



COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 19, T 19 S., R 33 E
Well: Geronimo Federal Com 11H
Wellbore: Wellbore #1
Plan: Plan #1 (Geronimo Federal Com 11H/Wellbore #1)
Scandrift Freedom

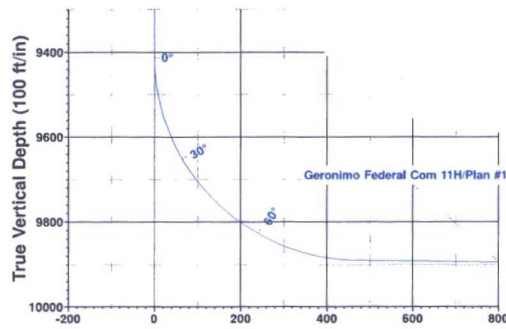
WELL DETAILS: Geronimo Federal Com 11H

Ground Elevation:: 3599.60
RKB Elevation: KB=26' @ 3625.60ft (Scandrift Freedom)
Rig Name: Scandrift Freedom

Northing 597166.40 Easting 692087.80 Latitude 32° 38' 24.583 N Longitude 103° 42' 33.536 W

Section Details

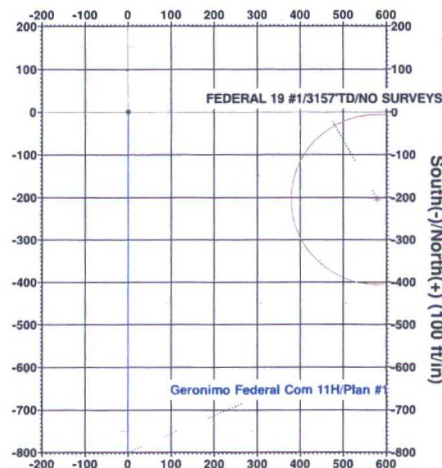
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	9412.56	0.00	0.00	9412.56	0.00	0.00	0.00	0.00	0.00
3	10157.64	89.41	180.03	9890.00	-472.55	-0.25	12.00	180.03	472.55
4	20837.29	89.41	180.03	10000.00	-11151.62	-5.90	0.00	0.00	11151.62



True Vertical Depth (200 ft/in)

Start Build 12.00

Start 10679.64 hold at 10157.64 MD

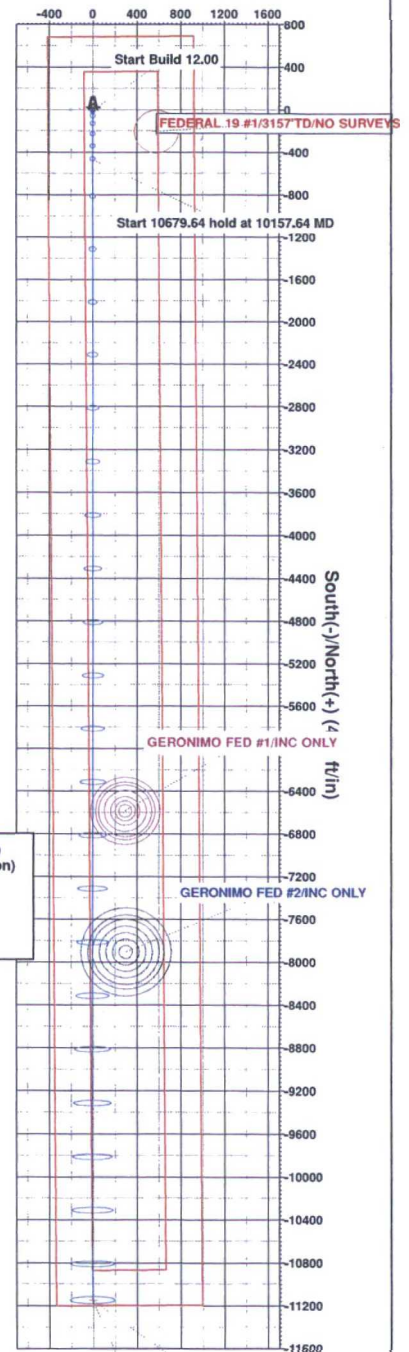


Vertical Section at 180.03° (200 ft/in)



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)



Geronimo Federal Com 11H/Plan #1

Geronimo Federal Com 11H PBHL



COG Operating L L C

Lea County, NM (NAD27 NME)

Sec. 19, T 19 S., R 33 E

Geronimo Federal Com 11H

Wellbore #1

Plan: Plan #1

Standard Survey Report

01 July, 2016

HOBBS OCD
DEC 19 2016
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Integrity Directional Services, LLC

Survey Report



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Geronimo Federal Com 11H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3625.60ft (Scandrell Freedom)
Site:	Sec. 19, T 19 S., R 33 E	MD Reference:	KB=26' @ 3625.60ft (Scandrell Freedom)
Well:	Geronimo Federal Com 11H	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. 19, T 19 S., R 33 E		
Site Position:		Northing:	596,530.30 usft
From:	Map	Easting:	691,672.10 usft
Position Uncertainty:	5.00 ft	Slot Radius:	13-3/16 "
		Latitude:	32° 38' 18.313 N
		Longitude:	103° 42' 38.441 W
		Grid Convergence:	0.34 °

Well	Geronimo Federal Com 11H		
Well Position	+N/-S	0.00 ft	Northing:
	+E/-W	0.00 ft	Easting:
Position Uncertainty		5.00 ft	Wellhead Elevation:
			0.00 ft
			Latitude:
			32° 38' 24.583 N
			Longitude:
			103° 42' 33.536 W
			Ground Level:
			3,599.60 ft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2015	6/14/2016	7.16
			Dip Angle (°)
			60.44
			Field Strength (nT)
			48,273

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 (°)
			180.03

Survey Tool Program	Date 6/20/2016		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name
0.00	20,836.70	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

Survey Report



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Geronimo Federal Com 11H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3625.60ft (Scandril Freedom)
Site:	Sec. 19, T 19 S., R 33 E	MD Reference:	KB=26' @ 3625.60ft (Scandril Freedom)
Well:	Geronimo Federal Com 11H	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
2,500.01	0.00	0.00	2,500.01	0.00	0.00	0.00	0.00	0.00	0.00
2,600.01	0.00	0.00	2,600.01	0.00	0.00	0.00	0.00	0.00	0.00
2,700.01	0.00	0.00	2,700.01	0.00	0.00	0.00	0.00	0.00	0.00
2,800.01	0.00	0.00	2,800.01	0.00	0.00	0.00	0.00	0.00	0.00
2,900.01	0.00	0.00	2,900.01	0.00	0.00	0.00	0.00	0.00	0.00
3,000.01	0.00	0.00	3,000.01	0.00	0.00	0.00	0.00	0.00	0.00
3,100.01	0.00	0.00	3,100.01	0.00	0.00	0.00	0.00	0.00	0.00
3,200.01	0.00	0.00	3,200.01	0.00	0.00	0.00	0.00	0.00	0.00
3,300.01	0.00	0.00	3,300.01	0.00	0.00	0.00	0.00	0.00	0.00
3,400.01	0.00	0.00	3,400.01	0.00	0.00	0.00	0.00	0.00	0.00
3,500.01	0.00	0.00	3,500.01	0.00	0.00	0.00	0.00	0.00	0.00
3,600.01	0.00	0.00	3,600.01	0.00	0.00	0.00	0.00	0.00	0.00
3,700.01	0.00	0.00	3,700.01	0.00	0.00	0.00	0.00	0.00	0.00
3,800.01	0.00	0.00	3,800.01	0.00	0.00	0.00	0.00	0.00	0.00
3,900.01	0.00	0.00	3,900.01	0.00	0.00	0.00	0.00	0.00	0.00
4,000.01	0.00	0.00	4,000.01	0.00	0.00	0.00	0.00	0.00	0.00
4,100.01	0.00	0.00	4,100.01	0.00	0.00	0.00	0.00	0.00	0.00
4,200.01	0.00	0.00	4,200.01	0.00	0.00	0.00	0.00	0.00	0.00
4,300.01	0.00	0.00	4,300.01	0.00	0.00	0.00	0.00	0.00	0.00
4,400.01	0.00	0.00	4,400.01	0.00	0.00	0.00	0.00	0.00	0.00
4,500.01	0.00	0.00	4,500.01	0.00	0.00	0.00	0.00	0.00	0.00
4,600.01	0.00	0.00	4,600.01	0.00	0.00	0.00	0.00	0.00	0.00
4,700.01	0.00	0.00	4,700.01	0.00	0.00	0.00	0.00	0.00	0.00
4,800.01	0.00	0.00	4,800.01	0.00	0.00	0.00	0.00	0.00	0.00
4,900.01	0.00	0.00	4,900.01	0.00	0.00	0.00	0.00	0.00	0.00
5,000.01	0.00	0.00	5,000.01	0.00	0.00	0.00	0.00	0.00	0.00
5,100.01	0.00	0.00	5,100.01	0.00	0.00	0.00	0.00	0.00	0.00
5,200.01	0.00	0.00	5,200.01	0.00	0.00	0.00	0.00	0.00	0.00
5,300.01	0.00	0.00	5,300.01	0.00	0.00	0.00	0.00	0.00	0.00



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5,400.01	0.00	0.00	5,400.01	0.00	0.00	0.00	0.00	0.00	0.00
5,500.01	0.00	0.00	5,500.01	0.00	0.00	0.00	0.00	0.00	0.00
5,600.01	0.00	0.00	5,600.01	0.00	0.00	0.00	0.00	0.00	0.00
5,700.01	0.00	0.00	5,700.01	0.00	0.00	0.00	0.00	0.00	0.00
5,800.01	0.00	0.00	5,800.01	0.00	0.00	0.00	0.00	0.00	0.00
5,900.01	0.00	0.00	5,900.01	0.00	0.00	0.00	0.00	0.00	0.00
6,000.01	0.00	0.00	6,000.01	0.00	0.00	0.00	0.00	0.00	0.00
6,100.01	0.00	0.00	6,100.01	0.00	0.00	0.00	0.00	0.00	0.00
6,200.01	0.00	0.00	6,200.01	0.00	0.00	0.00	0.00	0.00	0.00
6,300.01	0.00	0.00	6,300.01	0.00	0.00	0.00	0.00	0.00	0.00
6,400.01	0.00	0.00	6,400.01	0.00	0.00	0.00	0.00	0.00	0.00
6,500.01	0.00	0.00	6,500.01	0.00	0.00	0.00	0.00	0.00	0.00
6,600.01	0.00	0.00	6,600.01	0.00	0.00	0.00	0.00	0.00	0.00
6,700.01	0.00	0.00	6,700.01	0.00	0.00	0.00	0.00	0.00	0.00
6,800.01	0.00	0.00	6,800.01	0.00	0.00	0.00	0.00	0.00	0.00
6,900.01	0.00	0.00	6,900.01	0.00	0.00	0.00	0.00	0.00	0.00
7,000.01	0.00	0.00	7,000.01	0.00	0.00	0.00	0.00	0.00	0.00
7,100.01	0.00	0.00	7,100.01	0.00	0.00	0.00	0.00	0.00	0.00
7,200.01	0.00	0.00	7,200.01	0.00	0.00	0.00	0.00	0.00	0.00
7,300.01	0.00	0.00	7,300.01	0.00	0.00	0.00	0.00	0.00	0.00
7,400.01	0.00	0.00	7,400.01	0.00	0.00	0.00	0.00	0.00	0.00
7,500.02	0.00	0.00	7,500.02	0.00	0.00	0.00	0.00	0.00	0.00
7,600.02	0.00	0.00	7,600.02	0.00	0.00	0.00	0.00	0.00	0.00
7,700.02	0.00	0.00	7,700.02	0.00	0.00	0.00	0.00	0.00	0.00
7,800.02	0.00	0.00	7,800.02	0.00	0.00	0.00	0.00	0.00	0.00
7,900.02	0.00	0.00	7,900.02	0.00	0.00	0.00	0.00	0.00	0.00
8,000.02	0.00	0.00	8,000.02	0.00	0.00	0.00	0.00	0.00	0.00
8,100.02	0.00	0.00	8,100.02	0.00	0.00	0.00	0.00	0.00	0.00
8,200.02	0.00	0.00	8,200.02	0.00	0.00	0.00	0.00	0.00	0.00
8,300.02	0.00	0.00	8,300.02	0.00	0.00	0.00	0.00	0.00	0.00
8,400.02	0.00	0.00	8,400.02	0.00	0.00	0.00	0.00	0.00	0.00
8,500.02	0.00	0.00	8,500.02	0.00	0.00	0.00	0.00	0.00	0.00
8,600.02	0.00	0.00	8,600.02	0.00	0.00	0.00	0.00	0.00	0.00
8,700.02	0.00	0.00	8,700.02	0.00	0.00	0.00	0.00	0.00	0.00
8,800.02	0.00	0.00	8,800.02	0.00	0.00	0.00	0.00	0.00	0.00
8,900.02	0.00	0.00	8,900.02	0.00	0.00	0.00	0.00	0.00	0.00
9,000.02	0.00	0.00	9,000.02	0.00	0.00	0.00	0.00	0.00	0.00
9,100.02	0.00	0.00	9,100.02	0.00	0.00	0.00	0.00	0.00	0.00
9,200.02	0.00	0.00	9,200.02	0.00	0.00	0.00	0.00	0.00	0.00
9,300.02	0.00	0.00	9,300.02	0.00	0.00	0.00	0.00	0.00	0.00
9,400.02	0.00	0.00	9,400.02	0.00	0.00	0.00	0.00	0.00	0.00
9,412.56	0.00	0.00	9,412.56	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 12.00									



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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)
9,500.02	10.49	180.03	9,499.53	-7.99	0.00	7.99	12.00	12.00	0.00
9,600.02	22.49	180.03	9,595.24	-36.33	-0.02	36.33	12.00	12.00	0.00
9,700.02	34.49	180.03	9,682.97	-83.95	-0.04	83.95	12.00	12.00	0.00
9,800.02	46.49	180.03	9,758.87	-148.77	-0.08	148.77	12.00	12.00	0.00
9,900.02	58.49	180.03	9,819.65	-227.96	-0.12	227.96	12.00	12.00	0.00
10,000.02	70.49	180.03	9,862.63	-318.05	-0.17	318.05	12.00	12.00	0.00
10,100.02	82.49	180.03	9,885.94	-415.10	-0.22	415.10	12.00	12.00	0.00
10,157.64	89.41	180.03	9,890.00	-472.55	-0.25	472.55	12.00	12.00	0.00
Start 10679.64 hold at 10157.64 MD									
10,200.02	89.41	180.03	9,890.44	-514.92	-0.27	514.92	0.00	0.00	0.00
10,300.02	89.41	180.03	9,891.47	-614.92	-0.33	614.92	0.00	0.00	0.00
10,400.02	89.41	180.03	9,892.50	-714.91	-0.38	714.91	0.00	0.00	0.00
10,500.02	89.41	180.03	9,893.53	-814.91	-0.43	814.91	0.00	0.00	0.00
10,600.02	89.41	180.03	9,894.56	-914.90	-0.48	914.90	0.00	0.00	0.00
10,700.02	89.41	180.03	9,895.59	-1,014.90	-0.54	1,014.90	0.00	0.00	0.00
10,800.02	89.41	180.03	9,896.62	-1,114.89	-0.59	1,114.89	0.00	0.00	0.00
10,900.02	89.41	180.03	9,897.65	-1,214.89	-0.64	1,214.89	0.00	0.00	0.00
11,000.02	89.41	180.03	9,898.68	-1,314.88	-0.70	1,314.88	0.00	0.00	0.00
11,100.02	89.41	180.03	9,899.71	-1,414.88	-0.75	1,414.88	0.00	0.00	0.00
11,200.02	89.41	180.03	9,900.74	-1,514.87	-0.80	1,514.87	0.00	0.00	0.00
11,300.02	89.41	180.03	9,901.77	-1,614.87	-0.85	1,614.87	0.00	0.00	0.00
11,400.02	89.41	180.03	9,902.80	-1,714.86	-0.91	1,714.86	0.00	0.00	0.00
11,500.02	89.41	180.03	9,903.83	-1,814.86	-0.96	1,814.86	0.00	0.00	0.00
11,600.02	89.41	180.03	9,904.86	-1,914.85	-1.01	1,914.85	0.00	0.00	0.00
11,700.02	89.41	180.03	9,905.89	-2,014.85	-1.07	2,014.85	0.00	0.00	0.00
11,800.02	89.41	180.03	9,906.92	-2,114.84	-1.12	2,114.84	0.00	0.00	0.00
11,900.02	89.41	180.03	9,907.95	-2,214.84	-1.17	2,214.84	0.00	0.00	0.00
12,000.02	89.41	180.03	9,908.98	-2,314.83	-1.22	2,314.83	0.00	0.00	0.00
12,100.02	89.41	180.03	9,910.01	-2,414.83	-1.28	2,414.83	0.00	0.00	0.00
12,200.02	89.41	180.03	9,911.04	-2,514.82	-1.33	2,514.82	0.00	0.00	0.00
12,300.02	89.41	180.03	9,912.07	-2,614.82	-1.38	2,614.82	0.00	0.00	0.00
12,400.03	89.41	180.03	9,913.10	-2,714.81	-1.44	2,714.81	0.00	0.00	0.00
12,500.03	89.41	180.03	9,914.13	-2,814.80	-1.49	2,814.81	0.00	0.00	0.00
12,600.03	89.41	180.03	9,915.16	-2,914.80	-1.54	2,914.80	0.00	0.00	0.00
12,700.03	89.41	180.03	9,916.19	-3,014.79	-1.60	3,014.79	0.00	0.00	0.00
12,800.03	89.41	180.03	9,917.22	-3,114.79	-1.65	3,114.79	0.00	0.00	0.00
12,900.03	89.41	180.03	9,918.25	-3,214.78	-1.70	3,214.78	0.00	0.00	0.00
13,000.03	89.41	180.03	9,919.28	-3,314.78	-1.75	3,314.78	0.00	0.00	0.00
13,100.03	89.41	180.03	9,920.31	-3,414.77	-1.81	3,414.77	0.00	0.00	0.00
13,200.03	89.41	180.03	9,921.34	-3,514.77	-1.86	3,514.77	0.00	0.00	0.00
13,300.03	89.41	180.03	9,922.37	-3,614.76	-1.91	3,614.76	0.00	0.00	0.00
13,400.03	89.41	180.03	9,923.40	-3,714.76	-1.97	3,714.76	0.00	0.00	0.00
13,500.03	89.41	180.03	9,924.43	-3,814.75	-2.02	3,814.75	0.00	0.00	0.00
13,600.03	89.41	180.03	9,925.46	-3,914.75	-2.07	3,914.75	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. 19, T 19 S., R 33 E
Well: Geronimo Federal Com 11H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Geronimo Federal Com 11H
TVD Reference: KB=26' @ 3625.60ft (Scandril Freedom)
MD Reference: KB=26' @ 3625.60ft (Scandril Freedom)
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)
13,700.03	89.41	180.03	9,926.49	-4,014.74	-2.12	4,014.74	0.00	0.00	0.00
13,800.03	89.41	180.03	9,927.52	-4,114.74	-2.18	4,114.74	0.00	0.00	0.00
13,900.03	89.41	180.03	9,928.55	-4,214.73	-2.23	4,214.73	0.00	0.00	0.00
14,000.03	89.41	180.03	9,929.58	-4,314.73	-2.28	4,314.73	0.00	0.00	0.00
14,100.03	89.41	180.03	9,930.61	-4,414.72	-2.34	4,414.72	0.00	0.00	0.00
14,200.03	89.41	180.03	9,931.64	-4,514.72	-2.39	4,514.72	0.00	0.00	0.00
14,300.03	89.41	180.03	9,932.67	-4,614.71	-2.44	4,614.71	0.00	0.00	0.00
14,400.03	89.41	180.03	9,933.70	-4,714.71	-2.49	4,714.71	0.00	0.00	0.00
14,500.03	89.41	180.03	9,934.73	-4,814.70	-2.55	4,814.70	0.00	0.00	0.00
14,600.03	89.41	180.03	9,935.76	-4,914.70	-2.60	4,914.70	0.00	0.00	0.00
14,700.03	89.41	180.03	9,936.79	-5,014.69	-2.65	5,014.69	0.00	0.00	0.00
14,800.03	89.41	180.03	9,937.82	-5,114.69	-2.71	5,114.69	0.00	0.00	0.00
14,900.03	89.41	180.03	9,938.85	-5,214.68	-2.76	5,214.68	0.00	0.00	0.00
15,000.03	89.41	180.03	9,939.88	-5,314.68	-2.81	5,314.68	0.00	0.00	0.00
15,100.03	89.41	180.03	9,940.91	-5,414.67	-2.86	5,414.67	0.00	0.00	0.00
15,200.03	89.41	180.03	9,941.94	-5,514.67	-2.92	5,514.67	0.00	0.00	0.00
15,300.03	89.41	180.03	9,942.97	-5,614.66	-2.97	5,614.66	0.00	0.00	0.00
15,400.03	89.41	180.03	9,944.00	-5,714.66	-3.02	5,714.66	0.00	0.00	0.00
15,500.03	89.41	180.03	9,945.03	-5,814.65	-3.08	5,814.65	0.00	0.00	0.00
15,600.03	89.41	180.03	9,946.06	-5,914.65	-3.13	5,914.65	0.00	0.00	0.00
15,700.03	89.41	180.03	9,947.09	-6,014.64	-3.18	6,014.64	0.00	0.00	0.00
15,800.03	89.41	180.03	9,948.12	-6,114.64	-3.24	6,114.64	0.00	0.00	0.00
15,900.03	89.41	180.03	9,949.15	-6,214.63	-3.29	6,214.63	0.00	0.00	0.00
16,000.03	89.41	180.03	9,950.18	-6,314.63	-3.34	6,314.63	0.00	0.00	0.00
16,100.03	89.41	180.03	9,951.21	-6,414.62	-3.39	6,414.62	0.00	0.00	0.00
16,200.03	89.41	180.03	9,952.24	-6,514.62	-3.45	6,514.62	0.00	0.00	0.00
16,300.03	89.41	180.03	9,953.27	-6,614.61	-3.50	6,614.61	0.00	0.00	0.00
16,400.03	89.41	180.03	9,954.30	-6,714.61	-3.55	6,714.61	0.00	0.00	0.00
16,500.03	89.41	180.03	9,955.33	-6,814.60	-3.61	6,814.60	0.00	0.00	0.00
16,600.03	89.41	180.03	9,956.36	-6,914.60	-3.66	6,914.60	0.00	0.00	0.00
16,700.03	89.41	180.03	9,957.39	-7,014.59	-3.71	7,014.59	0.00	0.00	0.00
16,800.03	89.41	180.03	9,958.42	-7,114.58	-3.76	7,114.59	0.00	0.00	0.00
16,900.03	89.41	180.03	9,959.45	-7,214.58	-3.82	7,214.58	0.00	0.00	0.00
17,000.03	89.41	180.03	9,960.48	-7,314.57	-3.87	7,314.58	0.00	0.00	0.00
17,100.03	89.41	180.03	9,961.51	-7,414.57	-3.92	7,414.57	0.00	0.00	0.00
17,200.03	89.41	180.03	9,962.54	-7,514.56	-3.98	7,514.57	0.00	0.00	0.00
17,300.03	89.41	180.03	9,963.57	-7,614.56	-4.03	7,614.56	0.00	0.00	0.00
17,400.04	89.41	180.03	9,964.60	-7,714.55	-4.08	7,714.56	0.00	0.00	0.00
17,500.04	89.41	180.03	9,965.63	-7,814.55	-4.13	7,814.55	0.00	0.00	0.00
17,600.04	89.41	180.03	9,966.66	-7,914.54	-4.19	7,914.54	0.00	0.00	0.00
17,700.04	89.41	180.03	9,967.69	-8,014.54	-4.24	8,014.54	0.00	0.00	0.00
17,800.04	89.41	180.03	9,968.72	-8,114.53	-4.29	8,114.53	0.00	0.00	0.00
17,900.04	89.41	180.03	9,969.75	-8,214.53	-4.35	8,214.53	0.00	0.00	0.00



Integrity Directional Services, LLC

Survey Report



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Geronimo Federal Com 11H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3625.60ft (Scandril Freedom)
Site:	Sec. 19, T 19 S., R 33 E	MD Reference:	KB=26' @ 3625.60ft (Scandril Freedom)
Well:	Geronimo Federal Com 11H	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)
18,000.04	89.41	180.03	9,970.77	-8,314.52	-4.40	8,314.52	0.00	0.00	0.00
18,100.04	89.41	180.03	9,971.80	-8,414.52	-4.45	8,414.52	0.00	0.00	0.00
18,200.04	89.41	180.03	9,972.83	-8,514.51	-4.50	8,514.51	0.00	0.00	0.00
18,300.04	89.41	180.03	9,973.86	-8,614.51	-4.56	8,614.51	0.00	0.00	0.00
18,400.04	89.41	180.03	9,974.89	-8,714.50	-4.61	8,714.50	0.00	0.00	0.00
18,500.04	89.41	180.03	9,975.92	-8,814.50	-4.66	8,814.50	0.00	0.00	0.00
18,600.04	89.41	180.03	9,976.95	-8,914.49	-4.72	8,914.49	0.00	0.00	0.00
18,700.04	89.41	180.03	9,977.98	-9,014.49	-4.77	9,014.49	0.00	0.00	0.00
18,800.04	89.41	180.03	9,979.01	-9,114.48	-4.82	9,114.48	0.00	0.00	0.00
18,900.04	89.41	180.03	9,980.04	-9,214.48	-4.88	9,214.48	0.00	0.00	0.00
19,000.04	89.41	180.03	9,981.07	-9,314.47	-4.93	9,314.47	0.00	0.00	0.00
19,100.04	89.41	180.03	9,982.10	-9,414.47	-4.98	9,414.47	0.00	0.00	0.00
19,200.04	89.41	180.03	9,983.13	-9,514.46	-5.03	9,514.46	0.00	0.00	0.00
19,300.04	89.41	180.03	9,984.16	-9,614.46	-5.09	9,614.46	0.00	0.00	0.00
19,400.04	89.41	180.03	9,985.19	-9,714.45	-5.14	9,714.45	0.00	0.00	0.00
19,500.04	89.41	180.03	9,986.22	-9,814.45	-5.19	9,814.45	0.00	0.00	0.00
19,600.04	89.41	180.03	9,987.25	-9,914.44	-5.25	9,914.44	0.00	0.00	0.00
19,700.04	89.41	180.03	9,988.28	-10,014.44	-5.30	10,014.44	0.00	0.00	0.00
19,800.04	89.41	180.03	9,989.31	-10,114.43	-5.35	10,114.43	0.00	0.00	0.00
19,900.04	89.41	180.03	9,990.34	-10,214.43	-5.40	10,214.43	0.00	0.00	0.00
20,000.04	89.41	180.03	9,991.37	-10,314.42	-5.46	10,314.42	0.00	0.00	0.00
20,100.04	89.41	180.03	9,992.40	-10,414.42	-5.51	10,414.42	0.00	0.00	0.00
20,200.04	89.41	180.03	9,993.43	-10,514.41	-5.56	10,514.41	0.00	0.00	0.00
20,300.04	89.41	180.03	9,994.46	-10,614.41	-5.62	10,614.41	0.00	0.00	0.00
20,400.04	89.41	180.03	9,995.49	-10,714.40	-5.67	10,714.40	0.00	0.00	0.00
20,500.04	89.41	180.03	9,996.52	-10,814.40	-5.72	10,814.40	0.00	0.00	0.00
20,600.04	89.41	180.03	9,997.55	-10,914.39	-5.77	10,914.39	0.00	0.00	0.00
20,700.04	89.41	180.03	9,998.58	-11,014.39	-5.83	11,014.39	0.00	0.00	0.00
20,800.04	89.41	180.03	9,999.61	-11,114.38	-5.88	11,114.38	0.00	0.00	0.00
20,837.29	89.41	180.03	10,000.00	-11,151.62	-5.90	11,151.62	0.00	0.00	0.00
TD at 20837.29									

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									
FEDERAL 19 #1/3157	0.00	0.00	0.00	-206.00	579.00	596,960.40	692,666.79	32° 38' 22.511 N	103° 42' 26.779 W
- plan misses target center by 614.55ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Circle (radius 200.00)									
Geronimo Federal Co	0.00	0.00	10,000.0	-11,151.62	-5.90	586,014.80	692,081.90	32° 36' 34.236 N	103° 42' 34.370 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. 19, T 19 S., R 33 E
Well: Geronimo Federal Com 11H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Geronimo Federal Com 11H
TVD Reference: KB=26' @ 3625.60ft (Scandrift Freedom)
MD Reference: KB=26' @ 3625.60ft (Scandrift Freedom)
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)	
9413	9413	0	0	Start Build 12.00
10,158	9890	-473	0	Start 10679.64 hold at 10157.64 MD
20,837	10,000	-11,152	-6	TD at 20837.29

Checked By: _____ Approved By: _____ Date: _____