

COG Operating L L C
 Project: Lea County, NM (NAD27 NME)
 Site: Sec. 12, T 22 S., R 33 E
 Well: Tenderloin Federal 4H
 Wellbore: Wellbore #1
 Plan: Plan#1 (Tenderloin Federal 4H/Wellbore #1)

WELL DETAILS: Tenderloin Federal 4H

Ground Elevation:: 3524.30
 RKB Elevation: KB=26' @ 3550.30ft (Scandril Freedom)
 Rig Name: Scandril Freedom

Northing 509936.9000 Easting 747325.9000 Latitude 32° 23' 57.780 N Longitude 103° 31' 55.245 W

Section Details

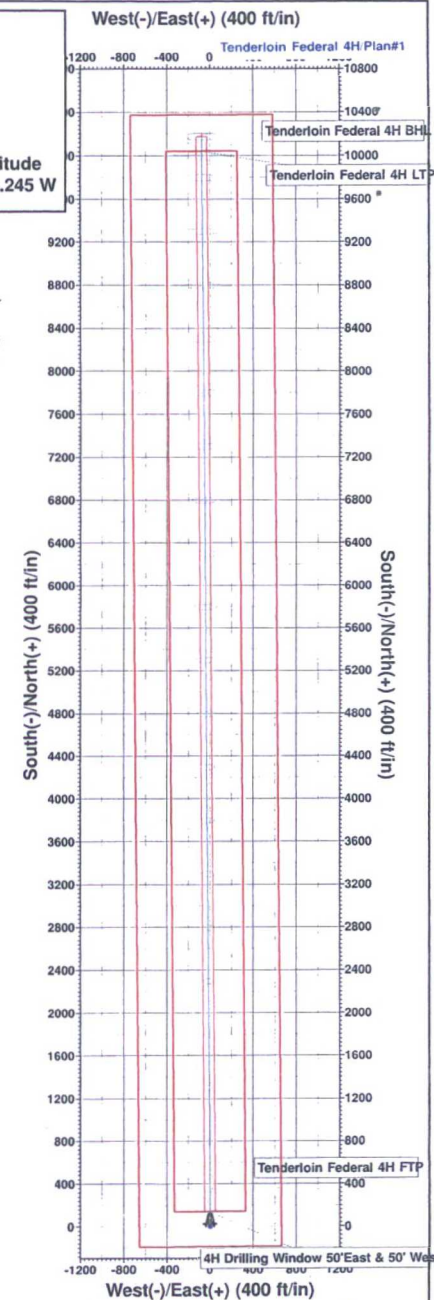
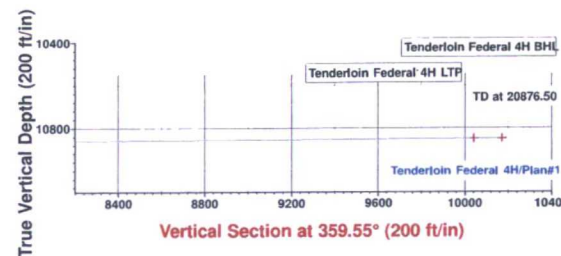
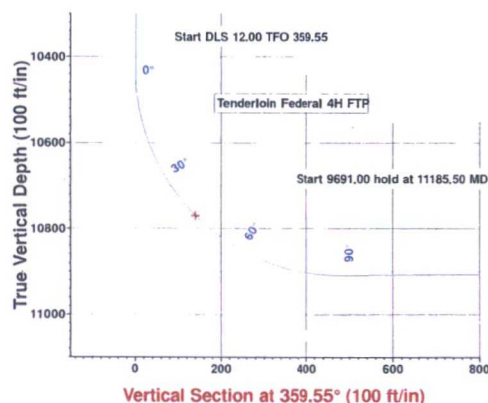
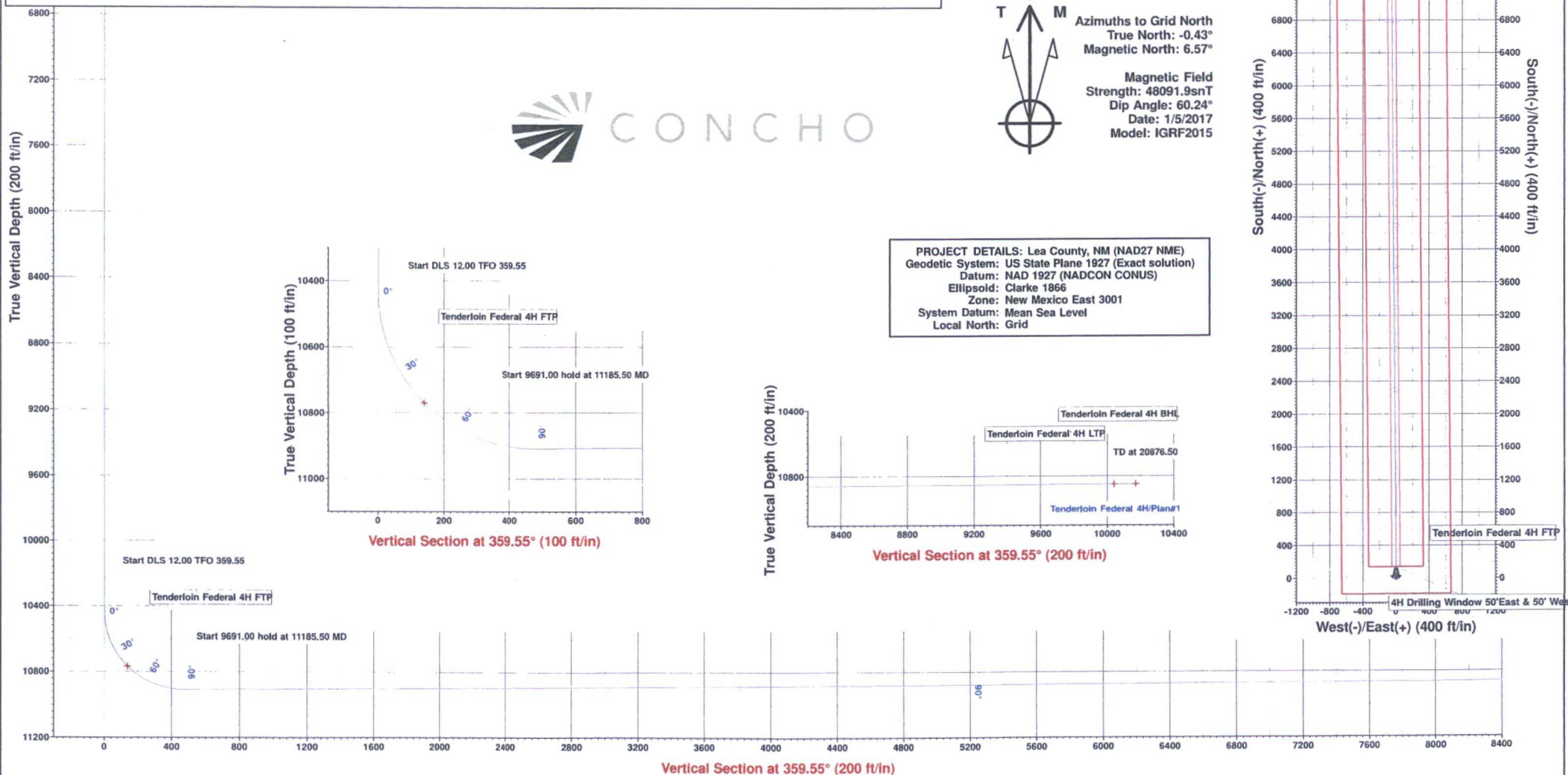
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	10432.54	0.00	0.00	10432.54	0.00	0.00	0.00	0.00	0.00	
3	11185.50	90.35	359.55	10910.00	480.41	-3.78	12.00	359.55	480.42	
4	20876.50	90.35	359.55	10850.00	10170.92	-80.10	0.00	0.00	10171.24	Tenderloin Federal 4H BHL

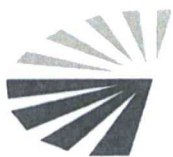


Azimuths to Grid North
 True North: -0.43°
 Magnetic North: 6.57°

Magnetic Field
 Strength: 48091.9snT
 Dip Angle: 60.24°
 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





CONCHO

HOBBS OCD

JUL 10 2017

RECEIVED

COG Operating L L C

Lea County, NM (NAD27 NME)

Sec. 12, T 22 S. , R 33 E

Tenderloin Federal Com 4H

Wellbore #1

Plan: Plan#1

Standard Survey Report

05 January, 2017



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Tenderloin Federal 4H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3550.30ft (Scandril Freedom)
Site:	Sec. 12, T 22 S. , R 33 E	MD Reference:	KB=26' @ 3550.30ft (Scandril Freedom)
Well:	Tenderloin Federal 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. 12, T 22 S. , R 33 E			
Site Position:		Northing:	509,936.9000 usft	Latitude:	32° 23' 57.780 N
From:	Map	Easting:	747,325.9000 usft	Longitude:	103° 31' 55.245 W
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.43 °

Well	Tenderloin Federal 4H					
Well Position	+N/-S	0.00 ft	Northing:	509,936.9000 usft	Latitude:	32° 23' 57.780 N
	+E/-W	0.00 ft	Easting:	747,325.9000 usft	Longitude:	103° 31' 55.245 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	3,524.30 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/5/2017	7.00	60.24	48,092

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)	Direction (°)	
	0.00	0.00	0.00	359.55	

Survey Tool Program	Date 1/5/2017				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.00	20,876.50	Plan#1 (Wellbore #1)	MWD	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



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MD Reference: KB=26' @ 3550.30ft (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)
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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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
10,432.54	0.00	0.00	10,432.54	0.00	0.00	0.00	0.00	0.00	0.00
Start DLS 12.00 TFO 359.55									
10,500.00	8.10	359.55	10,499.78	4.76	-0.04	4.76	12.00	12.00	0.00
10,600.00	20.10	359.55	10,596.59	29.07	-0.23	29.07	12.00	12.00	0.00
10,700.00	32.10	359.55	10,686.23	72.97	-0.57	72.97	12.00	12.00	0.00
10,800.00	44.10	359.55	10,764.79	134.55	-1.06	134.56	12.00	12.00	0.00
10,900.00	56.10	359.55	10,828.82	211.12	-1.66	211.13	12.00	12.00	0.00
11,000.00	68.10	359.55	10,875.53	299.33	-2.36	299.34	12.00	12.00	0.00
11,100.00	80.10	359.55	10,902.89	395.32	-3.11	395.33	12.00	12.00	0.00
11,185.50	90.35	359.55	10,910.00	480.41	-3.78	480.42	12.00	12.00	0.00
Start 9691.00 hold at 11185.50 MD									
11,200.00	90.35	359.55	10,909.91	494.91	-3.90	494.92	0.00	0.00	0.00
11,300.00	90.35	359.55	10,909.29	594.90	-4.69	594.92	0.00	0.00	0.00
11,400.00	90.35	359.55	10,908.67	694.90	-5.47	694.92	0.00	0.00	0.00
11,500.00	90.35	359.55	10,908.05	794.89	-6.26	794.92	0.00	0.00	0.00
11,600.00	90.35	359.55	10,907.43	894.89	-7.05	894.92	0.00	0.00	0.00
11,700.00	90.35	359.55	10,906.81	994.88	-7.84	994.91	0.00	0.00	0.00
11,800.00	90.35	359.55	10,906.19	1,094.88	-8.62	1,094.91	0.00	0.00	0.00
11,900.00	90.35	359.55	10,905.57	1,194.87	-9.41	1,194.91	0.00	0.00	0.00
12,000.00	90.35	359.55	10,904.95	1,294.87	-10.20	1,294.91	0.00	0.00	0.00
12,100.00	90.35	359.55	10,904.34	1,394.86	-10.99	1,394.91	0.00	0.00	0.00
12,200.00	90.35	359.55	10,903.72	1,494.86	-11.77	1,494.90	0.00	0.00	0.00
12,300.00	90.35	359.55	10,903.10	1,594.85	-12.56	1,594.90	0.00	0.00	0.00
12,400.00	90.35	359.55	10,902.48	1,694.85	-13.35	1,694.90	0.00	0.00	0.00
12,500.00	90.35	359.55	10,901.86	1,794.84	-14.14	1,794.90	0.00	0.00	0.00
12,600.00	90.35	359.55	10,901.24	1,894.84	-14.92	1,894.90	0.00	0.00	0.00
12,700.00	90.35	359.55	10,900.62	1,994.83	-15.71	1,994.90	0.00	0.00	0.00
12,800.00	90.35	359.55	10,900.00	2,094.83	-16.50	2,094.89	0.00	0.00	0.00
12,900.00	90.35	359.55	10,899.38	2,194.82	-17.29	2,194.89	0.00	0.00	0.00
13,000.00	90.35	359.55	10,898.76	2,294.82	-18.07	2,294.89	0.00	0.00	0.00
13,100.00	90.35	359.55	10,898.14	2,394.81	-18.86	2,394.89	0.00	0.00	0.00
13,200.00	90.35	359.55	10,897.53	2,494.81	-19.65	2,494.89	0.00	0.00	0.00
13,300.00	90.35	359.55	10,896.91	2,594.80	-20.44	2,594.88	0.00	0.00	0.00
13,400.00	90.35	359.55	10,896.29	2,694.80	-21.22	2,694.88	0.00	0.00	0.00
13,500.00	90.35	359.55	10,895.67	2,794.79	-22.01	2,794.88	0.00	0.00	0.00
13,600.00	90.35	359.55	10,895.05	2,894.79	-22.80	2,894.88	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. 12, T 22 S. , R 33 E
Well: Tenderloin Federal Com 4H
Wellbore: Wellbore #1
Design: Plan#1

Local Co-ordinate Reference: Well Tenderloin Federal 4H
TVD Reference: KB=26' @ 3550.30ft (Scandril Freedom)
MD Reference: KB=26' @ 3550.30ft (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)
13,700.00	90.35	359.55	10,894.43	2,994.78	-23.59	2,994.88	0.00	0.00	0.00
13,800.00	90.35	359.55	10,893.81	3,094.78	-24.37	3,094.87	0.00	0.00	0.00
13,900.00	90.35	359.55	10,893.19	3,194.77	-25.16	3,194.87	0.00	0.00	0.00
14,000.00	90.35	359.55	10,892.57	3,294.77	-25.95	3,294.87	0.00	0.00	0.00
14,100.00	90.35	359.55	10,891.95	3,394.76	-26.74	3,394.87	0.00	0.00	0.00
14,200.00	90.35	359.55	10,891.33	3,494.76	-27.52	3,494.87	0.00	0.00	0.00
14,300.00	90.35	359.55	10,890.72	3,594.75	-28.31	3,594.86	0.00	0.00	0.00
14,400.00	90.35	359.55	10,890.10	3,694.75	-29.10	3,694.86	0.00	0.00	0.00
14,500.00	90.35	359.55	10,889.48	3,794.74	-29.89	3,794.86	0.00	0.00	0.00
14,600.00	90.35	359.55	10,888.86	3,894.74	-30.67	3,894.86	0.00	0.00	0.00
14,700.00	90.35	359.55	10,888.24	3,994.73	-31.46	3,994.86	0.00	0.00	0.00
14,800.00	90.35	359.55	10,887.62	4,094.73	-32.25	4,094.86	0.00	0.00	0.00
14,900.00	90.35	359.55	10,887.00	4,194.72	-33.04	4,194.85	0.00	0.00	0.00
15,000.00	90.35	359.55	10,886.38	4,294.72	-33.82	4,294.85	0.00	0.00	0.00
15,100.00	90.35	359.55	10,885.76	4,394.71	-34.61	4,394.85	0.00	0.00	0.00
15,200.00	90.35	359.55	10,885.14	4,494.71	-35.40	4,494.85	0.00	0.00	0.00
15,300.00	90.35	359.55	10,884.52	4,594.70	-36.19	4,594.85	0.00	0.00	0.00
15,400.00	90.35	359.55	10,883.91	4,694.70	-36.97	4,694.84	0.00	0.00	0.00
15,500.00	90.35	359.55	10,883.29	4,794.69	-37.76	4,794.84	0.00	0.00	0.00
15,600.00	90.35	359.55	10,882.67	4,894.69	-38.55	4,894.84	0.00	0.00	0.00
15,700.00	90.35	359.55	10,882.05	4,994.68	-39.34	4,994.84	0.00	0.00	0.00
15,800.00	90.35	359.55	10,881.43	5,094.68	-40.12	5,094.84	0.00	0.00	0.00
15,900.00	90.35	359.55	10,880.81	5,194.67	-40.91	5,194.83	0.00	0.00	0.00
16,000.00	90.35	359.55	10,880.19	5,294.67	-41.70	5,294.83	0.00	0.00	0.00
16,100.00	90.35	359.55	10,879.57	5,394.66	-42.49	5,394.83	0.00	0.00	0.00
16,200.00	90.35	359.55	10,878.95	5,494.66	-43.27	5,494.83	0.00	0.00	0.00
16,300.00	90.35	359.55	10,878.33	5,594.65	-44.06	5,594.83	0.00	0.00	0.00
16,400.00	90.35	359.55	10,877.71	5,694.65	-44.85	5,694.82	0.00	0.00	0.00
16,500.00	90.35	359.55	10,877.09	5,794.64	-45.64	5,794.82	0.00	0.00	0.00
16,600.00	90.35	359.55	10,876.48	5,894.64	-46.42	5,894.82	0.00	0.00	0.00
16,700.00	90.35	359.55	10,875.86	5,994.63	-47.21	5,994.82	0.00	0.00	0.00
16,800.00	90.35	359.55	10,875.24	6,094.63	-48.00	6,094.82	0.00	0.00	0.00
16,900.00	90.35	359.55	10,874.62	6,194.62	-48.79	6,194.81	0.00	0.00	0.00
17,000.00	90.35	359.55	10,874.00	6,294.62	-49.57	6,294.81	0.00	0.00	0.00
17,100.00	90.35	359.55	10,873.38	6,394.61	-50.36	6,394.81	0.00	0.00	0.00
17,200.00	90.35	359.55	10,872.76	6,494.61	-51.15	6,494.81	0.00	0.00	0.00
17,300.00	90.35	359.55	10,872.14	6,594.60	-51.94	6,594.81	0.00	0.00	0.00
17,400.00	90.35	359.55	10,871.52	6,694.60	-52.72	6,694.81	0.00	0.00	0.00
17,500.00	90.35	359.55	10,870.90	6,794.59	-53.51	6,794.80	0.00	0.00	0.00
17,600.00	90.35	359.55	10,870.28	6,894.59	-54.30	6,894.80	0.00	0.00	0.00
17,700.00	90.35	359.55	10,869.67	6,994.58	-55.09	6,994.80	0.00	0.00	0.00
17,800.00	90.35	359.55	10,869.05	7,094.58	-55.87	7,094.80	0.00	0.00	0.00
17,900.00	90.35	359.55	10,868.43	7,194.57	-56.66	7,194.80	0.00	0.00	0.00

Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 12, T 22 S. , R 33 E
Well: Tenderloin Federal Com 4H
Wellbore: Wellbore #1
Design: Plan#1

Local Co-ordinate Reference: Well Tenderloin Federal 4H
TVD Reference: KB=26' @ 3550.30ft (Scandril Freedom)
MD Reference: KB=26' @ 3550.30ft (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)
18,000.00	90.35	359.55	10,867.81	7,294.57	-57.45	7,294.79	0.00	0.00	0.00
18,100.00	90.35	359.55	10,867.19	7,394.56	-58.24	7,394.79	0.00	0.00	0.00
18,200.00	90.35	359.55	10,866.57	7,494.56	-59.02	7,494.79	0.00	0.00	0.00
18,300.00	90.35	359.55	10,865.95	7,594.55	-59.81	7,594.79	0.00	0.00	0.00
18,400.00	90.35	359.55	10,865.33	7,694.55	-60.60	7,694.79	0.00	0.00	0.00
18,500.00	90.35	359.55	10,864.71	7,794.54	-61.39	7,794.78	0.00	0.00	0.00
18,600.00	90.35	359.55	10,864.09	7,894.54	-62.17	7,894.78	0.00	0.00	0.00
18,700.00	90.35	359.55	10,863.47	7,994.53	-62.96	7,994.78	0.00	0.00	0.00
18,800.00	90.35	359.55	10,862.86	8,094.53	-63.75	8,094.78	0.00	0.00	0.00
18,900.00	90.35	359.55	10,862.24	8,194.52	-64.54	8,194.78	0.00	0.00	0.00
19,000.00	90.35	359.55	10,861.62	8,294.52	-65.32	8,294.77	0.00	0.00	0.00
19,100.00	90.35	359.55	10,861.00	8,394.51	-66.11	8,394.77	0.00	0.00	0.00
19,200.00	90.35	359.55	10,860.38	8,494.51	-66.90	8,494.77	0.00	0.00	0.00
19,300.00	90.35	359.55	10,859.76	8,594.50	-67.69	8,594.77	0.00	0.00	0.00
19,400.00	90.35	359.55	10,859.14	8,694.50	-68.47	8,694.77	0.00	0.00	0.00
19,500.00	90.35	359.55	10,858.52	8,794.49	-69.26	8,794.77	0.00	0.00	0.00
19,600.00	90.35	359.55	10,857.90	8,894.49	-70.05	8,894.76	0.00	0.00	0.00
19,700.00	90.35	359.55	10,857.28	8,994.48	-70.84	8,994.76	0.00	0.00	0.00
19,800.00	90.35	359.55	10,856.66	9,094.48	-71.62	9,094.76	0.00	0.00	0.00
19,900.00	90.35	359.55	10,856.05	9,194.47	-72.41	9,194.76	0.00	0.00	0.00
20,000.00	90.35	359.55	10,855.43	9,294.47	-73.20	9,294.76	0.00	0.00	0.00
20,100.00	90.35	359.55	10,854.81	9,394.46	-73.99	9,394.75	0.00	0.00	0.00
20,200.00	90.35	359.55	10,854.19	9,494.46	-74.77	9,494.75	0.00	0.00	0.00
20,300.00	90.35	359.55	10,853.57	9,594.45	-75.56	9,594.75	0.00	0.00	0.00
20,400.00	90.35	359.55	10,852.95	9,694.45	-76.35	9,694.75	0.00	0.00	0.00
20,500.00	90.35	359.55	10,852.33	9,794.44	-77.14	9,794.75	0.00	0.00	0.00
20,600.00	90.35	359.55	10,851.71	9,894.44	-77.92	9,894.74	0.00	0.00	0.00
20,700.00	90.35	359.55	10,851.09	9,994.43	-78.71	9,994.74	0.00	0.00	0.00
20,800.00	90.35	359.55	10,850.47	10,094.43	-79.50	10,094.74	0.00	0.00	0.00
20,876.50	90.35	359.55	10,850.00	10,170.92	-80.10	10,171.24	0.00	0.00	0.00

TD at 20876.50



Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 12, T 22 S. , R 33 E
Well: Tenderloin Federal Com 4H
Wellbore: Wellbore #1
Design: Plan#1

Local Co-ordinate Reference: Well Tenderloin Federal 4H
TVD Reference: KB=26' @ 3550.30ft (Scandril Freedom)
MD Reference: KB=26' @ 3550.30ft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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									
4H Drilling Window 5C	0.00	359.55	0.00	139.97	-1.18	510,076.8657	747,324.7225	32° 23' 59.165 N	103° 31' 55.247 W
- plan misses target center by 139.97ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Rectangle (sides W100.00 H10,030.95 D0.00)									
Tenderloin Federal 4H	0.00	0.00	10,770.2 9	139.97	-1.18	510,076.8657	747,324.7225	32° 23' 59.165 N	103° 31' 55.247 W
- plan misses target center by 0.08ft at 10807.70ft MD (10770.27 TVD, 139.95 N, -1.10 E)									
- Point									
Tenderloin Federal 4H	0.00	0.00	10,850.0 0	10,170.92	-80.10	520,107.8000	747,245.8000	32° 25' 38.428 N	103° 31' 55.290 W
- plan hits target center									
- Point									
Tenderloin Federal 4H	0.00	0.00	10,850.8 0	10,041.02	-79.11	519,977.8980	747,246.7900	32° 25' 37.142 N	103° 31' 55.290 W
- plan misses target center by 0.03ft at 20746.59ft MD (10850.80 TVD, 10041.02 N, -79.08 E)									
- Point									

Plan Annotations

Measured Depth	Vertical Depth	Local Coordinates		Comment
(ft)	(ft)	+N/-S (ft)	+E/-W (ft)	
10,433	10,433	0	0	Start DLS 12.00 TFO 359.55
11,185	10,910	480	-4	Start 9691.00 hold at 11185.50 MD
20,876	10,850	10,171	-80	TD at 20876.50

Checked By: _____ Approved By: _____ Date: _____