

# **US ROCKIES REGION PLANNING**

**COLORADO NORTHERN ZONE - 83**

**WELD\_POWERS PAD**

**POWERS 1C-23HZ**

**POWERS 1C-23HZ**

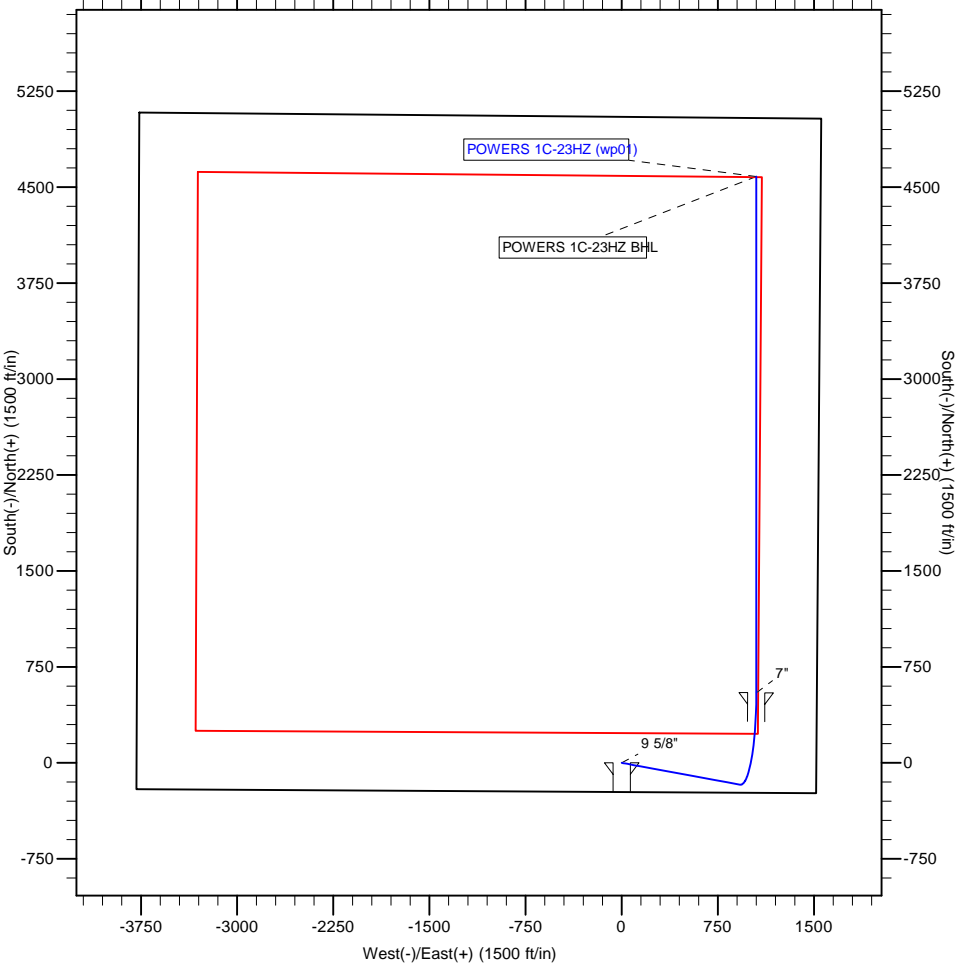
**Plan: POWERS 1C-23HZ (wp01)**

## **Standard Planning Report**

**29 April, 2011**



t(-)/East(+) (1500 ft/in)  
1500 -750 0 750 1500



Azimuths to True North  
Magnetic North: 8.78°

Magnetic Field  
Strength: 53010.5snT  
Dip Angle: 66.85°  
Date: 4/29/2011  
Model: IGRF2010

Project: COLORADO NORTHERN ZONE - 83  
 Site: WELD POWERS PAD  
 Well: POWERS 1C-23HZ  
 Wellbore: POWERS 1C-23HZ  
 Section:  
 SHL:  
 Design: POWERS 1C-23HZ (wp01)  
 Latitude: 40.117416  
 Longitude: -104.627204  
 GL: 4909.00  
 KB: 17' RKB + 4909' GL @ 4926.00ft

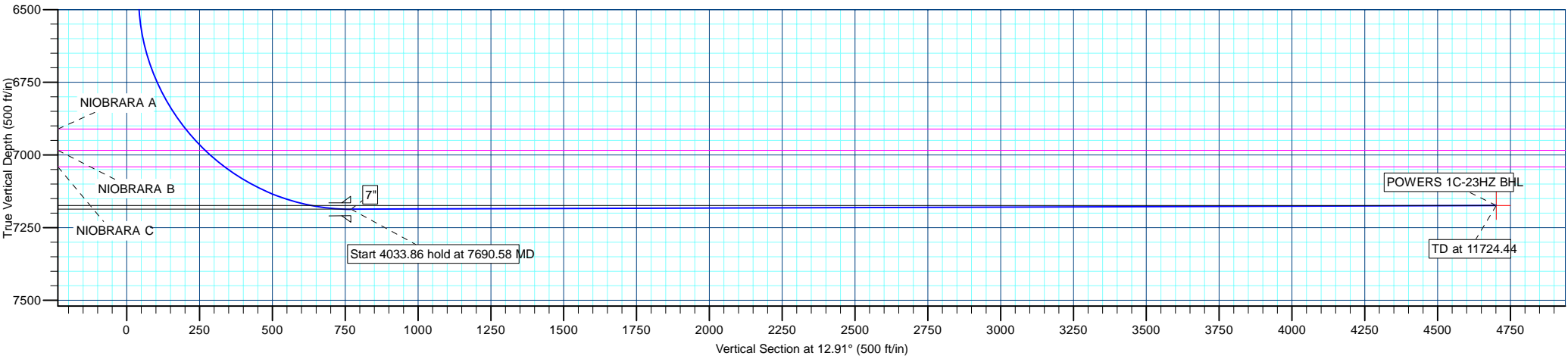
WELL DETAILS: POWERS 1C-23HZ						
+N/-S	+E/-W	Northing	Ground Level: Easting	4909.00	Latitude	Longitude
0.00	0.00	1286819.94	3244092.00	40.117416	-104.627204	Slot

WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)						
Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
POWERS 1C-23HZ BHL	7174.00	4582.30	1050.25	40.129995	-104.623448	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	
1401.50	10.03	100.44	1398.95	-7.93	43.06	2.00	100.44	1.89	
6540.30	10.03	100.44	6459.21	-170.06	923.25	0.00	0.00	40.50	
7690.12	90.18	0.00	7187.00	548.00	1050.25	8.00	-100.25	768.78	
7690.58	90.18	360.00	7187.00	548.46	1050.25	1.00	0.00	769.23	
11724.44	90.18	360.00	7174.00	4582.30	1050.25	0.00	0.00	4701.11	POWERS 1C-23HZ BHL

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
706.00	706.00	BASE FOX HILLS
3956.00	3998.24	PARKMAN
4322.00	4369.93	SUSSEX
6911.00	7031.66	NIOBRARA A
6984.00	7130.61	NIOBRARA B
7041.00	7218.76	NIOBRARA C

CASING DETAILS			
TVD	MD	Name	Size
750.00	750.00	9 5/8"	9-5/8
7187.00	7690.12	7"	7



<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well POWERS 1C-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 1C-23HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	POWERS 1C-23HZ		
<b>Design:</b>	POWERS 1C-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		

<b>Site</b>	WELD_POWERS PAD				
<b>Site Position:</b>		<b>Northing:</b>	1,286,819.50 ft	<b>Latitude:</b>	40.117418
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,243,972.03 ft	<b>Longitude:</b>	-104.627633
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	0 "	<b>Grid Convergence:</b>	0.56 °

<b>Well</b>	POWERS 1C-23HZ					
<b>Well Position</b>	<b>+N/-S</b>	-0.74 ft	<b>Northing:</b>	1,286,819.94 ft	<b>Latitude:</b>	40.117416
	<b>+E/-W</b>	119.98 ft	<b>Easting:</b>	3,244,092.01 ft	<b>Longitude:</b>	-104.627204
<b>Position Uncertainty</b>		0.00 ft	<b>Wellhead Elevation:</b>		<b>Ground Level:</b>	4,909.00 ft

<b>Wellbore</b>	POWERS 1C-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	53,011

<b>Design</b>	POWERS 1C-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	12.91

<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	
1,401.50	10.03	100.44	1,398.95	-7.93	43.06	2.00	2.00	0.00	100.44	
6,540.30	10.03	100.44	6,459.21	-170.06	923.25	0.00	0.00	0.00	0.00	
7,690.12	90.18	0.00	7,187.00	548.00	1,050.25	8.00	6.97	-8.74	-100.25	
7,690.58	90.18	360.00	7,187.00	548.46	1,050.25	1.00	1.00	0.00	0.00	
11,724.44	90.18	360.00	7,174.00	4,582.30	1,050.25	0.00	0.00	0.00	0.00	POWERS 1C-23HZ

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well POWERS 1C-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 1C-23HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	POWERS 1C-23HZ		
<b>Design:</b>	POWERS 1C-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
706.00	0.00	0.00	706.00	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	100.44	999.98	-0.32	1.72	0.08	2.00	2.00	0.00
1,100.00	4.00	100.44	1,099.84	-1.26	6.86	0.30	2.00	2.00	0.00
1,200.00	6.00	100.44	1,199.45	-2.84	15.43	0.68	2.00	2.00	0.00
1,300.00	8.00	100.44	1,298.70	-5.05	27.42	1.20	2.00	2.00	0.00
1,400.00	10.00	100.44	1,397.47	-7.88	42.80	1.88	2.00	2.00	0.00
1,401.50	10.03	100.44	1,398.95	-7.93	43.06	1.89	2.00	2.00	0.00
<b>Start 5138.80 hold at 1401.50 MD</b>									
1,500.00	10.03	100.44	1,495.94	-11.04	59.93	2.63	0.00	0.00	0.00
1,600.00	10.03	100.44	1,594.41	-14.19	77.06	3.38	0.00	0.00	0.00
1,700.00	10.03	100.44	1,692.88	-17.35	94.19	4.13	0.00	0.00	0.00
1,800.00	10.03	100.44	1,791.35	-20.50	111.32	4.88	0.00	0.00	0.00
1,900.00	10.03	100.44	1,889.82	-23.66	128.44	5.63	0.00	0.00	0.00
2,000.00	10.03	100.44	1,988.30	-26.81	145.57	6.39	0.00	0.00	0.00
2,100.00	10.03	100.44	2,086.77	-29.97	162.70	7.14	0.00	0.00	0.00
2,200.00	10.03	100.44	2,185.24	-33.12	179.83	7.89	0.00	0.00	0.00
2,300.00	10.03	100.44	2,283.71	-36.28	196.96	8.64	0.00	0.00	0.00
2,400.00	10.03	100.44	2,382.18	-39.43	214.09	9.39	0.00	0.00	0.00
2,500.00	10.03	100.44	2,480.65	-42.59	231.21	10.14	0.00	0.00	0.00
2,600.00	10.03	100.44	2,579.13	-45.74	248.34	10.89	0.00	0.00	0.00
2,700.00	10.03	100.44	2,677.60	-48.90	265.47	11.65	0.00	0.00	0.00
2,800.00	10.03	100.44	2,776.07	-52.05	282.60	12.40	0.00	0.00	0.00
2,900.00	10.03	100.44	2,874.54	-55.21	299.73	13.15	0.00	0.00	0.00
3,000.00	10.03	100.44	2,973.01	-58.36	316.86	13.90	0.00	0.00	0.00
3,100.00	10.03	100.44	3,071.48	-61.52	333.98	14.65	0.00	0.00	0.00
3,200.00	10.03	100.44	3,169.96	-64.67	351.11	15.40	0.00	0.00	0.00
3,300.00	10.03	100.44	3,268.43	-67.83	368.24	16.15	0.00	0.00	0.00
3,400.00	10.03	100.44	3,366.90	-70.98	385.37	16.90	0.00	0.00	0.00
3,500.00	10.03	100.44	3,465.37	-74.14	402.50	17.66	0.00	0.00	0.00
3,600.00	10.03	100.44	3,563.84	-77.29	419.63	18.41	0.00	0.00	0.00
3,700.00	10.03	100.44	3,662.31	-80.45	436.75	19.16	0.00	0.00	0.00
3,800.00	10.03	100.44	3,760.79	-83.60	453.88	19.91	0.00	0.00	0.00
3,900.00	10.03	100.44	3,859.26	-86.76	471.01	20.66	0.00	0.00	0.00
3,998.24	10.03	100.44	3,956.00	-89.86	487.84	21.40	0.00	0.00	0.00
<b>PARKMAN</b>									
4,000.00	10.03	100.44	3,957.73	-89.91	488.14	21.41	0.00	0.00	0.00
4,100.00	10.03	100.44	4,056.20	-93.07	505.27	22.16	0.00	0.00	0.00
4,200.00	10.03	100.44	4,154.67	-96.22	522.40	22.92	0.00	0.00	0.00
4,300.00	10.03	100.44	4,253.14	-99.38	539.52	23.67	0.00	0.00	0.00
4,369.93	10.03	100.44	4,322.00	-101.58	551.50	24.19	0.00	0.00	0.00

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<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 1C-23HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	POWERS 1C-23HZ		
<b>Design:</b>	POWERS 1C-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	10.03	100.44	4,351.61	-102.53	556.65	24.42	0.00	0.00	0.00
4,500.00	10.03	100.44	4,450.09	-105.69	573.78	25.17	0.00	0.00	0.00
4,600.00	10.03	100.44	4,548.56	-108.84	590.91	25.92	0.00	0.00	0.00
4,700.00	10.03	100.44	4,647.03	-112.00	608.04	26.67	0.00	0.00	0.00
4,800.00	10.03	100.44	4,745.50	-115.15	625.17	27.42	0.00	0.00	0.00
4,900.00	10.03	100.44	4,843.97	-118.31	642.29	28.18	0.00	0.00	0.00
5,000.00	10.03	100.44	4,942.44	-121.46	659.42	28.93	0.00	0.00	0.00
5,100.00	10.03	100.44	5,040.92	-124.62	676.55	29.68	0.00	0.00	0.00
5,200.00	10.03	100.44	5,139.39	-127.77	693.68	30.43	0.00	0.00	0.00
5,300.00	10.03	100.44	5,237.86	-130.93	710.81	31.18	0.00	0.00	0.00
5,400.00	10.03	100.44	5,336.33	-134.08	727.94	31.93	0.00	0.00	0.00
5,500.00	10.03	100.44	5,434.80	-137.24	745.07	32.68	0.00	0.00	0.00
5,600.00	10.03	100.44	5,533.27	-140.39	762.19	33.43	0.00	0.00	0.00
5,700.00	10.03	100.44	5,631.75	-143.55	779.32	34.19	0.00	0.00	0.00
5,800.00	10.03	100.44	5,730.22	-146.70	796.45	34.94	0.00	0.00	0.00
5,900.00	10.03	100.44	5,828.69	-149.86	813.58	35.69	0.00	0.00	0.00
6,000.00	10.03	100.44	5,927.16	-153.01	830.71	36.44	0.00	0.00	0.00
6,100.00	10.03	100.44	6,025.63	-156.17	847.84	37.19	0.00	0.00	0.00
6,200.00	10.03	100.44	6,124.10	-159.32	864.96	37.94	0.00	0.00	0.00
6,300.00	10.03	100.44	6,222.58	-162.48	882.09	38.69	0.00	0.00	0.00
6,400.00	10.03	100.44	6,321.05	-165.63	899.22	39.45	0.00	0.00	0.00
6,500.00	10.03	100.44	6,419.52	-168.79	916.35	40.20	0.00	0.00	0.00
6,540.30	10.03	100.44	6,459.21	-170.06	923.25	40.50	0.00	0.00	0.00
<b>Start DLS 8.00 TFO -100.25</b>									
6,600.00	10.30	73.17	6,518.00	-169.45	933.48	43.37	8.00	0.46	-45.67
6,700.00	14.72	41.51	6,615.71	-157.33	950.48	58.99	8.00	4.41	-31.67
6,800.00	21.30	26.53	6,710.81	-131.53	967.04	87.84	8.00	6.58	-14.98
6,900.00	28.59	18.64	6,801.44	-92.54	982.83	129.37	8.00	7.29	-7.89
7,000.00	36.17	13.80	6,885.85	-41.12	997.54	182.77	8.00	7.57	-4.84
7,031.66	38.60	12.62	6,911.00	-22.41	1,001.93	201.99	8.00	7.67	-3.72
<b>NIOBRARA A</b>									
7,100.00	43.88	10.46	6,962.38	21.71	1,010.89	247.00	8.00	7.72	-3.17
7,130.61	46.25	9.62	6,984.00	43.05	1,014.66	268.64	8.00	7.76	-2.74
<b>NIOBRARA B</b>									
7,200.00	51.66	7.94	7,029.55	94.75	1,022.61	320.81	8.00	7.79	-2.42
7,218.76	53.12	7.53	7,041.00	109.48	1,024.61	335.62	8.00	7.81	-2.19
<b>NIOBRARA C</b>									
7,300.00	59.48	5.92	7,086.05	176.57	1,032.49	402.77	8.00	7.83	-1.99
7,400.00	67.33	4.20	7,130.78	265.57	1,040.32	491.27	8.00	7.85	-1.72
7,500.00	75.20	2.67	7,162.88	360.03	1,045.95	584.60	8.00	7.87	-1.53
7,600.00	83.08	1.24	7,181.70	458.10	1,049.28	680.94	8.00	7.88	-1.42
7,690.12	90.18	0.00	7,187.00	548.00	1,050.25	768.78	8.00	7.88	-1.38
<b>7"</b>									
7,690.58	90.18	360.00	7,187.00	548.46	1,050.25	769.23	1.01	1.01	0.00
<b>Start 4033.86 hold at 7690.58 MD</b>									
7,700.00	90.18	360.00	7,186.97	557.88	1,050.25	778.41	0.00	0.00	0.00
7,800.00	90.18	360.00	7,186.65	657.88	1,050.25	875.88	0.00	0.00	0.00
7,900.00	90.18	360.00	7,186.32	757.88	1,050.25	973.35	0.00	0.00	0.00
8,000.00	90.18	360.00	7,186.00	857.88	1,050.25	1,070.83	0.00	0.00	0.00
8,100.00	90.18	360.00	7,185.68	957.88	1,050.25	1,168.30	0.00	0.00	0.00
8,200.00	90.18	360.00	7,185.36	1,057.88	1,050.25	1,265.77	0.00	0.00	0.00
8,300.00	90.18	360.00	7,185.03	1,157.88	1,050.25	1,363.24	0.00	0.00	0.00

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well POWERS 1C-23HZ
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<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 1C-23HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	POWERS 1C-23HZ		
<b>Design:</b>	POWERS 1C-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)
8,400.00	90.18	360.00	7,184.71	1,257.88	1,050.25	1,460.72	0.00	0.00	0.00
8,500.00	90.18	360.00	7,184.39	1,357.88	1,050.25	1,558.19	0.00	0.00	0.00
8,600.00	90.18	360.00	7,184.07	1,457.87	1,050.25	1,655.66	0.00	0.00	0.00
8,700.00	90.18	360.00	7,183.75	1,557.87	1,050.25	1,753.13	0.00	0.00	0.00
8,800.00	90.18	360.00	7,183.42	1,657.87	1,050.25	1,850.60	0.00	0.00	0.00
8,900.00	90.18	360.00	7,183.10	1,757.87	1,050.25	1,948.08	0.00	0.00	0.00
9,000.00	90.18	360.00	7,182.78	1,857.87	1,050.25	2,045.55	0.00	0.00	0.00
9,100.00	90.18	360.00	7,182.46	1,957.87	1,050.25	2,143.02	0.00	0.00	0.00
9,200.00	90.18	360.00	7,182.13	2,057.87	1,050.25	2,240.49	0.00	0.00	0.00
9,300.00	90.18	360.00	7,181.81	2,157.87	1,050.25	2,337.96	0.00	0.00	0.00
9,400.00	90.18	360.00	7,181.49	2,257.87	1,050.25	2,435.44	0.00	0.00	0.00
9,500.00	90.18	360.00	7,181.17	2,357.87	1,050.25	2,532.91	0.00	0.00	0.00
9,600.00	90.18	360.00	7,180.85	2,457.87	1,050.25	2,630.38	0.00	0.00	0.00
9,700.00	90.18	360.00	7,180.52	2,557.87	1,050.25	2,727.85	0.00	0.00	0.00
9,800.00	90.18	360.00	7,180.20	2,657.87	1,050.25	2,825.32	0.00	0.00	0.00
9,900.00	90.18	360.00	7,179.88	2,757.87	1,050.25	2,922.80	0.00	0.00	0.00
10,000.00	90.18	360.00	7,179.56	2,857.87	1,050.25	3,020.27	0.00	0.00	0.00
10,100.00	90.18	360.00	7,179.23	2,957.87	1,050.25	3,117.74	0.00	0.00	0.00
10,200.00	90.18	360.00	7,178.91	3,057.87	1,050.25	3,215.21	0.00	0.00	0.00
10,300.00	90.18	360.00	7,178.59	3,157.87	1,050.25	3,312.68	0.00	0.00	0.00
10,400.00	90.18	360.00	7,178.27	3,257.87	1,050.25	3,410.16	0.00	0.00	0.00
10,500.00	90.18	360.00	7,177.95	3,357.86	1,050.25	3,507.63	0.00	0.00	0.00
10,600.00	90.18	360.00	7,177.62	3,457.86	1,050.25	3,605.10	0.00	0.00	0.00
10,700.00	90.18	360.00	7,177.30	3,557.86	1,050.25	3,702.57	0.00	0.00	0.00
10,800.00	90.18	360.00	7,176.98	3,657.86	1,050.25	3,800.04	0.00	0.00	0.00
10,900.00	90.18	360.00	7,176.66	3,757.86	1,050.25	3,897.52	0.00	0.00	0.00
11,000.00	90.18	360.00	7,176.33	3,857.86	1,050.25	3,994.99	0.00	0.00	0.00
11,100.00	90.18	360.00	7,176.01	3,957.86	1,050.25	4,092.46	0.00	0.00	0.00
11,200.00	90.18	360.00	7,175.69	4,057.86	1,050.25	4,189.93	0.00	0.00	0.00
11,300.00	90.18	360.00	7,175.37	4,157.86	1,050.25	4,287.41	0.00	0.00	0.00
11,400.00	90.18	360.00	7,175.05	4,257.86	1,050.25	4,384.88	0.00	0.00	0.00
11,500.00	90.18	360.00	7,174.72	4,357.86	1,050.25	4,482.35	0.00	0.00	0.00
11,600.00	90.18	360.00	7,174.40	4,457.86	1,050.25	4,579.82	0.00	0.00	0.00
11,700.00	90.18	360.00	7,174.08	4,557.86	1,050.25	4,677.29	0.00	0.00	0.00
11,724.44	90.18	360.00	7,174.00	4,582.30	1,050.25	4,701.11	0.00	0.00	0.00

TD at 11724.44 - POWERS 1C-23HZ BHL

**Design Targets**

**Target Name**

- hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
POWERS 1C-23HZ B - plan hits target center - Point	0.00	0.00	7,174.00	4,582.30	1,050.25	1,291,412.36	3,245,097.11	40.129995	-104.623448

<b>Database:</b>	edm5000p	<b>Local Co-ordinate Reference:</b>	Well POWERS 1C-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 1C-23HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	POWERS 1C-23HZ		
<b>Design:</b>	POWERS 1C-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
7,690.12	7,187.00	7"		7	8-3/4

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
706.00	706.00	BASE FOX HILLS		0.00		
3,998.24	3,956.00	PARKMAN		0.00		
4,369.93	4,322.00	SUSSEX		0.00		
7,031.66	6,911.00	NIOBRARA A		0.00		
7,130.61	6,984.00	NIOBRARA B		0.00		
7,218.76	7,041.00	NIOBRARA C		0.00		

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
900.00	900.00	0.00	0.00	Start Build 2.00	
1,401.50	1,398.95	-7.93	43.06	Start 5138.80 hold at 1401.50 MD	
6,540.30	6,459.21	-170.06	923.25	Start DLS 8.00 TFO -100.25	
7,690.58	7,187.00	548.46	1,050.25	Start 4033.86 hold at 7690.58 MD	
11,724.44	7,174.00	4,582.30	1,050.25	TD at 11724.44	

# **US ROCKIES REGION PLANNING**

**COLORADO NORTHERN ZONE - 83  
WELD\_POWER PAD  
POWERS 1C-23HZ**

**POWERS 1C-23HZ  
POWERS 1C-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 1C-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 1C-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 1C-23HZ	<b>Database:</b>	edm5000p
<b>Reference Design:</b>	POWERS 1C-23HZ (wp01)	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	POWERS 1C-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	11,724.44	POWERS 1C-23HZ (wp01) (POWERS 1C	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_POWERS PAD						
POWERS 1N-23HZ - POWERS 1N-23HZ - POWERS 1N	900.00	900.00	24.05	20.27	6.359	CC
POWERS 1N-23HZ - POWERS 1N-23HZ - POWERS 1N	1,275.00	1,278.02	24.31	19.03	4.600	ES
POWERS 1N-23HZ - POWERS 1N-23HZ - POWERS 1N	11,724.44	11,460.55	393.82	242.22	2.598	SF
POWERS 28C-23HZ - POWERS 28C-23HZ - POWERS 28C-23HZ	900.00	900.00	95.93	92.15	25.359	CC, ES
POWERS 28C-23HZ - POWERS 28C-23HZ - POWERS 28C-23HZ	1,025.00	1,020.86	101.17	96.89	23.616	SF
POWERS 28N-23HZ - POWERS 28N-23HZ - POWERS 28N-23HZ	900.00	900.00	119.98	116.20	31.717	CC, ES
POWERS 28N-23HZ - POWERS 28N-23HZ - POWERS 28N-23HZ	1,075.00	1,067.59	130.21	125.74	29.135	SF
POWERS 2C-23HZ - POWERS 2C-23HZ - POWERS 2C	900.00	900.00	48.10	44.32	12.717	CC
POWERS 2C-23HZ - POWERS 2C-23HZ - POWERS 2C	1,075.00	1,077.73	48.40	43.92	10.792	ES
POWERS 2C-23HZ - POWERS 2C-23HZ - POWERS 2C	11,724.44	11,655.47	659.97	481.05	3.689	SF
POWERS 2N-23HZ - POWERS 2N-23HZ - POWERS 2N	900.00	900.00	72.16	68.38	19.075	CC
POWERS 2N-23HZ - POWERS 2N-23HZ - POWERS 2N	925.00	925.37	72.20	68.32	18.585	ES
POWERS 2N-23HZ - POWERS 2N-23HZ - POWERS 2N	1,150.00	1,151.43	78.67	73.92	16.558	SF

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

<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well POWERS 1C-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 1C-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 1C-23HZ	<b>Database:</b>	edm5000p
<b>Reference Design:</b>	POWERS 1C-23HZ (wp01)	<b>Offset TVD Reference:</b>	Offset Datum

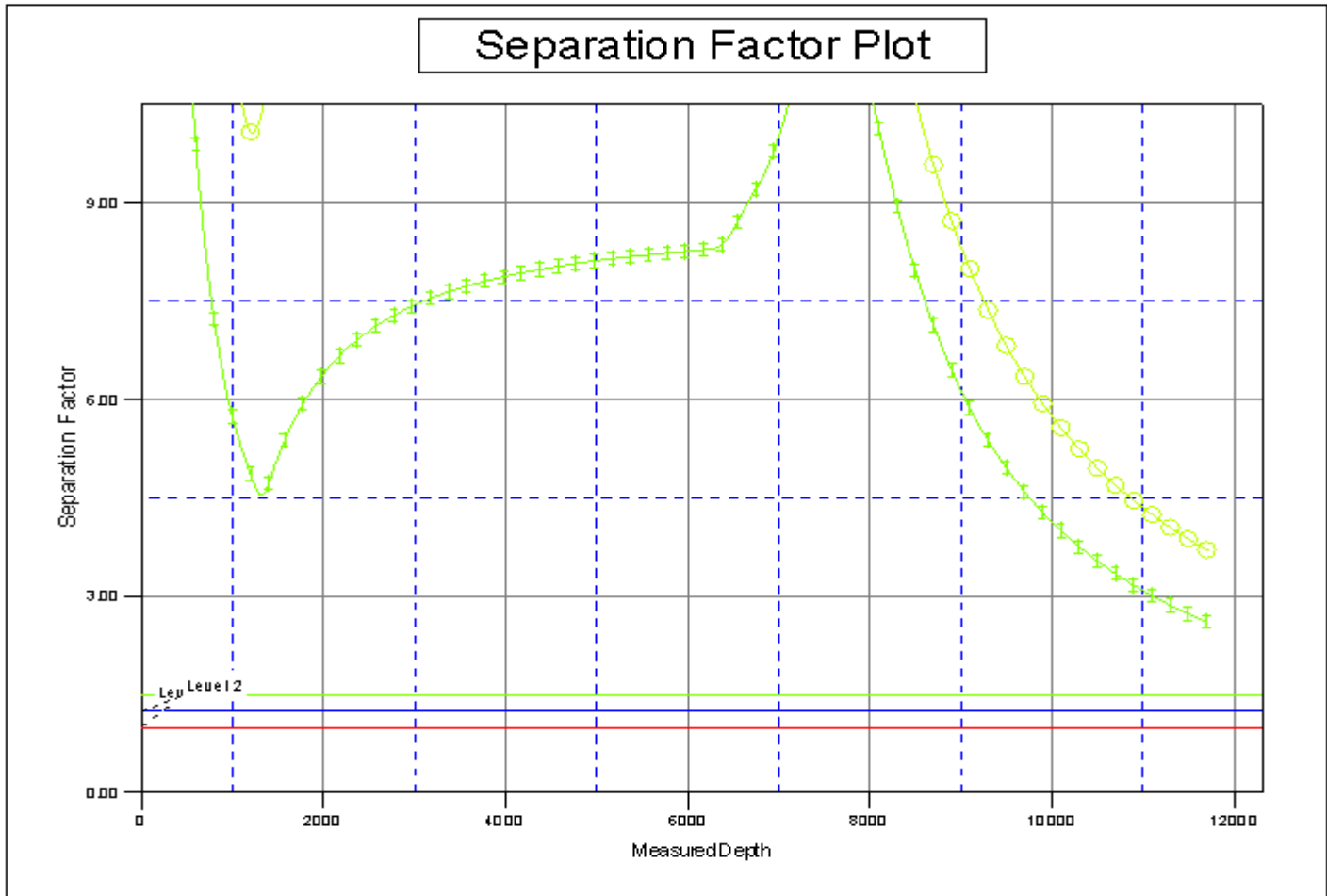
Reference Depths are relative to 17' RKB + 4909' GL @ 4926.00ft  
 Offset Depths are relative to Offset Datum  
 Central Meridian is -105.500000

Coordinates are relative to: POWERS 1C-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 1C-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 1C-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 1C-23HZ	<b>Database:</b>	edm5000p
<b>Reference Design:</b>	POWERS 1C-23HZ (wp01)	<b>Offset TVD Reference:</b>	Offset Datum

Reference Depths are relative to 17' RKB + 4909' GL @ 4926.00ft      Coordinates are relative to: POWERS 1C-23HZ  
 Offset Depths are relative to Offset Datum      Coordinate System is US State Plane 1983, Colorado Northern Zone  
 Central Meridian is -105.500000      Grid Convergence at Surface is: 0.56°



LEGEND

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