



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 22H
 Wellbore: Wellbore #1
 Plan: Plan #1 (Square Bill Federal Com 22H/Wellbore #1)
 McVay 8



WELL DETAILS: Square Bill Federal Com 22H

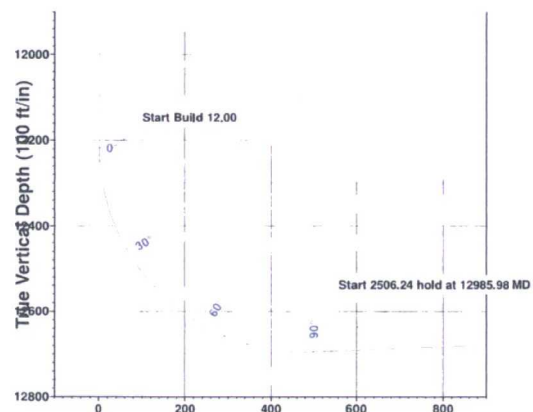
Ground Elevation:: 3273.60
 RKB Elevation: KB=26' @ 3299.60ft (McVay 8)
 Rig Name: McVay 8

Northing 394104.8000 Easting 788841.2000 Latitude 32° 4' 48.280 N Longitude 103° 24' 2.802 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	12217.88	0.00	0.00	12217.88	0.00	0.00	0.00	0.00	0.00
3	12985.98	92.17	359.44	12695.00	495.54	-4.83	12.00	359.44	495.56
4	15492.22	92.17	359.44	12600.00	2999.86	-29.25	0.00	0.00	3000.00
5	15595.66	90.10	359.44	12597.95	3103.27	-30.26	2.00	-180.00	3103.42
6	19998.73	90.10	359.44	12590.00	7506.12	-73.20	0.00	0.00	7506.47

True Vertical Depth (200 ft/in)

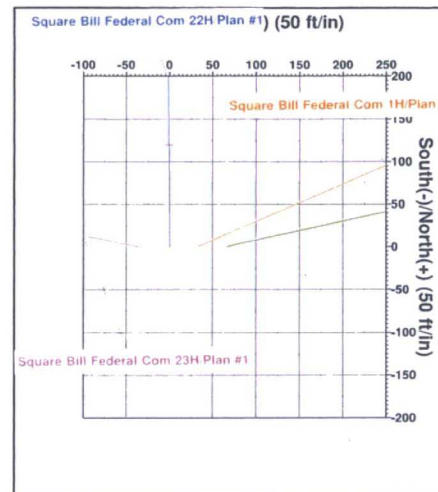


Vertical Section at 359.44° (100 ft/in)

True Vertical Depth (200 ft/in)



Vertical Section at 359.44° (200 ft/in)



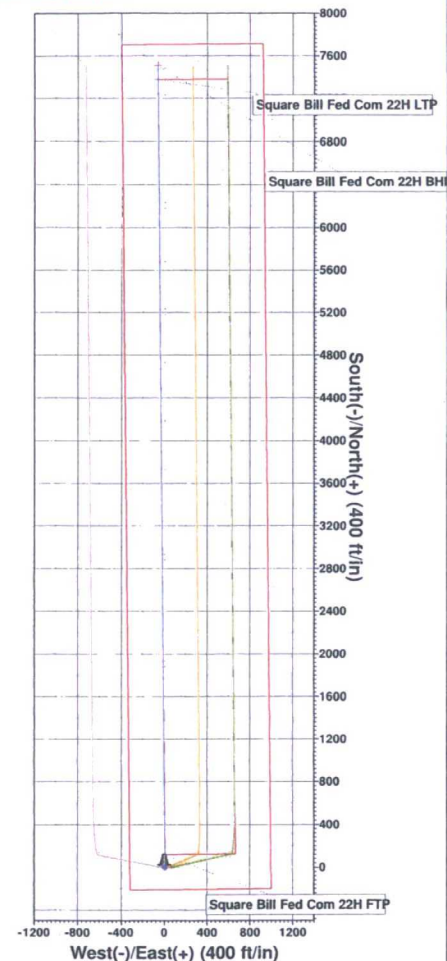
Square Bill Federal Com 23H Plan #1



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 22H FTP

Square Bill Fed Com 22H BHL
 Square Bill Federal Com 22H/Plan #1

TD at 19998.73



COG Operating L L C

Lea County, NM (NAD27 NME)

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

Square Bill Federal Com 22H

Wellbore #1

Plan: Plan #1

Standard Survey Report

13 March, 2017

HOBBS OCD
SEP 26 2017
RECEIVED





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 22H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
TVD Reference: KB=26' @ 3299.60ft (McVay 8)
MD Reference: KB=26' @ 3299.60ft (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 22H

Well Position	+N/-S	0.00 ft	Northing:	394,104.8000 usft	Latitude:	32° 4' 48.280 N
	+E/-W	0.00 ft	Easting:	788,841.2000 usft	Longitude:	103° 24' 2.802 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	3,273.60 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:** PROTOTYPE **Tie On Depth:** 0.00

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	359.44

Survey Tool Program **Date** 3/13/2017

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.00	19,998.73	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



Integrity Directional Services, LLC

Survey Report



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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)
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
5,100.00	0.00	0.00	5,100.00	0.00	0.00	0.00	0.00	0.00	0.00
5,200.00	0.00	0.00	5,200.00	0.00	0.00	0.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,300.00	0.00	0.00	0.00	0.00	0.00	0.00



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5,400.00	0.00	0.00	5,400.00	0.00	0.00	0.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,500.00	0.00	0.00	0.00	0.00	0.00	0.00
5,600.00	0.00	0.00	5,600.00	0.00	0.00	0.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,700.00	0.00	0.00	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,800.00	0.00	0.00	0.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,900.00	0.00	0.00	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	6,000.00	0.00	0.00	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	6,100.00	0.00	0.00	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,200.00	0.00	0.00	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,300.00	0.00	0.00	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,400.00	0.00	0.00	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,500.00	0.00	0.00	0.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,600.00	0.00	0.00	0.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,700.00	0.00	0.00	0.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,800.00	0.00	0.00	0.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,900.00	0.00	0.00	0.00	0.00	0.00	0.00
7,000.00	0.00	0.00	7,000.00	0.00	0.00	0.00	0.00	0.00	0.00
7,100.00	0.00	0.00	7,100.00	0.00	0.00	0.00	0.00	0.00	0.00
7,200.00	0.00	0.00	7,200.00	0.00	0.00	0.00	0.00	0.00	0.00
7,300.00	0.00	0.00	7,300.00	0.00	0.00	0.00	0.00	0.00	0.00
7,400.00	0.00	0.00	7,400.00	0.00	0.00	0.00	0.00	0.00	0.00
7,500.00	0.00	0.00	7,500.00	0.00	0.00	0.00	0.00	0.00	0.00
7,600.00	0.00	0.00	7,600.00	0.00	0.00	0.00	0.00	0.00	0.00
7,700.00	0.00	0.00	7,700.00	0.00	0.00	0.00	0.00	0.00	0.00
7,800.00	0.00	0.00	7,800.00	0.00	0.00	0.00	0.00	0.00	0.00
7,900.00	0.00	0.00	7,900.00	0.00	0.00	0.00	0.00	0.00	0.00
8,000.00	0.00	0.00	8,000.00	0.00	0.00	0.00	0.00	0.00	0.00
8,100.00	0.00	0.00	8,100.00	0.00	0.00	0.00	0.00	0.00	0.00
8,200.00	0.00	0.00	8,200.00	0.00	0.00	0.00	0.00	0.00	0.00
8,300.00	0.00	0.00	8,300.00	0.00	0.00	0.00	0.00	0.00	0.00
8,400.00	0.00	0.00	8,400.00	0.00	0.00	0.00	0.00	0.00	0.00
8,500.00	0.00	0.00	8,500.00	0.00	0.00	0.00	0.00	0.00	0.00
8,600.00	0.00	0.00	8,600.00	0.00	0.00	0.00	0.00	0.00	0.00
8,700.00	0.00	0.00	8,700.00	0.00	0.00	0.00	0.00	0.00	0.00
8,800.00	0.00	0.00	8,800.00	0.00	0.00	0.00	0.00	0.00	0.00
8,900.00	0.00	0.00	8,900.00	0.00	0.00	0.00	0.00	0.00	0.00
9,000.00	0.00	0.00	9,000.00	0.00	0.00	0.00	0.00	0.00	0.00
9,100.00	0.00	0.00	9,100.00	0.00	0.00	0.00	0.00	0.00	0.00
9,200.00	0.00	0.00	9,200.00	0.00	0.00	0.00	0.00	0.00	0.00
9,300.00	0.00	0.00	9,300.00	0.00	0.00	0.00	0.00	0.00	0.00
9,400.00	0.00	0.00	9,400.00	0.00	0.00	0.00	0.00	0.00	0.00
9,500.00	0.00	0.00	9,500.00	0.00	0.00	0.00	0.00	0.00	0.00
9,600.00	0.00	0.00	9,600.00	0.00	0.00	0.00	0.00	0.00	0.00



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9,700.00	0.00	0.00	9,700.00	0.00	0.00	0.00	0.00	0.00	0.00
9,800.00	0.00	0.00	9,800.00	0.00	0.00	0.00	0.00	0.00	0.00
9,900.00	0.00	0.00	9,900.00	0.00	0.00	0.00	0.00	0.00	0.00
10,000.00	0.00	0.00	10,000.00	0.00	0.00	0.00	0.00	0.00	0.00
10,100.00	0.00	0.00	10,100.00	0.00	0.00	0.00	0.00	0.00	0.00
10,200.00	0.00	0.00	10,200.00	0.00	0.00	0.00	0.00	0.00	0.00
10,300.00	0.00	0.00	10,300.00	0.00	0.00	0.00	0.00	0.00	0.00
10,400.00	0.00	0.00	10,400.00	0.00	0.00	0.00	0.00	0.00	0.00
10,500.00	0.00	0.00	10,500.00	0.00	0.00	0.00	0.00	0.00	0.00
10,600.00	0.00	0.00	10,600.00	0.00	0.00	0.00	0.00	0.00	0.00
10,700.00	0.00	0.00	10,700.00	0.00	0.00	0.00	0.00	0.00	0.00
10,800.00	0.00	0.00	10,800.00	0.00	0.00	0.00	0.00	0.00	0.00
10,900.00	0.00	0.00	10,900.00	0.00	0.00	0.00	0.00	0.00	0.00
11,000.00	0.00	0.00	11,000.00	0.00	0.00	0.00	0.00	0.00	0.00
11,100.00	0.00	0.00	11,100.00	0.00	0.00	0.00	0.00	0.00	0.00
11,200.00	0.00	0.00	11,200.00	0.00	0.00	0.00	0.00	0.00	0.00
11,300.00	0.00	0.00	11,300.00	0.00	0.00	0.00	0.00	0.00	0.00
11,400.00	0.00	0.00	11,400.00	0.00	0.00	0.00	0.00	0.00	0.00
11,500.00	0.00	0.00	11,500.00	0.00	0.00	0.00	0.00	0.00	0.00
11,600.00	0.00	0.00	11,600.00	0.00	0.00	0.00	0.00	0.00	0.00
11,700.00	0.00	0.00	11,700.00	0.00	0.00	0.00	0.00	0.00	0.00
11,800.00	0.00	0.00	11,800.00	0.00	0.00	0.00	0.00	0.00	0.00
11,900.00	0.00	0.00	11,900.00	0.00	0.00	0.00	0.00	0.00	0.00
12,000.00	0.00	0.00	12,000.00	0.00	0.00	0.00	0.00	0.00	0.00
12,100.00	0.00	0.00	12,100.00	0.00	0.00	0.00	0.00	0.00	0.00
12,200.00	0.00	0.00	12,200.00	0.00	0.00	0.00	0.00	0.00	0.00
12,217.88	0.00	0.00	12,217.88	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 12.00									
12,300.00	9.85	359.44	12,299.60	7.04	-0.07	7.04	12.00	12.00	0.00
12,400.00	21.85	359.44	12,395.62	34.31	-0.33	34.31	12.00	12.00	0.00
12,500.00	33.85	359.44	12,483.87	80.95	-0.79	80.95	12.00	12.00	0.00
12,600.00	45.85	359.44	12,560.50	144.91	-1.41	144.92	12.00	12.00	0.00
12,700.00	57.85	359.44	12,622.15	223.41	-2.18	223.42	12.00	12.00	0.00
12,800.00	69.85	359.44	12,666.13	313.01	-3.05	313.02	12.00	12.00	0.00
12,900.00	81.85	359.44	12,690.53	409.79	-4.00	409.81	12.00	12.00	0.00
12,985.98	92.17	359.44	12,695.00	495.54	-4.83	495.56	12.00	12.00	0.00
Start 2506.24 hold at 12985.98 MD									
13,000.00	92.17	359.44	12,694.47	509.55	-4.97	509.57	0.00	0.00	0.00
13,100.00	92.17	359.44	12,690.68	609.47	-5.94	609.50	0.00	0.00	0.00
13,200.00	92.17	359.44	12,686.89	709.39	-6.92	709.43	0.00	0.00	0.00
13,300.00	92.17	359.44	12,683.10	809.32	-7.89	809.35	0.00	0.00	0.00
13,400.00	92.17	359.44	12,679.31	909.24	-8.87	909.28	0.00	0.00	0.00
13,500.00	92.17	359.44	12,675.52	1,009.16	-9.84	1,009.21	0.00	0.00	0.00
13,600.00	92.17	359.44	12,671.73	1,109.09	-10.82	1,109.14	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 22H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
TVD Reference: KB=26' @ 3299.60ft (McVay 8)
MD Reference: KB=26' @ 3299.60ft (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)
13,700.00	92.17	359.44	12,667.94	1,209.01	-11.79	1,209.07	0.00	0.00	0.00
13,800.00	92.17	359.44	12,664.15	1,308.93	-12.76	1,308.99	0.00	0.00	0.00
13,900.00	92.17	359.44	12,660.36	1,408.86	-13.74	1,408.92	0.00	0.00	0.00
14,000.00	92.17	359.44	12,656.57	1,508.78	-14.71	1,508.85	0.00	0.00	0.00
14,100.00	92.17	359.44	12,652.78	1,608.70	-15.69	1,608.78	0.00	0.00	0.00
14,200.00	92.17	359.44	12,648.99	1,708.63	-16.66	1,708.71	0.00	0.00	0.00
14,300.00	92.17	359.44	12,645.20	1,808.55	-17.64	1,808.64	0.00	0.00	0.00
14,400.00	92.17	359.44	12,641.41	1,908.47	-18.61	1,908.56	0.00	0.00	0.00
14,500.00	92.17	359.44	12,637.61	2,008.40	-19.59	2,008.49	0.00	0.00	0.00
14,600.00	92.17	359.44	12,633.82	2,108.32	-20.56	2,108.42	0.00	0.00	0.00
14,700.00	92.17	359.44	12,630.03	2,208.24	-21.53	2,208.35	0.00	0.00	0.00
14,800.00	92.17	359.44	12,626.24	2,308.17	-22.51	2,308.28	0.00	0.00	0.00
14,900.00	92.17	359.44	12,622.45	2,408.09	-23.48	2,408.20	0.00	0.00	0.00
15,000.00	92.17	359.44	12,618.66	2,508.01	-24.46	2,508.13	0.00	0.00	0.00
15,100.00	92.17	359.44	12,614.87	2,607.94	-25.43	2,608.06	0.00	0.00	0.00
15,200.00	92.17	359.44	12,611.08	2,707.86	-26.41	2,707.99	0.00	0.00	0.00
15,300.00	92.17	359.44	12,607.29	2,807.78	-27.38	2,807.92	0.00	0.00	0.00
15,400.00	92.17	359.44	12,603.50	2,907.71	-28.36	2,907.85	0.00	0.00	0.00
15,492.22	92.17	359.44	12,600.00	2,999.86	-29.25	3,000.00	0.00	0.00	0.00
Start DLS 2.00 TFO -180.00									
15,500.00	92.02	359.44	12,599.72	3,007.63	-29.33	3,007.77	2.00	-2.00	0.00
15,595.66	90.10	359.44	12,597.95	3,103.27	-30.26	3,103.42	2.00	-2.00	0.00
Start 4403.06 hold at 15595.66 MD									
15,600.00	90.10	359.44	12,597.94	3,107.61	-30.31	3,107.75	0.00	0.00	0.00
15,700.00	90.10	359.44	12,597.76	3,207.60	-31.28	3,207.75	0.00	0.00	0.00
15,800.00	90.10	359.44	12,597.58	3,307.60	-32.26	3,307.75	0.00	0.00	0.00
15,900.00	90.10	359.44	12,597.40	3,407.59	-33.23	3,407.75	0.00	0.00	0.00
16,000.00	90.10	359.44	12,597.22	3,507.59	-34.21	3,507.75	0.00	0.00	0.00
16,100.00	90.10	359.44	12,597.04	3,607.58	-35.18	3,607.75	0.00	0.00	0.00
16,200.00	90.10	359.44	12,596.86	3,707.58	-36.16	3,707.75	0.00	0.00	0.00
16,300.00	90.10	359.44	12,596.68	3,807.57	-37.13	3,807.75	0.00	0.00	0.00
16,400.00	90.10	359.44	12,596.50	3,907.57	-38.11	3,907.75	0.00	0.00	0.00
16,500.00	90.10	359.44	12,596.32	4,007.56	-39.08	4,007.75	0.00	0.00	0.00
16,600.00	90.10	359.44	12,596.14	4,107.56	-40.06	4,107.75	0.00	0.00	0.00
16,700.00	90.10	359.44	12,595.96	4,207.55	-41.03	4,207.75	0.00	0.00	0.00
16,800.00	90.10	359.44	12,595.78	4,307.55	-42.01	4,307.75	0.00	0.00	0.00
16,900.00	90.10	359.44	12,595.60	4,407.54	-42.98	4,407.75	0.00	0.00	0.00
17,000.00	90.10	359.44	12,595.41	4,507.54	-43.96	4,507.75	0.00	0.00	0.00
17,100.00	90.10	359.44	12,595.23	4,607.53	-44.93	4,607.75	0.00	0.00	0.00
17,200.00	90.10	359.44	12,595.05	4,707.53	-45.91	4,707.75	0.00	0.00	0.00
17,300.00	90.10	359.44	12,594.87	4,807.52	-46.88	4,807.75	0.00	0.00	0.00
17,400.00	90.10	359.44	12,594.69	4,907.52	-47.86	4,907.75	0.00	0.00	0.00
17,500.00	90.10	359.44	12,594.51	5,007.51	-48.83	5,007.75	0.00	0.00	0.00



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 22H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
TVD Reference: KB=26' @ 3299.60ft (McVay 8)
MD Reference: KB=26' @ 3299.60ft (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)
17,600.00	90.10	359.44	12,594.33	5,107.51	-49.81	5,107.75	0.00	0.00	0.00
17,700.00	90.10	359.44	12,594.15	5,207.50	-50.78	5,207.75	0.00	0.00	0.00
17,800.00	90.10	359.44	12,593.97	5,307.50	-51.76	5,307.75	0.00	0.00	0.00
17,900.00	90.10	359.44	12,593.79	5,407.49	-52.73	5,407.75	0.00	0.00	0.00
18,000.00	90.10	359.44	12,593.61	5,507.49	-53.71	5,507.75	0.00	0.00	0.00
18,100.00	90.10	359.44	12,593.43	5,607.48	-54.68	5,607.75	0.00	0.00	0.00
18,200.00	90.10	359.44	12,593.25	5,707.48	-55.66	5,707.75	0.00	0.00	0.00
18,300.00	90.10	359.44	12,593.07	5,807.47	-56.63	5,807.75	0.00	0.00	0.00
18,400.00	90.10	359.44	12,592.89	5,907.47	-57.61	5,907.75	0.00	0.00	0.00
18,500.00	90.10	359.44	12,592.71	6,007.46	-58.59	6,007.75	0.00	0.00	0.00
18,600.00	90.10	359.44	12,592.53	6,107.46	-59.56	6,107.75	0.00	0.00	0.00
18,700.00	90.10	359.44	12,592.35	6,207.45	-60.54	6,207.75	0.00	0.00	0.00
18,800.00	90.10	359.44	12,592.16	6,307.45	-61.51	6,307.75	0.00	0.00	0.00
18,900.00	90.10	359.44	12,591.98	6,407.44	-62.49	6,407.75	0.00	0.00	0.00
19,000.00	90.10	359.44	12,591.80	6,507.44	-63.46	6,507.75	0.00	0.00	0.00
19,100.00	90.10	359.44	12,591.62	6,607.43	-64.44	6,607.75	0.00	0.00	0.00
19,200.00	90.10	359.44	12,591.44	6,707.43	-65.41	6,707.75	0.00	0.00	0.00
19,300.00	90.10	359.44	12,591.26	6,807.42	-66.39	6,807.75	0.00	0.00	0.00
19,400.00	90.10	359.44	12,591.08	6,907.42	-67.36	6,907.75	0.00	0.00	0.00
19,500.00	90.10	359.44	12,590.90	7,007.41	-68.34	7,007.75	0.00	0.00	0.00
19,600.00	90.10	359.44	12,590.72	7,107.41	-69.31	7,107.75	0.00	0.00	0.00
19,700.00	90.10	359.44	12,590.54	7,207.40	-70.29	7,207.75	0.00	0.00	0.00
19,800.00	90.10	359.44	12,590.36	7,307.40	-71.26	7,307.75	0.00	0.00	0.00
19,900.00	90.10	359.44	12,590.18	7,407.39	-72.24	7,407.75	0.00	0.00	0.00
19,998.73	90.10	359.44	12,590.00	7,506.12	-73.20	7,506.47	0.00	0.00	0.00

TD at 19998.73

Design Targets

Target Name	- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Square Bill Fed Com	- Shape	0.00	0.00	0.00	119.80	-1.27	394,224.6002	788,839.9286	32° 4' 49.465 N	103° 24' 2.804 W
- plan misses target center by 119.81ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)										
- Point										
Square Bill Fed Com	- Shape	0.00	0.00	0.00	7,376.12	-71.76	401,480.9055	788,769.4367	32° 6' 1.274 N	103° 24' 2.894 W
- plan misses target center by 7376.47ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)										
- Point										
Square Bill Fed Com	- Shape	0.00	0.00	12,590.00	7,506.12	-73.20	401,610.9000	788,768.0000	32° 6' 2.561 N	103° 24' 2.898 W
- plan hits target center										
- Point										



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 22H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 22H
TVD Reference: KB=26' @ 3299.60ft (McVay 8)
MD Reference: KB=26' @ 3299.60ft (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)	
12,218	12,218	0	0	Start Build 12.00
12,986	12,695	496	-5	Start 2506.24 hold at 12985.98 MD
15,492	12,600	3000	-29	Start DLS 2.00 TFO -180.00
15,596	12,598	3103	-30	Start 4403.06 hold at 15595.66 MD
19,999	12,590	7506	-73	TD at 19998.73

Checked By: _____ Approved By: _____ Date: _____