

# **US ROCKIES REGION PLANNING**

**COLORADO NORTHERN ZONE - 83**

**WELD\_HOWARD 20-29 PAD**

**Howard 16-29**

**Howard 16-29**

**Plan: Howard 16-29 (wp02)**

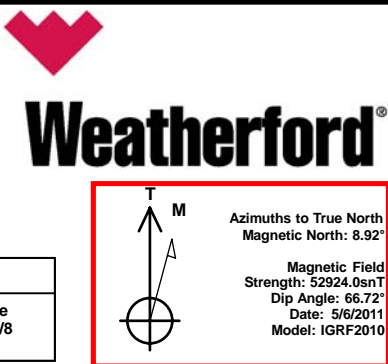
## **Standard Planning Report**

**18 May, 2011**



Project: COLORADO NORTHERN ZONE - 83  
 Site: WELD\_HOWARD 20-29 PAD  
 Well: Howard 16-29  
 Wellbore: Howard 16-29  
 Section:  
 SHL:  
 Design: Howard 16-29 (wp02)  
 Latitude: 40.017791  
 Longitude: -104.909419  
 GL: 5023.00  
 KB: 15' RKB + 5023' GL @ 5038.00ft

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
3888.00	3970.58	PK Depth
4838.00	4922.06	SX Depth
7356.00	7440.06	NIO Depth
7775.00	7859.06	CD Depth
7854.00	7938.06	GH Depth
8208.00	8292.06	J Depth



#### WELL DETAILS: Howard 16-29

+N/-S	+E/-W	Northing	Ground Level: Easting	5023.00 Latitude	Longitude	Slot
0.00	0.00	1249878.44	3165409.00	40.017791	-104.909419	

#### CASING DETAILS

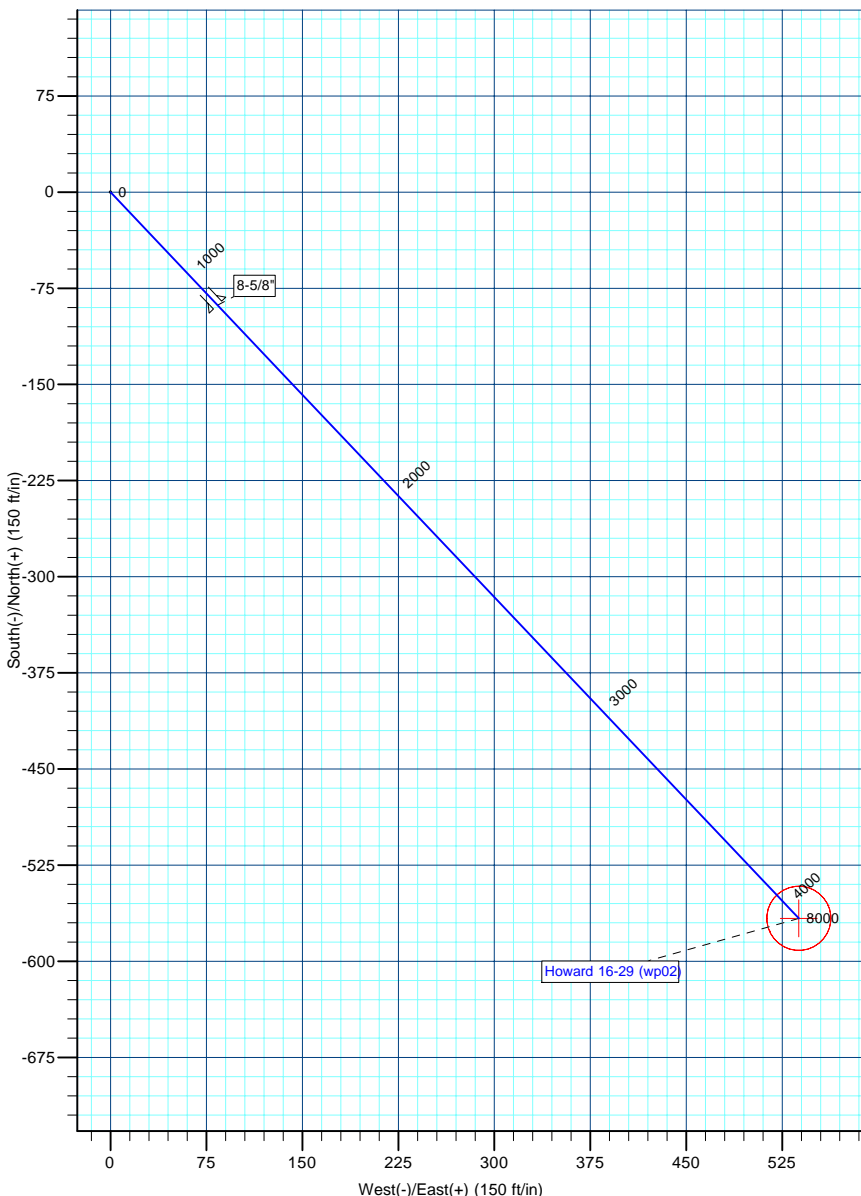
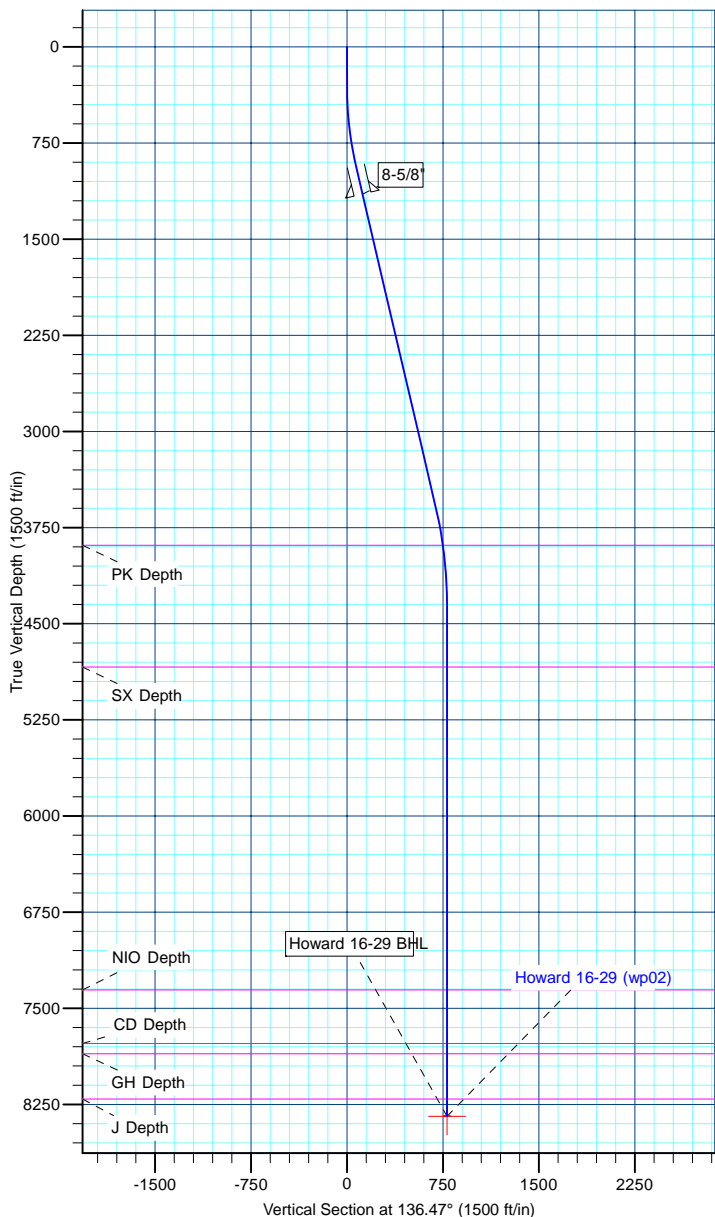
TVD	MD	Name	Size
1150.00	1161.13	8-5/8"	8-5/8

#### DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Howard 16-29 BHL	8343.00	-566.44	538.05	1249315.60	3165950.81	40.016236	-104.907498	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	0.00	300.00	0.00	0.00	0.00	0.00	0.00
959.55	13.19	136.47	953.74	-54.81	52.06	2.00	136.47	75.59
3673.28	13.19	136.47	3595.87	-503.80	478.55	0.00	0.00	694.86
4427.06	0.00	0.00	4343.00	-566.44	538.05	1.75	180.00	781.25
8427.06	0.00	0.00	8343.00	-566.44	538.05	0.00	0.00	781.25



<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well Howard 16-29
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	15' RKB + 5023' GL @ 5038.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	15' RKB + 5023' GL @ 5038.00ft
<b>Site:</b>	WELD_HOWARD 20-29 PAD	<b>North Reference:</b>	True
<b>Well:</b>	Howard 16-29	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Howard 16-29		
<b>Design:</b>	Howard 16-29 (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 20-29 PAD											
Site Position:						Northing:			1,249,878.45 ft			Latitude:			40.017791		
From:			Lat/Long			Easting:			3,165,409.00 ft			Longitude:			-104.909419		
Position Uncertainty:			0.00 ft			Slot Radius:			0 "			Grid Convergence:			0.38		

Well	Howard 16-29					
Well Position	+N-S	-0.01 ft	Northing:	1,249,878.44 ft	Latitude:	40.017791
	+E-W	0.00 ft	Easting:	3,165,409.00 ft	Longitude:	-104.909419
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	5,023.00 ft

<b>Wellbore</b>	Howard 16-29				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	5/6/2011	8.92	66.72	52,924

<b>Design</b>	Howard 16-29 (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	136.47

<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	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	
959.55	13.19	136.47	953.74	-54.81	52.06	2.00	2.00	0.00	136.47	
3,673.28	13.19	136.47	3,595.87	-503.80	478.55	0.00	0.00	0.00	0.00	
4,427.06	0.00	0.00	4,343.00	-566.44	538.05	1.75	-1.75	0.00	180.00	
8,427.06	0.00	0.00	8,343.00	-566.44	538.05	0.00	0.00	0.00	0.00	Howard 16-29 BHL

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well Howard 16-29
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	15' RKB + 5023' GL @ 5038.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	15' RKB + 5023' GL @ 5038.00ft
<b>Site:</b>	WELD_HOWARD 20-29 PAD	<b>North Reference:</b>	True
<b>Well:</b>	Howard 16-29	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Howard 16-29		
<b>Design:</b>	Howard 16-29 (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	0.00	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	2.00	136.47	399.98	-1.27	1.20	1.75	2.00	2.00	0.00
500.00	4.00	136.47	499.84	-5.06	4.81	6.98	2.00	2.00	0.00
600.00	6.00	136.47	599.45	-11.38	10.81	15.69	2.00	2.00	0.00
700.00	8.00	136.47	698.70	-20.21	19.20	27.88	2.00	2.00	0.00
800.00	10.00	136.47	797.47	-31.56	29.97	43.52	2.00	2.00	0.00
900.00	12.00	136.47	895.62	-45.39	43.11	62.60	2.00	2.00	0.00
959.55	13.19	136.47	953.74	-54.81	52.06	75.59	2.00	2.00	0.00
1,000.00	13.19	136.47	993.12	-61.50	58.42	84.82	0.00	0.00	0.00
1,100.00	13.19	136.47	1,090.48	-78.04	74.13	107.64	0.00	0.00	0.00
1,161.13	13.19	136.47	1,150.00	-88.16	83.74	121.59	0.00	0.00	0.00
8-5/8"									
1,200.00	13.19	136.47	1,187.84	-94.59	89.85	130.46	0.00	0.00	0.00
1,300.00	13.19	136.47	1,285.21	-111.13	105.56	153.28	0.00	0.00	0.00
1,400.00	13.19	136.47	1,382.57	-127.68	121.28	176.10	0.00	0.00	0.00
1,500.00	13.19	136.47	1,479.93	-144.22	137.00	198.92	0.00	0.00	0.00
1,600.00	13.19	136.47	1,577.29	-160.77	152.71	221.74	0.00	0.00	0.00
1,700.00	13.19	136.47	1,674.65	-177.32	168.43	244.56	0.00	0.00	0.00
1,800.00	13.19	136.47	1,772.01	-193.86	184.14	267.38	0.00	0.00	0.00
1,900.00	13.19	136.47	1,869.37	-210.41	199.86	290.20	0.00	0.00	0.00
2,000.00	13.19	136.47	1,966.74	-226.95	215.58	313.02	0.00	0.00	0.00
2,100.00	13.19	136.47	2,064.10	-243.50	231.29	335.84	0.00	0.00	0.00
2,200.00	13.19	136.47	2,161.46	-260.04	247.01	358.66	0.00	0.00	0.00
2,300.00	13.19	136.47	2,258.82	-276.59	262.72	381.48	0.00	0.00	0.00
2,400.00	13.19	136.47	2,356.18	-293.13	278.44	404.30	0.00	0.00	0.00
2,500.00	13.19	136.47	2,453.54	-309.68	294.16	427.12	0.00	0.00	0.00
2,600.00	13.19	136.47	2,550.90	-326.22	309.87	449.94	0.00	0.00	0.00
2,700.00	13.19	136.47	2,648.27	-342.77	325.59	472.76	0.00	0.00	0.00
2,800.00	13.19	136.47	2,745.63	-359.31	341.31	495.58	0.00	0.00	0.00
2,900.00	13.19	136.47	2,842.99	-375.86	357.02	518.40	0.00	0.00	0.00
3,000.00	13.19	136.47	2,940.35	-392.41	372.74	541.22	0.00	0.00	0.00
3,100.00	13.19	136.47	3,037.71	-408.95	388.45	564.04	0.00	0.00	0.00
3,200.00	13.19	136.47	3,135.07	-425.50	404.17	586.86	0.00	0.00	0.00
3,300.00	13.19	136.47	3,232.44	-442.04	419.89	609.68	0.00	0.00	0.00
3,400.00	13.19	136.47	3,329.80	-458.59	435.60	632.50	0.00	0.00	0.00
3,500.00	13.19	136.47	3,427.16	-475.13	451.32	655.32	0.00	0.00	0.00
3,600.00	13.19	136.47	3,524.52	-491.68	467.03	678.14	0.00	0.00	0.00
3,673.28	13.19	136.47	3,595.87	-503.80	478.55	694.86	0.00	0.00	0.00
3,700.00	12.72	136.47	3,621.91	-508.15	482.68	700.85	1.75	-1.75	0.00
3,800.00	10.97	136.47	3,719.77	-523.03	496.82	721.38	1.75	-1.75	0.00
3,900.00	9.22	136.47	3,818.22	-535.74	508.89	738.91	1.75	-1.75	0.00
3,970.58	7.99	136.47	3,888.00	-543.40	516.17	749.48	1.75	-1.75	0.00
PK Depth									
4,000.00	7.47	136.47	3,917.15	-546.27	518.89	753.43	1.75	-1.75	0.00
4,100.00	5.72	136.47	4,016.49	-554.60	526.81	764.92	1.75	-1.75	0.00
4,200.00	3.97	136.47	4,116.13	-560.73	532.63	773.38	1.75	-1.75	0.00
4,300.00	2.22	136.47	4,215.98	-564.65	536.35	778.78	1.75	-1.75	0.00
4,400.00	0.47	136.47	4,315.94	-566.36	537.97	781.13	1.75	-1.75	0.00
4,427.06	0.00	0.00	4,343.00	-566.44	538.05	781.25	1.75	-1.75	0.00
4,500.00	0.00	0.00	4,415.94	-566.44	538.05	781.25	0.00	0.00	0.00
4,600.00	0.00	0.00	4,515.94	-566.44	538.05	781.25	0.00	0.00	0.00

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well Howard 16-29
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	15' RKB + 5023' GL @ 5038.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	15' RKB + 5023' GL @ 5038.00ft
<b>Site:</b>	WELD_HOWARD 20-29 PAD	<b>North Reference:</b>	True
<b>Well:</b>	Howard 16-29	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Howard 16-29		
<b>Design:</b>	Howard 16-29 (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	0.00	0.00	4,615.94	-566.44	538.05	781.25	0.00	0.00	0.00
4,800.00	0.00	0.00	4,715.94	-566.44	538.05	781.25	0.00	0.00	0.00
4,900.00	0.00	0.00	4,815.94	-566.44	538.05	781.25	0.00	0.00	0.00
4,922.06	0.00	0.00	4,838.00	-566.44	538.05	781.25	0.00	0.00	0.00
<b>SX Depth</b>									
5,000.00	0.00	0.00	4,915.94	-566.44	538.05	781.25	0.00	0.00	0.00
5,100.00	0.00	0.00	5,015.94	-566.44	538.05	781.25	0.00	0.00	0.00
5,200.00	0.00	0.00	5,115.94	-566.44	538.05	781.25	0.00	0.00	0.00
5,300.00	0.00	0.00	5,215.94	-566.44	538.05	781.25	0.00	0.00	0.00
5,400.00	0.00	0.00	5,315.94	-566.44	538.05	781.25	0.00	0.00	0.00
5,500.00	0.00	0.00	5,415.94	-566.44	538.05	781.25	0.00	0.00	0.00
5,600.00	0.00	0.00	5,515.94	-566.44	538.05	781.25	0.00	0.00	0.00
5,700.00	0.00	0.00	5,615.94	-566.44	538.05	781.25	0.00	0.00	0.00
5,800.00	0.00	0.00	5,715.94	-566.44	538.05	781.25	0.00	0.00	0.00
5,900.00	0.00	0.00	5,815.94	-566.44	538.05	781.25	0.00	0.00	0.00
6,000.00	0.00	0.00	5,915.94	-566.44	538.05	781.25	0.00	0.00	0.00
6,100.00	0.00	0.00	6,015.94	-566.44	538.05	781.25	0.00	0.00	0.00
6,200.00	0.00	0.00	6,115.94	-566.44	538.05	781.25	0.00	0.00	0.00
6,300.00	0.00	0.00	6,215.94	-566.44	538.05	781.25	0.00	0.00	0.00
6,400.00	0.00	0.00	6,315.94	-566.44	538.05	781.25	0.00	0.00	0.00
6,500.00	0.00	0.00	6,415.94	-566.44	538.05	781.25	0.00	0.00	0.00
6,600.00	0.00	0.00	6,515.94	-566.44	538.05	781.25	0.00	0.00	0.00
6,700.00	0.00	0.00	6,615.94	-566.44	538.05	781.25	0.00	0.00	0.00
6,800.00	0.00	0.00	6,715.94	-566.44	538.05	781.25	0.00	0.00	0.00
6,900.00	0.00	0.00	6,815.94	-566.44	538.05	781.25	0.00	0.00	0.00
7,000.00	0.00	0.00	6,915.94	-566.44	538.05	781.25	0.00	0.00	0.00
7,100.00	0.00	0.00	7,015.94	-566.44	538.05	781.25	0.00	0.00	0.00
7,200.00	0.00	0.00	7,115.94	-566.44	538.05	781.25	0.00	0.00	0.00
7,300.00	0.00	0.00	7,215.94	-566.44	538.05	781.25	0.00	0.00	0.00
7,400.00	0.00	0.00	7,315.94	-566.44	538.05	781.25	0.00	0.00	0.00
7,440.06	0.00	0.00	7,356.00	-566.44	538.05	781.25	0.00	0.00	0.00
<b>NIO Depth</b>									
7,500.00	0.00	0.00	7,415.94	-566.44	538.05	781.25	0.00	0.00	0.00
7,600.00	0.00	0.00	7,515.94	-566.44	538.05	781.25	0.00	0.00	0.00
7,700.00	0.00	0.00	7,615.94	-566.44	538.05	781.25	0.00	0.00	0.00
7,800.00	0.00	0.00	7,715.94	-566.44	538.05	781.25	0.00	0.00	0.00
7,859.06	0.00	0.00	7,775.00	-566.44	538.05	781.25	0.00	0.00	0.00
<b>CD Depth</b>									
7,900.00	0.00	0.00	7,815.94	-566.44	538.05	781.25	0.00	0.00	0.00
7,938.06	0.00	0.00	7,854.00	-566.44	538.05	781.25	0.00	0.00	0.00
<b>GH Depth</b>									
8,000.00	0.00	0.00	7,915.94	-566.44	538.05	781.25	0.00	0.00	0.00
8,100.00	0.00	0.00	8,015.94	-566.44	538.05	781.25	0.00	0.00	0.00
8,200.00	0.00	0.00	8,115.94	-566.44	538.05	781.25	0.00	0.00	0.00
8,292.06	0.00	0.00	8,208.00	-566.44	538.05	781.25	0.00	0.00	0.00
<b>J Depth</b>									
8,300.00	0.00	0.00	8,215.94	-566.44	538.05	781.25	0.00	0.00	0.00
8,400.00	0.00	0.00	8,315.94	-566.44	538.05	781.25	0.00	0.00	0.00
8,427.06	0.00	0.00	8,343.00	-566.44	538.05	781.25	0.00	0.00	0.00
<b>Howard 16-29 BHL</b>									

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well Howard 16-29
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	15' RKB + 5023' GL @ 5038.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	15' RKB + 5023' GL @ 5038.00ft
<b>Site:</b>	WELD_HOWARD 20-29 PAD	<b>North Reference:</b>	True
<b>Well:</b>	Howard 16-29	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Howard 16-29		
<b>Design:</b>	Howard 16-29 (wp02)		

Design Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
Howard 16-29 BHL	0.00	0.00	8,343.00	-566.44	538.05	1,249,315.60	3,165,950.81	40.016236	-104.907498
- plan hits target center									
- Circle (radius 25.00)									

Casing Points					
Measured Depth	Vertical Depth			Casing Diameter	Hole Diameter
(ft)	(ft)		Name	(")	(")
1,161.13	1,150.00	8-5/8"		8-5/8	11

Formations						
Measured Depth	Vertical Depth				Dip	Dip Direction
(ft)	(ft)	Name	Lithology		(°)	(°)
3,970.58	3,888.00	PK Depth				
4,922.06	4,838.00	SX Depth				
7,440.06	7,356.00	NIO Depth				
7,859.06	7,775.00	CD Depth				
7,938.06	7,854.00	GH Depth				
8,292.06	8,208.00	J Depth				