

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

WELD_FARLEY 4 PAD SWSE

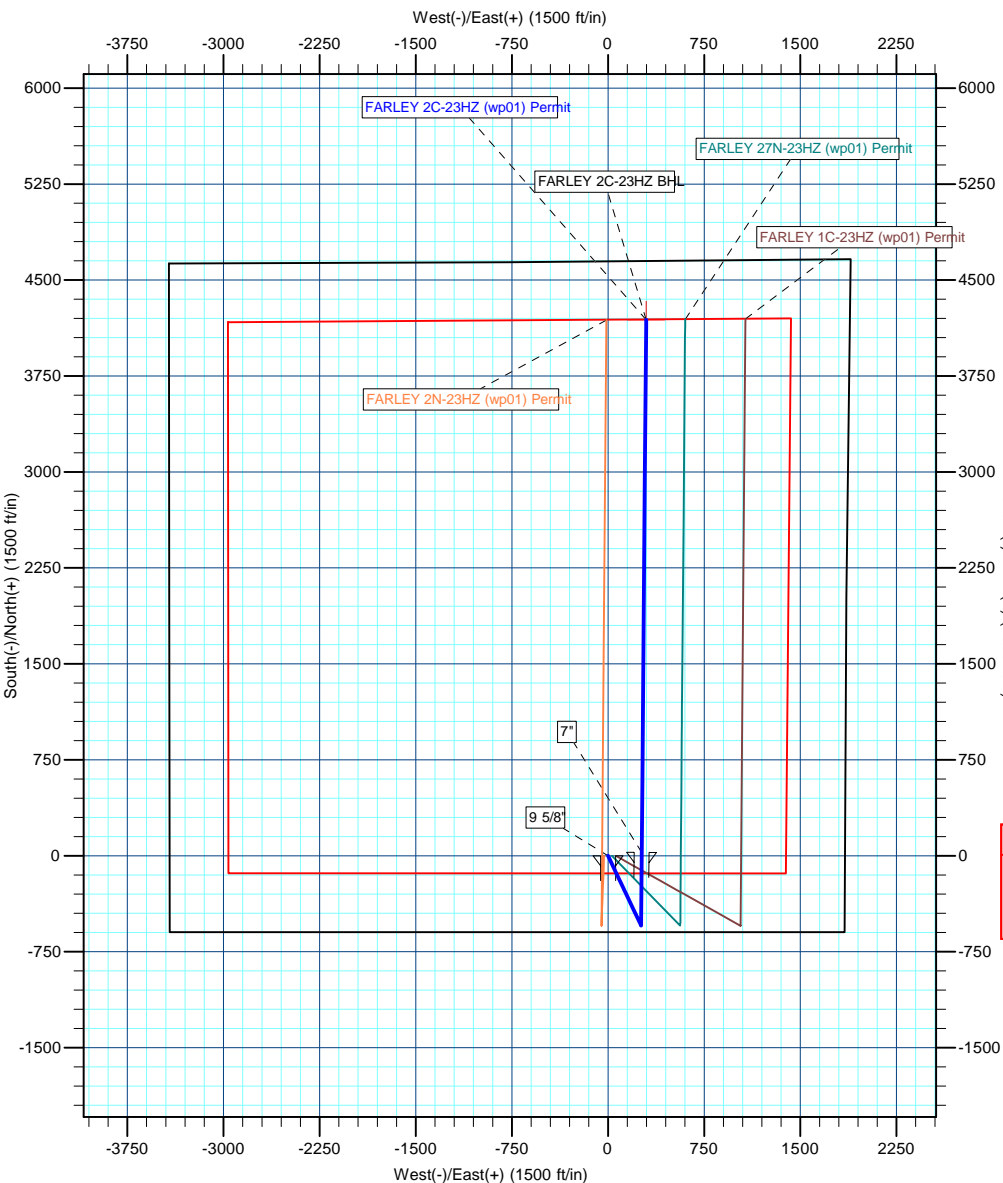
FARLEY 2C-23HZ

FARLEY 2C-23HZ

Plan: FARLEY 2C-23HZ (wp01) Permit

Standard Planning Report

11 September, 2012



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Azimuths to True North

Magnetic North: 8.67°

Magnetic Field

Strength: 52899.6snT

Dip Angle: 66.85°

Date: 9/10/2012

Model: IGRF2010



Project: COLORADO NORTHERN ZONE - 83
Site: WELD_FARLEY 4 PAD SWSE
Well: FARLEY 2C-23HZ
Wellbore: FARLEY 2C-23HZ
Section:
SHL:
Design: FARLEY 2C-23HZ (wp01) Permit
Latitude: 40.205100
Longitude: -104.741537
GL: 4979.00
KB: 17' RKB + 4979' GL @ 4996.00ft

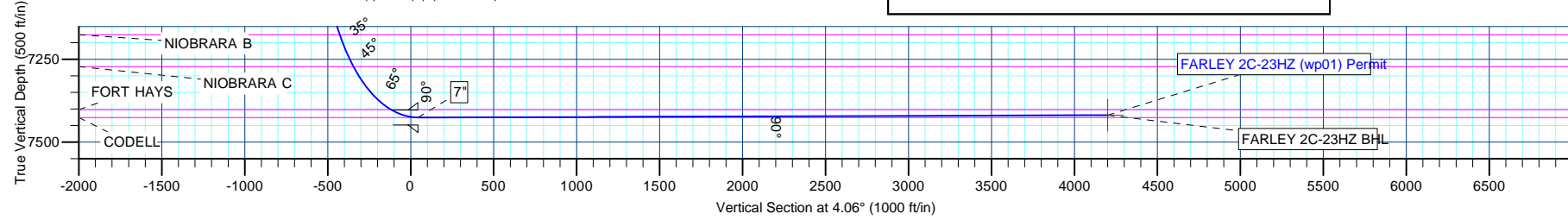
WELL DETAILS: FARLEY 2C-23HZ						
+N/-S	+E/-W	Northing	Ground Level: Easting	4979.00 Latitude	Longitude	Slot
0.00	0.00	1318466.28	3211844.50	40.205100	-104.741537	

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
1691.50	7.83	154.66	1690.29	-24.14	11.43	2.00	154.66	-23.27
5738.96	7.83	154.66	5700.01	-522.50	247.40	0.00	0.00	-503.67
6130.47	0.00	0.00	6090.29	-546.64	258.83	2.00	-180.00	-526.94
6893.22	0.00	0.00	6853.04	-546.64	258.83	0.00	0.00	-526.94
7793.22	90.00	0.46	7426.00	26.30	263.43	10.00	0.46	44.89
8109.34	90.10	0.47	7425.73	342.41	265.99	0.03	4.57	360.39
11956.72	90.10	0.47	7419.00	4189.65	297.42	0.00	0.00	4200.20

WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)						
Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape Point
FARLEY 2C-23HZ BHL	7419.00	4189.65	297.42	40.216601	-104.740472	

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
787.00	787.00	FOX HILLS
3980.00	4002.77	PARKMAN
4513.00	4540.78	SUSSEX
7080.00	7126.57	SHARON SPRINGS
7146.00	7200.72	NIOBRARA A
7176.00	7236.31	NIOBRARA B
7272.00	7363.10	NIOBRARA C
7402.00	7626.78	FORT HAYS
7426.00	7791.14	CODELL

CASING DETAILS			
TVD	MD	Name	Size
937.00	937.00	9 5/8"	9-5/8
7426.00	7793.22	7"	7



Andarko Petroleum Corporation

Planning Report

Database:	edmp	Local Co-ordinate Reference:	Well FARLEY 2C-23HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	17' RKB + 4979' GL @ 4996.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	17' RKB + 4979' GL @ 4996.00ft
Site:	WELD_FARLEY 4 PAD SWSE	North Reference:	True
Well:	FARLEY 2C-23HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	FARLEY 2C-23HZ		
Design:	FARLEY 2C-23HZ (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_FARLEY 4 PAD SWSE			
Site Position:		Northing:	1,318,466.04 usft	Latitude:	40.205100
From:	Lat/Long	Easting:	3,211,814.34 usft	Longitude:	-104.741645
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.49 °

Well	FARLEY 2C-23HZ					
Well Position	+N/-S	-0.02 ft	Northing:	1,318,466.28 usft	Latitude:	40.205100
	+E/-W	30.17 ft	Easting:	3,211,844.50 usft	Longitude:	-104.741537
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	4,979.00 ft

Wellbore	FARLEY 2C-23HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/10/2012	8.67	66.85	52,900

Design	FARLEY 2C-23HZ (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	4.06

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	
1,691.50	7.83	154.66	1,690.29	-24.14	11.43	2.00	2.00	39.51	154.66	
5,738.96	7.83	154.66	5,700.01	-522.50	247.40	0.00	0.00	0.00	0.00	
6,130.47	0.00	0.00	6,090.29	-546.64	258.83	2.00	-2.00	0.00	-180.00	
6,893.22	0.00	0.00	6,853.05	-546.64	258.83	0.00	0.00	0.00	0.00	
7,793.22	90.00	0.46	7,426.00	26.30	263.43	10.00	10.00	0.00	0.46	
8,109.34	90.10	0.47	7,425.73	342.41	265.99	0.03	0.03	0.00	4.57	
11,956.72	90.10	0.47	7,419.00	4,189.65	297.42	0.00	0.00	0.00	0.00	FARLEY 2C-23HZ B+

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Site:	WELD_FARLEY 4 PAD SWSE	North Reference:	True
Well:	FARLEY 2C-23HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	FARLEY 2C-23HZ		
Design:	FARLEY 2C-23HZ (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
787.00	0.00	0.00	787.00	0.00	0.00	0.00	0.00	0.00	0.00
FOX HILLS									
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
937.00	0.00	0.00	937.00	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
1,200.00	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 154.66									
1,400.00	2.00	154.66	1,399.98	-1.58	0.75	-1.52	2.00	2.00	0.00
1,500.00	4.00	154.66	1,499.84	-6.31	2.99	-6.08	2.00	2.00	0.00
1,600.00	6.00	154.66	1,599.45	-14.18	6.72	-13.67	2.00	2.00	0.00
1,691.50	7.83	154.66	1,690.29	-24.14	11.43	-23.27	2.00	2.00	0.00
Start 4047.46 hold at 1691.50 MD									
1,700.00	7.83	154.66	1,698.70	-25.19	11.93	-24.28	0.00	0.00	0.00
1,800.00	7.83	154.66	1,797.77	-37.50	17.76	-36.15	0.00	0.00	0.00
1,900.00	7.83	154.66	1,896.84	-49.81	23.59	-48.02	0.00	0.00	0.00
2,000.00	7.83	154.66	1,995.91	-62.13	29.42	-59.89	0.00	0.00	0.00
2,100.00	7.83	154.66	2,094.97	-74.44	35.25	-71.76	0.00	0.00	0.00
2,200.00	7.83	154.66	2,194.04	-86.75	41.08	-83.62	0.00	0.00	0.00
2,300.00	7.83	154.66	2,293.11	-99.06	46.91	-95.49	0.00	0.00	0.00
2,400.00	7.83	154.66	2,392.18	-111.38	52.74	-107.36	0.00	0.00	0.00
2,500.00	7.83	154.66	2,491.24	-123.69	58.57	-119.23	0.00	0.00	0.00
2,600.00	7.83	154.66	2,590.31	-136.00	64.40	-131.10	0.00	0.00	0.00
2,700.00	7.83	154.66	2,689.38	-148.32	70.23	-142.97	0.00	0.00	0.00
2,800.00	7.83	154.66	2,788.45	-160.63	76.06	-154.84	0.00	0.00	0.00
2,900.00	7.83	154.66	2,887.52	-172.94	81.89	-166.71	0.00	0.00	0.00
3,000.00	7.83	154.66	2,986.58	-185.25	87.72	-178.58	0.00	0.00	0.00
3,100.00	7.83	154.66	3,085.65	-197.57	93.55	-190.45	0.00	0.00	0.00
3,200.00	7.83	154.66	3,184.72	-209.88	99.38	-202.32	0.00	0.00	0.00
3,300.00	7.83	154.66	3,283.79	-222.19	105.21	-214.19	0.00	0.00	0.00
3,400.00	7.83	154.66	3,382.85	-234.51	111.04	-226.05	0.00	0.00	0.00
3,500.00	7.83	154.66	3,481.92	-246.82	116.87	-237.92	0.00	0.00	0.00
3,600.00	7.83	154.66	3,580.99	-259.13	122.70	-249.79	0.00	0.00	0.00
3,700.00	7.83	154.66	3,680.06	-271.44	128.53	-261.66	0.00	0.00	0.00
3,800.00	7.83	154.66	3,779.12	-283.76	134.36	-273.53	0.00	0.00	0.00
3,900.00	7.83	154.66	3,878.19	-296.07	140.19	-285.40	0.00	0.00	0.00
4,000.00	7.83	154.66	3,977.26	-308.38	146.02	-297.27	0.00	0.00	0.00
4,002.77	7.83	154.66	3,980.00	-308.72	146.18	-297.60	0.00	0.00	0.00
PARKMAN									
4,100.00	7.83	154.66	4,076.33	-320.70	151.85	-309.14	0.00	0.00	0.00
4,200.00	7.83	154.66	4,175.40	-333.01	157.68	-321.01	0.00	0.00	0.00
4,300.00	7.83	154.66	4,274.46	-345.32	163.51	-332.88	0.00	0.00	0.00
4,400.00	7.83	154.66	4,373.53	-357.64	169.34	-344.75	0.00	0.00	0.00

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Planning Report

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Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	17' RKB + 4979' GL @ 4996.00ft
Site:	WELD_FARLEY 4 PAD SWSE	North Reference:	True
Well:	FARLEY 2C-23HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	FARLEY 2C-23HZ		
Design:	FARLEY 2C-23HZ (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)
4,500.00	7.83	154.66	4,472.60	-369.95	175.17	-356.62	0.00	0.00	0.00
4,540.78	7.83	154.66	4,513.00	-374.97	177.55	-361.46	0.00	0.00	0.00
SUSSEX									
4,600.00	7.83	154.66	4,571.67	-382.26	181.00	-368.49	0.00	0.00	0.00
4,700.00	7.83	154.66	4,670.73	-394.57	186.83	-380.35	0.00	0.00	0.00
4,800.00	7.83	154.66	4,769.80	-406.89	192.66	-392.22	0.00	0.00	0.00
4,900.00	7.83	154.66	4,868.87	-419.20	198.49	-404.09	0.00	0.00	0.00
5,000.00	7.83	154.66	4,967.94	-431.51	204.32	-415.96	0.00	0.00	0.00
5,100.00	7.83	154.66	5,067.00	-443.83	210.15	-427.83	0.00	0.00	0.00
5,200.00	7.83	154.66	5,166.07	-456.14	215.98	-439.70	0.00	0.00	0.00
5,300.00	7.83	154.66	5,265.14	-468.45	221.81	-451.57	0.00	0.00	0.00
5,400.00	7.83	154.66	5,364.21	-480.76	227.64	-463.44	0.00	0.00	0.00
5,500.00	7.83	154.66	5,463.27	-493.08	233.47	-475.31	0.00	0.00	0.00
5,600.00	7.83	154.66	5,562.34	-505.39	239.30	-487.18	0.00	0.00	0.00
5,700.00	7.83	154.66	5,661.41	-517.70	245.13	-499.05	0.00	0.00	0.00
5,738.96	7.83	154.66	5,700.01	-522.50	247.40	-503.67	0.00	0.00	0.00
Start Drop -2.00									
5,800.00	6.61	154.66	5,760.56	-529.43	250.68	-510.35	2.00	-2.00	0.00
5,900.00	4.61	154.66	5,860.08	-538.27	254.87	-518.87	2.00	-2.00	0.00
6,000.00	2.61	154.66	5,959.87	-543.96	257.56	-524.35	2.00	-2.00	0.00
6,100.00	0.61	154.66	6,059.83	-546.49	258.76	-526.80	2.00	-2.00	0.00
6,130.47	0.00	0.00	6,090.29	-546.64	258.83	-526.94	2.00	-2.00	0.00
Start 762.75 hold at 6130.47 MD									
6,200.00	0.00	0.00	6,159.83	-546.64	258.83	-526.94	0.00	0.00	0.00
6,300.00	0.00	0.00	6,259.83	-546.64	258.83	-526.94	0.00	0.00	0.00
6,400.00	0.00	0.00	6,359.83	-546.64	258.83	-526.94	0.00	0.00	0.00
6,500.00	0.00	0.00	6,459.83	-546.64	258.83	-526.94	0.00	0.00	0.00
6,600.00	0.00	0.00	6,559.83	-546.64	258.83	-526.94	0.00	0.00	0.00
6,700.00	0.00	0.00	6,659.83	-546.64	258.83	-526.94	0.00	0.00	0.00
6,800.00	0.00	0.00	6,759.83	-546.64	258.83	-526.94	0.00	0.00	0.00
6,893.22	0.00	0.00	6,853.04	-546.64	258.83	-526.94	0.00	0.00	0.00
Start Build 10.00									
6,900.00	0.68	0.46	6,859.83	-546.60	258.83	-526.90	10.00	10.00	0.00
6,950.00	5.68	0.46	6,909.74	-543.83	258.85	-524.14	10.00	10.00	0.00
7,000.00	10.68	0.46	6,959.21	-536.72	258.91	-517.04	10.00	10.00	0.00
7,050.00	15.68	0.46	7,007.88	-525.32	259.00	-505.67	10.00	10.00	0.00
7,100.00	20.68	0.46	7,055.37	-509.73	259.13	-490.10	10.00	10.00	0.00
7,126.57	23.34	0.46	7,080.00	-499.78	259.21	-480.17	10.00	10.00	0.00
SHARON SPRINGS									
7,150.00	25.68	0.46	7,101.32	-490.06	259.28	-470.47	10.00	10.00	0.00
7,200.00	30.68	0.46	7,145.38	-466.46	259.47	-446.91	10.00	10.00	0.00
7,200.72	30.75	0.46	7,146.00	-466.09	259.48	-446.54	10.00	10.00	0.00
NIOBRARA A									
7,236.31	34.31	0.46	7,176.00	-446.95	259.63	-427.45	10.00	10.00	0.00
NIOBRARA B									
7,250.00	35.68	0.46	7,187.21	-439.10	259.69	-419.61	10.00	10.00	0.00
7,300.00	40.68	0.46	7,226.51	-408.21	259.94	-388.78	10.00	10.00	0.00
7,350.00	45.68	0.46	7,262.96	-374.01	260.22	-354.64	10.00	10.00	0.00
7,363.10	46.99	0.46	7,272.00	-364.53	260.29	-345.19	10.00	10.00	0.00
NIOBRARA C									
7,400.00	50.68	0.46	7,296.29	-336.76	260.52	-317.47	10.00	10.00	0.00
7,450.00	55.68	0.46	7,326.24	-296.75	260.84	-277.53	10.00	10.00	0.00
7,500.00	60.68	0.46	7,352.60	-254.28	261.18	-235.14	10.00	10.00	0.00

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Wellbore:	FARLEY 2C-23HZ		
Design:	FARLEY 2C-23HZ (wp01) Permit		

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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)
7,550.00	65.68	0.46	7,375.15	-209.67	261.54	-190.63	10.00	10.00	0.00
7,600.00	70.68	0.46	7,393.73	-163.27	261.91	-144.32	10.00	10.00	0.00
7,626.78	73.36	0.46	7,402.00	-137.80	262.11	-118.89	10.00	10.00	0.00
FORT HAYS									
7,650.00	75.68	0.46	7,408.20	-115.43	262.29	-96.56	10.00	10.00	0.00
7,700.00	80.68	0.46	7,418.44	-66.50	262.69	-47.74	10.00	10.00	0.00
7,750.00	85.68	0.46	7,424.37	-16.88	263.08	1.80	10.00	10.00	0.00
7,791.13	89.79	0.46	7,426.00	24.21	263.41	42.80	10.00	10.00	0.00
CODELL									
7,793.22	90.00	0.46	7,426.00	26.30	263.43	44.89	9.99	9.99	0.00
Start DLS 0.03 TFO 4.57 - 7"									
7,800.00	90.00	0.46	7,426.00	33.08	263.49	51.66	0.03	0.03	0.00
7,900.00	90.03	0.46	7,425.97	133.08	264.29	151.46	0.03	0.03	0.00
8,000.00	90.07	0.47	7,425.89	233.07	265.10	251.26	0.03	0.03	0.00
8,109.34	90.10	0.47	7,425.73	342.41	265.99	360.38	0.03	0.03	0.00
Start 3847.38 hold at 8109.34 MD									
8,200.00	90.10	0.47	7,425.57	433.07	266.73	450.87	0.00	0.00	0.00
8,300.00	90.10	0.47	7,425.39	533.06	267.55	550.67	0.00	0.00	0.00
8,400.00	90.10	0.47	7,425.22	633.06	268.36	650.47	0.00	0.00	0.00
8,500.00	90.10	0.47	7,425.04	733.06	269.18	750.28	0.00	0.00	0.00
8,600.00	90.10	0.47	7,424.87	833.05	270.00	850.08	0.00	0.00	0.00
8,700.00	90.10	0.47	7,424.69	933.05	270.82	949.88	0.00	0.00	0.00
8,800.00	90.10	0.47	7,424.52	1,033.05	271.63	1,049.69	0.00	0.00	0.00
8,900.00	90.10	0.47	7,424.35	1,133.04	272.45	1,149.49	0.00	0.00	0.00
9,000.00	90.10	0.47	7,424.17	1,233.04	273.27	1,249.29	0.00	0.00	0.00
9,100.00	90.10	0.47	7,424.00	1,333.04	274.08	1,349.10	0.00	0.00	0.00
9,200.00	90.10	0.47	7,423.82	1,433.03	274.90	1,448.90	0.00	0.00	0.00
9,300.00	90.10	0.47	7,423.65	1,533.03	275.72	1,548.70	0.00	0.00	0.00
9,400.00	90.10	0.47	7,423.47	1,633.03	276.53	1,648.51	0.00	0.00	0.00
9,500.00	90.10	0.47	7,423.30	1,733.02	277.35	1,748.31	0.00	0.00	0.00
9,600.00	90.10	0.47	7,423.12	1,833.02	278.17	1,848.12	0.00	0.00	0.00
9,700.00	90.10	0.47	7,422.95	1,933.02	278.98	1,947.92	0.00	0.00	0.00
9,800.00	90.10	0.47	7,422.77	2,033.01	279.80	2,047.72	0.00	0.00	0.00
9,900.00	90.10	0.47	7,422.60	2,133.01	280.62	2,147.53	0.00	0.00	0.00
10,000.00	90.10	0.47	7,422.42	2,233.01	281.43	2,247.33	0.00	0.00	0.00
10,100.00	90.10	0.47	7,422.25	2,333.00	282.25	2,347.13	0.00	0.00	0.00
10,200.00	90.10	0.47	7,422.07	2,433.00	283.07	2,446.94	0.00	0.00	0.00
10,300.00	90.10	0.47	7,421.90	2,532.99	283.88	2,546.74	0.00	0.00	0.00
10,400.00	90.10	0.47	7,421.72	2,632.99	284.70	2,646.54	0.00	0.00	0.00
10,500.00	90.10	0.47	7,421.55	2,732.99	285.52	2,746.35	0.00	0.00	0.00
10,600.00	90.10	0.47	7,421.37	2,832.98	286.33	2,846.15	0.00	0.00	0.00
10,700.00	90.10	0.47	7,421.20	2,932.98	287.15	2,945.95	0.00	0.00	0.00
10,800.00	90.10	0.47	7,421.02	3,032.98	287.97	3,045.76	0.00	0.00	0.00
10,900.00	90.10	0.47	7,420.85	3,132.97	288.79	3,145.56	0.00	0.00	0.00
11,000.00	90.10	0.47	7,420.67	3,232.97	289.60	3,245.36	0.00	0.00	0.00
11,100.00	90.10	0.47	7,420.50	3,332.97	290.42	3,345.17	0.00	0.00	0.00
11,200.00	90.10	0.47	7,420.32	3,432.96	291.24	3,444.97	0.00	0.00	0.00
11,300.00	90.10	0.47	7,420.15	3,532.96	292.05	3,544.77	0.00	0.00	0.00
11,400.00	90.10	0.47	7,419.97	3,632.96	292.87	3,644.58	0.00	0.00	0.00
11,500.00	90.10	0.47	7,419.80	3,732.95	293.69	3,744.38	0.00	0.00	0.00
11,600.00	90.10	0.47	7,419.62	3,832.95	294.50	3,844.18	0.00	0.00	0.00
11,700.00	90.10	0.47	7,419.45	3,932.95	295.32	3,943.99	0.00	0.00	0.00
11,800.00	90.10	0.47	7,419.27	4,032.94	296.14	4,043.79	0.00	0.00	0.00

Andarko Petroleum Corporation

Planning Report

Database:	edmp	Local Co-ordinate Reference:	Well FARLEY 2C-23HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	17' RKB + 4979' GL @ 4996.00ft
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	17' RKB + 4979' GL @ 4996.00ft
Site:	WELD_FARLEY 4 PAD SWSE	North Reference:	True
Well:	FARLEY 2C-23HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	FARLEY 2C-23HZ		
Design:	FARLEY 2C-23HZ (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)
11,900.00	90.10	0.47	7,419.10	4,132.94	296.95	4,143.59	0.00	0.00	0.00
11,956.72	90.10	0.47	7,419.00	4,189.65	297.42	4,200.20	0.00	0.00	0.00
TD at 11956.72 - FARLEY 2C-23HZ 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									
FARLEY 2C-23HZ BHL	0.00	0.00	7,419.00	4,189.65	297.42	1,322,658.32	3,212,106.08	40.216601	-104.740472
- plan hits target center									
- Point									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
937.00	937.00	9 5/8"	9-5/8	12-1/4	
7,793.22	7,426.00	7"	7	7-1/2	

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
787.00	787.00	FOX HILLS		0.00	
4,002.77	3,980.00	PARKMAN		0.00	
4,540.78	4,513.00	SUSSEX		0.00	
7,126.57	7,080.00	SHARON SPRINGS		0.00	
7,200.72	7,146.00	NIOBRARA A		0.00	
7,236.31	7,176.00	NIOBRARA B		0.00	
7,363.10	7,272.00	NIOBRARA C		0.00	
7,626.78	7,402.00	FORT HAYS		0.00	
7,791.14	7,426.00	CODELL		0.00	

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,300.00	1,300.00	0.00	0.00	Start DLS 2.00 TFO 154.66
1,691.50	1,690.29	-24.14	11.43	Start 4047.46 hold at 1691.50 MD
5,738.96	5,700.01	-522.50	247.40	Start Drop -2.00
6,130.47	6,090.29	-546.64	258.83	Start 762.75 hold at 6130.47 MD
6,893.22	6,853.04	-546.64	258.83	Start Build 10.00
7,793.22	7,426.00	26.30	263.43	Start DLS 0.03 TFO 4.57
8,109.34	7,425.73	342.41	265.99	Start 3847.38 hold at 8109.34 MD
11,956.72	7,419.00	4,189.65	297.42	TD at 11956.72