

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

WELD_CROWDER 27-18HZ PAD

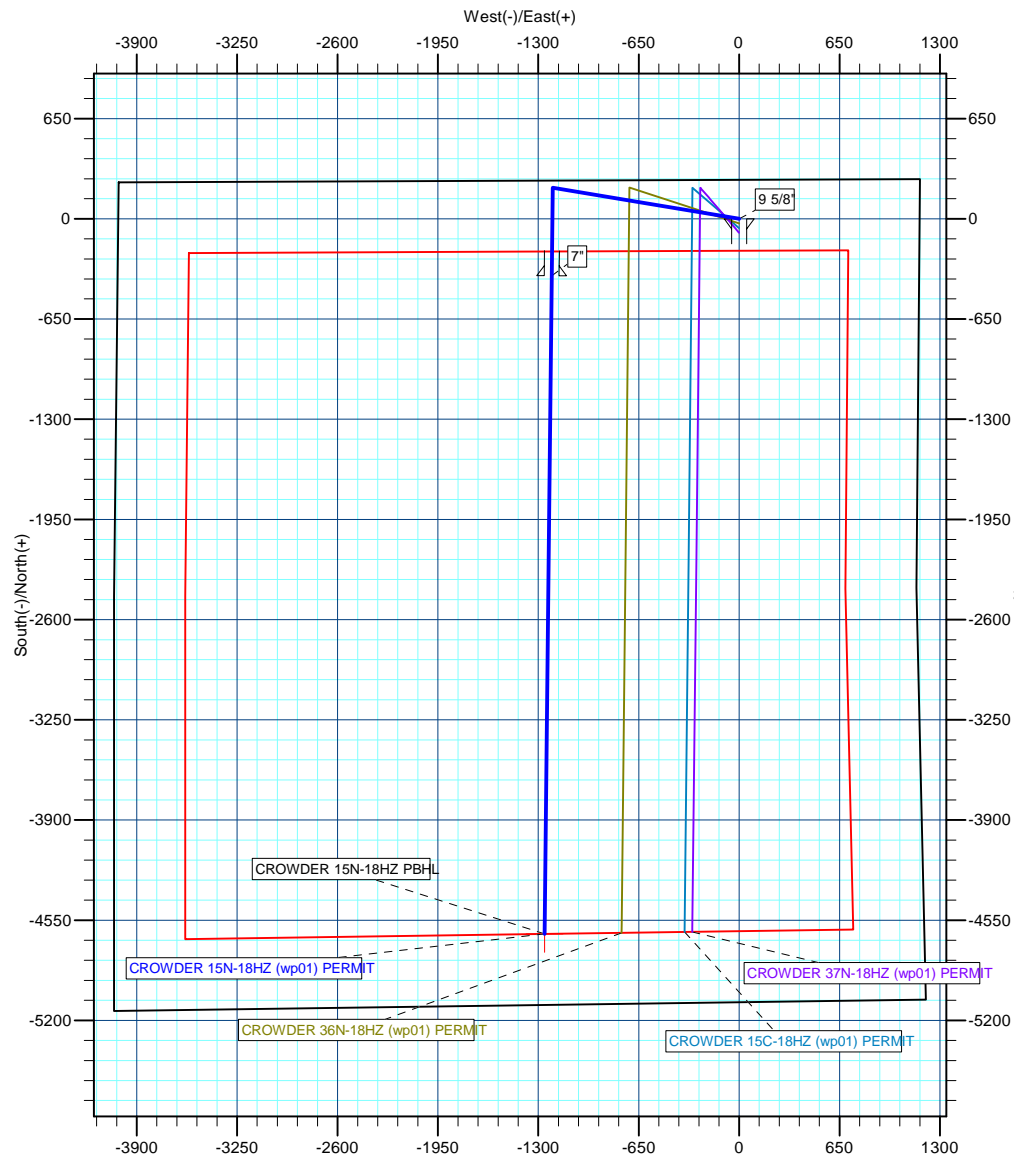
CROWDER 15N-18HZ

CROWDER 15N-18HZ

Plan: CROWDER 15N-18HZ (wp01) PERMIT

Standard Planning Report

05 October, 2012



Azimuths to True North
 Magnetic North: 8.63°
 Magnetic Field
 Strength: 52866.5nT
 Dip Angle: 66.81°
 Date: 10/1/2012
 Model: IGRF2010



Project: COLORADO NORTHERN ZONE - 83
 Site: WELD_CROWDER 27-18HZ PAD
 Well: CROWDER 15N-18HZ
 Wellbore: CROWDER 15N-18HZ
 Section:
 SHL:
 Design: CROWDER 15N-18HZ (wp01) PERMIT
 Latitude: 40.145253
 Longitude: -104.701455
 GL: 4957.00
 KB: 17' RKB+4957'GL @ 4974.00ft

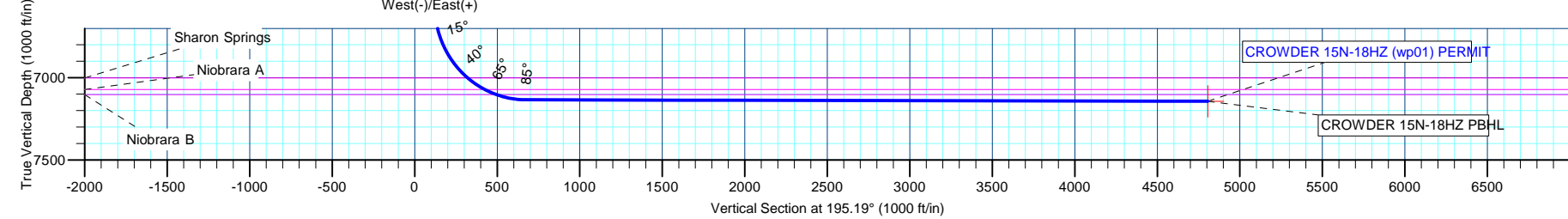
WELL DETAILS: CROWDER 15N-18HZ						
+N/-S	+E/-W	Northing	Ground Level: Easting	4957.00 Latitude	40.145253 Longitude	Slot
0.00	0.00	1296764.28	3223235.74			

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
1300.00	0.00	0.00	1300.00	0.00	0.00	0.00	0.00	0.00
2061.40	15.23	279.48	2052.47	16.57	-99.21	2.00	279.48	10.01
5955.23	15.23	279.48	5809.58	185.00	-1108.00	0.00	0.00	111.74
6716.63	0.00	0.00	6562.05	201.57	-1207.21	2.00	180.00	121.75
7615.42	89.88	180.62	7135.00	-370.15	-1213.37	10.00	180.62	675.11
1884.59	89.88	180.62	7144.00	-4639.06	-1259.36	0.00	0.00	4806.97

WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)						
Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
CROWDER 15N-18HZ PBHL	7144.00	-4639.06	-1259.36	40.132518	-104.705959	Point

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
4006.00	4086.02	Parkman
4600.00	4701.63	Sussex
7002.00	7218.25	Sharon Springs
7072.00	7345.41	Niobrara A
7103.00	7424.22	Niobrara B

CASING DETAILS			
TVD	MD	Name	Size
1040.00	1040.00	9 5/8"	9-5/8
7135.00	7615.29	7"	7



Andarko Petroleum Corporation

Planning Report

Database:	edmp	Local Co-ordinate Reference:	Well CROWDER 15N-18HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	17' RKB+4957'GL @ 4974.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	17' RKB+4957'GL @ 4974.00ft
Site:	WELD_CROWDER 27-18HZ PAD	North Reference:	True
Well:	CROWDER 15N-18HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	CROWDER 15N-18HZ		
Design:	CROWDER 15N-18HZ (wp01) PERMIT		

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_CROWDER 27-18HZ PAD											
Site Position:			Northing:			1,296,764.29 usft			Latitude:			40.145253					
From:			Lat/Long			Easting:			3,223,235.74 usft			Longitude:			-104.701455		
Position Uncertainty:			0.00 ft			Slot Radius:			13-3/16 "			Grid Convergence:			0.52 °		

Well	CROWDER 15N-18HZ					
Well Position	+N/-S	-0.02 ft	Northing:	1,296,764.28 usft	Latitude:	40.145253
	+E/-W	0.00 ft	Easting:	3,223,235.74 usft	Longitude:	-104.701455
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	4,957.00 ft

Wellbore	CROWDER 15N-18HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/1/2012	8.63	66.81	52,867

Design	CROWDER 15N-18HZ (wp01) PERMIT			
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	195.19

Plan Sections										
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	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,061.40	15.23	279.48	2,052.47	16.57	-99.21	2.00	2.00	-10.58	279.48	
5,955.23	15.23	279.48	5,809.58	185.00	-1,108.00	0.00	0.00	0.00	0.00	
6,716.63	0.00	0.00	6,562.05	201.57	-1,207.21	2.00	-2.00	10.58	180.00	
7,615.42	89.88	180.62	7,135.00	-370.15	-1,213.37	10.00	10.00	0.00	180.62	
11,884.59	89.88	180.62	7,144.00	-4,639.06	-1,259.36	0.00	0.00	0.00	0.00	CROWDER 15N-18H

Andarko Petroleum Corporation

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Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	17' RKB+4957'GL @ 4974.00ft
Site:	WELD_CROWDER 27-18HZ PAD	North Reference:	True
Well:	CROWDER 15N-18HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	CROWDER 15N-18HZ		
Design:	CROWDER 15N-18HZ (wp01) PERMIT		

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
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
1,040.00	0.00	0.00	1,040.00	0.00	0.00	0.00	0.00	0.00	0.00
9 5/8"									
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
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
Start DLS 2.00 TFO 279.48									
1,400.00	2.00	279.48	1,399.98	0.29	-1.72	0.17	2.00	2.00	0.00
1,500.00	4.00	279.48	1,499.84	1.15	-6.88	0.69	2.00	2.00	0.00
1,600.00	6.00	279.48	1,599.45	2.58	-15.48	1.56	2.00	2.00	0.00
1,700.00	8.00	279.48	1,698.70	4.59	-27.50	2.77	2.00	2.00	0.00
1,800.00	10.00	279.48	1,797.47	7.17	-42.93	4.33	2.00	2.00	0.00
1,900.00	12.00	279.48	1,895.62	10.31	-61.75	6.23	2.00	2.00	0.00
2,000.00	14.00	279.48	1,993.06	14.01	-83.93	8.46	2.00	2.00	0.00
2,061.40	15.23	279.48	2,052.47	16.57	-99.21	10.01	2.00	2.00	0.00
Start 3893.83 hold at 2061.40 MD									
2,100.00	15.23	279.48	2,089.71	18.24	-109.21	11.01	0.00	0.00	0.00
2,200.00	15.23	279.48	2,186.20	22.56	-135.12	13.63	0.00	0.00	0.00
2,300.00	15.23	279.48	2,282.69	26.89	-161.03	16.24	0.00	0.00	0.00
2,400.00	15.23	279.48	2,379.18	31.21	-186.94	18.85	0.00	0.00	0.00
2,500.00	15.23	279.48	2,475.67	35.54	-212.84	21.47	0.00	0.00	0.00
2,600.00	15.23	279.48	2,572.16	39.86	-238.75	24.08	0.00	0.00	0.00
2,700.00	15.23	279.48	2,668.65	44.19	-264.66	26.69	0.00	0.00	0.00
2,800.00	15.23	279.48	2,765.13	48.51	-290.57	29.30	0.00	0.00	0.00
2,900.00	15.23	279.48	2,861.62	52.84	-316.47	31.92	0.00	0.00	0.00
3,000.00	15.23	279.48	2,958.11	57.17	-342.38	34.53	0.00	0.00	0.00
3,100.00	15.23	279.48	3,054.60	61.49	-368.29	37.14	0.00	0.00	0.00
3,200.00	15.23	279.48	3,151.09	65.82	-394.19	39.76	0.00	0.00	0.00
3,300.00	15.23	279.48	3,247.58	70.14	-420.10	42.37	0.00	0.00	0.00
3,400.00	15.23	279.48	3,344.07	74.47	-446.01	44.98	0.00	0.00	0.00
3,500.00	15.23	279.48	3,440.56	78.79	-471.92	47.59	0.00	0.00	0.00
3,600.00	15.23	279.48	3,537.05	83.12	-497.82	50.21	0.00	0.00	0.00
3,700.00	15.23	279.48	3,633.53	87.45	-523.73	52.82	0.00	0.00	0.00
3,800.00	15.23	279.48	3,730.02	91.77	-549.64	55.43	0.00	0.00	0.00
3,900.00	15.23	279.48	3,826.51	96.10	-575.55	58.04	0.00	0.00	0.00
4,000.00	15.23	279.48	3,923.00	100.42	-601.45	60.66	0.00	0.00	0.00
4,086.02	15.23	279.48	4,006.00	104.14	-623.74	62.90	0.00	0.00	0.00
Parkman									
4,100.00	15.23	279.48	4,019.49	104.75	-627.36	63.27	0.00	0.00	0.00
4,200.00	15.23	279.48	4,115.98	109.07	-653.27	65.88	0.00	0.00	0.00
4,300.00	15.23	279.48	4,212.47	113.40	-679.17	68.50	0.00	0.00	0.00
4,400.00	15.23	279.48	4,308.96	117.73	-705.08	71.11	0.00	0.00	0.00
4,500.00	15.23	279.48	4,405.45	122.05	-730.99	73.72	0.00	0.00	0.00
4,600.00	15.23	279.48	4,501.93	126.38	-756.90	76.33	0.00	0.00	0.00

Andarko Petroleum Corporation

Planning Report

Database:	edmp	Local Co-ordinate Reference:	Well CROWDER 15N-18HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	17' RKB+4957'GL @ 4974.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	17' RKB+4957'GL @ 4974.00ft
Site:	WELD_CROWDER 27-18HZ PAD	North Reference:	True
Well:	CROWDER 15N-18HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	CROWDER 15N-18HZ		
Design:	CROWDER 15N-18HZ (wp01) PERMIT		

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)
4,700.00	15.23	279.48	4,598.42	130.70	-782.80	78.95	0.00	0.00	0.00
4,701.63	15.23	279.48	4,600.00	130.77	-783.23	78.99	0.00	0.00	0.00
Sussex									
4,800.00	15.23	279.48	4,694.91	135.03	-808.71	81.56	0.00	0.00	0.00
4,900.00	15.23	279.48	4,791.40	139.35	-834.62	84.17	0.00	0.00	0.00
5,000.00	15.23	279.48	4,887.89	143.68	-860.53	86.79	0.00	0.00	0.00
5,100.00	15.23	279.48	4,984.38	148.01	-886.43	89.40	0.00	0.00	0.00
5,200.00	15.23	279.48	5,080.87	152.33	-912.34	92.01	0.00	0.00	0.00
5,300.00	15.23	279.48	5,177.36	156.66	-938.25	94.62	0.00	0.00	0.00
5,400.00	15.23	279.48	5,273.84	160.98	-964.15	97.24	0.00	0.00	0.00
5,500.00	15.23	279.48	5,370.33	165.31	-990.06	99.85	0.00	0.00	0.00
5,600.00	15.23	279.48	5,466.82	169.63	-1,015.97	102.46	0.00	0.00	0.00
5,700.00	15.23	279.48	5,563.31	173.96	-1,041.88	105.07	0.00	0.00	0.00
5,800.00	15.23	279.48	5,659.80	178.29	-1,067.78	107.69	0.00	0.00	0.00
5,900.00	15.23	279.48	5,756.29	182.61	-1,093.69	110.30	0.00	0.00	0.00
5,955.23	15.23	279.48	5,809.58	185.00	-1,108.00	111.74	0.00	0.00	0.00
Start DLS 2.00 TFO 180.00									
6,000.00	14.33	279.48	5,852.87	186.88	-1,119.27	112.88	2.00	-2.00	0.00
6,100.00	12.33	279.48	5,950.17	190.68	-1,142.01	115.17	2.00	-2.00	0.00
6,200.00	10.33	279.48	6,048.21	193.91	-1,161.39	117.13	2.00	-2.00	0.00
6,300.00	8.33	279.48	6,146.88	196.58	-1,177.38	118.74	2.00	-2.00	0.00
6,400.00	6.33	279.48	6,246.06	198.69	-1,189.97	120.01	2.00	-2.00	0.00
6,500.00	4.33	279.48	6,345.62	200.22	-1,199.14	120.93	2.00	-2.00	0.00
6,600.00	2.33	279.48	6,445.45	201.17	-1,204.87	121.51	2.00	-2.00	0.00
6,700.00	0.33	279.48	6,545.42	201.56	-1,207.17	121.74	2.00	-2.00	0.00
6,716.63	0.00	0.00	6,562.05	201.57	-1,207.21	121.75	2.00	-2.00	484.27
Start Build 10.00									
6,750.00	3.34	180.62	6,595.40	200.59	-1,207.22	122.69	10.00	10.00	-537.52
6,800.00	8.34	180.62	6,645.12	195.51	-1,207.28	127.61	10.00	10.00	0.00
6,850.00	13.34	180.62	6,694.22	186.11	-1,207.38	136.71	10.00	10.00	0.00
6,900.00	18.34	180.62	6,742.30	172.47	-1,207.53	149.91	10.00	10.00	0.00
6,950.00	23.34	180.62	6,789.02	154.69	-1,207.72	167.12	10.00	10.00	0.00
7,000.00	28.34	180.62	6,834.01	132.91	-1,207.95	188.20	10.00	10.00	0.00
7,050.00	33.34	180.62	6,876.92	107.29	-1,208.23	213.00	10.00	10.00	0.00
7,100.00	38.34	180.62	6,917.44	78.03	-1,208.54	241.32	10.00	10.00	0.00
7,150.00	43.34	180.62	6,955.26	45.34	-1,208.90	272.95	10.00	10.00	0.00
7,200.00	48.34	180.62	6,990.09	9.49	-1,209.28	307.66	10.00	10.00	0.00
7,218.25	50.16	180.62	7,002.00	-4.34	-1,209.43	321.04	10.00	10.00	0.00
Sharon Springs									
7,250.00	53.34	180.62	7,021.65	-29.26	-1,209.70	345.17	10.00	10.00	0.00
7,300.00	58.34	180.62	7,049.72	-70.62	-1,210.15	385.20	10.00	10.00	0.00
7,345.41	62.88	180.62	7,072.00	-110.17	-1,210.57	423.48	10.00	10.00	0.00
Niobrara A									
7,350.00	63.34	180.62	7,074.08	-114.27	-1,210.62	427.44	10.00	10.00	0.00
7,400.00	68.34	180.62	7,094.54	-159.87	-1,211.11	471.58	10.00	10.00	0.00
7,424.22	70.76	180.62	7,103.00	-182.56	-1,211.35	493.54	10.00	10.00	0.00
Niobrara B									
7,450.00	73.34	180.62	7,110.94	-207.08	-1,211.62	517.27	10.00	10.00	0.00
7,500.00	78.34	180.62	7,123.17	-255.54	-1,212.14	564.18	10.00	10.00	0.00
7,550.00	83.34	180.62	7,131.13	-304.89	-1,212.67	611.94	10.00	10.00	0.00
7,600.00	88.34	180.62	7,134.76	-354.73	-1,213.21	660.19	10.00	10.00	0.00
7,615.29	89.87	180.62	7,135.00	-370.02	-1,213.37	674.98	10.00	10.00	0.00
Start 4269.32 hold at 7615.29 MD - 7"									

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Company:	US ROCKIES REGION PLANNING	TVD Reference:	17' RKB+4957'GL @ 4974.00ft
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Wellbore:	CROWDER 15N-18HZ		
Design:	CROWDER 15N-18HZ (wp01) PERMIT		

Planned Survey									
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7,615.42	89.88	180.62	7,135.00	-370.15	-1,213.37	675.11	10.00	10.00	0.00
7,700.00	89.88	180.62	7,135.18	-454.73	-1,214.28	756.97	0.00	0.00	0.00
7,800.00	89.88	180.62	7,135.39	-554.72	-1,215.36	853.75	0.00	0.00	0.00
7,900.00	89.88	180.62	7,135.60	-654.71	-1,216.44	950.54	0.00	0.00	0.00
8,000.00	89.88	180.62	7,135.81	-754.71	-1,217.52	1,047.32	0.00	0.00	0.00
8,100.00	89.88	180.62	7,136.02	-854.70	-1,218.59	1,144.10	0.00	0.00	0.00
8,200.00	89.88	180.62	7,136.23	-954.70	-1,219.67	1,240.89	0.00	0.00	0.00
8,300.00	89.88	180.62	7,136.45	-1,054.69	-1,220.75	1,337.67	0.00	0.00	0.00
8,400.00	89.88	180.62	7,136.66	-1,154.68	-1,221.82	1,434.45	0.00	0.00	0.00
8,500.00	89.88	180.62	7,136.87	-1,254.68	-1,222.90	1,531.24	0.00	0.00	0.00
8,600.00	89.88	180.62	7,137.08	-1,354.67	-1,223.98	1,628.02	0.00	0.00	0.00
8,700.00	89.88	180.62	7,137.29	-1,454.67	-1,225.06	1,724.81	0.00	0.00	0.00
8,800.00	89.88	180.62	7,137.50	-1,554.66	-1,226.13	1,821.59	0.00	0.00	0.00
8,900.00	89.88	180.62	7,137.71	-1,654.65	-1,227.21	1,918.37	0.00	0.00	0.00
9,000.00	89.88	180.62	7,137.92	-1,754.65	-1,228.29	2,015.16	0.00	0.00	0.00
9,100.00	89.88	180.62	7,138.13	-1,854.64	-1,229.37	2,111.94	0.00	0.00	0.00
9,200.00	89.88	180.62	7,138.34	-1,954.64	-1,230.44	2,208.72	0.00	0.00	0.00
9,300.00	89.88	180.62	7,138.55	-2,054.63	-1,231.52	2,305.51	0.00	0.00	0.00
9,400.00	89.88	180.62	7,138.76	-2,154.62	-1,232.60	2,402.29	0.00	0.00	0.00
9,500.00	89.88	180.62	7,138.97	-2,254.62	-1,233.67	2,499.07	0.00	0.00	0.00
9,600.00	89.88	180.62	7,139.19	-2,354.61	-1,234.75	2,595.86	0.00	0.00	0.00
9,700.00	89.88	180.62	7,139.40	-2,454.61	-1,235.83	2,692.64	0.00	0.00	0.00
9,800.00	89.88	180.62	7,139.61	-2,554.60	-1,236.91	2,789.42	0.00	0.00	0.00
9,900.00	89.88	180.62	7,139.82	-2,654.59	-1,237.98	2,886.21	0.00	0.00	0.00
10,000.00	89.88	180.62	7,140.03	-2,754.59	-1,239.06	2,982.99	0.00	0.00	0.00
10,100.00	89.88	180.62	7,140.24	-2,854.58	-1,240.14	3,079.78	0.00	0.00	0.00
10,200.00	89.88	180.62	7,140.45	-2,954.58	-1,241.22	3,176.56	0.00	0.00	0.00
10,300.00	89.88	180.62	7,140.66	-3,054.57	-1,242.29	3,273.34	0.00	0.00	0.00
10,400.00	89.88	180.62	7,140.87	-3,154.56	-1,243.37	3,370.13	0.00	0.00	0.00
10,500.00	89.88	180.62	7,141.08	-3,254.56	-1,244.45	3,466.91	0.00	0.00	0.00
10,600.00	89.88	180.62	7,141.29	-3,354.55	-1,245.52	3,563.69	0.00	0.00	0.00
10,700.00	89.88	180.62	7,141.50	-3,454.55	-1,246.60	3,660.48	0.00	0.00	0.00
10,800.00	89.88	180.62	7,141.71	-3,554.54	-1,247.68	3,757.26	0.00	0.00	0.00
10,900.00	89.88	180.62	7,141.93	-3,654.53	-1,248.76	3,854.04	0.00	0.00	0.00
11,000.00	89.88	180.62	7,142.14	-3,754.53	-1,249.83	3,950.83	0.00	0.00	0.00
11,100.00	89.88	180.62	7,142.35	-3,854.52	-1,250.91	4,047.61	0.00	0.00	0.00
11,200.00	89.88	180.62	7,142.56	-3,954.52	-1,251.99	4,144.39	0.00	0.00	0.00
11,300.00	89.88	180.62	7,142.77	-4,054.51	-1,253.06	4,241.18	0.00	0.00	0.00
11,400.00	89.88	180.62	7,142.98	-4,154.50	-1,254.14	4,337.96	0.00	0.00	0.00
11,500.00	89.88	180.62	7,143.19	-4,254.50	-1,255.22	4,434.74	0.00	0.00	0.00
11,600.00	89.88	180.62	7,143.40	-4,354.49	-1,256.30	4,531.53	0.00	0.00	0.00
11,700.00	89.88	180.62	7,143.61	-4,454.49	-1,257.37	4,628.31	0.00	0.00	0.00
11,800.00	89.88	180.62	7,143.82	-4,554.48	-1,258.45	4,725.10	0.00	0.00	0.00
11,884.59	89.88	180.62	7,144.00	-4,639.06	-1,259.36	4,806.97	0.00	0.00	0.00
TD at 11884.61 - CROWDER 15N-18HZ PBHL									

Andarko Petroleum Corporation

Planning Report

Database:	edmp	Local Co-ordinate Reference:	Well CROWDER 15N-18HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	17' RKB+4957'GL @ 4974.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	17' RKB+4957'GL @ 4974.00ft
Site:	WELD_CROWDER 27-18HZ PAD	North Reference:	True
Well:	CROWDER 15N-18HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	CROWDER 15N-18HZ		
Design:	CROWDER 15N-18HZ (wp01) PERMIT		

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(ft)	(ft)	(ft)	(usft)	(usft)		
- Shape									
CROWDER 15N-18HZ F	0.00	0.00	7,144.00	-4,639.06	-1,259.36	1,292,114.07	3,222,018.21	40.132518	-104.705959
- plan hits target center									
- Point									

Casing Points					
Measured Depth	Vertical Depth	Name		Casing Diameter	Hole Diameter
(ft)	(ft)			(")	(")
1,040.00	1,040.00	9 5/8"		9-5/8	12-1/4
7,615.29	7,135.00	7"		7	7-1/2

Formations						
Measured Depth	Vertical Depth	Name		Lithology	Dip	Dip Direction
(ft)	(ft)				(°)	(°)
4,086.02	4,006.00	Parkman				
4,701.63	4,600.00	Sussex				
7,218.25	7,002.00	Sharon Springs				
7,345.41	7,072.00	Niobrara A				
7,424.22	7,103.00	Niobrara B				

Plan Annotations					
Measured Depth	Vertical Depth	Local Coordinates		Comment	
(ft)	(ft)	+N/-S	+E/-W		
(ft)	(ft)	(ft)	(ft)		
1,300.00	1,300.00	0.00	0.00	Start DLS 2.00 TFO 279.48	
2,061.40	2,052.47	16.57	-99.21	Start 3893.83 hold at 2061.40 MD	
5,955.23	5,809.58	185.00	-1,108.00	Start DLS 2.00 TFO 180.00	
6,716.63	6,562.05	201.57	-1,207.21	Start Build 10.00	
7,615.29	7,135.00	-370.02	-1,213.37	Start 4269.32 hold at 7615.29 MD	
11,884.59	7,144.00	-4,639.06	-1,259.36	TD at 11884.61	