CONCHO

COG Operating, LLC

Lea County, NM
Sec 31, T19S, R32E
Nightcap 6 Federal 1H

Wellbore #1

Plan: Design #1

DDC Well Planning Report

10 July, 2015

DDC
The DIRECTIONAL DRILLING COMPANY

Database:	Compass	Local Co-ordinate Reference:	Well Nightcap 6 Federal 1H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3555.0usft (Ensign 772)
Project:	Lea County, NM	MD Reference:	Well @ 3555.0usft (Ensign 772)
Site:	Sec 31, T19S, R32E	North Reference:	Grid
Well:	Nightcap 6 Federal 1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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 1H

Well Position	**+N/-S**	1,266.0 usft	**Northing:**	587,656.00 usft	**Latitude:**	32° 36' 51.951 N
	+E/-W	4,427.5 usft	**Easting:**	664,734.50 usft	**Longitude:**	103° 47' 53.979 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**	0.0 usft	**Ground Level:**	3,524.0 usft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	7/9/2015	7.30	60.41	48,346

Design Design #1

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	180.23

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	
8,855.8	0.00	0.00	8,855.8	0.0	0.0	0.00	0.00	0.00	0.00	
9,601.0	89.42	180.23	9,333.2	-472.6	-1.9	12.00	12.00	-24.12	180.23	
11,258.5	89.42	180.23	9,350.0	-2,130.1	-8.5	0.00	0.00	0.00	0.00	Northern Hardline Nig
21,149.5	89.42	180.23	9,450.0	-12,020.5	-47.8	0.00	0.00	0.00	0.00	PBHL Nightcap 6 Fed

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

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
Build 12°/100'									
8,855.8	0.00	0.00	8,855.8	0.0	0.0	0.0	0.00	0.00	0.00
8,900.0	5.30	180.23	8,899.9	-2.0	0.0	2.0	12.00	12.00	0.00
9,000.0	17.30	180.23	8,997.8	-21.6	-0.1	21.6	12.00	12.00	0.00
9,100.0	29.30	180.23	9,089.5	-61.1	-0.2	61.1	12.00	12.00	0.00
9,200.0	41.30	180.23	9,171.0	-118.8	-0.5	118.8	12.00	12.00	0.00
SBSG_sand									
9,235.1	45.52	180.23	9,196.4	-142.9	-0.6	142.9	12.00	12.00	0.00
9,300.0	53.30	180.23	9,238.6	-192.1	-0.8	192.1	12.00	12.00	0.00
9,400.0	65.30	180.23	9,289.6	-278.0	-1.1	278.0	12.00	12.00	0.00
9,500.0	77.30	180.23	9,321.6	-372.5	-1.5	372.5	12.00	12.00	0.00
9,600.0	89.30	180.23	9,333.2	-471.7	-1.9	471.7	12.00	12.00	0.00
End of Curve / 89.42° Inc / 180.23° Azm / 9333' TVD									
9,601.0	89.42	180.23	9,333.2	-472.6	-1.9	472.6	12.00	12.00	0.00
9,700.0	89.42	180.23	9,334.2	-571.7	-2.3	571.7	0.00	0.00	0.00
9,800.0	89.42	180.23	9,335.3	-671.6	-2.7	671.7	0.00	0.00	0.00
9,900.0	89.42	180.23	9,336.3	-771.6	-3.1	771.6	0.00	0.00	0.00
10,000.0	89.42	180.23	9,337.3	-871.6	-3.5	871.6	0.00	0.00	0.00
10,100.0	89.42	180.23	9,338.3	-971.6	-3.9	971.6	0.00	0.00	0.00
10,200.0	89.42	180.23	9,339.3	-1,071.6	-4.3	1,071.6	0.00	0.00	0.00
10,300.0	89.42	180.23	9,340.3	-1,171.6	-4.7	1,171.6	0.00	0.00	0.00
10,400.0	89.42	180.23	9,341.3	-1,271.6	-5.1	1,271.6	0.00	0.00	0.00
10,500.0	89.42	180.23	9,342.3	-1,371.6	-5.5	1,371.6	0.00	0.00	0.00
Min. Distance 62'									
10,528.7	89.42	180.23	9,342.6	-1,400.3	-5.6	1,400.3	0.00	0.00	0.00
10,600.0	89.42	180.23	9,343.3	-1,471.6	-5.9	1,471.6	0.00	0.00	0.00
10,700.0	89.42	180.23	9,344.4	-1,571.6	-6.2	1,571.6	0.00	0.00	0.00
10,800.0	89.42	180.23	9,345.4	-1,671.6	-6.6	1,671.6	0.00	0.00	0.00
10,900.0	89.42	180.23	9,346.4	-1,771.6	-7.0	1,771.6	0.00	0.00	0.00
11,000.0	89.42	180.23	9,347.4	-1,871.6	-7.4	1,871.6	0.00	0.00	0.00
11,100.0	89.42	180.23	9,348.4	-1,971.6	-7.8	1,971.6	0.00	0.00	0.00
11,200.0	89.42	180.23	9,349.4	-2,071.6	-8.2	2,071.6	0.00	0.00	0.00
Cross N Hard Line @ 9350' TVD									
11,258.5	89.42	180.23	9,350.0	-2,130.1	-8.5	2,130.1	0.00	0.00	0.00
11,300.0	89.42	180.23	9,350.4	-2,171.6	-8.6	2,171.6	0.00	0.00	0.00
11,400.0	89.42	180.23	9,351.4	-2,271.6	-9.0	2,271.6	0.00	0.00	0.00
11,500.0	89.42	180.23	9,352.4	-2,371.5	-9.4	2,371.6	0.00	0.00	0.00
11,600.0	89.42	180.23	9,353.5	-2,471.5	-9.8	2,471.6	0.00	0.00	0.00
11,700.0	89.42	180.23	9,354.5	-2,571.5	-10.2	2,571.6	0.00	0.00	0.00
11,800.0	89.42	180.23	9,355.5	-2,671.5	-10.6	2,671.6	0.00	0.00	0.00
11,900.0	89.42	180.23	9,356.5	-2,771.5	-11.0	2,771.5	0.00	0.00	0.00
12,000.0	89.42	180.23	9,357.5	-2,871.5	-11.4	2,871.5	0.00	0.00	0.00
12,100.0	89.42	180.23	9,358.5	-2,971.5	-11.8	2,971.5	0.00	0.00	0.00
12,200.0	89.42	180.23	9,359.5	-3,071.5	-12.2	3,071.5	0.00	0.00	0.00
12,300.0	89.42	180.23	9,360.5	-3,171.5	-12.6	3,171.5	0.00	0.00	0.00
12,400.0	89.42	180.23	9,361.5	-3,271.5	-13.0	3,271.5	0.00	0.00	0.00
12,500.0	89.42	180.23	9,362.6	-3,371.5	-13.4	3,371.5	0.00	0.00	0.00
12,600.0	89.42	180.23	9,363.6	-3,471.5	-13.8	3,471.5	0.00	0.00	0.00
12,700.0	89.42	180.23	9,364.6	-3,571.5	-14.2	3,571.5	0.00	0.00	0.00
12,800.0	89.42	180.23	9,365.6	-3,671.5	-14.6	3,671.5	0.00	0.00	0.00
12,900.0	89.42	180.23	9,366.6	-3,771.5	-15.0	3,771.5	0.00	0.00	0.00
13,000.0	89.42	180.23	9,367.6	-3,871.5	-15.4	3,871.5	0.00	0.00	0.00
13,100.0	89.42	180.23	9,368.6	-3,971.5	-15.8	3,971.5	0.00	0.00	0.00

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Wellbore:	Wellbore #1		
Design:	Design #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,200.0	89.42	180.23	9,369.6	-4,071.4	-16.2	4,071.5	0.00	0.00	0.00
13,300.0	89.42	180.23	9,370.6	-4,171.4	-16.6	4,171.5	0.00	0.00	0.00
13,400.0	89.42	180.23	9,371.7	-4,271.4	-17.0	4,271.5	0.00	0.00	0.00
13,500.0	89.42	180.23	9,372.7	-4,371.4	-17.4	4,371.5	0.00	0.00	0.00
13,600.0	89.42	180.23	9,373.7	-4,471.4	-17.8	4,471.5	0.00	0.00	0.00
13,700.0	89.42	180.23	9,374.7	-4,571.4	-18.2	4,571.5	0.00	0.00	0.00
13,800.0	89.42	180.23	9,375.7	-4,671.4	-18.6	4,671.5	0.00	0.00	0.00
13,900.0	89.42	180.23	9,376.7	-4,771.4	-19.0	4,771.4	0.00	0.00	0.00
14,000.0	89.42	180.23	9,377.7	-4,871.4	-19.4	4,871.4	0.00	0.00	0.00
14,100.0	89.42	180.23	9,378.7	-4,971.4	-19.8	4,971.4	0.00	0.00	0.00
14,200.0	89.42	180.23	9,379.7	-5,071.4	-20.2	5,071.4	0.00	0.00	0.00
14,300.0	89.42	180.23	9,380.8	-5,171.4	-20.6	5,171.4	0.00	0.00	0.00
14,400.0	89.42	180.23	9,381.8	-5,271.4	-21.0	5,271.4	0.00	0.00	0.00
14,500.0	89.42	180.23	9,382.8	-5,371.4	-21.4	5,371.4	0.00	0.00	0.00
14,600.0	89.42	180.23	9,383.8	-5,471.4	-21.8	5,471.4	0.00	0.00	0.00
14,700.0	89.42	180.23	9,384.8	-5,571.4	-22.2	5,571.4	0.00	0.00	0.00
14,800.0	89.42	180.23	9,385.8	-5,671.4	-22.6	5,671.4	0.00	0.00	0.00
14,900.0	89.42	180.23	9,386.8	-5,771.3	-23.0	5,771.4	0.00	0.00	0.00
15,000.0	89.42	180.23	9,387.8	-5,871.3	-23.3	5,871.4	0.00	0.00	0.00
15,100.0	89.42	180.23	9,388.8	-5,971.3	-23.7	5,971.4	0.00	0.00	0.00
15,200.0	89.42	180.23	9,389.9	-6,071.3	-24.1	6,071.4	0.00	0.00	0.00
15,300.0	89.42	180.23	9,390.9	-6,171.3	-24.5	6,171.4	0.00	0.00	0.00
15,400.0	89.42	180.23	9,391.9	-6,271.3	-24.9	6,271.4	0.00	0.00	0.00
15,500.0	89.42	180.23	9,392.9	-6,371.3	-25.3	6,371.4	0.00	0.00	0.00
15,600.0	89.42	180.23	9,393.9	-6,471.3	-25.7	6,471.4	0.00	0.00	0.00
15,700.0	89.42	180.23	9,394.9	-6,571.3	-26.1	6,571.4	0.00	0.00	0.00
15,800.0	89.42	180.23	9,395.9	-6,671.3	-26.5	6,671.3	0.00	0.00	0.00
15,900.0	89.42	180.23	9,396.9	-6,771.3	-26.9	6,771.3	0.00	0.00	0.00
16,000.0	89.42	180.23	9,397.9	-6,871.3	-27.3	6,871.3	0.00	0.00	0.00
16,100.0	89.42	180.23	9,399.0	-6,971.3	-27.7	6,971.3	0.00	0.00	0.00
16,200.0	89.42	180.23	9,400.0	-7,071.3	-28.1	7,071.3	0.00	0.00	0.00
16,300.0	89.42	180.23	9,401.0	-7,171.3	-28.5	7,171.3	0.00	0.00	0.00
16,400.0	89.42	180.23	9,402.0	-7,271.3	-28.9	7,271.3	0.00	0.00	0.00
16,500.0	89.42	180.23	9,403.0	-7,371.3	-29.3	7,371.3	0.00	0.00	0.00
16,600.0	89.42	180.23	9,404.0	-7,471.2	-29.7	7,471.3	0.00	0.00	0.00
16,700.0	89.42	180.23	9,405.0	-7,571.2	-30.1	7,571.3	0.00	0.00	0.00
16,800.0	89.42	180.23	9,406.0	-7,671.2	-30.5	7,671.3	0.00	0.00	0.00
16,900.0	89.42	180.23	9,407.0	-7,771.2	-30.9	7,771.3	0.00	0.00	0.00
17,000.0	89.42	180.23	9,408.1	-7,871.2	-31.3	7,871.3	0.00	0.00	0.00
17,100.0	89.42	180.23	9,409.1	-7,971.2	-31.7	7,971.3	0.00	0.00	0.00
17,200.0	89.42	180.23	9,410.1	-8,071.2	-32.1	8,071.3	0.00	0.00	0.00
17,300.0	89.42	180.23	9,411.1	-8,171.2	-32.5	8,171.3	0.00	0.00	0.00
17,400.0	89.42	180.23	9,412.1	-8,271.2	-32.9	8,271.3	0.00	0.00	0.00
17,500.0	89.42	180.23	9,413.1	-8,371.2	-33.3	8,371.3	0.00	0.00	0.00
17,600.0	89.42	180.23	9,414.1	-8,471.2	-33.7	8,471.3	0.00	0.00	0.00
17,700.0	89.42	180.23	9,415.1	-8,571.2	-34.1	8,571.3	0.00	0.00	0.00
17,800.0	89.42	180.23	9,416.1	-8,671.2	-34.5	8,671.2	0.00	0.00	0.00
17,900.0	89.42	180.23	9,417.2	-8,771.2	-34.9	8,771.2	0.00	0.00	0.00
18,000.0	89.42	180.23	9,418.2	-8,871.2	-35.3	8,871.2	0.00	0.00	0.00
18,100.0	89.42	180.23	9,419.2	-8,971.2	-35.7	8,971.2	0.00	0.00	0.00
18,200.0	89.42	180.23	9,420.2	-9,071.2	-36.1	9,071.2	0.00	0.00	0.00
18,300.0	89.42	180.23	9,421.2	-9,171.1	-36.5	9,171.2	0.00	0.00	0.00
18,400.0	89.42	180.23	9,422.2	-9,271.1	-36.9	9,271.2	0.00	0.00	0.00
18,500.0	89.42	180.23	9,423.2	-9,371.1	-37.3	9,371.2	0.00	0.00	0.00

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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	180.23	9,424.2	-9,471.1	-37.7	9,471.2	0.00	0.00	0.00
18,700.0	89.42	180.23	9,425.2	-9,571.1	-38.1	9,571.2	0.00	0.00	0.00
18,800.0	89.42	180.23	9,426.3	-9,671.1	-38.5	9,671.2	0.00	0.00	0.00
18,900.0	89.42	180.23	9,427.3	-9,771.1	-38.9	9,771.2	0.00	0.00	0.00
19,000.0	89.42	180.23	9,428.3	-9,871.1	-39.3	9,871.2	0.00	0.00	0.00
19,100.0	89.42	180.23	9,429.3	-9,971.1	-39.7	9,971.2	0.00	0.00	0.00
19,200.0	89.42	180.23	9,430.3	-10,071.1	-40.0	10,071.2	0.00	0.00	0.00
19,300.0	89.42	180.23	9,431.3	-10,171.1	-40.4	10,171.2	0.00	0.00	0.00
19,400.0	89.42	180.23	9,432.3	-10,271.1	-40.8	10,271.2	0.00	0.00	0.00
19,500.0	89.42	180.23	9,433.3	-10,371.1	-41.2	10,371.2	0.00	0.00	0.00
19,600.0	89.42	180.23	9,434.3	-10,471.1	-41.6	10,471.2	0.00	0.00	0.00
19,700.0	89.42	180.23	9,435.4	-10,571.1	-42.0	10,571.1	0.00	0.00	0.00
19,800.0	89.42	180.23	9,436.4	-10,671.1	-42.4	10,671.1	0.00	0.00	0.00
19,900.0	89.42	180.23	9,437.4	-10,771.1	-42.8	10,771.1	0.00	0.00	0.00
20,000.0	89.42	180.23	9,438.4	-10,871.0	-43.2	10,871.1	0.00	0.00	0.00
20,100.0	89.42	180.23	9,439.4	-10,971.0	-43.6	10,971.1	0.00	0.00	0.00
20,200.0	89.42	180.23	9,440.4	-11,071.0	-44.0	11,071.1	0.00	0.00	0.00
20,300.0	89.42	180.23	9,441.4	-11,171.0	-44.4	11,171.1	0.00	0.00	0.00
20,400.0	89.42	180.23	9,442.4	-11,271.0	-44.8	11,271.1	0.00	0.00	0.00
20,500.0	89.42	180.23	9,443.4	-11,371.0	-45.2	11,371.1	0.00	0.00	0.00
20,600.0	89.42	180.23	9,444.5	-11,471.0	-45.6	11,471.1	0.00	0.00	0.00
20,700.0	89.42	180.23	9,445.5	-11,571.0	-46.0	11,571.1	0.00	0.00	0.00
20,800.0	89.42	180.23	9,446.5	-11,671.0	-46.4	11,671.1	0.00	0.00	0.00
20,900.0	89.42	180.23	9,447.5	-11,771.0	-46.8	11,771.1	0.00	0.00	0.00
21,000.0	89.42	180.23	9,448.5	-11,871.0	-47.2	11,871.1	0.00	0.00	0.00
21,100.0	89.42	180.23	9,449.5	-11,971.0	-47.6	11,971.1	0.00	0.00	0.00
PBHL @ 21150' MD / 9450' TVD									
21,149.5	89.42	180.23	9,450.0	-12,020.5	-47.8	12,020.6	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
Northern Hardline Nightc - plan hits target center - Point	0.00	0.00	9,350.0	-2,130.1	-8.5	585,525.92	664,726.03	32° 36' 30.874 N	103° 47' 54.204 W
PBHL Nightcap 6 Federa - plan hits target center - Point	0.00	0.00	9,450.0	-12,020.5	-47.8	575,635.50	664,686.70	32° 34' 53.007 N	103° 47' 55.245 W

Database:	Compass	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 1H
Company:	COG Operating LLC	**TVD Reference:**	Well @ 3555.0usft (Ensign 772)
Project:	Lea County, NM	**MD Reference:**	Well @ 3555.0usft (Ensign 772)
Site:	Sec 31, T19S, R32E	**North Reference:**	Grid
Well:	Nightcap 6 Federal 1H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
857.0	62.0	Rustler		0.58	180.23
948.0	153.0	TOS		0.58	180.23
2,489.0	1,694.0	BOS / Tansill		0.58	180.23
2,599.0	1,804.0	Yates		0.58	180.23
2,766.0	1,971.0	Seven Rivers		0.58	180.23
2,879.0	2,084.0	Captain Reef		0.58	180.23
4,359.0	3,564.0	Base of Reef (CYCN)		0.58	180.23
5,635.0	4,840.0	Brushy Canyon		0.58	180.23
7,315.0	6,520.0	Bone Spring (BSGL)		0.58	180.23
8,494.0	7,699.0	FBSG_sand		0.58	180.23
9,235.1	8,401.4	SBSG_sand		0.58	180.23

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
8,855.8	8,855.8	0.0	0.0	Build 12°/100'
9,601.0	9,333.2	-472.6	-1.9	End of Curve / 89.42° Inc / 180.23° Azm / 9333' TVD
10,528.7	9,342.6	-1,400.3	-5.6	Min. Distance 62'
11,258.5	9,350.0	-2,130.1	-8.5	Cross N Hard Line @ 9350' TVD
21,149.5	9,450.0	-12,020.5	-47.8	PBHL @ 21150' MD / 9450' TVD

CONCHO

COG Operating, LLC

Lea County, NM
Sec 31, T19S, R32E
Nightcap 6 Federal 1H

Wellbore #1
Design #1

DDC Anticollision Report

10 July, 2015

DDC
The DIRECTIONAL DRILLING COMPANY

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 1H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 1H	**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 #1	**Offset TVD Reference:**	Offset Datum

Reference Design #1

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** 7/9/2015

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	21,149.5	Design #1 (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	9,175.0	14,539.9	375.3	355.1	18.620	SF
Dirty Dozen State Com 3H - Wellbore #1 - Wellbore #1	9,214.4	14,539.4	371.6	352.0	18.953	CC, ES
Dirty Dozen State Com 4H - Wellbore #1 - Wellbore #1	10,528.9	14,795.3	78.9	61.9	4.619	CC, ES, SF
Nightcap 6 Federal 2H - Wellbore #1 - Design #1	8,835.9	8,835.9	156.3	116.8	3.964	CC
Nightcap 6 Federal 2H - Wellbore #1 - Design #1	8,855.8	8,852.2	156.3	116.8	3.957	ES
Nightcap 6 Federal 2H - Wellbore #1 - Design #1	21,149.5	21,470.2	1,320.1	882.1	3.014	SF
String Bean Federal Com 2H - Wellbore #1 - Wellbore #1	6,416.3	6,410.5	111.3	93.6	6.305	CC
String Bean Federal Com 2H - Wellbore #1 - Wellbore #1	6,700.0	6,693.9	111.7	93.3	6.063	ES
String Bean Federal Com 2H - Wellbore #1 - Wellbore #1	8,855.8	8,849.4	119.8	95.7	4.977	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	-89.77	21.5	-5,436.1	5,436.2			
100.0	100.0	96.6	96.6	0.1	0.0	-89.77	21.5	-5,435.9	5,436.0	5,435.9	N/A	
200.0	200.0	180.5	180.5	0.3	0.0	-89.77	21.5	-5,435.6	5,435.6	5,435.3	N/A	
300.0	300.0	271.6	271.6	0.5	0.0	-89.78	21.3	-5,435.5	5,435.5	5,435.0	N/A	
324.3	324.3	294.3	294.3	0.6	0.0	-89.78	21.3	-5,435.5	5,435.5	5,434.9	9,340.747	
400.0	400.0	360.6	360.6	0.8	0.0	-89.78	21.0	-5,435.5	5,435.6	5,434.8	7,227.762	
500.0	500.0	452.6	452.6	1.0	0.0	-89.78	20.5	-5,435.8	5,435.9	5,434.9	5,564.910	
600.0	600.0	550.6	550.5	1.2	0.0	-89.79	19.6	-5,436.1	5,436.2	5,435.0	4,524.229	
700.0	700.0	664.3	664.3	1.4	0.0	-89.81	18.5	-5,436.5	5,436.5	5,435.1	3,811.498	
800.0	800.0	782.4	782.4	1.7	0.0	-89.82	17.1	-5,436.4	5,436.4	5,434.8	3,292.585	
900.0	900.0	915.8	915.8	1.9	0.0	-89.84	15.4	-5,435.7	5,435.9	5,434.0	2,897.781	
1,000.0	1,000.0	1,023.0	1,023.0	2.1	0.0	-89.85	14.0	-5,434.7	5,434.9	5,432.8	2,587.284	
1,100.0	1,100.0	1,123.9	1,123.9	2.3	0.0	-89.87	12.7	-5,433.7	5,434.0	5,431.6	2,336.780	
1,200.0	1,200.0	1,220.1	1,220.1	2.5	0.0	-89.88	11.4	-5,432.7	5,433.0	5,430.4	2,130.441	
1,300.0	1,300.0	1,311.1	1,311.1	2.8	0.0	-89.89	10.3	-5,432.0	5,432.2	5,429.4	1,957.581	
1,400.0	1,400.0	1,416.6	1,416.5	3.0	0.0	-89.90	9.1	-5,431.1	5,431.4	5,428.4	1,810.631	
1,500.0	1,500.0	1,522.1	1,522.0	3.2	0.0	-89.91	8.2	-5,430.2	5,430.5	5,427.2	1,684.142	
1,600.0	1,600.0	1,643.0	1,642.9	3.4	0.0	-89.92	7.5	-5,428.9	5,429.4	5,425.9	1,574.076	

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 1H
Project:	Lea County, NM	TVD Reference:	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 1H	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 #1	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
1,700.0	1,700.0	1,969.7	1,969.3	3.7	0.0	-89.91	8.6	-5,418.2	5,426.5	5,422.8	1,476.996	
1,800.0	1,800.0	2,118.1	2,117.5	3.9	0.0	-89.89	10.7	-5,409.2	5,420.3	5,416.4	1,390.269	
1,900.0	1,900.0	2,215.0	2,214.2	4.1	0.0	-89.87	12.2	-5,402.9	5,413.9	5,409.8	1,312.930	
2,000.0	2,000.0	2,300.0	2,299.0	4.3	0.0	-89.86	13.3	-5,397.8	5,407.8	5,403.4	1,243.657	
2,100.0	2,100.0	2,391.7	2,390.5	4.6	0.0	-89.85	14.3	-5,392.4	5,401.9	5,397.3	1,181.241	
2,200.0	2,200.0	2,469.8	2,468.6	4.8	0.0	-89.84	15.0	-5,387.9	5,396.1	5,391.3	1,124.704	
2,300.0	2,300.0	2,532.5	2,531.1	5.0	0.0	-89.84	15.3	-5,384.6	5,390.9	5,385.9	1,073.330	
2,400.0	2,400.0	2,600.0	2,598.6	5.2	0.0	-89.83	15.6	-5,381.6	5,386.5	5,381.3	1,026.519	
2,500.0	2,500.0	2,644.7	2,643.3	5.5	0.0	-89.83	15.9	-5,380.1	5,382.9	5,377.4	983.692	
2,600.0	2,600.0	2,700.0	2,698.5	5.7	0.0	-89.82	16.6	-5,378.5	5,380.0	5,374.4	944.382	
2,700.0	2,700.0	2,779.1	2,777.5	5.9	0.0	-89.81	17.6	-5,376.7	5,377.8	5,371.9	908.157	
2,800.0	2,800.0	2,866.2	2,864.7	6.1	0.0	-89.80	18.7	-5,375.1	5,376.0	5,369.8	874.647	
2,900.0	2,900.0	2,963.7	2,962.2	6.4	0.0	-89.79	19.7	-5,373.4	5,374.2	5,367.9	843.520	
3,000.0	3,000.0	3,063.4	3,061.8	6.6	0.0	-89.78	20.6	-5,371.7	5,372.5	5,365.9	814.517	
3,100.0	3,100.0	3,169.5	3,167.9	6.8	0.0	-89.77	21.2	-5,369.8	5,370.8	5,364.0	787.420	
3,200.0	3,200.0	3,337.4	3,335.8	7.0	0.0	-89.77	22.0	-5,365.7	5,368.3	5,361.2	761.946	
3,300.0	3,300.0	3,432.8	3,431.1	7.3	0.0	-89.75	23.2	-5,362.7	5,365.2	5,357.9	737.961	
3,400.0	3,400.0	3,500.0	3,498.2	7.5	0.0	-89.73	24.8	-5,360.8	5,362.4	5,354.9	715.461	
3,500.0	3,500.0	3,587.8	3,586.0	7.7	0.0	-89.71	27.3	-5,358.7	5,360.0	5,352.3	694.322	
3,600.0	3,600.0	3,683.5	3,681.6	7.9	0.0	-89.68	30.0	-5,356.7	5,357.9	5,350.0	674.414	
3,700.0	3,700.0	3,775.8	3,773.9	8.2	0.0	-89.65	32.5	-5,354.8	5,355.9	5,347.7	655.611	
3,800.0	3,800.0	3,867.4	3,865.5	8.4	0.0	-89.63	34.7	-5,353.1	5,354.0	5,345.6	637.835	
3,900.0	3,900.0	3,955.9	3,953.9	8.6	0.0	-89.61	36.4	-5,351.6	5,352.4	5,343.7	621.005	
4,000.0	4,000.0	4,043.1	4,041.1	8.8	0.0	-89.59	37.9	-5,350.3	5,350.9	5,342.1	605.059	
4,100.0	4,100.0	14,488.0	9,404.4	9.1	0.0	-24.69	141.3	-65.0	5,336.7	5,327.6	588.492	
4,200.0	4,200.0	14,488.0	9,404.4	9.3	0.0	-24.69	141.3	-65.0	5,236.7	5,227.4	563.503	
4,300.0	4,300.0	14,488.0	9,404.4	9.5	0.0	-24.69	141.3	-65.0	5,136.8	5,127.2	539.694	
4,400.0	4,400.0	14,488.0	9,404.4	9.7	0.0	-24.69	141.3	-65.0	5,036.8	5,027.1	516.983	
4,500.0	4,500.0	14,488.0	9,404.4	10.0	0.0	-24.69	141.3	-65.0	4,936.9	4,926.9	495.298	
4,600.0	4,600.0	14,488.0	9,404.4	10.2	0.0	-24.69	141.3	-65.0	4,836.9	4,826.7	474.569	
4,700.0	4,700.0	14,488.0	9,404.4	10.4	0.0	-24.69	141.3	-65.0	4,737.0	4,726.5	454.734	
4,800.0	4,800.0	14,500.8	9,404.5	10.6	0.0	-20.20	141.7	-52.2	4,637.0	4,626.3	435.735	
4,900.0	4,900.0	14,501.4	9,404.5	10.9	0.0	-19.98	141.8	-51.5	4,537.0	4,526.2	417.525	
5,000.0	5,000.0	14,502.1	9,404.5	11.1	0.0	-19.76	141.8	-50.9	4,437.1	4,426.0	400.052	
5,100.0	5,100.0	14,502.7	9,404.5	11.3	0.0	-19.53	141.8	-50.3	4,337.2	4,325.8	383.275	
5,200.0	5,200.0	14,503.3	9,404.5	11.5	0.0	-19.29	141.8	-49.6	4,237.2	4,225.7	367.150	
5,300.0	5,300.0	14,504.0	9,404.6	11.8	0.0	-19.05	141.8	-49.0	4,137.3	4,125.5	351.643	
5,400.0	5,400.0	14,504.7	9,404.6	12.0	0.0	-18.80	141.9	-48.3	4,037.3	4,025.4	336.716	
5,500.0	5,500.0	14,505.4	9,404.6	12.2	0.0	-18.55	141.9	-47.6	3,937.4	3,925.2	322.340	
5,600.0	5,600.0	14,506.1	9,404.6	12.4	0.0	-18.30	141.9	-46.9	3,837.5	3,825.1	308.483	
5,700.0	5,700.0	14,506.8	9,404.6	12.7	0.0	-18.04	141.9	-46.2	3,737.6	3,724.9	295.118	
5,800.0	5,800.0	14,507.5	9,404.6	12.9	0.0	-17.77	141.9	-45.5	3,637.7	3,624.8	282.220	
5,900.0	5,900.0	14,508.2	9,404.6	13.1	0.0	-17.50	142.0	-44.8	3,537.7	3,524.6	269.764	
6,000.0	6,000.0	14,509.0	9,404.6	13.3	0.0	-17.22	142.0	-44.0	3,437.8	3,424.5	257.729	
6,100.0	6,100.0	14,509.8	9,404.6	13.6	0.0	-16.93	142.0	-43.2	3,337.9	3,324.4	246.092	
6,200.0	6,200.0	14,510.5	9,404.6	13.8	0.0	-16.64	142.0	-42.5	3,238.0	3,224.2	234.836	
6,300.0	6,300.0	14,511.3	9,404.6	14.0	0.0	-16.34	142.1	-41.7	3,138.1	3,124.1	223.941	
6,400.0	6,400.0	14,512.2	9,404.6	14.2	0.0	-16.04	142.1	-40.8	3,038.2	3,024.0	213.390	
6,500.0	6,500.0	14,513.0	9,404.7	14.5	0.0	-15.72	142.1	-40.0	2,938.4	2,923.9	203.168	
6,600.0	6,600.0	14,513.8	9,404.7	14.7	0.0	-15.40	142.2	-39.2	2,838.5	2,823.8	193.259	
6,700.0	6,700.0	14,514.7	9,404.7	14.9	0.0	-15.08	142.2	-38.3	2,738.6	2,723.7	183.650	
6,800.0	6,800.0	14,515.6	9,404.7	15.1	0.0	-14.74	142.2	-37.4	2,638.8	2,623.7	174.326	

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 1H
Project:	Lea County, NM	TVD Reference:	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 1H	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 #1	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
6,900.0	6,900.0	14,516.5	9,404.7	15.4	0.0	-14.40	142.2	-36.5	2,539.0	2,523.6	165.277	
7,000.0	7,000.0	14,517.4	9,404.7	15.6	0.0	-14.04	142.3	-35.6	2,439.1	2,423.5	156.489	
7,100.0	7,100.0	14,518.3	9,404.7	15.8	0.0	-13.68	142.3	-34.6	2,339.3	2,323.5	147.951	
7,200.0	7,200.0	14,519.3	9,404.7	16.0	0.0	-13.31	142.3	-33.7	2,239.5	2,223.5	139.655	
7,300.0	7,300.0	14,520.3	9,404.8	16.3	0.0	-12.94	142.4	-32.7	2,139.7	2,123.5	131.588	
7,400.0	7,400.0	14,521.3	9,404.8	16.5	0.0	-12.55	142.4	-31.7	2,040.0	2,023.5	123.743	
7,500.0	7,500.0	14,522.3	9,404.8	16.7	0.0	-12.15	142.4	-30.7	1,940.3	1,923.5	116.110	
7,600.0	7,600.0	14,523.4	9,404.8	16.9	0.0	-11.74	142.5	-29.6	1,840.6	1,823.6	108.682	
7,700.0	7,700.0	14,524.5	9,404.8	17.2	0.0	-11.32	142.5	-28.5	1,740.9	1,723.7	101.450	
7,800.0	7,800.0	14,525.6	9,404.8	17.4	0.0	-10.89	142.5	-27.4	1,641.3	1,623.9	94.408	
7,900.0	7,900.0	14,526.7	9,404.8	17.6	0.0	-10.45	142.6	-26.3	1,541.7	1,524.1	87.548	
8,000.0	8,000.0	14,527.9	9,404.9	17.8	0.0	-10.00	142.6	-25.1	1,442.1	1,424.3	80.864	
8,100.0	8,100.0	14,529.0	9,404.9	18.1	0.0	-9.53	142.7	-24.0	1,342.7	1,324.6	74.350	
8,200.0	8,200.0	14,530.3	9,404.9	18.3	0.0	-9.06	142.7	-22.7	1,243.3	1,225.0	68.001	
8,300.0	8,300.0	14,531.5	9,404.9	18.5	0.0	-8.57	142.7	-21.5	1,144.0	1,125.5	61.812	
8,400.0	8,400.0	14,532.8	9,404.9	18.7	0.0	-8.06	142.8	-20.2	1,044.9	1,026.2	55.779	
8,500.0	8,500.0	14,534.1	9,404.9	19.0	0.0	-7.54	142.8	-18.9	946.0	927.0	49.899	
8,600.0	8,600.0	14,535.4	9,405.0	19.2	0.0	-7.01	142.9	-17.6	847.3	828.1	44.169	
8,700.0	8,700.0	14,536.8	9,405.0	19.4	0.0	-6.46	142.9	-16.2	748.9	729.5	38.589	
8,800.0	8,800.0	14,538.2	9,405.0	19.6	0.0	-5.90	143.0	-14.8	651.1	631.4	33.163	
8,855.8	8,855.8	14,539.0	9,405.0	19.8	0.0	-5.58	143.0	-14.0	596.8	577.0	30.204	
8,875.0	8,875.0	14,539.3	9,405.0	19.8	0.0	175.08	143.0	-13.7	578.3	558.2	28.867	
8,900.0	8,899.9	14,539.6	9,405.0	19.8	0.0	175.88	143.0	-13.4	554.6	534.2	27.270	
8,925.0	8,924.8	14,539.9	9,405.0	19.9	0.0	176.44	143.0	-13.1	531.5	510.9	25.814	
8,950.0	8,949.4	14,540.1	9,405.0	19.9	0.0	176.84	143.0	-12.9	509.1	488.3	24.492	
8,975.0	8,973.8	14,540.3	9,405.0	20.0	0.0	177.14	143.0	-12.7	487.7	466.8	23.298	
9,000.0	8,997.8	14,540.4	9,405.0	20.0	0.0	177.37	143.0	-12.6	467.4	446.3	22.229	
9,025.0	9,021.5	14,540.5	9,405.0	20.0	0.0	177.54	143.0	-12.5	448.3	427.3	21.287	
9,050.0	9,044.7	14,540.5	9,405.0	20.1	0.0	177.67	143.0	-12.5	430.9	409.8	20.474	
9,075.0	9,067.4	14,540.5	9,405.0	20.1	0.0	177.76	143.0	-12.5	415.2	394.2	19.796	
9,100.0	9,089.5	14,540.4	9,405.0	20.2	0.0	177.82	143.0	-12.6	401.5	380.7	19.261	
9,125.0	9,111.0	14,540.3	9,405.0	20.2	0.0	177.86	143.0	-12.7	390.2	369.5	18.878	
9,150.0	9,131.7	14,540.1	9,405.0	20.2	0.0	177.88	143.0	-12.9	381.4	360.9	18.660	
9,175.0	9,151.7	14,539.9	9,405.0	20.3	0.0	177.87	143.0	-13.1	375.3	355.1	18.620	SF
9,200.0	9,171.0	14,539.6	9,405.0	20.3	0.0	177.84	143.0	-13.4	372.1	352.3	18.772	
9,214.4	9,181.6	14,539.4	9,405.0	20.4	0.0	177.81	143.0	-13.6	371.6	352.0	18.953	CC, ES
9,225.0	9,189.3	14,539.3	9,405.0	20.4	0.0	177.79	143.0	-13.8	371.8	352.4	19.130	
9,250.0	9,206.7	14,538.9	9,405.0	20.5	0.0	177.72	143.0	-14.1	374.6	355.6	19.707	
9,275.0	9,223.2	14,538.5	9,405.0	20.5	0.0	177.62	143.0	-14.6	380.2	361.7	20.516	
9,300.0	9,238.6	14,538.0	9,405.0	20.6	0.0	177.50	142.9	-15.0	388.7	370.6	21.571	
9,325.0	9,253.0	14,537.5	9,405.0	20.7	0.0	177.35	142.9	-15.5	399.6	382.2	22.887	
9,350.0	9,266.4	14,536.9	9,405.0	20.8	0.0	177.17	142.9	-16.1	412.9	396.1	24.477	
9,375.0	9,278.6	14,536.3	9,405.0	20.9	0.0	176.95	142.9	-16.7	428.3	412.1	26.358	
9,400.0	9,289.6	14,535.7	9,405.0	21.0	0.0	176.67	142.9	-17.3	445.5	429.9	28.545	
9,425.0	9,299.4	14,535.0	9,405.0	21.1	0.0	176.33	142.8	-18.0	464.3	449.4	31.053	
9,450.0	9,308.1	14,534.3	9,404.9	21.2	0.0	175.91	142.8	-18.7	484.5	470.2	33.879	
9,475.0	9,315.5	14,533.5	9,404.9	21.3	0.0	175.37	142.8	-19.5	505.7	492.1	36.996	
9,500.0	9,321.6	14,532.7	9,404.9	21.5	0.0	174.68	142.8	-20.3	528.0	514.9	40.304	
9,525.0	9,326.4	14,531.9	9,404.9	21.6	0.0	173.75	142.7	-21.1	550.9	538.3	43.573	
9,550.0	9,330.0	14,531.1	9,404.9	21.8	0.0	172.46	142.7	-21.9	574.5	562.1	46.348	
9,575.0	9,332.3	14,530.2	9,404.9	21.9	0.0	170.55	142.7	-22.8	598.6	586.1	47.899	
9,601.0	9,333.2	14,529.3	9,404.9	22.1	0.0	167.31	142.7	-23.7	624.0	610.8	47.247	

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 1H
Project:	Lea County, NM	TVD Reference:	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 1H	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 #1	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
9,700.0	9,334.2	14,525.8	9,404.8	22.8	0.0	165.54	142.5	-27.2	721.7	707.5	51.011	
9,800.0	9,335.3	14,522.2	9,404.8	23.7	0.0	163.78	142.4	-30.8	820.6	805.5	54.115	
9,900.0	9,336.3	14,518.7	9,404.7	24.6	0.0	162.05	142.3	-34.3	919.8	903.5	56.628	
10,000.0	9,337.3	14,515.2	9,404.7	25.7	0.0	160.37	142.2	-37.8	1,019.1	1,001.7	58.646	
10,100.0	9,338.3	14,511.7	9,404.6	26.8	0.0	158.73	142.1	-41.3	1,118.5	1,099.9	60.250	
10,200.0	9,339.3	14,508.2	9,404.6	28.0	0.0	157.14	142.0	-44.8	1,218.0	1,198.2	61.507	
10,300.0	9,340.3	14,504.7	9,404.6	29.3	0.0	155.58	141.9	-48.3	1,317.6	1,296.5	62.476	
10,400.0	9,341.3	14,501.3	9,404.5	30.6	0.0	154.07	141.7	-51.7	1,417.2	1,394.8	63.206	
10,500.0	9,342.3	14,497.9	9,404.5	32.0	0.0	152.61	141.6	-55.1	1,516.9	1,493.1	63.739	
10,600.0	9,343.3	14,494.5	9,404.5	33.4	0.0	151.19	141.5	-58.5	1,616.6	1,591.3	64.110	
10,700.0	9,344.4	14,491.1	9,404.4	34.8	0.0	149.81	141.4	-61.9	1,716.3	1,689.6	64.349	
10,800.0	9,345.4	14,487.5	9,404.4	36.3	0.0	148.42	141.3	-65.4	1,816.0	1,787.8	64.434	
10,900.0	9,346.4	14,482.6	9,404.4	37.8	0.0	146.54	141.1	-70.4	1,915.8	1,885.9	63.990	
11,000.0	9,347.4	14,477.5	9,404.3	39.4	0.0	144.67	141.0	-75.5	2,015.6	1,983.8	63.480	
11,100.0	9,348.4	14,472.2	9,404.3	41.0	0.0	142.81	140.8	-80.8	2,115.4	2,081.8	62.926	
11,200.0	9,349.4	14,466.6	9,404.2	42.5	0.0	140.96	140.6	-86.4	2,215.2	2,179.6	62.345	
11,258.5	9,350.0	14,463.2	9,404.2	43.5	0.0	139.88	140.5	-89.7	2,273.6	2,236.9	61.998	
11,300.0	9,350.4	14,460.8	9,404.2	44.2	0.0	139.12	140.4	-92.2	2,315.0	2,277.5	61.751	
11,400.0	9,351.4	14,454.7	9,404.2	45.8	0.0	137.31	140.2	-98.2	2,414.8	2,375.3	61.156	
11,500.0	9,352.4	14,448.4	9,404.1	47.4	0.0	135.53	139.9	-104.6	2,514.6	2,473.1	60.569	
11,600.0	9,353.5	14,441.8	9,404.1	49.1	0.0	133.77	139.7	-111.2	2,614.4	2,570.9	59.998	
11,700.0	9,354.5	14,434.8	9,404.0	50.7	0.0	132.04	139.4	-118.1	2,714.3	2,668.6	59.446	
11,800.0	9,355.5	14,427.6	9,404.0	52.4	0.0	130.34	139.1	-125.4	2,814.1	2,766.3	58.918	
11,900.0	9,356.5	14,422.1	9,404.0	54.1	0.0	129.12	138.9	-130.9	2,913.9	2,864.2	58.637	
12,000.0	9,357.5	14,417.6	9,403.9	55.8	0.0	128.19	138.7	-135.3	3,013.8	2,962.2	58.478	
12,100.0	9,358.5	14,413.2	9,403.9	57.5	0.0	127.29	138.5	-139.8	3,113.6	3,060.2	58.320	
12,200.0	9,359.5	14,408.7	9,403.9	59.2	0.0	126.42	138.4	-144.2	3,213.4	3,158.2	58.166	
12,300.0	9,360.5	14,404.3	9,403.9	60.9	0.0	125.59	138.2	-148.6	3,313.3	3,256.2	58.015	
12,400.0	9,361.5	14,399.8	9,403.8	62.6	0.0	124.80	138.0	-153.1	3,413.1	3,354.1	57.868	
12,500.0	9,362.6	14,395.4	9,403.8	64.3	0.0	124.03	137.8	-157.5	3,513.0	3,452.1	57.725	
12,600.0	9,363.6	14,390.9	9,403.8	66.1	0.0	123.29	137.6	-162.0	3,612.8	3,550.1	57.586	
12,700.0	9,364.6	14,386.5	9,403.8	67.8	0.0	122.58	137.4	-166.4	3,712.7	3,648.1	57.453	
12,800.0	9,365.6	14,382.1	9,403.7	69.6	0.0	121.90	137.3	-170.8	3,812.5	3,746.0	57.323	
12,900.0	9,366.6	14,377.6	9,403.7	71.3	0.0	121.24	137.1	-175.2	3,912.4	3,844.0	57.198	
13,000.0	9,367.6	14,373.2	9,403.7	73.0	0.0	120.60	136.9	-179.7	4,012.3	3,942.0	57.078	
13,100.0	9,368.6	14,368.8	9,403.7	74.8	0.0	119.99	136.7	-184.1	4,112.1	4,039.9	56.962	
13,200.0	9,369.6	14,364.4	9,403.6	76.6	0.0	119.40	136.5	-188.5	4,212.0	4,137.9	56.851	
13,300.0	9,370.6	14,362.0	9,403.6	78.3	0.0	119.10	136.4	-190.9	4,311.9	4,236.0	56.835	
13,400.0	9,371.7	14,362.0	9,403.6	80.1	0.0	119.10	136.4	-190.9	4,411.7	4,334.2	56.921	
13,500.0	9,372.7	14,362.0	9,403.6	81.8	0.0	119.10	136.4	-190.9	4,511.6	4,432.5	57.002	
13,600.0	9,373.7	14,351.4	9,403.6	83.6	0.0	117.78	136.0	-201.5	4,611.5	4,530.0	56.623	
13,700.0	9,374.7	14,348.4	9,403.5	85.4	0.0	117.44	135.9	-204.5	4,711.4	4,628.1	56.576	
13,800.0	9,375.7	14,345.4	9,403.5	87.1	0.0	117.10	135.8	-207.4	4,811.2	4,726.1	56.529	
13,900.0	9,376.7	14,342.5	9,403.5	88.9	0.0	116.77	135.7	-210.3	4,911.1	4,824.2	56.483	
14,000.0	9,377.7	14,339.7	9,403.5	90.7	0.0	116.46	135.6	-213.2	5,011.0	4,922.2	56.438	
14,100.0	9,378.7	14,336.9	9,403.4	92.5	0.0	116.16	135.4	-216.0	5,110.9	5,020.3	56.394	
14,200.0	9,379.7	14,334.1	9,403.4	94.3	0.0	115.86	135.3	-218.8	5,210.8	5,118.3	56.351	
14,300.0	9,380.8	14,331.4	9,403.4	96.0	0.0	115.58	135.2	-221.5	5,310.7	5,216.4	56.308	
14,400.0	9,381.8	14,328.7	9,403.4	97.8	0.0	115.31	135.1	-224.2	5,410.6	5,314.4	56.267	
14,500.0	9,382.8	14,326.0	9,403.3	99.6	0.0	115.04	135.0	-226.9	5,510.5	5,412.5	56.226	
14,600.0	9,383.8	14,323.4	9,403.3	101.4	0.0	114.78	134.9	-229.5	5,610.4	5,510.5	56.186	
14,700.0	9,384.8	14,320.8	9,403.3	103.2	0.0	114.53	134.8	-232.1	5,710.3	5,608.6	56.147	

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 1H
Project:	Lea County, NM	TVD Reference:	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 1H	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 #1	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-

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
14,800.0	9,385.8	14,065.6	9,396.9	105.0	0.0	101.56	119.8	-486.7	5,809.9	5,701.6	53.638	
14,900.0	9,386.8	14,056.6	9,396.7	106.8	0.0	101.33	119.1	-495.6	5,909.5	5,799.4	53.631	
15,000.0	9,387.8	14,047.7	9,396.5	108.5	0.0	101.12	118.4	-504.6	6,009.2	5,897.1	53.624	
15,100.0	9,388.8	14,041.0	9,396.4	110.3	0.0	100.96	117.9	-511.2	6,108.8	5,994.9	53.622	
15,200.0	9,389.9	14,032.2	9,396.2	112.1	0.0	100.76	117.2	-520.0	6,208.4	6,092.6	53.615	
15,300.0	9,390.9	14,025.3	9,396.1	113.9	0.0	100.61	116.6	-526.9	6,308.1	6,190.4	53.611	
15,400.0	9,391.9	14,018.4	9,395.9	115.7	0.0	100.46	116.1	-533.8	6,407.7	6,288.2	53.608	
15,500.0	9,392.9	14,011.5	9,395.7	117.5	0.0	100.31	115.5	-540.6	6,507.4	6,386.0	53.604	
15,600.0	9,393.9	14,004.7	9,395.6	119.3	0.0	100.17	115.0	-547.4	6,607.0	6,483.7	53.599	
15,700.0	9,394.9	13,997.9	9,395.4	121.1	0.0	100.03	114.5	-554.2	6,706.7	6,581.5	53.595	
15,800.0	9,395.9	13,991.2	9,395.2	122.9	0.0	99.89	113.9	-560.9	6,806.3	6,679.3	53.590	
15,900.0	9,396.9	13,984.4	9,395.1	124.7	0.0	99.76	113.4	-567.6	6,905.9	6,777.1	53.586	
16,000.0	9,397.9	13,977.0	9,394.9	126.5	0.0	99.62	112.8	-575.0	7,005.6	6,874.8	53.580	
16,100.0	9,399.0	13,977.0	9,394.9	128.3	0.0	99.62	112.8	-575.0	7,105.3	6,972.7	53.585	
16,200.0	9,400.0	13,966.6	9,394.6	130.1	0.0	99.42	112.0	-585.4	7,204.9	7,070.4	53.574	
16,300.0	9,401.0	13,961.1	9,394.5	131.9	0.0	99.33	111.6	-590.8	7,304.6	7,168.2	53.570	
16,400.0	9,402.0	13,955.7	9,394.3	133.7	0.0	99.23	111.2	-596.2	7,404.2	7,266.0	53.567	
16,500.0	9,403.0	13,950.3	9,394.2	135.5	0.0	99.14	110.8	-601.6	7,503.9	7,363.8	53.563	
16,600.0	9,404.0	13,945.0	9,394.1	137.3	0.0	99.05	110.4	-606.9	7,603.6	7,461.6	53.559	
16,700.0	9,405.0	13,939.7	9,393.9	139.1	0.0	98.96	110.0	-612.2	7,703.3	7,559.4	53.555	
16,800.0	9,406.0	13,934.5	9,393.8	140.9	0.0	98.87	109.6	-617.4	7,802.9	7,657.2	53.551	
16,900.0	9,407.0	13,929.3	9,393.7	142.7	0.0	98.79	109.2	-622.6	7,902.6	7,755.0	53.548	
17,000.0	9,408.1	13,924.1	9,393.6	144.5	0.0	98.71	108.8	-627.7	8,002.3	7,852.8	53.544	
17,100.0	9,409.1	13,913.0	9,393.4	146.4	0.0	98.54	108.0	-638.8	8,102.0	7,950.6	53.533	
17,200.0	9,410.1	13,913.0	9,393.4	148.2	0.0	98.54	108.0	-638.8	8,201.7	8,048.5	53.534	
17,300.0	9,411.1	13,913.0	9,393.4	150.0	0.0	98.54	108.0	-638.8	8,301.4	8,146.3	53.536	
17,400.0	9,412.1	13,913.0	9,393.4	151.8	0.0	98.54	108.0	-638.8	8,401.1	8,244.1	53.537	
17,500.0	9,413.1	13,913.0	9,393.4	153.6	0.0	98.54	108.0	-638.8	8,500.8	8,342.0	53.539	
17,600.0	9,414.1	13,913.0	9,393.4	155.4	0.0	98.54	108.0	-638.8	8,600.5	8,439.8	53.540	
17,700.0	9,415.1	13,913.0	9,393.4	157.2	0.0	98.54	108.0	-638.8	8,700.2	8,537.7	53.541	
17,800.0	9,416.1	13,893.4	9,393.1	159.0	0.0	98.27	106.6	-658.3	8,799.9	8,635.5	53.521	
17,900.0	9,417.2	13,890.2	9,393.1	160.8	0.0	98.22	106.3	-661.5	8,899.6	8,733.3	53.518	
18,000.0	9,418.2	13,887.0	9,393.1	162.6	0.0	98.18	106.1	-664.7	8,999.3	8,831.1	53.516	
18,100.0	9,419.2	13,883.8	9,393.0	164.4	0.0	98.14	105.9	-667.9	9,099.0	8,929.0	53.513	
18,200.0	9,420.2	13,880.7	9,393.0	166.2	0.0	98.10	105.7	-671.0	9,198.8	9,026.9	53.511	
18,300.0	9,421.2	13,877.6	9,393.0	168.1	0.0	98.07	105.5	-674.0	9,298.5	9,124.7	53.508	
18,400.0	9,422.2	13,874.6	9,393.0	169.9	0.0	98.03	105.2	-677.1	9,398.2	9,222.6	53.506	
18,500.0	9,423.2	13,871.6	9,393.0	171.7	0.0	98.00	105.0	-680.1	9,498.0	9,320.4	53.503	
18,600.0	9,424.2	13,868.6	9,393.0	173.5	0.0	97.96	104.8	-683.0	9,597.7	9,418.3	53.501	
18,700.0	9,425.2	13,849.0	9,393.2	175.3	0.0	97.76	103.6	-702.6	9,697.5	9,516.2	53.486	
18,800.0	9,426.3	13,849.0	9,393.2	177.1	0.0	97.76	103.6	-702.6	9,797.2	9,614.0	53.486	
18,900.0	9,427.3	13,849.0	9,393.2	178.9	0.0	97.76	103.6	-702.6	9,897.0	9,711.9	53.485	
19,000.0	9,428.3	13,849.0	9,393.2	180.7	0.0	97.76	103.6	-702.6	9,996.7	9,809.8	53.485	

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 1H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 1H	**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 #1	**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	-91.47	-138.2	-5,375.1	5,377.0			
100.0	100.0	57.7	57.7	0.1	0.0	-91.47	-138.2	-5,375.1	5,376.9	5,376.8	N/A	
200.0	200.0	145.2	145.2	0.3	0.0	-91.47	-138.3	-5,375.4	5,377.2	5,376.9	N/A	
300.0	300.0	234.9	234.9	0.5	0.0	-91.48	-138.6	-5,375.8	5,377.7	5,377.2	N/A	
400.0	400.0	328.4	328.4	0.8	0.0	-91.48	-138.9	-5,376.4	5,378.3	5,377.6	7,151.632	
500.0	500.0	421.7	421.7	1.0	0.0	-91.49	-139.4	-5,377.1	5,379.1	5,378.1	5,506.802	
600.0	600.0	514.4	514.4	1.2	0.0	-91.49	-140.1	-5,377.9	5,380.0	5,378.8	4,477.444	
700.0	700.0	607.6	607.6	1.4	0.0	-91.50	-140.9	-5,378.8	5,381.0	5,379.6	3,772.598	
800.0	800.0	706.2	706.2	1.7	0.0	-91.51	-141.8	-5,379.9	5,382.1	5,380.5	3,259.697	
900.0	900.0	804.8	804.8	1.9	0.0	-91.52	-142.7	-5,381.0	5,383.2	5,381.4	2,869.721	
1,000.0	1,000.0	903.0	902.9	2.1	0.0	-91.53	-143.7	-5,382.1	5,384.4	5,382.3	2,563.214	
1,100.0	1,100.0	1,001.4	1,001.4	2.3	0.0	-91.54	-144.8	-5,383.2	5,385.6	5,383.2	2,315.973	
1,200.0	1,200.0	1,120.9	1,120.9	2.5	0.0	-91.55	-146.0	-5,384.4	5,386.6	5,384.0	2,112.248	
1,300.0	1,300.0	1,238.7	1,238.6	2.8	0.0	-91.56	-147.0	-5,385.2	5,387.3	5,384.5	1,941.398	
1,400.0	1,400.0	1,353.1	1,353.0	3.0	0.0	-91.57	-148.0	-5,385.6	5,387.6	5,384.6	1,796.055	
1,500.0	1,500.0	1,467.6	1,467.5	3.2	0.0	-91.58	-149.0	-5,385.7	5,387.7	5,384.5	1,670.891	
1,600.0	1,600.0	1,582.2	1,582.1	3.4	0.0	-91.59	-149.8	-5,385.5	5,387.6	5,384.1	1,561.962	
1,700.0	1,700.0	1,696.6	1,696.5	3.7	0.0	-91.60	-150.4	-5,385.0	5,387.1	5,383.5	1,466.287	
1,800.0	1,800.0	2,007.5	2,007.3	3.9	0.0	-91.59	-149.6	-5,378.7	5,386.1	5,382.2	1,381.498	
1,900.0	1,900.0	2,113.6	2,113.3	4.1	0.0	-91.58	-148.0	-5,373.9	5,381.6	5,377.5	1,305.095	
2,000.0	2,000.0	2,217.6	2,217.2	4.3	0.0	-91.56	-146.6	-5,369.1	5,377.0	5,372.6	1,236.565	
2,100.0	2,100.0	2,313.0	2,312.4	4.6	0.0	-91.56	-145.7	-5,364.7	5,372.3	5,367.8	1,174.775	
2,200.0	2,200.0	2,400.0	2,399.4	4.8	0.0	-91.55	-145.5	-5,360.7	5,367.8	5,363.0	1,118.794	
2,300.0	2,300.0	2,473.3	2,472.6	5.0	0.0	-91.56	-145.7	-5,357.7	5,363.6	5,358.6	1,067.899	
2,400.0	2,400.0	2,540.8	2,540.0	5.2	0.0	-91.56	-145.9	-5,355.3	5,360.1	5,354.8	1,021.480	
2,500.0	2,500.0	2,611.2	2,610.4	5.5	0.0	-91.56	-146.1	-5,353.2	5,357.1	5,351.7	978.985	
2,600.0	2,600.0	2,702.7	2,701.9	5.7	0.0	-91.57	-146.5	-5,350.8	5,354.5	5,348.8	939.900	
2,700.0	2,700.0	2,800.0	2,799.2	5.9	0.0	-91.57	-146.9	-5,348.4	5,352.1	5,346.1	903.810	
2,800.0	2,800.0	2,880.5	2,879.6	6.1	0.0	-91.58	-147.3	-5,346.6	5,349.8	5,343.7	870.392	
2,900.0	2,900.0	2,966.5	2,965.6	6.4	0.0	-91.58	-147.7	-5,344.8	5,347.8	5,341.4	839.373	
3,000.0	3,000.0	3,057.3	3,056.4	6.6	0.0	-91.59	-148.2	-5,343.2	5,346.0	5,339.5	810.503	
3,100.0	3,100.0	3,151.2	3,150.3	6.8	0.0	-91.59	-148.4	-5,341.7	5,344.4	5,337.6	783.555	
3,200.0	3,200.0	3,251.8	3,250.8	7.0	0.0	-91.59	-148.4	-5,340.1	5,342.9	5,335.8	758.338	
3,300.0	3,300.0	3,359.5	3,358.6	7.3	0.0	-91.59	-148.0	-5,338.3	5,341.2	5,333.9	734.665	
3,400.0	3,400.0	3,477.2	3,476.3	7.5	0.0	-91.58	-147.5	-5,336.2	5,339.3	5,331.8	712.384	
3,500.0	3,500.0	3,600.8	3,599.9	7.7	0.0	-91.58	-147.1	-5,333.3	5,337.1	5,329.3	691.347	
3,600.0	3,600.0	3,705.8	3,704.8	7.9	0.0	-91.58	-146.9	-5,330.7	5,334.5	5,326.6	671.466	
3,700.0	3,700.0	3,800.0	3,798.9	8.2	0.0	-91.58	-146.9	-5,328.2	5,331.9	5,323.7	652.668	
3,800.0	3,800.0	3,894.0	3,893.0	8.4	0.0	-91.58	-147.0	-5,325.8	5,329.3	5,320.9	634.891	
3,900.0	3,900.0	3,979.3	3,978.2	8.6	0.0	-91.58	-147.3	-5,323.9	5,327.1	5,318.5	618.073	
4,000.0	4,000.0	4,057.7	4,056.6	8.8	0.0	-91.59	-147.7	-5,322.3	5,325.2	5,316.3	602.148	
4,100.0	4,100.0	4,134.0	4,132.8	9.1	0.0	-91.60	-148.4	-5,321.2	5,323.7	5,314.6	587.060	
4,200.0	4,200.0	4,200.0	4,198.9	9.3	0.0	-91.61	-149.1	-5,320.5	5,322.7	5,313.4	572.751	
4,300.0	4,300.0	14,729.0	9,387.4	9.5	0.0	-177.04	-1,395.9	-72.1	5,308.7	5,299.2	557.762	
4,400.0	4,400.0	14,728.9	9,387.4	9.7	0.0	-177.04	-1,395.9	-72.2	5,212.3	5,202.6	534.999	
4,500.0	4,500.0	14,728.8	9,387.4	10.0	0.0	-177.04	-1,395.9	-72.3	5,116.1	5,106.1	513.277	
4,600.0	4,600.0	14,728.7	9,387.4	10.2	0.0	-177.03	-1,395.9	-72.4	5,019.9	5,009.7	492.527	
4,700.0	4,700.0	14,728.6	9,387.4	10.4	0.0	-177.03	-1,395.9	-72.5	4,924.0	4,913.6	472.687	
4,800.0	4,800.0	14,728.5	9,387.4	10.6	0.0	-177.02	-1,395.9	-72.6	4,828.2	4,817.5	453.701	
4,900.0	4,900.0	14,728.4	9,387.4	10.9	0.0	-177.02	-1,395.9	-72.7	4,732.5	4,721.7	435.516	
5,000.0	5,000.0	14,728.4	9,387.4	11.1	0.0	-177.02	-1,395.9	-72.7	4,637.1	4,626.0	418.085	
5,100.0	5,100.0	14,728.3	9,387.4	11.3	0.0	-177.01	-1,395.9	-72.8	4,541.8	4,530.5	401.363	

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 1H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 1H	**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 #1	**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	14,728.2	9,387.4	11.5	0.0	-177.01	-1,395.9	-72.9	4,446.8	4,435.3	385.311	
5,300.0	5,300.0	14,728.1	9,387.4	11.8	0.0	-177.00	-1,395.8	-73.0	4,352.0	4,340.2	369.891	
5,400.0	5,400.0	14,728.0	9,387.4	12.0	0.0	-177.00	-1,395.8	-73.1	4,257.4	4,245.4	355.070	
5,500.0	5,500.0	14,727.9	9,387.4	12.2	0.0	-177.00	-1,395.8	-73.2	4,163.1	4,150.9	340.814	
5,600.0	5,600.0	14,727.8	9,387.4	12.4	0.0	-176.99	-1,395.8	-73.3	4,069.0	4,056.6	327.095	
5,700.0	5,700.0	14,727.6	9,387.4	12.7	0.0	-176.99	-1,395.8	-73.5	3,975.3	3,962.6	313.886	
5,800.0	5,800.0	14,727.5	9,387.4	12.9	0.0	-176.98	-1,395.8	-73.6	3,881.8	3,868.9	301.162	
5,900.0	5,900.0	14,727.4	9,387.4	13.1	0.0	-176.98	-1,395.8	-73.7	3,788.7	3,775.6	288.900	
6,000.0	6,000.0	14,727.3	9,387.4	13.3	0.0	-176.97	-1,395.8	-73.8	3,695.9	3,682.6	277.077	
6,100.0	6,100.0	14,727.2	9,387.4	13.6	0.0	-176.97	-1,395.8	-73.9	3,603.5	3,590.0	265.675	
6,200.0	6,200.0	14,727.1	9,387.4	13.8	0.0	-176.97	-1,395.8	-74.0	3,511.6	3,497.8	254.676	
6,300.0	6,300.0	14,727.0	9,387.4	14.0	0.0	-176.96	-1,395.8	-74.1	3,420.1	3,406.1	244.061	
6,400.0	6,400.0	14,726.9	9,387.4	14.2	0.0	-176.96	-1,395.8	-74.2	3,329.1	3,314.8	233.815	
6,500.0	6,500.0	14,726.7	9,387.4	14.5	0.0	-176.95	-1,395.8	-74.4	3,238.6	3,224.1	223.925	
6,600.0	6,600.0	14,726.6	9,387.4	14.7	0.0	-176.95	-1,395.8	-74.5	3,148.7	3,134.0	214.377	
6,700.0	6,700.0	14,726.5	9,387.4	14.9	0.0	-176.94	-1,395.8	-74.6	3,059.4	3,044.5	205.158	
6,800.0	6,800.0	14,726.4	9,387.4	15.1	0.0	-176.94	-1,395.7	-74.7	2,970.8	2,955.6	196.259	
6,900.0	6,900.0	14,726.2	9,387.4	15.4	0.0	-176.93	-1,395.7	-74.9	2,882.9	2,867.6	187.668	
7,000.0	7,000.0	14,726.1	9,387.4	15.6	0.0	-176.93	-1,395.7	-75.0	2,795.9	2,780.3	179.377	
7,100.0	7,100.0	14,726.0	9,387.4	15.8	0.0	-176.92	-1,395.7	-75.1	2,709.7	2,693.9	171.379	
7,200.0	7,200.0	14,725.9	9,387.4	16.0	0.0	-176.91	-1,395.7	-75.2	2,624.6	2,608.5	163.666	
7,300.0	7,300.0	14,725.7	9,387.4	16.3	0.0	-176.91	-1,395.7	-75.4	2,540.5	2,524.2	156.233	
7,400.0	7,400.0	14,725.6	9,387.4	16.5	0.0	-176.90	-1,395.7	-75.5	2,457.6	2,441.1	149.075	
7,500.0	7,500.0	14,725.4	9,387.4	16.7	0.0	-176.90	-1,395.7	-75.7	2,376.0	2,359.3	142.189	
7,600.0	7,600.0	14,725.3	9,387.4	16.9	0.0	-176.89	-1,395.7	-75.8	2,295.9	2,279.0	135.571	
7,700.0	7,700.0	14,725.1	9,387.4	17.2	0.0	-176.89	-1,395.7	-76.0	2,217.4	2,200.3	129.221	
7,800.0	7,800.0	14,725.0	9,387.4	17.4	0.0	-176.88	-1,395.7	-76.1	2,140.7	2,123.3	123.138	
7,900.0	7,900.0	14,724.8	9,387.4	17.6	0.0	-176.87	-1,395.7	-76.3	2,066.0	2,048.4	117.324	
8,000.0	8,000.0	14,724.7	9,387.4	17.8	0.0	-176.87	-1,395.7	-76.4	1,993.5	1,975.7	111.780	
8,100.0	8,100.0	14,724.5	9,387.4	18.1	0.0	-176.86	-1,395.6	-76.6	1,923.5	1,905.4	106.512	
8,200.0	8,200.0	14,724.4	9,387.4	18.3	0.0	-176.85	-1,395.6	-76.7	1,856.2	1,837.9	101.523	
8,300.0	8,300.0	14,724.2	9,387.4	18.5	0.0	-176.85	-1,395.6	-76.9	1,792.0	1,773.5	96.820	
8,400.0	8,400.0	14,724.0	9,387.4	18.7	0.0	-176.84	-1,395.6	-77.1	1,731.2	1,712.4	92.412	
8,500.0	8,500.0	14,723.9	9,387.4	19.0	0.0	-176.83	-1,395.6	-77.2	1,674.1	1,655.2	88.307	
8,600.0	8,600.0	14,723.7	9,387.4	19.2	0.0	-176.83	-1,395.6	-77.4	1,621.2	1,602.1	84.515	
8,700.0	8,700.0	14,723.5	9,387.4	19.4	0.0	-176.82	-1,395.6	-77.6	1,572.9	1,553.5	81.047	
8,800.0	8,800.0	14,723.3	9,387.4	19.6	0.0	-176.81	-1,395.6	-77.8	1,529.7	1,510.0	77.915	
8,855.8	8,855.8	14,723.2	9,387.4	19.8	0.0	-176.81	-1,395.6	-77.9	1,507.9	1,488.1	76.317	
8,875.0	8,875.0	14,723.2	9,387.4	19.8	0.0	3.02	-1,395.6	-77.9	1,500.4	1,480.6	75.856	
8,900.0	8,899.9	14,723.3	9,387.4	19.8	0.0	3.09	-1,395.6	-77.8	1,489.9	1,470.2	75.427	
8,925.0	8,924.8	14,723.3	9,387.4	19.9	0.0	3.17	-1,395.6	-77.7	1,478.7	1,459.0	75.156	
8,950.0	8,949.4	14,723.5	9,387.4	19.9	0.0	3.25	-1,395.6	-77.6	1,466.5	1,447.0	75.044	
8,975.0	8,973.8	14,723.7	9,387.4	20.0	0.0	3.35	-1,395.6	-77.4	1,453.6	1,434.3	75.093	
9,000.0	8,997.8	14,724.0	9,387.4	20.0	0.0	3.45	-1,395.6	-77.1	1,439.9	1,420.8	75.304	
9,025.0	9,021.5	14,724.3	9,387.4	20.0	0.0	3.57	-1,395.6	-76.7	1,425.4	1,406.5	75.685	
9,050.0	9,044.7	14,724.8	9,387.4	20.1	0.0	3.69	-1,395.7	-76.3	1,410.1	1,391.6	76.244	
9,075.0	9,067.4	14,725.2	9,387.4	20.1	0.0	3.83	-1,395.7	-75.9	1,394.1	1,376.0	76.991	
9,100.0	9,089.5	14,725.7	9,387.4	20.2	0.0	3.99	-1,395.7	-75.3	1,377.3	1,359.7	77.939	
9,125.0	9,111.0	14,726.3	9,387.4	20.2	0.0	4.16	-1,395.7	-74.8	1,359.9	1,342.7	79.106	
9,150.0	9,131.7	14,727.0	9,387.4	20.2	0.0	4.36	-1,395.8	-74.1	1,341.7	1,325.0	80.512	
9,175.0	9,151.7	14,727.7	9,387.4	20.3	0.0	4.58	-1,395.8	-73.4	1,322.9	1,306.8	82.184	
9,200.0	9,171.0	14,728.4	9,387.4	20.3	0.0	4.83	-1,395.9	-72.7	1,303.4	1,287.9	84.150	

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 1H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 1H	**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 #1	**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
9,225.0	9,189.3	14,729.2	9,387.4	20.4	0.0	5.12	-1,395.9	-71.9	1,283.3	1,268.5	86.448	
9,250.0	9,206.7	14,730.1	9,387.4	20.5	0.0	5.46	-1,396.0	-71.0	1,262.6	1,248.5	89.119	
9,275.0	9,223.2	14,731.0	9,387.4	20.5	0.0	5.86	-1,396.0	-70.1	1,241.4	1,227.9	92.207	
9,300.0	9,238.6	14,732.0	9,387.4	20.6	0.0	6.33	-1,396.1	-69.1	1,219.6	1,206.9	95.761	
9,325.0	9,253.0	14,733.0	9,387.4	20.7	0.0	6.91	-1,396.1	-68.1	1,197.4	1,185.4	99.816	
9,350.0	9,266.4	14,734.0	9,387.4	20.8	0.0	7.62	-1,396.2	-67.1	1,174.6	1,163.4	104.376	
9,375.0	9,278.6	14,735.1	9,387.4	20.9	0.0	8.52	-1,396.2	-66.0	1,151.4	1,140.9	109.357	
9,400.0	9,289.6	14,736.2	9,387.4	21.0	0.0	9.69	-1,396.3	-64.9	1,127.9	1,118.0	114.457	
9,425.0	9,299.4	14,737.4	9,387.4	21.1	0.0	11.28	-1,396.4	-63.7	1,104.0	1,094.7	118.887	
9,450.0	9,308.1	14,738.5	9,387.4	21.2	0.0	13.56	-1,396.4	-62.6	1,079.7	1,070.8	120.838	
9,475.0	9,315.5	14,739.8	9,387.4	21.3	0.0	17.08	-1,396.5	-61.4	1,055.3	1,046.2	116.818	
9,500.0	9,321.6	14,741.0	9,387.4	21.5	0.0	23.14	-1,396.6	-60.1	1,030.6	1,020.5	102.168	
9,525.0	9,326.4	14,742.2	9,387.4	21.6	0.0	35.50	-1,396.7	-58.9	1,005.7	992.5	75.815	
9,550.0	9,330.0	14,743.5	9,387.4	21.8	0.0	66.24	-1,396.7	-57.6	980.8	960.8	49.034	
9,575.0	9,332.3	14,744.8	9,387.4	21.9	0.0	118.58	-1,396.8	-56.4	955.8	932.9	41.674	
9,601.0	9,333.2	14,746.1	9,387.4	22.1	0.0	147.87	-1,396.9	-55.1	930.0	911.6	50.589	
9,700.0	9,334.2	14,751.2	9,387.4	22.8	0.0	150.59	-1,397.2	-50.0	831.5	813.2	45.617	
9,800.0	9,335.3	14,756.3	9,387.4	23.7	0.0	153.52	-1,397.5	-44.8	732.1	714.1	40.592	
9,900.0	9,336.3	14,761.5	9,387.4	24.6	0.0	156.63	-1,397.8	-39.6	632.9	615.1	35.564	
10,000.0	9,337.3	14,766.8	9,387.4	25.7	0.0	159.92	-1,398.1	-34.4	534.0	516.5	30.500	
10,100.0	9,338.3	14,772.1	9,387.5	26.8	0.0	163.38	-1,398.4	-29.1	435.5	418.3	25.339	
10,200.0	9,339.3	14,777.4	9,387.5	28.0	0.0	166.99	-1,398.7	-23.8	337.8	320.9	20.015	
10,300.0	9,340.3	14,782.8	9,387.5	29.3	0.0	170.74	-1,399.0	-18.4	241.8	225.2	14.519	
10,400.0	9,341.3	14,788.2	9,387.5	30.6	0.0	174.60	-1,399.3	-13.0	151.0	134.4	9.077	
10,500.0	9,342.3	14,793.7	9,387.6	32.0	0.0	178.58	-1,399.6	-7.5	84.1	67.1	4.965	
10,528.9	9,342.6	14,795.3	9,387.6	32.4	0.0	179.73	-1,399.7	-5.9	78.9	61.9	4.619	CC, ES, SF
10,600.0	9,343.3	14,799.2	9,387.6	33.4	0.0	-177.44	-1,400.0	-2.0	106.1	88.5	6.021	
10,700.0	9,344.4	14,804.7	9,387.6	34.8	0.0	-173.48	-1,400.3	3.5	188.2	169.4	10.040	
10,800.0	9,345.4	14,810.2	9,387.6	36.3	0.0	-169.58	-1,400.6	9.0	281.9	261.7	13.949	
10,900.0	9,346.4	14,815.7	9,387.7	37.8	0.0	-165.79	-1,400.9	14.5	378.8	356.9	17.249	
11,000.0	9,347.4	14,821.2	9,387.7	39.4	0.0	-162.11	-1,401.3	19.9	476.9	453.0	19.942	
11,100.0	9,348.4	14,826.7	9,387.7	41.0	0.0	-158.59	-1,401.6	25.4	575.6	549.6	22.132	
11,200.0	9,349.4	14,832.2	9,387.8	42.5	0.0	-155.23	-1,401.9	30.9	674.7	646.5	23.933	
11,258.5	9,350.0	14,835.4	9,387.8	43.5	0.0	-153.34	-1,402.1	34.1	732.7	703.3	24.846	
11,300.0	9,350.4	14,837.7	9,387.8	44.2	0.0	-152.05	-1,402.2	36.4	773.9	743.5	25.441	
11,400.0	9,351.4	14,843.2	9,387.8	45.8	0.0	-149.04	-1,402.6	41.9	873.3	840.6	26.729	
11,500.0	9,352.4	14,848.7	9,387.8	47.4	0.0	-146.21	-1,402.9	47.4	972.8	937.9	27.852	
11,600.0	9,353.5	14,854.2	9,387.9	49.1	0.0	-143.56	-1,403.2	52.9	1,072.4	1,035.2	28.849	
11,700.0	9,354.5	14,859.7	9,387.9	50.7	0.0	-141.08	-1,403.5	58.4	1,172.0	1,132.6	29.749	
11,800.0	9,355.5	14,865.2	9,387.9	52.4	0.0	-138.77	-1,403.9	63.9	1,271.6	1,230.0	30.573	
11,900.0	9,356.5	14,870.7	9,388.0	54.1	0.0	-136.61	-1,404.2	69.4	1,371.3	1,327.5	31.335	
12,000.0	9,357.5	14,876.2	9,388.0	55.8	0.0	-134.59	-1,404.5	74.9	1,471.0	1,425.1	32.047	
12,100.0	9,358.5	14,881.7	9,388.0	57.5	0.0	-132.71	-1,404.8	80.4	1,570.7	1,522.7	32.715	
12,200.0	9,359.5	14,887.2	9,388.0	59.2	0.0	-130.95	-1,405.2	85.9	1,670.4	1,620.3	33.347	
12,300.0	9,360.5	14,892.8	9,388.1	60.9	0.0	-129.32	-1,405.5	91.4	1,770.1	1,718.0	33.946	
12,400.0	9,361.5	14,898.3	9,388.1	62.6	0.0	-127.79	-1,405.8	96.9	1,869.9	1,815.7	34.516	
12,500.0	9,362.6	14,903.8	9,388.1	64.3	0.0	-126.36	-1,406.1	102.4	1,969.7	1,913.5	35.059	
12,600.0	9,363.6	14,909.3	9,388.2	66.1	0.0	-125.02	-1,406.5	107.8	2,069.4	2,011.3	35.579	
12,700.0	9,364.6	14,914.8	9,388.2	67.8	0.0	-123.76	-1,406.8	113.3	2,169.2	2,109.1	36.076	
12,800.0	9,365.6	14,920.3	9,388.2	69.6	0.0	-122.58	-1,407.1	118.8	2,269.0	2,206.9	36.553	
12,900.0	9,366.6	14,925.8	9,388.2	71.3	0.0	-121.48	-1,407.4	124.3	2,368.8	2,304.8	37.010	
13,000.0	9,367.6	14,931.3	9,388.3	73.0	0.0	-120.44	-1,407.8	129.8	2,468.6	2,402.7	37.450	

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 1H
Project:	Lea County, NM	TVD Reference:	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 1H	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 #1	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
13,100.0	9,368.6	14,936.8	9,388.3	74.8	0.0	-119.46	-1,408.1	135.3	2,568.4	2,500.6	37.872	
13,200.0	9,369.6	14,942.3	9,388.3	76.6	0.0	-118.54	-1,408.4	140.8	2,668.2	2,598.5	38.277	
13,300.0	9,370.6	14,947.8	9,388.4	78.3	0.0	-117.67	-1,408.7	146.3	2,768.0	2,696.4	38.668	
13,400.0	9,371.7	14,953.3	9,388.4	80.1	0.0	-116.85	-1,409.1	151.8	2,867.8	2,794.4	39.044	
13,500.0	9,372.7	14,958.8	9,388.4	81.8	0.0	-116.07	-1,409.4	157.3	2,967.6	2,892.3	39.406	
13,600.0	9,373.7	14,964.3	9,388.5	83.6	0.0	-115.34	-1,409.7	162.8	3,067.4	2,990.3	39.756	
13,700.0	9,374.7	14,969.8	9,388.5	85.4	0.0	-114.64	-1,410.0	168.3	3,167.2	3,088.2	40.092	
13,800.0	9,375.7	14,975.3	9,388.5	87.1	0.0	-113.98	-1,410.4	173.8	3,267.1	3,186.2	40.417	
13,900.0	9,376.7	14,980.0	9,388.5	88.9	0.0	-113.44	-1,410.6	178.5	3,366.9	3,284.2	40.707	
14,000.0	9,377.7	14,980.0	9,388.5	90.7	0.0	-113.44	-1,410.6	178.5	3,466.7	3,382.3	41.092	
14,100.0	9,378.7	14,980.0	9,388.5	92.5	0.0	-113.44	-1,410.6	178.5	3,566.5	3,480.5	41.461	
14,200.0	9,379.7	14,980.0	9,388.5	94.3	0.0	-113.44	-1,410.6	178.5	3,666.4	3,578.7	41.816	
14,300.0	9,380.8	14,980.0	9,388.5	96.0	0.0	-113.44	-1,410.6	178.5	3,766.2	3,676.9	42.157	
14,400.0	9,381.8	14,980.0	9,388.5	97.8	0.0	-113.44	-1,410.6	178.5	3,866.1	3,775.1	42.484	
14,500.0	9,382.8	14,980.0	9,388.5	99.6	0.0	-113.44	-1,410.6	178.5	3,966.0	3,873.3	42.800	
14,600.0	9,383.8	14,980.0	9,388.5	101.4	0.0	-113.44	-1,410.6	178.5	4,065.9	3,971.5	43.104	
14,700.0	9,384.8	14,980.0	9,388.5	103.2	0.0	-113.44	-1,410.6	178.5	4,165.7	4,069.7	43.397	
14,800.0	9,385.8	14,980.0	9,388.5	105.0	0.0	-113.44	-1,410.6	178.5	4,265.6	4,168.0	43.679	
14,900.0	9,386.8	14,980.0	9,388.5	106.8	0.0	-113.44	-1,410.6	178.5	4,365.5	4,266.2	43.952	
15,000.0	9,387.8	14,980.0	9,388.5	108.5	0.0	-113.44	-1,410.6	178.5	4,465.4	4,364.4	44.215	
15,100.0	9,388.8	14,980.0	9,388.5	110.3	0.0	-113.44	-1,410.6	178.5	4,565.3	4,462.6	44.469	
15,200.0	9,389.9	14,980.0	9,388.5	112.1	0.0	-113.44	-1,410.6	178.5	4,665.2	4,560.9	44.714	
15,300.0	9,390.9	14,980.0	9,388.5	113.9	0.0	-113.44	-1,410.6	178.5	4,765.1	4,659.1	44.952	
15,400.0	9,391.9	14,980.0	9,388.5	115.7	0.0	-113.44	-1,410.6	178.5	4,865.0	4,757.4	45.182	
15,500.0	9,392.9	14,980.0	9,388.5	117.5	0.0	-113.44	-1,410.6	178.5	4,965.0	4,855.6	45.404	
15,600.0	9,393.9	14,980.0	9,388.5	119.3	0.0	-113.44	-1,410.6	178.5	5,064.9	4,953.9	45.620	
15,700.0	9,394.9	14,980.0	9,388.5	121.1	0.0	-113.44	-1,410.6	178.5	5,164.8	5,052.1	45.829	
15,800.0	9,395.9	14,980.0	9,388.5	122.9	0.0	-113.44	-1,410.6	178.5	5,264.7	5,150.4	46.031	
15,900.0	9,396.9	14,980.0	9,388.5	124.7	0.0	-113.44	-1,410.6	178.5	5,364.7	5,248.6	46.228	
16,000.0	9,397.9	14,980.0	9,388.5	126.5	0.0	-113.44	-1,410.6	178.5	5,464.6	5,346.9	46.418	
16,100.0	9,399.0	14,980.0	9,388.5	128.3	0.0	-113.44	-1,410.6	178.5	5,564.5	5,445.1	46.603	
16,200.0	9,400.0	14,980.0	9,388.5	130.1	0.0	-113.44	-1,410.6	178.5	5,664.5	5,543.4	46.783	
16,300.0	9,401.0	14,980.0	9,388.5	131.9	0.0	-113.44	-1,410.6	178.5	5,764.4	5,641.6	46.957	
16,400.0	9,402.0	14,980.0	9,388.5	133.7	0.0	-113.44	-1,410.6	178.5	5,864.3	5,739.9	47.127	
16,500.0	9,403.0	14,980.0	9,388.5	135.5	0.0	-113.44	-1,410.6	178.5	5,964.3	5,838.2	47.292	
16,600.0	9,404.0	14,980.0	9,388.5	137.3	0.0	-113.44	-1,410.6	178.5	6,064.2	5,936.4	47.452	
16,700.0	9,405.0	14,980.0	9,388.5	139.1	0.0	-113.44	-1,410.6	178.5	6,164.2	6,034.7	47.608	
16,800.0	9,406.0	14,980.0	9,388.5	140.9	0.0	-113.44	-1,410.6	178.5	6,264.1	6,133.0	47.760	
16,900.0	9,407.0	14,980.0	9,388.5	142.7	0.0	-113.44	-1,410.6	178.5	6,364.1	6,231.2	47.908	
17,000.0	9,408.1	14,980.0	9,388.5	144.5	0.0	-113.44	-1,410.6	178.5	6,464.0	6,329.5	48.052	
17,100.0	9,409.1	14,980.0	9,388.5	146.4	0.0	-113.44	-1,410.6	178.5	6,564.0	6,427.8	48.192	
17,200.0	9,410.1	14,980.0	9,388.5	148.2	0.0	-113.44	-1,410.6	178.5	6,663.9	6,526.0	48.329	
17,300.0	9,411.1	14,980.0	9,388.5	150.0	0.0	-113.44	-1,410.6	178.5	6,763.9	6,624.3	48.462	
17,400.0	9,412.1	14,980.0	9,388.5	151.8	0.0	-113.44	-1,410.6	178.5	6,863.8	6,722.6	48.593	
17,500.0	9,413.1	14,980.0	9,388.5	153.6	0.0	-113.44	-1,410.6	178.5	6,963.8	6,820.9	48.719	
17,600.0	9,414.1	14,980.0	9,388.5	155.4	0.0	-113.44	-1,410.6	178.5	7,063.7	6,919.1	48.843	
17,700.0	9,415.1	14,980.0	9,388.5	157.2	0.0	-113.44	-1,410.6	178.5	7,163.7	7,017.4	48.964	
17,800.0	9,416.1	14,980.0	9,388.5	159.0	0.0	-113.44	-1,410.6	178.5	7,263.7	7,115.7	49.082	
17,900.0	9,417.2	14,980.0	9,388.5	160.8	0.0	-113.44	-1,410.6	178.5	7,363.6	7,214.0	49.197	
18,000.0	9,418.2	14,980.0	9,388.5	162.6	0.0	-113.44	-1,410.6	178.5	7,463.6	7,312.2	49.310	
18,100.0	9,419.2	14,980.0	9,388.5	164.4	0.0	-113.44	-1,410.6	178.5	7,563.6	7,410.5	49.420	
18,200.0	9,420.2	14,980.0	9,388.5	166.2	0.0	-113.44	-1,410.6	178.5	7,663.5	7,508.8	49.528	

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 1H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 1H	**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 #1	**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
18,300.0	9,421.2	14,980.0	9,388.5	168.1	0.0	-113.44	-1,410.6	178.5	7,763.5	7,607.1	49.633	
18,400.0	9,422.2	14,980.0	9,388.5	169.9	0.0	-113.44	-1,410.6	178.5	7,863.5	7,705.4	49.736	
18,500.0	9,423.2	14,980.0	9,388.5	171.7	0.0	-113.44	-1,410.6	178.5	7,963.4	7,803.6	49.836	
18,600.0	9,424.2	14,980.0	9,388.5	173.5	0.0	-113.44	-1,410.6	178.5	8,063.4	7,901.9	49.935	
18,700.0	9,425.2	14,980.0	9,388.5	175.3	0.0	-113.44	-1,410.6	178.5	8,163.4	8,000.2	50.031	
18,800.0	9,426.3	14,980.0	9,388.5	177.1	0.0	-113.44	-1,410.6	178.5	8,263.3	8,098.5	50.125	
18,900.0	9,427.3	14,980.0	9,388.5	178.9	0.0	-113.44	-1,410.6	178.5	8,363.3	8,196.8	50.217	
19,000.0	9,428.3	14,980.0	9,388.5	180.7	0.0	-113.44	-1,410.6	178.5	8,463.3	8,295.0	50.308	
19,100.0	9,429.3	14,980.0	9,388.5	182.6	0.0	-113.44	-1,410.6	178.5	8,563.2	8,393.3	50.396	
19,200.0	9,430.3	14,980.0	9,388.5	184.4	0.0	-113.44	-1,410.6	178.5	8,663.2	8,491.6	50.483	
19,300.0	9,431.3	14,980.0	9,388.5	186.2	0.0	-113.44	-1,410.6	178.5	8,763.2	8,589.9	50.568	
19,400.0	9,432.3	14,980.0	9,388.5	188.0	0.0	-113.44	-1,410.6	178.5	8,863.2	8,688.2	50.651	
19,500.0	9,433.3	14,980.0	9,388.5	189.8	0.0	-113.44	-1,410.6	178.5	8,963.1	8,786.5	50.733	
19,600.0	9,434.3	14,980.0	9,388.5	191.6	0.0	-113.44	-1,410.6	178.5	9,063.1	8,884.8	50.813	
19,700.0	9,435.4	14,980.0	9,388.5	193.4	0.0	-113.44	-1,410.6	178.5	9,163.1	8,983.0	50.892	
19,800.0	9,436.4	14,980.0	9,388.5	195.2	0.0	-113.44	-1,410.6	178.5	9,263.1	9,081.3	50.969	
19,900.0	9,437.4	14,980.0	9,388.5	197.1	0.0	-113.44	-1,410.6	178.5	9,363.0	9,179.6	51.044	
20,000.0	9,438.4	14,980.0	9,388.5	198.9	0.0	-113.44	-1,410.6	178.5	9,463.0	9,277.9	51.118	
20,100.0	9,439.4	14,980.0	9,388.5	200.7	0.0	-113.44	-1,410.6	178.5	9,563.0	9,376.2	51.191	
20,200.0	9,440.4	14,980.0	9,388.5	202.5	0.0	-113.44	-1,410.6	178.5	9,663.0	9,474.5	51.262	
20,300.0	9,441.4	14,980.0	9,388.5	204.3	0.0	-113.44	-1,410.6	178.5	9,763.0	9,572.8	51.332	
20,400.0	9,442.4	14,980.0	9,388.5	206.1	0.0	-113.44	-1,410.6	178.5	9,862.9	9,671.1	51.401	
20,500.0	9,443.4	14,980.0	9,388.5	208.0	0.0	-113.44	-1,410.6	178.5	9,962.9	9,769.3	51.469	

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 1H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 1H	**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 #1	**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	0.0	0.0	0.0	0.0	-140.17	-120.0	-100.1	156.3			
100.0	100.0	100.0	100.0	0.1	0.1	-140.17	-120.0	-100.1	156.3	156.1	1,007.610	
200.0	200.0	200.0	200.0	0.3	0.3	-140.17	-120.0	-100.1	156.3	155.7	258.458	
300.0	300.0	300.0	300.0	0.5	0.5	-140.17	-120.0	-100.1	156.3	155.2	148.241	
400.0	400.0	400.0	400.0	0.8	0.8	-140.17	-120.0	-100.1	156.3	154.8	103.924	
500.0	500.0	500.0	500.0	1.0	1.0	-140.17	-120.0	-100.1	156.3	154.3	80.006	
600.0	600.0	600.0	600.0	1.2	1.2	-140.17	-120.0	-100.1	156.3	153.9	65.038	
700.0	700.0	700.0	700.0	1.4	1.4	-140.17	-120.0	-100.1	156.3	153.4	54.787	
800.0	800.0	800.0	800.0	1.7	1.7	-140.17	-120.0	-100.1	156.3	153.0	47.328	
900.0	900.0	900.0	900.0	1.9	1.9	-140.17	-120.0	-100.1	156.3	152.5	41.657	
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	-140.17	-120.0	-100.1	156.3	152.1	37.199	
1,100.0	1,100.0	1,100.0	1,100.0	2.3	2.3	-140.17	-120.0	-100.1	156.3	151.6	33.603	
1,200.0	1,200.0	1,200.0	1,200.0	2.5	2.5	-140.17	-120.0	-100.1	156.3	151.2	30.641	
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	-140.17	-120.0	-100.1	156.3	150.7	28.159	
1,400.0	1,400.0	1,400.0	1,400.0	3.0	3.0	-140.17	-120.0	-100.1	156.3	150.3	26.049	
1,500.0	1,500.0	1,500.0	1,500.0	3.2	3.2	-140.17	-120.0	-100.1	156.3	149.8	24.233	
1,600.0	1,600.0	1,600.0	1,600.0	3.4	3.4	-140.17	-120.0	-100.1	156.3	149.4	22.654	
1,700.0	1,700.0	1,700.0	1,700.0	3.7	3.7	-140.17	-120.0	-100.1	156.3	148.9	21.268	
1,800.0	1,800.0	1,800.0	1,800.0	3.9	3.9	-140.17	-120.0	-100.1	156.3	148.5	20.042	
1,900.0	1,900.0	1,900.0	1,900.0	4.1	4.1	-140.17	-120.0	-100.1	156.3	148.0	18.949	
2,000.0	2,000.0	2,000.0	2,000.0	4.3	4.3	-140.17	-120.0	-100.1	156.3	147.6	17.970	
2,100.0	2,100.0	2,100.0	2,100.0	4.6	4.6	-140.17	-120.0	-100.1	156.3	147.1	17.087	
2,200.0	2,200.0	2,200.0	2,200.0	4.8	4.8	-140.17	-120.0	-100.1	156.3	146.7	16.286	
2,300.0	2,300.0	2,300.0	2,300.0	5.0	5.0	-140.17	-120.0	-100.1	156.3	146.2	15.557	
2,400.0	2,400.0	2,400.0	2,400.0	5.2	5.2	-140.17	-120.0	-100.1	156.3	145.8	14.891	
2,500.0	2,500.0	2,500.0	2,500.0	5.5	5.5	-140.17	-120.0	-100.1	156.3	145.3	14.279	
2,600.0	2,600.0	2,600.0	2,600.0	5.7	5.7	-140.17	-120.0	-100.1	156.3	144.9	13.716	
2,700.0	2,700.0	2,700.0	2,700.0	5.9	5.9	-140.17	-120.0	-100.1	156.3	144.4	13.195	
2,800.0	2,800.0	2,800.0	2,800.0	6.1	6.1	-140.17	-120.0	-100.1	156.3	144.0	12.713	
2,900.0	2,900.0	2,900.0	2,900.0	6.4	6.4	-140.17	-120.0	-100.1	156.3	143.5	12.264	
3,000.0	3,000.0	3,000.0	3,000.0	6.6	6.6	-140.17	-120.0	-100.1	156.3	143.1	11.846	
3,100.0	3,100.0	3,100.0	3,100.0	6.8	6.8	-140.17	-120.0	-100.1	156.3	142.6	11.456	
3,200.0	3,200.0	3,200.0	3,200.0	7.0	7.0	-140.17	-120.0	-100.1	156.3	142.2	11.090	
3,300.0	3,300.0	3,300.0	3,300.0	7.3	7.3	-140.17	-120.0	-100.1	156.3	141.7	10.747	
3,400.0	3,400.0	3,400.0	3,400.0	7.5	7.5	-140.17	-120.0	-100.1	156.3	141.3	10.425	
3,500.0	3,500.0	3,500.0	3,500.0	7.7	7.7	-140.17	-120.0	-100.1	156.3	140.8	10.122	
3,600.0	3,600.0	3,600.0	3,600.0	7.9	7.9	-140.17	-120.0	-100.1	156.3	140.4	9.835	
3,700.0	3,700.0	3,700.0	3,700.0	8.2	8.2	-140.17	-120.0	-100.1	156.3	139.9	9.565	
3,800.0	3,800.0	3,800.0	3,800.0	8.4	8.4	-140.17	-120.0	-100.1	156.3	139.5	9.309	
3,900.0	3,900.0	3,900.0	3,900.0	8.6	8.6	-140.17	-120.0	-100.1	156.3	139.0	9.066	
4,000.0	4,000.0	4,000.0	4,000.0	8.8	8.8	-140.17	-120.0	-100.1	156.3	138.6	8.835	
4,100.0	4,100.0	4,100.0	4,100.0	9.1	9.1	-140.17	-120.0	-100.1	156.3	138.1	8.616	
4,200.0	4,200.0	4,200.0	4,200.0	9.3	9.3	-140.17	-120.0	-100.1	156.3	137.7	8.408	
4,300.0	4,300.0	4,300.0	4,300.0	9.5	9.5	-140.17	-120.0	-100.1	156.3	137.2	8.209	
4,400.0	4,400.0	4,400.0	4,400.0	9.7	9.7	-140.17	-120.0	-100.1	156.3	136.8	8.020	
4,500.0	4,500.0	4,500.0	4,500.0	10.0	10.0	-140.17	-120.0	-100.1	156.3	136.3	7.839	
4,600.0	4,600.0	4,600.0	4,600.0	10.2	10.2	-140.17	-120.0	-100.1	156.3	135.9	7.666	
4,700.0	4,700.0	4,700.0	4,700.0	10.4	10.4	-140.17	-120.0	-100.1	156.3	135.4	7.501	
4,800.0	4,800.0	4,800.0	4,800.0	10.6	10.6	-140.17	-120.0	-100.1	156.3	135.0	7.342	
4,900.0	4,900.0	4,900.0	4,900.0	10.9	10.9	-140.17	-120.0	-100.1	156.3	134.5	7.191	
5,000.0	5,000.0	5,000.0	5,000.0	11.1	11.1	-140.17	-120.0	-100.1	156.3	134.1	7.045	
5,100.0	5,100.0	5,100.0	5,100.0	11.3	11.3	-140.17	-120.0	-100.1	156.3	133.6	6.905	

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 1H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 1H	**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 #1	**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	5,200.0	5,200.0	11.5	11.5	-140.17	-120.0	-100.1	156.3	133.2	6.770	
5,300.0	5,300.0	5,300.0	5,300.0	11.8	11.8	-140.17	-120.0	-100.1	156.3	132.7	6.641	
5,400.0	5,400.0	5,400.0	5,400.0	12.0	12.0	-140.17	-120.0	-100.1	156.3	132.3	6.517	
5,500.0	5,500.0	5,500.0	5,500.0	12.2	12.2	-140.17	-120.0	-100.1	156.3	131.8	6.397	
5,600.0	5,600.0	5,600.0	5,600.0	12.4	12.4	-140.17	-120.0	-100.1	156.3	131.4	6.281	
5,700.0	5,700.0	5,700.0	5,700.0	12.7	12.7	-140.17	-120.0	-100.1	156.3	130.9	6.170	
5,800.0	5,800.0	5,800.0	5,800.0	12.9	12.9	-140.17	-120.0	-100.1	156.3	130.5	6.062	
5,900.0	5,900.0	5,900.0	5,900.0	13.1	13.1	-140.17	-120.0	-100.1	156.3	130.0	5.958	
6,000.0	6,000.0	6,000.0	6,000.0	13.3	13.3	-140.17	-120.0	-100.1	156.3	129.6	5.858	
6,100.0	6,100.0	6,100.0	6,100.0	13.6	13.6	-140.17	-120.0	-100.1	156.3	129.1	5.761	
6,200.0	6,200.0	6,200.0	6,200.0	13.8	13.8	-140.17	-120.0	-100.1	156.3	128.7	5.667	
6,300.0	6,300.0	6,300.0	6,300.0	14.0	14.0	-140.17	-120.0	-100.1	156.3	128.2	5.576	
6,400.0	6,400.0	6,400.0	6,400.0	14.2	14.2	-140.17	-120.0	-100.1	156.3	127.8	5.488	
6,500.0	6,500.0	6,500.0	6,500.0	14.5	14.5	-140.17	-120.0	-100.1	156.3	127.3	5.403	
6,600.0	6,600.0	6,600.0	6,600.0	14.7	14.7	-140.17	-120.0	-100.1	156.3	126.9	5.320	
6,700.0	6,700.0	6,700.0	6,700.0	14.9	14.9	-140.17	-120.0	-100.1	156.3	126.4	5.240	
6,800.0	6,800.0	6,800.0	6,800.0	15.1	15.1	-140.17	-120.0	-100.1	156.3	126.0	5.162	
6,900.0	6,900.0	6,900.0	6,900.0	15.4	15.4	-140.17	-120.0	-100.1	156.3	125.5	5.086	
7,000.0	7,000.0	7,000.0	7,000.0	15.6	15.6	-140.17	-120.0	-100.1	156.3	125.1	5.013	
7,100.0	7,100.0	7,100.0	7,100.0	15.8	15.8	-140.17	-120.0	-100.1	156.3	124.6	4.942	
7,200.0	7,200.0	7,200.0	7,200.0	16.0	16.0	-140.17	-120.0	-100.1	156.3	124.2	4.872	
7,300.0	7,300.0	7,300.0	7,300.0	16.3	16.3	-140.17	-120.0	-100.1	156.3	123.7	4.805	
7,400.0	7,400.0	7,400.0	7,400.0	16.5	16.5	-140.17	-120.0	-100.1	156.3	123.3	4.740	
7,500.0	7,500.0	7,500.0	7,500.0	16.7	16.7	-140.17	-120.0	-100.1	156.3	122.8	4.676	
7,600.0	7,600.0	7,600.0	7,600.0	16.9	16.9	-140.17	-120.0	-100.1	156.3	122.4	4.614	
7,700.0	7,700.0	7,700.0	7,700.0	17.2	17.2	-140.17	-120.0	-100.1	156.3	121.9	4.553	
7,800.0	7,800.0	7,800.0	7,800.0	17.4	17.4	-140.17	-120.0	-100.1	156.3	121.5	4.494	
7,900.0	7,900.0	7,900.0	7,900.0	17.6	17.6	-140.17	-120.0	-100.1	156.3	121.1	4.437	
8,000.0	8,000.0	8,000.0	8,000.0	17.8	17.8	-140.17	-120.0	-100.1	156.3	120.6	4.381	
8,100.0	8,100.0	8,100.0	8,100.0	18.1	18.1	-140.17	-120.0	-100.1	156.3	120.2	4.327	
8,200.0	8,200.0	8,200.0	8,200.0	18.3	18.3	-140.17	-120.0	-100.1	156.3	119.7	4.273	
8,300.0	8,300.0	8,300.0	8,300.0	18.5	18.5	-140.17	-120.0	-100.1	156.3	119.3	4.222	
8,400.0	8,400.0	8,400.0	8,400.0	18.7	18.7	-140.17	-120.0	-100.1	156.3	118.8	4.171	
8,500.0	8,500.0	8,500.0	8,500.0	19.0	19.0	-140.17	-120.0	-100.1	156.3	118.4	4.121	
8,600.0	8,600.0	8,600.0	8,600.0	19.2	19.2	-140.17	-120.0	-100.1	156.3	117.9	4.073	
8,700.0	8,700.0	8,700.0	8,700.0	19.4	19.4	-140.17	-120.0	-100.1	156.3	117.5	4.026	
8,800.0	8,800.0	8,800.0	8,800.0	19.6	19.6	-140.17	-120.0	-100.1	156.3	117.0	3.980	
8,835.9	8,835.9	8,835.9	8,835.9	19.7	19.7	-140.17	-120.0	-100.1	156.3	116.8	3.964	CC
8,855.8	8,855.8	8,852.2	8,852.2	19.8	19.7	-140.17	-120.0	-100.1	156.3	116.8	3.957	ES
8,875.0	8,875.0	8,869.4	8,869.4	19.8	19.8	39.67	-120.2	-100.3	156.4	116.8	3.953	
8,900.0	8,899.9	8,888.2	8,888.2	19.8	19.8	39.95	-121.0	-101.0	156.5	116.9	3.956	
8,925.0	8,924.8	8,907.0	8,906.8	19.9	19.9	40.46	-122.4	-102.1	156.6	117.1	3.966	
8,950.0	8,949.4	8,925.0	8,924.7	19.9	19.9	41.16	-124.3	-103.6	156.7	117.4	3.981	
8,975.0	8,973.8	8,944.3	8,943.7	20.0	19.9	42.13	-126.8	-105.8	156.9	117.7	4.002	
9,000.0	8,997.8	8,962.9	8,961.9	20.0	19.9	43.28	-129.8	-108.3	157.2	118.2	4.028	
9,025.0	9,021.5	8,981.3	8,979.7	20.0	20.0	44.62	-133.3	-111.2	157.6	118.8	4.061	
9,050.0	9,044.7	9,000.0	8,997.7	20.1	20.0	46.17	-137.4	-114.6	158.2	119.6	4.099	
9,075.0	9,067.4	9,017.7	9,014.4	20.1	20.0	47.80	-141.8	-118.3	159.0	120.6	4.143	
9,100.0	9,089.5	9,035.7	9,031.2	20.2	20.1	49.60	-146.8	-122.4	160.2	122.0	4.192	
9,125.0	9,111.0	9,053.6	9,047.7	20.2	20.1	51.50	-152.2	-126.9	161.7	123.6	4.248	
9,150.0	9,131.7	9,071.2	9,063.6	20.2	20.1	53.48	-158.0	-131.7	163.7	125.7	4.311	
9,175.0	9,151.7	9,088.7	9,079.2	20.3	20.2	55.50	-164.1	-136.8	166.2	128.3	4.381	

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 1H
Project:	Lea County, NM	TVD Reference:	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 1H	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 #1	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
9,200.0	9,171.0	9,106.0	9,094.2	20.3	20.2	57.54	-170.7	-142.2	169.3	131.4	4.459	
9,225.0	9,189.3	9,125.0	9,110.4	20.4	20.2	59.83	-178.3	-148.6	173.1	135.0	4.542	
9,250.0	9,206.7	9,140.0	9,122.9	20.5	20.3	61.53	-184.7	-153.9	177.4	139.2	4.644	
9,275.0	9,223.2	9,156.7	9,136.5	20.5	20.3	63.43	-192.2	-160.1	182.5	144.1	4.754	
9,300.0	9,238.6	9,175.0	9,151.0	20.6	20.4	65.50	-200.8	-167.2	188.4	149.7	4.870	
9,325.0	9,253.0	9,189.5	9,162.1	20.7	20.4	66.93	-207.9	-173.2	194.9	156.0	5.012	
9,350.0	9,266.4	9,205.6	9,174.2	20.8	20.4	68.49	-216.1	-180.0	202.1	163.0	5.163	
9,375.0	9,278.6	9,221.5	9,185.8	20.9	20.5	69.91	-224.5	-187.0	210.1	170.7	5.327	
9,400.0	9,289.6	9,237.3	9,196.9	21.0	20.5	71.19	-233.1	-194.1	218.8	179.1	5.507	
9,425.0	9,299.4	9,252.9	9,207.5	21.1	20.6	72.32	-241.9	-201.4	228.1	188.1	5.700	
9,450.0	9,308.1	9,268.3	9,217.6	21.2	20.6	73.30	-250.8	-208.9	238.1	197.8	5.907	
9,475.0	9,315.5	9,283.6	9,227.2	21.3	20.7	74.12	-259.9	-216.4	248.7	208.1	6.126	
9,500.0	9,321.6	9,300.0	9,237.2	21.5	20.7	74.99	-270.0	-224.8	259.8	218.9	6.352	
9,525.0	9,326.4	9,313.7	9,245.1	21.6	20.8	75.34	-278.5	-231.9	271.5	230.4	6.599	
9,550.0	9,330.0	9,328.6	9,253.4	21.8	20.8	75.75	-288.1	-239.8	283.7	242.3	6.850	
9,575.0	9,332.3	9,343.4	9,261.2	21.9	20.9	76.03	-297.7	-247.9	296.3	254.6	7.110	
9,601.0	9,333.2	9,358.7	9,268.9	22.1	21.0	76.19	-307.9	-256.3	309.9	267.9	7.388	
9,700.0	9,334.2	9,420.6	9,295.5	22.8	21.3	82.85	-350.8	-292.0	366.4	322.5	8.353	
9,800.0	9,335.3	9,490.1	9,316.6	23.7	21.7	87.25	-401.7	-334.3	428.1	382.7	9.431	
9,900.0	9,336.3	9,564.4	9,328.2	24.6	22.2	89.25	-458.1	-381.2	491.3	444.4	10.481	
10,000.0	9,337.3	9,641.0	9,330.1	25.7	22.9	89.51	-516.9	-430.2	554.9	506.4	11.440	
10,100.0	9,338.3	9,718.1	9,330.9	26.8	23.6	89.59	-576.2	-479.5	618.5	568.3	12.305	
10,200.0	9,339.3	9,795.3	9,331.6	28.0	24.4	89.64	-635.6	-528.8	682.2	630.0	13.078	
10,300.0	9,340.3	9,872.4	9,332.4	29.3	25.3	89.69	-694.9	-578.1	745.8	691.6	13.765	
10,400.0	9,341.3	9,949.5	9,333.2	30.6	26.2	89.73	-754.2	-627.4	809.4	753.1	14.376	
10,500.0	9,342.3	10,026.7	9,334.0	32.0	27.2	89.77	-813.5	-676.8	873.0	814.5	14.920	
10,600.0	9,343.3	10,103.8	9,334.8	33.4	28.3	89.80	-872.8	-726.1	936.7	875.9	15.404	
10,700.0	9,344.4	10,181.0	9,335.5	34.8	29.4	89.82	-932.1	-775.4	1,000.3	937.1	15.830	
10,800.0	9,345.4	10,258.1	9,336.3	36.3	30.5	89.85	-991.5	-824.7	1,063.9	998.3	16.209	
10,900.0	9,346.4	10,335.3	9,337.1	37.8	31.7	89.87	-1,050.8	-874.1	1,127.6	1,059.4	16.546	
11,000.0	9,347.4	10,412.4	9,337.9	39.4	32.9	89.89	-1,110.1	-923.4	1,191.2	1,120.5	16.846	
11,100.0	9,348.4	10,489.6	9,338.7	41.0	34.2	89.90	-1,169.4	-972.7	1,254.8	1,181.5	17.113	
11,200.0	9,349.4	10,566.7	9,339.4	42.5	35.4	89.92	-1,228.7	-1,022.0	1,318.4	1,242.4	17.351	
11,258.5	9,350.0	10,611.9	9,339.9	43.5	36.2	89.92	-1,263.4	-1,050.9	1,355.7	1,278.1	17.479	
11,300.0	9,350.4	10,643.9	9,340.2	44.2	36.7	89.93	-1,288.0	-1,071.3	1,382.1	1,303.4	17.563	
11,400.0	9,351.4	11,727.7	9,351.5	45.8	52.0	90.00	-2,279.0	-1,419.6	1,410.6	1,315.4	14.820	
11,500.0	9,352.4	11,827.7	9,352.5	47.4	53.2	90.00	-2,379.0	-1,419.1	1,409.7	1,311.5	14.352	
11,600.0	9,353.5	11,927.6	9,353.5	49.1	54.4	90.00	-2,479.0	-1,418.6	1,408.8	1,307.5	13.905	
11,700.0	9,354.5	12,027.6	9,354.6	50.7	55.7	90.00	-2,579.0	-1,418.1	1,407.8	1,303.4	13.481	
11,800.0	9,355.5	12,127.6	9,355.6	52.4	57.0	90.00	-2,679.0	-1,417.5	1,406.9	1,299.3	13.077	
11,900.0	9,356.5	12,227.6	9,356.6	54.1	58.3	90.00	-2,779.0	-1,417.0	1,406.0	1,295.2	12.692	
12,000.0	9,357.5	12,327.6	9,357.6	55.8	59.6	90.00	-2,879.0	-1,416.5	1,405.1	1,291.1	12.326	
12,100.0	9,358.5	12,427.6	9,358.6	57.5	61.0	90.00	-2,979.0	-1,415.9	1,404.1	1,286.9	11.977	
12,200.0	9,359.5	12,527.6	9,359.6	59.2	62.4	90.00	-3,079.0	-1,415.4	1,403.2	1,282.7	11.645	
12,300.0	9,360.5	12,627.6	9,360.6	60.9	63.8	90.00	-3,178.9	-1,414.9	1,402.3	1,278.5	11.328	
12,400.0	9,361.5	12,727.6	9,361.6	62.6	65.3	90.00	-3,278.9	-1,414.3	1,401.3	1,274.2	11.026	
12,500.0	9,362.6	12,827.6	9,362.6	64.3	66.7	90.00	-3,378.9	-1,413.8	1,400.4	1,270.0	10.737	
12,600.0	9,363.6	12,927.6	9,363.7	66.1	68.2	90.00	-3,478.9	-1,413.3	1,399.5	1,265.7	10.462	
12,700.0	9,364.6	13,027.6	9,364.7	67.8	69.7	90.00	-3,578.9	-1,412.7	1,398.6	1,261.4	10.199	
12,800.0	9,365.6	13,127.6	9,365.7	69.6	71.2	90.00	-3,678.9	-1,412.2	1,397.6	1,257.1	9.947	
12,900.0	9,366.6	13,227.6	9,366.7	71.3	72.7	90.00	-3,778.9	-1,411.7	1,396.7	1,252.8	9.706	
13,000.0	9,367.6	13,327.6	9,367.7	73.0	74.3	90.00	-3,878.9	-1,411.1	1,395.8	1,248.5	9.476	

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 1H
Project:	Lea County, NM	TVD Reference:	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 1H	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 #1	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	9,368.6	13,427.6	9,368.7	74.8	75.8	90.00	-3,978.9	-1,410.6	1,394.8	1,244.1	9.255	
13,200.0	9,369.6	13,527.6	9,369.7	76.6	77.4	90.00	-4,078.9	-1,410.1	1,393.9	1,239.8	9.044	
13,300.0	9,370.6	13,627.6	9,370.7	78.3	79.0	90.00	-4,178.8	-1,409.6	1,393.0	1,235.4	8.841	
13,400.0	9,371.7	13,727.6	9,371.7	80.1	80.5	90.00	-4,278.8	-1,409.0	1,392.1	1,231.0	8.646	
13,500.0	9,372.7	13,827.6	9,372.8	81.8	82.1	90.00	-4,378.8	-1,408.5	1,391.1	1,226.7	8.458	
13,600.0	9,373.7	13,927.6	9,373.8	83.6	83.7	90.00	-4,478.8	-1,408.0	1,390.2	1,222.3	8.279	
13,700.0	9,374.7	14,027.6	9,374.8	85.4	85.4	90.00	-4,578.8	-1,407.4	1,389.3	1,217.9	8.106	
13,800.0	9,375.7	14,127.6	9,375.8	87.1	87.0	90.00	-4,678.8	-1,406.9	1,388.3	1,213.5	7.939	
13,900.0	9,376.7	14,227.5	9,376.8	88.9	88.6	90.00	-4,778.8	-1,406.4	1,387.4	1,209.1	7.779	
14,000.0	9,377.7	14,327.5	9,377.8	90.7	90.2	90.00	-4,878.8	-1,405.8	1,386.5	1,204.6	7.624	
14,100.0	9,378.7	14,427.5	9,378.8	92.5	91.9	90.00	-4,978.8	-1,405.3	1,385.6	1,200.2	7.476	
14,200.0	9,379.7	14,527.5	9,379.8	94.3	93.5	90.00	-5,078.7	-1,404.8	1,384.6	1,195.8	7.332	
14,300.0	9,380.8	14,627.5	9,380.8	96.0	95.2	90.00	-5,178.7	-1,404.2	1,383.7	1,191.3	7.193	
14,400.0	9,381.8	14,727.5	9,381.8	97.8	96.9	90.00	-5,278.7	-1,403.7	1,382.8	1,186.9	7.060	
14,500.0	9,382.8	14,827.5	9,382.9	99.6	98.5	90.00	-5,378.7	-1,403.2	1,381.8	1,182.5	6.930	
14,600.0	9,383.8	14,927.5	9,383.9	101.4	100.2	90.00	-5,478.7	-1,402.7	1,380.9	1,178.0	6.806	
14,700.0	9,384.8	15,027.5	9,384.9	103.2	101.9	90.00	-5,578.7	-1,402.1	1,380.0	1,173.5	6.685	
14,800.0	9,385.8	15,127.5	9,385.9	105.0	103.6	90.00	-5,678.7	-1,401.6	1,379.1	1,169.1	6.568	
14,900.0	9,386.8	15,227.5	9,386.9	106.8	105.3	90.00	-5,778.7	-1,401.1	1,378.1	1,164.6	6.455	
15,000.0	9,387.8	15,327.5	9,387.9	108.5	107.0	90.00	-5,878.7	-1,400.5	1,377.2	1,160.2	6.345	
15,100.0	9,388.8	15,427.5	9,388.9	110.3	108.7	90.00	-5,978.6	-1,400.0	1,376.3	1,155.7	6.239	
15,200.0	9,389.9	15,527.5	9,389.9	112.1	110.4	90.00	-6,078.6	-1,399.5	1,375.3	1,151.2	6.136	
15,300.0	9,390.9	15,627.5	9,390.9	113.9	112.1	90.00	-6,178.6	-1,398.9	1,374.4	1,146.7	6.037	
15,400.0	9,391.9	15,727.5	9,392.0	115.7	113.8	90.00	-6,278.6	-1,398.4	1,373.5	1,142.2	5.940	
15,500.0	9,392.9	15,827.5	9,393.0	117.5	115.5	90.00	-6,378.6	-1,397.9	1,372.6	1,137.8	5.846	
15,600.0	9,393.9	15,927.5	9,394.0	119.3	117.3	90.00	-6,478.6	-1,397.3	1,371.6	1,133.3	5.755	
15,700.0	9,394.9	16,027.5	9,395.0	121.1	119.0	90.00	-6,578.6	-1,396.8	1,370.7	1,128.8	5.666	
15,800.0	9,395.9	16,127.5	9,396.0	122.9	120.7	90.00	-6,678.6	-1,396.3	1,369.8	1,124.3	5.580	
15,900.0	9,396.9	16,227.5	9,397.0	124.7	122.5	90.00	-6,778.6	-1,395.7	1,368.8	1,119.8	5.496	
16,000.0	9,397.9	16,327.5	9,398.0	126.5	124.2	90.00	-6,878.5	-1,395.2	1,367.9	1,115.3	5.415	
16,100.0	9,399.0	16,427.5	9,399.0	128.3	125.9	90.00	-6,978.5	-1,394.7	1,367.0	1,110.8	5.336	
16,200.0	9,400.0	16,527.4	9,400.0	130.1	127.7	90.00	-7,078.5	-1,394.2	1,366.1	1,106.3	5.259	
16,300.0	9,401.0	16,627.4	9,401.1	131.9	129.4	90.00	-7,178.5	-1,393.6	1,365.1	1,101.8	5.184	
16,400.0	9,402.0	16,727.4	9,402.1	133.7	131.1	90.00	-7,278.5	-1,393.1	1,364.2	1,097.3	5.111	
16,500.0	9,403.0	16,827.4	9,403.1	135.5	132.9	90.00	-7,378.5	-1,392.6	1,363.3	1,092.8	5.040	
16,600.0	9,404.0	16,927.4	9,404.1	137.3	134.6	90.00	-7,478.5	-1,392.0	1,362.3	1,088.3	4.971	
16,700.0	9,405.0	17,027.4	9,405.1	139.1	136.4	90.00	-7,578.5	-1,391.5	1,361.4	1,083.8	4.903	
16,800.0	9,406.0	17,127.4	9,406.1	140.9	138.1	90.00	-7,678.5	-1,391.0	1,360.5	1,079.2	4.838	
16,900.0	9,407.0	17,227.4	9,407.1	142.7	139.9	90.00	-7,778.5	-1,390.4	1,359.6	1,074.7	4.773	
17,000.0	9,408.1	17,327.4	9,408.1	144.5	141.7	90.00	-7,878.4	-1,389.9	1,358.6	1,070.2	4.711	
17,100.0	9,409.1	17,427.4	9,409.1	146.4	143.4	90.00	-7,978.4	-1,389.4	1,357.7	1,065.7	4.650	
17,200.0	9,410.1	17,527.4	9,410.1	148.2	145.2	90.00	-8,078.4	-1,388.8	1,356.8	1,061.2	4.590	
17,300.0	9,411.1	17,627.4	9,411.2	150.0	146.9	90.00	-8,178.4	-1,388.3	1,355.8	1,056.7	4.532	
17,400.0	9,412.1	17,727.4	9,412.2	151.8	148.7	90.00	-8,278.4	-1,387.8	1,354.9	1,052.1	4.475	
17,500.0	9,413.1	17,827.4	9,413.2	153.6	150.5	90.00	-8,378.4	-1,387.2	1,354.0	1,047.6	4.420	
17,600.0	9,414.1	17,927.4	9,414.2	155.4	152.2	90.00	-8,478.4	-1,386.7	1,353.0	1,043.1	4.365	
17,700.0	9,415.1	18,027.4	9,415.2	157.2	154.0	90.00	-8,578.4	-1,386.2	1,352.1	1,038.6	4.312	
17,800.0	9,416.1	18,127.4	9,416.2	159.0	155.8	90.00	-8,678.4	-1,385.7	1,351.2	1,034.0	4.260	
17,900.0	9,417.2	18,227.4	9,417.2	160.8	157.5	90.00	-8,778.3	-1,385.1	1,350.3	1,029.5	4.210	
18,000.0	9,418.2	18,327.4	9,418.2	162.6	159.3	90.00	-8,878.3	-1,384.6	1,349.3	1,025.0	4.160	
18,100.0	9,419.2	18,427.4	9,419.2	164.4	161.1	90.00	-8,978.3	-1,384.1	1,348.4	1,020.5	4.112	
18,200.0	9,420.2	18,527.4	9,420.3	166.2	162.9	90.00	-9,078.3	-1,383.5	1,347.5	1,015.9	4.064	

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 1H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 1H	**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 #1	**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	9,421.2	18,627.4	9,421.3	168.1	164.6	90.00	-9,178.3	-1,383.0	1,346.5	1,011.4	4.018	
18,400.0	9,422.2	18,727.4	9,422.3	169.9	166.4	90.00	-9,278.3	-1,382.5	1,345.6	1,006.9	3.972	
18,500.0	9,423.2	18,827.3	9,423.3	171.7	168.2	90.00	-9,378.3	-1,381.9	1,344.7	1,002.3	3.928	
18,600.0	9,424.2	18,927.3	9,424.3	173.5	170.0	90.00	-9,478.3	-1,381.4	1,343.8	997.8	3.884	
18,700.0	9,425.2	19,027.3	9,425.3	175.3	171.8	90.00	-9,578.3	-1,380.9	1,342.8	993.3	3.841	
18,800.0	9,426.3	19,127.3	9,426.3	177.1	173.5	90.00	-9,678.2	-1,380.3	1,341.9	988.7	3.799	
18,900.0	9,427.3	19,227.3	9,427.3	178.9	175.3	90.00	-9,778.2	-1,379.8	1,341.0	984.2	3.758	
19,000.0	9,428.3	19,327.3	9,428.3	180.7	177.1	90.00	-9,878.2	-1,379.3	1,340.0	979.6	3.718	
19,100.0	9,429.3	19,427.3	9,429.4	182.6	178.9	90.00	-9,978.2	-1,378.8	1,339.1	975.1	3.679	
19,200.0	9,430.3	19,527.3	9,430.4	184.4	180.7	90.00	-10,078.2	-1,378.2	1,338.2	970.6	3.640	
19,300.0	9,431.3	19,627.3	9,431.4	186.2	182.5	90.00	-10,178.2	-1,377.7	1,337.3	966.0	3.602	
19,400.0	9,432.3	19,727.3	9,432.4	188.0	184.2	90.00	-10,278.2	-1,377.2	1,336.3	961.5	3.565	
19,500.0	9,433.3	19,827.3	9,433.4	189.8	186.0	90.00	-10,378.2	-1,376.6	1,335.4	956.9	3.529	
19,600.0	9,434.3	19,927.3	9,434.4	191.6	187.8	90.00	-10,478.2	-1,376.1	1,334.5	952.4	3.493	
19,700.0	9,435.4	20,027.3	9,435.4	193.4	189.6	90.00	-10,578.1	-1,375.6	1,333.5	947.9	3.458	
19,800.0	9,436.4	20,127.3	9,436.4	195.2	191.4	90.00	-10,678.1	-1,375.0	1,332.6	943.3	3.423	
19,900.0	9,437.4	20,227.3	9,437.4	197.1	193.2	90.00	-10,778.1	-1,374.5	1,331.7	938.8	3.389	
20,000.0	9,438.4	20,327.3	9,438.4	198.9	195.0	90.00	-10,878.1	-1,374.0	1,330.8	934.2	3.356	
20,100.0	9,439.4	20,427.3	9,439.5	200.7	196.8	90.00	-10,978.1	-1,373.4	1,329.8	929.7	3.323	
20,200.0	9,440.4	20,527.3	9,440.5	202.5	198.6	90.00	-11,078.1	-1,372.9	1,328.9	925.1	3.291	
20,300.0	9,441.4	20,627.3	9,441.5	204.3	200.4	90.00	-11,178.1	-1,372.4	1,328.0	920.6	3.260	
20,400.0	9,442.4	20,727.3	9,442.5	206.1	202.2	90.00	-11,278.1	-1,371.8	1,327.0	916.0	3.229	
20,500.0	9,443.4	20,827.3	9,443.5	208.0	203.9	90.00	-11,378.1	-1,371.3	1,326.1	911.5	3.198	
20,600.0	9,444.5	20,927.3	9,444.5	209.8	205.7	90.00	-11,478.0	-1,370.8	1,325.2	906.9	3.168	
20,700.0	9,445.5	21,027.3	9,445.5	211.6	207.5	90.00	-11,578.0	-1,370.3	1,324.3	902.4	3.139	
20,800.0	9,446.5	21,127.2	9,446.5	213.4	209.3	90.00	-11,678.0	-1,369.7	1,323.3	897.8	3.110	
20,900.0	9,447.5	21,227.2	9,447.5	215.2	211.1	90.00	-11,778.0	-1,369.2	1,322.4	893.3	3.082	
21,000.0	9,448.5	21,327.2	9,448.6	217.0	212.9	90.00	-11,878.0	-1,368.7	1,321.5	888.7	3.054	
21,100.0	9,449.5	21,427.2	9,449.6	218.8	214.7	90.00	-11,978.0	-1,368.1	1,320.5	884.2	3.026	
21,149.5	9,450.0	21,470.2	9,450.0	219.7	215.5	90.00	-12,021.0	-1,367.9	1,320.1	882.1	3.014	SF

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 1H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 1H	**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 #1	**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	0.0	0.0	0.0	0.0	-29.15	179.3	-100.0	205.5			
100.0	100.0	92.1	92.1	0.1	0.0	-29.15	179.3	-100.0	205.3	205.2	1,700.576	
200.0	200.0	192.2	192.2	0.3	0.1	-29.14	179.2	-99.9	205.2	204.8	522.922	
300.0	300.0	292.2	292.2	0.5	0.1	-29.14	179.1	-99.9	205.1	204.4	306.532	
400.0	400.0	392.1	392.1	0.8	0.2	-29.12	179.1	-99.8	205.0	204.1	216.693	
476.3	476.3	468.3	468.3	0.9	0.2	-29.11	179.1	-99.7	205.0	203.8	177.095	
500.0	500.0	492.0	492.0	1.0	0.2	-29.11	179.1	-99.7	205.0	203.8	167.599	
600.0	600.0	591.8	591.8	1.2	0.3	-29.11	179.1	-99.8	205.1	203.6	136.679	
700.0	700.0	691.6	691.6	1.4	0.4	-29.12	179.2	-99.8	205.2	203.4	115.444	
800.0	800.0	791.4	791.4	1.7	0.4	-29.11	179.4	-99.9	205.4	203.3	99.984	
900.0	900.0	891.5	891.5	1.9	0.5	-29.09	179.7	-100.0	205.6	203.3	88.205	
1,000.0	1,000.0	991.7	991.7	2.1	0.5	-29.04	180.0	-99.9	205.8	203.2	78.905	
1,100.0	1,100.0	1,091.8	1,091.8	2.3	0.6	-28.96	180.2	-99.7	206.0	203.1	71.366	
1,200.0	1,200.0	1,192.0	1,192.0	2.5	0.6	-28.86	180.4	-99.4	206.0	202.8	65.123	
1,300.0	1,300.0	1,292.2	1,292.2	2.8	0.7	-28.75	180.6	-99.1	206.0	202.5	59.862	
1,400.0	1,400.0	1,392.4	1,392.4	3.0	0.7	-28.64	180.6	-98.6	205.8	202.1	55.361	
1,500.0	1,500.0	1,492.4	1,492.4	3.2	0.8	-28.49	180.7	-98.1	205.6	201.6	51.471	
1,600.0	1,600.0	1,592.3	1,592.3	3.4	0.8	-28.24	181.0	-97.2	205.5	201.2	48.089	
1,700.0	1,700.0	1,692.2	1,692.2	3.7	0.9	-27.91	181.4	-96.1	205.3	200.8	45.127	
1,800.0	1,800.0	1,792.1	1,792.0	3.9	0.9	-27.56	182.0	-95.0	205.3	200.5	42.520	
1,900.0	1,900.0	1,892.1	1,892.0	4.1	1.0	-27.16	182.6	-93.7	205.3	200.2	40.199	
2,000.0	2,000.0	1,992.1	1,992.1	4.3	1.0	-26.67	183.4	-92.1	205.2	199.9	38.116	
2,100.0	2,100.0	2,092.9	2,092.8	4.6	1.1	-26.09	184.1	-90.2	205.0	199.4	36.198	
2,200.0	2,200.0	2,193.7	2,193.6	4.8	1.1	-25.39	184.7	-87.7	204.5	198.5	34.396	
2,300.0	2,300.0	2,294.1	2,293.9	5.0	1.2	-24.58	185.1	-84.7	203.6	197.4	32.705	
2,400.0	2,400.0	2,394.5	2,394.3	5.2	1.3	-23.71	185.5	-81.4	202.6	196.1	31.133	
2,500.0	2,500.0	2,494.8	2,494.5	5.5	1.3	-22.80	185.6	-78.0	201.4	194.6	29.670	
2,600.0	2,600.0	2,595.0	2,594.7	5.7	1.4	-21.91	185.6	-74.7	200.1	193.0	28.305	
2,700.0	2,700.0	2,695.2	2,694.8	5.9	1.4	-21.07	185.4	-71.4	198.7	191.3	27.034	
2,800.0	2,800.0	2,795.3	2,794.9	6.1	1.5	-20.25	185.0	-68.3	197.3	189.6	25.849	
2,900.0	2,900.0	2,895.8	2,895.3	6.4	1.5	-19.40	184.5	-65.0	195.7	187.8	24.725	
3,000.0	3,000.0	2,996.2	2,995.6	6.6	1.6	-18.41	184.0	-61.2	193.9	185.7	23.654	
3,100.0	3,100.0	3,096.5	3,095.9	6.8	1.7	-17.44	183.1	-57.5	192.0	183.5	22.643	
3,200.0	3,200.0	3,196.8	3,196.2	7.0	1.7	-16.69	181.8	-54.5	189.9	181.1	21.678	
3,300.0	3,300.0	3,299.3	3,298.5	7.3	1.8	-16.00	179.7	-51.5	187.1	178.0	20.684	
3,400.0	3,400.0	3,401.6	3,400.7	7.5	1.8	-15.21	176.3	-47.9	182.9	173.6	19.613	
3,500.0	3,500.0	3,501.1	3,500.1	7.7	1.9	-14.44	172.4	-44.4	178.3	168.6	18.556	
3,600.0	3,600.0	3,600.6	3,599.5	7.9	2.0	-13.82	168.6	-41.5	173.8	163.9	17.584	
3,700.0	3,700.0	3,701.1	3,699.9	8.2	2.0	-13.32	164.6	-39.0	169.3	159.2	16.659	
3,800.0	3,800.0	3,801.6	3,800.2	8.4	2.1	-12.93	160.1	-36.8	164.5	154.1	15.750	
3,900.0	3,900.0	3,900.6	3,899.2	8.6	2.1	-12.64	155.7	-34.9	159.7	149.0	14.900	
4,000.0	4,000.0	4,000.0	3,998.4	8.8	2.2	-12.47	151.7	-33.6	155.5	144.5	14.139	
4,100.0	4,100.0	4,099.4	4,097.7	9.1	2.2	-12.41	148.0	-32.6	151.6	140.3	13.449	
4,200.0	4,200.0	4,199.0	4,197.3	9.3	2.3	-12.43	144.4	-31.8	147.9	136.4	12.808	
4,300.0	4,300.0	4,298.3	4,296.5	9.5	2.4	-12.54	141.1	-31.4	144.6	132.8	12.227	
4,400.0	4,400.0	4,397.5	4,395.7	9.7	2.4	-12.70	138.2	-31.1	141.7	129.6	11.713	
4,500.0	4,500.0	4,497.4	4,495.6	10.0	2.5	-12.92	135.6	-31.1	139.1	126.8	11.244	
4,600.0	4,600.0	4,597.3	4,595.4	10.2	2.5	-13.20	132.9	-31.2	136.6	123.9	10.799	
4,700.0	4,700.0	4,697.1	4,695.2	10.4	2.6	-13.49	130.4	-31.3	134.1	121.2	10.379	
4,800.0	4,800.0	4,796.9	4,795.0	10.6	2.6	-13.77	128.0	-31.4	131.8	118.6	9.987	
4,900.0	4,900.0	4,896.9	4,895.0	10.9	2.7	-14.03	125.6	-31.4	129.5	116.1	9.614	
5,000.0	5,000.0	4,996.9	4,994.9	11.1	2.7	-14.32	123.2	-31.5	127.2	113.5	9.254	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well Nightcap 6 Federal 1H
Project:	Lea County, NM	TVD Reference:	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 1H	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 #1	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, 8600-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	5,096.7	5,094.7	11.3	2.8	-14.64	120.9	-31.6	125.0	111.0	8.913	
5,200.0	5,200.0	5,196.5	5,194.4	11.5	2.8	-15.03	118.7	-31.9	122.9	108.6	8.598	
5,300.0	5,300.0	5,296.3	5,294.2	11.8	2.9	-15.45	116.6	-32.2	121.0	106.5	8.305	
5,400.0	5,400.0	5,396.1	5,394.1	12.0	2.9	-15.84	114.7	-32.6	119.2	104.4	8.030	
5,500.0	5,500.0	5,496.0	5,493.9	12.2	3.0	-16.24	112.8	-32.9	117.6	102.4	7.772	
5,600.0	5,600.0	5,595.9	5,593.8	12.4	3.0	-16.68	111.0	-33.3	115.9	100.5	7.529	
5,700.0	5,700.0	5,695.5	5,693.3	12.7	3.1	-17.12	109.5	-33.7	114.6	98.9	7.309	
5,800.0	5,800.0	5,795.0	5,792.9	12.9	3.1	-17.56	108.3	-34.3	113.6	97.6	7.122	
5,900.0	5,900.0	5,894.9	5,892.7	13.1	3.2	-17.99	107.4	-34.9	112.9	96.7	6.958	
6,000.0	6,000.0	5,994.8	5,992.6	13.3	3.2	-18.39	106.6	-35.4	112.3	95.8	6.806	
6,100.0	6,100.0	6,094.6	6,092.4	13.6	3.3	-18.78	105.9	-36.0	111.8	95.0	6.666	
6,200.0	6,200.0	6,194.4	6,192.3	13.8	3.3	-19.17	105.3	-36.6	111.5	94.5	6.540	
6,300.0	6,300.0	6,294.3	6,292.1	14.0	3.4	-19.56	104.9	-37.3	111.3	94.0	6.425	
6,400.0	6,400.0	6,394.2	6,392.0	14.2	3.4	-19.97	104.6	-38.0	111.3	93.7	6.321	
6,416.3	6,416.3	6,410.5	6,408.3	14.3	3.5	-20.03	104.5	-38.1	111.3	93.6	6.305	CC
6,500.0	6,500.0	6,494.0	6,491.9	14.5	3.5	-20.38	104.3	-38.8	111.3	93.4	6.226	
6,600.0	6,600.0	6,593.9	6,591.7	14.7	3.5	-20.77	104.2	-39.5	111.5	93.3	6.141	
6,700.0	6,700.0	6,693.9	6,691.7	14.9	3.6	-21.13	104.2	-40.3	111.7	93.3	6.063	ES
6,800.0	6,800.0	6,793.8	6,791.6	15.1	3.6	-21.41	104.3	-40.9	112.0	93.3	5.990	
6,900.0	6,900.0	6,893.8	6,891.6	15.4	3.7	-21.62	104.5	-41.4	112.4	93.4	5.920	
7,000.0	7,000.0	6,993.8	6,991.6	15.6	3.7	-21.78	104.6	-41.8	112.7	93.4	5.851	
7,100.0	7,100.0	7,093.7	7,091.5	15.8	3.8	-21.88	104.9	-42.1	113.1	93.5	5.788	
7,200.0	7,200.0	7,193.5	7,191.4	16.0	3.8	-21.87	105.4	-42.3	113.6	93.7	5.732	
7,300.0	7,300.0	7,293.6	7,291.4	16.3	3.9	-21.77	106.0	-42.3	114.1	94.0	5.680	
7,400.0	7,400.0	7,393.6	7,391.4	16.5	3.9	-21.55	106.6	-42.1	114.6	94.3	5.629	
7,500.0	7,500.0	7,493.9	7,491.7	16.7	4.0	-21.26	107.2	-41.7	115.0	94.4	5.572	
7,600.0	7,600.0	7,594.2	7,592.0	16.9	4.1	-20.94	107.5	-41.2	115.1	94.2	5.503	
7,645.4	7,645.4	7,639.6	7,637.4	17.0	4.1	-20.79	107.6	-40.9	115.1	94.1	5.470	
7,700.0	7,700.0	7,694.1	7,691.9	17.2	4.1	-20.59	107.8	-40.5	115.1	93.9	5.431	
7,800.0	7,800.0	7,794.0	7,791.8	17.4	4.2	-20.18	108.2	-39.8	115.3	93.8	5.367	
7,900.0	7,900.0	7,893.9	7,891.7	17.6	4.2	-19.74	108.7	-39.0	115.5	93.7	5.315	
8,000.0	8,000.0	7,993.9	7,991.7	17.8	4.2	-19.30	109.2	-38.3	115.7	93.7	5.268	
8,100.0	8,100.0	8,093.8	8,091.6	18.1	4.2	-18.86	109.8	-37.5	116.0	93.8	5.224	
8,200.0	8,200.0	8,193.8	8,191.6	18.3	4.2	-18.41	110.4	-36.8	116.4	93.9	5.183	
8,300.0	8,300.0	8,293.7	8,291.5	18.5	4.2	-17.96	111.1	-36.0	116.8	94.1	5.144	
8,400.0	8,400.0	8,393.7	8,391.4	18.7	4.2	-17.51	111.8	-35.3	117.2	94.3	5.109	
8,500.0	8,500.0	8,493.6	8,491.4	19.0	4.3	-17.05	112.5	-34.5	117.7	94.5	5.077	
8,600.0	8,600.0	8,593.6	8,591.3	19.2	4.3	-16.59	113.3	-33.8	118.2	94.8	5.047	
8,700.0	8,700.0	8,693.5	8,691.3	19.4	4.3	-16.14	114.2	-33.0	118.8	95.2	5.020	
8,800.0	8,800.0	8,793.4	8,791.2	19.6	4.3	-15.68	115.0	-32.3	119.5	95.6	4.996	
8,855.8	8,855.8	8,849.4	8,847.2	19.8	4.3	-15.52	115.4	-32.1	119.8	95.7	4.977	SF
8,875.0	8,875.0	8,868.7	8,866.5	19.8	4.3	164.28	115.5	-32.1	120.3	96.2	4.995	
8,900.0	8,899.9	8,893.8	8,891.5	19.8	4.4	164.38	115.6	-32.2	122.0	97.9	5.066	
8,925.0	8,924.8	8,919.1	8,916.9	19.9	4.4	164.53	115.6	-32.5	124.9	100.8	5.196	
8,950.0	8,949.4	8,944.5	8,942.2	19.9	4.4	164.65	115.3	-33.1	128.9	105.0	5.384	
8,975.0	8,973.8	8,969.6	8,967.3	20.0	4.4	164.73	114.9	-33.9	134.0	110.2	5.630	
9,000.0	8,997.8	8,994.6	8,992.2	20.0	4.4	164.77	114.2	-35.0	140.3	116.6	5.938	
9,025.0	9,021.5	9,019.0	9,016.7	20.0	4.4	164.76	113.4	-36.4	147.6	124.2	6.309	
9,050.0	9,044.7	9,043.1	9,040.6	20.1	4.5	164.68	112.4	-38.0	156.0	132.9	6.748	
9,075.0	9,067.4	9,066.7	9,064.2	20.1	4.5	164.53	111.2	-40.0	165.6	142.8	7.258	
9,100.0	9,089.5	9,090.0	9,087.3	20.2	4.5	164.31	109.9	-42.2	176.2	153.7	7.845	
9,125.0	9,111.0	9,112.3	9,109.4	20.2	4.5	164.04	108.6	-44.6	187.9	165.8	8.512	

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 1H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 1H	**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 #1	**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: 1200-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
9,150.0	9,131.7	9,133.7	9,130.6	20.2	4.5	163.72	107.2	-47.2	200.7	179.0	9.269	
9,175.0	9,151.7	9,154.4	9,151.1	20.3	4.5	163.37	105.9	-49.8	214.5	193.3	10.122	
9,200.0	9,171.0	9,174.4	9,170.9	20.3	4.6	162.97	104.5	-52.5	229.4	208.7	11.077	
9,225.0	9,189.3	9,193.6	9,189.8	20.4	4.6	162.52	103.2	-55.3	245.3	225.1	12.140	
9,250.0	9,206.7	9,212.2	9,208.2	20.5	4.6	162.00	101.9	-58.1	262.2	242.5	13.315	
9,275.0	9,223.2	9,230.0	9,225.7	20.5	4.6	161.41	100.6	-61.0	279.9	260.7	14.603	
9,300.0	9,238.6	9,247.0	9,242.4	20.6	4.6	160.72	99.3	-63.8	298.4	279.8	16.006	
9,325.0	9,253.0	9,263.0	9,258.1	20.7	4.7	159.92	98.1	-66.6	317.8	299.7	17.514	
9,350.0	9,266.4	9,278.1	9,272.9	20.8	4.7	158.97	96.9	-69.3	337.9	320.2	19.106	
9,375.0	9,278.6	9,292.1	9,286.7	20.9	4.7	157.84	95.7	-71.9	358.7	341.4	20.746	
9,400.0	9,289.6	9,305.2	9,299.5	21.0	4.7	156.49	94.6	-74.4	380.2	363.2	22.369	
9,425.0	9,299.4	9,317.5	9,311.4	21.1	4.7	154.85	93.6	-76.8	402.2	385.4	23.885	
9,450.0	9,308.1	9,328.6	9,322.3	21.2	4.8	152.82	92.6	-79.0	424.8	407.9	25.174	
9,475.0	9,315.5	9,338.6	9,332.0	21.3	4.8	150.25	91.7	-81.1	447.8	430.6	26.094	
9,500.0	9,321.6	9,347.4	9,340.6	21.5	4.8	146.94	90.9	-83.0	471.3	453.5	26.516	
9,525.0	9,326.4	9,355.0	9,347.9	21.6	4.8	142.57	90.1	-84.7	495.1	476.3	26.352	
9,550.0	9,330.0	9,361.3	9,354.1	21.8	4.8	136.62	89.5	-86.1	519.2	498.9	25.600	
9,575.0	9,332.3	9,366.4	9,359.0	21.9	4.8	128.31	89.0	-87.2	543.6	521.3	24.351	
9,601.0	9,333.2	9,370.2	9,362.7	22.1	4.8	116.02	88.6	-88.1	569.1	544.2	22.897	
9,700.0	9,334.2	9,382.5	9,374.6	22.8	4.9	121.09	87.4	-90.9	666.7	642.1	27.032	
9,800.0	9,335.3	9,395.5	9,387.2	23.7	4.9	125.61	86.0	-94.0	765.5	741.0	31.236	
9,900.0	9,336.3	9,409.8	9,400.9	24.6	4.9	129.73	84.5	-97.5	864.4	840.0	35.470	
10,000.0	9,337.3	9,425.2	9,415.8	25.7	5.0	133.40	82.8	-101.4	963.3	939.1	39.683	
10,100.0	9,338.3	9,441.8	9,431.7	26.8	5.0	136.62	80.9	-105.5	1,062.3	1,038.0	43.807	
10,200.0	9,339.3	9,459.4	9,448.6	28.0	5.0	139.43	78.8	-110.1	1,161.2	1,136.9	47.801	
10,300.0	9,340.3	9,478.4	9,466.7	29.3	5.1	141.88	76.4	-115.1	1,260.1	1,235.7	51.632	
10,400.0	9,341.3	9,498.8	9,486.2	30.6	5.1	144.03	73.8	-120.5	1,359.0	1,334.4	55.277	
10,500.0	9,342.3	9,516.8	9,503.4	32.0	5.2	145.61	71.4	-125.5	1,457.8	1,432.9	58.422	
10,600.0	9,343.3	9,535.4	9,521.1	33.4	5.3	146.96	68.9	-130.6	1,556.6	1,531.3	61.322	
10,700.0	9,344.4	9,554.8	9,539.4	34.8	5.3	148.15	66.2	-136.2	1,655.4	1,629.6	64.002	
10,800.0	9,345.4	9,574.9	9,558.5	36.3	5.4	149.20	63.3	-142.0	1,754.2	1,727.8	66.472	
10,900.0	9,346.4	9,595.8	9,578.2	37.8	5.5	150.12	60.3	-148.2	1,852.9	1,825.9	68.714	
11,000.0	9,347.4	9,613.0	9,594.4	39.4	5.5	150.76	57.8	-153.4	1,951.6	1,923.9	70.554	
11,100.0	9,348.4	9,629.1	9,609.6	41.0	5.6	151.29	55.4	-158.4	2,050.3	2,021.9	72.192	
11,200.0	9,349.4	9,645.4	9,624.8	42.5	5.7	151.76	53.0	-163.5	2,149.0	2,119.8	73.689	
11,258.5	9,350.0	9,654.9	9,633.7	43.5	5.7	152.02	51.6	-166.5	2,206.7	2,177.1	74.505	
11,300.0	9,350.4	9,661.7	9,640.1	44.2	5.7	152.18	50.6	-168.7	2,247.7	2,217.7	75.058	
11,400.0	9,351.4	9,678.0	9,655.4	45.8	5.8	152.56	48.1	-174.0	2,346.4	2,315.6	76.312	
11,500.0	9,352.4	9,694.5	9,670.7	47.4	5.9	152.89	45.7	-179.4	2,445.1	2,413.5	77.460	
11,600.0	9,353.5	9,708.9	9,684.2	49.1	5.9	153.15	43.5	-184.2	2,543.8	2,511.4	78.469	
11,700.0	9,354.5	9,722.3	9,696.6	50.7	6.0	153.36	41.6	-188.7	2,642.5	2,609.2	79.376	
11,800.0	9,355.5	9,735.5	9,708.8	52.4	6.1	153.56	39.6	-193.2	2,741.2	2,707.0	80.211	
11,900.0	9,356.5	9,748.5	9,720.9	54.1	6.1	153.73	37.7	-197.7	2,840.0	2,804.9	80.982	
12,000.0	9,357.5	9,761.5	9,732.9	55.8	6.2	153.88	35.8	-202.2	2,938.7	2,902.7	81.693	
12,100.0	9,358.5	9,774.2	9,744.7	57.5	6.3	154.02	34.0	-206.8	3,037.5	3,000.6	82.352	
12,200.0	9,359.5	9,786.9	9,756.3	59.2	6.3	154.14	32.2	-211.3	3,136.3	3,098.5	82.961	
12,300.0	9,360.5	9,800.0	9,768.4	60.9	6.4	154.25	30.3	-216.1	3,235.1	3,196.4	83.532	
12,400.0	9,361.5	9,817.9	9,784.9	62.6	6.5	154.39	27.7	-222.6	3,333.9	3,294.3	84.115	
12,500.0	9,362.6	9,837.0	9,802.5	64.3	6.6	154.54	25.0	-229.5	3,432.7	3,392.2	84.681	
12,600.0	9,363.6	9,856.4	9,820.4	66.1	6.7	154.68	22.2	-236.5	3,531.5	3,490.0	85.222	
12,700.0	9,364.6	9,874.6	9,837.1	67.8	6.8	154.81	19.5	-243.0	3,630.2	3,587.9	85.726	
12,800.0	9,365.6	9,889.3	9,850.7	69.6	6.8	154.91	17.4	-248.3	3,729.0	3,685.7	86.181	

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 1H
Project:	Lea County, NM	TVD Reference:	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 1H	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 #1	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
12,900.0	9,366.6	9,900.0	9,860.6	71.3	6.9	154.98	15.8	-252.0	3,827.7	3,783.5	86.582	
13,000.0	9,367.6	9,917.9	9,877.1	73.0	7.0	155.11	13.2	-258.3	3,926.5	3,881.4	87.032	
13,100.0	9,368.6	9,931.9	9,890.1	74.8	7.1	155.20	11.2	-263.2	4,025.3	3,979.2	87.427	
13,200.0	9,369.6	9,945.8	9,902.9	76.6	7.1	155.28	9.2	-268.1	4,124.1	4,077.1	87.805	
13,300.0	9,370.6	9,959.6	9,915.7	78.3	7.2	155.37	7.2	-272.9	4,222.8	4,175.0	88.166	
13,400.0	9,371.7	9,973.4	9,928.5	80.1	7.3	155.45	5.2	-277.7	4,321.6	4,272.8	88.512	
13,500.0	9,372.7	9,987.1	9,941.2	81.8	7.3	155.53	3.2	-282.5	4,420.4	4,370.7	88.844	
13,600.0	9,373.7	10,000.9	9,954.0	83.6	7.4	155.60	1.2	-287.4	4,519.2	4,468.6	89.164	
13,700.0	9,374.7	10,019.5	9,971.2	85.4	7.5	155.70	-1.4	-293.8	4,618.0	4,566.5	89.502	
13,800.0	9,375.7	10,038.2	9,988.6	87.1	7.6	155.79	-4.1	-300.4	4,716.8	4,664.3	89.826	
13,900.0	9,376.7	10,057.2	10,006.1	88.9	7.7	155.88	-6.8	-307.0	4,815.6	4,762.2	90.135	
14,000.0	9,377.7	10,076.3	10,023.7	90.7	7.8	155.96	-9.6	-313.7	4,914.4	4,860.0	90.430	
14,100.0	9,378.7	10,095.5	10,041.6	92.5	7.9	156.04	-12.4	-320.4	5,013.2	4,957.9	90.713	
14,200.0	9,379.7	10,110.4	10,055.4	94.3	8.0	156.10	-14.6	-325.7	5,111.9	5,055.7	90.961	
14,300.0	9,380.8	10,123.9	10,067.8	96.0	8.1	156.15	-16.6	-330.4	5,210.7	5,153.5	91.193	
14,400.0	9,381.8	10,137.3	10,080.3	97.8	8.2	156.20	-18.5	-335.1	5,309.4	5,251.4	91.418	
14,500.0	9,382.8	10,150.7	10,092.6	99.6	8.3	156.25	-20.5	-339.7	5,408.2	5,349.2	91.637	
14,600.0	9,383.8	10,164.0	10,104.9	101.4	8.3	156.30	-22.4	-344.3	5,507.0	5,447.0	91.850	
14,700.0	9,384.8	10,177.2	10,117.2	103.2	8.4	156.35	-24.3	-348.9	5,605.8	5,544.9	92.056	
14,800.0	9,385.8	10,190.3	10,129.3	105.0	8.5	156.39	-26.2	-353.5	5,704.6	5,642.7	92.257	
14,900.0	9,386.8	10,200.0	10,138.3	106.8	8.5	156.43	-27.6	-356.8	5,803.4	5,740.6	92.436	
15,000.0	9,387.8	10,200.0	10,138.3	108.5	8.5	156.43	-27.6	-356.8	5,902.2	5,838.4	92.564	
15,100.0	9,388.8	10,221.6	10,158.4	110.3	8.7	156.50	-30.7	-364.2	6,001.0	5,936.3	92.792	
15,200.0	9,389.9	10,231.0	10,167.1	112.1	8.7	156.54	-32.0	-367.4	6,099.8	6,034.2	92.957	
15,300.0	9,390.9	10,240.2	10,175.7	113.9	8.8	156.57	-33.3	-370.6	6,198.7	6,132.1	93.118	
15,400.0	9,391.9	10,249.4	10,184.2	115.7	8.8	156.60	-34.5	-373.7	6,297.6	6,230.1	93.275	
15,500.0	9,392.9	10,258.4	10,192.6	117.5	8.9	156.63	-35.8	-376.8	6,396.5	6,328.0	93.428	
15,600.0	9,393.9	10,267.3	10,200.9	119.3	8.9	156.66	-37.0	-379.8	6,495.4	6,426.0	93.578	
15,700.0	9,394.9	10,500.0	10,416.8	121.1	10.4	157.28	-72.4	-459.0	6,594.2	6,524.5	94.519	
15,800.0	9,395.9	10,500.0	10,416.8	122.9	10.4	157.28	-72.4	-459.0	6,692.6	6,621.9	94.615	
15,900.0	9,396.9	10,500.0	10,416.8	124.7	10.4	157.28	-72.4	-459.0	6,791.1	6,719.4	94.709	
16,000.0	9,397.9	10,500.0	10,416.8	126.5	10.4	157.28	-72.4	-459.0	6,889.5	6,816.9	94.801	
16,100.0	9,399.0	10,531.6	10,446.1	128.3	10.5	157.35	-77.7	-469.6	6,987.9	6,914.3	94.985	
16,200.0	9,400.0	10,538.6	10,452.6	130.1	10.6	157.37	-78.8	-471.9	7,086.4	7,011.8	95.092	
16,300.0	9,401.0	10,545.5	10,459.0	131.9	10.6	157.38	-79.9	-474.2	7,184.9	7,109.4	95.197	
16,400.0	9,402.0	10,552.2	10,465.2	133.7	10.7	157.40	-81.0	-476.5	7,283.4	7,207.0	95.299	
16,500.0	9,403.0	10,558.9	10,471.4	135.5	10.7	157.41	-82.0	-478.7	7,382.0	7,304.6	95.399	
16,600.0	9,404.0	10,565.4	10,477.5	137.3	10.8	157.43	-83.1	-480.9	7,480.5	7,402.2	95.497	
16,700.0	9,405.0	10,600.0	10,509.6	139.1	11.0	157.50	-88.4	-492.5	7,579.3	7,500.0	95.671	
16,800.0	9,406.0	10,600.0	10,509.6	140.9	11.0	157.50	-88.4	-492.5	7,677.8	7,597.6	95.746	
16,900.0	9,407.0	10,600.0	10,509.6	142.7	11.0	157.50	-88.4	-492.5	7,776.4	7,695.3	95.820	
17,000.0	9,408.1	10,600.0	10,509.6	144.5	11.0	157.50	-88.4	-492.5	7,875.1	7,793.0	95.892	
17,100.0	9,409.1	10,600.0	10,509.6	146.4	11.0	157.50	-88.4	-492.5	7,973.8	7,890.7	95.962	
17,200.0	9,410.1	10,600.0	10,509.6	148.2	11.0	157.50	-88.4	-492.5	8,072.5	7,988.4	96.032	
17,300.0	9,411.1	10,600.0	10,509.6	150.0	11.0	157.50	-88.4	-492.5	8,171.2	8,086.2	96.100	
17,400.0	9,412.1	10,600.0	10,509.6	151.8	11.0	157.50	-88.4	-492.5	8,270.0	8,184.0	96.166	
17,500.0	9,413.1	10,600.0	10,509.6	153.6	11.0	157.50	-88.4	-492.5	8,368.8	8,281.8	96.232	
17,600.0	9,414.1	10,600.0	10,509.6	155.4	11.0	157.50	-88.4	-492.5	8,467.6	8,379.7	96.296	
17,700.0	9,415.1	10,600.0	10,509.6	157.2	11.0	157.50	-88.4	-492.5	8,566.4	8,477.5	96.358	
17,800.0	9,416.1	10,600.0	10,509.6	159.0	11.0	157.50	-88.4	-492.5	8,665.3	8,575.5	96.420	
17,900.0	9,417.2	10,600.0	10,509.6	160.8	11.0	157.50	-88.4	-492.5	8,764.2	8,673.4	96.481	
18,000.0	9,418.2	10,600.0	10,509.6	162.6	11.0	157.50	-88.4	-492.5	8,863.2	8,771.4	96.540	

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 1H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 1H	**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 #1	**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

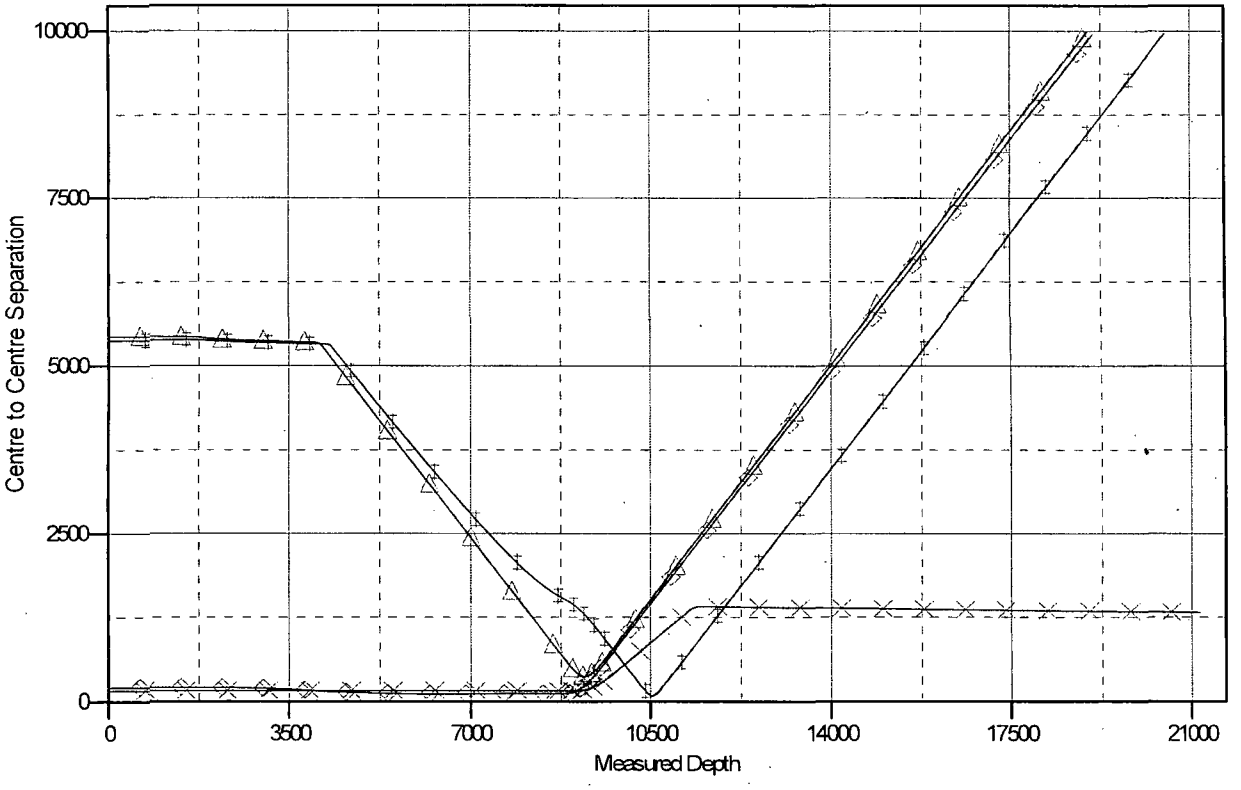
Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
18,100.0	9,419.2	10,600.0	10,509.6	164.4	11.0	157.50	-88.4	-492.5	8,962.1	8,869.3	96.598	
18,200.0	9,420.2	10,600.0	10,509.6	166.2	11.0	157.50	-88.4	-492.5	9,061.1	8,967.3	96.656	
18,300.0	9,421.2	10,600.0	10,509.6	168.1	11.0	157.50	-88.4	-492.5	9,160.1	9,065.4	96.712	
18,400.0	9,422.2	10,600.0	10,509.6	169.9	11.0	157.50	-88.4	-492.5	9,259.1	9,163.4	96.767	
18,500.0	9,423.2	10,641.2	10,548.0	171.7	11.2	157.58	-94.1	-506.3	9,357.7	9,261.1	96.937	
18,600.0	9,424.2	10,643.9	10,550.5	173.5	11.2	157.59	-94.5	-507.2	9,456.7	9,359.2	96.998	
18,700.0	9,425.2	10,646.6	10,553.0	175.3	11.2	157.59	-94.8	-508.1	9,555.7	9,457.2	97.058	
18,800.0	9,426.3	10,649.2	10,555.5	177.1	11.3	157.60	-95.2	-509.0	9,654.7	9,555.3	97.117	
18,900.0	9,427.3	10,651.7	10,557.9	178.9	11.3	157.60	-95.5	-509.8	9,753.8	9,653.4	97.175	
19,000.0	9,428.3	10,654.2	10,560.2	180.7	11.3	157.61	-95.8	-510.7	9,852.8	9,751.5	97.232	
19,100.0	9,429.3	10,656.7	10,562.5	182.6	11.3	157.62	-96.1	-511.5	9,951.9	9,849.6	97.289	

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Nightcap 6 Federal 1H
Project:	Lea County, NM	TVD Reference:	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	MD Reference:	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Nightcap 6 Federal 1H	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 #1	Offset TVD Reference:	Offset Datum

Reference Depths are relative to Well @ 3555.0usft (Ensign 772)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Nightcap 6 Federal 1H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.29°

Ladder Plot



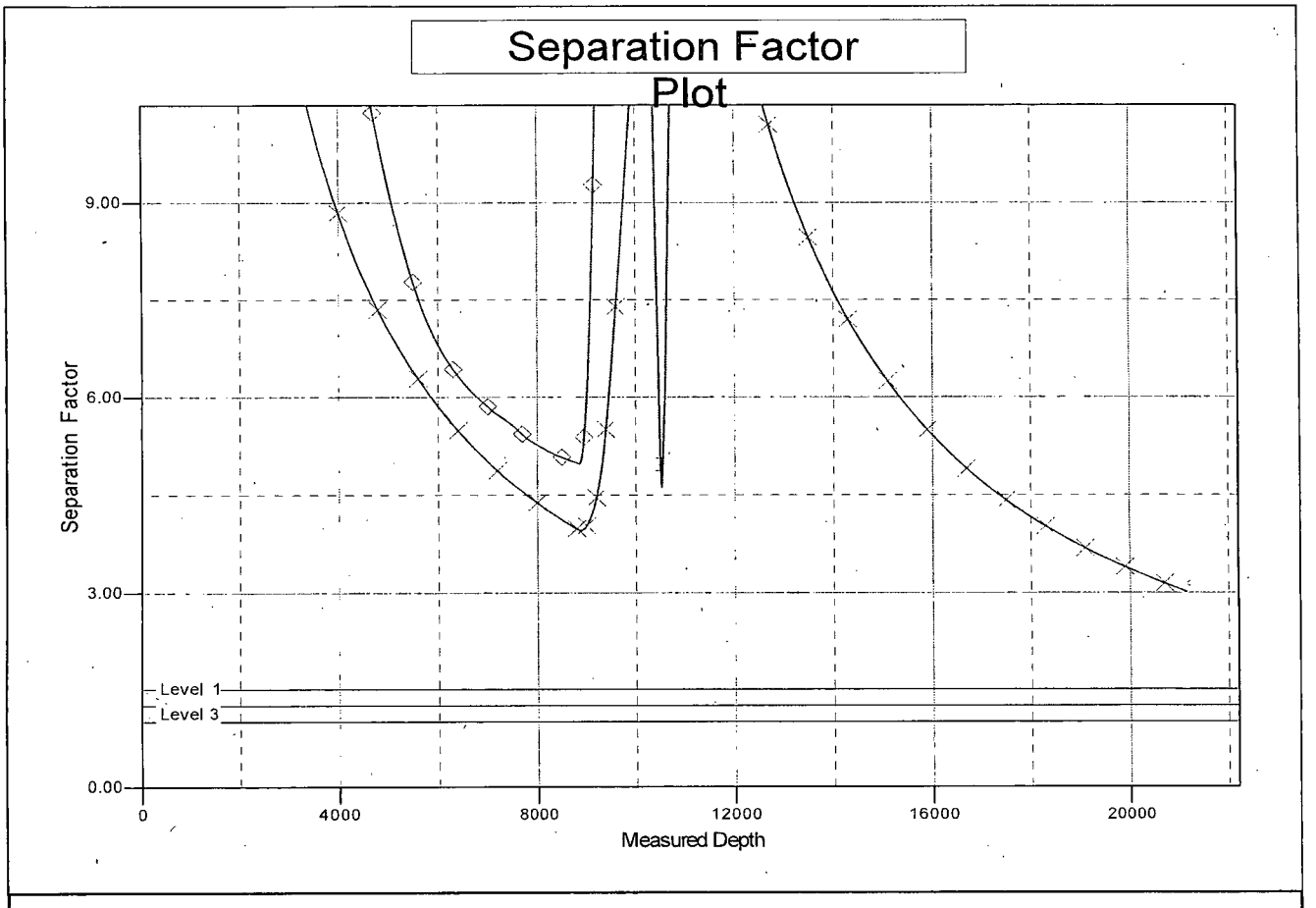
LEGEND

an Federal Com 2H, Wellbore #1, Wellbore #1 V0
6 Federal 2H, Wellbore #1, Design #1 V0
Dirty Dozen State Com 3H, Wellbore #1, Wellbore #1 V0
Dirty Dozen State Com 4H, Wellbore #1, Wellbore #1 V0

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Nightcap 6 Federal 1H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3555.0usft (Ensign 772)
Reference Site:	Sec 31, T19S, R32E	**MD Reference:**	Well @ 3555.0usft (Ensign 772)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Nightcap 6 Federal 1H	**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 #1	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to Well @ 3555.0usft (Ensign 772)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Nightcap 6 Federal 1H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.29°



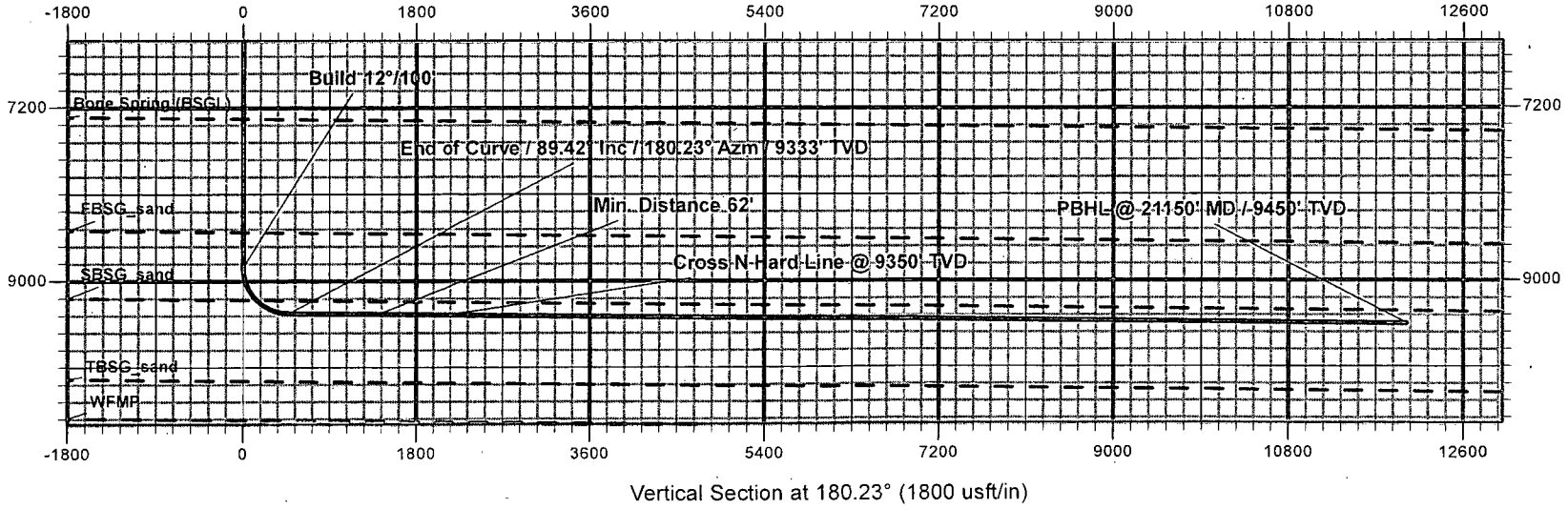
LEGEND

an Federal Com 2H, Wellbore #1, Wellbore #1 V0
6 Federal 2H, Wellbore #1, Design #1 V0
Dirty Dozen State Com 3H, Wellbore #1, Wellbore #1 V0
Dirty Dozen State Com 4H, Wellbore #1, Wellbore #1 V0

CONCHO

Lea County, NM
Sec 31, T19S, R32E
Nightcap 6 Federal 1H
Design #1

DDC
The DIRECTIONAL DRILLING COMPANY



Vertical Section at 180.23° (1800 usft/in)

Lea County, NM
Sec 31, T19S, R32E
Nightcap 6 Federal 1H
Design #1