

HOBBS OCD

APR 21 2016

RECEIVED



COG Operating, LLC

Lea County, NM

Sec 27, T22S, R34E

Squints Federal Com #7H

Wellbore #1

Plan: Design #1

DDC Well Planning Report

08 June, 2015



APR 25 2016



HP
Well Planning Report



Database:	Compass	Local Co-ordinate Reference:	Well Squints Federal Com #7H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3435.0usft (Ensign #772)
Project:	Lea County, NM	MD Reference:	Well @ 3435.0usft (Ensign #772)
Site:	Sec 27, T22S, R34E	North Reference:	Grid
Well:	Squints Federal Com #7H	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 27, T22S, R34E		
Site Position:		Northing:	494,272.80 usft
From:	Map	Easting:	770,960.20 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 21' 20.947 N
		Longitude:	103° 27' 21.105 W
		Grid Convergence:	0.47 °

Well:	Squints Federal Com #7H		
Well Position	+N/-S	-9.2 usft	Northing:
	+E/-W	-1,122.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft
		Latitude:	32° 21' 20.947 N
		Longitude:	103° 27' 34.185 W
		Ground Level:	3,404.0 usft

Wellbore:	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2015	5/28/2015	7.13
			Dip Angle
			(°)
			60.23
			Field Strength
			(nT)
			48,241

Design:	Design #1		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			(°)
			359.49

Plan Sections										
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Dogleg	Build	Turn	TFO	Target
Depth	(°)	(°)	Depth	(usft)	(usft)	Rate	Rate	Rate	(°)	
(usft)			(usft)			(°/100usft)	(°/100usft)	(°/100usft)		
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
9,902.5	0.00	0.00	9,902.5	0.0	0.0	0.00	0.00	0.00	0.00	
10,655.5	90.36	359.49	10,380.0	480.4	-4.3	12.00	12.00	-0.07	359.49	
20,217.1	90.36	359.49	10,320.0	10,041.5	-89.0	0.00	0.00	0.00	0.00	PBHL Squints Federa



HP
Well Planning Report



Database:	Compass	Local Co-ordinate Reference:	Well Squints Federal Com #7H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3435.0usft (Ensign #772)
Project:	Lea County, NM	MD Reference:	Well @ 3435.0usft (Ensign #772)
Site:	Sec 27, T22S, R34E	North Reference:	Grid
Well:	Squints Federal Com #7H	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)
KOP 12°/100'									
9,902.5	0.00	0.00	9,902.5	0.0	0.0	0.0	0.00	0.00	0.00
10,000.0	11.70	359.49	9,999.3	9.9	-0.1	9.9	12.00	12.00	0.00
SBSG_sand									
10,091.7	22.70	359.49	10,086.8	37.0	-0.3	37.0	12.00	12.00	0.00
10,100.0	23.70	359.49	10,094.4	40.3	-0.4	40.3	12.00	12.00	0.00
10,200.0	35.70	359.49	10,181.1	89.7	-0.8	89.7	12.00	12.00	0.00
10,300.0	47.70	359.49	10,255.6	156.1	-1.4	156.1	12.00	12.00	0.00
10,400.0	59.70	359.49	10,314.7	236.6	-2.1	236.6	12.00	12.00	0.00
10,500.0	71.70	359.49	10,355.8	327.5	-2.9	327.5	12.00	12.00	0.00
10,600.0	83.70	359.49	10,377.1	425.1	-3.8	425.1	12.00	12.00	0.00
End of Curve / 90.36° Inc / 359.49° Azm / 10380' TVD									
10,655.5	90.36	359.49	10,380.0	480.4	-4.3	480.5	12.00	12.00	0.00
10,700.0	90.36	359.49	10,379.7	524.9	-4.7	525.0	0.00	0.00	0.00
10,800.0	90.36	359.49	10,379.0	624.9	-5.5	625.0	0.00	0.00	0.00
10,900.0	90.36	359.49	10,378.4	724.9	-6.4	725.0	0.00	0.00	0.00
11,000.0	90.36	359.49	10,377.8	824.9	-7.3	825.0	0.00	0.00	0.00
11,100.0	90.36	359.49	10,377.2	924.9	-8.2	925.0	0.00	0.00	0.00
11,200.0	90.36	359.49	10,376.5	1,024.9	-9.1	1,025.0	0.00	0.00	0.00
11,300.0	90.36	359.49	10,375.9	1,124.9	-10.0	1,125.0	0.00	0.00	0.00
11,400.0	90.36	359.49	10,375.3	1,224.9	-10.9	1,225.0	0.00	0.00	0.00
11,500.0	90.36	359.49	10,374.7	1,324.9	-11.7	1,324.9	0.00	0.00	0.00
11,600.0	90.36	359.49	10,374.0	1,424.9	-12.6	1,424.9	0.00	0.00	0.00
11,700.0	90.36	359.49	10,373.4	1,524.9	-13.5	1,524.9	0.00	0.00	0.00
11,800.0	90.36	359.49	10,372.8	1,624.9	-14.4	1,624.9	0.00	0.00	0.00
11,900.0	90.36	359.49	10,372.2	1,724.9	-15.3	1,724.9	0.00	0.00	0.00
12,000.0	90.36	359.49	10,371.5	1,824.9	-16.2	1,824.9	0.00	0.00	0.00
12,100.0	90.36	359.49	10,370.9	1,924.9	-17.1	1,924.9	0.00	0.00	0.00
12,200.0	90.36	359.49	10,370.3	2,024.9	-17.9	2,024.9	0.00	0.00	0.00
12,300.0	90.36	359.49	10,369.6	2,124.8	-18.8	2,124.9	0.00	0.00	0.00
12,400.0	90.36	359.49	10,369.0	2,224.8	-19.7	2,224.9	0.00	0.00	0.00
12,500.0	90.36	359.49	10,368.4	2,324.8	-20.6	2,324.9	0.00	0.00	0.00
12,600.0	90.36	359.49	10,367.8	2,424.8	-21.5	2,424.9	0.00	0.00	0.00
12,700.0	90.36	359.49	10,367.1	2,524.8	-22.4	2,524.9	0.00	0.00	0.00
12,800.0	90.36	359.49	10,366.5	2,624.8	-23.3	2,624.9	0.00	0.00	0.00
12,900.0	90.36	359.49	10,365.9	2,724.8	-24.2	2,724.9	0.00	0.00	0.00
13,000.0	90.36	359.49	10,365.3	2,824.8	-25.0	2,824.9	0.00	0.00	0.00
13,100.0	90.36	359.49	10,364.6	2,924.8	-25.9	2,924.9	0.00	0.00	0.00
13,200.0	90.36	359.49	10,364.0	3,024.8	-26.8	3,024.9	0.00	0.00	0.00
13,300.0	90.36	359.49	10,363.4	3,124.8	-27.7	3,124.9	0.00	0.00	0.00
13,400.0	90.36	359.49	10,362.7	3,224.8	-28.6	3,224.9	0.00	0.00	0.00
13,500.0	90.36	359.49	10,362.1	3,324.8	-29.5	3,324.9	0.00	0.00	0.00
13,600.0	90.36	359.49	10,361.5	3,424.8	-30.4	3,424.9	0.00	0.00	0.00
13,700.0	90.36	359.49	10,360.9	3,524.8	-31.2	3,524.9	0.00	0.00	0.00
13,800.0	90.36	359.49	10,360.2	3,624.8	-32.1	3,624.9	0.00	0.00	0.00
13,900.0	90.36	359.49	10,359.6	3,724.8	-33.0	3,724.9	0.00	0.00	0.00
14,000.0	90.36	359.49	10,359.0	3,824.7	-33.9	3,824.9	0.00	0.00	0.00
14,100.0	90.36	359.49	10,358.4	3,924.7	-34.8	3,924.9	0.00	0.00	0.00
14,200.0	90.36	359.49	10,357.7	4,024.7	-35.7	4,024.9	0.00	0.00	0.00
14,300.0	90.36	359.49	10,357.1	4,124.7	-36.6	4,124.9	0.00	0.00	0.00
14,400.0	90.36	359.49	10,356.5	4,224.7	-37.4	4,224.9	0.00	0.00	0.00
14,500.0	90.36	359.49	10,355.8	4,324.7	-38.3	4,324.9	0.00	0.00	0.00
14,600.0	90.36	359.49	10,355.2	4,424.7	-39.2	4,424.9	0.00	0.00	0.00



HP
Well Planning Report



Database:	Compass	Local Co-ordinate Reference:	Well Squints Federal Com #7H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3435.0usft (Ensign #772)
Project:	Lea County, NM	MD Reference:	Well @ 3435.0usft (Ensign #772)
Site:	Sec 27, T22S, R34E	North Reference:	Grid
Well:	Squints Federal Com #7H	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)
14,700.0	90.36	359.49	10,354.6	4,524.7	-40.1	4,524.9	0.00	0.00	0.00
14,800.0	90.36	359.49	10,354.0	4,624.7	-41.0	4,624.9	0.00	0.00	0.00
14,900.0	90.36	359.49	10,353.3	4,724.7	-41.9	4,724.9	0.00	0.00	0.00
15,000.0	90.36	359.49	10,352.7	4,824.7	-42.8	4,824.9	0.00	0.00	0.00
15,100.0	90.36	359.49	10,352.1	4,924.7	-43.6	4,924.9	0.00	0.00	0.00
15,200.0	90.36	359.49	10,351.5	5,024.7	-44.5	5,024.9	0.00	0.00	0.00
15,300.0	90.36	359.49	10,350.8	5,124.7	-45.4	5,124.9	0.00	0.00	0.00
15,400.0	90.36	359.49	10,350.2	5,224.7	-46.3	5,224.9	0.00	0.00	0.00
15,500.0	90.36	359.49	10,349.6	5,324.7	-47.2	5,324.9	0.00	0.00	0.00
15,600.0	90.36	359.49	10,349.0	5,424.7	-48.1	5,424.9	0.00	0.00	0.00
15,700.0	90.36	359.49	10,348.3	5,524.6	-49.0	5,524.9	0.00	0.00	0.00
15,800.0	90.36	359.49	10,347.7	5,624.6	-49.9	5,624.9	0.00	0.00	0.00
15,900.0	90.36	359.49	10,347.1	5,724.6	-50.7	5,724.9	0.00	0.00	0.00
16,000.0	90.36	359.49	10,346.4	5,824.6	-51.6	5,824.9	0.00	0.00	0.00
16,100.0	90.36	359.49	10,345.8	5,924.6	-52.5	5,924.9	0.00	0.00	0.00
16,200.0	90.36	359.49	10,345.2	6,024.6	-53.4	6,024.9	0.00	0.00	0.00
16,300.0	90.36	359.49	10,344.6	6,124.6	-54.3	6,124.9	0.00	0.00	0.00
16,400.0	90.36	359.49	10,343.9	6,224.6	-55.2	6,224.9	0.00	0.00	0.00
16,500.0	90.36	359.49	10,343.3	6,324.6	-56.1	6,324.8	0.00	0.00	0.00
16,600.0	90.36	359.49	10,342.7	6,424.6	-56.9	6,424.8	0.00	0.00	0.00
16,700.0	90.36	359.49	10,342.1	6,524.6	-57.8	6,524.8	0.00	0.00	0.00
16,800.0	90.36	359.49	10,341.4	6,624.6	-58.7	6,624.8	0.00	0.00	0.00
16,900.0	90.36	359.49	10,340.8	6,724.6	-59.6	6,724.8	0.00	0.00	0.00
17,000.0	90.36	359.49	10,340.2	6,824.6	-60.5	6,824.8	0.00	0.00	0.00
17,100.0	90.36	359.49	10,339.5	6,924.6	-61.4	6,924.8	0.00	0.00	0.00
17,200.0	90.36	359.49	10,338.9	7,024.6	-62.3	7,024.8	0.00	0.00	0.00
17,300.0	90.36	359.49	10,338.3	7,124.6	-63.1	7,124.8	0.00	0.00	0.00
17,400.0	90.36	359.49	10,337.7	7,224.5	-64.0	7,224.8	0.00	0.00	0.00
17,500.0	90.36	359.49	10,337.0	7,324.5	-64.9	7,324.8	0.00	0.00	0.00
17,600.0	90.36	359.49	10,336.4	7,424.5	-65.8	7,424.8	0.00	0.00	0.00
17,700.0	90.36	359.49	10,335.8	7,524.5	-66.7	7,524.8	0.00	0.00	0.00
17,800.0	90.36	359.49	10,335.2	7,624.5	-67.6	7,624.8	0.00	0.00	0.00
17,900.0	90.36	359.49	10,334.5	7,724.5	-68.5	7,724.8	0.00	0.00	0.00
18,000.0	90.36	359.49	10,333.9	7,824.5	-69.4	7,824.8	0.00	0.00	0.00
18,100.0	90.36	359.49	10,333.3	7,924.5	-70.2	7,924.8	0.00	0.00	0.00
18,200.0	90.36	359.49	10,332.6	8,024.5	-71.1	8,024.8	0.00	0.00	0.00
18,300.0	90.36	359.49	10,332.0	8,124.5	-72.0	8,124.8	0.00	0.00	0.00
18,400.0	90.36	359.49	10,331.4	8,224.5	-72.9	8,224.8	0.00	0.00	0.00
18,500.0	90.36	359.49	10,330.8	8,324.5	-73.8	8,324.8	0.00	0.00	0.00
18,600.0	90.36	359.49	10,330.1	8,424.5	-74.7	8,424.8	0.00	0.00	0.00
18,700.0	90.36	359.49	10,329.5	8,524.5	-75.6	8,524.8	0.00	0.00	0.00
18,800.0	90.36	359.49	10,328.9	8,624.5	-76.4	8,624.8	0.00	0.00	0.00
18,900.0	90.36	359.49	10,328.3	8,724.5	-77.3	8,724.8	0.00	0.00	0.00
19,000.0	90.36	359.49	10,327.6	8,824.5	-78.2	8,824.8	0.00	0.00	0.00
19,100.0	90.36	359.49	10,327.0	8,924.4	-79.1	8,924.8	0.00	0.00	0.00
19,200.0	90.36	359.49	10,326.4	9,024.4	-80.0	9,024.8	0.00	0.00	0.00
19,300.0	90.36	359.49	10,325.8	9,124.4	-80.9	9,124.8	0.00	0.00	0.00
19,400.0	90.36	359.49	10,325.1	9,224.4	-81.8	9,224.8	0.00	0.00	0.00
19,500.0	90.36	359.49	10,324.5	9,324.4	-82.6	9,324.8	0.00	0.00	0.00
19,600.0	90.36	359.49	10,323.9	9,424.4	-83.5	9,424.8	0.00	0.00	0.00
19,700.0	90.36	359.49	10,323.2	9,524.4	-84.4	9,524.8	0.00	0.00	0.00
19,800.0	90.36	359.49	10,322.6	9,624.4	-85.3	9,624.8	0.00	0.00	0.00
19,900.0	90.36	359.49	10,322.0	9,724.4	-86.2	9,724.8	0.00	0.00	0.00
20,000.0	90.36	359.49	10,321.4	9,824.4	-87.1	9,824.8	0.00	0.00	0.00



HP Well Planning Report



Database:	Compass	Local Co-ordinate Reference:	Well Squints Federal Com #7H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3435.0usft (Ensign #772)
Project:	Lea County, NM	MD Reference:	Well @ 3435.0usft (Ensign #772)
Site:	Sec 27, T22S, R34E	North Reference:	Grid
Well:	Squints Federal Com #7H	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)	
20,100.0	90.36	359.49	10,320.7	9,924.4	-88.0	9,924.8	0.00	0.00	0.00	
20,200.0	90.36	359.49	10,320.1	10,024.4	-88.8	10,024.8	0.00	0.00	0.00	
PBHL @ 20217' MD / 10320' TVD										
20,217.1	90.36	359.49	10,320.0	10,041.5	-89.0	10,041.9	0.00	0.00	0.00	

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
- hit/miss target										
- Shape										
PBHL Squints Federal #	0.00	0.00	10,320.0	10,041.5	-89.0	504,305.10	769,749.20	32° 23' 0.315 N	103° 27' 34.267 W	
- plan hits target center										
- Point										

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,687.0	1,687.0	Rustler		-0.36	359.41	
1,883.0	1,883.0	TOS		-0.36	359.41	
3,623.0	3,623.0	BOS / Tansill		-0.36	359.41	
3,702.0	3,702.0	Yates		-0.36	359.41	
3,910.0	3,910.0	Seven Rivers		-0.36	359.41	
4,031.0	4,031.0	Captain Reef		-0.36	359.41	
5,299.0	5,299.0	Base of Reef (BLCN)		-0.36	359.41	
5,815.0	5,815.0	CYCN		-0.36	359.41	
7,208.0	7,208.0	BYCN		-0.36	359.41	
8,520.0	8,520.0	Bone Spring (BSGL)		-0.36	359.41	
8,828.0	8,828.0	U Avalon Sh		-0.36	359.41	
8,954.0	8,954.0	L Avalon Sh		-0.36	359.41	
9,602.0	9,602.0	FBSG_sand		-0.36	359.41	
10,091.7	10,086.8	SBSG_sand		-0.36	359.41	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
9,902.5	9,902.5	0.0	0.0	KOP 12°/100'	
10,655.5	10,380.0	480.4	-4.3	End of Curve / 90.36° Inc / 359.49° Azm / 10380' TVD	
20,217.1	10,320.0	10,041.5	-89.0	PBHL @ 20217' MD / 10320' TVD	