

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

WELD_BYDALEK 35-20HZ PAD

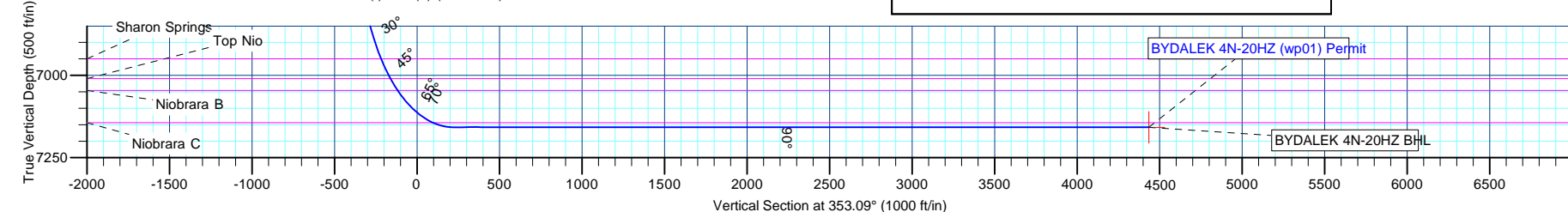
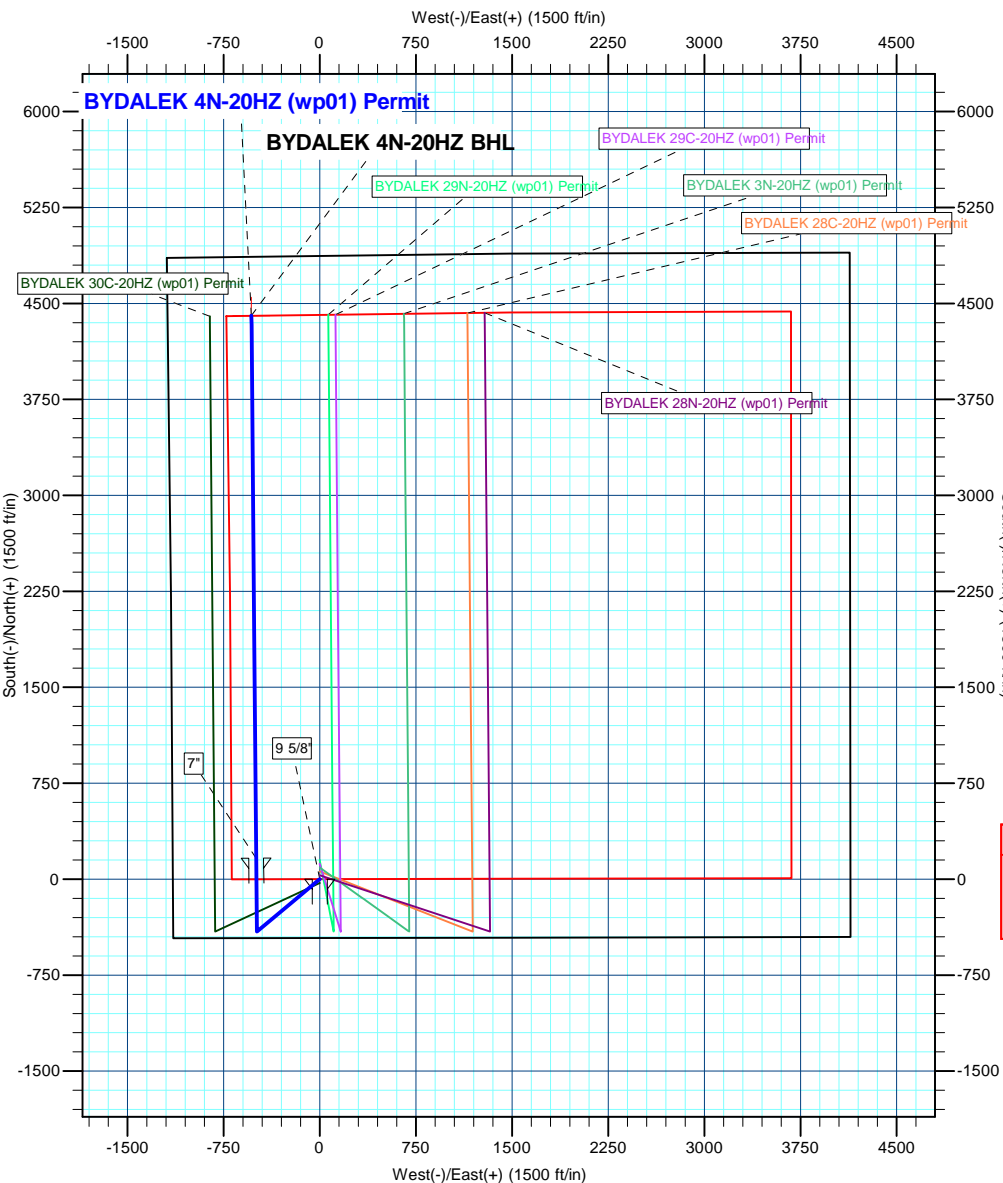
BYDALEK 4N-20HZ

BYDALEK 4N-20HZ

Plan: BYDALEK 4N-20HZ (wp01) Permit

Standard Planning Report

18 September, 2012



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Azimuths to True North

Magnetic North: 8.63°

Magnetic Field

Strength: 52857.3snT

Dip Angle: 66.79°

Date: 9/17/2012

Model: IGRF2010



Project: COLORADO NORTHERN ZONE - 83

Site: WELD BYDALEK 35-20HZ PAD

Well: BYDALEK 4N-20HZ

Wellbore: BYDALEK 4N-20HZ

Section:

SHL:

Design: BYDALEK 4N-20HZ (wp01) Permit

Latitude: 40.118015

Longitude: -104.693210

GL: 4931.00

KB: 17'RKB + 4931' GL @ 4948.00ft

WELL DETAILS: BYDALEK 4N-20HZ						
+N/-S	+E/-W	Northing	Ground Level: Easting	4931.00 Latitude	Longitude	Slot
0.00	0.00	1286863.31	3225630.87	40.118015	-104.693210	

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
1125.00	0.00	0.00	1125.00	0.00	0.00	0.00	0.00	0.00
1541.09	8.32	230.09	1539.63	-19.35	-23.14	2.00	230.09	-16.43
5543.60	8.32	230.09	5500.00	-391.00	-467.50	0.00	0.00	-331.94
5959.69	0.00	0.00	5914.63	-410.35	-490.64	2.00	180.00	-348.36
6630.11	0.00	0.00	6585.04	-410.35	-490.64	0.00	0.00	-348.36
7530.11	90.00	359.49	7158.00	162.58	-495.74	10.00	359.49	221.03
11771.49	90.00	359.49	7158.00	4403.80	-533.51	0.00	0.00	4436.00

WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)						
Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
BYDALEK 4N-20HZ BHL	7158.00	4403.80	-533.51	40.130104	-104.695118	Point

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
4100.00	4128.71	Parkman
4454.00	4486.47	Sussex
6950.00	7025.77	Sharon Springs
7010.00	7108.87	Top Nio
7046.00	7165.75	Niobrara B
7144.00	7403.19	Niobrara C

CASING DETAILS			
TVD	MD	Name	Size
975.00	975.00	9 5/8"	9-5/8
7158.00	7530.11	7"	7

Andarko Petroleum Corporation

Planning Report

Database:	edmp	Local Co-ordinate Reference:	Well BYDALEK 4N-20HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	17'RKB + 4931' GL @ 4948.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	17'RKB + 4931' GL @ 4948.00ft
Site:	WELD_BYDALEK 35-20HZ PAD	North Reference:	True
Well:	BYDALEK 4N-20HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	BYDALEK 4N-20HZ		
Design:	BYDALEK 4N-20HZ (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_BYDALEK 35-20HZ PAD			
Site Position:		Northing:	1,286,833.46 usft	Latitude: 40.117933
From:	Lat/Long	Easting:	3,225,631.42 usft	Longitude: -104.693209
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence: 0.52 °

Well	BYDALEK 4N-20HZ			
Well Position	+N/-S	29.86 ft	Northing:	1,286,863.31 usft
	+E/-W	-0.28 ft	Easting:	3,225,630.87 usft
Position Uncertainty		0.00 ft	Wellhead Elevation:	Latitude: 40.118015
				Longitude: -104.693210
				Ground Level: 4,931.00 ft

Wellbore	BYDALEK 4N-20HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/17/2012	8.63	66.79	52,857

Design	BYDALEK 4N-20HZ (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	353.09

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	
1,125.00	0.00	0.00	1,125.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,541.09	8.32	230.09	1,539.63	-19.35	-23.14	2.00	2.00	-31.22	230.09	
5,543.60	8.32	230.09	5,500.00	-391.00	-467.50	0.00	0.00	0.00	0.00	
5,959.69	0.00	0.00	5,914.63	-410.35	-490.64	2.00	-2.00	0.00	180.00	
6,630.11	0.00	0.00	6,585.04	-410.35	-490.64	0.00	0.00	0.00	0.00	
7,530.11	90.00	359.49	7,158.00	162.58	-495.74	10.00	10.00	0.00	359.49	
11,771.49	90.00	359.49	7,158.00	4,403.80	-533.51	0.00	0.00	0.00	0.00	BYDALEK 4N-20HZ E

Andarko Petroleum Corporation

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Site:	WELD_BYDALEK 35-20HZ PAD	North Reference:	True
Well:	BYDALEK 4N-20HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	BYDALEK 4N-20HZ		
Design:	BYDALEK 4N-20HZ (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
975.00	0.00	0.00	975.00	0.00	0.00	0.00	0.00	0.00	0.00
9 5/8"									
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,125.00	0.00	0.00	1,125.00	0.00	0.00	0.00	0.00	0.00	0.00
Start DLS 2.00 TFO 230.09									
1,200.00	1.50	230.09	1,199.99	-0.63	-0.75	-0.53	2.00	2.00	0.00
1,300.00	3.50	230.09	1,299.89	-3.43	-4.10	-2.91	2.00	2.00	0.00
1,400.00	5.50	230.09	1,399.58	-8.46	-10.12	-7.18	2.00	2.00	0.00
1,500.00	7.50	230.09	1,498.93	-15.72	-18.80	-13.35	2.00	2.00	0.00
1,541.09	8.32	230.09	1,539.63	-19.35	-23.14	-16.43	2.00	2.00	0.00
Start 4002.52 hold at 1541.09 MD									
1,600.00	8.32	230.09	1,597.92	-24.82	-29.68	-21.07	0.00	0.00	0.00
1,700.00	8.32	230.09	1,696.87	-34.11	-40.78	-28.95	0.00	0.00	0.00
1,800.00	8.32	230.09	1,795.81	-43.39	-51.88	-36.84	0.00	0.00	0.00
1,900.00	8.32	230.09	1,894.76	-52.68	-62.98	-44.72	0.00	0.00	0.00
2,000.00	8.32	230.09	1,993.71	-61.96	-74.09	-52.60	0.00	0.00	0.00
2,100.00	8.32	230.09	2,092.65	-71.25	-85.19	-60.49	0.00	0.00	0.00
2,200.00	8.32	230.09	2,191.60	-80.53	-96.29	-68.37	0.00	0.00	0.00
2,300.00	8.32	230.09	2,290.55	-89.82	-107.39	-76.25	0.00	0.00	0.00
2,400.00	8.32	230.09	2,389.50	-99.10	-118.49	-84.13	0.00	0.00	0.00
2,500.00	8.32	230.09	2,488.44	-108.39	-129.60	-92.02	0.00	0.00	0.00
2,600.00	8.32	230.09	2,587.39	-117.68	-140.70	-99.90	0.00	0.00	0.00
2,700.00	8.32	230.09	2,686.34	-126.96	-151.80	-107.78	0.00	0.00	0.00
2,800.00	8.32	230.09	2,785.28	-136.25	-162.90	-115.67	0.00	0.00	0.00
2,900.00	8.32	230.09	2,884.23	-145.53	-174.01	-123.55	0.00	0.00	0.00
3,000.00	8.32	230.09	2,983.18	-154.82	-185.11	-131.43	0.00	0.00	0.00
3,100.00	8.32	230.09	3,082.12	-164.10	-196.21	-139.31	0.00	0.00	0.00
3,200.00	8.32	230.09	3,181.07	-173.39	-207.31	-147.20	0.00	0.00	0.00
3,300.00	8.32	230.09	3,280.02	-182.67	-218.41	-155.08	0.00	0.00	0.00
3,400.00	8.32	230.09	3,378.97	-191.96	-229.52	-162.96	0.00	0.00	0.00
3,500.00	8.32	230.09	3,477.91	-201.24	-240.62	-170.84	0.00	0.00	0.00
3,600.00	8.32	230.09	3,576.86	-210.53	-251.72	-178.73	0.00	0.00	0.00
3,700.00	8.32	230.09	3,675.81	-219.81	-262.82	-186.61	0.00	0.00	0.00
3,800.00	8.32	230.09	3,774.75	-229.10	-273.92	-194.49	0.00	0.00	0.00
3,900.00	8.32	230.09	3,873.70	-238.39	-285.03	-202.38	0.00	0.00	0.00
4,000.00	8.32	230.09	3,972.65	-247.67	-296.13	-210.26	0.00	0.00	0.00
4,100.00	8.32	230.09	4,071.60	-256.96	-307.23	-218.14	0.00	0.00	0.00
4,128.71	8.32	230.09	4,100.00	-259.62	-310.42	-220.40	0.00	0.00	0.00
Parkman									
4,200.00	8.32	230.09	4,170.54	-266.24	-318.33	-226.02	0.00	0.00	0.00
4,300.00	8.32	230.09	4,269.49	-275.53	-329.43	-233.91	0.00	0.00	0.00
4,400.00	8.32	230.09	4,368.44	-284.81	-340.54	-241.79	0.00	0.00	0.00
4,486.47	8.32	230.09	4,454.00	-292.84	-350.14	-248.61	0.00	0.00	0.00

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Planning Report

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Company:	US ROCKIES REGION PLANNING	TVD Reference:	17'RKB + 4931' GL @ 4948.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	17'RKB + 4931' GL @ 4948.00ft
Site:	WELD_BYDALEK 35-20HZ PAD	North Reference:	True
Well:	BYDALEK 4N-20HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	BYDALEK 4N-20HZ		
Design:	BYDALEK 4N-20HZ (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)
Sussex									
4,500.00	8.32	230.09	4,467.38	-294.10	-351.64	-249.67	0.00	0.00	0.00
4,600.00	8.32	230.09	4,566.33	-303.38	-362.74	-257.55	0.00	0.00	0.00
4,700.00	8.32	230.09	4,665.28	-312.67	-373.84	-265.44	0.00	0.00	0.00
4,800.00	8.32	230.09	4,764.23	-321.95	-384.94	-273.32	0.00	0.00	0.00
4,900.00	8.32	230.09	4,863.17	-331.24	-396.05	-281.20	0.00	0.00	0.00
5,000.00	8.32	230.09	4,962.12	-340.52	-407.15	-289.09	0.00	0.00	0.00
5,100.00	8.32	230.09	5,061.07	-349.81	-418.25	-296.97	0.00	0.00	0.00
5,200.00	8.32	230.09	5,160.01	-359.10	-429.35	-304.85	0.00	0.00	0.00
5,300.00	8.32	230.09	5,258.96	-368.38	-440.45	-312.73	0.00	0.00	0.00
5,400.00	8.32	230.09	5,357.91	-377.67	-451.56	-320.62	0.00	0.00	0.00
5,500.00	8.32	230.09	5,456.85	-386.95	-462.66	-328.50	0.00	0.00	0.00
5,543.60	8.32	230.09	5,500.00	-391.00	-467.50	-331.94	0.00	0.00	0.00
Start Drop -2.00									
5,600.00	7.19	230.09	5,555.88	-395.88	-473.34	-336.08	2.00	-2.00	0.00
5,700.00	5.19	230.09	5,655.29	-402.81	-481.62	-341.96	2.00	-2.00	0.00
5,800.00	3.19	230.09	5,755.02	-407.50	-487.22	-345.94	2.00	-2.00	0.00
5,900.00	1.19	230.09	5,854.94	-409.95	-490.16	-348.03	2.00	-2.00	0.00
5,959.69	0.00	0.00	5,914.63	-410.35	-490.64	-348.36	2.00	-2.00	0.00
Start 670.41 hold at 5959.69 MD									
6,000.00	0.00	0.00	5,954.93	-410.35	-490.64	-348.36	0.00	0.00	0.00
6,100.00	0.00	0.00	6,054.93	-410.35	-490.64	-348.36	0.00	0.00	0.00
6,200.00	0.00	0.00	6,154.93	-410.35	-490.64	-348.36	0.00	0.00	0.00
6,300.00	0.00	0.00	6,254.93	-410.35	-490.64	-348.36	0.00	0.00	0.00
6,400.00	0.00	0.00	6,354.93	-410.35	-490.64	-348.36	0.00	0.00	0.00
6,500.00	0.00	0.00	6,454.93	-410.35	-490.64	-348.36	0.00	0.00	0.00
6,600.00	0.00	0.00	6,554.93	-410.35	-490.64	-348.36	0.00	0.00	0.00
6,630.11	0.00	0.00	6,585.04	-410.35	-490.64	-348.36	0.00	0.00	0.00
Start Build 10.00									
6,650.00	1.99	359.49	6,604.93	-410.01	-490.64	-348.02	10.00	10.00	0.00
6,700.00	6.99	359.49	6,654.76	-406.09	-490.68	-344.13	10.00	10.00	0.00
6,750.00	11.99	359.49	6,704.06	-397.85	-490.75	-335.94	10.00	10.00	0.00
6,800.00	16.99	359.49	6,752.46	-385.35	-490.86	-323.52	10.00	10.00	0.00
6,850.00	21.99	359.49	6,799.58	-368.67	-491.01	-306.94	10.00	10.00	0.00
6,900.00	26.99	359.49	6,845.06	-347.95	-491.19	-286.35	10.00	10.00	0.00
6,950.00	31.99	359.49	6,888.57	-323.35	-491.41	-261.90	10.00	10.00	0.00
7,000.00	36.99	359.49	6,929.77	-295.05	-491.66	-233.77	10.00	10.00	0.00
7,025.77	39.57	359.49	6,950.00	-279.08	-491.81	-217.91	10.00	10.00	0.00
Sharon Springs									
7,050.00	41.99	359.49	6,968.35	-263.26	-491.95	-202.18	10.00	10.00	0.00
7,100.00	46.99	359.49	7,004.00	-228.24	-492.26	-167.38	10.00	10.00	0.00
7,108.87	47.88	359.49	7,010.00	-221.71	-492.32	-160.89	10.00	10.00	0.00
Top Nio									
7,150.00	51.99	359.49	7,036.47	-190.24	-492.60	-129.61	10.00	10.00	0.00
7,165.75	53.56	359.49	7,046.00	-177.69	-492.71	-117.15	10.00	10.00	0.00
Niobrara B									
7,200.00	56.99	359.49	7,065.51	-149.55	-492.96	-89.18	10.00	10.00	0.00
7,250.00	61.99	359.49	7,090.88	-106.49	-493.34	-46.38	10.00	10.00	0.00
7,300.00	66.99	359.49	7,112.41	-61.38	-493.75	-1.55	10.00	10.00	0.00
7,350.00	71.99	359.49	7,129.92	-14.57	-494.16	44.97	10.00	10.00	0.00
7,400.00	76.99	359.49	7,143.29	33.60	-494.59	92.84	10.00	10.00	0.00
7,403.19	77.31	359.49	7,144.00	36.71	-494.62	95.93	10.00	10.00	0.00
Niobrara C									

Andarko Petroleum Corporation

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Wellbore:	BYDALEK 4N-20HZ		
Design:	BYDALEK 4N-20HZ (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)
7,450.00	81.99	359.49	7,152.41	82.74	-495.03	141.68	10.00	10.00	0.00
7,500.00	86.99	359.49	7,157.21	132.49	-495.47	191.12	10.00	10.00	0.00
7,530.11	90.00	359.49	7,158.00	162.59	-495.74	221.03	10.00	10.00	0.00
Start 4241.38 hold at 7530.11 MD - 7"									
7,600.00	90.00	359.49	7,158.00	232.47	-496.36	290.48	0.00	0.00	0.00
7,700.00	90.00	359.49	7,158.00	332.47	-497.25	389.86	0.00	0.00	0.00
7,800.00	90.00	359.49	7,158.00	432.47	-498.14	489.24	0.00	0.00	0.00
7,900.00	90.00	359.49	7,158.00	532.46	-499.03	588.61	0.00	0.00	0.00
8,000.00	90.00	359.49	7,158.00	632.46	-499.93	687.99	0.00	0.00	0.00
8,100.00	90.00	359.49	7,158.00	732.45	-500.82	787.37	0.00	0.00	0.00
8,200.00	90.00	359.49	7,158.00	832.45	-501.71	886.75	0.00	0.00	0.00
8,300.00	90.00	359.49	7,158.00	932.45	-502.60	986.12	0.00	0.00	0.00
8,400.00	90.00	359.49	7,158.00	1,032.44	-503.49	1,085.50	0.00	0.00	0.00
8,500.00	90.00	359.49	7,158.00	1,132.44	-504.38	1,184.88	0.00	0.00	0.00
8,600.00	90.00	359.49	7,158.00	1,232.43	-505.27	1,284.26	0.00	0.00	0.00
8,700.00	90.00	359.49	7,158.00	1,332.43	-506.16	1,383.63	0.00	0.00	0.00
8,800.00	90.00	359.49	7,158.00	1,432.43	-507.05	1,483.01	0.00	0.00	0.00
8,900.00	90.00	359.49	7,158.00	1,532.42	-507.94	1,582.39	0.00	0.00	0.00
9,000.00	90.00	359.49	7,158.00	1,632.42	-508.83	1,681.77	0.00	0.00	0.00
9,100.00	90.00	359.49	7,158.00	1,732.41	-509.72	1,781.14	0.00	0.00	0.00
9,200.00	90.00	359.49	7,158.00	1,832.41	-510.61	1,880.52	0.00	0.00	0.00
9,300.00	90.00	359.49	7,158.00	1,932.41	-511.50	1,979.90	0.00	0.00	0.00
9,400.00	90.00	359.49	7,158.00	2,032.40	-512.39	2,079.27	0.00	0.00	0.00
9,500.00	90.00	359.49	7,158.00	2,132.40	-513.28	2,178.65	0.00	0.00	0.00
9,600.00	90.00	359.49	7,158.00	2,232.39	-514.18	2,278.03	0.00	0.00	0.00
9,700.00	90.00	359.49	7,158.00	2,332.39	-515.07	2,377.41	0.00	0.00	0.00
9,800.00	90.00	359.49	7,158.00	2,432.39	-515.96	2,476.78	0.00	0.00	0.00
9,900.00	90.00	359.49	7,158.00	2,532.38	-516.85	2,576.16	0.00	0.00	0.00
10,000.00	90.00	359.49	7,158.00	2,632.38	-517.74	2,675.54	0.00	0.00	0.00
10,100.00	90.00	359.49	7,158.00	2,732.37	-518.63	2,774.92	0.00	0.00	0.00
10,200.00	90.00	359.49	7,158.00	2,832.37	-519.52	2,874.29	0.00	0.00	0.00
10,300.00	90.00	359.49	7,158.00	2,932.37	-520.41	2,973.67	0.00	0.00	0.00
10,400.00	90.00	359.49	7,158.00	3,032.36	-521.30	3,073.05	0.00	0.00	0.00
10,500.00	90.00	359.49	7,158.00	3,132.36	-522.19	3,172.42	0.00	0.00	0.00
10,600.00	90.00	359.49	7,158.00	3,232.35	-523.08	3,271.80	0.00	0.00	0.00
10,700.00	90.00	359.49	7,158.00	3,332.35	-523.97	3,371.18	0.00	0.00	0.00
10,800.00	90.00	359.49	7,158.00	3,432.35	-524.86	3,470.56	0.00	0.00	0.00
10,900.00	90.00	359.49	7,158.00	3,532.34	-525.75	3,569.93	0.00	0.00	0.00
11,000.00	90.00	359.49	7,158.00	3,632.34	-526.64	3,669.31	0.00	0.00	0.00
11,100.00	90.00	359.49	7,158.00	3,732.33	-527.53	3,768.69	0.00	0.00	0.00
11,200.00	90.00	359.49	7,158.00	3,832.33	-528.42	3,868.07	0.00	0.00	0.00
11,300.00	90.00	359.49	7,158.00	3,932.33	-529.32	3,967.44	0.00	0.00	0.00
11,400.00	90.00	359.49	7,158.00	4,032.32	-530.21	4,066.82	0.00	0.00	0.00
11,500.00	90.00	359.49	7,158.00	4,132.32	-531.10	4,166.20	0.00	0.00	0.00
11,600.00	90.00	359.49	7,158.00	4,232.31	-531.99	4,265.58	0.00	0.00	0.00
11,700.00	90.00	359.49	7,158.00	4,332.31	-532.88	4,364.95	0.00	0.00	0.00
11,771.49	90.00	359.49	7,158.00	4,403.80	-533.51	4,436.00	0.00	0.00	0.00
TD at 11771.49 - BYDALEK 4N-20HZ BHL									

Andarko Petroleum Corporation

Planning Report

Database:	edmp	Local Co-ordinate Reference:	Well BYDALEK 4N-20HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	17'RKB + 4931' GL @ 4948.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	17'RKB + 4931' GL @ 4948.00ft
Site:	WELD_BYDALEK 35-20HZ PAD	North Reference:	True
Well:	BYDALEK 4N-20HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	BYDALEK 4N-20HZ		
Design:	BYDALEK 4N-20HZ (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									
BYDALEK 4N-20HZ BHI	0.00	0.00	7,158.00	4,403.80	-533.51	1,291,262.06	3,225,057.31	40.130104	-104.695118
- plan hits target center									
- Point									

Casing Points					
Measured Depth	Vertical Depth	Name		Casing Diameter	Hole Diameter
(ft)	(ft)			(")	(")
975.00	975.00	9 5/8"		9-5/8	12-1/4
7,530.11	7,158.00	7"		7	8-3/4

Formations						
Measured Depth	Vertical Depth	Name		Lithology	Dip	Dip Direction
(ft)	(ft)				(°)	(°)
4,128.71	4,100.00	Parkman				
4,486.47	4,454.00	Sussex				
7,025.77	6,950.00	Sharon Springs				
7,108.87	7,010.00	Top Nio				
7,165.75	7,046.00	Niobrara B				
7,403.19	7,144.00	Niobrara C				

Plan Annotations					
Measured Depth	Vertical Depth	Local Coordinates		Comment	
(ft)	(ft)	+N/-S	+E/-W		
(ft)	(ft)	(ft)	(ft)		
1,125.00	1,125.00	0.00	0.00	Start DLS 2.00 TFO 230.09	
1,541.09	1,539.63	-19.35	-23.14	Start 4002.52 hold at 1541.09 MD	
5,543.60	5,500.00	-391.00	-467.50	Start Drop -2.00	
5,959.69	5,914.63	-410.35	-490.64	Start 670.41 hold at 5959.69 MD	
6,630.11	6,585.04	-410.35	-490.64	Start Build 10.00	
7,530.11	7,158.00	162.58	-495.74	Start 4241.38 hold at 7530.11 MD	
11,771.49	7,158.00	4,403.80	-533.51	TD at 11771.49	