

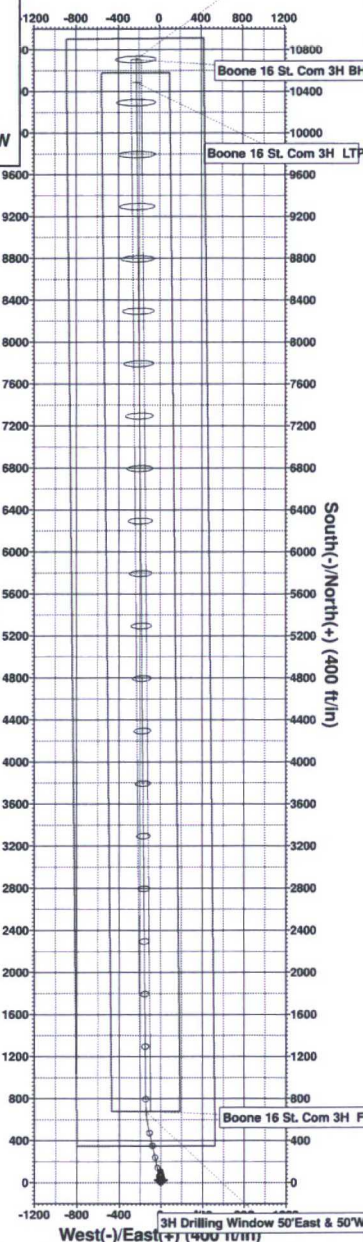
COG Operating L L C
 Project: Lea County, NM (NAD27 NME)
 Site: Sec. 21, T 21 S., R 33 E
 Well: Boone 16 State Com 3H
 Wellbore: Wellbore #1
 Plan: Plan#1 (Boone 16 State Com 3H/Wellbore #1)

WELL DETAILS: Boone 16 State Com 3H

Ground Elevation:: 3753.20
 RKB Elevation: KB=26' @ 3779.20ft (Scandril Freedom)
 Rig Name: Scandril Freedom

Northing 535715.5000 Easting 732736.0000 Latitude 32° 28' 13.914 N Longitude 103° 34' 43.282 W

West(-)/East(+) Boone 16 State Com 3H/Plan#1



Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	11317.61	0.00	0.00	11317.61	0.00	0.00	0.00	0.00	0.00	
3	12076.28	91.04	347.00	11795.00	473.67	-109.36	12.00	347.00	475.90	
4	12389.23	91.04	359.52	11789.31	783.80	-146.01	4.00	89.91	786.74	
5	22314.83	91.04	359.52	11610.00	10707.42	-229.10	0.00	0.00	10709.87	Boone 16 St. Com 3H BHL

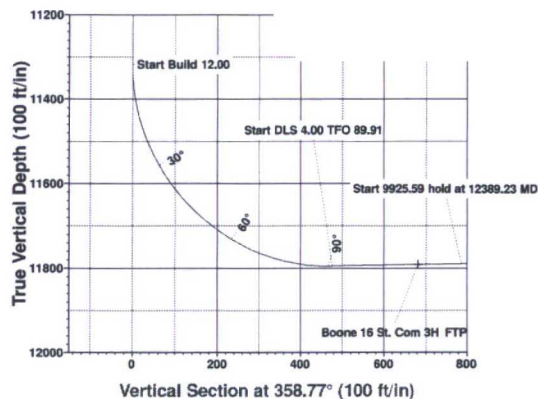
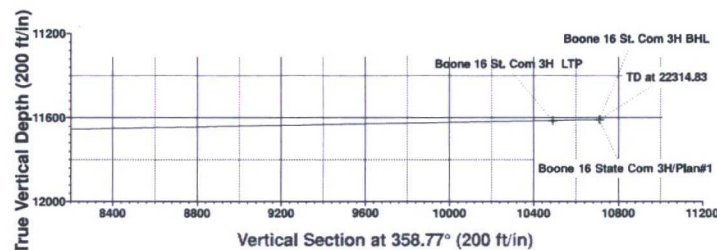


Azimuths to Grid North
 True North: -0.41°
 Magnetic North: 6.62°

Magnetic Field
 Strength: 48127.6nT
 Dip Angle: 60.29°
 Date: 1/5/2017
 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



Vertical Section at 358.77° (200 ft/in)

Boone 16 St. Com 3H FTP

Boone 16 State Com 3H/Plan#1



CONCHO

COG Operating L L C

Lea County, NM (NAD27 NME)

Sec. 21, T 21 S. , R 33 E

Boone 16 State Com 3H

Wellbore #1

Plan: Plan#1

Standard Survey Report

05 January, 2017





Integrity Directional Services, LLC
Survey Report



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Boone 16 State Com 3H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3779.20ft (Scandril Freedom)
Site:	Sec. 21, T 21 S. , R 33 E	MD Reference:	KB=26' @ 3779.20ft (Scandril Freedom)
Well:	Boone 16 State Com 3H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Plan#1	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. 21, T 21 S. , R 33 E		
Site Position:		Northing:	535,715.5000 usft
From:	Map	Easting:	732,736.0000 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "
		Latitude:	32° 28' 13.914 N
		Longitude:	103° 34' 43.282 W
		Grid Convergence:	0.41 °

Well	Boone 16 State Com 3H		
Well Position	+N/-S	0.00 ft	Northing:
	+E/-W	0.00 ft	Easting:
Position Uncertainty	0.00 ft	Wellhead Elevation:	0.00 ft
		Latitude:	32° 28' 13.914 N
		Longitude:	103° 34' 43.282 W
		Ground Level:	3,753.20 ft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2015	1/5/2017	7.02
			Dip Angle
			(°)
			60.29
			Field Strength
			(nT)
			48,128

Design	Plan#1		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(ft)	(ft)	(ft)
	0.00	0.00	0.00
			Direction
			(°)
			358.77

Survey Tool Program	Date 1/5/2017		
From	To	Survey (Wellbore)	Tool Name
(ft)	(ft)		
0.00	22,314.83	Plan#1 (Wellbore #1)	MWD
			Description
			MWD - Standard

Planned Survey									
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Build	Turn
Depth	(°)	(°)	Depth	(ft)	(ft)	Section	Rate	Rate	Rate
(ft)			(ft)			(ft)	(°/100usft)	(°/100usft)	(°/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



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Boone 16 State Com 3H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3779.20ft (Scandril Freedom)
Site:	Sec. 21, T 21 S. , R 33 E	MD Reference:	KB=26' @ 3779.20ft (Scandril Freedom)
Well:	Boone 16 State Com 3H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Plan#1	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)
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



Integrity Directional Services, LLC

Survey Report



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Boone 16 State Com 3H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3779.20ft (Scandrill Freedom)
Site:	Sec. 21, T 21 S. , R 33 E	MD Reference:	KB=26' @ 3779.20ft (Scandrill Freedom)
Well:	Boone 16 State Com 3H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Plan#1	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)
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



Integrity Directional Services, LLC

Survey Report



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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
11,317.61	0.00	0.00	11,317.61	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 12.00									
11,400.00	9.89	347.00	11,399.59	6.91	-1.60	6.94	12.00	12.00	0.00
11,500.00	21.89	347.00	11,495.60	33.53	-7.74	33.69	12.00	12.00	0.00
11,600.00	33.89	347.00	11,583.82	79.02	-18.24	79.40	12.00	12.00	0.00
11,700.00	45.89	347.00	11,660.41	141.39	-32.64	142.06	12.00	12.00	0.00
11,800.00	57.89	347.00	11,722.02	217.92	-50.31	218.94	12.00	12.00	0.00
11,900.00	69.89	347.00	11,765.96	305.25	-70.47	306.68	12.00	12.00	0.00
12,000.00	81.89	347.00	11,790.30	399.57	-92.25	401.45	12.00	12.00	0.00
12,076.28	91.04	347.00	11,795.00	473.67	-109.36	475.90	12.00	12.00	0.00
Start DLS 4.00 TFO 89.91									
12,100.00	91.04	347.95	11,794.57	496.83	-114.50	499.16	4.00	0.01	4.00
12,200.00	91.04	351.95	11,792.75	595.25	-131.95	597.94	4.00	0.00	4.00
12,300.00	91.04	355.95	11,790.93	694.66	-142.48	697.55	4.00	0.00	4.00
12,389.23	91.04	359.52	11,789.31	783.80	-146.01	786.74	4.00	-0.01	4.00
Start 9925.59 hold at 12389.23 MD									
12,400.00	91.04	359.52	11,789.11	794.56	-146.10	797.50	0.00	0.00	0.00
12,500.00	91.04	359.52	11,787.31	894.54	-146.93	897.48	0.00	0.00	0.00
12,600.00	91.04	359.52	11,785.50	994.52	-147.77	997.45	0.00	0.00	0.00
12,700.00	91.04	359.52	11,783.69	1,094.50	-148.61	1,097.43	0.00	0.00	0.00
12,800.00	91.04	359.52	11,781.89	1,194.48	-149.44	1,197.40	0.00	0.00	0.00
12,900.00	91.04	359.52	11,780.08	1,294.46	-150.28	1,297.38	0.00	0.00	0.00
13,000.00	91.04	359.52	11,778.27	1,394.44	-151.12	1,397.35	0.00	0.00	0.00
13,100.00	91.04	359.52	11,776.47	1,494.42	-151.96	1,497.33	0.00	0.00	0.00
13,200.00	91.04	359.52	11,774.66	1,594.40	-152.79	1,597.31	0.00	0.00	0.00
13,300.00	91.04	359.52	11,772.85	1,694.38	-153.63	1,697.28	0.00	0.00	0.00
13,400.00	91.04	359.52	11,771.05	1,794.36	-154.47	1,797.26	0.00	0.00	0.00



Integrity Directional Services, LLC

Survey Report



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Boone 16 State Com 3H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3779.20ft (Scandril Freedom)
Site:	Sec. 21, T 21 S. , R 33 E	MD Reference:	KB=26' @ 3779.20ft (Scandril Freedom)
Well:	Boone 16 State Com 3H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Plan#1	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)
13,500.00	91.04	359.52	11,769.24	1,894.34	-155.30	1,897.23	0.00	0.00	0.00
13,600.00	91.04	359.52	11,767.44	1,994.32	-156.14	1,997.21	0.00	0.00	0.00
13,700.00	91.04	359.52	11,765.63	2,094.30	-156.98	2,097.18	0.00	0.00	0.00
13,800.00	91.04	359.52	11,763.82	2,194.28	-157.82	2,197.16	0.00	0.00	0.00
13,900.00	91.04	359.52	11,762.02	2,294.26	-158.65	2,297.13	0.00	0.00	0.00
14,000.00	91.04	359.52	11,760.21	2,394.24	-159.49	2,397.11	0.00	0.00	0.00
14,100.00	91.04	359.52	11,758.40	2,494.22	-160.33	2,497.08	0.00	0.00	0.00
14,200.00	91.04	359.52	11,756.60	2,594.20	-161.17	2,597.06	0.00	0.00	0.00
14,300.00	91.04	359.52	11,754.79	2,694.18	-162.00	2,697.03	0.00	0.00	0.00
14,400.00	91.04	359.52	11,752.98	2,794.16	-162.84	2,797.01	0.00	0.00	0.00
14,500.00	91.04	359.52	11,751.18	2,894.14	-163.68	2,896.98	0.00	0.00	0.00
14,600.00	91.04	359.52	11,749.37	2,994.12	-164.51	2,996.96	0.00	0.00	0.00
14,700.00	91.04	359.52	11,747.56	3,094.10	-165.35	3,096.93	0.00	0.00	0.00
14,800.00	91.04	359.52	11,745.76	3,194.08	-166.19	3,196.91	0.00	0.00	0.00
14,900.00	91.04	359.52	11,743.95	3,294.06	-167.03	3,296.88	0.00	0.00	0.00
15,000.00	91.04	359.52	11,742.14	3,394.04	-167.86	3,396.86	0.00	0.00	0.00
15,100.00	91.04	359.52	11,740.34	3,494.02	-168.70	3,496.83	0.00	0.00	0.00
15,200.00	91.04	359.52	11,738.53	3,594.01	-169.54	3,596.81	0.00	0.00	0.00
15,300.00	91.04	359.52	11,736.72	3,693.99	-170.37	3,696.78	0.00	0.00	0.00
15,400.00	91.04	359.52	11,734.92	3,793.97	-171.21	3,796.76	0.00	0.00	0.00
15,500.00	91.04	359.52	11,733.11	3,893.95	-172.05	3,896.74	0.00	0.00	0.00
15,600.00	91.04	359.52	11,731.30	3,993.93	-172.89	3,996.71	0.00	0.00	0.00
15,700.00	91.04	359.52	11,729.50	4,093.91	-173.72	4,096.69	0.00	0.00	0.00
15,800.00	91.04	359.52	11,727.69	4,193.89	-174.56	4,196.66	0.00	0.00	0.00
15,900.00	91.04	359.52	11,725.89	4,293.87	-175.40	4,296.64	0.00	0.00	0.00
16,000.00	91.04	359.52	11,724.08	4,393.85	-176.23	4,396.61	0.00	0.00	0.00
16,100.00	91.04	359.52	11,722.27	4,493.83	-177.07	4,496.59	0.00	0.00	0.00
16,200.00	91.04	359.52	11,720.47	4,593.81	-177.91	4,596.56	0.00	0.00	0.00
16,300.00	91.04	359.52	11,718.66	4,693.79	-178.75	4,696.54	0.00	0.00	0.00
16,400.00	91.04	359.52	11,716.85	4,793.77	-179.58	4,796.51	0.00	0.00	0.00
16,500.00	91.04	359.52	11,715.05	4,893.75	-180.42	4,896.49	0.00	0.00	0.00
16,600.00	91.04	359.52	11,713.24	4,993.73	-181.26	4,996.46	0.00	0.00	0.00
16,700.00	91.04	359.52	11,711.43	5,093.71	-182.09	5,096.44	0.00	0.00	0.00
16,800.00	91.04	359.52	11,709.63	5,193.69	-182.93	5,196.41	0.00	0.00	0.00
16,900.00	91.04	359.52	11,707.82	5,293.67	-183.77	5,296.39	0.00	0.00	0.00
17,000.00	91.04	359.52	11,706.01	5,393.65	-184.61	5,396.36	0.00	0.00	0.00
17,100.00	91.04	359.52	11,704.21	5,493.63	-185.44	5,496.34	0.00	0.00	0.00
17,200.00	91.04	359.52	11,702.40	5,593.61	-186.28	5,596.31	0.00	0.00	0.00
17,300.00	91.04	359.52	11,700.59	5,693.59	-187.12	5,696.29	0.00	0.00	0.00
17,400.00	91.04	359.52	11,698.79	5,793.57	-187.95	5,796.26	0.00	0.00	0.00
17,500.00	91.04	359.52	11,696.98	5,893.55	-188.79	5,896.24	0.00	0.00	0.00
17,600.00	91.04	359.52	11,695.17	5,993.53	-189.63	5,996.21	0.00	0.00	0.00
17,700.00	91.04	359.52	11,693.37	6,093.51	-190.47	6,096.19	0.00	0.00	0.00



Integrity Directional Services, LLC

Survey Report



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Boone 16 State Com 3H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3779.20ft (Scandrill Freedom)
Site:	Sec. 21, T 21 S. , R 33 E	MD Reference:	KB=26' @ 3779.20ft (Scandrill Freedom)
Well:	Boone 16 State Com 3H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Plan#1	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)
17,800.00	91.04	359.52	11,691.56	6,193.49	-191.30	6,196.16	0.00	0.00	0.00
17,900.00	91.04	359.52	11,689.75	6,293.47	-192.14	6,296.14	0.00	0.00	0.00
18,000.00	91.04	359.52	11,687.95	6,393.45	-192.98	6,396.12	0.00	0.00	0.00
18,100.00	91.04	359.52	11,686.14	6,493.43	-193.81	6,496.09	0.00	0.00	0.00
18,200.00	91.04	359.52	11,684.34	6,593.41	-194.65	6,596.07	0.00	0.00	0.00
18,300.00	91.04	359.52	11,682.53	6,693.39	-195.49	6,696.04	0.00	0.00	0.00
18,400.00	91.04	359.52	11,680.72	6,793.37	-196.33	6,796.02	0.00	0.00	0.00
18,500.00	91.04	359.52	11,678.92	6,893.35	-197.16	6,895.99	0.00	0.00	0.00
18,600.00	91.04	359.52	11,677.11	6,993.33	-198.00	6,995.97	0.00	0.00	0.00
18,700.00	91.04	359.52	11,675.30	7,093.31	-198.84	7,095.94	0.00	0.00	0.00
18,800.00	91.04	359.52	11,673.50	7,193.29	-199.68	7,195.92	0.00	0.00	0.00
18,900.00	91.04	359.52	11,671.69	7,293.27	-200.51	7,295.89	0.00	0.00	0.00
19,000.00	91.04	359.52	11,669.88	7,393.25	-201.35	7,395.87	0.00	0.00	0.00
19,100.00	91.04	359.52	11,668.08	7,493.23	-202.19	7,495.84	0.00	0.00	0.00
19,200.00	91.04	359.52	11,666.27	7,593.21	-203.02	7,595.82	0.00	0.00	0.00
19,300.00	91.04	359.52	11,664.46	7,693.19	-203.86	7,695.79	0.00	0.00	0.00
19,400.00	91.04	359.52	11,662.66	7,793.17	-204.70	7,795.77	0.00	0.00	0.00
19,500.00	91.04	359.52	11,660.85	7,893.15	-205.54	7,895.74	0.00	0.00	0.00
19,600.00	91.04	359.52	11,659.04	7,993.13	-206.37	7,995.72	0.00	0.00	0.00
19,700.00	91.04	359.52	11,657.24	8,093.11	-207.21	8,095.69	0.00	0.00	0.00
19,800.00	91.04	359.52	11,655.43	8,193.09	-208.05	8,195.67	0.00	0.00	0.00
19,900.00	91.04	359.52	11,653.62	8,293.07	-208.88	8,295.64	0.00	0.00	0.00
20,000.00	91.04	359.52	11,651.82	8,393.05	-209.72	8,395.62	0.00	0.00	0.00
20,100.00	91.04	359.52	11,650.01	8,493.03	-210.56	8,495.59	0.00	0.00	0.00
20,200.00	91.04	359.52	11,648.20	8,593.01	-211.40	8,595.57	0.00	0.00	0.00
20,300.00	91.04	359.52	11,646.40	8,692.99	-212.23	8,695.55	0.00	0.00	0.00
20,400.00	91.04	359.52	11,644.59	8,792.97	-213.07	8,795.52	0.00	0.00	0.00
20,500.00	91.04	359.52	11,642.79	8,892.95	-213.91	8,895.50	0.00	0.00	0.00
20,600.00	91.04	359.52	11,640.98	8,992.93	-214.74	8,995.47	0.00	0.00	0.00
20,700.00	91.04	359.52	11,639.17	9,092.91	-215.58	9,095.45	0.00	0.00	0.00
20,800.00	91.04	359.52	11,637.37	9,192.90	-216.42	9,195.42	0.00	0.00	0.00
20,900.00	91.04	359.52	11,635.56	9,292.88	-217.26	9,295.40	0.00	0.00	0.00
21,000.00	91.04	359.52	11,633.75	9,392.86	-218.09	9,395.37	0.00	0.00	0.00
21,100.00	91.04	359.52	11,631.95	9,492.84	-218.93	9,495.35	0.00	0.00	0.00
21,200.00	91.04	359.52	11,630.14	9,592.82	-219.77	9,595.32	0.00	0.00	0.00
21,300.00	91.04	359.52	11,628.33	9,692.80	-220.60	9,695.30	0.00	0.00	0.00
21,400.00	91.04	359.52	11,626.53	9,792.78	-221.44	9,795.27	0.00	0.00	0.00
21,500.00	91.04	359.52	11,624.72	9,892.76	-222.28	9,895.25	0.00	0.00	0.00
21,600.00	91.04	359.52	11,622.91	9,992.74	-223.12	9,995.22	0.00	0.00	0.00
21,700.00	91.04	359.52	11,621.11	10,092.72	-223.95	10,095.20	0.00	0.00	0.00
21,800.00	91.04	359.52	11,619.30	10,192.70	-224.79	10,195.17	0.00	0.00	0.00
21,900.00	91.04	359.52	11,617.49	10,292.68	-225.63	10,295.15	0.00	0.00	0.00
22,000.00	91.04	359.52	11,615.69	10,392.66	-226.46	10,395.12	0.00	0.00	0.00
22,100.00	91.04	359.52	11,613.88	10,492.64	-227.30	10,495.10	0.00	0.00	0.00



Integrity Directional Services, LLC
Survey Report



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Boone 16 State Com 3H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3779.20ft (Scandril Freedom)
Site:	Sec. 21, T 21 S., R 33 E	MD Reference:	KB=26' @ 3779.20ft (Scandril Freedom)
Well:	Boone 16 State Com 3H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Plan#1	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)
22,200.00	91.04	359.52	11,612.07	10,592.62	-228.14	10,595.07	0.00	0.00	0.00
22,300.00	91.04	359.52	11,610.27	10,692.60	-228.98	10,695.05	0.00	0.00	0.00
22,314.83	91.04	359.52	11,610.00	10,707.42	-229.10	10,709.87	0.00	0.00	0.00
TD at 22314.83									

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									
3H Drilling Window 5C	0.00	0.00	0.00	679.08	-145.65	536,394.5775	732,590.3507	32° 28' 20.644 N	103° 34' 44.926 W
- plan misses target center by 694.52ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Rectangle (sides W100.00 H10,028.34 D0.00)									
Boone 16 St. Com 3H	0.00	0.00	11,610.00	10,707.42	-229.10	546,422.9000	732,506.9000	32° 29' 59.881 N	103° 34' 45.072 W
- plan hits target center									
- Point									
Boone 16 St. Com 3H	0.00	0.00	11,613.98	10,487.01	-227.33	546,202.4840	732,508.6739	32° 29' 57.700 N	103° 34' 45.070 W
- plan misses target center by 0.07ft at 22094.37ft MD (11613.98 TVD, 10487.01 N, -227.25 E)									
- Point									
Boone 16 St. Com 3H	0.00	0.00	11,791.21	679.08	-145.65	536,394.5775	732,590.3507	32° 28' 20.644 N	103° 34' 44.926 W
- plan misses target center by 4.34ft at 12284.83ft MD (11791.20 TVD, 679.54 N, -141.33 E)									
- Point									

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment
11,318	11,318	0	0	Start Build 12.00
12,076	11,795	474	-109	Start DLS 4.00 TFO 89.91
12,389	11,789	784	-146	Start 9925.59 hold at 12389.23 MD
22,315	11,610	10,707	-229	TD at 22314.83

Checked By: _____ Approved By: _____ Date: _____