



30-015-43924

COG Operating LLC

Eddy County, NM (NAD-27 2015)

Copperhead 31 Fee #3H

Copperhead 31 Fee #3H

Lateral #1

NM OIL CONSERVATION
ARTESIA DISTRICT

OCT 17 2016

RECEIVED

Plan: Design #1

Standard Planning Report

14 October, 2016



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Copperhead 31 Fee #3H
Company:	COG Operating LLC	TVD Reference:	KB @ 2966.60usft (Latshaw 44)
Project:	Eddy County, NM (NAD-27 2015)	MD Reference:	KB @ 2966.60usft (Latshaw 44)
Site:	Copperhead 31 Fee #3H	North Reference:	Grid
Well:	Copperhead 31 Fee #3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Lateral #1		
Design:	Design #1		

Project	Eddy County, NM (NAD-27 2015)		
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	Copperhead 31 Fee #3H			
Site Position:		Northing:	371,068.50 usft	Latitude: 32° 1' 11.235 N
From:	Map	Easting:	597,975.70 usft	Longitude: 104° 1' 1.956 W
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence: 0.17 °

Well	Copperhead 31 Fee #3H			
Well Position	+N/-S	0.00 usft	Northing:	371,068.49 usft
	+E/-W	0.00 usft	Easting:	597,975.70 usft
Position Uncertainty	0.00 usft		Wellhead Elevation:	0.00 usft
			Ground Level:	2,941.60 usft

Wellbore	Lateral #1			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)
	IGRF2015	10/14/2016	7.22	59.81
				Field Strength (nT) 47,841

Design	Design #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.00	0.00	0.00	179.14

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
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
10,264.54	0.00	0.00	10,264.54	0.00	0.00	0.00	0.00	0.00	0.00	
11,014.38	89.98	179.14	10,742.01	-477.25	7.13	12.00	12.00	23.89	179.14	
16,855.97	89.98	179.14	10,744.00	-6,318.19	94.40	0.00	0.00	0.00	0.00	PBHL (C31F#3H/L 1)



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Well:	Copperhead 31 Fee #3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Lateral #1		
Design:	Design #1		

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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	0.00	0.00
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00
4,500.00	0.00	0.00	4,500.00	0.00	0.00	0.00	0.00	0.00	0.00
4,600.00	0.00	0.00	4,600.00	0.00	0.00	0.00	0.00	0.00	0.00
4,700.00	0.00	0.00	4,700.00	0.00	0.00	0.00	0.00	0.00	0.00
4,800.00	0.00	0.00	4,800.00	0.00	0.00	0.00	0.00	0.00	0.00
4,900.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	0.00	0.00
5,000.00	0.00	0.00	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00
5,100.00	0.00	0.00	5,100.00	0.00	0.00	0.00	0.00	0.00	0.00
5,200.00	0.00	0.00	5,200.00	0.00	0.00	0.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,300.00	0.00	0.00	0.00	0.00	0.00	0.00



TDS
Planning Report



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Well:	Copperhead 31 Fee #3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Lateral #1		
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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)
5,400.00	0.00	0.00	5,400.00	0.00	0.00	0.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,500.00	0.00	0.00	0.00	0.00	0.00	0.00
5,600.00	0.00	0.00	5,600.00	0.00	0.00	0.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,700.00	0.00	0.00	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,800.00	0.00	0.00	0.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,900.00	0.00	0.00	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	6,000.00	0.00	0.00	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	6,100.00	0.00	0.00	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,200.00	0.00	0.00	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,300.00	0.00	0.00	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,400.00	0.00	0.00	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,500.00	0.00	0.00	0.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,600.00	0.00	0.00	0.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,700.00	0.00	0.00	0.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,800.00	0.00	0.00	0.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,900.00	0.00	0.00	0.00	0.00	0.00	0.00
7,000.00	0.00	0.00	7,000.00	0.00	0.00	0.00	0.00	0.00	0.00
7,100.00	0.00	0.00	7,100.00	0.00	0.00	0.00	0.00	0.00	0.00
7,200.00	0.00	0.00	7,200.00	0.00	0.00	0.00	0.00	0.00	0.00
7,300.00	0.00	0.00	7,300.00	0.00	0.00	0.00	0.00	0.00	0.00
7,400.00	0.00	0.00	7,400.00	0.00	0.00	0.00	0.00	0.00	0.00
7,500.00	0.00	0.00	7,500.00	0.00	0.00	0.00	0.00	0.00	0.00
7,600.00	0.00	0.00	7,600.00	0.00	0.00	0.00	0.00	0.00	0.00
7,700.00	0.00	0.00	7,700.00	0.00	0.00	0.00	0.00	0.00	0.00
7,800.00	0.00	0.00	7,800.00	0.00	0.00	0.00	0.00	0.00	0.00
7,900.00	0.00	0.00	7,900.00	0.00	0.00	0.00	0.00	0.00	0.00
8,000.00	0.00	0.00	8,000.00	0.00	0.00	0.00	0.00	0.00	0.00
8,100.00	0.00	0.00	8,100.00	0.00	0.00	0.00	0.00	0.00	0.00
8,200.00	0.00	0.00	8,200.00	0.00	0.00	0.00	0.00	0.00	0.00
8,300.00	0.00	0.00	8,300.00	0.00	0.00	0.00	0.00	0.00	0.00
8,400.00	0.00	0.00	8,400.00	0.00	0.00	0.00	0.00	0.00	0.00
8,500.00	0.00	0.00	8,500.00	0.00	0.00	0.00	0.00	0.00	0.00
8,600.00	0.00	0.00	8,600.00	0.00	0.00	0.00	0.00	0.00	0.00
8,700.00	0.00	0.00	8,700.00	0.00	0.00	0.00	0.00	0.00	0.00
8,800.00	0.00	0.00	8,800.00	0.00	0.00	0.00	0.00	0.00	0.00
8,900.00	0.00	0.00	8,900.00	0.00	0.00	0.00	0.00	0.00	0.00
9,000.00	0.00	0.00	9,000.00	0.00	0.00	0.00	0.00	0.00	0.00
9,100.00	0.00	0.00	9,100.00	0.00	0.00	0.00	0.00	0.00	0.00
9,200.00	0.00	0.00	9,200.00	0.00	0.00	0.00	0.00	0.00	0.00
9,300.00	0.00	0.00	9,300.00	0.00	0.00	0.00	0.00	0.00	0.00
9,400.00	0.00	0.00	9,400.00	0.00	0.00	0.00	0.00	0.00	0.00
9,500.00	0.00	0.00	9,500.00	0.00	0.00	0.00	0.00	0.00	0.00
9,600.00	0.00	0.00	9,600.00	0.00	0.00	0.00	0.00	0.00	0.00
9,700.00	0.00	0.00	9,700.00	0.00	0.00	0.00	0.00	0.00	0.00
9,800.00	0.00	0.00	9,800.00	0.00	0.00	0.00	0.00	0.00	0.00
9,900.00	0.00	0.00	9,900.00	0.00	0.00	0.00	0.00	0.00	0.00
10,000.00	0.00	0.00	10,000.00	0.00	0.00	0.00	0.00	0.00	0.00
10,100.00	0.00	0.00	10,100.00	0.00	0.00	0.00	0.00	0.00	0.00
10,200.00	0.00	0.00	10,200.00	0.00	0.00	0.00	0.00	0.00	0.00
10,264.54	0.00	0.00	10,264.54	0.00	0.00	0.00	0.00	0.00	0.00
Start DLS 12.00 TFO 179.14									
10,275.00	1.26	179.14	10,275.00	-0.11	0.00	0.11	12.00	12.00	0.00
10,300.00	4.26	179.14	10,299.97	-1.32	0.02	1.32	12.00	12.00	0.00



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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)	
10,325.00	7.26	179.14	10,324.84	-3.82	0.06	3.82	12.00	12.00	0.00	
10,350.00	10.26	179.14	10,349.54	-7.63	0.11	7.63	12.00	12.00	0.00	
10,375.00	13.26	179.14	10,374.02	-12.72	0.19	12.72	12.00	12.00	0.00	
10,400.00	16.26	179.14	10,398.19	-19.08	0.29	19.09	12.00	12.00	0.00	
10,425.00	19.26	179.14	10,422.00	-26.71	0.40	26.71	12.00	12.00	0.00	
10,450.00	22.26	179.14	10,445.37	-35.56	0.53	35.57	12.00	12.00	0.00	
10,475.00	25.26	179.14	10,468.25	-45.63	0.68	45.64	12.00	12.00	0.00	
10,500.00	28.26	179.14	10,490.57	-56.88	0.85	56.89	12.00	12.00	0.00	
10,525.00	31.26	179.14	10,512.27	-69.29	1.04	69.30	12.00	12.00	0.00	
10,550.00	34.26	179.14	10,533.30	-82.81	1.24	82.82	12.00	12.00	0.00	
10,575.00	37.26	179.14	10,553.58	-97.42	1.46	97.43	12.00	12.00	0.00	
10,600.00	40.26	179.14	10,573.07	-113.06	1.69	113.08	12.00	12.00	0.00	
10,625.00	43.26	179.14	10,591.72	-129.71	1.94	129.72	12.00	12.00	0.00	
10,650.00	46.26	179.14	10,609.47	-147.31	2.20	147.32	12.00	12.00	0.00	
10,675.00	49.26	179.14	10,626.28	-165.81	2.48	165.83	12.00	12.00	0.00	
10,700.00	52.26	179.14	10,642.09	-185.17	2.77	185.19	12.00	12.00	0.00	
10,725.00	55.26	179.14	10,656.87	-205.32	3.07	205.35	12.00	12.00	0.00	
10,750.00	58.26	179.14	10,670.58	-226.23	3.38	226.25	12.00	12.00	0.00	
10,775.00	61.26	179.14	10,683.17	-247.82	3.70	247.85	12.00	12.00	0.00	
10,800.00	64.26	179.14	10,694.61	-270.04	4.03	270.07	12.00	12.00	0.00	
10,825.00	67.26	179.14	10,704.88	-292.83	4.38	292.86	12.00	12.00	0.00	
10,850.00	70.26	179.14	10,713.93	-316.13	4.72	316.16	12.00	12.00	0.00	
10,875.00	73.26	179.14	10,721.76	-339.86	5.08	339.90	12.00	12.00	0.00	
10,900.00	76.26	179.14	10,728.33	-363.98	5.44	364.02	12.00	12.00	0.00	
10,925.00	79.26	179.14	10,733.63	-388.41	5.80	388.45	12.00	12.00	0.00	
10,950.00	82.26	179.14	10,737.65	-413.08	6.17	413.12	12.00	12.00	0.00	
10,975.00	85.26	179.14	10,740.37	-437.92	6.54	437.97	12.00	12.00	0.00	
11,000.00	88.26	179.14	10,741.78	-462.88	6.92	462.93	12.00	12.00	0.00	
11,014.38	89.98	179.14	10,742.01	-477.25	7.13	477.30	12.00	12.00	0.00	
Start 5841.60 hold at 11014.38 MD										
11,100.00	89.98	179.14	10,742.03	-562.86	8.41	562.92	0.00	0.00	0.00	
11,200.00	89.98	179.14	10,742.07	-662.85	9.90	662.92	0.00	0.00	0.00	
11,300.00	89.98	179.14	10,742.10	-762.84	11.40	762.92	0.00	0.00	0.00	
11,400.00	89.98	179.14	10,742.14	-862.83	12.89	862.92	0.00	0.00	0.00	
11,500.00	89.98	179.14	10,742.17	-962.82	14.39	962.92	0.00	0.00	0.00	
11,600.00	89.98	179.14	10,742.21	-1,062.81	15.88	1,062.92	0.00	0.00	0.00	
11,700.00	89.98	179.14	10,742.24	-1,162.80	17.37	1,162.92	0.00	0.00	0.00	
11,800.00	89.98	179.14	10,742.27	-1,262.78	18.87	1,262.92	0.00	0.00	0.00	
11,900.00	89.98	179.14	10,742.31	-1,362.77	20.36	1,362.92	0.00	0.00	0.00	
12,000.00	89.98	179.14	10,742.34	-1,462.76	21.86	1,462.92	0.00	0.00	0.00	
12,100.00	89.98	179.14	10,742.38	-1,562.75	23.35	1,562.92	0.00	0.00	0.00	
12,200.00	89.98	179.14	10,742.41	-1,662.74	24.84	1,662.92	0.00	0.00	0.00	
12,300.00	89.98	179.14	10,742.44	-1,762.73	26.34	1,762.92	0.00	0.00	0.00	
12,400.00	89.98	179.14	10,742.48	-1,862.72	27.83	1,862.92	0.00	0.00	0.00	
12,500.00	89.98	179.14	10,742.51	-1,962.71	29.32	1,962.92	0.00	0.00	0.00	
12,600.00	89.98	179.14	10,742.55	-2,062.69	30.82	2,062.92	0.00	0.00	0.00	
12,700.00	89.98	179.14	10,742.58	-2,162.68	32.31	2,162.92	0.00	0.00	0.00	
12,800.00	89.98	179.14	10,742.61	-2,262.67	33.81	2,262.92	0.00	0.00	0.00	
12,900.00	89.98	179.14	10,742.65	-2,362.66	35.30	2,362.92	0.00	0.00	0.00	
13,000.00	89.98	179.14	10,742.68	-2,462.65	36.79	2,462.92	0.00	0.00	0.00	
13,100.00	89.98	179.14	10,742.72	-2,562.64	38.29	2,562.92	0.00	0.00	0.00	
13,200.00	89.98	179.14	10,742.75	-2,662.63	39.78	2,662.92	0.00	0.00	0.00	
13,300.00	89.98	179.14	10,742.79	-2,762.62	41.28	2,762.92	0.00	0.00	0.00	
13,400.00	89.98	179.14	10,742.82	-2,862.61	42.77	2,862.92	0.00	0.00	0.00	



TDS
Planning Report



Database:	EDM.5000.1.Single User Db	Local Co-ordinate Reference:	Well Copperhead 31 Fee #3H
Company:	COG Operating LLC	TVD Reference:	KB @ 2966.60usft (Latshaw 44)
Project:	Eddy County, NM (NAD-27 2015)	MD Reference:	KB @ 2966.60usft (Latshaw 44)
Site:	Copperhead 31 Fee #3H	North Reference:	Grid
Well:	Copperhead 31 Fee #3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Lateral #1		
Design:	Design #1		

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)
13,500.00	89.98	179.14	10,742.85	-2,962.59	44.26	2,962.92	0.00	0.00	0.00
13,600.00	89.98	179.14	10,742.89	-3,062.58	45.76	3,062.92	0.00	0.00	0.00
13,700.00	89.98	179.14	10,742.92	-3,162.57	47.25	3,162.92	0.00	0.00	0.00
13,800.00	89.98	179.14	10,742.96	-3,262.56	48.75	3,262.92	0.00	0.00	0.00
13,900.00	89.98	179.14	10,742.99	-3,362.55	50.24	3,362.92	0.00	0.00	0.00
14,000.00	89.98	179.14	10,743.02	-3,462.54	51.73	3,462.92	0.00	0.00	0.00
14,100.00	89.98	179.14	10,743.06	-3,562.53	53.23	3,562.92	0.00	0.00	0.00
14,200.00	89.98	179.14	10,743.09	-3,662.52	54.72	3,662.92	0.00	0.00	0.00
14,300.00	89.98	179.14	10,743.13	-3,762.50	56.22	3,762.92	0.00	0.00	0.00
14,400.00	89.98	179.14	10,743.16	-3,862.49	57.71	3,862.92	0.00	0.00	0.00
14,500.00	89.98	179.14	10,743.20	-3,962.48	59.20	3,962.92	0.00	0.00	0.00
14,600.00	89.98	179.14	10,743.23	-4,062.47	60.70	4,062.92	0.00	0.00	0.00
14,700.00	89.98	179.14	10,743.26	-4,162.46	62.19	4,162.92	0.00	0.00	0.00
14,800.00	89.98	179.14	10,743.30	-4,262.45	63.69	4,262.92	0.00	0.00	0.00
14,900.00	89.98	179.14	10,743.33	-4,362.44	65.18	4,362.92	0.00	0.00	0.00
15,000.00	89.98	179.14	10,743.37	-4,462.43	66.67	4,462.92	0.00	0.00	0.00
15,100.00	89.98	179.14	10,743.40	-4,562.42	68.17	4,562.92	0.00	0.00	0.00
15,200.00	89.98	179.14	10,743.43	-4,662.40	69.66	4,662.92	0.00	0.00	0.00
15,300.00	89.98	179.14	10,743.47	-4,762.39	71.15	4,762.92	0.00	0.00	0.00
15,400.00	89.98	179.14	10,743.50	-4,862.38	72.65	4,862.92	0.00	0.00	0.00
15,500.00	89.98	179.14	10,743.54	-4,962.37	74.14	4,962.92	0.00	0.00	0.00
15,600.00	89.98	179.14	10,743.57	-5,062.36	75.64	5,062.92	0.00	0.00	0.00
15,700.00	89.98	179.14	10,743.61	-5,162.35	77.13	5,162.92	0.00	0.00	0.00
15,800.00	89.98	179.14	10,743.64	-5,262.34	78.62	5,262.92	0.00	0.00	0.00
15,900.00	89.98	179.14	10,743.67	-5,362.33	80.12	5,362.92	0.00	0.00	0.00
16,000.00	89.98	179.14	10,743.71	-5,462.32	81.61	5,462.92	0.00	0.00	0.00
16,100.00	89.98	179.14	10,743.74	-5,562.30	83.11	5,562.92	0.00	0.00	0.00
16,200.00	89.98	179.14	10,743.78	-5,662.29	84.60	5,662.92	0.00	0.00	0.00
16,300.00	89.98	179.14	10,743.81	-5,762.28	86.09	5,762.92	0.00	0.00	0.00
16,400.00	89.98	179.14	10,743.84	-5,862.27	87.59	5,862.92	0.00	0.00	0.00
16,500.00	89.98	179.14	10,743.88	-5,962.26	89.08	5,962.92	0.00	0.00	0.00
16,600.00	89.98	179.14	10,743.91	-6,062.25	90.58	6,062.92	0.00	0.00	0.00
16,700.00	89.98	179.14	10,743.95	-6,162.24	92.07	6,162.92	0.00	0.00	0.00
16,800.00	89.98	179.14	10,743.98	-6,262.23	93.56	6,262.92	0.00	0.00	0.00
16,855.97	89.98	179.14	10,744.00	-6,318.19	94.40	6,318.90	0.00	0.00	0.00
TD at 16855.98									

Design Targets									
Target Name									
- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- Shape									
KOP (C31F#3H/L1)	0.00	0.00	10,264.54	0.00	0.00	371,068.49	597,975.70	32° 1' 11.235 N	104° 1' 1.956 W
- plan hits target center									
- Point									
EOC (C31F#3H/L1)	0.00	357.54	10,742.01	-477.24	7.13	370,591.25	597,982.83	32° 1' 6.511 N	104° 1' 1.890 W
- plan hits target center									
- Point									
PBHL (C31F#3H/L1)	0.00	357.54	10,744.00	-6,318.19	94.40	364,750.30	598,070.10	32° 0' 8.704 N	104° 1' 1.075 W
- plan hits target center									
- Point									



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Copperhead 31 Fee #3H
Company:	COG Operating LLC	TVD Reference:	KB @ 2966.60usft (Latshaw 44)
Project:	Eddy County, NM (NAD-27 2015)	MD Reference:	KB @ 2966.60usft (Latshaw 44)
Site:	Copperhead 31 Fee #3H	North Reference:	Grid
Well:	Copperhead 31 Fee #3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Lateral #1		
Design:	Design #1		

Plan Annotations

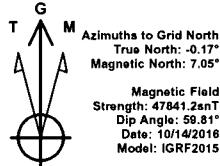
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
10,264.54	10,264.54	0.00	0.00	Start DLS 12.00 TFO 179.14
11,014.38	10,742.01	-477.25	7.13	Start 5841.60 hold at 11014.38 MD
16,855.97	10,744.00	-6,318.19	94.40	TD at 16855.98



COG Operating LLC
Project: Eddy County, NM (NAD-27 2015)
Site: Copperhead 31 Fee #3H
Well: Copperhead 31 Fee #3H
Wellbore: Lateral #1
Plan: Design #1 (Copperhead 31 Fee #3H/Lateral #1)

Section Details

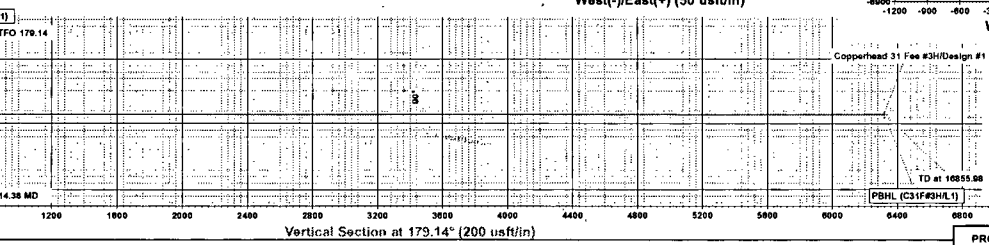
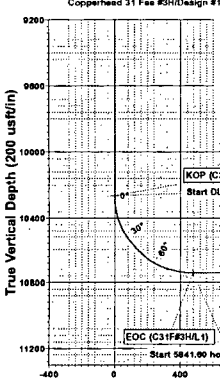
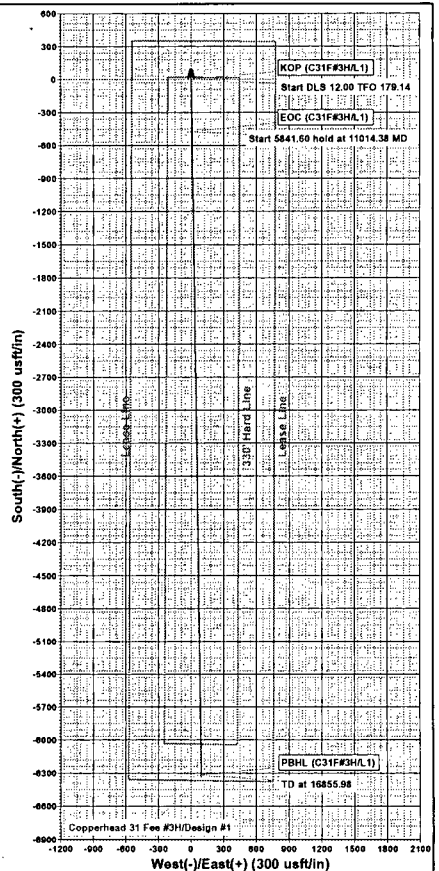
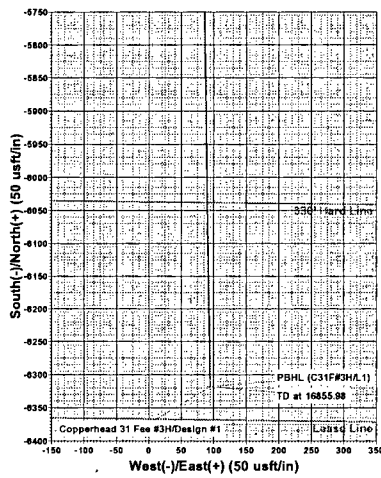
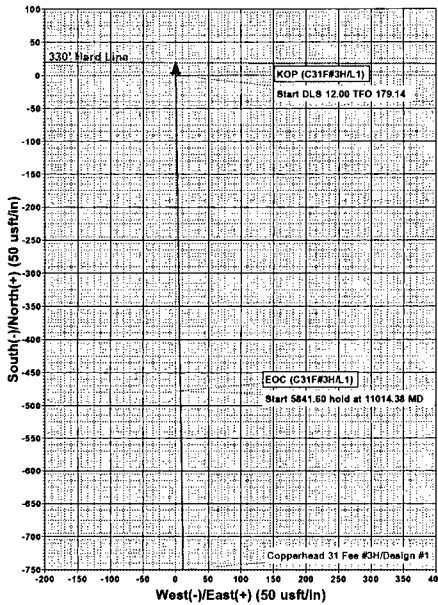
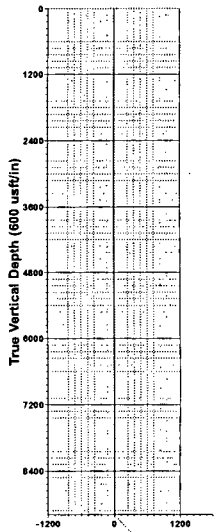
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSeet
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	10284.54	0.00	0.00	10284.54	0.00	0.00	0.00	0.00	0.00
3	11014.38	89.98	179.14	10742.00	-477.25	7.13	12.00	179.14	477.30
4	16855.97	89.98	179.14	10744.00	-6318.10	94.40	0.00	0.00	6318.90



WELL DETAILS: Copperhead 31 Fee #3H

Ground Elevation: 2941.60
RKB Elevation: KB @ 2968.60usft (Latahaw 44)
Rig Name: Latahaw 44

Northing: 371068.49 Easting: 597075.70 Latitude: 32° 1' 11.235 N Longitude: 104° 1' 1.956 W



Plan: Design #1 (Copperhead 31 Fee #3H/Lateral #1)
Created By: Well Planner Date: 12/23, October 14 2016

Terra Directional Services
3705 South County Road 1210, Midland, TX 79706
432.618.1210

PROJECT DETAILS: Eddy County, NM (NAD-27 2015)
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level
Local North: Grid