



COG Operating L L C
 Project: Lea County, NM (NAD27 NME)
 Site: Sec. 17, T 26 S., R 33 E
 Well: Vast State 25H
 Wellbore: Wellbore #1
 Plan: Plan #1 (Vast State 25H/Wellbore #1)

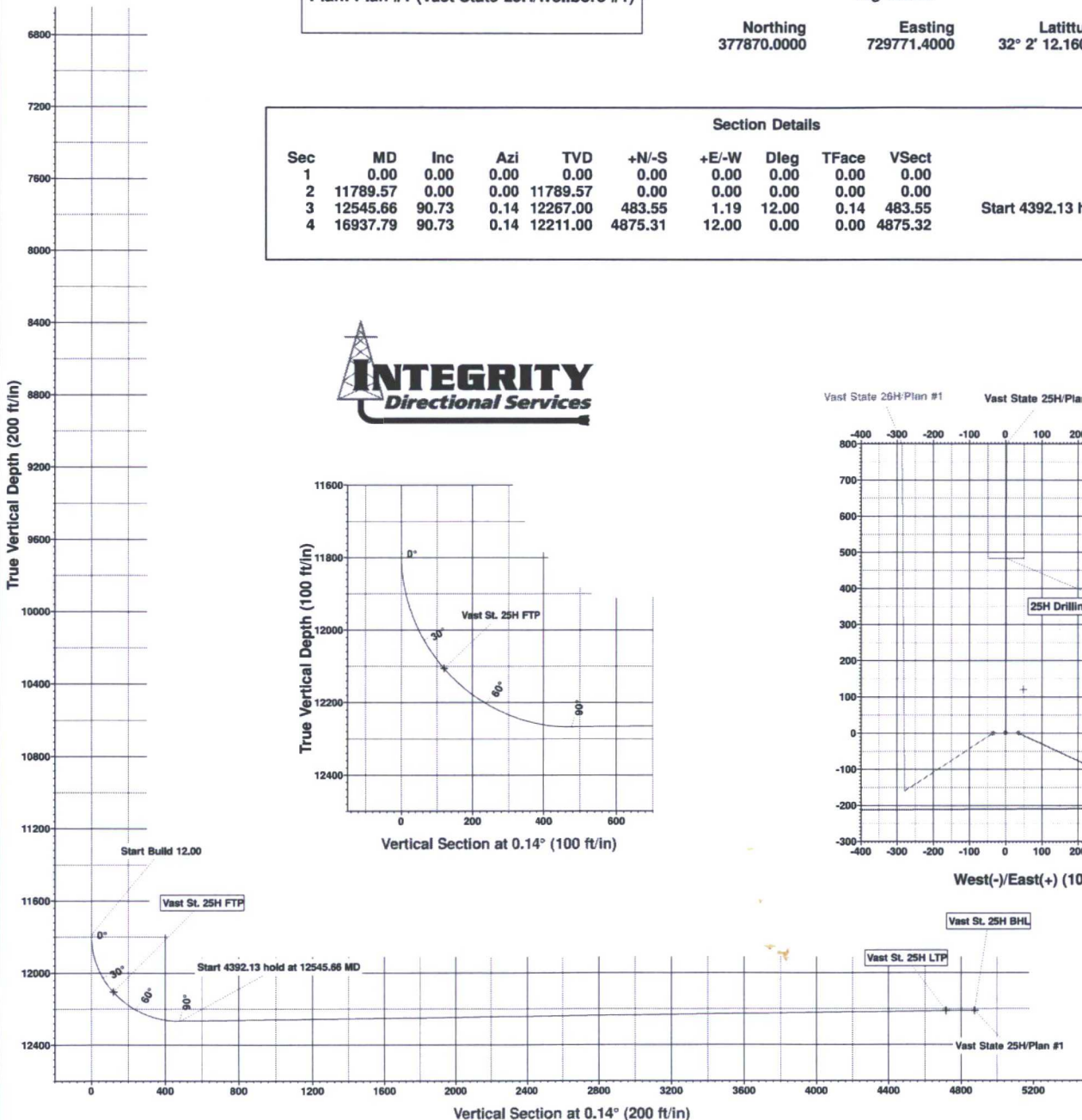
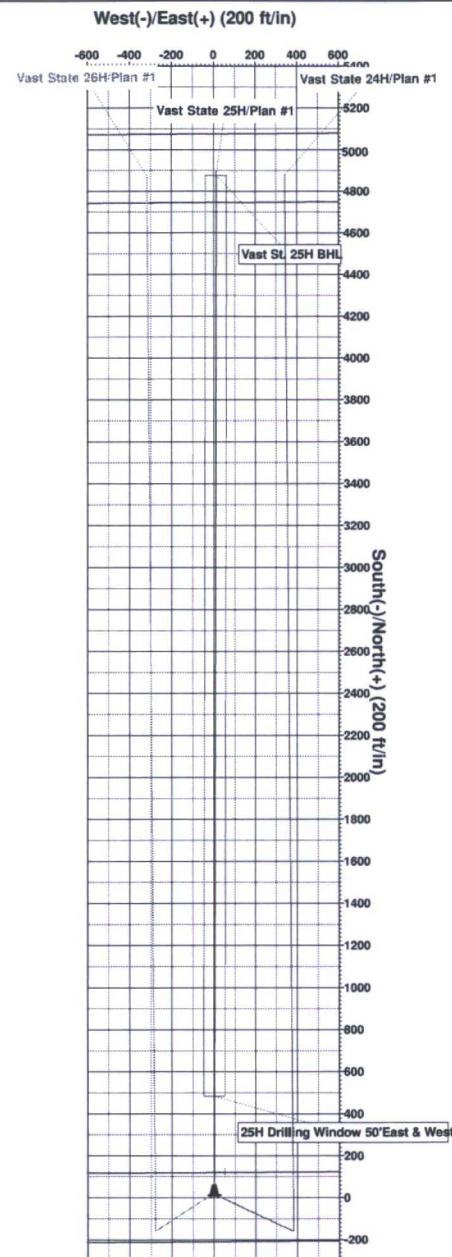
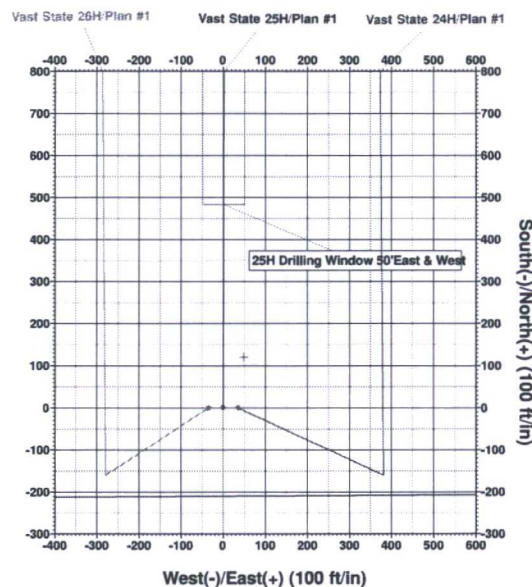
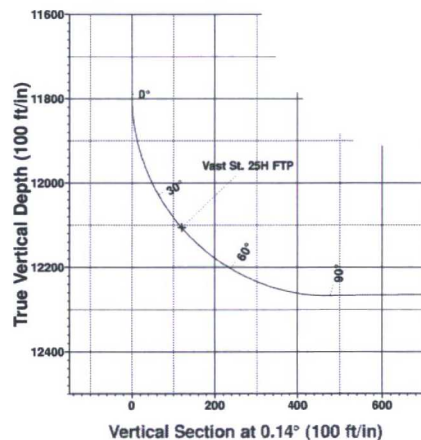
WELL DETAILS: Vast State 25H

Ground Elevation:: 3262.00
 RKB Elevation: KB=28' @ 3290.00ft
 Rig Name:

Northing 377870.0000 Easting 729771.4000 Latitude 32° 2' 12.160 N Longitude 103° 35' 30.610 W

Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	11789.57	0.00	0.00	11789.57	0.00	0.00	0.00	0.00	0.00	Start Build 12.00
3	12545.66	90.73	0.14	12267.00	483.55	1.19	12.00	0.14	483.55	Start 4392.13 hold at 12545.66 MD
4	16937.79	90.73	0.14	12211.00	4875.31	12.00	0.00	0.00	4875.32	TD at 16937.79



Mag Azimuths to Grid North
 True North: -0.39°
 Magnetic North: 6.61°
 Magnetic Field
 Strength: 47871.3nT
 Dip Angle: 59.89°
 Date: 1/6/2017
 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



COG Operating L L C

Lea County, NM (NAD27 NME)

Sec. 17, T 26 S. , R 33 E

Vast State 25H

Wellbore #1

Plan: Plan #1

Standard Survey Report

06 January, 2017





Integrity Directional Services, LLC
Survey Report



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Vast State 25H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=28' @ 3290.00ft
Site:	Sec. 17, T 26 S. , R 33 E	MD Reference:	KB=28' @ 3290.00ft
Well:	Vast State 25H	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. 17, T 26 S. , R 33 E		
Site Position:		Northing:	377,872.3000 usft
From:	Map	Easting:	730,181.4000 usft
Position Uncertainty:	5.00 ft	Slot Radius:	13-3/16 "
		Latitude:	32° 2' 12.155 N
		Longitude:	103° 35' 25.847 W
		Grid Convergence:	0.39 °

Well	Vast State 25H		
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° 2' 12.160 N
		Longitude:	103° 35' 30.610 W
		Ground Level:	3,262.00 ft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2015	1/6/2017	7.00
			Dip Angle (°)
			59.89
			Field Strength (nT)
			47,871

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 (°)
			0.14

Survey Tool Program	Date 1/6/2017		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name
0.00	16,937.67	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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Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=28' @ 3290.00ft
Site:	Sec. 17, T 26 S. , R 33 E	MD Reference:	KB=28' @ 3290.00ft
Well:	Vast State 25H	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

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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
11,789.57	0.00	0.00	11,789.57	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 12.00									
11,800.00	1.25	0.14	11,800.00	0.11	0.00	0.11	12.00	12.00	0.00
11,900.00	13.25	0.14	11,899.02	12.71	0.03	12.71	12.00	12.00	0.00
12,000.00	25.25	0.14	11,993.25	45.62	0.11	45.63	12.00	12.00	0.00
12,100.00	37.25	0.14	12,078.59	97.41	0.24	97.41	12.00	12.00	0.00
12,200.00	49.25	0.14	12,151.29	165.80	0.41	165.81	12.00	12.00	0.00
12,300.00	61.25	0.14	12,208.18	247.82	0.61	247.82	12.00	12.00	0.00
12,400.00	73.25	0.14	12,246.78	339.87	0.84	339.87	12.00	12.00	0.00
12,500.00	85.25	0.14	12,265.40	437.94	1.08	437.94	12.00	12.00	0.00
12,545.66	90.73	0.14	12,267.00	483.55	1.19	483.55	12.00	12.00	0.00
Start 4392.13 hold at 12545.66 MD									
12,600.00	90.73	0.14	12,266.30	537.89	1.32	537.89	0.00	0.00	0.00
12,700.00	90.73	0.14	12,265.03	637.88	1.57	637.88	0.00	0.00	0.00
12,800.00	90.73	0.14	12,263.75	737.87	1.82	737.87	0.00	0.00	0.00
12,900.00	90.73	0.14	12,262.48	837.86	2.06	837.87	0.00	0.00	0.00
13,000.00	90.73	0.14	12,261.20	937.85	2.31	937.86	0.00	0.00	0.00
13,100.00	90.73	0.14	12,259.93	1,037.85	2.55	1,037.85	0.00	0.00	0.00
13,200.00	90.73	0.14	12,258.65	1,137.84	2.80	1,137.84	0.00	0.00	0.00
13,300.00	90.73	0.14	12,257.38	1,237.83	3.05	1,237.83	0.00	0.00	0.00
13,400.00	90.73	0.14	12,256.10	1,337.82	3.29	1,337.83	0.00	0.00	0.00
13,500.00	90.73	0.14	12,254.83	1,437.81	3.54	1,437.82	0.00	0.00	0.00
13,600.00	90.73	0.14	12,253.55	1,537.80	3.79	1,537.81	0.00	0.00	0.00



Integrity Directional Services, LLC

Survey Report



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Vast State 25H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=28' @ 3290.00ft
Site:	Sec. 17, T 26 S. , R 33 E	MD Reference:	KB=28' @ 3290.00ft
Well:	Vast State 25H	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)
13,700.00	90.73	0.14	12,252.28	1,637.80	4.03	1,637.80	0.00	0.00	0.00
13,800.00	90.73	0.14	12,251.00	1,737.79	4.28	1,737.79	0.00	0.00	0.00
13,900.00	90.73	0.14	12,249.73	1,837.78	4.52	1,837.78	0.00	0.00	0.00
14,000.00	90.73	0.14	12,248.45	1,937.77	4.77	1,937.78	0.00	0.00	0.00
14,100.00	90.73	0.14	12,247.18	2,037.76	5.02	2,037.77	0.00	0.00	0.00
14,200.00	90.73	0.14	12,245.91	2,137.75	5.26	2,137.76	0.00	0.00	0.00
14,300.00	90.73	0.14	12,244.63	2,237.75	5.51	2,237.75	0.00	0.00	0.00
14,400.00	90.73	0.14	12,243.36	2,337.74	5.75	2,337.74	0.00	0.00	0.00
14,500.00	90.73	0.14	12,242.08	2,437.73	6.00	2,437.74	0.00	0.00	0.00
14,600.00	90.73	0.14	12,240.81	2,537.72	6.25	2,537.73	0.00	0.00	0.00
14,700.00	90.73	0.14	12,239.53	2,637.71	6.49	2,637.72	0.00	0.00	0.00
14,800.00	90.73	0.14	12,238.26	2,737.70	6.74	2,737.71	0.00	0.00	0.00
14,900.00	90.73	0.14	12,236.98	2,837.69	6.98	2,837.70	0.00	0.00	0.00
15,000.00	90.73	0.14	12,235.71	2,937.69	7.23	2,937.70	0.00	0.00	0.00
15,100.00	90.73	0.14	12,234.43	3,037.68	7.48	3,037.69	0.00	0.00	0.00
15,200.00	90.73	0.14	12,233.16	3,137.67	7.72	3,137.68	0.00	0.00	0.00
15,300.00	90.73	0.14	12,231.88	3,237.66	7.97	3,237.67	0.00	0.00	0.00
15,400.00	90.73	0.14	12,230.61	3,337.65	8.22	3,337.66	0.00	0.00	0.00
15,500.00	90.73	0.14	12,229.33	3,437.64	8.46	3,437.65	0.00	0.00	0.00
15,600.00	90.73	0.14	12,228.06	3,537.64	8.71	3,537.65	0.00	0.00	0.00
15,700.00	90.73	0.14	12,226.78	3,637.63	8.95	3,637.64	0.00	0.00	0.00
15,800.00	90.73	0.14	12,225.51	3,737.62	9.20	3,737.63	0.00	0.00	0.00
15,900.00	90.73	0.14	12,224.23	3,837.61	9.45	3,837.62	0.00	0.00	0.00
16,000.00	90.73	0.14	12,222.96	3,937.60	9.69	3,937.61	0.00	0.00	0.00
16,100.00	90.73	0.14	12,221.68	4,037.59	9.94	4,037.61	0.00	0.00	0.00
16,200.00	90.73	0.14	12,220.41	4,137.59	10.18	4,137.60	0.00	0.00	0.00
16,300.00	90.73	0.14	12,219.13	4,237.58	10.43	4,237.59	0.00	0.00	0.00
16,400.00	90.73	0.14	12,217.86	4,337.57	10.68	4,337.58	0.00	0.00	0.00
16,500.00	90.73	0.14	12,216.58	4,437.56	10.92	4,437.57	0.00	0.00	0.00
16,600.00	90.73	0.14	12,215.31	4,537.55	11.17	4,537.57	0.00	0.00	0.00
16,700.00	90.73	0.14	12,214.03	4,637.54	11.41	4,637.56	0.00	0.00	0.00
16,800.00	90.73	0.14	12,212.76	4,737.53	11.66	4,737.55	0.00	0.00	0.00
16,900.00	90.73	0.14	12,211.48	4,837.53	11.91	4,837.54	0.00	0.00	0.00
16,937.79	90.73	0.14	12,211.00	4,875.31	12.00	4,875.32	0.00	0.00	0.00

TD at 16937.79



Integrity Directional Services, LLC

Survey Report



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Vast State 25H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=28' @ 3290.00ft
Site:	Sec. 17, T 26 S. , R 33 E	MD Reference:	KB=28' @ 3290.00ft
Well:	Vast State 25H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1	Database:	EDM 5000.1 Multi User Db

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
25H Drilling Window 5 - plan misses target center by 483.55ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E) - Rectangle (sides W100.00 H4,392.13 D0.00)	0.00	0.00	0.00	483.55	1.19	378,353.5490	729,772.5900	32° 2' 16.945 N	103° 35' 30.558 W
Vast St. 25H FTP - plan misses target center by 48.60ft at 12135.97ft MD (12106.37 TVD, 120.24 N, 0.30 E) - Point	0.00	0.00	12,106.3 3	120.20	48.90	377,990.2000	729,820.3000	32° 2' 13.346 N	103° 35' 30.032 W
Vast St. 25H BHL - plan hits target center - Point	0.00	0.00	12,211.00	4,875.31	12.00	382,745.3000	729,783.4000	32° 3' 0.404 N	103° 35' 30.082 W
Vast St. 25H LTP - plan misses target center by 41186.52ft at 16779.01ft MD (12213.02 TVD, 4716.55 N, 11.61 E) - Point	0.00	0.00	12,211.73	4,817.91	-41,174.78	382,687.9000	688,596.7000	32° 3' 2.385 N	103° 43' 28.620 W

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
11,790	11,790	0	0	Start Build 12.00
12,546	12,267	484	1	Start 4392.13 hold at 12545.66 MD
16,938	12,211	4875	12	TD at 16937.79

Checked By: _____ Approved By: _____ Date: _____