

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

WELD_HOWARD 17-32 PAD

Howard 1-32

Howard 1-32

Plan: Howard 1-32 (wp02)

Standard Planning Report

12 May, 2011



Weatherford®

Project: COLORADO NORTHERN ZONE - 83
 Site: WELD_HOWARD 17-32 PAD
 Well: Howard 1-32
 Wellbore: Howard 1-32
 Section:
 SHL:
 Design: Howard 1-32 (wp02)
 Latitude: 40.010453
 Longitude: -104.910623
 GL: 5047.00
 KB: 15' RKB + 5047' GL @ 5062.00ft

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
3912.00	3987.45	PK Depth
4879.00	4977.23	SX Depth
7372.00	7511.17	NIO Depth
7820.00	7959.17	CD Depth
7898.00	8037.17	GH Depth
8250.00	8389.17	J Depth



Azimuths to True North
 Magnetic North: 8.92°

Magnetic Field
 Strength: 52918.9snT
 Dip Angle: 66.71°
 Date: 5/9/2011
 Model: IGRF2010

WELL DETAILS: Howard 1-32

+N/-S	+E/-W	Northing	Ground Level: Easting	5047.00 Latitude	Longitude	Slot
0.00	0.00	1247203.21	3165089.56	40.010453	-104.910623	

CASING DETAILS

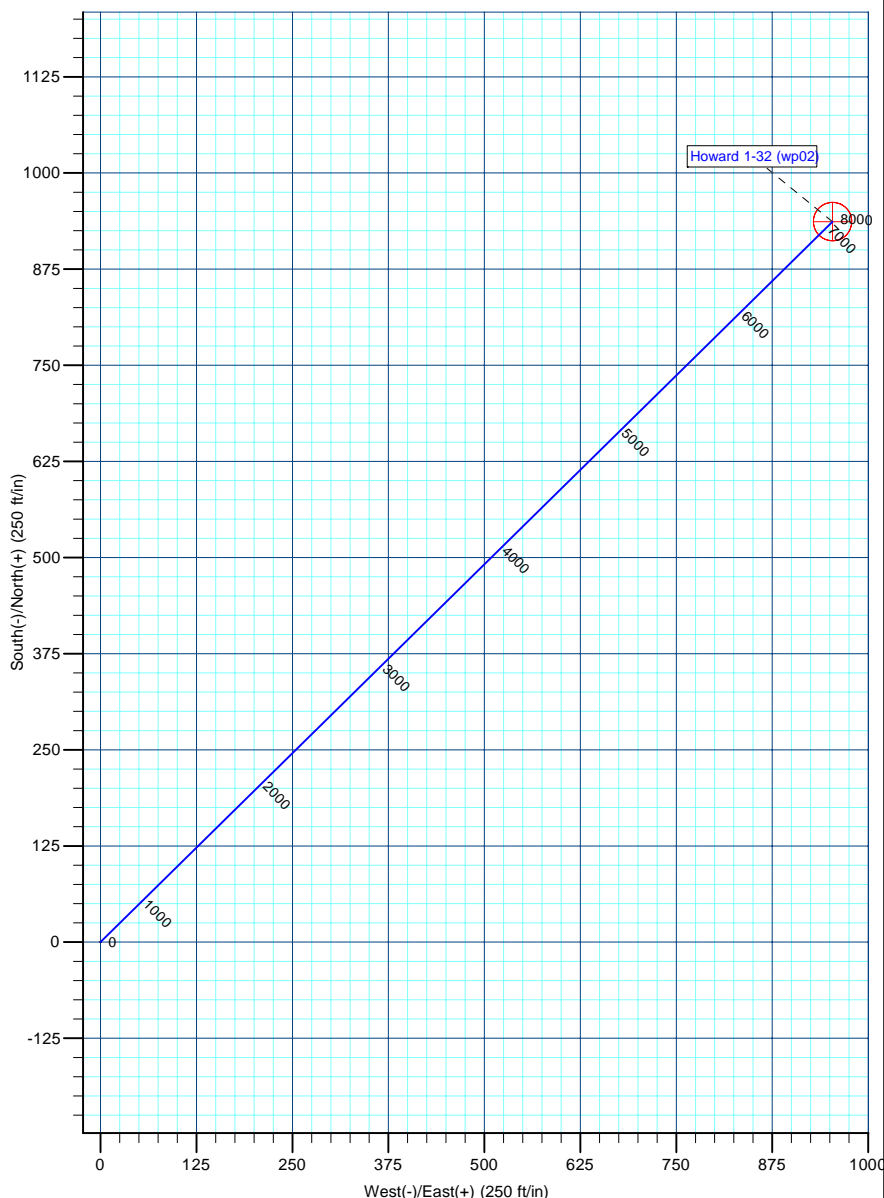
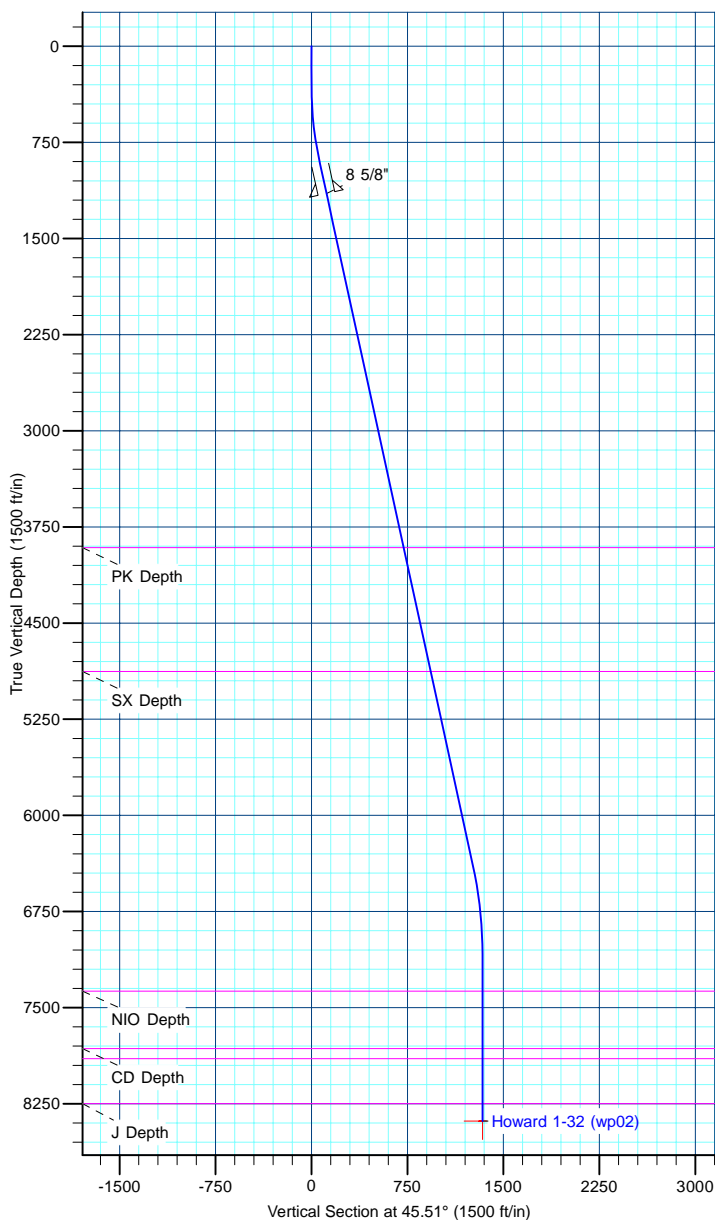
TVD	MD	Name	Size
1150.00	1160.36	8 5/8"	8-5/8

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Howard 1-32 BHL	8385.00	936.94	953.74	1248146.47	3166037.05	40.013025	-104.907218	Circle (Radius: 25.00)

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.38	300.00	0.00	0.00	0.00	0.38	0.00
915.91	12.32	45.51	911.18	46.22	47.05	2.00	45.51	65.95
6520.27	12.32	45.51	6386.51	884.12	899.97	0.00	0.00	1261.59
7224.17	0.00	0.38	7085.00	936.94	953.74	1.75	180.00	1336.97
8524.17	0.00	0.38	8385.00	936.94	953.74	0.00	0.00	1336.97



Database:	edm5000p	Local Co-ordinate Reference:	Site WELD_HOWARD 17-32 PAD
Company:	US ROCKIES REGION PLANNING	TVD Reference:	15' RKB + 5047' GL @ 5062.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	15' RKB + 5047' GL @ 5062.00ft
Site:	WELD_HOWARD 17-32 PAD	North Reference:	True
Well:	Howard 1-32	Survey Calculation Method:	Minimum Curvature
Wellbore:	Howard 1-32		
Design:	Howard 1-32 (wp02)		

Project	COLORADO NORTHERN ZONE - 83		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site						WELD_HOWARD 17-32 PAD							
Site Position:						Northing:		1,247,203.06 ft		Latitude:		40.010452	
From:			Lat/Long			Easting:		3,165,119.53 ft		Longitude:		-104.910516	
Position Uncertainty:			0.00 ft			Slot Radius:		0 "		Grid Convergence:		0.38	

Well	Howard 1-32					
Well Position	+N-S	0.35 ft	Northing:	1,247,203.21 ft	Latitude:	40.010453
	+E-W	-29.97 ft	Easting:	3,165,089.56 ft	Longitude:	-104.910623
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	5,047.00 ft

Wellbore	Howard 1-32				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/9/2011	8.92	66.71	52,919

Design	Howard 1-32 (wp02)			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.35	-29.97	45.51

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.35	-29.97	0.00	0.00	0.00	0.00	
300.00	0.00	0.38	300.00	0.35	-29.97	0.00	0.00	0.00	0.38	
915.91	12.32	45.51	911.18	46.57	17.08	2.00	2.00	0.00	45.51	
6,520.27	12.32	45.51	6,386.51	884.47	870.00	0.00	0.00	0.00	0.00	
7,224.17	0.00	0.38	7,085.00	937.29	923.77	1.75	-1.75	0.00	180.00	
8,524.17	0.00	0.38	8,385.00	937.29	923.77	0.00	0.00	0.00	0.00	Howard 1-32 BHL

Database:	edm5000p	Local Co-ordinate Reference:	Site WELD_HOWARD 17-32 PAD
Company:	US ROCKIES REGION PLANNING	TVD Reference:	15' RKB + 5047' GL @ 5062.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	15' RKB + 5047' GL @ 5062.00ft
Site:	WELD_HOWARD 17-32 PAD	North Reference:	True
Well:	Howard 1-32	Survey Calculation Method:	Minimum Curvature
Wellbore:	Howard 1-32		
Design:	Howard 1-32 (wp02)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.35	-29.97	0.00	0.00	0.00	0.00
100.00	0.00	0.38	100.00	0.35	-29.97	0.00	0.00	0.00	0.00
200.00	0.00	0.38	200.00	0.35	-29.97	0.00	0.00	0.00	0.00
300.00	0.00	0.38	300.00	0.35	-29.97	0.00	0.00	0.00	0.00
Start Build 2.00									
400.00	2.00	45.51	399.98	1.57	-28.73	1.75	2.00	2.00	0.00
500.00	4.00	45.51	499.84	5.24	-24.99	6.98	2.00	2.00	0.00
600.00	6.00	45.51	599.45	11.35	-18.78	15.69	2.00	2.00	0.00
700.00	8.00	45.51	698.70	19.89	-10.08	27.88	2.00	2.00	0.00
800.00	10.00	45.51	797.47	30.85	1.08	43.52	2.00	2.00	0.00
900.00	12.00	45.51	895.62	44.22	14.69	62.60	2.00	2.00	0.00
915.91	12.32	45.51	911.18	46.57	17.08	65.95	2.00	2.00	0.00
Start 5604.36 hold at 915.91 MD									
1,000.00	12.32	45.51	993.33	59.14	29.87	83.89	0.00	0.00	0.00
1,100.00	12.32	45.51	1,091.03	74.09	45.09	105.23	0.00	0.00	0.00
1,160.36	12.32	45.51	1,150.00	83.12	54.28	118.11	0.00	0.00	0.00
8 5/8"									
1,200.00	12.32	45.51	1,188.73	89.05	60.31	126.56	0.00	0.00	0.00
1,300.00	12.32	45.51	1,286.42	104.00	75.53	147.90	0.00	0.00	0.00
1,400.00	12.32	45.51	1,384.12	118.95	90.75	169.23	0.00	0.00	0.00
1,500.00	12.32	45.51	1,481.82	133.90	105.97	190.56	0.00	0.00	0.00
1,600.00	12.32	45.51	1,579.52	148.85	121.19	211.90	0.00	0.00	0.00
1,700.00	12.32	45.51	1,677.21	163.80	136.41	233.23	0.00	0.00	0.00
1,800.00	12.32	45.51	1,774.91	178.75	151.63	254.57	0.00	0.00	0.00
1,900.00	12.32	45.51	1,872.61	193.70	166.84	275.90	0.00	0.00	0.00
2,000.00	12.32	45.51	1,970.31	208.65	182.06	297.23	0.00	0.00	0.00
2,100.00	12.32	45.51	2,068.01	223.60	197.28	318.57	0.00	0.00	0.00
2,200.00	12.32	45.51	2,165.70	238.55	212.50	339.90	0.00	0.00	0.00
2,300.00	12.32	45.51	2,263.40	253.51	227.72	361.24	0.00	0.00	0.00
2,400.00	12.32	45.51	2,361.10	268.46	242.94	382.57	0.00	0.00	0.00
2,500.00	12.32	45.51	2,458.80	283.41	258.16	403.90	0.00	0.00	0.00
2,600.00	12.32	45.51	2,556.49	298.36	273.38	425.24	0.00	0.00	0.00
2,700.00	12.32	45.51	2,654.19	313.31	288.60	446.57	0.00	0.00	0.00
2,800.00	12.32	45.51	2,751.89	328.26	303.82	467.91	0.00	0.00	0.00
2,900.00	12.32	45.51	2,849.59	343.21	319.03	489.24	0.00	0.00	0.00
3,000.00	12.32	45.51	2,947.29	358.16	334.25	510.58	0.00	0.00	0.00
3,100.00	12.32	45.51	3,044.98	373.11	349.47	531.91	0.00	0.00	0.00
3,200.00	12.32	45.51	3,142.68	388.06	364.69	553.24	0.00	0.00	0.00
3,300.00	12.32	45.51	3,240.38	403.01	379.91	574.58	0.00	0.00	0.00
3,400.00	12.32	45.51	3,338.08	417.96	395.13	595.91	0.00	0.00	0.00
3,500.00	12.32	45.51	3,435.77	432.92	410.35	617.25	0.00	0.00	0.00
3,600.00	12.32	45.51	3,533.47	447.87	425.57	638.58	0.00	0.00	0.00
3,700.00	12.32	45.51	3,631.17	462.82	440.79	659.91	0.00	0.00	0.00
3,800.00	12.32	45.51	3,728.87	477.77	456.00	681.25	0.00	0.00	0.00
3,900.00	12.32	45.51	3,826.57	492.72	471.22	702.58	0.00	0.00	0.00
3,987.45	12.32	45.51	3,912.00	505.79	484.53	721.24	0.00	0.00	0.00
PK Depth									
4,000.00	12.32	45.51	3,924.26	507.67	486.44	723.92	0.00	0.00	0.00
4,100.00	12.32	45.51	4,021.96	522.62	501.66	745.25	0.00	0.00	0.00
4,200.00	12.32	45.51	4,119.66	537.57	516.88	766.58	0.00	0.00	0.00
4,300.00	12.32	45.51	4,217.36	552.52	532.10	787.92	0.00	0.00	0.00
4,400.00	12.32	45.51	4,315.05	567.47	547.32	809.25	0.00	0.00	0.00
4,500.00	12.32	45.51	4,412.75	582.42	562.54	830.59	0.00	0.00	0.00
4,600.00	12.32	45.51	4,510.45	597.37	577.76	851.92	0.00	0.00	0.00

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Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	15' RKB + 5047' GL @ 5062.00ft
Site:	WELD_HOWARD 17-32 PAD	North Reference:	True
Well:	Howard 1-32	Survey Calculation Method:	Minimum Curvature
Wellbore:	Howard 1-32		
Design:	Howard 1-32 (wp02)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,700.00	12.32	45.51	4,608.15	612.33	592.97	873.26	0.00	0.00	0.00
4,800.00	12.32	45.51	4,705.85	627.28	608.19	894.59	0.00	0.00	0.00
4,900.00	12.32	45.51	4,803.54	642.23	623.41	915.92	0.00	0.00	0.00
4,977.23	12.32	45.51	4,879.00	653.77	635.17	932.40	0.00	0.00	0.00
SX Depth									
5,000.00	12.32	45.51	4,901.24	657.18	638.63	937.26	0.00	0.00	0.00
5,100.00	12.32	45.51	4,998.94	672.13	653.85	958.59	0.00	0.00	0.00
5,200.00	12.32	45.51	5,096.64	687.08	669.07	979.93	0.00	0.00	0.00
5,300.00	12.32	45.51	5,194.33	702.03	684.29	1,001.26	0.00	0.00	0.00
5,400.00	12.32	45.51	5,292.03	716.98	699.51	1,022.59	0.00	0.00	0.00
5,500.00	12.32	45.51	5,389.73	731.93	714.73	1,043.93	0.00	0.00	0.00
5,600.00	12.32	45.51	5,487.43	746.88	729.94	1,065.26	0.00	0.00	0.00
5,700.00	12.32	45.51	5,585.13	761.83	745.16	1,086.60	0.00	0.00	0.00
5,800.00	12.32	45.51	5,682.82	776.79	760.38	1,107.93	0.00	0.00	0.00
5,900.00	12.32	45.51	5,780.52	791.74	775.60	1,129.26	0.00	0.00	0.00
6,000.00	12.32	45.51	5,878.22	806.69	790.82	1,150.60	0.00	0.00	0.00
6,100.00	12.32	45.51	5,975.92	821.64	806.04	1,171.93	0.00	0.00	0.00
6,200.00	12.32	45.51	6,073.61	836.59	821.26	1,193.27	0.00	0.00	0.00
6,300.00	12.32	45.51	6,171.31	851.54	836.48	1,214.60	0.00	0.00	0.00
6,400.00	12.32	45.51	6,269.01	866.49	851.70	1,235.93	0.00	0.00	0.00
6,500.00	12.32	45.51	6,366.71	881.44	866.92	1,257.27	0.00	0.00	0.00
6,520.27	12.32	45.51	6,386.51	884.47	870.00	1,261.59	0.00	0.00	0.00
Start Drop -1.75									
6,600.00	10.92	45.51	6,464.61	895.73	881.46	1,277.65	1.75	-1.75	0.00
6,700.00	9.17	45.51	6,563.07	907.95	893.90	1,295.10	1.75	-1.75	0.00
6,800.00	7.42	45.51	6,662.02	918.07	904.20	1,309.53	1.75	-1.75	0.00
6,900.00	5.67	45.51	6,761.36	926.06	912.33	1,320.93	1.75	-1.75	0.00
7,000.00	3.92	45.51	6,861.01	931.92	918.30	1,329.30	1.75	-1.75	0.00
7,100.00	2.17	45.51	6,960.86	935.65	922.09	1,334.61	1.75	-1.75	0.00
7,200.00	0.42	45.51	7,060.83	937.23	923.71	1,336.88	1.75	-1.75	0.00
7,224.17	0.00	0.00	7,085.00	937.29	923.77	1,336.97	1.75	-1.75	-188.30
Start 1300.00 hold at 7224.17 MD									
7,300.00	0.00	0.38	7,160.83	937.29	923.77	1,336.97	0.00	0.00	0.00
7,400.00	0.00	0.38	7,260.83	937.29	923.77	1,336.97	0.00	0.00	0.00
7,500.00	0.00	0.38	7,360.83	937.29	923.77	1,336.97	0.00	0.00	0.00
7,511.17	0.00	0.38	7,372.00	937.29	923.77	1,336.97	0.00	0.00	0.00
NIO Depth									
7,600.00	0.00	0.38	7,460.83	937.29	923.77	1,336.97	0.00	0.00	0.00
7,700.00	0.00	0.38	7,560.83	937.29	923.77	1,336.97	0.00	0.00	0.00
7,800.00	0.00	0.38	7,660.83	937.29	923.77	1,336.97	0.00	0.00	0.00
7,900.00	0.00	0.38	7,760.83	937.29	923.77	1,336.97	0.00	0.00	0.00
7,959.17	0.00	0.38	7,820.00	937.29	923.77	1,336.97	0.00	0.00	0.00
CD Depth									
8,000.00	0.00	0.38	7,860.83	937.29	923.77	1,336.97	0.00	0.00	0.00
8,037.17	0.00	0.38	7,898.00	937.29	923.77	1,336.97	0.00	0.00	0.00
GH Depth									
8,100.00	0.00	0.38	7,960.83	937.29	923.77	1,336.97	0.00	0.00	0.00
8,200.00	0.00	0.38	8,060.83	937.29	923.77	1,336.97	0.00	0.00	0.00
8,300.00	0.00	0.38	8,160.83	937.29	923.77	1,336.97	0.00	0.00	0.00
8,389.17	0.00	0.38	8,250.00	937.29	923.77	1,336.97	0.00	0.00	0.00
J Depth									
8,400.00	0.00	0.38	8,260.83	937.29	923.77	1,336.97	0.00	0.00	0.00
8,500.00	0.00	0.38	8,360.83	937.29	923.77	1,336.97	0.00	0.00	0.00

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Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	15' RKB + 5047' GL @ 5062.00ft
Site:	WELD_HOWARD 17-32 PAD	North Reference:	True
Well:	Howard 1-32	Survey Calculation Method:	Minimum Curvature
Wellbore:	Howard 1-32		
Design:	Howard 1-32 (wp02)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
8,524.17	0.00	0.38	8,385.00	937.29	923.77	1,336.97	0.00	0.00	0.00
TD at 8524.17 - Howard 1-32 BHL									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
Howard 1-32 BHL	0.00	0.38	8,385.00	937.29	923.77	1,248,146.47	3,166,037.05	40.013025	-104.907218
- plan hits target center									
- Circle (radius 25.00)									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
1,160.36	1,150.00	8 5/8"	8-5/8	11	

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
3,987.45	3,912.00	PK Depth				
4,977.23	4,879.00	SX Depth				
7,511.17	7,372.00	NIO Depth				
7,959.17	7,820.00	CD Depth				
8,037.17	7,898.00	GH Depth				
8,389.17	8,250.00	J Depth				

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
300.00	300.00	0.35	-29.97	Start Build 2.00	
915.91	911.18	46.57	17.08	Start 5604.36 hold at 915.91 MD	
6,520.27	6,386.51	884.47	870.00	Start Drop -1.75	
7,224.17	7,085.00	937.29	923.77	Start 1300.00 hold at 7224.17 MD	
8,524.17	8,385.00	937.29	923.77	TD at 8524.17	