CONCHO

COG Operating, LLC

Lea County, NM
Sec 31, T19S, R32E
Nightcap 6 Federal 4H

Wellbore #1

Plan: Design #2

DDC Well Planning Report

14 July, 2015

DDC
The DIRECTIONAL DRILLING COMPANY

Database:	Compass	Local Co-ordinate Reference:	Well Nightcap 6 Federal 4H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3530.0usft (Ensign 772)
Project:	Lea County, NM	MD Reference:	Well @ 3530.0usft (Ensign 772)
Site:	Sec 31, T19S, R32E	North Reference:	Grid
Well:	Nightcap 6 Federal 4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

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 Sec 31, T19S, R32E

Site Position:		Northing:	586,390.00 usft	Latitude:	32° 36' 39.641 N
From:	Map	Easting:	660,307.00 usft	Longitude:	103° 48' 45.815 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.28 °

Well Nightcap 6 Federal 4H

Well Position	+N/-S	0.0 usft	Northing:	586,390.00 usft	Latitude:	32° 36' 39.641 N
	+E/-W	0.0 usft	Easting:	660,307.00 usft	Longitude:	103° 48' 45.815 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	3,499.0 usft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	7/9/2015	7.30	60.40	48,342

Design Design #2

Audit Notes:					
Version:		Phase:	PLAN	Tie On Depth:	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	177.72

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	
8,863.0	0.00	0.00	8,863.0	0.0	0.0	0.00	0.00	0.00	0.00	
9,238.0	45.00	164.80	9,200.6	-135.0	36.7	12.00	12.00	0.00	164.80	
9,620.9	89.42	178.07	9,345.8	-475.3	81.0	12.00	11.60	3.47	18.62	
19,907.9	89.42	178.07	9,450.0	-10,756.0	428.0	0.00	0.00	0.00	0.00	PBHL Nightcap 6 Fed

Database:	Compass	Local Co-ordinate Reference:	Well Nightcap 6 Federal 4H
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Site:	Sec 31, T19S, R32E	North Reference:	Grid
Well:	Nightcap 6 Federal 4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

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)
Build 12°/100'									
8,863.0	0.00	0.00	8,863.0	0.0	0.0	0.0	0.00	0.00	0.00
8,900.0	4.44	164.80	8,900.0	-1.4	0.4	1.4	12.00	12.00	0.00
9,000.0	16.44	164.80	8,998.1	-18.8	5.1	19.0	12.00	12.00	0.00
9,100.0	28.44	164.80	9,090.4	-55.6	15.1	56.2	12.00	12.00	0.00
9,200.0	40.44	164.80	9,172.7	-110.1	29.9	111.2	12.00	12.00	0.00
SBSG_sand									
9,222.2	43.11	164.80	9,189.3	-124.4	33.8	125.6	12.00	12.00	0.00
EOB / 45° Inc / 164.80° Azm / Build 12°/100'									
9,238.0	45.00	164.80	9,200.6	-135.0	36.7	136.3	12.00	12.00	0.00
9,300.0	52.09	167.80	9,241.6	-180.1	47.6	181.8	12.00	11.44	4.85
9,400.0	63.65	171.61	9,294.7	-263.3	62.5	265.5	12.00	11.56	3.81
9,500.0	75.30	174.72	9,329.8	-356.1	73.6	358.7	12.00	11.64	3.10
9,600.0	86.98	177.50	9,345.1	-454.5	80.2	457.3	12.00	11.68	2.79
EOC / 89.42° Inc / 178.07° Azm / 9346' TVD									
9,620.9	89.42	178.07	9,345.8	-475.3	81.0	478.2	12.00	11.69	2.71
9,700.0	89.42	178.07	9,346.6	-554.4	83.7	557.3	0.00	0.00	0.00
9,800.0	89.42	178.07	9,347.6	-654.4	87.1	657.3	0.00	0.00	0.00
9,900.0	89.42	178.07	9,348.6	-754.3	90.4	757.3	0.00	0.00	0.00
Cross 330' Hard Line @ 9350' TVD									
9,996.6	89.42	178.07	9,349.6	-850.8	93.7	853.9	0.00	0.00	0.00
10,000.0	89.42	178.07	9,349.6	-854.2	93.8	857.3	0.00	0.00	0.00
10,100.0	89.42	178.07	9,350.6	-954.2	97.2	957.3	0.00	0.00	0.00
10,200.0	89.42	178.07	9,351.7	-1,054.1	100.6	1,057.3	0.00	0.00	0.00
10,300.0	89.42	178.07	9,352.7	-1,154.0	103.9	1,157.3	0.00	0.00	0.00
10,400.0	89.42	178.07	9,353.7	-1,254.0	107.3	1,257.3	0.00	0.00	0.00
10,500.0	89.42	178.07	9,354.7	-1,353.9	110.7	1,357.3	0.00	0.00	0.00
10,600.0	89.42	178.07	9,355.7	-1,453.9	114.0	1,457.2	0.00	0.00	0.00
10,700.0	89.42	178.07	9,356.7	-1,553.8	117.4	1,557.2	0.00	0.00	0.00
10,800.0	89.42	178.07	9,357.7	-1,653.7	120.8	1,657.2	0.00	0.00	0.00
10,900.0	89.42	178.07	9,358.7	-1,753.7	124.2	1,757.2	0.00	0.00	0.00
11,000.0	89.42	178.07	9,359.8	-1,853.6	127.5	1,857.2	0.00	0.00	0.00
11,100.0	89.42	178.07	9,360.8	-1,953.5	130.9	1,957.2	0.00	0.00	0.00
11,200.0	89.42	178.07	9,361.8	-2,053.5	134.3	2,057.2	0.00	0.00	0.00
11,300.0	89.42	178.07	9,362.8	-2,153.4	137.7	2,157.2	0.00	0.00	0.00
11,400.0	89.42	178.07	9,363.8	-2,253.4	141.0	2,257.2	0.00	0.00	0.00
11,500.0	89.42	178.07	9,364.8	-2,353.3	144.4	2,357.2	0.00	0.00	0.00
11,600.0	89.42	178.07	9,365.8	-2,453.2	147.8	2,457.2	0.00	0.00	0.00
11,700.0	89.42	178.07	9,366.8	-2,553.2	151.1	2,557.2	0.00	0.00	0.00
11,800.0	89.42	178.07	9,367.9	-2,653.1	154.5	2,657.2	0.00	0.00	0.00
11,900.0	89.42	178.07	9,368.9	-2,753.1	157.9	2,757.2	0.00	0.00	0.00
12,000.0	89.42	178.07	9,369.9	-2,853.0	161.3	2,857.1	0.00	0.00	0.00
12,100.0	89.42	178.07	9,370.9	-2,952.9	164.6	2,957.1	0.00	0.00	0.00
12,200.0	89.42	178.07	9,371.9	-3,052.9	168.0	3,057.1	0.00	0.00	0.00
12,300.0	89.42	178.07	9,372.9	-3,152.8	171.4	3,157.1	0.00	0.00	0.00
12,400.0	89.42	178.07	9,373.9	-3,252.7	174.8	3,257.1	0.00	0.00	0.00
12,500.0	89.42	178.07	9,375.0	-3,352.7	178.1	3,357.1	0.00	0.00	0.00
12,600.0	89.42	178.07	9,376.0	-3,452.6	181.5	3,457.1	0.00	0.00	0.00
12,700.0	89.42	178.07	9,377.0	-3,552.6	184.9	3,557.1	0.00	0.00	0.00
12,800.0	89.42	178.07	9,378.0	-3,652.5	188.2	3,657.1	0.00	0.00	0.00
12,900.0	89.42	178.07	9,379.0	-3,752.4	191.6	3,757.1	0.00	0.00	0.00
13,000.0	89.42	178.07	9,380.0	-3,852.4	195.0	3,857.1	0.00	0.00	0.00
13,100.0	89.42	178.07	9,381.0	-3,952.3	198.4	3,957.1	0.00	0.00	0.00

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Well:	Nightcap 6 Federal 4H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

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)
13,200.0	89.42	178.07	9,382.0	-4,052.2	201.7	4,057.1	0.00	0.00	0.00
13,300.0	89.42	178.07	9,383.1	-4,152.2	205.1	4,157.1	0.00	0.00	0.00
13,400.0	89.42	178.07	9,384.1	-4,252.1	208.5	4,257.0	0.00	0.00	0.00
13,500.0	89.42	178.07	9,385.1	-4,352.1	211.9	4,357.0	0.00	0.00	0.00
13,600.0	89.42	178.07	9,386.1	-4,452.0	215.2	4,457.0	0.00	0.00	0.00
13,700.0	89.42	178.07	9,387.1	-4,551.9	218.6	4,557.0	0.00	0.00	0.00
13,800.0	89.42	178.07	9,388.1	-4,651.9	222.0	4,657.0	0.00	0.00	0.00
13,900.0	89.42	178.07	9,389.1	-4,751.8	225.4	4,757.0	0.00	0.00	0.00
14,000.0	89.42	178.07	9,390.1	-4,851.8	228.7	4,857.0	0.00	0.00	0.00
14,100.0	89.42	178.07	9,391.2	-4,951.7	232.1	4,957.0	0.00	0.00	0.00
14,200.0	89.42	178.07	9,392.2	-5,051.6	235.5	5,057.0	0.00	0.00	0.00
14,300.0	89.42	178.07	9,393.2	-5,151.6	238.8	5,157.0	0.00	0.00	0.00
14,400.0	89.42	178.07	9,394.2	-5,251.5	242.2	5,257.0	0.00	0.00	0.00
14,500.0	89.42	178.07	9,395.2	-5,351.4	245.6	5,357.0	0.00	0.00	0.00
14,600.0	89.42	178.07	9,396.2	-5,451.4	249.0	5,457.0	0.00	0.00	0.00
14,700.0	89.42	178.07	9,397.2	-5,551.3	252.3	5,557.0	0.00	0.00	0.00
14,800.0	89.42	178.07	9,398.3	-5,651.3	255.7	5,657.0	0.00	0.00	0.00
14,900.0	89.42	178.07	9,399.3	-5,751.2	259.1	5,756.9	0.00	0.00	0.00
15,000.0	89.42	178.07	9,400.3	-5,851.1	262.5	5,856.9	0.00	0.00	0.00
15,100.0	89.42	178.07	9,401.3	-5,951.1	265.8	5,956.9	0.00	0.00	0.00
15,200.0	89.42	178.07	9,402.3	-6,051.0	269.2	6,056.9	0.00	0.00	0.00
15,300.0	89.42	178.07	9,403.3	-6,150.9	272.6	6,156.9	0.00	0.00	0.00
15,400.0	89.42	178.07	9,404.3	-6,250.9	275.9	6,256.9	0.00	0.00	0.00
15,500.0	89.42	178.07	9,405.3	-6,350.8	279.3	6,356.9	0.00	0.00	0.00
15,600.0	89.42	178.07	9,406.4	-6,450.8	282.7	6,456.9	0.00	0.00	0.00
15,700.0	89.42	178.07	9,407.4	-6,550.7	286.1	6,556.9	0.00	0.00	0.00
15,800.0	89.42	178.07	9,408.4	-6,650.6	289.4	6,656.9	0.00	0.00	0.00
15,900.0	89.42	178.07	9,409.4	-6,750.6	292.8	6,756.9	0.00	0.00	0.00
16,000.0	89.42	178.07	9,410.4	-6,850.5	296.2	6,856.9	0.00	0.00	0.00
16,100.0	89.42	178.07	9,411.4	-6,950.4	299.6	6,956.9	0.00	0.00	0.00
16,200.0	89.42	178.07	9,412.4	-7,050.4	302.9	7,056.9	0.00	0.00	0.00
16,300.0	89.42	178.07	9,413.4	-7,150.3	306.3	7,156.8	0.00	0.00	0.00
16,400.0	89.42	178.07	9,414.5	-7,250.3	309.7	7,256.8	0.00	0.00	0.00
16,500.0	89.42	178.07	9,415.5	-7,350.2	313.1	7,356.8	0.00	0.00	0.00
16,600.0	89.42	178.07	9,416.5	-7,450.1	316.4	7,456.8	0.00	0.00	0.00
16,700.0	89.42	178.07	9,417.5	-7,550.1	319.8	7,556.8	0.00	0.00	0.00
16,800.0	89.42	178.07	9,418.5	-7,650.0	323.2	7,656.8	0.00	0.00	0.00
16,900.0	89.42	178.07	9,419.5	-7,750.0	326.5	7,756.8	0.00	0.00	0.00
17,000.0	89.42	178.07	9,420.5	-7,849.9	329.9	7,856.8	0.00	0.00	0.00
17,100.0	89.42	178.07	9,421.6	-7,949.8	333.3	7,956.8	0.00	0.00	0.00
17,200.0	89.42	178.07	9,422.6	-8,049.8	336.7	8,056.8	0.00	0.00	0.00
17,300.0	89.42	178.07	9,423.6	-8,149.7	340.0	8,156.8	0.00	0.00	0.00
17,400.0	89.42	178.07	9,424.6	-8,249.6	343.4	8,256.8	0.00	0.00	0.00
17,500.0	89.42	178.07	9,425.6	-8,349.6	346.8	8,356.8	0.00	0.00	0.00
17,600.0	89.42	178.07	9,426.6	-8,449.5	350.2	8,456.8	0.00	0.00	0.00
17,700.0	89.42	178.07	9,427.6	-8,549.5	353.5	8,556.8	0.00	0.00	0.00
17,800.0	89.42	178.07	9,428.6	-8,649.4	356.9	8,656.7	0.00	0.00	0.00
17,900.0	89.42	178.07	9,429.7	-8,749.3	360.3	8,756.7	0.00	0.00	0.00
18,000.0	89.42	178.07	9,430.7	-8,849.3	363.6	8,856.7	0.00	0.00	0.00
18,100.0	89.42	178.07	9,431.7	-8,949.2	367.0	8,956.7	0.00	0.00	0.00
18,200.0	89.42	178.07	9,432.7	-9,049.1	370.4	9,056.7	0.00	0.00	0.00
18,300.0	89.42	178.07	9,433.7	-9,149.1	373.8	9,156.7	0.00	0.00	0.00
18,400.0	89.42	178.07	9,434.7	-9,249.0	377.1	9,256.7	0.00	0.00	0.00
18,500.0	89.42	178.07	9,435.7	-9,349.0	380.5	9,356.7	0.00	0.00	0.00

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Well:	Nightcap 6 Federal 4H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

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)
18,600.0	89.42	178.07	9,436.7	-9,448.9	383.9	9,456.7	0.00	0.00	0.00
18,700.0	89.42	178.07	9,437.8	-9,548.8	387.3	9,556.7	0.00	0.00	0.00
18,800.0	89.42	178.07	9,438.8	-9,648.8	390.6	9,656.7	0.00	0.00	0.00
18,900.0	89.42	178.07	9,439.8	-9,748.7	394.0	9,756.7	0.00	0.00	0.00
19,000.0	89.42	178.07	9,440.8	-9,848.6	397.4	9,856.7	0.00	0.00	0.00
19,100.0	89.42	178.07	9,441.8	-9,948.6	400.7	9,956.7	0.00	0.00	0.00
19,200.0	89.42	178.07	9,442.8	-10,048.5	404.1	10,056.6	0.00	0.00	0.00
19,300.0	89.42	178.07	9,443.8	-10,148.5	407.5	10,156.6	0.00	0.00	0.00
19,400.0	89.42	178.07	9,444.9	-10,248.4	410.9	10,256.6	0.00	0.00	0.00
19,500.0	89.42	178.07	9,445.9	-10,348.3	414.2	10,356.6	0.00	0.00	0.00
19,600.0	89.42	178.07	9,446.9	-10,448.3	417.6	10,456.6	0.00	0.00	0.00
19,700.0	89.42	178.07	9,447.9	-10,548.2	421.0	10,556.6	0.00	0.00	0.00
19,800.0	89.42	178.07	9,448.9	-10,648.2	424.4	10,656.6	0.00	0.00	0.00
19,900.0	89.42	178.07	9,449.9	-10,748.1	427.7	10,756.6	0.00	0.00	0.00
PBHL @ 19908' MD / 9450' TVD									
19,907.9	89.42	178.07	9,450.0	-10,756.0	428.0	10,764.5	0.00	0.00	0.00

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 Nightcap 6 Federa - plan hits target center - Point	0.00	0.00	9,450.0	-10,756.0	428.0	575,634.00	660,735.00	32° 34' 53.186 N	103° 48' 41.428 W

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
829.0	829.0	Rustler		0.58	177.72
917.0	917.0	TOS		0.58	177.72
2,616.0	2,616.0	BOS (Tansill)		0.58	177.72
2,739.0	2,739.0	Yates		0.58	177.72
2,900.0	2,900.0	Seven Rivers		0.58	177.72
3,017.0	3,017.0	Captain Reef		0.58	177.72
4,342.0	4,342.0	Base of Reef (CYCN)		0.58	177.72
5,570.0	5,570.0	Brushy Canyon		0.58	177.72
7,260.0	7,260.0	Bone Spring (BSGL)		0.58	177.72
8,429.0	8,429.0	FBSG_sand		0.58	177.72
9,222.2	9,189.3	SBSG_sand		0.58	177.72

Database:	Compass	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 4H
Company:	COG Operating, LLC	**TVD Reference:**	Well @ 3530.0usft (Ensign 772)
Project:	Lea County, NM	**MD Reference:**	Well @ 3530.0usft (Ensign 772)
Site:	Sec 31, T19S, R32E	**North Reference:**	Grid
Well:	Nightcap 6 Federal 4H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #2		

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
8,863.0	8,863.0	0.0	0.0	Build 12°/100'
9,238.0	9,200.6	-135.0	36.7	EOB / 45° Inc / 164.80° Azm / Build 12°/100'
9,620.9	9,345.8	-475.3	81.0	EOC / 89.42° Inc / 178.07° Azm / 9346' TVD
9,996.6	9,349.6	-850.8	93.7	Cross 330' Hard Line @ 9350' TVD
19,907.9	9,450.0	-10,756.0	428.0	PBHL @ 19908' MD / 9450' TVD

CONCHO

COG Operating, LLC

Lea County, NM
Sec 31, T19S, R32E
Nightcap 6 Federal 4H

Wellbore #1
Design #2

DDC Anticollision Report

14 July, 2015

DDC
The DIRECTIONAL DRILLING COMPANY

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	TVD Reference:	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 4H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Compass
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Reference	Design #2		
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:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program Date 7/14/2015

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	19,907.9	Design #2 (Wellbore #1)	MWD default	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
Sec 31, T19S, R32E						
Dirty Dozen State Com 3H - Wellbore #1 - Wellbore #1	9,011.7	10,092.9	1,329.2	1,308.2	63.119	CC, ES
Dirty Dozen State Com 3H - Wellbore #1 - Wellbore #1	9,025.0	10,093.7	1,329.5	1,308.4	63.048	SF
Dirty Dozen State Com 4H - Wellbore #1 - Wellbore #1	9,125.0	10,491.0	508.6	487.6	24.217	SF
Dirty Dozen State Com 4H - Wellbore #1 - Wellbore #1	9,150.0	10,491.0	507.4	486.5	24.298	ES
Dirty Dozen State Com 4H - Wellbore #1 - Wellbore #1	9,150.5	10,491.0	507.4	486.5	24.312	CC
Nightcap 6 Federal 1H - Wellbore #1 - Design #1	19,907.9	21,149.5	3,951.8	3,534.2	9.464	CC, ES, SF
Nightcap 6 Federal 2H - Wellbore #1 - Design #1	19,907.9	21,457.5	2,631.7	2,220.4	6.399	CC, ES, SF
String Bean Federal Com 2H - Wellbore #1 - Wellbore #1	9,377.5	10,800.0	4,292.6	4,265.0	155.612	CC, ES
String Bean Federal Com 2H - Wellbore #1 - Wellbore #1	17,400.0	12,100.0	9,983.9	9,844.5	71.628	SF

Offset Design Sec 31, T19S, R32E - Dirty Dozen State Com 3H - Wellbore #1 - Wellbore #1 — Offset Site Error: 0.0 usft

Survey Program: 100 — 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)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-38.07	1,287.5	-1,008.6	1,635.5			
100.0	100.0	100.0	100.0	0.1	0.0	-38.07	1,287.5	-1,008.3	1,635.4	1,635.3	N/A	
200.0	200.0	197.6	197.6	0.3	0.0	-38.06	1,287.5	-1,008.0	1,635.1	1,634.8	5,405.250	
300.0	300.0	298.9	298.9	0.5	0.0	-38.06	1,287.3	-1,008.0	1,634.9	1,634.4	3,100.741	
400.0	400.0	399.4	399.4	0.8	0.0	-38.08	1,286.8	-1,008.1	1,634.7	1,633.9	2,173.672	
500.0	500.0	502.4	502.4	1.0	0.0	-38.10	1,286.1	-1,008.5	1,634.3	1,633.4	1,673.136	
600.0	600.0	605.0	604.9	1.2	0.0	-38.13	1,285.1	-1,008.8	1,633.8	1,632.6	1,359.722	
700.0	700.0	710.7	710.6	1.4	0.0	-38.16	1,283.9	-1,009.0	1,633.0	1,631.6	1,144.899	
800.0	800.0	814.1	814.1	1.7	0.0	-38.18	1,282.7	-1,008.8	1,632.0	1,630.3	988.407	
900.0	900.0	920.1	920.1	1.9	0.0	-38.19	1,281.4	-1,008.1	1,630.6	1,628.7	869.242	
1,000.0	1,000.0	1,021.8	1,021.8	2.1	0.0	-38.20	1,280.0	-1,007.2	1,629.0	1,626.9	775.473	
1,100.0	1,100.0	1,121.9	1,121.8	2.3	0.0	-38.20	1,278.7	-1,006.2	1,627.3	1,625.0	699.808	
1,200.0	1,200.0	1,220.6	1,220.5	2.5	0.0	-38.20	1,277.4	-1,005.2	1,625.7	1,623.2	637.490	
1,300.0	1,300.0	1,317.5	1,317.4	2.8	0.0	-38.20	1,276.2	-1,004.5	1,624.3	1,621.5	585.330	
1,400.0	1,400.0	1,417.2	1,417.1	3.0	0.0	-38.21	1,275.1	-1,003.6	1,622.9	1,619.9	541.007	
1,500.0	1,500.0	1,513.3	1,513.2	3.2	0.0	-38.20	1,274.3	-1,002.8	1,621.6	1,618.4	502.915	
1,600.0	1,600.0	1,613.7	1,613.6	3.4	0.0	-38.18	1,273.7	-1,001.7	1,620.5	1,617.1	469.817	
1,700.0	1,700.0	1,716.8	1,716.7	3.7	0.0	-38.15	1,273.2	-1,000.2	1,619.3	1,615.6	440.741	

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	TVD Reference:	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 4H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Compass
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Offset Design — Sec 31, T19S, R32E - Dirty Dozen State Com 3H - Wellbore #1 - Wellbore #1 — Offset Site Error: 0.0 usft

Survey Program: 100 — 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)	Separation Factor	Warning
1,800.0	1,800.0	1,823.9	1,823.7	3.9	0.0	-38.07	1,273.4	-997.4	1,617.7	1,613.8	414.935	
1,900.0	1,900.0	1,932.2	1,932.0	4.1	0.0	-37.92	1,274.2	-992.7	1,615.7	1,611.6	391.823	
2,000.0	2,000.0	2,037.7	2,037.3	4.3	0.0	-37.72	1,275.5	-986.7	1,613.2	1,608.8	370.995	
2,100.0	2,100.0	2,139.4	2,138.7	4.6	0.0	-37.51	1,277.1	-980.3	1,610.5	1,606.0	352.178	
2,200.0	2,200.0	2,239.4	2,238.5	4.8	0.0	-37.30	1,278.5	-973.9	1,607.8	1,603.0	335.107	
2,300.0	2,300.0	2,338.7	2,337.6	5.0	0.0	-37.10	1,279.7	-968.0	1,605.1	1,600.1	319.585	
2,400.0	2,400.0	2,441.1	2,439.9	5.2	0.0	-36.91	1,280.8	-962.0	1,602.4	1,597.2	305.376	
2,500.0	2,500.0	2,536.2	2,534.8	5.5	0.0	-36.75	1,281.3	-956.9	1,599.6	1,594.2	292.325	
2,600.0	2,600.0	2,620.6	2,619.1	5.7	0.0	-36.64	1,281.7	-953.4	1,597.6	1,591.9	280.438	
2,700.0	2,700.0	2,703.4	2,701.9	5.9	0.0	-36.55	1,282.6	-950.9	1,596.7	1,590.7	269.632	
2,800.0	2,800.0	2,800.0	2,798.5	6.1	0.0	-36.46	1,283.9	-948.8	1,596.4	1,590.3	259.729	
2,900.0	2,900.0	2,898.1	2,896.6	6.4	0.0	-36.39	1,285.0	-947.0	1,596.3	1,589.9	250.551	
3,000.0	3,000.0	3,001.9	3,000.3	6.6	0.0	-36.32	1,286.1	-945.2	1,596.1	1,589.5	241.980	
3,100.0	3,100.0	3,103.3	3,101.7	6.8	0.0	-36.25	1,286.9	-943.5	1,595.7	1,588.9	233.952	
3,200.0	3,200.0	3,212.7	3,211.1	7.0	0.0	-36.18	1,287.4	-941.5	1,595.0	1,588.0	226.386	
3,300.0	3,300.0	3,316.5	3,314.9	7.3	0.0	-36.09	1,287.8	-938.8	1,593.8	1,586.5	219.221	
3,400.0	3,400.0	3,400.0	3,398.3	7.5	0.0	-36.00	1,288.7	-936.2	1,592.9	1,585.4	212.523	
3,460.5	3,460.5	3,455.8	3,454.1	7.6	0.0	-35.93	1,289.7	-934.5	1,592.7	1,585.1	208.713	
3,500.0	3,500.0	3,488.2	3,486.4	7.7	0.0	-35.88	1,290.5	-933.6	1,592.8	1,585.1	206.329	
3,600.0	3,600.0	3,580.2	3,578.4	7.9	0.0	-35.76	1,293.1	-931.4	1,593.7	1,585.7	200.597	
3,700.0	3,700.0	3,679.7	3,677.8	8.2	0.0	-35.64	1,295.9	-929.3	1,594.8	1,586.6	195.212	
3,800.0	3,800.0	3,781.8	3,779.9	8.4	0.0	-35.52	1,298.7	-927.2	1,595.8	1,587.4	190.107	
3,900.0	3,900.0	3,887.8	3,885.8	8.6	0.0	-35.42	1,301.1	-925.2	1,596.6	1,587.9	185.240	
4,000.0	4,000.0	3,987.3	3,985.3	8.8	0.0	-35.33	1,302.9	-923.6	1,597.1	1,588.3	180.596	
4,100.0	4,100.0	4,087.2	4,085.2	9.1	0.0	-35.26	1,304.7	-922.2	1,597.7	1,588.7	176.187	
4,200.0	4,200.0	4,187.0	4,185.0	9.3	0.0	-35.19	1,306.2	-921.1	1,598.4	1,589.1	171.993	
4,300.0	4,300.0	4,286.8	4,284.7	9.5	0.0	-35.13	1,307.7	-920.1	1,599.0	1,589.5	167.998	
4,400.0	4,400.0	4,387.3	4,385.2	9.7	0.0	-35.08	1,309.1	-919.3	1,599.6	1,589.9	164.187	
4,500.0	4,500.0	4,487.4	4,485.3	10.0	0.0	-35.03	1,310.3	-918.5	1,600.2	1,590.3	160.546	
4,600.0	4,600.0	4,579.8	4,577.7	10.2	0.0	-34.98	1,311.7	-917.9	1,601.0	1,590.9	157.085	
4,700.0	4,700.0	4,675.8	4,673.6	10.4	0.0	-34.94	1,313.3	-917.6	1,602.3	1,591.9	153.815	
4,800.0	4,800.0	4,774.1	4,771.9	10.6	0.0	-34.90	1,315.1	-917.5	1,603.7	1,593.0	150.697	
4,900.0	4,900.0	4,870.1	4,868.0	10.9	0.0	-34.86	1,317.0	-917.3	1,605.2	1,594.4	147.721	
5,000.0	5,000.0	4,968.0	4,965.9	11.1	0.0	-34.80	1,319.4	-916.9	1,607.0	1,595.9	144.888	
5,100.0	5,100.0	5,057.4	5,055.1	11.3	0.0	-34.72	1,322.1	-916.3	1,609.0	1,597.7	142.191	
5,200.0	5,200.0	5,155.5	5,153.1	11.5	0.0	-34.61	1,326.1	-915.2	1,611.8	1,600.2	139.660	
5,300.0	5,300.0	5,269.8	5,267.4	11.8	0.0	-34.47	1,330.4	-913.3	1,614.0	1,602.2	137.177	
5,400.0	5,400.0	5,382.1	5,379.6	12.0	0.0	-34.34	1,333.7	-911.1	1,615.3	1,603.3	134.715	
5,500.0	5,500.0	5,494.9	5,492.3	12.2	0.0	-34.22	1,336.0	-908.8	1,615.8	1,603.6	132.282	
5,600.0	5,600.0	5,596.8	5,594.3	12.4	0.0	-34.15	1,337.4	-907.0	1,615.9	1,603.5	129.899	
5,700.0	5,700.0	5,698.7	5,696.2	12.7	0.0	-34.10	1,338.1	-905.9	1,615.9	1,603.3	127.593	
5,800.0	5,800.0	5,800.0	5,797.4	12.9	0.0	-34.07	1,338.4	-905.3	1,615.8	1,602.9	125.359	
5,843.3	5,843.3	5,840.9	5,838.3	13.0	0.0	-34.07	1,338.4	-905.2	1,615.8	1,602.8	124.416	
5,900.0	5,900.0	5,894.3	5,891.7	13.1	0.0	-34.08	1,338.4	-905.4	1,615.8	1,602.7	123.213	
6,000.0	6,000.0	5,989.6	5,987.1	13.3	0.0	-34.09	1,338.4	-905.9	1,616.2	1,602.8	121.163	
6,100.0	6,100.0	6,087.7	6,085.1	13.6	0.0	-34.11	1,338.6	-906.7	1,616.7	1,603.2	119.196	
6,200.0	6,200.0	6,186.0	6,183.4	13.8	0.0	-34.13	1,338.8	-907.5	1,617.4	1,603.6	117.301	
6,300.0	6,300.0	6,286.3	6,283.8	14.0	0.0	-34.15	1,339.1	-908.3	1,618.1	1,604.1	115.471	
6,400.0	6,400.0	6,384.2	6,381.6	14.2	0.0	-34.16	1,339.5	-909.0	1,618.9	1,604.6	113.701	
6,500.0	6,500.0	6,483.5	6,480.9	14.5	0.0	-34.16	1,340.2	-909.5	1,619.7	1,605.3	111.993	
6,600.0	6,600.0	6,581.7	6,579.1	14.7	0.0	-34.16	1,340.9	-910.0	1,620.6	1,606.0	110.342	
6,700.0	6,700.0	6,692.1	6,689.5	14.9	0.0	-34.16	1,341.6	-910.4	1,621.4	1,606.5	108.728	

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

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Compass
Reference Design:	Design #2	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 31, T19S, R32E - Dirty Dozen State Com 3H - Wellbore #1 - Wellbore #1 — **Offset Site Error:** 0.0 usft

Survey Program: 100 — **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)	Separation Factor	Warning
6,800.0	6,800.0	6,799.4	6,796.8	15.1	0.0	-34.17	1,341.6	-910.6	1,621.5	1,606.3	107.120	
6,900.0	6,900.0	6,905.7	6,903.1	15.4	0.0	-34.18	1,341.2	-910.7	1,621.2	1,605.8	105.533	
7,000.0	7,000.0	7,012.1	7,009.5	15.6	0.0	-34.19	1,340.4	-910.5	1,620.5	1,604.9	103.965	
7,100.0	7,100.0	7,112.8	7,110.2	15.8	0.0	-34.21	1,339.3	-910.5	1,619.5	1,603.7	102.428	
7,200.0	7,200.0	7,208.9	7,206.3	16.0	0.0	-34.25	1,338.0	-910.9	1,618.7	1,602.7	100.941	
7,300.0	7,300.0	7,305.2	7,302.6	16.3	0.0	-34.29	1,336.9	-911.6	1,618.1	1,601.9	99.510	
7,400.0	7,400.0	7,400.2	7,397.6	16.5	0.0	-34.33	1,335.9	-912.5	1,617.8	1,601.3	98.134	
7,500.0	7,500.0	7,502.0	7,499.3	16.7	0.0	-34.40	1,334.8	-913.8	1,617.6	1,600.9	96.802	
7,600.0	7,600.0	7,603.0	7,600.3	16.9	0.0	-34.47	1,333.3	-915.4	1,617.3	1,600.4	95.499	
7,700.0	7,700.0	7,700.5	7,697.8	17.2	0.0	-34.55	1,331.9	-917.0	1,617.0	1,599.9	94.233	
7,800.0	7,800.0	7,811.4	7,808.7	17.4	0.0	-34.64	1,330.0	-918.9	1,616.6	1,599.2	92.992	
7,900.0	7,900.0	7,951.5	7,948.7	17.6	0.0	-34.77	1,325.3	-920.1	1,614.3	1,596.6	91.670	
8,000.0	8,000.0	8,059.5	8,056.6	17.8	0.0	-34.87	1,320.4	-920.1	1,610.6	1,592.7	90.307	
8,100.0	8,100.0	8,158.0	8,154.9	18.1	0.0	-34.96	1,315.9	-920.1	1,606.7	1,588.7	88.972	
8,200.0	8,200.0	8,257.7	8,254.5	18.3	0.0	-35.06	1,311.3	-920.1	1,603.1	1,584.8	87.677	
8,300.0	8,300.0	8,356.7	8,353.4	18.5	0.0	-35.14	1,306.9	-920.0	1,599.3	1,580.8	86.411	
8,400.0	8,400.0	8,452.3	8,449.0	18.7	0.0	-35.21	1,303.1	-919.6	1,595.8	1,577.1	85.185	
8,500.0	8,500.0	10,096.6	9,401.0	19.0	0.0	-1.09	1,246.2	-23.7	1,540.9	1,521.9	81.278	
8,600.0	8,600.0	10,094.8	9,401.0	19.2	0.0	-1.17	1,246.1	-25.5	1,484.3	1,465.1	77.375	
8,700.0	8,700.0	10,093.0	9,401.0	19.4	0.0	-1.25	1,246.1	-27.3	1,432.4	1,413.0	73.808	
8,800.0	8,800.0	10,091.2	9,401.1	19.6	0.0	-1.34	1,246.0	-29.1	1,385.9	1,366.2	70.592	
8,863.0	8,863.0	10,091.0	9,401.1	19.8	0.0	-1.35	1,246.0	-29.3	1,359.5	1,339.7	68.752	
8,875.0	8,875.0	10,091.0	9,401.1	19.8	0.0	-166.29	1,246.0	-29.3	1,354.9	1,335.0	67.928	
8,900.0	8,900.0	10,091.0	9,401.1	19.8	0.0	-166.54	1,246.0	-29.3	1,346.5	1,326.2	66.452	
8,925.0	8,924.8	10,091.0	9,401.1	19.9	0.0	-166.74	1,246.0	-29.3	1,339.7	1,319.1	65.257	
8,950.0	8,949.5	10,091.0	9,401.1	19.9	0.0	-166.88	1,246.0	-29.3	1,334.5	1,313.8	64.329	
8,975.0	8,974.0	10,091.1	9,401.1	20.0	0.0	-166.97	1,246.0	-29.2	1,331.1	1,310.2	63.656	
9,000.0	8,998.1	10,092.3	9,401.0	20.0	0.0	-166.97	1,246.0	-28.0	1,329.4	1,308.4	63.232	
9,011.7	9,009.3	10,092.9	9,401.0	20.0	0.0	-166.94	1,246.0	-27.4	1,329.2	1,308.2	63.119	CC, ES
9,025.0	9,021.9	10,093.7	9,401.0	20.0	0.0	-166.90	1,246.1	-26.6	1,329.5	1,308.4	63.048	SF
9,050.0	9,045.3	10,095.5	9,401.0	20.1	0.0	-166.78	1,246.1	-24.8	1,331.3	1,310.2	63.100	
9,075.0	9,068.1	10,097.6	9,401.0	20.1	0.0	-166.59	1,246.2	-22.7	1,334.8	1,313.8	63.387	
9,100.0	9,090.4	10,100.0	9,400.9	20.2	0.0	-166.33	1,246.3	-20.3	1,340.0	1,319.1	63.907	
9,125.0	9,112.0	10,102.7	9,400.9	20.2	0.0	-166.01	1,246.4	-17.6	1,346.9	1,326.1	64.659	
9,150.0	9,133.0	10,105.7	9,400.8	20.3	0.0	-165.61	1,246.4	-14.6	1,355.4	1,334.8	65.643	
9,175.0	9,153.3	10,109.0	9,400.8	20.3	0.0	-165.12	1,246.6	-11.3	1,365.5	1,345.1	66.860	
9,200.0	9,172.7	10,112.6	9,400.7	20.4	0.0	-164.54	1,246.7	-7.7	1,377.1	1,357.0	68.306	
9,225.0	9,191.3	10,116.5	9,400.6	20.4	0.0	-163.86	1,246.8	-3.8	1,390.1	1,370.3	69.975	
9,238.0	9,200.6	10,118.6	9,400.6	20.5	0.0	-163.46	1,246.8	-1.7	1,397.4	1,377.7	70.926	
9,250.0	9,209.0	10,120.6	9,400.6	20.5	0.0	-163.84	1,246.9	0.3	1,404.5	1,385.0	71.937	
9,275.0	9,225.8	10,124.6	9,400.5	20.6	0.0	-164.55	1,247.0	4.2	1,420.2	1,401.1	74.272	
9,300.0	9,241.6	10,128.3	9,400.5	20.6	0.0	-165.15	1,247.1	8.0	1,437.1	1,418.4	76.928	
9,325.0	9,256.5	10,131.9	9,400.4	20.7	0.0	-165.67	1,247.2	11.6	1,455.2	1,437.0	79.926	
9,350.0	9,270.3	10,135.2	9,400.4	20.8	0.0	-166.11	1,247.3	14.9	1,474.3	1,456.6	83.286	
9,375.0	9,283.1	10,138.3	9,400.3	20.9	0.0	-166.49	1,247.4	18.0	1,494.4	1,477.2	87.029	
9,400.0	9,294.7	10,141.2	9,400.3	21.0	0.0	-166.82	1,247.5	20.9	1,515.4	1,498.8	91.171	
9,425.0	9,305.3	10,143.8	9,400.2	21.1	0.0	-167.10	1,247.6	23.5	1,537.1	1,521.1	95.720	
9,450.0	9,314.6	10,146.1	9,400.2	21.2	0.0	-167.34	1,247.6	25.8	1,559.6	1,544.1	100.669	
9,475.0	9,322.8	10,148.2	9,400.2	21.3	0.0	-167.56	1,247.7	27.8	1,582.6	1,567.7	105.984	
9,500.0	9,329.8	10,149.9	9,400.1	21.5	0.0	-167.76	1,247.8	29.6	1,606.2	1,591.8	111.595	
9,525.0	9,335.5	10,151.4	9,400.1	21.6	0.0	-167.97	1,247.8	31.1	1,630.2	1,616.3	117.382	
9,550.0	9,340.0	10,152.6	9,400.1	21.8	0.0	-168.23	1,247.8	32.3	1,654.6	1,641.2	123.185	

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

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Compass
Reference Design:	Design #2	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 31, T19S, R32E - Dirty Dozen State Com 3H - Wellbore #1 - Wellbore #1 — Offset Site Error: 0.0 usft

Survey Program: 100 — 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)	Separation Factor	Warning
9,575.0	9,343.2	10,153.5	9,400.1	21.9	0.0	-168.62	1,247.9	33.2	1,679.2	1,666.2	128.900	
9,600.0	9,345.1	10,154.1	9,400.1	22.1	0.0	-169.47	1,247.9	33.7	1,704.1	1,691.4	134.920	
9,620.9	9,345.8	10,154.3	9,400.1	22.2	0.0	-171.75	1,247.9	34.0	1,724.9	1,712.8	142.927	
9,700.0	9,346.6	10,154.8	9,400.1	22.8	0.0	-171.37	1,247.9	34.5	1,803.9	1,791.4	144.122	
9,800.0	9,347.6	10,155.5	9,400.1	23.7	0.0	-170.88	1,247.9	35.2	1,903.8	1,890.7	144.944	
9,900.0	9,348.6	10,156.2	9,400.1	24.6	0.0	-170.39	1,247.9	35.9	2,003.8	1,990.0	145.205	
10,000.0	9,349.6	10,156.9	9,400.0	25.6	0.0	-169.88	1,247.9	36.6	2,103.7	2,089.2	145.065	
10,100.0	9,350.6	10,157.6	9,400.0	26.8	0.0	-169.38	1,248.0	37.3	2,203.6	2,188.4	144.639	
10,200.0	9,351.7	10,158.3	9,400.0	28.0	0.0	-168.86	1,248.0	38.0	2,303.6	2,287.6	144.003	
10,300.0	9,352.7	10,159.0	9,400.0	29.2	0.0	-168.34	1,248.0	38.7	2,403.5	2,386.7	143.212	
10,400.0	9,353.7	10,159.8	9,400.0	30.6	0.0	-167.81	1,248.0	39.4	2,503.5	2,485.9	142.304	
10,500.0	9,354.7	10,160.5	9,400.0	32.0	0.0	-167.28	1,248.0	40.2	2,603.4	2,585.0	141.306	
10,600.0	9,355.7	10,161.3	9,400.0	33.4	0.0	-166.74	1,248.1	40.9	2,703.4	2,684.1	140.237	
10,700.0	9,356.7	10,162.0	9,400.0	34.8	0.0	-166.19	1,248.1	41.7	2,803.3	2,783.2	139.112	
10,800.0	9,357.7	10,162.8	9,400.0	36.3	0.0	-165.64	1,248.1	42.5	2,903.3	2,882.2	137.941	
10,900.0	9,358.7	10,163.6	9,400.0	37.8	0.0	-165.08	1,248.1	43.3	3,003.3	2,981.3	136.734	
11,000.0	9,359.8	10,164.4	9,399.9	39.4	0.0	-164.51	1,248.2	44.1	3,103.2	3,080.3	135.495	
11,100.0	9,360.8	10,165.3	9,399.9	41.0	0.0	-163.94	1,248.2	44.9	3,203.2	3,179.3	134.230	
11,200.0	9,361.8	10,166.1	9,399.9	42.6	0.0	-163.36	1,248.2	45.8	3,303.2	3,278.3	132.944	
11,300.0	9,362.8	10,166.9	9,399.9	44.2	0.0	-162.77	1,248.2	46.6	3,403.1	3,377.3	131.640	
11,400.0	9,363.8	10,167.8	9,399.9	45.8	0.0	-162.18	1,248.2	47.5	3,503.1	3,476.2	130.320	
11,500.0	9,364.8	10,168.7	9,399.9	47.5	0.0	-161.58	1,248.3	48.4	3,603.1	3,575.1	128.988	
11,600.0	9,365.8	10,169.6	9,399.9	49.1	0.0	-160.97	1,248.3	49.3	3,703.0	3,674.0	127.646	
11,700.0	9,366.8	10,170.5	9,399.9	50.8	0.0	-160.36	1,248.3	50.2	3,803.0	3,772.9	126.296	
11,800.0	9,367.9	10,171.4	9,399.9	52.5	0.0	-159.74	1,248.3	51.1	3,903.0	3,871.8	124.940	
11,900.0	9,368.9	10,172.4	9,399.8	54.1	0.0	-159.12	1,248.4	52.0	4,003.0	3,970.6	123.581	
12,000.0	9,369.9	10,173.4	9,399.8	55.8	0.0	-158.49	1,248.4	53.0	4,103.0	4,069.4	122.220	
12,100.0	9,370.9	10,174.3	9,399.8	57.6	0.0	-157.85	1,248.4	54.0	4,202.9	4,168.2	120.858	
12,200.0	9,371.9	10,175.3	9,399.8	59.3	0.0	-157.21	1,248.4	55.0	4,302.9	4,266.9	119.498	
12,300.0	9,372.9	10,176.4	9,399.8	61.0	0.0	-156.56	1,248.5	56.0	4,402.9	4,365.6	118.142	
12,400.0	9,373.9	10,177.4	9,399.8	62.7	0.0	-155.90	1,248.5	57.1	4,502.9	4,464.3	116.790	
12,500.0	9,375.0	10,178.5	9,399.8	64.5	0.0	-155.24	1,248.5	58.1	4,602.9	4,563.0	115.444	
12,600.0	9,376.0	10,179.5	9,399.8	66.2	0.0	-154.57	1,248.6	59.2	4,702.9	4,661.6	114.107	
12,700.0	9,377.0	10,180.6	9,399.7	67.9	0.0	-153.90	1,248.6	60.3	4,802.8	4,760.3	112.778	
12,800.0	9,378.0	10,181.8	9,399.7	69.7	0.0	-153.22	1,248.6	61.4	4,902.8	4,858.8	111.460	
12,900.0	9,379.0	10,182.9	9,399.7	71.4	0.0	-152.54	1,248.6	62.6	5,002.8	4,957.4	110.153	
13,000.0	9,380.0	10,184.1	9,399.7	73.2	0.0	-151.85	1,248.7	63.7	5,102.8	5,055.9	108.859	
13,100.0	9,381.0	10,185.3	9,399.7	75.0	0.0	-151.15	1,248.7	64.9	5,202.8	5,154.4	107.580	
13,200.0	9,382.0	10,186.0	9,399.7	76.7	0.0	-150.73	1,248.7	65.7	5,302.8	5,253.1	106.736	
13,300.0	9,383.1	10,186.0	9,399.7	78.5	0.0	-150.73	1,248.7	65.7	5,402.8	5,352.0	106.543	
13,400.0	9,384.1	10,186.0	9,399.7	80.3	0.0	-150.73	1,248.7	65.7	5,502.7	5,451.0	106.355	
13,500.0	9,385.1	10,186.0	9,399.7	82.0	0.0	-150.73	1,248.7	65.7	5,602.7	5,550.0	106.172	
13,600.0	9,386.1	10,186.0	9,399.7	83.8	0.0	-150.73	1,248.7	65.7	5,702.7	5,648.9	105.994	
13,700.0	9,387.1	10,186.0	9,399.7	85.6	0.0	-150.73	1,248.7	65.7	5,802.7	5,747.9	105.820	
13,800.0	9,388.1	10,186.0	9,399.7	87.4	0.0	-150.73	1,248.7	65.7	5,902.7	5,846.8	105.651	
13,900.0	9,389.1	10,186.0	9,399.7	89.2	0.0	-150.73	1,248.7	65.7	6,002.7	5,945.8	105.487	
14,000.0	9,390.1	10,186.0	9,399.7	90.9	0.0	-150.73	1,248.7	65.7	6,102.7	6,044.7	105.327	
14,100.0	9,391.2	10,186.0	9,399.7	92.7	0.0	-150.73	1,248.7	65.7	6,202.7	6,143.7	105.170	
14,200.0	9,392.2	10,186.0	9,399.7	94.5	0.0	-150.73	1,248.7	65.7	6,302.6	6,242.6	105.018	
14,300.0	9,393.2	10,186.0	9,399.7	96.3	0.0	-150.73	1,248.7	65.7	6,402.6	6,341.6	104.870	
14,400.0	9,394.2	10,186.0	9,399.7	98.1	0.0	-150.73	1,248.7	65.7	6,502.6	6,440.5	104.726	
14,500.0	9,395.2	10,186.0	9,399.7	99.9	0.0	-150.73	1,248.7	65.7	6,602.6	6,539.5	104.585	

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

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Compass
Reference Design:	Design #2	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 31, T19S, R32E - Dirty Dozen State Com 3H - Wellbore #1 - Wellbore #1 — **Offset Site Error:** 0.0 usft

Survey Program: 100 — **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)	Separation Factor	Warning
14,600.0	9,396.2	10,186.0	9,399.7	101.7	0.0	-150.73	1,248.7	65.7	6,702.6	6,638.4	104.448	
14,700.0	9,397.2	10,186.0	9,399.7	103.5	0.0	-150.73	1,248.7	65.7	6,802.6	6,737.4	104.314	
14,800.0	9,398.3	10,186.0	9,399.7	105.3	0.0	-150.73	1,248.7	65.7	6,902.6	6,836.3	104.183	
14,900.0	9,399.3	10,186.0	9,399.7	107.1	0.0	-150.73	1,248.7	65.7	7,002.6	6,935.3	104.056	
15,000.0	9,400.3	10,186.0	9,399.7	108.9	0.0	-150.73	1,248.7	65.7	7,102.6	7,034.2	103.932	
15,100.0	9,401.3	10,186.0	9,399.7	110.7	0.0	-150.73	1,248.7	65.7	7,202.6	7,133.2	103.811	
15,200.0	9,402.3	10,186.0	9,399.7	112.5	0.0	-150.73	1,248.7	65.7	7,302.6	7,232.1	103.693	
15,300.0	9,403.3	10,186.0	9,399.7	114.3	0.0	-150.73	1,248.7	65.7	7,402.6	7,331.1	103.578	
15,400.0	9,404.3	10,186.0	9,399.7	116.1	0.0	-150.73	1,248.7	65.7	7,502.6	7,430.0	103.465	
15,500.0	9,405.3	10,186.0	9,399.7	117.9	0.0	-150.73	1,248.7	65.7	7,602.5	7,529.0	103.355	
15,600.0	9,406.4	10,186.0	9,399.7	119.7	0.0	-150.73	1,248.7	65.7	7,702.5	7,627.9	103.248	
15,700.0	9,407.4	10,186.0	9,399.7	121.5	0.0	-150.73	1,248.7	65.7	7,802.5	7,726.9	103.143	
15,800.0	9,408.4	10,186.0	9,399.7	123.3	0.0	-150.73	1,248.7	65.7	7,902.5	7,825.8	103.040	
15,900.0	9,409.4	10,186.0	9,399.7	125.1	0.0	-150.73	1,248.7	65.7	8,002.5	7,924.8	102.940	
16,000.0	9,410.4	10,186.0	9,399.7	126.9	0.0	-150.73	1,248.7	65.7	8,102.5	8,023.7	102.842	
16,100.0	9,411.4	10,186.0	9,399.7	128.7	0.0	-150.73	1,248.7	65.7	8,202.5	8,122.7	102.746	
16,200.0	9,412.4	10,186.0	9,399.7	130.5	0.0	-150.73	1,248.7	65.7	8,302.5	8,221.6	102.653	
16,300.0	9,413.4	10,186.0	9,399.7	132.4	0.0	-150.73	1,248.7	65.7	8,402.5	8,320.6	102.561	
16,400.0	9,414.5	10,186.0	9,399.7	134.2	0.0	-150.73	1,248.7	65.7	8,502.5	8,419.5	102.472	
16,500.0	9,415.5	10,186.0	9,399.7	136.0	0.0	-150.73	1,248.7	65.7	8,602.5	8,518.5	102.384	
16,600.0	9,416.5	10,186.0	9,399.7	137.8	0.0	-150.73	1,248.7	65.7	8,702.5	8,617.4	102.298	
16,700.0	9,417.5	10,186.0	9,399.7	139.6	0.0	-150.73	1,248.7	65.7	8,802.5	8,716.4	102.214	
16,800.0	9,418.5	10,186.0	9,399.7	141.4	0.0	-150.73	1,248.7	65.7	8,902.5	8,815.3	102.132	
16,900.0	9,419.5	10,186.0	9,399.7	143.2	0.0	-150.73	1,248.7	65.7	9,002.5	8,914.3	102.051	
17,000.0	9,420.5	10,186.0	9,399.7	145.0	0.0	-150.73	1,248.7	65.7	9,102.5	9,013.2	101.973	
17,100.0	9,421.6	10,186.0	9,399.7	146.9	0.0	-150.73	1,248.7	65.7	9,202.5	9,112.1	101.895	
17,200.0	9,422.6	10,186.0	9,399.7	148.7	0.0	-150.73	1,248.7	65.7	9,302.5	9,211.1	101.820	
17,300.0	9,423.6	10,186.0	9,399.7	150.5	0.0	-150.73	1,248.7	65.7	9,402.4	9,310.0	101.745	
17,400.0	9,424.6	10,186.0	9,399.7	152.3	0.0	-150.73	1,248.7	65.7	9,502.4	9,409.0	101.673	
17,500.0	9,425.6	10,186.0	9,399.7	154.1	0.0	-150.73	1,248.7	65.7	9,602.4	9,507.9	101.601	
17,600.0	9,426.6	10,186.0	9,399.7	155.9	0.0	-150.73	1,248.7	65.7	9,702.4	9,606.9	101.531	
17,700.0	9,427.6	10,186.0	9,399.7	157.8	0.0	-150.73	1,248.7	65.7	9,802.4	9,705.8	101.463	
17,800.0	9,428.6	10,186.0	9,399.7	159.6	0.0	-150.73	1,248.7	65.7	9,902.4	9,804.8	101.396	

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Compass
Reference Design:	Design #2	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 31, T19S, R32E - Dirty Dozen State Com 4H - Wellbore #1 - Wellbore #1 — **Offset Site Error:** 0.0 usft

Survey Program: 200 — **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)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-40.04	1,127.8	-947.6	1,473.1			
100.0	100.0	90.2	90.2	0.1	0.0	-40.04	1,127.7	-947.7	1,473.1	1,473.0	N/A	
200.0	200.0	189.2	189.2	0.3	0.0	-40.06	1,127.6	-948.1	1,473.2	1,472.9	4,869.976	
300.0	300.0	289.5	289.5	0.5	0.0	-40.08	1,127.2	-948.6	1,473.3	1,472.8	2,794.136	
400.0	400.0	389.9	389.9	0.8	0.0	-40.12	1,126.7	-949.4	1,473.4	1,472.6	1,959.158	
500.0	500.0	490.5	490.5	1.0	0.0	-40.16	1,126.1	-950.2	1,473.4	1,472.4	1,508.406	
600.0	600.0	591.1	591.1	1.2	0.0	-40.21	1,125.3	-951.2	1,473.4	1,472.2	1,226.257	
700.0	700.0	691.2	691.1	1.4	0.0	-40.26	1,124.4	-952.2	1,473.4	1,472.0	1,033.014	
800.0	800.0	791.2	791.2	1.7	0.0	-40.32	1,123.4	-953.3	1,473.4	1,471.8	892.383	
900.0	900.0	892.0	892.0	1.9	0.0	-40.38	1,122.4	-954.5	1,473.4	1,471.5	785.439	
1,000.0	1,000.0	992.9	992.9	2.1	0.0	-40.44	1,121.3	-955.6	1,473.3	1,471.2	701.352	
1,100.0	1,100.0	1,093.5	1,093.4	2.3	0.0	-40.50	1,120.2	-956.7	1,473.1	1,470.8	633.498	
1,200.0	1,200.0	1,194.1	1,194.0	2.5	0.0	-40.54	1,119.3	-957.4	1,473.0	1,470.4	577.591	
1,300.0	1,300.0	1,297.2	1,297.2	2.8	0.0	-40.58	1,118.5	-957.9	1,472.6	1,469.9	530.696	
1,400.0	1,400.0	1,400.5	1,400.5	3.0	0.0	-40.61	1,117.6	-958.2	1,472.1	1,469.1	490.755	
1,500.0	1,500.0	1,500.6	1,500.6	3.2	0.0	-40.63	1,116.7	-958.1	1,471.5	1,468.2	456.346	
1,600.0	1,600.0	1,600.8	1,600.7	3.4	0.0	-40.64	1,116.1	-957.9	1,470.8	1,467.4	426.419	
1,700.0	1,700.0	1,701.6	1,701.5	3.7	0.0	-40.64	1,115.6	-957.4	1,470.1	1,466.5	400.145	
1,800.0	1,800.0	1,802.6	1,802.5	3.9	0.0	-40.63	1,115.2	-956.7	1,469.4	1,465.5	376.886	
1,900.0	1,900.0	1,910.8	1,910.7	4.1	0.0	-40.56	1,115.4	-954.7	1,468.3	1,464.2	356.086	
2,000.0	2,000.0	2,017.6	2,017.4	4.3	0.0	-40.41	1,116.6	-950.7	1,466.7	1,462.4	337.310	
2,100.0	2,100.0	2,118.5	2,118.1	4.6	0.0	-40.24	1,118.0	-946.2	1,464.9	1,460.3	320.332	
2,200.0	2,200.0	2,220.9	2,220.4	4.8	0.0	-40.06	1,119.5	-941.4	1,463.0	1,458.2	304.931	
2,300.0	2,300.0	2,329.8	2,329.3	5.0	0.0	-39.89	1,120.4	-936.4	1,460.7	1,455.7	290.824	
2,400.0	2,400.0	2,433.3	2,432.6	5.2	0.0	-39.75	1,120.4	-931.8	1,457.8	1,452.6	277.822	
2,500.0	2,500.0	2,526.7	2,526.0	5.5	0.0	-39.65	1,120.2	-928.2	1,455.2	1,449.7	265.931	
2,600.0	2,600.0	2,621.3	2,620.5	5.7	0.0	-39.57	1,119.8	-925.4	1,453.0	1,447.3	255.055	
2,700.0	2,700.0	2,719.9	2,719.1	5.9	0.0	-39.50	1,119.4	-922.8	1,451.0	1,445.1	245.039	
2,800.0	2,800.0	2,818.4	2,817.6	6.1	0.0	-39.44	1,119.0	-920.4	1,449.1	1,443.0	235.770	
2,900.0	2,900.0	2,916.0	2,915.2	6.4	0.0	-39.39	1,118.5	-918.3	1,447.4	1,441.0	227.178	
3,000.0	3,000.0	3,013.4	3,012.5	6.6	0.0	-39.34	1,118.0	-916.5	1,445.8	1,439.2	219.196	
3,100.0	3,100.0	3,109.3	3,108.4	6.8	0.0	-39.30	1,117.7	-914.9	1,444.5	1,437.6	211.775	
3,200.0	3,200.0	3,205.3	3,204.4	7.0	0.0	-39.26	1,117.6	-913.4	1,443.4	1,436.4	204.869	
3,300.0	3,300.0	3,303.7	3,302.8	7.3	0.0	-39.21	1,117.8	-911.8	1,442.5	1,435.3	198.415	
3,400.0	3,400.0	3,402.3	3,401.4	7.5	0.0	-39.14	1,118.2	-910.1	1,441.8	1,434.3	192.362	
3,500.0	3,500.0	3,507.5	3,506.5	7.7	0.0	-39.07	1,118.6	-908.0	1,440.9	1,433.1	186.645	
3,600.0	3,600.0	3,612.3	3,611.3	7.9	0.0	-38.98	1,118.9	-905.6	1,439.6	1,431.7	181.207	
3,700.0	3,700.0	3,714.6	3,713.5	8.2	0.0	-38.90	1,119.1	-902.9	1,438.1	1,430.0	176.039	
3,800.0	3,800.0	3,816.4	3,815.4	8.4	0.0	-38.81	1,119.1	-900.2	1,436.5	1,428.1	171.129	
3,900.0	3,900.0	3,916.2	3,915.1	8.6	0.0	-38.74	1,119.0	-897.8	1,434.8	1,426.2	166.471	
4,000.0	4,000.0	4,015.9	4,014.7	8.8	0.0	-38.68	1,118.5	-895.6	1,433.1	1,424.3	162.051	
4,100.0	4,100.0	4,115.0	4,113.9	9.1	0.0	-38.65	1,117.8	-894.0	1,431.5	1,422.4	157.855	
4,200.0	4,200.0	4,213.6	4,212.4	9.3	0.0	-38.64	1,116.7	-892.9	1,429.9	1,420.6	153.868	
4,300.0	4,300.0	4,308.2	4,307.0	9.5	0.0	-38.65	1,115.6	-892.2	1,428.6	1,419.1	150.097	
4,400.0	4,400.0	4,400.0	4,398.8	9.7	0.0	-38.66	1,114.8	-891.9	1,427.7	1,417.9	146.539	
4,500.0	4,500.0	4,499.9	4,498.8	10.0	0.0	-38.67	1,114.2	-891.6	1,427.0	1,417.1	143.169	
4,600.0	4,600.0	4,597.0	4,595.8	10.2	0.0	-38.66	1,114.0	-891.2	1,426.6	1,416.4	139.969	
4,700.0	4,700.0	4,695.7	4,694.6	10.4	0.0	-38.65	1,113.9	-890.8	1,426.3	1,415.9	136.921	
4,800.0	4,800.0	4,794.5	4,793.4	10.6	0.0	-38.64	1,113.9	-890.4	1,426.1	1,415.5	134.009	
4,900.0	4,900.0	4,894.5	4,893.4	10.9	0.0	-38.63	1,114.0	-890.2	1,425.9	1,415.1	131.223	
5,000.0	5,000.0	4,994.6	4,993.4	11.1	0.0	-38.62	1,114.0	-889.8	1,425.8	1,414.7	128.548	
5,100.0	5,100.0	5,094.0	5,092.8	11.3	0.0	-38.60	1,114.1	-889.4	1,425.6	1,414.3	125.982	

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

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	TVD Reference:	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 4H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at:	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Compass
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Offset Design	Sec 31, T19S, R32E - Dirty Dozen State Com 4H - Wellbore #1 - Wellbore #1	Offset Site Error:	0.0 usft
Survey Program:	200	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)	Separation Factor	Warning
5,200.0	5,200.0	5,193.3	5,192.2	11.5	0.0	-38.58	1,114.4	-888.9	1,425.5	1,414.0	123.519	
5,257.4	5,257.4	5,249.6	5,248.4	11.7	0.0	-38.56	1,114.6	-888.6	1,425.5	1,413.8	122.151	
5,300.0	5,300.0	5,291.2	5,290.1	11.8	0.0	-38.55	1,114.8	-888.3	1,425.5	1,413.7	121.158	
5,400.0	5,400.0	5,389.0	5,387.8	12.0	0.0	-38.51	1,115.5	-887.7	1,425.6	1,413.7	118.899	
5,500.0	5,500.0	5,485.2	5,484.0	12.2	0.0	-38.48	1,116.3	-887.3	1,426.0	1,413.8	116.740	
5,600.0	5,600.0	5,581.1	5,579.9	12.4	0.0	-38.46	1,117.0	-887.3	1,426.6	1,414.2	114.682	
5,700.0	5,700.0	5,679.8	5,678.6	12.7	0.0	-38.46	1,117.7	-887.8	1,427.5	1,414.8	112.713	
5,800.0	5,800.0	5,779.2	5,778.0	12.9	0.0	-38.47	1,118.2	-888.6	1,428.4	1,415.5	110.816	
5,900.0	5,900.0	5,873.4	5,872.2	13.1	0.0	-38.50	1,118.6	-889.7	1,429.4	1,416.3	108.999	
6,000.0	6,000.0	5,966.3	5,965.1	13.3	0.0	-38.53	1,119.3	-891.2	1,431.0	1,417.7	107.279	
6,100.0	6,100.0	6,068.0	6,066.7	13.6	0.0	-38.57	1,120.1	-893.2	1,432.9	1,419.3	105.639	
6,200.0	6,200.0	6,174.6	6,173.3	13.8	0.0	-38.61	1,120.8	-894.9	1,434.3	1,420.5	104.023	
6,300.0	6,300.0	6,274.0	6,272.7	14.0	0.0	-38.63	1,121.3	-896.1	1,435.5	1,421.5	102.439	
6,400.0	6,400.0	6,371.1	6,369.9	14.2	0.0	-38.66	1,121.9	-897.5	1,436.9	1,422.6	100.918	
6,500.0	6,500.0	6,473.6	6,472.3	14.5	0.0	-38.69	1,122.6	-899.0	1,438.3	1,423.9	99.450	
6,600.0	6,600.0	6,578.3	6,577.0	14.7	0.0	-38.73	1,122.9	-900.5	1,439.5	1,424.8	98.005	
6,700.0	6,700.0	6,681.4	6,680.1	14.9	0.0	-38.77	1,122.9	-901.9	1,440.3	1,425.4	96.585	
6,800.0	6,800.0	6,784.1	6,782.7	15.1	0.0	-38.81	1,122.9	-903.0	1,441.0	1,425.8	95.195	
6,900.0	6,900.0	6,884.1	6,882.8	15.4	0.0	-38.84	1,122.8	-904.1	1,441.5	1,426.2	93.838	
7,000.0	7,000.0	6,983.8	6,982.4	15.6	0.0	-38.88	1,122.6	-905.1	1,442.1	1,426.5	92.522	
7,100.0	7,100.0	7,082.2	7,080.9	15.8	0.0	-38.92	1,122.4	-906.4	1,442.7	1,426.9	91.247	
7,200.0	7,200.0	7,180.4	7,179.0	16.0	0.0	-38.98	1,122.1	-908.0	1,443.5	1,427.5	90.016	
7,300.0	7,300.0	7,279.4	7,278.1	16.3	0.0	-39.05	1,121.6	-909.9	1,444.4	1,428.1	88.826	
7,400.0	7,400.0	7,378.7	7,377.3	16.5	0.0	-39.15	1,120.8	-912.4	1,445.3	1,428.8	87.670	
7,500.0	7,500.0	7,482.3	7,480.9	16.7	0.0	-39.26	1,119.7	-915.1	1,446.2	1,429.4	86.542	
7,600.0	7,600.0	7,587.2	7,585.7	16.9	0.0	-39.34	1,118.9	-917.1	1,446.7	1,429.8	85.425	
7,700.0	7,700.0	7,684.3	7,682.8	17.2	0.0	-39.41	1,118.1	-918.7	1,447.1	1,430.0	84.331	
7,800.0	7,800.0	7,780.3	7,778.8	17.4	0.0	-39.50	1,117.2	-920.8	1,447.8	1,430.4	83.282	
7,900.0	7,900.0	7,881.5	7,879.9	17.6	0.0	-39.61	1,116.0	-923.6	1,448.7	1,431.1	82.266	
8,000.0	8,000.0	10,441.4	9,379.0	17.8	0.0	15.80	355.4	100.6	1,436.4	1,418.5	80.539	
8,100.0	8,100.0	10,443.0	9,379.1	18.1	0.0	16.05	354.9	102.1	1,340.0	1,321.9	74.199	
8,200.0	8,200.0	10,444.7	9,379.1	18.3	0.0	16.30	354.3	103.6	1,244.1	1,225.9	68.046	
8,300.0	8,300.0	10,446.3	9,379.2	18.5	0.0	16.56	353.7	105.2	1,149.0	1,130.5	62.081	
8,400.0	8,400.0	10,448.0	9,379.2	18.7	0.0	16.82	353.1	106.7	1,054.8	1,036.1	56.306	
8,500.0	8,500.0	10,449.7	9,379.2	19.0	0.0	17.09	352.5	108.3	961.8	942.8	50.730	
8,600.0	8,600.0	10,451.5	9,379.3	19.2	0.0	17.35	351.9	110.0	870.2	851.1	45.365	
8,700.0	8,700.0	10,453.2	9,379.3	19.4	0.0	17.63	351.3	111.6	780.8	761.4	40.232	
8,800.0	8,800.0	10,455.0	9,379.4	19.6	0.0	17.91	350.6	113.3	694.2	674.6	35.362	
8,863.0	8,863.0	10,456.2	9,379.4	19.8	0.0	18.08	350.2	114.4	641.7	622.0	32.453	
8,875.0	8,875.0	10,456.4	9,379.4	19.8	0.0	-147.75	350.1	114.6	632.0	612.1	31.715	
8,900.0	8,900.0	10,457.4	9,379.4	19.8	0.0	-149.54	349.8	115.6	612.6	592.3	30.295	
8,925.0	8,924.8	10,458.9	9,379.5	19.9	0.0	-150.93	349.3	117.0	594.3	573.8	29.021	
8,950.0	8,949.5	10,461.0	9,379.5	19.9	0.0	-151.99	348.6	118.9	577.3	556.6	27.897	
8,975.0	8,974.0	10,463.6	9,379.6	20.0	0.0	-152.76	347.7	121.3	561.8	541.0	26.923	
9,000.0	8,998.1	10,466.6	9,379.7	20.0	0.0	-153.29	346.7	124.2	548.0	527.0	26.099	
9,025.0	9,021.9	10,470.2	9,379.8	20.0	0.0	-153.61	345.5	127.6	536.0	514.9	25.425	
9,050.0	9,045.3	10,474.2	9,379.9	20.1	0.0	-153.73	344.2	131.4	526.0	504.8	24.900	
9,075.0	9,068.1	10,491.0	9,380.4	20.1	0.0	-152.32	338.8	147.3	518.2	497.1	24.527	
9,100.0	9,090.4	10,491.0	9,380.4	20.2	0.0	-152.66	338.8	147.3	512.2	491.2	24.294	
9,125.0	9,112.0	10,491.0	9,380.4	20.2	0.0	-152.86	338.8	147.3	508.6	487.6	24.217	SF
9,150.0	9,133.0	10,491.0	9,380.4	20.3	0.0	-152.93	338.8	147.3	507.4	486.5	24.298	ES
9,150.5	9,133.5	10,491.0	9,380.4	20.3	0.0	-152.93	338.8	147.3	507.4	486.5	24.312	CC

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

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	TVD Reference:	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 4H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Compass
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Offset Design Sec 31, T19S, R32E - Dirty Dozen State Com 4H - Wellbore #1 - Wellbore #1 — Offset Site Error: 0.0 usft

Survey Program: 200 — 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)	Separation Factor	Warning
9,175.0	9,153.3	10,491.0	9,380.4	20.3	0.0	-152.86	338.8	147.3	508.5	487.8	24.535	
9,200.0	9,172.7	10,508.5	9,380.9	20.4	0.0	-150.83	333.4	163.9	511.7	491.0	24.826	
9,225.0	9,191.3	10,515.6	9,381.0	20.4	0.0	-149.74	331.3	170.7	517.1	496.6	25.280	
9,238.0	9,200.6	10,519.4	9,381.1	20.5	0.0	-149.11	330.2	174.3	520.8	500.4	25.558	
9,250.0	9,209.0	10,522.9	9,381.2	20.5	0.0	-149.07	329.1	177.7	524.7	504.4	25.871	
9,275.0	9,225.8	10,530.2	9,381.4	20.6	0.0	-148.85	327.1	184.6	534.3	514.2	26.614	
9,300.0	9,241.6	10,537.2	9,381.5	20.6	0.0	-148.41	325.1	191.4	545.9	526.0	27.463	
9,325.0	9,256.5	10,544.2	9,381.6	20.7	0.0	-147.76	323.2	198.1	559.3	539.7	28.394	
9,350.0	9,270.3	10,550.9	9,381.7	20.8	0.0	-146.88	321.3	204.6	574.5	554.9	29.376	
9,375.0	9,283.1	10,557.5	9,381.8	20.9	0.0	-145.76	319.6	210.9	591.1	571.6	30.369	
9,400.0	9,294.7	10,563.8	9,381.9	21.0	0.0	-144.35	317.9	217.0	609.0	589.6	31.326	
9,425.0	9,305.3	10,584.0	9,382.1	21.1	0.0	-140.94	312.9	236.5	628.4	608.7	31.837	
9,450.0	9,314.6	10,584.0	9,382.1	21.2	0.0	-139.49	312.9	236.5	648.4	628.6	32.697	
9,475.0	9,322.8	10,584.0	9,382.1	21.3	0.0	-137.58	312.9	236.5	669.4	649.4	33.413	
9,500.0	9,329.8	10,584.0	9,382.1	21.5	0.0	-135.08	312.9	236.5	691.3	670.9	33.941	
9,525.0	9,335.5	10,584.0	9,382.1	21.6	0.0	-131.82	312.9	236.5	713.8	693.0	34.263	
9,550.0	9,340.0	10,584.0	9,382.1	21.8	0.0	-127.54	312.9	236.5	736.9	715.5	34.399	
9,575.0	9,343.2	10,584.0	9,382.1	21.9	0.0	-121.88	312.9	236.5	760.5	738.4	34.441	
9,600.0	9,345.1	10,605.2	9,382.2	22.1	0.0	-112.20	307.9	257.2	784.0	761.3	34.493	
9,620.9	9,345.8	10,608.5	9,382.2	22.2	0.0	-104.52	307.1	260.4	804.1	781.2	35.214	
9,700.0	9,346.6	10,620.3	9,382.2	22.8	0.0	-103.78	304.6	271.9	880.5	857.2	37.774	
9,800.0	9,347.6	10,634.1	9,382.2	23.7	0.0	-103.00	301.7	285.3	977.4	953.3	40.691	
9,900.0	9,348.6	10,646.6	9,382.2	24.6	0.0	-102.35	299.2	297.7	1,074.5	1,049.7	43.259	
10,000.0	9,349.6	10,677.0	9,381.9	25.6	0.0	-100.98	293.7	327.5	1,172.2	1,146.5	45.567	
10,100.0	9,350.6	10,677.0	9,381.9	26.8	0.0	-100.98	293.7	327.5	1,269.6	1,242.9	47.459	
10,200.0	9,351.7	10,677.0	9,381.9	28.0	0.0	-100.98	293.7	327.5	1,367.4	1,339.5	49.096	
10,300.0	9,352.7	10,677.0	9,381.9	29.2	0.0	-100.98	293.7	327.5	1,465.4	1,436.4	50.506	
10,400.0	9,353.7	10,700.0	9,381.7	30.6	0.0	-100.11	290.0	350.2	1,563.4	1,533.2	51.760	
10,500.0	9,354.7	10,709.6	9,381.6	32.0	0.0	-99.79	288.5	359.7	1,661.6	1,630.1	52.782	
10,600.0	9,355.7	10,718.8	9,381.6	33.4	0.0	-99.50	287.2	368.8	1,759.9	1,727.0	53.474	
10,700.0	9,356.7	10,727.4	9,381.6	34.8	0.0	-99.24	286.0	377.3	1,858.3	1,824.0	54.053	
10,800.0	9,357.7	10,735.5	9,381.5	36.3	0.0	-99.02	284.8	385.4	1,956.8	1,921.0	54.539	
10,900.0	9,358.7	10,743.3	9,381.5	37.8	0.0	-98.81	283.8	393.1	2,055.4	2,018.0	54.946	
11,000.0	9,359.8	10,772.0	9,381.5	39.4	0.0	-98.13	280.3	421.6	2,154.3	2,115.3	55.229	
11,100.0	9,360.8	10,772.0	9,381.5	41.0	0.0	-98.13	280.3	421.6	2,252.9	2,212.3	55.534	
11,200.0	9,361.8	10,772.0	9,381.5	42.6	0.0	-98.13	280.3	421.6	2,351.6	2,309.4	55.792	
11,300.0	9,362.8	10,772.0	9,381.5	44.2	0.0	-98.13	280.3	421.6	2,450.4	2,406.6	56.010	
11,400.0	9,363.8	10,789.6	9,381.5	45.8	0.0	-97.76	278.3	439.0	2,549.2	2,503.8	56.149	
11,500.0	9,364.8	10,812.8	9,381.5	47.5	0.0	-97.33	275.5	462.1	2,648.1	2,601.0	56.250	
11,600.0	9,365.8	10,837.0	9,381.5	49.1	0.0	-96.92	272.6	486.1	2,746.8	2,698.1	56.331	
11,700.0	9,366.8	10,862.2	9,381.5	50.8	0.0	-96.54	269.4	511.1	2,845.6	2,795.1	56.394	
11,800.0	9,367.9	10,888.0	9,381.5	52.5	0.0	-96.18	266.1	536.7	2,944.2	2,892.1	56.444	
11,900.0	9,368.9	10,914.9	9,381.5	54.1	0.0	-95.86	262.6	563.4	3,042.8	2,989.0	56.481	
12,000.0	9,369.9	10,943.0	9,381.7	55.8	0.0	-95.57	258.8	591.2	3,141.4	3,085.8	56.508	
12,100.0	9,370.9	10,972.6	9,381.9	57.6	0.0	-95.30	254.7	620.5	3,239.9	3,182.6	56.527	
12,200.0	9,371.9	11,003.8	9,382.1	59.3	0.0	-95.04	250.2	651.4	3,338.3	3,279.3	56.537	
12,300.0	9,372.9	11,036.5	9,382.4	61.0	0.0	-94.81	245.4	683.8	3,436.7	3,375.9	56.540	
12,400.0	9,373.9	11,062.7	9,382.7	62.7	0.0	-94.64	241.5	709.7	3,535.0	3,472.4	56.541	
12,500.0	9,375.0	11,084.0	9,383.0	64.5	0.0	-94.51	238.2	730.7	3,633.2	3,569.0	56.539	
12,600.0	9,376.0	11,105.5	9,383.2	66.2	0.0	-94.40	235.0	751.9	3,731.5	3,665.5	56.533	
12,700.0	9,377.0	11,127.1	9,383.6	67.9	0.0	-94.29	231.6	773.3	3,829.7	3,761.9	56.523	
12,800.0	9,378.0	11,145.0	9,383.9	69.7	0.0	-94.21	228.9	791.0	3,927.9	3,858.4	56.512	

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

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	TVD Reference:	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 4H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Compass
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Offset Design: Sec 31, T19S, R32E - Dirty Dozen State Com 4H - Wellbore #1 - Wellbore #1 — Offset Site Error: 0.0 usft

Survey Program: 200 — 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)	Separation Factor	Warning
12,900.0	9,379.0	11,164.3	9,384.2	71.4	0.0	-94.12	225.9	810.0	4,026.1	3,954.9	56.497	
13,000.0	9,380.0	11,180.5	9,384.3	73.2	0.0	-94.05	223.4	826.0	4,124.4	4,051.4	56.481	
13,100.0	9,381.0	11,196.6	9,384.5	75.0	0.0	-93.97	221.0	842.0	4,222.6	4,147.8	56.463	
13,200.0	9,382.0	11,212.6	9,384.5	76.7	0.0	-93.90	218.5	857.8	4,320.9	4,244.3	56.443	
13,300.0	9,383.1	11,228.5	9,384.5	78.5	0.0	-93.82	216.1	873.5	4,419.2	4,340.8	56.421	
13,400.0	9,384.1	11,237.0	9,384.4	80.3	0.0	-93.78	214.8	881.9	4,517.4	4,437.4	56.401	
13,500.0	9,385.1	11,237.0	9,384.4	82.0	0.0	-93.78	214.8	881.9	4,615.8	4,533.9	56.383	
13,600.0	9,386.1	11,237.0	9,384.4	83.8	0.0	-93.78	214.8	881.9	4,714.2	4,630.6	56.365	
13,700.0	9,387.1	11,265.2	9,384.3	85.6	0.0	-93.64	210.7	909.7	4,812.5	4,727.1	56.336	
13,800.0	9,388.1	11,272.9	9,384.3	87.4	0.0	-93.60	209.6	917.4	4,911.0	4,823.7	56.315	
13,900.0	9,389.1	11,280.4	9,384.2	89.2	0.0	-93.57	208.5	924.8	5,009.4	4,920.4	56.293	
14,000.0	9,390.1	11,287.8	9,384.2	90.9	0.0	-93.54	207.5	932.1	5,107.9	5,017.2	56.271	
14,100.0	9,391.2	11,295.0	9,384.1	92.7	0.0	-93.51	206.5	939.3	5,206.5	5,113.9	56.250	
14,200.0	9,392.2	11,302.1	9,384.1	94.5	0.0	-93.48	205.6	946.3	5,305.0	5,210.7	56.228	
14,300.0	9,393.2	11,330.0	9,384.0	96.3	0.0	-93.36	201.9	974.0	5,403.7	5,307.6	56.203	
14,400.0	9,394.2	11,330.0	9,384.0	98.1	0.0	-93.36	201.9	974.0	5,502.3	5,404.4	56.183	
14,500.0	9,395.2	11,330.0	9,384.0	99.9	0.0	-93.36	201.9	974.0	5,600.9	5,501.2	56.163	
14,600.0	9,396.2	11,330.0	9,384.0	101.7	0.0	-93.36	201.9	974.0	5,699.6	5,598.1	56.144	
14,700.0	9,397.2	11,330.0	9,384.0	103.5	0.0	-93.36	201.9	974.0	5,798.3	5,695.0	56.124	
14,800.0	9,398.3	11,330.0	9,384.0	105.3	0.0	-93.36	201.9	974.0	5,897.1	5,792.0	56.106	
14,900.0	9,399.3	11,357.1	9,383.8	107.1	0.0	-93.25	198.5	1,000.9	5,995.8	5,888.9	56.081	
15,000.0	9,400.3	11,366.4	9,383.7	108.9	0.0	-93.21	197.4	1,010.1	6,094.6	5,985.8	56.060	
15,100.0	9,401.3	11,375.7	9,383.6	110.7	0.0	-93.18	196.3	1,019.3	6,193.3	6,082.8	56.040	
15,200.0	9,402.3	11,384.8	9,383.5	112.5	0.0	-93.14	195.2	1,028.3	6,292.1	6,179.8	56.020	
15,300.0	9,403.3	11,393.8	9,383.4	114.3	0.0	-93.11	194.1	1,037.2	6,390.9	6,276.8	56.000	
15,400.0	9,404.3	11,402.6	9,383.3	116.1	0.0	-93.07	193.0	1,046.1	6,489.8	6,373.8	55.981	
15,500.0	9,405.3	11,424.0	9,383.1	117.9	0.0	-92.99	190.5	1,067.3	6,588.6	6,470.9	55.960	
15,600.0	9,406.4	11,424.0	9,383.1	119.7	0.0	-92.99	190.5	1,067.3	6,687.5	6,567.9	55.942	
15,700.0	9,407.4	11,424.0	9,383.1	121.5	0.0	-92.99	190.5	1,067.3	6,786.3	6,665.0	55.925	
15,800.0	9,408.4	11,424.0	9,383.1	123.3	0.0	-92.99	190.5	1,067.3	6,885.2	6,762.1	55.908	
15,900.0	9,409.4	11,424.0	9,383.1	125.1	0.0	-92.99	190.5	1,067.3	6,984.2	6,859.2	55.892	
16,000.0	9,410.4	11,451.6	9,382.7	126.9	0.0	-92.89	187.4	1,094.7	7,083.0	6,956.3	55.871	
16,100.0	9,411.4	11,459.1	9,382.6	128.7	0.0	-92.86	186.5	1,102.2	7,182.0	7,053.4	55.854	
16,200.0	9,412.4	11,466.6	9,382.5	130.5	0.0	-92.84	185.7	1,109.6	7,280.9	7,150.5	55.837	
16,300.0	9,413.4	11,474.0	9,382.4	132.4	0.0	-92.81	184.9	1,116.9	7,379.9	7,247.7	55.820	
16,400.0	9,414.5	11,481.2	9,382.4	134.2	0.0	-92.79	184.1	1,124.1	7,478.8	7,344.8	55.804	
16,500.0	9,415.5	11,488.4	9,382.3	136.0	0.0	-92.77	183.3	1,131.3	7,577.8	7,442.0	55.788	
16,600.0	9,416.5	11,518.0	9,382.1	137.8	0.0	-92.68	180.1	1,160.7	7,676.9	7,539.2	55.770	
16,700.0	9,417.5	11,518.0	9,382.1	139.6	0.0	-92.68	180.1	1,160.7	7,775.9	7,636.4	55.756	
16,800.0	9,418.5	11,518.0	9,382.1	141.4	0.0	-92.68	180.1	1,160.7	7,874.9	7,733.6	55.741	
16,900.0	9,419.5	11,518.0	9,382.1	143.2	0.0	-92.68	180.1	1,160.7	7,973.9	7,830.8	55.727	
17,000.0	9,420.5	11,518.0	9,382.1	145.0	0.0	-92.68	180.1	1,160.7	8,073.0	7,928.0	55.714	
17,100.0	9,421.6	11,518.0	9,382.1	146.9	0.0	-92.68	180.1	1,160.7	8,172.0	8,025.3	55.700	
17,200.0	9,422.6	11,518.0	9,382.1	148.7	0.0	-92.68	180.1	1,160.7	8,271.1	8,122.6	55.687	
17,300.0	9,423.6	11,518.0	9,382.1	150.5	0.0	-92.68	180.1	1,160.7	8,370.2	8,219.9	55.674	
17,400.0	9,424.6	11,546.7	9,381.9	152.3	0.0	-92.60	177.2	1,189.2	8,469.3	8,317.1	55.658	
17,500.0	9,425.6	11,552.5	9,381.8	154.1	0.0	-92.59	176.6	1,195.0	8,568.4	8,414.4	55.645	
17,600.0	9,426.6	11,558.3	9,381.8	155.9	0.0	-92.57	176.1	1,200.8	8,667.5	8,511.7	55.632	
17,700.0	9,427.6	11,564.0	9,381.7	157.8	0.0	-92.55	175.5	1,206.4	8,766.6	8,609.0	55.620	
17,800.0	9,428.6	11,569.6	9,381.7	159.6	0.0	-92.54	175.0	1,212.0	8,865.8	8,706.3	55.607	
17,900.0	9,429.7	11,575.1	9,381.7	161.4	0.0	-92.53	174.4	1,217.5	8,964.9	8,803.7	55.595	
18,000.0	9,430.7	11,580.6	9,381.6	163.2	0.0	-92.51	173.9	1,222.9	9,064.1	8,901.0	55.583	

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

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Compass
Reference Design:	Design #2	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 31, T19S, R32E - Dirty Dozen State Com 4H - Wellbore #1 - Wellbore #1 — **Offset Site Error:** 0.0 usft

Survey Program: 200 — **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)	Separation Factor	Warning
18,100.0	9,431.7	11,611.0	9,381.4	165.0	0.0	-92.44	171.1	1,253.2	9,163.4	8,998.5	55.570	
18,200.0	9,432.7	11,611.0	9,381.4	166.9	0.0	-92.44	171.1	1,253.2	9,262.5	9,095.8	55.558	
18,300.0	9,433.7	11,611.0	9,381.4	168.7	0.0	-92.44	171.1	1,253.2	9,361.7	9,193.2	55.547	
18,400.0	9,434.7	11,611.0	9,381.4	170.5	0.0	-92.44	171.1	1,253.2	9,460.9	9,290.5	55.537	
18,500.0	9,435.7	11,611.0	9,381.4	172.3	0.0	-92.44	171.1	1,253.2	9,560.1	9,387.9	55.526	
18,600.0	9,436.7	11,613.9	9,381.4	174.1	0.0	-92.43	170.8	1,256.2	9,659.3	9,485.3	55.516	
18,700.0	9,437.8	11,629.1	9,381.3	176.0	0.0	-92.39	169.5	1,271.3	9,758.5	9,582.7	55.504	
18,800.0	9,438.8	11,644.4	9,381.2	177.8	0.0	-92.36	168.1	1,286.5	9,857.8	9,680.1	55.493	
18,900.0	9,439.8	11,659.7	9,381.1	179.6	0.0	-92.32	166.7	1,301.7	9,957.0	9,777.5	55.482	

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore:	Wellbore #1	**Database:**	Compass
Reference Design:	Design #2	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 31, T19S, R32E - Nightcap 6 Federal 1H - Wellbore #1 - Design #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD default — **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)	Separation Factor	Warning
0.0	0.0	25.0	25.0	0.0	0.0	74.04	1,266.0	4,427.5	4,604.9			
100.0	100.0	125.0	125.0	0.1	0.1	74.04	1,266.0	4,427.5	4,604.9	4,604.7	N/A	
200.0	200.0	225.0	225.0	0.3	0.4	74.04	1,266.0	4,427.5	4,604.9	4,604.3	6,968.611	
300.0	300.0	325.0	325.0	0.5	0.6	74.04	1,266.0	4,427.5	4,604.9	4,603.8	4,147.312	
400.0	400.0	425.0	425.0	0.8	0.8	74.04	1,266.0	4,427.5	4,604.9	4,603.4	2,952.121	
500.0	500.0	525.0	525.0	1.0	1.0	74.04	1,266.0	4,427.5	4,604.9	4,602.9	2,291.691	
600.0	600.0	625.0	625.0	1.2	1.3	74.04	1,266.0	4,427.5	4,604.9	4,602.5	1,872.735	
700.0	700.0	725.0	725.0	1.4	1.5	74.04	1,266.0	4,427.5	4,604.9	4,602.0	1,583.286	
800.0	800.0	825.0	825.0	1.7	1.7	74.04	1,266.0	4,427.5	4,604.9	4,601.6	1,371.333	
900.0	900.0	925.0	925.0	1.9	1.9	74.04	1,266.0	4,427.5	4,604.9	4,601.1	1,209.429	
1,000.0	1,000.0	1,025.0	1,025.0	2.1	2.2	74.04	1,266.0	4,427.5	4,604.9	4,600.7	1,081.717	
1,100.0	1,100.0	1,125.0	1,125.0	2.3	2.4	74.04	1,266.0	4,427.5	4,604.9	4,600.2	978.401	
1,200.0	1,200.0	1,225.0	1,225.0	2.5	2.6	74.04	1,266.0	4,427.5	4,604.9	4,599.8	893.100	
1,300.0	1,300.0	1,325.0	1,325.0	2.8	2.8	74.04	1,266.0	4,427.5	4,604.9	4,599.3	821.480	
1,400.0	1,400.0	1,425.0	1,425.0	3.0	3.1	74.04	1,266.0	4,427.5	4,604.9	4,598.9	760.495	
1,500.0	1,500.0	1,525.0	1,525.0	3.2	3.3	74.04	1,266.0	4,427.5	4,604.9	4,598.4	707.938	
1,600.0	1,600.0	1,625.0	1,625.0	3.4	3.5	74.04	1,266.0	4,427.5	4,604.9	4,598.0	662.176	
1,700.0	1,700.0	1,725.0	1,725.0	3.7	3.7	74.04	1,266.0	4,427.5	4,604.9	4,597.5	621.971	
1,800.0	1,800.0	1,825.0	1,825.0	3.9	4.0	74.04	1,266.0	4,427.5	4,604.9	4,597.1	586.369	
1,900.0	1,900.0	1,925.0	1,925.0	4.1	4.2	74.04	1,266.0	4,427.5	4,604.9	4,596.6	554.622	
2,000.0	2,000.0	2,025.0	2,025.0	4.3	4.4	74.04	1,266.0	4,427.5	4,604.9	4,596.2	526.136	
2,100.0	2,100.0	2,125.0	2,125.0	4.6	4.6	74.04	1,266.0	4,427.5	4,604.9	4,595.7	500.433	
2,200.0	2,200.0	2,225.0	2,225.0	4.8	4.9	74.04	1,266.0	4,427.5	4,604.9	4,595.3	477.124	
2,300.0	2,300.0	2,325.0	2,325.0	5.0	5.1	74.04	1,266.0	4,427.5	4,604.9	4,594.8	455.891	
2,400.0	2,400.0	2,425.0	2,425.0	5.2	5.3	74.04	1,266.0	4,427.5	4,604.9	4,594.4	436.466	
2,500.0	2,500.0	2,525.0	2,525.0	5.5	5.5	74.04	1,266.0	4,427.5	4,604.9	4,593.9	418.629	
2,600.0	2,600.0	2,625.0	2,625.0	5.7	5.8	74.04	1,266.0	4,427.5	4,604.9	4,593.5	402.193	
2,700.0	2,700.0	2,725.0	2,725.0	5.9	6.0	74.04	1,266.0	4,427.5	4,604.9	4,593.0	386.999	
2,800.0	2,800.0	2,825.0	2,825.0	6.1	6.2	74.04	1,266.0	4,427.5	4,604.9	4,592.6	372.911	
2,900.0	2,900.0	2,925.0	2,925.0	6.4	6.4	74.04	1,266.0	4,427.5	4,604.9	4,592.1	359.812	
3,000.0	3,000.0	3,025.0	3,025.0	6.6	6.7	74.04	1,266.0	4,427.5	4,604.9	4,591.7	347.603	
3,100.0	3,100.0	3,125.0	3,125.0	6.8	6.9	74.04	1,266.0	4,427.5	4,604.9	4,591.2	336.195	
3,200.0	3,200.0	3,225.0	3,225.0	7.0	7.1	74.04	1,266.0	4,427.5	4,604.9	4,590.8	325.512	
3,300.0	3,300.0	3,325.0	3,325.0	7.3	7.3	74.04	1,266.0	4,427.5	4,604.9	4,590.3	315.487	
3,400.0	3,400.0	3,425.0	3,425.0	7.5	7.6	74.04	1,266.0	4,427.5	4,604.9	4,589.9	306.061	
3,500.0	3,500.0	3,525.0	3,525.0	7.7	7.8	74.04	1,266.0	4,427.5	4,604.9	4,589.4	297.182	
3,600.0	3,600.0	3,625.0	3,625.0	7.9	8.0	74.04	1,266.0	4,427.5	4,604.9	4,589.0	288.804	
3,700.0	3,700.0	3,725.0	3,725.0	8.2	8.2	74.04	1,266.0	4,427.5	4,604.9	4,588.5	280.885	
3,800.0	3,800.0	3,825.0	3,825.0	8.4	8.5	74.04	1,266.0	4,427.5	4,604.9	4,588.1	273.388	
3,900.0	3,900.0	3,925.0	3,925.0	8.6	8.7	74.04	1,266.0	4,427.5	4,604.9	4,587.7	266.282	
4,000.0	4,000.0	4,025.0	4,025.0	8.8	8.9	74.04	1,266.0	4,427.5	4,604.9	4,587.2	259.535	
4,100.0	4,100.0	4,125.0	4,125.0	9.1	9.1	74.04	1,266.0	4,427.5	4,604.9	4,586.8	253.122	
4,200.0	4,200.0	4,225.0	4,225.0	9.3	9.3	74.04	1,266.0	4,427.5	4,604.9	4,586.3	247.019	
4,300.0	4,300.0	4,325.0	4,325.0	9.5	9.6	74.04	1,266.0	4,427.5	4,604.9	4,585.9	241.202	
4,400.0	4,400.0	4,425.0	4,425.0	9.7	9.8	74.04	1,266.0	4,427.5	4,604.9	4,585.4	235.654	
4,500.0	4,500.0	4,525.0	4,525.0	10.0	10.0	74.04	1,266.0	4,427.5	4,604.9	4,585.0	230.354	
4,600.0	4,600.0	4,625.0	4,625.0	10.2	10.2	74.04	1,266.0	4,427.5	4,604.9	4,584.5	225.288	
4,700.0	4,700.0	4,725.0	4,725.0	10.4	10.5	74.04	1,266.0	4,427.5	4,604.9	4,584.1	220.440	
4,800.0	4,800.0	4,825.0	4,825.0	10.6	10.7	74.04	1,266.0	4,427.5	4,604.9	4,583.6	215.797	
4,900.0	4,900.0	4,925.0	4,925.0	10.9	10.9	74.04	1,266.0	4,427.5	4,604.9	4,583.2	211.344	
5,000.0	5,000.0	5,025.0	5,025.0	11.1	11.1	74.04	1,266.0	4,427.5	4,604.9	4,582.7	207.072	
5,100.0	5,100.0	5,125.0	5,125.0	11.3	11.4	74.04	1,266.0	4,427.5	4,604.9	4,582.3	202.969	

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

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	TVD Reference:	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 4H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Compass
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Offset Design | Sec 31, T19S, R32E - Nightcap 6 Federal 1H - Wellbore #1 - Design #1 | Offset Site Error: 0.0 usft

Survey Program: 0-MWD default | 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)	Separation Factor	Warning
5,200.0	5,200.0	5,225.0	5,225.0	11.5	11.6	74.04	1,266.0	4,427.5	4,604.9	4,581.8	199.026	
5,300.0	5,300.0	5,325.0	5,325.0	11.8	11.8	74.04	1,266.0	4,427.5	4,604.9	4,581.4	195.233	
5,400.0	5,400.0	5,425.0	5,425.0	12.0	12.0	74.04	1,266.0	4,427.5	4,604.9	4,580.9	191.581	
5,500.0	5,500.0	5,525.0	5,525.0	12.2	12.3	74.04	1,266.0	4,427.5	4,604.9	4,580.5	188.064	
5,600.0	5,600.0	5,625.0	5,625.0	12.4	12.5	74.04	1,266.0	4,427.5	4,604.9	4,580.0	184.674	
5,700.0	5,700.0	5,725.0	5,725.0	12.7	12.7	74.04	1,266.0	4,427.5	4,604.9	4,579.6	181.404	
5,800.0	5,800.0	5,825.0	5,825.0	12.9	12.9	74.04	1,266.0	4,427.5	4,604.9	4,579.1	178.247	
5,900.0	5,900.0	5,925.0	5,925.0	13.1	13.2	74.04	1,266.0	4,427.5	4,604.9	4,578.7	175.199	
6,000.0	6,000.0	6,025.0	6,025.0	13.3	13.4	74.04	1,266.0	4,427.5	4,604.9	4,578.2	172.253	
6,100.0	6,100.0	6,125.0	6,125.0	13.6	13.6	74.04	1,266.0	4,427.5	4,604.9	4,577.8	169.404	
6,200.0	6,200.0	6,225.0	6,225.0	13.8	13.8	74.04	1,266.0	4,427.5	4,604.9	4,577.3	166.648	
6,300.0	6,300.0	6,325.0	6,325.0	14.0	14.1	74.04	1,266.0	4,427.5	4,604.9	4,576.9	163.980	
6,400.0	6,400.0	6,425.0	6,425.0	14.2	14.3	74.04	1,266.0	4,427.5	4,604.9	4,576.4	161.397	
6,500.0	6,500.0	6,525.0	6,525.0	14.5	14.5	74.04	1,266.0	4,427.5	4,604.9	4,576.0	158.893	
6,600.0	6,600.0	6,625.0	6,625.0	14.7	14.7	74.04	1,266.0	4,427.5	4,604.9	4,575.5	156.467	
6,700.0	6,700.0	6,725.0	6,725.0	14.9	15.0	74.04	1,266.0	4,427.5	4,604.9	4,575.1	154.113	
6,800.0	6,800.0	6,825.0	6,825.0	15.1	15.2	74.04	1,266.0	4,427.5	4,604.9	4,574.6	151.828	
6,900.0	6,900.0	6,925.0	6,925.0	15.4	15.4	74.04	1,266.0	4,427.5	4,604.9	4,574.2	149.611	
7,000.0	7,000.0	7,025.0	7,025.0	15.6	15.6	74.04	1,266.0	4,427.5	4,604.9	4,573.7	147.457	
7,100.0	7,100.0	7,125.0	7,125.0	15.8	15.9	74.04	1,266.0	4,427.5	4,604.9	4,573.3	145.365	
7,200.0	7,200.0	7,225.0	7,225.0	16.0	16.1	74.04	1,266.0	4,427.5	4,604.9	4,572.8	143.331	
7,300.0	7,300.0	7,325.0	7,325.0	16.3	16.3	74.04	1,266.0	4,427.5	4,604.9	4,572.4	141.353	
7,400.0	7,400.0	7,425.0	7,425.0	16.5	16.5	74.04	1,266.0	4,427.5	4,604.9	4,571.9	139.429	
7,500.0	7,500.0	7,525.0	7,525.0	16.7	16.8	74.04	1,266.0	4,427.5	4,604.9	4,571.5	137.557	
7,600.0	7,600.0	7,625.0	7,625.0	16.9	17.0	74.04	1,266.0	4,427.5	4,604.9	4,571.0	135.734	
7,700.0	7,700.0	7,725.0	7,725.0	17.2	17.2	74.04	1,266.0	4,427.5	4,604.9	4,570.6	133.959	
7,800.0	7,800.0	7,825.0	7,825.0	17.4	17.4	74.04	1,266.0	4,427.5	4,604.9	4,570.1	132.230	
7,900.0	7,900.0	7,925.0	7,925.0	17.6	17.7	74.04	1,266.0	4,427.5	4,604.9	4,569.7	130.545	
8,000.0	8,000.0	8,025.0	8,025.0	17.8	17.9	74.04	1,266.0	4,427.5	4,604.9	4,569.2	128.902	
8,100.0	8,100.0	10,399.7	9,341.3	18.1	30.6	90.07	-5.3	4,422.4	4,586.7	4,538.6	95.414	
8,200.0	8,200.0	10,400.7	9,341.3	18.3	30.6	90.08	-6.3	4,422.4	4,561.2	4,512.9	94.419	
8,300.0	8,300.0	10,401.7	9,341.3	18.5	30.6	90.09	-7.3	4,422.4	4,537.7	4,489.2	93.475	
8,400.0	8,400.0	10,402.7	9,341.3	18.7	30.6	90.11	-8.3	4,422.4	4,516.4	4,467.6	92.583	
8,500.0	8,500.0	10,403.7	9,341.4	19.0	30.6	90.12	-9.3	4,422.4	4,497.2	4,448.1	91.744	
8,600.0	8,600.0	10,404.7	9,341.4	19.2	30.7	90.13	-10.3	4,422.4	4,480.1	4,430.8	90.956	
8,700.0	8,700.0	10,405.7	9,341.4	19.4	30.7	90.15	-11.4	4,422.4	4,465.2	4,415.7	90.219	
8,800.0	8,800.0	10,406.8	9,341.4	19.6	30.7	90.16	-12.4	4,422.4	4,452.5	4,402.8	89.534	
8,863.0	8,863.0	10,407.4	9,341.4	19.8	30.7	90.17	-13.0	4,422.4	4,445.6	4,395.7	89.128	
8,875.0	8,875.0	10,407.7	9,341.4	19.8	30.7	-74.77	-13.3	4,422.4	4,444.4	4,393.1	86.625	
8,900.0	8,900.0	10,409.1	9,341.4	19.8	30.7	-75.07	-14.8	4,422.4	4,441.6	4,390.2	86.447	
8,925.0	8,924.8	10,411.9	9,341.4	19.9	30.8	-75.38	-17.5	4,422.4	4,438.7	4,387.2	86.251	
8,950.0	8,949.5	10,415.9	9,341.5	19.9	30.8	-75.70	-21.5	4,422.4	4,435.5	4,384.0	86.036	
8,975.0	8,974.0	10,421.1	9,341.5	20.0	30.9	-76.02	-26.7	4,422.4	4,432.2	4,380.6	85.801	
9,000.0	8,998.1	10,427.6	9,341.6	20.0	31.0	-76.35	-33.2	4,422.3	4,428.7	4,376.9	85.547	
9,025.0	9,021.9	10,435.2	9,341.7	20.0	31.1	-76.69	-40.8	4,422.3	4,425.0	4,373.1	85.271	
9,050.0	9,045.3	10,444.1	9,341.8	20.1	31.2	-77.04	-49.7	4,422.3	4,421.2	4,369.1	84.974	
9,075.0	9,068.1	10,454.1	9,341.9	20.1	31.3	-77.40	-59.7	4,422.2	4,417.1	4,364.9	84.654	
9,100.0	9,090.4	10,465.2	9,342.0	20.2	31.5	-77.77	-70.8	4,422.2	4,412.9	4,360.6	84.310	
9,125.0	9,112.0	10,477.5	9,342.1	20.2	31.7	-78.15	-83.1	4,422.1	4,408.6	4,356.0	83.942	
9,150.0	9,133.0	10,490.8	9,342.2	20.3	31.8	-78.54	-96.4	4,422.1	4,404.0	4,351.3	83.548	
9,175.0	9,153.3	10,505.1	9,342.4	20.3	32.0	-78.95	-110.7	4,422.0	4,399.3	4,346.4	83.126	
9,200.0	9,172.7	10,520.5	9,342.5	20.4	32.3	-79.38	-126.1	4,422.0	4,394.5	4,341.3	82.671	

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	TVD Reference:	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 4H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Compass
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Offset Design — Sec 31, T19S, R32E - Nightcap 6 Federal 1H - Wellbore #1 - Design #1 — Offset Site Error: 0.0 usft

Survey Program: 0-MWD default — 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)	Separation Factor	Warning
9,225.0	9,191.3	10,536.8	9,342.7	20.4	32.5	-79.82	-142.4	4,421.9	4,389.5	4,336.1	82.189	
9,238.0	9,200.6	10,545.6	9,342.8	20.5	32.6	-80.06	-151.2	4,421.9	4,386.8	4,333.2	81.928	
9,250.0	9,209.0	10,554.0	9,342.9	20.5	32.7	-80.72	-159.6	4,421.8	4,384.3	4,330.6	81.618	
9,275.0	9,225.8	10,572.1	9,343.1	20.6	33.0	-81.98	-177.7	4,421.8	4,379.4	4,325.3	80.968	
9,300.0	9,241.6	10,591.1	9,343.3	20.6	33.3	-83.10	-196.7	4,421.7	4,374.8	4,320.3	80.313	
9,325.0	9,256.5	10,610.9	9,343.5	20.7	33.5	-84.09	-216.5	4,421.6	4,370.4	4,315.5	79.648	
9,350.0	9,270.3	10,631.5	9,343.7	20.8	33.8	-84.97	-237.1	4,421.5	4,366.3	4,311.0	78.973	
9,375.0	9,283.1	10,652.8	9,343.9	20.9	34.2	-85.75	-258.4	4,421.4	4,362.5	4,306.8	78.296	
9,400.0	9,294.7	10,674.8	9,344.1	21.0	34.5	-86.44	-280.4	4,421.4	4,358.9	4,302.8	77.616	
9,425.0	9,305.3	10,697.3	9,344.3	21.1	34.8	-87.06	-302.9	4,421.3	4,355.7	4,299.0	76.936	
9,450.0	9,314.6	10,720.4	9,344.6	21.2	35.1	-87.59	-326.0	4,421.2	4,352.6	4,295.6	76.248	
9,475.0	9,322.8	10,743.9	9,344.8	21.3	35.5	-88.06	-349.5	4,421.1	4,349.9	4,292.4	75.560	
9,500.0	9,329.8	10,767.9	9,345.0	21.5	35.9	-88.47	-373.5	4,421.0	4,347.5	4,289.4	74.875	
9,525.0	9,335.5	10,792.2	9,345.3	21.6	36.2	-88.82	-397.8	4,420.9	4,345.3	4,286.7	74.195	
9,550.0	9,340.0	10,816.7	9,345.5	21.8	36.6	-89.11	-422.3	4,420.8	4,343.4	4,284.3	73.515	
9,575.0	9,343.2	10,841.5	9,345.8	21.9	37.0	-89.35	-447.1	4,420.7	4,341.8	4,282.2	72.841	
9,600.0	9,345.1	10,866.4	9,346.0	22.1	37.3	-89.54	-472.0	4,420.6	4,340.5	4,280.3	72.176	
9,620.9	9,345.8	10,887.3	9,346.2	22.2	37.7	-89.65	-492.8	4,420.5	4,339.6	4,279.0	71.631	
9,700.0	9,346.6	10,966.3	9,347.0	22.8	38.9	-89.65	-571.9	4,420.2	4,336.6	4,274.2	69.533	
9,800.0	9,347.6	11,066.3	9,348.1	23.7	40.4	-89.65	-671.8	4,419.8	4,332.8	4,268.1	66.918	
9,900.0	9,348.6	11,166.2	9,349.1	24.6	42.0	-89.65	-771.8	4,419.4	4,329.1	4,261.8	64.363	
10,000.0	9,349.6	11,266.1	9,350.1	25.6	43.6	-89.65	-871.7	4,419.0	4,325.3	4,255.4	61.892	
10,100.0	9,350.6	11,366.0	9,351.1	26.8	45.2	-89.65	-971.6	4,418.6	4,321.5	4,248.9	59.513	
10,200.0	9,351.7	11,466.0	9,352.1	28.0	46.9	-89.65	-1,071.5	4,418.2	4,317.8	4,242.3	57.240	
10,300.0	9,352.7	11,565.9	9,353.1	29.2	48.5	-89.65	-1,171.4	4,417.8	4,314.0	4,235.7	55.075	
10,400.0	9,353.7	11,665.8	9,354.1	30.6	50.2	-89.65	-1,271.4	4,417.4	4,310.2	4,228.9	53.018	
10,500.0	9,354.7	11,765.8	9,355.1	32.0	51.8	-89.65	-1,371.3	4,417.0	4,306.4	4,222.1	51.070	
10,600.0	9,355.7	11,865.7	9,356.1	33.4	53.5	-89.65	-1,471.2	4,416.6	4,302.7	4,215.3	49.226	
10,700.0	9,356.7	11,965.6	9,357.1	34.8	55.2	-89.65	-1,571.1	4,416.2	4,298.9	4,208.4	47.483	
10,800.0	9,357.7	12,065.5	9,358.2	36.3	56.9	-89.65	-1,671.1	4,415.8	4,295.1	4,201.4	45.835	
10,900.0	9,358.7	12,165.5	9,359.2	37.8	58.6	-89.65	-1,771.0	4,415.4	4,291.4	4,194.4	44.278	
11,000.0	9,359.8	12,265.4	9,360.2	39.4	60.3	-89.65	-1,870.9	4,415.0	4,287.6	4,187.4	42.807	
11,100.0	9,360.8	12,365.3	9,361.2	41.0	62.0	-89.65	-1,970.8	4,414.6	4,283.8	4,180.4	41.416	
11,200.0	9,361.8	12,465.3	9,362.2	42.6	63.7	-89.65	-2,070.8	4,414.2	4,280.1	4,173.3	40.100	
11,300.0	9,362.8	12,565.2	9,363.2	44.2	65.5	-89.65	-2,170.7	4,413.8	4,276.3	4,166.2	38.855	
11,400.0	9,363.8	12,665.1	9,364.2	45.8	67.2	-89.65	-2,270.6	4,413.4	4,272.5	4,159.1	37.676	
11,500.0	9,364.8	12,765.1	9,365.2	47.5	68.9	-89.65	-2,370.5	4,413.0	4,268.7	4,152.0	36.558	
11,600.0	9,365.8	12,865.0	9,366.2	49.1	70.7	-89.65	-2,470.4	4,412.6	4,265.0	4,144.8	35.498	
11,700.0	9,366.8	12,964.9	9,367.3	50.8	72.4	-89.65	-2,570.4	4,412.2	4,261.2	4,137.7	34.491	
11,800.0	9,367.9	13,064.8	9,368.3	52.5	74.2	-89.65	-2,670.3	4,411.8	4,257.4	4,130.5	33.534	
11,900.0	9,368.9	13,164.8	9,369.3	54.1	75.9	-89.65	-2,770.2	4,411.4	4,253.7	4,123.3	32.624	
12,000.0	9,369.9	13,264.7	9,370.3	55.8	77.7	-89.65	-2,870.1	4,411.1	4,249.9	4,116.1	31.757	
12,100.0	9,370.9	13,364.6	9,371.3	57.6	79.5	-89.65	-2,970.1	4,410.7	4,246.1	4,108.8	30.932	
12,200.0	9,371.9	13,464.6	9,372.3	59.3	81.2	-89.65	-3,070.0	4,410.3	4,242.4	4,101.6	30.145	
12,300.0	9,372.9	13,564.5	9,373.3	61.0	83.0	-89.65	-3,169.9	4,409.9	4,238.6	4,094.4	29.393	
12,400.0	9,373.9	13,664.4	9,374.3	62.7	84.7	-89.64	-3,269.8	4,409.5	4,234.8	4,087.1	28.675	
12,500.0	9,375.0	13,764.3	9,375.3	64.5	86.5	-89.64	-3,369.8	4,409.1	4,231.0	4,079.9	27.989	
12,600.0	9,376.0	13,864.3	9,376.3	66.2	88.3	-89.64	-3,469.7	4,408.7	4,227.3	4,072.6	27.332	
12,700.0	9,377.0	13,964.2	9,377.4	67.9	90.1	-89.64	-3,569.6	4,408.3	4,223.5	4,065.3	26.704	
12,800.0	9,378.0	14,064.1	9,378.4	69.7	91.8	-89.64	-3,669.5	4,407.9	4,219.7	4,058.1	26.101	
12,900.0	9,379.0	14,164.1	9,379.4	71.4	93.6	-89.64	-3,769.4	4,407.5	4,216.0	4,050.8	25.523	
13,000.0	9,380.0	14,264.0	9,380.4	73.2	95.4	-89.64	-3,869.4	4,407.1	4,212.2	4,043.5	24.968	

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

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Compass
Reference Design:	Design #2	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 31, T19S, R32E - Nightcap 6 Federal 1H - Wellbore #1 - Design #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD default — **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)	Separation Factor	Warning
13,100.0	9,381.0	14,363.9	9,381.4	75.0	97.2	-89.64	-3,969.3	4,406.7	4,208.4	4,036.2	24.436	
13,200.0	9,382.0	14,463.8	9,382.4	76.7	99.0	-89.64	-4,069.2	4,406.3	4,204.6	4,028.9	23.923	
13,300.0	9,383.1	14,563.8	9,383.4	78.5	100.7	-89.64	-4,169.1	4,405.9	4,200.9	4,021.6	23.431	
13,400.0	9,384.1	14,663.7	9,384.4	80.3	102.5	-89.64	-4,269.1	4,405.5	4,197.1	4,014.3	22.957	
13,500.0	9,385.1	14,763.6	9,385.4	82.0	104.3	-89.64	-4,369.0	4,405.1	4,193.3	4,007.0	22.500	
13,600.0	9,386.1	14,863.6	9,386.5	83.8	106.1	-89.64	-4,468.9	4,404.7	4,189.6	3,999.7	22.060	
13,700.0	9,387.1	14,963.5	9,387.5	85.6	107.9	-89.64	-4,568.8	4,404.3	4,185.8	3,992.3	21.636	
13,800.0	9,388.1	15,063.4	9,388.5	87.4	109.7	-89.64	-4,668.8	4,403.9	4,182.0	3,985.0	21.227	
13,900.0	9,389.1	15,163.3	9,389.5	89.2	111.5	-89.64	-4,768.7	4,403.5	4,178.3	3,977.7	20.832	
14,000.0	9,390.1	15,263.3	9,390.5	90.9	113.3	-89.64	-4,868.6	4,403.1	4,174.5	3,970.4	20.450	
14,100.0	9,391.2	15,363.2	9,391.5	92.7	115.1	-89.64	-4,968.5	4,402.7	4,170.7	3,963.0	20.081	
14,200.0	9,392.2	15,463.1	9,392.5	94.5	116.9	-89.64	-5,068.4	4,402.3	4,166.9	3,955.7	19.722	
14,300.0	9,393.2	15,563.1	9,393.5	96.3	118.7	-89.64	-5,168.4	4,401.9	4,163.2	3,948.3	19.376	
14,400.0	9,394.2	15,663.0	9,394.5	98.1	120.4	-89.64	-5,268.3	4,401.5	4,159.4	3,941.0	19.040	
14,500.0	9,395.2	15,762.9	9,395.5	99.9	122.2	-89.64	-5,368.2	4,401.1	4,155.6	3,933.6	18.716	
14,600.0	9,396.2	15,862.8	9,396.6	101.7	124.0	-89.64	-5,468.1	4,400.7	4,151.9	3,926.2	18.401	
14,700.0	9,397.2	15,962.8	9,397.6	103.5	125.8	-89.64	-5,568.1	4,400.3	4,148.1	3,918.9	18.096	
14,800.0	9,398.3	16,062.7	9,398.6	105.3	127.6	-89.64	-5,668.0	4,399.9	4,144.3	3,911.5	17.801	
14,900.0	9,399.3	16,162.6	9,399.6	107.1	129.4	-89.64	-5,767.9	4,399.5	4,140.6	3,904.1	17.514	
15,000.0	9,400.3	16,262.6	9,400.6	108.9	131.2	-89.64	-5,867.8	4,399.1	4,136.8	3,896.8	17.235	
15,100.0	9,401.3	16,362.5	9,401.6	110.7	133.0	-89.64	-5,967.8	4,398.7	4,133.0	3,889.4	16.965	
15,200.0	9,402.3	16,462.4	9,402.6	112.5	134.8	-89.64	-6,067.7	4,398.3	4,129.2	3,882.0	16.703	
15,300.0	9,403.3	16,562.3	9,403.6	114.3	136.6	-89.63	-6,167.6	4,397.9	4,125.5	3,874.6	16.448	
15,400.0	9,404.3	16,662.3	9,404.6	116.1	138.4	-89.63	-6,267.5	4,397.5	4,121.7	3,867.3	16.200	
15,500.0	9,405.3	16,762.2	9,405.6	117.9	140.3	-89.63	-6,367.4	4,397.1	4,117.9	3,859.9	15.959	
15,600.0	9,406.4	16,862.1	9,406.7	119.7	142.1	-89.63	-6,467.4	4,396.7	4,114.2	3,852.5	15.724	
15,700.0	9,407.4	16,962.1	9,407.7	121.5	143.9	-89.63	-6,567.3	4,396.4	4,110.4	3,845.1	15.496	
15,800.0	9,408.4	17,062.0	9,408.7	123.3	145.7	-89.63	-6,667.2	4,396.0	4,106.6	3,837.8	15.274	
15,900.0	9,409.4	17,161.9	9,409.7	125.1	147.5	-89.63	-6,767.1	4,395.6	4,102.9	3,830.4	15.058	
16,000.0	9,410.4	17,261.9	9,410.7	126.9	149.3	-89.63	-6,867.1	4,395.2	4,099.1	3,823.0	14.847	
16,100.0	9,411.4	17,361.8	9,411.7	128.7	151.1	-89.63	-6,967.0	4,394.8	4,095.3	3,815.6	14.642	
16,200.0	9,412.4	17,461.7	9,412.7	130.5	152.9	-89.63	-7,066.9	4,394.4	4,091.5	3,808.2	14.441	
16,300.0	9,413.4	17,561.6	9,413.7	132.4	154.7	-89.63	-7,166.8	4,394.0	4,087.8	3,800.8	14.246	
16,400.0	9,414.5	17,661.6	9,414.7	134.2	156.5	-89.63	-7,266.8	4,393.6	4,084.0	3,793.4	14.056	
16,500.0	9,415.5	17,761.5	9,415.8	136.0	158.3	-89.63	-7,366.7	4,393.2	4,080.2	3,786.1	13.870	
16,600.0	9,416.5	17,861.4	9,416.8	137.8	160.1	-89.63	-7,466.6	4,392.8	4,076.5	3,778.7	13.689	
16,700.0	9,417.5	17,961.4	9,417.8	139.6	161.9	-89.63	-7,566.5	4,392.4	4,072.7	3,771.3	13.512	
16,800.0	9,418.5	18,061.3	9,418.8	141.4	163.7	-89.63	-7,666.4	4,392.0	4,068.9	3,763.9	13.339	
16,900.0	9,419.5	18,161.2	9,419.8	143.2	165.5	-89.63	-7,766.4	4,391.6	4,065.1	3,756.5	13.171	
17,000.0	9,420.5	18,261.1	9,420.8	145.0	167.4	-89.63	-7,866.3	4,391.2	4,061.4	3,749.1	13.006	
17,100.0	9,421.6	18,361.1	9,421.8	146.9	169.2	-89.63	-7,966.2	4,390.8	4,057.6	3,741.7	12.845	
17,200.0	9,422.6	18,461.0	9,422.8	148.7	171.0	-89.63	-8,066.1	4,390.4	4,053.8	3,734.3	12.687	
17,300.0	9,423.6	18,560.9	9,423.8	150.5	172.8	-89.63	-8,166.1	4,390.0	4,050.1	3,726.9	12.533	
17,400.0	9,424.6	18,660.9	9,424.8	152.3	174.6	-89.63	-8,266.0	4,389.6	4,046.3	3,719.5	12.383	
17,500.0	9,425.6	18,760.8	9,425.9	154.1	176.4	-89.63	-8,365.9	4,389.2	4,042.5	3,712.1	12.235	
17,600.0	9,426.6	18,860.7	9,426.9	155.9	178.2	-89.63	-8,465.8	4,388.8	4,038.8	3,704.7	12.091	
17,700.0	9,427.6	18,960.6	9,427.9	157.8	180.0	-89.63	-8,565.8	4,388.4	4,035.0	3,697.3	11.950	
17,800.0	9,428.6	19,060.6	9,428.9	159.6	181.8	-89.63	-8,665.7	4,388.0	4,031.2	3,689.9	11.812	
17,900.0	9,429.7	19,160.5	9,429.9	161.4	183.6	-89.63	-8,765.6	4,387.6	4,027.4	3,682.5	11.677	
18,000.0	9,430.7	19,260.4	9,430.9	163.2	185.5	-89.63	-8,865.5	4,387.2	4,023.7	3,675.1	11.544	
18,100.0	9,431.7	19,360.4	9,431.9	165.0	187.3	-89.62	-8,965.4	4,386.8	4,019.9	3,667.7	11.415	
18,200.0	9,432.7	19,460.3	9,432.9	166.9	189.1	-89.62	-9,065.4	4,386.4	4,016.1	3,660.3	11.288	

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

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Compass
Reference Design:	Design #2	**Offset TVD Reference:**	Offset Datum

Offset Design: Sec 31, T19S, R32E - Nightcap 6 Federal 1H - Wellbore #1 - Design #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD default — **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)	Separation Factor	Warning
18,300.0	9,433.7	19,560.2	9,433.9	168.7	190.9	-89.62	-9,165.3	4,386.0	4,012.4	3,652.9	11.163	
18,400.0	9,434.7	19,660.1	9,434.9	170.5	192.7	-89.62	-9,265.2	4,385.6	4,008.6	3,645.5	11.041	
18,500.0	9,435.7	19,760.1	9,436.0	172.3	194.5	-89.62	-9,365.1	4,385.2	4,004.8	3,638.1	10.921	
18,600.0	9,436.7	19,860.0	9,437.0	174.1	196.3	-89.62	-9,465.1	4,384.8	4,001.1	3,630.7	10.804	
18,700.0	9,437.8	19,959.9	9,438.0	176.0	198.1	-89.62	-9,565.0	4,384.4	3,997.3	3,623.3	10.689	
18,800.0	9,438.8	20,059.9	9,439.0	177.8	200.0	-89.62	-9,664.9	4,384.0	3,993.5	3,615.9	10.576	
18,900.0	9,439.8	20,159.8	9,440.0	179.6	201.8	-89.62	-9,764.8	4,383.6	3,989.7	3,608.5	10.466	
19,000.0	9,440.8	20,259.7	9,441.0	181.4	203.6	-89.62	-9,864.7	4,383.2	3,986.0	3,601.1	10.357	
19,100.0	9,441.8	20,359.6	9,442.0	183.2	205.4	-89.62	-9,964.7	4,382.8	3,982.2	3,593.7	10.250	
19,200.0	9,442.8	20,459.6	9,443.0	185.1	207.2	-89.62	-10,064.6	4,382.4	3,978.4	3,586.3	10.146	
19,300.0	9,443.8	20,559.5	9,444.0	186.9	209.0	-89.62	-10,164.5	4,382.0	3,974.7	3,578.9	10.043	
19,400.0	9,444.9	20,659.4	9,445.1	188.7	210.8	-89.62	-10,264.4	4,381.6	3,970.9	3,571.5	9.942	
19,500.0	9,445.9	20,759.4	9,446.1	190.5	212.7	-89.62	-10,364.4	4,381.3	3,967.1	3,564.1	9.843	
19,600.0	9,446.9	20,859.3	9,447.1	192.4	214.5	-89.62	-10,464.3	4,380.9	3,963.3	3,556.7	9.746	
19,700.0	9,447.9	20,959.2	9,448.1	194.2	216.3	-89.62	-10,564.2	4,380.5	3,959.6	3,549.3	9.650	
19,800.0	9,448.9	21,059.1	9,449.1	196.0	218.1	-89.62	-10,664.1	4,380.1	3,955.8	3,541.9	9.556	
19,907.9	9,450.0	21,149.5	9,450.0	198.0	219.7	-89.62	-10,754.5	4,379.7	3,951.8	3,534.2	9.464	CC, ES, SF

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

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore:	Wellbore #1	**Database:**	Compass
Reference Design:	Design #2	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 31, T19S, R32E - Nightcap 6 Federal 2H - Wellbore #1 - Design #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD default — **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)	Separation Factor	Warning
0.0	0.0	25.0	25.0	0.0	0.0	75.17	1,146.0	4,327.4	4,476.6			
100.0	100.0	125.0	125.0	0.1	0.1	75.17	1,146.0	4,327.4	4,476.6	4,476.4	N/A	
200.0	200.0	225.0	225.0	0.3	0.4	75.17	1,146.0	4,327.4	4,476.6	4,475.9	6,774.348	
300.0	300.0	325.0	325.0	0.5	0.6	75.17	1,146.0	4,327.4	4,476.6	4,475.5	4,031.698	
400.0	400.0	425.0	425.0	0.8	0.8	75.17	1,146.0	4,327.4	4,476.6	4,475.0	2,869.825	
500.0	500.0	525.0	525.0	1.0	1.0	75.17	1,146.0	4,327.4	4,476.6	4,474.6	2,227.806	
600.0	600.0	625.0	625.0	1.2	1.3	75.17	1,146.0	4,327.4	4,476.6	4,474.1	1,820.529	
700.0	700.0	725.0	725.0	1.4	1.5	75.17	1,146.0	4,327.4	4,476.6	4,473.7	1,539.149	
800.0	800.0	825.0	825.0	1.7	1.7	75.17	1,146.0	4,327.4	4,476.6	4,473.2	1,333.105	
900.0	900.0	925.0	925.0	1.9	1.9	75.17	1,146.0	4,327.4	4,476.6	4,472.8	1,175.714	
1,000.0	1,000.0	1,025.0	1,025.0	2.1	2.2	75.17	1,146.0	4,327.4	4,476.6	4,472.3	1,051.562	
1,100.0	1,100.0	1,125.0	1,125.0	2.3	2.4	75.17	1,146.0	4,327.4	4,476.6	4,471.9	951.127	
1,200.0	1,200.0	1,225.0	1,225.0	2.5	2.6	75.17	1,146.0	4,327.4	4,476.6	4,471.4	868.204	
1,300.0	1,300.0	1,325.0	1,325.0	2.8	2.8	75.17	1,146.0	4,327.4	4,476.6	4,471.0	798.580	
1,400.0	1,400.0	1,425.0	1,425.0	3.0	3.1	75.17	1,146.0	4,327.4	4,476.6	4,470.5	739.294	
1,500.0	1,500.0	1,525.0	1,525.0	3.2	3.3	75.17	1,146.0	4,327.4	4,476.6	4,470.1	688.203	
1,600.0	1,600.0	1,625.0	1,625.0	3.4	3.5	75.17	1,146.0	4,327.4	4,476.6	4,469.6	643.717	
1,700.0	1,700.0	1,725.0	1,725.0	3.7	3.7	75.17	1,146.0	4,327.4	4,476.6	4,469.2	604.632	
1,800.0	1,800.0	1,825.0	1,825.0	3.9	4.0	75.17	1,146.0	4,327.4	4,476.6	4,468.7	570.023	
1,900.0	1,900.0	1,925.0	1,925.0	4.1	4.2	75.17	1,146.0	4,327.4	4,476.6	4,468.3	539.161	
2,000.0	2,000.0	2,025.0	2,025.0	4.3	4.4	75.17	1,146.0	4,327.4	4,476.6	4,467.8	511.469	
2,100.0	2,100.0	2,125.0	2,125.0	4.6	4.6	75.17	1,146.0	4,327.4	4,476.6	4,467.4	486.482	
2,200.0	2,200.0	2,225.0	2,225.0	4.8	4.9	75.17	1,146.0	4,327.4	4,476.6	4,466.9	463.824	
2,300.0	2,300.0	2,325.0	2,325.0	5.0	5.1	75.17	1,146.0	4,327.4	4,476.6	4,466.5	443.182	
2,400.0	2,400.0	2,425.0	2,425.0	5.2	5.3	75.17	1,146.0	4,327.4	4,476.6	4,466.0	424.299	
2,500.0	2,500.0	2,525.0	2,525.0	5.5	5.5	75.17	1,146.0	4,327.4	4,476.6	4,465.6	406.959	
2,600.0	2,600.0	2,625.0	2,625.0	5.7	5.8	75.17	1,146.0	4,327.4	4,476.6	4,465.1	390.981	
2,700.0	2,700.0	2,725.0	2,725.0	5.9	6.0	75.17	1,146.0	4,327.4	4,476.6	4,464.7	376.211	
2,800.0	2,800.0	2,825.0	2,825.0	6.1	6.2	75.17	1,146.0	4,327.4	4,476.6	4,464.2	362.515	
2,900.0	2,900.0	2,925.0	2,925.0	6.4	6.4	75.17	1,146.0	4,327.4	4,476.6	4,463.8	349.782	
3,000.0	3,000.0	3,025.0	3,025.0	6.6	6.7	75.17	1,146.0	4,327.4	4,476.6	4,463.3	337.913	
3,100.0	3,100.0	3,125.0	3,125.0	6.8	6.9	75.17	1,146.0	4,327.4	4,476.6	4,462.9	326.823	
3,200.0	3,200.0	3,225.0	3,225.0	7.0	7.1	75.17	1,146.0	4,327.4	4,476.6	4,462.4	316.438	
3,300.0	3,300.0	3,325.0	3,325.0	7.3	7.3	75.17	1,146.0	4,327.4	4,476.6	4,462.0	306.692	
3,400.0	3,400.0	3,425.0	3,425.0	7.5	7.6	75.17	1,146.0	4,327.4	4,476.6	4,461.5	297.529	
3,500.0	3,500.0	3,525.0	3,525.0	7.7	7.8	75.17	1,146.0	4,327.4	4,476.6	4,461.1	288.897	
3,600.0	3,600.0	3,625.0	3,625.0	7.9	8.0	75.17	1,146.0	4,327.4	4,476.6	4,460.6	280.753	
3,700.0	3,700.0	3,725.0	3,725.0	8.2	8.2	75.17	1,146.0	4,327.4	4,476.6	4,460.2	273.054	
3,800.0	3,800.0	3,825.0	3,825.0	8.4	8.5	75.17	1,146.0	4,327.4	4,476.6	4,459.7	265.767	
3,900.0	3,900.0	3,925.0	3,925.0	8.6	8.7	75.17	1,146.0	4,327.4	4,476.6	4,459.3	258.859	
4,000.0	4,000.0	4,025.0	4,025.0	8.8	8.9	75.17	1,146.0	4,327.4	4,476.6	4,458.8	252.300	
4,100.0	4,100.0	4,125.0	4,125.0	9.1	9.1	75.17	1,146.0	4,327.4	4,476.6	4,458.4	246.066	
4,200.0	4,200.0	4,225.0	4,225.0	9.3	9.3	75.17	1,146.0	4,327.4	4,476.6	4,457.9	240.133	
4,300.0	4,300.0	4,325.0	4,325.0	9.5	9.6	75.17	1,146.0	4,327.4	4,476.6	4,457.5	234.478	
4,400.0	4,400.0	4,425.0	4,425.0	9.7	9.8	75.17	1,146.0	4,327.4	4,476.6	4,457.0	229.084	
4,500.0	4,500.0	4,525.0	4,525.0	10.0	10.0	75.17	1,146.0	4,327.4	4,476.6	4,456.6	223.933	
4,600.0	4,600.0	4,625.0	4,625.0	10.2	10.2	75.17	1,146.0	4,327.4	4,476.6	4,456.1	219.008	
4,700.0	4,700.0	4,725.0	4,725.0	10.4	10.5	75.17	1,146.0	4,327.4	4,476.6	4,455.7	214.295	
4,800.0	4,800.0	4,825.0	4,825.0	10.6	10.7	75.17	1,146.0	4,327.4	4,476.6	4,455.2	209.781	
4,900.0	4,900.0	4,925.0	4,925.0	10.9	10.9	75.17	1,146.0	4,327.4	4,476.6	4,454.8	205.453	
5,000.0	5,000.0	5,025.0	5,025.0	11.1	11.1	75.17	1,146.0	4,327.4	4,476.6	4,454.3	201.300	
5,100.0	5,100.0	5,125.0	5,125.0	11.3	11.4	75.17	1,146.0	4,327.4	4,476.6	4,453.9	197.311	

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

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	TVD Reference:	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 4H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Compass
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Offset Design: Sec 31, T19S, R32E - Nightcap 6 Federal 2H - Wellbore #1 - Design #1 — Offset Site Error: 0.0 usft

Survey Program: 0-MWD default — 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)	Separation Factor	Warning
5,200.0	5,200.0	5,225.0	5,225.0	11.5	11.6	75.17	1,146.0	4,327.4	4,476.6	4,453.4	193.478	
5,300.0	5,300.0	5,325.0	5,325.0	11.8	11.8	75.17	1,146.0	4,327.4	4,476.6	4,453.0	189.790	
5,400.0	5,400.0	5,425.0	5,425.0	12.0	12.0	75.17	1,146.0	4,327.4	4,476.6	4,452.5	186.241	
5,500.0	5,500.0	5,525.0	5,525.0	12.2	12.3	75.17	1,146.0	4,327.4	4,476.6	4,452.1	182.822	
5,600.0	5,600.0	5,625.0	5,625.0	12.4	12.5	75.17	1,146.0	4,327.4	4,476.6	4,451.6	179.526	
5,700.0	5,700.0	5,725.0	5,725.0	12.7	12.7	75.17	1,146.0	4,327.4	4,476.6	4,451.2	176.347	
5,800.0	5,800.0	5,825.0	5,825.0	12.9	12.9	75.17	1,146.0	4,327.4	4,476.6	4,450.7	173.278	
5,900.0	5,900.0	5,925.0	5,925.0	13.1	13.2	75.17	1,146.0	4,327.4	4,476.6	4,450.3	170.315	
6,000.0	6,000.0	6,025.0	6,025.0	13.3	13.4	75.17	1,146.0	4,327.4	4,476.6	4,449.8	167.451	
6,100.0	6,100.0	11,300.0	9,347.1	13.6	46.8	100.95	-587.9	3,038.8	4,467.9	4,403.1	68.898	
6,200.0	6,200.0	11,300.0	9,347.1	13.8	46.8	100.95	-587.9	3,038.8	4,396.3	4,331.3	67.561	
6,300.0	6,300.0	11,300.0	9,347.1	14.0	46.8	100.95	-587.9	3,038.8	4,325.9	4,260.6	66.249	
6,400.0	6,400.0	11,300.0	9,347.1	14.2	46.8	100.95	-587.9	3,038.8	4,256.6	4,191.1	64.965	
6,500.0	6,500.0	11,300.0	9,347.1	14.5	46.8	100.95	-587.9	3,038.8	4,188.6	4,122.9	63.708	
6,600.0	6,600.0	11,300.0	9,347.1	14.7	46.8	100.95	-587.9	3,038.8	4,121.9	4,055.9	62.480	
6,700.0	6,700.0	11,300.0	9,347.1	14.9	46.8	100.95	-587.9	3,038.8	4,056.6	3,990.4	61.281	
6,800.0	6,800.0	11,300.0	9,347.1	15.1	46.8	100.95	-587.9	3,038.8	3,992.6	3,926.2	60.111	
6,900.0	6,900.0	11,300.0	9,347.1	15.4	46.8	100.95	-587.9	3,038.8	3,930.2	3,863.6	58.972	
7,000.0	7,000.0	11,300.0	9,347.1	15.6	46.8	100.95	-587.9	3,038.8	3,869.4	3,802.5	57.864	
7,100.0	7,100.0	11,300.0	9,347.1	15.8	46.8	100.95	-587.9	3,038.8	3,810.2	3,743.2	56.789	
7,200.0	7,200.0	11,300.0	9,347.1	16.0	46.8	100.95	-587.9	3,038.8	3,752.8	3,685.5	55.746	
7,300.0	7,300.0	11,300.0	9,347.1	16.3	46.8	100.95	-587.9	3,038.8	3,697.2	3,629.6	54.737	
7,400.0	7,400.0	11,300.0	9,347.1	16.5	46.8	100.95	-587.9	3,038.8	3,643.4	3,575.7	53.762	
7,500.0	7,500.0	11,300.0	9,347.1	16.7	46.8	100.95	-587.9	3,038.8	3,591.7	3,523.7	52.823	
7,600.0	7,600.0	11,300.0	9,347.1	16.9	46.8	100.95	-587.9	3,038.8	3,542.0	3,473.8	51.921	
7,700.0	7,700.0	11,300.0	9,347.1	17.2	46.8	100.95	-587.9	3,038.8	3,494.5	3,426.0	51.056	
7,800.0	7,800.0	11,300.0	9,347.1	17.4	46.8	100.95	-587.9	3,038.8	3,449.2	3,380.5	50.230	
7,900.0	7,900.0	11,300.0	9,347.1	17.6	46.8	100.95	-587.9	3,038.8	3,406.3	3,337.4	49.442	
8,000.0	8,000.0	11,300.0	9,347.1	17.8	46.8	100.95	-587.9	3,038.8	3,365.7	3,296.6	48.695	
8,100.0	8,100.0	11,300.0	9,347.1	18.1	46.8	100.95	-587.9	3,038.8	3,327.7	3,258.4	47.989	
8,200.0	8,200.0	11,300.0	9,347.1	18.3	46.8	100.95	-587.9	3,038.8	3,292.3	3,222.7	47.325	
8,300.0	8,300.0	11,300.0	9,347.1	18.5	46.8	100.95	-587.9	3,038.8	3,259.6	3,189.8	46.704	
8,400.0	8,400.0	11,300.0	9,347.1	18.7	46.8	100.95	-587.9	3,038.8	3,229.6	3,159.6	46.126	
8,500.0	8,500.0	11,300.0	9,347.1	19.0	46.8	100.95	-587.9	3,038.8	3,202.5	3,132.3	45.592	
8,600.0	8,600.0	11,300.0	9,347.1	19.2	46.8	100.95	-587.9	3,038.8	3,178.3	3,107.8	45.104	
8,700.0	8,700.0	11,300.0	9,347.1	19.4	46.8	100.95	-587.9	3,038.8	3,157.1	3,086.4	44.660	
8,800.0	8,800.0	11,300.0	9,347.1	19.6	46.8	100.95	-587.9	3,038.8	3,138.9	3,068.0	44.262	
8,863.0	8,863.0	11,300.0	9,347.1	19.8	46.8	100.95	-587.9	3,038.8	3,129.1	3,058.0	44.035	
8,875.0	8,875.0	11,300.0	9,347.1	19.8	46.8	-64.05	-587.9	3,038.8	3,127.3	3,064.5	49.867	
8,900.0	8,900.0	11,336.8	9,347.5	19.8	47.3	-63.81	-623.9	3,030.8	3,122.4	3,059.1	49.340	
8,925.0	8,924.8	11,337.5	9,347.5	19.9	47.3	-64.28	-624.5	3,030.7	3,118.0	3,054.9	49.417	
8,950.0	8,949.5	11,338.5	9,347.5	19.9	47.3	-64.79	-625.5	3,030.5	3,113.2	3,050.4	49.529	
8,975.0	8,974.0	11,339.8	9,347.5	20.0	47.3	-65.34	-626.8	3,030.2	3,108.1	3,045.5	49.672	
9,000.0	8,998.1	11,341.5	9,347.6	20.0	47.4	-65.92	-628.4	3,029.9	3,102.6	3,040.3	49.845	
9,025.0	9,021.9	11,343.4	9,347.6	20.0	47.4	-66.54	-630.3	3,029.5	3,096.8	3,034.9	50.043	
9,050.0	9,045.3	11,345.6	9,347.6	20.1	47.4	-67.20	-632.5	3,029.1	3,090.6	3,029.1	50.262	
9,075.0	9,068.1	11,348.2	9,347.6	20.1	47.5	-67.90	-635.0	3,028.6	3,084.2	3,023.1	50.499	
9,100.0	9,090.4	11,351.0	9,347.7	20.2	47.5	-68.63	-637.8	3,028.0	3,077.4	3,016.8	50.749	
9,125.0	9,112.0	11,354.1	9,347.7	20.2	47.5	-69.40	-640.8	3,027.4	3,070.4	3,010.2	51.007	
9,150.0	9,133.0	11,357.5	9,347.7	20.3	47.6	-70.20	-644.1	3,026.8	3,063.1	3,003.3	51.267	
9,175.0	9,153.3	11,361.2	9,347.8	20.3	47.6	-71.04	-647.7	3,026.1	3,055.5	2,996.2	51.524	
9,200.0	9,172.7	11,400.0	9,348.2	20.4	48.1	-71.36	-686.0	3,019.7	3,048.5	2,989.1	51.296	

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

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at:**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Compass
Reference Design:	Design #2	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 31, T19S, R32E - Nightcap 6 Federal 2H - Wellbore #1 - Design #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD default — **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)	Separation Factor	Warning
9,225.0	9,191.3	11,400.0	9,348.2	20.4	48.1	-72.35	-686.0	3,019.7	3,040.3	2,981.4	51.592	
9,238.0	9,200.6	11,400.0	9,348.2	20.5	48.1	-72.88	-686.0	3,019.7	3,036.0	2,977.3	51.738	
9,250.0	9,209.0	11,400.0	9,348.2	20.5	48.1	-73.83	-686.0	3,019.7	3,032.0	2,973.4	51.696	
9,275.0	9,225.8	11,400.0	9,348.2	20.6	48.1	-75.69	-686.0	3,019.7	3,023.9	2,965.2	51.581	
9,300.0	9,241.6	11,400.0	9,348.2	20.6	48.1	-77.40	-686.0	3,019.7	3,016.0	2,957.3	51.431	
9,325.0	9,256.5	11,400.0	9,348.2	20.7	48.1	-78.98	-686.0	3,019.7	3,008.4	2,949.7	51.247	
9,350.0	9,270.3	11,400.0	9,348.2	20.8	48.1	-80.44	-686.0	3,019.7	3,001.0	2,942.2	51.031	
9,375.0	9,283.1	11,400.0	9,348.2	20.9	48.1	-81.77	-686.0	3,019.7	2,994.1	2,935.1	50.786	
9,400.0	9,294.7	11,400.0	9,348.2	21.0	48.1	-83.00	-686.0	3,019.7	2,987.4	2,928.3	50.515	
9,425.0	9,305.3	11,400.0	9,348.2	21.1	48.1	-84.12	-686.0	3,019.7	2,981.1	2,921.7	50.220	
9,450.0	9,314.6	11,400.0	9,348.2	21.2	48.1	-85.14	-686.0	3,019.7	2,975.2	2,915.6	49.903	
9,475.0	9,322.8	11,400.0	9,348.2	21.3	48.1	-86.05	-686.0	3,019.7	2,969.7	2,909.8	49.570	
9,500.0	9,329.8	11,400.0	9,348.2	21.5	48.1	-86.87	-686.0	3,019.7	2,964.6	2,904.4	49.221	
9,525.0	9,335.5	11,437.6	9,348.6	21.6	48.6	-87.45	-723.3	3,014.8	2,959.1	2,898.0	48.446	
9,550.0	9,340.0	11,444.3	9,348.6	21.8	48.6	-88.10	-730.0	3,014.0	2,954.5	2,893.0	48.008	
9,575.0	9,343.2	11,451.2	9,348.7	21.9	48.7	-88.66	-736.8	3,013.3	2,950.4	2,888.4	47.565	
9,600.0	9,345.1	11,458.1	9,348.8	22.1	48.8	-89.15	-743.7	3,012.6	2,946.6	2,884.1	47.120	
9,620.9	9,345.8	11,463.9	9,348.8	22.2	48.9	-89.50	-749.4	3,012.0	2,943.9	2,880.9	46.750	
9,700.0	9,346.6	11,500.0	9,349.2	22.8	49.3	-89.49	-785.5	3,009.2	2,934.7	2,870.7	45.830	
9,800.0	9,347.6	11,500.0	9,349.2	23.7	49.3	-89.49	-785.5	3,009.2	2,925.2	2,860.3	45.089	
9,900.0	9,348.6	11,542.0	9,349.6	24.6	49.8	-89.49	-827.4	3,007.4	2,918.0	2,851.6	43.956	
10,000.0	9,349.6	11,576.7	9,350.0	25.6	50.2	-89.49	-862.1	3,007.1	2,913.4	2,845.5	42.912	
10,100.0	9,350.6	11,653.6	9,350.8	26.8	51.1	-89.49	-939.0	3,007.5	2,910.4	2,840.4	41.540	
10,200.0	9,351.7	11,753.5	9,351.8	28.0	52.3	-89.49	-1,038.9	3,008.0	2,907.6	2,834.9	40.023	
10,300.0	9,352.7	11,853.5	9,352.8	29.2	53.5	-89.49	-1,138.9	3,008.5	2,904.7	2,829.4	38.560	
10,400.0	9,353.7	11,953.4	9,353.8	30.6	54.7	-89.49	-1,238.8	3,009.1	2,901.9	2,823.8	37.157	
10,500.0	9,354.7	12,053.4	9,354.8	32.0	56.0	-89.49	-1,338.8	3,009.6	2,899.1	2,818.1	35.817	
10,600.0	9,355.7	12,153.4	9,355.8	33.4	57.3	-89.49	-1,438.7	3,010.1	2,896.2	2,812.4	34.540	
10,700.0	9,356.7	12,253.3	9,356.8	34.8	58.6	-89.49	-1,538.7	3,010.6	2,893.4	2,806.6	33.326	
10,800.0	9,357.7	12,353.3	9,357.8	36.3	60.0	-89.49	-1,638.6	3,011.2	2,890.5	2,800.7	32.172	
10,900.0	9,358.7	12,453.2	9,358.9	37.8	61.4	-89.49	-1,738.6	3,011.7	2,887.7	2,794.8	31.078	
11,000.0	9,359.8	12,553.2	9,359.9	39.4	62.8	-89.49	-1,838.5	3,012.2	2,884.9	2,788.8	30.041	
11,100.0	9,360.8	12,653.2	9,360.9	41.0	64.2	-89.49	-1,938.5	3,012.8	2,882.0	2,782.8	29.057	
11,200.0	9,361.8	12,753.1	9,361.9	42.6	65.6	-89.49	-2,038.4	3,013.3	2,879.2	2,776.8	28.124	
11,300.0	9,362.8	12,853.1	9,362.9	44.2	67.1	-89.49	-2,138.4	3,013.8	2,876.3	2,770.7	27.240	
11,400.0	9,363.8	12,953.0	9,363.9	45.8	68.6	-89.49	-2,238.4	3,014.4	2,873.5	2,764.6	26.401	
11,500.0	9,364.8	13,053.0	9,364.9	47.5	70.1	-89.49	-2,338.3	3,014.9	2,870.6	2,758.5	25.605	
11,600.0	9,365.8	13,153.0	9,365.9	49.1	71.6	-89.49	-2,438.3	3,015.4	2,867.8	2,752.4	24.848	
11,700.0	9,366.8	13,252.9	9,366.9	50.8	73.1	-89.49	-2,538.2	3,016.0	2,865.0	2,746.2	24.130	
11,800.0	9,367.9	13,352.9	9,368.0	52.5	74.7	-89.48	-2,638.2	3,016.5	2,862.1	2,740.0	23.447	
11,900.0	9,368.9	13,452.8	9,369.0	54.1	76.2	-89.48	-2,738.1	3,017.0	2,859.3	2,733.8	22.797	
12,000.0	9,369.9	13,552.8	9,370.0	55.8	77.8	-89.48	-2,838.1	3,017.5	2,856.4	2,727.6	22.177	
12,100.0	9,370.9	13,652.8	9,371.0	57.6	79.4	-89.48	-2,938.0	3,018.1	2,853.6	2,721.4	21.587	
12,200.0	9,371.9	13,752.7	9,372.0	59.3	80.9	-89.48	-3,038.0	3,018.6	2,850.7	2,715.2	21.025	
12,300.0	9,372.9	13,852.7	9,373.0	61.0	82.5	-89.48	-3,137.9	3,019.1	2,847.9	2,708.9	20.488	
12,400.0	9,373.9	13,952.6	9,374.0	62.7	84.1	-89.48	-3,237.9	3,019.7	2,845.1	2,702.6	19.975	
12,500.0	9,375.0	14,052.6	9,375.0	64.5	85.8	-89.48	-3,337.8	3,020.2	2,842.2	2,696.3	19.484	
12,600.0	9,376.0	14,152.6	9,376.0	66.2	87.4	-89.48	-3,437.8	3,020.7	2,839.4	2,690.1	19.015	
12,700.0	9,377.0	14,252.5	9,377.0	67.9	89.0	-89.48	-3,537.7	3,021.3	2,836.5	2,683.8	18.566	
12,800.0	9,378.0	14,352.5	9,378.1	69.7	90.7	-89.48	-3,637.7	3,021.8	2,833.7	2,677.4	18.136	
12,900.0	9,379.0	14,452.4	9,379.1	71.4	92.3	-89.48	-3,737.6	3,022.3	2,830.9	2,671.1	17.723	
13,000.0	9,380.0	14,552.4	9,380.1	73.2	94.0	-89.48	-3,837.6	3,022.9	2,828.0	2,664.8	17.327	

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

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	TVD Reference:	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 4H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Compass
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Offset Design: Sec 31, T19S, R32E - Nightcap 6 Federal 2H - Wellbore #1 - Design #1 — Offset Site Error: 0.0 usft

Survey Program: 0-MWD default — 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)	Separation Factor	Warning
13,100.0	9,381.0	14,652.4	9,381.1	75.0	95.6	-89.48	-3,937.6	3,023.4	2,825.2	2,658.5	16.947	
13,200.0	9,382.0	14,752.3	9,382.1	76.7	97.3	-89.48	-4,037.5	3,023.9	2,822.3	2,652.1	16.582	
13,300.0	9,383.1	14,852.3	9,383.1	78.5	99.0	-89.48	-4,137.5	3,024.5	2,819.5	2,645.8	16.231	
13,400.0	9,384.1	14,952.2	9,384.1	80.3	100.6	-89.48	-4,237.4	3,025.0	2,816.6	2,639.4	15.893	
13,500.0	9,385.1	15,052.2	9,385.1	82.0	102.3	-89.48	-4,337.4	3,025.5	2,813.8	2,633.1	15.568	
13,600.0	9,386.1	15,152.2	9,386.1	83.8	104.0	-89.47	-4,437.3	3,026.0	2,811.0	2,626.7	15.255	
13,700.0	9,387.1	15,252.1	9,387.1	85.6	105.7	-89.47	-4,537.3	3,026.6	2,808.1	2,620.3	14.953	
13,800.0	9,388.1	15,352.1	9,388.2	87.4	107.4	-89.47	-4,637.2	3,027.1	2,805.3	2,614.0	14.662	
13,900.0	9,389.1	15,452.0	9,389.2	89.2	109.1	-89.47	-4,737.2	3,027.6	2,802.4	2,607.6	14.382	
14,000.0	9,390.1	15,552.0	9,390.2	90.9	110.8	-89.47	-4,837.1	3,028.2	2,799.6	2,601.2	14.111	
14,100.0	9,391.2	15,652.0	9,391.2	92.7	112.5	-89.47	-4,937.1	3,028.7	2,796.7	2,594.8	13.849	
14,200.0	9,392.2	15,751.9	9,392.2	94.5	114.2	-89.47	-5,037.0	3,029.2	2,793.9	2,588.4	13.596	
14,300.0	9,393.2	15,851.9	9,393.2	96.3	116.0	-89.47	-5,137.0	3,029.8	2,791.1	2,582.0	13.351	
14,400.0	9,394.2	15,951.8	9,394.2	98.1	117.7	-89.47	-5,236.9	3,030.3	2,788.2	2,575.6	13.114	
14,500.0	9,395.2	16,051.8	9,395.2	99.9	119.4	-89.47	-5,336.9	3,030.8	2,785.4	2,569.2	12.885	
14,600.0	9,396.2	16,151.7	9,396.2	101.7	121.1	-89.47	-5,436.9	3,031.4	2,782.5	2,562.8	12.663	
14,700.0	9,397.2	16,251.7	9,397.3	103.5	122.9	-89.47	-5,536.8	3,031.9	2,779.7	2,556.4	12.448	
14,800.0	9,398.3	16,351.7	9,398.3	105.3	124.6	-89.47	-5,636.8	3,032.4	2,776.9	2,550.0	12.240	
14,900.0	9,399.3	16,451.6	9,399.3	107.1	126.3	-89.47	-5,736.7	3,032.9	2,774.0	2,543.6	12.038	
15,000.0	9,400.3	16,551.6	9,400.3	108.9	128.1	-89.47	-5,836.7	3,033.5	2,771.2	2,537.2	11.842	
15,100.0	9,401.3	16,651.5	9,401.3	110.7	129.8	-89.47	-5,936.6	3,034.0	2,768.3	2,530.7	11.651	
15,200.0	9,402.3	16,751.5	9,402.3	112.5	131.6	-89.47	-6,036.6	3,034.5	2,765.5	2,524.3	11.467	
15,300.0	9,403.3	16,851.5	9,403.3	114.3	133.3	-89.46	-6,136.5	3,035.1	2,762.6	2,517.9	11.287	
15,400.0	9,404.3	16,951.4	9,404.3	116.1	135.1	-89.46	-6,236.5	3,035.6	2,759.8	2,511.5	11.113	
15,500.0	9,405.3	17,051.4	9,405.3	117.9	136.8	-89.46	-6,336.4	3,036.1	2,757.0	2,505.0	10.943	
15,600.0	9,406.4	17,151.3	9,406.3	119.7	138.6	-89.46	-6,436.4	3,036.7	2,754.1	2,498.6	10.778	
15,700.0	9,407.4	17,251.3	9,407.4	121.5	140.3	-89.46	-6,536.3	3,037.2	2,751.3	2,492.2	10.618	
15,800.0	9,408.4	17,351.3	9,408.4	123.3	142.1	-89.46	-6,636.3	3,037.7	2,748.4	2,485.7	10.462	
15,900.0	9,409.4	17,451.2	9,409.4	125.1	143.8	-89.46	-6,736.2	3,038.3	2,745.6	2,479.3	10.310	
16,000.0	9,410.4	17,551.2	9,410.4	126.9	145.6	-89.46	-6,836.2	3,038.8	2,742.8	2,472.9	10.162	
16,100.0	9,411.4	17,651.1	9,411.4	128.7	147.4	-89.46	-6,936.1	3,039.3	2,739.9	2,466.4	10.018	
16,200.0	9,412.4	17,751.1	9,412.4	130.5	149.1	-89.46	-7,036.1	3,039.8	2,737.1	2,460.0	9.878	
16,300.0	9,413.4	17,851.1	9,413.4	132.4	150.9	-89.46	-7,136.1	3,040.4	2,734.2	2,453.5	9.741	
16,400.0	9,414.5	17,951.0	9,414.4	134.2	152.7	-89.46	-7,236.0	3,040.9	2,731.4	2,447.1	9.608	
16,500.0	9,415.5	18,051.0	9,415.4	136.0	154.4	-89.46	-7,336.0	3,041.4	2,728.5	2,440.6	9.478	
16,600.0	9,416.5	18,150.9	9,416.4	137.8	156.2	-89.46	-7,435.9	3,042.0	2,725.7	2,434.2	9.351	
16,700.0	9,417.5	18,250.9	9,417.5	139.6	158.0	-89.46	-7,535.9	3,042.5	2,722.9	2,427.7	9.227	
16,800.0	9,418.5	18,350.9	9,418.5	141.4	159.7	-89.46	-7,635.8	3,043.0	2,720.0	2,421.3	9.106	
16,900.0	9,419.5	18,450.8	9,419.5	143.2	161.5	-89.46	-7,735.8	3,043.6	2,717.2	2,414.8	8.988	
17,000.0	9,420.5	18,550.8	9,420.5	145.0	163.3	-89.45	-7,835.7	3,044.1	2,714.3	2,408.4	8.872	
17,100.0	9,421.6	18,650.7	9,421.5	146.9	165.1	-89.45	-7,935.7	3,044.6	2,711.5	2,401.9	8.760	
17,200.0	9,422.6	18,750.7	9,422.5	148.7	166.8	-89.45	-8,035.6	3,045.2	2,708.6	2,395.5	8.649	
17,300.0	9,423.6	18,850.7	9,423.5	150.5	168.6	-89.45	-8,135.6	3,045.7	2,705.8	2,389.0	8.542	
17,400.0	9,424.6	18,950.6	9,424.5	152.3	170.4	-89.45	-8,235.5	3,046.2	2,703.0	2,382.6	8.437	
17,500.0	9,425.6	19,050.6	9,425.5	154.1	172.2	-89.45	-8,335.5	3,046.7	2,700.1	2,376.1	8.334	
17,600.0	9,426.6	19,150.5	9,426.6	155.9	174.0	-89.45	-8,435.4	3,047.3	2,697.3	2,369.7	8.233	
17,700.0	9,427.6	19,250.5	9,427.6	157.8	175.7	-89.45	-8,535.4	3,047.8	2,694.4	2,363.2	8.135	
17,800.0	9,428.6	19,350.5	9,428.6	159.6	177.5	-89.45	-8,635.4	3,048.3	2,691.6	2,356.7	8.038	
17,900.0	9,429.7	19,450.4	9,429.6	161.4	179.3	-89.45	-8,735.3	3,048.9	2,688.8	2,350.3	7.944	
18,000.0	9,430.7	19,550.4	9,430.6	163.2	181.1	-89.45	-8,835.3	3,049.4	2,685.9	2,343.8	7.852	
18,100.0	9,431.7	19,650.3	9,431.6	165.0	182.9	-89.45	-8,935.2	3,049.9	2,683.1	2,337.4	7.761	
18,200.0	9,432.7	19,750.3	9,432.6	166.9	184.7	-89.45	-9,035.2	3,050.5	2,680.2	2,330.9	7.672	

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

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Compass
Reference Design:	Design #2	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 31, T19S, R32E - Nightcap 6 Federal 2H - Wellbore #1 - Design #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-MWD default — **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)	Separation Factor	Warning
18,300.0	9,433.7	19,850.3	9,433.6	168.7	186.4	-89.45	-9,135.1	3,051.0	2,677.4	2,324.4	7.586	
18,400.0	9,434.7	19,950.2	9,434.6	170.5	188.2	-89.45	-9,235.1	3,051.5	2,674.5	2,318.0	7.501	
18,500.0	9,435.7	20,050.2	9,435.6	172.3	190.0	-89.45	-9,335.0	3,052.1	2,671.7	2,311.5	7.417	
18,600.0	9,436.7	20,150.1	9,436.7	174.1	191.8	-89.44	-9,435.0	3,052.6	2,668.9	2,305.0	7.336	
18,700.0	9,437.8	20,250.1	9,437.7	176.0	193.6	-89.44	-9,534.9	3,053.1	2,666.0	2,298.6	7.256	
18,800.0	9,438.8	20,350.1	9,438.7	177.8	195.4	-89.44	-9,634.9	3,053.7	2,663.2	2,292.1	7.177	
18,900.0	9,439.8	20,450.0	9,439.7	179.6	197.2	-89.44	-9,734.8	3,054.2	2,660.3	2,285.6	7.100	
19,000.0	9,440.8	20,550.0	9,440.7	181.4	199.0	-89.44	-9,834.8	3,054.7	2,657.5	2,279.2	7.024	
19,100.0	9,441.8	20,649.9	9,441.7	183.2	200.8	-89.44	-9,934.7	3,055.2	2,654.6	2,272.7	6.950	
19,200.0	9,442.8	20,749.9	9,442.7	185.1	202.6	-89.44	-10,034.7	3,055.8	2,651.8	2,266.2	6.877	
19,300.0	9,443.8	20,849.8	9,443.7	186.9	204.4	-89.44	-10,134.6	3,056.3	2,649.0	2,259.8	6.806	
19,400.0	9,444.9	20,949.8	9,444.7	188.7	206.1	-89.44	-10,234.6	3,056.8	2,646.1	2,253.3	6.736	
19,500.0	9,445.9	21,049.8	9,445.7	190.5	207.9	-89.44	-10,334.6	3,057.4	2,643.3	2,246.8	6.667	
19,600.0	9,446.9	21,149.7	9,446.8	192.4	209.7	-89.44	-10,434.5	3,057.9	2,640.4	2,240.3	6.599	
19,700.0	9,447.9	21,249.7	9,447.8	194.2	211.5	-89.44	-10,534.5	3,058.4	2,637.6	2,233.9	6.533	
19,800.0	9,448.9	21,349.6	9,448.8	196.0	213.3	-89.44	-10,634.4	3,059.0	2,634.8	2,227.4	6.468	
19,907.9	9,450.0	21,457.5	9,449.9	198.0	215.3	-89.44	-10,742.3	3,059.5	2,631.7	2,220.4	6.399	CC, ES, SF

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

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	TVD Reference:	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 4H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Compass
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Offset Design — Sec 31, T19S, R32E - String Bean Federal Com 2H - Wellbore #1 - Wellbore #1 — Offset Site Error: 0.0 usft

Survey Program: 200-Good gyro, 8800-MWD default — 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)	Separation Factor	Warning
0.0	0.0	16.9	16.9	0.0	0.0	71.53	1,445.3	4,327.5	4,562.5			
100.0	100.0	116.0	116.0	0.1	0.1	71.53	1,445.3	4,327.5	4,562.5	4,562.4	N/A	
200.0	200.0	215.2	215.2	0.3	0.1	71.53	1,445.2	4,327.6	4,562.5	4,562.1	N/A	
300.0	300.0	314.6	314.6	0.5	0.2	71.53	1,445.1	4,327.7	4,562.6	4,561.9	6,701.373	
400.0	400.0	414.5	414.5	0.8	0.2	71.53	1,445.1	4,327.7	4,562.6	4,561.7	4,763.171	
500.0	500.0	517.0	517.0	1.0	0.3	71.53	1,445.1	4,327.8	4,562.7	4,561.4	3,690.570	
600.0	600.0	618.8	618.8	1.2	0.3	71.53	1,445.2	4,327.7	4,562.6	4,561.1	3,012.810	
700.0	700.0	718.3	718.3	1.4	0.4	71.53	1,445.3	4,327.6	4,562.6	4,560.8	2,547.144	
798.6	798.6	815.6	815.6	1.6	0.4	71.53	1,445.5	4,327.5	4,562.6	4,560.5	2,210.614	
800.0	800.0	816.9	816.9	1.7	0.4	71.53	1,445.5	4,327.5	4,562.6	4,560.5	2,206.618	
900.0	900.0	911.7	911.7	1.9	0.5	71.53	1,445.8	4,327.5	4,562.6	4,560.3	1,948.085	
1,000.0	1,000.0	1,006.7	1,006.6	2.1	0.5	71.52	1,446.0	4,327.6	4,562.8	4,560.2	1,743.795	
1,100.0	1,100.0	1,102.8	1,102.8	2.3	0.6	71.52	1,446.2	4,327.8	4,563.1	4,560.2	1,577.972	
1,200.0	1,200.0	1,200.0	1,200.0	2.5	0.6	71.52	1,446.4	4,328.1	4,563.4	4,560.3	1,440.745	
1,300.0	1,300.0	1,298.4	1,298.4	2.8	0.7	71.52	1,446.6	4,328.5	4,563.8	4,560.4	1,325.276	
1,400.0	1,400.0	1,397.8	1,397.8	3.0	0.7	71.52	1,446.6	4,328.9	4,564.2	4,560.5	1,226.780	
1,500.0	1,500.0	1,484.4	1,484.4	3.2	0.8	71.52	1,446.7	4,329.4	4,564.8	4,560.8	1,143.864	
1,600.0	1,600.0	1,570.7	1,570.7	3.4	0.8	71.52	1,446.9	4,330.1	4,565.7	4,561.4	1,071.574	
1,700.0	1,700.0	1,663.2	1,663.2	3.7	0.9	71.52	1,447.3	4,331.0	4,566.8	4,562.3	1,007.218	
1,800.0	1,800.0	1,758.9	1,758.9	3.9	0.9	71.52	1,447.8	4,332.1	4,568.0	4,563.2	949.866	
1,900.0	1,900.0	1,850.5	1,850.4	4.1	1.0	71.52	1,448.3	4,333.2	4,569.4	4,564.3	899.116	
2,000.0	2,000.0	1,938.8	1,938.8	4.3	1.0	71.52	1,449.0	4,334.5	4,570.9	4,565.6	853.840	
2,100.0	2,100.0	2,025.4	2,025.4	4.6	1.1	71.51	1,449.7	4,336.0	4,572.8	4,567.2	813.110	
2,200.0	2,200.0	2,108.0	2,107.9	4.8	1.1	71.51	1,450.2	4,337.7	4,575.0	4,569.1	776.450	
2,300.0	2,300.0	2,200.0	2,199.9	5.0	1.2	71.52	1,450.7	4,340.0	4,577.6	4,571.4	742.449	
2,400.0	2,400.0	2,279.0	2,278.8	5.2	1.2	71.52	1,451.1	4,342.3	4,580.5	4,574.0	712.127	
2,500.0	2,500.0	2,368.1	2,367.9	5.5	1.2	71.53	1,451.4	4,345.2	4,583.6	4,576.9	683.708	
2,600.0	2,600.0	2,467.9	2,467.7	5.7	1.3	71.54	1,451.6	4,348.6	4,586.9	4,579.9	656.997	
2,700.0	2,700.0	2,573.7	2,573.4	5.9	1.4	71.55	1,451.6	4,352.1	4,590.1	4,582.8	632.039	
2,800.0	2,800.0	2,681.4	2,681.0	6.1	1.4	71.57	1,451.4	4,355.6	4,593.1	4,585.6	608.841	
2,900.0	2,900.0	2,789.7	2,789.3	6.4	1.5	71.59	1,451.1	4,359.0	4,596.0	4,588.2	587.264	
3,000.0	3,000.0	2,875.7	2,875.3	6.6	1.5	71.60	1,450.7	4,361.8	4,598.9	4,590.8	568.001	
3,100.0	3,100.0	2,959.3	2,958.8	6.8	1.6	71.62	1,450.2	4,364.8	4,602.2	4,593.8	550.106	
3,200.0	3,200.0	3,081.3	3,080.7	7.0	1.7	71.65	1,449.3	4,369.5	4,605.6	4,596.9	532.098	
3,300.0	3,300.0	3,222.9	3,222.2	7.3	1.7	71.69	1,447.4	4,373.7	4,607.9	4,599.0	514.535	
3,400.0	3,400.0	3,314.4	3,313.6	7.5	1.8	71.72	1,445.3	4,376.5	4,610.1	4,600.9	499.474	
3,500.0	3,500.0	3,408.4	3,407.6	7.7	1.8	71.78	1,442.0	4,379.8	4,612.4	4,602.9	485.204	
3,600.0	3,600.0	3,541.7	3,540.7	7.9	1.9	71.85	1,436.9	4,384.4	4,614.4	4,604.6	470.651	
3,700.0	3,700.0	3,669.4	3,668.2	8.2	2.0	71.93	1,431.9	4,387.8	4,615.8	4,605.7	456.977	
3,800.0	3,800.0	3,792.7	3,791.3	8.4	2.1	72.00	1,426.5	4,390.6	4,616.6	4,606.2	444.100	
3,900.0	3,900.0	3,909.4	3,907.9	8.6	2.1	72.07	1,421.3	4,392.7	4,616.9	4,606.3	432.054	
4,000.0	4,000.0	4,024.7	4,023.2	8.8	2.2	72.13	1,416.8	4,394.2	4,617.0	4,606.0	420.644	
4,100.0	4,100.0	4,136.5	4,134.8	9.1	2.3	72.18	1,412.6	4,395.2	4,616.7	4,605.4	409.871	
4,200.0	4,200.0	4,245.0	4,243.3	9.3	2.3	72.23	1,408.8	4,395.9	4,616.2	4,604.7	399.696	
4,300.0	4,300.0	4,349.3	4,347.5	9.5	2.4	72.27	1,405.5	4,396.3	4,615.6	4,603.8	390.103	
4,400.0	4,400.0	4,454.2	4,452.4	9.7	2.4	72.30	1,402.7	4,396.4	4,614.9	4,602.8	380.938	
4,500.0	4,500.0	4,559.7	4,557.8	10.0	2.5	72.34	1,399.9	4,396.4	4,614.1	4,601.7	372.171	
4,600.0	4,600.0	4,659.3	4,657.4	10.2	2.5	72.37	1,397.3	4,396.2	4,613.2	4,600.5	363.889	
4,700.0	4,700.0	4,755.2	4,753.2	10.4	2.6	72.39	1,395.0	4,396.2	4,612.3	4,599.4	356.028	
4,800.0	4,800.0	4,853.7	4,851.8	10.6	2.6	72.42	1,392.7	4,396.1	4,611.6	4,598.3	348.460	
4,900.0	4,900.0	4,954.7	4,952.7	10.9	2.7	72.45	1,390.3	4,396.1	4,610.8	4,597.3	341.170	
5,000.0	5,000.0	5,057.9	5,055.9	11.1	2.8	72.48	1,387.8	4,396.0	4,610.0	4,596.2	334.150	

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

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Compass
Reference Design:	Design #2	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 31, T19S, R32E - String Bean Federal Com 2H - Wellbore #1 - Wellbore #1 — Offset Site Error: 0.0 usft

Survey Program: 200-Good_gyro, 8800-MWD default — 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)	Separation Factor	Warning
5,100.0	5,100.0	5,163.1	5,161.1	11.3	2.8	72.51	1,385.4	4,395.7	4,609.1	4,595.0	327.385	
5,200.0	5,200.0	5,262.8	5,260.7	11.5	2.9	72.53	1,383.3	4,395.4	4,608.1	4,593.8	320.952	
5,300.0	5,300.0	5,359.6	5,357.5	11.8	2.9	72.55	1,381.4	4,395.1	4,607.2	4,592.6	314.807	
5,400.0	5,400.0	5,459.3	5,457.2	12.0	3.0	72.57	1,379.5	4,394.7	4,606.4	4,591.4	308.862	
5,500.0	5,500.0	5,561.2	5,559.1	12.2	3.0	72.59	1,377.7	4,394.4	4,605.5	4,590.3	303.112	
5,600.0	5,600.0	5,660.9	5,658.8	12.4	3.1	72.61	1,376.0	4,393.9	4,604.5	4,589.1	297.610	
5,700.0	5,700.0	5,759.3	5,757.1	12.7	3.1	72.63	1,374.7	4,393.4	4,603.6	4,587.9	292.328	
5,800.0	5,800.0	5,857.3	5,855.1	12.9	3.2	72.63	1,373.7	4,392.9	4,602.8	4,586.8	287.237	
5,900.0	5,900.0	5,955.1	5,952.9	13.1	3.2	72.64	1,372.9	4,392.3	4,602.0	4,585.7	282.326	
6,000.0	6,000.0	6,053.9	6,051.7	13.3	3.3	72.65	1,372.1	4,391.7	4,601.2	4,584.7	277.577	
6,100.0	6,100.0	6,153.6	6,151.4	13.6	3.3	72.65	1,371.5	4,391.1	4,600.5	4,583.6	272.981	
6,200.0	6,200.0	6,254.1	6,252.0	13.8	3.4	72.66	1,371.1	4,390.5	4,599.7	4,582.6	268.528	
6,300.0	6,300.0	6,355.4	6,353.3	14.0	3.4	72.66	1,370.7	4,389.8	4,599.0	4,581.5	264.212	
6,400.0	6,400.0	6,455.7	6,453.5	14.2	3.5	72.66	1,370.4	4,389.0	4,598.2	4,580.5	260.040	
6,500.0	6,500.0	6,555.2	6,553.0	14.5	3.5	72.66	1,370.3	4,388.3	4,597.4	4,579.4	256.006	
6,600.0	6,600.0	6,651.3	6,649.2	14.7	3.6	72.66	1,370.2	4,387.5	4,596.6	4,578.4	252.120	
6,700.0	6,700.0	6,744.8	6,742.6	14.9	3.6	72.65	1,370.3	4,386.9	4,596.0	4,577.5	248.375	
6,800.0	6,800.0	6,839.4	6,837.2	15.1	3.7	72.65	1,370.4	4,386.4	4,595.5	4,576.7	244.738	
6,900.0	6,900.0	6,935.5	6,933.3	15.4	3.7	72.65	1,370.5	4,385.9	4,595.1	4,576.0	241.200	
7,000.0	7,000.0	7,030.3	7,028.1	15.6	3.8	72.64	1,370.7	4,385.6	4,594.8	4,575.5	237.777	
7,100.0	7,100.0	7,122.4	7,120.2	15.8	3.8	72.64	1,371.0	4,385.3	4,594.6	4,575.0	234.478	
7,140.3	7,140.3	7,159.4	7,157.3	15.9	3.8	72.64	1,371.2	4,385.2	4,594.6	4,574.9	233.177	
7,200.0	7,200.0	7,214.3	7,212.1	16.0	3.9	72.63	1,371.5	4,385.2	4,594.6	4,574.8	231.278	
7,300.0	7,300.0	7,305.2	7,303.0	16.3	3.9	72.63	1,372.0	4,385.2	4,594.9	4,574.7	228.178	
7,400.0	7,400.0	7,400.0	7,397.8	16.5	4.0	72.62	1,372.7	4,385.4	4,595.3	4,574.8	225.149	
7,500.0	7,500.0	7,492.2	7,490.0	16.7	4.0	72.61	1,373.2	4,385.8	4,595.8	4,575.1	222.213	
7,600.0	7,600.0	7,588.4	7,586.2	16.9	4.0	72.61	1,373.5	4,386.3	4,596.4	4,575.5	219.335	
7,700.0	7,700.0	7,684.4	7,682.2	17.2	4.1	72.61	1,373.8	4,386.9	4,597.1	4,575.9	216.539	
7,800.0	7,800.0	7,780.4	7,778.2	17.4	4.1	72.61	1,374.1	4,387.6	4,597.9	4,576.4	213.818	
7,900.0	7,900.0	7,879.2	7,877.0	17.6	4.2	72.61	1,374.6	4,388.4	4,598.8	4,577.1	211.399	
8,000.0	8,000.0	7,978.6	7,976.4	17.8	4.2	72.60	1,375.1	4,389.1	4,599.7	4,577.7	209.094	
8,100.0	8,100.0	8,078.1	8,075.9	18.1	4.2	72.60	1,375.7	4,389.9	4,600.6	4,578.3	206.839	
8,200.0	8,200.0	8,177.6	8,175.4	18.3	4.2	72.60	1,376.3	4,390.6	4,601.5	4,579.0	204.634	
8,300.0	8,300.0	8,277.0	8,274.8	18.5	4.2	72.59	1,377.0	4,391.4	4,602.4	4,579.7	202.477	
8,400.0	8,400.0	10,200.0	10,138.3	18.7	8.5	73.08	1,238.4	4,070.7	4,589.9	4,564.7	181.841	
8,500.0	8,500.0	10,249.7	10,184.5	19.0	8.8	73.10	1,231.4	4,053.7	4,552.9	4,527.3	177.835	
8,600.0	8,600.0	10,382.6	10,308.1	19.2	9.6	73.17	1,212.7	4,008.5	4,516.5	4,490.3	172.335	
8,700.0	8,700.0	10,466.8	10,386.0	19.4	10.1	73.23	1,199.2	3,979.7	4,479.0	4,452.3	167.782	
8,800.0	8,800.0	10,539.3	10,453.3	19.6	10.6	73.29	1,187.1	3,955.3	4,442.0	4,414.8	163.598	
8,863.0	8,863.0	10,586.9	10,497.5	19.8	10.9	73.33	1,179.6	3,939.3	4,418.8	4,391.4	161.002	
8,875.0	8,875.0	10,600.0	10,509.6	19.8	11.0	-92.03	1,177.6	3,935.0	4,414.5	4,386.7	158.810	
8,900.0	8,900.0	10,600.0	10,509.6	19.8	11.0	-93.19	1,177.6	3,935.0	4,405.4	4,377.6	158.305	
8,925.0	8,924.8	10,600.0	10,509.6	19.9	11.0	-94.33	1,177.6	3,935.0	4,396.5	4,368.7	157.822	
8,950.0	8,949.5	10,632.8	10,540.1	19.9	11.2	-95.50	1,173.0	3,924.0	4,387.6	4,359.7	156.767	
8,975.0	8,974.0	10,644.4	10,551.0	20.0	11.2	-96.63	1,171.5	3,920.1	4,379.0	4,351.0	156.135	
9,000.0	8,998.1	10,655.9	10,561.8	20.0	11.3	-97.73	1,170.0	3,916.3	4,370.6	4,342.5	155.549	
9,025.0	9,021.9	10,667.3	10,572.4	20.0	11.4	-98.80	1,168.6	3,912.5	4,362.5	4,334.3	155.019	
9,050.0	9,045.3	10,700.0	10,603.1	20.1	11.6	-99.96	1,164.9	3,901.7	4,354.7	4,326.4	154.184	
9,075.0	9,068.1	10,700.0	10,603.1	20.1	11.6	-100.92	1,164.9	3,901.7	4,347.0	4,318.7	153.978	
9,100.0	9,090.4	10,700.0	10,603.1	20.2	11.6	-101.82	1,164.9	3,901.7	4,339.6	4,311.4	153.843	
9,125.0	9,112.0	10,700.0	10,603.1	20.2	11.6	-102.67	1,164.9	3,901.7	4,332.7	4,304.5	153.781	
9,150.0	9,133.0	10,700.0	10,603.1	20.3	11.6	-103.46	1,164.9	3,901.7	4,326.2	4,298.0	153.791	

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

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Compass
Reference Design:	Design #2	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 31, T19S, R32E - String Bean Federal Com 2H - Wellbore #1 - Wellbore #1 — **Offset Site Error:** 0.0 usft

Survey Program: 200-Good gyro, 8800-MWD default — **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)	Separation Factor	Warning
9,175.0	9,153.3	10,700.0	10,603.1	20.3	11.6	-104.19	1,164.9	3,901.7	4,320.1	4,292.0	153.870	
9,200.0	9,172.7	10,734.5	10,635.5	20.4	11.8	-105.18	1,161.3	3,890.6	4,314.1	4,286.0	153.511	
9,225.0	9,191.3	10,742.4	10,643.0	20.4	11.8	-105.89	1,160.4	3,888.1	4,308.8	4,280.7	153.618	
9,238.0	9,200.6	10,746.4	10,646.8	20.5	11.8	-106.23	1,160.0	3,886.8	4,306.2	4,278.1	153.697	
9,250.0	9,209.0	10,750.0	10,650.2	20.5	11.9	-106.93	1,159.6	3,885.7	4,303.9	4,276.0	154.002	
9,275.0	9,225.8	10,757.3	10,657.1	20.6	11.9	-108.24	1,158.8	3,883.4	4,299.9	4,272.1	154.685	
9,300.0	9,241.6	10,764.4	10,663.7	20.6	11.9	-109.34	1,158.0	3,881.3	4,296.7	4,269.0	155.396	
9,325.0	9,256.5	10,771.1	10,670.0	20.7	12.0	-110.26	1,157.2	3,879.2	4,294.4	4,266.8	155.745	
9,350.0	9,270.3	10,800.0	10,697.4	20.8	12.1	-111.26	1,153.9	3,870.5	4,293.1	4,265.5	155.584	
9,375.0	9,283.1	10,800.0	10,697.4	20.9	12.1	-111.78	1,153.9	3,870.5	4,292.6	4,265.0	155.616	
9,377.5	9,284.3	10,800.0	10,697.4	20.9	12.1	-111.82	1,153.9	3,870.5	4,292.6	4,265.0	155.612	CC, ES
9,400.0	9,294.7	10,800.0	10,697.4	21.0	12.1	-112.15	1,153.9	3,870.5	4,292.9	4,265.3	155.537	
9,425.0	9,305.3	10,800.0	10,697.4	21.1	12.1	-112.37	1,153.9	3,870.5	4,294.2	4,266.6	155.320	
9,450.0	9,314.6	11,000.0	10,885.4	21.2	13.4	-114.90	1,130.8	3,806.2	4,296.1	4,268.2	153.794	
9,475.0	9,322.8	11,000.0	10,885.4	21.3	13.4	-114.89	1,130.8	3,806.2	4,298.8	4,270.8	153.336	
9,500.0	9,329.8	11,000.0	10,885.4	21.5	13.4	-114.75	1,130.8	3,806.2	4,302.4	4,274.3	152.661	
9,525.0	9,335.5	11,000.0	10,885.4	21.6	13.4	-114.47	1,130.8	3,806.2	4,307.0	4,278.6	151.766	
9,550.0	9,340.0	11,000.0	10,885.4	21.8	13.4	-114.06	1,130.8	3,806.2	4,312.5	4,283.9	150.660	
9,575.0	9,343.2	11,000.0	10,885.4	21.9	13.4	-113.51	1,130.8	3,806.2	4,319.0	4,290.0	149.361	
9,600.0	9,345.1	11,000.0	10,885.4	22.1	13.4	-112.83	1,130.8	3,806.2	4,326.3	4,297.0	147.897	
9,620.9	9,345.8	11,000.0	10,885.4	22.2	13.4	-112.15	1,130.8	3,806.2	4,333.0	4,303.5	146.574	
9,700.0	9,346.6	11,000.0	10,885.4	22.8	13.4	-112.15	1,130.8	3,806.2	4,360.4	4,330.3	144.821	
9,800.0	9,347.6	11,000.0	10,885.4	23.7	13.4	-112.15	1,130.8	3,806.2	4,396.8	4,365.9	142.285	
9,900.0	9,348.6	11,000.0	10,885.4	24.6	13.4	-112.15	1,130.8	3,806.2	4,435.1	4,403.3	139.487	
10,000.0	9,349.6	11,033.9	10,917.0	25.6	13.6	-112.62	1,127.6	3,794.4	4,475.0	4,442.2	136.429	
10,100.0	9,350.6	11,037.8	10,920.6	26.8	13.6	-112.68	1,127.2	3,793.1	4,517.1	4,483.2	133.380	
10,200.0	9,351.7	11,041.8	10,924.4	28.0	13.6	-112.73	1,126.8	3,791.8	4,560.9	4,525.9	130.310	
10,300.0	9,352.7	11,045.8	10,928.1	29.2	13.6	-112.79	1,126.4	3,790.4	4,606.5	4,570.3	127.268	
10,400.0	9,353.7	11,049.9	10,932.0	30.6	13.7	-112.85	1,126.0	3,789.1	4,653.8	4,616.3	124.290	
10,500.0	9,354.7	11,054.1	10,935.9	32.0	13.7	-112.90	1,125.6	3,787.7	4,702.7	4,663.9	121.403	
10,600.0	9,355.7	11,058.4	10,940.0	33.4	13.7	-112.96	1,125.1	3,786.3	4,753.2	4,713.1	118.624	
10,700.0	9,356.7	11,062.8	10,944.1	34.8	13.8	-113.03	1,124.7	3,784.8	4,805.2	4,763.8	115.964	
10,800.0	9,357.7	11,800.0	11,617.7	36.3	19.1	-123.04	989.3	3,522.0	4,856.4	4,813.7	113.795	
10,900.0	9,358.7	11,800.0	11,617.7	37.8	19.1	-123.04	989.3	3,522.0	4,908.7	4,864.7	111.545	
11,000.0	9,359.8	11,800.0	11,617.7	39.4	19.1	-123.04	989.3	3,522.0	4,962.5	4,917.1	109.405	
11,100.0	9,360.8	11,800.0	11,617.7	41.0	19.1	-123.04	989.3	3,522.0	5,017.7	4,970.9	107.373	
11,200.0	9,361.8	11,800.0	11,617.7	42.6	19.1	-123.04	989.3	3,522.0	5,074.2	5,026.1	105.448	
11,300.0	9,362.8	11,831.1	11,645.4	44.2	19.4	-123.45	982.5	3,509.6	5,131.9	5,082.5	103.710	
11,400.0	9,363.8	11,843.3	11,656.3	45.8	19.5	-123.61	979.8	3,504.8	5,191.0	5,140.1	102.026	
11,500.0	9,364.8	11,855.5	11,667.2	47.5	19.6	-123.77	977.1	3,500.0	5,251.2	5,198.9	100.440	
11,600.0	9,365.8	11,867.7	11,678.1	49.1	19.6	-123.93	974.4	3,495.2	5,312.5	5,258.8	98.946	
11,700.0	9,366.8	11,900.0	11,707.0	50.8	19.9	-124.36	967.4	3,482.7	5,375.1	5,320.0	97.617	
11,800.0	9,367.9	11,900.0	11,707.0	52.5	19.9	-124.36	967.4	3,482.7	5,438.5	5,382.0	96.244	
11,900.0	9,368.9	11,900.0	11,707.0	54.1	19.9	-124.36	967.4	3,482.7	5,503.1	5,445.1	94.946	
12,000.0	9,369.9	11,900.0	11,707.0	55.8	19.9	-124.36	967.4	3,482.7	5,568.7	5,509.3	93.716	
12,100.0	9,370.9	11,900.0	11,707.0	57.6	19.9	-124.36	967.4	3,482.7	5,635.4	5,574.5	92.552	
12,200.0	9,371.9	11,900.0	11,707.0	59.3	19.9	-124.36	967.4	3,482.7	5,703.0	5,640.6	91.450	
12,300.0	9,372.9	11,900.0	11,707.0	61.0	19.9	-124.36	967.4	3,482.7	5,771.5	5,707.7	90.405	
12,400.0	9,373.9	11,900.0	11,707.0	62.7	19.9	-124.36	967.4	3,482.7	5,841.0	5,775.6	89.415	
12,500.0	9,375.0	11,937.9	11,741.2	64.5	20.2	-124.86	959.3	3,468.4	5,910.8	5,844.2	88.661	
12,600.0	9,376.0	11,943.5	11,746.3	66.2	20.2	-124.93	958.2	3,466.3	5,981.9	5,913.7	87.799	
12,700.0	9,377.0	11,949.1	11,751.3	67.9	20.3	-125.00	957.1	3,464.2	6,053.7	5,984.1	86.982	

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

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 4H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Compass
Reference Design:	Design #2	**Offset TVD Reference:**	Offset Datum

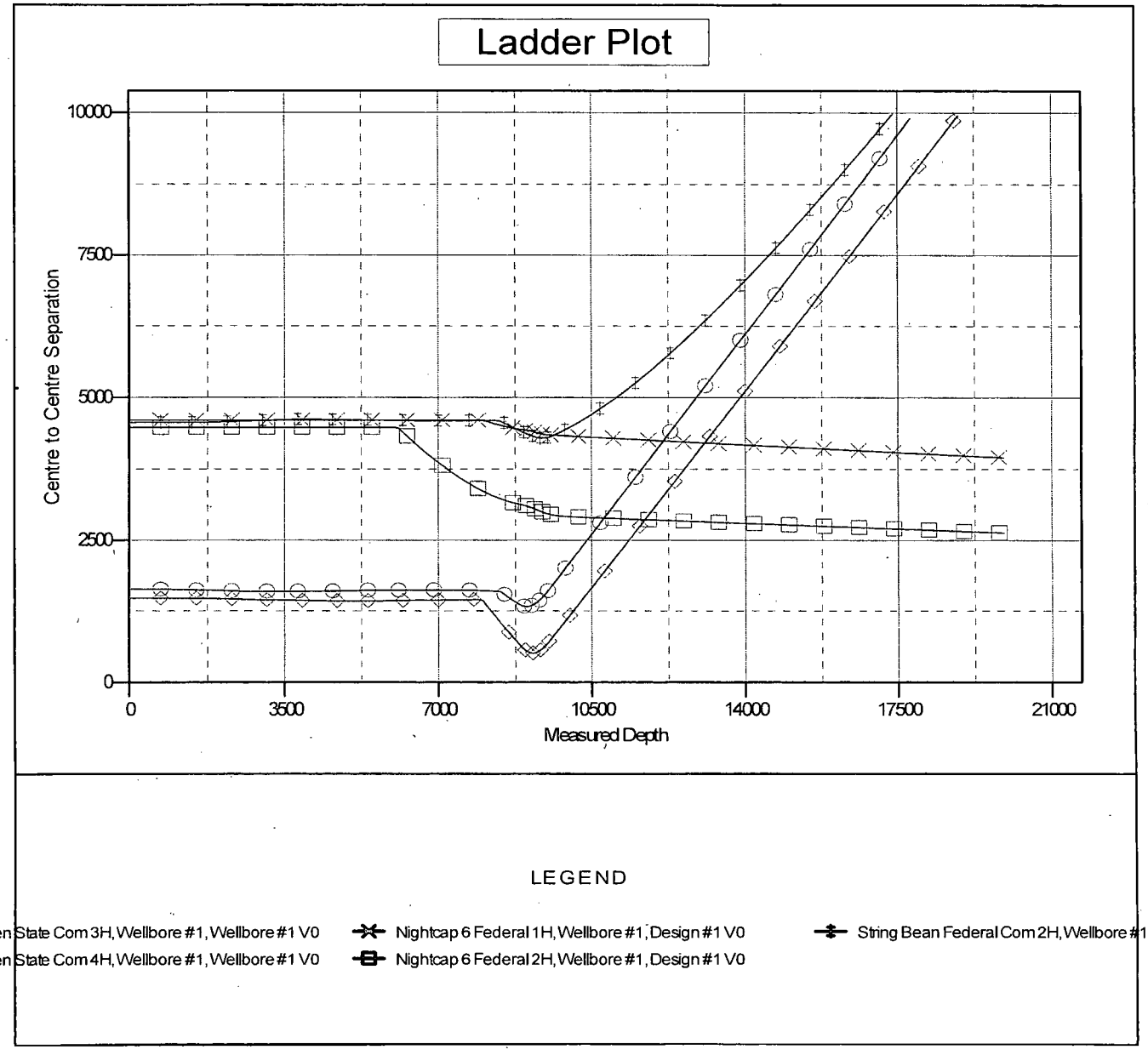
Offset Design Sec 31, T19S, R32E - String Bean Federal Com 2H - Wellbore #1 - Wellbore #1 — Offset Site Error: 0.0 usft

Survey Program: 200-Good gyro 8800-MWD default — 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)	Separation Factor	Warning
12,800.0	9,378.0	11,954.5	11,756.2	69.7	20.3	-125.07	955.9	3,462.2	6,126.3	6,055.3	86.208	
12,900.0	9,379.0	11,959.9	11,761.1	71.4	20.4	-125.15	954.9	3,460.2	6,199.7	6,127.1	85.473	
13,000.0	9,380.0	12,000.0	11,797.6	73.2	20.7	-125.67	947.1	3,445.6	6,274.1	6,200.3	84.975	
13,100.0	9,381.0	12,000.0	11,797.6	75.0	20.7	-125.67	947.1	3,445.6	6,348.8	6,273.4	84.283	
13,200.0	9,382.0	12,000.0	11,797.6	76.7	20.7	-125.67	947.1	3,445.6	6,424.1	6,347.3	83.625	
13,300.0	9,383.1	12,000.0	11,797.6	78.5	20.7	-125.67	947.1	3,445.6	6,500.1	6,421.8	82.997	
13,400.0	9,384.1	12,000.0	11,797.6	80.3	20.7	-125.67	947.1	3,445.6	6,576.8	6,497.0	82.398	
13,500.0	9,385.1	12,000.0	11,797.6	82.0	20.7	-125.67	947.1	3,445.6	6,654.1	6,572.8	81.827	
13,600.0	9,386.1	12,000.0	11,797.6	83.8	20.7	-125.67	947.1	3,445.6	6,732.0	6,649.1	81.282	
13,700.0	9,387.1	12,000.0	11,797.6	85.6	20.7	-125.67	947.1	3,445.6	6,810.4	6,726.1	80.761	
13,800.0	9,388.1	12,000.0	11,797.6	87.4	20.7	-125.67	947.1	3,445.6	6,889.4	6,803.6	80.263	
13,900.0	9,389.1	12,000.0	11,797.6	89.2	20.7	-125.67	947.1	3,445.6	6,969.0	6,881.6	79.787	
14,000.0	9,390.1	12,000.0	11,797.6	90.9	20.7	-125.67	947.1	3,445.6	7,049.1	6,960.2	79.332	
14,100.0	9,391.2	12,000.0	11,797.6	92.7	20.7	-125.67	947.1	3,445.6	7,129.6	7,039.3	78.896	
14,200.0	9,392.2	12,000.0	11,797.6	94.5	20.7	-125.67	947.1	3,445.6	7,210.7	7,118.8	78.478	
14,300.0	9,393.2	12,000.0	11,797.6	96.3	20.7	-125.67	947.1	3,445.6	7,292.2	7,198.9	78.078	
14,400.0	9,394.2	12,000.0	11,797.6	98.1	20.7	-125.67	947.1	3,445.6	7,374.2	7,279.3	77.695	
14,500.0	9,395.2	12,000.0	11,797.6	99.9	20.7	-125.67	947.1	3,445.6	7,456.7	7,360.2	77.327	
14,600.0	9,396.2	12,000.0	11,797.6	101.7	20.7	-125.67	947.1	3,445.6	7,539.5	7,441.6	76.974	
14,700.0	9,397.2	12,000.0	11,797.6	103.5	20.7	-125.67	947.1	3,445.6	7,622.8	7,523.3	76.635	
14,800.0	9,398.3	12,000.0	11,797.6	105.3	20.7	-125.67	947.1	3,445.6	7,706.5	7,605.5	76.309	
14,900.0	9,399.3	12,042.1	11,836.3	107.1	21.0	-126.21	939.5	3,430.9	7,789.9	7,687.8	76.270	
15,000.0	9,400.3	12,045.3	11,839.3	108.9	21.0	-126.26	938.9	3,429.9	7,874.2	7,770.6	75.991	
15,100.0	9,401.3	12,048.4	11,842.2	110.7	21.0	-126.30	938.4	3,428.8	7,958.9	7,853.8	75.723	
15,200.0	9,402.3	12,051.6	11,845.1	112.5	21.0	-126.34	937.9	3,427.7	8,043.9	7,937.4	75.466	
15,300.0	9,403.3	12,054.6	11,848.0	114.3	21.0	-126.38	937.3	3,426.7	8,129.3	8,021.2	75.218	
15,400.0	9,404.3	12,057.7	11,850.8	116.1	21.1	-126.42	936.8	3,425.7	8,215.0	8,105.4	74.981	
15,500.0	9,405.3	12,100.0	11,890.2	117.9	21.4	-126.96	930.1	3,411.9	8,301.5	8,190.9	75.028	
15,600.0	9,406.4	12,100.0	11,890.2	119.7	21.4	-126.96	930.1	3,411.9	8,387.7	8,275.6	74.788	
15,700.0	9,407.4	12,100.0	11,890.2	121.5	21.4	-126.96	930.1	3,411.9	8,474.3	8,360.6	74.557	
15,800.0	9,408.4	12,100.0	11,890.2	123.3	21.4	-126.96	930.1	3,411.9	8,561.1	8,445.9	74.334	
15,900.0	9,409.4	12,100.0	11,890.2	125.1	21.4	-126.96	930.1	3,411.9	8,648.2	8,531.5	74.118	
16,000.0	9,410.4	12,100.0	11,890.2	126.9	21.4	-126.96	930.1	3,411.9	8,735.6	8,617.4	73.911	
16,100.0	9,411.4	12,100.0	11,890.2	128.7	21.4	-126.96	930.1	3,411.9	8,823.3	8,703.6	73.710	
16,200.0	9,412.4	12,100.0	11,890.2	130.5	21.4	-126.96	930.1	3,411.9	8,911.2	8,790.0	73.516	
16,300.0	9,413.4	12,100.0	11,890.2	132.4	21.4	-126.96	930.1	3,411.9	8,999.4	8,876.6	73.329	
16,400.0	9,414.5	12,100.0	11,890.2	134.2	21.4	-126.96	930.1	3,411.9	9,087.8	8,963.5	73.148	
16,500.0	9,415.5	12,100.0	11,890.2	136.0	21.4	-126.96	930.1	3,411.9	9,176.4	9,050.7	72.973	
16,600.0	9,416.5	12,100.0	11,890.2	137.8	21.4	-126.96	930.1	3,411.9	9,265.3	9,138.0	72.803	
16,700.0	9,417.5	12,100.0	11,890.2	139.6	21.4	-126.96	930.1	3,411.9	9,354.4	9,225.6	72.640	
16,800.0	9,418.5	12,100.0	11,890.2	141.4	21.4	-126.96	930.1	3,411.9	9,443.7	9,313.4	72.481	
16,900.0	9,419.5	12,100.0	11,890.2	143.2	21.4	-126.96	930.1	3,411.9	9,533.3	9,401.5	72.327	
17,000.0	9,420.5	12,100.0	11,890.2	145.0	21.4	-126.96	930.1	3,411.9	9,623.0	9,489.7	72.179	
17,100.0	9,421.6	12,100.0	11,890.2	146.9	21.4	-126.96	930.1	3,411.9	9,713.0	9,578.1	72.035	
17,200.0	9,422.6	12,100.0	11,890.2	148.7	21.4	-126.96	930.1	3,411.9	9,803.1	9,666.7	71.895	
17,300.0	9,423.6	12,100.0	11,890.2	150.5	21.4	-126.96	930.1	3,411.9	9,893.4	9,755.6	71.760	
17,400.0	9,424.6	12,100.0	11,890.2	152.3	21.4	-126.96	930.1	3,411.9	9,983.9	9,844.5	71.628	SF

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	TVD Reference:	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 4H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Compass
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

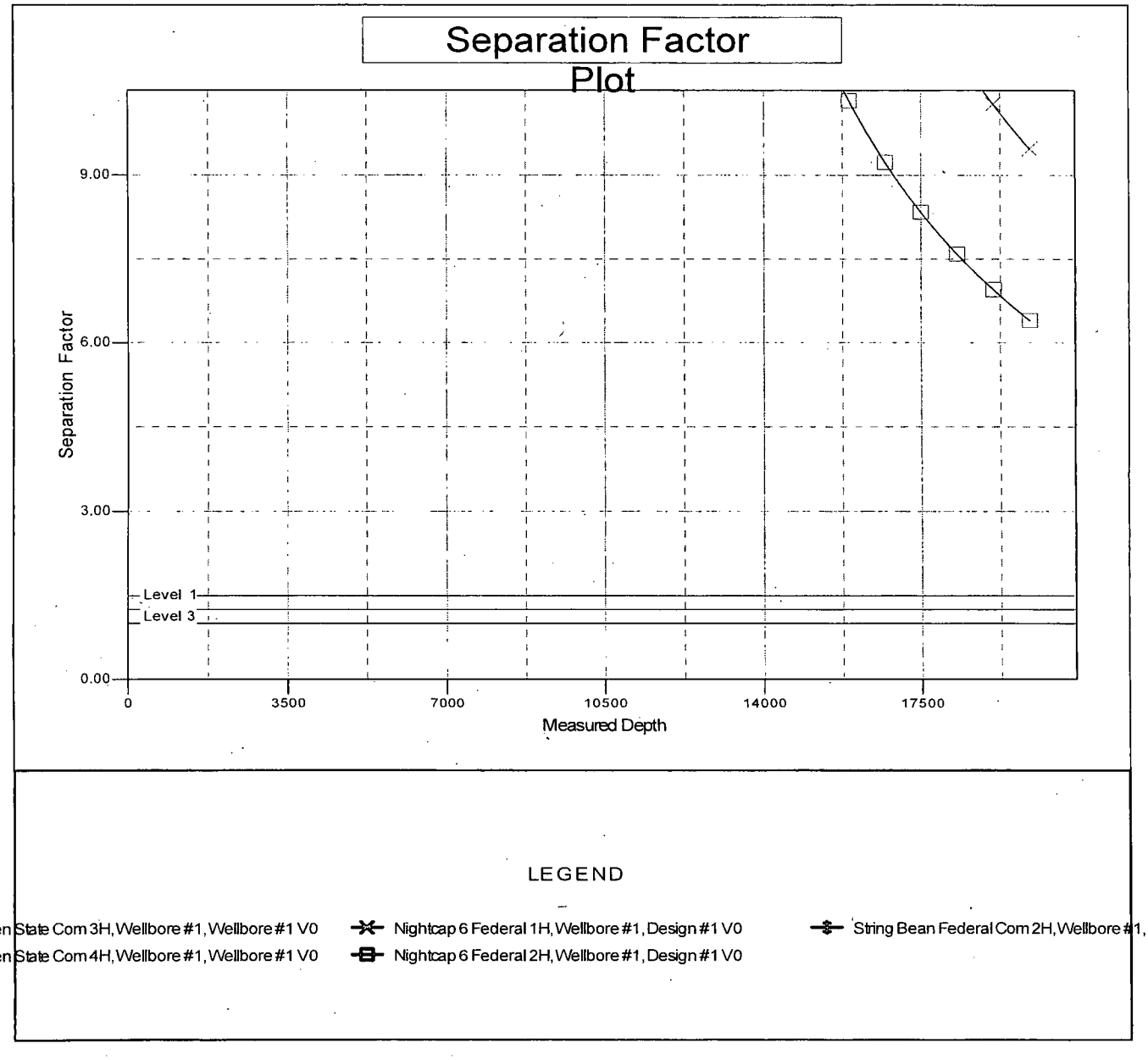
Reference Depths are relative to Well @ 3530.0usft (Ensign 772)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W
Coordinates are relative to: Nightcap 6 Federal 4H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.28°



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Nightcap 6 Federal 4H
Project:	Lea County, NM	TVD Reference:	Well @ 3530.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3530.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 4H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Compass
Reference Design:	Design #2	Offset TVD Reference:	Offset Datum

Reference Depths are relative to Well @ 3530.0usft (Ensign 772)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

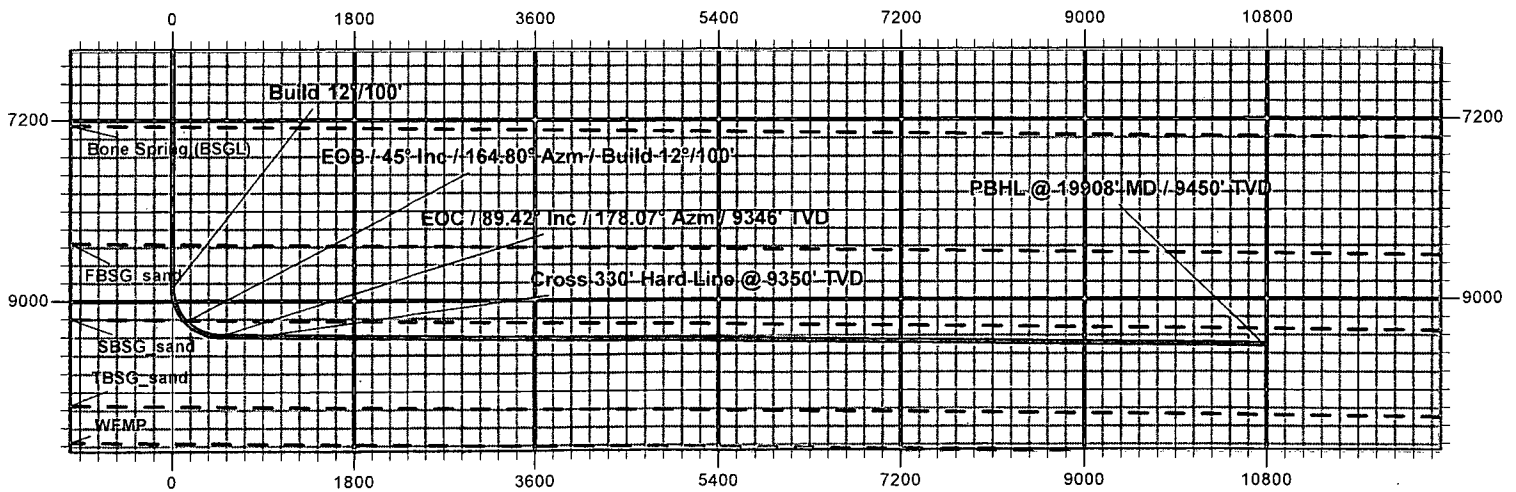
Coordinates are relative to: Nightcap 6 Federal 4H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.28°



CONCHO

Lea County, NM
Sec 31, T19S, R32E
Nightcap 6 Federal 4H
Design #2

DDC
The DIRECTIONAL DRILLING COMPANY



Vertical Section at 177.72° (1800 usft/in)

Lea County, NM
Sec 31, T19S, R32E
Nightcap 6 Federal 4H
Design #2