

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

WELD_BYDALEK 35-20HZ PAD

BYDALEK 30C-20HZ

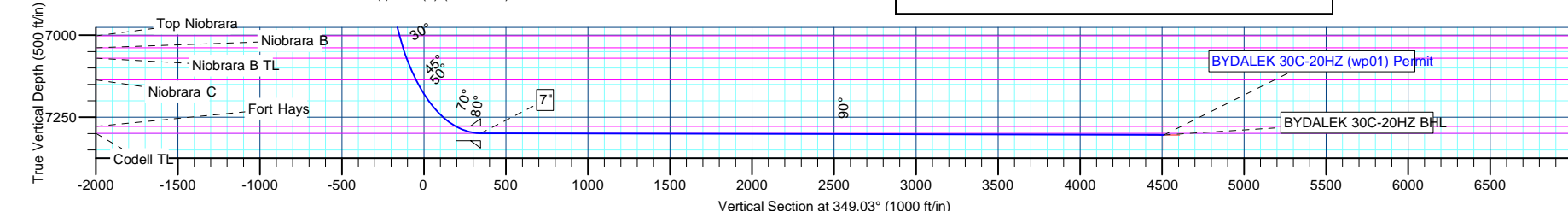
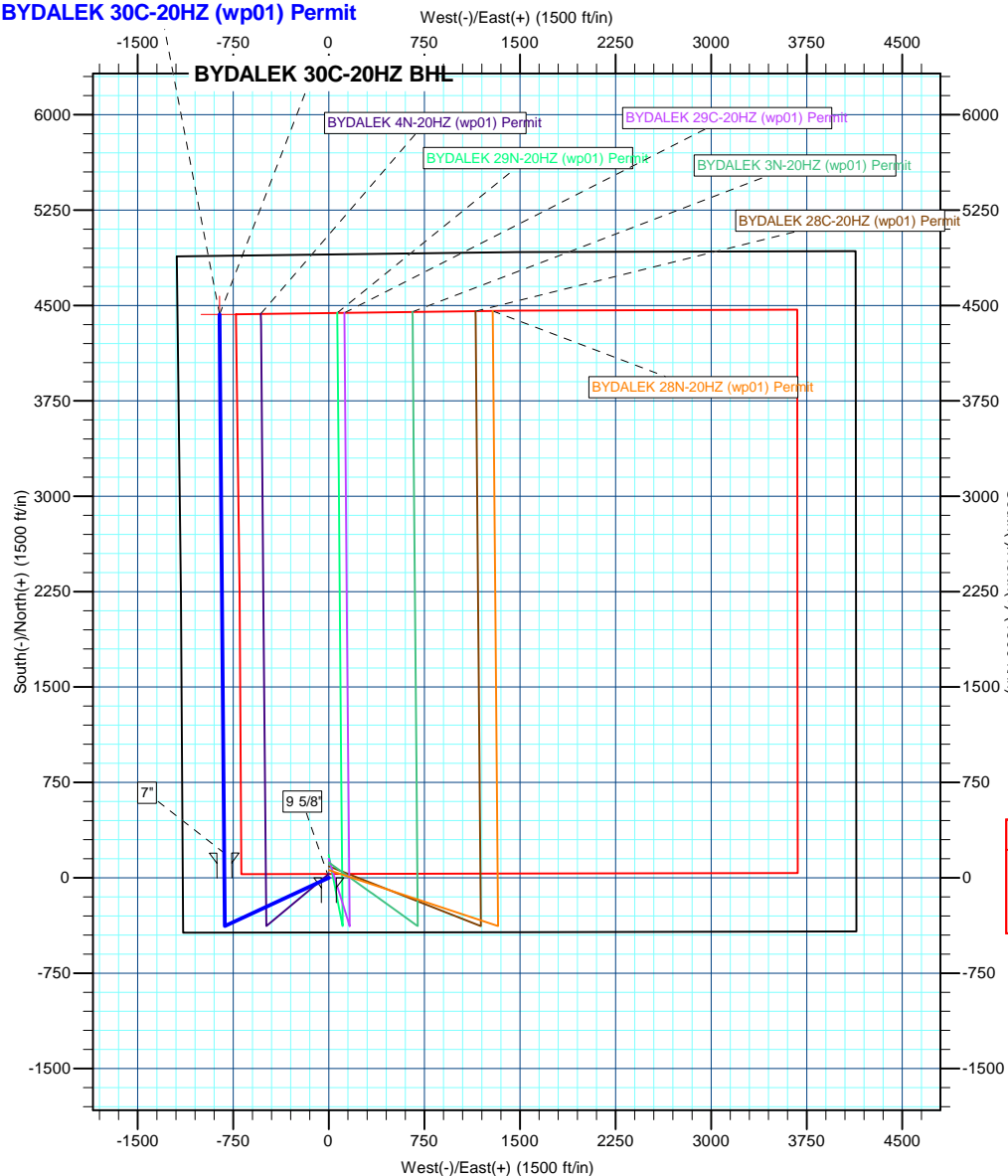
BYDALEK 30C-20HZ

Plan: BYDALEK 30C-20HZ (wp01) Permit

Standard Planning Report

18 September, 2012

BYDALEK 30C-20HZ (wp01) Permit



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Azimuths to True North

Magnetic North: 8.63°

Magnetic Field

Strength: 52857.2snT

Dip Angle: 66.79°

Date: 9/17/2012

Model: IGRF2010



Project: COLORADO NORTHERN ZONE - 83

Site: WELD BYDALEK 35-20HZ PAD

Well: BYDALEK 30C-20HZ

Wellbore: BYDALEK 30C-20HZ

Section:

SHL:

Design: BYDALEK 30C-20HZ (wp01) Permit

Latitude: 40.117933

Longitude: -104.693209

GL: 4931.00

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

WELL DETAILS: BYDALEK 30C-20HZ						
+N/-S	+E/-W	Northing	Ground Level: Easting	4931.00 Latitude	Longitude	Slot
0.00	0.00	1286833.46	3225631.42	40.117933	-104.693209	

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
1670.56	10.91	245.01	1667.26	-21.88	-46.94	2.00	245.01	-12.55
5879.38	10.91	245.01	5800.00	-358.50	-769.00	0.00	0.00	-205.59
6424.93	0.00	0.00	6342.26	-380.38	-815.94	2.00	180.00	-218.13
6808.71	0.00	0.00	6726.04	-380.38	-815.94	0.00	0.00	-218.13
7708.72	90.00	359.49	7299.00	192.55	-821.04	10.00	359.49	345.30
7917.26	89.93	359.49	7299.13	401.09	-822.89	0.03	179.54	550.37
11945.63	89.93	359.49	7304.00	4429.29	-858.71	0.00	0.00	4511.77

WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)						
Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape Point
BYDALEK 30C-20HZ BHL	7304.00	4429.29	-858.71	40.130092	-104.696280	

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
4092.00	4139.93	Parkman
4447.00	4501.47	Sussex
6942.00	7030.14	Sharon Springs
7002.00	7096.64	Top Niobrara
7038.00	7138.60	Niobrara B
7070.00	7177.64	Niobrara B TL
7136.00	7265.56	Niobrara C
7278.00	7553.10	Fort Hays
7299.00	7706.70	Codell TL

CASING DETAILS			
TVD	MD	Name	Size
975.00	975.00	9 5/8"	9-5/8
7299.00	7708.72	7"	7

Andarko Petroleum Corporation

Planning Report

Database:	edmp	Local Co-ordinate Reference:	Well BYDALEK 30C-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 30C-20HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	BYDALEK 30C-20HZ		
Design:	BYDALEK 30C-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 30C-20HZ			
Well Position	+N/-S	0.00 ft	Northing:	1,286,833.46 usft
	+E/-W	0.00 ft	Easting:	3,225,631.42 usft
Position Uncertainty		0.00 ft	Wellhead Elevation:	Latitude: 40.117933
				Longitude: -104.693209
				Ground Level: 4,931.00 ft

Wellbore	BYDALEK 30C-20HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/17/2012	8.63	66.79	52,857

Design	BYDALEK 30C-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	349.03

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	
1,670.56	10.91	245.01	1,667.26	-21.88	-46.94	2.00	2.00	-21.08	245.01	
5,879.38	10.91	245.01	5,800.00	-358.50	-769.00	0.00	0.00	0.00	0.00	
6,424.93	0.00	0.00	6,342.26	-380.38	-815.94	2.00	-2.00	0.00	180.00	
6,808.71	0.00	0.00	6,726.04	-380.38	-815.94	0.00	0.00	0.00	0.00	
7,708.72	90.00	359.49	7,299.00	192.55	-821.04	10.00	10.00	0.00	359.49	
7,917.26	89.93	359.49	7,299.13	401.09	-822.89	0.03	-0.03	0.00	179.54	
11,945.63	89.93	359.49	7,304.00	4,429.29	-858.71	0.00	0.00	0.00	0.00	BYDALEK 30C-20HZ

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Wellbore:	BYDALEK 30C-20HZ		
Design:	BYDALEK 30C-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 245.01									
1,200.00	1.50	245.01	1,199.99	-0.41	-0.89	-0.24	2.00	2.00	0.00
1,300.00	3.50	245.01	1,299.89	-2.26	-4.84	-1.29	2.00	2.00	0.00
1,400.00	5.50	245.01	1,399.58	-5.57	-11.95	-3.20	2.00	2.00	0.00
1,500.00	7.50	245.01	1,498.93	-10.36	-22.21	-5.94	2.00	2.00	0.00
1,600.00	9.50	245.01	1,597.83	-16.60	-35.61	-9.52	2.00	2.00	0.00
1,670.56	10.91	245.01	1,667.26	-21.88	-46.94	-12.55	2.00	2.00	0.00
Start 4208.82 hold at 1670.56 MD									
1,700.00	10.91	245.01	1,696.18	-24.24	-51.99	-13.90	0.00	0.00	0.00
1,800.00	10.91	245.01	1,794.37	-32.24	-69.15	-18.49	0.00	0.00	0.00
1,900.00	10.91	245.01	1,892.56	-40.23	-86.30	-23.07	0.00	0.00	0.00
2,000.00	10.91	245.01	1,990.75	-48.23	-103.46	-27.66	0.00	0.00	0.00
2,100.00	10.91	245.01	2,088.95	-56.23	-120.61	-32.25	0.00	0.00	0.00
2,200.00	10.91	245.01	2,187.14	-64.23	-137.77	-36.83	0.00	0.00	0.00
2,300.00	10.91	245.01	2,285.33	-72.22	-154.93	-41.42	0.00	0.00	0.00
2,400.00	10.91	245.01	2,383.52	-80.22	-172.08	-46.00	0.00	0.00	0.00
2,500.00	10.91	245.01	2,481.71	-88.22	-189.24	-50.59	0.00	0.00	0.00
2,600.00	10.91	245.01	2,579.91	-96.22	-206.39	-55.18	0.00	0.00	0.00
2,700.00	10.91	245.01	2,678.10	-104.22	-223.55	-59.76	0.00	0.00	0.00
2,800.00	10.91	245.01	2,776.29	-112.21	-240.71	-64.35	0.00	0.00	0.00
2,900.00	10.91	245.01	2,874.48	-120.21	-257.86	-68.94	0.00	0.00	0.00
3,000.00	10.91	245.01	2,972.67	-128.21	-275.02	-73.52	0.00	0.00	0.00
3,100.00	10.91	245.01	3,070.87	-136.21	-292.17	-78.11	0.00	0.00	0.00
3,200.00	10.91	245.01	3,169.06	-144.21	-309.33	-82.70	0.00	0.00	0.00
3,300.00	10.91	245.01	3,267.25	-152.20	-326.48	-87.28	0.00	0.00	0.00
3,400.00	10.91	245.01	3,365.44	-160.20	-343.64	-91.87	0.00	0.00	0.00
3,500.00	10.91	245.01	3,463.64	-168.20	-360.80	-96.46	0.00	0.00	0.00
3,600.00	10.91	245.01	3,561.83	-176.20	-377.95	-101.04	0.00	0.00	0.00
3,700.00	10.91	245.01	3,660.02	-184.20	-395.11	-105.63	0.00	0.00	0.00
3,800.00	10.91	245.01	3,758.21	-192.19	-412.26	-110.22	0.00	0.00	0.00
3,900.00	10.91	245.01	3,856.40	-200.19	-429.42	-114.80	0.00	0.00	0.00
4,000.00	10.91	245.01	3,954.60	-208.19	-446.58	-119.39	0.00	0.00	0.00
4,100.00	10.91	245.01	4,052.79	-216.19	-463.73	-123.97	0.00	0.00	0.00
4,139.93	10.91	245.01	4,092.00	-219.38	-470.58	-125.81	0.00	0.00	0.00
Parkman									
4,200.00	10.91	245.01	4,150.98	-224.19	-480.89	-128.56	0.00	0.00	0.00
4,300.00	10.91	245.01	4,249.17	-232.18	-498.04	-133.15	0.00	0.00	0.00
4,400.00	10.91	245.01	4,347.37	-240.18	-515.20	-137.73	0.00	0.00	0.00
4,500.00	10.91	245.01	4,445.56	-248.18	-532.36	-142.32	0.00	0.00	0.00

Andarko Petroleum Corporation

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Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	17' RKB + 4931' GL @ 4948.00ft
Site:	WELD_BYDALEK 35-20HZ PAD	North Reference:	True
Well:	BYDALEK 30C-20HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	BYDALEK 30C-20HZ		
Design:	BYDALEK 30C-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)
4,501.47	10.91	245.01	4,447.00	-248.30	-532.61	-142.39	0.00	0.00	0.00
Sussex									
4,600.00	10.91	245.01	4,543.75	-256.18	-549.51	-146.91	0.00	0.00	0.00
4,700.00	10.91	245.01	4,641.94	-264.17	-566.67	-151.49	0.00	0.00	0.00
4,800.00	10.91	245.01	4,740.13	-272.17	-583.82	-156.08	0.00	0.00	0.00
4,900.00	10.91	245.01	4,838.33	-280.17	-600.98	-160.67	0.00	0.00	0.00
5,000.00	10.91	245.01	4,936.52	-288.17	-618.13	-165.25	0.00	0.00	0.00
5,100.00	10.91	245.01	5,034.71	-296.17	-635.29	-169.84	0.00	0.00	0.00
5,200.00	10.91	245.01	5,132.90	-304.16	-652.45	-174.43	0.00	0.00	0.00
5,300.00	10.91	245.01	5,231.10	-312.16	-669.60	-179.01	0.00	0.00	0.00
5,400.00	10.91	245.01	5,329.29	-320.16	-686.76	-183.60	0.00	0.00	0.00
5,500.00	10.91	245.01	5,427.48	-328.16	-703.91	-188.19	0.00	0.00	0.00
5,600.00	10.91	245.01	5,525.67	-336.16	-721.07	-192.77	0.00	0.00	0.00
5,700.00	10.91	245.01	5,623.86	-344.15	-738.23	-197.36	0.00	0.00	0.00
5,800.00	10.91	245.01	5,722.06	-352.15	-755.38	-201.94	0.00	0.00	0.00
5,879.38	10.91	245.01	5,800.00	-358.50	-769.00	-205.59	0.00	0.00	0.00
Start Drop -2.00									
5,900.00	10.50	245.01	5,820.26	-360.12	-772.47	-206.51	2.00	-2.00	0.00
6,000.00	8.50	245.01	5,918.89	-367.09	-787.43	-210.51	2.00	-2.00	0.00
6,100.00	6.50	245.01	6,018.03	-372.60	-799.26	-213.67	2.00	-2.00	0.00
6,200.00	4.50	245.01	6,117.56	-376.65	-807.94	-216.00	2.00	-2.00	0.00
6,300.00	2.50	245.01	6,217.37	-379.23	-813.47	-217.47	2.00	-2.00	0.00
6,400.00	0.50	245.01	6,317.33	-380.34	-815.84	-218.11	2.00	-2.00	0.00
6,424.93	0.00	0.00	6,342.26	-380.38	-815.94	-218.13	2.00	-2.00	0.00
Start 383.78 hold at 6424.93 MD									
6,500.00	0.00	0.00	6,417.33	-380.38	-815.94	-218.13	0.00	0.00	0.00
6,600.00	0.00	0.00	6,517.33	-380.38	-815.94	-218.13	0.00	0.00	0.00
6,700.00	0.00	0.00	6,617.33	-380.38	-815.94	-218.13	0.00	0.00	0.00
6,808.71	0.00	0.00	6,726.04	-380.38	-815.94	-218.13	0.00	0.00	0.00
Start Build 10.00									
6,850.00	4.13	359.49	6,767.29	-378.90	-815.95	-216.67	10.00	10.00	0.00
6,900.00	9.13	359.49	6,816.94	-373.13	-816.00	-211.00	10.00	10.00	0.00
6,950.00	14.13	359.49	6,865.90	-363.05	-816.09	-201.09	10.00	10.00	0.00
7,000.00	19.13	359.49	6,913.80	-348.75	-816.22	-187.02	10.00	10.00	0.00
7,030.14	22.14	359.49	6,942.00	-338.13	-816.32	-176.58	10.00	10.00	0.00
Sharon Springs									
7,050.00	24.13	359.49	6,960.26	-330.33	-816.39	-168.91	10.00	10.00	0.00
7,096.64	28.79	359.49	7,002.00	-309.55	-816.57	-148.48	10.00	10.00	0.00
Top Niobrara									
7,100.00	29.13	359.49	7,004.94	-307.92	-816.58	-146.88	10.00	10.00	0.00
7,138.60	32.99	359.49	7,038.00	-288.02	-816.76	-127.30	10.00	10.00	0.00
Niobrara B									
7,150.00	34.13	359.49	7,047.50	-281.71	-816.82	-121.10	10.00	10.00	0.00
7,177.64	36.89	359.49	7,070.00	-265.66	-816.96	-105.31	10.00	10.00	0.00
Niobrara B TL									
7,200.00	39.13	359.49	7,087.62	-251.89	-817.08	-91.77	10.00	10.00	0.00
7,250.00	44.13	359.49	7,124.98	-218.69	-817.38	-59.12	10.00	10.00	0.00
7,265.56	45.68	359.49	7,136.00	-207.70	-817.48	-48.32	10.00	10.00	0.00
Niobrara C									
7,300.00	49.13	359.49	7,159.30	-182.36	-817.70	-23.39	10.00	10.00	0.00
7,350.00	54.13	359.49	7,190.33	-143.17	-818.05	15.14	10.00	10.00	0.00
7,400.00	59.13	359.49	7,217.83	-101.43	-818.42	56.19	10.00	10.00	0.00
7,450.00	64.13	359.49	7,241.58	-57.45	-818.81	99.44	10.00	10.00	0.00

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7,500.00	69.13	359.49	7,261.41	-11.57	-819.22	144.56	10.00	10.00	0.00	
7,550.00	74.13	359.49	7,277.16	35.87	-819.64	191.21	10.00	10.00	0.00	
7,553.10	74.44	359.49	7,278.00	38.85	-819.67	194.14	10.00	10.00	0.00	
Fort Hays										
7,600.00	79.13	359.49	7,288.72	84.49	-820.08	239.03	10.00	10.00	0.00	
7,650.00	84.13	359.49	7,296.00	133.94	-820.52	287.66	10.00	10.00	0.00	
7,700.00	89.13	359.49	7,298.94	183.84	-820.96	336.73	10.00	10.00	0.00	
7,706.70	89.80	359.49	7,299.00	190.54	-821.02	343.32	10.00	10.00	0.00	
Codell TL										
7,708.72	90.00	359.49	7,299.00	192.56	-821.04	345.30	9.98	9.98	0.00	
Start DLS 0.03 TFO 179.54 - 7"										
7,800.00	89.97	359.49	7,299.03	283.83	-821.85	435.07	0.03	-0.03	0.00	
7,900.00	89.94	359.49	7,299.11	383.83	-822.74	533.40	0.03	-0.03	0.00	
7,917.26	89.93	359.49	7,299.13	401.09	-822.89	550.37	0.03	-0.03	0.00	
Start 4028.37 hold at 7917.26 MD										
8,000.00	89.93	359.49	7,299.23	483.83	-823.63	631.74	0.00	0.00	0.00	
8,100.00	89.93	359.49	7,299.35	583.82	-824.52	730.08	0.00	0.00	0.00	
8,200.00	89.93	359.49	7,299.47	683.82	-825.41	828.42	0.00	0.00	0.00	
8,300.00	89.93	359.49	7,299.59	783.81	-826.30	926.75	0.00	0.00	0.00	
8,400.00	89.93	359.49	7,299.71	883.81	-827.19	1,025.09	0.00	0.00	0.00	
8,500.00	89.93	359.49	7,299.83	983.81	-828.08	1,123.43	0.00	0.00	0.00	
8,600.00	89.93	359.49	7,299.96	1,083.80	-828.97	1,221.77	0.00	0.00	0.00	
8,700.00	89.93	359.49	7,300.08	1,183.80	-829.85	1,320.10	0.00	0.00	0.00	
8,800.00	89.93	359.49	7,300.20	1,283.79	-830.74	1,418.44	0.00	0.00	0.00	
8,900.00	89.93	359.49	7,300.32	1,383.79	-831.63	1,516.78	0.00	0.00	0.00	
9,000.00	89.93	359.49	7,300.44	1,483.79	-832.52	1,615.11	0.00	0.00	0.00	
9,100.00	89.93	359.49	7,300.56	1,583.78	-833.41	1,713.45	0.00	0.00	0.00	
9,200.00	89.93	359.49	7,300.68	1,683.78	-834.30	1,811.79	0.00	0.00	0.00	
9,300.00	89.93	359.49	7,300.80	1,783.77	-835.19	1,910.13	0.00	0.00	0.00	
9,400.00	89.93	359.49	7,300.92	1,883.77	-836.08	2,008.46	0.00	0.00	0.00	
9,500.00	89.93	359.49	7,301.04	1,983.77	-836.97	2,106.80	0.00	0.00	0.00	
9,600.00	89.93	359.49	7,301.16	2,083.76	-837.86	2,205.14	0.00	0.00	0.00	
9,700.00	89.93	359.49	7,301.29	2,183.76	-838.75	2,303.48	0.00	0.00	0.00	
9,800.00	89.93	359.49	7,301.41	2,283.75	-839.63	2,401.81	0.00	0.00	0.00	
9,900.00	89.93	359.49	7,301.53	2,383.75	-840.52	2,500.15	0.00	0.00	0.00	
10,000.00	89.93	359.49	7,301.65	2,483.75	-841.41	2,598.49	0.00	0.00	0.00	
10,100.00	89.93	359.49	7,301.77	2,583.74	-842.30	2,696.83	0.00	0.00	0.00	
10,200.00	89.93	359.49	7,301.89	2,683.74	-843.19	2,795.16	0.00	0.00	0.00	
10,300.00	89.93	359.49	7,302.01	2,783.73	-844.08	2,893.50	0.00	0.00	0.00	
10,400.00	89.93	359.49	7,302.13	2,883.73	-844.97	2,991.84	0.00	0.00	0.00	
10,500.00	89.93	359.49	7,302.25	2,983.73	-845.86	3,090.17	0.00	0.00	0.00	
10,600.00	89.93	359.49	7,302.37	3,083.72	-846.75	3,188.51	0.00	0.00	0.00	
10,700.00	89.93	359.49	7,302.49	3,183.72	-847.64	3,286.85	0.00	0.00	0.00	
10,800.00	89.93	359.49	7,302.62	3,283.71	-848.53	3,385.19	0.00	0.00	0.00	
10,900.00	89.93	359.49	7,302.74	3,383.71	-849.42	3,483.52	0.00	0.00	0.00	
11,000.00	89.93	359.49	7,302.86	3,483.71	-850.30	3,581.86	0.00	0.00	0.00	
11,100.00	89.93	359.49	7,302.98	3,583.70	-851.19	3,680.20	0.00	0.00	0.00	
11,200.00	89.93	359.49	7,303.10	3,683.70	-852.08	3,778.54	0.00	0.00	0.00	
11,300.00	89.93	359.49	7,303.22	3,783.69	-852.97	3,876.87	0.00	0.00	0.00	
11,400.00	89.93	359.49	7,303.34	3,883.69	-853.86	3,975.21	0.00	0.00	0.00	
11,500.00	89.93	359.49	7,303.46	3,983.68	-854.75	4,073.55	0.00	0.00	0.00	
11,600.00	89.93	359.49	7,303.58	4,083.68	-855.64	4,171.89	0.00	0.00	0.00	
11,700.00	89.93	359.49	7,303.70	4,183.68	-856.53	4,270.22	0.00	0.00	0.00	

Andarko Petroleum Corporation

Planning Report

Database:	edmp	Local Co-ordinate Reference:	Well BYDALEK 30C-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 30C-20HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	BYDALEK 30C-20HZ		
Design:	BYDALEK 30C-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)
11,800.00	89.93	359.49	7,303.82	4,283.67	-857.42	4,368.56	0.00	0.00	0.00
11,900.00	89.93	359.49	7,303.94	4,383.67	-858.31	4,466.90	0.00	0.00	0.00
11,945.63	89.93	359.49	7,304.00	4,429.29	-858.71	4,511.77	0.00	0.00	0.00
TD at 11945.63 - BYDALEK 30C-20HZ BHL									

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									
BYDALEK 30C-20HZ BHL	0.00	0.00	7,304.00	4,429.29	-858.71	1,291,254.74	3,224,732.45	40.130092	-104.696280
- plan hits target center									
- Point									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
975.00	975.00	9 5/8"	9-5/8	12-1/4	
7,708.72	7,299.00	7"	7	8-3/4	

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
4,139.93	4,093.00	Parkman				
4,501.47	4,448.00	Sussex				
7,030.14	6,943.00	Sharon Springs				
7,096.64	7,003.00	Top Niobrara				
7,138.60	7,039.00	Niobrara B				
7,177.64	7,071.00	Niobrara B TL				
7,265.56	7,137.00	Niobrara C				
7,553.10	7,279.00	Fort Hays				
7,706.70	7,300.00	Codell TL				

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
1,125.00	1,125.00	0.00	0.00	Start DLS 2.00 TFO 245.01	
1,670.56	1,667.26	-21.88	-46.94	Start 4208.82 hold at 1670.56 MD	
5,879.38	5,800.00	-358.50	-769.00	Start Drop -2.00	
6,424.93	6,342.26	-380.38	-815.94	Start 383.78 hold at 6424.93 MD	
6,808.71	6,726.04	-380.38	-815.94	Start Build 10.00	
7,708.72	7,299.00	192.55	-821.04	Start DLS 0.03 TFO 179.54	
7,917.26	7,299.13	401.09	-822.89	Start 4028.37 hold at 7917.26 MD	
11,945.63	7,304.00	4,429.29	-858.71	TD at 11945.63	