

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

WELD_BYDALEK 35-20HZ PAD

BYDALEK 28N-20HZ

BYDALEK 28N-20HZ

Plan: BYDALEK 28N-20HZ (wp01) Permit

Standard Planning Report

18 September, 2012

Andarko Petroleum Corporation

Planning Report

Database:	edmp	Local Co-ordinate Reference:	Well BYDALEK 28N-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 28N-20HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	BYDALEK 28N-20HZ		
Design:	BYDALEK 28N-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 28N-20HZ			
Well Position	+N/-S	60.10 ft	Northing:	1,286,893.55 usft
	+E/-W	-0.28 ft	Easting:	3,225,630.59 usft
Position Uncertainty		0.00 ft	Wellhead Elevation:	Latitude: 40.118098
				Longitude: -104.693210
				Ground Level: 4,931.00 ft

Wellbore	BYDALEK 28N-20HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/17/2012	8.63	66.79	52,857

Design	BYDALEK 28N-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	16.31

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	
2,016.07	17.82	108.33	2,001.77	-43.24	130.49	2.00	2.00	12.16	108.33	
5,690.62	17.82	108.33	5,500.00	-397.00	1,198.00	0.00	0.00	0.00	0.00	
6,581.69	0.00	0.00	6,376.77	-440.24	1,328.49	2.00	-2.00	-12.16	-180.00	
6,714.96	0.00	0.00	6,510.04	-440.24	1,328.49	0.00	0.00	0.00	0.00	
7,614.97	90.00	359.50	7,083.00	132.70	1,323.49	10.00	10.00	0.00	359.50	
7,826.61	89.93	359.50	7,083.13	344.33	1,321.64	0.03	-0.03	0.00	-179.66	
11,878.97	89.93	359.50	7,088.00	4,396.54	1,286.25	0.00	0.00	0.00	0.00	BYDALEK 28N-20HZ

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Wellbore:	BYDALEK 28N-20HZ		
Design:	BYDALEK 28N-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 108.33									
1,200.00	1.50	108.33	1,199.99	-0.31	0.93	-0.03	2.00	2.00	0.00
1,300.00	3.50	108.33	1,299.89	-1.68	5.07	-0.19	2.00	2.00	0.00
1,400.00	5.50	108.33	1,399.58	-4.15	12.52	-0.47	2.00	2.00	0.00
1,500.00	7.50	108.33	1,498.93	-7.71	23.26	-0.87	2.00	2.00	0.00
1,600.00	9.50	108.33	1,597.83	-12.36	37.29	-1.39	2.00	2.00	0.00
1,700.00	11.50	108.33	1,696.15	-18.09	54.59	-2.03	2.00	2.00	0.00
1,800.00	13.50	108.33	1,793.77	-24.90	75.14	-2.80	2.00	2.00	0.00
1,900.00	15.50	108.33	1,890.58	-32.77	98.90	-3.69	2.00	2.00	0.00
2,000.00	17.50	108.33	1,986.46	-41.71	125.86	-4.69	2.00	2.00	0.00
2,016.07	17.82	108.33	2,001.77	-43.24	130.49	-4.86	2.00	2.00	0.00
Start 3674.55 hold at 2016.07 MD									
2,100.00	17.82	108.33	2,081.67	-51.32	154.87	-5.77	0.00	0.00	0.00
2,200.00	17.82	108.33	2,176.88	-60.95	183.92	-6.85	0.00	0.00	0.00
2,300.00	17.82	108.33	2,272.08	-70.58	212.97	-7.94	0.00	0.00	0.00
2,400.00	17.82	108.33	2,367.28	-80.20	242.03	-9.02	0.00	0.00	0.00
2,500.00	17.82	108.33	2,462.48	-89.83	271.08	-10.10	0.00	0.00	0.00
2,600.00	17.82	108.33	2,557.68	-99.46	300.13	-11.18	0.00	0.00	0.00
2,700.00	17.82	108.33	2,652.88	-109.09	329.18	-12.27	0.00	0.00	0.00
2,800.00	17.82	108.33	2,748.08	-118.71	358.23	-13.35	0.00	0.00	0.00
2,900.00	17.82	108.33	2,843.29	-128.34	387.28	-14.43	0.00	0.00	0.00
3,000.00	17.82	108.33	2,938.49	-137.97	416.33	-15.51	0.00	0.00	0.00
3,100.00	17.82	108.33	3,033.69	-147.59	445.39	-16.60	0.00	0.00	0.00
3,200.00	17.82	108.33	3,128.89	-157.22	474.44	-17.68	0.00	0.00	0.00
3,300.00	17.82	108.33	3,224.09	-166.85	503.49	-18.76	0.00	0.00	0.00
3,400.00	17.82	108.33	3,319.29	-176.48	532.54	-19.84	0.00	0.00	0.00
3,500.00	17.82	108.33	3,414.50	-186.10	561.59	-20.93	0.00	0.00	0.00
3,600.00	17.82	108.33	3,509.70	-195.73	590.64	-22.01	0.00	0.00	0.00
3,700.00	17.82	108.33	3,604.90	-205.36	619.69	-23.09	0.00	0.00	0.00
3,800.00	17.82	108.33	3,700.10	-214.99	648.75	-24.17	0.00	0.00	0.00
3,900.00	17.82	108.33	3,795.30	-224.61	677.80	-25.26	0.00	0.00	0.00
4,000.00	17.82	108.33	3,890.50	-234.24	706.85	-26.34	0.00	0.00	0.00
4,100.00	17.82	108.33	3,985.70	-243.87	735.90	-27.42	0.00	0.00	0.00
4,200.00	17.82	108.33	4,080.91	-253.49	764.95	-28.51	0.00	0.00	0.00
4,224.26	17.82	108.33	4,104.00	-255.83	772.00	-28.77	0.00	0.00	0.00
Parkman									
4,300.00	17.82	108.33	4,176.11	-263.12	794.00	-29.59	0.00	0.00	0.00
4,400.00	17.82	108.33	4,271.31	-272.75	823.06	-30.67	0.00	0.00	0.00
4,500.00	17.82	108.33	4,366.51	-282.38	852.11	-31.75	0.00	0.00	0.00

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Well:	BYDALEK 28N-20HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	BYDALEK 28N-20HZ		
Design:	BYDALEK 28N-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)
4,596.10	17.82	108.33	4,458.00	-291.63	880.03	-32.79	0.00	0.00	0.00
Sussex									
4,600.00	17.82	108.33	4,461.71	-292.00	881.16	-32.84	0.00	0.00	0.00
4,700.00	17.82	108.33	4,556.91	-301.63	910.21	-33.92	0.00	0.00	0.00
4,800.00	17.82	108.33	4,652.11	-311.26	939.26	-35.00	0.00	0.00	0.00
4,900.00	17.82	108.33	4,747.32	-320.88	968.31	-36.08	0.00	0.00	0.00
5,000.00	17.82	108.33	4,842.52	-330.51	997.36	-37.17	0.00	0.00	0.00
5,100.00	17.82	108.33	4,937.72	-340.14	1,026.42	-38.25	0.00	0.00	0.00
5,200.00	17.82	108.33	5,032.92	-349.77	1,055.47	-39.33	0.00	0.00	0.00
5,300.00	17.82	108.33	5,128.12	-359.39	1,084.52	-40.41	0.00	0.00	0.00
5,400.00	17.82	108.33	5,223.32	-369.02	1,113.57	-41.50	0.00	0.00	0.00
5,500.00	17.82	108.33	5,318.53	-378.65	1,142.62	-42.58	0.00	0.00	0.00
5,600.00	17.82	108.33	5,413.73	-388.28	1,171.67	-43.66	0.00	0.00	0.00
5,690.62	17.82	108.33	5,500.00	-397.00	1,198.00	-44.64	0.00	0.00	0.00
Start DLS 2.00 TFO -180.00									
5,700.00	17.63	108.33	5,508.93	-397.90	1,200.71	-44.74	2.00	-2.00	0.00
5,800.00	15.63	108.33	5,604.74	-406.90	1,227.88	-45.76	2.00	-2.00	0.00
5,900.00	13.63	108.33	5,701.49	-414.85	1,251.86	-46.65	2.00	-2.00	0.00
6,000.00	11.63	108.33	5,799.07	-421.73	1,272.62	-47.42	2.00	-2.00	0.00
6,100.00	9.63	108.33	5,897.35	-427.53	1,290.14	-48.08	2.00	-2.00	0.00
6,200.00	7.63	108.33	5,996.21	-432.26	1,304.39	-48.61	2.00	-2.00	0.00
6,300.00	5.63	108.33	6,095.53	-435.89	1,315.35	-49.02	2.00	-2.00	0.00
6,400.00	3.63	108.33	6,195.20	-438.43	1,323.02	-49.30	2.00	-2.00	0.00
6,500.00	1.63	108.33	6,295.09	-439.88	1,327.38	-49.46	2.00	-2.00	0.00
6,581.69	0.00	0.00	6,376.77	-440.24	1,328.49	-49.50	2.00	-2.00	-132.61
Start 133.27 hold at 6581.69 MD									
6,600.00	0.00	0.00	6,395.08	-440.24	1,328.49	-49.50	0.00	0.00	0.00
6,700.00	0.00	0.00	6,495.08	-440.24	1,328.49	-49.50	0.00	0.00	0.00
6,714.96	0.00	0.00	6,510.04	-440.24	1,328.49	-49.50	0.00	0.00	0.00
Start Build 10.00									
6,750.00	3.50	359.50	6,545.06	-439.17	1,328.48	-48.48	10.00	10.00	-1.43
6,800.00	8.50	359.50	6,594.77	-433.94	1,328.43	-43.47	10.00	10.00	0.00
6,850.00	13.50	359.50	6,643.83	-424.40	1,328.35	-34.34	10.00	10.00	0.00
6,900.00	18.50	359.50	6,691.88	-410.62	1,328.23	-21.15	10.00	10.00	0.00
6,950.00	23.50	359.50	6,738.54	-392.71	1,328.07	-4.00	10.00	10.00	0.00
7,000.00	28.50	359.50	6,783.47	-370.80	1,327.88	16.98	10.00	10.00	0.00
7,050.00	33.50	359.50	6,826.31	-345.05	1,327.66	41.62	10.00	10.00	0.00
7,100.00	38.50	359.50	6,866.75	-315.67	1,327.40	69.75	10.00	10.00	0.00
7,150.00	43.50	359.50	6,904.47	-282.87	1,327.12	101.15	10.00	10.00	0.00
7,200.00	48.50	359.50	6,939.19	-246.92	1,326.80	135.57	10.00	10.00	0.00
7,222.88	50.79	359.50	6,954.00	-229.49	1,326.65	152.26	10.00	10.00	0.00
Sharon Springs									
7,250.00	53.50	359.50	6,970.64	-208.07	1,326.46	172.76	10.00	10.00	0.00
7,300.00	58.50	359.50	6,998.59	-166.63	1,326.10	212.43	10.00	10.00	0.00
7,330.87	61.59	359.50	7,014.00	-139.89	1,325.87	238.03	10.00	10.00	0.00
Top Nio									
7,350.00	63.50	359.50	7,022.82	-122.92	1,325.72	254.28	10.00	10.00	0.00
7,400.00	68.50	359.50	7,043.15	-77.26	1,325.32	297.99	10.00	10.00	0.00
7,450.00	73.50	359.50	7,059.42	-30.00	1,324.91	343.23	10.00	10.00	0.00
7,500.00	78.50	359.50	7,071.51	18.50	1,324.49	389.66	10.00	10.00	0.00
7,550.00	83.50	359.50	7,079.32	67.87	1,324.05	436.92	10.00	10.00	0.00
7,600.00	88.50	359.50	7,082.81	117.73	1,323.62	484.65	10.00	10.00	0.00
7,613.23	89.83	359.50	7,083.00	130.96	1,323.50	497.32	10.00	10.00	0.00

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Niobrara B									
7,614.97	90.00	359.50	7,083.00	132.70	1,323.49	498.98	9.98	9.98	0.00
Start DLS 0.03 TFO -179.66 - 7"									
7,700.00	89.97	359.50	7,083.02	217.73	1,322.75	580.38	0.03	-0.03	0.00
7,800.00	89.94	359.50	7,083.10	317.72	1,321.87	676.11	0.03	-0.03	0.00
7,826.61	89.93	359.50	7,083.13	344.33	1,321.64	701.58	0.03	-0.03	0.00
Start 4052.37 hold at 7826.61 MD									
7,900.00	89.93	359.50	7,083.22	417.72	1,321.00	771.84	0.00	0.00	0.00
8,000.00	89.93	359.50	7,083.34	517.71	1,320.13	867.56	0.00	0.00	0.00
8,100.00	89.93	359.50	7,083.46	617.71	1,319.25	963.29	0.00	0.00	0.00
8,200.00	89.93	359.50	7,083.58	717.71	1,318.38	1,059.02	0.00	0.00	0.00
8,300.00	89.93	359.50	7,083.70	817.70	1,317.51	1,154.75	0.00	0.00	0.00
8,400.00	89.93	359.50	7,083.82	917.70	1,316.63	1,250.48	0.00	0.00	0.00
8,500.00	89.93	359.50	7,083.94	1,017.69	1,315.76	1,346.20	0.00	0.00	0.00
8,600.00	89.93	359.50	7,084.06	1,117.69	1,314.89	1,441.93	0.00	0.00	0.00
8,700.00	89.93	359.50	7,084.18	1,217.69	1,314.01	1,537.66	0.00	0.00	0.00
8,800.00	89.93	359.50	7,084.30	1,317.68	1,313.14	1,633.39	0.00	0.00	0.00
8,900.00	89.93	359.50	7,084.42	1,417.68	1,312.27	1,729.12	0.00	0.00	0.00
9,000.00	89.93	359.50	7,084.54	1,517.68	1,311.39	1,824.84	0.00	0.00	0.00
9,100.00	89.93	359.50	7,084.66	1,617.67	1,310.52	1,920.57	0.00	0.00	0.00
9,200.00	89.93	359.50	7,084.78	1,717.67	1,309.65	2,016.30	0.00	0.00	0.00
9,300.00	89.93	359.50	7,084.90	1,817.66	1,308.77	2,112.03	0.00	0.00	0.00
9,400.00	89.93	359.50	7,085.02	1,917.66	1,307.90	2,207.76	0.00	0.00	0.00
9,500.00	89.93	359.50	7,085.14	2,017.66	1,307.03	2,303.48	0.00	0.00	0.00
9,600.00	89.93	359.50	7,085.26	2,117.65	1,306.15	2,399.21	0.00	0.00	0.00
9,700.00	89.93	359.50	7,085.38	2,217.65	1,305.28	2,494.94	0.00	0.00	0.00
9,800.00	89.93	359.50	7,085.50	2,317.64	1,304.41	2,590.67	0.00	0.00	0.00
9,900.00	89.93	359.50	7,085.62	2,417.64	1,303.53	2,686.40	0.00	0.00	0.00
10,000.00	89.93	359.50	7,085.74	2,517.64	1,302.66	2,782.12	0.00	0.00	0.00
10,100.00	89.93	359.50	7,085.86	2,617.63	1,301.79	2,877.85	0.00	0.00	0.00
10,200.00	89.93	359.50	7,085.98	2,717.63	1,300.91	2,973.58	0.00	0.00	0.00
10,300.00	89.93	359.50	7,086.10	2,817.62	1,300.04	3,069.31	0.00	0.00	0.00
10,400.00	89.93	359.50	7,086.22	2,917.62	1,299.17	3,165.04	0.00	0.00	0.00
10,500.00	89.93	359.50	7,086.34	3,017.62	1,298.29	3,260.76	0.00	0.00	0.00
10,600.00	89.93	359.50	7,086.46	3,117.61	1,297.42	3,356.49	0.00	0.00	0.00
10,700.00	89.93	359.50	7,086.58	3,217.61	1,296.55	3,452.22	0.00	0.00	0.00
10,800.00	89.93	359.50	7,086.70	3,317.61	1,295.67	3,547.95	0.00	0.00	0.00
10,900.00	89.93	359.50	7,086.82	3,417.60	1,294.80	3,643.68	0.00	0.00	0.00
11,000.00	89.93	359.50	7,086.94	3,517.60	1,293.93	3,739.40	0.00	0.00	0.00
11,100.00	89.93	359.50	7,087.06	3,617.59	1,293.05	3,835.13	0.00	0.00	0.00
11,200.00	89.93	359.50	7,087.18	3,717.59	1,292.18	3,930.86	0.00	0.00	0.00
11,300.00	89.93	359.50	7,087.30	3,817.59	1,291.31	4,026.59	0.00	0.00	0.00
11,400.00	89.93	359.50	7,087.42	3,917.58	1,290.43	4,122.32	0.00	0.00	0.00
11,500.00	89.93	359.50	7,087.54	4,017.58	1,289.56	4,218.04	0.00	0.00	0.00
11,600.00	89.93	359.50	7,087.66	4,117.57	1,288.69	4,313.77	0.00	0.00	0.00
11,700.00	89.93	359.50	7,087.79	4,217.57	1,287.81	4,409.50	0.00	0.00	0.00
11,800.00	89.93	359.50	7,087.91	4,317.57	1,286.94	4,505.23	0.00	0.00	0.00
11,878.97	89.93	359.50	7,088.00	4,396.54	1,286.25	4,580.83	0.00	0.00	0.00
TD at 11878.97 - BYDALEK 28N-20HZ BHL									

Andarko Petroleum Corporation

Planning Report

Database:	edmp	Local Co-ordinate Reference:	Well BYDALEK 28N-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 28N-20HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	BYDALEK 28N-20HZ		
Design:	BYDALEK 28N-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 28N-20HZ Bl	0.00	0.00	7,088.00	4,396.54	1,286.25	1,291,301.60	3,226,876.79	40.130167	-104.688610
- 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
7,614.97	7,083.00	7"		7	8-3/4

Formations					
Measured Depth	Vertical Depth	Name		Dip	Dip Direction
(ft)	(ft)			(°)	(°)
4,224.26	4,104.00	Parkman			
4,596.10	4,458.00	Sussex			
7,222.88	6,954.00	Sharon Springs			
7,330.87	7,014.00	Top Nio			
7,613.23	7,083.00	Niobrara B			

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 108.33	
2,016.07	2,001.77	-43.24	130.49	Start 3674.55 hold at 2016.07 MD	
5,690.62	5,500.00	-397.00	1,198.00	Start DLS 2.00 TFO -180.00	
6,581.69	6,376.77	-440.24	1,328.49	Start 133.27 hold at 6581.69 MD	
6,714.96	6,510.04	-440.24	1,328.49	Start Build 10.00	
7,614.97	7,083.00	132.70	1,323.49	Start DLS 0.03 TFO -179.66	
7,826.61	7,083.13	344.33	1,321.64	Start 4052.37 hold at 7826.61 MD	
11,878.97	7,088.00	4,396.54	1,286.25	TD at 11878.97	