

# **US ROCKIES REGION PLANNING**

**COLORADO NORTHERN ZONE - 83**

**WELD\_HOWARD 20-29 PAD**

**Howard 37-29**

**Howard 37-29**

**Plan: Howard 37-29 (wp01)**

## **Standard Planning Report**

**10 May, 2011**



Project: COLORADO NORTHERN ZONE - 83  
Site: WELD\_HOWARD 20-29 PAD  
Well: Howard 37-29  
Wellbore: Howard 37-29  
Section:  
SHL:  
Design: Howard 37-29 (wp01)  
Latitude: 40.017803  
Longitude: -104.909451  
GL: 5023.00  
KB: 15' RKB + 5023' GL @ 5038.00ft

## FORMATION TOP DETAILS

TVDPath	MDPath	Formation
3888.00	3976.28	PK Depth
4838.00	4950.78	SX Depth
7356.00	7470.80	NIO Depth
7775.00	7889.80	CD Depth
7854.00	7968.80	GH Depth
8208.00	8322.80	J Depth



Azimuths to True North  
Magnetic North: 8.92°

Magnetic Field  
Strength: 52924.0snT  
Dip Angle: 66.72°  
Date: 5/6/2011  
Model: IGRF2010

## WELL DETAILS: Howard 37-29

+N/-S	+E/-W	Northing	Ground Level: Easting	5023.00 Latitude	Longitude	Slot
0.00	0.00	1249882.74	3165400.01	40.017803	-104.909451	

## CASING DETAILS

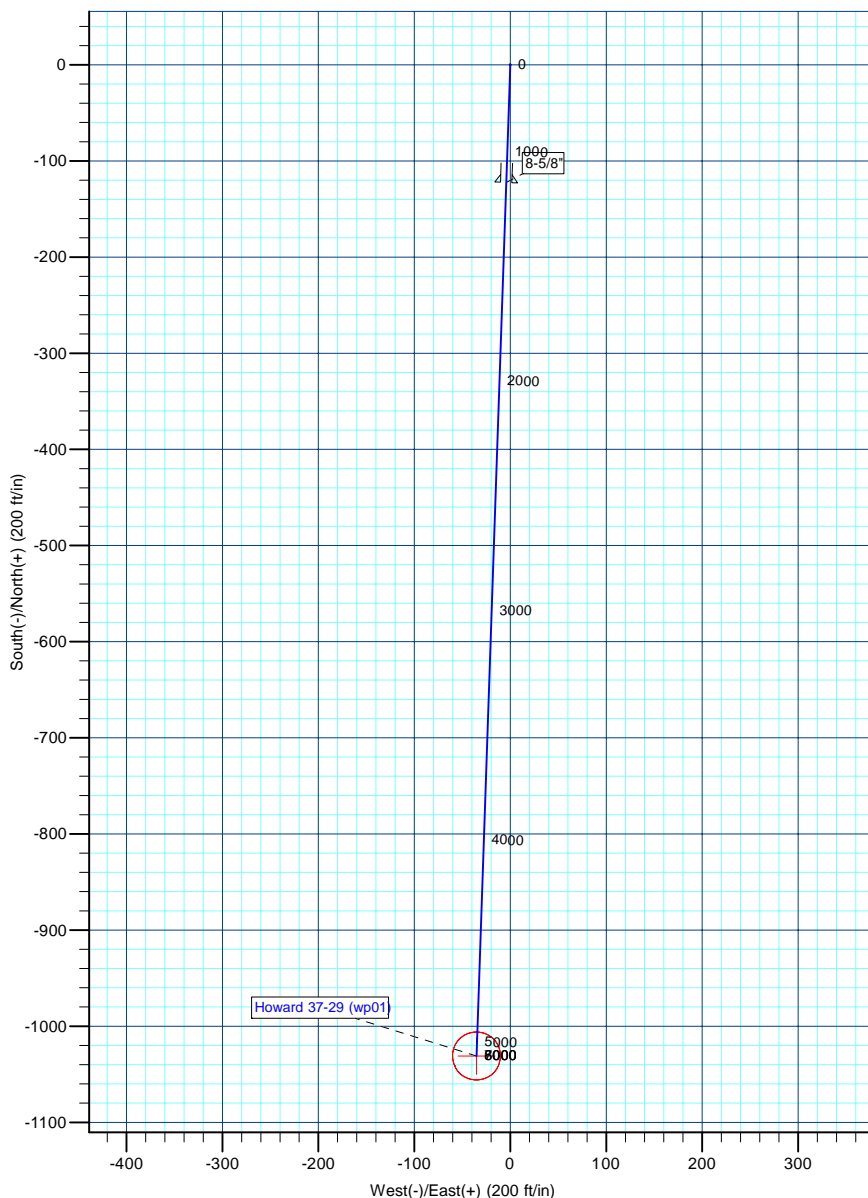
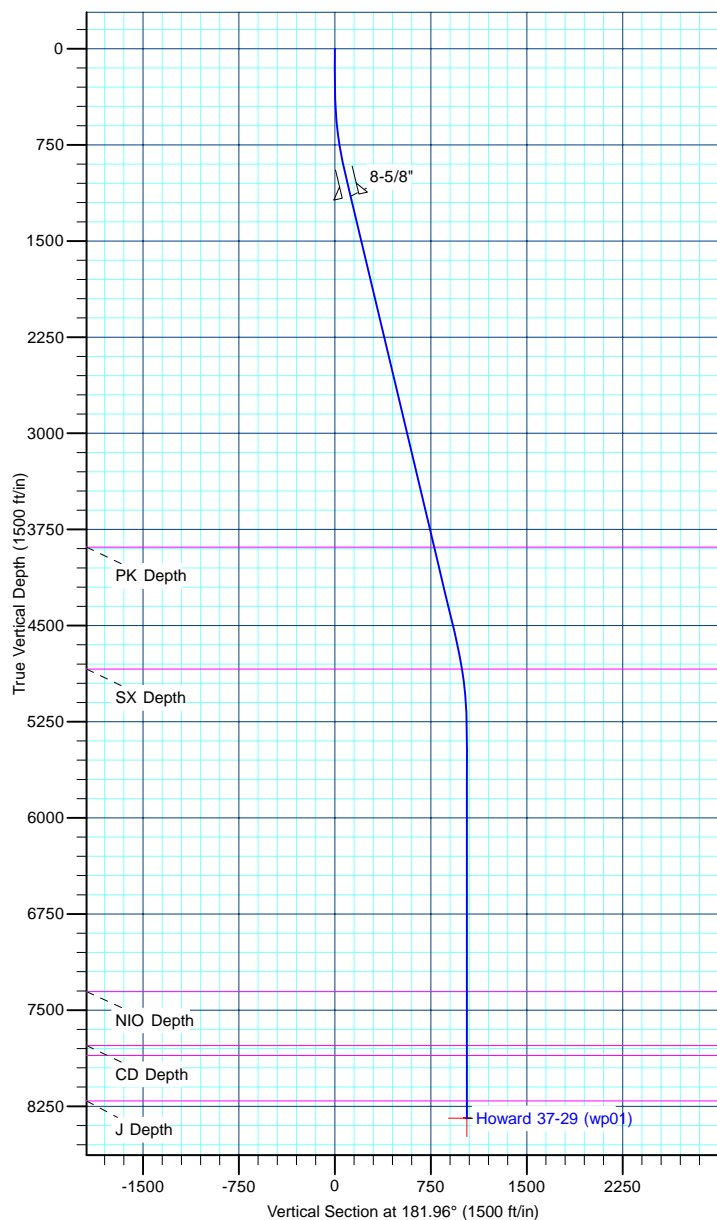
TVD	MD	Name	Size
1150.00	1161.32	8-5/8"	8-5/8"

## DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Howard 37-29 BHL	8343.00	-1030.88	-35.29	1248851.66	3165371.59	40.014973	-104.909577	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
971.40	13.43	181.96	965.27	-78.27	-2.68	2.00	181.96	78.32
4690.49	13.43	181.96	4582.69	-941.42	-32.23	0.00	0.00	941.98
5457.80	0.00	0.00	5343.00	-1030.88	-35.29	1.75	180.00	1031.48
8457.80	0.00	0.00	8343.00	-1030.88	-35.29	0.00	0.00	1031.48



<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well Howard 37-29
<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 37-29	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Howard 37-29		
<b>Design:</b>	Howard 37-29 (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 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 37-29					
Well Position	+N-S	4.35 ft	Northing:	1,249,882.74 ft	Latitude:	40.017803
	+E-W	-8.96 ft	Easting:	3,165,400.01 ft	Longitude:	-104.909451
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	5,023.00 ft

<b>Wellbore</b>	Howard 37-29				
<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 37-29 (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	181.96

<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	
971.40	13.43	181.96	965.27	-78.27	-2.68	2.00	2.00	0.00	181.96	
4,690.49	13.43	181.96	4,582.69	-941.42	-32.23	0.00	0.00	0.00	0.00	
5,457.81	0.00	0.00	5,343.00	-1,030.88	-35.29	1.75	-1.75	0.00	180.00	
8,457.81	0.00	0.00	8,343.00	-1,030.88	-35.29	0.00	0.00	0.00	0.00	Howard 37-29 BHL

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well Howard 37-29
<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 37-29	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Howard 37-29		
<b>Design:</b>	Howard 37-29 (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	0.00	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	181.96	399.98	-1.74	-0.06	1.75	2.00	2.00	0.00
500.00	4.00	181.96	499.84	-6.97	-0.24	6.98	2.00	2.00	0.00
600.00	6.00	181.96	599.45	-15.68	-0.54	15.69	2.00	2.00	0.00
700.00	8.00	181.96	698.70	-27.86	-0.95	27.88	2.00	2.00	0.00
800.00	10.00	181.96	797.47	-43.50	-1.49	43.52	2.00	2.00	0.00
900.00	12.00	181.96	895.62	-62.57	-2.14	62.60	2.00	2.00	0.00
971.40	13.43	181.96	965.27	-78.27	-2.68	78.32	2.00	2.00	0.00
1,000.00	13.43	181.96	993.09	-84.91	-2.91	84.96	0.00	0.00	0.00
1,100.00	13.43	181.96	1,090.36	-108.12	-3.70	108.18	0.00	0.00	0.00
1,161.32	13.43	181.96	1,150.00	-122.35	-4.19	122.42	0.00	0.00	0.00
8-5/8"									
1,200.00	13.43	181.96	1,187.62	-131.33	-4.50	131.40	0.00	0.00	0.00
1,300.00	13.43	181.96	1,284.89	-154.53	-5.29	154.62	0.00	0.00	0.00
1,400.00	13.43	181.96	1,382.15	-177.74	-6.08	177.85	0.00	0.00	0.00
1,500.00	13.43	181.96	1,479.42	-200.95	-6.88	201.07	0.00	0.00	0.00
1,600.00	13.43	181.96	1,576.69	-224.16	-7.67	224.29	0.00	0.00	0.00
1,700.00	13.43	181.96	1,673.95	-247.37	-8.47	247.51	0.00	0.00	0.00
1,800.00	13.43	181.96	1,771.22	-270.58	-9.26	270.74	0.00	0.00	0.00
1,900.00	13.43	181.96	1,868.49	-293.79	-10.06	293.96	0.00	0.00	0.00
2,000.00	13.43	181.96	1,965.75	-317.00	-10.85	317.18	0.00	0.00	0.00
2,100.00	13.43	181.96	2,063.02	-340.20	-11.65	340.40	0.00	0.00	0.00
2,200.00	13.43	181.96	2,160.28	-363.41	-12.44	363.63	0.00	0.00	0.00
2,300.00	13.43	181.96	2,257.55	-386.62	-13.24	386.85	0.00	0.00	0.00
2,400.00	13.43	181.96	2,354.82	-409.83	-14.03	410.07	0.00	0.00	0.00
2,500.00	13.43	181.96	2,452.08	-433.04	-14.82	433.29	0.00	0.00	0.00
2,600.00	13.43	181.96	2,549.35	-456.25	-15.62	456.51	0.00	0.00	0.00
2,700.00	13.43	181.96	2,646.62	-479.46	-16.41	479.74	0.00	0.00	0.00
2,800.00	13.43	181.96	2,743.88	-502.67	-17.21	502.96	0.00	0.00	0.00
2,900.00	13.43	181.96	2,841.15	-525.87	-18.00	526.18	0.00	0.00	0.00
3,000.00	13.43	181.96	2,938.41	-549.08	-18.80	549.40	0.00	0.00	0.00
3,100.00	13.43	181.96	3,035.68	-572.29	-19.59	572.63	0.00	0.00	0.00
3,200.00	13.43	181.96	3,132.95	-595.50	-20.39	595.85	0.00	0.00	0.00
3,300.00	13.43	181.96	3,230.21	-618.71	-21.18	619.07	0.00	0.00	0.00
3,400.00	13.43	181.96	3,327.48	-641.92	-21.98	642.29	0.00	0.00	0.00
3,500.00	13.43	181.96	3,424.75	-665.13	-22.77	665.52	0.00	0.00	0.00
3,600.00	13.43	181.96	3,522.01	-688.33	-23.56	688.74	0.00	0.00	0.00
3,700.00	13.43	181.96	3,619.28	-711.54	-24.36	711.96	0.00	0.00	0.00
3,800.00	13.43	181.96	3,716.54	-734.75	-25.15	735.18	0.00	0.00	0.00
3,900.00	13.43	181.96	3,813.81	-757.96	-25.95	758.41	0.00	0.00	0.00
3,976.28	13.43	181.96	3,888.00	-775.66	-26.55	776.12	0.00	0.00	0.00
PK Depth									
4,000.00	13.43	181.96	3,911.08	-781.17	-26.74	781.63	0.00	0.00	0.00
4,100.00	13.43	181.96	4,008.34	-804.38	-27.54	804.85	0.00	0.00	0.00
4,200.00	13.43	181.96	4,105.61	-827.59	-28.33	828.07	0.00	0.00	0.00
4,300.00	13.43	181.96	4,202.88	-850.80	-29.13	851.29	0.00	0.00	0.00
4,400.00	13.43	181.96	4,300.14	-874.00	-29.92	874.52	0.00	0.00	0.00
4,500.00	13.43	181.96	4,397.41	-897.21	-30.72	897.74	0.00	0.00	0.00
4,600.00	13.43	181.96	4,494.67	-920.42	-31.51	920.96	0.00	0.00	0.00
4,690.49	13.43	181.96	4,582.69	-941.42	-32.23	941.98	0.00	0.00	0.00
4,700.00	13.26	181.96	4,591.94	-943.62	-32.30	944.17	1.75	-1.75	0.00

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<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 37-29	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Howard 37-29		
<b>Design:</b>	Howard 37-29 (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	11.51	181.96	4,689.61	-965.05	-33.04	965.62	1.75	-1.75	0.00
4,900.00	9.76	181.96	4,787.89	-983.50	-33.67	984.08	1.75	-1.75	0.00
4,950.78	8.87	181.96	4,838.00	-991.72	-33.95	992.30	1.75	-1.75	0.00
<b>SX Depth</b>									
5,000.00	8.01	181.96	4,886.69	-998.94	-34.20	999.52	1.75	-1.75	0.00
5,100.00	6.26	181.96	4,985.91	-1,011.36	-34.62	1,011.95	1.75	-1.75	0.00
5,200.00	4.51	181.96	5,085.46	-1,020.74	-34.94	1,021.33	1.75	-1.75	0.00
5,300.00	2.76	181.96	5,185.26	-1,027.08	-35.16	1,027.68	1.75	-1.75	0.00
5,400.00	1.01	181.96	5,285.20	-1,030.37	-35.27	1,030.97	1.75	-1.75	0.00
5,457.81	0.00	0.00	5,343.00	-1,030.88	-35.29	1,031.48	1.75	-1.75	0.00
5,500.00	0.00	0.00	5,385.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
5,600.00	0.00	0.00	5,485.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
5,700.00	0.00	0.00	5,585.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
5,800.00	0.00	0.00	5,685.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
5,900.00	0.00	0.00	5,785.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
6,000.00	0.00	0.00	5,885.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
6,100.00	0.00	0.00	5,985.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
6,200.00	0.00	0.00	6,085.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
6,300.00	0.00	0.00	6,185.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
6,400.00	0.00	0.00	6,285.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
6,500.00	0.00	0.00	6,385.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
6,600.00	0.00	0.00	6,485.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
6,700.00	0.00	0.00	6,585.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
6,800.00	0.00	0.00	6,685.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
6,900.00	0.00	0.00	6,785.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
7,000.00	0.00	0.00	6,885.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
7,100.00	0.00	0.00	6,985.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
7,200.00	0.00	0.00	7,085.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
7,300.00	0.00	0.00	7,185.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
7,400.00	0.00	0.00	7,285.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
7,470.81	0.00	0.00	7,356.00	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
<b>NIO Depth</b>									
7,500.00	0.00	0.00	7,385.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
7,600.00	0.00	0.00	7,485.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
7,700.00	0.00	0.00	7,585.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
7,800.00	0.00	0.00	7,685.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
7,889.81	0.00	0.00	7,775.00	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
<b>CD Depth</b>									
7,900.00	0.00	0.00	7,785.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
7,968.81	0.00	0.00	7,854.00	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
<b>GH Depth</b>									
8,000.00	0.00	0.00	7,885.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
8,100.00	0.00	0.00	7,985.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
8,200.00	0.00	0.00	8,085.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
8,300.00	0.00	0.00	8,185.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
8,322.81	0.00	0.00	8,208.00	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
<b>J Depth</b>									
8,400.00	0.00	0.00	8,285.20	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
8,457.81	0.00	0.00	8,343.00	-1,030.88	-35.29	1,031.48	0.00	0.00	0.00
<b>Howard 37-29 BHL</b>									

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well Howard 37-29
<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 37-29	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Howard 37-29		
<b>Design:</b>	Howard 37-29 (wp01)		

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 37-29 BHL	0.00	0.00	8,343.00	-1,030.88	-35.29	1,248,851.65	3,165,371.59	40.014973	-104.909577
- plan hits target center									
- Circle (radius 25.00)									

Casing Points					
Measured Depth	Vertical Depth			Casing Diameter	Hole Diameter
(ft)	(ft)		Name	(")	(")
1,161.32	1,150.00	8-5/8"		8-5/8	11

Formations						
Measured Depth	Vertical Depth				Dip	Dip Direction
(ft)	(ft)		Name	Lithology	(°)	(°)
3,976.28	3,888.00	PK Depth				
4,950.78	4,838.00	SX Depth				
7,470.81	7,356.00	NIO Depth				
7,889.81	7,775.00	CD Depth				
7,968.81	7,854.00	GH Depth				
8,322.81	8,208.00	J Depth				