



HOBBS-OCD

APR 18 2016

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COG Operating, LLC

Lea County, NM

Sec 27, T22S, R34E

Squints Federal Com #4H

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 #4H
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 #4H	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 #4H		
Well Position	+N/-S	-20.0 usft	Northing:
	+E/-W	-2,471.7 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft
		Latitude:	32° 21' 20.949 N
		Longitude:	103° 27' 49.919 W
		Ground Level:	3,405.0 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2015	5/28/2015	7.14
			Dip Angle
			(°)
			60.23
			Field Strength
			(nT)
			48,240

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	
10,627.5	0.00	0.00	10,627.5	0.0	0.0	0.00	0.00	0.00	0.00	
11,374.5	89.64	359.66	11,105.0	474.5	-2.8	12.00	12.00	-0.05	359.66	
20,940.1	89.64	359.66	11,165.0	10,039.7	-59.2	0.00	0.00	0.00	0.00	PBHL Squints Federa



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Well:	Squints Federal Com #4H	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'										
10,627.5	0.00	0.00	10,627.5	0.0	0.0	0.0	0.00	0.00	0.00	
10,700.0	8.70	359.66	10,699.7	5.5	0.0	5.5	12.00	12.00	0.00	
10,800.0	20.70	359.66	10,796.3	30.8	-0.2	30.8	12.00	12.00	0.00	
10,900.0	32.70	359.66	10,885.4	75.7	-0.4	75.7	12.00	12.00	0.00	
TBSG_sand										
10,978.6	42.13	359.66	10,947.8	123.3	-0.7	123.4	12.00	12.00	0.00	
11,000.0	44.70	359.66	10,963.3	138.1	-0.8	138.1	12.00	12.00	0.00	
11,100.0	56.70	359.66	11,026.6	215.3	-1.3	215.3	12.00	12.00	0.00	
11,200.0	68.70	359.66	11,072.3	304.0	-1.8	304.0	12.00	12.00	0.00	
11,300.0	80.70	359.66	11,098.7	400.3	-2.4	400.3	12.00	12.00	0.00	
End of Curve / 89.64° Inc / 359.66° Azm / 11105' TVD										
11,374.5	89.64	359.66	11,105.0	474.5	-2.8	474.5	12.00	12.00	0.00	
11,400.0	89.64	359.66	11,105.1	500.0	-2.9	500.0	0.00	0.00	0.00	
11,500.0	89.64	359.66	11,105.7	600.0	-3.5	600.0	0.00	0.00	0.00	
11,600.0	89.64	359.66	11,106.4	699.9	-4.1	700.0	0.00	0.00	0.00	
11,700.0	89.64	359.66	11,107.0	799.9	-4.7	800.0	0.00	0.00	0.00	
11,800.0	89.64	359.66	11,107.6	899.9	-5.3	900.0	0.00	0.00	0.00	
11,900.0	89.64	359.66	11,108.3	999.9	-5.9	1,000.0	0.00	0.00	0.00	
12,000.0	89.64	359.66	11,108.9	1,099.9	-6.5	1,100.0	0.00	0.00	0.00	
12,100.0	89.64	359.66	11,109.5	1,199.9	-7.1	1,200.0	0.00	0.00	0.00	
12,200.0	89.64	359.66	11,110.1	1,299.9	-7.7	1,299.9	0.00	0.00	0.00	
12,300.0	89.64	359.66	11,110.8	1,399.9	-8.3	1,399.9	0.00	0.00	0.00	
12,400.0	89.64	359.66	11,111.4	1,499.9	-8.8	1,499.9	0.00	0.00	0.00	
12,500.0	89.64	359.66	11,112.0	1,599.9	-9.4	1,599.9	0.00	0.00	0.00	
12,600.0	89.64	359.66	11,112.6	1,699.9	-10.0	1,699.9	0.00	0.00	0.00	
12,700.0	89.64	359.66	11,113.3	1,799.9	-10.6	1,799.9	0.00	0.00	0.00	
12,800.0	89.64	359.66	11,113.9	1,899.9	-11.2	1,899.9	0.00	0.00	0.00	
12,900.0	89.64	359.66	11,114.5	1,999.9	-11.8	1,999.9	0.00	0.00	0.00	
13,000.0	89.64	359.66	11,115.2	2,099.9	-12.4	2,099.9	0.00	0.00	0.00	
13,100.0	89.64	359.66	11,115.8	2,199.9	-13.0	2,199.9	0.00	0.00	0.00	
13,200.0	89.64	359.66	11,116.4	2,299.9	-13.6	2,299.9	0.00	0.00	0.00	
13,300.0	89.64	359.66	11,117.0	2,399.9	-14.2	2,399.9	0.00	0.00	0.00	
13,400.0	89.64	359.66	11,117.7	2,499.9	-14.7	2,499.9	0.00	0.00	0.00	
13,500.0	89.64	359.66	11,118.3	2,599.9	-15.3	2,599.9	0.00	0.00	0.00	
13,600.0	89.64	359.66	11,118.9	2,699.9	-15.9	2,699.9	0.00	0.00	0.00	
13,700.0	89.64	359.66	11,119.6	2,799.9	-16.5	2,799.9	0.00	0.00	0.00	
13,800.0	89.64	359.66	11,120.2	2,899.9	-17.1	2,899.9	0.00	0.00	0.00	
13,900.0	89.64	359.66	11,120.8	2,999.9	-17.7	2,999.9	0.00	0.00	0.00	
14,000.0	89.64	359.66	11,121.4	3,099.9	-18.3	3,099.9	0.00	0.00	0.00	
14,100.0	89.64	359.66	11,122.1	3,199.9	-18.9	3,199.9	0.00	0.00	0.00	
14,200.0	89.64	359.66	11,122.7	3,299.9	-19.5	3,299.9	0.00	0.00	0.00	
14,300.0	89.64	359.66	11,123.3	3,399.8	-20.0	3,399.9	0.00	0.00	0.00	
14,400.0	89.64	359.66	11,123.9	3,499.8	-20.6	3,499.9	0.00	0.00	0.00	
14,500.0	89.64	359.66	11,124.6	3,599.8	-21.2	3,599.9	0.00	0.00	0.00	
14,600.0	89.64	359.66	11,125.2	3,699.8	-21.8	3,699.9	0.00	0.00	0.00	
14,700.0	89.64	359.66	11,125.8	3,799.8	-22.4	3,799.9	0.00	0.00	0.00	
14,800.0	89.64	359.66	11,126.5	3,899.8	-23.0	3,899.9	0.00	0.00	0.00	
14,900.0	89.64	359.66	11,127.1	3,999.8	-23.6	3,999.9	0.00	0.00	0.00	
15,000.0	89.64	359.66	11,127.7	4,099.8	-24.2	4,099.9	0.00	0.00	0.00	
15,100.0	89.64	359.66	11,128.3	4,199.8	-24.8	4,199.9	0.00	0.00	0.00	
15,200.0	89.64	359.66	11,129.0	4,299.8	-25.4	4,299.9	0.00	0.00	0.00	
15,300.0	89.64	359.66	11,129.6	4,399.8	-25.9	4,399.9	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)
15,400.0	89.64	359.66	11,130.2	4,499.8	-26.5	4,499.9	0.00	0.00	0.00
15,500.0	89.64	359.66	11,130.9	4,599.8	-27.1	4,599.9	0.00	0.00	0.00
15,600.0	89.64	359.66	11,131.5	4,699.8	-27.7	4,699.9	0.00	0.00	0.00
15,700.0	89.64	359.66	11,132.1	4,799.8	-28.3	4,799.9	0.00	0.00	0.00
15,800.0	89.64	359.66	11,132.7	4,899.8	-28.9	4,899.9	0.00	0.00	0.00
15,900.0	89.64	359.66	11,133.4	4,999.8	-29.5	4,999.9	0.00	0.00	0.00
16,000.0	89.64	359.66	11,134.0	5,099.8	-30.1	5,099.9	0.00	0.00	0.00
16,100.0	89.64	359.66	11,134.6	5,199.8	-30.7	5,199.9	0.00	0.00	0.00
16,200.0	89.64	359.66	11,135.2	5,299.8	-31.3	5,299.9	0.00	0.00	0.00
16,300.0	89.64	359.66	11,135.9	5,399.8	-31.8	5,399.9	0.00	0.00	0.00
16,400.0	89.64	359.66	11,136.5	5,499.8	-32.4	5,499.9	0.00	0.00	0.00
16,500.0	89.64	359.66	11,137.1	5,599.8	-33.0	5,599.9	0.00	0.00	0.00
16,600.0	89.64	359.66	11,137.8	5,699.8	-33.6	5,699.9	0.00	0.00	0.00
16,700.0	89.64	359.66	11,138.4	5,799.8	-34.2	5,799.9	0.00	0.00	0.00
16,800.0	89.64	359.66	11,139.0	5,899.8	-34.8	5,899.9	0.00	0.00	0.00
16,900.0	89.64	359.66	11,139.6	5,999.8	-35.4	5,999.9	0.00	0.00	0.00
17,000.0	89.64	359.66	11,140.3	6,099.7	-36.0	6,099.9	0.00	0.00	0.00
17,100.0	89.64	359.66	11,140.9	6,199.7	-36.6	6,199.9	0.00	0.00	0.00
17,200.0	89.64	359.66	11,141.5	6,299.7	-37.1	6,299.8	0.00	0.00	0.00
17,300.0	89.64	359.66	11,142.2	6,399.7	-37.7	6,399.8	0.00	0.00	0.00
17,400.0	89.64	359.66	11,142.8	6,499.7	-38.3	6,499.8	0.00	0.00	0.00
17,500.0	89.64	359.66	11,143.4	6,599.7	-38.9	6,599.8	0.00	0.00	0.00
17,600.0	89.64	359.66	11,144.0	6,699.7	-39.5	6,699.8	0.00	0.00	0.00
17,700.0	89.64	359.66	11,144.7	6,799.7	-40.1	6,799.8	0.00	0.00	0.00
17,800.0	89.64	359.66	11,145.3	6,899.7	-40.7	6,899.8	0.00	0.00	0.00
17,900.0	89.64	359.66	11,145.9	6,999.7	-41.3	6,999.8	0.00	0.00	0.00
18,000.0	89.64	359.66	11,146.5	7,099.7	-41.9	7,099.8	0.00	0.00	0.00
18,100.0	89.64	359.66	11,147.2	7,199.7	-42.5	7,199.8	0.00	0.00	0.00
18,200.0	89.64	359.66	11,147.8	7,299.7	-43.0	7,299.8	0.00	0.00	0.00
18,300.0	89.64	359.66	11,148.4	7,399.7	-43.6	7,399.8	0.00	0.00	0.00
18,400.0	89.64	359.66	11,149.1	7,499.7	-44.2	7,499.8	0.00	0.00	0.00
18,500.0	89.64	359.66	11,149.7	7,599.7	-44.8	7,599.8	0.00	0.00	0.00
18,600.0	89.64	359.66	11,150.3	7,699.7	-45.4	7,699.8	0.00	0.00	0.00
18,700.0	89.64	359.66	11,150.9	7,799.7	-46.0	7,799.8	0.00	0.00	0.00
18,800.0	89.64	359.66	11,151.6	7,899.7	-46.6	7,899.8	0.00	0.00	0.00
18,900.0	89.64	359.66	11,152.2	7,999.7	-47.2	7,999.8	0.00	0.00	0.00
19,000.0	89.64	359.66	11,152.8	8,099.7	-47.8	8,099.8	0.00	0.00	0.00
19,100.0	89.64	359.66	11,153.4	8,199.7	-48.4	8,199.8	0.00	0.00	0.00
19,200.0	89.64	359.66	11,154.1	8,299.7	-48.9	8,299.8	0.00	0.00	0.00
19,300.0	89.64	359.66	11,154.7	8,399.7	-49.5	8,399.8	0.00	0.00	0.00
19,400.0	89.64	359.66	11,155.3	8,499.7	-50.1	8,499.8	0.00	0.00	0.00
19,500.0	89.64	359.66	11,156.0	8,599.7	-50.7	8,599.8	0.00	0.00	0.00
19,600.0	89.64	359.66	11,156.6	8,699.7	-51.3	8,699.8	0.00	0.00	0.00
19,700.0	89.64	359.66	11,157.2	8,799.6	-51.9	8,799.8	0.00	0.00	0.00
19,800.0	89.64	359.66	11,157.8	8,899.6	-52.5	8,899.8	0.00	0.00	0.00
19,900.0	89.64	359.66	11,158.5	8,999.6	-53.1	8,999.8	0.00	0.00	0.00
20,000.0	89.64	359.66	11,159.1	9,099.6	-53.7	9,099.8	0.00	0.00	0.00
20,100.0	89.64	359.66	11,159.7	9,199.6	-54.2	9,199.8	0.00	0.00	0.00
20,200.0	89.64	359.66	11,160.4	9,299.6	-54.8	9,299.8	0.00	0.00	0.00
20,300.0	89.64	359.66	11,161.0	9,399.6	-55.4	9,399.8	0.00	0.00	0.00
20,400.0	89.64	359.66	11,161.6	9,499.6	-56.0	9,499.8	0.00	0.00	0.00
20,500.0	89.64	359.66	11,162.2	9,599.6	-56.6	9,599.8	0.00	0.00	0.00
20,600.0	89.64	359.66	11,162.9	9,699.6	-57.2	9,699.8	0.00	0.00	0.00
20,700.0	89.64	359.66	11,163.5	9,799.6	-57.8	9,799.8	0.00	0.00	0.00



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Well Planning Report



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Project:	Lea County, NM	MD Reference:	Well @ 3436.0usft (Ensign #772)
Site:	Sec 27, T22S, R34E	North Reference:	Grid
Well:	Squints Federal Com #4H	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)
20,800.0	89.64	359.66	11,164.1	9,899.6	-58.4	9,899.8	0.00	0.00	0.00
20,900.0	89.64	359.66	11,164.7	9,999.6	-59.0	9,999.8	0.00	0.00	0.00
PBHL @ 20940' MD / 11165' TVD									
20,940.1	89.64	359.66	11,165.0	10,039.7	-59.2	10,039.9	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	11,165.0	10,039.7	-59.2	504,292.50	768,429.30	32° 23' 0.297 N	103° 27' 49.659 W
- plan hits target center									
- Point									

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,673.0	1,673.0	Rustler		0.36	359.66
1,869.0	1,869.0	TOS		0.36	359.66
3,609.0	3,609.0	BOS / Tansill		0.36	359.66
3,688.0	3,688.0	Yates		0.36	359.66
3,896.0	3,896.0	Seven Rivers		0.36	359.66
4,017.0	4,017.0	Captain Reef		0.36	359.66
5,285.0	5,285.0	Base of Reef (BLCN)		0.36	359.66
5,801.0	5,801.0	CYCN		0.36	359.66
7,194.0	7,194.0	BYCN		0.36	359.66
8,506.0	8,506.0	Bone Spring (BSGL)		0.36	359.66
8,814.0	8,814.0	U Avalon Sh		0.36	359.66
8,940.0	8,940.0	L Avalon Sh		0.36	359.66
9,588.0	9,588.0	FBSG_sand		0.36	359.66
10,073.0	10,073.0	SBSG_sand		0.36	359.66
10,978.6	10,947.8	TBSG_sand		0.36	359.66

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
10,627.5	10,627.5	0.0	0.0	KOP 12°/100'
11,374.5	11,105.0	474.5	-2.8	End of Curve / 89.64° Inc / 359.66° Azm / 11105' TVD
20,940.1	11,165.0	10,039.7	-59.2	PBHL @ 20940' MD / 11165' TVD