



COG Operating L L C
 Project: Lea County, NM (NAD27 NME)
 Site: Sec. 31, T 25 S., R 35 E
 Well: Square Bill Federal Com 23H
 Wellbore: Wellbore #1
 Plan: Plan #1 (Square Bill Federal Com 23H/Wellbore #1)
 McVay 8



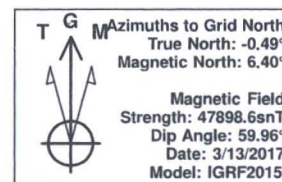
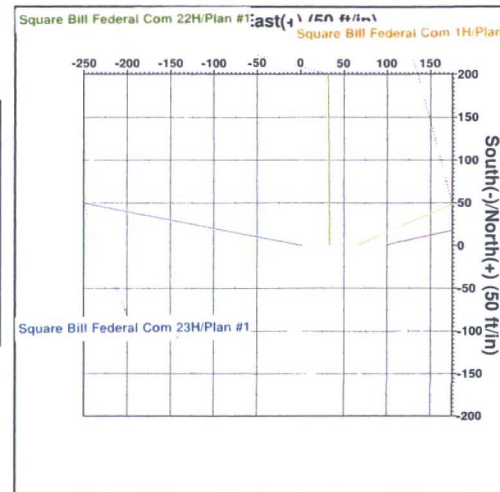
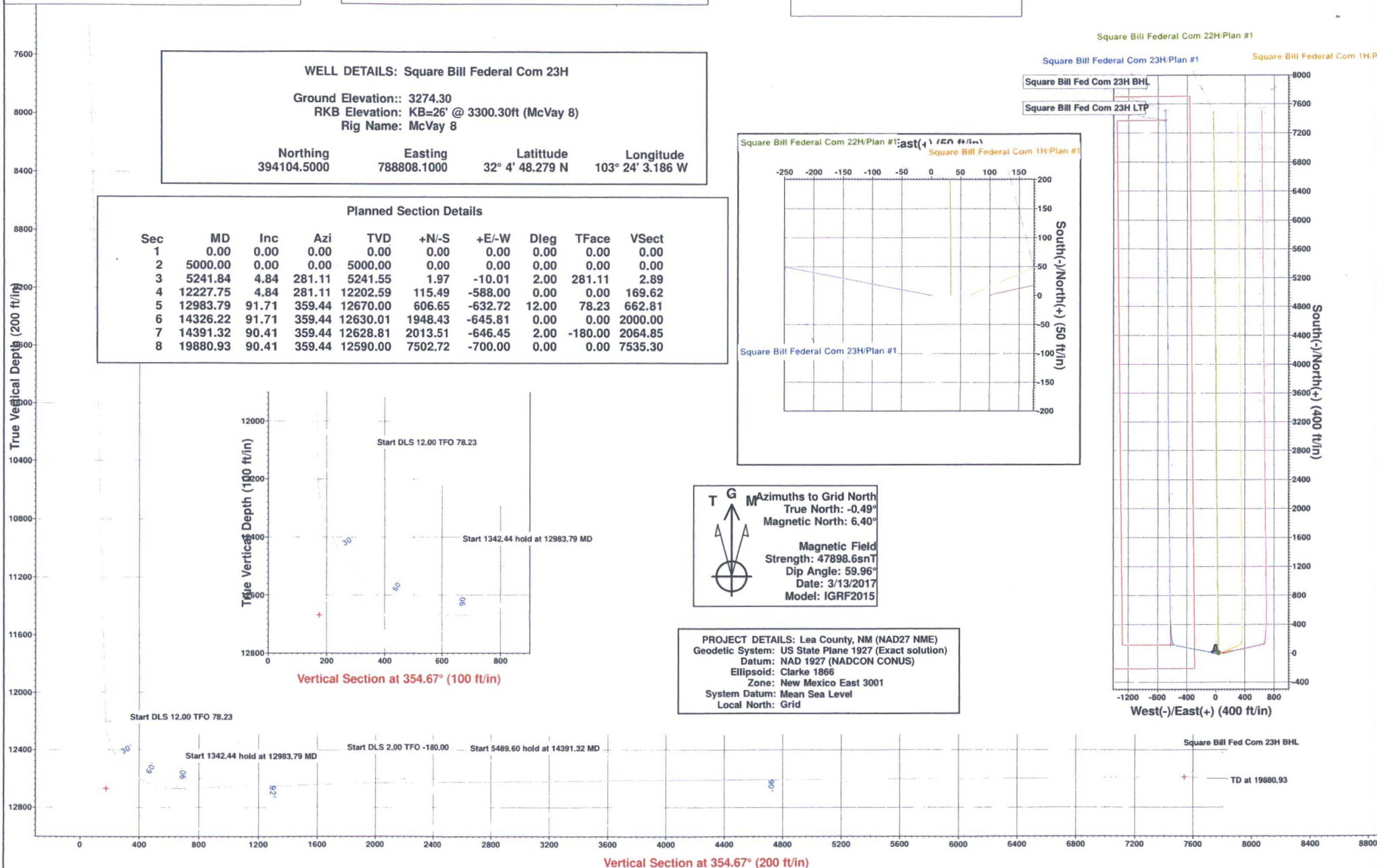
WELL DETAILS: Square Bill Federal Com 23H

Ground Elevation:: 3274.30
 RKB Elevation: KB=26' @ 3300.30ft (McVay 8)
 Rig Name: McVay 8

Northing	Easting	Latitude	Longitude
394104.5000	788808.1000	32° 4' 48.279 N	103° 24' 3.186 W

Planned Section Details

Sec	MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	VSect
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5000.00	0.00	0.00	5000.00	0.00	0.00	0.00	0.00	0.00
3	5241.84	4.84	281.11	5241.55	1.97	-10.01	2.00	281.11	2.89
4	12227.75	4.84	281.11	12202.59	115.49	-588.00	0.00	0.00	169.62
5	12983.79	91.71	359.44	12670.00	606.65	-632.72	12.00	78.23	662.81
6	14326.22	91.71	359.44	12630.01	1948.43	-645.81	0.00	0.00	2000.00
7	14391.32	90.41	359.44	12628.81	2013.51	-646.45	2.00	-180.00	2064.85
8	19880.93	90.41	359.44	12590.00	7502.72	-700.00	0.00	0.00	7535.30



PROJECT DETAILS: Lea County, NM (NAD27 NME)
 Geodetic System: US State Plane 1927 (Exact solution)
 Datum: NAD 1927 (NADCON CONUS)
 Ellipsoid: Clarke 1866
 Zone: New Mexico East 3001
 System Datum: Mean Sea Level
 Local North: Grid

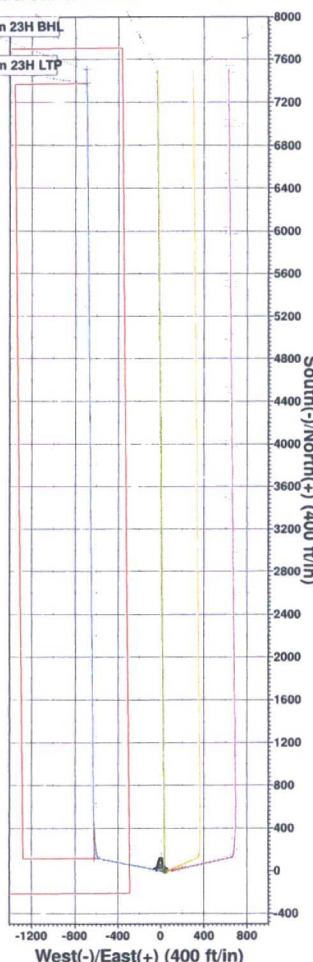
Square Bill Federal Com 22H/Plan #1

Square Bill Federal Com 23H/Plan #1

Square Bill Federal Com 1H/Plan #1

Square Bill Fed Com 23H BHL

Square Bill Fed Com 23H LTP





HOBBS OCD
SEP 26 2017
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COG Operating L L C

Lea County, NM (NAD27 NME)

Sec. 31, T 25 S., R 35 E

Square Bill Federal Com 23H

Wellbore #1

Plan: Plan #1

Standard Survey Report

13 March, 2017





Integrity Directional Services, LLC

Survey Report



Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 31, T 25 S., R 35 E
Well: Square Bill Federal Com 23H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 23H
TVD Reference: KB=26' @ 3300.30ft (McVay 8)
MD Reference: KB=26' @ 3300.30ft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Multi User Db

Project	Lea County, NM (NAD27 NME)		
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, T 25 S., R 35 E

Site Position:		Northing:	394,105.2000 usft	Latitude:	32° 4' 48.278 N
From:	Map	Easting:	788,907.2000 usft	Longitude:	103° 24' 2.035 W
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.50 °

Well Square Bill Federal Com 23H

Well Position	+N/-S	0.00 ft	Northing:	394,104.5000 usft	Latitude:	32° 4' 48.279 N
	+E/-W	0.00 ft	Easting:	788,808.1000 usft	Longitude:	103° 24' 3.186 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	3,274.30 ft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	3/13/2017	6.89	59.96	47,899

Design Plan #1

Audit Notes:

Version: Phase: PLAN Tie On Depth: 0.00

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	354.67

Survey Tool Program Date 3/13/2017

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.00	19,880.93	Plan #1 (Wellbore #1)	MWD	MWD - Standard

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00



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Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	0.00	0.00
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00
4,500.00	0.00	0.00	4,500.00	0.00	0.00	0.00	0.00	0.00	0.00
4,600.00	0.00	0.00	4,600.00	0.00	0.00	0.00	0.00	0.00	0.00
4,700.00	0.00	0.00	4,700.00	0.00	0.00	0.00	0.00	0.00	0.00
4,800.00	0.00	0.00	4,800.00	0.00	0.00	0.00	0.00	0.00	0.00
4,900.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	0.00	0.00
5,000.00	0.00	0.00	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
5,100.00	2.00	281.11	5,099.98	0.34	-1.71	0.49	2.00	2.00	0.00
5,200.00	4.00	281.11	5,199.84	1.35	-6.85	1.98	2.00	2.00	0.00



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Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,241.84	4.84	281.11	5,241.55	1.97	-10.01	2.89	2.00	2.00	0.00
Start 6985.92 hold at 5241.84 MD									
5,300.00	4.84	281.11	5,299.51	2.91	-14.82	4.28	0.00	0.00	0.00
5,400.00	4.84	281.11	5,399.15	4.54	-23.10	6.66	0.00	0.00	0.00
5,500.00	4.84	281.11	5,498.79	6.16	-31.37	9.05	0.00	0.00	0.00
5,600.00	4.84	281.11	5,598.44	7.79	-39.64	11.44	0.00	0.00	0.00
5,700.00	4.84	281.11	5,698.08	9.41	-47.92	13.82	0.00	0.00	0.00
5,800.00	4.84	281.11	5,797.73	11.04	-56.19	16.21	0.00	0.00	0.00
5,900.00	4.84	281.11	5,897.37	12.66	-64.46	18.60	0.00	0.00	0.00
6,000.00	4.84	281.11	5,997.01	14.29	-72.74	20.98	0.00	0.00	0.00
6,100.00	4.84	281.11	6,096.66	15.91	-81.01	23.37	0.00	0.00	0.00
6,200.00	4.84	281.11	6,196.30	17.54	-89.29	25.76	0.00	0.00	0.00
6,300.00	4.84	281.11	6,295.94	19.16	-97.56	28.14	0.00	0.00	0.00
6,400.00	4.84	281.11	6,395.59	20.79	-105.83	30.53	0.00	0.00	0.00
6,500.00	4.84	281.11	6,495.23	22.41	-114.11	32.92	0.00	0.00	0.00
6,600.00	4.84	281.11	6,594.88	24.04	-122.38	35.30	0.00	0.00	0.00
6,700.00	4.84	281.11	6,694.52	25.66	-130.65	37.69	0.00	0.00	0.00
6,800.00	4.84	281.11	6,794.16	27.29	-138.93	40.08	0.00	0.00	0.00
6,900.00	4.84	281.11	6,893.81	28.91	-147.20	42.46	0.00	0.00	0.00
7,000.00	4.84	281.11	6,993.45	30.54	-155.47	44.85	0.00	0.00	0.00
7,100.00	4.84	281.11	7,093.10	32.16	-163.75	47.24	0.00	0.00	0.00
7,200.00	4.84	281.11	7,192.74	33.79	-172.02	49.62	0.00	0.00	0.00
7,300.00	4.84	281.11	7,292.38	35.41	-180.30	52.01	0.00	0.00	0.00
7,400.00	4.84	281.11	7,392.03	37.04	-188.57	54.40	0.00	0.00	0.00
7,500.00	4.84	281.11	7,491.67	38.66	-196.84	56.78	0.00	0.00	0.00
7,600.00	4.84	281.11	7,591.32	40.29	-205.12	59.17	0.00	0.00	0.00
7,700.00	4.84	281.11	7,690.96	41.91	-213.39	61.56	0.00	0.00	0.00
7,800.00	4.84	281.11	7,790.60	43.54	-221.66	63.94	0.00	0.00	0.00
7,900.00	4.84	281.11	7,890.25	45.16	-229.94	66.33	0.00	0.00	0.00
8,000.00	4.84	281.11	7,989.89	46.79	-238.21	68.72	0.00	0.00	0.00
8,100.00	4.84	281.11	8,089.54	48.41	-246.48	71.10	0.00	0.00	0.00
8,200.00	4.84	281.11	8,189.18	50.04	-254.76	73.49	0.00	0.00	0.00
8,300.00	4.84	281.11	8,288.82	51.66	-263.03	75.88	0.00	0.00	0.00
8,400.00	4.84	281.11	8,388.47	53.29	-271.31	78.26	0.00	0.00	0.00
8,500.00	4.84	281.11	8,488.11	54.91	-279.58	80.65	0.00	0.00	0.00
8,600.00	4.84	281.11	8,587.75	56.54	-287.85	83.04	0.00	0.00	0.00
8,700.00	4.84	281.11	8,687.40	58.16	-296.13	85.42	0.00	0.00	0.00
8,800.00	4.84	281.11	8,787.04	59.79	-304.40	87.81	0.00	0.00	0.00
8,900.00	4.84	281.11	8,886.69	61.42	-312.67	90.20	0.00	0.00	0.00
9,000.00	4.84	281.11	8,986.33	63.04	-320.95	92.58	0.00	0.00	0.00
9,100.00	4.84	281.11	9,085.97	64.67	-329.22	94.97	0.00	0.00	0.00
9,200.00	4.84	281.11	9,185.62	66.29	-337.49	97.36	0.00	0.00	0.00
9,300.00	4.84	281.11	9,285.26	67.92	-345.77	99.74	0.00	0.00	0.00



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9,400.00	4.84	281.11	9,384.91	69.54	-354.04	102.13	0.00	0.00	0.00
9,500.00	4.84	281.11	9,484.55	71.17	-362.32	104.52	0.00	0.00	0.00
9,600.00	4.84	281.11	9,584.19	72.79	-370.59	106.90	0.00	0.00	0.00
9,700.00	4.84	281.11	9,683.84	74.42	-378.86	109.29	0.00	0.00	0.00
9,800.00	4.84	281.11	9,783.48	76.04	-387.14	111.68	0.00	0.00	0.00
9,900.00	4.84	281.11	9,883.13	77.67	-395.41	114.06	0.00	0.00	0.00
10,000.00	4.84	281.11	9,982.77	79.29	-403.68	116.45	0.00	0.00	0.00
10,100.00	4.84	281.11	10,082.41	80.92	-411.96	118.84	0.00	0.00	0.00
10,200.00	4.84	281.11	10,182.06	82.54	-420.23	121.22	0.00	0.00	0.00
10,300.00	4.84	281.11	10,281.70	84.17	-428.50	123.61	0.00	0.00	0.00
10,400.00	4.84	281.11	10,381.34	85.79	-436.78	126.00	0.00	0.00	0.00
10,500.00	4.84	281.11	10,480.99	87.42	-445.05	128.38	0.00	0.00	0.00
10,600.00	4.84	281.11	10,580.63	89.04	-453.33	130.77	0.00	0.00	0.00
10,700.00	4.84	281.11	10,680.28	90.67	-461.60	133.16	0.00	0.00	0.00
10,800.00	4.84	281.11	10,779.92	92.29	-469.87	135.54	0.00	0.00	0.00
10,900.00	4.84	281.11	10,879.56	93.92	-478.15	137.93	0.00	0.00	0.00
11,000.00	4.84	281.11	10,979.21	95.54	-486.42	140.32	0.00	0.00	0.00
11,100.00	4.84	281.11	11,078.85	97.17	-494.69	142.70	0.00	0.00	0.00
11,200.00	4.84	281.11	11,178.50	98.79	-502.97	145.09	0.00	0.00	0.00
11,300.00	4.84	281.11	11,278.14	100.42	-511.24	147.48	0.00	0.00	0.00
11,400.00	4.84	281.11	11,377.78	102.04	-519.51	149.86	0.00	0.00	0.00
11,500.00	4.84	281.11	11,477.43	103.67	-527.79	152.25	0.00	0.00	0.00
11,600.00	4.84	281.11	11,577.07	105.29	-536.06	154.64	0.00	0.00	0.00
11,700.00	4.84	281.11	11,676.72	106.92	-544.34	157.02	0.00	0.00	0.00
11,800.00	4.84	281.11	11,776.36	108.54	-552.61	159.41	0.00	0.00	0.00
11,900.00	4.84	281.11	11,876.00	110.17	-560.88	161.80	0.00	0.00	0.00
12,000.00	4.84	281.11	11,975.65	111.79	-569.16	164.18	0.00	0.00	0.00
12,100.00	4.84	281.11	12,075.29	113.42	-577.43	166.57	0.00	0.00	0.00
12,200.00	4.84	281.11	12,174.93	115.04	-585.70	168.96	0.00	0.00	0.00
12,227.75	4.84	281.11	12,202.59	115.49	-588.00	169.62	0.00	0.00	0.00
Start DLS 12.00 TFO 78.23									
12,300.00	10.75	333.43	12,274.21	122.12	-594.01	176.77	12.00	8.18	72.41
12,400.00	22.15	347.56	12,370.00	148.96	-602.28	204.27	12.00	11.40	14.13
12,500.00	33.95	352.23	12,458.10	195.20	-610.14	251.04	12.00	11.81	4.68
12,600.00	45.85	354.69	12,534.69	258.83	-617.26	315.05	12.00	11.90	2.45
12,700.00	57.78	356.31	12,596.40	337.05	-623.33	393.49	12.00	11.93	1.62
12,800.00	69.73	357.55	12,640.54	426.45	-628.08	482.95	12.00	11.95	1.24
12,900.00	81.69	358.61	12,665.18	523.12	-631.30	579.51	12.00	11.96	1.06
12,983.79	91.71	359.44	12,670.00	606.65	-632.72	662.81	12.00	11.96	1.00
Start 1342.44 hold at 12983.79 MD									
13,000.00	91.71	359.44	12,669.52	622.86	-632.88	678.95	0.00	0.00	0.00
13,100.00	91.71	359.44	12,666.54	722.81	-633.85	778.56	0.00	0.00	0.00
13,200.00	91.71	359.44	12,663.56	822.76	-634.83	878.17	0.00	0.00	0.00
13,300.00	91.71	359.44	12,660.58	922.71	-635.80	977.78	0.00	0.00	0.00



Company: COG Operating L L C
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Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 23H
TVD Reference: KB=26' @ 3300.30ft (McVay 8)
MD Reference: KB=26' @ 3300.30ft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Multi User Db

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,400.00	91.71	359.44	12,657.60	1,022.66	-636.78	1,077.39	0.00	0.00	0.00
13,500.00	91.71	359.44	12,654.62	1,122.61	-637.76	1,177.00	0.00	0.00	0.00
13,600.00	91.71	359.44	12,651.64	1,222.56	-638.73	1,276.61	0.00	0.00	0.00
13,700.00	91.71	359.44	12,648.67	1,322.51	-639.71	1,376.22	0.00	0.00	0.00
13,800.00	91.71	359.44	12,645.69	1,422.46	-640.68	1,475.83	0.00	0.00	0.00
13,900.00	91.71	359.44	12,642.71	1,522.41	-641.66	1,575.44	0.00	0.00	0.00
14,000.00	91.71	359.44	12,639.73	1,622.36	-642.63	1,675.05	0.00	0.00	0.00
14,100.00	91.71	359.44	12,636.75	1,722.32	-643.61	1,774.66	0.00	0.00	0.00
14,200.00	91.71	359.44	12,633.77	1,822.27	-644.58	1,874.27	0.00	0.00	0.00
14,300.00	91.71	359.44	12,630.79	1,922.22	-645.56	1,973.87	0.00	0.00	0.00
14,326.23	91.71	359.44	12,630.01	1,948.43	-645.81	2,000.00	0.00	0.00	0.00
Start DLS 2.00 TFO -180.00									
14,391.32	90.41	359.44	12,628.81	2,013.51	-646.45	2,064.85	2.00	-2.00	0.00
Start 5489.60 hold at 14391.32 MD									
14,400.00	90.41	359.44	12,628.75	2,022.19	-646.53	2,073.50	0.00	0.00	0.00
14,500.00	90.41	359.44	12,628.04	2,122.18	-647.51	2,173.15	0.00	0.00	0.00
14,600.00	90.41	359.44	12,627.34	2,222.17	-648.48	2,272.81	0.00	0.00	0.00
14,700.00	90.41	359.44	12,626.63	2,322.17	-649.46	2,372.46	0.00	0.00	0.00
14,800.00	90.41	359.44	12,625.92	2,422.16	-650.43	2,472.11	0.00	0.00	0.00
14,900.00	90.41	359.44	12,625.22	2,522.15	-651.41	2,571.76	0.00	0.00	0.00
15,000.00	90.41	359.44	12,624.51	2,622.14	-652.39	2,671.41	0.00	0.00	0.00
15,100.00	90.41	359.44	12,623.80	2,722.14	-653.36	2,771.06	0.00	0.00	0.00
15,200.00	90.41	359.44	12,623.09	2,822.13	-654.34	2,870.71	0.00	0.00	0.00
15,300.00	90.41	359.44	12,622.39	2,922.12	-655.31	2,970.36	0.00	0.00	0.00
15,400.00	90.41	359.44	12,621.68	3,022.12	-656.29	3,070.01	0.00	0.00	0.00
15,500.00	90.41	359.44	12,620.97	3,122.11	-657.26	3,169.66	0.00	0.00	0.00
15,600.00	90.41	359.44	12,620.27	3,222.10	-658.24	3,269.32	0.00	0.00	0.00
15,700.00	90.41	359.44	12,619.56	3,322.09	-659.21	3,368.97	0.00	0.00	0.00
15,800.00	90.41	359.44	12,618.85	3,422.09	-660.19	3,468.62	0.00	0.00	0.00
15,900.00	90.41	359.44	12,618.15	3,522.08	-661.17	3,568.27	0.00	0.00	0.00
16,000.00	90.41	359.44	12,617.44	3,622.07	-662.14	3,667.92	0.00	0.00	0.00
16,100.00	90.41	359.44	12,616.73	3,722.06	-663.12	3,767.57	0.00	0.00	0.00
16,200.00	90.41	359.44	12,616.02	3,822.06	-664.09	3,867.22	0.00	0.00	0.00
16,300.00	90.41	359.44	12,615.32	3,922.05	-665.07	3,966.87	0.00	0.00	0.00
16,400.00	90.41	359.44	12,614.61	4,022.04	-666.04	4,066.52	0.00	0.00	0.00
16,500.00	90.41	359.44	12,613.90	4,122.04	-667.02	4,166.17	0.00	0.00	0.00
16,600.00	90.41	359.44	12,613.20	4,222.03	-667.99	4,265.83	0.00	0.00	0.00
16,700.00	90.41	359.44	12,612.49	4,322.02	-668.97	4,365.48	0.00	0.00	0.00
16,800.00	90.41	359.44	12,611.78	4,422.01	-669.95	4,465.13	0.00	0.00	0.00
16,900.00	90.41	359.44	12,611.08	4,522.01	-670.92	4,564.78	0.00	0.00	0.00
17,000.00	90.41	359.44	12,610.37	4,622.00	-671.90	4,664.43	0.00	0.00	0.00
17,100.00	90.41	359.44	12,609.66	4,721.99	-672.87	4,764.08	0.00	0.00	0.00
17,200.00	90.41	359.44	12,608.95	4,821.98	-673.85	4,863.73	0.00	0.00	0.00
17,300.00	90.41	359.44	12,608.25	4,921.98	-674.82	4,963.38	0.00	0.00	0.00



Integrity Directional Services, LLC

Survey Report



Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 31, T 25 S., R 35 E
Well: Square Bill Federal Com 23H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 23H
TVD Reference: KB=26' @ 3300.30ft (McVay 8)
MD Reference: KB=26' @ 3300.30ft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Multi User Db

Planned Survey

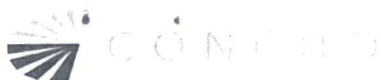
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
17,400.00	90.41	359.44	12,607.54	5,021.97	-675.80	5,063.03	0.00	0.00	0.00
17,500.00	90.41	359.44	12,606.83	5,121.96	-676.77	5,162.68	0.00	0.00	0.00
17,600.00	90.41	359.44	12,606.13	5,221.96	-677.75	5,262.34	0.00	0.00	0.00
17,700.00	90.41	359.44	12,605.42	5,321.95	-678.73	5,361.99	0.00	0.00	0.00
17,800.00	90.41	359.44	12,604.71	5,421.94	-679.70	5,461.64	0.00	0.00	0.00
17,900.00	90.41	359.44	12,604.01	5,521.93	-680.68	5,561.29	0.00	0.00	0.00
18,000.00	90.41	359.44	12,603.30	5,621.93	-681.65	5,660.94	0.00	0.00	0.00
18,100.00	90.41	359.44	12,602.59	5,721.92	-682.63	5,760.59	0.00	0.00	0.00
18,200.00	90.41	359.44	12,601.88	5,821.91	-683.60	5,860.24	0.00	0.00	0.00
18,300.00	90.41	359.44	12,601.18	5,921.90	-684.58	5,959.89	0.00	0.00	0.00
18,400.00	90.41	359.44	12,600.47	6,021.90	-685.55	6,059.54	0.00	0.00	0.00
18,500.00	90.41	359.44	12,599.76	6,121.89	-686.53	6,159.19	0.00	0.00	0.00
18,600.00	90.41	359.44	12,599.06	6,221.88	-687.51	6,258.84	0.00	0.00	0.00
18,700.00	90.41	359.44	12,598.35	6,321.88	-688.48	6,358.50	0.00	0.00	0.00
18,800.00	90.41	359.44	12,597.64	6,421.87	-689.46	6,458.15	0.00	0.00	0.00
18,900.00	90.41	359.44	12,596.94	6,521.86	-690.43	6,557.80	0.00	0.00	0.00
19,000.00	90.41	359.44	12,596.23	6,621.85	-691.41	6,657.45	0.00	0.00	0.00
19,100.00	90.41	359.44	12,595.52	6,721.85	-692.38	6,757.10	0.00	0.00	0.00
19,200.00	90.41	359.44	12,594.81	6,821.84	-693.36	6,856.75	0.00	0.00	0.00
19,300.00	90.41	359.44	12,594.11	6,921.83	-694.33	6,956.40	0.00	0.00	0.00
19,400.00	90.41	359.44	12,593.40	7,021.82	-695.31	7,056.05	0.00	0.00	0.00
19,500.00	90.41	359.44	12,592.69	7,121.82	-696.29	7,155.70	0.00	0.00	0.00
19,600.00	90.41	359.44	12,591.99	7,221.81	-697.26	7,255.35	0.00	0.00	0.00
19,700.00	90.41	359.44	12,591.28	7,321.80	-698.24	7,355.01	0.00	0.00	0.00
19,800.00	90.41	359.44	12,590.57	7,421.80	-699.21	7,454.66	0.00	0.00	0.00
19,880.93	90.41	359.44	12,590.00	7,502.72	-700.00	7,535.30	0.00	0.00	0.00

TD at 19880.93

Design Targets

Target Name

- hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Square Bill Fed Com : - plan misses target center by 7405.59ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	7,372.53	-698.91	401,477.0201	788,109.1949	32° 6' 1.292 N	103° 24' 10.570 W
Square Bill Fed Com : - plan hits target center - Point	0.00	0.00	12,590.0 0	7,502.72	-700.00	401,607.2000	788,108.1000	32° 6' 2.581 N	103° 24' 10.569 W
Square Bill Fed Com : - plan misses target center by 197.40ft at 12600.00ft MD (12534.69 TVD, 258.83 N, -617.26 E) - Point	0.00	0.00	12,670.0 0	115.49	-627.93	394,219.9944	788,180.1690	32° 4' 49.476 N	103° 24' 10.472 W



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MD Reference: KB=26' @ 3300.30ft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Multi User Db

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
5000	5000	0	0	Start Build 2.00
5242	5242	2	-10	Start 6985.92 hold at 5241.84 MD
12,228	12,203	115	-588	Start DLS 12.00 TFO 78.23
12,984	12,670	607	-633	Start 1342.44 hold at 12983.79 MD
14,326	12,630	1948	-646	Start DLS 2.00 TFO -180.00
14,391	12,629	2014	-646	Start 5489.60 hold at 14391.32 MD
19,881	12,590	7503	-700	TD at 19880.93

Checked By: _____ Approved By: _____ Date: _____