3	11.0	-100.25	-34.0	-187.8	190.8	168.5	22.30	8.557	
7,400.0	7,400.0	7,399.4	7,398.2	11.5	11.1	-100.23	-34.2	-189.6	192.7	170.1	22.57	8.537	
7,500.0	7,500.0	7,499.2	7,497.9	11.6	11.2	-100.22	-34.5	-191.6	194.7	171.9	22.84	8.527	
7,600.0	7,600.0	7,599.2	7,597.9	11.8	11.3	-100.23	-35.0	-193.7	196.8	173.7	23.11	8.516	
7,700.0	7,700.0	7,699.0	7,697.6	11.9	11.5	-100.34	-35.7	-195.7	198.9	175.5	23.39	8.505	
7,800.0	7,800.0	7,800.2	7,798.9	12.1	11.6	-101.00	-38.3	-197.2	201.0	177.3	23.63	8.503	
7,900.0	7,900.0	7,895.3	7,892.8	12.2	11.6	-104.75	-51.9	-197.1	204.0	180.2	23.81	8.566	
8,000.0	8,000.0	7,982.3	7,976.3	12.4	11.6	-111.29	-76.1	-195.4	211.3	187.3	24.02	8.797	
8,100.0	8,100.0	8,060.8	8,048.3	12.5	11.7	-118.82	-107.3	-195.0	229.0	204.7	24.26	9.438	
8,200.0	8,200.0	8,133.3	8,111.3	12.7	11.9	-126.27	-143.2	-195.1	258.4	233.9	24.55	10.526	
8,300.0	8,300.0	8,199.5	8,165.3	12.9	12.0	-133.05	-181.4	-194.2	298.8	273.9	24.89	12.007	
8,400.0	8,400.0	8,249.4	8,203.3	13.0	12.2	-137.81	-213.6	-193.7	350.2	324.9	25.22	13.883	
8,500.0	8,500.0	8,290.0	8,232.0	13.2	12.4	-141.29	-242.4	-194.3	411.5	386.0	25.56	16.102	
8,600.0	8,600.0	8,329.9	8,257.9	13.3	12.6	-144.40	-272.6	-195.2	480.4	454.6	25.85	18.588	
8,700.0	8,700.0	8,367.0	8,280.5	13.3	12.8	-147.07	-302.2	-195.7	554.3	528.3	26.08	21.258	
8,719.5	8,719.5	8,373.9	8,284.5	13.3	12.9	-147.54	-307.7	-195.8	569.2	543.1	26.13	21.788	
8,725.0	8,725.0	8,375.8	8,285.6	13.3	12.9	65.17	-309.3	-195.8	573.5	547.3	26.14	21.938	
8,750.0	8,750.0	8,384.8	8,290.7	13.3	12.9	61.48	-316.7	-195.8	592.6	566.3	26.20	22.612	
8,775.0	8,774.9	8,399.0	8,298.6	13.3	13.0	57.85	-328.5	-195.7	611.5	585.2	26.31	23.245	
8,800.0	8,799.6	8,399.0	8,298.6	13.3	13.0	55.05	-328.5	-195.7	630.1	603.8	26.31	23.946	
8,825.0	8,824.1	8,413.7	8,306.6	13.3	13.1	52.04	-340.8	-195.6	648.4	622.0	26.43	24.533	
8,850.0	8,848.4	8,430.0	8,315.2	13.3	13.3	49.36	-354.7	-195.4	666.4	639.9	26.56	25.090	
8,875.0	8,872.3	8,430.0	8,315.2	13.3	13.3	47.16	-354.7	-195.4	684.0	657.4	26.57	25.738	
8,900.0	8,895.7	8,441.6	8,321.1	13.3	13.4	45.05	-364.7	-195.2	701.1	674.5	26.68	26.277	
8,925.0	8,918.7	8,449.9	8,325.1	13.3	13.4	43.15	-371.9	-195.0	717.9	691.1	26.77	26.822	
8,950.0	8,941.2	8,461.0	8,330.4	13.4	13.5	41.46	-381.7	-194.7	734.2	707.4	26.87	27.322	

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #1H - OWB - ACTUAL WELLPATH — Offset Site Error: 0.0 usft

Survey Program: 211-MWD, 4639-MWD, 7802-MWD — Offset Well Error: 0.0 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
8,975.0	8,963.0	8,461.0	8,330.4	13.4	13.5	39.85	-381.7	-194.7	750.1	723.2	26.89	27.892	
9,000.0	8,984.1	8,474.6	8,336.5	13.4	13.6	38.51	-393.8	-194.3	765.4	738.4	27.04	28.311	
9,025.0	9,004.6	8,482.8	8,340.1	13.4	13.7	37.25	-401.2	-194.1	780.3	753.2	27.14	28.755	
9,050.0	9,024.2	8,493.0	8,344.3	13.5	13.8	36.15	-410.5	-193.7	794.6	767.4	27.26	29.154	
9,075.0	9,043.1	8,493.0	8,344.3	13.5	13.8	34.99	-410.5	-193.7	808.5	781.2	27.29	29.625	
9,100.0	9,061.0	8,507.5	8,350.0	13.5	13.9	34.20	-423.8	-193.2	821.6	794.1	27.47	29.915	
9,125.0	9,078.0	8,524.0	8,356.1	13.6	14.1	33.56	-439.1	-192.6	834.4	806.7	27.66	30.160	
9,150.0	9,094.0	8,524.0	8,356.1	13.6	14.1	32.67	-439.1	-192.6	846.3	818.6	27.71	30.538	
9,175.0	9,109.0	8,533.9	8,359.5	13.7	14.2	32.07	-448.5	-192.2	857.7	829.9	27.87	30.778	
9,200.0	9,122.9	8,543.9	8,362.7	13.7	14.3	31.55	-457.9	-191.8	868.5	840.5	28.03	30.985	
9,225.0	9,135.7	8,556.0	8,366.5	13.8	14.4	31.15	-469.4	-191.2	878.6	850.4	28.22	31.133	
9,250.0	9,147.4	8,556.0	8,366.5	13.9	14.4	30.52	-469.4	-191.2	888.1	859.8	28.30	31.384	
9,275.0	9,157.9	8,574.7	8,371.8	14.0	14.6	30.42	-487.2	-190.1	896.7	868.2	28.59	31.367	
9,300.0	9,167.2	8,585.2	8,374.6	14.1	14.7	30.17	-497.3	-189.3	904.8	876.0	28.80	31.415	
9,325.0	9,175.3	8,596.0	8,377.3	14.2	14.8	29.98	-507.8	-188.5	912.1	883.1	29.03	31.419	
9,350.0	9,182.1	8,596.0	8,377.3	14.3	14.8	29.57	-507.8	-188.5	918.8	889.7	29.16	31.514	
9,375.0	9,187.6	8,611.9	8,380.9	14.5	15.0	29.63	-523.3	-187.3	924.7	895.2	29.48	31.367	
9,400.0	9,191.9	8,628.0	8,384.0	14.6	15.2	29.77	-539.0	-186.3	930.1	900.3	29.82	31.187	
9,425.0	9,194.9	8,628.0	8,384.0	14.8	15.2	29.49	-539.0	-186.3	934.7	904.7	30.01	31.151	
9,450.0	9,196.6	8,628.0	8,384.0	15.0	15.2	29.25	-539.0	-186.3	938.8	908.6	30.21	31.078	
9,469.5	9,197.0	8,640.9	8,386.2	15.2	15.4	29.49	-551.7	-185.5	941.4	910.9	30.53	30.832	
9,500.0	9,197.0	8,659.0	8,388.8	15.5	15.6	30.18	-569.6	-184.7	945.6	914.6	31.04	30.462	
9,600.0	9,197.0	8,690.0	8,391.6	16.6	16.0	31.57	-600.4	-183.7	961.8	929.2	32.58	29.520	
9,700.0	9,197.0	8,722.0	8,393.0	18.0	16.4	32.95	-632.4	-183.0	981.1	946.7	34.35	28.561	
9,800.0	9,197.0	8,773.2	8,393.1	19.5	17.0	34.60	-683.6	-182.5	1,002.3	965.8	36.48	27.471	
9,900.0	9,197.0	8,892.4	8,392.0	21.0	18.5	36.85	-802.7	-180.8	1,021.2	981.7	39.50	25.852	
10,000.0	9,197.0	8,990.2	8,392.3	22.4	19.8	38.28	-900.5	-178.2	1,034.7	992.5	42.22	24.507	
10,100.0	9,197.0	9,067.0	8,391.1	23.9	20.8	39.08	-977.3	-176.2	1,045.6	1,000.9	44.71	23.384	
10,200.0	9,197.0	9,172.4	8,387.9	25.2	22.4	39.54	-1,082.6	-172.8	1,052.9	1,005.2	47.64	22.102	
10,297.5	9,197.0	9,266.5	8,386.1	26.5	23.7	39.63	-1,176.6	-170.6	1,055.5	1,005.3	50.24	21.007	
10,300.0	9,197.0	9,269.0	8,386.0	26.5	23.8	39.63	-1,179.1	-170.6	1,055.5	1,005.2	50.31	20.979	
10,400.0	9,197.0	9,363.4	8,386.2	27.8	25.1	39.69	-1,273.5	-171.2	1,056.3	1,003.4	52.95	19.950	
10,500.0	9,197.0	9,443.0	8,386.8	29.1	26.3	39.86	-1,353.1	-174.2	1,058.7	1,003.2	55.45	19.091	
10,600.0	9,197.0	9,550.8	8,387.6	30.5	28.0	40.12	-1,460.8	-178.9	1,061.3	1,002.9	58.46	18.154	
10,700.0	9,197.0	9,631.0	8,386.8	31.9	29.2	40.25	-1,540.9	-182.0	1,065.1	1,003.9	61.12	17.426	
10,800.0	9,197.0	9,810.2	8,386.3	33.3	32.1	40.34	-1,720.0	-183.5	1,066.8	1,001.4	65.37	16.319	
10,900.0	9,197.0	9,922.2	8,389.1	34.8	33.9	40.30	-1,831.9	-179.2	1,062.9	994.3	68.64	15.485	
11,000.0	9,197.0	10,028.0	8,389.4	36.2	35.7	40.03	-1,937.4	-171.4	1,058.4	986.5	71.88	14.724	
11,100.0	9,197.0	10,141.0	8,390.7	37.7	37.5	39.73	-2,050.0	-162.4	1,053.0	977.7	75.23	13.996	
11,200.0	9,197.0	10,240.0	8,392.2	39.2	39.2	39.45	-2,148.7	-153.8	1,046.7	968.3	78.38	13.353	
11,300.0	9,197.0	10,337.4	8,394.4	40.7	40.8	39.28	-2,245.8	-147.2	1,041.1	959.6	81.51	12.773	
11,400.0	9,197.0	10,421.8	8,397.0	42.3	42.2	39.18	-2,330.0	-142.2	1,035.6	951.2	84.43	12.266	
11,500.0	9,197.0	10,506.0	8,397.8	43.8	43.6	39.11	-2,414.1	-139.2	1,032.9	945.6	87.37	11.822	
11,600.0	9,197.0	10,615.8	8,399.4	45.4	45.4	38.91	-2,523.7	-132.4	1,028.3	937.5	90.78	11.327	
11,700.0	9,197.0	10,700.8	8,398.5	46.9	46.9	38.72	-2,608.6	-128.0	1,026.1	932.3	93.79	10.941	
11,800.0	9,197.0	10,821.3	8,397.7	48.5	48.9	38.32	-2,728.7	-118.7	1,022.2	924.7	97.43	10.492	
11,900.0	9,197.0	10,911.0	8,396.3	50.1	50.5	37.95	-2,818.1	-110.7	1,018.4	917.9	100.54	10.129	
12,000.0	9,197.0	10,986.4	8,395.1	51.7	51.7	37.71	-2,893.3	-105.8	1,016.2	912.8	103.40	9.828	
12,021.8	9,197.0	11,000.8	8,394.8	52.0	52.0	37.68	-2,907.7	-105.2	1,016.1	912.1	103.99	9.772	
12,100.0	9,197.0	11,058.9	8,393.2	53.3	52.9	37.59	-2,965.7	-103.9	1,017.1	910.9	106.20	9.577	
12,200.0	9,197.0	11,165.5	8,392.2	54.9	54.7	37.63	-3,072.3	-104.7	1,018.7	909.1	109.57	9.297	

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

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #1H - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 211-MWD, 4639-MWD, 7802-MWD — **Offset Well Error:** 0.0 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
12,300.0	9,197.0	11,262.5	8,391.9	56.4	56.3	37.69	-3,169.3	-105.6	1,020.0	907.2	112.79	9.043	
12,400.0	9,197.0	11,350.6	8,391.9	58.1	57.8	37.84	-3,257.4	-108.2	1,022.2	906.4	115.87	8.822	
12,500.0	9,197.0	11,446.4	8,392.1	59.7	59.4	38.08	-3,353.1	-112.8	1,025.5	906.5	119.07	8.613	
12,600.0	9,197.0	11,547.2	8,392.6	61.3	61.1	38.31	-3,453.7	-116.9	1,028.2	905.8	122.36	8.403	
12,700.0	9,197.0	11,636.7	8,392.1	62.9	62.6	38.53	-3,543.1	-121.7	1,032.3	906.9	125.47	8.228	
12,800.0	9,197.0	11,747.1	8,393.1	64.5	64.4	38.85	-3,653.3	-127.5	1,035.3	906.4	128.91	8.031	
12,900.0	9,197.0	11,851.8	8,394.7	66.1	66.2	39.24	-3,757.9	-134.4	1,038.8	906.6	132.28	7.854	
13,000.0	9,197.0	11,954.1	8,394.9	67.7	67.9	39.41	-3,860.1	-137.4	1,041.0	905.4	135.62	7.676	
13,100.0	9,197.0	12,038.4	8,394.5	69.4	69.3	39.55	-3,944.4	-140.5	1,044.2	905.5	138.68	7.530	
13,200.0	9,197.0	12,115.8	8,393.2	71.0	70.6	39.70	-4,021.6	-144.4	1,049.2	907.6	141.61	7.409	
13,300.0	9,197.0	12,213.2	8,391.4	72.6	72.3	39.99	-4,118.7	-152.3	1,056.3	911.5	144.87	7.291	
13,400.0	9,197.0	12,334.0	8,392.0	74.2	74.3	40.42	-4,239.1	-161.1	1,061.0	912.5	148.51	7.145	
13,500.0	9,197.0	12,443.4	8,394.1	75.9	76.1	40.88	-4,348.2	-169.7	1,065.2	913.2	151.95	7.010	
13,600.0	9,197.0	12,540.5	8,396.1	77.5	77.7	41.26	-4,445.0	-176.7	1,068.9	913.7	155.21	6.886	
13,700.0	9,197.0	12,641.8	8,397.0	79.1	79.4	41.57	-4,546.2	-182.8	1,072.7	914.2	158.57	6.765	
13,800.0	9,197.0	12,757.5	8,395.7	80.8	81.4	41.68	-4,661.8	-185.7	1,075.7	913.6	162.17	6.633	
13,900.0	9,197.0	12,868.9	8,392.5	82.4	83.3	41.54	-4,773.1	-184.2	1,077.5	911.8	165.73	6.501	
14,000.0	9,197.0	13,025.3	8,388.6	84.0	86.0	41.15	-4,929.3	-176.8	1,077.0	907.0	170.07	6.333	
14,100.0	9,197.0	13,113.0	8,388.4	85.7	87.5	40.94	-5,016.8	-171.0	1,073.5	900.3	173.23	6.197	
14,200.0	9,197.0	13,207.0	8,386.4	87.3	89.2	40.63	-5,110.5	-164.3	1,070.9	894.4	176.52	6.067	
14,300.0	9,197.0	13,302.7	8,384.1	89.0	90.9	40.32	-5,205.9	-158.1	1,069.0	889.2	179.82	5.945	
14,400.0	9,197.0	13,418.4	8,384.8	90.6	92.8	40.16	-5,321.5	-152.5	1,065.8	882.4	183.43	5.811	
14,500.0	9,197.0	13,493.7	8,385.1	92.3	94.1	40.08	-5,396.8	-149.8	1,063.7	877.4	186.37	5.708	
14,600.0	9,197.0	13,584.0	8,384.7	93.9	95.7	40.00	-5,487.0	-147.5	1,063.0	873.4	189.57	5.607	
14,644.4	9,197.0	13,627.6	8,384.4	94.6	96.4	39.97	-5,530.6	-146.7	1,062.8	871.8	191.05	5.563	
14,700.0	9,197.0	13,678.0	8,383.7	95.5	97.3	39.92	-5,581.0	-145.7	1,063.0	870.2	192.84	5.513	
14,800.0	9,197.0	13,813.0	8,384.9	97.2	99.6	39.85	-5,715.9	-142.0	1,060.8	864.0	196.81	5.390	
14,900.0	9,197.0	13,902.1	8,385.0	98.8	101.2	39.74	-5,805.0	-138.6	1,058.7	858.7	200.00	5.294	
15,000.0	9,197.0	14,009.6	8,384.0	100.5	103.0	39.52	-5,912.4	-133.3	1,056.8	853.3	203.52	5.193	
15,100.0	9,197.0	14,127.2	8,384.0	102.1	105.1	39.26	-6,029.7	-126.3	1,053.5	846.3	207.20	5.084	
15,200.0	9,197.0	14,241.6	8,385.3	103.8	107.1	39.01	-6,143.8	-118.3	1,048.7	837.8	210.83	4.974	
15,300.0	9,197.0	14,328.9	8,386.8	105.4	108.6	38.84	-6,230.9	-112.6	1,043.8	829.8	214.00	4.877	
15,400.0	9,197.0	14,412.8	8,386.3	107.1	110.1	38.60	-6,314.7	-106.7	1,040.2	823.1	217.13	4.791	
15,500.0	9,197.0	14,504.7	8,384.7	108.7	111.7	38.31	-6,406.3	-100.5	1,038.0	817.6	220.38	4.710	
15,600.0	9,197.0	14,623.8	8,384.2	110.4	113.7	38.04	-6,525.2	-93.8	1,035.3	811.2	224.08	4.620	
15,700.0	9,197.0	14,721.0	8,383.7	112.0	115.4	37.74	-6,622.2	-86.7	1,031.7	804.2	227.43	4.536	
15,800.0	9,197.0	14,822.8	8,383.7	113.7	117.2	37.46	-6,723.7	-79.5	1,027.8	796.9	230.86	4.452	
15,900.0	9,197.0	14,901.0	8,382.6	115.3	118.6	37.22	-6,801.7	-74.4	1,025.3	791.5	233.87	4.384	
16,000.0	9,197.0	15,008.7	8,380.7	117.0	120.4	36.91	-6,909.1	-67.8	1,023.5	786.1	237.40	4.311	
16,100.0	9,197.0	15,104.7	8,380.9	118.6	122.1	36.77	-7,005.1	-64.0	1,021.4	780.7	240.70	4.244	
16,200.0	9,197.0	15,199.4	8,382.3	120.3	123.7	36.79	-7,099.8	-62.5	1,019.8	775.8	243.98	4.180	
16,300.0	9,197.0	15,291.3	8,383.3	121.9	125.3	36.80	-7,191.7	-61.5	1,018.7	771.5	247.23	4.121	
16,343.7	9,197.0	15,329.1	8,383.5	122.7	126.0	36.81	-7,229.5	-61.3	1,018.6	770.0	248.60	4.097	
16,400.0	9,197.0	15,377.8	8,383.7	123.6	126.8	36.85	-7,278.2	-61.5	1,018.8	768.5	250.38	4.069	
16,500.0	9,197.0	15,467.5	8,383.1	125.2	128.3	36.88	-7,367.8	-61.9	1,020.1	766.5	253.58	4.023	
16,600.0	9,197.0	15,565.1	8,382.0	126.9	130.0	36.91	-7,465.4	-62.7	1,021.9	765.0	256.92	3.978	
16,700.0	9,197.0	15,656.5	8,380.5	128.5	131.6	36.94	-7,556.9	-63.7	1,024.4	764.2	260.15	3.938	
16,800.0	9,197.0	15,778.2	8,379.9	130.2	133.7	37.03	-7,678.5	-65.3	1,026.1	762.2	263.90	3.888	
16,900.0	9,197.0	15,880.2	8,382.2	131.9	135.4	37.27	-7,780.4	-68.1	1,026.3	759.0	267.29	3.840	
17,000.0	9,197.0	15,971.0	8,383.4	133.5	137.0	37.46	-7,871.2	-70.7	1,027.4	756.9	270.51	3.798	

COG PRODUCTION, LLC

Anticollision Report

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #1H - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 211-MWD, 4639-MWD, 7802-MWD — **Offset Well Error:** 0.0 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
17,100.0	9,197.0	16,075.8	8,383.7	135.2	138.8	37.58	-7,976.0	-72.6	1,028.8	754.8	273.98	3.755	
17,200.0	9,197.0	16,183.9	8,383.4	136.8	140.7	37.59	-8,084.1	-72.1	1,029.3	751.7	277.51	3.709	
17,300.0	9,197.0	16,286.8	8,382.2	138.5	142.5	37.48	-8,187.0	-69.8	1,029.2	748.3	280.96	3.663	
17,400.0	9,197.0	16,392.4	8,382.1	140.1	144.3	37.45	-8,292.5	-68.3	1,028.9	744.5	284.44	3.617	
17,500.0	9,197.0	16,498.4	8,384.3	141.8	146.1	37.57	-8,398.5	-68.6	1,028.0	740.0	287.92	3.570	
17,594.9	9,197.0	16,580.6	8,385.8	143.4	147.6	37.67	-8,480.7	-69.1	1,027.4	736.4	290.91	3.531	
17,600.0	9,197.0	16,585.0	8,385.8	143.4	147.6	37.67	-8,485.1	-69.1	1,027.4	736.3	291.08	3.530	
17,700.0	9,197.0	16,675.4	8,385.2	145.1	149.2	37.66	-8,575.5	-68.5	1,027.9	733.6	294.32	3.493	
17,800.0	9,197.0	16,773.0	8,384.0	146.8	150.9	37.63	-8,673.1	-68.1	1,029.1	731.4	297.68	3.457	
17,900.0	9,197.0	16,866.6	8,383.5	148.4	152.5	37.69	-8,766.6	-69.1	1,030.6	729.7	300.95	3.425	
18,000.0	9,197.0	16,951.5	8,381.7	150.1	154.0	37.68	-8,851.6	-69.6	1,033.2	729.1	304.09	3.398	
18,100.0	9,197.0	17,071.0	8,378.3	151.7	156.1	37.59	-8,971.0	-69.4	1,035.9	728.1	307.81	3.365	
18,200.0	9,197.0	17,174.9	8,378.8	153.4	157.9	37.72	-9,074.9	-71.2	1,037.0	725.8	311.24	3.332	
18,300.0	9,197.0	17,265.1	8,379.6	155.0	159.4	37.90	-9,165.0	-73.8	1,038.5	724.1	314.45	3.303	
18,400.0	9,197.0	17,356.8	8,379.1	156.7	161.0	38.01	-9,256.6	-76.2	1,041.1	723.4	317.70	3.277	
18,500.0	9,197.0	17,486.8	8,378.7	158.4	163.2	38.12	-9,386.7	-78.0	1,042.6	721.1	321.57	3.242	
18,600.0	9,197.0	17,598.7	8,381.3	160.0	165.1	38.26	-9,498.5	-78.4	1,041.5	716.3	325.14	3.203	
18,700.0	9,197.0	17,695.2	8,382.5	161.7	166.8	38.30	-9,595.1	-77.6	1,040.4	712.0	328.49	3.167	
18,800.0	9,197.0	17,798.4	8,383.0	163.3	168.6	38.28	-9,698.2	-75.8	1,039.5	707.5	331.96	3.131	
18,900.0	9,197.0	17,897.5	8,382.9	165.0	170.4	38.19	-9,797.2	-73.1	1,038.3	702.9	335.36	3.096	
19,000.0	9,197.0	18,007.2	8,382.8	166.7	172.3	38.06	-9,906.9	-69.4	1,036.8	697.9	338.93	3.059	
19,096.8	9,197.0	18,083.0	8,383.1	168.3	173.6	37.97	-9,982.6	-66.5	1,034.9	693.1	341.85	3.027	
19,100.0	9,197.0	18,083.0	8,383.1	168.3	173.6	37.97	-9,982.6	-66.5	1,034.9	693.0	341.90	3.027 SF	
19,200.0	9,197.0	18,083.0	8,383.1	170.0	173.6	37.97	-9,982.6	-66.5	1,040.0	696.5	343.56	3.027	
19,300.0	9,197.0	18,083.0	8,383.1	171.6	173.6	37.97	-9,982.6	-66.5	1,054.7	709.5	345.22	3.055	
19,400.0	9,197.0	18,083.0	8,383.1	173.3	173.6	37.97	-9,982.6	-66.5	1,078.4	731.5	346.88	3.109	
19,415.3	9,197.0	18,083.0	8,383.1	173.5	173.6	37.97	-9,982.6	-66.5	1,082.8	735.7	347.13	3.119	

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #2H - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 100- VES GyroFlex, 7835-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	5.1	5.1	0.0	3.0	88.54	27.8	1,089.5	1,089.9				
100.0	100.0	106.8	106.8	0.1	3.0	88.55	27.7	1,089.4	1,089.8	1,086.7	3.06	356.302	
200.0	200.0	207.4	207.4	0.2	3.0	88.56	27.4	1,089.2	1,089.6	1,086.4	3.22	338.150	
300.0	300.0	309.3	309.3	0.4	3.0	88.57	27.3	1,088.9	1,089.3	1,085.9	3.39	321.215	
400.0	400.0	411.1	411.1	0.5	3.0	88.57	27.2	1,088.5	1,088.8	1,085.2	3.57	305.244	
500.0	500.0	516.9	516.9	0.7	3.1	88.58	26.9	1,087.6	1,088.0	1,084.2	3.75	289.842	
600.0	600.0	620.1	620.1	0.8	3.1	88.61	26.4	1,086.3	1,086.7	1,082.8	3.95	275.262	
700.0	700.0	720.4	720.4	1.0	3.2	88.63	25.9	1,084.8	1,085.3	1,081.1	4.15	261.615	
800.0	800.0	816.2	816.2	1.2	3.2	88.66	25.4	1,083.7	1,084.0	1,079.7	4.35	249.018	
900.0	900.0	911.7	911.7	1.3	3.3	88.68	25.0	1,082.9	1,083.2	1,078.7	4.56	237.350	
1,000.0	1,000.0	1,009.1	1,009.1	1.5	3.3	88.69	24.8	1,082.4	1,082.7	1,077.9	4.78	226.508	
1,100.0	1,100.0	1,107.5	1,107.5	1.6	3.4	88.71	24.4	1,082.1	1,082.4	1,077.4	5.00	216.632	
1,146.0	1,146.0	1,151.1	1,151.0	1.7	3.4	88.71	24.3	1,082.1	1,082.4	1,077.3	5.07	213.307	
1,200.0	1,200.0	1,202.3	1,202.2	1.8	3.4	88.71	24.4	1,082.2	1,082.4	1,077.3	5.16	209.574	
1,300.0	1,300.0	1,303.9	1,303.8	1.9	3.4	88.72	24.2	1,082.3	1,082.6	1,077.3	5.32	203.567	
1,400.0	1,400.0	1,400.0	1,400.0	2.1	3.4	88.73	24.0	1,082.6	1,082.9	1,077.4	5.48	197.545	
1,500.0	1,500.0	1,505.6	1,505.6	2.2	3.4	88.69	24.7	1,082.8	1,083.1	1,077.5	5.63	192.535	
1,600.0	1,600.0	1,620.6	1,620.6	2.4	3.4	88.63	25.8	1,081.8	1,082.2	1,076.4	5.81	186.117	
1,700.0	1,700.0	1,713.2	1,713.2	2.6	3.5	88.65	25.5	1,080.7	1,081.0	1,075.0	6.03	179.391	
1,752.3	1,752.3	1,757.3	1,757.3	2.6	3.5	88.67	25.1	1,080.5	1,080.8	1,074.7	6.13	176.432	
1,800.0	1,800.0	1,800.0	1,799.9	2.7	3.5	88.69	24.8	1,080.7	1,081.0	1,074.8	6.22	173.825	
1,900.0	1,900.0	1,894.1	1,894.0	2.9	3.5	88.70	24.6	1,081.5	1,081.9	1,075.5	6.37	169.852	
2,000.0	2,000.0	2,004.5	2,004.4	3.0	3.5	88.66	25.3	1,082.1	1,082.4	1,075.9	6.51	166.169	
2,100.0	2,100.0	2,116.5	2,116.4	3.2	3.5	88.61	26.2	1,081.4	1,081.8	1,075.1	6.70	161.343	
2,200.0	2,200.0	2,208.9	2,208.8	3.3	3.6	88.61	26.3	1,080.8	1,081.1	1,074.2	6.92	156.174	
2,300.0	2,300.0	2,307.0	2,306.9	3.5	3.7	88.62	26.0	1,080.5	1,080.8	1,073.6	7.15	151.130	
2,318.5	2,318.5	2,323.7	2,323.7	3.5	3.7	88.62	26.0	1,080.5	1,080.8	1,073.6	7.19	150.421	
2,400.0	2,400.0	2,400.0	2,399.9	3.6	3.7	88.62	26.0	1,080.7	1,081.1	1,073.7	7.33	147.412	
2,500.0	2,500.0	2,498.9	2,498.8	3.8	3.7	88.59	26.6	1,081.4	1,081.7	1,074.3	7.47	144.728	
2,600.0	2,600.0	2,608.0	2,607.9	4.0	3.7	88.53	27.7	1,081.5	1,081.9	1,074.2	7.64	141.597	
2,700.0	2,700.0	2,713.1	2,712.9	4.1	3.7	88.49	28.6	1,080.9	1,081.3	1,073.5	7.84	137.853	
2,800.0	2,800.0	2,811.9	2,811.8	4.3	3.8	88.49	28.5	1,080.2	1,080.6	1,072.6	8.07	133.924	
2,900.0	2,900.0	2,905.6	2,905.5	4.4	3.9	88.52	27.9	1,079.9	1,080.3	1,072.0	8.29	130.348	
2,911.3	2,911.3	2,916.4	2,916.3	4.4	3.9	88.52	27.9	1,079.9	1,080.3	1,072.0	8.31	130.007	
3,000.0	3,000.0	3,001.0	3,000.9	4.6	3.9	88.55	27.4	1,080.1	1,080.5	1,072.0	8.48	127.377	
3,100.0	3,100.0	3,100.0	3,099.9	4.7	3.9	88.57	26.9	1,080.6	1,080.9	1,072.2	8.66	124.811	
3,200.0	3,200.0	3,196.2	3,196.1	4.9	3.9	88.59	26.7	1,081.2	1,081.6	1,072.7	8.83	122.528	
3,300.0	3,300.0	3,296.2	3,296.1	5.1	3.9	88.56	27.2	1,082.0	1,082.4	1,073.4	8.99	120.455	
3,400.0	3,400.0	3,412.2	3,412.1	5.2	4.0	88.49	28.5	1,082.0	1,082.4	1,073.2	9.17	118.007	
3,500.0	3,500.0	3,511.4	3,511.2	5.4	4.0	88.47	28.9	1,081.4	1,081.8	1,072.4	9.39	115.198	
3,600.0	3,600.0	3,611.3	3,611.2	5.5	4.1	88.48	28.6	1,080.8	1,081.2	1,071.6	9.63	112.318	
3,678.5	3,678.5	3,684.0	3,683.8	5.6	4.2	88.51	28.1	1,080.6	1,081.0	1,071.2	9.80	110.292	
3,700.0	3,700.0	3,700.0	3,699.9	5.7	4.2	88.52	27.9	1,080.6	1,081.0	1,071.1	9.85	109.787	
3,800.0	3,800.0	3,795.5	3,795.3	5.8	4.2	88.53	27.7	1,081.1	1,081.5	1,071.4	10.03	107.830	
3,900.0	3,900.0	3,901.9	3,901.8	6.0	4.2	88.49	28.6	1,081.7	1,082.1	1,071.9	10.20	106.135	
4,000.0	4,000.0	4,009.7	4,009.5	6.1	4.3	88.45	29.3	1,081.6	1,082.0	1,071.6	10.40	104.047	
4,100.0	4,100.0	4,107.8	4,107.6	6.3	4.3	88.44	29.4	1,081.3	1,081.7	1,071.0	10.63	101.759	
4,161.4	4,161.4	4,166.6	4,166.4	6.4	4.4	88.45	29.3	1,081.2	1,081.6	1,070.8	10.77	100.471	
4,200.0	4,200.0	4,203.4	4,203.3	6.5	4.4	88.46	29.1	1,081.2	1,081.6	1,070.8	10.85	99.691	
4,300.0	4,300.0	4,300.0	4,299.8	6.6	4.4	88.49	28.5	1,081.7	1,082.1	1,071.0	11.05	97.953	
4,400.0	4,400.0	4,391.2	4,391.0	6.8	4.5	88.53	27.7	1,082.6	1,083.0	1,071.8	11.23	96.404	

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

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #2H - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 100- VES GyroFlex, 7835-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
4,500.0	4,500.0	4,495.9	4,495.7	6.9	4.5	88.58	26.8	1,083.8	1,084.2	1,072.7	11.43	94.861	
4,600.0	4,600.0	4,599.7	4,599.5	7.1	4.5	88.61	26.2	1,084.5	1,084.8	1,073.2	11.63	93.284	
4,700.0	4,700.0	4,699.3	4,699.1	7.2	4.6	88.64	25.8	1,085.1	1,085.4	1,073.5	11.83	91.717	
4,800.0	4,800.0	4,796.1	4,795.9	7.4	4.6	88.67	25.3	1,085.7	1,086.1	1,074.0	12.04	90.203	
4,900.0	4,900.0	4,892.0	4,891.8	7.6	4.7	88.71	24.5	1,086.7	1,087.1	1,074.8	12.25	88.738	
5,000.0	5,000.0	4,993.6	4,993.3	7.7	4.8	88.77	23.4	1,087.9	1,088.2	1,075.8	12.47	87.259	
5,100.0	5,100.0	5,094.8	5,094.6	7.9	4.8	88.83	22.3	1,089.0	1,089.3	1,076.6	12.70	85.777	
5,200.0	5,200.0	5,200.0	5,199.7	8.0	4.9	88.87	21.4	1,089.8	1,090.0	1,077.1	12.93	84.283	
5,300.0	5,300.0	5,297.0	5,296.8	8.2	5.0	88.90	21.0	1,090.4	1,090.6	1,077.4	13.16	82.884	
5,400.0	5,400.0	5,400.1	5,399.9	8.3	5.1	88.92	20.5	1,091.0	1,091.2	1,077.8	13.39	81.472	
5,500.0	5,500.0	5,502.7	5,502.4	8.5	5.2	88.95	20.0	1,091.4	1,091.6	1,077.9	13.64	80.015	
5,600.0	5,600.0	5,603.4	5,603.2	8.6	5.3	88.97	19.6	1,091.6	1,091.8	1,077.9	13.89	78.573	
5,700.0	5,700.0	5,702.4	5,702.1	8.8	5.3	89.00	19.1	1,091.8	1,092.0	1,077.8	14.15	77.176	
5,800.0	5,800.0	5,805.7	5,805.4	9.0	5.5	89.02	18.7	1,091.9	1,092.1	1,077.7	14.41	75.775	
5,900.0	5,900.0	5,907.3	5,907.1	9.1	5.6	89.05	18.2	1,091.8	1,092.0	1,077.3	14.68	74.407	
6,000.0	6,000.0	6,008.0	6,007.8	9.3	5.7	89.08	17.6	1,091.6	1,091.8	1,076.8	14.94	73.086	
6,100.0	6,100.0	6,110.7	6,110.5	9.4	5.8	89.11	16.9	1,091.2	1,091.4	1,076.2	15.20	71.806	
6,200.0	6,200.0	6,213.3	6,213.1	9.6	5.9	89.14	16.4	1,090.6	1,090.8	1,075.3	15.45	70.601	
6,300.0	6,300.0	6,316.8	6,316.6	9.7	6.0	89.17	15.8	1,089.7	1,089.9	1,074.2	15.70	69.430	
6,400.0	6,400.0	6,422.0	6,421.7	9.9	6.1	89.21	15.1	1,088.3	1,088.5	1,072.6	15.94	68.270	
6,500.0	6,500.0	6,521.9	6,521.7	10.0	6.1	89.24	14.4	1,086.8	1,087.0	1,070.8	16.18	67.163	
6,600.0	6,600.0	6,625.2	6,624.9	10.2	6.2	89.27	13.8	1,085.1	1,085.3	1,068.9	16.43	66.055	
6,700.0	6,700.0	6,727.6	6,727.2	10.4	6.3	89.32	12.8	1,083.1	1,083.4	1,066.7	16.68	64.946	
6,800.0	6,800.0	6,828.0	6,827.6	10.5	6.4	89.39	11.5	1,081.0	1,081.3	1,064.4	16.94	63.843	
6,900.0	6,900.0	6,926.3	6,925.9	10.7	6.5	89.45	10.4	1,079.0	1,079.2	1,062.1	17.19	62.773	
7,000.0	7,000.0	7,022.7	7,022.3	10.8	6.6	89.51	9.3	1,077.3	1,077.5	1,060.1	17.45	61.746	
7,100.0	7,100.0	7,123.2	7,122.8	11.0	6.7	89.57	8.1	1,075.7	1,075.9	1,058.2	17.72	60.725	
7,200.0	7,200.0	7,227.5	7,227.0	11.1	6.8	89.65	6.6	1,073.8	1,074.1	1,056.1	17.99	59.699	
7,300.0	7,300.0	7,330.0	7,329.5	11.3	7.0	89.74	4.9	1,071.6	1,071.8	1,053.6	18.26	58.686	
7,400.0	7,400.0	7,428.4	7,427.9	11.5	7.1	89.82	3.3	1,069.4	1,069.6	1,051.1	18.53	57.712	
7,500.0	7,500.0	7,525.2	7,524.6	11.6	7.2	89.91	1.7	1,067.4	1,067.6	1,048.8	18.80	56.774	
7,600.0	7,600.0	7,620.8	7,620.2	11.8	7.3	89.99	0.2	1,065.9	1,066.0	1,046.9	19.08	55.877	
7,700.0	7,700.0	7,721.9	7,721.3	11.9	7.4	90.08	-1.5	1,064.4	1,064.6	1,045.2	19.36	54.986	
7,800.0	7,800.0	7,838.2	7,837.5	12.1	7.6	90.26	-4.9	1,062.0	1,062.5	1,042.9	19.64	54.093	
7,900.0	7,900.0	7,974.8	7,970.2	12.2	7.6	91.87	-34.5	1,056.4	1,059.0	1,039.1	19.86	53.311	
8,000.0	8,000.0	8,023.0	8,015.4	12.4	7.7	92.78	-51.1	1,053.5	1,054.8	1,034.7	20.05	52.609	
8,028.0	8,028.0	8,042.1	8,033.0	12.4	7.7	93.18	-58.6	1,052.9	1,054.5	1,034.4	20.11	52.440	
8,100.0	8,100.0	8,072.4	8,060.2	12.5	7.7	93.91	-71.9	1,052.6	1,056.0	1,035.8	20.25	52.145	
8,200.0	8,200.0	8,117.0	8,098.5	12.7	7.8	95.13	-94.6	1,053.8	1,063.4	1,042.9	20.46	51.970	
8,300.0	8,300.0	8,149.0	8,124.8	12.9	7.8	96.11	-112.9	1,055.5	1,076.7	1,056.0	20.66	52.106	
8,400.0	8,400.0	8,196.8	8,162.2	13.0	7.9	97.66	-142.5	1,059.1	1,095.9	1,075.0	20.90	52.435	
8,500.0	8,500.0	8,243.0	8,196.6	13.2	8.0	99.23	-172.9	1,063.6	1,120.8	1,099.7	21.15	52.995	
8,600.0	8,600.0	8,282.8	8,224.8	13.3	8.1	100.64	-200.6	1,067.9	1,151.2	1,129.9	21.34	53.947	
8,700.0	8,700.0	8,317.9	8,248.3	13.3	8.2	101.93	-226.4	1,071.9	1,186.9	1,165.5	21.47	55.275	
8,719.5	8,719.5	8,323.8	8,252.1	13.3	8.2	102.15	-230.9	1,072.6	1,194.5	1,173.0	21.50	55.559	
8,725.0	8,725.0	8,325.5	8,253.1	13.3	8.2	-44.03	-232.1	1,072.8	1,196.7	1,175.2	21.51	55.639	
8,750.0	8,750.0	8,337.0	8,260.4	13.3	8.3	-42.77	-241.0	1,074.2	1,206.2	1,184.7	21.56	55.944	
8,775.0	8,774.9	8,337.0	8,260.4	13.3	8.3	-41.99	-241.0	1,074.2	1,215.2	1,193.6	21.57	56.343	
8,800.0	8,799.6	8,351.3	8,269.1	13.3	8.4	-40.81	-252.2	1,075.9	1,223.5	1,201.9	21.64	56.527	
8,825.0	8,824.1	8,368.0	8,279.0	13.3	8.4	-39.66	-265.5	1,077.9	1,231.3	1,209.6	21.74	56.637	

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #2H - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 100- VES GyroFlex, 7835-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
8,850.0	8,848.4	8,400.0	8,297.6	13.3	8.6	-38.14	-291.4	1,081.1	1,238.2	1,216.3	21.94	56.427	
8,875.0	8,872.3	8,412.4	8,304.7	13.3	8.7	-37.32	-301.5	1,082.2	1,244.1	1,222.1	22.04	56.447	
8,900.0	8,895.7	8,422.4	8,310.3	13.3	8.8	-36.65	-309.6	1,083.1	1,249.4	1,227.3	22.13	56.462	
8,925.0	8,918.7	8,431.0	8,315.1	13.3	8.9	-36.09	-316.7	1,084.0	1,253.9	1,231.7	22.21	56.460	
8,950.0	8,941.2	8,441.7	8,321.0	13.4	8.9	-35.55	-325.6	1,085.0	1,257.8	1,235.5	22.32	56.364	
8,975.0	8,963.0	8,451.1	8,326.0	13.4	9.0	-35.10	-333.5	1,085.9	1,260.9	1,238.5	22.41	56.255	
9,000.0	8,984.1	8,463.0	8,332.2	13.4	9.1	-34.65	-343.6	1,087.1	1,263.3	1,240.7	22.54	56.053	
9,025.0	9,004.6	8,473.0	8,337.3	13.4	9.2	-34.30	-352.2	1,088.1	1,264.9	1,242.2	22.65	55.836	
9,050.0	9,024.2	8,486.7	8,344.0	13.5	9.3	-33.94	-364.0	1,089.4	1,265.7	1,242.9	22.81	55.498	
9,075.0	9,043.1	8,494.0	8,347.5	13.5	9.4	-33.78	-370.4	1,090.1	1,265.7	1,242.8	22.90	55.258	
9,100.0	9,061.0	8,511.6	8,355.8	13.5	9.6	-33.45	-385.9	1,091.7	1,264.8	1,241.7	23.11	54.739	
9,125.0	9,078.0	8,525.0	8,361.8	13.6	9.7	-33.28	-397.8	1,092.9	1,263.2	1,239.9	23.27	54.275	
9,150.0	9,094.0	8,534.9	8,366.1	13.6	9.8	-33.24	-406.6	1,093.7	1,260.7	1,237.3	23.43	53.818	
9,175.0	9,109.0	8,546.0	8,370.8	13.7	9.9	-33.23	-416.7	1,094.7	1,257.5	1,233.9	23.60	53.288	
9,200.0	9,122.9	8,557.0	8,375.2	13.7	10.0	-33.28	-426.7	1,095.5	1,253.5	1,229.7	23.78	52.720	
9,225.0	9,135.7	8,557.0	8,375.2	13.8	10.0	-33.60	-426.7	1,095.5	1,248.8	1,224.9	23.84	52.370	
9,250.0	9,147.4	8,570.4	8,380.4	13.9	10.2	-33.73	-439.0	1,096.6	1,243.2	1,219.1	24.07	51.642	
9,275.0	9,157.9	8,577.1	8,382.8	14.0	10.3	-34.03	-445.3	1,097.2	1,237.0	1,212.8	24.24	51.039	
9,300.0	9,167.2	8,588.0	8,386.5	14.1	10.4	-34.33	-455.4	1,098.3	1,230.1	1,205.7	24.46	50.293	
9,325.0	9,175.3	8,588.0	8,386.5	14.2	10.4	-34.88	-455.4	1,098.3	1,222.5	1,198.0	24.57	49.756	
9,350.0	9,182.1	8,598.1	8,389.8	14.3	10.5	-35.32	-464.9	1,099.3	1,214.3	1,189.4	24.82	48.927	
9,375.0	9,187.6	8,605.4	8,392.0	14.5	10.6	-35.89	-471.8	1,100.0	1,205.3	1,180.3	25.05	48.119	
9,400.0	9,191.9	8,615.0	8,394.7	14.6	10.7	-36.49	-481.0	1,101.0	1,195.7	1,170.4	25.33	47.211	
9,425.0	9,194.9	8,615.0	8,394.7	14.8	10.7	-37.30	-481.0	1,101.0	1,185.4	1,159.9	25.51	46.473	
9,450.0	9,196.6	8,629.2	8,398.4	15.0	10.9	-38.02	-494.6	1,102.6	1,174.4	1,148.5	25.89	45.361	
9,469.5	9,197.0	8,635.8	8,400.0	15.2	11.0	-38.70	-500.9	1,103.3	1,165.4	1,139.3	26.15	44.570	
9,500.0	9,197.0	8,647.0	8,402.6	15.5	11.1	-39.07	-511.8	1,104.5	1,151.4	1,124.8	26.59	43.302	
9,600.0	9,197.0	8,691.4	8,411.3	16.6	11.7	-40.02	-555.1	1,109.8	1,110.7	1,082.4	28.34	39.187	
9,700.0	9,197.0	8,780.4	8,424.6	18.0	13.0	-40.32	-642.6	1,118.9	1,076.6	1,045.6	30.95	34.779	
9,800.0	9,197.0	8,849.5	8,432.4	19.5	14.0	-40.59	-711.0	1,123.6	1,047.4	1,014.0	33.42	31.340	
9,900.0	9,197.0	8,898.0	8,434.5	21.0	14.7	-40.77	-759.4	1,126.5	1,026.8	991.2	35.63	28.818	
10,000.0	9,197.0	8,991.4	8,433.7	22.4	16.1	-40.32	-852.7	1,130.2	1,013.6	975.1	38.50	26.329	
10,100.0	9,197.0	9,099.8	8,432.5	23.9	17.7	-39.83	-961.0	1,133.1	1,004.6	963.0	41.57	24.165	
10,200.0	9,197.0	9,207.1	8,433.0	25.2	19.4	-39.61	-1,068.4	1,135.9	998.8	954.2	44.60	22.397	
10,257.7	9,197.0	9,255.2	8,432.9	26.0	20.1	-39.57	-1,116.5	1,137.1	997.8	951.7	46.09	21.651	
10,297.5	9,197.0	9,290.8	8,432.4	26.5	20.7	-39.55	-1,152.0	1,138.0	998.3	951.1	47.16	21.166	
10,300.0	9,197.0	9,293.3	8,432.4	26.5	20.7	-39.55	-1,154.4	1,138.1	998.3	951.1	47.24	21.135	
10,400.0	9,197.0	9,389.5	8,431.5	27.8	22.2	-39.62	-1,250.6	1,141.2	1,000.7	950.6	50.03	20.001	
10,500.0	9,197.0	9,480.9	8,430.2	29.1	23.7	-39.70	-1,342.0	1,144.6	1,003.6	950.8	52.82	19.003	
10,600.0	9,197.0	9,577.6	8,428.6	30.5	25.3	-39.81	-1,438.5	1,149.3	1,007.5	951.8	55.74	18.076	
10,700.0	9,197.0	9,696.2	8,429.1	31.9	27.2	-40.06	-1,557.0	1,155.4	1,009.9	950.8	59.06	17.098	
10,800.0	9,197.0	9,792.3	8,430.6	33.3	28.8	-40.31	-1,652.9	1,160.8	1,011.9	949.9	62.06	16.305	
10,900.0	9,197.0	9,894.3	8,430.4	34.8	30.4	-40.46	-1,754.8	1,165.3	1,014.3	949.2	65.18	15.562	
11,000.0	9,197.0	10,017.7	8,429.8	36.2	32.4	-40.51	-1,878.2	1,167.7	1,015.5	946.9	68.66	14.791	
11,080.3	9,197.0	10,095.8	8,428.5	37.4	33.7	-40.37	-1,956.3	1,166.4	1,015.3	944.2	71.11	14.278	
11,100.0	9,197.0	10,114.3	8,428.1	37.7	34.0	-40.35	-1,974.8	1,166.1	1,015.4	943.7	71.70	14.161	
11,200.0	9,197.0	10,223.5	8,427.2	39.2	35.8	-40.25	-2,083.9	1,165.5	1,015.1	940.2	74.97	13.540	
11,300.0	9,197.0	10,335.8	8,427.6	40.7	37.6	-40.16	-2,196.3	1,164.1	1,013.5	935.2	78.31	12.942	
11,400.0	9,197.0	10,426.6	8,427.5	42.3	39.0	-40.06	-2,287.0	1,162.3	1,011.9	930.5	81.31	12.444	
11,457.9	9,197.0	10,473.7	8,426.8	43.2	39.8	-39.97	-2,334.1	1,161.4	1,011.5	928.6	82.97	12.192	
11,500.0	9,197.0	10,513.0	8,425.7	43.8	40.4	-39.89	-2,373.3	1,160.7	1,011.7	927.4	84.26	12.007	

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

COG PRODUCTION, LLC

Anticollision Report

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #2H - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 100- VES GyroFlex, 7835-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
11,600.0	9,197.0	10,631.3	8,424.7	45.4	42.4	-39.74	-2,491.6	1,159.0	1,010.9	923.2	87.73	11.523	
11,700.0	9,197.0	10,732.0	8,425.5	46.9	44.0	-39.68	-2,592.3	1,157.8	1,009.1	918.2	90.93	11.097	
11,800.0	9,197.0	10,824.6	8,425.7	48.5	45.5	-39.63	-2,684.9	1,157.2	1,007.9	913.9	94.02	10.721	
11,889.2	9,197.0	10,905.1	8,425.8	49.9	46.8	-39.61	-2,765.4	1,157.1	1,007.4	910.7	96.74	10.413	
11,900.0	9,197.0	10,914.0	8,425.7	50.1	47.0	-39.60	-2,774.4	1,157.1	1,007.4	910.4	97.06	10.379	
12,000.0	9,197.0	11,007.4	8,424.4	51.7	48.5	-39.54	-2,867.7	1,157.6	1,008.3	908.1	100.18	10.065	
12,100.0	9,197.0	11,106.0	8,424.1	53.3	50.1	-39.55	-2,966.3	1,158.7	1,008.8	905.5	103.39	9.757	
12,200.0	9,197.0	11,195.1	8,422.8	54.9	51.6	-39.54	-3,055.4	1,160.3	1,010.5	904.1	106.46	9.492	
12,300.0	9,197.0	11,303.0	8,421.8	56.4	53.4	-39.60	-3,163.2	1,163.2	1,012.5	902.7	109.85	9.217	
12,400.0	9,197.0	11,417.5	8,422.2	58.1	55.3	-39.67	-3,277.7	1,165.4	1,012.9	899.6	113.35	8.936	
12,500.0	9,197.0	11,552.4	8,423.6	59.7	57.5	-39.60	-3,412.6	1,163.8	1,010.9	893.7	117.17	8.628	
12,600.0	9,197.0	11,640.6	8,424.9	61.3	59.0	-39.53	-3,500.7	1,161.7	1,007.8	887.5	120.22	8.383	
12,700.0	9,197.0	11,721.0	8,424.2	62.9	60.3	-39.40	-3,581.1	1,160.0	1,006.5	883.4	123.15	8.173	
12,800.0	9,197.0	11,839.6	8,423.8	64.5	62.2	-39.24	-3,699.7	1,157.7	1,005.0	878.3	126.70	7.932	
12,900.0	9,197.0	11,930.3	8,424.2	66.1	63.7	-39.15	-3,790.4	1,155.9	1,003.0	873.2	129.81	7.727	
13,000.0	9,197.0	12,019.3	8,422.9	67.7	65.2	-39.00	-3,879.3	1,154.2	1,002.4	869.6	132.89	7.544	
13,100.0	9,197.0	12,132.4	8,422.5	69.4	67.0	-38.85	-3,992.4	1,152.1	1,001.0	864.6	136.37	7.340	
13,200.0	9,197.0	12,230.1	8,422.7	71.0	68.6	-38.79	-4,090.1	1,151.3	999.8	860.2	139.60	7.162	
13,300.0	9,197.0	12,328.9	8,424.2	72.6	70.2	-38.80	-4,188.9	1,151.2	998.0	855.2	142.86	6.986	
13,369.6	9,197.0	12,385.9	8,424.3	73.7	71.2	-38.79	-4,245.9	1,151.2	997.6	852.7	144.94	6.883	
13,400.0	9,197.0	12,412.6	8,424.1	74.2	71.6	-38.77	-4,272.6	1,151.2	997.7	851.8	145.87	6.839	
13,500.0	9,197.0	12,513.4	8,422.8	75.9	73.3	-38.71	-4,373.4	1,151.6	998.5	849.3	149.17	6.693	
13,600.0	9,197.0	12,617.7	8,423.2	77.5	75.0	-38.71	-4,477.7	1,152.1	998.0	845.5	152.53	6.543	
13,700.0	9,197.0	12,739.3	8,423.2	79.1	77.0	-38.67	-4,599.3	1,152.2	997.7	841.5	156.17	6.388	
13,800.0	9,197.0	12,841.8	8,426.1	80.8	78.7	-38.74	-4,701.8	1,152.2	995.0	835.5	159.51	6.238	
13,894.1	9,197.0	12,910.5	8,426.8	82.3	79.9	-38.73	-4,770.4	1,152.0	993.7	831.5	162.18	6.127	
13,900.0	9,197.0	12,914.7	8,426.8	82.4	79.9	-38.73	-4,774.6	1,152.0	993.7	831.3	162.35	6.121	
14,000.0	9,197.0	13,015.9	8,424.8	84.0	81.6	-38.60	-4,875.8	1,151.5	994.4	828.8	165.66	6.003	
14,049.9	9,197.0	13,066.0	8,424.6	84.9	82.4	-38.58	-4,925.9	1,151.5	994.4	827.1	167.30	5.944	
14,100.0	9,197.0	13,110.3	8,424.1	85.7	83.2	-38.54	-4,970.2	1,151.5	994.5	825.7	168.86	5.890	
14,200.0	9,197.0	13,223.1	8,423.3	87.3	85.0	-38.49	-5,083.0	1,151.7	994.8	822.4	172.36	5.772	
14,229.9	9,197.0	13,246.3	8,423.4	87.8	85.4	-38.49	-5,106.2	1,151.9	994.7	821.4	173.24	5.742	
14,300.0	9,197.0	13,299.2	8,423.0	89.0	86.3	-38.48	-5,159.1	1,152.5	995.3	820.0	175.27	5.679	
14,400.0	9,197.0	13,419.2	8,421.8	90.6	88.3	-38.48	-5,279.0	1,154.3	996.6	817.7	178.90	5.571	
14,500.0	9,197.0	13,532.2	8,422.9	92.3	90.2	-38.46	-5,392.1	1,153.9	995.1	812.7	182.42	5.455	
14,569.1	9,197.0	13,585.6	8,422.7	93.4	91.0	-38.42	-5,445.5	1,153.4	994.5	810.1	184.43	5.392	
14,600.0	9,197.0	13,613.7	8,422.3	93.9	91.5	-38.38	-5,473.6	1,153.2	994.6	809.2	185.41	5.365	
14,700.0	9,197.0	13,721.7	8,422.0	95.5	93.3	-38.33	-5,581.5	1,153.0	994.2	805.4	188.84	5.265	
14,742.6	9,197.0	13,759.1	8,422.1	96.2	93.9	-38.32	-5,619.0	1,153.2	994.1	803.9	190.16	5.228	
14,800.0	9,197.0	13,813.5	8,422.0	97.2	94.8	-38.33	-5,673.4	1,153.8	994.2	802.2	192.01	5.178	
14,900.0	9,197.0	13,912.8	8,421.5	98.8	96.5	-38.29	-5,772.7	1,154.2	994.4	799.1	195.30	5.092	
15,000.0	9,197.0	14,008.3	8,420.1	100.5	98.1	-38.23	-5,868.1	1,154.5	995.3	796.8	198.53	5.013	
15,100.0	9,197.0	14,109.8	8,419.7	102.1	99.7	-38.20	-5,969.7	1,155.1	995.5	793.7	201.86	4.932	
15,200.0	9,197.0	14,207.3	8,418.2	103.8	101.4	-38.17	-6,067.1	1,156.3	996.9	791.8	205.13	4.860	
15,300.0	9,197.0	14,309.5	8,418.6	105.4	103.1	-38.22	-6,169.3	1,157.9	997.1	788.6	208.48	4.783	
15,400.0	9,197.0	14,429.4	8,418.2	107.1	105.1	-38.23	-6,289.2	1,159.4	997.9	785.8	212.12	4.704	
15,490.4	9,197.0	14,507.0	8,419.5	108.6	106.3	-38.29	-6,366.7	1,160.2	996.9	782.0	214.90	4.639	
15,500.0	9,197.0	14,514.1	8,419.5	108.7	106.5	-38.29	-6,373.8	1,160.3	996.9	781.7	215.18	4.633	
15,600.0	9,197.0	14,627.4	8,418.6	110.4	108.3	-38.22	-6,487.2	1,160.4	997.2	778.5	218.71	4.560	
15,668.2	9,197.0	14,684.8	8,418.6	111.5	109.3	-38.19	-6,544.6	1,160.2	996.7	775.9	220.78	4.514	

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

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - KING TUT FEDERAL #2H - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 100- VES GyroFlex, 7835-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
15,700.0	9,197.0	14,709.8	8,418.4	112.0	109.7	-38.18	-6,569.6	1,160.2	996.8	775.1	221.72	4.496	
15,800.0	9,197.0	14,824.0	8,418.5	113.7	111.6	-38.18	-6,683.7	1,161.1	996.8	771.5	225.27	4.425	
15,900.0	9,197.0	14,918.0	8,418.8	115.3	113.2	-38.20	-6,777.7	1,161.9	996.5	768.1	228.48	4.362	
16,000.0	9,197.0	15,032.9	8,419.1	117.0	115.1	-38.18	-6,892.6	1,162.2	996.0	764.0	232.04	4.292	
16,100.0	9,197.0	15,118.7	8,419.1	118.6	116.5	-38.12	-6,978.4	1,161.5	995.1	760.0	235.11	4.232	
16,112.1	9,197.0	15,129.2	8,418.9	118.8	116.7	-38.10	-6,988.9	1,161.4	995.1	759.6	235.49	4.226	
16,200.0	9,197.0	15,215.3	8,417.6	120.3	118.1	-38.01	-7,075.0	1,161.0	995.5	757.2	238.36	4.176	
16,300.0	9,197.0	15,353.1	8,421.7	121.9	120.4	-38.10	-7,212.8	1,160.9	992.3	750.0	242.30	4.095	
16,400.0	9,197.0	15,445.1	8,424.6	123.6	121.9	-38.15	-7,304.7	1,160.4	989.0	743.5	245.48	4.029	
16,500.0	9,197.0	15,535.7	8,427.0	125.2	123.4	-38.22	-7,395.2	1,160.6	986.6	737.9	248.64	3.968	
16,600.0	9,197.0	15,627.4	8,429.3	126.9	124.9	-38.33	-7,486.9	1,162.1	985.1	733.3	251.82	3.912	
16,680.6	9,197.0	15,697.4	8,430.4	128.2	126.1	-38.40	-7,556.9	1,163.2	984.6	730.2	254.32	3.871	
16,700.0	9,197.0	15,712.7	8,430.4	128.5	126.3	-38.40	-7,572.2	1,163.4	984.6	729.7	254.89	3.863	
16,800.0	9,197.0	15,794.8	8,428.6	130.2	127.7	-38.32	-7,654.3	1,163.7	986.1	728.1	257.91	3.823	
16,900.0	9,197.0	15,884.6	8,425.5	131.9	129.2	-38.22	-7,744.0	1,164.6	988.8	727.8	261.06	3.788	
17,000.0	9,197.0	15,986.6	8,421.5	133.5	130.9	-38.12	-7,845.9	1,166.2	992.4	728.0	264.41	3.753	
17,100.0	9,197.0	16,105.4	8,418.9	135.2	132.9	-38.04	-7,964.7	1,167.4	994.2	726.2	268.04	3.709	
17,200.0	9,197.0	16,214.8	8,419.7	136.8	134.7	-38.16	-8,074.0	1,170.4	994.9	723.4	271.53	3.664	
17,300.0	9,197.0	16,319.0	8,421.8	138.5	136.4	-38.36	-8,178.1	1,173.8	994.9	720.0	274.92	3.619	
17,310.9	9,197.0	16,328.0	8,421.9	138.7	136.6	-38.36	-8,187.1	1,174.0	994.9	719.6	275.26	3.614	
17,400.0	9,197.0	16,398.0	8,421.7	140.1	137.8	-38.39	-8,257.1	1,175.2	995.7	717.8	277.90	3.583	
17,500.0	9,197.0	16,501.0	8,419.0	141.8	139.5	-38.30	-8,360.1	1,176.2	997.9	716.6	281.27	3.548	
17,600.0	9,197.0	16,627.5	8,416.8	143.4	141.6	-38.10	-8,486.5	1,174.6	997.9	712.9	285.01	3.501	
17,700.0	9,197.0	16,717.5	8,416.0	145.1	143.1	-38.00	-8,576.6	1,173.6	997.4	709.2	288.16	3.461	
17,707.7	9,197.0	16,725.0	8,415.9	145.2	143.2	-37.99	-8,584.0	1,173.5	997.4	709.0	288.41	3.458	
17,800.0	9,197.0	16,819.1	8,415.3	146.8	144.7	-37.95	-8,678.1	1,173.7	997.5	706.0	291.50	3.422	
17,900.0	9,197.0	16,935.7	8,416.0	148.4	146.7	-37.89	-8,794.7	1,172.9	996.2	701.1	295.08	3.376	
18,000.0	9,197.0	17,041.9	8,415.8	150.1	148.4	-37.71	-8,900.9	1,169.9	994.1	695.6	298.49	3.331	
18,100.0	9,197.0	17,137.5	8,416.0	151.7	150.0	-37.56	-8,996.5	1,167.1	991.6	689.9	301.72	3.287	
18,200.0	9,197.0	17,225.0	8,415.4	153.4	151.4	-37.41	-9,083.9	1,164.9	990.2	685.4	304.82	3.249	
18,300.0	9,197.0	17,340.8	8,414.4	155.0	153.3	-37.23	-9,199.7	1,162.7	989.4	681.0	308.38	3.208	
18,400.0	9,197.0	17,448.5	8,416.3	156.7	155.1	-37.16	-9,307.4	1,160.6	986.4	674.5	311.82	3.163	
18,500.0	9,197.0	17,533.1	8,417.1	158.4	156.5	-37.08	-9,391.9	1,159.0	983.9	669.1	314.87	3.125	
18,600.0	9,197.0	17,630.5	8,416.9	160.0	158.1	-36.96	-9,489.4	1,157.3	982.7	664.5	318.14	3.089	
18,700.0	9,197.0	17,724.6	8,417.0	161.7	159.7	-36.90	-9,583.4	1,156.6	981.6	660.2	321.35	3.055	
18,785.0	9,197.0	17,802.7	8,417.0	163.1	161.0	-36.88	-9,661.5	1,156.7	981.3	657.2	324.06	3.028	CC
18,800.0	9,197.0	17,816.4	8,417.0	163.3	161.2	-36.87	-9,675.2	1,156.8	981.3	656.8	324.54	3.024	
18,900.0	9,197.0	17,898.9	8,416.4	165.0	162.6	-36.88	-9,757.7	1,157.9	982.2	654.7	327.57	2.999	
19,000.0	9,197.0	17,985.9	8,415.5	166.7	164.0	-36.97	-9,844.6	1,161.2	984.9	654.2	330.69	2.978	
19,100.0	9,197.0	18,101.4	8,415.0	168.3	166.0	-37.17	-9,960.0	1,166.8	987.7	653.5	334.29	2.955	ES
19,200.0	9,197.0	18,142.0	8,415.4	170.0	166.7	-37.26	-10,000.5	1,168.8	991.2	654.6	336.63	2.944	SF
19,300.0	9,197.0	18,142.0	8,415.4	171.6	166.7	-37.26	-10,000.5	1,168.8	1,003.8	665.5	338.29	2.967	
19,400.0	9,197.0	18,142.0	8,415.4	173.3	166.7	-37.26	-10,000.5	1,168.8	1,026.0	686.1	339.95	3.018	
19,415.3	9,197.0	18,142.0	8,415.4	173.5	166.7	-37.26	-10,000.5	1,168.8	1,030.3	690.1	340.20	3.028	

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

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - REDHEAD 31 FEDERAL #1H - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 100-GYD_DP_MS, 9674-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	0.0	0.0	0.0	3.0	175.10	-5,394.3	462.1	5,414.2				
100.0	100.0	68.6	68.6	0.1	3.0	175.10	-5,394.3	462.0	5,414.0	5,411.0	3.06	1,770.243	
146.3	146.3	113.3	113.3	0.1	3.0	175.11	-5,394.3	461.9	5,414.0	5,410.9	3.13	1,728.734	
200.0	200.0	159.0	159.0	0.2	3.0	175.11	-5,394.3	461.8	5,414.1	5,410.9	3.22	1,682.373	
300.0	300.0	265.7	265.7	0.4	3.0	175.11	-5,394.5	461.6	5,414.3	5,410.9	3.38	1,601.877	
400.0	400.0	380.9	380.9	0.5	3.0	175.11	-5,394.4	461.4	5,414.1	5,410.6	3.54	1,527.708	
500.0	500.0	495.2	495.2	0.7	3.0	175.11	-5,394.0	461.2	5,413.7	5,410.0	3.71	1,459.624	
600.0	600.0	610.9	610.9	0.8	3.0	175.12	-5,393.2	460.6	5,413.0	5,409.2	3.87	1,397.213	
700.0	700.0	713.7	713.7	1.0	3.0	175.12	-5,392.4	460.0	5,412.2	5,408.2	4.04	1,339.955	
800.0	800.0	810.0	809.9	1.2	3.1	175.13	-5,391.7	459.4	5,411.4	5,407.2	4.20	1,287.257	
900.0	900.0	922.8	922.8	1.3	3.1	175.14	-5,390.7	458.4	5,410.4	5,406.0	4.37	1,237.861	
1,000.0	1,000.0	1,009.0	1,009.0	1.5	3.1	175.15	-5,390.0	457.5	5,409.5	5,405.0	4.54	1,192.718	
1,100.0	1,100.0	1,100.0	1,100.0	1.6	3.1	175.16	-5,389.4	456.8	5,408.8	5,404.1	4.70	1,150.608	
1,200.0	1,200.0	1,196.5	1,196.4	1.8	3.1	175.16	-5,388.9	455.8	5,408.2	5,403.3	4.87	1,111.228	
1,300.0	1,300.0	1,306.8	1,306.7	1.9	3.1	175.18	-5,388.3	454.6	5,407.5	5,402.5	5.03	1,074.037	
1,400.0	1,400.0	1,407.5	1,407.4	2.1	3.1	175.19	-5,387.6	453.7	5,406.8	5,401.6	5.20	1,039.405	
1,500.0	1,500.0	1,500.0	1,499.9	2.2	3.1	175.19	-5,387.0	453.2	5,406.1	5,400.8	5.37	1,007.033	
1,600.0	1,600.0	1,591.5	1,591.5	2.4	3.1	175.19	-5,386.6	452.9	5,405.7	5,400.1	5.53	976.645	
1,700.0	1,700.0	1,699.8	1,699.7	2.6	3.1	175.20	-5,386.1	452.5	5,405.1	5,399.4	5.70	947.649	
1,800.0	1,800.0	1,780.4	1,780.3	2.7	3.2	175.20	-5,385.7	452.3	5,404.7	5,398.8	5.87	920.814	
1,900.0	1,900.0	1,873.0	1,873.0	2.9	3.2	175.20	-5,385.6	452.2	5,404.6	5,398.5	6.04	895.404	
2,000.0	2,000.0	1,988.6	1,988.5	3.0	3.2	175.20	-5,385.4	451.9	5,404.4	5,398.1	6.20	871.068	
2,100.0	2,100.0	2,070.7	2,070.6	3.2	3.2	175.20	-5,385.2	451.8	5,404.1	5,397.7	6.36	849.339	
2,200.0	2,200.0	2,177.0	2,176.9	3.3	3.2	175.20	-5,385.1	452.0	5,404.1	5,397.5	6.52	828.828	
2,300.0	2,300.0	2,267.2	2,267.1	3.5	3.2	175.20	-5,385.0	451.8	5,403.9	5,397.2	6.68	808.767	
2,300.8	2,300.8	2,267.8	2,267.8	3.5	3.2	175.20	-5,385.0	451.8	5,403.9	5,397.2	6.68	808.613	
2,400.0	2,400.0	2,359.3	2,359.2	3.6	3.2	175.21	-5,385.1	451.6	5,404.0	5,397.2	6.84	789.927	
2,500.0	2,500.0	2,464.5	2,464.4	3.8	3.2	175.21	-5,385.2	451.7	5,404.1	5,397.1	7.00	772.263	
2,600.0	2,600.0	2,577.2	2,577.2	4.0	3.2	175.20	-5,385.1	451.8	5,404.1	5,396.9	7.16	755.240	
2,684.1	2,684.1	2,651.2	2,651.1	4.1	3.2	175.21	-5,385.0	451.6	5,404.0	5,396.7	7.29	741.537	
2,700.0	2,700.0	2,663.9	2,663.8	4.1	3.2	175.21	-5,385.1	451.6	5,404.0	5,396.6	7.31	739.010	
2,800.0	2,800.0	2,765.1	2,765.1	4.3	3.2	175.21	-5,385.2	451.7	5,404.1	5,396.6	7.47	723.566	
2,900.0	2,900.0	2,875.8	2,875.7	4.4	3.2	175.20	-5,385.1	451.9	5,404.0	5,396.4	7.63	708.406	
3,000.0	3,000.0	2,967.8	2,967.7	4.6	3.2	175.20	-5,384.9	452.4	5,403.9	5,396.1	7.79	693.884	
3,005.6	3,005.6	2,972.7	2,972.6	4.6	3.2	175.20	-5,384.9	452.5	5,403.9	5,396.1	7.80	693.086	
3,100.0	3,100.0	3,062.3	3,062.2	4.7	3.2	175.19	-5,384.9	453.3	5,404.0	5,396.0	7.95	680.006	
3,200.0	3,200.0	3,190.1	3,190.0	4.9	3.2	175.16	-5,384.6	455.5	5,403.9	5,395.8	8.11	666.511	
3,300.0	3,300.0	3,288.4	3,288.3	5.1	3.2	175.14	-5,384.0	457.7	5,403.4	5,395.2	8.27	653.494	
3,400.0	3,400.0	3,404.6	3,404.5	5.2	3.2	175.12	-5,383.2	459.9	5,402.9	5,394.5	8.43	640.826	
3,500.0	3,500.0	3,509.4	3,509.2	5.4	3.2	175.09	-5,382.2	462.1	5,402.2	5,393.6	8.59	628.596	
3,600.0	3,600.0	3,614.4	3,614.2	5.5	3.2	175.07	-5,381.2	464.3	5,401.4	5,392.6	8.76	616.772	
3,700.0	3,700.0	3,714.2	3,714.0	5.7	3.2	175.05	-5,380.1	465.8	5,400.5	5,391.6	8.92	605.332	
3,800.0	3,800.0	3,812.0	3,811.7	5.8	3.3	175.04	-5,379.2	466.6	5,399.6	5,390.5	9.09	594.231	
3,900.0	3,900.0	3,900.0	3,899.8	6.0	3.3	175.04	-5,378.7	467.0	5,399.0	5,389.7	9.25	583.593	
4,000.0	4,000.0	3,978.4	3,978.2	6.1	3.3	175.03	-5,378.4	467.3	5,398.7	5,389.3	9.41	573.419	
4,054.3	4,054.3	4,021.6	4,021.3	6.2	3.3	175.03	-5,378.4	467.4	5,398.6	5,389.1	9.50	568.167	
4,100.0	4,100.0	4,053.7	4,053.5	6.3	3.3	175.03	-5,378.4	467.4	5,398.7	5,389.1	9.57	563.945	
4,200.0	4,200.0	4,120.7	4,120.5	6.5	3.3	175.03	-5,378.7	467.4	5,399.2	5,389.5	9.73	554.937	
4,300.0	4,300.0	4,200.0	4,199.8	6.6	3.3	175.03	-5,379.8	467.4	5,400.5	5,390.6	9.89	546.239	
4,400.0	4,400.0	4,258.6	4,258.4	6.8	3.3	175.04	-5,380.9	467.4	5,402.3	5,392.2	10.04	537.870	
4,500.0	4,500.0	4,348.9	4,348.7	6.9	3.3	175.04	-5,382.9	467.4	5,404.4	5,394.2	10.20	529.755	

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

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - REDHEAD 31 FEDERAL #1H - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 100-GYD_DP_MS, 9674-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
4,600.0	4,600.0	4,472.1	4,471.8	7.1	3.3	175.04	-5,385.5	467.1	5,406.5	5,396.2	10.36	521.833	
4,700.0	4,700.0	4,594.1	4,593.8	7.2	3.3	175.05	-5,387.4	466.4	5,408.0	5,397.5	10.52	514.049	
4,800.0	4,800.0	4,699.1	4,698.7	7.4	3.3	175.06	-5,388.8	465.7	5,409.3	5,398.7	10.68	506.470	
4,900.0	4,900.0	4,813.5	4,813.2	7.6	3.3	175.07	-5,390.2	464.9	5,410.4	5,399.6	10.84	499.042	
5,000.0	5,000.0	4,914.2	4,913.8	7.7	3.3	175.08	-5,391.2	464.1	5,411.4	5,400.4	11.00	491.817	
5,100.0	5,100.0	5,006.3	5,006.0	7.9	3.3	175.09	-5,392.3	463.3	5,412.5	5,401.3	11.16	484.812	
5,200.0	5,200.0	5,123.6	5,123.2	8.0	3.3	175.10	-5,393.5	462.2	5,413.4	5,402.1	11.33	477.911	
5,300.0	5,300.0	5,228.1	5,227.7	8.2	3.3	175.11	-5,394.4	461.2	5,414.2	5,402.7	11.49	471.193	
5,400.0	5,400.0	5,334.2	5,333.8	8.3	3.3	175.13	-5,395.2	460.1	5,414.8	5,403.2	11.65	464.616	
5,500.0	5,500.0	5,429.9	5,429.5	8.5	3.3	175.14	-5,395.9	459.1	5,415.5	5,403.7	11.82	458.244	
5,600.0	5,600.0	5,536.3	5,535.9	8.6	3.3	175.15	-5,396.7	457.9	5,416.2	5,404.2	11.98	451.996	
5,700.0	5,700.0	5,638.0	5,637.6	8.8	3.3	175.16	-5,397.3	456.7	5,416.7	5,404.5	12.15	445.900	
5,800.0	5,800.0	5,728.3	5,727.9	9.0	3.4	175.17	-5,398.0	455.8	5,417.3	5,405.0	12.31	440.020	
5,900.0	5,900.0	5,837.2	5,836.8	9.1	3.4	175.19	-5,398.8	454.7	5,418.0	5,405.5	12.48	434.218	
6,000.0	6,000.0	5,946.3	5,945.9	9.3	3.4	175.20	-5,399.4	453.3	5,418.5	5,405.8	12.64	428.530	
6,100.0	6,100.0	6,053.8	6,053.4	9.4	3.4	175.22	-5,399.9	451.6	5,418.7	5,405.9	12.81	422.949	
6,200.0	6,200.0	6,154.6	6,154.2	9.6	3.4	175.24	-5,400.3	450.0	5,419.0	5,406.0	12.98	417.523	
6,300.0	6,300.0	6,247.5	6,247.0	9.7	3.4	175.25	-5,400.6	449.0	5,419.3	5,406.1	13.15	412.259	
6,400.0	6,400.0	6,351.2	6,350.7	9.9	3.4	175.26	-5,401.2	447.5	5,419.7	5,406.4	13.31	407.098	
6,500.0	6,500.0	6,459.2	6,458.7	10.0	3.4	175.28	-5,401.4	446.3	5,419.8	5,406.4	13.48	402.015	
6,600.0	6,600.0	6,549.7	6,549.2	10.2	3.4	175.28	-5,401.7	445.6	5,420.1	5,406.4	13.65	397.156	
6,700.0	6,700.0	6,648.9	6,648.4	10.4	3.5	175.29	-5,402.1	445.3	5,420.5	5,406.6	13.81	392.423	
6,800.0	6,800.0	6,745.6	6,745.1	10.5	3.5	175.29	-5,402.4	445.0	5,420.8	5,406.8	13.98	387.782	
6,900.0	6,900.0	6,829.7	6,829.2	10.7	3.5	175.30	-5,402.9	444.6	5,421.3	5,407.2	14.14	383.300	
7,000.0	7,000.0	6,917.4	6,916.9	10.8	3.5	175.30	-5,403.7	444.3	5,422.2	5,407.9	14.31	378.957	
7,100.0	7,100.0	7,033.1	7,032.6	11.0	3.5	175.31	-5,404.6	443.7	5,422.9	5,408.5	14.48	374.625	
7,200.0	7,200.0	7,133.7	7,133.2	11.1	3.5	175.31	-5,405.3	443.4	5,423.5	5,408.9	14.64	370.403	
7,300.0	7,300.0	7,221.1	7,220.6	11.3	3.5	175.31	-5,405.9	443.1	5,424.2	5,409.4	14.81	366.330	
7,400.0	7,400.0	7,306.5	7,305.9	11.5	3.5	175.32	-5,406.8	442.7	5,425.2	5,410.3	14.97	362.360	
7,500.0	7,500.0	7,405.5	7,404.9	11.6	3.5	175.33	-5,408.0	442.2	5,426.4	5,411.2	15.14	358.457	
7,600.0	7,600.0	7,500.0	7,499.5	11.8	3.5	175.33	-5,409.2	441.8	5,427.6	5,412.3	15.30	354.653	
7,700.0	7,700.0	7,586.8	7,586.3	11.9	3.5	175.34	-5,410.4	441.4	5,429.0	5,413.5	15.47	350.961	
7,800.0	7,800.0	7,687.6	7,687.0	12.1	3.6	175.34	-5,412.0	441.1	5,430.5	5,414.9	15.64	347.320	
7,900.0	7,900.0	7,797.2	7,796.6	12.2	3.6	175.35	-5,413.5	440.7	5,431.9	5,416.1	15.80	343.720	
8,000.0	8,000.0	7,883.6	7,883.0	12.4	3.6	175.35	-5,414.8	440.5	5,433.3	5,417.3	15.97	340.247	
8,100.0	8,100.0	7,986.5	7,985.9	12.5	3.6	175.36	-5,416.4	439.9	5,434.9	5,418.7	16.14	336.792	
8,200.0	8,200.0	8,094.0	8,093.4	12.7	3.6	175.37	-5,418.0	439.1	5,436.3	5,420.0	16.31	333.366	
8,300.0	8,300.0	8,187.6	8,187.0	12.9	3.6	175.37	-5,419.4	438.4	5,437.7	5,421.2	16.48	330.048	
8,400.0	8,400.0	8,274.4	8,273.7	13.0	3.6	175.38	-5,420.8	437.8	5,439.3	5,422.6	16.64	326.820	
8,500.0	8,500.0	8,367.9	8,367.2	13.2	3.6	175.39	-5,422.6	436.9	5,441.1	5,424.3	16.81	323.639	
8,600.0	8,600.0	8,498.0	8,497.3	13.3	3.7	175.42	-5,424.9	435.0	5,442.7	5,425.8	16.91	321.851	
8,700.0	8,700.0	8,612.1	8,611.3	13.3	3.7	175.44	-5,426.4	432.7	5,443.9	5,427.0	16.94	321.396	
8,719.5	8,719.5	8,661.9	8,661.2	13.3	3.7	175.45	-5,426.9	431.7	5,444.1	5,427.1	16.95	321.204	
8,725.0	8,725.0	8,676.0	8,675.2	13.3	3.7	29.02	-5,427.0	431.4	5,444.1	5,427.1	16.95	321.145	
8,750.0	8,750.0	8,700.0	8,699.3	13.3	3.7	29.07	-5,427.0	430.9	5,443.3	5,426.3	16.96	320.934	
8,775.0	8,774.9	8,729.0	8,728.3	13.3	3.7	29.20	-5,427.1	430.3	5,441.4	5,424.4	16.97	320.594	
8,800.0	8,799.6	8,746.7	8,746.0	13.3	3.7	29.40	-5,427.2	429.9	5,438.3	5,421.4	16.99	320.108	
8,825.0	8,824.1	8,764.3	8,763.5	13.3	3.7	29.67	-5,427.3	429.5	5,434.2	5,417.2	17.06	318.584	
8,850.0	8,848.4	8,781.6	8,780.9	13.3	3.7	30.01	-5,427.5	429.1	5,429.0	5,411.8	17.19	315.888	
8,875.0	8,872.3	8,800.0	8,799.2	13.3	3.7	30.44	-5,427.6	428.6	5,422.7	5,405.4	17.34	312.689	

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - REDHEAD 31 FEDERAL #1H - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 100-GYD_DP_MS, 9674-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
8,900.0	8,895.7	8,800.0	8,799.2	13.3	3.7	30.90	-5,427.6	428.6	5,415.5	5,397.9	17.51	309.277	
8,925.0	8,918.7	8,824.3	8,823.5	13.3	3.7	31.52	-5,427.9	427.9	5,407.1	5,389.4	17.71	305.397	
8,950.0	8,941.2	8,836.5	8,835.7	13.4	3.7	32.19	-5,428.1	427.6	5,397.8	5,379.9	17.91	301.410	
8,975.0	8,963.0	8,848.4	8,847.6	13.4	3.7	32.96	-5,428.3	427.2	5,387.5	5,369.3	18.12	297.281	
9,000.0	8,984.1	8,859.9	8,859.1	13.4	3.7	33.84	-5,428.5	426.9	5,376.2	5,357.9	18.34	293.064	
9,025.0	9,004.6	8,871.1	8,870.2	13.4	3.7	34.83	-5,428.7	426.6	5,364.1	5,345.5	18.57	288.804	
9,050.0	9,024.2	8,900.0	8,899.2	13.5	3.7	36.03	-5,429.4	425.6	5,351.1	5,332.3	18.82	284.265	
9,075.0	9,043.1	8,900.0	8,899.2	13.5	3.7	37.24	-5,429.4	425.6	5,337.1	5,318.1	19.05	280.171	
9,100.0	9,061.0	8,900.0	8,899.2	13.5	3.7	38.58	-5,429.4	425.6	5,322.4	5,303.2	19.27	276.138	
9,125.0	9,078.0	8,919.0	8,918.2	13.6	3.7	40.21	-5,429.9	425.0	5,307.0	5,287.4	19.52	271.843	
9,150.0	9,094.0	8,933.9	8,933.0	13.6	3.7	42.00	-5,430.3	424.6	5,290.7	5,271.0	19.76	267.682	
9,175.0	9,109.0	8,947.9	8,947.0	13.7	3.7	44.01	-5,430.6	424.2	5,273.8	5,253.8	20.01	263.613	
9,200.0	9,122.9	8,960.9	8,960.0	13.7	3.7	46.24	-5,431.0	423.8	5,256.2	5,235.9	20.24	259.644	
9,225.0	9,135.7	8,972.9	8,972.0	13.8	3.7	48.71	-5,431.3	423.5	5,238.0	5,217.5	20.48	255.779	
9,250.0	9,147.4	8,983.8	8,982.9	13.9	3.7	51.45	-5,431.6	423.2	5,219.2	5,198.5	20.71	252.017	
9,275.0	9,157.9	8,993.7	8,992.8	14.0	3.7	54.46	-5,431.9	422.9	5,200.0	5,179.0	20.94	248.354	
9,300.0	9,167.2	9,006.2	9,005.3	14.1	3.7	57.83	-5,432.2	422.6	5,180.3	5,159.1	21.17	244.708	
9,325.0	9,175.3	9,024.9	9,024.0	14.2	3.7	61.63	-5,432.7	422.1	5,160.2	5,138.8	21.41	240.995	
9,350.0	9,182.1	9,040.7	9,039.7	14.3	3.7	65.72	-5,433.0	421.7	5,139.7	5,118.1	21.65	237.393	
9,375.0	9,187.6	9,053.4	9,052.5	14.5	3.8	70.09	-5,433.3	421.4	5,119.0	5,097.1	21.89	233.890	
9,400.0	9,191.9	9,063.2	9,062.3	14.6	3.8	74.68	-5,433.5	421.2	5,098.0	5,075.9	22.12	230.473	
9,425.0	9,194.9	9,070.1	9,069.1	14.8	3.8	79.43	-5,433.6	421.0	5,076.9	5,054.5	22.35	227.130	
9,450.0	9,196.6	9,073.9	9,073.0	15.0	3.8	84.27	-5,433.7	420.9	5,055.7	5,033.1	22.59	223.850	
9,469.5	9,197.0	9,074.9	9,074.0	15.2	3.8	88.06	-5,433.7	420.9	5,039.1	5,016.3	22.77	221.332	
9,500.0	9,197.0	9,075.1	9,074.2	15.5	3.8	87.99	-5,433.7	420.9	5,013.0	4,990.0	23.07	217.333	
9,600.0	9,197.0	9,076.1	9,075.1	16.6	3.8	87.75	-5,433.8	420.9	4,925.6	4,901.4	24.23	203.309	
9,700.0	9,197.0	9,077.4	9,076.4	18.0	3.8	87.43	-5,433.8	420.9	4,835.4	4,809.8	25.60	188.915	
9,800.0	9,197.0	9,079.1	9,078.1	19.5	3.8	87.01	-5,433.8	420.8	4,742.8	4,715.7	27.07	175.207	
9,900.0	9,197.0	9,081.1	9,080.1	21.0	3.8	86.40	-5,433.8	420.8	4,647.9	4,619.4	28.57	162.670	
10,000.0	9,197.0	9,083.4	9,082.5	22.4	3.8	85.43	-5,433.9	420.7	4,551.3	4,521.2	30.06	151.423	
10,100.0	9,197.0	9,086.0	9,085.1	23.9	3.8	83.68	-5,433.9	420.7	4,453.2	4,421.7	31.49	141.407	
10,200.0	9,197.0	9,088.9	9,087.9	25.2	3.8	79.42	-5,434.0	420.6	4,354.0	4,321.2	32.86	132.497	
10,297.5	9,197.0	9,091.8	9,090.8	26.5	3.8	57.51	-5,434.0	420.5	4,256.7	4,222.6	34.12	124.742	
10,300.0	9,197.0	9,091.9	9,090.9	26.5	3.8	57.54	-5,434.0	420.5	4,254.2	4,220.1	34.16	124.544	
10,400.0	9,197.0	9,094.9	9,094.0	27.8	3.8	58.65	-5,434.1	420.5	4,154.3	4,118.8	35.44	117.229	
10,500.0	9,197.0	9,097.9	9,096.9	29.1	3.8	59.74	-5,434.1	420.4	4,054.3	4,017.6	36.76	110.282	
10,600.0	9,197.0	9,100.6	9,099.6	30.5	3.8	60.76	-5,434.2	420.3	3,954.4	3,916.3	38.13	103.710	
10,700.0	9,197.0	9,102.8	9,101.8	31.9	3.8	61.62	-5,434.2	420.3	3,854.4	3,814.9	39.53	97.510	
10,800.0	9,197.0	9,104.9	9,104.0	33.3	3.8	62.47	-5,434.2	420.2	3,754.5	3,713.6	40.96	91.669	
10,900.0	9,197.0	9,107.1	9,106.1	34.8	3.8	63.32	-5,434.3	420.2	3,654.6	3,612.2	42.41	86.170	
11,000.0	9,197.0	9,109.1	9,108.2	36.2	3.8	64.16	-5,434.3	420.1	3,554.6	3,510.7	43.89	80.996	
11,100.0	9,197.0	9,111.2	9,110.2	37.7	3.8	64.99	-5,434.3	420.1	3,454.7	3,409.3	45.38	76.127	
11,200.0	9,197.0	9,113.2	9,112.2	39.2	3.8	65.82	-5,434.4	420.0	3,354.8	3,307.9	46.89	71.544	
11,300.0	9,197.0	9,115.1	9,114.1	40.7	3.8	66.63	-5,434.4	420.0	3,254.8	3,206.4	48.42	67.227	
11,400.0	9,197.0	9,117.0	9,116.0	42.3	3.8	67.44	-5,434.4	420.0	3,154.9	3,105.0	49.95	63.158	
11,500.0	9,197.0	9,118.9	9,117.9	43.8	3.8	68.24	-5,434.4	419.9	3,055.0	3,003.5	51.50	59.320	
11,600.0	9,197.0	9,120.7	9,119.7	45.4	3.8	69.04	-5,434.5	419.9	2,955.1	2,902.0	53.06	55.696	
11,700.0	9,197.0	9,122.5	9,121.5	46.9	3.8	69.82	-5,434.5	419.8	2,855.2	2,800.6	54.62	52.270	
11,800.0	9,197.0	9,124.2	9,123.3	48.5	3.8	70.60	-5,434.5	419.8	2,755.3	2,699.1	56.20	49.029	
11,900.0	9,197.0	9,126.0	9,125.0	50.1	3.8	71.36	-5,434.5	419.7	2,655.4	2,597.6	57.78	45.958	
12,000.0	9,197.0	9,127.6	9,126.7	51.7	3.8	72.12	-5,434.6	419.7	2,555.5	2,496.1	59.36	43.048	

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

COG PRODUCTION, LLC

Anticollision Report

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - REDHEAD 31 FEDERAL #1H - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 100-GYD_DP_MS, 9674-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
12,100.0	9,197.0	9,129.3	9,128.3	53.3	3.8	72.87	-5,434.6	419.6	2,455.6	2,394.6	60.96	40.285	
12,200.0	9,197.0	9,130.9	9,129.9	54.9	3.8	73.61	-5,434.6	419.6	2,355.7	2,293.2	62.55	37.660	
12,300.0	9,197.0	9,132.5	9,131.5	56.4	3.8	74.34	-5,434.6	419.6	2,255.9	2,191.7	64.15	35.163	
12,400.0	9,197.0	9,134.1	9,133.1	58.1	3.8	75.07	-5,434.7	419.5	2,156.0	2,090.2	65.76	32.786	
12,500.0	9,197.0	9,135.6	9,134.6	59.7	3.8	75.78	-5,434.7	419.5	2,056.2	1,988.8	67.37	30.521	
12,600.0	9,197.0	9,137.1	9,136.1	61.3	3.8	76.48	-5,434.7	419.4	1,956.3	1,887.4	68.98	28.360	
12,700.0	9,197.0	9,138.6	9,137.6	62.9	3.8	77.18	-5,434.7	419.4	1,856.5	1,785.9	70.60	26.298	
12,800.0	9,197.0	9,140.0	9,139.0	64.5	3.8	77.86	-5,434.7	419.4	1,756.8	1,684.5	72.22	24.326	
12,900.0	9,197.0	9,141.4	9,140.4	66.1	3.8	78.53	-5,434.8	419.3	1,657.0	1,583.2	73.84	22.441	
13,000.0	9,197.0	9,142.8	9,141.8	67.7	3.8	79.20	-5,434.8	419.3	1,557.3	1,481.8	75.46	20.637	
13,100.0	9,197.0	9,144.2	9,143.2	69.4	3.8	79.86	-5,434.8	419.3	1,457.6	1,380.5	77.09	18.908	
13,200.0	9,197.0	9,145.5	9,144.5	71.0	3.8	80.50	-5,434.8	419.2	1,357.9	1,279.2	78.71	17.251	
13,300.0	9,197.0	9,146.8	9,145.9	72.6	3.8	81.14	-5,434.8	419.2	1,258.3	1,178.0	80.34	15.662	
13,400.0	9,197.0	9,148.1	9,147.2	74.2	3.8	81.77	-5,434.8	419.2	1,158.8	1,076.8	81.98	14.136	
13,500.0	9,197.0	9,149.4	9,148.4	75.9	3.8	82.39	-5,434.8	419.1	1,059.4	975.8	83.61	12.671	
13,600.0	9,197.0	9,150.7	9,149.7	77.5	3.8	83.00	-5,434.9	419.1	960.1	874.8	85.24	11.262	
13,700.0	9,197.0	9,151.9	9,150.9	79.1	3.8	83.60	-5,434.9	419.1	860.9	774.0	86.88	9.909	
13,800.0	9,197.0	9,153.1	9,152.1	80.8	3.8	84.19	-5,434.9	419.0	761.9	673.4	88.52	8.608	
13,900.0	9,197.0	9,154.3	9,153.3	82.4	3.8	84.78	-5,434.9	419.0	663.3	573.1	90.16	7.357	
14,000.0	9,197.0	9,155.5	9,154.5	84.0	3.8	85.35	-5,434.9	419.0	565.1	473.3	91.80	6.156	
14,100.0	9,197.0	9,156.6	9,155.6	85.7	3.8	85.91	-5,434.9	418.9	467.7	374.3	93.44	5.006	
14,200.0	9,197.0	9,157.8	9,156.8	87.3	3.8	86.47	-5,434.9	418.9	371.7	276.7	95.08	3.910	
14,300.0	9,197.0	9,158.9	9,157.9	89.0	3.8	87.02	-5,435.0	418.9	278.6	181.9	96.72	2.880	
14,400.0	9,197.0	9,160.0	9,159.0	90.6	3.8	87.56	-5,435.0	418.8	192.4	94.0	98.37	1.956	Advise and Monitor
14,500.0	9,197.0	9,161.1	9,160.1	92.3	3.8	88.09	-5,435.0	418.8	128.1	28.1	100.01	1.281	Shut in Produces
14,553.0	9,197.0	9,161.6	9,160.6	93.1	3.8	88.37	-5,435.0	418.8	116.6	15.7	100.88	1.156	Shut in Produces, CC, ES, SF
14,600.0	9,197.0	9,162.1	9,161.1	93.9	3.8	88.61	-5,435.0	418.8	125.7	24.1	101.66	1.237	Shut in Produces
14,700.0	9,197.0	9,163.2	9,162.2	95.5	3.8	89.13	-5,435.0	418.7	187.6	84.3	103.30	1.816	Advise and Monitor
14,800.0	9,197.0	9,164.2	9,163.2	97.2	3.8	89.63	-5,435.0	418.7	273.1	168.2	104.95	2.603	
14,900.0	9,197.0	9,165.2	9,164.2	98.8	3.8	90.13	-5,435.0	418.7	366.1	259.5	106.60	3.434	
15,000.0	9,197.0	9,166.2	9,165.2	100.5	3.8	90.62	-5,435.0	418.6	461.9	353.7	108.25	4.267	
15,100.0	9,197.0	9,167.2	9,166.2	102.1	3.8	91.11	-5,435.0	418.6	559.3	449.4	109.90	5.089	
15,200.0	9,197.0	9,168.2	9,167.2	103.8	3.8	91.58	-5,435.1	418.6	657.4	545.8	111.55	5.893	
15,300.0	9,197.0	9,169.1	9,168.1	105.4	3.8	92.05	-5,435.1	418.6	756.0	642.8	113.20	6.679	
15,400.0	9,197.0	9,170.1	9,169.1	107.1	3.8	92.51	-5,435.1	418.5	854.9	740.1	114.85	7.444	
15,500.0	9,197.0	9,171.0	9,170.0	108.7	3.8	92.96	-5,435.1	418.5	954.1	837.6	116.50	8.190	
15,600.0	9,197.0	9,171.9	9,170.9	110.4	3.8	93.41	-5,435.1	418.5	1,053.4	935.3	118.15	8.916	
15,700.0	9,197.0	9,172.8	9,171.8	112.0	3.8	93.85	-5,435.1	418.5	1,152.9	1,033.1	119.80	9.623	
15,800.0	9,197.0	9,173.7	9,172.7	113.7	3.8	94.28	-5,435.1	418.4	1,252.4	1,130.9	121.45	10.311	
15,900.0	9,197.0	11,601.9	10,493.9	115.3	24.6	174.23	-6,805.6	411.6	1,336.9	1,197.0	139.92	9.555	
16,000.0	9,197.0	11,734.9	10,489.8	117.0	27.0	174.29	-6,938.5	414.4	1,333.6	1,189.7	143.95	9.265	
16,100.0	9,197.0	11,804.1	10,487.6	118.6	28.1	174.31	-7,007.7	415.5	1,330.5	1,183.7	146.76	9.065	
16,200.0	9,197.0	11,899.6	10,486.4	120.3	29.7	174.30	-7,103.2	416.1	1,329.2	1,179.2	150.02	8.860	
16,300.0	9,197.0	11,984.2	10,485.2	121.9	31.2	174.29	-7,187.8	416.6	1,327.9	1,174.8	153.09	8.674	
16,322.1	9,197.0	12,000.5	10,485.2	122.3	31.4	174.28	-7,204.1	416.6	1,327.8	1,174.1	153.73	8.638	
16,400.0	9,197.0	12,063.9	10,485.5	123.6	32.5	174.26	-7,267.5	416.6	1,328.3	1,172.3	156.04	8.512	
16,500.0	9,197.0	12,151.6	10,486.9	125.2	33.9	174.26	-7,355.2	417.2	1,329.9	1,170.8	159.11	8.359	
16,600.0	9,197.0	12,244.7	10,489.3	126.9	35.4	174.34	-7,448.2	419.5	1,332.3	1,170.0	162.30	8.209	
16,700.0	9,197.0	12,357.1	10,492.2	128.5	37.3	174.47	-7,560.5	423.1	1,334.6	1,168.7	165.88	8.046	
16,800.0	9,197.0	12,466.1	10,493.5	130.2	39.2	174.54	-7,669.4	425.5	1,335.6	1,166.2	169.43	7.883	

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

COG PRODUCTION, LLC

Anticollision Report

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - REDHEAD 31 FEDERAL #1H - OWB - ACTUAL WELLPATH

Offset Site Error: 0.0 usft

Survey Program: 100-GYD_DP_MS, 9674-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
16,900.0	9,197.0	12,582.5	10,494.3	131.9	41.2	174.66	-7,785.9	429.1	1,336.2	1,163.1	173.10	7.719	
16,991.4	9,197.0	12,670.0	10,494.3	133.4	42.8	174.74	-7,873.3	431.7	1,336.0	1,159.8	176.13	7.585	
17,000.0	9,197.0	12,678.0	10,494.3	133.5	42.9	174.75	-7,881.3	431.8	1,336.0	1,159.5	176.41	7.573	
17,100.0	9,197.0	12,770.3	10,494.7	135.2	44.5	174.79	-7,973.6	433.6	1,336.3	1,156.7	179.62	7.439	
17,200.0	9,197.0	12,869.4	10,495.6	136.8	46.2	174.88	-8,072.6	436.2	1,337.0	1,154.0	182.97	7.307	
17,300.0	9,197.0	12,975.7	10,496.2	138.5	48.0	174.95	-8,178.9	438.8	1,337.5	1,151.0	186.48	7.172	
17,400.0	9,197.0	13,084.3	10,496.3	140.1	49.9	174.99	-8,287.5	440.4	1,337.4	1,147.4	190.03	7.038	
17,500.0	9,197.0	13,199.6	10,495.0	141.8	51.9	175.00	-8,402.7	441.8	1,336.3	1,142.6	193.73	6.898	
17,600.0	9,197.0	13,296.8	10,493.5	143.4	53.6	175.01	-8,499.9	442.8	1,334.7	1,137.6	197.10	6.772	
17,700.0	9,197.0	13,386.8	10,492.6	145.1	55.2	174.96	-8,589.9	442.4	1,333.8	1,133.5	200.28	6.660	
17,800.0	9,197.0	13,482.5	10,492.0	146.8	56.8	174.88	-8,685.6	441.4	1,333.4	1,129.8	203.52	6.552	
17,880.3	9,197.0	13,559.1	10,491.7	148.1	58.0	174.81	-8,762.2	440.3	1,333.2	1,127.1	206.12	6.468	
17,900.0	9,197.0	13,576.6	10,491.7	148.4	58.3	174.79	-8,779.8	440.1	1,333.2	1,126.5	206.74	6.449	
18,000.0	9,197.0	13,689.1	10,491.7	150.1	60.2	174.69	-8,892.2	438.4	1,333.5	1,123.2	210.28	6.342	
18,100.0	9,197.0	13,828.0	10,487.9	151.7	62.6	174.58	-9,031.1	437.3	1,330.8	1,116.5	214.36	6.208	
18,200.0	9,197.0	13,902.6	10,485.6	153.4	63.9	174.53	-9,105.6	436.9	1,327.9	1,110.6	217.29	6.111	
18,300.0	9,197.0	13,999.9	10,484.0	155.0	65.6	174.42	-9,202.9	435.2	1,326.5	1,105.9	220.62	6.013	
18,400.0	9,197.0	14,098.3	10,482.3	156.7	67.3	174.32	-9,301.2	433.9	1,325.0	1,101.0	223.97	5.916	
18,500.0	9,197.0	14,203.6	10,480.5	158.4	69.1	174.27	-9,406.6	433.6	1,323.4	1,095.9	227.43	5.819	
18,600.0	9,197.0	14,307.3	10,478.4	160.0	70.9	174.25	-9,510.2	434.2	1,321.4	1,090.5	230.91	5.723	
18,700.0	9,197.0	14,425.2	10,474.9	161.7	73.0	174.24	-9,628.1	435.2	1,318.4	1,083.7	234.66	5.618	
18,800.0	9,197.0	14,516.7	10,471.8	163.3	74.6	174.23	-9,719.5	436.1	1,315.0	1,077.1	237.93	5.527	
18,900.0	9,197.0	14,591.6	10,470.3	165.0	75.9	174.20	-9,794.4	436.1	1,313.1	1,072.3	240.88	5.451	
19,000.0	9,197.0	14,708.8	10,468.3	166.7	77.9	174.12	-9,911.6	435.4	1,311.5	1,067.0	244.56	5.363	
19,080.8	9,197.0	14,760.0	10,467.0	168.0	78.8	174.07	-9,962.8	434.9	1,310.1	1,063.3	246.80	5.308	
19,100.0	9,197.0	14,760.0	10,467.0	168.3	78.8	174.07	-9,962.8	434.9	1,310.2	1,063.1	247.12	5.302	
19,200.0	9,197.0	14,760.0	10,467.0	170.0	78.8	174.07	-9,962.8	434.9	1,315.5	1,066.7	248.78	5.288	
19,300.0	9,197.0	14,760.0	10,467.0	171.6	78.8	174.07	-9,962.8	434.9	1,328.3	1,077.8	250.44	5.304	
19,400.0	9,197.0	14,760.0	10,467.0	173.3	78.8	174.07	-9,962.8	434.9	1,348.4	1,096.3	252.10	5.349	
19,415.3	9,197.0	14,760.0	10,467.0	173.5	78.8	174.07	-9,962.8	434.9	1,352.1	1,099.7	252.35	5.358	

COG PRODUCTION, LLC

Anticollision Report

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - TURQUOIS 30 FEDERAL #1 - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 400-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	0.0	3.0	140.06	-1,707.0	1,429.4	2,226.6				
100.0	100.0	71.0	71.0	0.1	3.1	140.06	-1,707.0	1,429.4	2,226.4	2,223.3	3.12	712.913	
200.0	200.0	171.0	171.0	0.2	3.4	140.06	-1,707.0	1,429.4	2,226.4	2,222.9	3.57	622.837	
300.0	300.0	271.0	271.0	0.4	3.8	140.06	-1,707.0	1,429.4	2,226.4	2,222.2	4.21	528.554	
400.0	400.0	371.0	371.0	0.5	4.4	140.06	-1,707.0	1,429.4	2,226.4	2,221.5	4.98	447.438	
500.0	500.0	471.0	471.0	0.7	5.7	140.06	-1,707.0	1,429.4	2,226.4	2,220.0	6.41	347.401	
600.0	600.0	571.0	571.0	0.8	7.4	140.06	-1,707.0	1,429.4	2,226.4	2,218.2	8.23	270.467	
700.0	700.0	671.0	671.0	1.0	9.3	140.06	-1,707.0	1,429.4	2,226.4	2,216.2	10.26	217.017	
800.0	800.0	771.0	771.0	1.2	11.3	140.06	-1,707.0	1,429.4	2,226.4	2,214.0	12.48	178.404	
900.0	900.0	871.0	871.0	1.3	13.4	140.06	-1,707.0	1,429.4	2,226.4	2,211.7	14.73	151.149	
1,000.0	1,000.0	971.0	971.0	1.5	15.5	140.06	-1,707.0	1,429.4	2,226.4	2,209.4	17.00	130.981	
1,100.0	1,100.0	1,071.0	1,071.0	1.6	17.7	140.06	-1,707.0	1,429.4	2,226.4	2,207.2	19.28	115.493	
1,200.0	1,200.0	1,171.0	1,171.0	1.8	19.8	140.06	-1,707.0	1,429.4	2,226.4	2,204.8	21.62	102.963	
1,300.0	1,300.0	1,271.0	1,271.0	1.9	22.1	140.06	-1,707.0	1,429.4	2,226.4	2,202.4	24.04	92.603	
1,400.0	1,400.0	1,371.0	1,371.0	2.1	24.4	140.06	-1,707.0	1,429.4	2,226.4	2,200.0	26.47	84.122	
1,500.0	1,500.0	1,471.0	1,471.0	2.2	26.7	140.06	-1,707.0	1,429.4	2,226.4	2,197.5	28.89	77.056	
1,600.0	1,600.0	1,599.0	1,598.9	2.4	29.6	140.06	-1,707.0	1,429.4	2,226.6	2,194.7	31.96	69.670	
1,646.3	1,646.3	1,617.3	1,617.3	2.5	30.0	140.06	-1,707.0	1,429.4	2,226.4	2,194.0	32.47	68.574	
1,700.0	1,700.0	1,671.1	1,671.0	2.6	31.3	140.06	-1,707.0	1,429.4	2,226.4	2,192.6	33.83	65.809	
1,800.0	1,800.0	1,771.1	1,771.0	2.7	33.7	140.06	-1,707.0	1,429.4	2,226.4	2,190.1	36.37	61.215	
1,900.0	1,900.0	1,871.1	1,871.0	2.9	36.0	140.06	-1,707.0	1,429.4	2,226.4	2,187.5	38.91	57.219	
2,000.0	2,000.0	1,971.1	1,971.0	3.0	38.4	140.06	-1,707.0	1,429.4	2,226.4	2,185.0	41.45	53.711	
2,100.0	2,100.0	2,099.0	2,098.9	3.2	41.5	140.06	-1,707.0	1,429.4	2,226.6	2,182.0	44.66	49.856	
2,146.2	2,146.2	2,117.3	2,117.2	3.3	42.0	140.06	-1,707.0	1,429.4	2,226.4	2,181.2	45.23	49.229	
2,200.0	2,200.0	2,171.1	2,171.0	3.3	43.4	140.06	-1,707.0	1,429.4	2,226.4	2,179.7	46.75	47.620	
2,300.0	2,300.0	2,271.1	2,271.0	3.5	46.1	140.06	-1,707.0	1,429.4	2,226.4	2,176.8	49.60	44.890	
2,400.0	2,400.0	2,371.1	2,371.0	3.6	48.8	140.06	-1,707.0	1,429.4	2,226.4	2,174.0	52.44	42.456	
2,500.0	2,500.0	2,471.1	2,471.0	3.8	51.5	140.06	-1,707.0	1,429.4	2,226.4	2,171.2	55.29	40.272	
2,600.0	2,600.0	2,572.0	2,571.8	4.0	54.2	140.06	-1,707.0	1,429.4	2,226.4	2,168.3	58.15	38.285	
2,633.6	2,633.6	2,604.8	2,604.6	4.0	55.2	140.06	-1,707.0	1,429.4	2,226.4	2,167.3	59.16	37.632	
2,700.0	2,700.0	2,671.2	2,671.0	4.1	57.1	140.06	-1,707.0	1,429.4	2,226.4	2,165.2	61.20	36.377	
2,800.0	2,800.0	2,771.2	2,771.0	4.3	60.0	140.06	-1,707.0	1,429.4	2,226.4	2,162.2	64.28	34.636	
2,900.0	2,900.0	2,871.2	2,871.0	4.4	62.9	140.06	-1,707.0	1,429.4	2,226.4	2,159.1	67.36	33.055	
3,000.0	3,000.0	2,971.2	2,971.0	4.6	65.8	140.06	-1,707.0	1,429.4	2,226.4	2,156.0	70.43	31.611	
3,100.0	3,100.0	3,071.3	3,071.0	4.7	68.8	140.06	-1,707.0	1,429.4	2,226.4	2,152.9	73.51	30.286	
3,200.0	3,200.0	3,171.3	3,171.0	4.9	71.7	140.06	-1,707.0	1,429.4	2,226.4	2,149.8	76.62	29.060	
3,300.0	3,300.0	3,271.3	3,271.0	5.1	74.7	140.06	-1,707.0	1,429.4	2,226.4	2,146.7	79.72	27.929	
3,400.0	3,400.0	3,371.3	3,371.0	5.2	77.6	140.06	-1,707.0	1,429.4	2,226.4	2,143.6	82.82	26.882	
3,500.0	3,500.0	3,471.3	3,471.0	5.4	80.6	140.06	-1,707.0	1,429.4	2,226.4	2,140.5	85.93	25.911	
3,600.0	3,600.0	3,571.4	3,571.0	5.5	83.5	140.06	-1,707.0	1,429.4	2,226.4	2,137.4	89.05	25.002	
3,700.0	3,700.0	3,671.4	3,671.0	5.7	87.1	140.06	-1,707.0	1,429.4	2,226.4	2,133.7	92.77	23.999	
3,800.0	3,800.0	3,771.4	3,771.0	5.8	91.7	140.06	-1,707.0	1,429.4	2,226.4	2,128.9	97.51	22.834	
3,900.0	3,900.0	3,875.0	3,874.5	6.0	96.5	140.06	-1,707.0	1,429.4	2,226.4	2,124.0	102.49	21.723	
3,915.2	3,915.2	3,886.7	3,886.2	6.0	97.0	140.06	-1,707.0	1,429.4	2,226.4	2,123.4	103.06	21.603	
4,000.0	4,000.0	3,978.0	3,977.4	6.1	101.3	140.06	-1,707.0	1,429.4	2,226.4	2,119.0	107.45	20.721	
4,035.6	4,035.6	4,009.0	4,008.4	6.2	102.6	140.06	-1,707.0	1,429.4	2,226.4	2,117.7	108.75	20.473	
4,100.0	4,100.0	4,071.6	4,071.0	6.3	105.1	140.06	-1,707.0	1,429.4	2,226.4	2,115.0	111.41	19.983	
4,200.0	4,200.0	4,171.7	4,171.0	6.5	109.3	140.06	-1,707.0	1,429.4	2,226.4	2,110.7	115.71	19.242	
4,300.0	4,300.0	4,287.0	4,286.2	6.6	113.2	140.06	-1,707.0	1,429.4	2,226.5	2,106.7	119.82	18.581	
4,339.3	4,339.3	4,311.1	4,310.3	6.7	113.7	140.06	-1,707.0	1,429.4	2,226.4	2,106.1	120.38	18.495	
4,400.0	4,400.0	4,371.8	4,371.0	6.8	114.9	140.06	-1,707.0	1,429.4	2,226.4	2,104.7	121.69	18.296	

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

COG PRODUCTION, LLC

Anticollision Report

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - TURQUOIS 30 FEDERAL #1 - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 400-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
4,500.0	4,500.0	4,471.8	4,471.0	6.9	116.9	140.06	-1,707.0	1,429.4	2,226.4	2,102.7	123.78	17.987	
4,600.0	4,600.0	4,571.8	4,571.0	7.1	118.8	140.06	-1,707.0	1,429.4	2,226.4	2,100.6	125.88	17.688	
4,700.0	4,700.0	4,671.8	4,671.0	7.2	120.7	140.06	-1,707.0	1,429.4	2,226.4	2,098.5	127.97	17.398	
4,800.0	4,800.0	4,771.8	4,771.0	7.4	122.7	140.06	-1,707.0	1,429.4	2,226.4	2,096.4	130.07	17.117	
4,900.0	4,900.0	4,871.8	4,871.0	7.6	124.6	140.06	-1,707.0	1,429.4	2,226.4	2,094.3	132.17	16.845	
5,000.0	5,000.0	4,971.8	4,971.0	7.7	126.6	140.06	-1,707.0	1,429.4	2,226.4	2,092.2	134.28	16.581	
5,100.0	5,100.0	5,071.8	5,071.0	7.9	128.6	140.06	-1,707.0	1,429.4	2,226.4	2,089.9	136.50	16.310	
5,200.0	5,200.0	5,171.8	5,171.0	8.0	130.7	140.06	-1,707.0	1,429.4	2,226.4	2,087.7	138.73	16.049	
5,300.0	5,300.0	5,271.8	5,271.0	8.2	132.8	140.06	-1,707.0	1,429.4	2,226.4	2,085.5	140.96	15.795	
5,400.0	5,400.0	5,371.8	5,371.0	8.3	134.9	140.06	-1,707.0	1,429.4	2,226.4	2,083.3	143.18	15.550	
5,500.0	5,500.0	5,471.8	5,471.0	8.5	136.9	140.06	-1,707.0	1,429.4	2,226.4	2,081.0	145.42	15.310	
5,600.0	5,600.0	5,571.8	5,571.0	8.6	139.2	140.06	-1,707.0	1,429.4	2,226.4	2,078.6	147.88	15.056	
5,700.0	5,700.0	5,671.8	5,671.0	8.8	141.5	140.06	-1,707.0	1,429.4	2,226.4	2,076.1	150.34	14.810	
5,800.0	5,800.0	5,771.8	5,771.0	9.0	143.8	140.06	-1,707.0	1,429.4	2,226.4	2,073.6	152.79	14.571	
5,900.0	5,900.0	5,871.8	5,871.0	9.1	146.1	140.06	-1,707.0	1,429.4	2,226.4	2,071.2	155.25	14.341	
6,000.0	6,000.0	5,971.8	5,971.0	9.3	148.5	140.06	-1,707.0	1,429.4	2,226.4	2,068.7	157.73	14.116	
6,100.0	6,100.0	6,071.8	6,071.0	9.4	151.0	140.06	-1,707.0	1,429.4	2,226.4	2,066.0	160.41	13.880	
6,200.0	6,200.0	6,171.8	6,171.0	9.6	153.5	140.06	-1,707.0	1,429.4	2,226.4	2,063.4	163.09	13.652	
6,300.0	6,300.0	6,271.8	6,271.0	9.7	156.0	140.06	-1,707.0	1,429.4	2,226.4	2,060.7	165.77	13.431	
6,400.0	6,400.0	6,371.8	6,371.0	9.9	158.6	140.06	-1,707.0	1,429.4	2,226.4	2,058.0	168.45	13.217	
6,500.0	6,500.0	6,471.9	6,471.0	10.0	161.2	140.06	-1,707.0	1,429.4	2,226.4	2,055.2	171.25	13.001	
6,600.0	6,600.0	6,571.9	6,571.0	10.2	164.1	140.06	-1,707.0	1,429.4	2,226.4	2,052.2	174.27	12.776	
6,700.0	6,700.0	6,671.9	6,671.0	10.4	166.9	140.06	-1,707.0	1,429.4	2,226.4	2,049.2	177.29	12.558	
6,800.0	6,800.0	6,771.9	6,771.0	10.5	169.8	140.06	-1,707.0	1,429.4	2,226.4	2,046.1	180.31	12.348	
6,900.0	6,900.0	6,871.9	6,871.0	10.7	172.7	140.06	-1,707.0	1,429.4	2,226.4	2,043.1	183.33	12.145	
7,000.0	7,000.0	6,972.0	6,971.0	10.8	175.5	140.06	-1,707.0	1,429.4	2,226.4	2,040.1	186.31	11.950	
7,100.0	7,100.0	7,072.0	7,071.0	11.0	178.2	140.06	-1,707.0	1,429.4	2,226.4	2,037.2	189.21	11.767	
7,200.0	7,200.0	7,172.0	7,171.0	11.1	181.0	140.06	-1,707.0	1,429.4	2,226.4	2,034.3	192.12	11.589	
7,300.0	7,300.0	7,272.0	7,271.0	11.3	183.7	140.06	-1,707.0	1,429.4	2,226.4	2,031.4	195.03	11.416	
7,400.0	7,400.0	7,372.0	7,371.0	11.5	186.5	140.06	-1,707.0	1,429.4	2,226.4	2,028.5	197.94	11.248	
7,500.0	7,500.0	7,472.1	7,471.0	11.6	189.2	140.06	-1,707.0	1,429.4	2,226.4	2,025.6	200.81	11.088	
7,600.0	7,600.0	7,572.1	7,571.0	11.8	191.8	140.06	-1,707.0	1,429.4	2,226.4	2,022.8	203.60	10.935	
7,700.0	7,700.0	7,672.1	7,671.0	11.9	194.5	140.06	-1,707.0	1,429.4	2,226.4	2,020.0	206.39	10.787	
7,800.0	7,800.0	7,772.1	7,771.0	12.1	197.1	140.06	-1,707.0	1,429.4	2,226.4	2,017.3	209.19	10.643	
7,900.0	7,900.0	7,912.0	7,910.9	12.2	200.8	140.06	-1,707.0	1,429.4	2,226.8	2,013.8	213.04	10.453	
7,955.4	7,955.4	7,927.6	7,926.4	12.3	201.2	140.06	-1,707.0	1,429.4	2,226.4	2,012.9	213.53	10.427	
8,000.0	8,000.0	7,972.1	7,971.0	12.4	202.4	140.06	-1,707.0	1,429.4	2,226.4	2,011.7	214.78	10.366	
8,100.0	8,100.0	8,072.1	8,071.0	12.5	205.0	140.06	-1,707.0	1,429.4	2,226.4	2,008.9	217.57	10.233	
8,200.0	8,200.0	8,172.1	8,171.0	12.7	207.7	140.06	-1,707.0	1,429.4	2,226.4	2,006.1	220.37	10.103	
8,300.0	8,300.0	8,272.1	8,271.0	12.9	210.3	140.06	-1,707.0	1,429.4	2,226.4	2,003.3	223.16	9.977	
8,400.0	8,400.0	8,412.0	8,410.8	13.0	214.0	140.06	-1,707.0	1,429.4	2,226.8	1,999.8	227.01	9.809	
8,455.4	8,455.4	8,427.6	8,426.4	13.1	214.4	140.06	-1,707.0	1,429.4	2,226.4	1,998.9	227.51	9.786	
8,500.0	8,500.0	8,472.2	8,471.0	13.2	215.6	140.06	-1,707.0	1,429.4	2,226.4	1,997.7	228.75	9.733	
8,600.0	8,600.0	8,572.2	8,571.0	13.3	218.2	140.06	-1,707.0	1,429.4	2,226.4	1,995.0	231.47	9.619	
8,700.0	8,700.0	8,672.2	8,671.0	13.3	220.9	140.06	-1,707.0	1,429.4	2,226.4	1,992.3	234.12	9.510	
8,719.5	8,719.5	8,691.7	8,690.5	13.3	221.4	140.06	-1,707.0	1,429.4	2,226.4	1,991.8	234.64	9.489	
8,725.0	8,725.0	8,697.2	8,696.0	13.3	221.5	-6.38	-1,707.0	1,429.4	2,226.4	1,991.6	234.78	9.483	
8,750.0	8,750.0	8,722.2	8,721.0	13.3	222.2	-6.40	-1,707.0	1,429.4	2,225.5	1,990.0	235.45	9.452	
8,775.0	8,774.9	8,747.1	8,745.9	13.3	222.8	-6.43	-1,707.0	1,429.4	2,223.2	1,987.1	236.11	9.416	
8,800.0	8,799.6	8,750.0	8,748.8	13.3	222.9	-6.48	-1,707.0	1,429.4	2,219.8	1,983.6	236.19	9.398	

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

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - TURQUOIS 30 FEDERAL #1 - OWB - ACTUAL WELLPATH — Offset Site Error: 0.0 usft

Survey Program: 400-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
8,825.0	8,824.1	8,750.0	8,748.8	13.3	222.9	-6.54	-1,707.0	1,429.4	2,215.4	1,979.2	236.20	9.379	
8,850.0	8,848.4	8,750.0	8,748.8	13.3	222.9	-6.62	-1,707.0	1,429.4	2,210.0	1,973.7	236.21	9.356	
8,875.0	8,872.3	8,750.0	8,748.8	13.3	222.9	-6.71	-1,707.0	1,429.4	2,203.5	1,967.3	236.22	9.328	
8,900.0	8,895.7	8,750.0	8,748.8	13.3	222.9	-6.82	-1,707.0	1,429.4	2,196.1	1,959.9	236.24	9.296	
8,925.0	8,918.7	8,750.0	8,748.8	13.3	222.9	-6.95	-1,707.0	1,429.4	2,187.7	1,951.5	236.26	9.260	
8,950.0	8,941.2	8,750.0	8,748.8	13.4	222.9	-7.10	-1,707.0	1,429.4	2,178.4	1,942.1	236.27	9.220	
8,975.0	8,963.0	8,750.0	8,748.8	13.4	222.9	-7.27	-1,707.0	1,429.4	2,168.0	1,931.8	236.29	9.175	
9,000.0	8,984.1	8,750.0	8,748.8	13.4	222.9	-7.46	-1,707.0	1,429.4	2,156.8	1,920.5	236.32	9.127	
9,025.0	9,004.6	8,750.0	8,748.8	13.4	222.9	-7.68	-1,707.0	1,429.4	2,144.6	1,908.3	236.34	9.074	
9,050.0	9,024.2	8,750.0	8,748.8	13.5	222.9	-7.93	-1,707.0	1,429.4	2,131.6	1,895.2	236.37	9.018	
9,075.0	9,043.1	8,750.0	8,748.8	13.5	222.9	-8.22	-1,707.0	1,429.4	2,117.6	1,881.2	236.41	8.957	
9,100.0	9,061.0	8,750.0	8,748.8	13.5	222.9	-8.54	-1,707.0	1,429.4	2,102.8	1,866.3	236.45	8.893	
9,125.0	9,078.0	8,750.0	8,748.8	13.6	222.9	-8.90	-1,707.0	1,429.4	2,087.1	1,850.7	236.49	8.825	
9,150.0	9,094.0	8,750.0	8,748.8	13.6	222.9	-9.32	-1,707.0	1,429.4	2,070.7	1,834.1	236.54	8.754	
9,175.0	9,109.0	8,750.0	8,748.8	13.7	222.9	-9.79	-1,707.0	1,429.4	2,053.4	1,816.8	236.59	8.679	
9,200.0	9,122.9	8,750.0	8,748.8	13.7	222.9	-10.34	-1,707.0	1,429.4	2,035.4	1,798.7	236.65	8.601	
9,225.0	9,135.7	8,750.0	8,748.8	13.8	222.9	-10.97	-1,707.0	1,429.4	2,016.6	1,779.9	236.72	8.519	
9,250.0	9,147.4	8,750.0	8,748.8	13.9	222.9	-11.70	-1,707.0	1,429.4	1,997.2	1,760.4	236.80	8.434	
9,275.0	9,157.9	8,750.0	8,748.8	14.0	222.9	-12.55	-1,707.0	1,429.4	1,977.1	1,740.2	236.89	8.346	
9,300.0	9,167.2	8,750.0	8,748.8	14.1	222.9	-13.56	-1,707.0	1,429.4	1,956.3	1,719.3	236.98	8.255	
9,325.0	9,175.3	8,750.0	8,748.8	14.2	222.9	-14.77	-1,707.0	1,429.4	1,935.0	1,697.9	237.10	8.161	
9,350.0	9,182.1	8,750.0	8,748.8	14.3	222.9	-16.22	-1,707.0	1,429.4	1,913.1	1,675.9	237.22	8.065	
9,375.0	9,187.6	8,750.0	8,748.8	14.5	222.9	-18.00	-1,707.0	1,429.4	1,890.7	1,653.3	237.36	7.965	
9,400.0	9,191.9	8,750.0	8,748.8	14.6	222.9	-20.23	-1,707.0	1,429.4	1,867.8	1,630.3	237.52	7.864	
9,425.0	9,194.9	8,750.0	8,748.8	14.8	222.9	-23.07	-1,707.0	1,429.4	1,844.5	1,606.8	237.71	7.760	
9,450.0	9,196.6	8,750.0	8,748.8	15.0	222.9	-26.79	-1,707.0	1,429.4	1,820.9	1,582.9	237.91	7.654	
9,469.5	9,197.0	8,750.0	8,748.8	15.2	222.9	-30.56	-1,707.0	1,429.4	1,802.2	1,564.1	238.08	7.570	
9,500.0	9,197.0	8,750.0	8,748.8	15.5	222.9	-34.12	-1,707.0	1,429.4	1,772.9	1,534.5	238.38	7.437	
9,600.0	9,197.0	8,750.0	8,748.8	16.6	222.9	-43.54	-1,707.0	1,429.4	1,678.0	1,438.4	239.54	7.005	
9,700.0	9,197.0	8,750.0	8,748.8	18.0	222.9	-50.24	-1,707.0	1,429.4	1,585.4	1,344.5	240.91	6.581	
9,800.0	9,197.0	8,750.0	8,748.8	19.5	222.9	-55.05	-1,707.0	1,429.4	1,496.2	1,253.8	242.38	6.173	
9,900.0	9,197.0	8,750.0	8,748.8	21.0	222.9	-58.57	-1,707.0	1,429.4	1,411.4	1,167.5	243.88	5.787	
10,000.0	9,197.0	8,750.0	8,748.8	22.4	222.9	-61.17	-1,707.0	1,429.4	1,332.3	1,086.9	245.36	5.430	
10,100.0	9,197.0	8,750.0	8,748.8	23.9	222.9	-63.11	-1,707.0	1,429.4	1,260.3	1,013.6	246.79	5.107	
10,200.0	9,197.0	8,750.0	8,748.8	25.2	222.9	-64.55	-1,707.0	1,429.4	1,197.3	949.2	248.15	4.825	
10,297.5	9,197.0	8,750.0	8,748.8	26.5	222.9	-65.57	-1,707.0	1,429.4	1,146.1	896.7	249.41	4.595	
10,300.0	9,197.0	8,750.0	8,748.8	26.5	222.9	-65.57	-1,707.0	1,429.4	1,145.0	895.5	249.44	4.590	
10,400.0	9,197.0	8,750.0	8,748.8	27.8	222.9	-65.57	-1,707.0	1,429.4	1,102.0	851.3	250.72	4.395	
10,500.0	9,197.0	8,750.0	8,748.8	29.1	222.9	-65.57	-1,707.0	1,429.4	1,066.7	814.6	252.04	4.232	
10,600.0	9,197.0	8,750.0	8,748.8	30.5	222.9	-65.57	-1,707.0	1,429.4	1,039.8	786.4	253.40	4.104	
10,700.0	9,197.0	8,750.0	8,748.8	31.9	222.9	-65.57	-1,707.0	1,429.4	1,022.1	767.3	254.79	4.011	
10,800.0	9,197.0	8,750.0	8,748.8	33.3	222.9	-65.57	-1,707.0	1,429.4	1,013.9	757.7	256.22	3.957	
10,832.9	9,197.0	8,750.0	8,748.8	33.8	222.9	-65.57	-1,707.0	1,429.4	1,013.4	756.7	256.69	3.948	CC, ES
10,900.0	9,197.0	8,750.0	8,748.8	34.8	222.9	-65.57	-1,707.0	1,429.4	1,015.6	758.0	257.67	3.942	SF
11,000.0	9,197.0	8,750.0	8,748.8	36.2	222.9	-65.57	-1,707.0	1,429.4	1,027.1	768.0	259.14	3.964	
11,100.0	9,197.0	8,750.0	8,748.8	37.7	222.9	-65.57	-1,707.0	1,429.4	1,048.0	787.4	260.63	4.021	
11,200.0	9,197.0	8,750.0	8,748.8	39.2	222.9	-65.57	-1,707.0	1,429.4	1,077.9	815.7	262.13	4.112	
11,300.0	9,197.0	8,750.0	8,748.8	40.7	222.9	-65.57	-1,707.0	1,429.4	1,115.9	852.2	263.66	4.232	
11,400.0	9,197.0	8,750.0	8,748.8	42.3	222.9	-65.57	-1,707.0	1,429.4	1,161.3	896.1	265.19	4.379	
11,500.0	9,197.0	8,750.0	8,748.8	43.8	222.9	-65.57	-1,707.0	1,429.4	1,213.3	946.5	266.73	4.549	
11,600.0	9,197.0	8,750.0	8,748.8	45.4	222.9	-65.57	-1,707.0	1,429.4	1,271.0	1,002.7	268.29	4.737	

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

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - TURQUOIS 30 FEDERAL #1 - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

Survey Program: 400-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
11,700.0	9,197.0	8,750.0	8,748.8	46.9	222.9	-65.57	-1,707.0	1,429.4	1,333.7	1,063.9	269.85	4.943	
11,800.0	9,197.0	8,750.0	8,748.8	48.5	222.9	-65.57	-1,707.0	1,429.4	1,400.8	1,129.4	271.42	5.161	
11,900.0	9,197.0	8,750.0	8,748.8	50.1	222.9	-65.57	-1,707.0	1,429.4	1,471.6	1,198.6	273.00	5.391	
12,000.0	9,197.0	8,750.0	8,748.8	51.7	222.9	-65.57	-1,707.0	1,429.4	1,545.7	1,271.1	274.58	5.629	
12,100.0	9,197.0	8,750.0	8,748.8	53.3	222.9	-65.57	-1,707.0	1,429.4	1,622.5	1,346.4	276.17	5.875	
12,200.0	9,197.0	8,750.0	8,748.8	54.9	222.9	-65.57	-1,707.0	1,429.4	1,701.8	1,424.0	277.76	6.127	
12,300.0	9,197.0	8,750.0	8,748.8	56.4	222.9	-65.57	-1,707.0	1,429.4	1,783.1	1,503.7	279.36	6.383	
12,400.0	9,197.0	8,750.0	8,748.8	58.1	222.9	-65.57	-1,707.0	1,429.4	1,866.2	1,585.3	280.96	6.642	
12,500.0	9,197.0	8,750.0	8,748.8	59.7	222.9	-65.57	-1,707.0	1,429.4	1,951.0	1,668.4	282.57	6.904	
12,600.0	9,197.0	8,750.0	8,748.8	61.3	222.9	-65.57	-1,707.0	1,429.4	2,037.1	1,752.9	284.18	7.168	
12,700.0	9,197.0	8,750.0	8,748.8	62.9	222.9	-65.57	-1,707.0	1,429.4	2,124.4	1,838.6	285.79	7.433	
12,800.0	9,197.0	8,750.0	8,748.8	64.5	222.9	-65.57	-1,707.0	1,429.4	2,212.8	1,925.4	287.41	7.699	
12,900.0	9,197.0	8,750.0	8,748.8	66.1	222.9	-65.57	-1,707.0	1,429.4	2,302.2	2,013.1	289.03	7.965	
13,000.0	9,197.0	8,750.0	8,748.8	67.7	222.9	-65.57	-1,707.0	1,429.4	2,392.4	2,101.7	290.65	8.231	
13,100.0	9,197.0	8,750.0	8,748.8	69.4	222.9	-65.57	-1,707.0	1,429.4	2,483.3	2,191.0	292.27	8.497	
13,200.0	9,197.0	8,750.0	8,748.8	71.0	222.9	-65.57	-1,707.0	1,429.4	2,574.9	2,281.0	293.90	8.761	
13,300.0	9,197.0	8,750.0	8,748.8	72.6	222.9	-65.57	-1,707.0	1,429.4	2,667.1	2,371.6	295.52	9.025	
13,400.0	9,197.0	8,750.0	8,748.8	74.2	222.9	-65.57	-1,707.0	1,429.4	2,759.9	2,462.8	297.15	9.288	
13,500.0	9,197.0	8,750.0	8,748.8	75.9	222.9	-65.57	-1,707.0	1,429.4	2,853.2	2,554.4	298.78	9.549	
13,600.0	9,197.0	8,750.0	8,748.8	77.5	222.9	-65.57	-1,707.0	1,429.4	2,946.8	2,646.4	300.41	9.809	
13,700.0	9,197.0	8,750.0	8,748.8	79.1	222.9	-65.57	-1,707.0	1,429.4	3,040.9	2,738.9	302.05	10.068	
13,800.0	9,197.0	8,750.0	8,748.8	80.8	222.9	-65.57	-1,707.0	1,429.4	3,135.4	2,831.7	303.68	10.325	
13,900.0	9,197.0	8,750.0	8,748.8	82.4	222.9	-65.57	-1,707.0	1,429.4	3,230.2	2,924.9	305.32	10.580	
14,000.0	9,197.0	8,750.0	8,748.8	84.0	222.9	-65.57	-1,707.0	1,429.4	3,325.3	3,018.3	306.96	10.833	
14,100.0	9,197.0	8,750.0	8,748.8	85.7	222.9	-65.57	-1,707.0	1,429.4	3,420.7	3,112.1	308.60	11.085	
14,200.0	9,197.0	8,750.0	8,748.8	87.3	222.9	-65.57	-1,707.0	1,429.4	3,516.3	3,206.1	310.24	11.334	
14,300.0	9,197.0	8,750.0	8,748.8	89.0	222.9	-65.57	-1,707.0	1,429.4	3,612.2	3,300.3	311.88	11.582	
14,400.0	9,197.0	8,750.0	8,748.8	90.6	222.9	-65.57	-1,707.0	1,429.4	3,708.3	3,394.8	313.52	11.828	
14,500.0	9,197.0	8,750.0	8,748.8	92.3	222.9	-65.57	-1,707.0	1,429.4	3,804.6	3,489.4	315.16	12.072	
14,600.0	9,197.0	8,750.0	8,748.8	93.9	222.9	-65.57	-1,707.0	1,429.4	3,901.0	3,584.2	316.81	12.314	
14,700.0	9,197.0	8,750.0	8,748.8	95.5	222.9	-65.57	-1,707.0	1,429.4	3,997.7	3,679.2	318.45	12.554	
14,800.0	9,197.0	8,750.0	8,748.8	97.2	222.9	-65.57	-1,707.0	1,429.4	4,094.5	3,774.4	320.10	12.792	
14,900.0	9,197.0	8,750.0	8,748.8	98.8	222.9	-65.57	-1,707.0	1,429.4	4,191.5	3,869.7	321.74	13.027	
15,000.0	9,197.0	8,750.0	8,748.8	100.5	222.9	-65.57	-1,707.0	1,429.4	4,288.6	3,965.2	323.39	13.261	
15,100.0	9,197.0	8,750.0	8,748.8	102.1	222.9	-65.57	-1,707.0	1,429.4	4,385.8	4,060.8	325.04	13.493	
15,200.0	9,197.0	8,750.0	8,748.8	103.8	222.9	-65.57	-1,707.0	1,429.4	4,483.2	4,156.5	326.68	13.723	
15,300.0	9,197.0	8,750.0	8,748.8	105.4	222.9	-65.57	-1,707.0	1,429.4	4,580.6	4,252.3	328.33	13.951	
15,400.0	9,197.0	8,750.0	8,748.8	107.1	222.9	-65.57	-1,707.0	1,429.4	4,678.2	4,348.2	329.98	14.177	
15,500.0	9,197.0	8,750.0	8,748.8	108.7	222.9	-65.57	-1,707.0	1,429.4	4,775.9	4,444.2	331.63	14.401	
15,600.0	9,197.0	8,750.0	8,748.8	110.4	222.9	-65.57	-1,707.0	1,429.4	4,873.6	4,540.4	333.28	14.623	
15,700.0	9,197.0	8,750.0	8,748.8	112.0	222.9	-65.57	-1,707.0	1,429.4	4,971.5	4,636.6	334.93	14.843	
15,800.0	9,197.0	8,750.0	8,748.8	113.7	222.9	-65.57	-1,707.0	1,429.4	5,069.4	4,732.9	336.58	15.062	
15,900.0	9,197.0	8,750.0	8,748.8	115.3	222.9	-65.57	-1,707.0	1,429.4	5,167.5	4,829.2	338.23	15.278	
16,000.0	9,197.0	8,750.0	8,748.8	117.0	222.9	-65.57	-1,707.0	1,429.4	5,265.6	4,925.7	339.88	15.492	
16,100.0	9,197.0	8,750.0	8,748.8	118.6	222.9	-65.57	-1,707.0	1,429.4	5,363.7	5,022.2	341.54	15.705	
16,200.0	9,197.0	8,750.0	8,748.8	120.3	222.9	-65.57	-1,707.0	1,429.4	5,462.0	5,118.8	343.19	15.915	
16,300.0	9,197.0	8,750.0	8,748.8	121.9	222.9	-65.57	-1,707.0	1,429.4	5,560.2	5,215.4	344.84	16.124	
16,400.0	9,197.0	8,750.0	8,748.8	123.6	222.9	-65.57	-1,707.0	1,429.4	5,658.6	5,312.1	346.50	16.331	
16,500.0	9,197.0	8,750.0	8,748.8	125.2	222.9	-65.57	-1,707.0	1,429.4	5,757.0	5,408.9	348.15	16.536	
16,600.0	9,197.0	8,750.0	8,748.8	126.9	222.9	-65.57	-1,707.0	1,429.4	5,855.5	5,505.7	349.80	16.739	

Company:	COG PRODUCTION, LLC	**Local Co-ordinate Reference:**	Well WINWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	EDM_Users
Reference Design:	DWD Plan 2	**Offset TVD Reference:**	Offset Datum

Offset Design DELAWARE - TURQUOIS 30 FEDERAL #1 - OWB - ACTUAL WELLPATH — **Offset Site Error:** 0.0 usft

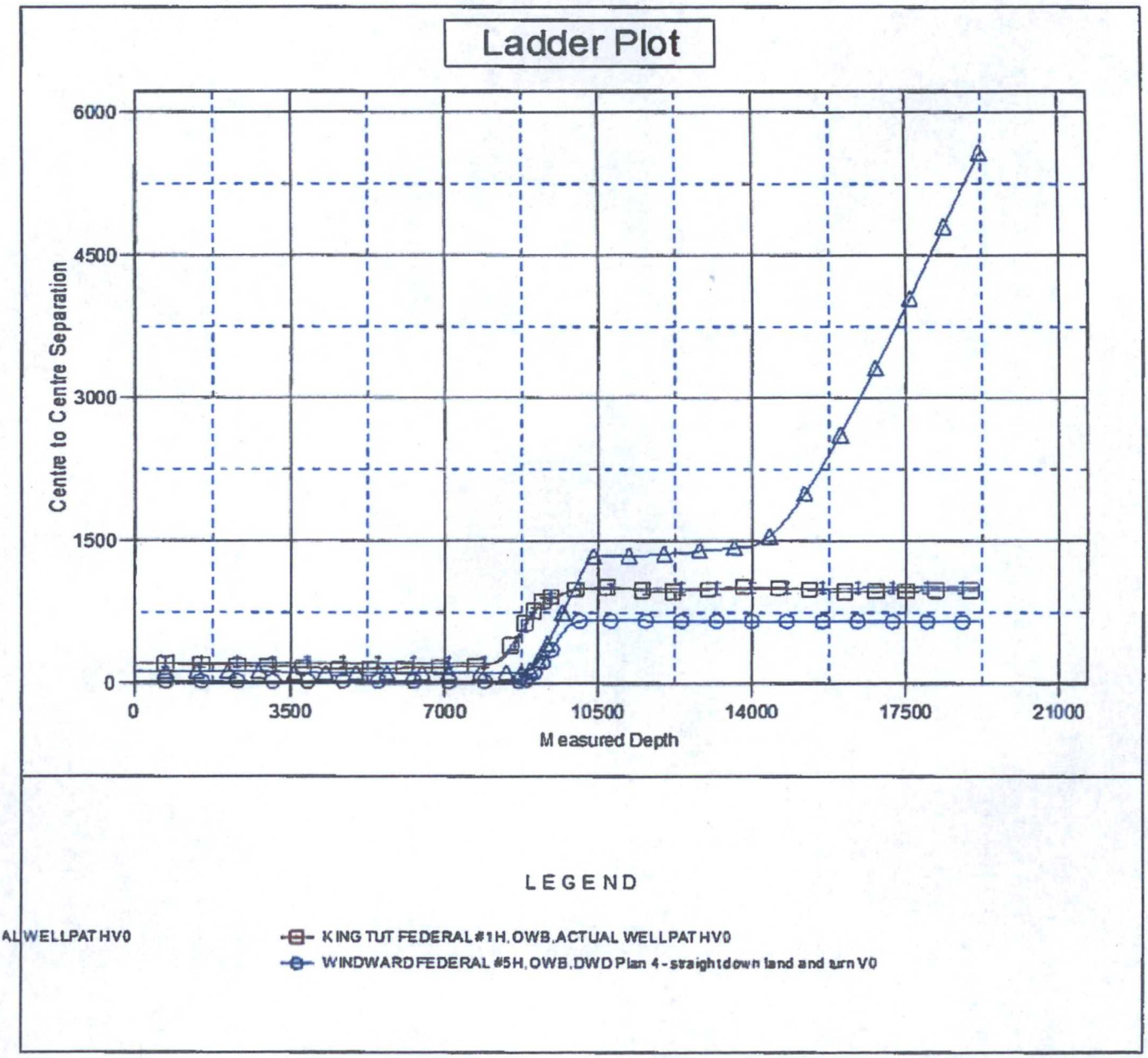
Survey Program: 400-INC-ONLY — **Offset Well Error:** 3.0 usft

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
16,700.0	9,197.0	8,750.0	8,748.8	128.5	222.9	-65.57	-1,707.0	1,429.4	5,954.0	5,602.5	351.46	16.941	
16,800.0	9,197.0	8,750.0	8,748.8	130.2	222.9	-65.57	-1,707.0	1,429.4	6,052.6	5,699.4	353.11	17.141	
16,900.0	9,197.0	8,750.0	8,748.8	131.9	222.9	-65.57	-1,707.0	1,429.4	6,151.2	5,796.4	354.77	17.339	
17,000.0	9,197.0	8,750.0	8,748.8	133.5	222.9	-65.57	-1,707.0	1,429.4	6,249.8	5,893.4	356.42	17.535	
17,100.0	9,197.0	8,750.0	8,748.8	135.2	222.9	-65.57	-1,707.0	1,429.4	6,348.5	5,990.4	358.08	17.729	
17,200.0	9,197.0	8,750.0	8,748.8	136.8	222.9	-65.57	-1,707.0	1,429.4	6,447.3	6,087.5	359.73	17.922	
17,300.0	9,197.0	8,750.0	8,748.8	138.5	222.9	-65.57	-1,707.0	1,429.4	6,546.0	6,184.6	361.39	18.114	
17,400.0	9,197.0	8,750.0	8,748.8	140.1	222.9	-65.57	-1,707.0	1,429.4	6,644.8	6,281.8	363.04	18.303	
17,500.0	9,197.0	8,750.0	8,748.8	141.8	222.9	-65.57	-1,707.0	1,429.4	6,743.7	6,379.0	364.70	18.491	
17,600.0	9,197.0	8,750.0	8,748.8	143.4	222.9	-65.57	-1,707.0	1,429.4	6,842.6	6,476.2	366.36	18.677	
17,700.0	9,197.0	8,750.0	8,748.8	145.1	222.9	-65.57	-1,707.0	1,429.4	6,941.5	6,573.5	368.01	18.862	
17,800.0	9,197.0	8,750.0	8,748.8	146.8	222.9	-65.57	-1,707.0	1,429.4	7,040.4	6,670.8	369.67	19.045	
17,900.0	9,197.0	8,750.0	8,748.8	148.4	222.9	-65.57	-1,707.0	1,429.4	7,139.4	6,768.1	371.33	19.227	
18,000.0	9,197.0	8,750.0	8,748.8	150.1	222.9	-65.57	-1,707.0	1,429.4	7,238.4	6,865.4	372.99	19.407	
18,100.0	9,197.0	8,750.0	8,748.8	151.7	222.9	-65.57	-1,707.0	1,429.4	7,337.4	6,962.8	374.64	19.585	
18,200.0	9,197.0	8,750.0	8,748.8	153.4	222.9	-65.57	-1,707.0	1,429.4	7,436.5	7,060.2	376.30	19.762	
18,300.0	9,197.0	8,750.0	8,748.8	155.0	222.9	-65.57	-1,707.0	1,429.4	7,535.6	7,157.6	377.96	19.938	
18,400.0	9,197.0	8,750.0	8,748.8	156.7	222.9	-65.57	-1,707.0	1,429.4	7,634.7	7,255.1	379.62	20.111	
18,500.0	9,197.0	8,750.0	8,748.8	158.4	222.9	-65.57	-1,707.0	1,429.4	7,733.8	7,352.5	381.28	20.284	
18,600.0	9,197.0	8,750.0	8,748.8	160.0	222.9	-65.57	-1,707.0	1,429.4	7,832.9	7,450.0	382.93	20.455	
18,700.0	9,197.0	8,750.0	8,748.8	161.7	222.9	-65.57	-1,707.0	1,429.4	7,932.1	7,547.5	384.59	20.625	
18,800.0	9,197.0	8,750.0	8,748.8	163.3	222.9	-65.57	-1,707.0	1,429.4	8,031.3	7,645.1	386.25	20.793	
18,900.0	9,197.0	8,750.0	8,748.8	165.0	222.9	-65.57	-1,707.0	1,429.4	8,130.5	7,742.6	387.91	20.960	
19,000.0	9,197.0	8,750.0	8,748.8	166.7	222.9	-65.57	-1,707.0	1,429.4	8,229.7	7,840.2	389.57	21.125	
19,100.0	9,197.0	8,750.0	8,748.8	168.3	222.9	-65.57	-1,707.0	1,429.4	8,329.0	7,937.8	391.23	21.289	
19,200.0	9,197.0	8,750.0	8,748.8	170.0	222.9	-65.57	-1,707.0	1,429.4	8,428.3	8,035.4	392.89	21.452	
19,300.0	9,197.0	8,750.0	8,748.8	171.6	222.9	-65.57	-1,707.0	1,429.4	8,527.5	8,133.0	394.55	21.614	
19,400.0	9,197.0	8,750.0	8,748.8	173.3	222.9	-65.57	-1,707.0	1,429.4	8,626.8	8,230.6	396.21	21.774	
19,415.3	9,197.0	8,750.0	8,748.8	173.5	222.9	-65.57	-1,707.0	1,429.4	8,642.0	8,245.5	396.46	21.798	

Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 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 3538 + 26 = 3564' RKB @ 3564.0usft
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to WINDWARD FEDERAL #6H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.33°



Company:	COG PRODUCTION LLC	**Local Co-ordinate Reference:**	Well WINDWARD FEDERAL #6H
Project:	LEA COUNTY, NM	**TVD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Reference Site:	AVALON SHALE	**MD Reference:**	3538 + 26 = 3564' RKB @ 3564.0usft (MCVAY 8)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	WINDWARD FEDERAL #6H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 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 3538 + 26 = 3564' RKB @ 3564.0usft
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: WINDWARD FEDERAL #6H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.33°