

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

WELD_CROWDER 27-18HZ PAD

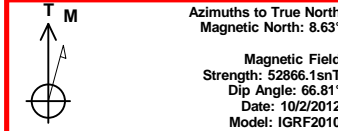
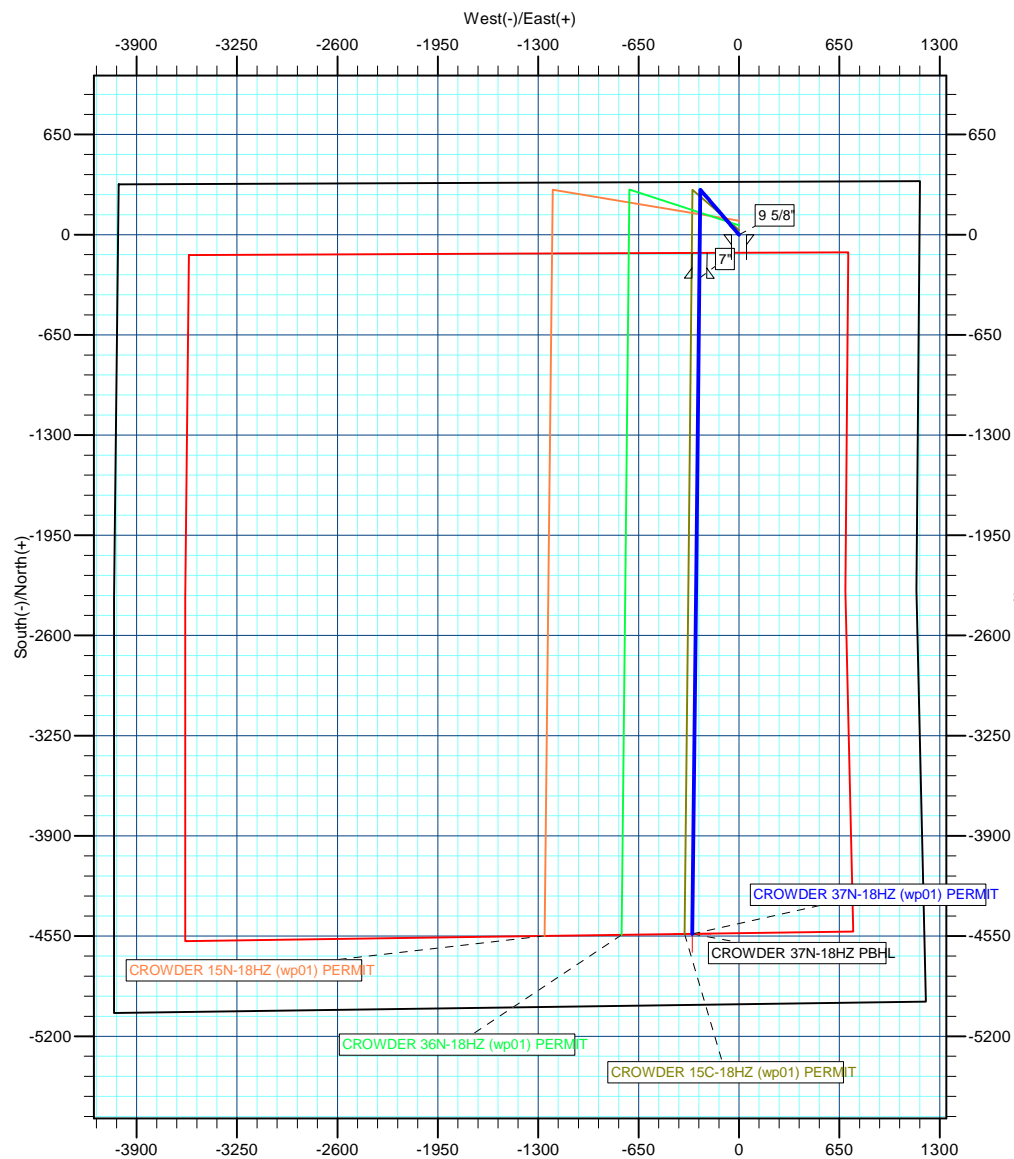
CROWDER 37N-18HZ

CROWDER 37N-18HZ

Plan: CROWDER 37N-18HZ (wp01) PERMIT

Standard Planning Report

05 October, 2012



Project: COLORADO NORTHERN ZONE - 83
 Site: WELD_CROWDER 27-18HZ PAD
 Well: CROWDER 37N-18HZ
 Wellbore: CROWDER 37N-18HZ
 Section:
 SHL:
 Design: CROWDER 37N-18HZ (wp01) PERMIT
 Latitude: 40.145006
 Longitude: -104.701458
 GL: 4957.00
 KB: 17'RKB+4957'GL @ 4974.00ft

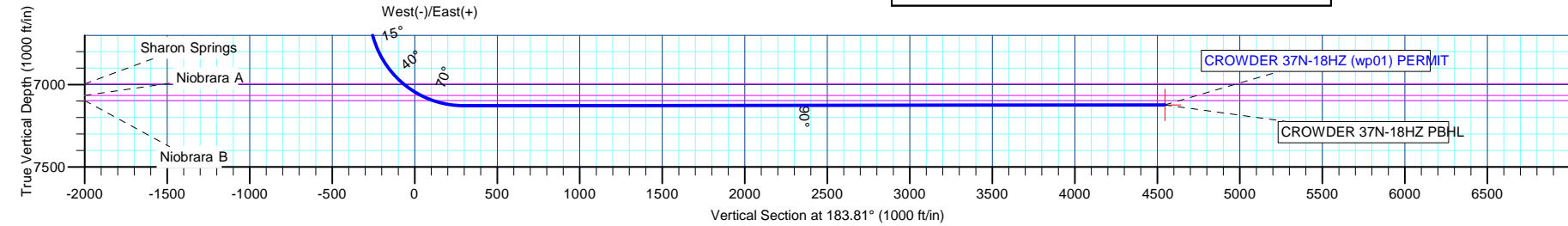
WELL DETAILS: CROWDER 37N-18HZ						
+N/-S	+E/-W	Northing	Ground Level: Easting	4957.00 Latitude	40.145006 Longitude	Slot
0.00	0.00	1296674.29	3223235.71			

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
1200.00	0.00	0.00	1200.00	0.00	0.00	0.00	0.00	0.00
1413.32	4.27	319.33	1413.12	6.02	-5.17	2.00	319.33	-5.66
6356.81	4.27	319.33	6342.92	284.98	-244.83	0.00	0.00	-268.07
6570.13	0.00	0.00	6556.04	291.00	-250.00	2.00	180.00	-273.73
7470.81	90.07	180.62	7129.00	-282.60	-256.21	10.00	180.62	299.01
1724.46	90.07	180.62	7124.00	-4536.00	-302.26	0.00	0.00	4546.06

WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)						
Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
CROWDER 37N-18HZ PBHL	7124.00	-4536.00	-302.26	40.132554	-104.702539	Point

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
3965.00	4007.39	Parkman
4559.00	4603.04	Sussex
6961.00	7071.77	Sharon Springs
7031.00	7198.92	Niobrara A
7062.00	7277.74	Niobrara B

CASING DETAILS			
TVD	MD	Name	Size
1040.00	1040.00	9 5/8"	9-5/8
7129.00	7470.81	7"	7



Andarko Petroleum Corporation

Planning Report

Database:	edmp	Local Co-ordinate Reference:	Well CROWDER 37N-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 37N-18HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	CROWDER 37N-18HZ		
Design:	CROWDER 37N-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 37N-18HZ					
Well Position	+N/-S	-90.00 ft	Northing:	1,296,674.29 usft	Latitude:	40.145006
	+E/-W	-0.84 ft	Easting:	3,223,235.71 usft	Longitude:	-104.701458
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	4,957.00 ft

Wellbore	CROWDER 37N-18HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/2/2012	8.63	66.81	52,866

Design	CROWDER 37N-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	183.81

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	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,413.32	4.27	319.33	1,413.12	6.02	-5.17	2.00	2.00	0.00	319.33	
6,356.81	4.27	319.33	6,342.92	284.98	-244.83	0.00	0.00	0.00	0.00	
6,570.13	0.00	0.00	6,556.04	291.00	-250.00	2.00	-2.00	0.00	180.00	
7,470.81	90.07	180.62	7,129.00	-282.60	-256.21	10.00	10.00	0.00	180.62	
11,724.46	90.07	180.62	7,124.00	-4,536.00	-302.26	0.00	0.00	0.00	0.00	CROWDER 37N-18H

Andarko Petroleum Corporation

Planning Report

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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 37N-18HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	CROWDER 37N-18HZ		
Design:	CROWDER 37N-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
Start Build 2.00									
1,300.00	2.00	319.33	1,299.98	1.32	-1.14	-1.25	2.00	2.00	0.00
1,400.00	4.00	319.33	1,399.84	5.29	-4.55	-4.98	2.00	2.00	0.00
1,413.32	4.27	319.33	1,413.12	6.02	-5.17	-5.66	2.00	2.00	0.00
Start 4943.49 hold at 1413.32 MD									
1,500.00	4.27	319.33	1,499.56	10.91	-9.38	-10.27	0.00	0.00	0.00
1,600.00	4.27	319.33	1,599.29	16.56	-14.22	-15.57	0.00	0.00	0.00
1,700.00	4.27	319.33	1,699.01	22.20	-19.07	-20.88	0.00	0.00	0.00
1,800.00	4.27	319.33	1,798.73	27.84	-23.92	-26.19	0.00	0.00	0.00
1,900.00	4.27	319.33	1,898.45	33.48	-28.77	-31.50	0.00	0.00	0.00
2,000.00	4.27	319.33	1,998.18	39.13	-33.61	-36.81	0.00	0.00	0.00
2,100.00	4.27	319.33	2,097.90	44.77	-38.46	-42.11	0.00	0.00	0.00
2,200.00	4.27	319.33	2,197.62	50.41	-43.31	-47.42	0.00	0.00	0.00
2,300.00	4.27	319.33	2,297.35	56.06	-48.16	-52.73	0.00	0.00	0.00
2,400.00	4.27	319.33	2,397.07	61.70	-53.01	-58.04	0.00	0.00	0.00
2,500.00	4.27	319.33	2,496.79	67.34	-57.85	-63.35	0.00	0.00	0.00
2,600.00	4.27	319.33	2,596.51	72.98	-62.70	-68.65	0.00	0.00	0.00
2,700.00	4.27	319.33	2,696.24	78.63	-67.55	-73.96	0.00	0.00	0.00
2,800.00	4.27	319.33	2,795.96	84.27	-72.40	-79.27	0.00	0.00	0.00
2,900.00	4.27	319.33	2,895.68	89.91	-77.25	-84.58	0.00	0.00	0.00
3,000.00	4.27	319.33	2,995.41	95.56	-82.09	-89.89	0.00	0.00	0.00
3,100.00	4.27	319.33	3,095.13	101.20	-86.94	-95.19	0.00	0.00	0.00
3,200.00	4.27	319.33	3,194.85	106.84	-91.79	-100.50	0.00	0.00	0.00
3,300.00	4.27	319.33	3,294.57	112.49	-96.64	-105.81	0.00	0.00	0.00
3,400.00	4.27	319.33	3,394.30	118.13	-101.48	-111.12	0.00	0.00	0.00
3,500.00	4.27	319.33	3,494.02	123.77	-106.33	-116.43	0.00	0.00	0.00
3,600.00	4.27	319.33	3,593.74	129.41	-111.18	-121.74	0.00	0.00	0.00
3,700.00	4.27	319.33	3,693.47	135.06	-116.03	-127.04	0.00	0.00	0.00
3,800.00	4.27	319.33	3,793.19	140.70	-120.88	-132.35	0.00	0.00	0.00
3,900.00	4.27	319.33	3,892.91	146.34	-125.72	-137.66	0.00	0.00	0.00
4,000.00	4.27	319.33	3,992.64	151.99	-130.57	-142.97	0.00	0.00	0.00
4,007.39	4.27	319.33	4,000.00	152.40	-130.93	-143.36	0.00	0.00	0.00
Parkman									
4,100.00	4.27	319.33	4,092.36	157.63	-135.42	-148.28	0.00	0.00	0.00
4,200.00	4.27	319.33	4,192.08	163.27	-140.27	-153.58	0.00	0.00	0.00
4,300.00	4.27	319.33	4,291.80	168.91	-145.12	-158.89	0.00	0.00	0.00
4,400.00	4.27	319.33	4,391.53	174.56	-149.96	-164.20	0.00	0.00	0.00
4,500.00	4.27	319.33	4,491.25	180.20	-154.81	-169.51	0.00	0.00	0.00
4,600.00	4.27	319.33	4,590.97	185.84	-159.66	-174.82	0.00	0.00	0.00

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Planning Report

Database:	edmp	Local Co-ordinate Reference:	Well CROWDER 37N-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 37N-18HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	CROWDER 37N-18HZ		
Design:	CROWDER 37N-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)
4,603.04	4.27	319.33	4,594.00	186.01	-159.81	-174.98	0.00	0.00	0.00
Sussex									
4,700.00	4.27	319.33	4,690.70	191.49	-164.51	-180.12	0.00	0.00	0.00
4,800.00	4.27	319.33	4,790.42	197.13	-169.35	-185.43	0.00	0.00	0.00
4,900.00	4.27	319.33	4,890.14	202.77	-174.20	-190.74	0.00	0.00	0.00
5,000.00	4.27	319.33	4,989.86	208.41	-179.05	-196.05	0.00	0.00	0.00
5,100.00	4.27	319.33	5,089.59	214.06	-183.90	-201.36	0.00	0.00	0.00
5,200.00	4.27	319.33	5,189.31	219.70	-188.75	-206.67	0.00	0.00	0.00
5,300.00	4.27	319.33	5,289.03	225.34	-193.59	-211.97	0.00	0.00	0.00
5,400.00	4.27	319.33	5,388.76	230.99	-198.44	-217.28	0.00	0.00	0.00
5,500.00	4.27	319.33	5,488.48	236.63	-203.29	-222.59	0.00	0.00	0.00
5,600.00	4.27	319.33	5,588.20	242.27	-208.14	-227.90	0.00	0.00	0.00
5,700.00	4.27	319.33	5,687.92	247.92	-212.99	-233.21	0.00	0.00	0.00
5,800.00	4.27	319.33	5,787.65	253.56	-217.83	-238.51	0.00	0.00	0.00
5,900.00	4.27	319.33	5,887.37	259.20	-222.68	-243.82	0.00	0.00	0.00
6,000.00	4.27	319.33	5,987.09	264.84	-227.53	-249.13	0.00	0.00	0.00
6,100.00	4.27	319.33	6,086.82	270.49	-232.38	-254.44	0.00	0.00	0.00
6,200.00	4.27	319.33	6,186.54	276.13	-237.22	-259.75	0.00	0.00	0.00
6,300.00	4.27	319.33	6,286.26	281.77	-242.07	-265.05	0.00	0.00	0.00
6,356.81	4.27	319.33	6,342.92	284.98	-244.83	-268.07	0.00	0.00	0.00
Start Drop -2.00									
6,400.00	3.40	319.33	6,386.01	287.17	-246.71	-270.13	2.00	-2.00	0.00
6,500.00	1.40	319.33	6,485.91	290.35	-249.44	-273.12	2.00	-2.00	0.00
6,570.13	0.00	0.00	6,556.04	291.00	-250.00	-273.73	2.00	-2.00	0.00
Start Build 10.00									
6,600.00	2.99	180.62	6,585.89	290.22	-250.01	-272.96	10.00	10.00	0.00
6,650.00	7.99	180.62	6,635.65	285.44	-250.06	-268.19	10.00	10.00	0.00
6,700.00	12.99	180.62	6,684.80	276.35	-250.16	-259.10	10.00	10.00	0.00
6,750.00	17.99	180.62	6,732.97	263.00	-250.30	-245.78	10.00	10.00	0.00
6,800.00	22.99	180.62	6,779.79	245.51	-250.49	-228.31	10.00	10.00	0.00
6,850.00	27.99	180.62	6,824.91	224.00	-250.73	-206.83	10.00	10.00	0.00
6,900.00	32.99	180.62	6,867.98	198.64	-251.00	-181.51	10.00	10.00	0.00
6,950.00	37.99	180.62	6,908.68	169.63	-251.31	-152.54	10.00	10.00	0.00
7,000.00	42.99	180.62	6,946.70	137.18	-251.67	-120.14	10.00	10.00	0.00
7,050.00	47.99	180.62	6,981.74	101.54	-252.05	-84.55	10.00	10.00	0.00
7,071.77	50.16	180.62	6,996.00	85.09	-252.23	-68.13	10.00	10.00	0.00
Sharon Springs									
7,100.00	52.99	180.62	7,013.54	62.98	-252.47	-46.05	10.00	10.00	0.00
7,150.00	57.99	180.62	7,041.87	21.79	-252.91	-4.93	10.00	10.00	0.00
7,198.92	62.88	180.62	7,066.00	-20.75	-253.38	37.55	10.00	10.00	0.00
Niobrara A									
7,200.00	62.99	180.62	7,066.49	-21.70	-253.39	38.50	10.00	10.00	0.00
7,250.00	67.99	180.62	7,087.23	-67.18	-253.88	83.91	10.00	10.00	0.00
7,277.74	70.76	180.62	7,097.00	-93.14	-254.16	109.83	10.00	10.00	0.00
Niobrara B									
7,300.00	72.99	180.62	7,103.92	-114.29	-254.39	130.95	10.00	10.00	0.00
7,350.00	77.99	180.62	7,116.45	-162.68	-254.91	179.26	10.00	10.00	0.00
7,400.00	82.99	180.62	7,124.71	-211.97	-255.45	228.48	10.00	10.00	0.00
7,450.00	87.99	180.62	7,128.65	-261.80	-255.98	278.24	10.00	10.00	0.00
7,470.81	90.07	180.62	7,129.00	-282.60	-256.21	299.01	10.00	10.00	0.00
Start 4253.65 hold at 7470.81 MD - 7"									
7,500.00	90.07	180.62	7,128.96	-311.79	-256.53	328.15	0.00	0.00	0.00
7,600.00	90.07	180.62	7,128.85	-411.78	-257.61	428.00	0.00	0.00	0.00

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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
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Well:	CROWDER 37N-18HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	CROWDER 37N-18HZ		
Design:	CROWDER 37N-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)
7,700.00	90.07	180.62	7,128.73	-511.78	-258.69	527.84	0.00	0.00	0.00
7,800.00	90.07	180.62	7,128.61	-611.77	-259.77	627.69	0.00	0.00	0.00
7,900.00	90.07	180.62	7,128.49	-711.77	-260.86	727.53	0.00	0.00	0.00
8,000.00	90.07	180.62	7,128.38	-811.76	-261.94	827.38	0.00	0.00	0.00
8,100.00	90.07	180.62	7,128.26	-911.75	-263.02	927.22	0.00	0.00	0.00
8,200.00	90.07	180.62	7,128.14	-1,011.75	-264.10	1,027.07	0.00	0.00	0.00
8,300.00	90.07	180.62	7,128.02	-1,111.74	-265.19	1,126.91	0.00	0.00	0.00
8,400.00	90.07	180.62	7,127.91	-1,211.74	-266.27	1,226.76	0.00	0.00	0.00
8,500.00	90.07	180.62	7,127.79	-1,311.73	-267.35	1,326.60	0.00	0.00	0.00
8,600.00	90.07	180.62	7,127.67	-1,411.72	-268.43	1,426.45	0.00	0.00	0.00
8,700.00	90.07	180.62	7,127.55	-1,511.72	-269.52	1,526.29	0.00	0.00	0.00
8,800.00	90.07	180.62	7,127.44	-1,611.71	-270.60	1,626.14	0.00	0.00	0.00
8,900.00	90.07	180.62	7,127.32	-1,711.71	-271.68	1,725.98	0.00	0.00	0.00
9,000.00	90.07	180.62	7,127.20	-1,811.70	-272.76	1,825.83	0.00	0.00	0.00
9,100.00	90.07	180.62	7,127.08	-1,911.69	-273.85	1,925.67	0.00	0.00	0.00
9,200.00	90.07	180.62	7,126.97	-2,011.69	-274.93	2,025.52	0.00	0.00	0.00
9,300.00	90.07	180.62	7,126.85	-2,111.68	-276.01	2,125.36	0.00	0.00	0.00
9,400.00	90.07	180.62	7,126.73	-2,211.68	-277.09	2,225.21	0.00	0.00	0.00
9,500.00	90.07	180.62	7,126.61	-2,311.67	-278.18	2,325.05	0.00	0.00	0.00
9,600.00	90.07	180.62	7,126.50	-2,411.66	-279.26	2,424.90	0.00	0.00	0.00
9,700.00	90.07	180.62	7,126.38	-2,511.66	-280.34	2,524.74	0.00	0.00	0.00
9,800.00	90.07	180.62	7,126.26	-2,611.65	-281.42	2,624.58	0.00	0.00	0.00
9,900.00	90.07	180.62	7,126.14	-2,711.65	-282.51	2,724.43	0.00	0.00	0.00
10,000.00	90.07	180.62	7,126.03	-2,811.64	-283.59	2,824.27	0.00	0.00	0.00
10,100.00	90.07	180.62	7,125.91	-2,911.63	-284.67	2,924.12	0.00	0.00	0.00
10,200.00	90.07	180.62	7,125.79	-3,011.63	-285.75	3,023.96	0.00	0.00	0.00
10,300.00	90.07	180.62	7,125.67	-3,111.62	-286.84	3,123.81	0.00	0.00	0.00
10,400.00	90.07	180.62	7,125.56	-3,211.62	-287.92	3,223.65	0.00	0.00	0.00
10,500.00	90.07	180.62	7,125.44	-3,311.61	-289.00	3,323.50	0.00	0.00	0.00
10,600.00	90.07	180.62	7,125.32	-3,411.61	-290.09	3,423.34	0.00	0.00	0.00
10,700.00	90.07	180.62	7,125.20	-3,511.60	-291.17	3,523.19	0.00	0.00	0.00
10,800.00	90.07	180.62	7,125.09	-3,611.59	-292.25	3,623.03	0.00	0.00	0.00
10,900.00	90.07	180.62	7,124.97	-3,711.59	-293.33	3,722.88	0.00	0.00	0.00
11,000.00	90.07	180.62	7,124.85	-3,811.58	-294.42	3,822.72	0.00	0.00	0.00
11,100.00	90.07	180.62	7,124.73	-3,911.58	-295.50	3,922.57	0.00	0.00	0.00
11,200.00	90.07	180.62	7,124.62	-4,011.57	-296.58	4,022.41	0.00	0.00	0.00
11,300.00	90.07	180.62	7,124.50	-4,111.56	-297.66	4,122.26	0.00	0.00	0.00
11,400.00	90.07	180.62	7,124.38	-4,211.56	-298.75	4,222.10	0.00	0.00	0.00
11,500.00	90.07	180.62	7,124.26	-4,311.55	-299.83	4,321.95	0.00	0.00	0.00
11,600.00	90.07	180.62	7,124.15	-4,411.55	-300.91	4,421.79	0.00	0.00	0.00
11,700.00	90.07	180.62	7,124.03	-4,511.54	-301.99	4,521.64	0.00	0.00	0.00
11,724.46	90.07	180.62	7,124.00	-4,536.00	-302.26	4,546.06	0.00	0.00	0.00
TD at 11724.46 - CROWDER 37N-18HZ PBHL									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
CROWDER 37N-18HZ F	0.00	0.00	7,124.00	-4,536.00	-302.26	1,292,135.76	3,222,974.32	40.132554	-104.702539
- plan hits target center									
- Point									

Andarko Petroleum Corporation

Planning Report

Database:	edmp	Local Co-ordinate Reference:	Well CROWDER 37N-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 37N-18HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	CROWDER 37N-18HZ		
Design:	CROWDER 37N-18HZ (wp01) PERMIT		

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
1,040.00	1,040.00	9 5/8"	9-5/8	12-1/4	
7,470.81	7,129.00	7"	7	7-1/2	

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
4,007.39	4,000.00	Parkman				
4,603.04	4,594.00	Sussex				
7,071.77	6,996.00	Sharon Springs				
7,198.92	7,066.00	Niobrara A				
7,277.74	7,097.00	Niobrara B				

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
1,200.00	1,200.00	0.00	0.00	Start Build 2.00	
1,413.32	1,413.12	6.02	-5.17	Start 4943.49 hold at 1413.32 MD	
6,356.81	6,342.92	284.98	-244.83	Start Drop -2.00	
6,570.13	6,556.04	291.00	-250.00	Start Build 10.00	
7,470.81	7,129.00	-282.60	-256.21	Start 4253.65 hold at 7470.81 MD	
11,724.46	7,124.00	-4,536.00	-302.26	TD at 11724.46	