

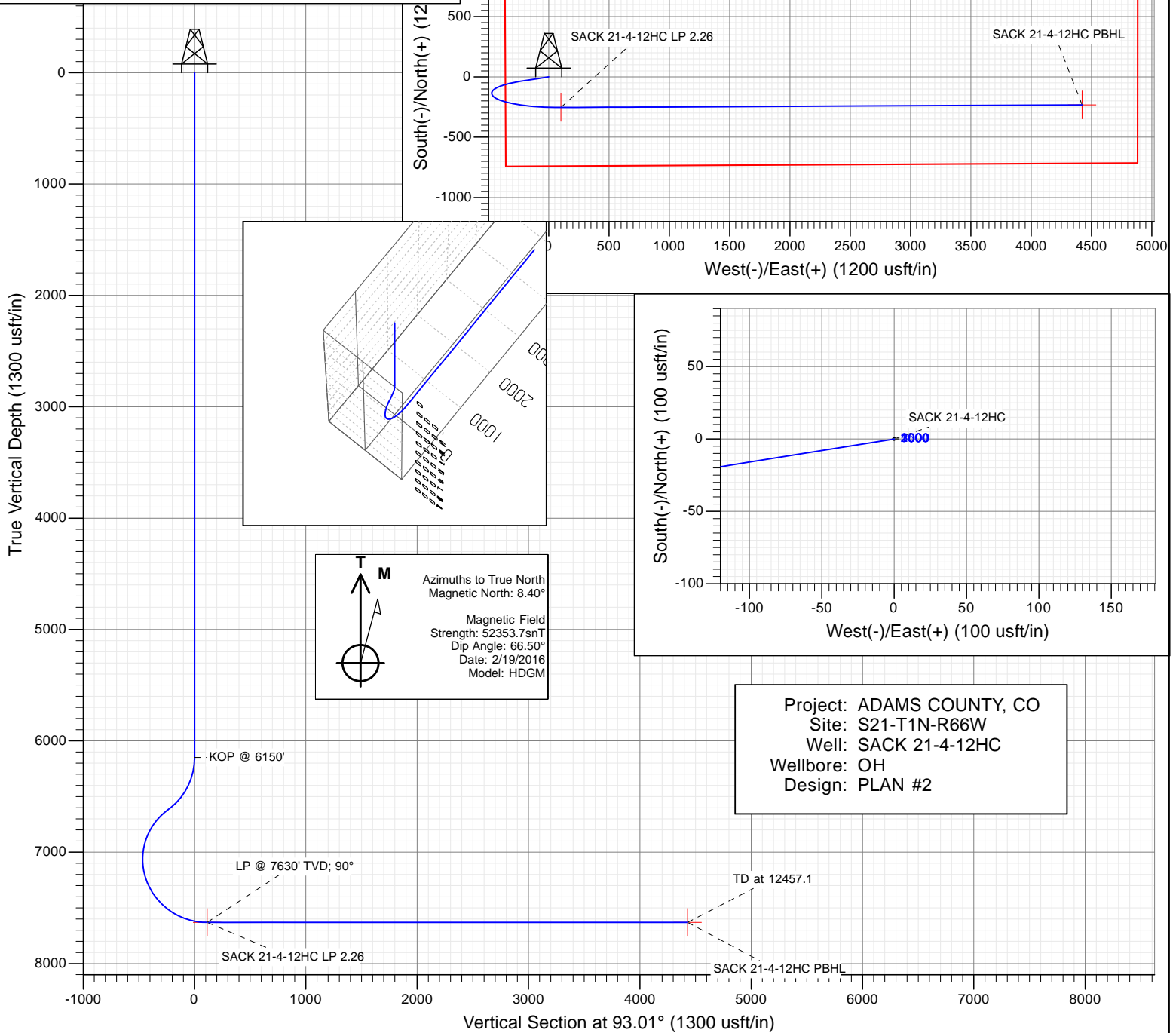


SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	6150.0	0.00	0.00	6150.0	0.0	0.0	0.00	0.00	0.0	
3	6697.5	54.75	260.98	6617.9	-38.0	-239.3	10.00	260.98	-236.9	
4	8135.4	90.00	89.72	7630.0	-254.0	100.0	10.00	-165.08	113.2	SACK 21-4-12HC LP 2.26
5	12457.1	90.00	89.72	7630.0	-232.7	4421.6	0.00	0.00	4427.7	SACK 21-4-12HC PBHL

PLAN #2
SACK 21-4-12HC
16000 LR
KB @ 4979.0usft
Ground Level @ 4958.0
North American Datum 1983
Well SACK 21-4-12HC, True North

Type	Target	Azimuth	Origin	Type	N/S	E/W	From TVD
TD	No Target (Freehand)	93.01	Slot		0.0	0.0	0.0
Name		TVD	+N/-S	+E/-W	Latitude	Longitude	
SACK 21-4-12HC LP		7630.0	-279.0	125.0	40.030704	-104.789734	
SACK 21-4-12HC LP 2.26		7630.0	-254.0	100.0	40.030773	-104.789823	
SACK 21-4-12HC PBHL		7630.0	-232.7	4421.6	40.030830	-104.774590	



WELL DETAILS: SACK 21-4-12HC

+N/-S	+E/-W	Northing	Ground Level:	4958.0	Latitude	Longitude
0.0	0.0	1255106.07	Easting	3198764.74	40.031470	-104.790180

CATHEDRAL



Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well SACK 21-4-12HC
Company:	Ward Petroleum	TVD Reference:	KB @ 4979.0usft
Project:	ADAMS COUNTY, CO	MD Reference:	KB @ 4979.0usft
Site:	S21-T1N-R66W	North Reference:	True
Well:	SACK 21-4-12HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #2		

Project	ADAMS COUNTY, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site		S21-T1N-R66W			
Site Position:		Northing:	1,255,106.08 usft	Latitude:	40.031470
From:	Lat/Long	Easting:	3,198,764.74 usft	Longitude:	-104.790180
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.46 °

Well	SACK 21-4-12HC					
Well Position	+N/-S	0.0 usft	Northing:	1,255,106.07 usft	Latitude:	40.031470
	+E/-W	0.0 usft	Easting:	3,198,764.74 usft	Longitude:	-104.790180
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	4,958.0 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	2/19/2016	8.40	66.50	52,354

Design	PLAN #2			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	93.01

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
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
6,150.0	0.00	0.00	6,150.0	0.0	0.0	0.00	0.00	0.00	0.00	
6,697.5	54.75	260.98	6,617.9	-38.0	-239.3	10.00	10.00	0.00	260.98	
8,135.4	90.00	89.72	7,630.0	-254.0	100.0	10.00	2.45	-11.91	-165.08	SACK 21-4-12HC LP
12,457.1	90.00	89.72	7,630.0	-232.7	4,421.6	0.00	0.00	0.00	0.00	SACK 21-4-12HC PB

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well SACK 21-4-12HC
Company:	Ward Petroleum	TVD Reference:	KB @ 4979.0usft
Project:	ADAMS COUNTY, CO	MD Reference:	KB @ 4979.0usft
Site:	S21-T1N-R66W	North Reference:	True
Well:	SACK 21-4-12HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #2		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.0	0.00	0.00	
5,100.0	0.00	0.00	5,100.0	0.0	0.0	0.0	0.00	0.00	

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well SACK 21-4-12HC
Company:	Ward Petroleum	TVD Reference:	KB @ 4979.0usft
Project:	ADAMS COUNTY, CO	MD Reference:	KB @ 4979.0usft
Site:	S21-T1N-R66W	North Reference:	True
Well:	SACK 21-4-12HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #2		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
5,200.0	0.00	0.00	5,200.0	0.0	0.0	0.0	0.00	0.00	
5,300.0	0.00	0.00	5,300.0	0.0	0.0	0.0	0.00	0.00	
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	
5,600.0	0.00	0.00	5,600.0	0.0	0.0	0.0	0.00	0.00	
5,700.0	0.00	0.00	5,700.0	0.0	0.0	0.0	0.00	0.00	
5,800.0	0.00	0.00	5,800.0	0.0	0.0	0.0	0.00	0.00	
5,900.0	0.00	0.00	5,900.0	0.0	0.0	0.0	0.00	0.00	
6,000.0	0.00	0.00	6,000.0	0.0	0.0	0.0	0.00	0.00	
6,100.0	0.00	0.00	6,100.0	0.0	0.0	0.0	0.00	0.00	
6,150.0	0.00	0.00	6,150.0	0.0	0.0	0.0	0.00	0.00	KOP @ 6150'
6,200.0	5.00	260.98	6,199.9	-0.3	-2.2	-2.1	10.00	10.00	
6,300.0	15.00	260.98	6,298.3	-3.1	-19.3	-19.1	10.00	10.00	
6,400.0	25.00	260.98	6,392.1	-8.4	-53.0	-52.5	10.00	10.00	
6,500.0	35.00	260.98	6,478.6	-16.3	-102.3	-101.3	10.00	10.00	
6,600.0	45.00	260.98	6,555.1	-26.3	-165.7	-164.1	10.00	10.00	
6,697.5	54.75	260.98	6,617.9	-38.0	-239.3	-236.9	10.00	10.00	
6,700.0	54.51	260.90	6,619.3	-38.3	-241.3	-238.9	10.00	-9.66	
6,800.0	44.89	257.25	6,684.0	-52.6	-316.1	-312.9	10.00	-9.61	
6,900.0	35.45	252.13	6,760.3	-69.3	-378.3	-374.1	10.00	-9.45	
7,000.0	26.34	243.98	6,846.1	-88.0	-425.9	-420.7	10.00	-9.10	
7,100.0	18.12	228.64	6,938.6	-108.1	-457.6	-451.3	10.00	-8.22	
7,200.0	12.64	196.19	7,035.2	-128.9	-472.4	-465.0	10.00	-5.48	
7,300.0	13.72	151.47	7,132.8	-149.9	-469.8	-461.2	10.00	1.08	
7,400.0	20.34	125.18	7,228.5	-170.4	-449.8	-440.3	10.00	6.62	
7,500.0	28.92	112.63	7,319.4	-189.7	-413.2	-402.7	10.00	8.58	
7,600.0	38.15	105.61	7,402.7	-207.4	-361.0	-349.6	10.00	9.23	
7,700.0	47.66	101.02	7,475.9	-222.8	-294.9	-282.7	10.00	9.51	
7,800.0	57.30	97.65	7,536.7	-235.5	-216.7	-204.0	10.00	9.64	
7,900.0	67.01	94.95	7,583.4	-245.1	-128.9	-115.8	10.00	9.71	
8,000.0	76.76	92.62	7,614.4	-251.3	-34.2	-20.9	10.00	9.75	
8,100.0	86.54	90.46	7,628.9	-253.9	64.6	77.9	10.00	9.77	
8,135.4	90.00	89.72	7,630.0	-254.0	100.0	113.2	10.00	9.78	LP @ 7630' TVD; 90°
8,200.0	90.00	89.72	7,630.0	-253.7	164.6	177.7	0.00	0.00	
8,300.0	90.00	89.72	7,630.0	-253.2	264.6	277.5	0.00	0.00	
8,400.0	90.00	89.72	7,630.0	-252.7	364.6	377.3	0.00	0.00	
8,500.0	90.00	89.72	7,630.0	-252.2	464.6	477.2	0.00	0.00	
8,600.0	90.00	89.72	7,630.0	-251.7	564.6	577.0	0.00	0.00	
8,700.0	90.00	89.72	7,630.0	-251.2	664.6	676.9	0.00	0.00	
8,800.0	90.00	89.72	7,630.0	-250.7	764.6	776.7	0.00	0.00	
8,900.0	90.00	89.72	7,630.0	-250.2	864.6	876.5	0.00	0.00	
9,000.0	90.00	89.72	7,630.0	-249.7	964.6	976.4	0.00	0.00	
9,100.0	90.00	89.72	7,630.0	-249.3	1,064.6	1,076.2	0.00	0.00	
9,200.0	90.00	89.72	7,630.0	-248.8	1,164.6	1,176.0	0.00	0.00	
9,300.0	90.00	89.72	7,630.0	-248.3	1,264.6	1,275.9	0.00	0.00	
9,400.0	90.00	89.72	7,630.0	-247.8	1,364.6	1,375.7	0.00	0.00	
9,500.0	90.00	89.72	7,630.0	-247.3	1,464.6	1,475.5	0.00	0.00	
9,600.0	90.00	89.72	7,630.0	-246.8	1,564.6	1,575.4	0.00	0.00	
9,700.0	90.00	89.72	7,630.0	-246.3	1,664.6	1,675.2	0.00	0.00	
9,800.0	90.00	89.72	7,630.0	-245.8	1,764.6	1,775.0	0.00	0.00	
9,900.0	90.00	89.72	7,630.0	-245.3	1,864.5	1,874.9	0.00	0.00	
10,000.0	90.00	89.72	7,630.0	-244.8	1,964.5	1,974.7	0.00	0.00	

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well SACK 21-4-12HC
Company:	Ward Petroleum	TVD Reference:	KB @ 4979.0usft
Project:	ADAMS COUNTY, CO	MD Reference:	KB @ 4979.0usft
Site:	S21-T1N-R66W	North Reference:	True
Well:	SACK 21-4-12HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #2		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
10,100.0	90.00	89.72	7,630.0	-244.3	2,064.5	2,074.5	0.00	0.00	
10,200.0	90.00	89.72	7,630.0	-243.8	2,164.5	2,174.4	0.00	0.00	
10,300.0	90.00	89.72	7,630.0	-243.3	2,264.5	2,274.2	0.00	0.00	
10,400.0	90.00	89.72	7,630.0	-242.9	2,364.5	2,374.0	0.00	0.00	
10,500.0	90.00	89.72	7,630.0	-242.4	2,464.5	2,473.9	0.00	0.00	
10,600.0	90.00	89.72	7,630.0	-241.9	2,564.5	2,573.7	0.00	0.00	
10,700.0	90.00	89.72	7,630.0	-241.4	2,664.5	2,673.5	0.00	0.00	
10,800.0	90.00	89.72	7,630.0	-240.9	2,764.5	2,773.4	0.00	0.00	
10,900.0	90.00	89.72	7,630.0	-240.4	2,864.5	2,873.2	0.00	0.00	
11,000.0	90.00	89.72	7,630.0	-239.9	2,964.5	2,973.0	0.00	0.00	
11,100.0	90.00	89.72	7,630.0	-239.4	3,064.5	3,072.9	0.00	0.00	
11,200.0	90.00	89.72	7,630.0	-238.9	3,164.5	3,172.7	0.00	0.00	
11,300.0	90.00	89.72	7,630.0	-238.4	3,264.5	3,272.6	0.00	0.00	
11,400.0	90.00	89.72	7,630.0	-237.9	3,364.5	3,372.4	0.00	0.00	
11,500.0	90.00	89.72	7,630.0	-237.4	3,464.5	3,472.2	0.00	0.00	
11,600.0	90.00	89.72	7,630.0	-236.9	3,564.5	3,572.1	0.00	0.00	
11,700.0	90.00	89.72	7,630.0	-236.5	3,664.5	3,671.9	0.00	0.00	
11,800.0	90.00	89.72	7,630.0	-236.0	3,764.5	3,771.7	0.00	0.00	
11,900.0	90.00	89.72	7,630.0	-235.5	3,864.5	3,871.6	0.00	0.00	
12,000.0	90.00	89.72	7,630.0	-235.0	3,964.5	3,971.4	0.00	0.00	
12,100.0	90.00	89.72	7,630.0	-234.5	4,064.5	4,071.2	0.00	0.00	
12,200.0	90.00	89.72	7,630.0	-234.0	4,164.5	4,171.1	0.00	0.00	
12,300.0	90.00	89.72	7,630.0	-233.5	4,264.5	4,270.9	0.00	0.00	
12,400.0	90.00	89.72	7,630.0	-233.0	4,364.5	4,370.7	0.00	0.00	
12,457.1	90.00	89.72	7,630.0	-232.7	4,421.6	4,427.7	0.00	0.00	TD at 12457.1

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
SACK 21-4-12HC LP - hit/miss target - Shape - Point	0.00	0.00	7,630.0	-279.0	125.0	1,254,828.08	3,198,891.96	40.030704	-104.789734
- plan misses target center by 25.1usft at 8160.3usft MD (7630.0 TVD, -253.9 N, 124.9 E)									
SACK 21-4-12HC PBHL - plan hits target center - Point	0.00	0.00	7,630.0	-232.7	4,421.6	1,254,908.74	3,203,188.08	40.030830	-104.774390
SACK 21-4-12HC LP 2.1 - plan hits target center - Point	0.00	0.00	7,630.0	-254.0	100.0	1,254,852.87	3,198,866.77	40.030773	-104.789823

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
6,150.0	6,150.0	+N/-S (usft)	+E/-W (usft)	
8,135.4	7,630.0	0.0	0.0	KOP @ 6150'
12,457.1	7,630.0	-38.0	-239.3	LP @ 7630' TVD; 90°
		-254.0	100.0	TD at 12457.1