



WELL DETAILS: WHITE FALCON 16 ST COM #24H

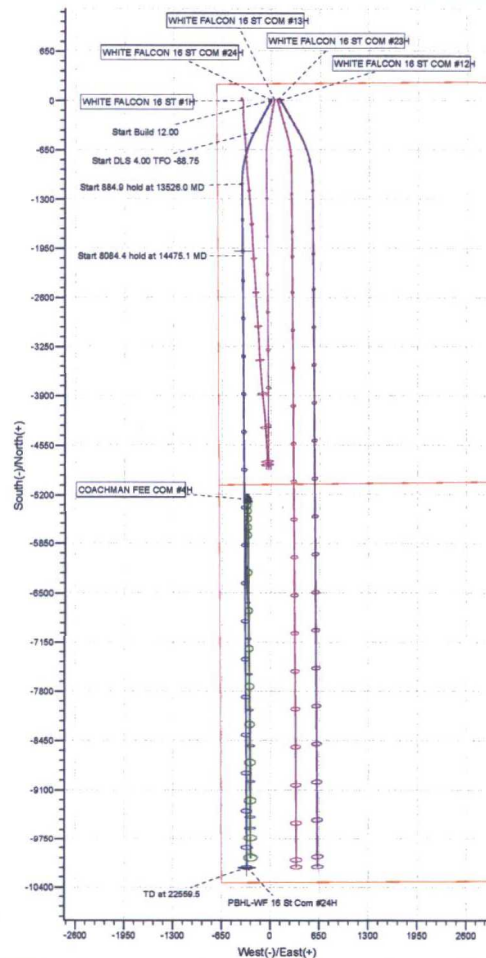
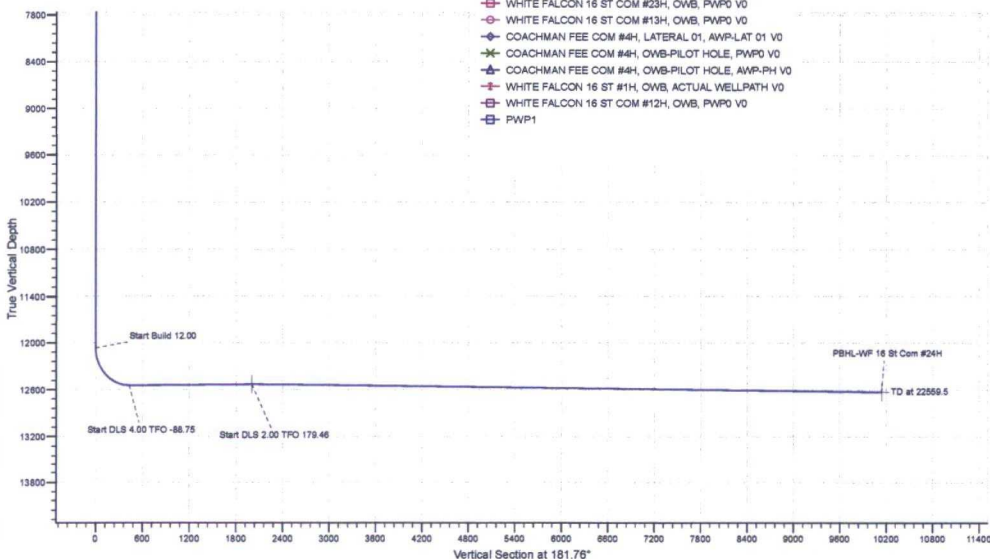
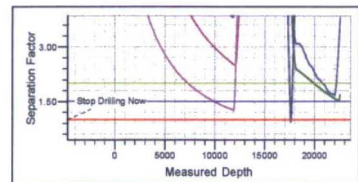
+N-S 0.0 +E-W 0.0 Northing 414833.50 Easting 795654.00 Latitude 32° 8' 12.804 N 103° 22' 41.491 W Longitude Slot

Sec	MD	Inc	Azi	TVD	SECTION DETAILS		Dleg	TFace	VSecl	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	12065.5	0.00	0.00	12065.5	0.0	0.0	0.00	0.00	0.0	
3	12815.6	90.00	207.90	12543.0	-422.0	-223.4	12.00	207.90	428.6	
4	13526.0	90.60	179.49	12539.2	-1105.2	-389.9	4.00	-88.75	1116.6	
5	14410.9	90.60	179.49	12530.0	-1990.0	-382.0	0.00	0.00	2000.8	
6	14475.1	89.31	179.50	12530.1	-2054.2	-381.4	2.00	179.46	2064.9	
7	22559.5	89.31	179.50	12627.0	-10137.7	-310.9	0.00	0.00	10142.5	

Project: LEA COUNTY, NM
Site: BULLDOG
Well: WHITE FALCON 16 ST COM #24H
Wellbore: OWB
Design: PWP1

LEGEND

- WHITE FALCON 16 ST COM #23H, OWB, PWP0 V0
- WHITE FALCON 16 ST COM #13H, OWB, PWP0 V0
- COACHMAN FEE COM #4H, LATERAL 01, AWP-LAT 01 V0
- COACHMAN FEE COM #4H, OWB-PILOT HOLE, PWP0 V0
- COACHMAN FEE COM #4H, OWB-PILOT HOLE, AWP-PH V0
- WHITE FALCON 16 ST #1H, OWB, ACTUAL WELLPATH V0
- WHITE FALCON 16 ST COM #12H, OWB, PWP0 V0
- PWP1



COG OPERATING LLC

LEA COUNTY, NM

BULLDOG

WHITE FALCON 16 ST COM #24H

OWB

Plan: PWP1

Survey Report - Geographic

13 March, 2017

COG Operating LLC

Survey Report - Geographic

Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Well WHITE FALCON 16 ST COM #24H
Project:	LEA COUNTY, NM	TVD Reference:	RKB=3255+29 @ 3284.0usft (NORAM 23)
Site:	BULLDOG	MD Reference:	RKB=3255+29 @ 3284.0usft (NORAM 23)
Well:	WHITE FALCON 16 ST COM #24H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	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	WHITE FALCON 16 ST COM #24H					
Well Position	+N/-S	0.0 usft	Northing:	414,833.50 usf	Latitude:	32° 8' 12.804 N
	+E/-W	0.0 usft	Easting:	795,654.00 usf	Longitude:	103° 22' 41.491 W
Position Uncertainty		3.0 usft	Wellhead Elevation:	usf	Ground Level:	3,255.0 usf

Wellbore	OWB				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	WMM2015	1/19/2017	6.92	60.01	47,939.75763661

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	181.76	

Survey Tool Program	Date	3/13/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.0	12,000.0	PWP1 (OWB)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4	
12,000.0	22,559.5	PWP1 (OWB)	MWD+IFR1+MS	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	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W	
100.0	0.00	0.00	100.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W	
200.0	0.00	0.00	200.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W	
300.0	0.00	0.00	300.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W	
400.0	0.00	0.00	400.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W	
500.0	0.00	0.00	500.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W	
600.0	0.00	0.00	600.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W	
700.0	0.00	0.00	700.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W	
800.0	0.00	0.00	800.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W	
900.0	0.00	0.00	900.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W	

COG Operating LLC

Survey Report - Geographic

Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Well WHITE FALCON 16 ST COM #24H
Project:	LEA COUNTY, NM	TVD Reference:	RKB=3255+29 @ 3284.0usft (NORAM 23)
Site:	BULLDOG	MD Reference:	RKB=3255+29 @ 3284.0usft (NORAM 23)
Well:	WHITE FALCON 16 ST COM #24H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	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	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
1,200.0	0.00	0.00	1,200.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
1,300.0	0.00	0.00	1,300.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
1,400.0	0.00	0.00	1,400.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
1,500.0	0.00	0.00	1,500.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
1,600.0	0.00	0.00	1,600.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
1,700.0	0.00	0.00	1,700.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
1,800.0	0.00	0.00	1,800.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
1,900.0	0.00	0.00	1,900.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
2,000.0	0.00	0.00	2,000.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
2,100.0	0.00	0.00	2,100.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
2,200.0	0.00	0.00	2,200.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
2,300.0	0.00	0.00	2,300.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
2,400.0	0.00	0.00	2,400.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
2,500.0	0.00	0.00	2,500.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
2,600.0	0.00	0.00	2,600.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
2,700.0	0.00	0.00	2,700.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
2,800.0	0.00	0.00	2,800.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
2,900.0	0.00	0.00	2,900.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
3,000.0	0.00	0.00	3,000.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
3,100.0	0.00	0.00	3,100.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
3,200.0	0.00	0.00	3,200.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
3,300.0	0.00	0.00	3,300.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
3,400.0	0.00	0.00	3,400.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
3,500.0	0.00	0.00	3,500.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
3,600.0	0.00	0.00	3,600.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
3,700.0	0.00	0.00	3,700.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
3,800.0	0.00	0.00	3,800.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
3,900.0	0.00	0.00	3,900.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
4,000.0	0.00	0.00	4,000.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
4,100.0	0.00	0.00	4,100.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
4,200.0	0.00	0.00	4,200.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
4,300.0	0.00	0.00	4,300.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
4,400.0	0.00	0.00	4,400.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
4,500.0	0.00	0.00	4,500.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
4,600.0	0.00	0.00	4,600.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
4,700.0	0.00	0.00	4,700.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
4,800.0	0.00	0.00	4,800.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
4,900.0	0.00	0.00	4,900.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
5,000.0	0.00	0.00	5,000.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
5,100.0	0.00	0.00	5,100.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
5,200.0	0.00	0.00	5,200.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
5,300.0	0.00	0.00	5,300.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
5,400.0	0.00	0.00	5,400.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
5,500.0	0.00	0.00	5,500.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
5,600.0	0.00	0.00	5,600.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
5,700.0	0.00	0.00	5,700.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
5,800.0	0.00	0.00	5,800.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
5,900.0	0.00	0.00	5,900.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
6,000.0	0.00	0.00	6,000.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
6,100.0	0.00	0.00	6,100.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
6,200.0	0.00	0.00	6,200.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
6,300.0	0.00	0.00	6,300.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
6,400.0	0.00	0.00	6,400.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
6,500.0	0.00	0.00	6,500.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W

COG Operating LLC

Survey Report - Geographic

Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Well WHITE FALCON 16 ST COM #24H
Project:	LEA COUNTY, NM	TVD Reference:	RKB=3255+29 @ 3284.0usft (NORAM 23)
Site:	BULLDOG	MD Reference:	RKB=3255+29 @ 3284.0usft (NORAM 23)
Well:	WHITE FALCON 16 ST COM #24H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	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
6,600.0	0.00	0.00	6,600.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
6,700.0	0.00	0.00	6,700.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
6,800.0	0.00	0.00	6,800.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
6,900.0	0.00	0.00	6,900.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
7,000.0	0.00	0.00	7,000.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
7,100.0	0.00	0.00	7,100.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
7,200.0	0.00	0.00	7,200.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
7,300.0	0.00	0.00	7,300.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
7,400.0	0.00	0.00	7,400.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
7,500.0	0.00	0.00	7,500.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
7,600.0	0.00	0.00	7,600.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
7,700.0	0.00	0.00	7,700.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
7,800.0	0.00	0.00	7,800.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
7,900.0	0.00	0.00	7,900.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
8,000.0	0.00	0.00	8,000.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
8,100.0	0.00	0.00	8,100.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
8,200.0	0.00	0.00	8,200.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
8,300.0	0.00	0.00	8,300.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
8,400.0	0.00	0.00	8,400.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
8,500.0	0.00	0.00	8,500.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
8,600.0	0.00	0.00	8,600.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
8,700.0	0.00	0.00	8,700.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
8,800.0	0.00	0.00	8,800.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
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9,000.0	0.00	0.00	9,000.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
9,100.0	0.00	0.00	9,100.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
9,200.0	0.00	0.00	9,200.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
9,300.0	0.00	0.00	9,300.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
9,400.0	0.00	0.00	9,400.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
9,500.0	0.00	0.00	9,500.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
9,600.0	0.00	0.00	9,600.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
9,700.0	0.00	0.00	9,700.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
9,800.0	0.00	0.00	9,800.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
9,900.0	0.00	0.00	9,900.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
10,000.0	0.00	0.00	10,000.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
10,100.0	0.00	0.00	10,100.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
10,200.0	0.00	0.00	10,200.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
10,300.0	0.00	0.00	10,300.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
10,400.0	0.00	0.00	10,400.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
10,500.0	0.00	0.00	10,500.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
10,600.0	0.00	0.00	10,600.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
10,700.0	0.00	0.00	10,700.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
10,800.0	0.00	0.00	10,800.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
10,900.0	0.00	0.00	10,900.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
11,000.0	0.00	0.00	11,000.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
11,100.0	0.00	0.00	11,100.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
11,200.0	0.00	0.00	11,200.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
11,300.0	0.00	0.00	11,300.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
11,400.0	0.00	0.00	11,400.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
11,500.0	0.00	0.00	11,500.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
11,600.0	0.00	0.00	11,600.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
11,700.0	0.00	0.00	11,700.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
11,800.0	0.00	0.00	11,800.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
11,900.0	0.00	0.00	11,900.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
12,000.0	0.00	0.00	12,000.0	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W

COG Operating LLC

Survey Report - Geographic

Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Well WHITE FALCON 16 ST COM #24H
Project:	LEA COUNTY, NM	TVD Reference:	RKB=3255+29 @ 3284.0usft (NORAM 23)
Site:	BULLDOG	MD Reference:	RKB=3255+29 @ 3284.0usft (NORAM 23)
Well:	WHITE FALCON 16 ST COM #24H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	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
12,065.5	0.00	0.00	12,065.5	0.0	0.0	414,833.50	795,654.00	32° 8' 12.804 N	103° 22' 41.491 W
12,100.0	4.14	207.90	12,100.0	-1.1	-0.6	414,832.40	795,653.41	32° 8' 12.793 N	103° 22' 41.498 W
12,200.0	16.14	207.90	12,198.2	-16.6	-8.8	414,816.87	795,645.19	32° 8' 12.641 N	103° 22' 41.595 W
12,300.0	28.14	207.90	12,290.7	-49.9	-26.4	414,783.63	795,627.59	32° 8' 12.313 N	103° 22' 41.803 W
12,400.0	40.14	207.90	12,373.3	-99.4	-52.6	414,734.12	795,601.38	32° 8' 11.826 N	103° 22' 42.113 W
12,500.0	52.14	207.90	12,442.5	-163.0	-86.3	414,670.52	795,567.70	32° 8' 11.199 N	103° 22' 42.511 W
12,600.0	64.14	207.90	12,495.2	-237.9	-126.0	414,595.60	795,528.03	32° 8' 10.461 N	103° 22' 42.980 W
12,700.0	76.13	207.90	12,529.1	-320.9	-169.9	414,512.63	795,484.11	32° 8' 9.644 N	103° 22' 43.500 W
12,800.0	88.13	207.90	12,542.7	-408.3	-216.2	414,425.25	795,437.84	32° 8' 8.784 N	103° 22' 44.047 W
12,815.6	90.00	207.90	12,543.0	-422.0	-223.4	414,411.50	795,430.56	32° 8' 8.648 N	103° 22' 44.133 W
12,900.0	90.07	204.52	12,542.9	-497.7	-260.7	414,335.75	795,393.27	32° 8' 7.902 N	103° 22' 44.574 W
13,000.0	90.16	200.52	12,542.7	-590.1	-299.0	414,243.40	795,354.97	32° 8' 6.991 N	103° 22' 45.029 W
13,100.0	90.25	196.52	12,542.4	-684.9	-330.8	414,148.60	795,323.21	32° 8' 6.056 N	103° 22' 45.408 W
13,200.0	90.33	192.53	12,541.9	-781.7	-355.9	414,051.82	795,298.13	32° 8' 5.101 N	103° 22' 45.710 W
13,300.0	90.42	188.53	12,541.2	-880.0	-374.1	413,953.52	795,279.87	32° 8' 4.130 N	103° 22' 45.932 W
13,400.0	90.50	184.53	12,540.4	-979.3	-385.5	413,854.19	795,268.50	32° 8' 3.148 N	103° 22' 46.075 W
13,500.0	90.58	180.53	12,539.5	-1,079.2	-389.9	413,754.31	795,264.09	32° 8' 2.160 N	103° 22' 46.136 W
13,526.0	90.60	179.49	12,539.2	-1,105.2	-389.9	413,728.32	795,264.09	32° 8' 1.903 N	103° 22' 46.139 W
13,600.0	90.60	179.49	12,538.4	-1,179.2	-389.2	413,654.32	795,264.75	32° 8' 1.170 N	103° 22' 46.139 W
13,700.0	90.60	179.49	12,537.4	-1,279.2	-388.4	413,554.33	795,265.64	32° 8' 0.181 N	103° 22' 46.139 W
13,800.0	90.60	179.49	12,536.4	-1,379.2	-387.5	413,454.34	795,266.54	32° 7' 59.191 N	103° 22' 46.139 W
13,900.0	90.60	179.49	12,535.3	-1,479.1	-386.6	413,354.35	795,267.43	32° 7' 58.202 N	103° 22' 46.139 W
14,000.0	90.60	179.49	12,534.3	-1,579.1	-385.7	413,254.36	795,268.33	32° 7' 57.212 N	103° 22' 46.139 W
14,100.0	90.60	179.49	12,533.2	-1,679.1	-384.8	413,154.37	795,269.22	32° 7' 56.223 N	103° 22' 46.139 W
14,200.0	90.60	179.49	12,532.2	-1,779.1	-383.9	413,054.38	795,270.11	32° 7' 55.233 N	103° 22' 46.138 W
14,300.0	90.60	179.49	12,531.2	-1,879.1	-383.0	412,954.39	795,271.01	32° 7' 54.244 N	103° 22' 46.138 W
14,400.0	90.60	179.49	12,530.1	-1,979.1	-382.1	412,854.40	795,271.90	32° 7' 53.254 N	103° 22' 46.138 W
14,410.9	90.60	179.49	12,530.0	-1,990.0	-382.0	412,843.50	795,272.00	32° 7' 53.146 N	103° 22' 46.138 W
14,475.1	89.31	179.50	12,530.1	-2,054.2	-381.4	412,779.29	795,272.56	32° 7' 52.111 N	103° 22' 46.138 W
14,500.0	89.31	179.50	12,530.3	-2,079.1	-381.2	412,754.41	795,272.78	32° 7' 52.265 N	103° 22' 46.138 W
14,600.0	89.31	179.50	12,531.5	-2,179.1	-380.3	412,654.42	795,273.65	32° 7' 51.275 N	103° 22' 46.138 W
14,700.0	89.31	179.50	12,532.7	-2,279.1	-379.5	412,554.43	795,274.53	32° 7' 50.286 N	103° 22' 46.139 W
14,800.0	89.31	179.50	12,533.9	-2,379.1	-378.6	412,454.44	795,275.40	32° 7' 49.296 N	103° 22' 46.139 W
14,900.0	89.31	179.50	12,535.1	-2,479.0	-377.7	412,354.45	795,276.27	32° 7' 48.307 N	103° 22' 46.139 W
15,000.0	89.31	179.50	12,536.3	-2,579.0	-376.9	412,254.46	795,277.14	32° 7' 47.317 N	103° 22' 46.139 W
15,100.0	89.31	179.50	12,537.5	-2,679.0	-376.0	412,154.47	795,278.02	32° 7' 46.328 N	103° 22' 46.139 W
15,200.0	89.31	179.50	12,538.7	-2,779.0	-375.1	412,054.48	795,278.89	32° 7' 45.338 N	103° 22' 46.139 W
15,300.0	89.31	179.50	12,539.9	-2,879.0	-374.2	411,954.49	795,279.76	32° 7' 44.349 N	103° 22' 46.140 W
15,400.0	89.31	179.50	12,541.1	-2,979.0	-373.4	411,854.50	795,280.63	32° 7' 43.359 N	103° 22' 46.140 W
15,500.0	89.31	179.50	12,542.3	-3,079.0	-372.5	411,754.52	795,281.51	32° 7' 42.370 N	103° 22' 46.140 W
15,600.0	89.31	179.50	12,543.5	-3,179.0	-371.6	411,654.53	795,282.38	32° 7' 41.380 N	103° 22' 46.140 W
15,700.0	89.31	179.50	12,544.7	-3,279.0	-370.7	411,554.54	795,283.25	32° 7' 40.391 N	103° 22' 46.140 W
15,800.0	89.31	179.50	12,545.9	-3,379.0	-369.9	411,454.55	795,284.12	32° 7' 39.402 N	103° 22' 46.140 W
15,900.0	89.31	179.50	12,547.1	-3,478.9	-369.0	411,354.56	795,285.00	32° 7' 38.412 N	103° 22' 46.140 W
16,000.0	89.31	179.50	12,548.3	-3,578.9	-368.1	411,254.57	795,285.87	32° 7' 37.423 N	103° 22' 46.141 W
16,100.0	89.31	179.50	12,549.5	-3,678.9	-367.3	411,154.58	795,286.74	32° 7' 36.433 N	103° 22' 46.141 W
16,200.0	89.31	179.50	12,550.7	-3,778.9	-366.4	411,054.59	795,287.61	32° 7' 35.444 N	103° 22' 46.141 W
16,300.0	89.31	179.50	12,551.9	-3,878.9	-365.5	410,954.60	795,288.49	32° 7' 34.454 N	103° 22' 46.141 W
16,400.0	89.31	179.50	12,553.1	-3,978.9	-364.6	410,854.61	795,289.36	32° 7' 33.465 N	103° 22' 46.141 W
16,500.0	89.31	179.50	12,554.3	-4,078.9	-363.8	410,754.63	795,290.23	32° 7' 32.475 N	103° 22' 46.141 W
16,600.0	89.31	179.50	12,555.5	-4,178.9	-362.9	410,654.64	795,291.10	32° 7' 31.486 N	103° 22' 46.141 W
16,700.0	89.31	179.50	12,556.7	-4,278.9	-362.0	410,554.65	795,291.98	32° 7' 30.496 N	103° 22' 46.142 W
16,800.0	89.31	179.50	12,557.9	-4,378.8	-361.1	410,454.66	795,292.85	32° 7' 29.507 N	103° 22' 46.142 W
16,900.0	89.31	179.50	12,559.1	-4,478.8	-360.3	410,354.67	795,293.72	32° 7' 28.517 N	103° 22' 46.142 W
17,000.0	89.31	179.50	12,560.3	-4,578.8	-359.4	410,254.68	795,294.59	32° 7' 27.528 N	103° 22' 46.142 W

COG Operating LLC

Survey Report - Geographic

Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Well WHITE FALCON 16 ST COM #24H
Project:	LEA COUNTY, NM	TVD Reference:	RKB=3255+29 @ 3284.0usft (NORAM 23)
Site:	BULLDOG	MD Reference:	RKB=3255+29 @ 3284.0usft (NORAM 23)
Well:	WHITE FALCON 16 ST COM #24H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	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	89.31	179.50	12,561.5	-4,678.8	-358.5	410,154.69	795,295.47	32° 7' 26.538 N	103° 22' 46.142 W
17,200.0	89.31	179.50	12,562.7	-4,778.8	-357.7	410,054.70	795,296.34	32° 7' 25.549 N	103° 22' 46.142 W
17,300.0	89.31	179.50	12,563.9	-4,878.8	-356.8	409,954.71	795,297.21	32° 7' 24.559 N	103° 22' 46.143 W
17,400.0	89.31	179.50	12,565.1	-4,978.8	-355.9	409,854.72	795,298.08	32° 7' 23.570 N	103° 22' 46.143 W
17,500.0	89.31	179.50	12,566.3	-5,078.8	-355.0	409,754.74	795,298.96	32° 7' 22.580 N	103° 22' 46.143 W
17,600.0	89.31	179.50	12,567.5	-5,178.8	-354.2	409,654.75	795,299.83	32° 7' 21.591 N	103° 22' 46.143 W
17,700.0	89.31	179.50	12,568.7	-5,278.7	-353.3	409,554.76	795,300.70	32° 7' 20.601 N	103° 22' 46.143 W
17,800.0	89.31	179.50	12,569.9	-5,378.7	-352.4	409,454.77	795,301.57	32° 7' 19.612 N	103° 22' 46.143 W
17,900.0	89.31	179.50	12,571.1	-5,478.7	-351.6	409,354.78	795,302.45	32° 7' 18.622 N	103° 22' 46.143 W
18,000.0	89.31	179.50	12,572.3	-5,578.7	-350.7	409,254.79	795,303.32	32° 7' 17.633 N	103° 22' 46.144 W
18,100.0	89.31	179.50	12,573.5	-5,678.7	-349.8	409,154.80	795,304.19	32° 7' 16.643 N	103° 22' 46.144 W
18,200.0	89.31	179.50	12,574.7	-5,778.7	-348.9	409,054.81	795,305.06	32° 7' 15.654 N	103° 22' 46.144 W
18,300.0	89.31	179.50	12,575.9	-5,878.7	-348.1	408,954.82	795,305.94	32° 7' 14.664 N	103° 22' 46.144 W
18,400.0	89.31	179.50	12,577.1	-5,978.7	-347.2	408,854.83	795,306.81	32° 7' 13.675 N	103° 22' 46.144 W
18,500.0	89.31	179.50	12,578.3	-6,078.7	-346.3	408,754.85	795,307.68	32° 7' 12.685 N	103° 22' 46.144 W
18,600.0	89.31	179.50	12,579.5	-6,178.6	-345.4	408,654.86	795,308.55	32° 7' 11.696 N	103° 22' 46.144 W
18,700.0	89.31	179.50	12,580.7	-6,278.6	-344.6	408,554.87	795,309.43	32° 7' 10.706 N	103° 22' 46.145 W
18,800.0	89.31	179.50	12,581.9	-6,378.6	-343.7	408,454.88	795,310.30	32° 7' 9.717 N	103° 22' 46.145 W
18,900.0	89.31	179.50	12,583.1	-6,478.6	-342.8	408,354.89	795,311.17	32° 7' 8.728 N	103° 22' 46.145 W
19,000.0	89.31	179.50	12,584.3	-6,578.6	-342.0	408,254.90	795,312.04	32° 7' 7.738 N	103° 22' 46.145 W
19,100.0	89.31	179.50	12,585.5	-6,678.6	-341.1	408,154.91	795,312.92	32° 7' 6.749 N	103° 22' 46.145 W
19,200.0	89.31	179.50	12,586.7	-6,778.6	-340.2	408,054.92	795,313.79	32° 7' 5.759 N	103° 22' 46.145 W
19,300.0	89.31	179.50	12,587.9	-6,878.6	-339.3	407,954.93	795,314.66	32° 7' 4.770 N	103° 22' 46.145 W
19,400.0	89.31	179.50	12,589.1	-6,978.6	-338.5	407,854.94	795,315.53	32° 7' 3.780 N	103° 22' 46.146 W
19,500.0	89.31	179.50	12,590.3	-7,078.5	-337.6	407,754.96	795,316.40	32° 7' 2.791 N	103° 22' 46.146 W
19,600.0	89.31	179.50	12,591.5	-7,178.5	-336.7	407,654.97	795,317.28	32° 7' 1.801 N	103° 22' 46.146 W
19,700.0	89.31	179.50	12,592.7	-7,278.5	-335.8	407,554.98	795,318.15	32° 7' 0.812 N	103° 22' 46.146 W
19,800.0	89.31	179.50	12,593.9	-7,378.5	-335.0	407,454.99	795,319.02	32° 6' 59.822 N	103° 22' 46.146 W
19,900.0	89.31	179.50	12,595.1	-7,478.5	-334.1	407,355.00	795,319.89	32° 6' 58.833 N	103° 22' 46.146 W
20,000.0	89.31	179.50	12,596.3	-7,578.5	-333.2	407,255.01	795,320.77	32° 6' 57.843 N	103° 22' 46.146 W
20,100.0	89.31	179.50	12,597.5	-7,678.5	-332.4	407,155.02	795,321.64	32° 6' 56.854 N	103° 22' 46.147 W
20,200.0	89.31	179.50	12,598.7	-7,778.5	-331.5	407,055.03	795,322.51	32° 6' 55.864 N	103° 22' 46.147 W
20,300.0	89.31	179.50	12,599.9	-7,878.5	-330.6	406,955.04	795,323.38	32° 6' 54.875 N	103° 22' 46.147 W
20,400.0	89.31	179.50	12,601.1	-7,978.4	-329.7	406,855.05	795,324.26	32° 6' 53.885 N	103° 22' 46.147 W
20,500.0	89.31	179.50	12,602.3	-8,078.4	-328.9	406,755.07	795,325.13	32° 6' 52.896 N	103° 22' 46.147 W
20,600.0	89.31	179.50	12,603.5	-8,178.4	-328.0	406,655.08	795,326.00	32° 6' 51.906 N	103° 22' 46.147 W
20,700.0	89.31	179.50	12,604.7	-8,278.4	-327.1	406,555.09	795,326.87	32° 6' 50.917 N	103° 22' 46.148 W
20,800.0	89.31	179.50	12,605.9	-8,378.4	-326.3	406,455.10	795,327.75	32° 6' 49.927 N	103° 22' 46.148 W
20,900.0	89.31	179.50	12,607.1	-8,478.4	-325.4	406,355.11	795,328.62	32° 6' 48.938 N	103° 22' 46.148 W
21,000.0	89.31	179.50	12,608.3	-8,578.4	-324.5	406,255.12	795,329.49	32° 6' 47.948 N	103° 22' 46.148 W
21,100.0	89.31	179.50	12,609.5	-8,678.4	-323.6	406,155.13	795,330.36	32° 6' 46.959 N	103° 22' 46.148 W
21,200.0	89.31	179.50	12,610.7	-8,778.4	-322.8	406,055.14	795,331.24	32° 6' 45.969 N	103° 22' 46.148 W
21,300.0	89.31	179.50	12,611.9	-8,878.3	-321.9	405,955.15	795,332.11	32° 6' 44.980 N	103° 22' 46.148 W
21,400.0	89.31	179.50	12,613.1	-8,978.3	-321.0	405,855.16	795,332.98	32° 6' 43.990 N	103° 22' 46.149 W
21,500.0	89.31	179.50	12,614.3	-9,078.3	-320.1	405,755.18	795,333.85	32° 6' 43.001 N	103° 22' 46.149 W
21,600.0	89.31	179.50	12,615.5	-9,178.3	-319.3	405,655.19	795,334.73	32° 6' 42.011 N	103° 22' 46.149 W
21,700.0	89.31	179.50	12,616.7	-9,278.3	-318.4	405,555.20	795,335.60	32° 6' 41.022 N	103° 22' 46.149 W
21,800.0	89.31	179.50	12,617.9	-9,378.3	-317.5	405,455.21	795,336.47	32° 6' 40.032 N	103° 22' 46.149 W
21,900.0	89.31	179.50	12,619.1	-9,478.3	-316.7	405,355.22	795,337.34	32° 6' 39.043 N	103° 22' 46.149 W
22,000.0	89.31	179.50	12,620.3	-9,578.3	-315.8	405,255.23	795,338.22	32° 6' 38.053 N	103° 22' 46.149 W
22,100.0	89.31	179.50	12,621.5	-9,678.3	-314.9	405,155.24	795,339.09	32° 6' 37.064 N	103° 22' 46.150 W
22,200.0	89.31	179.50	12,622.7	-9,778.2	-314.0	405,055.25	795,339.96	32° 6' 36.074 N	103° 22' 46.150 W
22,300.0	89.31	179.50	12,623.9	-9,878.2	-313.2	404,955.26	795,340.83	32° 6' 35.085 N	103° 22' 46.150 W
22,400.0	89.31	179.50	12,625.1	-9,978.2	-312.3	404,855.27	795,341.71	32° 6' 34.096 N	103° 22' 46.150 W
22,500.0	89.31	179.50	12,626.3	-10,078.2	-311.4	404,755.29	795,342.58	32° 6' 33.106 N	103° 22' 46.150 W

COG Operating LLC

Survey Report - Geographic

Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Well WHITE FALCON 16 ST COM #24H
Project:	LEA COUNTY, NM	TVD Reference:	RKB=3255+29 @ 3284.0usft (NORAM 23)
Site:	BULLDOG	MD Reference:	RKB=3255+29 @ 3284.0usft (NORAM 23)
Well:	WHITE FALCON 16 ST COM #24H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	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
22,559.5	89.31	179.50	12,627.0	-10,137.7	-310.9	404,695.80	795,343.10	32° 6' 32.517 N	103° 22' 46.150 W

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 24H - plan hits target center - Point	0.00	0.00	12,530.0	-1,990.0	-382.0	412,843.50	795,272.00	32° 7' 53.146 N	103° 22' 46.138 W
PBHL-WF 16 St Com - plan hits target center - Point	0.00	0.00	12,627.0	-10,137.7	-310.9	404,695.80	795,343.10	32° 6' 32.517 N	103° 22' 46.150 W

Checked By: _____ Approved By: _____ Date: _____