



COG OPERATING LLC

LEA COUNTY, NM

BULLDOG

STOVE PIPE FED COM #1H

OWB

Plan: PWP1

Survey Report - Geographic

20 January, 2017



COG Operating LLC

Survey Report - Geographic

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Site: BULLDOG
Well: STOVE PIPE FED COM #1H
Wellbore: OWB
Design: PWP1

Local Co-ordinate Reference: Well STOVE PIPE FED COM #1H
TVD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)
MD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM_Users

Project	LEA COUNTY, NM		
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		BULLDOG			
Site Position:		Northing:	398,637.10 usft	Latitude:	32° 5' 36.820 N
From:	Map	Easting:	741,887.40 usft	Longitude:	103° 33' 8.116 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.42 °

Well	STOVE PIPE FED COM #1H					
Well Position	+N/-S	0.0 usft	Northing:	425,164.50 usf	Latitude:	32° 9' 55.604 N
	+E/-W	0.0 usft	Easting:	789,052.00 usf	Longitude:	103° 23' 57.222 W
Position Uncertainty	3.0 usft	Wellhead Elevation:	usf	Ground Level:	3,295.0 usf	

Wellbore	OWB				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	WMM2015	12/19/2016	6.94	60.03	47,963.27975784

Design	PWP1				
Audit Notes:					
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0	
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	178.53	

Survey Tool Program	Date	1/20/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.0	22,300.3	PWP1 (OWB)	MWD	OWSG MWD - Standard	

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
100.0	0.00	0.00	100.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
200.0	0.00	0.00	200.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
300.0	0.00	0.00	300.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
400.0	0.00	0.00	400.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
500.0	0.00	0.00	500.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
600.0	0.00	0.00	600.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
700.0	0.00	0.00	700.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
800.0	0.00	0.00	800.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
900.0	0.00	0.00	900.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
1,000.0	0.00	0.00	1,000.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
1,100.0	0.00	0.00	1,100.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W



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Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,200.0	0.00	0.00	1,200.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
1,300.0	0.00	0.00	1,300.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
1,400.0	0.00	0.00	1,400.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
1,500.0	0.00	0.00	1,500.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
1,600.0	0.00	0.00	1,600.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
1,700.0	0.00	0.00	1,700.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
1,800.0	0.00	0.00	1,800.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
1,900.0	0.00	0.00	1,900.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
2,000.0	0.00	0.00	2,000.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
2,100.0	0.00	0.00	2,100.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
2,200.0	0.00	0.00	2,200.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
2,300.0	0.00	0.00	2,300.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
2,400.0	0.00	0.00	2,400.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
2,500.0	0.00	0.00	2,500.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
2,600.0	0.00	0.00	2,600.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
2,700.0	0.00	0.00	2,700.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
2,800.0	0.00	0.00	2,800.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
2,900.0	0.00	0.00	2,900.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
3,000.0	0.00	0.00	3,000.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
3,100.0	0.00	0.00	3,100.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
3,200.0	0.00	0.00	3,200.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
3,300.0	0.00	0.00	3,300.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
3,400.0	0.00	0.00	3,400.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
3,500.0	0.00	0.00	3,500.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
3,600.0	0.00	0.00	3,600.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
3,700.0	0.00	0.00	3,700.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
3,800.0	0.00	0.00	3,800.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
3,900.0	0.00	0.00	3,900.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
4,000.0	0.00	0.00	4,000.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
4,100.0	0.00	0.00	4,100.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
4,200.0	0.00	0.00	4,200.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
4,300.0	0.00	0.00	4,300.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
4,400.0	0.00	0.00	4,400.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
4,500.0	0.00	0.00	4,500.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
4,600.0	0.00	0.00	4,600.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
4,700.0	0.00	0.00	4,700.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
4,800.0	0.00	0.00	4,800.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
4,900.0	0.00	0.00	4,900.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
5,000.0	0.00	0.00	5,000.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
5,100.0	0.00	0.00	5,100.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
5,200.0	0.00	0.00	5,200.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
5,300.0	0.00	0.00	5,300.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
5,400.0	0.00	0.00	5,400.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
5,500.0	0.00	0.00	5,500.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
5,600.0	0.00	0.00	5,600.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
5,700.0	0.00	0.00	5,700.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
5,800.0	0.00	0.00	5,800.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
5,900.0	0.00	0.00	5,900.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
6,000.0	0.00	0.00	6,000.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
6,100.0	0.00	0.00	6,100.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
6,200.0	0.00	0.00	6,200.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
6,300.0	0.00	0.00	6,300.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
6,400.0	0.00	0.00	6,400.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
6,500.0	0.00	0.00	6,500.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
6,600.0	0.00	0.00	6,600.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W



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6,700.0	0.00	0.00	6,700.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
6,800.0	0.00	0.00	6,800.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
6,900.0	0.00	0.00	6,900.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
7,000.0	0.00	0.00	7,000.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
7,100.0	0.00	0.00	7,100.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
7,200.0	0.00	0.00	7,200.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
7,300.0	0.00	0.00	7,300.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
7,400.0	0.00	0.00	7,400.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
7,500.0	0.00	0.00	7,500.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
7,600.0	0.00	0.00	7,600.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
7,700.0	0.00	0.00	7,700.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
7,800.0	0.00	0.00	7,800.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
7,900.0	0.00	0.00	7,900.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
8,000.0	0.00	0.00	8,000.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
8,100.0	0.00	0.00	8,100.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
8,200.0	0.00	0.00	8,200.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
8,300.0	0.00	0.00	8,300.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
8,400.0	0.00	0.00	8,400.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
8,500.0	0.00	0.00	8,500.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
8,600.0	0.00	0.00	8,600.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
8,700.0	0.00	0.00	8,700.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
8,800.0	0.00	0.00	8,800.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
8,900.0	0.00	0.00	8,900.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
9,000.0	0.00	0.00	9,000.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
9,100.0	0.00	0.00	9,100.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
9,200.0	0.00	0.00	9,200.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
9,300.0	0.00	0.00	9,300.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
9,400.0	0.00	0.00	9,400.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
9,500.0	0.00	0.00	9,500.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
9,600.0	0.00	0.00	9,600.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
9,700.0	0.00	0.00	9,700.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
9,800.0	0.00	0.00	9,800.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
9,900.0	0.00	0.00	9,900.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
10,000.0	0.00	0.00	10,000.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
10,100.0	0.00	0.00	10,100.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
10,200.0	0.00	0.00	10,200.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
10,300.0	0.00	0.00	10,300.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
10,400.0	0.00	0.00	10,400.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
10,500.0	0.00	0.00	10,500.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
10,600.0	0.00	0.00	10,600.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
10,700.0	0.00	0.00	10,700.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
10,800.0	0.00	0.00	10,800.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
10,900.0	0.00	0.00	10,900.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
11,000.0	0.00	0.00	11,000.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
11,100.0	0.00	0.00	11,100.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
11,200.0	0.00	0.00	11,200.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
11,300.0	0.00	0.00	11,300.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
11,400.0	0.00	0.00	11,400.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
11,500.0	0.00	0.00	11,500.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
11,600.0	0.00	0.00	11,600.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
11,700.0	0.00	0.00	11,700.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
11,800.0	0.00	0.00	11,800.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
11,900.0	0.00	0.00	11,900.0	0.0	0.0	25,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
12,000.0	0.00	0.00	12,000.0	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W
12,036.5	0.00	0.00	12,036.5	0.0	0.0	425,164.50	789,052.00	32° 9' 55.604 N	103° 23' 57.222 W



COG Operating LLC

Survey Report - Geographic

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Site: BULLDOG
Well: STOVE PIPE FED COM #1H
Wellbore: OWB
Design: PWP1

Local Co-ordinate Reference: Well STOVE PIPE FED COM #1H
TVD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)
MD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM_Users

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
12,100.0	7.62	159.60	12,099.8	-4.0	1.5	425,160.55	789,053.47	32° 9' 55.565 N	103° 23' 57.206 W
12,200.0	19.62	159.60	12,196.8	-26.0	9.7	425,138.52	789,061.66	32° 9' 55.346 N	103° 23' 57.113 W
12,300.0	31.62	159.60	12,286.8	-66.4	24.7	425,098.07	789,076.70	32° 9' 54.945 N	103° 23' 56.942 W
12,400.0	43.62	159.60	12,365.9	-123.5	45.9	425,040.96	789,097.94	32° 9' 54.378 N	103° 23' 56.700 W
12,500.0	55.62	159.60	12,430.6	-194.8	72.4	424,969.70	789,124.44	32° 9' 53.670 N	103° 23' 56.399 W
12,600.0	67.62	159.60	12,478.0	-277.1	103.1	424,887.39	789,155.05	32° 9' 52.853 N	103° 23' 56.052 W
12,700.0	79.61	159.60	12,506.2	-366.9	136.4	424,797.63	789,188.44	32° 9' 51.962 N	103° 23' 55.672 W
12,786.6	90.00	159.60	12,514.0	-447.6	166.4	424,716.95	789,218.44	32° 9' 51.161 N	103° 23' 55.331 W
12,800.0	90.02	160.14	12,514.0	-460.2	171.1	424,704.32	789,223.07	32° 9' 51.036 N	103° 23' 55.279 W
12,900.0	90.14	164.14	12,513.9	-555.3	201.7	424,609.16	789,253.74	32° 9' 50.092 N	103° 23' 54.932 W
13,000.0	90.26	168.13	12,513.5	-652.4	225.7	424,512.10	789,277.70	32° 9' 49.129 N	103° 23' 54.663 W
13,100.0	90.39	172.13	12,512.9	-750.9	242.8	424,413.60	789,294.83	32° 9' 48.153 N	103° 23' 54.473 W
13,200.0	90.50	176.13	12,512.2	-850.4	253.1	424,314.15	789,305.05	32° 9' 47.168 N	103° 23' 54.365 W
13,296.8	90.62	180.00	12,511.2	-947.1	256.3	424,217.41	789,308.32	32° 9' 46.211 N	103° 23' 54.336 W
13,300.0	90.62	180.00	12,511.2	-950.3	256.3	424,214.23	789,308.32	32° 9' 46.179 N	103° 23' 54.337 W
13,400.0	90.62	180.00	12,510.1	-1,050.3	256.3	424,114.23	789,308.32	32° 9' 45.190 N	103° 23' 54.347 W
13,500.0	90.62	180.00	12,509.0	-1,150.3	256.3	424,014.24	789,308.31	32° 9' 44.200 N	103° 23' 54.357 W
13,600.0	90.62	180.00	12,507.9	-1,250.3	256.3	423,914.24	789,308.31	32° 9' 43.211 N	103° 23' 54.367 W
13,700.0	90.62	180.00	12,506.9	-1,350.3	256.3	423,814.25	789,308.31	32° 9' 42.221 N	103° 23' 54.377 W
13,800.0	90.62	180.00	12,505.8	-1,450.2	256.3	423,714.25	789,308.31	32° 9' 41.232 N	103° 23' 54.387 W
13,900.0	90.62	180.00	12,504.7	-1,550.2	256.3	423,614.26	789,308.30	32° 9' 40.242 N	103° 23' 54.398 W
14,000.0	90.62	180.00	12,503.6	-1,650.2	256.3	423,514.27	789,308.30	32° 9' 39.253 N	103° 23' 54.408 W
14,100.0	90.62	180.00	12,502.5	-1,750.2	256.3	423,414.27	789,308.30	32° 9' 38.264 N	103° 23' 54.418 W
14,200.0	90.62	180.00	12,501.5	-1,850.2	256.3	423,314.28	789,308.30	32° 9' 37.274 N	103° 23' 54.428 W
14,300.0	90.62	180.00	12,500.4	-1,950.2	256.3	423,214.28	789,308.29	32° 9' 36.285 N	103° 23' 54.438 W
14,400.0	90.62	180.00	12,499.3	-2,050.2	256.3	423,114.29	789,308.29	32° 9' 35.295 N	103° 23' 54.448 W
14,500.0	90.62	180.00	12,498.2	-2,150.2	256.3	423,014.30	789,308.29	32° 9' 34.306 N	103° 23' 54.458 W
14,600.0	90.62	180.00	12,497.1	-2,250.2	256.3	422,914.30	789,308.29	32° 9' 33.316 N	103° 23' 54.468 W
14,700.0	90.62	180.00	12,496.1	-2,350.2	256.3	422,814.31	789,308.28	32° 9' 32.327 N	103° 23' 54.479 W
14,800.0	90.62	180.00	12,495.0	-2,450.2	256.3	422,714.31	789,308.28	32° 9' 31.337 N	103° 23' 54.489 W
14,900.0	90.62	180.00	12,493.9	-2,550.2	256.3	422,614.32	789,308.28	32° 9' 30.348 N	103° 23' 54.499 W
15,000.0	90.62	180.00	12,492.8	-2,650.2	256.3	422,514.32	789,308.28	32° 9' 29.358 N	103° 23' 54.509 W
15,100.0	90.62	180.00	12,491.7	-2,750.2	256.3	422,414.33	789,308.27	32° 9' 28.369 N	103° 23' 54.519 W
15,200.0	90.62	180.00	12,490.7	-2,850.2	256.3	422,314.34	789,308.27	32° 9' 27.379 N	103° 23' 54.529 W
15,300.0	90.62	180.00	12,489.6	-2,950.2	256.3	422,214.34	789,308.27	32° 9' 26.390 N	103° 23' 54.539 W
15,400.0	90.62	180.00	12,488.5	-3,050.2	256.3	422,114.35	789,308.27	32° 9' 25.401 N	103° 23' 54.549 W
15,500.0	90.62	180.00	12,487.4	-3,150.1	256.3	422,014.35	789,308.26	32° 9' 24.411 N	103° 23' 54.560 W
15,600.0	90.62	180.00	12,486.3	-3,250.1	256.3	421,914.36	789,308.26	32° 9' 23.422 N	103° 23' 54.570 W
15,700.0	90.62	180.00	12,485.3	-3,350.1	256.3	421,814.36	789,308.26	32° 9' 22.432 N	103° 23' 54.580 W
15,800.0	90.62	180.00	12,484.2	-3,450.1	256.3	421,714.37	789,308.26	32° 9' 21.443 N	103° 23' 54.590 W
15,900.0	90.62	180.00	12,483.1	-3,550.1	256.3	421,614.38	789,308.25	32° 9' 20.453 N	103° 23' 54.600 W
16,000.0	90.62	180.00	12,482.0	-3,650.1	256.3	421,514.38	789,308.25	32° 9' 19.464 N	103° 23' 54.610 W
16,100.0	90.62	180.00	12,480.9	-3,750.1	256.3	421,414.39	789,308.25	32° 9' 18.474 N	103° 23' 54.620 W
16,200.0	90.62	180.00	12,479.9	-3,850.1	256.2	421,314.39	789,308.25	32° 9' 17.485 N	103° 23' 54.630 W
16,300.0	90.62	180.00	12,478.8	-3,950.1	256.2	421,214.40	789,308.24	32° 9' 16.495 N	103° 23' 54.641 W
16,400.0	90.62	180.00	12,477.7	-4,050.1	256.2	421,114.41	789,308.24	32° 9' 15.506 N	103° 23' 54.651 W
16,500.0	90.62	180.00	12,476.6	-4,150.1	256.2	421,014.41	789,308.24	32° 9' 14.517 N	103° 23' 54.661 W
16,600.0	90.62	180.00	12,475.5	-4,250.1	256.2	420,914.42	789,308.24	32° 9' 13.527 N	103° 23' 54.671 W
16,700.0	90.62	180.00	12,474.5	-4,350.1	256.2	420,814.42	789,308.23	32° 9' 12.538 N	103° 23' 54.681 W
16,800.0	90.62	180.00	12,473.4	-4,450.1	256.2	420,714.43	789,308.23	32° 9' 11.548 N	103° 23' 54.691 W
16,900.0	90.62	180.00	12,472.3	-4,550.1	256.2	420,614.43	789,308.23	32° 9' 10.559 N	103° 23' 54.701 W
17,000.0	90.62	180.00	12,471.2	-4,650.1	256.2	420,514.44	789,308.23	32° 9' 9.569 N	103° 23' 54.712 W
17,100.0	90.62	180.00	12,470.2	-4,750.1	256.2	420,414.45	789,308.22	32° 9' 8.580 N	103° 23' 54.722 W
17,200.0	90.62	180.00	12,469.1	-4,850.0	256.2	420,314.45	789,308.22	32° 9' 7.590 N	103° 23' 54.732 W
17,300.0	90.62	180.00	12,468.0	-4,950.0	256.2	420,214.46	789,308.22	32° 9' 6.601 N	103° 23' 54.742 W



COG Operating LLC

Survey Report - Geographic

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Wellbore: OWB
Design: PWP1

Local Co-ordinate Reference: Well STOVE PIPE FED COM #1H
TVD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)
MD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM_Users

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
17,400.0	90.62	180.00	12,466.9	-5,050.0	256.2	420,114.46	789,308.22	32° 9' 5.611 N	103° 23' 54.752 W
17,500.0	90.62	180.00	12,465.8	-5,150.0	256.2	420,014.47	789,308.22	32° 9' 4.622 N	103° 23' 54.762 W
17,600.0	90.62	180.00	12,464.8	-5,250.0	256.2	419,914.48	789,308.21	32° 9' 3.632 N	103° 23' 54.772 W
17,700.0	90.62	180.00	12,463.7	-5,350.0	256.2	419,814.48	789,308.21	32° 9' 2.643 N	103° 23' 54.782 W
17,800.0	90.62	180.00	12,462.6	-5,450.0	256.2	419,714.49	789,308.21	32° 9' 1.654 N	103° 23' 54.793 W
17,900.0	90.62	180.00	12,461.5	-5,550.0	256.2	419,614.49	789,308.21	32° 9' 0.664 N	103° 23' 54.803 W
18,000.0	90.62	180.00	12,460.4	-5,650.0	256.2	419,514.50	789,308.20	32° 8' 59.675 N	103° 23' 54.813 W
18,100.0	90.62	180.00	12,459.4	-5,750.0	256.2	419,414.50	789,308.20	32° 8' 58.685 N	103° 23' 54.823 W
18,200.0	90.62	180.00	12,458.3	-5,850.0	256.2	419,314.51	789,308.20	32° 8' 57.696 N	103° 23' 54.833 W
18,300.0	90.62	180.00	12,457.2	-5,950.0	256.2	419,214.52	789,308.20	32° 8' 56.706 N	103° 23' 54.843 W
18,400.0	90.62	180.00	12,456.1	-6,050.0	256.2	419,114.52	789,308.19	32° 8' 55.717 N	103° 23' 54.853 W
18,500.0	90.62	180.00	12,455.0	-6,150.0	256.2	419,014.53	789,308.19	32° 8' 54.727 N	103° 23' 54.863 W
18,600.0	90.62	180.00	12,454.0	-6,250.0	256.2	418,914.53	789,308.19	32° 8' 53.738 N	103° 23' 54.874 W
18,700.0	90.62	180.00	12,452.9	-6,350.0	256.2	418,814.54	789,308.19	32° 8' 52.748 N	103° 23' 54.884 W
18,800.0	90.62	180.00	12,451.8	-6,450.0	256.2	418,714.55	789,308.18	32° 8' 51.759 N	103° 23' 54.894 W
18,900.0	90.62	180.00	12,450.7	-6,549.9	256.2	418,614.55	789,308.18	32° 8' 50.769 N	103° 23' 54.904 W
19,000.0	90.62	180.00	12,449.6	-6,649.9	256.2	418,514.56	789,308.18	32° 8' 49.780 N	103° 23' 54.914 W
19,100.0	90.62	180.00	12,448.6	-6,749.9	256.2	418,414.56	789,308.18	32° 8' 48.791 N	103° 23' 54.924 W
19,200.0	90.62	180.00	12,447.5	-6,849.9	256.2	418,314.57	789,308.17	32° 8' 47.801 N	103° 23' 54.934 W
19,300.0	90.62	180.00	12,446.4	-6,949.9	256.2	418,214.57	789,308.17	32° 8' 46.812 N	103° 23' 54.944 W
19,400.0	90.62	180.00	12,445.3	-7,049.9	256.2	418,114.58	789,308.17	32° 8' 45.822 N	103° 23' 54.955 W
19,500.0	90.62	180.00	12,444.2	-7,149.9	256.2	418,014.59	789,308.17	32° 8' 44.833 N	103° 23' 54.965 W
19,600.0	90.62	180.00	12,443.2	-7,249.9	256.2	417,914.59	789,308.16	32° 8' 43.843 N	103° 23' 54.975 W
19,700.0	90.62	180.00	12,442.1	-7,349.9	256.2	417,814.60	789,308.16	32° 8' 42.854 N	103° 23' 54.985 W
19,800.0	90.62	180.00	12,441.0	-7,449.9	256.2	417,714.60	789,308.16	32° 8' 41.864 N	103° 23' 54.995 W
19,900.0	90.62	180.00	12,439.9	-7,549.9	256.2	417,614.61	789,308.16	32° 8' 40.875 N	103° 23' 55.005 W
20,000.0	90.62	180.00	12,438.8	-7,649.9	256.2	417,514.62	789,308.15	32° 8' 39.885 N	103° 23' 55.015 W
20,100.0	90.62	180.00	12,437.8	-7,749.9	256.2	417,414.62	789,308.15	32° 8' 38.896 N	103° 23' 55.025 W
20,200.0	90.62	180.00	12,436.7	-7,849.9	256.2	417,314.63	789,308.15	32° 8' 37.906 N	103° 23' 55.036 W
20,300.0	90.62	180.00	12,435.6	-7,949.9	256.1	417,214.63	789,308.15	32° 8' 36.917 N	103° 23' 55.046 W
20,400.0	90.62	180.00	12,434.5	-8,049.9	256.1	417,114.64	789,308.14	32° 8' 35.928 N	103° 23' 55.056 W
20,500.0	90.62	180.00	12,433.4	-8,149.9	256.1	417,014.64	789,308.14	32° 8' 34.938 N	103° 23' 55.066 W
20,600.0	90.62	180.00	12,432.4	-8,249.8	256.1	416,914.65	789,308.14	32° 8' 33.949 N	103° 23' 55.076 W
20,700.0	90.62	180.00	12,431.3	-8,349.8	256.1	416,814.66	789,308.14	32° 8' 32.959 N	103° 23' 55.086 W
20,800.0	90.62	180.00	12,430.2	-8,449.8	256.1	416,714.66	789,308.13	32° 8' 31.970 N	103° 23' 55.096 W
20,900.0	90.62	180.00	12,429.1	-8,549.8	256.1	416,614.67	789,308.13	32° 8' 30.980 N	103° 23' 55.106 W
21,000.0	90.62	180.00	12,428.0	-8,649.8	256.1	416,514.67	789,308.13	32° 8' 29.991 N	103° 23' 55.117 W
21,100.0	90.62	180.00	12,427.0	-8,749.8	256.1	416,414.68	789,308.13	32° 8' 29.001 N	103° 23' 55.127 W
21,200.0	90.62	180.00	12,425.9	-8,849.8	256.1	416,314.69	789,308.12	32° 8' 28.012 N	103° 23' 55.137 W
21,300.0	90.62	180.00	12,424.8	-8,949.8	256.1	416,214.69	789,308.12	32° 8' 27.022 N	103° 23' 55.147 W
21,400.0	90.62	180.00	12,423.7	-9,049.8	256.1	416,114.70	789,308.12	32° 8' 26.033 N	103° 23' 55.157 W
21,500.0	90.62	180.00	12,422.6	-9,149.8	256.1	416,014.70	789,308.12	32° 8' 25.043 N	103° 23' 55.167 W
21,600.0	90.62	180.00	12,421.6	-9,249.8	256.1	415,914.71	789,308.11	32° 8' 24.054 N	103° 23' 55.177 W
21,700.0	90.62	180.00	12,420.5	-9,349.8	256.1	415,814.71	789,308.11	32° 8' 23.065 N	103° 23' 55.187 W
21,800.0	90.62	180.00	12,419.4	-9,449.8	256.1	415,714.72	789,308.11	32° 8' 22.075 N	103° 23' 55.197 W
21,900.0	90.62	180.00	12,418.3	-9,549.8	256.1	415,614.73	789,308.11	32° 8' 21.086 N	103° 23' 55.208 W
22,000.0	90.62	180.00	12,417.2	-9,649.8	256.1	415,514.73	789,308.10	32° 8' 20.096 N	103° 23' 55.218 W
22,100.0	90.62	180.00	12,416.2	-9,749.8	256.1	415,414.74	789,308.10	32° 8' 19.107 N	103° 23' 55.228 W
22,200.0	90.62	180.00	12,415.1	-9,849.8	256.1	415,314.74	789,308.10	32° 8' 18.117 N	103° 23' 55.238 W
22,300.0	90.62	180.00	12,414.0	-9,949.7	256.1	415,214.75	789,308.10	32° 8' 17.128 N	103° 23' 55.248 W
22,300.3	90.62	180.00	12,414.0	-9,950.1	256.1	415,214.40	789,308.10	32° 8' 17.124 N	103° 23' 55.248 W



COG Operating LLC

Survey Report - Geographic

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Site: BULLDOG
Well: STOVE PIPE FED COM #1H
Wellbore: OWB
Design: PWP1

Local Co-ordinate Reference: Well STOVE PIPE FED COM #1H
TVD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)
MD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM_Users

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL-Stove Pipe Fed - plan hits target center - Point	0.00	0.00	12,414.0	-9,950.1	256.1	415,214.40	789,308.10	32° 8' 17.124 N	103° 23' 55.248 W

Checked By: _____ Approved By: _____ Date: _____



Project: LEA COUNTY, NM
Site: BULLDOG
Well: **STOVE PIPE FED COM #1H**
Wellbore: OWB
Design: **PWP1**

WELL DETAILS: STOVE PIPE FED COM #1H
3295.0
Northing 425164.50 Easting 789052.00 Latitude 32° 9' 55.604 N 103° 23' 57.222 W Longitude

SECTION DETAILS									
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0
2	12036.5	0.00	0.00	12036.5	0.0	0.0	0.00	0.00	0.0
3	12786.6	90.00	159.60	12514.0	-447.6	166.4	12.00	159.60	451.7
4	13296.8	90.62	180.00	12511.2	-947.1	256.3	4.00	88.23	953.4
5	22300.4	90.62	180.00	12414.0	-9950.1	256.1	0.00	0.00	9953.4

PWP1
LEGEND

