

# **US ROCKIES REGION PLANNING**

**COLORADO NORTHERN ZONE - 83**

**WELD\_HOWARD 17-32 PAD**

**Howard 8-32**

**Howard 8-32**

**Plan: Howard 8-32 (wp02)**

## **Standard Planning Report**

**12 May, 2011**



Project: COLORADO NORTHERN ZONE - 83  
 Site: WELD\_HOWARD 17-32 PAD  
 Well: Howard 8-32  
 Wellbore: Howard 8-32  
 Section:  
 SHL:  
 Design: Howard 8-32 (wp02)  
 Latitude: 40.010452  
 Longitude: -104.910588  
 GL: 5047.00  
 KB: 15' RKB + 5047' GL @ 5062.00ft

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
3912.00	3953.79	PK Depth
4867.00	4921.66	SX Depth
7416.00	7497.20	NIO Depth
7858.00	7939.20	CD Depth
7928.00	8009.20	GH Depth
8258.00	8339.20	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 8-32

+N/-S	+E/-W	Northing	Ground Level: Easting	5047.00 Latitude	Longitude	Slot
0.00	0.00	1247202.91	3165099.37	40.010452	-104.910588	

#### CASING DETAILS

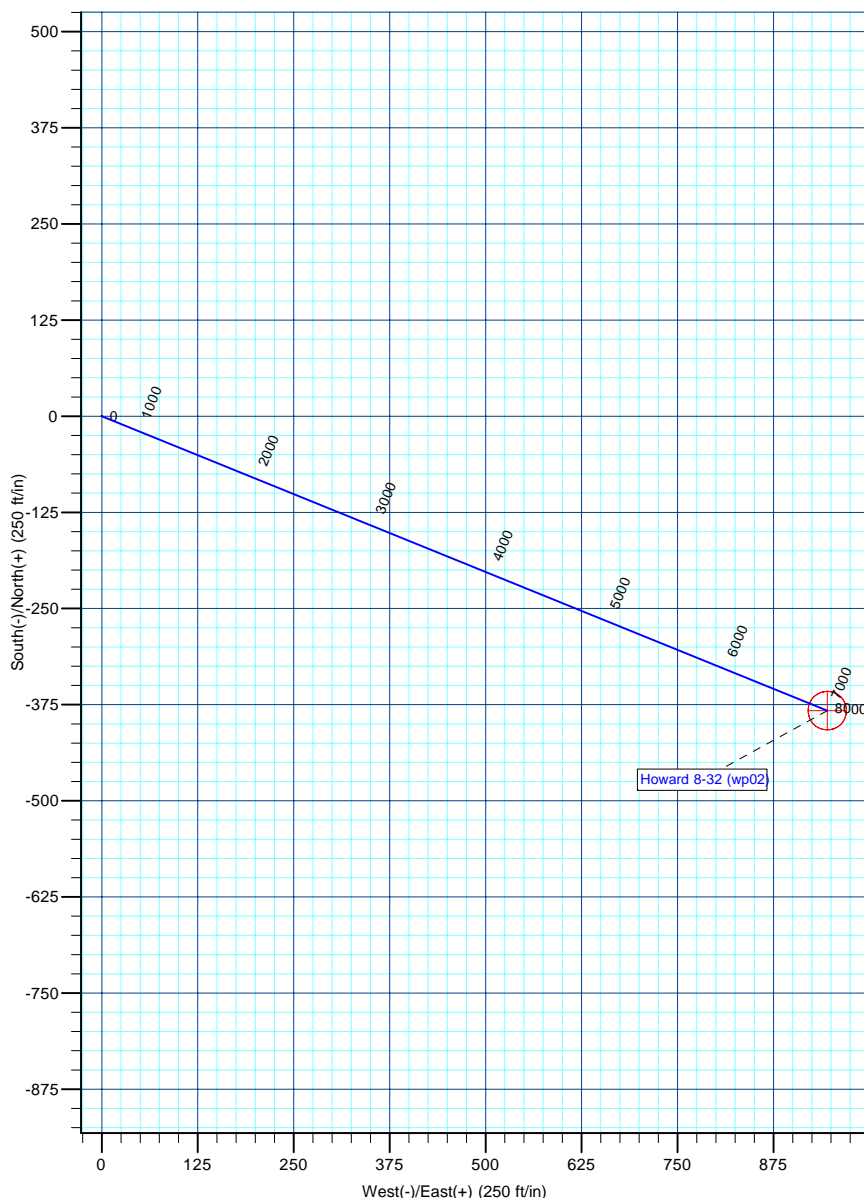
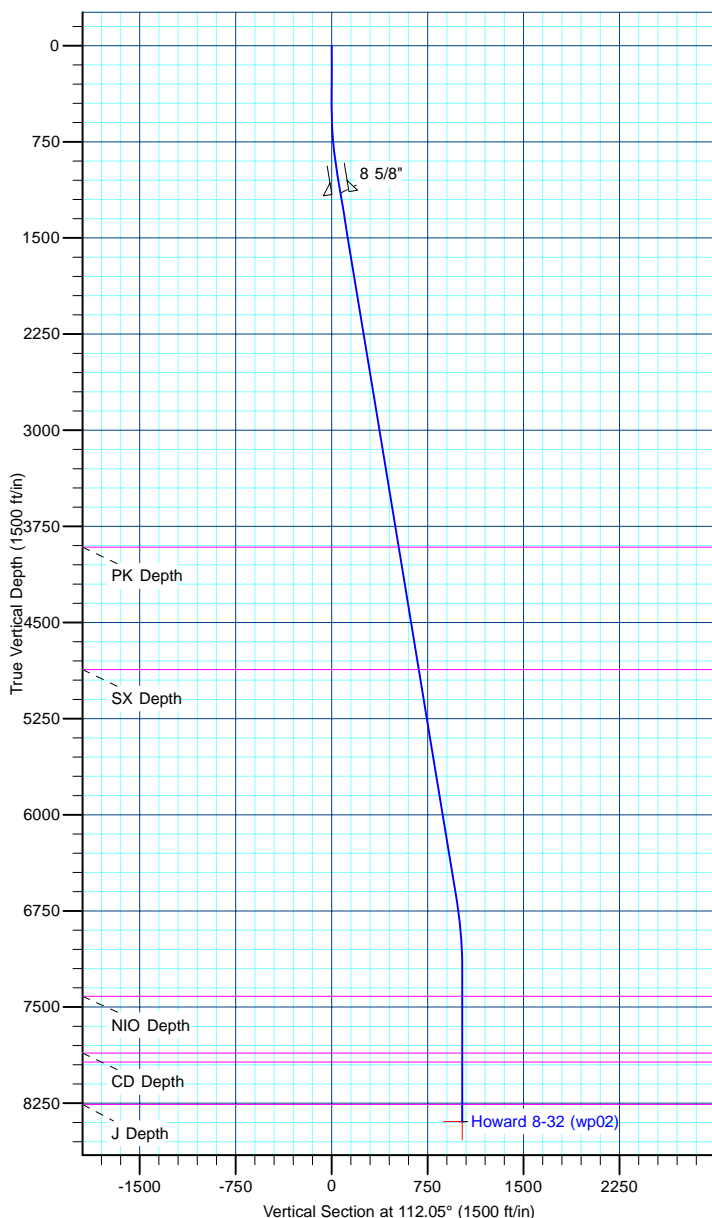
TVD	MD	Name	Size
1150.00	1154.56	8 5/8"	8-5/8

#### DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Howard 8-32 BHL	8392.00	-382.82	945.11	1246826.38	3166047.00	40.009401	-104.907214	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
500.00	0.00	0.38	500.00	0.00	0.00	0.00	0.38	0.00
967.74	9.35	112.05	965.67	-14.30	35.31	2.00	112.05	38.10
6738.63	9.35	112.05	6659.81	-366.47	904.75	0.00	0.00	976.15
7273.20	0.00	0.38	7192.00	-382.82	945.11	1.75	180.00	1019.70
8473.20	0.00	0.38	8392.00	-382.82	945.11	0.00	0.00	1019.70



<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well Howard 8-32
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	15' RKB + 5047' GL @ 5062.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	15' RKB + 5047' GL @ 5062.00ft
<b>Site:</b>	WELD_HOWARD 17-32 PAD	<b>North Reference:</b>	True
<b>Well:</b>	Howard 8-32	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Howard 8-32		
<b>Design:</b>	Howard 8-32 (wp02)		

<b>Project</b>	COLORADO NORTHERN ZONE - 83		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	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 8-32					
Well Position	+N-S	-0.01 ft	Northing:	1,247,202.91 ft	Latitude:	40.010452
	+E-W	-20.17 ft	Easting:	3,165,099.37 ft	Longitude:	-104.910588
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	5,047.00 ft

<b>Wellbore</b>	Howard 8-32				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	5/9/2011	8.92	66.71	52,919

<b>Design</b>	Howard 8-32 (wp02)			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>
	0.00	0.00	0.00	112.05

<b>Plan Sections</b>										
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	0.00	0.00	0.00	0.00	0.00	0.00	
500.00	0.00	0.38	500.00	0.00	0.00	0.00	0.00	0.00	0.38	
967.74	9.35	112.05	965.67	-14.30	35.31	2.00	2.00	0.00	112.05	
6,738.63	9.35	112.05	6,659.81	-366.47	904.75	0.00	0.00	0.00	0.00	
7,273.20	0.00	0.38	7,192.00	-382.82	945.11	1.75	-1.75	0.00	180.00	
8,473.20	0.00	0.38	8,392.00	-382.82	945.11	0.00	0.00	0.00	0.00	Howard 8-32 BHL

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well Howard 8-32
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	15' RKB + 5047' GL @ 5062.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	15' RKB + 5047' GL @ 5062.00ft
<b>Site:</b>	WELD_HOWARD 17-32 PAD	<b>North Reference:</b>	True
<b>Well:</b>	Howard 8-32	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Howard 8-32		
<b>Design:</b>	Howard 8-32 (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	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.38	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.38	200.00	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	0.00	0.00	0.00
400.00	0.00	0.38	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.38	500.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
600.00	2.00	112.05	599.98	-0.66	1.62	1.75	2.00	2.00	0.00
700.00	4.00	112.05	699.84	-2.62	6.47	6.98	2.00	2.00	0.00
800.00	6.00	112.05	799.45	-5.89	14.55	15.69	2.00	2.00	0.00
900.00	8.00	112.05	898.70	-10.47	25.84	27.88	2.00	2.00	0.00
967.74	9.35	112.05	965.67	-14.30	35.31	38.10	2.00	2.00	0.00
Start 5770.89 hold at 967.74 MD									
1,000.00	9.35	112.05	997.50	-16.27	40.17	43.34	0.00	0.00	0.00
1,100.00	9.35	112.05	1,096.17	-22.37	55.24	59.60	0.00	0.00	0.00
1,154.56	9.35	112.05	1,150.00	-25.70	63.46	68.47	0.00	0.00	0.00
8 5/8"									
1,200.00	9.35	112.05	1,194.84	-28.48	70.30	75.85	0.00	0.00	0.00
1,300.00	9.35	112.05	1,293.51	-34.58	85.37	92.11	0.00	0.00	0.00
1,400.00	9.35	112.05	1,392.18	-40.68	100.44	108.36	0.00	0.00	0.00
1,500.00	9.35	112.05	1,490.85	-46.78	115.50	124.62	0.00	0.00	0.00
1,600.00	9.35	112.05	1,589.52	-52.89	130.57	140.87	0.00	0.00	0.00
1,700.00	9.35	112.05	1,688.19	-58.99	145.63	157.13	0.00	0.00	0.00
1,800.00	9.35	112.05	1,786.86	-65.09	160.70	173.38	0.00	0.00	0.00
1,900.00	9.35	112.05	1,885.53	-71.20	175.77	189.64	0.00	0.00	0.00
2,000.00	9.35	112.05	1,984.20	-77.30	190.83	205.89	0.00	0.00	0.00
2,100.00	9.35	112.05	2,082.87	-83.40	205.90	222.15	0.00	0.00	0.00
2,200.00	9.35	112.05	2,181.54	-89.50	220.96	238.40	0.00	0.00	0.00
2,300.00	9.35	112.05	2,280.21	-95.61	236.03	254.66	0.00	0.00	0.00
2,400.00	9.35	112.05	2,378.88	-101.71	251.10	270.91	0.00	0.00	0.00
2,500.00	9.35	112.05	2,477.55	-107.81	266.16	287.17	0.00	0.00	0.00
2,600.00	9.35	112.05	2,576.22	-113.91	281.23	303.42	0.00	0.00	0.00
2,700.00	9.35	112.05	2,674.89	-120.02	296.29	319.68	0.00	0.00	0.00
2,800.00	9.35	112.05	2,773.56	-126.12	311.36	335.93	0.00	0.00	0.00
2,900.00	9.35	112.05	2,872.23	-132.22	326.43	352.19	0.00	0.00	0.00
3,000.00	9.35	112.05	2,970.90	-138.32	341.49	368.44	0.00	0.00	0.00
3,100.00	9.35	112.05	3,069.57	-144.43	356.56	384.70	0.00	0.00	0.00
3,200.00	9.35	112.05	3,168.24	-150.53	371.62	400.95	0.00	0.00	0.00
3,300.00	9.35	112.05	3,266.91	-156.63	386.69	417.21	0.00	0.00	0.00
3,400.00	9.35	112.05	3,365.58	-162.73	401.75	433.46	0.00	0.00	0.00
3,500.00	9.35	112.05	3,464.25	-168.84	416.82	449.72	0.00	0.00	0.00
3,600.00	9.35	112.05	3,562.92	-174.94	431.89	465.97	0.00	0.00	0.00
3,700.00	9.35	112.05	3,661.59	-181.04	446.95	482.23	0.00	0.00	0.00
3,800.00	9.35	112.05	3,760.26	-187.14	462.02	498.48	0.00	0.00	0.00
3,900.00	9.35	112.05	3,858.93	-193.25	477.08	514.74	0.00	0.00	0.00
3,953.79	9.35	112.05	3,912.00	-196.53	485.19	523.48	0.00	0.00	0.00
PK Depth									
4,000.00	9.35	112.05	3,957.60	-199.35	492.15	530.99	0.00	0.00	0.00
4,100.00	9.35	112.05	4,056.27	-205.45	507.22	547.25	0.00	0.00	0.00
4,200.00	9.35	112.05	4,154.94	-211.55	522.28	563.50	0.00	0.00	0.00
4,300.00	9.35	112.05	4,253.61	-217.66	537.35	579.76	0.00	0.00	0.00
4,400.00	9.35	112.05	4,352.28	-223.76	552.41	596.01	0.00	0.00	0.00
4,500.00	9.35	112.05	4,450.95	-229.86	567.48	612.27	0.00	0.00	0.00
4,600.00	9.35	112.05	4,549.62	-235.96	582.55	628.52	0.00	0.00	0.00

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<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	15' RKB + 5047' GL @ 5062.00ft
<b>Site:</b>	WELD_HOWARD 17-32 PAD	<b>North Reference:</b>	True
<b>Well:</b>	Howard 8-32	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Howard 8-32		
<b>Design:</b>	Howard 8-32 (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	9.35	112.05	4,648.29	-242.07	597.61	644.78	0.00	0.00	0.00
4,800.00	9.35	112.05	4,746.96	-248.17	612.68	661.03	0.00	0.00	0.00
4,900.00	9.35	112.05	4,845.63	-254.27	627.74	677.29	0.00	0.00	0.00
4,921.66	9.35	112.05	4,867.00	-255.59	631.01	680.81	0.00	0.00	0.00
<b>SX Depth</b>									
5,000.00	9.35	112.05	4,944.30	-260.37	642.81	693.54	0.00	0.00	0.00
5,100.00	9.35	112.05	5,042.97	-266.48	657.87	709.80	0.00	0.00	0.00
5,200.00	9.35	112.05	5,141.64	-272.58	672.94	726.05	0.00	0.00	0.00
5,300.00	9.35	112.05	5,240.31	-278.68	688.01	742.30	0.00	0.00	0.00
5,400.00	9.35	112.05	5,338.98	-284.78	703.07	758.56	0.00	0.00	0.00
5,500.00	9.35	112.05	5,437.65	-290.89	718.14	774.81	0.00	0.00	0.00
5,600.00	9.35	112.05	5,536.32	-296.99	733.20	791.07	0.00	0.00	0.00
5,700.00	9.35	112.05	5,634.99	-303.09	748.27	807.32	0.00	0.00	0.00
5,800.00	9.35	112.05	5,733.66	-309.19	763.34	823.58	0.00	0.00	0.00
5,900.00	9.35	112.05	5,832.33	-315.30	778.40	839.83	0.00	0.00	0.00
6,000.00	9.35	112.05	5,931.00	-321.40	793.47	856.09	0.00	0.00	0.00
6,100.00	9.35	112.05	6,029.67	-327.50	808.53	872.34	0.00	0.00	0.00
6,200.00	9.35	112.05	6,128.34	-333.60	823.60	888.60	0.00	0.00	0.00
6,300.00	9.35	112.05	6,227.01	-339.71	838.67	904.85	0.00	0.00	0.00
6,400.00	9.35	112.05	6,325.68	-345.81	853.73	921.11	0.00	0.00	0.00
6,500.00	9.35	112.05	6,424.35	-351.91	868.80	937.36	0.00	0.00	0.00
6,600.00	9.35	112.05	6,523.02	-358.01	883.86	953.62	0.00	0.00	0.00
6,700.00	9.35	112.05	6,621.69	-364.12	898.93	969.87	0.00	0.00	0.00
6,738.63	9.35	112.05	6,659.81	-366.47	904.75	976.15	0.00	0.00	0.00
<b>Start Drop -1.75</b>									
6,800.00	8.28	112.05	6,720.45	-370.01	913.47	985.56	1.75	-1.75	0.00
6,900.00	6.53	112.05	6,819.61	-374.84	925.42	998.45	1.75	-1.75	0.00
7,000.00	4.78	112.05	6,919.12	-378.54	934.55	1,008.31	1.75	-1.75	0.00
7,100.00	3.03	112.05	7,018.88	-381.10	940.86	1,015.12	1.75	-1.75	0.00
7,200.00	1.28	112.05	7,118.81	-382.51	944.35	1,018.88	1.75	-1.75	0.00
7,273.20	0.00	0.00	7,192.00	-382.82	945.11	1,019.70	1.75	-1.75	-153.08
<b>Start 1200.00 hold at 7273.20 MD</b>									
7,300.00	0.00	0.38	7,218.80	-382.82	945.11	1,019.70	0.00	0.00	0.00
7,400.00	0.00	0.38	7,318.80	-382.82	945.11	1,019.70	0.00	0.00	0.00
7,497.20	0.00	0.38	7,416.00	-382.82	945.11	1,019.70	0.00	0.00	0.00
<b>NIO Depth</b>									
7,500.00	0.00	0.38	7,418.80	-382.82	945.11	1,019.70	0.00	0.00	0.00
7,600.00	0.00	0.38	7,518.80	-382.82	945.11	1,019.70	0.00	0.00	0.00
7,700.00	0.00	0.38	7,618.80	-382.82	945.11	1,019.70	0.00	0.00	0.00
7,800.00	0.00	0.38	7,718.80	-382.82	945.11	1,019.70	0.00	0.00	0.00
7,900.00	0.00	0.38	7,818.80	-382.82	945.11	1,019.70	0.00	0.00	0.00
7,939.20	0.00	0.38	7,858.00	-382.82	945.11	1,019.70	0.00	0.00	0.00
<b>CD Depth</b>									
8,000.00	0.00	0.38	7,918.80	-382.82	945.11	1,019.70	0.00	0.00	0.00
8,009.20	0.00	0.38	7,928.00	-382.82	945.11	1,019.70	0.00	0.00	0.00
<b>GH Depth</b>									
8,100.00	0.00	0.38	8,018.80	-382.82	945.11	1,019.70	0.00	0.00	0.00
8,200.00	0.00	0.38	8,118.80	-382.82	945.11	1,019.70	0.00	0.00	0.00
8,300.00	0.00	0.38	8,218.80	-382.82	945.11	1,019.70	0.00	0.00	0.00
8,339.20	0.00	0.38	8,258.00	-382.82	945.11	1,019.70	0.00	0.00	0.00
<b>J Depth</b>									
8,400.00	0.00	0.38	8,318.80	-382.82	945.11	1,019.70	0.00	0.00	0.00
8,473.20	0.00	0.38	8,392.00	-382.82	945.11	1,019.70	0.00	0.00	0.00

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<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	15' RKB + 5047' GL @ 5062.00ft
<b>Site:</b>	WELD_HOWARD 17-32 PAD	<b>North Reference:</b>	True
<b>Well:</b>	Howard 8-32	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Howard 8-32		
<b>Design:</b>	Howard 8-32 (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)	
TD at 8473.20 - Howard 8-32 BHL										

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Howard 8-32 BHL	0.00	0.38	8,392.00	-382.82	945.11	1,246,826.38	3,166,047.00	40.009401	-104.907214
- hit/miss target									
- Shape									
- plan hits target center									
- Circle (radius 25.00)									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
1,154.56	1,150.00	8 5/8"	8-5/8	11	

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
3,953.79	3,912.00	PK Depth				
4,921.66	4,867.00	SX Depth				
7,497.20	7,416.00	NIO Depth				
7,939.20	7,858.00	CD Depth				
8,009.20	7,928.00	GH Depth				
8,339.20	8,258.00	J Depth				

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment	
500.00	500.00	0.00	0.00	Start Build 2.00	
967.74	965.67	-14.30	35.31	Start 5770.89 hold at 967.74 MD	
6,738.63	6,659.81	-366.47	904.75	Start Drop -1.75	
7,273.20	7,192.00	-382.82	945.11	Start 1200.00 hold at 7273.20 MD	
8,473.20	8,392.00	-382.82	945.11	TD at 8473.20	