

# **US ROCKIES REGION PLANNING**

**COLORADO NORTHERN ZONE - 83**

**WELD\_HEIN 2-1 PAD**

**HEIN 8-1**

**HEIN 8-1**

**Plan: HEIN 8-1 (wp02)**

## **Standard Planning Report**

**09 January, 2012**

Project: COLORADO NORTHERN ZONE - 83  
Site: WELD\_HEIN 2-1 PAD  
Well: HEIN 8-1  
Wellbore: HEIN 8-1  
Section:  
SHL:  
Design: HEIN 8-1 (wp02)  
Latitude: 40.081973  
Longitude: -104.836624  
GL: 4893.00  
KB: 15' rkb + 4893' gl @ 4908.00ft

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
4008.00	4182.94	PK Depth
4470.00	4652.01	SX Depth
7166.00	7348.51	NIO Depth
7485.00	7667.51	CD Depth
7572.00	7754.51	GH Depth
8098.00	8280.51	DK Depth

WELL DETAILS: HEIN 8-1						
+N/-S	+E/-W	Northing	Ground Level: Easting	4893.00 Latitude	Longitude	Slot
0.00	0.00	1273401.89	3185622.05	40.081973	-104.836624	

CASING DETAILS			
TVD	MD	Name	Size
915.00	919.82	8-5/8"	8-5/8

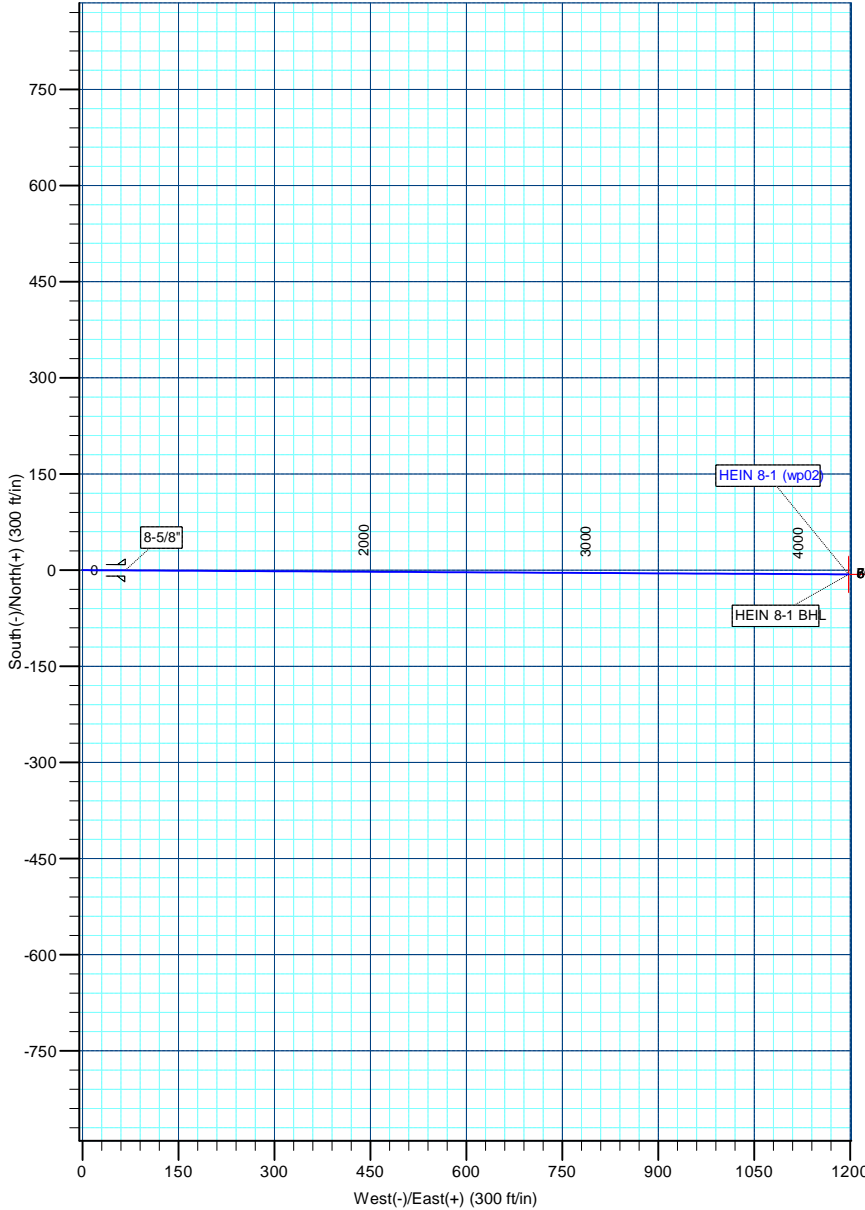
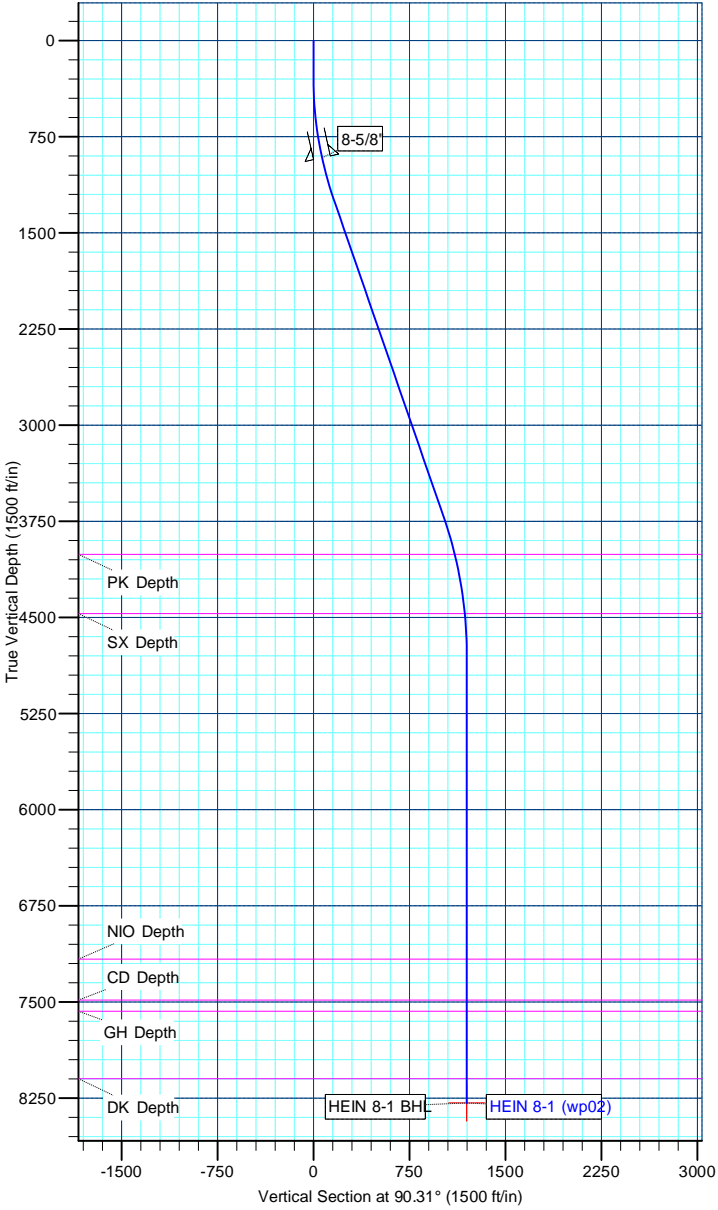
T  
M

Azimuths to True North  
Magnetic North: 8.95°

Magnetic Field  
Strength: 53012.1snT  
Dip Angle: 66.80°  
Date: 12/1/2010  
Model: IGRF2010

DESIGN TARGET DETAILS									
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape	
HEIN 8-1 BHL	8288.00	-6.52	1197.62	1273404.34	3186819.68	40.081955	-104.832344	Point	

SECTION DETAILS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	
1256.21	19.12	90.31	1238.55	-0.86	158.10	2.00	90.31	158.10	
3877.71	19.12	90.31	3715.37	-5.53	1016.93	0.00	0.00	1016.95	
4970.51	0.00	0.00	4788.00	-6.52	1197.62	1.75	180.00	1197.64	
8470.51	0.00	0.00	8288.00	-6.52	1197.62	0.00	0.00	1197.64	



# Anadarko Petroleum Corp

## Planning Report

<b>Database:</b>	edmp	<b>Local Co-ordinate Reference:</b>	Well HEIN 8-1
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	15' rkb + 4893' gl @ 4908.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	15' rkb + 4893' gl @ 4908.00ft
<b>Site:</b>	WELD_HEIN 2-1 PAD	<b>North Reference:</b>	True
<b>Well:</b>	HEIN 8-1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HEIN 8-1		
<b>Design:</b>	HEIN 8-1 (wp02)		

<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_HEIN 2-1 PAD			
<b>Site Position:</b>		<b>Northing:</b>	1,273,385.87 usft	<b>Latitude:</b> 40.081929
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,185,622.17 usft	<b>Longitude:</b> -104.836624
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	0 "	<b>Grid Convergence:</b> 0.43 °

<b>Well</b>	HEIN 8-1			
<b>Well Position</b>	<b>+N/-S</b>	16.02 ft	<b>Northing:</b>	1,273,401.89 usft
	<b>+E/-W</b>	0.00 ft	<b>Easting:</b>	3,185,622.05 usft
<b>Position Uncertainty</b>		0.00 ft	<b>Wellhead Elevation:</b>	<b>Ground Level:</b> 4,893.00 ft

<b>Wellbore</b>	HEIN 8-1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	12/1/2010	8.95	66.80	53,012

<b>Design</b>	HEIN 8-1 (wp02)			
<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	90.31

<b>Plan Sections</b>										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,256.21	19.12	90.31	1,238.55	-0.86	158.10	2.00	2.00	0.00	90.31	
3,877.71	19.12	90.31	3,715.37	-5.53	1,016.93	0.00	0.00	0.00	0.00	
4,970.51	0.00	0.00	4,788.00	-6.52	1,197.62	1.75	-1.75	0.00	180.00	
8,470.51	0.00	0.00	8,288.00	-6.52	1,197.62	0.00	0.00	0.00	0.00	HEIN 8-1 BHL

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## Planning Report

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<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	15' rkb + 4893' gl @ 4908.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	15' rkb + 4893' gl @ 4908.00ft
<b>Site:</b>	WELD_HEIN 2-1 PAD	<b>North Reference:</b>	True
<b>Well:</b>	HEIN 8-1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HEIN 8-1		
<b>Design:</b>	HEIN 8-1 (wp02)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
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
Start Build 2.00									
400.00	2.00	90.31	399.98	-0.01	1.75	1.75	2.00	2.00	0.00
500.00	4.00	90.31	499.84	-0.04	6.98	6.98	2.00	2.00	0.00
600.00	6.00	90.31	599.45	-0.09	15.69	15.69	2.00	2.00	0.00
700.00	8.00	90.31	698.70	-0.15	27.88	27.88	2.00	2.00	0.00
800.00	10.00	90.31	797.47	-0.24	43.52	43.52	2.00	2.00	0.00
900.00	12.00	90.31	895.62	-0.34	62.60	62.60	2.00	2.00	0.00
919.82	12.40	90.31	915.00	-0.36	66.79	66.79	2.00	2.00	0.00
8-5/8"									
1,000.00	14.00	90.31	993.06	-0.46	85.10	85.10	2.00	2.00	0.00
1,100.00	16.00	90.31	1,089.64	-0.60	110.98	110.98	2.00	2.00	0.00
1,200.00	18.00	90.31	1,185.27	-0.76	140.21	140.21	2.00	2.00	0.00
1,256.21	19.12	90.31	1,238.55	-0.86	158.10	158.10	2.00	2.00	0.00
Start 2621.50 hold at 1256.21 MD									
1,300.00	19.12	90.31	1,279.93	-0.94	172.45	172.45	0.00	0.00	0.00
1,400.00	19.12	90.31	1,374.41	-1.12	205.21	205.21	0.00	0.00	0.00
1,500.00	19.12	90.31	1,468.89	-1.29	237.97	237.97	0.00	0.00	0.00
1,600.00	19.12	90.31	1,563.37	-1.47	270.73	270.74	0.00	0.00	0.00
1,700.00	19.12	90.31	1,657.85	-1.65	303.49	303.50	0.00	0.00	0.00
1,800.00	19.12	90.31	1,752.33	-1.83	336.25	336.26	0.00	0.00	0.00
1,900.00	19.12	90.31	1,846.81	-2.01	369.02	369.02	0.00	0.00	0.00
2,000.00	19.12	90.31	1,941.29	-2.19	401.78	401.78	0.00	0.00	0.00
2,100.00	19.12	90.31	2,035.78	-2.36	434.54	434.54	0.00	0.00	0.00
2,200.00	19.12	90.31	2,130.26	-2.54	467.30	467.31	0.00	0.00	0.00
2,300.00	19.12	90.31	2,224.74	-2.72	500.06	500.07	0.00	0.00	0.00
2,400.00	19.12	90.31	2,319.22	-2.90	532.82	532.83	0.00	0.00	0.00
2,500.00	19.12	90.31	2,413.70	-3.08	565.58	565.59	0.00	0.00	0.00
2,600.00	19.12	90.31	2,508.18	-3.26	598.34	598.35	0.00	0.00	0.00
2,700.00	19.12	90.31	2,602.66	-3.43	631.10	631.11	0.00	0.00	0.00
2,800.00	19.12	90.31	2,697.14	-3.61	663.86	663.87	0.00	0.00	0.00
2,900.00	19.12	90.31	2,791.63	-3.79	696.63	696.64	0.00	0.00	0.00
3,000.00	19.12	90.31	2,886.11	-3.97	729.39	729.40	0.00	0.00	0.00
3,100.00	19.12	90.31	2,980.59	-4.15	762.15	762.16	0.00	0.00	0.00
3,200.00	19.12	90.31	3,075.07	-4.32	794.91	794.92	0.00	0.00	0.00
3,300.00	19.12	90.31	3,169.55	-4.50	827.67	827.68	0.00	0.00	0.00
3,400.00	19.12	90.31	3,264.03	-4.68	860.43	860.44	0.00	0.00	0.00
3,500.00	19.12	90.31	3,358.51	-4.86	893.19	893.20	0.00	0.00	0.00
3,600.00	19.12	90.31	3,452.99	-5.04	925.95	925.97	0.00	0.00	0.00
3,700.00	19.12	90.31	3,547.47	-5.22	958.71	958.73	0.00	0.00	0.00
3,800.00	19.12	90.31	3,641.96	-5.39	991.47	991.49	0.00	0.00	0.00
3,877.71	19.12	90.31	3,715.37	-5.53	1,016.93	1,016.95	0.00	0.00	0.00
Start Drop -1.75									
3,900.00	18.73	90.31	3,736.46	-5.57	1,024.16	1,024.18	1.75	-1.75	0.00
4,000.00	16.98	90.31	3,831.64	-5.74	1,054.83	1,054.84	1.75	-1.75	0.00
4,100.00	15.23	90.31	3,927.71	-5.89	1,082.57	1,082.59	1.75	-1.75	0.00
4,182.94	13.78	90.31	4,008.00	-6.00	1,103.35	1,103.37	1.75	-1.75	0.00
PK Depth									
4,200.00	13.48	90.31	4,024.58	-6.02	1,107.37	1,107.39	1.75	-1.75	0.00
4,300.00	11.73	90.31	4,122.17	-6.14	1,129.20	1,129.22	1.75	-1.75	0.00
4,400.00	9.98	90.31	4,220.37	-6.25	1,148.04	1,148.06	1.75	-1.75	0.00

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## Planning Report

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<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	15' rkb + 4893' gl @ 4908.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	15' rkb + 4893' gl @ 4908.00ft
<b>Site:</b>	WELD_HEIN 2-1 PAD	<b>North Reference:</b>	True
<b>Well:</b>	HEIN 8-1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HEIN 8-1		
<b>Design:</b>	HEIN 8-1 (wp02)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,500.00	8.23	90.31	4,319.11	-6.33	1,163.87	1,163.89	1.75	-1.75	0.00
4,600.00	6.48	90.31	4,418.28	-6.40	1,176.68	1,176.69	1.75	-1.75	0.00
4,652.01	5.57	90.31	4,470.00	-6.43	1,182.14	1,182.16	1.75	-1.75	0.00
<b>SX Depth</b>									
4,700.00	4.73	90.31	4,517.80	-6.45	1,186.45	1,186.47	1.75	-1.75	0.00
4,800.00	2.98	90.31	4,617.57	-6.49	1,193.18	1,193.20	1.75	-1.75	0.00
4,900.00	1.23	90.31	4,717.49	-6.51	1,196.86	1,196.88	1.75	-1.75	0.00
4,970.51	0.00	0.00	4,788.00	-6.52	1,197.62	1,197.64	1.75	-1.75	0.00
<b>Start 3500.00 hold at 4970.51 MD</b>									
5,000.00	0.00	0.00	4,817.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
5,100.00	0.00	0.00	4,917.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
5,200.00	0.00	0.00	5,017.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
5,300.00	0.00	0.00	5,117.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
5,400.00	0.00	0.00	5,217.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
5,500.00	0.00	0.00	5,317.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
5,600.00	0.00	0.00	5,417.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
5,700.00	0.00	0.00	5,517.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
5,800.00	0.00	0.00	5,617.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
5,900.00	0.00	0.00	5,717.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
6,000.00	0.00	0.00	5,817.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
6,100.00	0.00	0.00	5,917.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
6,200.00	0.00	0.00	6,017.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
6,300.00	0.00	0.00	6,117.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
6,400.00	0.00	0.00	6,217.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
6,500.00	0.00	0.00	6,317.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
6,600.00	0.00	0.00	6,417.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
6,700.00	0.00	0.00	6,517.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
6,800.00	0.00	0.00	6,617.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
6,900.00	0.00	0.00	6,717.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
7,000.00	0.00	0.00	6,817.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
7,100.00	0.00	0.00	6,917.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
7,200.00	0.00	0.00	7,017.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
7,300.00	0.00	0.00	7,117.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
7,348.51	0.00	0.00	7,166.00	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
<b>NIO Depth</b>									
7,400.00	0.00	0.00	7,217.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
7,500.00	0.00	0.00	7,317.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
7,600.00	0.00	0.00	7,417.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
7,667.51	0.00	0.00	7,485.00	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
<b>CD Depth</b>									
7,700.00	0.00	0.00	7,517.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
7,754.51	0.00	0.00	7,572.00	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
<b>GH Depth</b>									
7,800.00	0.00	0.00	7,617.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
7,900.00	0.00	0.00	7,717.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
8,000.00	0.00	0.00	7,817.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
8,100.00	0.00	0.00	7,917.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
8,200.00	0.00	0.00	8,017.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
8,280.51	0.00	0.00	8,098.00	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
<b>DK Depth</b>									
8,300.00	0.00	0.00	8,117.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
8,400.00	0.00	0.00	8,217.49	-6.52	1,197.62	1,197.64	0.00	0.00	0.00
8,470.51	0.00	0.00	8,288.00	-6.52	1,197.62	1,197.64	0.00	0.00	0.00

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## Planning Report

<b>Database:</b>	edmp	<b>Local Co-ordinate Reference:</b>	Well HEIN 8-1
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	15' rkb + 4893' gl @ 4908.00ft
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	15' rkb + 4893' gl @ 4908.00ft
<b>Site:</b>	WELD_HEIN 2-1 PAD	<b>North Reference:</b>	True
<b>Well:</b>	HEIN 8-1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HEIN 8-1		
<b>Design:</b>	HEIN 8-1 (wp02)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
TD at 8470.51 - HEIN 8-1 BHL									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
HEIN 8-1 BHL	0.00	0.00	8,288.00	-6.52	1,197.62	1,273,404.33	3,186,819.68	40.081955	-104.832344
- hit/miss target									
- Shape									
- plan hits target center									
- Point									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
919.82	915.00	8-5/8"	8-5/8	11	

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
4,182.94	4,008.00	PK Depth				
4,652.01	4,470.00	SX Depth				
7,348.51	7,166.00	NIO Depth				
7,667.51	7,485.00	CD Depth				
7,754.51	7,572.00	GH Depth				
8,280.51	8,098.00	DK Depth				

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
300.00	300.00	0.00	0.00	Start Build 2.00	
1,256.21	1,238.55	-0.86	158.10	Start 2621.50 hold at 1256.21 MD	
3,877.71	3,715.37	-5.53	1,016.93	Start Drop -1.75	
4,970.51	4,788.00	-6.52	1,197.62	Start 3500.00 hold at 4970.51 MD	
8,470.51	8,288.00	-6.52	1,197.62	TD at 8470.51	