

# **US ROCKIES REGION PLANNING**

**COLORADO NORTHERN ZONE - 83**

**WELD\_POWER PAD**

**POWERS 28C-23HZ**

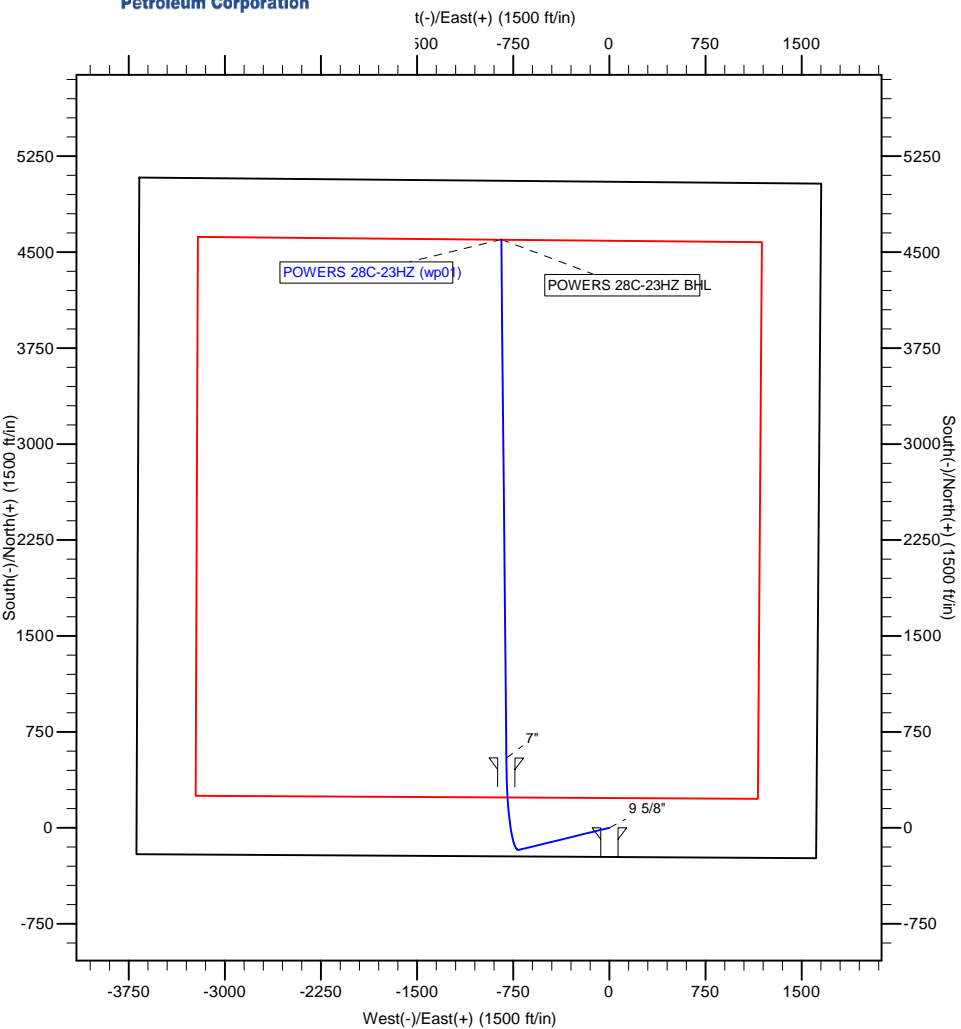
**POWERS 28C-23HZ**

**Plan: POWERS 28C-23HZ (wp01)**

## **Standard Planning Report**

**29 April, 2011**





T

M

Azimuths to True North

Magnetic North: 8.78°

Magnetic Field

Strength: 53010.5nT

Dip Angle: 66.85°

Date: 4/29/2011

Model: IGRF2010

Project: COLORADO NORTHERN ZONE - 83

Site: WELD POWERS PAD

Well: POWERS 28C-23HZ

Wellbore: POWERS 28C-23HZ

Section: SHL:

Design: POWERS 28C-23HZ (wp01)

Latitude: 40.117418

Longitude: -104.627547

GL: 4909.00

KB: 17' RKB + 4909' GL @ 4926.00ft

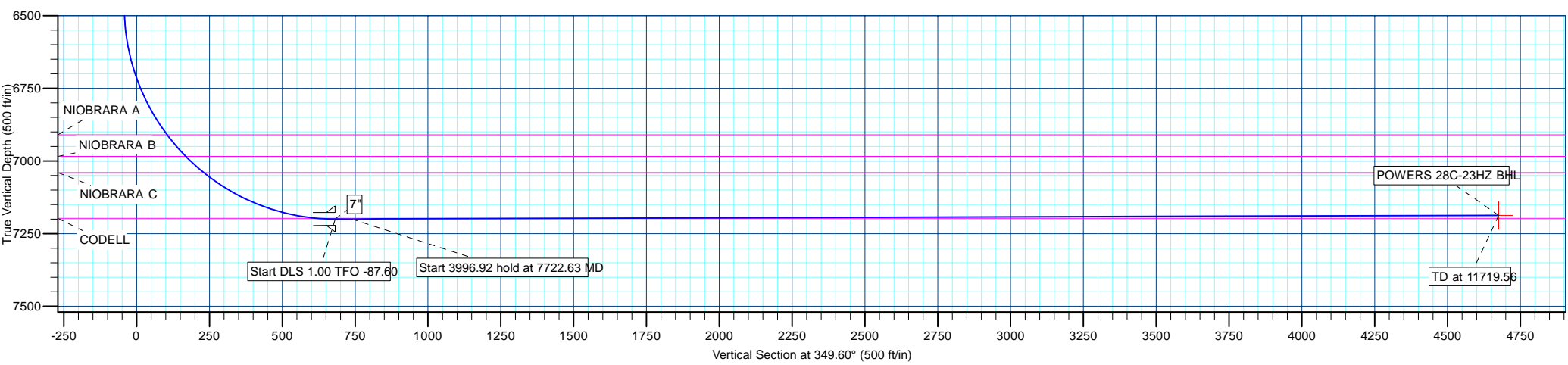
WELL DETAILS: POWERS 28C-23HZ						
+N/-S	+E/-W	Northing	Ground Level: Easting	4909.00	Latitude	Longitude
0.00	0.00	128619.72	3243996.07	40.117418	-104.627547	Slot

WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)						
Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
POWERS 28C-23HZ BHL	7187.00	4598.69	-843.89	40.130042	-104.630565	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	
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	
1285.73	7.71	256.27	1284.57	-6.16	-25.19	2.00	256.27	-1.51	
6515.84	7.71	256.27	6467.34	-172.82	-707.20	0.00	0.00	-42.33	
7665.65	90.16	0.00	7200.00	545.00	-803.89	8.00	103.59	681.15	
7722.63	90.18	359.43	7199.83	601.99	-804.17	1.00	-87.60	737.25	
11719.56	90.18	359.43	7187.00	4598.69	-843.89	0.00	0.00	4675.48	POWERS 28C-23HZ BHL

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
705.00	705.00	BASE FOX HILLS
3955.00	3980.56	PARKMAN
4321.00	4349.90	SUSSEX
6910.00	6992.00	NIOBRARA A
6984.00	7089.77	NIOBRARA B
7040.00	7173.32	NIOBRARA C
7197.00	7597.74	CODELL

CASING DETAILS			
TVD	MD	Name	Size
750.00	750.00	9 5/8"	9-5/8
7200.00	7665.65	7"	7



<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well POWERS 28C-23HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	17' RKB + 4909' GL @ 4926.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	17' RKB + 4909' GL @ 4926.00ft
<b>Site:</b>	WELD_POWERS PAD	<b>North Reference:</b>	True
<b>Well:</b>	POWERS 28C-23HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	POWERS 28C-23HZ		
<b>Design:</b>	POWERS 28C-23HZ (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_POWERS PAD			
Site Position:		Northing:	1,286,819.50 ft	Latitude:	40.117418
From:	Lat/Long	Easting:	3,243,972.03 ft	Longitude:	-104.627633
Position Uncertainty:	0.00 ft	Slot Radius:	0 "	Grid Convergence:	0.56

Well	POWERS 28C-23HZ					
Well Position	+N-S	-0.02 ft	Northing:	1,286,819.72 ft	Latitude:	40.117418
	+E-W	24.05 ft	Easting:	3,243,996.08 ft	Longitude:	-104.627547
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	4,909.00 ft

<b>Wellbore</b>	POWERS 28C-23HZ				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	4/29/2011	8.78	66.85	53,010

<b>Design</b>	POWERS 28C-23HZ (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	349.60

<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	
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,285.73	7.71	256.27	1,284.57	-6.16	-25.19	2.00	2.00	0.00	256.27	
6,515.84	7.71	256.27	6,467.34	-172.82	-707.20	0.00	0.00	0.00	0.00	
7,665.65	90.16	0.00	7,200.00	545.00	-803.89	8.00	7.17	9.02	103.59	
7,722.63	90.18	359.43	7,199.83	601.99	-804.17	1.00	0.04	-1.00	-87.60	
11,719.56	90.18	359.43	7,187.00	4,598.69	-843.89	0.00	0.00	0.00	0.00	POWERS 28C-23H

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well POWERS 28C-23HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	17' RKB + 4909' GL @ 4926.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	17' RKB + 4909' GL @ 4926.00ft
<b>Site:</b>	WELD_POWERS PAD	<b>North Reference:</b>	True
<b>Well:</b>	POWERS 28C-23HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	POWERS 28C-23HZ		
<b>Design:</b>	POWERS 28C-23HZ (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	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
705.00	0.00	0.00	705.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>BASE FOX HILLS</b>									
750.00	0.00	0.00	750.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>9 5/8"</b>									
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
<b>Start Build 2.00</b>									
1,000.00	2.00	256.27	999.98	-0.41	-1.70	-0.10	2.00	2.00	0.00
1,100.00	4.00	256.27	1,099.84	-1.66	-6.78	-0.41	2.00	2.00	0.00
1,200.00	6.00	256.27	1,199.45	-3.73	-15.25	-0.91	2.00	2.00	0.00
1,285.73	7.71	256.27	1,284.57	-6.16	-25.19	-1.51	2.00	2.00	0.00
<b>Start 5230.11 hold at 1285.73 MD</b>									
1,300.00	7.71	256.27	1,298.71	-6.61	-27.05	-1.62	0.00	0.00	0.00
1,400.00	7.71	256.27	1,397.80	-9.80	-40.09	-2.40	0.00	0.00	0.00
1,500.00	7.71	256.27	1,496.90	-12.98	-53.13	-3.18	0.00	0.00	0.00
1,600.00	7.71	256.27	1,595.99	-16.17	-66.17	-3.96	0.00	0.00	0.00
1,700.00	7.71	256.27	1,695.09	-19.36	-79.21	-4.74	0.00	0.00	0.00
1,800.00	7.71	256.27	1,794.18	-22.54	-92.25	-5.52	0.00	0.00	0.00
1,900.00	7.71	256.27	1,893.28	-25.73	-105.29	-6.30	0.00	0.00	0.00
2,000.00	7.71	256.27	1,992.37	-28.92	-118.33	-7.08	0.00	0.00	0.00
2,100.00	7.71	256.27	2,091.47	-32.10	-131.37	-7.86	0.00	0.00	0.00
2,200.00	7.71	256.27	2,190.56	-35.29	-144.41	-8.64	0.00	0.00	0.00
2,300.00	7.71	256.27	2,289.66	-38.48	-157.45	-9.42	0.00	0.00	0.00
2,400.00	7.71	256.27	2,388.75	-41.66	-170.49	-10.21	0.00	0.00	0.00
2,500.00	7.71	256.27	2,487.85	-44.85	-183.53	-10.99	0.00	0.00	0.00
2,600.00	7.71	256.27	2,586.94	-48.04	-196.57	-11.77	0.00	0.00	0.00
2,700.00	7.71	256.27	2,686.04	-51.22	-209.61	-12.55	0.00	0.00	0.00
2,800.00	7.71	256.27	2,785.13	-54.41	-222.65	-13.33	0.00	0.00	0.00
2,900.00	7.71	256.27	2,884.22	-57.60	-235.69	-14.11	0.00	0.00	0.00
3,000.00	7.71	256.27	2,983.32	-60.78	-248.73	-14.89	0.00	0.00	0.00
3,100.00	7.71	256.27	3,082.41	-63.97	-261.77	-15.67	0.00	0.00	0.00
3,200.00	7.71	256.27	3,181.51	-67.15	-274.81	-16.45	0.00	0.00	0.00
3,300.00	7.71	256.27	3,280.60	-70.34	-287.85	-17.23	0.00	0.00	0.00
3,400.00	7.71	256.27	3,379.70	-73.53	-300.89	-18.01	0.00	0.00	0.00
3,500.00	7.71	256.27	3,478.79	-76.71	-313.93	-18.79	0.00	0.00	0.00
3,600.00	7.71	256.27	3,577.89	-79.90	-326.97	-19.57	0.00	0.00	0.00
3,700.00	7.71	256.27	3,676.98	-83.09	-340.01	-20.35	0.00	0.00	0.00
3,800.00	7.71	256.27	3,776.08	-86.27	-353.05	-21.13	0.00	0.00	0.00
3,900.00	7.71	256.27	3,875.17	-89.46	-366.09	-21.91	0.00	0.00	0.00
3,980.56	7.71	256.27	3,955.00	-92.03	-376.60	-22.54	0.00	0.00	0.00
<b>PARKMAN</b>									
4,000.00	7.71	256.27	3,974.27	-92.65	-379.13	-22.69	0.00	0.00	0.00
4,100.00	7.71	256.27	4,073.36	-95.83	-392.17	-23.48	0.00	0.00	0.00
4,200.00	7.71	256.27	4,172.46	-99.02	-405.21	-24.26	0.00	0.00	0.00
4,300.00	7.71	256.27	4,271.55	-102.21	-418.25	-25.04	0.00	0.00	0.00
4,349.90	7.71	256.27	4,321.00	-103.80	-424.76	-25.43	0.00	0.00	0.00

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well POWERS 28C-23HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	17' RKB + 4909' GL @ 4926.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	17' RKB + 4909' GL @ 4926.00ft
<b>Site:</b>	WELD_POWERS PAD	<b>North Reference:</b>	True
<b>Well:</b>	POWERS 28C-23HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	POWERS 28C-23HZ		
<b>Design:</b>	POWERS 28C-23HZ (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)
<b>SUSSEX</b>									
4,400.00	7.71	256.27	4,370.65	-105.39	-431.29	-25.82	0.00	0.00	0.00
4,500.00	7.71	256.27	4,469.74	-108.58	-444.33	-26.60	0.00	0.00	0.00
4,600.00	7.71	256.27	4,568.84	-111.77	-457.38	-27.38	0.00	0.00	0.00
4,700.00	7.71	256.27	4,667.93	-114.95	-470.42	-28.16	0.00	0.00	0.00
4,800.00	7.71	256.27	4,767.03	-118.14	-483.46	-28.94	0.00	0.00	0.00
4,900.00	7.71	256.27	4,866.12	-121.33	-496.50	-29.72	0.00	0.00	0.00
5,000.00	7.71	256.27	4,965.22	-124.51	-509.54	-30.50	0.00	0.00	0.00
5,100.00	7.71	256.27	5,064.31	-127.70	-522.58	-31.28	0.00	0.00	0.00
5,200.00	7.71	256.27	5,163.41	-130.89	-535.62	-32.06	0.00	0.00	0.00
5,300.00	7.71	256.27	5,262.50	-134.07	-548.66	-32.84	0.00	0.00	0.00
5,400.00	7.71	256.27	5,361.60	-137.26	-561.70	-33.62	0.00	0.00	0.00
5,500.00	7.71	256.27	5,460.69	-140.45	-574.74	-34.40	0.00	0.00	0.00
5,600.00	7.71	256.27	5,559.79	-143.63	-587.78	-35.18	0.00	0.00	0.00
5,700.00	7.71	256.27	5,658.88	-146.82	-600.82	-35.96	0.00	0.00	0.00
5,800.00	7.71	256.27	5,757.98	-150.01	-613.86	-36.75	0.00	0.00	0.00
5,900.00	7.71	256.27	5,857.07	-153.19	-626.90	-37.53	0.00	0.00	0.00
6,000.00	7.71	256.27	5,956.17	-156.38	-639.94	-38.31	0.00	0.00	0.00
6,100.00	7.71	256.27	6,055.26	-159.57	-652.98	-39.09	0.00	0.00	0.00
6,200.00	7.71	256.27	6,154.36	-162.75	-666.02	-39.87	0.00	0.00	0.00
6,300.00	7.71	256.27	6,253.45	-165.94	-679.06	-40.65	0.00	0.00	0.00
6,400.00	7.71	256.27	6,352.55	-169.13	-692.10	-41.43	0.00	0.00	0.00
6,500.00	7.71	256.27	6,451.64	-172.31	-705.14	-42.21	0.00	0.00	0.00
6,515.84	7.71	256.27	6,467.34	-172.82	-707.20	-42.33	0.00	0.00	0.00
<b>Start DLS 8.00 TFO 103.59</b>									
6,600.00	8.95	303.34	6,550.70	-170.56	-718.18	-38.13	8.00	1.47	55.93
6,700.00	14.90	330.33	6,648.57	-155.08	-731.06	-20.59	8.00	5.94	26.99
6,800.00	22.16	341.12	6,743.35	-126.03	-743.55	10.25	8.00	7.26	10.80
6,900.00	29.78	346.69	6,833.20	-83.95	-755.39	53.77	8.00	7.63	5.56
6,992.00	36.93	349.90	6,910.00	-34.43	-765.51	104.30	8.00	7.77	3.49
<b>NIORARA A</b>									
7,000.00	37.56	350.12	6,916.37	-29.66	-766.35	109.15	8.00	7.81	2.85
7,089.77	44.59	352.31	6,984.00	28.60	-775.27	168.06	8.00	7.84	2.43
<b>NIORARA B</b>									
7,100.00	45.40	352.52	6,991.23	35.77	-776.23	175.28	8.00	7.86	2.09
7,173.32	51.17	353.90	7,040.00	90.09	-782.67	229.88	8.00	7.88	1.88
<b>NIORARA C</b>									
7,200.00	53.28	354.35	7,056.34	111.07	-784.82	250.90	8.00	7.89	1.67
7,300.00	61.18	355.83	7,110.43	194.78	-791.97	334.53	8.00	7.90	1.48
7,400.00	69.10	357.10	7,152.44	285.27	-797.54	424.53	8.00	7.92	1.27
7,500.00	77.02	358.24	7,181.55	380.77	-801.40	519.17	8.00	7.93	1.14
7,597.74	84.77	359.29	7,197.00	477.19	-803.47	614.37	8.00	7.93	1.07
<b>CODELL</b>									
7,600.00	84.95	359.31	7,197.20	479.44	-803.50	616.59	8.00	7.93	1.05
7,665.65	90.16	0.00	7,200.00	545.00	-803.89	681.15	8.00	7.93	1.05
<b>Start DLS 1.00 TFO -87.60 - 7"</b>									
7,700.00	90.17	359.66	7,199.90	579.35	-803.99	714.95	1.00	0.04	-1.00
7,722.63	90.18	359.43	7,199.83	601.99	-804.17	737.25	1.00	0.04	-1.00
<b>Start 3996.92 hold at 7722.63 MD</b>									
7,800.00	90.18	359.43	7,199.58	679.35	-804.94	813.48	0.00	0.00	0.00
7,900.00	90.18	359.43	7,199.26	779.34	-805.94	912.01	0.00	0.00	0.00
8,000.00	90.18	359.43	7,198.94	879.34	-806.93	1,010.54	0.00	0.00	0.00
8,100.00	90.18	359.43	7,198.62	979.33	-807.92	1,109.07	0.00	0.00	0.00

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well POWERS 28C-23HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	17' RKB + 4909' GL @ 4926.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	17' RKB + 4909' GL @ 4926.00ft
<b>Site:</b>	WELD_POWERS PAD	<b>North Reference:</b>	True
<b>Well:</b>	POWERS 28C-23HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	POWERS 28C-23HZ		
<b>Design:</b>	POWERS 28C-23HZ (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)
8,200.00	90.18	359.43	7,198.30	1,079.33	-808.92	1,207.60	0.00	0.00	0.00
8,300.00	90.18	359.43	7,197.98	1,179.32	-809.91	1,306.14	0.00	0.00	0.00
8,400.00	90.18	359.43	7,197.65	1,279.32	-810.90	1,404.67	0.00	0.00	0.00
8,500.00	90.18	359.43	7,197.33	1,379.31	-811.90	1,503.20	0.00	0.00	0.00
8,600.00	90.18	359.43	7,197.01	1,479.30	-812.89	1,601.73	0.00	0.00	0.00
8,700.00	90.18	359.43	7,196.69	1,579.30	-813.89	1,700.26	0.00	0.00	0.00
8,800.00	90.18	359.43	7,196.37	1,679.29	-814.88	1,798.79	0.00	0.00	0.00
8,900.00	90.18	359.43	7,196.05	1,779.29	-815.87	1,897.32	0.00	0.00	0.00
9,000.00	90.18	359.43	7,195.73	1,879.28	-816.87	1,995.86	0.00	0.00	0.00
9,100.00	90.18	359.43	7,195.41	1,979.28	-817.86	2,094.39	0.00	0.00	0.00
9,200.00	90.18	359.43	7,195.09	2,079.27	-818.85	2,192.92	0.00	0.00	0.00
9,300.00	90.18	359.43	7,194.77	2,179.27	-819.85	2,291.45	0.00	0.00	0.00
9,400.00	90.18	359.43	7,194.45	2,279.26	-820.84	2,389.98	0.00	0.00	0.00
9,500.00	90.18	359.43	7,194.12	2,379.26	-821.84	2,488.51	0.00	0.00	0.00
9,600.00	90.18	359.43	7,193.80	2,479.25	-822.83	2,587.05	0.00	0.00	0.00
9,700.00	90.18	359.43	7,193.48	2,579.24	-823.82	2,685.58	0.00	0.00	0.00
9,800.00	90.18	359.43	7,193.16	2,679.24	-824.82	2,784.11	0.00	0.00	0.00
9,900.00	90.18	359.43	7,192.84	2,779.23	-825.81	2,882.64	0.00	0.00	0.00
10,000.00	90.18	359.43	7,192.52	2,879.23	-826.80	2,981.17	0.00	0.00	0.00
10,100.00	90.18	359.43	7,192.20	2,979.22	-827.80	3,079.70	0.00	0.00	0.00
10,200.00	90.18	359.43	7,191.88	3,079.22	-828.79	3,178.24	0.00	0.00	0.00
10,300.00	90.18	359.43	7,191.56	3,179.21	-829.78	3,276.77	0.00	0.00	0.00
10,400.00	90.18	359.43	7,191.24	3,279.21	-830.78	3,375.30	0.00	0.00	0.00
10,500.00	90.18	359.43	7,190.91	3,379.20	-831.77	3,473.83	0.00	0.00	0.00
10,600.00	90.18	359.43	7,190.59	3,479.20	-832.77	3,572.36	0.00	0.00	0.00
10,700.00	90.18	359.43	7,190.27	3,579.19	-833.76	3,670.89	0.00	0.00	0.00
10,800.00	90.18	359.43	7,189.95	3,679.18	-834.75	3,769.43	0.00	0.00	0.00
10,900.00	90.18	359.43	7,189.63	3,779.18	-835.75	3,867.96	0.00	0.00	0.00
11,000.00	90.18	359.43	7,189.31	3,879.17	-836.74	3,966.49	0.00	0.00	0.00
11,100.00	90.18	359.43	7,188.99	3,979.17	-837.73	4,065.02	0.00	0.00	0.00
11,200.00	90.18	359.43	7,188.67	4,079.16	-838.73	4,163.55	0.00	0.00	0.00
11,300.00	90.18	359.43	7,188.35	4,179.16	-839.72	4,262.08	0.00	0.00	0.00
11,400.00	90.18	359.43	7,188.03	4,279.15	-840.72	4,360.62	0.00	0.00	0.00
11,500.00	90.18	359.43	7,187.70	4,379.15	-841.71	4,459.15	0.00	0.00	0.00
11,600.00	90.18	359.43	7,187.38	4,479.14	-842.70	4,557.68	0.00	0.00	0.00
11,700.00	90.18	359.43	7,187.06	4,579.14	-843.70	4,656.21	0.00	0.00	0.00
11,719.56	90.18	359.43	7,187.00	4,598.69	-843.89	4,675.48	0.00	0.00	0.00
TD at 11719.56 - POWERS 28C-23HZ BHL									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
POWERS 28C-23HZ	0.00	0.00	7,187.00	4,598.69	-843.89	1,291,409.88	3,243,106.98	40.130042	-104.630565
- hit/miss target									
- Shape									
- plan hits target center									
- Point									

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well POWERS 28C-23HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	17' RKB + 4909' GL @ 4926.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	17' RKB + 4909' GL @ 4926.00ft
<b>Site:</b>	WELD_POWERS PAD	<b>North Reference:</b>	True
<b>Well:</b>	POWERS 28C-23HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	POWERS 28C-23HZ		
<b>Design:</b>	POWERS 28C-23HZ (wp01)		

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
750.00	750.00	9 5/8"	9-5/8	12-1/4	
7,665.65	7,200.00	7"	7	8-3/4	

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
705.00	705.00	BASE FOX HILLS		0.00	
3,980.56	3,955.00	PARKMAN		0.00	
4,349.90	4,321.00	SUSSEX		0.00	
6,992.00	6,910.00	NIOBRARA A		0.00	
7,089.77	6,984.00	NIOBRARA B		0.00	
7,173.32	7,040.00	NIOBRARA C		0.00	
7,597.74	7,197.00	CODELL		0.00	

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
900.00	900.00	0.00	0.00	Start Build 2.00	
1,285.73	1,284.57	-6.16	-25.19	Start 5230.11 hold at 1285.73 MD	
6,515.84	6,467.34	-172.82	-707.20	Start DLS 8.00 TFO 103.59	
7,665.65	7,200.00	545.00	-803.89	Start DLS 1.00 TFO -87.60	
7,722.63	7,199.83	601.99	-804.17	Start 3996.92 hold at 7722.63 MD	
11,719.56	7,187.00	4,598.69	-843.89	TD at 11719.56	

# **US ROCKIES REGION PLANNING**

**COLORADO NORTHERN ZONE - 83  
WELD\_POWER PAD  
POWERS 28C-23HZ**

**POWERS 28C-23HZ  
POWERS 28C-23HZ (wp01)**

## **Anticollision Summary Report**

**29 April, 2011**





# APC

## Anticollision Summary Report



<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well POWERS 28C-23HZ
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>TVD Reference:</b>	17' RKB + 4909' GL @ 4926.00ft
<b>Reference Site:</b>	WELD_POWER'S PAD	<b>MD Reference:</b>	17' RKB + 4909' GL @ 4926.00ft
<b>Site Error:</b>	0.00 ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	POWERS 28C-23HZ	<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>	POWERS 28C-23HZ	<b>Database:</b>	edm5000p
<b>Reference Design:</b>	POWERS 28C-23HZ (wp01)	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	POWERS 28C-23HZ (wp01)		
<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		

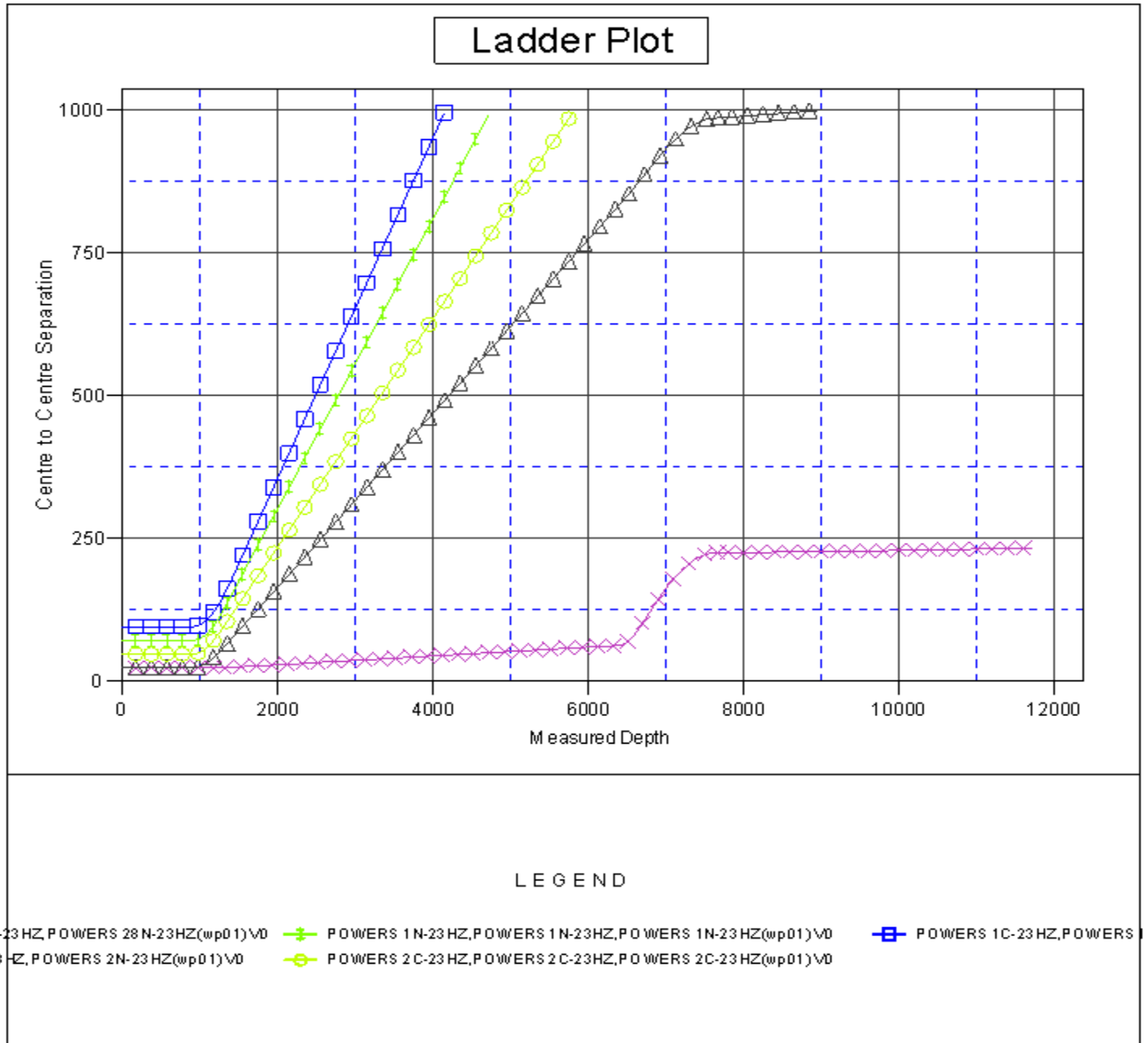
<b>Survey Tool Program</b>	<b>Date</b> 4/29/2011			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.00	11,719.56	POWERS 28C-23HZ (wp01) (POWERS 28C-23HZ)	MWD	MWD - Standard

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_POWER'S PAD						
POWERS 1C-23HZ - POWERS 1C-23HZ - POWERS 1C	900.00	900.00	95.93	92.15	25.359	CC, ES
POWERS 1C-23HZ - POWERS 1C-23HZ - POWERS 1C	1,025.00	1,020.80	101.17	96.88	23.616	SF
POWERS 1N-23HZ - POWERS 1N-23HZ - POWERS 1N	900.00	900.00	71.88	68.09	19.001	CC, ES
POWERS 1N-23HZ - POWERS 1N-23HZ - POWERS 1N	1,000.00	997.52	75.22	71.03	17.953	SF
POWERS 28N-23HZ - POWERS 28N-23HZ - POWERS 28N-23HZ	1,288.20	1,285.07	23.89	18.57	4.491	CC
POWERS 28N-23HZ - POWERS 28N-23HZ - POWERS 28N-23HZ	1,300.00	1,296.77	23.91	18.54	4.454	ES
POWERS 28N-23HZ - POWERS 28N-23HZ - POWERS 28N-23HZ	6,475.00	6,469.17	66.10	33.41	2.022	SF
POWERS 2C-23HZ - POWERS 2C-23HZ - POWERS 2C	900.00	900.00	47.83	44.04	12.643	CC, ES
POWERS 2C-23HZ - POWERS 2C-23HZ - POWERS 2C	975.00	973.82	49.66	45.58	12.148	SF
POWERS 2N-23HZ - POWERS 2N-23HZ - POWERS 2N	900.00	900.00	23.77	19.99	6.284	CC, ES
POWERS 2N-23HZ - POWERS 2N-23HZ - POWERS 2N	950.00	949.76	24.44	20.46	6.134	SF

<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well POWERS 28C-23HZ
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>TVD Reference:</b>	17' RKB + 4909' GL @ 4926.00ft
<b>Reference Site:</b>	WELD_POWERS PAD	<b>MD Reference:</b>	17' RKB + 4909' GL @ 4926.00ft
<b>Site Error:</b>	0.00 ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	POWERS 28C-23HZ	<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>	POWERS 28C-23HZ	<b>Database:</b>	edm5000p
<b>Reference Design:</b>	POWERS 28C-23HZ (wp01)	<b>Offset TVD Reference:</b>	Offset Datum

Reference Depths are relative to 17' RKB + 4909' GL @ 4926.00ft  
Offset Depths are relative to Offset Datum  
Central Meridian is -105.500000

Coordinates are relative to: POWERS 28C-23HZ  
Coordinate System is US State Plane 1983, Colorado Northern Zone  
Grid Convergence at Surface is: 0.56°

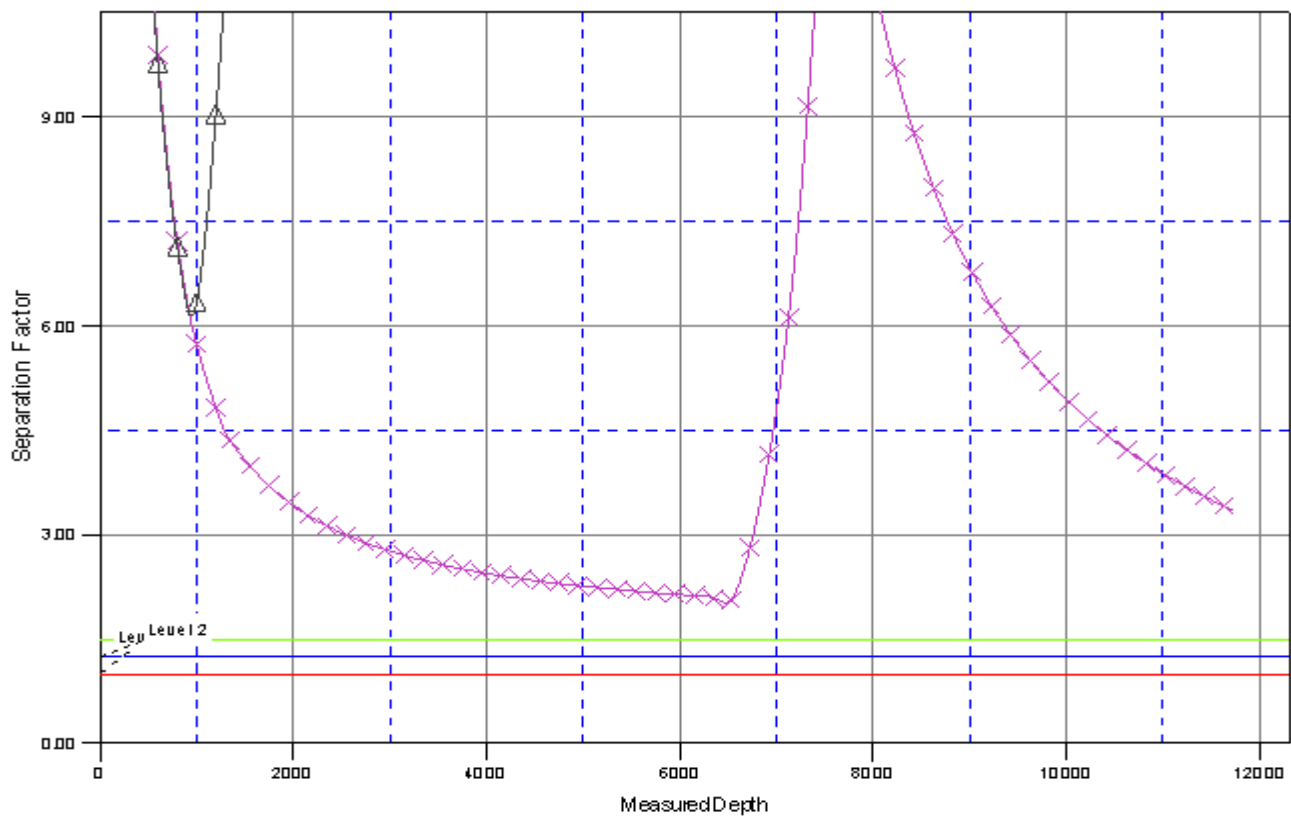


<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well POWERS 28C-23HZ
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>TVD Reference:</b>	17' RKB + 4909' GL @ 4926.00ft
<b>Reference Site:</b>	WELD_POWERS PAD	<b>MD Reference:</b>	17' RKB + 4909' GL @ 4926.00ft
<b>Site Error:</b>	0.00 ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	POWERS 28C-23HZ	<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>	POWERS 28C-23HZ	<b>Database:</b>	edm5000p
<b>Reference Design:</b>	POWERS 28C-23HZ (wp01)	<b>Offset TVD Reference:</b>	Offset Datum




Reference Depths are relative to 17' RKB + 4909' GL @ 4926.00ft  
Offset Depths are relative to Offset Datum  
Central Meridian is -105.500000

Coordinates are relative to: POWERS 28C-23HZ  
Coordinate System is US State Plane 1983, Colorado Northern Zone  
Grid Convergence at Surface is: 0.56°

## Separation Factor Plot



### LEGEND

N-23 HZ, POWERS 28N-23HZ(wp01)\VD     POWERS 1N-23 HZ, POWERS 1N-23HZ, POWERS 1N-23 HZ(wp01)\VD     POWERS 1C-23 HZ, POWERS 1C-23 HZ(wp01)\VD  
23-HZ, POWERS 2N-23 HZ(wp01)\VD     POWERS 2C-23 HZ, POWERS 2C-23HZ, POWERS 2C-23 HZ(wp01)\VD