



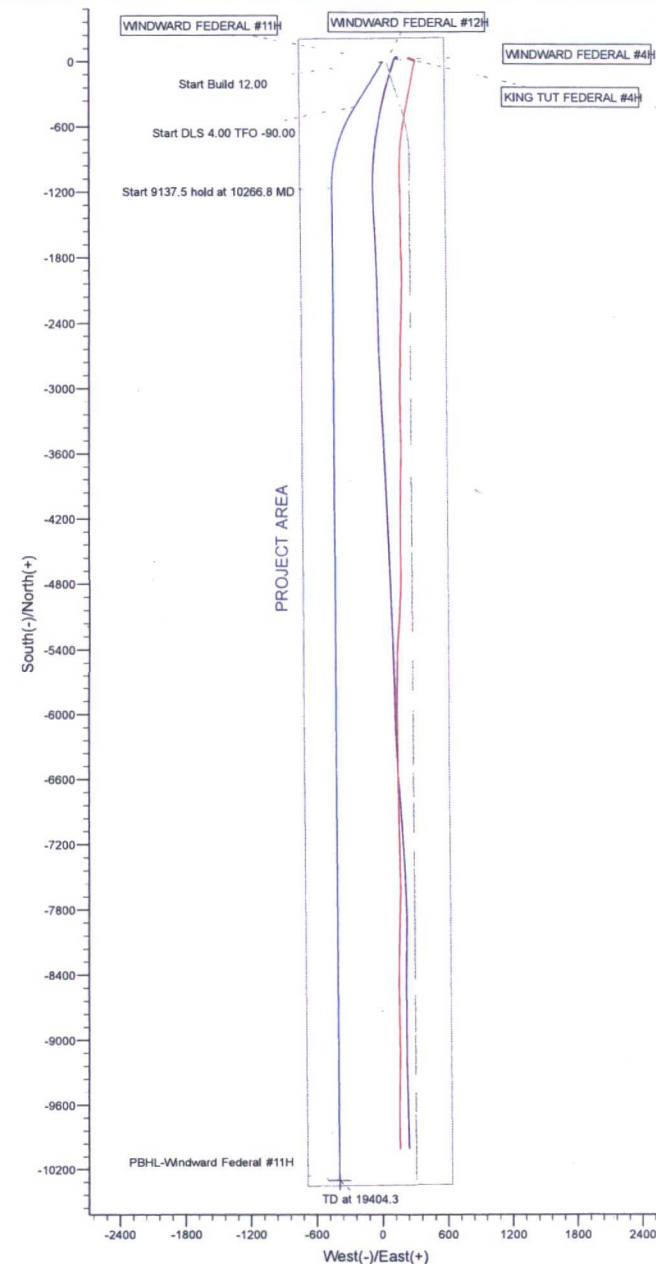
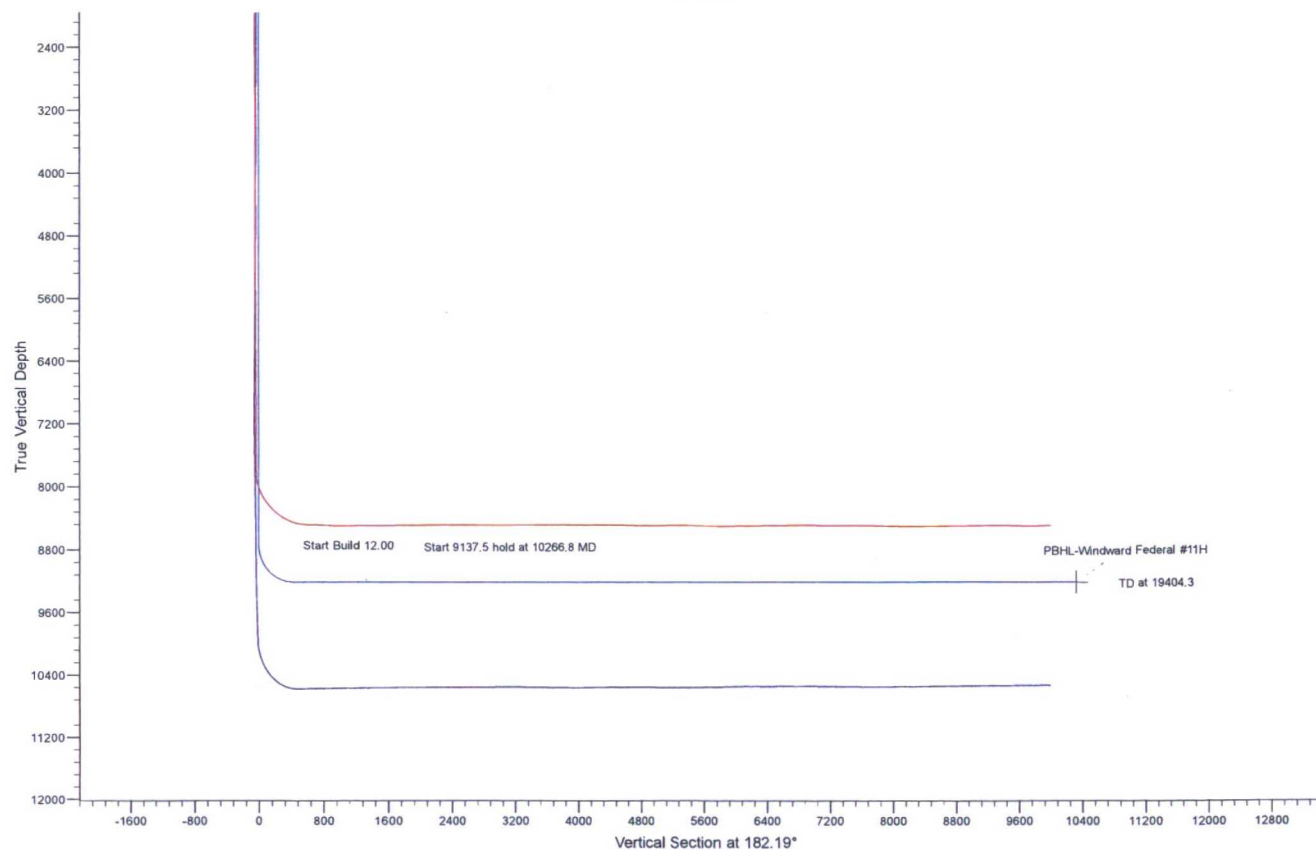
WELL DETAILS: **WINDWARD FEDERAL #11H**

Ground Level: 3547.8
 Northing 435203.10 Easting 693884.30 Latitude 32° 11' 41.774 N Longitude 103° 42' 23.635 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	8717.5	0.00	0.00	8717.5	0.0	0.0	0.00	0.00	0.0	Start Build 12.00
3	9467.6	90.00	211.55	9195.0	-406.9	-249.8	12.00	211.55	416.2	Start DLS 4.00 TFO -90.00
4	10266.8	90.00	179.58	9195.0	-1166.9	-461.5	4.00	-90.00	1183.7	Start 9137.5 hold at 10266.8 MD
5	19404.3	90.00	179.58	9195.0	-10304.2	-394.5	0.00	0.00	10311.7	TD at 19404.3

LEGEND

- WINDWARD FEDERAL #4H, OWB, ACTUAL WELLPATH V0
- KING TUT FEDERAL #4H, OWB, ACTUAL WELLPATH V0
- WINDWARD FEDERAL #12H, OWB, PWP0 V0
- PWP0





CONCHO

COG OPERATING LLC

LEA COUNTY, NM
AVALON SHALE
WINDWARD FEDERAL #11H

OWB

Plan: PWP0

HOBBS CCD

MAR 22 2017

RECEIVED

Standard Planning Report

01 September, 2016



COG Operating LLC

Planning Report

Database: EDM_Users
 Company: COG OPERATING LLC
 Project: LEA COUNTY, NM
 Site: AVALON SHALE
 Well: WINDWARD FEDERAL #11H
 Wellbore: OWB
 Design: PWP0

Local Co-ordinate Reference: Well WINDWARD FEDERAL #11H
 TVD Reference: RKB=3547.8+26 @ 3573.8usft (McVay 8)
 MD Reference: RKB=3547.8+26 @ 3573.8usft (McVay 8)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

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 #11H
 Well Position +N/-S 15,422.6 usft Northing: 435,203.10 usft Latitude: 32° 11' 41.774 N
 +E/-W -47,850.0 usft Easting: 693,884.30 usft Longitude: 103° 42' 23.635 W
 Position Uncertainty 3.0 usft Wellhead Elevation: 0.0 usft Ground Level: 3,547.8 usft

Wellbore: OWB
 Magnetics Model Name Sample Date Declination (°) Dip Angle (°) Field Strength (nT)
 WMM2015 8/29/2016 7.12 60.01 47,979

Design: PWP0
 Audit Notes:
 Version: Phase: PROTOTYPE Tie On Depth: 0.0
 Vertical Section: Depth From (TVD) +N/-S +E/-W Direction
 (usft) (usft) (usft) (°)
 0.0 0.0 0.0 182.19

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	
8,717.5	0.00	0.01	8,717.5	0.0	0.0	0.00	0.00	0.00	0.01	
9,467.6	90.00	211.55	9,195.0	-406.9	-249.8	12.00	12.00	0.00	211.55	
10,266.8	90.00	179.58	9,195.0	-1,166.9	-461.5	4.00	0.00	-4.00	-90.00	
19,404.3	90.00	179.58	9,195.0	-10,304.2	-394.5	0.00	0.00	0.00	0.00	PBHL-Windward



COG Operating LLC

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MD Reference: RKB=3547.8+26 @ 3573.8usft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	0.00
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	0.00
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	0.00
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	0.00
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	0.00
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	0.00
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	0.00
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	0.00
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	0.00
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	0.00
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	0.00
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.0	0.00	0.00	0.00
5,100.0	0.00	0.00	5,100.0	0.0	0.0	0.0	0.00	0.00	0.00
5,200.0	0.00	0.00	5,200.0	0.0	0.0	0.0	0.00	0.00	0.00
5,300.0	0.00	0.00	5,300.0	0.0	0.0	0.0	0.00	0.00	0.00



COG Operating LLC

Planning Report

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 Wellbore: OWB
 Design: PWP0

Local Co-ordinate Reference:
 TVD Reference:
 MD Reference:
 North Reference:
 Survey Calculation Method:

Well WINDWARD FEDERAL #11H
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 RKB=3547.8+26 @ 3573.8usft (McVay 8)
 Grid
 Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	0.00
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	0.00
5,600.0	0.00	0.00	5,600.0	0.0	0.0	0.0	0.00	0.00	0.00
5,700.0	0.00	0.00	5,700.0	0.0	0.0	0.0	0.00	0.00	0.00
5,800.0	0.00	0.00	5,800.0	0.0	0.0	0.0	0.00	0.00	0.00
5,900.0	0.00	0.00	5,900.0	0.0	0.0	0.0	0.00	0.00	0.00
6,000.0	0.00	0.00	6,000.0	0.0	0.0	0.0	0.00	0.00	0.00
6,100.0	0.00	0.00	6,100.0	0.0	0.0	0.0	0.00	0.00	0.00
6,200.0	0.00	0.00	6,200.0	0.0	0.0	0.0	0.00	0.00	0.00
6,300.0	0.00	0.00	6,300.0	0.0	0.0	0.0	0.00	0.00	0.00
6,400.0	0.00	0.00	6,400.0	0.0	0.0	0.0	0.00	0.00	0.00
6,500.0	0.00	0.00	6,500.0	0.0	0.0	0.0	0.00	0.00	0.00
6,600.0	0.00	0.00	6,600.0	0.0	0.0	0.0	0.00	0.00	0.00
6,700.0	0.00	0.00	6,700.0	0.0	0.0	0.0	0.00	0.00	0.00
6,800.0	0.00	0.00	6,800.0	0.0	0.0	0.0	0.00	0.00	0.00
6,900.0	0.00	0.00	6,900.0	0.0	0.0	0.0	0.00	0.00	0.00
7,000.0	0.00	0.00	7,000.0	0.0	0.0	0.0	0.00	0.00	0.00
7,100.0	0.00	0.00	7,100.0	0.0	0.0	0.0	0.00	0.00	0.00
7,200.0	0.00	0.00	7,200.0	0.0	0.0	0.0	0.00	0.00	0.00
7,300.0	0.00	0.00	7,300.0	0.0	0.0	0.0	0.00	0.00	0.00
7,400.0	0.00	0.00	7,400.0	0.0	0.0	0.0	0.00	0.00	0.00
7,500.0	0.00	0.00	7,500.0	0.0	0.0	0.0	0.00	0.00	0.00
7,600.0	0.00	0.00	7,600.0	0.0	0.0	0.0	0.00	0.00	0.00
7,700.0	0.00	0.00	7,700.0	0.0	0.0	0.0	0.00	0.00	0.00
7,800.0	0.00	0.00	7,800.0	0.0	0.0	0.0	0.00	0.00	0.00
7,900.0	0.00	0.00	7,900.0	0.0	0.0	0.0	0.00	0.00	0.00
8,000.0	0.00	0.00	8,000.0	0.0	0.0	0.0	0.00	0.00	0.00
8,100.0	0.00	0.00	8,100.0	0.0	0.0	0.0	0.00	0.00	0.00
8,200.0	0.00	0.00	8,200.0	0.0	0.0	0.0	0.00	0.00	0.00
8,300.0	0.00	0.00	8,300.0	0.0	0.0	0.0	0.00	0.00	0.00
8,400.0	0.00	0.00	8,400.0	0.0	0.0	0.0	0.00	0.00	0.00
8,500.0	0.00	0.00	8,500.0	0.0	0.0	0.0	0.00	0.00	0.00
8,600.0	0.00	0.00	8,600.0	0.0	0.0	0.0	0.00	0.00	0.00
8,700.0	0.00	0.00	8,700.0	0.0	0.0	0.0	0.00	0.00	0.00
8,717.5	0.00	0.01	8,717.5	0.0	0.0	0.0	0.00	0.00	0.00
8,800.0	9.90	211.55	8,799.6	-6.1	-3.7	6.2	12.00	12.00	0.00
8,900.0	21.90	211.55	8,895.6	-29.4	-18.0	30.0	12.00	12.00	0.00
9,000.0	33.90	211.55	8,983.8	-69.2	-42.5	70.7	12.00	12.00	0.00
9,100.0	45.90	211.55	9,060.4	-123.7	-76.0	126.5	12.00	12.00	0.00
9,200.0	57.90	211.55	9,122.0	-190.7	-117.1	195.0	12.00	12.00	0.00
9,300.0	69.89	211.55	9,165.9	-267.0	-164.0	273.1	12.00	12.00	0.00
9,400.0	81.89	211.55	9,190.2	-349.5	-214.6	357.5	12.00	12.00	0.00
9,467.6	90.00	211.55	9,195.0	-406.9	-249.8	416.2	12.00	12.00	0.00
9,500.0	90.00	210.25	9,195.0	-434.8	-266.5	444.6	4.00	0.00	-4.00
9,600.0	90.00	206.25	9,195.0	-522.8	-313.8	534.4	4.00	0.00	-4.00
9,700.0	90.00	202.25	9,195.0	-614.0	-354.9	627.1	4.00	0.00	-4.00
9,800.0	90.00	198.25	9,195.0	-707.8	-389.5	722.2	4.00	0.00	-4.00
9,900.0	90.00	194.25	9,195.0	-803.8	-417.5	819.1	4.00	0.00	-4.00
10,000.0	90.00	190.25	9,195.0	-901.5	-438.7	917.6	4.00	0.00	-4.00
10,100.0	90.00	186.25	9,195.0	-1,000.4	-453.1	1,017.0	4.00	0.00	-4.00
10,200.0	90.00	182.25	9,195.0	-1,100.1	-460.5	1,116.9	4.00	0.00	-4.00
10,266.8	90.00	179.58	9,195.0	-1,166.9	-461.5	1,183.7	4.00	0.00	-4.00
10,300.0	90.00	179.58	9,195.0	-1,200.1	-461.3	1,216.9	0.00	0.00	0.00
10,400.0	90.00	179.58	9,195.0	-1,300.1	-460.6	1,316.8	0.00	0.00	0.00



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 Grid
 Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,500.0	90.00	179.58	9,195.0	-1,400.1	-459.8	1,416.7	0.00	0.00	0.00
10,600.0	90.00	179.58	9,195.0	-1,500.1	-459.1	1,516.6	0.00	0.00	0.00
10,700.0	90.00	179.58	9,195.0	-1,600.1	-458.4	1,616.5	0.00	0.00	0.00
10,800.0	90.00	179.58	9,195.0	-1,700.1	-457.6	1,716.4	0.00	0.00	0.00
10,900.0	90.00	179.58	9,195.0	-1,800.1	-456.9	1,816.2	0.00	0.00	0.00
11,000.0	90.00	179.58	9,195.0	-1,900.1	-456.2	1,916.1	0.00	0.00	0.00
11,100.0	90.00	179.58	9,195.0	-2,000.1	-455.4	2,016.0	0.00	0.00	0.00
11,200.0	90.00	179.58	9,195.0	-2,100.1	-454.7	2,115.9	0.00	0.00	0.00
11,300.0	90.00	179.58	9,195.0	-2,200.1	-454.0	2,215.8	0.00	0.00	0.00
11,400.0	90.00	179.58	9,195.0	-2,300.1	-453.2	2,315.7	0.00	0.00	0.00
11,500.0	90.00	179.58	9,195.0	-2,400.1	-452.5	2,415.6	0.00	0.00	0.00
11,600.0	90.00	179.58	9,195.0	-2,500.1	-451.8	2,515.5	0.00	0.00	0.00
11,700.0	90.00	179.58	9,195.0	-2,600.1	-451.0	2,615.4	0.00	0.00	0.00
11,800.0	90.00	179.58	9,195.0	-2,700.1	-450.3	2,715.3	0.00	0.00	0.00
11,900.0	90.00	179.58	9,195.0	-2,800.1	-449.6	2,815.2	0.00	0.00	0.00
12,000.0	90.00	179.58	9,195.0	-2,900.1	-448.8	2,915.1	0.00	0.00	0.00
12,100.0	90.00	179.58	9,195.0	-3,000.1	-448.1	3,015.0	0.00	0.00	0.00
12,200.0	90.00	179.58	9,195.0	-3,100.0	-447.4	3,114.9	0.00	0.00	0.00
12,300.0	90.00	179.58	9,195.0	-3,200.0	-446.6	3,214.8	0.00	0.00	0.00
12,400.0	90.00	179.58	9,195.0	-3,300.0	-445.9	3,314.7	0.00	0.00	0.00
12,500.0	90.00	179.58	9,195.0	-3,400.0	-445.2	3,414.6	0.00	0.00	0.00
12,600.0	90.00	179.58	9,195.0	-3,500.0	-444.4	3,514.5	0.00	0.00	0.00
12,700.0	90.00	179.58	9,195.0	-3,600.0	-443.7	3,614.4	0.00	0.00	0.00
12,800.0	90.00	179.58	9,195.0	-3,700.0	-443.0	3,714.3	0.00	0.00	0.00
12,900.0	90.00	179.58	9,195.0	-3,800.0	-442.2	3,814.2	0.00	0.00	0.00
13,000.0	90.00	179.58	9,195.0	-3,900.0	-441.5	3,914.1	0.00	0.00	0.00
13,100.0	90.00	179.58	9,195.0	-4,000.0	-440.8	4,014.0	0.00	0.00	0.00
13,200.0	90.00	179.58	9,195.0	-4,100.0	-440.0	4,113.9	0.00	0.00	0.00
13,300.0	90.00	179.58	9,195.0	-4,200.0	-439.3	4,213.8	0.00	0.00	0.00
13,400.0	90.00	179.58	9,195.0	-4,300.0	-438.6	4,313.6	0.00	0.00	0.00
13,500.0	90.00	179.58	9,195.0	-4,400.0	-437.8	4,413.5	0.00	0.00	0.00
13,600.0	90.00	179.58	9,195.0	-4,500.0	-437.1	4,513.4	0.00	0.00	0.00
13,700.0	90.00	179.58	9,195.0	-4,600.0	-436.4	4,613.3	0.00	0.00	0.00
13,800.0	90.00	179.58	9,195.0	-4,700.0	-435.6	4,713.2	0.00	0.00	0.00
13,900.0	90.00	179.58	9,195.0	-4,800.0	-434.9	4,813.1	0.00	0.00	0.00
14,000.0	90.00	179.58	9,195.0	-4,900.0	-434.2	4,913.0	0.00	0.00	0.00
14,100.0	90.00	179.58	9,195.0	-5,000.0	-433.4	5,012.9	0.00	0.00	0.00
14,200.0	90.00	179.58	9,195.0	-5,100.0	-432.7	5,112.8	0.00	0.00	0.00
14,300.0	90.00	179.58	9,195.0	-5,200.0	-431.9	5,212.7	0.00	0.00	0.00
14,400.0	90.00	179.58	9,195.0	-5,300.0	-431.2	5,312.6	0.00	0.00	0.00
14,500.0	90.00	179.58	9,195.0	-5,400.0	-430.5	5,412.5	0.00	0.00	0.00
14,600.0	90.00	179.58	9,195.0	-5,500.0	-429.7	5,512.4	0.00	0.00	0.00
14,700.0	90.00	179.58	9,195.0	-5,600.0	-429.0	5,612.3	0.00	0.00	0.00
14,800.0	90.00	179.58	9,195.0	-5,700.0	-428.3	5,712.2	0.00	0.00	0.00
14,900.0	90.00	179.58	9,195.0	-5,800.0	-427.5	5,812.1	0.00	0.00	0.00
15,000.0	90.00	179.58	9,195.0	-5,900.0	-426.8	5,912.0	0.00	0.00	0.00
15,100.0	90.00	179.58	9,195.0	-6,000.0	-426.1	6,011.9	0.00	0.00	0.00
15,200.0	90.00	179.58	9,195.0	-6,100.0	-425.3	6,111.8	0.00	0.00	0.00
15,300.0	90.00	179.58	9,195.0	-6,200.0	-424.6	6,211.7	0.00	0.00	0.00
15,400.0	90.00	179.58	9,195.0	-6,300.0	-423.9	6,311.6	0.00	0.00	0.00
15,500.0	90.00	179.58	9,195.0	-6,400.0	-423.1	6,411.5	0.00	0.00	0.00
15,600.0	90.00	179.58	9,195.0	-6,500.0	-422.4	6,511.4	0.00	0.00	0.00
15,700.0	90.00	179.58	9,195.0	-6,600.0	-421.7	6,611.3	0.00	0.00	0.00
15,800.0	90.00	179.58	9,195.0	-6,700.0	-420.9	6,711.2	0.00	0.00	0.00



COG Operating LLC

Planning Report

Database: EDM_Users
 Company: COG OPERATING LLC
 Project: LEA COUNTY, NM
 Site: AVALON SHALE
 Well: WINDWARD FEDERAL #11H
 Wellbore: OWB
 Design: PWP0

Local Co-ordinate Reference:
 TVD Reference:
 MD Reference:
 North Reference:
 Survey Calculation Method:

Well WINDWARD FEDERAL #11H
 RKB=3547.8+26 @ 3573.8usft (McVay 8)
 RKB=3547.8+26 @ 3573.8usft (McVay 8)
 Grid
 Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
15,900.0	90.00	179.58	9,195.0	-6,800.0	-420.2	6,811.0	0.00	0.00	0.00
16,000.0	90.00	179.58	9,195.0	-6,899.9	-419.5	6,910.9	0.00	0.00	0.00
16,100.0	90.00	179.58	9,195.0	-6,999.9	-418.7	7,010.8	0.00	0.00	0.00
16,200.0	90.00	179.58	9,195.0	-7,099.9	-418.0	7,110.7	0.00	0.00	0.00
16,300.0	90.00	179.58	9,195.0	-7,199.9	-417.3	7,210.6	0.00	0.00	0.00
16,400.0	90.00	179.58	9,195.0	-7,299.9	-416.5	7,310.5	0.00	0.00	0.00
16,500.0	90.00	179.58	9,195.0	-7,399.9	-415.8	7,410.4	0.00	0.00	0.00
16,600.0	90.00	179.58	9,195.0	-7,499.9	-415.1	7,510.3	0.00	0.00	0.00
16,700.0	90.00	179.58	9,195.0	-7,599.9	-414.3	7,610.2	0.00	0.00	0.00
16,800.0	90.00	179.58	9,195.0	-7,699.9	-413.6	7,710.1	0.00	0.00	0.00
16,900.0	90.00	179.58	9,195.0	-7,799.9	-412.9	7,810.0	0.00	0.00	0.00
17,000.0	90.00	179.58	9,195.0	-7,899.9	-412.1	7,909.9	0.00	0.00	0.00
17,100.0	90.00	179.58	9,195.0	-7,999.9	-411.4	8,009.8	0.00	0.00	0.00
17,200.0	90.00	179.58	9,195.0	-8,099.9	-410.7	8,109.7	0.00	0.00	0.00
17,300.0	90.00	179.58	9,195.0	-8,199.9	-409.9	8,209.6	0.00	0.00	0.00
17,400.0	90.00	179.58	9,195.0	-8,299.9	-409.2	8,309.5	0.00	0.00	0.00
17,500.0	90.00	179.58	9,195.0	-8,399.9	-408.5	8,409.4	0.00	0.00	0.00
17,600.0	90.00	179.58	9,195.0	-8,499.9	-407.7	8,509.3	0.00	0.00	0.00
17,700.0	90.00	179.58	9,195.0	-8,599.9	-407.0	8,609.2	0.00	0.00	0.00
17,800.0	90.00	179.58	9,195.0	-8,699.9	-406.3	8,709.1	0.00	0.00	0.00
17,900.0	90.00	179.58	9,195.0	-8,799.9	-405.5	8,809.0	0.00	0.00	0.00
18,000.0	90.00	179.58	9,195.0	-8,899.9	-404.8	8,908.9	0.00	0.00	0.00
18,100.0	90.00	179.58	9,195.0	-8,999.9	-404.1	9,008.8	0.00	0.00	0.00
18,200.0	90.00	179.58	9,195.0	-9,099.9	-403.3	9,108.7	0.00	0.00	0.00
18,300.0	90.00	179.58	9,195.0	-9,199.9	-402.6	9,208.6	0.00	0.00	0.00
18,400.0	90.00	179.58	9,195.0	-9,299.9	-401.9	9,308.4	0.00	0.00	0.00
18,500.0	90.00	179.58	9,195.0	-9,399.9	-401.1	9,408.3	0.00	0.00	0.00
18,600.0	90.00	179.58	9,195.0	-9,499.9	-400.4	9,508.2	0.00	0.00	0.00
18,700.0	90.00	179.58	9,195.0	-9,599.9	-399.7	9,608.1	0.00	0.00	0.00
18,800.0	90.00	179.58	9,195.0	-9,699.9	-398.9	9,708.0	0.00	0.00	0.00
18,900.0	90.00	179.58	9,195.0	-9,799.9	-398.2	9,807.9	0.00	0.00	0.00
19,000.0	90.00	179.58	9,195.0	-9,899.9	-397.5	9,907.8	0.00	0.00	0.00
19,100.0	90.00	179.58	9,195.0	-9,999.9	-396.7	10,007.7	0.00	0.00	0.00
19,200.0	90.00	179.58	9,195.0	-10,099.9	-396.0	10,107.6	0.00	0.00	0.00
19,300.0	90.00	179.58	9,195.0	-10,199.9	-395.3	10,207.5	0.00	0.00	0.00
19,400.0	90.00	179.58	9,195.0	-10,299.9	-394.5	10,307.4	0.00	0.00	0.00
19,404.3	90.00	179.58	9,195.0	-10,304.2	-394.5	10,311.7	0.00	0.00	0.00

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
PBHL-Windward	0.00	0.00	9,195.0	-10,304.2	-394.5	424,898.90	693,489.80	32° 9' 59.827 N	103° 42' 28.922 W
- plan hits target center									
- Point									



COG Operating LLC
Planning Report

Database: EDM_Users
Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Site: AVALON SHALE
Well: WINDWARD FEDERAL #11H
Wellbore: OWB
Design: PWP0

Local Co-ordinate Reference: Well WINDWARD FEDERAL #11H
TVD Reference: RKB=3547.8+26 @ 3573.8usft (McVay 8)
MD Reference: RKB=3547.8+26 @ 3573.8usft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
8,717.5	8,717.5	0.0	0.0	Start Build 12.00
9,467.6	9,195.0	-406.9	-249.8	Start DLS 4.00 TFO -90.00
10,266.8	9,195.0	-1,166.9	-461.5	Start 9137.5 hold at 10266.8 MD
19,404.3	9,195.0	-10,304.2	-394.5	TD at 19404.3