

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

WELD_HOWARD 24N-29HZ

HOWARD 24N-29HZ

HOWARD 24N-29HZ

Plan: HOWARD 24N-29HZ (wp05)

Standard Planning Report

29 June, 2011



Weatherford®



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Azimuths to True North
Magnetic North: 8.92°

Magnetic Field
Strength: 52917.3snT
Dip Angle: 66.71°
Date: 5/10/2011
Model: IGRF2010

Project: COLORADO NORTHERN ZONE - 83
Site: WELD_HOWARD 24N-29HZ
Well: HOWARD 24N-29HZ
Wellbore: HOWARD 24N-29HZ
Section:
SHL:
Design: HOWARD 24N-29HZ (wp05)
Latitude: 40.007998
Longitude: -104.910299
GL: 5057.00
KB: 17' RKB + 5057 @ 5074.00ft

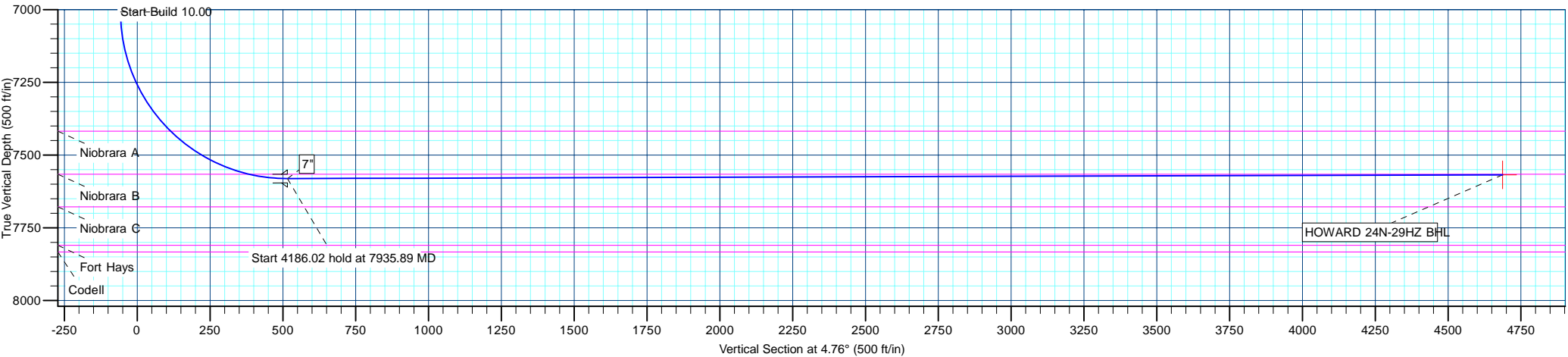
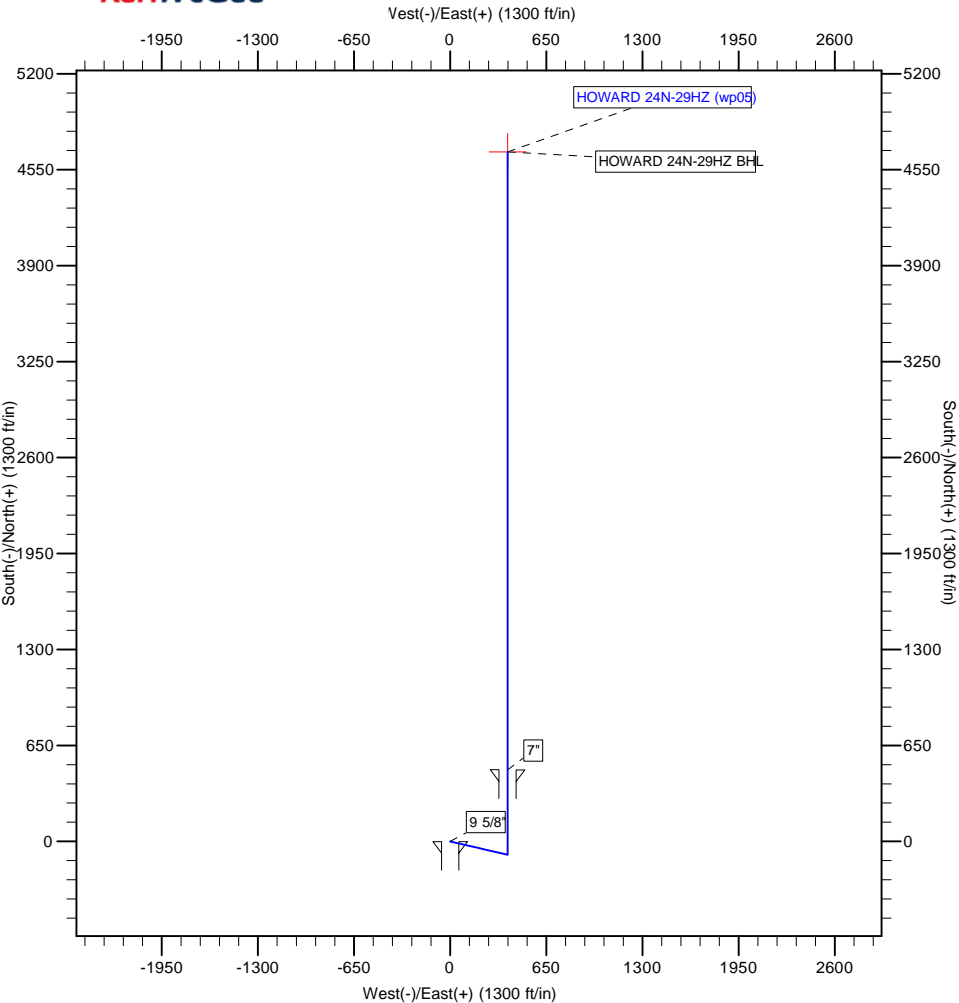
WELL DETAILS: HOWARD 24N-29HZ						
+N/-S	+E/-W	Northing	Ground Level: Easting	5057.00 Latitude	Longitude	Slot
0.00	0.00	1246309.55	3165186.26	40.007998	-104.910299	

WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)						
Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
HOWARD 24N-29HZ BHL	7568.00	4670.73	389.01	40.020820	-104.908910	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	
1400.00	0.00	0.00	1400.00	0.00	0.00	0.00	0.00	0.00	
1790.83	7.82	103.03	1789.62	-6.00	25.93	2.00	103.03	-3.83	
4335.23	7.82	103.03	4310.38	-84.00	363.08	0.00	0.00	-53.57	
4726.06	0.00	0.00	4700.00	-90.00	389.01	2.00	180.00	-57.40	
5026.06	0.00	0.00	5000.00	-90.00	389.01	0.00	0.00	-57.40	
7034.11	0.00	0.00	7008.05	-90.00	389.01	0.00	0.00	-57.40	
7935.89	90.18	0.00	7581.00	484.74	389.01	10.00	0.00	515.35	
12121.91	90.18	0.00	7568.00	4670.73	389.01	0.00	0.00	4686.91	HOWARD 24N-29HZ BHL

CASING DETAILS			
TVD	MD	Name	Size
1100.00	1100.00	9 5/8"	9-5/8
7581.00	7935.89	7"	7

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
4374.00	4399.36	Parkman
4909.00	4935.06	Sussex
7418.00	7490.96	Niobrara A
7566.00	7802.70	Niobrara B



Database:	edm5000p	Local Co-ordinate Reference:	Well HOWARD 24N-29HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	17' RKB + 5057 @ 5074.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	17' RKB + 5057 @ 5074.00ft
Site:	WELD_HOWARD 24N-29HZ	North Reference:	True
Well:	HOWARD 24N-29HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	HOWARD 24N-29HZ		
Design:	HOWARD 24N-29HZ (wp05)		

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 24N-29HZ			
Site Position:		Northing:	1,246,309.55 ft	Latitude:	40.007998
From:	Lat/Long	Easting:	3,165,186.26 ft	Longitude:	-104.910299
Position Uncertainty:	0.00 ft	Slot Radius:	0 "	Grid Convergence:	0.38

Well	HOWARD 24N-29HZ					
Well Position	+N-S	0.00 ft	Northing:	1,246,309.55 ft	Latitude:	40.007998
	+E-W	0.00 ft	Easting:	3,165,186.26 ft	Longitude:	-104.910299
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	5,057.00 ft

Wellbore	HOWARD 24N-29HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/10/2011	8.92	66.71	52,917

Design	HOWARD 24N-29HZ (wp05)			
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	4.76

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	
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,790.83	7.82	103.03	1,789.62	-6.00	25.93	2.00	2.00	0.00	103.03	
4,335.23	7.82	103.03	4,310.38	-84.00	363.08	0.00	0.00	0.00	0.00	
4,726.06	0.00	0.00	4,700.00	-90.00	389.01	2.00	-2.00	0.00	180.00	
5,026.06	0.00	0.00	5,000.00	-90.00	389.01	0.00	0.00	0.00	0.00	
7,034.11	0.00	0.00	7,008.05	-90.00	389.01	0.00	0.00	0.00	0.00	
7,935.89	90.18	0.00	7,581.00	484.74	389.01	10.00	10.00	0.00	0.00	
12,121.91	90.18	0.00	7,568.00	4,670.73	389.01	0.00	0.00	0.00	0.00	HOWARD 24N-29H-

Database:	edm5000p	Local Co-ordinate Reference:	Well HOWARD 24N-29HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	17' RKB + 5057 @ 5074.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	17' RKB + 5057 @ 5074.00ft
Site:	WELD_HOWARD 24N-29HZ	North Reference:	True
Well:	HOWARD 24N-29HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	HOWARD 24N-29HZ		
Design:	HOWARD 24N-29HZ (wp05)		

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
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
1,500.00	2.00	103.03	1,499.98	-0.39	1.70	-0.25	2.00	2.00	0.00
1,600.00	4.00	103.03	1,599.84	-1.57	6.80	-1.00	2.00	2.00	0.00
1,700.00	6.00	103.03	1,699.45	-3.54	15.29	-2.26	2.00	2.00	0.00
1,790.83	7.82	103.03	1,789.62	-6.00	25.93	-3.83	2.00	2.00	0.00
Start 2544.40 hold at 1790.83 MD									
1,800.00	7.82	103.03	1,798.70	-6.28	27.15	-4.01	0.00	0.00	0.00
1,900.00	7.82	103.03	1,897.77	-9.35	40.40	-5.96	0.00	0.00	0.00
2,000.00	7.82	103.03	1,996.85	-12.41	53.65	-7.92	0.00	0.00	0.00
2,100.00	7.82	103.03	2,095.92	-15.48	66.90	-9.87	0.00	0.00	0.00
2,200.00	7.82	103.03	2,194.99	-18.54	80.15	-11.83	0.00	0.00	0.00
2,300.00	7.82	103.03	2,294.06	-21.61	93.40	-13.78	0.00	0.00	0.00
2,400.00	7.82	103.03	2,393.13	-24.67	106.65	-15.74	0.00	0.00	0.00
2,500.00	7.82	103.03	2,492.20	-27.74	119.90	-17.69	0.00	0.00	0.00
2,600.00	7.82	103.03	2,591.27	-30.81	133.15	-19.65	0.00	0.00	0.00
2,700.00	7.82	103.03	2,690.34	-33.87	146.40	-21.60	0.00	0.00	0.00
2,800.00	7.82	103.03	2,789.41	-36.94	159.65	-23.56	0.00	0.00	0.00
2,900.00	7.82	103.03	2,888.48	-40.00	172.90	-25.51	0.00	0.00	0.00
3,000.00	7.82	103.03	2,987.55	-43.07	186.15	-27.47	0.00	0.00	0.00
3,100.00	7.82	103.03	3,086.62	-46.13	199.40	-29.42	0.00	0.00	0.00
3,200.00	7.82	103.03	3,185.70	-49.20	212.65	-31.38	0.00	0.00	0.00
3,300.00	7.82	103.03	3,284.77	-52.26	225.90	-33.33	0.00	0.00	0.00
3,400.00	7.82	103.03	3,383.84	-55.33	239.15	-35.29	0.00	0.00	0.00
3,500.00	7.82	103.03	3,482.91	-58.40	252.40	-37.24	0.00	0.00	0.00
3,600.00	7.82	103.03	3,581.98	-61.46	265.66	-39.20	0.00	0.00	0.00
3,700.00	7.82	103.03	3,681.05	-64.53	278.91	-41.15	0.00	0.00	0.00
3,800.00	7.82	103.03	3,780.12	-67.59	292.16	-43.11	0.00	0.00	0.00
3,900.00	7.82	103.03	3,879.19	-70.66	305.41	-45.07	0.00	0.00	0.00
4,000.00	7.82	103.03	3,978.26	-73.72	318.66	-47.02	0.00	0.00	0.00
4,100.00	7.82	103.03	4,077.33	-76.79	331.91	-48.98	0.00	0.00	0.00
4,200.00	7.82	103.03	4,176.40	-79.85	345.16	-50.93	0.00	0.00	0.00
4,300.00	7.82	103.03	4,275.47	-82.92	358.41	-52.89	0.00	0.00	0.00
4,335.23	7.82	103.03	4,310.38	-84.00	363.08	-53.57	0.00	0.00	0.00
Start Drop -2.00									
4,399.36	6.53	103.03	4,374.00	-85.81	370.88	-54.73	2.00	-2.00	0.00
Parkman									
4,400.00	6.52	103.03	4,374.64	-85.82	370.95	-54.74	2.00	-2.00	0.00
4,500.00	4.52	103.03	4,474.17	-87.99	380.32	-56.12	2.00	-2.00	0.00

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Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	17' RKB + 5057 @ 5074.00ft
Site:	WELD_HOWARD 24N-29HZ	North Reference:	True
Well:	HOWARD 24N-29HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	HOWARD 24N-29HZ		
Design:	HOWARD 24N-29HZ (wp05)		

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)	
4,600.00	2.52	103.03	4,573.98	-89.37	386.31	-57.00	2.00	-2.00	0.00	
4,700.00	0.52	103.03	4,673.94	-89.97	388.89	-57.38	2.00	-2.00	0.00	
4,726.06	0.00	0.00	4,700.00	-90.00	389.01	-57.40	2.00	-2.00	0.00	
Start 300.00 hold at 4726.06 MD										
4,800.00	0.00	0.00	4,773.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
4,900.00	0.00	0.00	4,873.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
4,935.06	0.00	0.00	4,909.00	-90.00	389.01	-57.40	0.00	0.00	0.00	
Sussex										
5,000.00	0.00	0.00	4,973.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
5,026.06	0.00	0.00	5,000.00	-90.00	389.01	-57.40	0.00	0.00	0.00	
Start 2008.05 hold at 5026.06 MD										
5,100.00	0.00	0.00	5,073.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
5,200.00	0.00	0.00	5,173.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
5,300.00	0.00	0.00	5,273.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
5,400.00	0.00	0.00	5,373.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
5,500.00	0.00	0.00	5,473.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
5,600.00	0.00	0.00	5,573.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
5,700.00	0.00	0.00	5,673.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
5,800.00	0.00	0.00	5,773.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
5,900.00	0.00	0.00	5,873.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
6,000.00	0.00	0.00	5,973.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
6,100.00	0.00	0.00	6,073.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
6,200.00	0.00	0.00	6,173.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
6,300.00	0.00	0.00	6,273.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
6,400.00	0.00	0.00	6,373.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
6,500.00	0.00	0.00	6,473.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
6,600.00	0.00	0.00	6,573.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
6,700.00	0.00	0.00	6,673.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
6,800.00	0.00	0.00	6,773.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
6,900.00	0.00	0.00	6,873.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
7,000.00	0.00	0.00	6,973.94	-90.00	389.01	-57.40	0.00	0.00	0.00	
7,034.11	0.00	0.00	7,008.05	-90.00	389.01	-57.40	0.00	0.00	0.00	
Start Build 10.00										
7,100.00	6.59	0.00	7,073.79	-86.22	389.01	-53.63	10.00	10.00	0.00	
7,200.00	16.59	0.00	7,171.63	-66.15	389.01	-33.64	10.00	10.00	0.00	
7,300.00	26.59	0.00	7,264.49	-29.40	389.01	2.99	10.00	10.00	0.00	
7,400.00	36.59	0.00	7,349.57	22.91	389.01	55.12	10.00	10.00	0.00	
7,490.96	45.68	0.00	7,418.00	82.69	389.01	114.69	10.00	10.00	0.00	
Niobrara A										
7,500.00	46.59	0.00	7,424.27	89.21	389.01	121.19	10.00	10.00	0.00	
7,600.00	56.59	0.00	7,486.32	167.46	389.01	199.17	10.00	10.00	0.00	
7,700.00	66.59	0.00	7,533.84	255.31	389.01	286.71	10.00	10.00	0.00	
7,800.00	76.59	0.00	7,565.38	350.07	389.01	381.15	10.00	10.00	0.00	
7,802.70	76.86	0.00	7,566.00	352.70	389.01	383.77	10.00	10.00	0.00	
Niobrara B										
7,900.00	86.59	0.00	7,579.99	448.87	389.01	479.61	10.00	10.00	0.00	
7,935.89	90.18	0.00	7,581.00	484.74	389.01	515.35	10.00	10.00	0.00	
Start 4186.02 hold at 7935.89 MD - 7"										
8,000.00	90.18	0.00	7,580.80	548.85	389.01	579.24	0.00	0.00	0.00	
8,100.00	90.18	0.00	7,580.49	648.85	389.01	678.90	0.00	0.00	0.00	
8,200.00	90.18	0.00	7,580.18	748.85	389.01	778.55	0.00	0.00	0.00	
8,300.00	90.18	0.00	7,579.87	848.85	389.01	878.21	0.00	0.00	0.00	
8,400.00	90.18	0.00	7,579.56	948.85	389.01	977.86	0.00	0.00	0.00	

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Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	17' RKB + 5057 @ 5074.00ft
Site:	WELD_HOWARD 24N-29HZ	North Reference:	True
Well:	HOWARD 24N-29HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	HOWARD 24N-29HZ		
Design:	HOWARD 24N-29HZ (wp05)		

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)
8,500.00	90.18	0.00	7,579.25	1,048.85	389.01	1,077.51	0.00	0.00	0.00
8,600.00	90.18	0.00	7,578.94	1,148.84	389.01	1,177.17	0.00	0.00	0.00
8,700.00	90.18	0.00	7,578.63	1,248.84	389.01	1,276.82	0.00	0.00	0.00
8,800.00	90.18	0.00	7,578.32	1,348.84	389.01	1,376.48	0.00	0.00	0.00
8,900.00	90.18	0.00	7,578.01	1,448.84	389.01	1,476.13	0.00	0.00	0.00
9,000.00	90.18	0.00	7,577.70	1,548.84	389.01	1,575.79	0.00	0.00	0.00
9,100.00	90.18	0.00	7,577.39	1,648.84	389.01	1,675.44	0.00	0.00	0.00
9,200.00	90.18	0.00	7,577.07	1,748.84	389.01	1,775.10	0.00	0.00	0.00
9,300.00	90.18	0.00	7,576.76	1,848.84	389.01	1,874.75	0.00	0.00	0.00
9,400.00	90.18	0.00	7,576.45	1,948.84	389.01	1,974.40	0.00	0.00	0.00
9,500.00	90.18	0.00	7,576.14	2,048.84	389.01	2,074.06	0.00	0.00	0.00
9,600.00	90.18	0.00	7,575.83	2,148.84	389.01	2,173.71	0.00	0.00	0.00
9,700.00	90.18	0.00	7,575.52	2,248.84	389.01	2,273.37	0.00	0.00	0.00
9,800.00	90.18	0.00	7,575.21	2,348.84	389.01	2,373.02	0.00	0.00	0.00
9,900.00	90.18	0.00	7,574.90	2,448.84	389.01	2,472.68	0.00	0.00	0.00
10,000.00	90.18	0.00	7,574.59	2,548.84	389.01	2,572.33	0.00	0.00	0.00
10,100.00	90.18	0.00	7,574.28	2,648.84	389.01	2,671.99	0.00	0.00	0.00
10,200.00	90.18	0.00	7,573.97	2,748.84	389.01	2,771.64	0.00	0.00	0.00
10,300.00	90.18	0.00	7,573.66	2,848.84	389.01	2,871.29	0.00	0.00	0.00
10,400.00	90.18	0.00	7,573.35	2,948.84	389.01	2,970.95	0.00	0.00	0.00
10,500.00	90.18	0.00	7,573.04	3,048.84	389.01	3,070.60	0.00	0.00	0.00
10,600.00	90.18	0.00	7,572.73	3,148.84	389.01	3,170.26	0.00	0.00	0.00
10,700.00	90.18	0.00	7,572.42	3,248.83	389.01	3,269.91	0.00	0.00	0.00
10,800.00	90.18	0.00	7,572.11	3,348.83	389.01	3,369.57	0.00	0.00	0.00
10,900.00	90.18	0.00	7,571.80	3,448.83	389.01	3,469.22	0.00	0.00	0.00
11,000.00	90.18	0.00	7,571.48	3,548.83	389.01	3,568.88	0.00	0.00	0.00
11,100.00	90.18	0.00	7,571.17	3,648.83	389.01	3,668.53	0.00	0.00	0.00
11,200.00	90.18	0.00	7,570.86	3,748.83	389.01	3,768.19	0.00	0.00	0.00
11,300.00	90.18	0.00	7,570.55	3,848.83	389.01	3,867.84	0.00	0.00	0.00
11,400.00	90.18	0.00	7,570.24	3,948.83	389.01	3,967.49	0.00	0.00	0.00
11,500.00	90.18	0.00	7,569.93	4,048.83	389.01	4,067.15	0.00	0.00	0.00
11,600.00	90.18	0.00	7,569.62	4,148.83	389.01	4,166.80	0.00	0.00	0.00
11,700.00	90.18	0.00	7,569.31	4,248.83	389.01	4,266.46	0.00	0.00	0.00
11,800.00	90.18	0.00	7,569.00	4,348.83	389.01	4,366.11	0.00	0.00	0.00
11,900.00	90.18	0.00	7,568.69	4,448.83	389.01	4,465.77	0.00	0.00	0.00
12,000.00	90.18	0.00	7,568.38	4,548.83	389.01	4,565.42	0.00	0.00	0.00
12,100.00	90.18	0.00	7,568.07	4,648.83	389.01	4,665.08	0.00	0.00	0.00
12,121.91	90.18	0.00	7,568.00	4,670.73	389.01	4,686.91	0.00	0.00	0.00
TD at 12121.91 - HOWARD 24N-29HZ BHL									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
HOWARD 24N-29HZ	0.00	0.00	7,568.00	4,670.73	389.01	1,250,982.76	3,165,544.21	40.020820	-104.908910
- hit/miss target									
- Shape									
- plan hits target center									
- Point									

Database:	edm5000p	Local Co-ordinate Reference:	Well HOWARD 24N-29HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	17' RKB + 5057 @ 5074.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	17' RKB + 5057 @ 5074.00ft
Site:	WELD_HOWARD 24N-29HZ	North Reference:	True
Well:	HOWARD 24N-29HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	HOWARD 24N-29HZ		
Design:	HOWARD 24N-29HZ (wp05)		

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
1,100.00	1,100.00	9 5/8"	9-5/8	12-1/4
7,935.89	7,581.00	7"	7	8-3/4

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,399.36	4,374.00	Parkman		0.00	
4,935.06	4,909.00	Sussex		0.00	
7,490.96	7,418.00	Niobrara A		0.00	
7,802.70	7,566.00	Niobrara B		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,400.00	1,400.00	0.00	0.00	Start Build 2.00
1,790.83	1,789.62	-6.00	25.93	Start 2544.40 hold at 1790.83 MD
4,335.23	4,310.38	-84.00	363.08	Start Drop -2.00
4,726.06	4,700.00	-90.00	389.01	Start 300.00 hold at 4726.06 MD
5,026.06	5,000.00	-90.00	389.01	Start 2008.05 hold at 5026.06 MD
7,034.11	7,008.05	-90.00	389.01	Start Build 10.00
7,935.89	7,581.00	484.74	389.01	Start 4186.02 hold at 7935.89 MD
12,121.91	7,568.00	4,670.73	389.01	TD at 12121.91

US ROCKIES REGION PLANNING

**COLORADO NORTHERN ZONE - 83
WELD_HOWARD 24N-29HZ
HOWARD 24N-29HZ**

**HOWARD 24N-29HZ
HOWARD 24N-29HZ (wp05)**

Anticollision Summary Report

29 June, 2011



APC

Anticollision Summary Report



Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well HOWARD 24N-29HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	17' RKB + 5057 @ 5074.00ft
Reference Site:	WELD_HOWARD 24N-29HZ	MD Reference:	17' RKB + 5057 @ 5074.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	HOWARD 24N-29HZ	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	HOWARD 24N-29HZ	Database:	edm5000p
Reference Design:	HOWARD 24N-29HZ (wp05)	Offset TVD Reference:	Offset Datum

Reference	HOWARD 24N-29HZ (wp05)		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD + Stations Interval 25.00ft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,000.00 ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program	Date	6/29/2011		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.00	12,121.80	HOWARD 24N-29HZ (wp05) (HOWARD 2	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
WELD_HOWARD 10C-29HZ						
HOWARD 10C-29HZ - HOWARD 10C-29HZ - HOWARD	1,250.00	1,250.00	24.09	18.73	4.498	CC
HOWARD 10C-29HZ - HOWARD 10C-29HZ - HOWARD	1,275.00	1,274.79	24.20	18.73	4.428	ES
HOWARD 10C-29HZ - HOWARD 10C-29HZ - HOWARD	1,300.00	1,299.58	24.52	18.95	4.399	SF
WELD_HOWARD 17-32 PAD						
David Howard #1 - David Howard #1 - David Howard #1	4,978.14	4,928.00	737.24	713.05	30.469	CC, ES
David Howard #1 - David Howard #1 - David Howard #1	5,025.00	4,928.00	738.73	714.45	30.427	SF
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	644.65	644.64	10,000.000	CC
David Howard #5 - David Howard #5 - David Howard #5	50.00	21.38	644.68	644.61	10,000.000	ES
David Howard #5 - David Howard #5 - David Howard #5	3,525.00	3,448.39	997.03	981.60	64.614	SF
David Howard #C 1 - David Howard #C 1 - David Howard #C 1	8,560.87	7,556.58	501.34	456.45	11.170	CC
David Howard #C 1 - David Howard #C 1 - David Howard #C 1	8,575.00	7,557.03	501.53	456.44	11.121	ES
David Howard #C 1 - David Howard #C 1 - David Howard #C 1	8,650.00	7,559.42	509.19	462.86	10.992	SF
Howard 1-32 - Howard 1-32 - Howard 1-32 (wp02)	9,282.39	7,703.99	473.97	410.69	7.489	CC, ES
Howard 1-32 - Howard 1-32 - Howard 1-32 (wp02)	9,350.00	7,703.78	478.77	414.31	7.428	SF
Howard 21-32 - Howard 21-32 - Howard 21-32 (wp01)	302.64	290.64	903.38	902.31	842.110	CC
Howard 21-32 - Howard 21-32 - Howard 21-32 (wp01)	350.00	333.82	903.47	902.20	709.645	ES
Howard 21-32 - Howard 21-32 - Howard 21-32 (wp01)	1,575.00	1,460.88	999.58	991.71	127.097	SF
Howard 2-32 - Howard 2-32 - Howard 2-32 (wp02)	9,281.64	7,641.44	845.86	782.71	13.395	CC
Howard 2-32 - Howard 2-32 - Howard 2-32 (wp02)	9,300.00	7,641.38	846.06	782.59	13.331	ES
Howard 2-32 - Howard 2-32 - Howard 2-32 (wp02)	9,500.00	7,640.76	873.59	806.46	13.013	SF
Howard 24-32 - Howard 24-32 - Howard 24-32 (wp01)	7,188.94	7,257.87	184.52	145.39	4.716	CC
Howard 24-32 - Howard 24-32 - Howard 24-32 (wp01)	7,200.00	7,268.50	184.54	145.31	4.704	ES
Howard 24-32 - Howard 24-32 - Howard 24-32 (wp01)	7,250.00	7,315.74	185.53	145.85	4.675	SF
Howard 25-32 - Howard 25-32 - Howard 25-32 (wp02)	1,611.49	1,667.38	832.83	823.34	87.697	CC
Howard 25-32 - Howard 25-32 - Howard 25-32 (wp02)	1,625.00	1,680.35	832.86	823.27	86.798	ES
Howard 25-32 - Howard 25-32 - Howard 25-32 (wp02)	2,975.00	2,957.02	995.77	976.62	51.999	SF
Howard 26-32 - Howard 26-32 - Howard 26-32 (wp03)	302.64	290.64	897.09	896.02	836.243	CC
Howard 26-32 - Howard 26-32 - Howard 26-32 (wp03)	350.00	332.55	897.20	895.93	705.478	ES
Howard 26-32 - Howard 26-32 - Howard 26-32 (wp03)	1,400.00	1,200.00	999.87	993.91	167.744	SF
Howard 28-32 - Howard 28-32 - Howard 28-32 (wp01)	325.00	298.00	901.99	900.84	779.988	CC
Howard 28-32 - Howard 28-32 - Howard 28-32 (wp01)	350.00	317.96	902.06	900.80	717.607	ES
Howard 28-32 - Howard 28-32 - Howard 28-32 (wp01)	1,225.00	987.61	999.77	994.59	192.958	SF
Howard 41-32 - Howard 41-32 - Howard 41-32 (wp01)	302.64	290.64	895.99	894.92	835.214	CC
Howard 41-32 - Howard 41-32 - Howard 41-32 (wp01)	425.00	409.16	896.23	894.63	559.175	ES

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

APC

Anticollision Summary Report



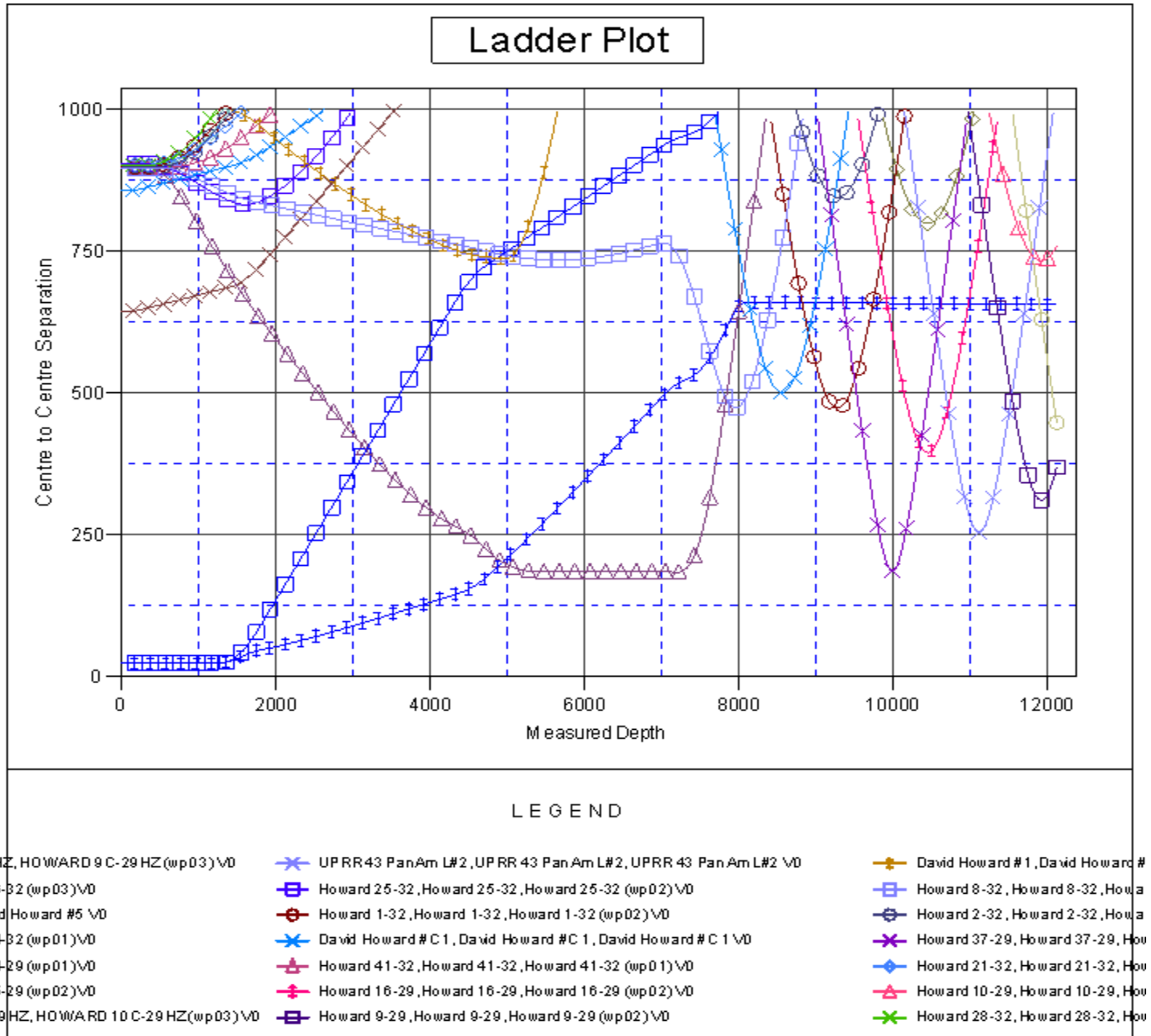
Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well HOWARD 24N-29HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	17' RKB + 5057 @ 5074.00ft
Reference Site:	WELD_HOWARD 24N-29HZ	MD Reference:	17' RKB + 5057 @ 5074.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	HOWARD 24N-29HZ	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	HOWARD 24N-29HZ	Database:	edm5000p
Reference Design:	HOWARD 24N-29HZ (wp05)	Offset TVD Reference:	Offset Datum

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
WELD_HOWARD 17-32 PAD						
Howard 41-32 - Howard 41-32 - Howard 41-32 (wp01)	1,975.00	1,886.57	997.50	985.58	83.640	SF
Howard 8-32 - Howard 8-32 - Howard 8-32 (wp02)	7,962.25	7,650.12	475.15	436.83	12.400	CC, ES
Howard 8-32 - Howard 8-32 - Howard 8-32 (wp02)	8,025.00	7,649.92	479.27	440.31	12.301	SF
WELD_HOWARD 20-29 PAD						
Howard 10-29 - Howard 10-29 - Howard 10-29 (wp02)	11,921.55	7,662.38	733.77	621.24	6.520	CC
Howard 10-29 - Howard 10-29 - Howard 10-29 (wp02)	11,925.00	7,662.37	733.78	621.18	6.517	ES
Howard 10-29 - Howard 10-29 - Howard 10-29 (wp02)	12,025.00	7,662.06	741.03	626.47	6.468	SF
Howard 15-29 - Howard 15-29 - Howard 15-29 (wp02)	10,451.70	7,639.40	799.63	717.91	9.785	CC
Howard 15-29 - Howard 15-29 - Howard 15-29 (wp02)	10,475.00	7,639.32	799.96	717.82	9.739	ES
Howard 15-29 - Howard 15-29 - Howard 15-29 (wp02)	10,600.00	7,638.94	813.26	728.71	9.618	SF
Howard 16-29 - Howard 16-29 - Howard 16-29 (wp02)	10,452.06	7,621.24	395.50	316.51	5.007	CC, ES
Howard 16-29 - Howard 16-29 - Howard 16-29 (wp02)	10,500.00	7,621.09	398.40	318.53	4.988	SF
Howard 23-29 - Howard 23-29 - Howard 23-29 (wp01)						Out of range
Howard 24-29 - Howard 24-29 - Howard 24-29 (wp01)	12,121.91	7,750.11	448.30	322.72	3.570	CC, ES, SF
Howard 37-29 - Howard 37-29 - Howard 37-29 (wp01)	9,991.98	7,653.42	186.80	109.07	2.403	CC, ES
Howard 37-29 - Howard 37-29 - Howard 37-29 (wp01)	10,000.00	7,653.40	186.97	109.09	2.401	SF
Howard 39-29 - Howard 39-29 - Howard 39-29 (wp01)						Out of range
Howard 9-29 - Howard 9-29 - Howard 9-29 (wp02)	11,921.92	7,658.15	311.45	201.49	2.832	CC
Howard 9-29 - Howard 9-29 - Howard 9-29 (wp02)	11,925.00	7,658.14	311.46	201.45	2.831	ES
Howard 9-29 - Howard 9-29 - Howard 9-29 (wp02)	11,950.00	7,658.06	312.71	202.23	2.830	SF
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	11,112.99	7,520.81	255.31	163.85	2.792	CC, ES
UPRR 43 PanAm L#2 - UPRR 43 PanAm L#2 - UPRR 43	11,125.00	7,520.89	255.59	163.91	2.788	SF
WELD_HOWARD 9C-29HZ						
HOWARD 9C-29HZ - HOWARD 9C-29HZ - HOWARD 9C	1,250.00	1,250.00	23.81	18.45	4.445	CC
HOWARD 9C-29HZ - HOWARD 9C-29HZ - HOWARD 9C	1,275.00	1,274.79	23.92	18.45	4.377	ES
HOWARD 9C-29HZ - HOWARD 9C-29HZ - HOWARD 9C	12,121.91	12,277.92	656.87	488.28	3.896	SF

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well HOWARD 24N-29HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	17' RKB + 5057 @ 5074.00ft
Reference Site:	WELD_HOWARD 24N-29HZ	MD Reference:	17' RKB + 5057 @ 5074.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	HOWARD 24N-29HZ	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	HOWARD 24N-29HZ	Database:	edm5000p
Reference Design:	HOWARD 24N-29HZ (wp05)	Offset TVD Reference:	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 24N-29HZ
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.38°



Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well HOWARD 24N-29HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	17' RKB + 5057 @ 5074.00ft
Reference Site:	WELD_HOWARD 24N-29HZ	MD Reference:	17' RKB + 5057 @ 5074.00ft
Site Error:	0.00 ft	North Reference:	True
Reference Well:	HOWARD 24N-29HZ	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 ft	Output errors are at	2.00 sigma
Reference Wellbore	HOWARD 24N-29HZ	Database:	edm5000p
Reference Design:	HOWARD 24N-29HZ (wp05)	Offset TVD Reference:	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 24N-29HZ
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.38°

