

# **US ROCKIES REGION PLANNING**

**COLORADO NORTHERN ZONE - 83**

**WELD\_HOWARD 10C-29HZ**

**HOWARD 10C-29HZ**

**HOWARD 10C-29HZ**

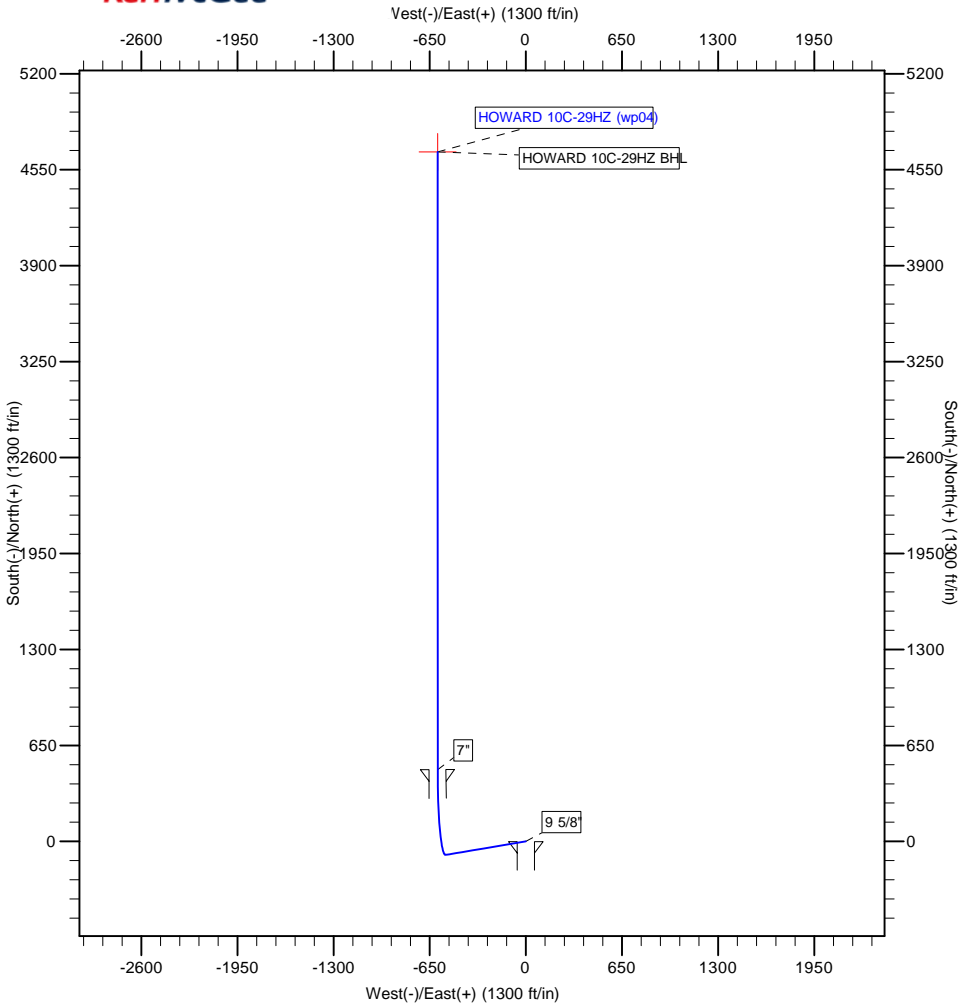
**Plan: HOWARD 10C-29HZ (wp04)**

## **Standard Planning Report**

**05 July, 2011**



**Weatherford®**



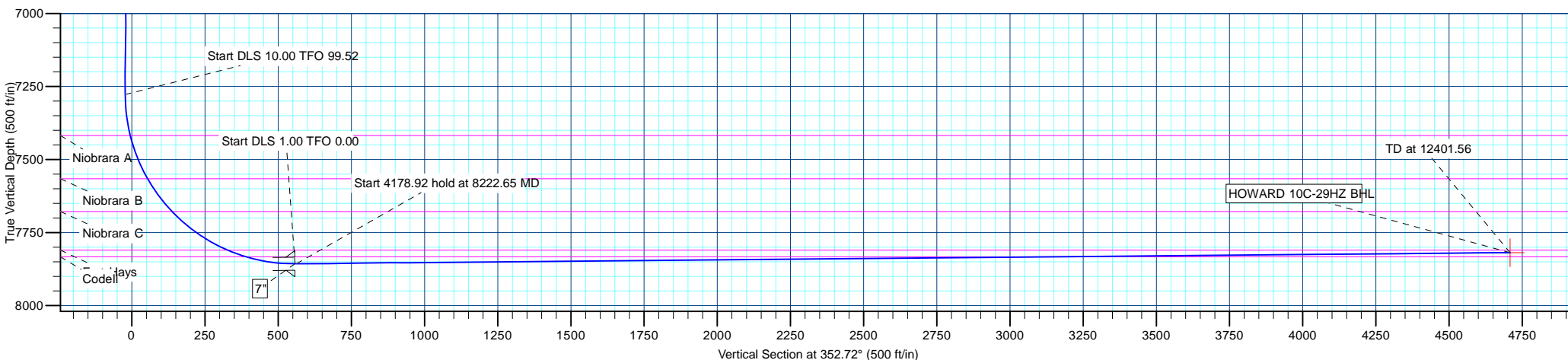
WELL DETAILS: HOWARD 10C-29HZ						
+N/-S	+E/-W	Northing	Ground Level: Easting	5057.00 Latitude	Longitude	Slot
0.00	0.00	1246309.39	3165162.17	40.007998	-104.910385	

WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)						
Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
HOWARD 10C-29HZ BHL	7819.00	4670.37	-596.83	40.020819	-104.912516	Point

SECTION DETAILS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1250.00	0.00	0.00	1250.00	0.00	0.00	0.00	0.00	0.00	
1516.91	5.34	260.40	1516.52	-2.07	-12.25	2.00	260.40	-0.50	
7303.14	5.34	260.40	7277.66	-91.87	-543.02	0.00	0.00	-22.31	
8216.62	90.46	0.00	7857.00	485.60	-596.83	10.00	99.52	557.33	
8216.62	90.46	0.00	7857.00	485.60	-596.83	0.00	0.00	557.33	
8222.65	90.52	0.00	7856.95	491.63	-596.83	1.00	0.00	563.31	
12401.56	90.52	0.00	7819.00	4670.37	-596.83	0.00	0.00	4708.35	HOWARD 10C-29HZ BHL

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
4374.00	4386.83	Parkman
4909.00	4924.16	Sussex
7418.00	7445.27	Niobrara A
7566.00	7605.35	Niobrara B
7678.00	7745.32	Niobrara C
7810.00	7977.76	Fort Hays
7833.00	8045.15	Codell

CASING DETAILS			
TVD	MD	Name	Size
1100.00	1100.00	9 5/8"	9-5/8
7857.00	8216.60	7"	7



<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well HOWARD 10C-29HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	17' RKB + 5057 @ 5074.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	17' RKB + 5057 @ 5074.00ft
<b>Site:</b>	WELD_HOWARD 10C-29HZ	<b>North Reference:</b>	True
<b>Well:</b>	HOWARD 10C-29HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HOWARD 10C-29HZ		
<b>Design:</b>	HOWARD 10C-29HZ (wp04)		

<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 10C-29HZ			
Site Position:		Northing:	1,246,309.39 ft	Latitude:	40.007998
From:	Lat/Long	Easting:	3,165,162.17 ft	Longitude:	-104.910385
Position Uncertainty:	0.00 ft	Slot Radius:	0 "	Grid Convergence:	0.38

Well	HOWARD 10C-29HZ					
Well Position	+N-S	0.00 ft	Northing:	1,246,309.39 ft	Latitude:	40.007998
	+E-W	0.00 ft	Easting:	3,165,162.17 ft	Longitude:	-104.910385
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	5,057.00 ft

<b>Wellbore</b>	HOWARD 10C-29HZ				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	5/10/2011	8.92	66.71	52,917

<b>Design</b>	HOWARD 10C-29HZ (wp04)			
<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	352.72

<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	
1,250.00	0.00	0.00	1,250.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,516.91	5.34	260.40	1,516.52	-2.07	-12.25	2.00	2.00	0.00	260.40	
7,303.14	5.34	260.40	7,277.66	-91.87	-543.02	0.00	0.00	0.00	0.00	
8,216.62	90.46	0.00	7,857.00	485.60	-596.83	10.00	9.32	10.90	99.52	
8,216.62	90.46	0.00	7,857.00	485.60	-596.83	0.00	0.00	0.00	0.00	
8,222.65	90.52	0.00	7,856.95	491.63	-596.83	1.00	1.00	0.00	0.00	
12,401.56	90.52	0.00	7,819.00	4,670.37	-596.83	0.00	0.00	0.00	0.00	HOWARD 10C-29H-

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well HOWARD 10C-29HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	17' RKB + 5057 @ 5074.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	17' RKB + 5057 @ 5074.00ft
<b>Site:</b>	WELD_HOWARD 10C-29HZ	<b>North Reference:</b>	True
<b>Well:</b>	HOWARD 10C-29HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HOWARD 10C-29HZ		
<b>Design:</b>	HOWARD 10C-29HZ (wp04)		

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	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
9 5/8"									
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,250.00	0.00	0.00	1,250.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
1,300.00	1.00	260.40	1,300.00	-0.07	-0.43	-0.02	2.00	2.00	0.00
1,400.00	3.00	260.40	1,399.93	-0.65	-3.87	-0.16	2.00	2.00	0.00
1,500.00	5.00	260.40	1,499.68	-1.82	-10.75	-0.44	2.00	2.00	0.00
1,516.91	5.34	260.40	1,516.52	-2.07	-12.25	-0.50	2.00	2.00	0.00
Start 5786.24 hold at 1516.91 MD									
1,600.00	5.34	260.40	1,599.25	-3.36	-19.87	-0.82	0.00	0.00	0.00
1,700.00	5.34	260.40	1,698.82	-4.91	-29.05	-1.19	0.00	0.00	0.00
1,800.00	5.34	260.40	1,798.39	-6.47	-38.22	-1.57	0.00	0.00	0.00
1,900.00	5.34	260.40	1,897.95	-8.02	-47.39	-1.95	0.00	0.00	0.00
2,000.00	5.34	260.40	1,997.52	-9.57	-56.56	-2.32	0.00	0.00	0.00
2,100.00	5.34	260.40	2,097.09	-11.12	-65.74	-2.70	0.00	0.00	0.00
2,200.00	5.34	260.40	2,196.65	-12.67	-74.91	-3.08	0.00	0.00	0.00
2,300.00	5.34	260.40	2,296.22	-14.23	-84.08	-3.45	0.00	0.00	0.00
2,400.00	5.34	260.40	2,395.78	-15.78	-93.26	-3.83	0.00	0.00	0.00
2,500.00	5.34	260.40	2,495.35	-17.33	-102.43	-4.21	0.00	0.00	0.00
2,600.00	5.34	260.40	2,594.92	-18.88	-111.60	-4.58	0.00	0.00	0.00
2,700.00	5.34	260.40	2,694.48	-20.43	-120.77	-4.96	0.00	0.00	0.00
2,800.00	5.34	260.40	2,794.05	-21.99	-129.95	-5.34	0.00	0.00	0.00
2,900.00	5.34	260.40	2,893.62	-23.54	-139.12	-5.71	0.00	0.00	0.00
3,000.00	5.34	260.40	2,993.18	-25.09	-148.29	-6.09	0.00	0.00	0.00
3,100.00	5.34	260.40	3,092.75	-26.64	-157.47	-6.47	0.00	0.00	0.00
3,200.00	5.34	260.40	3,192.31	-28.19	-166.64	-6.85	0.00	0.00	0.00
3,300.00	5.34	260.40	3,291.88	-29.74	-175.81	-7.22	0.00	0.00	0.00
3,400.00	5.34	260.40	3,391.45	-31.30	-184.99	-7.60	0.00	0.00	0.00
3,500.00	5.34	260.40	3,491.01	-32.85	-194.16	-7.98	0.00	0.00	0.00
3,600.00	5.34	260.40	3,590.58	-34.40	-203.33	-8.35	0.00	0.00	0.00
3,700.00	5.34	260.40	3,690.15	-35.95	-212.50	-8.73	0.00	0.00	0.00
3,800.00	5.34	260.40	3,789.71	-37.50	-221.68	-9.11	0.00	0.00	0.00
3,900.00	5.34	260.40	3,889.28	-39.06	-230.85	-9.48	0.00	0.00	0.00
4,000.00	5.34	260.40	3,988.85	-40.61	-240.02	-9.86	0.00	0.00	0.00
4,100.00	5.34	260.40	4,088.41	-42.16	-249.20	-10.24	0.00	0.00	0.00
4,200.00	5.34	260.40	4,187.98	-43.71	-258.37	-10.61	0.00	0.00	0.00
4,300.00	5.34	260.40	4,287.54	-45.26	-267.54	-10.99	0.00	0.00	0.00
4,386.83	5.34	260.40	4,374.00	-46.61	-275.51	-11.32	0.00	0.00	0.00
Parkman									
4,400.00	5.34	260.40	4,387.11	-46.82	-276.71	-11.37	0.00	0.00	0.00
4,500.00	5.34	260.40	4,486.68	-48.37	-285.89	-11.74	0.00	0.00	0.00
4,600.00	5.34	260.40	4,586.24	-49.92	-295.06	-12.12	0.00	0.00	0.00

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well HOWARD 10C-29HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	17' RKB + 5057 @ 5074.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	17' RKB + 5057 @ 5074.00ft
<b>Site:</b>	WELD_HOWARD 10C-29HZ	<b>North Reference:</b>	True
<b>Well:</b>	HOWARD 10C-29HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HOWARD 10C-29HZ		
<b>Design:</b>	HOWARD 10C-29HZ (wp04)		

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	5.34	260.40	4,685.81	-51.47	-304.23	-12.50	0.00	0.00	0.00
4,800.00	5.34	260.40	4,785.38	-53.02	-313.41	-12.87	0.00	0.00	0.00
4,900.00	5.34	260.40	4,884.94	-54.58	-322.58	-13.25	0.00	0.00	0.00
4,924.16	5.34	260.40	4,909.00	-54.95	-324.80	-13.34	0.00	0.00	0.00
<b>Sussex</b>									
5,000.00	5.34	260.40	4,984.51	-56.13	-331.75	-13.63	0.00	0.00	0.00
5,100.00	5.34	260.40	5,084.07	-57.68	-340.92	-14.00	0.00	0.00	0.00
5,200.00	5.34	260.40	5,183.64	-59.23	-350.10	-14.38	0.00	0.00	0.00
5,300.00	5.34	260.40	5,283.21	-60.78	-359.27	-14.76	0.00	0.00	0.00
5,400.00	5.34	260.40	5,382.77	-62.33	-368.44	-15.13	0.00	0.00	0.00
5,500.00	5.34	260.40	5,482.34	-63.89	-377.62	-15.51	0.00	0.00	0.00
5,600.00	5.34	260.40	5,581.91	-65.44	-386.79	-15.89	0.00	0.00	0.00
5,700.00	5.34	260.40	5,681.47	-66.99	-395.96	-16.27	0.00	0.00	0.00
5,800.00	5.34	260.40	5,781.04	-68.54	-405.14	-16.64	0.00	0.00	0.00
5,900.00	5.34	260.40	5,880.60	-70.09	-414.31	-17.02	0.00	0.00	0.00
6,000.00	5.34	260.40	5,980.17	-71.65	-423.48	-17.40	0.00	0.00	0.00
6,100.00	5.34	260.40	6,079.74	-73.20	-432.65	-17.77	0.00	0.00	0.00
6,200.00	5.34	260.40	6,179.30	-74.75	-441.83	-18.15	0.00	0.00	0.00
6,300.00	5.34	260.40	6,278.87	-76.30	-451.00	-18.53	0.00	0.00	0.00
6,400.00	5.34	260.40	6,378.44	-77.85	-460.17	-18.90	0.00	0.00	0.00
6,500.00	5.34	260.40	6,478.00	-79.41	-469.35	-19.28	0.00	0.00	0.00
6,600.00	5.34	260.40	6,577.57	-80.96	-478.52	-19.66	0.00	0.00	0.00
6,700.00	5.34	260.40	6,677.14	-82.51	-487.69	-20.03	0.00	0.00	0.00
6,800.00	5.34	260.40	6,776.70	-84.06	-496.86	-20.41	0.00	0.00	0.00
6,900.00	5.34	260.40	6,876.27	-85.61	-506.04	-20.79	0.00	0.00	0.00
7,000.00	5.34	260.40	6,975.83	-87.17	-515.21	-21.16	0.00	0.00	0.00
7,100.00	5.34	260.40	7,075.40	-88.72	-524.38	-21.54	0.00	0.00	0.00
7,200.00	5.34	260.40	7,174.97	-90.27	-533.56	-21.92	0.00	0.00	0.00
7,300.00	5.34	260.40	7,274.53	-91.82	-542.73	-22.29	0.00	0.00	0.00
7,303.14	5.34	260.40	7,277.66	-91.87	-543.02	-22.31	0.00	0.00	0.00
<b>Start DLS 10.00 TFO 99.52</b>									
7,400.00	10.24	329.30	7,373.77	-85.20	-551.88	-14.57	10.00	5.07	71.14
7,445.27	14.31	338.79	7,418.00	-76.52	-555.96	-5.44	10.00	8.99	20.94
<b>Niobrara A</b>									
7,500.00	19.50	344.87	7,470.35	-61.38	-560.79	10.19	10.00	9.48	11.12
7,600.00	29.24	350.48	7,561.34	-21.08	-569.21	51.23	10.00	9.74	5.61
7,605.35	29.76	350.69	7,566.00	-18.48	-569.64	53.86	10.00	9.82	3.78
<b>Niobrara B</b>									
7,700.00	39.10	353.45	7,643.98	34.47	-576.86	107.30	10.00	9.87	2.92
7,745.32	43.59	354.40	7,678.00	64.23	-580.02	137.23	10.00	9.90	2.11
<b>Niobrara C</b>									
7,800.00	49.01	355.37	7,715.76	103.59	-583.53	176.71	10.00	9.92	1.76
7,900.00	58.95	356.78	7,774.50	184.18	-589.00	257.35	10.00	9.94	1.41
7,977.76	66.68	357.68	7,810.00	253.22	-592.32	326.25	10.00	9.95	1.16
<b>Fort Hays</b>									
8,000.00	68.89	357.92	7,818.41	273.79	-593.11	346.76	10.00	9.95	1.07
8,045.15	73.39	358.38	7,833.00	316.49	-594.49	389.28	10.00	9.95	1.03
<b>Codell</b>									
8,100.00	78.85	358.92	7,846.15	369.70	-595.74	442.22	10.00	9.96	0.97
8,200.00	88.81	359.85	7,856.89	468.98	-596.80	540.84	10.00	9.96	0.93
8,216.60	90.46	360.00	7,857.00	485.58	-596.83	557.31	10.00	9.96	0.92
<b>7"</b>									
8,216.62	90.46	0.00	7,857.00	485.60	-596.83	557.33	9.39	9.35	0.86

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well HOWARD 10C-29HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	17' RKB + 5057 @ 5074.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	17' RKB + 5057 @ 5074.00ft
<b>Site:</b>	WELD_HOWARD 10C-29HZ	<b>North Reference:</b>	True
<b>Well:</b>	HOWARD 10C-29HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HOWARD 10C-29HZ		
<b>Design:</b>	HOWARD 10C-29HZ (wp04)		

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)
<b>Start DLS 1.00 TFO 0.00</b>									
8,222.65	90.52	0.00	7,856.95	491.63	-596.83	563.31	1.00	1.00	0.00
<b>Start 4178.92 hold at 8222.65 MD</b>									
8,300.00	90.52	0.00	7,856.25	568.98	-596.83	640.03	0.00	0.00	0.00
8,400.00	90.52	0.00	7,855.34	668.98	-596.83	739.22	0.00	0.00	0.00
8,500.00	90.52	0.00	7,854.43	768.97	-596.83	838.41	0.00	0.00	0.00
8,600.00	90.52	0.00	7,853.52	868.97	-596.83	937.60	0.00	0.00	0.00
8,700.00	90.52	0.00	7,852.61	968.96	-596.83	1,036.79	0.00	0.00	0.00
8,800.00	90.52	0.00	7,851.71	1,068.96	-596.83	1,135.98	0.00	0.00	0.00
8,900.00	90.52	0.00	7,850.80	1,168.96	-596.83	1,235.17	0.00	0.00	0.00
9,000.00	90.52	0.00	7,849.89	1,268.95	-596.83	1,334.36	0.00	0.00	0.00
9,100.00	90.52	0.00	7,848.98	1,368.95	-596.83	1,433.55	0.00	0.00	0.00
9,200.00	90.52	0.00	7,848.07	1,468.94	-596.83	1,532.74	0.00	0.00	0.00
9,300.00	90.52	0.00	7,847.17	1,568.94	-596.83	1,631.93	0.00	0.00	0.00
9,400.00	90.52	0.00	7,846.26	1,668.93	-596.83	1,731.12	0.00	0.00	0.00
9,500.00	90.52	0.00	7,845.35	1,768.93	-596.83	1,830.31	0.00	0.00	0.00
9,600.00	90.52	0.00	7,844.44	1,868.93	-596.83	1,929.50	0.00	0.00	0.00
9,700.00	90.52	0.00	7,843.53	1,968.92	-596.83	2,028.69	0.00	0.00	0.00
9,800.00	90.52	0.00	7,842.62	2,068.92	-596.83	2,127.88	0.00	0.00	0.00
9,900.00	90.52	0.00	7,841.72	2,168.91	-596.83	2,227.07	0.00	0.00	0.00
10,000.00	90.52	0.00	7,840.81	2,268.91	-596.83	2,326.26	0.00	0.00	0.00
10,100.00	90.52	0.00	7,839.90	2,368.91	-596.83	2,425.45	0.00	0.00	0.00
10,200.00	90.52	0.00	7,838.99	2,468.90	-596.83	2,524.63	0.00	0.00	0.00
10,300.00	90.52	0.00	7,838.08	2,568.90	-596.83	2,623.82	0.00	0.00	0.00
10,400.00	90.52	0.00	7,837.18	2,668.89	-596.83	2,723.01	0.00	0.00	0.00
10,500.00	90.52	0.00	7,836.27	2,768.89	-596.83	2,822.20	0.00	0.00	0.00
10,600.00	90.52	0.00	7,835.36	2,868.89	-596.83	2,921.39	0.00	0.00	0.00
10,700.00	90.52	0.00	7,834.45	2,968.88	-596.83	3,020.58	0.00	0.00	0.00
10,800.00	90.52	0.00	7,833.54	3,068.88	-596.83	3,119.77	0.00	0.00	0.00
10,900.00	90.52	0.00	7,832.64	3,168.87	-596.83	3,218.96	0.00	0.00	0.00
11,000.00	90.52	0.00	7,831.73	3,268.87	-596.83	3,318.15	0.00	0.00	0.00
11,100.00	90.52	0.00	7,830.82	3,368.86	-596.83	3,417.34	0.00	0.00	0.00
11,200.00	90.52	0.00	7,829.91	3,468.86	-596.83	3,516.53	0.00	0.00	0.00
11,300.00	90.52	0.00	7,829.00	3,568.86	-596.83	3,615.72	0.00	0.00	0.00
11,400.00	90.52	0.00	7,828.10	3,668.85	-596.83	3,714.91	0.00	0.00	0.00
11,500.00	90.52	0.00	7,827.19	3,768.85	-596.83	3,814.10	0.00	0.00	0.00
11,600.00	90.52	0.00	7,826.28	3,868.84	-596.83	3,913.29	0.00	0.00	0.00
11,700.00	90.52	0.00	7,825.37	3,968.84	-596.83	4,012.48	0.00	0.00	0.00
11,800.00	90.52	0.00	7,824.46	4,068.84	-596.83	4,111.67	0.00	0.00	0.00
11,900.00	90.52	0.00	7,823.55	4,168.83	-596.83	4,210.86	0.00	0.00	0.00
12,000.00	90.52	0.00	7,822.65	4,268.83	-596.83	4,310.05	0.00	0.00	0.00
12,100.00	90.52	0.00	7,821.74	4,368.82	-596.83	4,409.24	0.00	0.00	0.00
12,200.00	90.52	0.00	7,820.83	4,468.82	-596.83	4,508.42	0.00	0.00	0.00
12,300.00	90.52	0.00	7,819.92	4,568.82	-596.83	4,607.61	0.00	0.00	0.00
12,400.00	90.52	0.00	7,819.01	4,668.81	-596.83	4,706.80	0.00	0.00	0.00
12,401.56	90.52	0.00	7,819.00	4,670.37	-596.83	4,708.35	0.00	0.00	0.00
<b>TD at 12401.56 - HOWARD 10C-29HZ BHL</b>									

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well HOWARD 10C-29HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	17' RKB + 5057 @ 5074.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	17' RKB + 5057 @ 5074.00ft
<b>Site:</b>	WELD_HOWARD 10C-29HZ	<b>North Reference:</b>	True
<b>Well:</b>	HOWARD 10C-29HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HOWARD 10C-29HZ		
<b>Design:</b>	HOWARD 10C-29HZ (wp04)		

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 10C-29HZ	0.00	0.00	7,819.00	4,670.37	-596.83	1,250,975.69	3,164,534.31	40.020819	-104.912516
- plan hits target center									
- Point									

Casing Points					
	Measured Depth	Vertical Depth		Casing Diameter	Hole Diameter
	(ft)	(ft)	Name	(")	(")
	1,100.00	1,100.00	9 5/8"	9-5/8	12-1/4
	8,216.60	7,857.00	7"	7	8-3/4

Formations						
	Measured Depth	Vertical Depth			Dip	Dip Direction
	(ft)	(ft)	Name	Lithology	(°)	(°)
	4,386.83	4,374.00	Parkman		0.00	
	4,924.16	4,909.00	Sussex		0.00	
	7,445.27	7,418.00	Niobrara A		0.00	
	7,605.35	7,566.00	Niobrara B		0.00	
	7,745.32	7,678.00	Niobrara C		0.00	
	7,977.76	7,810.00	Fort Hays		0.00	
	8,045.15	7,833.00	Codell		0.00	

Plan Annotations					
	Measured Depth	Vertical Depth	Local Coordinates		
	(ft)	(ft)	+N/-S	+E/-W	Comment
	(ft)	(ft)	(ft)	(ft)	
	1,250.00	1,250.00	0.00	0.00	Start Build 2.00
	1,516.91	1,516.52	-2.07	-12.25	Start 5786.24 hold at 1516.91 MD
	7,303.14	7,277.66	-91.87	-543.02	Start DLS 10.00 TFO 99.52
	8,216.62	7,857.00	485.60	-596.83	Start DLS 1.00 TFO 0.00
	8,222.65	7,856.95	491.63	-596.83	Start 4178.92 hold at 8222.65 MD
	12,401.56	7,819.00	4,670.37	-596.83	TD at 12401.56

# **US ROCKIES REGION PLANNING**

**COLORADO NORTHERN ZONE - 83  
WELD\_HOWARD 10C-29HZ  
HOWARD 10C-29HZ**

**HOWARD 10C-29HZ  
HOWARD 10C-29HZ (wp04)**

## **Anticollision Summary Report**

**05 July, 2011**





# APC

## Anticollision Summary Report



<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well HOWARD 10C-29HZ
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>TVD Reference:</b>	17' RKB + 5057 @ 5074.00ft
<b>Reference Site:</b>	WELD_HOWARD 10C-29HZ	<b>MD Reference:</b>	17' RKB + 5057 @ 5074.00ft
<b>Site Error:</b>	0.00 ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HOWARD 10C-29HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HOWARD 10C-29HZ	<b>Database:</b>	edm5000p
<b>Reference Design:</b>	HOWARD 10C-29HZ (wp04)	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	HOWARD 10C-29HZ (wp04)		
<b>Filter type:</b>	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
<b>Interpolation Method:</b>	MD + Stations Interval 25.00ft	<b>Error Model:</b>	ISCWSA
<b>Depth Range:</b>	Unlimited	<b>Scan Method:</b>	Closest Approach 3D
<b>Results Limited by:</b>	Maximum center-center distance of 1,000.00 ft	<b>Error Surface:</b>	Elliptical Conic
<b>Warning Levels Evaluated at:</b>	2.00 Sigma		

<b>Survey Tool Program</b>	<b>Date</b> 7/5/2011			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.00	12,401.56	HOWARD 10C-29HZ (wp04) (HOWARD 1	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
WELD_HOWARD 17-32 PAD						
David Howard #1 - David Howard #1 - David Howard #1						Out of range
David Howard #2 - David Howard #2 - David Howard #2						Out of range
David Howard #4 - David Howard #4 - David Howard #4						Out of range
David Howard #5 - David Howard #5 - David Howard #5	27.00	0.00	627.05	627.04	10,000.000	CC
David Howard #5 - David Howard #5 - David Howard #5	50.00	21.38	627.08	627.02	10,000.000	ES
David Howard #5 - David Howard #5 - David Howard #5	5,025.00	4,922.00	657.40	633.68	27.706	SF
David Howard #C 1 - David Howard #C 1 - David Howard #C 1	8,850.26	7,828.94	508.59	462.65	11.072	CC, ES
David Howard #C 1 - David Howard #C 1 - David Howard #C 1	8,925.00	7,830.87	514.05	466.98	10.922	SF
Howard 1-32 - Howard 1-32 - Howard 1-32 (wp02)	302.64	290.64	896.77	895.69	835.944	CC
Howard 1-32 - Howard 1-32 - Howard 1-32 (wp02)	325.00	310.81	896.78	895.61	767.845	ES
Howard 1-32 - Howard 1-32 - Howard 1-32 (wp02)	1,375.00	1,219.19	998.91	992.78	162.995	SF
Howard 21-32 - Howard 21-32 - Howard 21-32 (wp01)	8,901.12	7,951.51	558.34	510.06	11.566	CC, ES
Howard 21-32 - Howard 21-32 - Howard 21-32 (wp01)	9,000.00	7,950.61	567.03	517.17	11.373	SF
Howard 2-32 - Howard 2-32 - Howard 2-32 (wp02)	9,561.56	7,909.40	164.07	100.31	2.573	CC, ES
Howard 2-32 - Howard 2-32 - Howard 2-32 (wp02)	9,575.00	7,909.28	164.62	100.64	2.573	SF
Howard 24-32 - Howard 24-32 - Howard 24-32 (wp01)	3,621.20	3,710.99	432.77	409.50	18.595	CC
Howard 24-32 - Howard 24-32 - Howard 24-32 (wp01)	3,675.00	3,763.04	432.99	409.27	18.254	ES
Howard 24-32 - Howard 24-32 - Howard 24-32 (wp01)	4,400.00	4,464.37	475.64	446.62	16.387	SF
Howard 25-32 - Howard 25-32 - Howard 25-32 (wp02)	7,525.00	7,660.23	584.95	543.32	14.050	SF
Howard 25-32 - Howard 25-32 - Howard 25-32 (wp02)	7,650.00	7,770.37	579.36	538.41	14.149	ES
Howard 25-32 - Howard 25-32 - Howard 25-32 (wp02)	7,655.06	7,774.55	579.35	538.41	14.153	CC
Howard 26-32 - Howard 26-32 - Howard 26-32 (wp03)	302.64	290.64	895.51	894.43	834.770	CC
Howard 26-32 - Howard 26-32 - Howard 26-32 (wp03)	325.00	311.07	895.52	894.35	766.481	ES
Howard 26-32 - Howard 26-32 - Howard 26-32 (wp03)	1,375.00	1,176.59	996.66	990.48	161.111	SF
Howard 28-32 - Howard 28-32 - Howard 28-32 (wp01)	10,171.40	8,131.34	566.13	481.79	6.713	CC
Howard 28-32 - Howard 28-32 - Howard 28-32 (wp01)	10,175.00	8,131.30	566.14	481.74	6.708	ES
Howard 28-32 - Howard 28-32 - Howard 28-32 (wp01)	10,250.00	8,130.62	571.56	485.74	6.660	SF
Howard 41-32 - Howard 41-32 - Howard 41-32 (wp01)	302.64	290.64	894.68	893.61	833.994	CC
Howard 41-32 - Howard 41-32 - Howard 41-32 (wp01)	400.00	384.35	894.86	893.37	599.233	ES
Howard 41-32 - Howard 41-32 - Howard 41-32 (wp01)	1,800.00	1,688.57	998.88	988.62	97.361	SF
Howard 8-32 - Howard 8-32 - Howard 8-32 (wp02)	1,844.95	1,872.69	846.72	837.34	90.355	CC
Howard 8-32 - Howard 8-32 - Howard 8-32 (wp02)	1,925.00	1,950.30	846.94	837.08	85.851	ES
Howard 8-32 - Howard 8-32 - Howard 8-32 (wp02)	4,000.00	3,962.12	997.73	975.63	45.141	SF

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

# APC

## Anticollision Summary Report



<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well HOWARD 10C-29HZ
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>TVD Reference:</b>	17' RKB + 5057 @ 5074.00ft
<b>Reference Site:</b>	WELD_HOWARD 10C-29HZ	<b>MD Reference:</b>	17' RKB + 5057 @ 5074.00ft
<b>Site Error:</b>	0.00 ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HOWARD 10C-29HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HOWARD 10C-29HZ	<b>Database:</b>	edm5000p
<b>Reference Design:</b>	HOWARD 10C-29HZ (wp04)	<b>Offset TVD Reference:</b>	Offset Datum

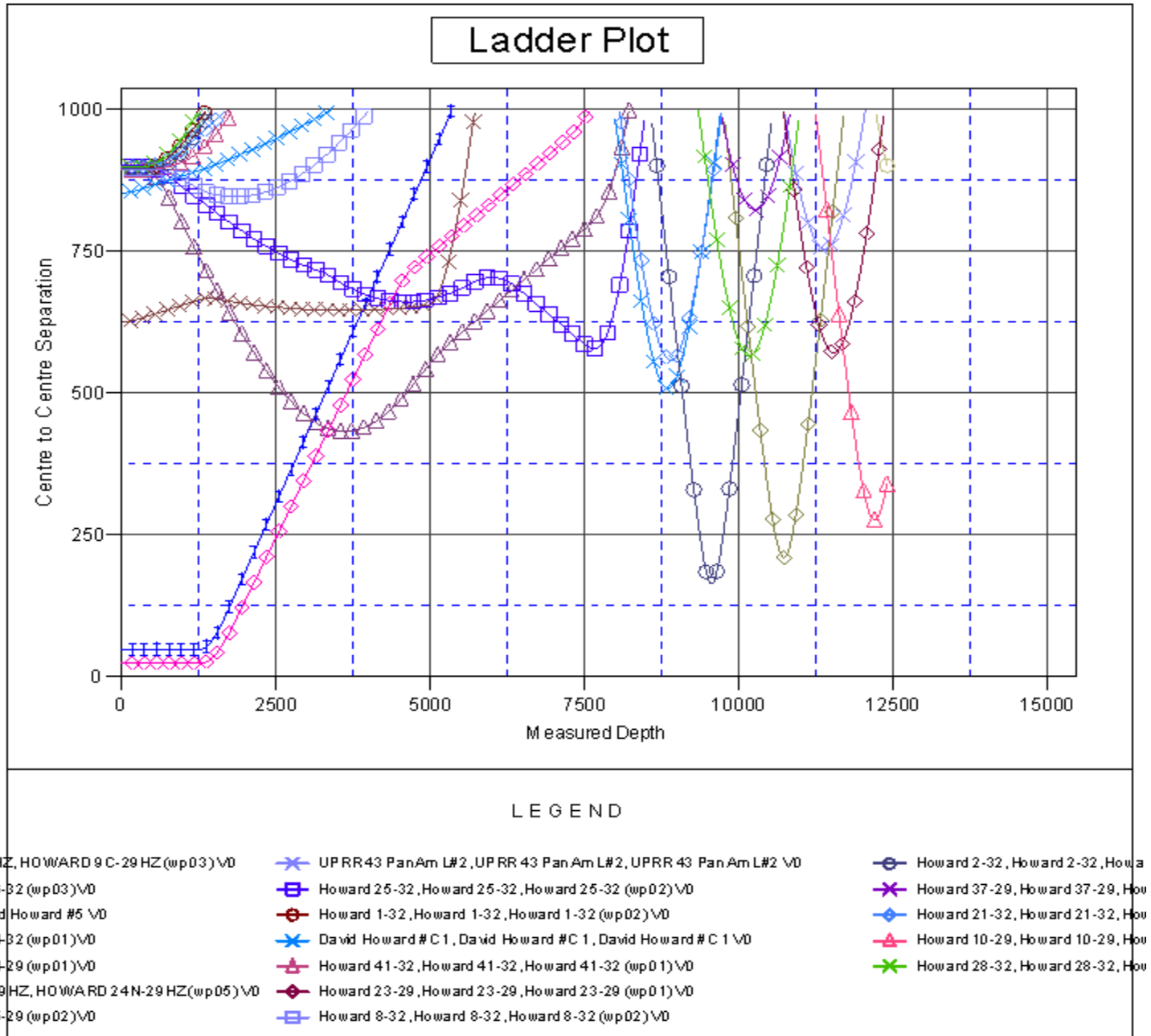
### Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
WELD_HOWARD 20-29 PAD						
Howard 10-29 - Howard 10-29 - Howard 10-29 (wp02)	12,201.56	7,914.57	276.15	165.22	2.489	CC, ES
Howard 10-29 - Howard 10-29 - Howard 10-29 (wp02)	12,225.00	7,914.36	277.14	165.77	2.488	SF
Howard 15-29 - Howard 15-29 - Howard 15-29 (wp02)	10,731.66	7,900.37	210.30	130.01	2.619	CC, ES
Howard 15-29 - Howard 15-29 - Howard 15-29 (wp02)	10,750.00	7,900.21	211.10	130.48	2.619	SF
Howard 16-29 - Howard 16-29 - Howard 16-29 (wp02)						Out of range
Howard 23-29 - Howard 23-29 - Howard 23-29 (wp01)	11,541.14	8,006.64	571.94	474.76	5.886	CC
Howard 23-29 - Howard 23-29 - Howard 23-29 (wp01)	11,550.00	8,006.56	572.01	474.67	5.876	ES
Howard 23-29 - Howard 23-29 - Howard 23-29 (wp01)	11,600.00	8,006.11	574.96	476.64	5.848	SF
Howard 24-29 - Howard 24-29 - Howard 24-29 (wp01)	12,402.17	8,001.11	900.97	778.03	7.329	CC, ES, SF
Howard 37-29 - Howard 37-29 - Howard 37-29 (wp01)	10,271.92	7,917.15	823.13	746.18	10.697	CC
Howard 37-29 - Howard 37-29 - Howard 37-29 (wp01)	10,275.00	7,917.12	823.13	746.13	10.689	ES
Howard 37-29 - Howard 37-29 - Howard 37-29 (wp01)	10,425.00	7,915.76	837.24	757.54	10.505	SF
Howard 39-29 - Howard 39-29 - Howard 39-29 (wp01)						Out of range
Howard 9-29 - Howard 9-29 - Howard 9-29 (wp02)						Out of range
UPRR 43 Pan AM G1 - UPRR 43 Pan AM G1 - UPRR 43						Out of range
UPRR 43 Pan AM G11 - UPRR 43 Pan AM G11 - UPRR						Out of range
UPRR 43 Pan AM G12 - UPRR 43 Pan AM G12 - UPRR						Out of range
UPRR 43 Pan AM G4 - UPRR 43 Pan AM G4 - UPRR 43						Out of range
UPRR 43 PanAm L#2 - UPRR 43 PanAm L#2 - UPRR 43	11,394.47	7,777.86	754.39	664.70	8.411	CC
UPRR 43 PanAm L#2 - UPRR 43 PanAm L#2 - UPRR 43	11,400.00	7,777.83	754.41	664.62	8.402	ES
UPRR 43 PanAm L#2 - UPRR 43 PanAm L#2 - UPRR 43	11,500.00	7,777.31	761.74	670.10	8.312	SF
WELD_HOWARD 24N-29HZ						
HOWARD 24N-29HZ - HOWARD 24N-29HZ - HOWARD	1,250.00	1,250.00	24.09	18.73	4.498	CC
HOWARD 24N-29HZ - HOWARD 24N-29HZ - HOWARD	1,275.00	1,275.00	24.20	18.73	4.429	ES
HOWARD 24N-29HZ - HOWARD 24N-29HZ - HOWARD	1,300.00	1,300.00	24.52	18.95	4.401	SF
WELD_HOWARD 9C-29HZ						
HOWARD 9C-29HZ - HOWARD 9C-29HZ - HOWARD 9C	1,250.00	1,250.00	47.90	42.54	8.943	CC, ES
HOWARD 9C-29HZ - HOWARD 9C-29HZ - HOWARD 9C	1,300.00	1,299.16	48.76	43.20	8.765	SF

<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well HOWARD 10C-29HZ
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>TVD Reference:</b>	17' RKB + 5057 @ 5074.00ft
<b>Reference Site:</b>	WELD_HOWARD 10C-29HZ	<b>MD Reference:</b>	17' RKB + 5057 @ 5074.00ft
<b>Site Error:</b>	0.00 ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HOWARD 10C-29HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HOWARD 10C-29HZ	<b>Database:</b>	edm5000p
<b>Reference Design:</b>	HOWARD 10C-29HZ (wp04)	<b>Offset TVD Reference:</b>	Offset Datum

Reference Depths are relative to 17' RKB + 5057 @ 5074.00ft  
Offset Depths are relative to Offset Datum  
Central Meridian is -105.500000

Coordinates are relative to: HOWARD 10C-29HZ  
Coordinate System is US State Plane 1983, Colorado Northern Zone  
Grid Convergence at Surface is: 0.38°



<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well HOWARD 10C-29HZ
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>TVD Reference:</b>	17' RKB + 5057 @ 5074.00ft
<b>Reference Site:</b>	WELD_HOWARD 10C-29HZ	<b>MD Reference:</b>	17' RKB + 5057 @ 5074.00ft
<b>Site Error:</b>	0.00 ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HOWARD 10C-29HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.00 ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	HOWARD 10C-29HZ	<b>Database:</b>	edm5000p
<b>Reference Design:</b>	HOWARD 10C-29HZ (wp04)	<b>Offset TVD Reference:</b>	Offset Datum

Reference Depths are relative to 17' RKB + 5057 @ 5074.00ft  
Offset Depths are relative to Offset Datum  
Central Meridian is -105.500000

Coordinates are relative to: HOWARD 10C-29HZ  
Coordinate System is US State Plane 1983, Colorado Northern Zone  
Grid Convergence at Surface is: 0.38°

