



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 21H
 Wellbore: Wellbore #1
 Plan: Plan #1 (Square Bill Federal Com 21H/Wellbore #1)
 McVay 8



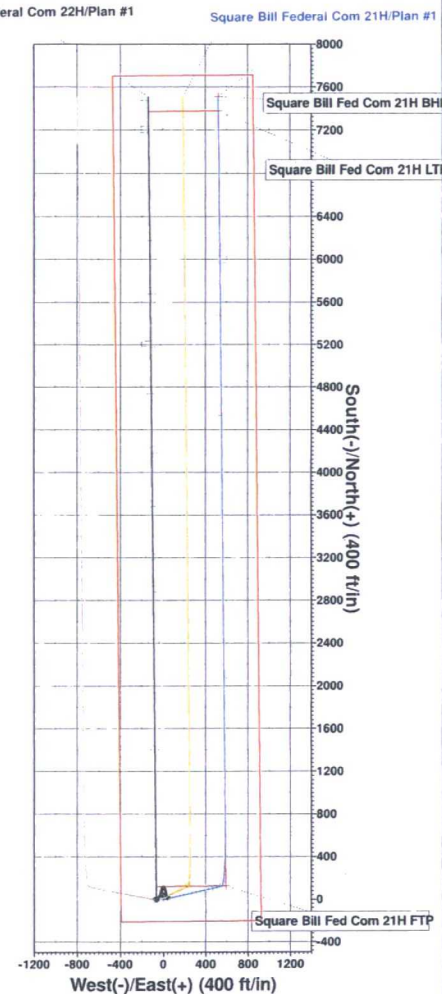
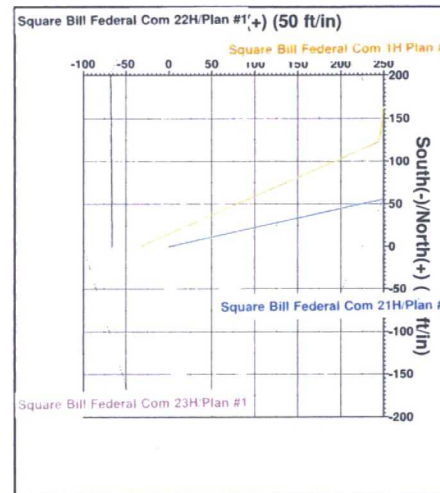
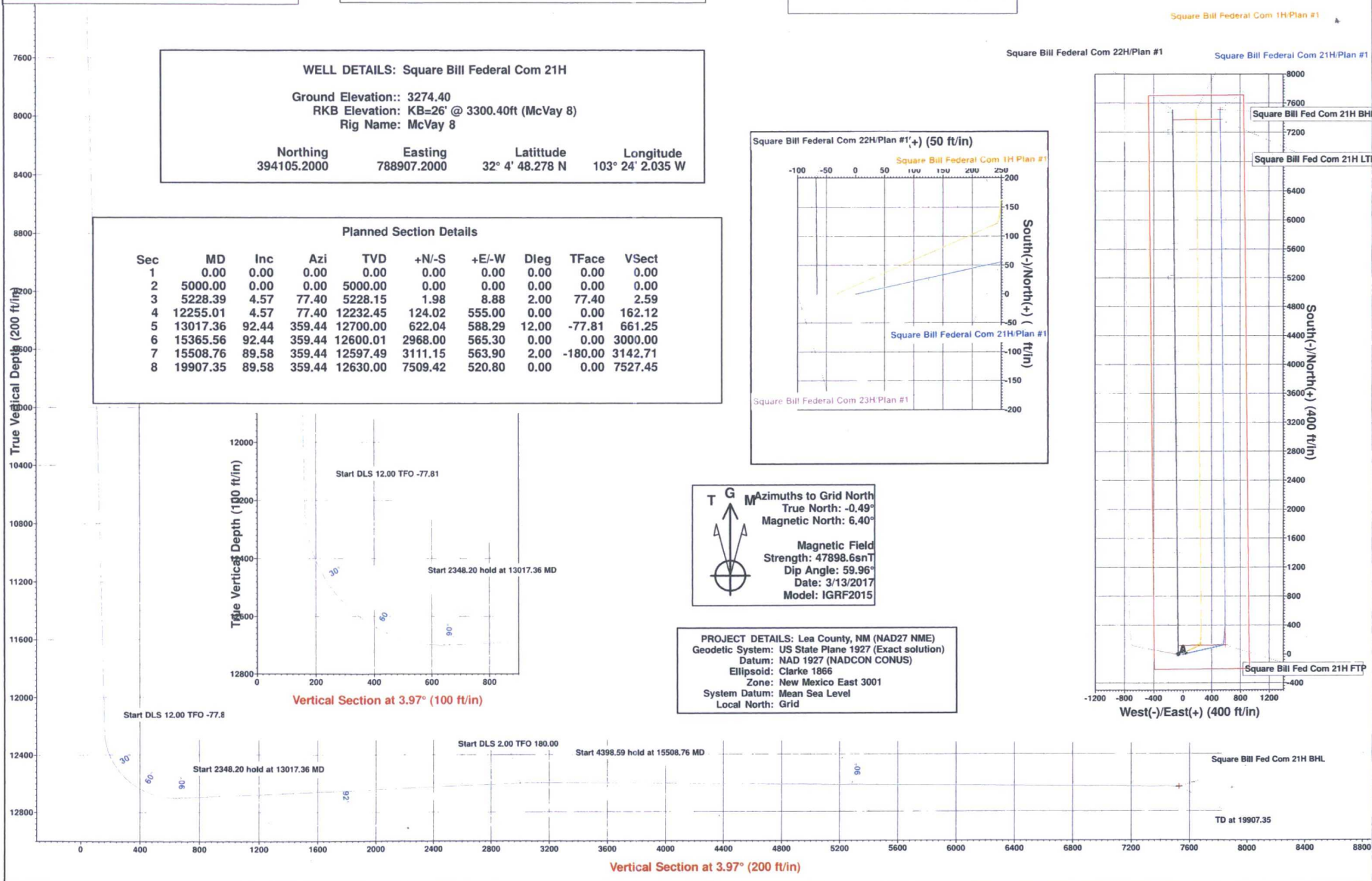
WELL DETAILS: Square Bill Federal Com 21H

Ground Elevation:: 3274.40
 RKB Elevation: KB=26' @ 3300.40ft (McVay 8)
 Rig Name: McVay 8

Northing	Easting	Latitude	Longitude
394105.2000	788907.2000	32° 4' 48.278 N	103° 24' 2.035 W

Planned Section Details

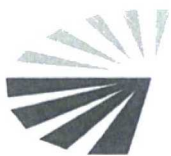
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5000.00	0.00	0.00	5000.00	0.00	0.00	0.00	0.00	0.00
3	5228.39	4.57	77.40	5228.15	1.98	8.88	2.00	77.40	2.59
4	12255.01	4.57	77.40	12232.45	124.02	555.00	0.00	0.00	162.12
5	13017.36	92.44	359.44	12700.00	622.04	588.29	12.00	-77.81	661.25
6	15365.56	92.44	359.44	12600.01	2968.00	565.30	0.00	0.00	3000.00
7	15508.76	89.58	359.44	12597.49	3111.15	563.90	2.00	-180.00	3142.71
8	19907.35	89.58	359.44	12630.00	7509.42	520.80	0.00	0.00	7527.45



Azimuths to Grid North
 True North: -0.49°
 Magnetic North: 6.40°

Magnetic Field
 Strength: 47898.6snT
 Dip Angle: 59.96°
 Date: 3/13/2017
 Model: IGRF2015

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



CONCHO

COG Operating L L C

Lea County, NM (NAD27 NME)

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

Square Bill Federal Com 21H

Wellbore #1

Plan: Plan #1

Standard Survey Report

13 March, 2017

HOBBS OCD
SEP 25 2017
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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 21H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 21H
TVD Reference: KB=26' @ 3300.40ft (McVay 8)
MD Reference: KB=26' @ 3300.40ft (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
From:	Map	Easting:	788,907.2000 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "
		Latitude:	32° 4' 48.278 N
		Longitude:	103° 24' 2.035 W
		Grid Convergence:	0.50 °

Well	Square Bill Federal Com 21H		
Well Position	+N/-S	0.00 ft	Northing: 394,105.2000 usft
	+E/-W	0.00 ft	Easting: 788,907.2000 usft
Position Uncertainty	0.00 ft	Wellhead Elevation:	0.00 ft
		Latitude:	32° 4' 48.278 N
		Longitude:	103° 24' 2.035 W
		Ground Level:	3,274.40 ft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2015	3/13/2017	6.89
			Dip Angle (°) 59.96
			Field Strength (nT) 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)
	0.00	0.00	0.00
			Direction (°) 3.97

Survey Tool Program	Date 3/13/2017		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name
0.00	19,907.33	Plan #1 (Wellbore #1)	MWD
			Description 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

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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	77.40	5,099.98	0.38	1.70	0.50	2.00	2.00	0.00
5,200.00	4.00	77.40	5,199.84	1.52	6.81	1.99	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)
5,228.39	4.57	77.40	5,228.15	1.98	8.88	2.59	2.00	2.00	0.00
Start 7026.62 hold at 5228.39 MD									
5,300.00	4.57	77.40	5,299.53	3.23	14.45	4.22	0.00	0.00	0.00
5,400.00	4.57	77.40	5,399.21	4.96	22.22	6.49	0.00	0.00	0.00
5,500.00	4.57	77.40	5,498.90	6.70	29.99	8.76	0.00	0.00	0.00
5,600.00	4.57	77.40	5,598.58	8.44	37.76	11.03	0.00	0.00	0.00
5,700.00	4.57	77.40	5,698.26	10.18	45.53	13.30	0.00	0.00	0.00
5,800.00	4.57	77.40	5,797.94	11.91	53.31	15.57	0.00	0.00	0.00
5,900.00	4.57	77.40	5,897.63	13.65	61.08	17.84	0.00	0.00	0.00
6,000.00	4.57	77.40	5,997.31	15.39	68.85	20.11	0.00	0.00	0.00
6,100.00	4.57	77.40	6,096.99	17.12	76.62	22.38	0.00	0.00	0.00
6,200.00	4.57	77.40	6,196.67	18.86	84.40	24.65	0.00	0.00	0.00
6,300.00	4.57	77.40	6,296.35	20.60	92.17	26.92	0.00	0.00	0.00
6,400.00	4.57	77.40	6,396.04	22.33	99.94	29.19	0.00	0.00	0.00
6,500.00	4.57	77.40	6,495.72	24.07	107.71	31.46	0.00	0.00	0.00
6,600.00	4.57	77.40	6,595.40	25.81	115.48	33.73	0.00	0.00	0.00
6,700.00	4.57	77.40	6,695.08	27.54	123.26	36.00	0.00	0.00	0.00
6,800.00	4.57	77.40	6,794.77	29.28	131.03	38.28	0.00	0.00	0.00
6,900.00	4.57	77.40	6,894.45	31.02	138.80	40.55	0.00	0.00	0.00
7,000.00	4.57	77.40	6,994.13	32.75	146.57	42.82	0.00	0.00	0.00
7,100.00	4.57	77.40	7,093.81	34.49	154.34	45.09	0.00	0.00	0.00
7,200.00	4.57	77.40	7,193.50	36.23	162.12	47.36	0.00	0.00	0.00
7,300.00	4.57	77.40	7,293.18	37.96	169.89	49.63	0.00	0.00	0.00
7,400.00	4.57	77.40	7,392.86	39.70	177.66	51.90	0.00	0.00	0.00
7,500.00	4.57	77.40	7,492.54	41.44	185.43	54.17	0.00	0.00	0.00
7,600.00	4.57	77.40	7,592.23	43.17	193.21	56.44	0.00	0.00	0.00
7,700.00	4.57	77.40	7,691.91	44.91	200.98	58.71	0.00	0.00	0.00
7,800.00	4.57	77.40	7,791.59	46.65	208.75	60.98	0.00	0.00	0.00
7,900.00	4.57	77.40	7,891.27	48.38	216.52	63.25	0.00	0.00	0.00
8,000.00	4.57	77.40	7,990.96	50.12	224.29	65.52	0.00	0.00	0.00
8,100.00	4.57	77.40	8,090.64	51.86	232.07	67.79	0.00	0.00	0.00
8,200.00	4.57	77.40	8,190.32	53.60	239.84	70.06	0.00	0.00	0.00
8,300.00	4.57	77.40	8,290.00	55.33	247.61	72.33	0.00	0.00	0.00
8,400.00	4.57	77.40	8,389.68	57.07	255.38	74.60	0.00	0.00	0.00
8,500.00	4.57	77.40	8,489.37	58.81	263.15	76.87	0.00	0.00	0.00
8,600.00	4.57	77.40	8,589.05	60.54	270.93	79.14	0.00	0.00	0.00
8,700.00	4.57	77.40	8,688.73	62.28	278.70	81.41	0.00	0.00	0.00
8,800.00	4.57	77.40	8,788.41	64.02	286.47	83.68	0.00	0.00	0.00
8,900.00	4.57	77.40	8,888.10	65.75	294.24	85.95	0.00	0.00	0.00
9,000.00	4.57	77.40	8,987.78	67.49	302.02	88.22	0.00	0.00	0.00
9,100.00	4.57	77.40	9,087.46	69.23	309.79	90.49	0.00	0.00	0.00
9,200.00	4.57	77.40	9,187.14	70.96	317.56	92.76	0.00	0.00	0.00
9,300.00	4.57	77.40	9,286.83	72.70	325.33	95.03	0.00	0.00	0.00



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9,400.00	4.57	77.40	9,386.51	74.44	333.10	97.30	0.00	0.00	0.00
9,500.00	4.57	77.40	9,486.19	76.17	340.88	99.57	0.00	0.00	0.00
9,600.00	4.57	77.40	9,585.87	77.91	348.65	101.85	0.00	0.00	0.00
9,700.00	4.57	77.40	9,685.56	79.65	356.42	104.12	0.00	0.00	0.00
9,800.00	4.57	77.40	9,785.24	81.38	364.19	106.39	0.00	0.00	0.00
9,900.00	4.57	77.40	9,884.92	83.12	371.96	108.66	0.00	0.00	0.00
10,000.00	4.57	77.40	9,984.60	84.86	379.74	110.93	0.00	0.00	0.00
10,100.00	4.57	77.40	10,084.29	86.59	387.51	113.20	0.00	0.00	0.00
10,200.00	4.57	77.40	10,183.97	88.33	395.28	115.47	0.00	0.00	0.00
10,300.00	4.57	77.40	10,283.65	90.07	403.05	117.74	0.00	0.00	0.00
10,400.00	4.57	77.40	10,383.33	91.80	410.83	120.01	0.00	0.00	0.00
10,500.00	4.57	77.40	10,483.01	93.54	418.60	122.28	0.00	0.00	0.00
10,600.00	4.57	77.40	10,582.70	95.28	426.37	124.55	0.00	0.00	0.00
10,700.00	4.57	77.40	10,682.38	97.01	434.14	126.82	0.00	0.00	0.00
10,800.00	4.57	77.40	10,782.06	98.75	441.91	129.09	0.00	0.00	0.00
10,900.00	4.57	77.40	10,881.74	100.49	449.69	131.36	0.00	0.00	0.00
11,000.00	4.57	77.40	10,981.43	102.23	457.46	133.63	0.00	0.00	0.00
11,100.00	4.57	77.40	11,081.11	103.96	465.23	135.90	0.00	0.00	0.00
11,200.00	4.57	77.40	11,180.79	105.70	473.00	138.17	0.00	0.00	0.00
11,300.00	4.57	77.40	11,280.47	107.44	480.78	140.44	0.00	0.00	0.00
11,400.00	4.57	77.40	11,380.16	109.17	488.55	142.71	0.00	0.00	0.00
11,500.00	4.57	77.40	11,479.84	110.91	496.32	144.98	0.00	0.00	0.00
11,600.00	4.57	77.40	11,579.52	112.65	504.09	147.25	0.00	0.00	0.00
11,700.00	4.57	77.40	11,679.20	114.38	511.86	149.52	0.00	0.00	0.00
11,800.00	4.57	77.40	11,778.89	116.12	519.64	151.79	0.00	0.00	0.00
11,900.00	4.57	77.40	11,878.57	117.86	527.41	154.06	0.00	0.00	0.00
12,000.00	4.57	77.40	11,978.25	119.59	535.18	156.33	0.00	0.00	0.00
12,100.00	4.57	77.40	12,077.93	121.33	542.95	158.60	0.00	0.00	0.00
12,200.00	4.57	77.40	12,177.62	123.07	550.72	160.87	0.00	0.00	0.00
12,255.01	4.57	77.40	12,232.45	124.02	555.00	162.12	0.00	0.00	0.00
Start DLS 12.00 TFO -77.81									
12,300.00	7.77	34.54	12,277.20	126.92	558.48	165.26	12.00	7.12	-95.28
12,400.00	18.88	12.83	12,374.40	148.34	565.93	187.14	12.00	11.11	-21.71
12,500.00	30.66	7.20	12,465.05	189.57	572.74	228.74	12.00	11.78	-5.63
12,600.00	42.56	4.51	12,545.19	248.79	578.61	288.23	12.00	11.89	-2.69
12,700.00	54.49	2.82	12,611.30	323.43	583.29	363.01	12.00	11.93	-1.68
12,800.00	66.44	1.58	12,660.51	410.21	586.57	449.81	12.00	11.95	-1.24
12,900.00	78.40	0.55	12,690.66	505.35	588.31	544.84	12.00	11.96	-1.03
13,000.00	90.36	359.60	12,700.43	604.69	588.43	643.95	12.00	11.96	-0.95
13,017.36	92.44	359.44	12,700.00	622.04	588.29	661.25	12.00	11.96	-0.93
Start 2348.20 hold at 13017.36 MD									
13,100.00	92.44	359.44	12,696.49	704.60	587.48	743.56	0.00	0.00	0.00
13,200.00	92.44	359.44	12,692.23	804.51	586.50	843.16	0.00	0.00	0.00
13,300.00	92.44	359.44	12,687.97	904.41	585.52	942.75	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 21H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 21H
TVD Reference: KB=26' @ 3300.40ft (McVay 8)
MD Reference: KB=26' @ 3300.40ft (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	92.44	359.44	12,683.71	1,004.32	584.54	1,042.35	0.00	0.00	0.00
13,500.00	92.44	359.44	12,679.45	1,104.22	583.56	1,141.95	0.00	0.00	0.00
13,600.00	92.44	359.44	12,675.19	1,204.12	582.58	1,241.55	0.00	0.00	0.00
13,700.00	92.44	359.44	12,670.94	1,304.03	581.60	1,341.14	0.00	0.00	0.00
13,800.00	92.44	359.44	12,666.68	1,403.93	580.62	1,440.74	0.00	0.00	0.00
13,900.00	92.44	359.44	12,662.42	1,503.84	579.65	1,540.34	0.00	0.00	0.00
14,000.00	92.44	359.44	12,658.16	1,603.74	578.67	1,639.94	0.00	0.00	0.00
14,100.00	92.44	359.44	12,653.90	1,703.65	577.69	1,739.53	0.00	0.00	0.00
14,200.00	92.44	359.44	12,649.65	1,803.55	576.71	1,839.13	0.00	0.00	0.00
14,300.00	92.44	359.44	12,645.39	1,903.46	575.73	1,938.73	0.00	0.00	0.00
14,400.00	92.44	359.44	12,641.13	2,003.36	574.75	2,038.33	0.00	0.00	0.00
14,500.00	92.44	359.44	12,636.87	2,103.27	573.77	2,137.92	0.00	0.00	0.00
14,600.00	92.44	359.44	12,632.61	2,203.17	572.79	2,237.52	0.00	0.00	0.00
14,700.00	92.44	359.44	12,628.35	2,303.07	571.81	2,337.12	0.00	0.00	0.00
14,800.00	92.44	359.44	12,624.10	2,402.98	570.84	2,436.71	0.00	0.00	0.00
14,900.00	92.44	359.44	12,619.84	2,502.88	569.86	2,536.31	0.00	0.00	0.00
15,000.00	92.44	359.44	12,615.58	2,602.79	568.88	2,635.91	0.00	0.00	0.00
15,100.00	92.44	359.44	12,611.32	2,702.69	567.90	2,735.51	0.00	0.00	0.00
15,200.00	92.44	359.44	12,607.06	2,802.60	566.92	2,835.10	0.00	0.00	0.00
15,300.00	92.44	359.44	12,602.81	2,902.50	565.94	2,934.70	0.00	0.00	0.00
15,365.56	92.44	359.44	12,600.01	2,968.00	565.30	3,000.00	0.00	0.00	0.00
Start DLS 2.00 TFO 180.00									
15,400.00	91.75	359.44	12,598.75	3,002.41	564.96	3,034.31	2.00	-2.00	0.00
15,500.00	89.75	359.44	12,597.44	3,102.40	563.98	3,133.98	2.00	-2.00	0.00
15,508.76	89.58	359.44	12,597.49	3,111.15	563.90	3,142.71	2.00	-2.00	0.00
Start 4398.59 hold at 15508.76 MD									
15,600.00	89.58	359.44	12,598.17	3,202.39	563.00	3,233.67	0.00	0.00	0.00
15,700.00	89.58	359.44	12,598.91	3,302.38	562.02	3,333.35	0.00	0.00	0.00
15,800.00	89.58	359.44	12,599.65	3,402.37	561.04	3,433.04	0.00	0.00	0.00
15,900.00	89.58	359.44	12,600.39	3,502.37	560.06	3,532.72	0.00	0.00	0.00
16,000.00	89.58	359.44	12,601.12	3,602.36	559.08	3,632.41	0.00	0.00	0.00
16,100.00	89.58	359.44	12,601.86	3,702.35	558.10	3,732.09	0.00	0.00	0.00
16,200.00	89.58	359.44	12,602.60	3,802.34	557.12	3,831.78	0.00	0.00	0.00
16,300.00	89.58	359.44	12,603.34	3,902.34	556.14	3,931.46	0.00	0.00	0.00
16,400.00	89.58	359.44	12,604.08	4,002.33	555.16	4,031.15	0.00	0.00	0.00
16,500.00	89.58	359.44	12,604.82	4,102.32	554.18	4,130.83	0.00	0.00	0.00
16,600.00	89.58	359.44	12,605.56	4,202.31	553.20	4,230.52	0.00	0.00	0.00
16,700.00	89.58	359.44	12,606.30	4,302.30	552.23	4,330.20	0.00	0.00	0.00
16,800.00	89.58	359.44	12,607.04	4,402.30	551.25	4,429.89	0.00	0.00	0.00
16,900.00	89.58	359.44	12,607.78	4,502.29	550.27	4,529.57	0.00	0.00	0.00
17,000.00	89.58	359.44	12,608.51	4,602.28	549.29	4,629.26	0.00	0.00	0.00
17,100.00	89.58	359.44	12,609.25	4,702.27	548.31	4,728.94	0.00	0.00	0.00
17,200.00	89.58	359.44	12,609.99	4,802.27	547.33	4,828.63	0.00	0.00	0.00
17,300.00	89.58	359.44	12,610.73	4,902.26	546.35	4,928.31	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 21H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 21H
TVD Reference: KB=26' @ 3300.40ft (McVay 8)
MD Reference: KB=26' @ 3300.40ft (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	89.58	359.44	12,611.47	5,002.25	545.37	5,028.00	0.00	0.00	0.00
17,500.00	89.58	359.44	12,612.21	5,102.24	544.39	5,127.68	0.00	0.00	0.00
17,600.00	89.58	359.44	12,612.95	5,202.24	543.41	5,227.37	0.00	0.00	0.00
17,700.00	89.58	359.44	12,613.69	5,302.23	542.43	5,327.05	0.00	0.00	0.00
17,800.00	89.58	359.44	12,614.43	5,402.22	541.45	5,426.74	0.00	0.00	0.00
17,900.00	89.58	359.44	12,615.17	5,502.21	540.47	5,526.42	0.00	0.00	0.00
18,000.00	89.58	359.44	12,615.90	5,602.21	539.49	5,626.11	0.00	0.00	0.00
18,100.00	89.58	359.44	12,616.64	5,702.20	538.51	5,725.79	0.00	0.00	0.00
18,200.00	89.58	359.44	12,617.38	5,802.19	537.53	5,825.48	0.00	0.00	0.00
18,300.00	89.58	359.44	12,618.12	5,902.18	536.55	5,925.16	0.00	0.00	0.00
18,400.00	89.58	359.44	12,618.86	6,002.18	535.57	6,024.85	0.00	0.00	0.00
18,500.00	89.58	359.44	12,619.60	6,102.17	534.59	6,124.53	0.00	0.00	0.00
18,600.00	89.58	359.44	12,620.34	6,202.16	533.61	6,224.22	0.00	0.00	0.00
18,700.00	89.58	359.44	12,621.08	6,302.15	532.63	6,323.90	0.00	0.00	0.00
18,800.00	89.58	359.44	12,621.82	6,402.15	531.65	6,423.59	0.00	0.00	0.00
18,900.00	89.58	359.44	12,622.56	6,502.14	530.67	6,523.27	0.00	0.00	0.00
19,000.00	89.58	359.44	12,623.29	6,602.13	529.69	6,622.96	0.00	0.00	0.00
19,100.00	89.58	359.44	12,624.03	6,702.12	528.71	6,722.64	0.00	0.00	0.00
19,200.00	89.58	359.44	12,624.77	6,802.12	527.73	6,822.33	0.00	0.00	0.00
19,300.00	89.58	359.44	12,625.51	6,902.11	526.75	6,922.01	0.00	0.00	0.00
19,400.00	89.58	359.44	12,626.25	7,002.10	525.77	7,021.70	0.00	0.00	0.00
19,500.00	89.58	359.44	12,626.99	7,102.09	524.79	7,121.38	0.00	0.00	0.00
19,600.00	89.58	359.44	12,627.73	7,202.09	523.81	7,221.07	0.00	0.00	0.00
19,700.00	89.58	359.44	12,628.47	7,302.08	522.83	7,320.75	0.00	0.00	0.00
19,800.00	89.58	359.44	12,629.21	7,402.07	521.85	7,420.44	0.00	0.00	0.00
19,900.00	89.58	359.44	12,629.95	7,502.06	520.87	7,520.12	0.00	0.00	0.00
19,907.35	89.58	359.44	12,630.00	7,509.42	520.80	7,527.45	0.00	0.00	0.00

TD at 19907.35

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Square Bill Fed Com	0.00	0.00	0.00	124.02	592.80	394,229.2218	789,499.9981	32° 4' 49.454 N	103° 23' 55.133 W
- plan misses target center by 605.63ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									
Square Bill Fed Com	0.00	0.00	0.00	7,379.25	522.17	401,484.4374	789,429.3722	32° 6' 1.253 N	103° 23' 55.223 W
- plan misses target center by 7397.70ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									
Square Bill Fed Com	0.00	0.00	12,630.00	7,509.42	520.80	401,614.6000	789,428.0000	32° 6' 2.541 N	103° 23' 55.226 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 21H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Square Bill Federal Com 21H
TVD Reference: KB=26' @ 3300.40ft (McVay 8)
MD Reference: KB=26' @ 3300.40ft (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
5228	5228	2	9	Start 7026.62 hold at 5228.39 MD
12,255	12,232	124	555	Start DLS 12.00 TFO -77.81
13,017	12,700	622	588	Start 2348.20 hold at 13017.36 MD
15,366	12,600	2968	565	Start DLS 2.00 TFO 180.00
15,509	12,597	3111	564	Start 4398.59 hold at 15508.76 MD
19,907	12,630	7509	521	TD at 19907.35

Checked By: _____ Approved By: _____ Date: _____