

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

WELD_HOWARD 20-29 PAD

Howard 24-29

Howard 24-29

Plan: Howard 24-29 (wp01)

Standard Planning Report

10 May, 2011



Project: COLORADO NORTHERN ZONE - 83
Site: WELD_HOWARD 20-29 PAD
Well: Howard 24-29
Wellbore: Howard 24-29
Section:
SHL:
Design: Howard 24-29 (wp01)
Latitude: 40.017851
Longitude: -104.909579
GL: 5023.00
KB: 15' RKB + 5023' GL @ 5038.00ft

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
3888.00	4041.02	PK Depth
4838.00	5039.62	SX Depth
7356.00	7574.11	NIO Depth
7775.00	7993.11	CD Depth
7854.00	8072.11	GH Depth
8208.00	8426.11	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 24-29

+N/-S	+E/-W	Northing	Ground Level: Easting	5023.00 Latitude	Longitude	Slot
0.00	0.00	1249899.99	3165364.05	40.017851	-104.909579	

CASING DETAILS

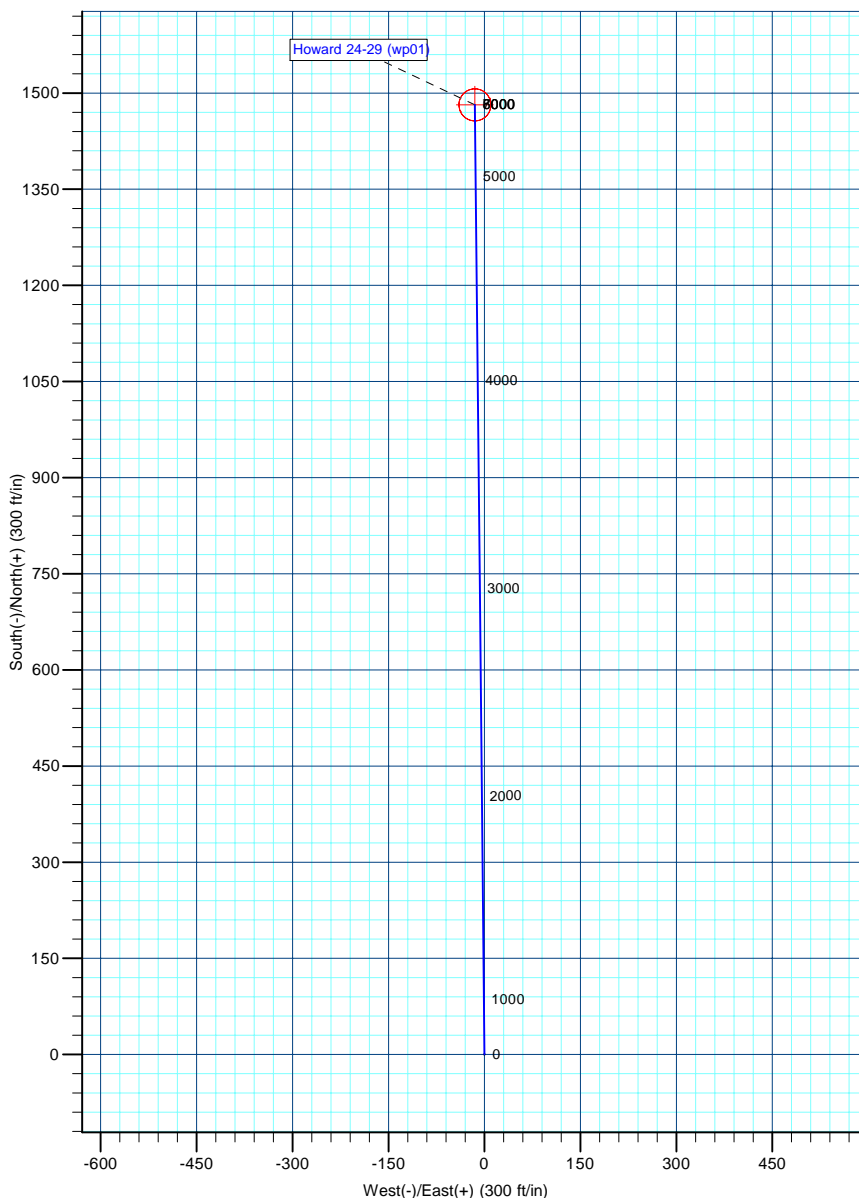
TVD	MD	Name	Size
1150.00	1162.99	8-5/8"	8-5/8

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Howard 24-29 BHL	8343.00	1481.52	-15.12	1251381.38	3165339.06	40.021918	-104.909633	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
1197.50	17.95	359.42	1182.89	139.44	-1.42	2.00	359.42	139.44
5035.40	17.95	359.42	4833.98	1322.17	-13.50	0.00	0.00	1322.24
6061.11	0.00	0.00	5843.00	1481.52	-15.12	1.75	180.00	1481.60
8561.11	0.00	0.00	8343.00	1481.52	-15.12	0.00	0.00	1481.60



Database:	edm5000p	Local Co-ordinate Reference:	Well Howard 24-29
Company:	US ROCKIES REGION PLANNING	TVD Reference:	15' RKB + 5023' GL @ 5038.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	15' RKB + 5023' GL @ 5038.00ft
Site:	WELD_HOWARD 20-29 PAD	North Reference:	True
Well:	Howard 24-29	Survey Calculation Method:	Minimum Curvature
Wellbore:	Howard 24-29		
Design:	Howard 24-29 (wp01)		

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 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 24-29					
Well Position	+N-S	21.84 ft	Northing:	1,249,899.99 ft	Latitude:	40.017851
	+E-W	-44.81 ft	Easting:	3,165,364.05 ft	Longitude:	-104.909579
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	5,023.00 ft

Wellbore	Howard 24-29				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/6/2011	8.92	66.72	52,924

Design	Howard 24-29 (wp01)			
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	0.00	0.00	359.42

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	0.00	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	
1,197.50	17.95	359.42	1,182.89	139.44	-1.42	2.00	2.00	0.00	359.42	
5,035.40	17.95	359.42	4,833.98	1,322.17	-13.50	0.00	0.00	0.00	0.00	
6,061.11	0.00	0.00	5,843.00	1,481.52	-15.12	1.75	-1.75	0.00	180.00	
8,561.11	0.00	0.00	8,343.00	1,481.52	-15.12	0.00	0.00	0.00	0.00	Howard 24-29 BHL

Database:	edm5000p	Local Co-ordinate Reference:	Well Howard 24-29
Company:	US ROCKIES REGION PLANNING	TVD Reference:	15' RKB + 5023' GL @ 5038.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	15' RKB + 5023' GL @ 5038.00ft
Site:	WELD_HOWARD 20-29 PAD	North Reference:	True
Well:	Howard 24-29	Survey Calculation Method:	Minimum Curvature
Wellbore:	Howard 24-29		
Design:	Howard 24-29 (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	359.42	399.98	1.75	-0.02	1.75	2.00	2.00	0.00
500.00	4.00	359.42	499.84	6.98	-0.07	6.98	2.00	2.00	0.00
600.00	6.00	359.42	599.45	15.69	-0.16	15.69	2.00	2.00	0.00
700.00	8.00	359.42	698.70	27.88	-0.28	27.88	2.00	2.00	0.00
800.00	10.00	359.42	797.47	43.52	-0.44	43.52	2.00	2.00	0.00
900.00	12.00	359.42	895.62	62.60	-0.64	62.60	2.00	2.00	0.00
1,000.00	14.00	359.42	993.06	85.09	-0.87	85.10	2.00	2.00	0.00
1,100.00	16.00	359.42	1,089.64	110.97	-1.13	110.98	2.00	2.00	0.00
1,162.99	17.26	359.42	1,150.00	129.00	-1.32	129.00	2.00	2.00	0.00
8-5/8"									
1,197.50	17.95	359.42	1,182.89	139.44	-1.42	139.44	2.00	2.00	0.00
1,200.00	17.95	359.42	1,185.27	140.20	-1.43	140.21	0.00	0.00	0.00
1,300.00	17.95	359.42	1,280.40	171.02	-1.75	171.03	0.00	0.00	0.00
1,400.00	17.95	359.42	1,375.53	201.84	-2.06	201.85	0.00	0.00	0.00
1,500.00	17.95	359.42	1,470.67	232.66	-2.37	232.67	0.00	0.00	0.00
1,600.00	17.95	359.42	1,565.80	263.47	-2.69	263.49	0.00	0.00	0.00
1,700.00	17.95	359.42	1,660.93	294.29	-3.00	294.31	0.00	0.00	0.00
1,800.00	17.95	359.42	1,756.06	325.11	-3.32	325.12	0.00	0.00	0.00
1,900.00	17.95	359.42	1,851.20	355.93	-3.63	355.94	0.00	0.00	0.00
2,000.00	17.95	359.42	1,946.33	386.74	-3.95	386.76	0.00	0.00	0.00
2,100.00	17.95	359.42	2,041.46	417.56	-4.26	417.58	0.00	0.00	0.00
2,200.00	17.95	359.42	2,136.59	448.38	-4.58	448.40	0.00	0.00	0.00
2,300.00	17.95	359.42	2,231.73	479.19	-4.89	479.22	0.00	0.00	0.00
2,400.00	17.95	359.42	2,326.86	510.01	-5.21	510.04	0.00	0.00	0.00
2,500.00	17.95	359.42	2,421.99	540.83	-5.52	540.86	0.00	0.00	0.00
2,600.00	17.95	359.42	2,517.12	571.65	-5.84	571.68	0.00	0.00	0.00
2,700.00	17.95	359.42	2,612.26	602.46	-6.15	602.49	0.00	0.00	0.00
2,800.00	17.95	359.42	2,707.39	633.28	-6.46	633.31	0.00	0.00	0.00
2,900.00	17.95	359.42	2,802.52	664.10	-6.78	664.13	0.00	0.00	0.00
3,000.00	17.95	359.42	2,897.65	694.91	-7.09	694.95	0.00	0.00	0.00
3,100.00	17.95	359.42	2,992.79	725.73	-7.41	725.77	0.00	0.00	0.00
3,200.00	17.95	359.42	3,087.92	756.55	-7.72	756.59	0.00	0.00	0.00
3,300.00	17.95	359.42	3,183.05	787.37	-8.04	787.41	0.00	0.00	0.00
3,400.00	17.95	359.42	3,278.18	818.18	-8.35	818.23	0.00	0.00	0.00
3,500.00	17.95	359.42	3,373.32	849.00	-8.67	849.04	0.00	0.00	0.00
3,600.00	17.95	359.42	3,468.45	879.82	-8.98	879.86	0.00	0.00	0.00
3,700.00	17.95	359.42	3,563.58	910.64	-9.30	910.68	0.00	0.00	0.00
3,800.00	17.95	359.42	3,658.71	941.45	-9.61	941.50	0.00	0.00	0.00
3,900.00	17.95	359.42	3,753.85	972.27	-9.92	972.32	0.00	0.00	0.00
4,000.00	17.95	359.42	3,848.98	1,003.09	-10.24	1,003.14	0.00	0.00	0.00
4,041.02	17.95	359.42	3,888.00	1,015.73	-10.37	1,015.78	0.00	0.00	0.00
PK Depth									
4,100.00	17.95	359.42	3,944.11	1,033.90	-10.55	1,033.96	0.00	0.00	0.00
4,200.00	17.95	359.42	4,039.24	1,064.72	-10.87	1,064.78	0.00	0.00	0.00
4,300.00	17.95	359.42	4,134.38	1,095.54	-11.18	1,095.60	0.00	0.00	0.00
4,400.00	17.95	359.42	4,229.51	1,126.36	-11.50	1,126.41	0.00	0.00	0.00
4,500.00	17.95	359.42	4,324.64	1,157.17	-11.81	1,157.23	0.00	0.00	0.00
4,600.00	17.95	359.42	4,419.78	1,187.99	-12.13	1,188.05	0.00	0.00	0.00
4,700.00	17.95	359.42	4,514.91	1,218.81	-12.44	1,218.87	0.00	0.00	0.00
4,800.00	17.95	359.42	4,610.04	1,249.62	-12.76	1,249.69	0.00	0.00	0.00

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Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	15' RKB + 5023' GL @ 5038.00ft
Site:	WELD_HOWARD 20-29 PAD	North Reference:	True
Well:	Howard 24-29	Survey Calculation Method:	Minimum Curvature
Wellbore:	Howard 24-29		
Design:	Howard 24-29 (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)
4,900.00	17.95	359.42	4,705.17	1,280.44	-13.07	1,280.51	0.00	0.00	0.00
5,000.00	17.95	359.42	4,800.31	1,311.26	-13.39	1,311.33	0.00	0.00	0.00
5,035.40	17.95	359.42	4,833.98	1,322.17	-13.50	1,322.24	0.00	0.00	0.00
5,039.62	17.88	359.42	4,838.00	1,323.47	-13.51	1,323.54	1.75	-1.75	0.00
SX Depth									
5,100.00	16.82	359.42	4,895.63	1,341.47	-13.69	1,341.54	1.75	-1.75	0.00
5,200.00	15.07	359.42	4,991.78	1,368.94	-13.97	1,369.01	1.75	-1.75	0.00
5,300.00	13.32	359.42	5,088.72	1,393.46	-14.22	1,393.53	1.75	-1.75	0.00
5,400.00	11.57	359.42	5,186.37	1,415.00	-14.44	1,415.08	1.75	-1.75	0.00
5,500.00	9.82	359.42	5,284.63	1,433.56	-14.63	1,433.63	1.75	-1.75	0.00
5,600.00	8.07	359.42	5,383.41	1,449.11	-14.79	1,449.18	1.75	-1.75	0.00
5,700.00	6.32	359.42	5,482.62	1,461.63	-14.92	1,461.70	1.75	-1.75	0.00
5,800.00	4.57	359.42	5,582.16	1,471.12	-15.02	1,471.19	1.75	-1.75	0.00
5,900.00	2.82	359.42	5,681.95	1,477.56	-15.08	1,477.64	1.75	-1.75	0.00
6,000.00	1.07	359.42	5,781.89	1,480.95	-15.12	1,481.03	1.75	-1.75	0.00
6,061.11	0.00	0.00	5,843.00	1,481.52	-15.12	1,481.60	1.75	-1.75	0.00
6,100.00	0.00	0.00	5,881.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
6,200.00	0.00	0.00	5,981.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
6,300.00	0.00	0.00	6,081.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
6,400.00	0.00	0.00	6,181.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
6,500.00	0.00	0.00	6,281.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
6,600.00	0.00	0.00	6,381.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
6,700.00	0.00	0.00	6,481.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
6,800.00	0.00	0.00	6,581.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
6,900.00	0.00	0.00	6,681.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
7,000.00	0.00	0.00	6,781.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
7,100.00	0.00	0.00	6,881.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
7,200.00	0.00	0.00	6,981.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
7,300.00	0.00	0.00	7,081.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
7,400.00	0.00	0.00	7,181.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
7,500.00	0.00	0.00	7,281.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
7,574.11	0.00	0.00	7,356.00	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
NIO Depth									
7,600.00	0.00	0.00	7,381.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
7,700.00	0.00	0.00	7,481.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
7,800.00	0.00	0.00	7,581.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
7,900.00	0.00	0.00	7,681.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
7,993.11	0.00	0.00	7,775.00	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
CD Depth									
8,000.00	0.00	0.00	7,781.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
8,072.11	0.00	0.00	7,854.00	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
GH Depth									
8,100.00	0.00	0.00	7,881.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
8,200.00	0.00	0.00	7,981.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
8,300.00	0.00	0.00	8,081.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
8,400.00	0.00	0.00	8,181.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
8,426.11	0.00	0.00	8,208.00	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
J Depth									
8,500.00	0.00	0.00	8,281.89	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
8,561.11	0.00	0.00	8,343.00	1,481.52	-15.12	1,481.60	0.00	0.00	0.00
Howard 24-29 BHL									

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Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	15' RKB + 5023' GL @ 5038.00ft
Site:	WELD_HOWARD 20-29 PAD	North Reference:	True
Well:	Howard 24-29	Survey Calculation Method:	Minimum Curvature
Wellbore:	Howard 24-29		
Design:	Howard 24-29 (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 24-29 BHL	0.00	0.00	8,343.00	1,481.52	-15.12	1,251,381.38	3,165,339.06	40.021918	-104.909633
- plan hits target center									
- Circle (radius 25.00)									

Casing Points					
Measured Depth	Vertical Depth		Name	Casing Diameter	Hole Diameter
(ft)	(ft)			(")	(")
1,162.99	1,150.00	8-5/8"		8-5/8	11

Formations						
Measured Depth	Vertical Depth		Name	Lithology	Dip	Dip Direction
(ft)	(ft)				(°)	(°)
4,041.02	3,888.00	PK Depth			0.00	
5,039.62	4,838.00	SX Depth				
7,574.11	7,356.00	NIO Depth				
7,993.11	7,775.00	CD Depth				
8,072.11	7,854.00	GH Depth				
8,426.11	8,208.00	J Depth				