

COG Operating LLC

Project: Lea County, NM
Site: Harrier Federal Com
Well: #202H
Wellbore: OH
Design: Plan #1

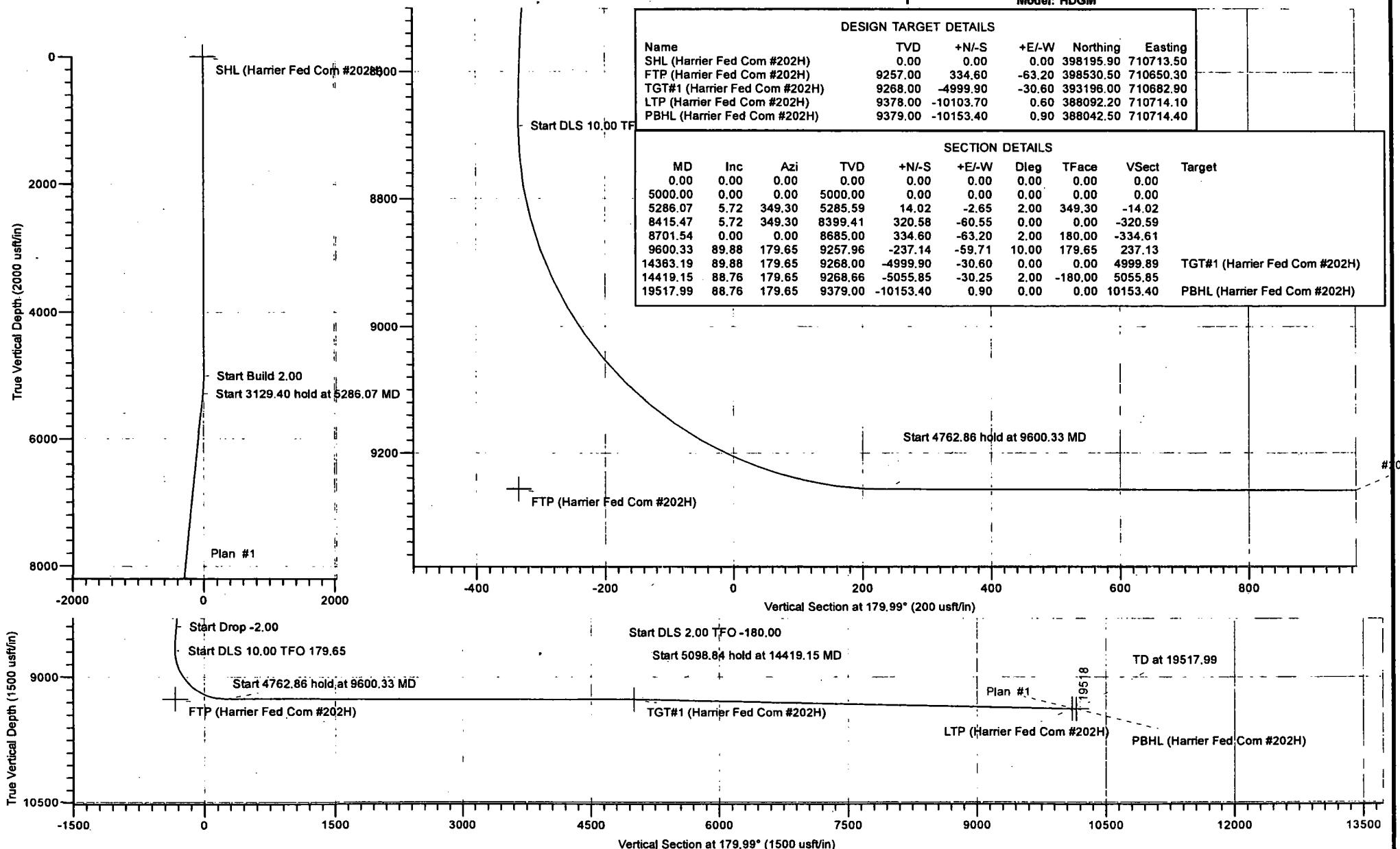
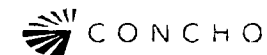
PROJECT DETAILS: Lea County, NM

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
Elevation: GE 3369' + KB 27' @ 3396.00usft (ICD 201)



Azimuths to Grid North
True North: -0.36°
Magnetic North: 6.27°

Magnetic Field
Strength: 47738.6nT
Dip Angle: 69.68°
Date: 8/22/2019
Model: HDGM



DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting
SHL (Harrier Fed Com #202H)	0.00	0.00	0.00	398195.90	710713.50
FTP (Harrier Fed Com #202H)	9257.00	334.60	-63.20	398530.50	710650.30
TGT#1 (Harrier Fed Com #202H)	9268.00	-4999.90	-30.60	393196.00	710682.90
LTP (Harrier Fed Com #202H)	9378.00	-10103.70	0.60	388092.20	710714.10
PBHL (Harrier Fed Com #202H)	9379.00	-10153.40	0.90	388042.50	710714.40

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5000.00	0.00	0.00	5000.00	0.00	0.00	0.00	0.00	0.00	
5286.07	5.72	349.30	5285.59	14.02	-2.65	2.00	349.30	-14.02	
8415.47	5.72	349.30	8399.41	320.58	-60.55	0.00	0.00	-320.59	
8701.54	0.00	0.00	8685.00	334.60	-63.20	2.00	180.00	-334.61	
9600.33	89.88	179.65	9257.96	-237.14	-59.71	10.00	179.65	237.13	
14363.19	89.88	179.65	9268.00	-4999.90	-30.60	0.00	0.00	4999.89	TGT#1 (Harrier Fed Com #202H)
14419.15	88.76	179.65	9268.66	-5055.85	-30.25	2.00	-180.00	5055.85	
19517.99	88.76	179.65	9379.00	-10153.40	0.90	0.00	0.00	10153.40	PBHL (Harrier Fed Com #202H)



LEAM DRILLING SERVICES
2010 East Davis, Conroe, Texas 77301
Phone: 936/756-7577, Fax: 936/756-7595

Plan: Plan #1 (#202H/OH)
Harrier Federal Com
Created By: Casey Rudick
Date: 15:15, August 22 2019

COG Operating LLC

Project: Lea County, NM
 Site: Harrier Federal Com
 Well: #202H
 Wellbore: OH
 Design: Plan #1



Azimuths to Grid North
 True North: -0.36°
 Magnetic North: 6.27°
 Magnetic Field
 Strength: 47738.6nT
 Dip Angle: 59.68°
 Date: 8/22/2019
 Model: HDGM

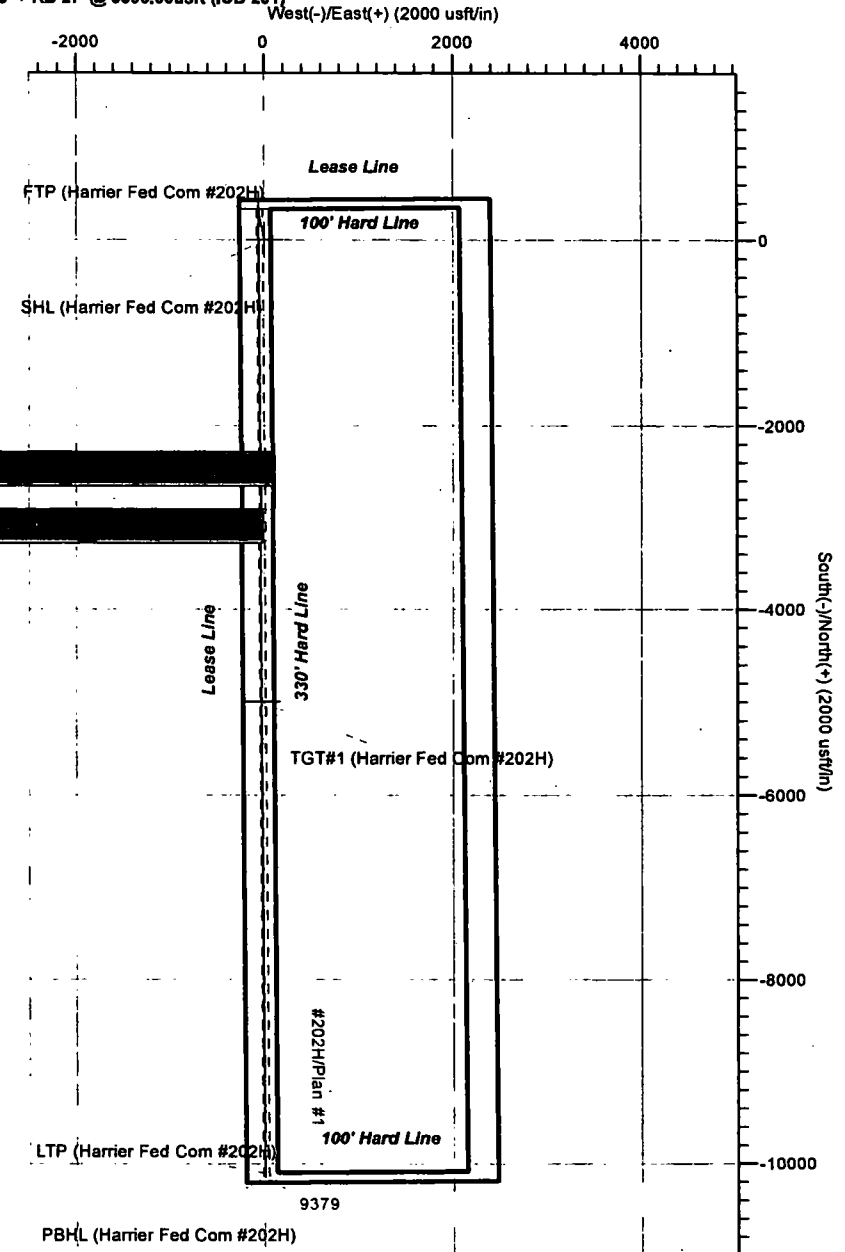
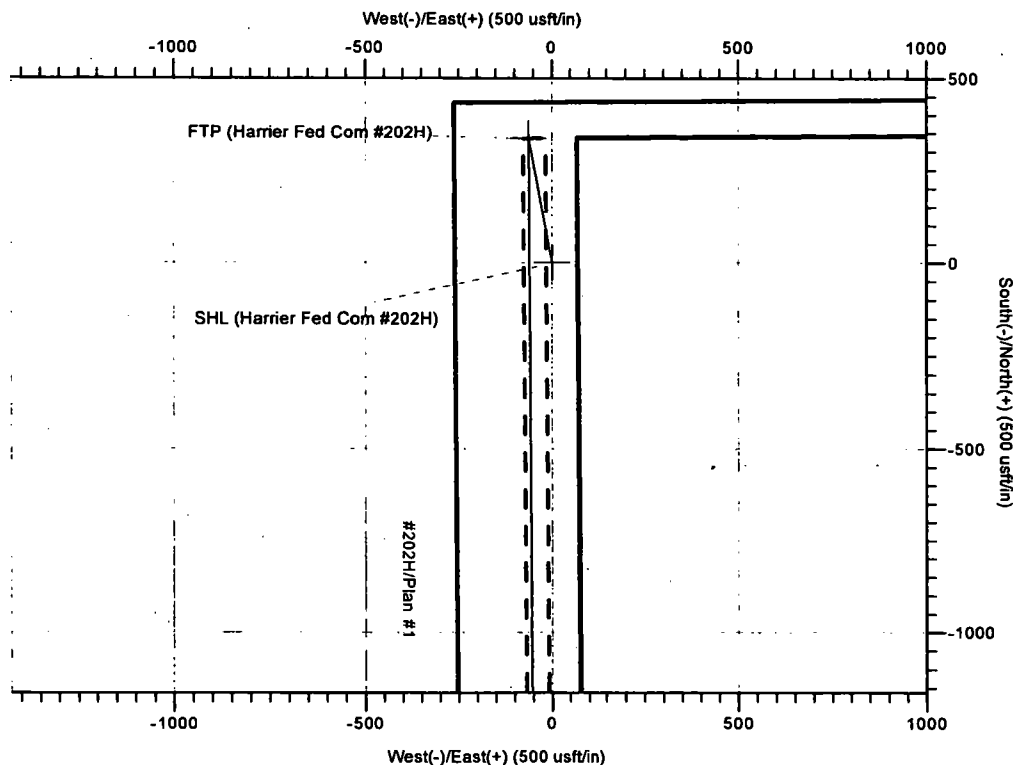
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 Zone: New Mexico East 3001
 Datum: GE 3369' + KB 27' @ 3396.00usft (ICD 201)



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Name	TVD	+N/-S	+E/-W	Northing	Easting
FTP (Harrier Fed Com #202H)	9257.00	334.60	-63.20	398530.50	710650.30
LTP (Harrier Fed Com #202H)	9378.00	-10103.70	0.60	388092.20	710714.10
PBHL (Harrier Fed Com #202H)	9379.00	-10153.40	0.90	388042.50	710714.40
SHL (Harrier Fed Com #202H)	0.00	0.00	0.00	398195.90	710713.50
TGT#1 (Harrier Fed Com #202H)	9268.00	-4999.90	-30.60	393196.00	710682.90



LEAM DRILLING SERVICES
 2010 East Davis, Conroe, Texas 77301
 Phone: 936/756-7618, Fax: 936/756-7595

Plan: Plan #1 (#202H/OH)
 Harrier Federal Com
 Created By: Casey Rudick
 Date: 15:05, August 22 2019

COG Operating LLC

Lea County, NM

Harrier Federal Com

#202H

OH

Plan: Plan #1

Standard Planning Report

22 August, 2019

LEAM Drilling Systems

Planning Report

Database: LEAM Multi_User Db
Company: COG Operating LLC
Project: Lea County, NM
Site: Harrier Federal Com
Well: #202H
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference: Well #202H
TVD Reference: GE 3369' + KB 27' @ 3396.00usft (ICD 201)
MD Reference: 3396.00usft @ 3396.00usft (ICD 201)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Project	Lea County, NM		
Map System:	North American Datum of 1983 (NAD 83)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	NAD 83 Zone 12N		

Site	Harrier Federal Com				
Site Position:		Northing:	398,195.90 usft	Latitude:	32° 5' 34.545 N
From:	Map	Easting:	710,713.50 usft	Longitude:	103° 39' 10.514 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.36 °

Well	#202H					
Well Position	+N-S	0.00 usft	Northing:	398,195.90 usft	Latitude:	32° 5' 34.545 N
	+E-W	0.00 usft	Easting:	710,713.50 usft	Longitude:	103° 39' 10.514 W
Position Uncertainty	0.00 usft	Wellhead Elevation:	Ground Level:			

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	HDGM	8/22/2019	(°)	(°)	(nT)
			6.63	59.68	47,738.60000000

Design	Plan #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.00	0.00	0.00	349.30

Plan Survey Tool Program	Date 8/22/2019			
Depth From	Depth To	Survey (Wellbore)	Tool Name	Remarks
(usft)	(usft)			
1	0.00	19,517.99 Plan #1 (OH)	LEAM MWD+HDGM	
			MWD+HDGM	

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	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	
5,286.07	5.72	349.30	5,285.59	14.02	-2.65	2.00	2.00	0.00	349.30	
8,415.47	5.72	349.30	8,399.41	320.58	-60.55	0.00	0.00	0.00	0.00	
8,701.54	0.00	0.00	8,685.00	334.60	-63.20	2.00	-2.00	0.00	180.00	
9,600.33	89.88	179.65	9,579.35	-237.14	-59.71	10.00	10.00	19.99	179.65	
14,363.19	89.88	179.65	14,343.19	-4,999.90	-30.60	0.00	0.00	0.00	0.00	TGT#1 (Harrier Fed C
14,419.15	88.76	179.65	14,399.15	-5,055.85	-30.25	2.00	-2.00	0.00	-180.00	
19,517.99	88.76	179.65	19,497.99	-10,153.40	0.90	0.00	0.00	0.00	0.00	PBHL (Harrier Fed Cc

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North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	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
SHL (Harrier Fed Com #202H)									
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
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	2.00	349.30	5,099.98	1.71	-0.32	-1.71	2.00	2.00	0.00
5,200.00	4.00	349.30	5,199.84	6.86	-1.30	-6.86	2.00	2.00	0.00

LEAM Drilling Systems

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North Reference:
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GE 3369' + KB 27' @ 3396.00usft (ICD 201)
Grid
Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,286.07	5.72	349.30	5,285.59	14.02	-2.65	-14.02	2.00	2.00	0.00
5,300.00	5.72	349.30	5,299.46	15.39	-2.91	-15.39	0.00	0.00	0.00
5,400.00	5.72	349.30	5,398.96	25.18	-4.76	-25.18	0.00	0.00	0.00
5,500.00	5.72	349.30	5,498.46	34.98	-6.61	-34.98	0.00	0.00	0.00
5,600.00	5.72	349.30	5,597.96	44.78	-8.46	-44.78	0.00	0.00	0.00
5,700.00	5.72	349.30	5,697.46	54.57	-10.31	-54.57	0.00	0.00	0.00
5,800.00	5.72	349.30	5,796.96	64.37	-12.16	-64.37	0.00	0.00	0.00
5,900.00	5.72	349.30	5,896.47	74.16	-14.01	-74.17	0.00	0.00	0.00
6,000.00	5.72	349.30	5,995.97	83.96	-15.86	-83.96	0.00	0.00	0.00
6,100.00	5.72	349.30	6,095.47	93.76	-17.71	-93.76	0.00	0.00	0.00
6,200.00	5.72	349.30	6,194.97	103.55	-19.56	-103.55	0.00	0.00	0.00
6,300.00	5.72	349.30	6,294.47	113.35	-21.41	-113.35	0.00	0.00	0.00
6,400.00	5.72	349.30	6,393.98	123.14	-23.26	-123.15	0.00	0.00	0.00
6,500.00	5.72	349.30	6,493.48	132.94	-25.11	-132.94	0.00	0.00	0.00
6,600.00	5.72	349.30	6,592.98	142.73	-26.96	-142.74	0.00	0.00	0.00
6,700.00	5.72	349.30	6,692.48	152.53	-28.81	-152.54	0.00	0.00	0.00
6,800.00	5.72	349.30	6,791.98	162.33	-30.66	-162.33	0.00	0.00	0.00
6,900.00	5.72	349.30	6,891.49	172.12	-32.51	-172.13	0.00	0.00	0.00
7,000.00	5.72	349.30	6,990.99	181.92	-34.36	-181.92	0.00	0.00	0.00
7,100.00	5.72	349.30	7,090.49	191.71	-36.21	-191.72	0.00	0.00	0.00
7,200.00	5.72	349.30	7,189.99	201.51	-38.06	-201.52	0.00	0.00	0.00
7,300.00	5.72	349.30	7,289.49	211.31	-39.91	-211.31	0.00	0.00	0.00
7,400.00	5.72	349.30	7,388.99	221.10	-41.76	-221.11	0.00	0.00	0.00
7,500.00	5.72	349.30	7,488.50	230.90	-43.61	-230.91	0.00	0.00	0.00
7,600.00	5.72	349.30	7,588.00	240.69	-45.46	-240.70	0.00	0.00	0.00
7,700.00	5.72	349.30	7,687.50	250.49	-47.31	-250.50	0.00	0.00	0.00
7,800.00	5.72	349.30	7,787.00	260.29	-49.16	-260.29	0.00	0.00	0.00
7,900.00	5.72	349.30	7,886.50	270.08	-51.01	-270.09	0.00	0.00	0.00
8,000.00	5.72	349.30	7,986.01	279.88	-52.86	-279.89	0.00	0.00	0.00
8,100.00	5.72	349.30	8,085.51	289.67	-54.71	-289.68	0.00	0.00	0.00
8,200.00	5.72	349.30	8,185.01	299.47	-56.56	-299.48	0.00	0.00	0.00
8,300.00	5.72	349.30	8,284.51	309.27	-58.41	-309.28	0.00	0.00	0.00
8,400.00	5.72	349.30	8,384.01	319.06	-60.27	-319.07	0.00	0.00	0.00
8,415.47	5.72	349.30	8,399.41	320.58	-60.55	-320.59	0.00	0.00	0.00
8,500.00	4.03	349.30	8,483.63	327.64	-61.88	-327.65	2.00	-2.00	0.00
8,600.00	2.03	349.30	8,583.48	332.83	-62.87	-332.84	2.00	-2.00	0.00
8,701.54	0.00	0.00	8,685.00	334.60	-63.20	-334.61	2.00	-2.00	0.00
8,750.00	4.85	179.65	8,733.40	332.55	-63.19	-332.56	10.00	10.00	0.00
8,800.00	9.85	179.65	8,782.98	326.16	-63.15	-326.17	10.00	10.00	0.00
8,850.00	14.85	179.65	8,831.80	315.47	-63.08	-315.48	10.00	10.00	0.00
8,900.00	19.85	179.65	8,879.52	300.57	-62.99	-300.58	10.00	10.00	0.00
8,950.00	24.85	179.65	8,925.75	281.57	-62.88	-281.58	10.00	10.00	0.00
9,000.00	29.85	179.65	8,970.14	258.61	-62.74	-258.62	10.00	10.00	0.00
9,050.00	34.85	179.65	9,012.37	231.87	-62.57	-231.88	10.00	10.00	0.00
9,100.00	39.85	179.65	9,052.11	201.54	-62.39	-201.55	10.00	10.00	0.00
9,150.00	44.85	179.65	9,089.05	167.88	-62.18	-167.89	10.00	10.00	0.00
FTP (Harrier Fed Com #202H)									
9,200.00	49.85	179.65	9,122.92	131.11	-61.96	-131.13	10.00	10.00	0.00
9,250.00	54.85	179.65	9,153.45	91.54	-61.71	-91.55	10.00	10.00	0.00
9,300.00	59.85	179.65	9,180.42	49.46	-61.46	-49.47	10.00	10.00	0.00
9,350.00	64.85	179.65	9,203.62	5.19	-61.19	-5.20	10.00	10.00	0.00
9,400.00	69.85	179.65	9,222.88	-40.94	-60.90	40.93	10.00	10.00	0.00
9,450.00	74.85	179.65	9,238.03	-88.57	-60.61	88.56	10.00	10.00	0.00

LEAM Drilling Systems

Planning Report

Database: LEAM Multi_User Db
 Company: COG Operating LLC
 Project: Lea County, NM
 Site: Harrier Federal Com
 Well: #202H
 Wellbore: OH
 Design: Plan #1

Local Co-ordinate Reference: Well #202H
 TVD Reference: GE 3369' + KB 27' @ 3396.00usft (ICD 201)
 MD Reference: GE 3369' + KB 27' @ 3396.00usft (ICD 201)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,500.00	79.85	179.65	9,248.98	-137.34	-60.32	137.33	10.00	10.00	0.00
9,550.00	84.85	179.65	9,255.64	-186.88	-60.01	186.87	10.00	10.00	0.00
9,600.33	89.88	179.65	9,257.96	-237.14	-59.71	237.13	10.00	10.00	0.00
9,700.00	89.88	179.65	9,258.17	-336.81	-59.10	336.79	0.00	0.00	0.00
9,800.00	89.88	179.65	9,258.38	-436.80	-58.49	436.79	0.00	0.00	0.00
9,900.00	89.88	179.65	9,258.59	-536.80	-57.87	536.79	0.00	0.00	0.00
10,000.00	89.88	179.65	9,258.80	-636.80	-57.26	636.79	0.00	0.00	0.00
10,100.00	89.88	179.65	9,259.01	-736.80	-56.65	736.79	0.00	0.00	0.00
10,200.00	89.88	179.65	9,259.22	-836.79	-56.04	836.78	0.00	0.00	0.00
10,300.00	89.88	179.65	9,259.43	-936.79	-55.43	936.78	0.00	0.00	0.00
10,400.00	89.88	179.65	9,259.64	-1,036.79	-54.82	1,036.78	0.00	0.00	0.00
10,500.00	89.88	179.65	9,259.85	-1,136.79	-54.21	1,136.78	0.00	0.00	0.00
10,600.00	89.88	179.65	9,260.06	-1,236.79	-53.60	1,236.78	0.00	0.00	0.00
10,700.00	89.88	179.65	9,260.28	-1,336.78	-52.98	1,336.78	0.00	0.00	0.00
10,800.00	89.88	179.65	9,260.49	-1,436.78	-52.37	1,436.77	0.00	0.00	0.00
10,900.00	89.88	179.65	9,260.70	-1,536.78	-51.76	1,536.77	0.00	0.00	0.00
11,000.00	89.88	179.65	9,260.91	-1,636.78	-51.15	1,636.77	0.00	0.00	0.00
11,100.00	89.88	179.65	9,261.12	-1,736.78	-50.54	1,736.77	0.00	0.00	0.00
11,200.00	89.88	179.65	9,261.33	-1,836.77	-49.93	1,836.77	0.00	0.00	0.00
11,300.00	89.88	179.65	9,261.54	-1,936.77	-49.32	1,936.76	0.00	0.00	0.00
11,400.00	89.88	179.65	9,261.75	-2,036.77	-48.71	2,036.76	0.00	0.00	0.00
11,500.00	89.88	179.65	9,261.96	-2,136.77	-48.10	2,136.76	0.00	0.00	0.00
11,600.00	89.88	179.65	9,262.17	-2,236.77	-47.48	2,236.76	0.00	0.00	0.00
11,700.00	89.88	179.65	9,262.38	-2,336.76	-46.87	2,336.76	0.00	0.00	0.00
11,800.00	89.88	179.65	9,262.60	-2,436.76	-46.26	2,436.75	0.00	0.00	0.00
11,900.00	89.88	179.65	9,262.81	-2,536.76	-45.65	2,536.75	0.00	0.00	0.00
12,000.00	89.88	179.65	9,263.02	-2,636.76	-45.04	2,636.75	0.00	0.00	0.00
12,100.00	89.88	179.65	9,263.23	-2,736.76	-44.43	2,736.75	0.00	0.00	0.00
12,200.00	89.88	179.65	9,263.44	-2,836.75	-43.82	2,836.75	0.00	0.00	0.00
12,300.00	89.88	179.65	9,263.65	-2,936.75	-43.21	2,936.74	0.00	0.00	0.00
12,400.00	89.88	179.65	9,263.86	-3,036.75	-42.60	3,036.74	0.00	0.00	0.00
12,500.00	89.88	179.65	9,264.07	-3,136.75	-41.98	3,136.74	0.00	0.00	0.00
12,600.00	89.88	179.65	9,264.28	-3,236.74	-41.37	3,236.74	0.00	0.00	0.00
12,700.00	89.88	179.65	9,264.49	-3,336.74	-40.76	3,336.74	0.00	0.00	0.00
12,800.00	89.88	179.65	9,264.70	-3,436.74	-40.15	3,436.73	0.00	0.00	0.00
12,900.00	89.88	179.65	9,264.91	-3,536.74	-39.54	3,536.73	0.00	0.00	0.00
13,000.00	89.88	179.65	9,265.13	-3,636.74	-38.93	3,636.73	0.00	0.00	0.00
13,100.00	89.88	179.65	9,265.34	-3,736.73	-38.32	3,736.73	0.00	0.00	0.00
13,200.00	89.88	179.65	9,265.55	-3,836.73	-37.71	3,836.73	0.00	0.00	0.00
13,300.00	89.88	179.65	9,265.76	-3,936.73	-37.09	3,936.72	0.00	0.00	0.00
13,400.00	89.88	179.65	9,265.97	-4,036.73	-36.48	4,036.72	0.00	0.00	0.00
13,500.00	89.88	179.65	9,266.18	-4,136.73	-35.87	4,136.72	0.00	0.00	0.00
13,600.00	89.88	179.65	9,266.39	-4,236.72	-35.26	4,236.72	0.00	0.00	0.00
13,700.00	89.88	179.65	9,266.60	-4,336.72	-34.65	4,336.72	0.00	0.00	0.00
13,800.00	89.88	179.65	9,266.81	-4,436.72	-34.04	4,436.71	0.00	0.00	0.00
13,900.00	89.88	179.65	9,267.02	-4,536.72	-33.43	4,536.71	0.00	0.00	0.00
14,000.00	89.88	179.65	9,267.23	-4,636.72	-32.82	4,636.71	0.00	0.00	0.00
14,100.00	89.88	179.65	9,267.45	-4,736.71	-32.21	4,736.71	0.00	0.00	0.00
14,200.00	89.88	179.65	9,267.66	-4,836.71	-31.59	4,836.71	0.00	0.00	0.00
14,300.00	89.88	179.65	9,267.87	-4,936.71	-30.98	4,936.70	0.00	0.00	0.00
14,363.19	89.88	179.65	9,268.00	-4,999.90	-30.60	4,999.90	0.00	0.00	0.00
TGT#1 (Harrier Fed Com #202H)									
14,400.00	89.14	179.65	9,268.31	-5,036.71	-30.37	5,036.70	2.00	-2.00	0.00
14,419.15	88.76	179.65	9,268.66	-5,055.85	-30.25	5,055.85	2.00	-2.00	0.00

LEAM Drilling Systems

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North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
14,500.00	88.76	179.65	9,270.41	-5,136.68	-29.76	5,136.68	0.00	0.00	0.00
14,600.00	88.76	179.65	9,272.58	-5,236.66	-29.15	5,236.65	0.00	0.00	0.00
14,700.00	88.76	179.65	9,274.74	-5,336.63	-28.54	5,336.63	0.00	0.00	0.00
14,800.00	88.76	179.65	9,276.91	-5,436.61	-27.93	5,436.60	0.00	0.00	0.00
14,900.00	88.76	179.65	9,279.07	-5,536.58	-27.32	5,536.58	0.00	0.00	0.00
15,000.00	88.76	179.65	9,281.23	-5,636.56	-26.71	5,636.55	0.00	0.00	0.00
15,100.00	88.76	179.65	9,283.40	-5,736.53	-26.09	5,736.53	0.00	0.00	0.00
15,200.00	88.76	179.65	9,285.56	-5,836.50	-25.48	5,836.50	0.00	0.00	0.00
15,300.00	88.76	179.65	9,287.73	-5,936.48	-24.87	5,936.47	0.00	0.00	0.00
15,400.00	88.76	179.65	9,289.89	-6,036.45	-24.26	6,036.45	0.00	0.00	0.00
15,500.00	88.76	179.65	9,292.05	-6,136.43	-23.65	6,136.42	0.00	0.00	0.00
15,600.00	88.76	179.65	9,294.22	-6,236.40	-23.04	6,236.40	0.00	0.00	0.00
15,700.00	88.76	179.65	9,296.38	-6,336.38	-22.43	6,336.37	0.00	0.00	0.00
15,800.00	88.76	179.65	9,298.55	-6,436.35	-21.82	6,436.35	0.00	0.00	0.00
15,900.00	88.76	179.65	9,300.71	-6,536.33	-21.21	6,536.32	0.00	0.00	0.00
16,000.00	88.76	179.65	9,302.87	-6,636.30	-20.60	6,636.30	0.00	0.00	0.00
16,100.00	88.76	179.65	9,305.04	-6,736.28	-19.98	6,736.27	0.00	0.00	0.00
16,200.00	88.76	179.65	9,307.20	-6,836.25	-19.37	6,836.25	0.00	0.00	0.00
16,300.00	88.76	179.65	9,309.37	-6,936.23	-18.76	6,936.22	0.00	0.00	0.00
16,400.00	88.76	179.65	9,311.53	-7,036.20	-18.15	7,036.20	0.00	0.00	0.00
16,500.00	88.76	179.65	9,313.69	-7,136.18	-17.54	7,136.17	0.00	0.00	0.00
16,600.00	88.76	179.65	9,315.86	-7,236.15	-16.93	7,236.15	0.00	0.00	0.00
16,700.00	88.76	179.65	9,318.02	-7,336.13	-16.32	7,336.12	0.00	0.00	0.00
16,800.00	88.76	179.65	9,320.18	-7,436.10	-15.71	7,436.10	0.00	0.00	0.00
16,900.00	88.76	179.65	9,322.35	-7,536.07	-15.10	7,536.07	0.00	0.00	0.00
17,000.00	88.76	179.65	9,324.51	-7,636.05	-14.49	7,636.05	0.00	0.00	0.00
17,100.00	88.76	179.65	9,326.68	-7,736.02	-13.87	7,736.02	0.00	0.00	0.00
17,200.00	88.76	179.65	9,328.84	-7,836.00	-13.26	7,836.00	0.00	0.00	0.00
17,300.00	88.76	179.65	9,331.00	-7,935.97	-12.65	7,935.97	0.00	0.00	0.00
17,400.00	88.76	179.65	9,333.17	-8,035.95	-12.04	8,035.95	0.00	0.00	0.00
17,500.00	88.76	179.65	9,335.33	-8,135.92	-11.43	8,135.92	0.00	0.00	0.00
17,600.00	88.76	179.65	9,337.50	-8,235.90	-10.82	8,235.90	0.00	0.00	0.00
17,700.00	88.76	179.65	9,339.66	-8,335.87	-10.21	8,335.87	0.00	0.00	0.00
17,800.00	88.76	179.65	9,341.82	-8,435.85	-9.60	8,435.85	0.00	0.00	0.00
17,900.00	88.76	179.65	9,343.99	-8,535.82	-8.99	8,535.82	0.00	0.00	0.00
18,000.00	88.76	179.65	9,346.15	-8,635.80	-8.38	8,635.80	0.00	0.00	0.00
18,100.00	88.76	179.65	9,348.32	-8,735.77	-7.76	8,735.77	0.00	0.00	0.00
18,200.00	88.76	179.65	9,350.48	-8,835.75	-7.15	8,835.74	0.00	0.00	0.00
18,300.00	88.76	179.65	9,352.64	-8,935.72	-6.54	8,935.72	0.00	0.00	0.00
18,400.00	88.76	179.65	9,354.81	-9,035.70	-5.93	9,035.69	0.00	0.00	0.00
18,500.00	88.76	179.65	9,356.97	-9,135.67	-5.32	9,135.67	0.00	0.00	0.00
18,600.00	88.76	179.65	9,359.14	-9,235.65	-4.71	9,235.64	0.00	0.00	0.00
18,700.00	88.76	179.65	9,361.30	-9,335.62	-4.10	9,335.62	0.00	0.00	0.00
18,800.00	88.76	179.65	9,363.46	-9,435.59	-3.49	9,435.59	0.00	0.00	0.00
18,900.00	88.76	179.65	9,365.63	-9,535.57	-2.88	9,535.57	0.00	0.00	0.00
19,000.00	88.76	179.65	9,367.79	-9,635.54	-2.27	9,635.54	0.00	0.00	0.00
19,100.00	88.76	179.65	9,369.96	-9,735.52	-1.65	9,735.52	0.00	0.00	0.00
19,200.00	88.76	179.65	9,372.12	-9,835.49	-1.04	9,835.49	0.00	0.00	0.00
19,300.00	88.76	179.65	9,374.28	-9,935.47	-0.43	9,935.47	0.00	0.00	0.00
19,400.00	88.76	179.65	9,376.45	-10,035.44	0.18	10,035.44	0.00	0.00	0.00
19,468.28	88.76	179.65	9,377.92	-10,103.70	0.60	10,103.70	0.00	0.00	0.00
LTP (Harrier Fed Com #202H)									
19,500.00	88.76	179.65	9,378.61	-10,135.42	0.79	10,135.42	0.00	0.00	0.00

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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
19,517.99	88.76	179.65	9,379.00	-10,153.40	0.90	10,153.40	0.00	0.00	0.00
PBHL (Harrier Fed Com #202H)									

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
SHL (Harrier Fed Com # - plan hits target center - Point	0.00	0.00	0.00	0.00	0.00	9089.05	167.88	32° 5' 34.545 N	103° 39' 10.514 W
FTP (Harrier Fed Com # - plan misses target center by 236.65usft at 9150.00usft MD (9089.05 TVD, 167.88 N, -62.18 E) - Point	0.00	0.00	9,257.00	334.60	-63.20	898,160.30	710,662.40	32° 5' 37.860 N	103° 39' 11.224 W
TGT#1 (Harrier Fed Com - plan hits target center - Point	0.00	0.00	9,378.00	-4,999.90	-30.60	393,196.00	710,682.90	32° 4' 45.068 N	103° 39' 11.236 W
LTP (Harrier Fed Com # - plan misses target center by 0.08usft at 19468.28usft MD (9377.92 TVD, -10103.70 N, 0.60 E) - Point	0.00	0.00	9,378.00	-10,103.70	0.60	898,091.10	710,714.10	32° 3' 54.559 N	103° 39' 11.248 W
PBHL (Harrier Fed Com - plan hits target center - Point	0.00	0.00	9,379.00	-10,153.40	0.90	898,082.10	710,722.10	32° 3' 54.067 N	103° 39' 11.248 W