



HOBBS OCD

APR 21 2016

RECEIVED

COG Operating, LLC

Lea County, NM

Sec 27, T22S, R34E

Squints Federal Com #3H

Wellbore #1

Plan: Design #1

DDC Well Planning Report

08 June, 2015



APR 22 2016



HP
Well Planning Report



Database:	Compass	Local Co-ordinate Reference:	Well Squints Federal Com #3H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3436.0usft (Ensign #772)
Project:	Lea County, NM	MD Reference:	Well @ 3436.0usft (Ensign #772)
Site:	Sec 27, T22S, R34E	North Reference:	Grid
Well:	Squints Federal Com #3H	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:	Map	Northing:	494,272.80 usft
From:		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 #3H		
Well Position	+N/-S	-9.4 usft	Northing:
	+E/-W	-1,151.9 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft
		Latitude:	32° 21' 20.948 N
		Longitude:	103° 27' 34.534 W
		Ground Level:	3,405.0 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
			(°)
			359.66

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	
10,747.5	0.00	0.00	10,747.5	0.0	0.0	0.00	0.00	0.00	0.00	
11,501.3	90.45	359.66	11,225.0	481.2	-2.8	12.00	12.00	-0.04	359.66	
21,062.2	90.45	359.66	11,150.0	10,041.7	-59.1	0.00	0.00	0.00	0.00	0.00 PBHL Squints Federa



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Well Planning Report



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Site:	Sec 27, T22S, R34E	North Reference:	Grid
Well:	Squints Federal Com #3H	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'									
10,747.5	0.00	0.00	10,747.5	0.0	0.0	0.0	0.00	0.00	0.00
10,800.0	6.30	359.66	10,799.9	2.9	0.0	2.9	12.00	12.00	0.00
10,900.0	18.30	359.66	10,897.4	24.1	-0.1	24.1	12.00	12.00	0.00
TBSG_sand									
10,969.5	26.64	359.66	10,961.6	50.7	-0.3	50.7	12.00	12.00	0.00
11,000.0	30.30	359.66	10,988.4	65.2	-0.4	65.2	12.00	12.00	0.00
11,100.0	42.30	359.66	11,068.8	124.3	-0.7	124.3	12.00	12.00	0.00
11,200.0	54.30	359.66	11,135.2	198.8	-1.2	198.8	12.00	12.00	0.00
11,300.0	66.30	359.66	11,184.7	285.5	-1.7	285.5	12.00	12.00	0.00
11,400.0	78.30	359.66	11,215.1	380.6	-2.2	380.6	12.00	12.00	0.00
11,500.0	90.30	359.66	11,225.0	479.9	-2.8	480.0	12.00	12.00	0.00
End of Curve / 90.45° Inc / 359.66° Azm / 11225' TVD									
11,501.2	90.45	359.66	11,225.0	481.2	-2.8	481.2	12.00	12.00	0.00
11,600.0	90.45	359.66	11,224.2	579.9	-3.4	580.0	0.00	0.00	0.00
11,700.0	90.45	359.66	11,223.4	679.9	-4.0	679.9	0.00	0.00	0.00
11,800.0	90.45	359.66	11,222.6	779.9	-4.6	779.9	0.00	0.00	0.00
11,900.0	90.45	359.66	11,221.8	879.9	-5.2	879.9	0.00	0.00	0.00
12,000.0	90.45	359.66	11,221.0	979.9	-5.8	979.9	0.00	0.00	0.00
12,100.0	90.45	359.66	11,220.3	1,079.9	-6.4	1,079.9	0.00	0.00	0.00
12,200.0	90.45	359.66	11,219.5	1,179.9	-6.9	1,179.9	0.00	0.00	0.00
12,300.0	90.45	359.66	11,218.7	1,279.9	-7.5	1,279.9	0.00	0.00	0.00
12,400.0	90.45	359.66	11,217.9	1,379.9	-8.1	1,379.9	0.00	0.00	0.00
12,500.0	90.45	359.66	11,217.1	1,479.9	-8.7	1,479.9	0.00	0.00	0.00
12,600.0	90.45	359.66	11,216.3	1,579.9	-9.3	1,579.9	0.00	0.00	0.00
12,700.0	90.45	359.66	11,215.6	1,679.9	-9.9	1,679.9	0.00	0.00	0.00
12,800.0	90.45	359.66	11,214.8	1,779.9	-10.5	1,779.9	0.00	0.00	0.00
12,900.0	90.45	359.66	11,214.0	1,879.9	-11.1	1,879.9	0.00	0.00	0.00
13,000.0	90.45	359.66	11,213.2	1,979.9	-11.7	1,979.9	0.00	0.00	0.00
13,100.0	90.45	359.66	11,212.4	2,079.9	-12.2	2,079.9	0.00	0.00	0.00
13,200.0	90.45	359.66	11,211.6	2,179.9	-12.8	2,179.9	0.00	0.00	0.00
13,300.0	90.45	359.66	11,210.9	2,279.9	-13.4	2,279.9	0.00	0.00	0.00
13,400.0	90.45	359.66	11,210.1	2,379.9	-14.0	2,379.9	0.00	0.00	0.00
13,500.0	90.45	359.66	11,209.3	2,479.9	-14.6	2,479.9	0.00	0.00	0.00
13,600.0	90.45	359.66	11,208.5	2,579.8	-15.2	2,579.9	0.00	0.00	0.00
13,700.0	90.45	359.66	11,207.7	2,679.8	-15.8	2,679.9	0.00	0.00	0.00
13,800.0	90.45	359.66	11,206.9	2,779.8	-16.4	2,779.9	0.00	0.00	0.00
13,900.0	90.45	359.66	11,206.2	2,879.8	-16.9	2,879.9	0.00	0.00	0.00
14,000.0	90.45	359.66	11,205.4	2,979.8	-17.5	2,979.9	0.00	0.00	0.00
14,100.0	90.45	359.66	11,204.6	3,079.8	-18.1	3,079.9	0.00	0.00	0.00
14,200.0	90.45	359.66	11,203.8	3,179.8	-18.7	3,179.9	0.00	0.00	0.00
14,300.0	90.45	359.66	11,203.0	3,279.8	-19.3	3,279.9	0.00	0.00	0.00
14,400.0	90.45	359.66	11,202.2	3,379.8	-19.9	3,379.9	0.00	0.00	0.00
14,500.0	90.45	359.66	11,201.4	3,479.8	-20.5	3,479.9	0.00	0.00	0.00
14,600.0	90.45	359.66	11,200.7	3,579.8	-21.1	3,579.9	0.00	0.00	0.00
14,700.0	90.45	359.66	11,199.9	3,679.8	-21.7	3,679.9	0.00	0.00	0.00
14,800.0	90.45	359.66	11,199.1	3,779.8	-22.2	3,779.9	0.00	0.00	0.00
14,900.0	90.45	359.66	11,198.3	3,879.8	-22.8	3,879.9	0.00	0.00	0.00
15,000.0	90.45	359.66	11,197.5	3,979.8	-23.4	3,979.8	0.00	0.00	0.00
15,100.0	90.45	359.66	11,196.7	4,079.8	-24.0	4,079.8	0.00	0.00	0.00
15,200.0	90.45	359.66	11,196.0	4,179.8	-24.6	4,179.8	0.00	0.00	0.00
15,300.0	90.45	359.66	11,195.2	4,279.8	-25.2	4,279.8	0.00	0.00	0.00
15,400.0	90.45	359.66	11,194.4	4,379.8	-25.8	4,379.8	0.00	0.00	0.00



HP
Well Planning Report



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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)
15,500.0	90.45	359.66	11,193.6	4,479.8	-26.4	4,479.8	0.00	0.00	0.00
15,600.0	90.45	359.66	11,192.8	4,579.7	-27.0	4,579.8	0.00	0.00	0.00
15,700.0	90.45	359.66	11,192.0	4,679.7	-27.5	4,679.8	0.00	0.00	0.00
15,800.0	90.45	359.66	11,191.3	4,779.7	-28.1	4,779.8	0.00	0.00	0.00
15,900.0	90.45	359.66	11,190.5	4,879.7	-28.7	4,879.8	0.00	0.00	0.00
16,000.0	90.45	359.66	11,189.7	4,979.7	-29.3	4,979.8	0.00	0.00	0.00
16,100.0	90.45	359.66	11,188.9	5,079.7	-29.9	5,079.8	0.00	0.00	0.00
16,200.0	90.45	359.66	11,188.1	5,179.7	-30.5	5,179.8	0.00	0.00	0.00
16,300.0	90.45	359.66	11,187.3	5,279.7	-31.1	5,279.8	0.00	0.00	0.00
16,400.0	90.45	359.66	11,186.6	5,379.7	-31.7	5,379.8	0.00	0.00	0.00
16,500.0	90.45	359.66	11,185.8	5,479.7	-32.3	5,479.8	0.00	0.00	0.00
16,600.0	90.45	359.66	11,185.0	5,579.7	-32.8	5,579.8	0.00	0.00	0.00
16,700.0	90.45	359.66	11,184.2	5,679.7	-33.4	5,679.8	0.00	0.00	0.00
16,800.0	90.45	359.66	11,183.4	5,779.7	-34.0	5,779.8	0.00	0.00	0.00
16,900.0	90.45	359.66	11,182.6	5,879.7	-34.6	5,879.8	0.00	0.00	0.00
17,000.0	90.45	359.66	11,181.8	5,979.7	-35.2	5,979.8	0.00	0.00	0.00
17,100.0	90.45	359.66	11,181.1	6,079.7	-35.8	6,079.8	0.00	0.00	0.00
17,200.0	90.45	359.66	11,180.3	6,179.7	-36.4	6,179.8	0.00	0.00	0.00
17,300.0	90.45	359.66	11,179.5	6,279.7	-37.0	6,279.8	0.00	0.00	0.00
17,400.0	90.45	359.66	11,178.7	6,379.7	-37.5	6,379.8	0.00	0.00	0.00
17,500.0	90.45	359.66	11,177.9	6,479.7	-38.1	6,479.8	0.00	0.00	0.00
17,600.0	90.45	359.66	11,177.1	6,579.7	-38.7	6,579.8	0.00	0.00	0.00
17,700.0	90.45	359.66	11,176.4	6,679.6	-39.3	6,679.8	0.00	0.00	0.00
17,800.0	90.45	359.66	11,175.6	6,779.6	-39.9	6,779.8	0.00	0.00	0.00
17,900.0	90.45	359.66	11,174.8	6,879.6	-40.5	6,879.8	0.00	0.00	0.00
18,000.0	90.45	359.66	11,174.0	6,979.6	-41.1	6,979.8	0.00	0.00	0.00
18,100.0	90.45	359.66	11,173.2	7,079.6	-41.7	7,079.8	0.00	0.00	0.00
18,200.0	90.45	359.66	11,172.4	7,179.6	-42.3	7,179.7	0.00	0.00	0.00
18,300.0	90.45	359.66	11,171.7	7,279.6	-42.8	7,279.7	0.00	0.00	0.00
18,400.0	90.45	359.66	11,170.9	7,379.6	-43.4	7,379.7	0.00	0.00	0.00
18,500.0	90.45	359.66	11,170.1	7,479.6	-44.0	7,479.7	0.00	0.00	0.00
18,600.0	90.45	359.66	11,169.3	7,579.6	-44.6	7,579.7	0.00	0.00	0.00
18,700.0	90.45	359.66	11,168.5	7,679.6	-45.2	7,679.7	0.00	0.00	0.00
18,800.0	90.45	359.66	11,167.7	7,779.6	-45.8	7,779.7	0.00	0.00	0.00
18,900.0	90.45	359.66	11,167.0	7,879.6	-46.4	7,879.7	0.00	0.00	0.00
19,000.0	90.45	359.66	11,166.2	7,979.6	-47.0	7,979.7	0.00	0.00	0.00
19,100.0	90.45	359.66	11,165.4	8,079.6	-47.6	8,079.7	0.00	0.00	0.00
19,200.0	90.45	359.66	11,164.6	8,179.6	-48.1	8,179.7	0.00	0.00	0.00
19,300.0	90.45	359.66	11,163.8	8,279.6	-48.7	8,279.7	0.00	0.00	0.00
19,400.0	90.45	359.66	11,163.0	8,379.6	-49.3	8,379.7	0.00	0.00	0.00
19,500.0	90.45	359.66	11,162.2	8,479.6	-49.9	8,479.7	0.00	0.00	0.00
19,600.0	90.45	359.66	11,161.5	8,579.6	-50.5	8,579.7	0.00	0.00	0.00
19,700.0	90.45	359.66	11,160.7	8,679.6	-51.1	8,679.7	0.00	0.00	0.00
19,800.0	90.45	359.66	11,159.9	8,779.5	-51.7	8,779.7	0.00	0.00	0.00
19,900.0	90.45	359.66	11,159.1	8,879.5	-52.3	8,879.7	0.00	0.00	0.00
20,000.0	90.45	359.66	11,158.3	8,979.5	-52.8	8,979.7	0.00	0.00	0.00
20,100.0	90.45	359.66	11,157.5	9,079.5	-53.4	9,079.7	0.00	0.00	0.00
20,200.0	90.45	359.66	11,156.8	9,179.5	-54.0	9,179.7	0.00	0.00	0.00
20,300.0	90.45	359.66	11,156.0	9,279.5	-54.6	9,279.7	0.00	0.00	0.00
20,400.0	90.45	359.66	11,155.2	9,379.5	-55.2	9,379.7	0.00	0.00	0.00
20,500.0	90.45	359.66	11,154.4	9,479.5	-55.8	9,479.7	0.00	0.00	0.00
20,600.0	90.45	359.66	11,153.6	9,579.5	-56.4	9,579.7	0.00	0.00	0.00
20,700.0	90.45	359.66	11,152.8	9,679.5	-57.0	9,679.7	0.00	0.00	0.00
20,800.0	90.45	359.66	11,152.1	9,779.5	-57.6	9,779.7	0.00	0.00	0.00



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Well Planning Report



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Site:	Sec 27, T22S, R34E	North Reference:	Grid
Well:	Squints Federal Com #3H	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)
20,900.0	90.45	359.66	11,151.3	9,879.5	-58.1	9,879.7	0.00	0.00	0.00
21,000.0	90.45	359.66	11,150.5	9,979.5	-58.7	9,979.7	0.00	0.00	0.00
PBHL @ 21062' MD / 11150' TVD									
21,062.2	90.45	359.66	11,150.0	10,041.7	-59.1	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	11,150.0	10,041.7	-59.1	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 (°)
1,688.0	1,688.0	Rustler		-0.45	359.66
1,884.0	1,884.0	TOS		-0.45	359.66
3,624.0	3,624.0	BOS / Tansill		-0.45	359.66
3,703.0	3,703.0	Yates		-0.45	359.66
3,911.0	3,911.0	Seven Rivers		-0.45	359.66
4,032.0	4,032.0	Captain Reef		-0.45	359.66
5,300.0	5,300.0	Base of Reef (BLCN)		-0.45	359.66
5,816.0	5,816.0	CYCN		-0.45	359.66
7,209.0	7,209.0	BYCN		-0.45	359.66
8,521.0	8,521.0	Bone Spring (BSGL)		-0.45	359.66
8,829.0	8,829.0	U Avalon Sh		-0.45	359.66
8,955.0	8,955.0	L Avalon Sh		-0.45	359.66
9,603.0	9,603.0	FBSG_sand		-0.45	359.66
10,088.0	10,088.0	SBSG_sand		-0.45	359.66
10,969.5	10,961.6	TBSG_sand		-0.45	359.66

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
10,747.5	10,747.5	0.0	0.0	KOP 12°/100'
11,501.2	11,225.0	481.2	-2.8	End of Curve / 90.45° Inc / 359.66° Azm / 11225' TVD
21,062.2	11,150.0	10,041.7	-59.1	PBHL @ 21062' MD / 11150' TVD