



WELL DETAILS: WHITE FALCON 16 ST COM #23H
3257.4

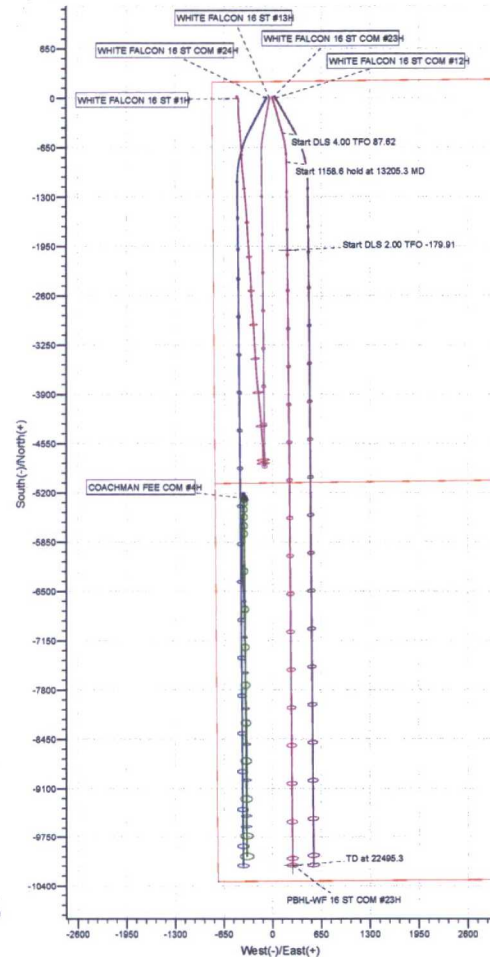
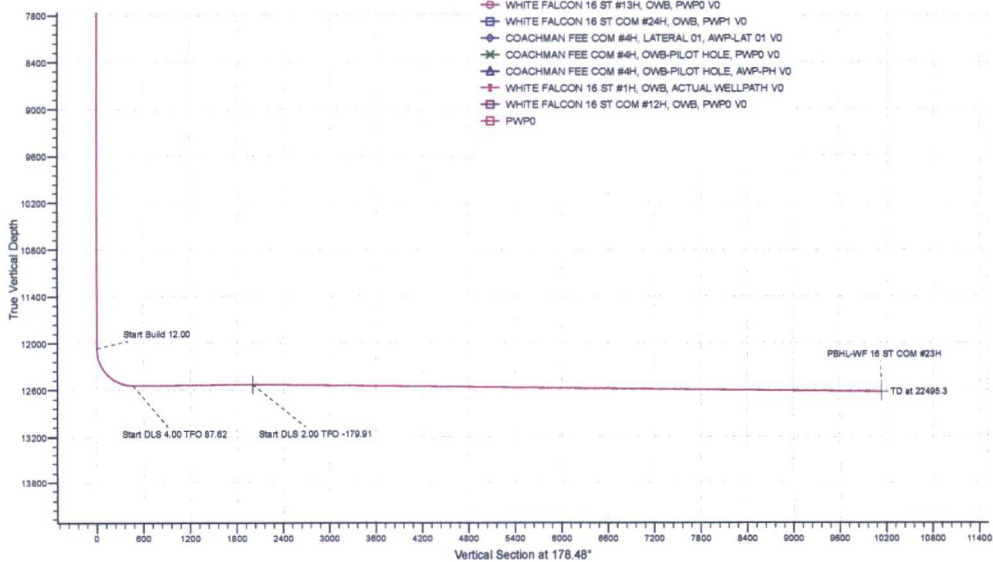
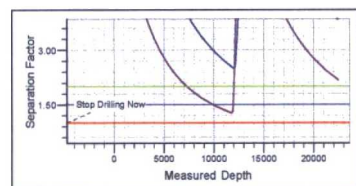
	+N/-S	+E/-W	North	East	Latitude	Longitude	Slot
	0.0	0.0	414834.20	795733.90	32° 8' 12.804 N 103° 22' 40.562 W		

Sec	MD	Inc	Azi	TVD	SECTION DETAILS		Dleg	TFace	VSeal	Annotation
					+N/-S	+E/-W				
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	12067.5	0.00	0.00	12067.5	0.0	0.0	0.00	0.00	0.0	
3	12817.6	90.00	164.00	12545.0	-459.0	131.6	12.00	164.00	462.3	
4	13205.3	90.63	179.50	12542.8	-841.5	187.1	4.00	87.62	846.2	
5	14363.9	90.63	179.50	12530.0	-2000.0	197.3	0.00	0.00	2004.5	
6	14429.7	89.32	179.49	12530.0	-2055.8	197.9	2.00	-179.91	2070.4	
7	22495.3	89.32	179.49	12826.0	-10130.5	269.2	0.00	0.00	10134.1	

Project: LEA COUNTY, NM
Site: BULLDOG
Well: WHITE FALCON 16 ST COM #23H
Wellbore: CWB
Design: PWP0

LEGEND

- WHITE FALCON 16 ST #13H, CWB, PWP0 V0
- WHITE FALCON 16 ST COM #24H, CWB, PWP1 V0
- ◇ COACHMAN FEE COM #4H, LATERAL 01, AWP-LAT 01 V0
- △ COACHMAN FEE COM #4H, CWB-PILOT HOLE, PWP0 V0
- ▲ COACHMAN FEE COM #4H, CWB-PILOT HOLE, AWP-PH V0
- ✱ WHITE FALCON 16 ST #1H, CWB, ACTUAL WELLPATH V0
- WHITE FALCON 16 ST COM #12H, CWB, PWP0 V0
- PWP0





COG OPERATING LLC

LEA COUNTY, NM

BULLDOG

WHITE FALCON 16 ST COM #23H

OWB

Plan: PWP0

Survey Report - Geographic

14 March, 2017



COG Operating LLC

Survey Report - Geographic

Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Well WHITE FALCON 16 ST COM #23H
Project:	LEA COUNTY, NM	TVD Reference:	RKB=3257.4+29 @ 3286.4usft (NORAM 23)
Site:	BULLDOG	MD Reference:	RKB=3257.4+29 @ 3286.4usft (NORAM 23)
Well:	WHITE FALCON 16 ST COM #23H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP0	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
From:	Map	Easting:	741,887.40 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 5' 36.820 N
		Longitude:	103° 33' 8.116 W
		Grid Convergence:	0.42 °

Well	WHITE FALCON 16 ST COM #23H		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	3.0 usft	Wellhead Elevation:	usf
		Latitude:	32° 8' 12.804 N
		Longitude:	103° 22' 40.562 W
		Ground Level:	3,257.4 usf

Wellbore	OWB		
Magnetics	Model Name	Sample Date	Declination (°)
	WMM2015	3/13/2017	6.90
			Dip Angle (°)
			60.01
			Field Strength (nT)
			47,924.39307735

Design	PWP0		
Audit Notes:			
Version:	Phase:	PROTOTYPE	Tie On Depth:
			0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	12,626.0	0.0	0.0
			Direction (°)
			178.48

Survey Tool Program	Date 3/13/2017		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
0.0	12,000.0	PWP0 (OWB)	Standard Keeper 104
12,000.0	22,495.2	PWP0 (OWB)	MWD+IFR1+MS
			Description
			Standard Wireline Keeper ver 1.0.4
			OWSG MWD + IFR1 + Multi-Station Correction

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	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
100.0	0.00	0.00	100.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
200.0	0.00	0.00	200.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
300.0	0.00	0.00	300.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
400.0	0.00	0.00	400.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
500.0	0.00	0.00	500.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
600.0	0.00	0.00	600.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
700.0	0.00	0.00	700.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
800.0	0.00	0.00	800.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
900.0	0.00	0.00	900.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
1,000.0	0.00	0.00	1,000.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W



COG Operating LLC
Survey Report - Geographic

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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
1,100.0	0.00	0.00	1,100.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
1,200.0	0.00	0.00	1,200.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
1,300.0	0.00	0.00	1,300.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
1,400.0	0.00	0.00	1,400.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
1,500.0	0.00	0.00	1,500.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
1,600.0	0.00	0.00	1,600.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
1,700.0	0.00	0.00	1,700.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
1,800.0	0.00	0.00	1,800.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
1,900.0	0.00	0.00	1,900.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
2,000.0	0.00	0.00	2,000.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
2,100.0	0.00	0.00	2,100.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
2,200.0	0.00	0.00	2,200.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
2,300.0	0.00	0.00	2,300.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
2,400.0	0.00	0.00	2,400.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
2,500.0	0.00	0.00	2,500.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
2,600.0	0.00	0.00	2,600.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
2,700.0	0.00	0.00	2,700.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
2,800.0	0.00	0.00	2,800.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
2,900.0	0.00	0.00	2,900.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
3,000.0	0.00	0.00	3,000.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
3,100.0	0.00	0.00	3,100.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
3,200.0	0.00	0.00	3,200.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
3,300.0	0.00	0.00	3,300.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
3,400.0	0.00	0.00	3,400.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
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3,800.0	0.00	0.00	3,800.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
3,900.0	0.00	0.00	3,900.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
4,000.0	0.00	0.00	4,000.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
4,100.0	0.00	0.00	4,100.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
4,200.0	0.00	0.00	4,200.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
4,300.0	0.00	0.00	4,300.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
4,400.0	0.00	0.00	4,400.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
4,500.0	0.00	0.00	4,500.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
4,600.0	0.00	0.00	4,600.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
4,700.0	0.00	0.00	4,700.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
4,800.0	0.00	0.00	4,800.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
4,900.0	0.00	0.00	4,900.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
5,000.0	0.00	0.00	5,000.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
5,100.0	0.00	0.00	5,100.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
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5,900.0	0.00	0.00	5,900.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
6,000.0	0.00	0.00	6,000.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
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Survey Report - Geographic

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Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWPO	Database:	EDM_Users

Planned Survey									
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6,600.0	0.00	0.00	6,600.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
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6,900.0	0.00	0.00	6,900.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
7,000.0	0.00	0.00	7,000.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
7,100.0	0.00	0.00	7,100.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
7,200.0	0.00	0.00	7,200.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
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7,900.0	0.00	0.00	7,900.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
8,000.0	0.00	0.00	8,000.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
8,100.0	0.00	0.00	8,100.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
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8,400.0	0.00	0.00	8,400.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
8,500.0	0.00	0.00	8,500.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
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8,700.0	0.00	0.00	8,700.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
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9,200.0	0.00	0.00	9,200.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
9,300.0	0.00	0.00	9,300.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
9,400.0	0.00	0.00	9,400.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
9,500.0	0.00	0.00	9,500.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
9,600.0	0.00	0.00	9,600.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
9,700.0	0.00	0.00	9,700.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
9,800.0	0.00	0.00	9,800.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
9,900.0	0.00	0.00	9,900.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
10,000.0	0.00	0.00	10,000.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
10,100.0	0.00	0.00	10,100.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
10,200.0	0.00	0.00	10,200.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
10,300.0	0.00	0.00	10,300.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
10,400.0	0.00	0.00	10,400.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
10,500.0	0.00	0.00	10,500.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
10,600.0	0.00	0.00	10,600.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
10,700.0	0.00	0.00	10,700.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
10,800.0	0.00	0.00	10,800.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
10,900.0	0.00	0.00	10,900.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
11,000.0	0.00	0.00	11,000.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
11,100.0	0.00	0.00	11,100.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
11,200.0	0.00	0.00	11,200.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
11,300.0	0.00	0.00	11,300.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
11,400.0	0.00	0.00	11,400.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
11,500.0	0.00	0.00	11,500.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
11,600.0	0.00	0.00	11,600.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
11,700.0	0.00	0.00	11,700.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
11,800.0	0.00	0.00	11,800.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
11,900.0	0.00	0.00	11,900.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
12,000.0	0.00	0.00	12,000.0	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W



COG Operating LLC

Survey Report - Geographic

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Site: BULLDOG
Well: WHITE FALCON 16 ST COM #23H
Wellbore: OWB
Design: PWP0

Local Co-ordinate Reference: Well WHITE FALCON 16 ST COM #23H
TVD Reference: RKB=3257.4+29 @ 3286.4usft (NORAM 23)
MD Reference: RKB=3257.4+29 @ 3286.4usft (NORAM 23)
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
12,067.5	0.00	0.00	12,067.5	0.0	0.0	414,834.20	795,733.90	32° 8' 12.804 N	103° 22' 40.562 W
12,100.0	3.90	164.00	12,100.0	-1.1	0.3	414,833.14	795,734.20	32° 8' 12.794 N	103° 22' 40.558 W
12,200.0	15.90	164.00	12,198.3	-17.6	5.0	414,816.64	795,738.93	32° 8' 12.630 N	103° 22' 40.505 W
12,300.0	27.90	164.00	12,290.9	-53.3	15.3	414,780.86	795,749.19	32° 8' 12.275 N	103° 22' 40.390 W
12,400.0	39.90	164.00	12,373.8	-106.9	30.6	414,727.34	795,764.54	32° 8' 11.744 N	103° 22' 40.217 W
12,500.0	51.90	164.00	12,443.2	-175.8	50.4	414,658.44	795,784.30	32° 8' 11.061 N	103° 22' 39.994 W
12,600.0	63.90	164.00	12,496.3	-257.0	73.7	414,577.16	795,807.60	32° 8' 10.254 N	103° 22' 39.731 W
12,700.0	75.89	164.00	12,530.6	-347.1	99.5	414,487.06	795,833.44	32° 8' 9.361 N	103° 22' 39.440 W
12,800.0	87.89	164.00	12,544.7	-442.1	126.8	414,392.07	795,860.68	32° 8' 8.418 N	103° 22' 39.133 W
12,817.6	90.00	164.00	12,545.0	-459.0	131.6	414,375.20	795,865.51	32° 8' 8.251 N	103° 22' 39.079 W
12,900.0	90.14	167.29	12,544.9	-538.9	152.1	414,295.34	795,885.95	32° 8' 7.459 N	103° 22' 38.849 W
13,000.0	90.30	171.29	12,544.5	-637.1	170.6	414,197.10	795,904.52	32° 8' 6.485 N	103° 22' 38.644 W
13,100.0	90.47	175.29	12,543.8	-736.4	182.3	414,097.81	795,916.20	32° 8' 5.502 N	103° 22' 38.518 W
13,200.0	90.63	179.29	12,542.9	-836.3	187.0	413,997.94	795,920.94	32° 8' 4.513 N	103° 22' 38.473 W
13,205.3	90.63	179.50	12,542.8	-841.5	187.1	413,992.69	795,920.99	32° 8' 4.461 N	103° 22' 38.473 W
13,300.0	90.63	179.50	12,541.8	-936.2	187.9	413,897.95	795,921.83	32° 8' 3.523 N	103° 22' 38.473 W
13,400.0	90.63	179.50	12,540.7	-1,036.2	188.8	413,797.96	795,922.71	32° 8' 2.534 N	103° 22' 38.473 W
13,500.0	90.63	179.50	12,539.6	-1,136.2	189.7	413,697.97	795,923.59	32° 8' 1.544 N	103° 22' 38.473 W
13,600.0	90.63	179.50	12,538.5	-1,236.2	190.6	413,597.98	795,924.47	32° 8' 0.555 N	103° 22' 38.473 W
13,700.0	90.63	179.50	12,537.4	-1,336.2	191.5	413,497.99	795,925.35	32° 7' 59.655 N	103° 22' 38.473 W
13,800.0	90.63	179.50	12,536.2	-1,436.2	192.3	413,398.00	795,926.23	32° 7' 58.576 N	103° 22' 38.474 W
13,900.0	90.63	179.50	12,535.1	-1,536.2	193.2	413,298.01	795,927.11	32° 7' 57.586 N	103° 22' 38.474 W
14,000.0	90.63	179.50	12,534.0	-1,636.2	194.1	413,198.02	795,927.99	32° 7' 56.597 N	103° 22' 38.474 W
14,100.0	90.63	179.50	12,532.9	-1,736.2	195.0	413,098.03	795,928.87	32° 7' 55.607 N	103° 22' 38.474 W
14,200.0	90.63	179.50	12,531.8	-1,836.2	195.9	412,998.04	795,929.75	32° 7' 54.618 N	103° 22' 38.474 W
14,300.0	90.63	179.50	12,530.7	-1,936.1	196.7	412,898.05	795,930.64	32° 7' 53.629 N	103° 22' 38.474 W
14,363.9	90.63	179.50	12,530.0	-2,000.0	197.3	412,834.20	795,931.20	32° 7' 52.997 N	103° 22' 38.474 W
14,400.0	89.91	179.49	12,529.8	-2,036.1	197.6	412,798.06	795,931.52	32° 7' 52.639 N	103° 22' 38.474 W
14,429.7	89.32	179.49	12,530.0	-2,065.8	197.9	412,768.37	795,931.78	32° 7' 52.345 N	103° 22' 38.474 W
14,500.0	89.32	179.49	12,530.9	-2,136.1	198.5	412,698.07	795,932.40	32° 7' 51.650 N	103° 22' 38.474 W
14,600.0	89.32	179.49	12,532.1	-2,236.1	199.4	412,598.08	795,933.28	32° 7' 50.660 N	103° 22' 38.474 W
14,700.0	89.32	179.49	12,533.2	-2,336.1	200.3	412,498.09	795,934.17	32° 7' 49.671 N	103° 22' 38.474 W
14,800.0	89.32	179.49	12,534.4	-2,436.1	201.2	412,398.10	795,935.05	32° 7' 48.681 N	103° 22' 38.474 W
14,900.0	89.32	179.49	12,535.6	-2,536.1	202.0	412,298.11	795,935.94	32° 7' 47.692 N	103° 22' 38.474 W
15,000.0	89.32	179.49	12,536.8	-2,636.1	202.9	412,198.13	795,936.82	32° 7' 46.702 N	103° 22' 38.474 W
15,100.0	89.32	179.49	12,538.0	-2,736.1	203.8	412,098.14	795,937.71	32° 7' 45.713 N	103° 22' 38.474 W
15,200.0	89.32	179.49	12,539.2	-2,836.1	204.7	411,998.15	795,938.59	32° 7' 44.723 N	103° 22' 38.474 W
15,300.0	89.32	179.49	12,540.4	-2,936.0	205.6	411,898.16	795,939.47	32° 7' 43.734 N	103° 22' 38.474 W
15,400.0	89.32	179.49	12,541.6	-3,036.0	206.5	411,798.17	795,940.36	32° 7' 42.744 N	103° 22' 38.474 W
15,500.0	89.32	179.49	12,542.8	-3,136.0	207.3	411,698.18	795,941.24	32° 7' 41.755 N	103° 22' 38.474 W
15,600.0	89.32	179.49	12,544.0	-3,236.0	208.2	411,598.19	795,942.13	32° 7' 40.765 N	103° 22' 38.474 W
15,700.0	89.32	179.49	12,545.1	-3,336.0	209.1	411,498.20	795,943.01	32° 7' 39.776 N	103° 22' 38.474 W
15,800.0	89.32	179.49	12,546.3	-3,436.0	210.0	411,398.21	795,943.90	32° 7' 38.786 N	103° 22' 38.475 W
15,900.0	89.32	179.49	12,547.5	-3,536.0	210.9	411,298.22	795,944.78	32° 7' 37.797 N	103° 22' 38.475 W
16,000.0	89.32	179.49	12,548.7	-3,636.0	211.8	411,198.24	795,945.66	32° 7' 36.807 N	103° 22' 38.475 W
16,100.0	89.32	179.49	12,549.9	-3,736.0	212.7	411,098.25	795,946.55	32° 7' 35.818 N	103° 22' 38.475 W
16,200.0	89.32	179.49	12,551.1	-3,835.9	213.5	410,998.26	795,947.43	32° 7' 34.828 N	103° 22' 38.475 W
16,300.0	89.32	179.49	12,552.3	-3,935.9	214.4	410,898.27	795,948.32	32° 7' 33.839 N	103° 22' 38.475 W
16,400.0	89.32	179.49	12,553.5	-4,035.9	215.3	410,798.28	795,949.20	32° 7' 32.849 N	103° 22' 38.475 W
16,500.0	89.32	179.49	12,554.7	-4,135.9	216.2	410,698.29	795,950.09	32° 7' 31.860 N	103° 22' 38.475 W
16,600.0	89.32	179.49	12,555.9	-4,235.9	217.1	410,598.30	795,950.97	32° 7' 30.870 N	103° 22' 38.475 W
16,700.0	89.32	179.49	12,557.0	-4,335.9	218.0	410,498.31	795,951.85	32° 7' 29.881 N	103° 22' 38.475 W
16,800.0	89.32	179.49	12,558.2	-4,435.9	218.8	410,398.32	795,952.74	32° 7' 28.891 N	103° 22' 38.475 W
16,900.0	89.32	179.49	12,559.4	-4,535.9	219.7	410,298.33	795,953.62	32° 7' 27.902 N	103° 22' 38.475 W
17,000.0	89.32	179.49	12,560.6	-4,635.9	220.6	410,198.35	795,954.51	32° 7' 26.912 N	103° 22' 38.475 W



COG Operating LLC

Survey Report - Geographic

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Site: BULLDOG
Well: WHITE FALCON 16 ST COM #23H
Wellbore: OWB
Design: PWP0

Local Co-ordinate Reference: Well WHITE FALCON 16 ST COM #23H
TVD Reference: RKB=3257.4+29 @ 3286.4usft (NORAM 23)
MD Reference: RKB=3257.4+29 @ 3286.4usft (NORAM 23)
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
17,100.0	89.32	179.49	12,561.8	-4,735.8	221.5	410,098.36	795,955.39	32° 7' 25.923 N	103° 22' 38.475 W
17,200.0	89.32	179.49	12,563.0	-4,835.8	222.4	409,998.37	795,956.27	32° 7' 24.933 N	103° 22' 38.475 W
17,300.0	89.32	179.49	12,564.2	-4,935.8	223.3	409,898.38	795,957.16	32° 7' 23.944 N	103° 22' 38.475 W
17,400.0	89.32	179.49	12,565.4	-5,035.8	224.1	409,798.39	795,958.04	32° 7' 22.954 N	103° 22' 38.475 W
17,500.0	89.32	179.49	12,566.6	-5,135.8	225.0	409,698.40	795,958.93	32° 7' 21.965 N	103° 22' 38.475 W
17,600.0	89.32	179.49	12,567.8	-5,235.8	225.9	409,598.41	795,959.81	32° 7' 20.975 N	103° 22' 38.475 W
17,700.0	89.32	179.49	12,568.9	-5,335.8	226.8	409,498.42	795,960.70	32° 7' 19.986 N	103° 22' 38.475 W
17,800.0	89.32	179.49	12,570.1	-5,435.8	227.7	409,398.43	795,961.58	32° 7' 18.997 N	103° 22' 38.475 W
17,900.0	89.32	179.49	12,571.3	-5,535.8	228.6	409,298.44	795,962.46	32° 7' 18.007 N	103° 22' 38.475 W
18,000.0	89.32	179.49	12,572.5	-5,635.7	229.5	409,198.46	795,963.35	32° 7' 17.018 N	103° 22' 38.475 W
18,100.0	89.32	179.49	12,573.7	-5,735.7	230.3	409,098.47	795,964.23	32° 7' 16.028 N	103° 22' 38.475 W
18,200.0	89.32	179.49	12,574.9	-5,835.7	231.2	408,998.48	795,965.12	32° 7' 15.039 N	103° 22' 38.475 W
18,300.0	89.32	179.49	12,576.1	-5,935.7	232.1	408,898.49	795,966.00	32° 7' 14.049 N	103° 22' 38.475 W
18,400.0	89.32	179.49	12,577.3	-6,035.7	233.0	408,798.50	795,966.89	32° 7' 13.060 N	103° 22' 38.475 W
18,500.0	89.32	179.49	12,578.5	-6,135.7	233.9	408,698.51	795,967.77	32° 7' 12.070 N	103° 22' 38.475 W
18,600.0	89.32	179.49	12,579.6	-6,235.7	234.8	408,598.52	795,968.65	32° 7' 11.081 N	103° 22' 38.475 W
18,700.0	89.32	179.49	12,580.8	-6,335.7	235.6	408,498.53	795,969.54	32° 7' 10.091 N	103° 22' 38.476 W
18,800.0	89.32	179.49	12,582.0	-6,435.7	236.5	408,398.54	795,970.42	32° 7' 9.102 N	103° 22' 38.476 W
18,900.0	89.32	179.49	12,583.2	-6,535.6	237.4	408,298.55	795,971.31	32° 7' 8.112 N	103° 22' 38.476 W
19,000.0	89.32	179.49	12,584.4	-6,635.6	238.3	408,198.57	795,972.19	32° 7' 7.123 N	103° 22' 38.476 W
19,100.0	89.32	179.49	12,585.6	-6,735.6	239.2	408,098.58	795,973.08	32° 7' 6.133 N	103° 22' 38.476 W
19,200.0	89.32	179.49	12,586.8	-6,835.6	240.1	407,998.59	795,973.96	32° 7' 5.144 N	103° 22' 38.476 W
19,300.0	89.32	179.49	12,588.0	-6,935.6	240.9	407,898.60	795,974.84	32° 7' 4.154 N	103° 22' 38.476 W
19,400.0	89.32	179.49	12,589.2	-7,035.6	241.8	407,798.61	795,975.73	32° 7' 3.165 N	103° 22' 38.476 W
19,500.0	89.32	179.49	12,590.4	-7,135.6	242.7	407,698.62	795,976.61	32° 7' 2.175 N	103° 22' 38.476 W
19,600.0	89.32	179.49	12,591.5	-7,235.6	243.6	407,598.63	795,977.50	32° 7' 1.186 N	103° 22' 38.476 W
19,700.0	89.32	179.49	12,592.7	-7,335.6	244.5	407,498.64	795,978.38	32° 7' 0.196 N	103° 22' 38.476 W
19,800.0	89.32	179.49	12,593.9	-7,435.5	245.4	407,398.65	795,979.27	32° 6' 59.207 N	103° 22' 38.476 W
19,900.0	89.32	179.49	12,595.1	-7,535.5	246.3	407,298.66	795,980.15	32° 6' 58.217 N	103° 22' 38.476 W
20,000.0	89.32	179.49	12,596.3	-7,635.5	247.1	407,198.67	795,981.03	32° 6' 57.228 N	103° 22' 38.476 W
20,100.0	89.32	179.49	12,597.5	-7,735.5	248.0	407,098.69	795,981.92	32° 6' 56.238 N	103° 22' 38.476 W
20,200.0	89.32	179.49	12,598.7	-7,835.5	248.9	406,998.70	795,982.80	32° 6' 55.249 N	103° 22' 38.476 W
20,300.0	89.32	179.49	12,599.9	-7,935.5	249.8	406,898.71	795,983.69	32° 6' 54.259 N	103° 22' 38.476 W
20,400.0	89.32	179.49	12,601.1	-8,035.5	250.7	406,798.72	795,984.57	32° 6' 53.270 N	103° 22' 38.476 W
20,500.0	89.32	179.49	12,602.3	-8,135.5	251.6	406,698.73	795,985.45	32° 6' 52.280 N	103° 22' 38.476 W
20,600.0	89.32	179.49	12,603.4	-8,235.5	252.4	406,598.74	795,986.34	32° 6' 51.291 N	103° 22' 38.476 W
20,700.0	89.32	179.49	12,604.6	-8,335.4	253.3	406,498.75	795,987.22	32° 6' 50.301 N	103° 22' 38.476 W
20,800.0	89.32	179.49	12,605.8	-8,435.4	254.2	406,398.76	795,988.11	32° 6' 49.312 N	103° 22' 38.476 W
20,900.0	89.32	179.49	12,607.0	-8,535.4	255.1	406,298.77	795,988.99	32° 6' 48.322 N	103° 22' 38.476 W
21,000.0	89.32	179.49	12,608.2	-8,635.4	256.0	406,198.78	795,989.88	32° 6' 47.333 N	103° 22' 38.476 W
21,100.0	89.32	179.49	12,609.4	-8,735.4	256.9	406,098.80	795,990.76	32° 6' 46.343 N	103° 22' 38.476 W
21,200.0	89.32	179.49	12,610.6	-8,835.4	257.7	405,998.81	795,991.64	32° 6' 45.354 N	103° 22' 38.476 W
21,300.0	89.32	179.49	12,611.8	-8,935.4	258.6	405,898.82	795,992.53	32° 6' 44.365 N	103° 22' 38.476 W
21,400.0	89.32	179.49	12,613.0	-9,035.4	259.5	405,798.83	795,993.41	32° 6' 43.375 N	103° 22' 38.476 W
21,500.0	89.32	179.49	12,614.2	-9,135.4	260.4	405,698.84	795,994.30	32° 6' 42.386 N	103° 22' 38.476 W
21,600.0	89.32	179.49	12,615.3	-9,235.3	261.3	405,598.85	795,995.18	32° 6' 41.396 N	103° 22' 38.476 W
21,700.0	89.32	179.49	12,616.5	-9,335.3	262.2	405,498.86	795,996.07	32° 6' 40.407 N	103° 22' 38.476 W
21,800.0	89.32	179.49	12,617.7	-9,435.3	263.1	405,398.87	795,996.95	32° 6' 39.417 N	103° 22' 38.477 W
21,900.0	89.32	179.49	12,618.9	-9,535.3	263.9	405,298.88	795,997.83	32° 6' 38.428 N	103° 22' 38.477 W
22,000.0	89.32	179.49	12,620.1	-9,635.3	264.8	405,198.89	795,998.72	32° 6' 37.438 N	103° 22' 38.477 W
22,100.0	89.32	179.49	12,621.3	-9,735.3	265.7	405,098.91	795,999.60	32° 6' 36.449 N	103° 22' 38.477 W
22,200.0	89.32	179.49	12,622.5	-9,835.3	266.6	404,998.92	796,000.49	32° 6' 35.459 N	103° 22' 38.477 W
22,300.0	89.32	179.49	12,623.7	-9,935.3	267.5	404,898.93	796,001.37	32° 6' 34.470 N	103° 22' 38.477 W
22,400.0	89.32	179.49	12,624.9	-10,035.3	268.4	404,798.94	796,002.26	32° 6' 33.480 N	103° 22' 38.477 W
22,495.2	89.32	179.49	12,626.0	-10,130.5	269.2	404,703.70	796,003.10	32° 6' 32.538 N	103° 22' 38.477 W



COG Operating LLC
Survey Report - Geographic

Company: COG OPERATING LLC
Project: LEA COUNTY, NM
Site: BULLDOG
Well: WHITE FALCON 16 ST COM #23H
Wellbore: OWB
Design: PWP0

Local Co-ordinate Reference: Well WHITE FALCON 16 ST COM #23H
TVD Reference: RKB=3257.4+29 @ 3286.4usft (NORAM 23)
MD Reference: RKB=3257.4+29 @ 3286.4usft (NORAM 23)
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
2K VS 23H - plan hits target center - Point	0.00	0.00	12,530.0	-2,000.0	197.3	412,834.20	795,931.20	32° 7' 52.997 N	103° 22' 38.474 W
PBHL-WF 16 ST COM - plan hits target center - Point	0.00	0.00	12,626.0	-10,130.5	269.2	404,703.70	796,003.10	32° 6' 32.538 N	103° 22' 38.477 W

Checked By: _____ Approved By: _____ Date: _____