

# **US ROCKIES REGION PLANNING**

**COLORADO NORTHERN ZONE - 83**

**WELD\_HOWARD 17-32 PAD**

**Howard 24-32**

**Howard 24-32**

**Plan: Howard 24-32 (wp01)**

## **Standard Planning Report**

**10 May, 2011**



Project: COLORADO NORTHERN ZONE - 83  
 Site: WELD\_HOWARD 17-32 PAD  
 Well: Howard 24-32  
 Wellbore: Howard 24-32  
 Section:  
 SHL:  
 Design: Howard 24-32 (wp01)  
 Latitude: 40.010452  
 Longitude: -104.910659  
 GL: 5047.00  
 KB: 15' RKB + 5047' GL @ 5062.00ft

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
3912.00	3995.24	PK Depth
4879.00	4985.84	SX Depth
7387.00	7495.88	NIO Depth
7820.00	7928.88	CD Depth
7898.00	8006.88	GH Depth
8250.00	8358.88	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 24-32

+N/-S	+E/-W	Northing	Ground Level: Easting	5047.00 Latitude	Longitude	Slot
0.00	0.00	1247202.78	3165079.48	40.010452	-104.910659	

#### CASING DETAILS

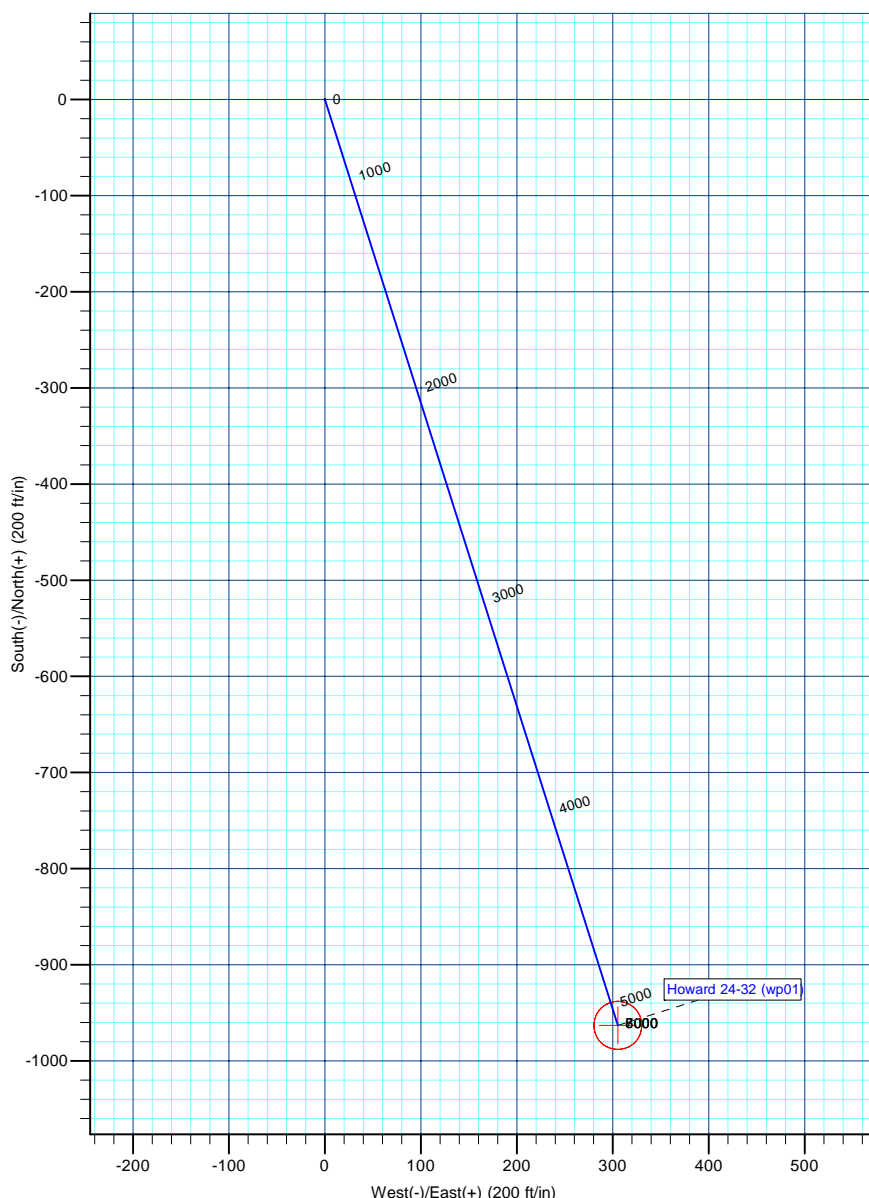
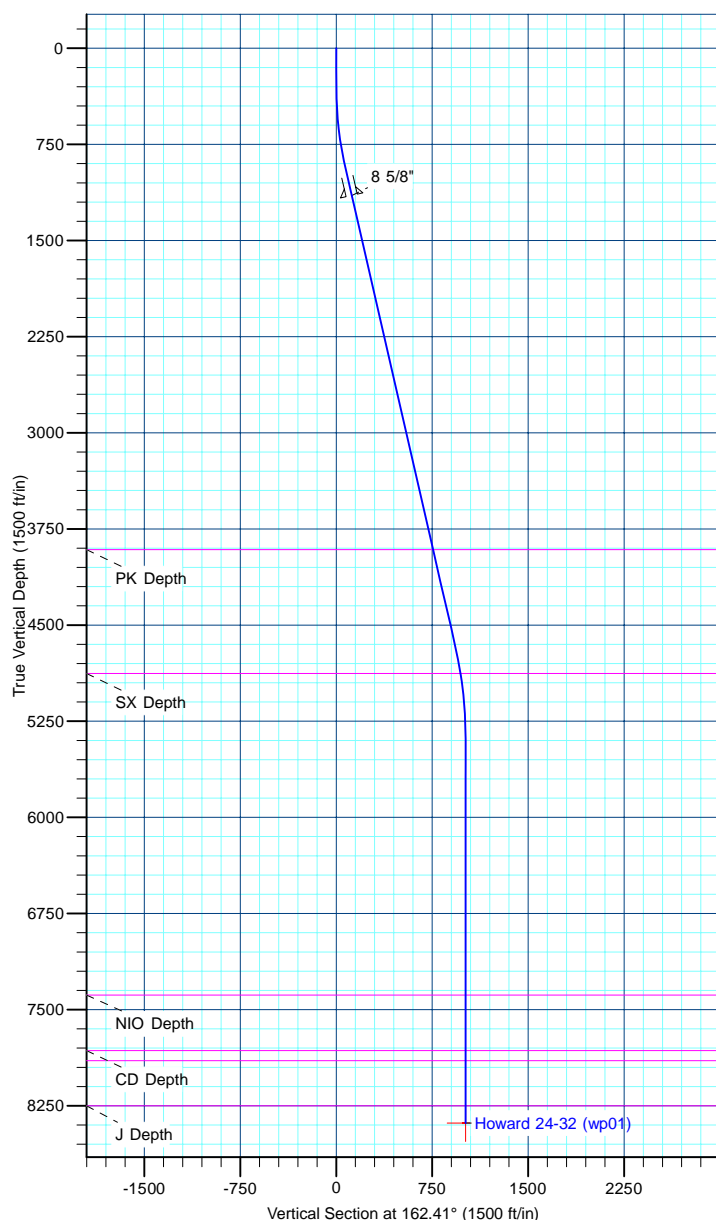
TVD	MD	Name	Size
1150.00	1160.94	8 5/8"	8-5/8

#### DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Howard 24-32 BHL	8385.00	-963.13	305.33	1246241.70	3165391.21	40.007808	-104.909569	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
948.44	12.97	162.41	942.92	-69.66	22.08	2.00	162.41	73.07
4752.80	12.97	162.41	4650.23	-883.52	280.09	0.00	0.00	926.85
5493.88	0.00	0.38	5385.00	-963.13	305.33	1.75	180.00	1010.37
8493.88	0.00	0.38	8385.00	-963.13	305.33	0.00	0.00	1010.37



<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well Howard 24-32
<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 24-32	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Howard 24-32		
<b>Design:</b>	Howard 24-32 (wp01)		

<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 24-32					
Well Position	+N-S	-0.01 ft	Northing:	1,247,202.78 ft	Latitude:	40.010452
	+E-W	-40.06 ft	Easting:	3,165,079.48 ft	Longitude:	-104.910659
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	5,047.00 ft

<b>Wellbore</b>	Howard 24-32				
<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 24-32 (wp01)			
<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	162.41

<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	
300.00	0.00	0.38	300.00	0.00	0.00	0.00	0.00	0.00	0.38	
948.44	12.97	162.41	942.92	-69.66	22.08	2.00	2.00	0.00	162.41	
4,752.80	12.97	162.41	4,650.23	-883.52	280.09	0.00	0.00	0.00	0.00	
5,493.88	0.00	0.38	5,385.00	-963.13	305.33	1.75	-1.75	0.00	180.00	
8,493.88	0.00	0.38	8,385.00	-963.13	305.33	0.00	0.00	0.00	0.00	Howard 24-32 BHL

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well Howard 24-32
<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 24-32	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Howard 24-32		
<b>Design:</b>	Howard 24-32 (wp01)		

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	2.00	162.41	399.98	-1.66	0.53	1.75	2.00	2.00	0.00
500.00	4.00	162.41	499.84	-6.65	2.11	6.98	2.00	2.00	0.00
600.00	6.00	162.41	599.45	-14.96	4.74	15.69	2.00	2.00	0.00
700.00	8.00	162.41	698.70	-26.58	8.43	27.88	2.00	2.00	0.00
800.00	10.00	162.41	797.47	-41.49	13.15	43.52	2.00	2.00	0.00
900.00	12.00	162.41	895.62	-59.68	18.92	62.60	2.00	2.00	0.00
948.44	12.97	162.41	942.92	-69.66	22.08	73.07	2.00	2.00	0.00
1,000.00	12.97	162.41	993.16	-80.69	25.58	84.65	0.00	0.00	0.00
1,100.00	12.97	162.41	1,090.61	-102.08	32.36	107.09	0.00	0.00	0.00
1,160.94	12.97	162.41	1,150.00	-115.12	36.49	120.76	0.00	0.00	0.00
8 5/8"									
1,200.00	12.97	162.41	1,188.06	-123.47	39.14	129.53	0.00	0.00	0.00
1,300.00	12.97	162.41	1,285.51	-144.87	45.93	151.97	0.00	0.00	0.00
1,400.00	12.97	162.41	1,382.96	-166.26	52.71	174.41	0.00	0.00	0.00
1,500.00	12.97	162.41	1,480.41	-187.65	59.49	196.86	0.00	0.00	0.00
1,600.00	12.97	162.41	1,577.86	-209.04	66.27	219.30	0.00	0.00	0.00
1,700.00	12.97	162.41	1,675.31	-230.44	73.05	241.74	0.00	0.00	0.00
1,800.00	12.97	162.41	1,772.76	-251.83	79.84	264.18	0.00	0.00	0.00
1,900.00	12.97	162.41	1,870.21	-273.22	86.62	286.62	0.00	0.00	0.00
2,000.00	12.97	162.41	1,967.65	-294.62	93.40	309.07	0.00	0.00	0.00
2,100.00	12.97	162.41	2,065.10	-316.01	100.18	331.51	0.00	0.00	0.00
2,200.00	12.97	162.41	2,162.55	-337.40	106.96	353.95	0.00	0.00	0.00
2,300.00	12.97	162.41	2,260.00	-358.79	113.75	376.39	0.00	0.00	0.00
2,400.00	12.97	162.41	2,357.45	-380.19	120.53	398.83	0.00	0.00	0.00
2,500.00	12.97	162.41	2,454.90	-401.58	127.31	421.28	0.00	0.00	0.00
2,600.00	12.97	162.41	2,552.35	-422.97	134.09	443.72	0.00	0.00	0.00
2,700.00	12.97	162.41	2,649.80	-444.37	140.87	466.16	0.00	0.00	0.00
2,800.00	12.97	162.41	2,747.25	-465.76	147.66	488.60	0.00	0.00	0.00
2,900.00	12.97	162.41	2,844.70	-487.15	154.44	511.05	0.00	0.00	0.00
3,000.00	12.97	162.41	2,942.15	-508.54	161.22	533.49	0.00	0.00	0.00
3,100.00	12.97	162.41	3,039.60	-529.94	168.00	555.93	0.00	0.00	0.00
3,200.00	12.97	162.41	3,137.04	-551.33	174.78	578.37	0.00	0.00	0.00
3,300.00	12.97	162.41	3,234.49	-572.72	181.57	600.81	0.00	0.00	0.00
3,400.00	12.97	162.41	3,331.94	-594.12	188.35	623.26	0.00	0.00	0.00
3,500.00	12.97	162.41	3,429.39	-615.51	195.13	645.70	0.00	0.00	0.00
3,600.00	12.97	162.41	3,526.84	-636.90	201.91	668.14	0.00	0.00	0.00
3,700.00	12.97	162.41	3,624.29	-658.29	208.69	690.58	0.00	0.00	0.00
3,800.00	12.97	162.41	3,721.74	-679.69	215.48	713.02	0.00	0.00	0.00
3,900.00	12.97	162.41	3,819.19	-701.08	222.26	735.47	0.00	0.00	0.00
3,995.24	12.97	162.41	3,912.00	-721.45	228.72	756.84	0.00	0.00	0.00
PK Depth									
4,000.00	12.97	162.41	3,916.64	-722.47	229.04	757.91	0.00	0.00	0.00
4,100.00	12.97	162.41	4,014.09	-743.87	235.82	780.35	0.00	0.00	0.00
4,200.00	12.97	162.41	4,111.54	-765.26	242.60	802.79	0.00	0.00	0.00
4,300.00	12.97	162.41	4,208.99	-786.65	249.39	825.24	0.00	0.00	0.00
4,400.00	12.97	162.41	4,306.44	-808.04	256.17	847.68	0.00	0.00	0.00
4,500.00	12.97	162.41	4,403.88	-829.44	262.95	870.12	0.00	0.00	0.00
4,600.00	12.97	162.41	4,501.33	-850.83	269.73	892.56	0.00	0.00	0.00
4,700.00	12.97	162.41	4,598.78	-872.22	276.51	915.00	0.00	0.00	0.00
4,752.80	12.97	162.41	4,650.23	-883.52	280.09	926.85	0.00	0.00	0.00

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well Howard 24-32
<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 24-32	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Howard 24-32		
<b>Design:</b>	Howard 24-32 (wp01)		

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)
4,800.00	12.14	162.41	4,696.31	-893.30	283.20	937.11	1.75	-1.75	0.00
4,900.00	10.39	162.41	4,794.38	-911.92	289.10	956.65	1.75	-1.75	0.00
4,985.84	8.89	162.41	4,879.00	-925.63	293.44	971.03	1.75	-1.75	0.00
<b>SX Depth</b>									
5,000.00	8.64	162.41	4,893.00	-927.69	294.10	973.19	1.75	-1.75	0.00
5,100.00	6.89	162.41	4,992.07	-940.57	298.18	986.70	1.75	-1.75	0.00
5,200.00	5.14	162.41	5,091.52	-950.56	301.35	997.19	1.75	-1.75	0.00
5,300.00	3.39	162.41	5,191.24	-957.66	303.60	1,004.63	1.75	-1.75	0.00
5,400.00	1.64	162.41	5,291.14	-961.84	304.93	1,009.02	1.75	-1.75	0.00
5,493.88	0.00	0.38	5,385.00	-963.13	305.33	1,010.37	1.75	-1.75	0.00
5,500.00	0.00	0.38	5,391.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
5,600.00	0.00	0.38	5,491.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
5,700.00	0.00	0.38	5,591.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
5,800.00	0.00	0.38	5,691.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
5,900.00	0.00	0.38	5,791.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
6,000.00	0.00	0.38	5,891.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
6,100.00	0.00	0.38	5,991.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
6,200.00	0.00	0.38	6,091.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
6,300.00	0.00	0.38	6,191.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
6,400.00	0.00	0.38	6,291.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
6,500.00	0.00	0.38	6,391.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
6,600.00	0.00	0.38	6,491.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
6,700.00	0.00	0.38	6,591.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
6,800.00	0.00	0.38	6,691.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
6,900.00	0.00	0.38	6,791.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
7,000.00	0.00	0.38	6,891.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
7,100.00	0.00	0.38	6,991.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
7,200.00	0.00	0.38	7,091.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
7,300.00	0.00	0.38	7,191.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
7,400.00	0.00	0.38	7,291.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
7,495.88	0.00	0.38	7,387.00	-963.13	305.33	1,010.37	0.00	0.00	0.00
<b>NIO Depth</b>									
7,500.00	0.00	0.38	7,391.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
7,600.00	0.00	0.38	7,491.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
7,700.00	0.00	0.38	7,591.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
7,800.00	0.00	0.38	7,691.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
7,900.00	0.00	0.38	7,791.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
7,928.88	0.00	0.38	7,820.00	-963.13	305.33	1,010.37	0.00	0.00	0.00
<b>CD Depth</b>									
8,000.00	0.00	0.38	7,891.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
8,006.88	0.00	0.38	7,898.00	-963.13	305.33	1,010.37	0.00	0.00	0.00
<b>GH Depth</b>									
8,100.00	0.00	0.38	7,991.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
8,200.00	0.00	0.38	8,091.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
8,300.00	0.00	0.38	8,191.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
8,358.88	0.00	0.38	8,250.00	-963.13	305.33	1,010.37	0.00	0.00	0.00
<b>J Depth</b>									
8,400.00	0.00	0.38	8,291.12	-963.13	305.33	1,010.37	0.00	0.00	0.00
8,493.88	0.00	0.38	8,385.00	-963.13	305.33	1,010.37	0.00	0.00	0.00
<b>Howard 24-32 BHL</b>									

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well Howard 24-32
<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 24-32	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Howard 24-32		
<b>Design:</b>	Howard 24-32 (wp01)		

#### Design Targets

##### Target Name

- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- Shape									
Howard 24-32 BHL	0.00	0.38	8,385.00	-963.13	305.33	1,246,241.70	3,165,391.21	40.007808	-104.909569
- plan hits target center									
- Circle (radius 25.00)									

#### Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
1,160.94	1,150.00	8 5/8"	8-5/8	11

#### Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,995.24	3,912.00	PK Depth			
4,985.84	4,879.00	SX Depth			
7,495.88	7,387.00	NIO Depth			
7,928.88	7,820.00	CD Depth			
8,006.88	7,898.00	GH Depth			
8,358.88	8,250.00	J Depth			