



COG Production L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 16, T 21 S. , R 33 E
Well: Warbler State Com 4H
Wellbore: Wellbore #1
Plan: Plan#1 (Warbler State Com 4H/Wellbore #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

West(-)/East(+) (400 ft/in)

-800 -400 0 400 800

Start Build 12.00

Start 2833.28 hold at 11192.53 MD

Start Build 2.00

Start 2783.60 hold at 14042.55 MD

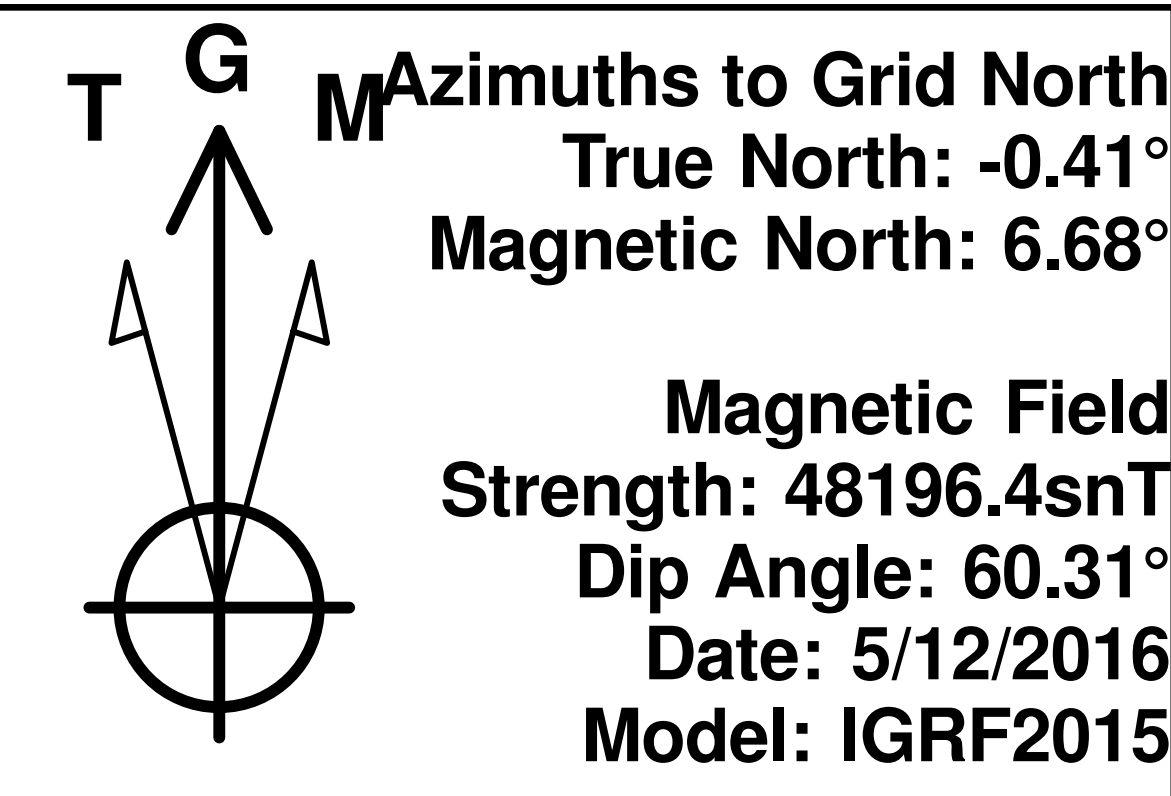
Start DLS 2.00 TFO 0.00

Start 4212.50 hold at 16864.19 MD

TD at 21076.69

Warbler State Com 4H BHL

Warbler State Com 4H/Plan#1



WELL DETAILS: Warbler State Com 4H

Ground Elevation:: 3758.00
RKB Elevation: KB=27' @ 3785.00ft
Rig Name:

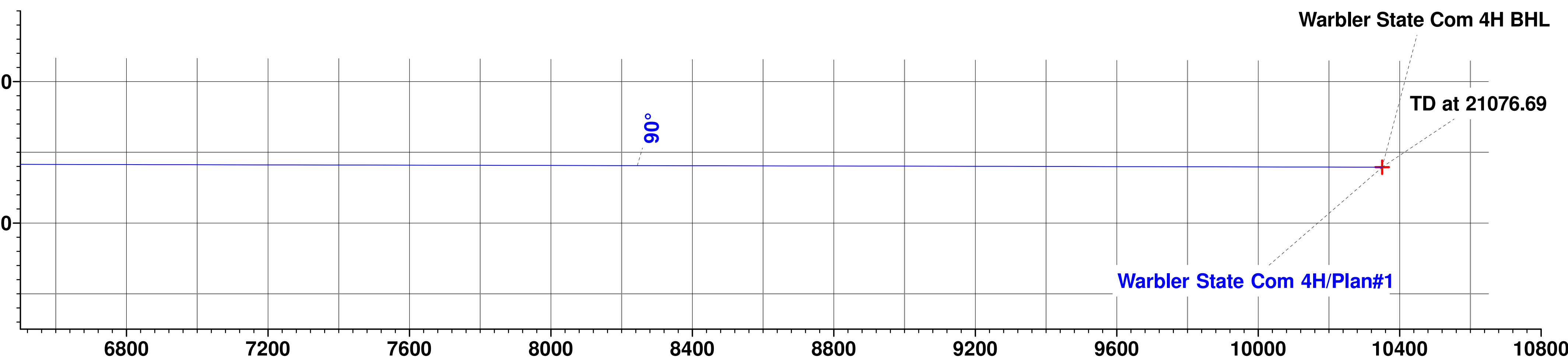
Northing	Easting	Latitude	Longitude
536198.50	735349.90	32° 28' 18.509 N	103° 34' 12.732 W

Section Details

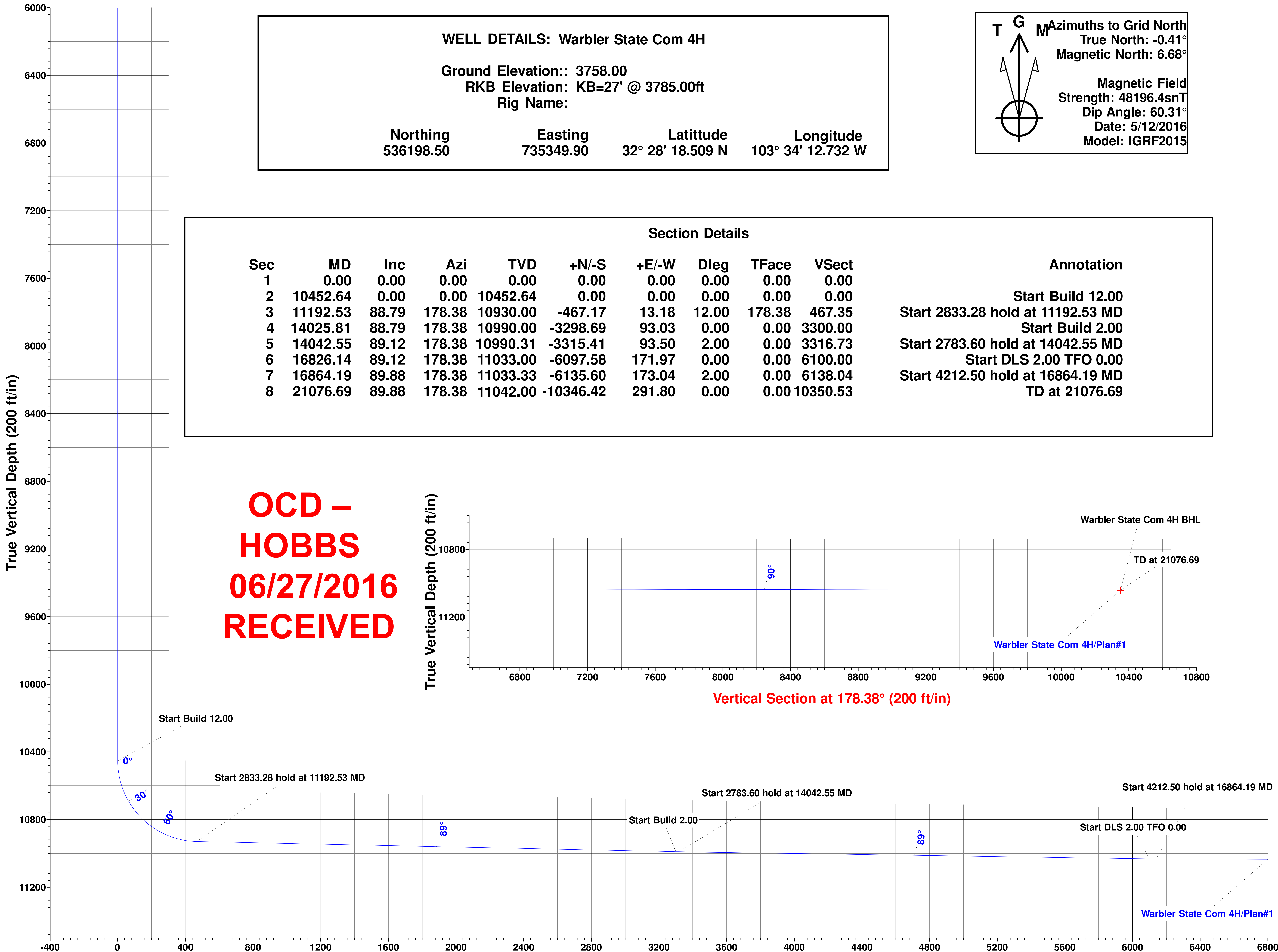
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Start Build 12.00
2	10452.64	0.00	0.00	10452.64	0.00	0.00	0.00	0.00	0.00	Start 2833.28 hold at 11192.53 MD
3	11192.53	88.79	178.38	10930.00	-467.17	13.18	12.00	178.38	467.35	Start Build 2.00
4	14025.81	88.79	178.38	10990.00	-3298.69	93.03	0.00	0.00	3300.00	Start 2783.60 hold at 14042.55 MD
5	14042.55	89.12	178.38	10990.31	-3315.41	93.50	2.00	0.00	3316.73	Start DLS 2.00 TFO 0.00
6	16826.14	89.12	178.38	11033.00	-6097.58	171.97	0.00	0.00	6100.00	Start 4212.50 hold at 16864.19 MD
7	16864.19	89.88	178.38	11033.33	-6135.60	173.04	2.00	0.00	6138.04	TD at 21076.69
8	21076.69	89.88	178.38	11042.00	-10346.42	291.80	0.00	0.00	10350.53	

OCD –
HOBBS
06/27/2016
RECEIVED

True Vertical Depth (200 ft/in)



Vertical Section at 178.38° (200 ft/in)



Vertical Section at 178.38° (200 ft/in)

COG Production L L C

Lea County, NM (NAD27 NME)

Sec. 16, T 21 S. , R 33 E

Warbler State Com 4H

Wellbore #1

Plan: Plan#1

Standard Survey Report

12 May, 2016

Integrity Directional Services, LLC

Survey Report

Company:	COG Production L L C	Local Co-ordinate Reference:	Well Warbler State Com 4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=27' @ 3785.00ft
Site:	Sec. 16, T 21 S. , R 33 E	MD Reference:	KB=27' @ 3785.00ft
Well:	Warbler State Com 4H	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. 16, T 21 S. , R 33 E		
Site Position:		Northing:	536,198.50 usft
From:	Map	Easting:	735,349.90 usft
Position Uncertainty:	5.00 ft	Slot Radius:	13-3/16 "
		Latitude:	32° 28' 18.509 N
		Longitude:	103° 34' 12.732 W
		Grid Convergence:	0.41 °

Well	Warbler State Com 4H		
Well Position	+N/-S	0.00 ft	Northing: 536,198.50 usft
	+E/-W	0.00 ft	Easting: 735,349.90 usft
Position Uncertainty	5.00 ft	Wellhead Elevation:	0.00 ft
		Latitude:	32° 28' 18.509 N
		Longitude:	103° 34' 12.732 W
		Ground Level:	3,758.00 ft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2015	5/12/2016	7.09
			Dip Angle (°)
			60.31
			Field Strength (nT)
			48,196

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 (°)
			178.38

Survey Tool Program	Date 5/12/2016		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name
0.00	21,076.69	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=27' @ 3785.00ft
Site:	Sec. 16, T 21 S. , R 33 E	MD Reference:	KB=27' @ 3785.00ft
Well:	Warbler State Com 4H	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

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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)
5,400.00	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
10,452.64	0.00	0.00	10,452.64	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 12.00									
10,500.00	5.68	178.38	10,499.92	-2.35	0.07	2.35	12.00	12.00	0.00
10,600.00	17.68	178.38	10,597.67	-22.55	0.64	22.56	12.00	12.00	0.00
10,700.00	29.68	178.38	10,689.08	-62.63	1.77	62.65	12.00	12.00	0.00
10,800.00	41.68	178.38	10,770.16	-120.83	3.41	120.88	12.00	12.00	0.00
10,900.00	53.68	178.38	10,837.36	-194.61	5.49	194.69	12.00	12.00	0.00
11,000.00	65.68	178.38	10,887.75	-280.74	7.92	280.85	12.00	12.00	0.00
11,100.00	77.68	178.38	10,919.12	-375.46	10.59	375.61	12.00	12.00	0.00
11,192.53	88.79	178.38	10,930.00	-467.17	13.18	467.35	12.00	12.00	0.00
Start 2833.28 hold at 11192.53 MD									
11,200.00	88.79	178.38	10,930.16	-474.63	13.39	474.82	0.00	0.00	0.00
11,300.00	88.79	178.38	10,932.27	-574.57	16.20	574.80	0.00	0.00	0.00
11,400.00	88.79	178.38	10,934.39	-674.51	19.02	674.78	0.00	0.00	0.00
11,500.00	88.79	178.38	10,936.51	-774.45	21.84	774.76	0.00	0.00	0.00
11,600.00	88.79	178.38	10,938.63	-874.39	24.66	874.73	0.00	0.00	0.00
11,700.00	88.79	178.38	10,940.75	-974.32	27.48	974.71	0.00	0.00	0.00
11,800.00	88.79	178.38	10,942.86	-1,074.26	30.30	1,074.69	0.00	0.00	0.00
11,900.00	88.79	178.38	10,944.98	-1,174.20	33.12	1,174.67	0.00	0.00	0.00
12,000.00	88.79	178.38	10,947.10	-1,274.14	35.93	1,274.64	0.00	0.00	0.00
12,100.00	88.79	178.38	10,949.22	-1,374.08	38.75	1,374.62	0.00	0.00	0.00
12,200.00	88.79	178.38	10,951.34	-1,474.01	41.57	1,474.60	0.00	0.00	0.00
12,300.00	88.79	178.38	10,953.45	-1,573.95	44.39	1,574.58	0.00	0.00	0.00
12,400.00	88.79	178.38	10,955.57	-1,673.89	47.21	1,674.55	0.00	0.00	0.00
12,500.00	88.79	178.38	10,957.69	-1,773.83	50.03	1,774.53	0.00	0.00	0.00
12,600.00	88.79	178.38	10,959.81	-1,873.76	52.85	1,874.51	0.00	0.00	0.00
12,700.00	88.79	178.38	10,961.92	-1,973.70	55.66	1,974.49	0.00	0.00	0.00
12,800.00	88.79	178.38	10,964.04	-2,073.64	58.48	2,074.46	0.00	0.00	0.00
12,900.00	88.79	178.38	10,966.16	-2,173.58	61.30	2,174.44	0.00	0.00	0.00
13,000.00	88.79	178.38	10,968.28	-2,273.52	64.12	2,274.42	0.00	0.00	0.00
13,100.00	88.79	178.38	10,970.40	-2,373.45	66.94	2,374.40	0.00	0.00	0.00
13,200.00	88.79	178.38	10,972.51	-2,473.39	69.76	2,474.37	0.00	0.00	0.00
13,300.00	88.79	178.38	10,974.63	-2,573.33	72.58	2,574.35	0.00	0.00	0.00
13,400.00	88.79	178.38	10,976.75	-2,673.27	75.39	2,674.33	0.00	0.00	0.00
13,500.00	88.79	178.38	10,978.87	-2,773.20	78.21	2,774.31	0.00	0.00	0.00
13,600.00	88.79	178.38	10,980.98	-2,873.14	81.03	2,874.29	0.00	0.00	0.00

Integrity Directional Services, LLC

Survey Report

Company:	COG Production L L C	Local Co-ordinate Reference:	Well Warbler State Com 4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=27' @ 3785.00ft
Site:	Sec. 16, T 21 S. , R 33 E	MD Reference:	KB=27' @ 3785.00ft
Well:	Warbler State Com 4H	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	88.79	178.38	10,983.10	-2,973.08	83.85	2,974.26	0.00	0.00	0.00
13,800.00	88.79	178.38	10,985.22	-3,073.02	86.67	3,074.24	0.00	0.00	0.00
13,900.00	88.79	178.38	10,987.34	-3,172.96	89.49	3,174.22	0.00	0.00	0.00
14,000.00	88.79	178.38	10,989.46	-3,272.89	92.31	3,274.20	0.00	0.00	0.00
14,025.81	88.79	178.38	10,990.00	-3,298.69	93.03	3,300.00	0.00	0.00	0.00
Start Build 2.00									
14,042.55	89.12	178.38	10,990.31	-3,315.41	93.50	3,316.73	2.00	2.00	0.00
Start 2783.60 hold at 14042.55 MD									
14,100.00	89.12	178.38	10,991.19	-3,372.84	95.12	3,374.18	0.00	0.00	0.00
14,200.00	89.12	178.38	10,992.72	-3,472.79	97.94	3,474.17	0.00	0.00	0.00
14,300.00	89.12	178.38	10,994.26	-3,572.74	100.76	3,574.16	0.00	0.00	0.00
14,400.00	89.12	178.38	10,995.79	-3,672.68	103.58	3,674.14	0.00	0.00	0.00
14,500.00	89.12	178.38	10,997.32	-3,772.63	106.40	3,774.13	0.00	0.00	0.00
14,600.00	89.12	178.38	10,998.86	-3,872.58	109.22	3,874.12	0.00	0.00	0.00
14,700.00	89.12	178.38	11,000.39	-3,972.53	112.04	3,974.11	0.00	0.00	0.00
14,800.00	89.12	178.38	11,001.93	-4,072.48	114.86	4,074.10	0.00	0.00	0.00
14,900.00	89.12	178.38	11,003.46	-4,172.43	117.68	4,174.09	0.00	0.00	0.00
15,000.00	89.12	178.38	11,004.99	-4,272.38	120.49	4,274.07	0.00	0.00	0.00
15,100.00	89.12	178.38	11,006.53	-4,372.32	123.31	4,374.06	0.00	0.00	0.00
15,200.00	89.12	178.38	11,008.06	-4,472.27	126.13	4,474.05	0.00	0.00	0.00
15,300.00	89.12	178.38	11,009.59	-4,572.22	128.95	4,574.04	0.00	0.00	0.00
15,400.00	89.12	178.38	11,011.13	-4,672.17	131.77	4,674.03	0.00	0.00	0.00
15,500.00	89.12	178.38	11,012.66	-4,772.12	134.59	4,774.02	0.00	0.00	0.00
15,600.00	89.12	178.38	11,014.19	-4,872.07	137.41	4,874.00	0.00	0.00	0.00
15,700.00	89.12	178.38	11,015.73	-4,972.01	140.23	4,973.99	0.00	0.00	0.00
15,800.00	89.12	178.38	11,017.26	-5,071.96	143.04	5,073.98	0.00	0.00	0.00
15,900.00	89.12	178.38	11,018.80	-5,171.91	145.86	5,173.97	0.00	0.00	0.00
16,000.00	89.12	178.38	11,020.33	-5,271.86	148.68	5,273.96	0.00	0.00	0.00
16,100.00	89.12	178.38	11,021.86	-5,371.81	151.50	5,373.94	0.00	0.00	0.00
16,200.00	89.12	178.38	11,023.40	-5,471.76	154.32	5,473.93	0.00	0.00	0.00
16,300.00	89.12	178.38	11,024.93	-5,571.71	157.14	5,573.92	0.00	0.00	0.00
16,400.00	89.12	178.38	11,026.46	-5,671.65	159.96	5,673.91	0.00	0.00	0.00
16,500.00	89.12	178.38	11,028.00	-5,771.60	162.78	5,773.90	0.00	0.00	0.00
16,600.00	89.12	178.38	11,029.53	-5,871.55	165.60	5,873.89	0.00	0.00	0.00
16,700.00	89.12	178.38	11,031.07	-5,971.50	168.41	5,973.87	0.00	0.00	0.00
16,800.00	89.12	178.38	11,032.60	-6,071.45	171.23	6,073.86	0.00	0.00	0.00
16,826.14	89.12	178.38	11,033.00	-6,097.58	171.97	6,100.00	0.00	0.00	0.00
Start DLS 2.00 TFO 0.00									
16,864.19	89.88	178.38	11,033.33	-6,135.60	173.04	6,138.04	2.00	2.00	0.00
Start 4212.50 hold at 16864.19 MD									
16,900.00	89.88	178.38	11,033.41	-6,171.40	174.05	6,173.86	0.00	0.00	0.00
17,000.00	89.88	178.38	11,033.61	-6,271.36	176.87	6,273.86	0.00	0.00	0.00
17,100.00	89.88	178.38	11,033.82	-6,371.32	179.69	6,373.86	0.00	0.00	0.00
17,200.00	89.88	178.38	11,034.02	-6,471.28	182.51	6,473.86	0.00	0.00	0.00

Integrity Directional Services, LLC

Survey Report

Company:	COG Production L L C	Local Co-ordinate Reference:	Well Warbler State Com 4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=27' @ 3785.00ft
Site:	Sec. 16, T 21 S. , R 33 E	MD Reference:	KB=27' @ 3785.00ft
Well:	Warbler State Com 4H	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)
17,300.00	89.88	178.38	11,034.23	-6,571.24	185.33	6,573.86	0.00	0.00	0.00
17,400.00	89.88	178.38	11,034.43	-6,671.20	188.15	6,673.86	0.00	0.00	0.00
17,500.00	89.88	178.38	11,034.64	-6,771.16	190.97	6,773.86	0.00	0.00	0.00
17,600.00	89.88	178.38	11,034.85	-6,871.12	193.79	6,873.86	0.00	0.00	0.00
17,700.00	89.88	178.38	11,035.05	-6,971.08	196.61	6,973.86	0.00	0.00	0.00
17,800.00	89.88	178.38	11,035.26	-7,071.04	199.42	7,073.86	0.00	0.00	0.00
17,900.00	89.88	178.38	11,035.46	-7,171.00	202.24	7,173.86	0.00	0.00	0.00
18,000.00	89.88	178.38	11,035.67	-7,270.96	205.06	7,273.86	0.00	0.00	0.00
18,100.00	89.88	178.38	11,035.87	-7,370.92	207.88	7,373.86	0.00	0.00	0.00
18,200.00	89.88	178.38	11,036.08	-7,470.88	210.70	7,473.85	0.00	0.00	0.00
18,300.00	89.88	178.38	11,036.29	-7,570.84	213.52	7,573.85	0.00	0.00	0.00
18,400.00	89.88	178.38	11,036.49	-7,670.80	216.34	7,673.85	0.00	0.00	0.00
18,500.00	89.88	178.38	11,036.70	-7,770.76	219.16	7,773.85	0.00	0.00	0.00
18,600.00	89.88	178.38	11,036.90	-7,870.72	221.98	7,873.85	0.00	0.00	0.00
18,700.00	89.88	178.38	11,037.11	-7,970.68	224.80	7,973.85	0.00	0.00	0.00
18,800.00	89.88	178.38	11,037.31	-8,070.64	227.62	8,073.85	0.00	0.00	0.00
18,900.00	89.88	178.38	11,037.52	-8,170.60	230.44	8,173.85	0.00	0.00	0.00
19,000.00	89.88	178.38	11,037.73	-8,270.56	233.26	8,273.85	0.00	0.00	0.00
19,100.00	89.88	178.38	11,037.93	-8,370.52	236.07	8,373.85	0.00	0.00	0.00
19,200.00	89.88	178.38	11,038.14	-8,470.48	238.89	8,473.85	0.00	0.00	0.00
19,300.00	89.88	178.38	11,038.34	-8,570.44	241.71	8,573.85	0.00	0.00	0.00
19,400.00	89.88	178.38	11,038.55	-8,670.40	244.53	8,673.85	0.00	0.00	0.00
19,500.00	89.88	178.38	11,038.76	-8,770.36	247.35	8,773.85	0.00	0.00	0.00
19,600.00	89.88	178.38	11,038.96	-8,870.32	250.17	8,873.85	0.00	0.00	0.00
19,700.00	89.88	178.38	11,039.17	-8,970.29	252.99	8,973.85	0.00	0.00	0.00
19,800.00	89.88	178.38	11,039.37	-9,070.25	255.81	9,073.85	0.00	0.00	0.00
19,900.00	89.88	178.38	11,039.58	-9,170.21	258.63	9,173.85	0.00	0.00	0.00
20,000.00	89.88	178.38	11,039.78	-9,270.17	261.45	9,273.85	0.00	0.00	0.00
20,100.00	89.88	178.38	11,039.99	-9,370.13	264.27	9,373.85	0.00	0.00	0.00
20,200.00	89.88	178.38	11,040.20	-9,470.09	267.09	9,473.85	0.00	0.00	0.00
20,300.00	89.88	178.38	11,040.40	-9,570.05	269.90	9,573.85	0.00	0.00	0.00
20,400.00	89.88	178.38	11,040.61	-9,670.01	272.72	9,673.85	0.00	0.00	0.00
20,500.00	89.88	178.38	11,040.81	-9,769.97	275.54	9,773.85	0.00	0.00	0.00
20,600.00	89.88	178.38	11,041.02	-9,869.93	278.36	9,873.85	0.00	0.00	0.00
20,700.00	89.88	178.38	11,041.22	-9,969.89	281.18	9,973.85	0.00	0.00	0.00
20,800.00	89.88	178.38	11,041.43	-10,069.85	284.00	10,073.85	0.00	0.00	0.00
20,900.00	89.88	178.38	11,041.64	-10,169.81	286.82	10,173.85	0.00	0.00	0.00
21,000.00	89.88	178.38	11,041.84	-10,269.77	289.64	10,273.85	0.00	0.00	0.00
21,076.69	89.88	178.38	11,042.00	-10,346.42	291.80	10,350.53	0.00	0.00	0.00
TD at 21076.69									

Integrity Directional Services, LLC

Survey Report

Company:	COG Production L L C	Local Co-ordinate Reference:	Well Warbler State Com 4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=27' @ 3785.00ft
Site:	Sec. 16, T 21 S. , R 33 E	MD Reference:	KB=27' @ 3785.00ft
Well:	Warbler State Com 4H	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	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(ft)	(ft)	(ft)	(usft)	(usft)		
- Shape									
Warbler State Com 4H	0.00	0.00	11,042.00	-10,346.42	291.80	525,852.10	735,641.70	32° 26' 36.110 N	103° 34' 10.190 W
- plan hits target center									
- Point									

Plan Annotations

Measured Depth	Vertical Depth	Local Coordinates		Comment
(ft)	(ft)	+N/-S	+E/-W	
(ft)	(ft)	(ft)	(ft)	
10,453	10,453	0	0	Start Build 12.00
11,193	10,930	-467	13	Start 2833.28 hold at 11192.53 MD
14,026	10,990	-3299	93	Start Build 2.00
14,043	10,990	-3315	94	Start 2783.60 hold at 14042.55 MD
16,826	11,033	-6098	172	Start DLS 2.00 TFO 0.00
16,864	11,033	-6136	173	Start 4212.50 hold at 16864.19 MD
21,077	11,042	-10,346	292	TD at 21076.69

Checked By: _____ Approved By: _____ Date: _____