

Azimuths to True North
 Magnetic North: 8.57°
 Magnetic Field
 Strength: 52828.2snT
 Dip Angle: 66.78°
 Date: 12/13/2012
 Model: IGRF2010



Project: COLORADO NORTHERN ZONE - 83
 Site: WELD SPARBOE 4 PAD
 Well: SPARBOE 24C-3HZ
 Wellbore: Wellbore #1
 Design: ACTUAL
 Latitude: 40.101500
 Longitude: -104.645706
 GL: 4977.00
 KB: 16'RKB+4977'GL @ 4993.00ft (XTREME 23)

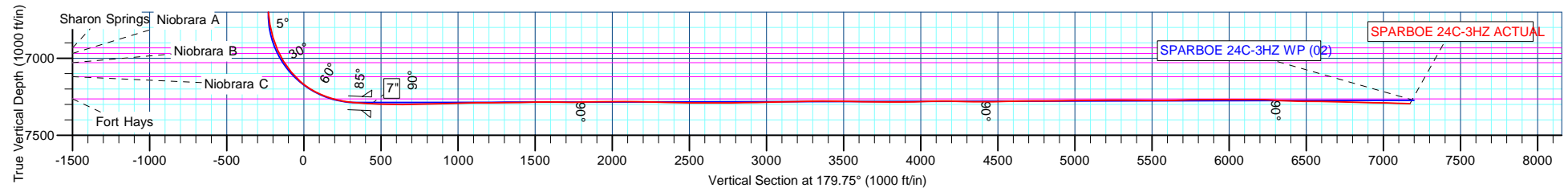
WELL DETAILS: SPARBOE 24C-3HZ						
+N/-S	+E/-W	Northing	Ground Level: Easting	4977.00	Latitude	Slot
0.00	0.00	1280971.96	3238973.63	40.101500	-104.645706	

ANNOTATIONS										
TVD	MD	Inc	Azi	+N/-S	+E/-W	Vsect	Departure	Annotation		
1805.98	1806.00	0.05	8.45	0.05	4.03	-0.03	7.03	TIE ON		
1885.98	1886.00	0.66	312.93	0.40	3.69	-0.38	7.52	FIRST WFT MWD+IFR SURVEY		
7294.43	7682.00	86.50	178.85	-406.56	-205.76	405.65	952.59	7 IN. CASING		
7293.98	14414.00	88.46	181.43	-7117.56	32.98	7117.64	7683.14	LAST WFT MWD+IFR SURVEY		
7295.45	14469.00	88.46	181.43	-7172.53	31.60	7172.60	7738.12	PROJECTION TO TD		

WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)						
Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
SPARBOE 24C-3HZ PBHL	7273.00	-7198.14	5.00	40.081740	-104.645688	Point

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
746.00	746.01	Fox Hills
4992.00	5000.25	Sussex
6933.00	6951.82	Sharon Springs
6969.00	6991.06	Niobrara A
7029.00	7059.58	Niobrara B
7120.00	7175.89	Niobrara C
7264.00	7465.66	Fort Hays

CASING DETAILS			
TVD	MD	Name	Size
7295.34	7698.00	7"	7"



US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

WELD_SPARBOE 4 PAD

SPARBOE 24C-3HZ

Wellbore #1

Survey: Survey #2

Standard Survey Report

27 March, 2013

Andarko Petroleum Corporation

Survey Report

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well SPARBOE 24C-3HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	16'RKB+4977'GL @ 4993.00ft (XTREME 23)
Site:	WELD_SPARBOE 4 PAD	MD Reference:	16'RKB+4977'GL @ 4993.00ft (XTREME 23)
Well:	SPARBOE 24C-3HZ	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	ACTUAL	Database:	edmp

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_SPARBOE 4 PAD			
Site Position:		Northing:	1,280,971.47 usft
From:	Lat/Long	Easting:	3,238,883.56 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "
		Latitude:	40.101501
		Longitude:	-104.646028
		Grid Convergence:	0.55 °

Well SPARBOE 24C-3HZ			
Well Position	+N/-S	0.00 ft	Northing: 1,280,971.96 usft
	+E/-W	0.00 ft	Easting: 3,238,973.63 usft
Position Uncertainty	0.00 ft	Wellhead Elevation:	ft
		Latitude:	40.101500
		Longitude:	-104.645706
		Ground Level:	4,977.00 ft

Wellbore Wellbore #1					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/13/2012	8.57	66.78	52,828

Design ACTUAL				
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 16.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	16.00	0.00	0.00	89.27

Survey Program		Date 3/27/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
116.00	1,806.00	Survey #1 (Wellbore #1)	NS-GYRO-MS	NORTH SENSING GYROCOMPASSING M/S	
1,886.00	14,469.00	Survey #2 (Wellbore #1)	MWD+IFR	MWD + IFR CORRECTION	

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)	
1,806.00	0.05	8.45	1,805.98	0.05	4.03	4.03	0.00	0.00	0.00	
TIE ON										
1,886.00	0.66	312.93	1,885.98	0.40	3.69	3.70	0.79	0.76	-69.40	
FIRST WFT MWD+IFR SURVEY										
1,979.00	0.91	312.83	1,978.97	1.27	2.76	2.78	0.27	0.27	-0.11	
2,072.00	0.79	328.08	2,071.96	2.31	1.88	1.91	0.27	-0.13	16.40	
2,166.00	0.60	333.13	2,165.96	3.30	1.31	1.36	0.21	-0.20	5.37	
2,259.00	0.53	10.22	2,258.95	4.16	1.17	1.22	0.39	-0.08	39.88	
2,352.00	0.70	9.69	2,351.95	5.14	1.34	1.41	0.18	0.18	-0.57	

Andarko Petroleum Corporation

Survey Report

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Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	16'RKB+4977'GL @ 4993.00ft (XTREME 23)
Site:	WELD_SPARBOE 4 PAD	MD Reference:	16'RKB+4977'GL @ 4993.00ft (XTREME 23)
Well:	SPARBOE 24C-3HZ	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	ACTUAL	Database:	edmp

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)	
2,446.00	0.82	3.35	2,445.94	6.38	1.48	1.56	0.16	0.13	-6.74	
2,539.00	3.67	350.89	2,538.86	9.98	1.05	1.17	3.09	3.06	-13.40	
2,632.00	4.29	334.91	2,631.64	16.07	-0.90	-0.70	1.36	0.67	-17.18	
2,726.00	5.50	328.03	2,725.29	23.08	-4.78	-4.48	1.43	1.29	-7.32	
2,819.00	5.13	324.44	2,817.89	30.24	-9.55	-9.17	0.53	-0.40	-3.86	
2,908.00	4.76	326.54	2,906.56	36.56	-13.90	-13.44	0.46	-0.42	2.36	
2,994.00	4.58	327.05	2,992.28	42.42	-17.74	-17.20	0.21	-0.21	0.59	
3,079.00	4.44	328.25	3,077.01	48.06	-21.32	-20.71	0.20	-0.16	1.41	
3,165.00	3.85	328.81	3,162.79	53.36	-24.56	-23.89	0.69	-0.69	0.65	
3,250.00	3.16	332.94	3,247.63	57.89	-27.11	-26.37	0.86	-0.81	4.86	
3,341.00	4.13	331.37	3,338.44	63.00	-29.82	-29.02	1.07	1.07	-1.73	
3,427.00	5.58	325.98	3,424.13	69.19	-33.64	-32.76	1.77	1.69	-6.27	
3,513.00	4.96	326.87	3,509.77	75.77	-38.01	-37.05	0.73	-0.72	1.03	
3,598.00	4.79	322.34	3,594.46	81.65	-42.19	-41.15	0.49	-0.20	-5.33	
3,683.00	4.32	323.72	3,679.19	87.04	-46.25	-45.15	0.57	-0.55	1.62	
3,768.00	3.83	326.48	3,763.98	91.99	-49.71	-48.54	0.62	-0.58	3.25	
3,853.00	5.18	316.52	3,848.71	97.14	-53.92	-52.69	1.83	1.59	-11.72	
3,939.00	4.22	316.54	3,934.42	102.25	-58.77	-57.47	1.12	-1.12	0.02	
4,024.00	5.49	305.41	4,019.12	106.88	-64.24	-62.88	1.85	1.49	-13.09	
4,110.00	5.34	305.38	4,104.73	111.58	-70.85	-69.43	0.17	-0.17	-0.03	
4,195.00	5.22	304.28	4,189.37	116.05	-77.27	-75.80	0.18	-0.14	-1.29	
4,281.00	5.04	305.98	4,275.03	120.47	-83.56	-82.03	0.27	-0.21	1.98	
4,366.00	4.47	313.06	4,359.74	124.93	-89.00	-87.41	0.96	-0.67	8.33	
4,451.00	4.50	317.54	4,444.48	129.65	-93.67	-92.02	0.41	0.04	5.27	
4,537.00	4.80	316.09	4,530.19	134.73	-98.45	-96.73	0.37	0.35	-1.69	
4,622.00	4.85	311.51	4,614.89	139.67	-103.60	-101.83	0.46	0.06	-5.39	
4,707.00	4.90	314.21	4,699.59	144.59	-108.90	-107.06	0.28	0.06	3.18	
4,793.00	4.62	313.95	4,785.29	149.55	-114.02	-112.12	0.33	-0.33	-0.30	
4,878.00	3.89	315.32	4,870.05	153.98	-118.52	-116.55	0.87	-0.86	1.61	
4,963.00	3.97	322.62	4,954.86	158.37	-122.33	-120.31	0.60	0.09	8.59	
5,049.00	5.43	331.89	5,040.56	164.32	-126.05	-123.96	1.91	1.70	10.78	
5,134.00	4.82	340.87	5,125.23	171.24	-129.12	-126.94	1.18	-0.72	10.56	
5,220.00	3.84	343.74	5,210.98	177.42	-131.11	-128.85	1.17	-1.14	3.34	
5,305.00	3.38	342.00	5,295.81	182.54	-132.68	-130.36	0.56	-0.54	-2.05	
5,390.00	3.92	329.09	5,380.64	187.41	-134.95	-132.56	1.15	0.64	-15.19	
5,475.00	4.16	321.84	5,465.43	192.33	-138.35	-135.90	0.66	0.28	-8.53	
5,561.00	4.11	314.97	5,551.21	196.96	-142.45	-139.95	0.58	-0.06	-7.99	
5,646.00	4.17	301.76	5,635.99	200.74	-147.24	-144.68	1.12	0.07	-15.54	
5,731.00	4.67	303.81	5,720.73	204.29	-152.74	-150.14	0.62	0.59	2.41	
5,817.00	3.43	306.79	5,806.52	207.78	-157.71	-155.06	1.46	-1.44	3.47	
5,902.00	4.57	313.56	5,891.31	211.64	-162.20	-159.50	1.45	1.34	7.96	
5,988.00	3.79	306.05	5,977.08	215.67	-166.98	-164.23	1.11	-0.91	-8.73	
6,073.00	3.18	307.96	6,061.92	218.77	-171.11	-168.32	0.73	-0.72	2.25	

Andarko Petroleum Corporation

Survey Report

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well SPARBOE 24C-3HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	16'RKB+4977'GL @ 4993.00ft (XTREME 23)
Site:	WELD_SPARBOE 4 PAD	MD Reference:	16'RKB+4977'GL @ 4993.00ft (XTREME 23)
Well:	SPARBOE 24C-3HZ	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	ACTUAL	Database:	edmp

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)	
6,158.00	2.48	310.63	6,146.82	221.42	-174.36	-171.54	0.84	-0.82	3.14	
6,243.00	2.10	310.79	6,231.75	223.64	-176.94	-174.09	0.45	-0.45	0.19	
6,328.00	1.73	321.38	6,316.70	225.66	-178.92	-176.04	0.60	-0.44	12.46	
6,414.00	2.31	287.74	6,402.65	227.20	-181.38	-178.49	1.50	0.67	-39.12	
6,499.00	1.82	286.33	6,487.60	228.10	-184.31	-181.40	0.58	-0.58	-1.66	
6,584.00	1.53	297.01	6,572.56	229.00	-186.61	-183.70	0.50	-0.34	12.56	
6,640.00	1.14	306.18	6,628.54	229.66	-187.73	-184.80	0.79	-0.70	16.38	
6,709.00	2.33	206.33	6,697.52	228.81	-188.90	-185.99	4.00	1.72	-144.71	
6,795.00	10.85	180.90	6,782.89	219.13	-189.81	-187.02	10.24	9.91	-29.57	
6,880.00	17.19	179.65	6,865.31	198.55	-189.86	-187.33	7.47	7.46	-1.47	
6,965.00	22.66	182.47	6,945.20	169.61	-190.49	-188.32	6.53	6.44	3.32	
7,050.00	31.33	183.85	7,020.86	131.13	-192.68	-191.00	10.23	10.20	1.62	
7,136.00	40.37	179.07	7,090.51	80.86	-193.73	-192.69	11.00	10.51	-5.56	
7,221.00	48.68	179.67	7,151.06	21.31	-193.10	-192.82	9.79	9.78	0.71	
7,307.00	58.24	182.69	7,202.21	-47.67	-194.63	-195.22	11.47	11.12	3.51	
7,392.00	68.63	184.18	7,240.17	-123.45	-199.23	-200.78	12.32	12.22	1.75	
7,477.00	74.38	183.83	7,267.13	-203.83	-204.85	-207.42	6.78	6.76	-0.41	
7,563.00	83.28	179.53	7,283.78	-288.06	-207.27	-210.91	11.45	10.35	-5.00	
7,630.00	85.04	179.30	7,290.59	-354.71	-206.59	-211.07	2.65	2.63	-0.34	
7,682.00	86.50	178.85	7,294.43	-406.56	-205.76	-210.89	2.94	2.81	-0.86	
7 IN. CASING										
7,744.00	88.24	178.32	7,297.27	-468.47	-204.23	-210.15	2.94	2.81	-0.86	
7,837.00	88.83	178.99	7,299.65	-561.42	-202.05	-209.14	0.96	0.63	0.72	
7,931.00	90.00	178.77	7,300.61	-655.39	-200.21	-208.50	1.27	1.24	-0.23	
8,024.00	90.99	179.28	7,299.81	-748.37	-198.63	-208.09	1.20	1.06	0.55	
8,117.00	91.54	179.53	7,297.76	-841.34	-197.66	-208.31	0.65	0.59	0.27	
8,211.00	92.12	179.91	7,294.75	-935.29	-197.20	-209.04	0.74	0.62	0.40	
8,304.00	92.41	181.27	7,291.08	-1,028.21	-198.16	-211.17	1.49	0.31	1.46	
8,397.00	89.01	181.01	7,289.93	-1,121.18	-200.01	-214.20	3.67	-3.66	-0.28	
8,491.00	90.99	182.42	7,289.93	-1,215.13	-202.82	-218.20	2.59	2.11	1.50	
8,584.00	90.71	181.14	7,288.55	-1,308.07	-205.71	-222.27	1.41	-0.30	-1.38	
8,677.00	90.80	180.70	7,287.32	-1,401.05	-207.20	-224.94	0.48	0.10	-0.47	
8,763.00	91.72	180.07	7,285.43	-1,487.02	-207.78	-226.61	1.30	1.07	-0.73	
8,848.00	89.81	178.79	7,284.29	-1,572.01	-206.93	-226.84	2.70	-2.25	-1.51	
8,933.00	88.21	177.73	7,285.76	-1,656.95	-204.35	-225.34	2.26	-1.88	-1.25	
9,019.00	90.93	178.68	7,286.41	-1,742.90	-201.66	-223.73	3.35	3.16	1.10	
9,105.00	92.04	178.52	7,284.18	-1,828.84	-199.56	-222.72	1.30	1.29	-0.19	
9,190.00	90.12	178.41	7,282.58	-1,913.79	-197.28	-221.52	2.26	-2.26	-0.13	
9,276.00	90.31	178.76	7,282.26	-1,999.77	-195.16	-220.49	0.46	0.22	0.41	
9,361.00	90.31	179.75	7,281.80	-2,084.76	-194.06	-220.46	1.16	0.00	1.16	
9,447.00	88.58	180.52	7,282.63	-2,170.75	-194.26	-221.75	2.20	-2.01	0.90	
9,532.00	88.46	180.46	7,284.82	-2,255.72	-194.98	-223.55	0.16	-0.14	-0.07	
9,617.00	88.64	180.09	7,286.97	-2,340.69	-195.39	-225.04	0.48	0.21	-0.44	
9,703.00	88.95	179.69	7,288.78	-2,426.67	-195.23	-225.96	0.59	0.36	-0.47	

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Survey Report

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well SPARBOE 24C-3HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	16'RKB+4977'GL @ 4993.00ft (XTREME 23)
Site:	WELD_SPARBOE 4 PAD	MD Reference:	16'RKB+4977'GL @ 4993.00ft (XTREME 23)
Well:	SPARBOE 24C-3HZ	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	ACTUAL	Database:	edmp

Survey										
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9,788.00	89.21	179.91	7,290.15	-2,511.66	-194.93	-226.74	0.40	0.31	0.26	
9,874.00	89.88	179.10	7,290.83	-2,597.65	-194.19	-227.09	1.22	0.78	-0.94	
9,959.00	90.12	179.29	7,290.83	-2,682.64	-192.99	-226.97	0.36	0.28	0.22	
10,045.00	90.80	178.98	7,290.14	-2,768.63	-191.70	-226.77	0.87	0.79	-0.36	
10,131.00	90.92	178.83	7,288.85	-2,854.60	-190.05	-226.21	0.22	0.14	-0.17	
10,216.00	91.42	179.24	7,287.11	-2,939.57	-188.62	-225.86	0.76	0.59	0.48	
10,302.00	91.11	178.76	7,285.22	-3,025.54	-187.12	-225.45	0.66	-0.36	-0.56	
10,387.00	91.36	179.63	7,283.38	-3,110.51	-185.93	-225.33	1.06	0.29	1.02	
10,472.00	91.54	179.31	7,281.23	-3,195.48	-185.14	-225.62	0.43	0.21	-0.38	
10,558.00	90.92	179.35	7,279.39	-3,281.45	-184.14	-225.70	0.72	-0.72	0.05	
10,643.00	90.12	178.36	7,278.62	-3,366.43	-182.44	-225.08	1.50	-0.94	-1.16	
10,729.00	89.14	178.75	7,279.17	-3,452.40	-180.27	-224.00	1.23	-1.14	0.45	
10,814.00	88.71	177.77	7,280.77	-3,537.34	-177.69	-222.50	1.26	-0.51	-1.15	
10,899.00	89.14	176.22	7,282.36	-3,622.21	-173.23	-219.12	1.89	0.51	-1.82	
10,984.00	88.94	174.97	7,283.78	-3,706.94	-166.71	-213.67	1.49	-0.24	-1.47	
11,070.00	89.88	173.87	7,284.67	-3,792.53	-158.34	-206.39	1.68	1.09	-1.28	
11,155.00	90.37	173.20	7,284.48	-3,876.99	-148.77	-197.89	0.98	0.58	-0.79	
11,240.00	91.36	173.36	7,283.20	-3,961.39	-138.83	-189.02	1.18	1.16	0.19	
11,326.00	91.91	173.81	7,280.75	-4,046.82	-129.22	-180.50	0.83	0.64	0.52	
11,411.00	90.68	173.52	7,278.83	-4,131.28	-119.85	-172.19	1.49	-1.45	-0.34	
11,496.00	88.77	171.97	7,279.23	-4,215.59	-109.11	-162.53	2.89	-2.25	-1.82	
11,582.00	88.50	171.45	7,281.28	-4,300.67	-96.72	-151.21	0.68	-0.31	-0.60	
11,667.00	89.82	171.48	7,282.53	-4,384.71	-84.10	-139.66	1.55	1.55	0.04	
11,753.00	90.68	172.47	7,282.15	-4,469.87	-72.10	-128.74	1.52	1.00	1.15	
11,838.00	91.35	173.20	7,280.65	-4,554.19	-61.50	-119.21	1.17	0.79	0.86	
11,923.00	90.99	173.72	7,278.91	-4,638.62	-51.82	-110.60	0.74	-0.42	0.61	
12,009.00	90.31	174.37	7,277.94	-4,724.15	-42.90	-102.76	1.09	-0.79	0.76	
12,094.00	90.92	174.69	7,277.02	-4,808.76	-34.79	-95.73	0.81	0.72	0.38	
12,179.00	90.12	175.02	7,276.25	-4,893.41	-27.17	-89.18	1.02	-0.94	0.39	
12,265.00	90.74	175.31	7,275.61	-4,979.10	-19.92	-83.02	0.80	0.72	0.34	
12,350.00	90.18	175.50	7,274.93	-5,063.83	-13.12	-77.28	0.70	-0.66	0.22	
12,435.00	91.11	175.73	7,273.97	-5,148.57	-6.62	-71.86	1.13	1.09	0.27	
12,521.00	91.17	174.74	7,272.26	-5,234.26	0.53	-65.80	1.15	0.07	-1.15	
12,606.00	88.83	170.21	7,272.26	-5,318.50	11.65	-55.75	6.00	-2.75	-5.33	
12,692.00	89.01	170.05	7,273.88	-5,403.21	26.39	-42.08	0.28	0.21	-0.19	
12,777.00	89.75	169.76	7,274.80	-5,486.89	41.29	-28.24	0.94	0.87	-0.34	
12,862.00	90.49	170.17	7,274.62	-5,570.58	56.10	-14.50	1.00	0.87	0.48	
12,948.00	91.48	172.63	7,273.14	-5,655.60	68.96	-2.72	3.08	1.15	2.86	
13,033.00	91.66	173.70	7,270.81	-5,739.96	79.07	6.33	1.28	0.21	1.26	
13,119.00	90.68	175.04	7,269.06	-5,825.52	87.51	13.68	1.93	-1.14	1.56	
13,204.00	90.74	177.04	7,268.00	-5,910.31	93.37	18.47	2.35	0.07	2.35	
13,289.00	89.12	178.50	7,268.11	-5,995.24	96.68	20.70	2.57	-1.91	1.72	
13,375.00	90.56	181.32	7,268.35	-6,081.23	96.82	19.75	3.68	1.67	3.28	

Andarko Petroleum Corporation

Survey Report

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well SPARBOE 24C-3HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	16'RKB+4977'GL @ 4993.00ft (XTREME 23)
Site:	WELD_SPARBOE 4 PAD	MD Reference:	16'RKB+4977'GL @ 4993.00ft (XTREME 23)
Well:	SPARBOE 24C-3HZ	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	ACTUAL	Database:	edmp

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)	
13,460.00	89.32	185.09	7,268.44	-6,166.08	92.07	13.92	4.67	-1.46	4.44	
13,547.00	87.34	185.67	7,270.97	-6,252.66	83.91	4.67	2.37	-2.28	0.67	
13,632.00	87.16	185.45	7,275.05	-6,337.16	75.69	-4.63	0.33	-0.21	-0.26	
13,718.00	87.59	184.61	7,278.99	-6,422.74	68.15	-13.24	1.10	0.50	-0.98	
13,803.00	89.91	184.14	7,280.84	-6,507.46	61.67	-20.80	2.78	2.73	-0.55	
13,888.00	89.88	183.58	7,281.00	-6,592.27	55.95	-27.59	0.66	-0.04	-0.66	
13,974.00	88.77	183.34	7,282.01	-6,678.10	50.76	-33.87	1.32	-1.29	-0.28	
14,059.00	88.21	182.64	7,284.25	-6,762.96	46.33	-39.38	1.05	-0.66	-0.82	
14,144.00	88.09	182.48	7,287.00	-6,847.83	42.53	-44.25	0.24	-0.14	-0.19	
14,230.00	89.08	182.10	7,289.12	-6,933.73	39.10	-48.77	1.23	1.15	-0.44	
14,315.00	88.46	182.10	7,290.94	-7,018.66	35.98	-52.96	0.73	-0.73	0.00	
14,400.00	88.03	181.48	7,293.55	-7,103.57	33.33	-56.69	0.89	-0.51	-0.73	
14,414.00	88.46	181.43	7,293.98	-7,117.56	32.98	-57.22	3.09	3.07	-0.36	
LAST WFT MWD+IFR SURVEY										
14,469.00	88.46	181.43	7,295.45	-7,172.53	31.60	-59.29	0.00	0.00	0.00	
PROJECTION TO TD										

Survey Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
1,806.00	1,805.98	0.05	4.03	TIE ON	
1,886.00	1,885.98	0.40	3.69	FIRST WFT MWD+IFR SURVEY	
7,682.00	7,294.43	-406.56	-205.76	7 IN. CASING	
14,414.00	7,293.98	-7,117.56	32.98	LAST WFT MWD+IFR SURVEY	
14,469.00	7,295.45	-7,172.53	31.60	PROJECTION TO TD	

Checked By: _____ Approved By: _____ Date: _____

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

WELD_SPARBOE 4 PAD

SPARBOE 24C-3HZ

Wellbore #1

Survey: Survey #2

Survey Report - Geographic

27 March, 2013

Andarko Petroleum Corporation

Survey Report - Geographic

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well SPARBOE 24C-3HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	16'RKB+4977'GL @ 4993.00ft (XTREME 23)
Site:	WELD_SPARBOE 4 PAD	MD Reference:	16'RKB+4977'GL @ 4993.00ft (XTREME 23)
Well:	SPARBOE 24C-3HZ	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	ACTUAL	Database:	edmp

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_SPARBOE 4 PAD			
Site Position:		Northing:	1,280,971.47 usft
From:	Lat/Long	Easting:	3,238,883.56 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "
		Latitude:	40.101501
		Longitude:	-104.646028
		Grid Convergence:	0.55 °

Well SPARBOE 24C-3HZ			
Well Position	+N/-S	0.00 ft	Northing:
	+E/-W	0.00 ft	1,280,971.96 usft
			Latitude:
			40.101500
			Longitude:
			-104.645706
Position Uncertainty		0.00 ft	Wellhead Elevation:
			ft
			Ground Level:
			4,977.00 ft

Wellbore Wellbore #1					
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	12/13/2012	8.57	66.78	52,828

Design ACTUAL				
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth:
				16.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(ft)	(ft)	(ft)	(°)
	16.00	0.00	0.00	89.27

Survey Program		Date	3/27/2013		
From	To	Survey (Wellbore)	Tool Name	Description	
(ft)	(ft)				
116.00	1,806.00	Survey #1 (Wellbore #1)	NS-GYRO-MS	NORTH SENSING GYROCOMPASSING M/S	
1,886.00	14,469.00	Survey #2 (Wellbore #1)	MWD+IFR	MWD + IFR CORRECTION	

Survey										
Measured	Depth	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Map	Map	Latitude	Longitude
	(ft)	(°)	(°)	Depth	(ft)	(ft)	Northing	Easting		
				(ft)			(usft)	(usft)		
	1,806.00	0.05	8.45	1,805.98	0.05	4.03	1,280,972.05	3,238,977.65	40.101500	-104.645692
	TIE ON									
	1,886.00	0.66	312.93	1,885.98	0.40	3.69	1,280,972.40	3,238,977.32	40.101501	-104.645693
	FIRST WFT MWD+IFR SURVEY									
	1,979.00	0.91	312.83	1,978.97	1.27	2.76	1,280,973.26	3,238,976.38	40.101504	-104.645696
	2,072.00	0.79	328.08	2,071.96	2.31	1.88	1,280,974.29	3,238,975.49	40.101506	-104.645700
	2,166.00	0.60	333.13	2,165.96	3.30	1.31	1,280,975.28	3,238,974.91	40.101509	-104.645702
	2,259.00	0.53	10.22	2,258.95	4.16	1.17	1,280,976.13	3,238,974.76	40.101511	-104.645702
	2,352.00	0.70	9.69	2,351.95	5.14	1.34	1,280,977.12	3,238,974.92	40.101514	-104.645701
	2,446.00	0.82	3.35	2,445.94	6.38	1.48	1,280,978.36	3,238,975.05	40.101518	-104.645701
	2,539.00	3.67	350.89	2,538.86	9.98	1.05	1,280,981.96	3,238,974.58	40.101527	-104.645703

Andarko Petroleum Corporation

Survey Report - Geographic

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well SPARBOE 24C-3HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	16'RKB+4977'GL @ 4993.00ft (XTREME 23)
Site:	WELD_SPARBOE 4 PAD	MD Reference:	16'RKB+4977'GL @ 4993.00ft (XTREME 23)
Well:	SPARBOE 24C-3HZ	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	ACTUAL	Database:	edmp

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
2,632.00	4.29	334.91	2,631.64	16.07	-0.90	1,280,988.03	3,238,972.57	40.101544	-104.645709	
2,726.00	5.50	328.03	2,725.29	23.08	-4.78	1,280,994.99	3,238,968.63	40.101563	-104.645723	
2,819.00	5.13	324.44	2,817.89	30.24	-9.55	1,281,002.11	3,238,963.78	40.101583	-104.645740	
2,908.00	4.76	326.54	2,906.56	36.56	-13.90	1,281,008.39	3,238,959.37	40.101600	-104.645756	
2,994.00	4.58	327.05	2,992.28	42.42	-17.74	1,281,014.21	3,238,955.48	40.101617	-104.645770	
3,079.00	4.44	328.25	3,077.01	48.06	-21.32	1,281,019.82	3,238,951.85	40.101632	-104.645782	
3,165.00	3.85	328.81	3,162.79	53.36	-24.56	1,281,025.09	3,238,948.55	40.101647	-104.645794	
3,250.00	3.16	332.94	3,247.63	57.89	-27.11	1,281,029.59	3,238,945.97	40.101659	-104.645803	
3,341.00	4.13	331.37	3,338.44	63.00	-29.82	1,281,034.67	3,238,943.21	40.101673	-104.645813	
3,427.00	5.58	325.98	3,424.13	69.19	-33.64	1,281,040.82	3,238,939.32	40.101690	-104.645827	
3,513.00	4.96	326.87	3,509.77	75.77	-38.01	1,281,047.36	3,238,934.89	40.101708	-104.645842	
3,598.00	4.79	322.34	3,594.46	81.65	-42.19	1,281,053.20	3,238,930.66	40.101724	-104.645857	
3,683.00	4.32	323.72	3,679.19	87.04	-46.25	1,281,058.55	3,238,926.54	40.101739	-104.645872	
3,768.00	3.83	326.48	3,763.98	91.99	-49.71	1,281,063.47	3,238,923.03	40.101753	-104.645884	
3,853.00	5.18	316.52	3,848.71	97.14	-53.92	1,281,068.58	3,238,918.77	40.101767	-104.645899	
3,939.00	4.22	316.54	3,934.42	102.25	-58.77	1,281,073.65	3,238,913.88	40.101781	-104.645916	
4,024.00	5.49	305.41	4,019.12	106.88	-64.24	1,281,078.22	3,238,908.37	40.101793	-104.645936	
4,110.00	5.34	305.38	4,104.73	111.58	-70.85	1,281,082.86	3,238,901.71	40.101806	-104.645960	
4,195.00	5.22	304.28	4,189.37	116.05	-77.27	1,281,087.26	3,238,895.24	40.101819	-104.645982	
4,281.00	5.04	305.98	4,275.03	120.47	-83.56	1,281,091.62	3,238,888.91	40.101831	-104.646005	
4,366.00	4.47	313.06	4,359.74	124.93	-89.00	1,281,096.03	3,238,883.43	40.101843	-104.646024	
4,451.00	4.50	317.54	4,444.48	129.65	-93.67	1,281,100.70	3,238,878.71	40.101856	-104.646041	
4,537.00	4.80	316.09	4,530.19	134.73	-98.45	1,281,105.74	3,238,873.89	40.101870	-104.646058	
4,622.00	4.85	311.51	4,614.89	139.67	-103.60	1,281,110.63	3,238,868.69	40.101883	-104.646077	
4,707.00	4.90	314.21	4,699.59	144.59	-108.90	1,281,115.49	3,238,863.35	40.101897	-104.646096	
4,793.00	4.62	313.95	4,785.29	149.55	-114.02	1,281,120.41	3,238,858.17	40.101911	-104.646114	
4,878.00	3.89	315.32	4,870.05	153.98	-118.52	1,281,124.79	3,238,853.64	40.101923	-104.646130	
4,963.00	3.97	322.62	4,954.86	158.37	-122.33	1,281,129.14	3,238,849.78	40.101935	-104.646144	
5,049.00	5.43	331.89	5,040.56	164.32	-126.05	1,281,135.06	3,238,846.00	40.101951	-104.646157	
5,134.00	4.82	340.87	5,125.23	171.24	-129.12	1,281,141.95	3,238,842.87	40.101970	-104.646168	
5,220.00	3.84	343.74	5,210.98	177.42	-131.11	1,281,148.11	3,238,840.82	40.101987	-104.646175	
5,305.00	3.38	342.00	5,295.81	182.54	-132.68	1,281,153.21	3,238,839.20	40.102001	-104.646181	
5,390.00	3.92	329.09	5,380.64	187.41	-134.95	1,281,158.07	3,238,836.88	40.102015	-104.646189	
5,475.00	4.16	321.84	5,465.43	192.33	-138.35	1,281,162.95	3,238,833.44	40.102028	-104.646201	
5,561.00	4.11	314.97	5,551.21	196.96	-142.45	1,281,167.54	3,238,829.29	40.102041	-104.646216	
5,646.00	4.17	301.76	5,635.99	200.74	-147.24	1,281,171.27	3,238,824.47	40.102051	-104.646233	
5,731.00	4.67	303.81	5,720.73	204.29	-152.74	1,281,174.77	3,238,818.93	40.102061	-104.646252	
5,817.00	3.43	306.79	5,806.52	207.78	-157.71	1,281,178.21	3,238,813.93	40.102070	-104.646270	
5,902.00	4.57	313.56	5,891.31	211.64	-162.20	1,281,182.03	3,238,809.40	40.102081	-104.646286	
5,988.00	3.79	306.05	5,977.08	215.67	-166.98	1,281,186.01	3,238,804.58	40.102092	-104.646303	
6,073.00	3.18	307.96	6,061.92	218.77	-171.11	1,281,189.08	3,238,800.42	40.102101	-104.646318	
6,158.00	2.48	310.63	6,146.82	221.42	-174.36	1,281,191.69	3,238,797.14	40.102108	-104.646330	
6,243.00	2.10	310.79	6,231.75	223.64	-176.94	1,281,193.88	3,238,794.55	40.102114	-104.646339	
6,328.00	1.73	321.38	6,316.70	225.66	-178.92	1,281,195.88	3,238,792.55	40.102120	-104.646346	
6,414.00	2.31	287.74	6,402.65	227.20	-181.38	1,281,197.40	3,238,790.07	40.102124	-104.646355	
6,499.00	1.82	286.33	6,487.60	228.10	-184.31	1,281,198.28	3,238,787.13	40.102126	-104.646365	
6,584.00	1.53	297.01	6,572.56	229.00	-186.61	1,281,199.15	3,238,784.82	40.102129	-104.646373	
6,640.00	1.14	306.18	6,628.54	229.66	-187.73	1,281,199.81	3,238,783.70	40.102131	-104.646377	
6,709.00	2.33	206.33	6,697.52	228.81	-188.90	1,281,198.94	3,238,782.53	40.102128	-104.646382	
6,795.00	10.85	180.90	6,782.89	219.13	-189.81	1,281,189.26	3,238,781.72	40.102102	-104.646385	
6,880.00	17.19	179.65	6,865.31	198.55	-189.86	1,281,168.68	3,238,781.87	40.102045	-104.646385	
6,965.00	22.66	182.47	6,945.20	169.61	-190.49	1,281,139.73	3,238,781.52	40.101966	-104.646387	
7,050.00	31.33	183.85	7,020.86	131.13	-192.68	1,281,101.23	3,238,779.69	40.101860	-104.646395	
7,136.00	40.37	179.07	7,090.51	80.86	-193.73	1,281,050.95	3,238,779.13	40.101722	-104.646399	
7,221.00	48.68	179.67	7,151.06	21.31	-193.10	1,280,991.41	3,238,780.33	40.101559	-104.646397	

Andarko Petroleum Corporation

Survey Report - Geographic

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well SPARBOE 24C-3HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	16'RKB+4977'GL @ 4993.00ft (XTREME 23)
Site:	WELD_SPARBOE 4 PAD	MD Reference:	16'RKB+4977'GL @ 4993.00ft (XTREME 23)
Well:	SPARBOE 24C-3HZ	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	ACTUAL	Database:	edmp

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
7,307.00	58.24	182.69	7,202.21	-47.67	-194.63	1,280,922.42	3,238,779.46	40.101369	-104.646402	
7,392.00	68.63	184.18	7,240.17	-123.45	-199.23	1,280,846.60	3,238,775.60	40.101161	-104.646418	
7,477.00	74.38	183.83	7,267.13	-203.83	-204.85	1,280,766.17	3,238,770.75	40.100941	-104.646439	
7,563.00	83.28	179.53	7,283.78	-288.06	-207.27	1,280,681.92	3,238,769.14	40.100709	-104.646447	
7,630.00	85.04	179.30	7,290.59	-354.71	-206.59	1,280,615.28	3,238,770.46	40.100526	-104.646445	
7,682.00	86.50	178.85	7,294.43	-406.56	-205.76	1,280,563.44	3,238,771.80	40.100384	-104.646442	
7 IN. CASING										
7,744.00	88.24	178.32	7,297.27	-468.47	-204.23	1,280,501.55	3,238,773.92	40.100214	-104.646436	
7,837.00	88.83	178.99	7,299.65	-561.42	-202.05	1,280,408.63	3,238,777.00	40.099959	-104.646429	
7,931.00	90.00	178.77	7,300.61	-655.39	-200.21	1,280,314.67	3,238,779.74	40.099701	-104.646422	
8,024.00	90.99	179.28	7,299.81	-748.37	-198.63	1,280,221.71	3,238,782.22	40.099446	-104.646416	
8,117.00	91.54	179.53	7,297.76	-841.34	-197.66	1,280,128.75	3,238,784.08	40.099190	-104.646413	
8,211.00	92.12	179.91	7,294.75	-935.29	-197.20	1,280,034.81	3,238,785.45	40.098933	-104.646411	
8,304.00	92.41	181.27	7,291.08	-1,028.21	-198.16	1,279,941.89	3,238,785.39	40.098677	-104.646415	
8,397.00	89.01	181.01	7,289.93	-1,121.18	-200.01	1,279,848.91	3,238,784.43	40.098422	-104.646421	
8,491.00	90.99	182.42	7,289.93	-1,215.13	-202.82	1,279,754.94	3,238,782.52	40.098164	-104.646431	
8,584.00	90.71	181.14	7,288.55	-1,308.07	-205.71	1,279,661.97	3,238,780.53	40.097909	-104.646442	
8,677.00	90.80	180.70	7,287.32	-1,401.05	-207.20	1,279,568.99	3,238,779.93	40.097654	-104.646447	
8,763.00	91.72	180.07	7,285.43	-1,487.02	-207.78	1,279,483.01	3,238,780.19	40.097418	-104.646449	
8,848.00	89.81	178.79	7,284.29	-1,572.01	-206.93	1,279,398.04	3,238,781.85	40.097185	-104.646446	
8,933.00	88.21	177.73	7,285.76	-1,656.95	-204.35	1,279,313.12	3,238,785.25	40.096951	-104.646437	
9,019.00	90.93	178.68	7,286.41	-1,742.90	-201.66	1,279,227.21	3,238,788.77	40.096716	-104.646427	
9,105.00	92.04	178.52	7,284.18	-1,828.84	-199.56	1,279,141.29	3,238,791.70	40.096480	-104.646420	
9,190.00	90.12	178.41	7,282.58	-1,913.79	-197.28	1,279,056.36	3,238,794.79	40.096246	-104.646411	
9,276.00	90.31	178.76	7,282.26	-1,999.77	-195.16	1,278,970.41	3,238,797.74	40.096010	-104.646404	
9,361.00	90.31	179.75	7,281.80	-2,084.76	-194.06	1,278,885.44	3,238,799.67	40.095777	-104.646400	
9,447.00	88.58	180.52	7,282.63	-2,170.75	-194.26	1,278,799.45	3,238,800.29	40.095541	-104.646401	
9,532.00	88.46	180.46	7,284.82	-2,255.72	-194.98	1,278,714.48	3,238,800.39	40.095308	-104.646403	
9,617.00	88.64	180.09	7,286.97	-2,340.69	-195.39	1,278,629.51	3,238,800.80	40.095075	-104.646405	
9,703.00	88.95	179.69	7,288.78	-2,426.67	-195.23	1,278,543.53	3,238,801.79	40.094838	-104.646404	
9,788.00	89.21	179.91	7,290.15	-2,511.66	-194.93	1,278,458.55	3,238,802.91	40.094605	-104.646403	
9,874.00	89.88	179.10	7,290.83	-2,597.65	-194.19	1,278,372.57	3,238,804.48	40.094369	-104.646400	
9,959.00	90.12	179.29	7,290.83	-2,682.64	-192.99	1,278,287.59	3,238,806.49	40.094136	-104.646396	
10,045.00	90.80	178.98	7,290.14	-2,768.63	-191.70	1,278,201.62	3,238,808.62	40.093900	-104.646391	
10,131.00	90.92	178.83	7,288.85	-2,854.60	-190.05	1,278,115.67	3,238,811.09	40.093664	-104.646386	
10,216.00	91.42	179.24	7,287.11	-2,939.57	-188.62	1,278,030.72	3,238,813.34	40.093430	-104.646380	
10,302.00	91.11	178.76	7,285.22	-3,025.54	-187.12	1,277,944.77	3,238,815.67	40.093194	-104.646375	
10,387.00	91.36	179.63	7,283.38	-3,110.51	-185.93	1,277,859.81	3,238,817.68	40.092961	-104.646371	
10,472.00	91.54	179.31	7,281.23	-3,195.48	-185.14	1,277,774.86	3,238,819.28	40.092728	-104.646368	
10,558.00	90.92	179.35	7,279.39	-3,281.45	-184.14	1,277,688.90	3,238,821.12	40.092492	-104.646364	
10,643.00	90.12	178.36	7,278.62	-3,366.43	-182.44	1,277,603.94	3,238,823.63	40.092259	-104.646358	
10,729.00	89.14	178.75	7,279.17	-3,452.40	-180.27	1,277,517.99	3,238,826.63	40.092023	-104.646351	
10,814.00	88.71	177.77	7,280.77	-3,537.34	-177.69	1,277,433.08	3,238,830.03	40.091790	-104.646341	
10,899.00	89.14	176.22	7,282.36	-3,622.21	-173.23	1,277,348.26	3,238,835.30	40.091557	-104.646325	
10,984.00	88.94	174.97	7,283.78	-3,706.94	-166.71	1,277,263.59	3,238,842.65	40.091324	-104.646302	
11,070.00	89.88	173.87	7,284.67	-3,792.53	-158.34	1,277,178.09	3,238,851.83	40.091089	-104.646272	
11,155.00	90.37	173.20	7,284.48	-3,876.99	-148.77	1,277,093.73	3,238,862.21	40.090857	-104.646238	
11,240.00	91.36	173.36	7,283.20	-3,961.39	-138.83	1,277,009.42	3,238,872.97	40.090625	-104.646202	
11,326.00	91.91	173.81	7,280.75	-4,046.82	-129.22	1,276,924.09	3,238,883.40	40.090391	-104.646168	
11,411.00	90.68	173.52	7,278.83	-4,131.28	-119.85	1,276,839.73	3,238,893.59	40.090159	-104.646135	
11,496.00	88.77	171.97	7,279.23	-4,215.59	-109.11	1,276,755.53	3,238,905.13	40.089928	-104.646096	
11,582.00	88.50	171.45	7,281.28	-4,300.67	-96.72	1,276,670.57	3,238,918.35	40.089694	-104.646052	
11,667.00	89.82	171.48	7,282.53	-4,384.71	-84.10	1,276,586.65	3,238,931.77	40.089463	-104.646007	
11,753.00	90.68	172.47	7,282.15	-4,469.87	-72.10	1,276,501.61	3,238,944.60	40.089230	-104.645964	
11,838.00	91.35	173.20	7,280.65	-4,554.19	-61.50	1,276,417.40	3,238,956.01	40.088998	-104.645926	

Andarko Petroleum Corporation

Survey Report - Geographic

Company:	US ROCKIES REGION PLANNING	Local Co-ordinate Reference:	Well SPARBOE 24C-3HZ
Project:	COLORADO NORTHERN ZONE - 83	TVD Reference:	16'RKB+4977'GL @ 4993.00ft (XTREME 23)
Site:	WELD_SPARBOE 4 PAD	MD Reference:	16'RKB+4977'GL @ 4993.00ft (XTREME 23)
Well:	SPARBOE 24C-3HZ	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	ACTUAL	Database:	edmp

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
11,923.00	90.99	173.72	7,278.91	-4,638.62	-51.82	1,276,333.07	3,238,966.50	40.088766	-104.645891	
12,009.00	90.31	174.37	7,277.94	-4,724.15	-42.90	1,276,247.63	3,238,976.25	40.088532	-104.645860	
12,094.00	90.92	174.69	7,277.02	-4,808.76	-34.79	1,276,163.10	3,238,985.16	40.088299	-104.645831	
12,179.00	90.12	175.02	7,276.25	-4,893.41	-27.17	1,276,078.53	3,238,993.60	40.088067	-104.645803	
12,265.00	90.74	175.31	7,275.61	-4,979.10	-19.92	1,275,992.91	3,239,001.67	40.087832	-104.645777	
12,350.00	90.18	175.50	7,274.93	-5,063.83	-13.12	1,275,908.26	3,239,009.30	40.087599	-104.645753	
12,435.00	91.11	175.73	7,273.97	-5,148.57	-6.62	1,275,823.58	3,239,016.61	40.087366	-104.645730	
12,521.00	91.17	174.74	7,272.26	-5,234.26	0.53	1,275,737.97	3,239,024.58	40.087131	-104.645704	
12,606.00	88.83	170.21	7,272.26	-5,318.50	11.65	1,275,653.84	3,239,036.52	40.086900	-104.645665	
12,692.00	89.01	170.05	7,273.88	-5,403.21	26.39	1,275,569.27	3,239,052.07	40.086667	-104.645612	
12,777.00	89.75	169.76	7,274.80	-5,486.89	41.29	1,275,485.74	3,239,067.78	40.086438	-104.645559	
12,862.00	90.49	170.17	7,274.62	-5,570.58	56.10	1,275,402.19	3,239,083.39	40.086208	-104.645506	
12,948.00	91.48	172.63	7,273.14	-5,655.60	68.96	1,275,317.30	3,239,097.07	40.085975	-104.645460	
13,033.00	91.66	173.70	7,270.81	-5,739.96	79.07	1,275,233.04	3,239,107.99	40.085743	-104.645424	
13,119.00	90.68	175.04	7,269.06	-5,825.52	87.51	1,275,147.56	3,239,117.25	40.085508	-104.645394	
13,204.00	90.74	177.04	7,268.00	-5,910.31	93.37	1,275,062.84	3,239,123.94	40.085275	-104.645373	
13,289.00	89.12	178.50	7,268.11	-5,995.24	96.68	1,274,977.94	3,239,128.06	40.085042	-104.645361	
13,375.00	90.56	181.32	7,268.35	-6,081.23	96.82	1,274,891.96	3,239,129.03	40.084806	-104.645360	
13,460.00	89.32	185.09	7,268.44	-6,166.08	92.07	1,274,807.07	3,239,125.09	40.084573	-104.645377	
13,547.00	87.34	185.67	7,270.97	-6,252.66	83.91	1,274,720.42	3,239,117.78	40.084336	-104.645406	
13,632.00	87.16	185.45	7,275.05	-6,337.16	75.69	1,274,635.84	3,239,110.36	40.084104	-104.645436	
13,718.00	87.59	184.61	7,278.99	-6,422.74	68.15	1,274,550.19	3,239,103.66	40.083869	-104.645463	
13,803.00	89.91	184.14	7,280.84	-6,507.46	61.67	1,274,465.41	3,239,097.99	40.083636	-104.645486	
13,888.00	89.88	183.58	7,281.00	-6,592.27	55.95	1,274,380.55	3,239,093.09	40.083403	-104.645506	
13,974.00	88.77	183.34	7,282.01	-6,678.10	50.76	1,274,294.67	3,239,088.72	40.083168	-104.645525	
14,059.00	88.21	182.64	7,284.25	-6,762.96	46.33	1,274,209.78	3,239,085.11	40.082935	-104.645541	
14,144.00	88.09	182.48	7,287.00	-6,847.83	42.53	1,274,124.87	3,239,082.13	40.082702	-104.645554	
14,230.00	89.08	182.10	7,289.12	-6,933.73	39.10	1,274,038.94	3,239,079.53	40.082466	-104.645567	
14,315.00	88.46	182.10	7,290.94	-7,018.66	35.98	1,273,953.99	3,239,077.23	40.082233	-104.645578	
14,400.00	88.03	181.48	7,293.55	-7,103.57	33.33	1,273,869.05	3,239,075.39	40.082000	-104.645587	
14,414.00	88.46	181.43	7,293.98	-7,117.56	32.98	1,273,855.06	3,239,075.17	40.081961	-104.645588	
LAST WFT MWD+IFR SURVEY										
14,469.00	88.46	181.43	7,295.45	-7,172.53	31.60	1,273,800.09	3,239,074.33	40.081810	-104.645593	
PROJECTION TO TD										

Survey Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
1,806.00	1,805.98	0.05	4.03	TIE ON	
1,886.00	1,885.98	0.40	3.69	FIRST WFT MWD+IFR SURVEY	
7,682.00	7,294.43	-406.56	-205.76	7 IN. CASING	
14,414.00	7,293.98	-7,117.56	32.98	LAST WFT MWD+IFR SURVEY	
14,469.00	7,295.45	-7,172.53	31.60	PROJECTION TO TD	

Checked By: _____ Approved By: _____ Date: _____