



# Weatherford®

Weatherford International Ltd.

2000 Oil Drive

Casper, WY 82604

## Survey Certification

<b>Operating Company:</b>	Anadarko Petroleum Corp.
<b>Well Name:</b>	Cannon 16N-E3HZ
<b>State:</b>	Colorado
<b>County:</b>	Weld
<b>API Number:</b>	512335794
<b>Datum:</b>	NAD 83
<b>Survey Calculation Method:</b>	Minimum Curvature
<b>North Reference:</b>	True North

I, John R. Morgan, hereby certify the attached directional survey run from the measure depth of 857.00 feet to the measured depth of 11,250.00 feet as accurate and true to the best of my knowledge.

Signature

4-Sep-12

Date

**John Morgan**

Directional Planning

Weatherford International - Rockies District



# Weatherford®



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**SLIDE REPORT .....SEC.5**

Drilling Services-Denver, CO



# FINAL SURVEYS

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Project: COLORADO NORTHERN ZONE - 83  
Site: WELD\_CANNON 26-3HZ PAD  
Well: CANNON 16N-E3HZ  
Wellbore: CANNON 16N-E3HZ  
Section:  
SHL:  
Design: CANNON 16N-E3HZ (wp05)  
Latitude: 40.173837  
Longitude: -104.641641  
GL: 4840.00  
KB: 25' RKB + 4840' GL @ 4865.00ft

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
3831.00	3855.44	Parkman
4226.00	4250.54	Sussex
6797.00	6914.38	Sharon Springs
6874.00	7077.51	Niobrara A
6892.00	7126.25	Niobrara B

WELL DETAILS: CANNON 16N-E3HZ						
+N/-S	+E/-W	Northing	Ground Level: Easting	4840.00 Latitude	Longitude	Slot
0.00	0.00	1307332.62	3239855.64	40.173837	-104.641641	

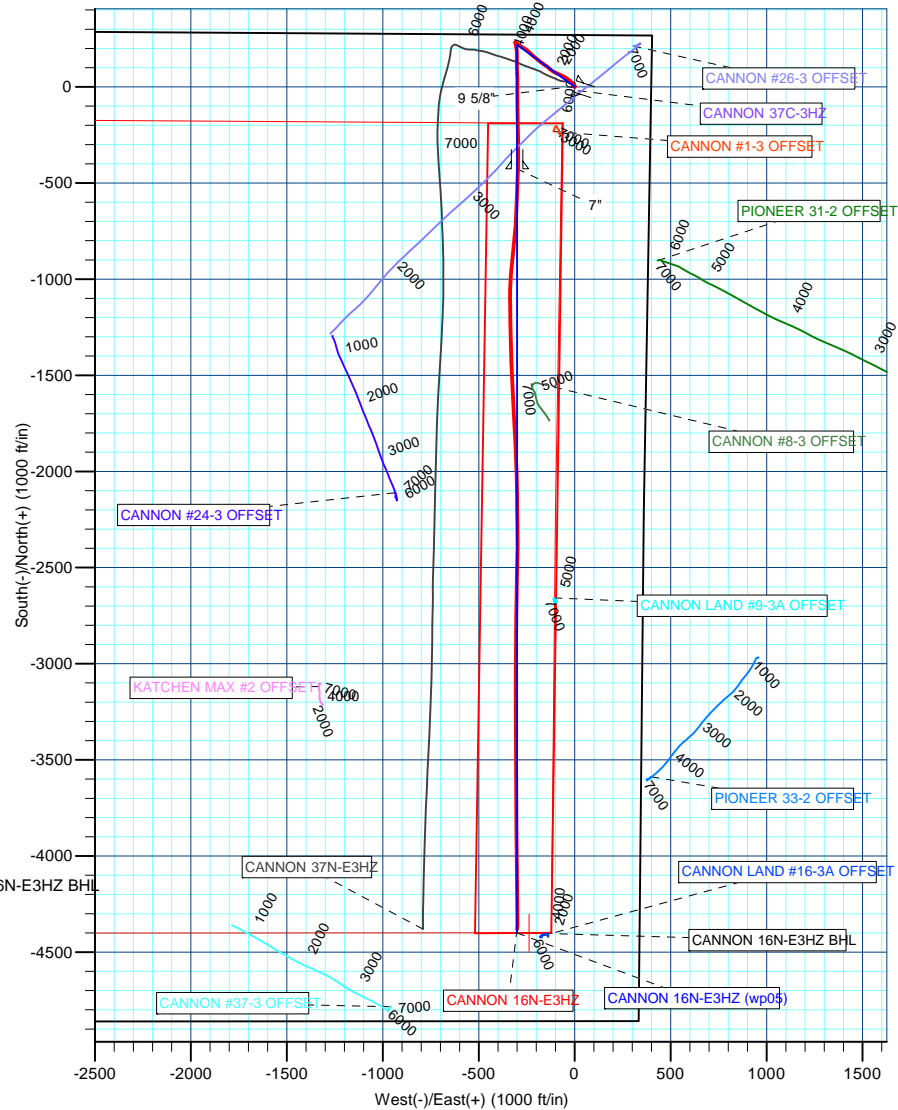
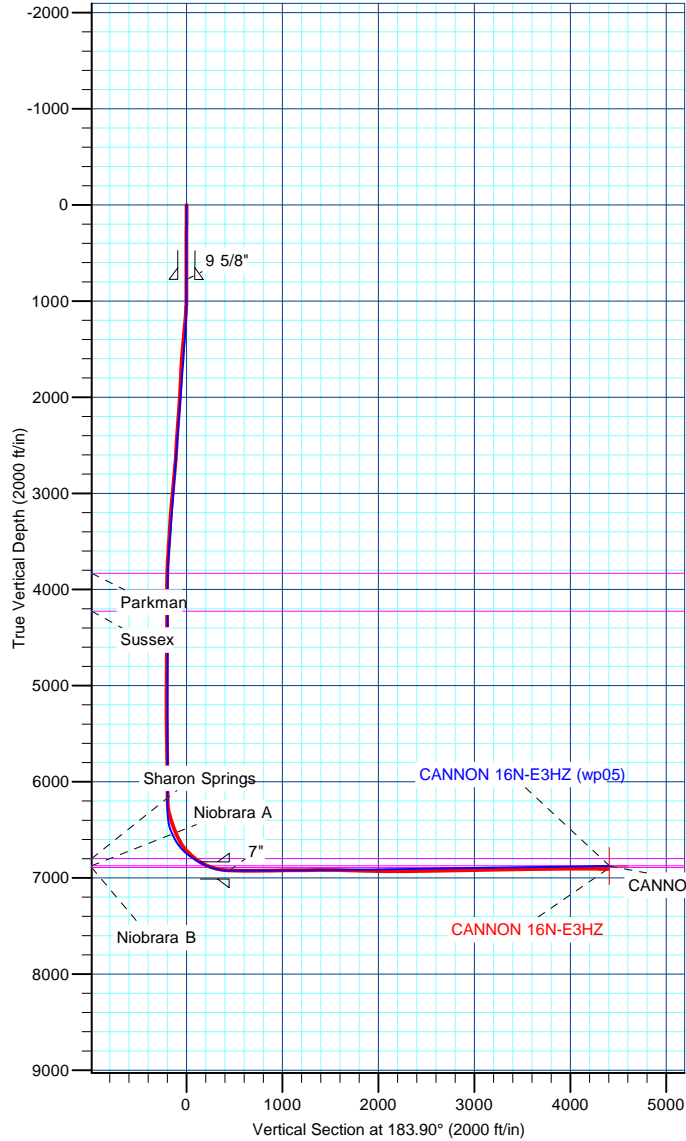
CASING DETAILS			
TVD	MD	Name	Size
774.99	775.00	9 5/8"	9-5/8
6924.00	7318.64	7"	7

T M

Azimuths to True North  
Magnetic North: 8.63°  
Magnetic Field  
Strength: 52913.1nT  
Dip Angle: 66.85°  
Date: 7/9/2012  
Model: IGRF2010

DESIGN TARGET DETAILS									
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape	
CANNON 16N-E3HZ BHL	6875.00	-4399.79	-237.01	1302930.75	3239661.23	40.161759	-104.642489	Point	

SECTION DETAILS								
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect
819.00	0.32	265.95	818.99	2.93	-0.92	0.00	0.00	-2.86
1000.00	0.32	265.95	999.99	2.86	-1.93	0.00	0.00	-2.72
1389.40	8.03	306.06	1388.07	18.82	-25.04	2.00	41.61	-17.07
3623.04	8.03	306.06	3599.81	202.47	-277.29	0.00	0.00	-183.14
4024.54	0.00	180.00	4000.00	219.00	-300.00	2.00	180.00	-198.09
6337.08	0.00	180.00	6312.54	219.00	-300.00	0.00	180.00	-198.09
6914.38	57.73	180.00	6797.00	-48.05	-300.00	10.00	180.00	68.34
7077.51	65.89	180.00	6874.00	-191.70	-300.00	5.00	0.00	211.66
7318.64	90.00	180.00	6924.00	-425.79	-300.00	10.00	0.00	445.20
8658.79	90.85	180.00	6914.06	-1765.88	-300.00	0.06	0.00	1782.20
11292.98	90.85	180.00	6875.00	-4399.79	-300.00	0.00	0.00	4410.00



# **US ROCKIES REGION PLANNING**

**COLORADO NORTHERN ZONE - 83**

**WELD\_CANNON 26-3HZ PAD**

**CANNON 16N-E3HZ**

**CANNON 16N-E3HZ**

**Design: CANNON 16N-E3HZ**

## **Standard Survey Report**

**04 September, 2012**

# Anadarko Petroleum Corp

## Survey Report

<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well CANNON 16N-E3HZ
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>TVD Reference:</b>	25' RKB + 4840' GL @ 4865.00ft
<b>Site:</b>	WELD_CANNON 26-3HZ PAD	<b>MD Reference:</b>	25' RKB + 4840' GL @ 4865.00ft
<b>Well:</b>	CANNON 16N-E3HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	CANNON 16N-E3HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	CANNON 16N-E3HZ	<b>Database:</b>	edmp

<b>Project</b>	COLORADO NORTHERN ZONE - 83		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		

Site		WELD_CANNON 26-3HZ PAD						
Site Position:		Northing:	1,307,351.72	usft	Latitude:	40.173890		
From:	Lat/Long	Easting:	3,239,832.54	usft	Longitude:	-104.641723		
Position Uncertainty:	0.00	ft	Slot Radius:	13-3/16	"	Grid Convergence:	0.55	°

Well	CANNON 16N-E3HZ					
Well Position	+N/-S	0.00 ft	Northing:	1,307,332.62 usft	Latitude:	40.173837
	+E/-W	0.00 ft	Easting:	3,239,855.64 usft	Longitude:	-104.641641
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	4,840.00 ft

<b>Wellbore</b>	CANNON 16N-E3HZ				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	7/9/2012	8.64	66.85	52,913

<b>Design</b>	CANNON 16N-E3HZ				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	-1.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>	
	-1.00	0.00	0.00	307.45	

<b>Survey Program</b>	<b>Date</b>	9/2/2012			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
99.00	819.00	Survey #1 (CANNON 16N-E3HZ)	NS-GYRO-MS	NORTH SENSING GYROCOMPASSING M/S	
857.00	11,250.00	Survey #2 (CANNON 16N-E3HZ)	MWD	MWD - STANDARD	

<b>Survey</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
-1.00	0.00	0.00	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	
99.00	0.55	340.39	99.00	0.45	-0.16	0.40	0.55	0.55	0.00	
199.00	0.08	310.50	199.00	0.95	-0.38	0.88	0.48	-0.47	-29.89	
299.00	0.32	24.87	299.00	1.25	-0.31	1.01	0.31	0.24	74.37	
399.00	0.10	347.91	399.00	1.59	-0.21	1.13	0.25	-0.22	-36.96	
499.00	0.06	55.69	499.00	1.70	-0.19	1.18	0.10	-0.04	67.78	
599.00	0.38	348.80	598.99	2.06	-0.21	1.42	0.36	0.32	-66.89	
699.00	0.38	327.55	698.99	2.66	-0.45	1.98	0.14	0.00	-21.25	
799.00	0.23	268.95	798.99	2.94	-0.83	2.44	0.33	-0.15	-58.60	
819.00	0.32	265.95	818.99	2.93	-0.92	2.52	0.46	0.45	-15.00	

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## Survey Report

<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well CANNON 16N-E3HZ
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>TVD Reference:</b>	25' RKB + 4840' GL @ 4865.00ft
<b>Site:</b>	WELD_CANNON 26-3HZ PAD	<b>MD Reference:</b>	25' RKB + 4840' GL @ 4865.00ft
<b>Well:</b>	CANNON 16N-E3HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	CANNON 16N-E3HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	CANNON 16N-E3HZ	<b>Database:</b>	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)
TIE ON									
857.00	0.35	171.12	856.99	2.81	-1.01	2.51	1.30	0.08	-249.55
FIRST MWD SURVEY									
948.00	0.51	159.03	947.99	2.16	-0.82	1.97	0.20	0.18	-13.29
1,038.00	1.91	318.73	1,037.98	2.91	-1.67	3.10	2.66	1.56	177.44
1,129.00	5.05	329.25	1,128.80	7.49	-4.72	8.30	3.51	3.45	11.56
1,219.00	6.63	326.63	1,218.33	15.24	-9.60	16.89	1.78	1.76	-2.91
1,312.00	7.88	318.17	1,310.58	24.47	-16.81	28.22	1.76	1.34	-9.10
1,405.00	9.22	306.93	1,402.56	33.70	-27.02	41.94	2.30	1.44	-12.09
1,500.00	9.14	307.43	1,496.34	42.86	-39.09	57.10	0.12	-0.08	0.53
1,595.00	9.36	298.41	1,590.11	51.12	-51.88	72.27	1.54	0.23	-9.49
1,690.00	8.95	294.95	1,683.90	57.91	-65.37	87.12	0.72	-0.43	-3.64
1,785.00	8.68	290.75	1,777.78	63.57	-78.78	101.20	0.73	-0.28	-4.42
1,880.00	8.42	295.31	1,871.72	69.08	-91.77	114.86	0.76	-0.27	4.80
1,974.00	7.89	303.02	1,964.78	75.54	-103.40	128.02	1.29	-0.56	8.20
2,069.00	7.44	298.70	2,058.93	82.05	-114.26	140.60	0.77	-0.47	-4.55
2,164.00	7.29	309.30	2,153.15	88.82	-124.32	152.71	1.44	-0.16	11.16
2,259.00	6.94	310.37	2,247.42	96.36	-133.36	164.46	0.39	-0.37	1.13
2,354.00	6.29	310.35	2,341.78	103.44	-141.70	175.39	0.68	-0.68	-0.02
2,448.00	7.25	306.45	2,435.13	110.30	-150.40	186.47	1.13	1.02	-4.15
2,544.00	7.03	304.62	2,530.38	117.24	-160.10	198.39	0.33	-0.23	-1.91
2,638.00	6.24	302.31	2,623.75	123.24	-169.15	209.23	0.89	-0.84	-2.46
2,733.00	9.18	309.04	2,717.88	130.77	-179.41	221.95	3.23	3.09	7.08
2,828.00	9.64	308.36	2,811.60	140.48	-191.53	237.47	0.50	0.48	-0.72
2,923.00	9.37	309.80	2,905.30	150.37	-203.71	253.15	0.38	-0.28	1.52
3,017.00	8.88	311.94	2,998.11	160.11	-214.98	268.03	0.63	-0.52	2.28
3,112.00	8.17	312.36	3,092.06	169.56	-225.43	282.07	0.75	-0.75	0.44
3,207.00	7.24	312.64	3,186.20	178.17	-234.82	294.76	0.98	-0.98	0.29
3,302.00	6.18	313.63	3,280.55	185.75	-242.92	305.80	1.12	-1.12	1.04
3,397.00	6.66	304.14	3,374.96	192.37	-251.18	316.38	1.22	0.51	-9.99
3,493.00	5.98	298.93	3,470.37	197.91	-260.17	326.89	0.93	-0.71	-5.43
3,587.00	8.64	304.10	3,563.60	204.24	-270.30	338.78	2.91	2.83	5.50
3,682.00	8.11	303.29	3,657.59	211.92	-281.81	352.59	0.57	-0.56	-0.85
3,776.00	4.60	304.94	3,751.00	217.72	-290.45	362.97	3.74	-3.73	1.76
3,872.00	4.11	302.91	3,846.72	221.80	-296.49	370.25	0.54	-0.51	-2.11
3,966.00	2.39	296.62	3,940.56	224.50	-301.07	375.53	1.87	-1.83	-6.69
4,061.00	0.22	133.65	4,035.54	225.27	-302.71	377.29	2.74	-2.28	-171.55
4,156.00	0.47	151.01	4,130.54	224.80	-302.39	376.76	0.28	0.26	18.27
4,250.00	0.50	160.39	4,224.53	224.08	-302.07	376.06	0.09	0.03	9.98
4,345.00	0.25	176.70	4,319.53	223.48	-301.91	375.57	0.28	-0.26	17.17
4,440.00	0.35	335.08	4,414.53	223.53	-302.02	375.70	0.62	0.11	166.72
4,535.00	0.82	334.21	4,509.53	224.41	-302.44	376.56	0.49	0.49	-0.92
4,629.00	0.97	328.70	4,603.51	225.69	-303.15	377.90	0.18	0.16	-5.86

# Anadarko Petroleum Corp

## Survey Report

<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well CANNON 16N-E3HZ
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>TVD Reference:</b>	25' RKB + 4840' GL @ 4865.00ft
<b>Site:</b>	WELD_CANNON 26-3HZ PAD	<b>MD Reference:</b>	25' RKB + 4840' GL @ 4865.00ft
<b>Well:</b>	CANNON 16N-E3HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	CANNON 16N-E3HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	CANNON 16N-E3HZ	<b>Database:</b>	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)	
4,724.00	1.07	307.71	4,698.50	226.92	-304.27	379.54	0.40	0.11	-22.09	
4,818.00	1.05	286.65	4,792.48	227.71	-305.79	381.22	0.41	-0.02	-22.40	
4,913.00	1.33	291.04	4,887.46	228.35	-307.65	383.09	0.31	0.29	4.62	
5,008.00	0.36	317.07	4,982.45	228.97	-308.88	384.45	1.07	-1.02	27.40	
5,103.00	0.70	321.83	5,077.45	229.64	-309.44	385.30	0.36	0.36	5.01	
5,198.00	0.90	308.59	5,172.44	230.56	-310.39	386.61	0.29	0.21	-13.94	
5,292.00	1.38	127.21	5,266.43	230.34	-310.06	386.22	2.43	0.51	190.02	
5,387.00	1.58	140.57	5,361.40	228.64	-308.32	383.80	0.42	0.21	14.06	
5,481.00	0.97	134.56	5,455.38	227.08	-306.93	381.74	0.66	-0.65	-6.39	
5,576.00	0.77	131.78	5,550.37	226.09	-305.88	380.31	0.22	-0.21	-2.93	
5,672.00	0.70	144.34	5,646.36	225.18	-305.06	379.11	0.18	-0.07	13.08	
5,767.00	1.55	200.29	5,741.34	223.50	-305.16	378.17	1.36	0.89	58.89	
5,863.00	0.72	172.11	5,837.32	221.69	-305.53	377.36	1.02	-0.86	-29.35	
5,957.00	0.78	181.61	5,931.31	220.46	-305.47	376.57	0.15	0.06	10.11	
6,052.00	1.15	186.22	6,026.30	218.87	-305.59	375.69	0.40	0.39	4.85	
6,147.00	0.25	208.86	6,121.29	217.74	-305.79	375.17	0.97	-0.95	23.83	
6,204.00	0.53	193.62	6,178.29	217.38	-305.92	375.04	0.52	0.49	-26.74	
6,242.00	0.85	190.24	6,216.29	216.93	-306.01	374.84	0.85	0.84	-8.89	
6,273.00	3.84	177.97	6,247.26	215.66	-306.01	374.08	9.73	9.65	-39.58	
6,305.00	7.81	171.40	6,279.09	212.44	-305.65	371.83	12.56	12.41	-20.53	
6,336.00	11.90	169.72	6,309.62	207.21	-304.76	367.95	13.22	13.19	-5.42	
6,368.00	15.51	172.66	6,340.71	199.72	-303.63	362.49	11.49	11.28	9.19	
6,400.00	18.10	173.75	6,371.34	190.53	-302.54	356.04	8.15	8.09	3.41	
6,431.00	19.55	175.35	6,400.68	180.58	-301.59	349.24	4.96	4.68	5.16	
6,463.00	19.50	176.05	6,430.84	169.91	-300.79	342.11	0.75	-0.16	2.19	
6,494.00	19.11	178.96	6,460.10	159.68	-300.34	335.53	3.35	-1.26	9.39	
6,526.00	19.09	182.00	6,490.34	149.21	-300.43	329.24	3.11	-0.06	9.50	
6,558.00	20.84	182.35	6,520.41	138.29	-300.85	322.93	5.48	5.47	1.09	
6,589.00	24.31	181.12	6,549.03	126.40	-301.20	315.98	11.30	11.19	-3.97	
6,621.00	26.97	179.37	6,577.88	112.55	-301.25	307.60	8.64	8.31	-5.47	
6,653.00	28.36	177.05	6,606.22	97.71	-300.78	298.20	5.49	4.34	-7.25	
6,685.00	31.10	176.99	6,634.01	81.86	-299.95	287.91	8.56	8.56	-0.19	
6,717.00	34.64	176.77	6,660.88	64.52	-299.00	276.61	11.07	11.06	-0.69	
6,748.00	37.82	178.35	6,685.88	46.22	-298.23	264.88	10.69	10.26	5.10	
6,780.00	41.64	179.43	6,710.49	25.77	-297.85	252.14	12.13	11.94	3.38	
6,811.00	44.48	181.44	6,733.14	4.61	-298.02	239.40	10.17	9.16	6.48	
6,843.00	46.99	181.10	6,755.47	-18.29	-298.52	225.88	7.88	7.84	-1.06	
6,874.00	49.62	180.46	6,776.09	-41.44	-298.83	212.05	8.62	8.48	-2.06	
6,906.00	53.19	180.33	6,796.05	-66.44	-299.01	196.99	11.16	11.16	-0.41	
6,938.00	56.43	179.37	6,814.49	-92.59	-298.93	181.03	10.42	10.13	-3.00	
6,969.00	57.87	177.70	6,831.30	-118.62	-298.26	164.67	6.49	4.65	-5.39	
7,001.00	60.21	177.46	6,847.76	-146.04	-297.11	147.08	7.34	7.31	-0.75	
7,032.00	63.47	178.41	6,862.39	-173.35	-296.12	129.70	10.86	10.52	3.06	
7,064.00	67.60	178.75	6,875.64	-202.46	-295.40	111.43	12.94	12.91	1.06	



# Anadarko Petroleum Corp

## Survey Report

<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well CANNON 16N-E3HZ
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<b>Site:</b>	WELD_CANNON 26-3HZ PAD	<b>MD Reference:</b>	25' RKB + 4840' GL @ 4865.00ft
<b>Well:</b>	CANNON 16N-E3HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	CANNON 16N-E3HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	CANNON 16N-E3HZ	<b>Database:</b>	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)
7,096.00	71.43	178.87	6,886.84	-232.42	-294.78	92.71	11.97	11.97	0.38
7,127.00	74.78	178.98	6,895.85	-262.07	-294.23	74.24	10.81	10.81	0.35
7,159.00	77.87	179.48	6,903.41	-293.16	-293.81	55.01	9.77	9.66	1.56
7,190.00	80.31	180.32	6,909.28	-323.60	-293.76	36.46	8.31	7.87	2.71
7,222.00	82.01	180.66	6,914.19	-355.22	-294.03	17.45	5.42	5.31	1.06
7,242.00	83.34	180.86	6,916.74	-375.05	-294.29	5.60	6.72	6.65	1.00
7,343.00	89.75	182.43	6,922.83	-475.77	-297.19	-53.34	6.53	6.35	1.55
7,438.00	89.29	182.15	6,923.62	-570.69	-300.98	-108.04	0.57	-0.48	-0.29
7,533.00	89.74	181.97	6,924.43	-665.62	-304.40	-163.05	0.51	0.47	-0.19
7,627.00	90.26	185.50	6,924.43	-759.41	-310.52	-215.22	3.80	0.55	3.76
7,722.00	90.88	186.03	6,923.48	-853.92	-320.06	-265.11	0.86	0.65	0.56
7,817.00	91.05	185.33	6,921.88	-948.44	-329.46	-315.11	0.76	0.18	-0.74
7,912.00	90.79	181.62	6,920.36	-1,043.24	-335.22	-368.18	3.91	-0.27	-3.91
8,006.00	90.00	179.18	6,919.71	-1,137.23	-335.88	-424.81	2.73	-0.84	-2.60
8,101.00	90.86	179.25	6,919.00	-1,232.22	-334.57	-483.60	0.91	0.91	0.07
8,196.00	90.79	178.44	6,917.63	-1,327.19	-332.66	-542.86	0.86	-0.07	-0.85
8,291.00	90.71	178.09	6,916.38	-1,422.13	-329.78	-602.88	0.38	-0.08	-0.37
8,386.00	89.08	177.15	6,916.56	-1,517.05	-325.84	-663.72	1.98	-1.72	-0.99
8,481.00	88.83	177.50	6,918.29	-1,611.93	-321.41	-724.93	0.45	-0.26	0.37
8,576.00	88.50	176.51	6,920.51	-1,706.77	-316.44	-786.53	1.10	-0.35	-1.04
8,672.00	87.71	176.53	6,923.68	-1,802.54	-310.62	-849.39	0.82	-0.82	0.02
8,767.00	88.46	178.20	6,926.85	-1,897.38	-306.25	-910.52	1.93	0.79	1.76
8,862.00	88.85	178.09	6,929.08	-1,992.31	-303.18	-970.68	0.43	0.41	-0.12
8,956.00	90.31	179.19	6,929.77	-2,086.27	-300.95	-1,029.58	1.94	1.55	1.17
9,052.00	90.49	179.29	6,929.10	-2,182.26	-299.68	-1,088.96	0.21	0.19	0.10
9,146.00	90.12	178.72	6,928.60	-2,276.25	-298.04	-1,147.40	0.72	-0.39	-0.61
9,241.00	89.75	180.56	6,928.71	-2,371.24	-297.45	-1,205.63	1.98	-0.39	1.94
9,336.00	92.28	181.71	6,927.03	-2,466.20	-299.33	-1,261.88	2.93	2.66	1.21
9,431.00	91.48	181.27	6,923.91	-2,561.11	-301.80	-1,317.63	0.96	-0.84	-0.46
9,526.00	89.38	180.56	6,923.20	-2,656.09	-303.31	-1,374.17	2.33	-2.21	-0.75
9,621.00	91.11	180.70	6,922.79	-2,751.08	-304.36	-1,431.10	1.83	1.82	0.15
9,716.00	90.68	179.68	6,921.31	-2,846.07	-304.67	-1,488.60	1.17	-0.45	-1.07
9,810.00	92.16	180.59	6,918.98	-2,940.04	-304.89	-1,545.56	1.85	1.57	0.97
9,906.00	91.60	180.04	6,915.83	-3,035.98	-305.42	-1,603.48	0.82	-0.58	-0.57
10,000.00	91.11	180.73	6,913.61	-3,129.95	-306.05	-1,660.12	0.90	-0.52	0.73
10,095.00	90.18	180.20	6,912.54	-3,224.94	-306.82	-1,717.26	1.13	-0.98	-0.56
10,191.00	91.17	180.06	6,911.41	-3,320.93	-307.04	-1,775.46	1.04	1.03	-0.15
10,286.00	90.92	179.65	6,909.67	-3,415.92	-306.80	-1,833.40	0.51	-0.26	-0.43
10,381.00	90.80	179.43	6,908.25	-3,510.90	-306.04	-1,891.76	0.26	-0.13	-0.23
10,476.00	90.74	179.64	6,906.97	-3,605.89	-305.27	-1,950.13	0.23	-0.06	0.22
10,571.00	90.49	179.48	6,905.95	-3,700.88	-304.54	-2,008.46	0.31	-0.26	-0.17
10,666.00	90.68	179.06	6,904.98	-3,795.87	-303.33	-2,067.18	0.49	0.20	-0.44
10,761.00	90.37	179.27	6,904.11	-3,890.86	-301.94	-2,126.03	0.39	-0.33	0.22

# Anadarko Petroleum Corp

## Survey Report

<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well CANNON 16N-E3HZ
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>TVD Reference:</b>	25' RKB + 4840' GL @ 4865.00ft
<b>Site:</b>	WELD_CANNON 26-3HZ PAD	<b>MD Reference:</b>	25' RKB + 4840' GL @ 4865.00ft
<b>Well:</b>	CANNON 16N-E3HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	CANNON 16N-E3HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	CANNON 16N-E3HZ	<b>Database:</b>	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)
10,855.00	90.37	179.90	6,903.50	-3,984.85	-301.26	-2,183.72	0.67	0.00	0.67
10,950.00	90.37	179.84	6,902.89	-4,079.85	-301.05	-2,241.66	0.06	0.00	-0.06
11,046.00	90.00	179.60	6,902.58	-4,175.85	-300.58	-2,300.40	0.46	-0.39	-0.25
11,141.00	87.90	178.43	6,904.32	-4,270.81	-298.95	-2,359.43	2.53	-2.21	-1.23
11,195.00	89.20	180.31	6,905.69	-4,324.79	-298.35	-2,392.72	4.23	2.41	3.48
LAST MWD SURVEY									
11,250.00	90.52	182.22	6,905.82	-4,379.77	-299.57	-2,425.19	4.22	2.40	3.47
PROJECTION TO TD									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
819.00	818.99	2.93	-0.92	TIE ON
857.00	856.99	2.81	-1.01	FIRST MWD SURVEY
11,195.00	6,905.69	-4,324.79	-298.35	LAST MWD SURVEY
11,250.00	6,905.82	-4,379.77	-299.57	PROJECTION TO TD

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_

# **US ROCKIES REGION PLANNING**

**COLORADO NORTHERN ZONE - 83**

**WELD\_CANNON 26-3HZ PAD**

**CANNON 16N-E3HZ**

**CANNON 16N-E3HZ**

**Design: CANNON 16N-E3HZ**

## **Survey Report - Geographic**

**04 September, 2012**

# Anadarko Petroleum Corp

## Survey Report - Geographic

<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well CANNON 16N-E3HZ
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>TVD Reference:</b>	25' RKB + 4840' GL @ 4865.00ft
<b>Site:</b>	WELD_CANNON 26-3HZ PAD	<b>MD Reference:</b>	25' RKB + 4840' GL @ 4865.00ft
<b>Well:</b>	CANNON 16N-E3HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	CANNON 16N-E3HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	CANNON 16N-E3HZ	<b>Database:</b>	edmp

<b>Project</b>	COLORADO NORTHERN ZONE - 83		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		

<b>Site</b>	WELD_CANNON 26-3HZ PAD			
<b>Site Position:</b>		<b>Northing:</b>	1,307,351.72 usft	<b>Latitude:</b> 40.173890
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,239,832.54 usft	<b>Longitude:</b> -104.641723
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b> 0.55 °

<b>Well</b>	CANNON 16N-E3HZ			
<b>Well Position</b>	<b>+N/-S</b>	0.00 ft	<b>Northing:</b>	1,307,332.62 usft
	<b>+E/-W</b>	0.00 ft	<b>Easting:</b>	3,239,855.64 usft
<b>Position Uncertainty</b>	0.00 ft	<b>Wellhead Elevation:</b>	ft	<b>Ground Level:</b> 4,840.00 ft

<b>Wellbore</b>	CANNON 16N-E3HZ				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	7/9/2012	8.64	66.85	52,913

<b>Design</b>	CANNON 16N-E3HZ			
<b>Audit Notes:</b>				
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b> -1.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>
	-1.00	0.00	0.00	307.45

<b>Survey Program</b>	<b>Date</b>	9/2/2012		
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
99.00	819.00	Survey #1 (CANNON 16N-E3HZ)	NS-GYRO-MS	NORTH SENSING GYROCOMPASSING M/S
857.00	11,250.00	Survey #2 (CANNON 16N-E3HZ)	MWD	MWD - STANDARD

<b>Survey</b>									
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Map Northing (usft)</b>	<b>Map Easting (usft)</b>	<b>Latitude</b>	<b>Longitude</b>
-1.00	0.00	0.00	-1.00	0.00	0.00	1,307,332.62	3,239,855.64	40.173837	-104.641641
99.00	0.55	340.39	99.00	0.45	-0.16	1,307,333.07	3,239,855.47	40.173838	-104.641642
199.00	0.08	310.50	199.00	0.95	-0.38	1,307,333.56	3,239,855.25	40.173840	-104.641643
299.00	0.32	24.87	299.00	1.25	-0.31	1,307,333.86	3,239,855.31	40.173840	-104.641642
399.00	0.10	347.91	399.00	1.59	-0.21	1,307,334.20	3,239,855.41	40.173841	-104.641642
499.00	0.06	55.69	499.00	1.70	-0.19	1,307,334.32	3,239,855.43	40.173842	-104.641642
599.00	0.38	348.80	598.99	2.06	-0.21	1,307,334.67	3,239,855.41	40.173843	-104.641642
699.00	0.38	327.55	698.99	2.66	-0.45	1,307,335.28	3,239,855.16	40.173844	-104.641643
799.00	0.23	268.95	798.99	2.94	-0.83	1,307,335.55	3,239,854.78	40.173845	-104.641644
819.00	0.32	265.95	818.99	2.93	-0.92	1,307,335.54	3,239,854.68	40.173845	-104.641645
<b>TIE ON</b>									

# Anadarko Petroleum Corp

## Survey Report - Geographic

<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well CANNON 16N-E3HZ
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>TVD Reference:</b>	25' RKB + 4840' GL @ 4865.00ft
<b>Site:</b>	WELD_CANNON 26-3HZ PAD	<b>MD Reference:</b>	25' RKB + 4840' GL @ 4865.00ft
<b>Well:</b>	CANNON 16N-E3HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	CANNON 16N-E3HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	CANNON 16N-E3HZ	<b>Database:</b>	edmp

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
857.00	0.35	171.12	856.99	2.81	-1.01	1,307,335.42	3,239,854.60	40.173845	-104.641645
<b>FIRST MWD SURVEY</b>									
948.00	0.51	159.03	947.99	2.16	-0.82	1,307,334.77	3,239,854.79	40.173843	-104.641644
1,038.00	1.91	318.73	1,037.98	2.91	-1.67	1,307,335.51	3,239,853.94	40.173845	-104.641647
1,129.00	5.05	329.25	1,128.80	7.49	-4.72	1,307,340.07	3,239,850.85	40.173858	-104.641658
1,219.00	6.63	326.63	1,218.33	15.24	-9.60	1,307,347.76	3,239,845.89	40.173879	-104.641676
1,312.00	7.88	318.17	1,310.58	24.47	-16.81	1,307,356.93	3,239,838.59	40.173904	-104.641701
1,405.00	9.22	306.93	1,402.56	33.70	-27.02	1,307,366.06	3,239,828.30	40.173930	-104.641738
1,500.00	9.14	307.43	1,496.34	42.86	-39.09	1,307,375.10	3,239,816.13	40.173955	-104.641781
1,595.00	9.36	298.41	1,590.11	51.12	-51.88	1,307,383.24	3,239,803.27	40.173977	-104.641827
1,690.00	8.95	294.95	1,683.90	57.91	-65.37	1,307,389.90	3,239,789.71	40.173996	-104.641875
1,785.00	8.68	290.75	1,777.78	63.57	-78.78	1,307,395.42	3,239,776.25	40.174012	-104.641923
1,880.00	8.42	295.31	1,871.72	69.08	-91.77	1,307,400.81	3,239,763.20	40.174027	-104.641970
1,974.00	7.89	303.02	1,964.78	75.54	-103.40	1,307,407.16	3,239,751.51	40.174044	-104.642011
2,069.00	7.44	298.70	2,058.93	82.05	-114.26	1,307,413.56	3,239,740.58	40.174062	-104.642050
2,164.00	7.29	309.30	2,153.15	88.82	-124.32	1,307,420.23	3,239,730.46	40.174081	-104.642086
2,259.00	6.94	310.37	2,247.42	96.36	-133.36	1,307,427.68	3,239,721.35	40.174102	-104.642119
2,354.00	6.29	310.35	2,341.78	103.44	-141.70	1,307,434.69	3,239,712.94	40.174121	-104.642148
2,448.00	7.25	306.45	2,435.13	110.30	-150.40	1,307,441.46	3,239,704.18	40.174140	-104.642179
2,544.00	7.03	304.62	2,530.38	117.24	-160.10	1,307,448.30	3,239,694.41	40.174159	-104.642214
2,638.00	6.24	302.31	2,623.75	123.24	-169.15	1,307,454.21	3,239,685.30	40.174175	-104.642247
2,733.00	9.18	309.04	2,717.88	130.77	-179.41	1,307,461.65	3,239,674.98	40.174196	-104.642283
2,828.00	9.64	308.36	2,811.60	140.48	-191.53	1,307,471.24	3,239,662.76	40.174223	-104.642327
2,923.00	9.37	309.80	2,905.30	150.37	-203.71	1,307,481.01	3,239,650.48	40.174250	-104.642370
3,017.00	8.88	311.94	2,998.11	160.11	-214.98	1,307,490.64	3,239,639.12	40.174277	-104.642411
3,112.00	8.17	312.36	3,092.06	169.56	-225.43	1,307,499.99	3,239,628.58	40.174303	-104.642448
3,207.00	7.24	312.64	3,186.20	178.17	-234.82	1,307,508.50	3,239,619.11	40.174326	-104.642482
3,302.00	6.18	313.63	3,280.55	185.75	-242.92	1,307,516.01	3,239,610.93	40.174347	-104.642511
3,397.00	6.66	304.14	3,374.96	192.37	-251.18	1,307,522.55	3,239,602.60	40.174365	-104.642540
3,493.00	5.98	298.93	3,470.37	197.91	-260.17	1,307,528.00	3,239,593.57	40.174380	-104.642572
3,587.00	8.64	304.10	3,563.60	204.24	-270.30	1,307,534.23	3,239,583.37	40.174398	-104.642609
3,682.00	8.11	303.29	3,657.59	211.92	-281.81	1,307,541.80	3,239,571.79	40.174419	-104.642650
3,776.00	4.60	304.94	3,751.00	217.72	-290.45	1,307,547.52	3,239,563.10	40.174435	-104.642681
3,872.00	4.11	302.91	3,846.72	221.80	-296.49	1,307,551.53	3,239,557.01	40.174446	-104.642702
3,966.00	2.39	296.62	3,940.56	224.50	-301.07	1,307,554.20	3,239,552.41	40.174453	-104.642719
4,061.00	0.22	133.65	4,035.54	225.27	-302.71	1,307,554.94	3,239,550.76	40.174455	-104.642725
4,156.00	0.47	151.01	4,130.54	224.80	-302.39	1,307,554.48	3,239,551.09	40.174454	-104.642723
4,250.00	0.50	160.39	4,224.53	224.08	-302.07	1,307,553.76	3,239,551.42	40.174452	-104.642722
4,345.00	0.25	176.70	4,319.53	223.48	-301.91	1,307,553.16	3,239,551.58	40.174451	-104.642722
4,440.00	0.35	335.08	4,414.53	223.53	-302.02	1,307,553.22	3,239,551.46	40.174451	-104.642722
4,535.00	0.82	334.21	4,509.53	224.41	-302.44	1,307,554.09	3,239,551.04	40.174453	-104.642724
4,629.00	0.97	328.70	4,603.51	225.69	-303.15	1,307,555.37	3,239,550.32	40.174457	-104.642726
4,724.00	1.07	307.71	4,698.50	226.92	-304.27	1,307,556.59	3,239,549.19	40.174460	-104.642730
4,818.00	1.05	286.65	4,792.48	227.71	-305.79	1,307,557.36	3,239,547.66	40.174462	-104.642736
4,913.00	1.33	291.04	4,887.46	228.35	-307.65	1,307,557.98	3,239,545.79	40.174464	-104.642742
5,008.00	0.36	317.07	4,982.45	228.97	-308.88	1,307,558.59	3,239,544.55	40.174466	-104.642747
5,103.00	0.70	321.83	5,077.45	229.64	-309.44	1,307,559.25	3,239,543.99	40.174467	-104.642749
5,198.00	0.90	308.59	5,172.44	230.56	-310.39	1,307,560.17	3,239,543.03	40.174470	-104.642752
5,292.00	1.38	127.21	5,266.43	230.34	-310.06	1,307,559.95	3,239,543.36	40.174469	-104.642751
5,387.00	1.58	140.57	5,361.40	228.64	-308.32	1,307,558.26	3,239,545.12	40.174465	-104.642745
5,481.00	0.97	134.56	5,455.38	227.08	-306.93	1,307,556.71	3,239,546.53	40.174460	-104.642740
5,576.00	0.77	131.78	5,550.37	226.09	-305.88	1,307,555.73	3,239,547.58	40.174458	-104.642736
5,672.00	0.70	144.34	5,646.36	225.18	-305.06	1,307,554.84	3,239,548.42	40.174455	-104.642733
5,767.00	1.55	200.29	5,741.34	223.50	-305.16	1,307,553.16	3,239,548.32	40.174451	-104.642733
5,863.00	0.72	172.11	5,837.32	221.69	-305.53	1,307,551.34	3,239,547.97	40.174446	-104.642735

# Anadarko Petroleum Corp

## Survey Report - Geographic

<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well CANNON 16N-E3HZ
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>TVD Reference:</b>	25' RKB + 4840' GL @ 4865.00ft
<b>Site:</b>	WELD_CANNON 26-3HZ PAD	<b>MD Reference:</b>	25' RKB + 4840' GL @ 4865.00ft
<b>Well:</b>	CANNON 16N-E3HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	CANNON 16N-E3HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	CANNON 16N-E3HZ	<b>Database:</b>	edmp

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,957.00	0.78	181.61	5,931.31	220.46	-305.47	1,307,550.12	3,239,548.05	40.174442	-104.642734
6,052.00	1.15	186.22	6,026.30	218.87	-305.59	1,307,548.52	3,239,547.94	40.174438	-104.642735
6,147.00	0.25	208.86	6,121.29	217.74	-305.79	1,307,547.39	3,239,547.75	40.174435	-104.642736
6,204.00	0.53	193.62	6,178.29	217.38	-305.92	1,307,547.02	3,239,547.63	40.174434	-104.642736
6,242.00	0.85	190.24	6,216.29	216.93	-306.01	1,307,546.57	3,239,547.55	40.174433	-104.642736
6,273.00	3.84	177.97	6,247.26	215.66	-306.01	1,307,545.31	3,239,547.55	40.174429	-104.642736
6,305.00	7.81	171.40	6,279.09	212.44	-305.65	1,307,542.09	3,239,547.95	40.174420	-104.642735
6,336.00	11.90	169.72	6,309.62	207.21	-304.76	1,307,536.87	3,239,548.88	40.174406	-104.642732
6,368.00	15.51	172.66	6,340.71	199.72	-303.63	1,307,529.39	3,239,550.09	40.174385	-104.642728
6,400.00	18.10	173.75	6,371.34	190.53	-302.54	1,307,520.21	3,239,551.27	40.174360	-104.642724
6,431.00	19.55	175.35	6,400.68	180.58	-301.59	1,307,510.27	3,239,552.31	40.174333	-104.642721
6,463.00	19.50	176.05	6,430.84	169.91	-300.79	1,307,499.61	3,239,553.22	40.174303	-104.642718
6,494.00	19.11	178.96	6,460.10	159.68	-300.34	1,307,489.38	3,239,553.76	40.174275	-104.642716
6,526.00	19.09	182.00	6,490.34	149.21	-300.43	1,307,478.91	3,239,553.78	40.174247	-104.642716
6,558.00	20.84	182.35	6,520.41	138.29	-300.85	1,307,467.99	3,239,553.47	40.174217	-104.642718
6,589.00	24.31	181.12	6,549.03	126.40	-301.20	1,307,456.10	3,239,553.23	40.174184	-104.642719
6,621.00	26.97	179.37	6,577.88	112.55	-301.25	1,307,442.25	3,239,553.32	40.174146	-104.642719
6,653.00	28.36	177.05	6,606.22	97.71	-300.78	1,307,427.41	3,239,553.93	40.174105	-104.642718
6,685.00	31.10	176.99	6,634.01	81.86	-299.95	1,307,411.57	3,239,554.91	40.174062	-104.642715
6,717.00	34.64	176.77	6,660.88	64.52	-299.00	1,307,394.24	3,239,556.02	40.174014	-104.642711
6,748.00	37.82	178.35	6,685.88	46.22	-298.23	1,307,375.95	3,239,556.97	40.173964	-104.642709
6,780.00	41.64	179.43	6,710.49	25.77	-297.85	1,307,355.51	3,239,557.56	40.173908	-104.642707
6,811.00	44.48	181.44	6,733.14	4.61	-298.02	1,307,334.35	3,239,557.59	40.173850	-104.642708
6,843.00	46.99	181.10	6,755.47	-18.29	-298.52	1,307,311.44	3,239,557.31	40.173787	-104.642710
6,874.00	49.62	180.46	6,776.09	-41.44	-298.83	1,307,288.29	3,239,557.22	40.173723	-104.642711
6,906.00	53.19	180.33	6,796.05	-66.44	-299.01	1,307,263.28	3,239,557.29	40.173655	-104.642711
6,938.00	56.43	179.37	6,814.49	-92.59	-298.93	1,307,237.14	3,239,557.62	40.173583	-104.642711
6,969.00	57.87	177.70	6,831.30	-118.62	-298.26	1,307,211.11	3,239,558.54	40.173511	-104.642709
7,001.00	60.21	177.46	6,847.76	-146.04	-297.11	1,307,183.71	3,239,559.96	40.173436	-104.642704
7,032.00	63.47	178.41	6,862.39	-173.35	-296.12	1,307,156.41	3,239,561.21	40.173361	-104.642701
7,064.00	67.60	178.75	6,875.64	-202.46	-295.40	1,307,127.31	3,239,562.21	40.173281	-104.642698
7,096.00	71.43	178.87	6,886.84	-232.42	-294.78	1,307,097.35	3,239,563.12	40.173199	-104.642696
7,127.00	74.78	178.98	6,895.85	-262.07	-294.23	1,307,067.71	3,239,563.96	40.173118	-104.642694
7,159.00	77.87	179.48	6,903.41	-293.16	-293.81	1,307,036.63	3,239,564.68	40.173032	-104.642693
7,190.00	80.31	180.32	6,909.28	-323.60	-293.76	1,307,006.19	3,239,565.03	40.172949	-104.642692
7,222.00	82.01	180.66	6,914.19	-355.22	-294.03	1,306,974.57	3,239,565.06	40.172862	-104.642693
7,242.00	83.34	180.86	6,916.74	-375.05	-294.29	1,306,954.74	3,239,564.99	40.172807	-104.642694
7,343.00	89.75	182.43	6,922.83	-475.77	-297.19	1,306,854.00	3,239,563.07	40.172531	-104.642705
7,438.00	89.29	182.15	6,923.62	-570.69	-300.98	1,306,759.04	3,239,560.19	40.172270	-104.642718
7,533.00	89.74	181.97	6,924.43	-665.62	-304.40	1,306,664.08	3,239,557.70	40.172010	-104.642731
7,627.00	90.26	185.50	6,924.43	-759.41	-310.52	1,306,570.24	3,239,552.48	40.171752	-104.642752
7,722.00	90.88	186.03	6,923.48	-853.92	-320.06	1,306,475.64	3,239,543.86	40.171493	-104.642787
7,817.00	91.05	185.33	6,921.88	-948.44	-329.46	1,306,381.03	3,239,535.37	40.171233	-104.642820
7,912.00	90.79	181.62	6,920.36	-1,043.24	-335.22	1,306,286.18	3,239,530.53	40.170973	-104.642841
8,006.00	90.00	179.18	6,919.71	-1,137.23	-335.88	1,306,192.20	3,239,530.79	40.170715	-104.642843
8,101.00	90.86	179.25	6,919.00	-1,232.22	-334.57	1,306,097.23	3,239,533.01	40.170454	-104.642839
8,196.00	90.79	178.44	6,917.63	-1,327.19	-332.66	1,306,002.28	3,239,535.84	40.170194	-104.642832
8,291.00	90.71	178.09	6,916.38	-1,422.13	-329.78	1,305,907.36	3,239,539.64	40.169933	-104.642821
8,386.00	89.08	177.15	6,916.56	-1,517.05	-325.84	1,305,812.49	3,239,544.50	40.169673	-104.642807
8,481.00	88.83	177.50	6,918.29	-1,611.93	-321.41	1,305,717.66	3,239,549.85	40.169412	-104.642791
8,576.00	88.50	176.51	6,920.51	-1,706.77	-316.44	1,305,622.87	3,239,555.73	40.169152	-104.642774
8,672.00	87.71	176.53	6,923.68	-1,802.54	-310.62	1,305,527.16	3,239,562.48	40.168889	-104.642753
8,767.00	88.46	178.20	6,926.85	-1,897.38	-306.25	1,305,432.36	3,239,567.76	40.168628	-104.642737
8,862.00	88.85	178.09	6,929.08	-1,992.31	-303.18	1,305,337.47	3,239,571.76	40.168368	-104.642726
8,956.00	90.31	179.19	6,929.77	-2,086.27	-300.95	1,305,243.53	3,239,574.90	40.168110	-104.642718

# Anadarko Petroleum Corp

## Survey Report - Geographic

<b>Company:</b>	US ROCKIES REGION PLANNING	<b>Local Co-ordinate Reference:</b>	Well CANNON 16N-E3HZ
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>TVD Reference:</b>	25' RKB + 4840' GL @ 4865.00ft
<b>Site:</b>	WELD_CANNON 26-3HZ PAD	<b>MD Reference:</b>	25' RKB + 4840' GL @ 4865.00ft
<b>Well:</b>	CANNON 16N-E3HZ	<b>North Reference:</b>	True
<b>Wellbore:</b>	CANNON 16N-E3HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	CANNON 16N-E3HZ	<b>Database:</b>	edmp

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,052.00	90.49	179.29	6,929.10	-2,182.26	-299.68	1,305,147.56	3,239,577.10	40.167846	-104.642714
9,146.00	90.12	178.72	6,928.60	-2,276.25	-298.04	1,305,053.60	3,239,579.64	40.167588	-104.642708
9,241.00	89.75	180.56	6,928.71	-2,371.24	-297.45	1,304,958.61	3,239,581.16	40.167328	-104.642706
9,336.00	92.28	181.71	6,927.03	-2,466.20	-299.33	1,304,863.64	3,239,580.20	40.167067	-104.642712
9,431.00	91.48	181.27	6,923.91	-2,561.11	-301.80	1,304,768.71	3,239,578.65	40.166806	-104.642721
9,526.00	89.38	180.56	6,923.20	-2,656.09	-303.31	1,304,673.72	3,239,578.05	40.166546	-104.642727
9,621.00	91.11	180.70	6,922.79	-2,751.08	-304.36	1,304,578.72	3,239,577.92	40.166285	-104.642730
9,716.00	90.68	179.68	6,921.31	-2,846.07	-304.67	1,304,483.74	3,239,578.53	40.166024	-104.642731
9,810.00	92.16	180.59	6,918.98	-2,940.04	-304.89	1,304,389.77	3,239,579.22	40.165766	-104.642732
9,906.00	91.60	180.04	6,915.83	-3,035.98	-305.42	1,304,293.83	3,239,579.62	40.165503	-104.642734
10,000.00	91.11	180.73	6,913.61	-3,129.95	-306.05	1,304,199.86	3,239,579.90	40.165245	-104.642736
10,095.00	90.18	180.20	6,912.54	-3,224.94	-306.82	1,304,104.86	3,239,580.04	40.164984	-104.642739
10,191.00	91.17	180.06	6,911.41	-3,320.93	-307.04	1,304,008.87	3,239,580.76	40.164721	-104.642740
10,286.00	90.92	179.65	6,909.67	-3,415.92	-306.80	1,303,913.90	3,239,581.92	40.164460	-104.642739
10,381.00	90.80	179.43	6,908.25	-3,510.90	-306.04	1,303,818.92	3,239,583.60	40.164199	-104.642736
10,476.00	90.74	179.64	6,906.97	-3,605.89	-305.27	1,303,723.95	3,239,585.29	40.163938	-104.642734
10,571.00	90.49	179.48	6,905.95	-3,700.88	-304.54	1,303,628.97	3,239,586.94	40.163678	-104.642731
10,666.00	90.68	179.06	6,904.98	-3,795.87	-303.33	1,303,534.00	3,239,589.07	40.163417	-104.642727
10,761.00	90.37	179.27	6,904.11	-3,890.86	-301.94	1,303,439.03	3,239,591.37	40.163156	-104.642722
10,855.00	90.37	179.90	6,903.50	-3,984.85	-301.26	1,303,345.04	3,239,592.96	40.162898	-104.642719
10,950.00	90.37	179.84	6,902.89	-4,079.85	-301.05	1,303,250.05	3,239,594.10	40.162637	-104.642718
11,046.00	90.00	179.60	6,902.58	-4,175.85	-300.58	1,303,154.06	3,239,595.49	40.162374	-104.642717
11,141.00	87.90	178.43	6,904.32	-4,270.81	-298.95	1,303,059.12	3,239,598.05	40.162113	-104.642711
11,195.00	89.20	180.31	6,905.69	-4,324.79	-298.35	1,303,005.15	3,239,599.16	40.161965	-104.642709
LAST MWD SURVEY									
11,250.00	90.52	182.22	6,905.82	-4,379.77	-299.57	1,302,950.16	3,239,598.48	40.161814	-104.642713
PROJECTION TO TD									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
819.00	818.99	2.93	-0.92	TIE ON
857.00	856.99	2.81	-1.01	FIRST MWD SURVEY
11,195.00	6,905.69	-4,324.79	-298.35	LAST MWD SURVEY
11,250.00	6,905.82	-4,379.77	-299.57	PROJECTION TO TD

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_



# DAILY ACTIVITY

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**Weatherford®**

# Daily Activity Report

Drilling Services  
v4.2.2674

Day 1 - 2012/08/26

FILE #: 4027075

WELL NAME: Cannon 16N-E3HZ

SERVICE CO.: Weatherford Drilling Services

JOB TYPE: Horizontal

COMPANY: Anadarko Petroleum Corporation

SURVEY TYPE: HEL LWD

RIG &amp; NO: Helmerich &amp; Payne 307

SURFACE LOCATION: Weld County

FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry

MWD Supervisor: Rusty Komrs

Other: Cory Langford

MWD Trainee: James Asher

GROUND ELEV: 4840 ft

START DEPTH: 852.0 ft

PROGRESS: 1654.0 ft

DAILY COST: USD\$22927.50

KB ELEV: 4865 ft

END DEPTH: 2506.0 ft

AVG. ROP.: 206.8 ft/hr

PREVIOUS COST: USD\$0.00

TOTAL COST: USD\$22927.50

WORK STATUS: Operating

(All units are imperial.)

TIME	DAILY ACTIVITY	HRS	DPTH	BHA	TIME	DAILY ACTIVITY	HRS	DPTH	BHA
00:00-03:40	Wait On Orders	3.67	819	n/a	18:10-18:15	Circ & Accumulate Surveys	0.08	1558	2
03:40-04:40	Handle Directional Tools	1.00	819	1	18:15-18:20	Rotating With Motor	0.08	1568	2
04:40-05:10	Rig Service - change st80 dies	0.50	819	1	18:20-18:25	Work On MWD - Restart computer	0.08	1568	2
05:10-06:15	Handle Directional Tools	1.08	852	1	18:25-18:30	Orienting With Motor	0.08	1573	2
06:15-07:45	RIH	1.50	852	1	18:30-18:45	Rotating With Motor	0.25	1653	2
07:45-08:00	Drill Out Flt, Shoe & Cmmt - Drill CMT	0.25	852	1	18:45-18:50	Circ & Accumulate Surveys	0.08	1653	2
08:00-08:50	Rotating With Motor	0.83	915	1	18:50-19:05	Rotating With Motor	0.25	1748	2
08:50-08:55	Circ & Accumulate Surveys	0.08	915	1	19:05-19:10	Circ & Accumulate Surveys	0.08	1748	2
08:55-09:20	Rotating With Motor	0.42	1006	1	19:10-19:30	Rotating With Motor	0.33	1843	2
09:20-09:25	Circ & Accumulate Surveys	0.08	1006	1	19:30-19:35	Circ & Accumulate Surveys	0.08	1843	2
09:25-10:00	Rotating With Motor	0.58	1017	1	19:35-19:40	Rotating With Motor	0.08	1853	2
10:00-10:50	Circ & Condition Hole	0.83	1017	1	19:40-19:45	Orienting With Motor	0.08	1859	2
10:50-12:00	POOH For Motor	1.17	1017	1	19:45-20:00	Rotating With Motor	0.25	1938	2
12:00-13:00	Change Motor	1.00	1017	1	20:00-20:05	Circ & Accumulate Surveys	0.08	1938	2
13:00-14:20	RIH	1.33	1017	2	20:05-20:10	Rotating With Motor	0.08	1948	2
14:20-14:25	Orienting With Motor	0.08	1032	2	20:10-20:15	Orienting With Motor	0.08	1958	2
14:25-14:40	Rotating With Motor	0.25	1096	2	20:15-20:35	Rotating With Motor	0.33	2032	2
14:40-14:45	Circ & Accumulate Surveys	0.08	1096	2	20:35-20:40	Circ & Accumulate Surveys	0.08	2032	2
14:45-14:50	Orienting With Motor	0.08	1111	2	20:40-20:55	Rotating With Motor	0.25	2127	2
14:50-15:05	Rotating With Motor	0.25	1187	2	20:55-21:00	Circ & Accumulate Surveys	0.08	2127	2
15:05-15:10	Circ & Accumulate Surveys	0.08	1187	2	21:00-21:05	Rotating With Motor	0.08	2137	2
15:10-15:15	Orienting With Motor	0.08	1197	2	21:05-21:15	Orienting With Motor	0.17	2147	2
15:15-15:30	Rotating With Motor	0.25	1277	2	21:15-21:20	BOP Drill	0.08	2147	2
15:30-15:35	Circ & Accumulate Surveys	0.08	1277	2	21:20-21:35	Rotating With Motor	0.25	2222	2
15:35-15:40	Orienting With Motor	0.08	1287	2	21:35-21:40	Circ & Accumulate Surveys	0.08	2222	2
15:40-15:50	Rotating With Motor	0.17	1338	2	21:40-22:10	Rotating With Motor	0.50	2317	2
15:50-16:15	Circulating - See Comments - Pump Sweep	0.42	1338	2	22:10-22:15	Circ & Accumulate Surveys	0.08	2317	2
16:15-17:15	Rig Service - Change Saver Sub	1.00	1338	2	22:15-22:45	Rotating With Motor	0.50	2412	2
17:15-17:30	Rotating With Motor	0.25	1370	2	22:45-22:50	Circ & Accumulate Surveys	0.08	2412	2
17:30-17:35	Circ & Accumulate Surveys	0.08	1370	2	22:50-23:00	Rotating With Motor	0.17	2422	2
17:35-17:37	Orienting With Motor	0.03	1378	2	23:00-23:05	Orienting With Motor	0.08	2432	2
17:37-17:50	Rotating With Motor	0.22	1463	2	23:05-23:20	Rotating With Motor	0.25	2506	2
17:50-17:55	Circ & Accumulate Surveys	0.08	1463	2	23:20-24:00	Rig Service	0.67	2506	2
17:55-18:10	Rotating With Motor	0.25	1558	2			0.00		

**Weatherford®**

# Daily Activity Report

Drilling Services

v4.2.2674

Day 1 - 2012/08/26

TIME SUMMARY (hrs):				DRILLING PARAMETERS:			
MOTOR DRILL:	8.00	ORIENTING HRS:	0.00	ROTARY DRILL:	0.00	ROTARY TORQUE:	5000 ft-lb
TIME DRILL:	0.00	ROTATING HRS:	1.83	MOTOR HRS:	10.92	WOB SLIDING (HI):	10000 lbf
MOTOR REAM:	0.00			TRIP:	4.00	WOB SLIDING (LO):	5000 lbf
CIRC:	2.92	ROTARY DRILL:	0.00	OTHER:	9.08	RPM (ROTARY):	55 rpm
MOTOR HRS:	10.92	DRILL HRS:	8.00	TOTAL HRS:	24.00	RPM (MOTOR):	287 rpm
						STRING WEIGHT	96000 lbs
						WOB ROTATE (HI):	35000 lbf
						WOB ROTATE (LO):	30000 lbf
						DRAG UP:	99000 lbf
						DRAG DN:	94000 lbf

**BHA / MOTOR / BIT INFORMATION:**

**BHA:** 1      **HOLE SIZE:** 8.75 in      **SECTION TYPE:** Build & Hold      **SURVEY TYPE:** Positive Pulse MWD  
**MANFCT.:** Weatherford      **STABILIZER:** No      **SERIAL#:** 675-43581      **MODEL:** ME4570      **LOBE CFG.:** 4/5  
**SETTING:** 1.81 °      **KICKPAD:** No      **SIZE:** 6 3/4" (171mm)      **MTR HRS THIS DAY:** 3.0833333333333333      **MTR HRS TO DATE:** 3.0833333333333333  
**MANFCT:** Hughes      **BIT TYPE:** HUGHES      **TYPE:** DP505F      **NOZZLES:** 0.648 in<sup>2</sup> TFA  
**IADC BIT GRADE:** 1 / 1 / ? / ? / ? / ? / ? / DMF

**BHA:** 2      **HOLE SIZE:** 8.75 in      **SECTION TYPE:** Build & Hold      **SURVEY TYPE:** Positive Pulse MWD  
**MANFCT.:** Weatherford      **STABILIZER:** No      **SERIAL#:** 675-43582      **MODEL:** QME4570      **LOBE CFG.:** 4/5  
**SETTING:** 1.81 °      **KICKPAD:** No      **SIZE:** 6 3/4" (171mm)      **MTR HRS THIS DAY:** 7.8333333333333333      **MTR HRS TO DATE:** 7.8333333333333333  
**MANFCT:** Hughes      **BIT TYPE:** HUGHES      **TYPE:** DP505F      **NOZZLES:** 0.648 in<sup>2</sup> TFA  
**IADC BIT GRADE:** ? / ? / ? / ? / ? / ? / ? / ?

**PUMP PARAMETERS**

**PRESSURE ON BTM:** 1700      **PRESSURE OFF BTM:** 700      **TOTAL FLOW RATE:** 598.00 gal/min  
**PUMP 1:** TYPE: PZ-11      **EFF.:** 95.0%      **SPM:** 78.00      **LINER:** 6.00 in      **STROKE VOL.:** 3.8438 gal/stk  
**PUMP 2:** TYPE: PZ-11      **EFF.:** 95.0%      **SPM:** 78.00      **LINER:** 6.00 in      **STROKE VOL.:** 3.8438 gal/stk  
**PUMP 3:** TYPE:      **EFF.:** 100.0%      **SPM:** 0.00      **LINER:** 0.00 in      **STROKE VOL.:** 0.0000 gal/stk

**MUD RECORD**

**MUD TYPE:** Water      **VISC:** 28 sec/qt      **WTR LOSS:** 28 cc/30min      **PV:** 2 cP      **YP:** 3 lb/100 ft<sup>2</sup>      **pH:** 7.9  
**DENSITY:** 8.45 lb/gal      **GEL 0/10:** 0.00 lb/100 ft<sup>2</sup>      **SAND:** 0.01      **SOLIDS:** 0.7      **OIL:** 0      **TEMP:** 125 °F  
**LIQUID BASE:** Water      **LIQUID RATE:** 0 gal/min      **GAS TYPE:**      **GAS RATE:** 0 cu ft/min

**COMMENTS:**

Drill Ahead F/ 852' -2602'

Nipple up / Test BOP's/ Rig service/ Change quill out for 4 1/2 HWDP.

Note. When the surface rig was drilling surface they thought they had dropped a fish downhole. They P/U a milltooth bit and drilled Flt equipment and to check for fish. Nothing was found. They plugged the hole back with CMT so we could get our casing test.

Drill CMT Only.

While spudding this well we were not getting ROP expected in rotation and had no Diff. pressure while drilling. Also, we were running more WOB than usual in this section of the well. WOB exceeded 35K to try to achieve desired ROP but it was never accomplished. While sliding I could not even drill a foot. WOB would immediately stack out and I had everything but the blocks on it. WOB exceeded 35K while sliding and on similar wells in the area at this depth of 1,000' I normally would slide with 5K WOB.

POOH to check BHA

We wanted to double check to make sure we didn't tear this bit up it there is a fish downhole. Also Take a good look at the motor to make sure it is in operational condition.

WFT Motor 4570 SN (675-43581) FAILED! This motor had a total of 3.08 hours on it. This motor was locked up from the very beginning. Once on surface I pumped through it to double check and the bit box would not turn. We were running 600 gpm through this Motor and it was verified we could do so through upper managment.

**CUSTOMER SIGNATURE:**

**Weatherford®**

# Daily Activity Report

Drilling Services  
v4.2.2674

Day 2 - 2012/08/27

FILE #: 4027075

WELL NAME: Cannon 16N-E3HZ

SERVICE CO.: Weatherford Drilling Services

JOB TYPE: Horizontal

COMPANY: Anadarko Petroleum Corporation

SURVEY TYPE: HEL LWD

RIG &amp; NO: Helmerich &amp; Payne 307

SURFACE LOCATION: Weld County

FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry

MWD Supervisor: Rusty Komrs

Other: Cory Langford

MWD Trainee: James Asher

GROUND ELEV: 4840 ft

START DEPTH: 2506.0 ft

PROGRESS: 2087.0 ft

DAILY COST: USD\$19507.50

KB ELEV: 4865 ft

END DEPTH: 4593.0 ft

AVG. ROP.: 147.3 ft/hr

PREVIOUS COST: USD\$22927.50

TOTAL COST: USD\$42435.00

WORK STATUS: Operating

(All units are imperial.)

TIME	DAILY ACTIVITY	HRS	DPTH	BHA	TIME	DAILY ACTIVITY	HRS	DPTH	BHA
00:00-00:10	Rig Service	0.17	2506	2	07:45-08:30	Rotating With Motor	0.75	3740	2
00:10-00:15	Circ & Accumulate Surveys	0.08	2506	2	08:30-08:35	Circ & Accumulate Surveys	0.08	3740	2
00:15-00:45	Rotating With Motor	0.50	2602	2	08:35-08:45	Orienting With Motor	0.17	3752	2
00:45-00:50	Circ & Accumulate Surveys	0.08	2602	2	08:45-09:15	Rotating With Motor	0.50	3834	2
00:50-01:20	Rotating With Motor	0.50	2696	2	09:15-09:20	Circ & Accumulate Surveys	0.08	3834	2
01:20-01:25	Circ & Accumulate Surveys	0.08	2696	2	09:20-10:10	Rotating With Motor	0.83	3930	2
01:25-01:30	Rotating With Motor	0.08	2701	2	10:10-10:15	Circ & Accumulate Surveys	0.08	3930	2
01:30-01:45	Orienting With Motor	0.25	2726	2	10:15-10:25	Orienting With Motor	0.17	3940	2
01:45-02:05	Rotating With Motor	0.33	2791	2	10:25-11:10	Rotating With Motor	0.75	4024	2
02:05-02:10	Circ & Accumulate Surveys	0.08	2791	2	11:10-11:15	Circ & Accumulate Surveys	0.08	4024	2
02:10-02:30	Rotating With Motor	0.33	2886	2	11:15-11:25	Orienting With Motor	0.17	4038	2
02:30-02:35	Circ & Accumulate Surveys	0.08	2886	2	11:25-12:10	Rotating With Motor	0.75	4119	2
02:35-02:50	Rotating With Motor	0.25	2981	2	12:10-12:15	Circ & Accumulate Surveys	0.08	4119	2
02:50-02:55	Circ & Accumulate Surveys	0.08	2981	2	12:15-12:45	Rotating With Motor	0.50	4214	2
02:55-03:15	Rotating With Motor	0.33	3075	2	12:45-12:50	Circ & Accumulate Surveys	0.08	4214	2
03:15-03:20	Circ & Accumulate Surveys	0.08	3075	2	12:50-13:35	Rotating With Motor	0.75	4308	2
03:20-03:40	Rotating With Motor	0.33	3170	2	13:35-13:40	Circ & Accumulate Surveys	0.08	4308	2
03:40-03:45	Circ & Accumulate Surveys	0.08	3170	2	13:40-15:00	Rotating With Motor	1.33	4403	2
03:45-04:25	Rotating With Motor	0.67	3265	2	15:00-15:05	Circ & Accumulate Surveys	0.08	4403	2
04:25-04:30	Circ & Accumulate Surveys	0.08	3265	2	15:05-15:30	Rotating With Motor	0.42	4418	2
04:30-05:00	Rotating With Motor	0.50	3360	2	15:30-16:20	Circ & Condition Hole	0.83	4418	2
05:00-05:05	Circ & Accumulate Surveys	0.08	3360	2	16:20-18:40	POOH For Motor	2.33	4418	2
05:05-05:15	Rotating With Motor	0.17	3370	2	18:40-19:35	Change Motor	0.92	4418	2
05:15-05:30	Orienting With Motor	0.25	3390	2	19:35-20:00	Undefined - See Comments - get ruber out of bit	0.42	4418	2
05:30-05:55	Rotating With Motor	0.42	3455	2	20:00-20:35	Change Motor	0.58	4418	2
05:55-06:00	Circ & Accumulate Surveys	0.08	3455	2	20:35-23:00	RIH - BHA 3	2.42	4418	2
06:00-06:55	Rotating With Motor	0.92	3551	2	23:00-23:15	Wash To Bottom - f/ 4396-4418	0.25	4418	2
06:55-07:00	Circ & Accumulate Surveys	0.08	3551	2	23:15-23:30	Rotating With Motor	0.25	4498	2
07:00-07:10	Orienting With Motor	0.17	3572	2	23:30-23:35	Circ & Accumulate Surveys	0.08	4498	2
07:10-07:40	Rotating With Motor	0.50	3645	2	23:35-23:55	Rotating With Motor	0.33	4593	2
07:40-07:45	Circ & Accumulate Surveys	0.08	3645	2	23:55-24:00	Circ & Accumulate Surveys	0.08	4593	2

**TIME SUMMARY (hrs):**

MOTOR DRILL: 14.17	ORIENTING HRS: 1.17	ROTARY DRILL: 0.00
TIME DRILL: 0.00	ROTATING HRS: 13.00	MOTOR HRS: 17.17
MOTOR REAM: 0.00		TRIP: 4.75
CIRC: 3.00	ROTARY DRILL: 0.00	OTHER: 2.08
MOTOR HRS: 17.17	DRILL HRS: 14.17	TOTAL HRS: 24.00

**DRILLING PARAMETERS:**

ROTARY TORQUE: 6700 ft-lb	STRING WEIGHT: 108000 lbs
WOB SLIDING (HI): 15000 lbf	WOB ROTATE (HI): 25000 lbf
WOB SLIDING (LO): 5000 lbf	WOB ROTATE (LO): 15000 lbf
RPM (ROTARY): 45 rpm	DRAG UP: 110000 lbf
RPM (MOTOR): 167 rpm	DRAG DN: 106000 lbf

— BHA / MOTOR / BIT INFORMATION: —

**Weatherford®**

# Daily Activity Report

Drilling Services  
v4.2.2674**Day 2 - 2012/08/27**

**BHA:** 2      **HOLE SIZE:** 8.75 in      **SECTION TYPE:** Build & Hold      **SURVEY TYPE:** Positive Pulse MWD  
**MANFCT.:** Weatherford      **STABILIZER:** No      **SERIAL#:** 675-43582      **MODEL:** QME4570      **LOBE CFG.:** 4/5  
**SETTING:** 1.81 °      **KICKPAD:** No      **SIZE:** 6 3/4" (171mm)      **MTR HRS THIS DAY:** 17.16666667      **MTR HRS TO DATE:** 25  
**MANFCT:** Hughes      **BIT TYPE:** HUGHES      **TYPE:** DP505F      **NOZZLES:** 0.648 in² TFA  
**IADC BIT GRADE:** ? / ? / ? / ? / ? / ? / ? / ?

**PUMP PARAMETERS**

<b>PRESSURE ON BTM:</b> 3200		<b>PRESSURE OFF BTM:</b> 2000		<b>TOTAL FLOW RATE:</b> 598.00 gal/min	
<b>PUMP 1:</b>	<b>TYPE:</b> PZ-11	<b>EFF.:</b> 95.0%	<b>SPM:</b> 78.00	<b>LINER:</b> 6.00 in	<b>STROKE VOL.:</b> 3.8438 gal/stk
<b>PUMP 2:</b>	<b>TYPE:</b> PZ-11	<b>EFF.:</b> 95.0%	<b>SPM:</b> 78.00	<b>LINER:</b> 6.00 in	<b>STROKE VOL.:</b> 3.8438 gal/stk
<b>PUMP 3:</b>	<b>TYPE:</b>	<b>EFF.:</b> 100.0%	<b>SPM:</b> 0.00	<b>LINER:</b> 0.00 in	<b>STROKE VOL.:</b> 0.0000 gal/stk

**MUD RECORD**

<b>MUD TYPE:</b> Water	<b>VISC:</b> 26 sec/qt	<b>WTR LOSS:</b> 28 cc/30min	<b>PV:</b> 2 cP	<b>YP:</b> 3 lb/100 ft²	<b>pH:</b> 8.2
<b>DENSITY:</b> 8.4 lb/gal	<b>GEL 0/10:</b> 0.00 lb/100 ft²	<b>SAND:</b> 0.01	<b>SOLIDS:</b> 0.4	<b>OIL:</b> 0	<b>TEMP:</b> 108 °F
<b>LIQUID BASE:</b> Water		<b>LIQUID RATE:</b> 0 gal/min	<b>GAS TYPE:</b>		<b>GAS RATE:</b> 0 cu ft/min

**COMMENTS:**

Drill F/ 2506 to 4418'

Motor failed at 4418'. We experienced chunking of the motor and were getting a lot of stator rubber over the shakers. This was a 1.81 MBTB motor. 600 gpm was ran through it per upper managements request. RPM's ran were 40-50.

POOH For Motor

**CUSTOMER SIGNATURE:**

**Weatherford®**

# Daily Activity Report

Drilling Services  
v4.2.2674**Day 3 - 2012/08/28****FILE #:** 4027075**WELL NAME:** Cannon 16N-E3HZ**SERVICE CO.:** Weatherford Drilling Services**JOB TYPE:** Horizontal**COMPANY:** Anadarko Petroleum Corporation**SURVEY TYPE:** HEL LWD**RIG & NO:** Helmerich & Payne 307**SURFACE LOCATION:** Weld County**FIELD / LOCATION:** Wattenburg / CO / USA**DIR Supervisor:** Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry, Trevor Cunningham**MWD Supervisor:** Rusty Komrs**Other:** Cory Langford**MWD Trainee:** James Asher**GROUND ELEV:** 4840 ft**START DEPTH:** 4593.0 ft**PROGRESS:** 1770.0 ft**DAILY COST:** USD\$21007.50**KB ELEV:** 4865 ft**END DEPTH:** 6363.0 ft**AVG. ROP.:** 134.4 ft/hr**PREVIOUS COST:** USD\$42435.00**TOTAL COST:** USD\$63442.50**WORK STATUS:** Operating*(All units are imperial.)*

TIME	DAILY ACTIVITY	HRS	DPTH	BHA	TIME	DAILY ACTIVITY	HRS	DPTH	BHA
00:00-00:30	Rotating With Motor	0.50	4687	3	08:50-09:15	Rotating With Motor	0.42	5825	3
00:30-01:00	Rig Service - spr	0.50	4687	3	09:15-09:20	Circ & Accumulate Surveys	0.08	5825	3
01:00-01:05	Circ & Accumulate Surveys	0.08	4687	3	09:20-09:40	Orienting With Motor	0.33	5845	3
01:05-01:30	Rotating With Motor	0.42	4782	3	09:40-10:15	Rotating With Motor	0.58	5921	3
01:30-01:35	Circ & Accumulate Surveys	0.08	4782	3	10:15-10:20	Circ & Accumulate Surveys	0.08	5921	3
01:35-02:10	Rotating With Motor	0.58	4876	3	10:20-10:55	Rotating With Motor	0.58	6015	3
02:10-02:15	Circ & Accumulate Surveys	0.08	4876	3	10:55-11:00	Circ & Accumulate Surveys	0.08	6015	3
02:15-02:50	Rotating With Motor	0.58	4971	3	11:00-11:45	Rotating With Motor	0.75	6110	3
02:50-02:55	Circ & Accumulate Surveys	0.08	4971	3	11:45-11:50	Circ & Accumulate Surveys	0.08	6110	3
02:55-03:00	Rotating With Motor	0.08	4976	3	11:50-12:00	Orienting With Motor	0.17	6125	3
03:00-03:55	Orienting With Motor	0.92	4996	3	12:00-12:45	Rotating With Motor	0.75	6205	3
03:55-04:15	Rotating With Motor	0.33	5066	3	12:45-12:50	Circ & Accumulate Surveys	0.08	6205	3
04:15-04:25	Circ & Accumulate Surveys	0.17	5066	3	12:50-13:05	Rotating With Motor	0.25	6262	3
04:25-04:55	Rotating With Motor	0.50	5161	3	13:05-13:10	Circ & Accumulate Surveys	0.08	6262	3
04:55-05:00	Circ & Accumulate Surveys	0.08	5161	3	13:10-14:30	Circ & Condition Hole	1.33	6262	3
05:00-05:30	Rotating With Motor	0.50	5256	3	14:30-17:30	POOH - See Comments	3.00	6262	3
05:30-05:35	Circ & Accumulate Surveys	0.08	5256	3	17:30-18:15	Change Motor	0.75	6262	4
05:35-05:40	Rotating With Motor	0.08	5266	3	18:15-18:50	RIH	0.58	6262	4
05:40-06:05	Orienting With Motor	0.42	5291	3	18:50-19:00	Shallow Test Tools - & Fill pipe	0.17	6262	4
06:05-06:30	Rotating With Motor	0.42	5350	3	19:00-21:25	RIH	2.42	6262	4
06:30-06:35	Circ & Accumulate Surveys	0.08	5350	3	21:25-21:30	Wash To Bottom	0.08	6262	4
06:35-07:00	Rotating With Motor	0.42	5445	3	21:30-21:35	Circ & Accumulate Surveys - check shot	0.08	6262	4
07:00-07:05	Circ & Accumulate Surveys	0.08	5445	3	21:35-22:35	Orienting With Motor	1.00	6300	4
07:05-07:35	Rotating With Motor	0.50	5539	3	22:35-22:45	Circ & Accumulate Surveys	0.17	6300	4
07:35-07:40	Circ & Accumulate Surveys	0.08	5539	3	22:45-23:15	Orienting With Motor	0.50	6331	4
07:40-08:05	Rotating With Motor	0.42	5634	3	23:15-23:20	Circ & Accumulate Surveys	0.08	6331	4
08:05-08:10	Circ & Accumulate Surveys	0.08	5634	3	23:20-23:55	Orienting With Motor	0.58	6363	4
08:10-08:45	Rotating With Motor	0.58	5730	3	23:55-24:00	Circ & Accumulate Surveys	0.08	6363	4
08:45-08:50	Circ & Accumulate Surveys	0.08	5730	3			0.00		

**TIME SUMMARY (hrs):**

<b>MOTOR DRILL:</b> 13.17	<b>ORIENTING HRS:</b> 1.83
<b>TIME DRILL:</b> 0.00	<b>ROTATING HRS:</b> 9.25
<b>MOTOR REAM:</b> 0.00	
<b>CIRC:</b> 3.42	<b>ROTARY DRILL:</b> 0.00
<b>MOTOR HRS:</b> 16.58	<b>DRILL HRS:</b> 13.17

<b>ROTARY DRILL:</b> 0.00	<b>MOTOR HRS:</b> 16.58
<b>TRIP:</b> 6.00	<b>OTHER:</b> 1.42
<b>TOTAL HRS:</b> 24.00	

**DRILLING PARAMETERS:**

<b>ROTARY TORQUE:</b> 6900 ft-lb	<b>STRING WEIGHT</b> 108000 lbs
<b>WOB SLIDING (HI):</b> 10000 lbf	<b>WOB ROTATE (HI):</b> 25000 lbf
<b>WOB SLIDING (LO):</b> 5000 lbf	<b>WOB ROTATE (LO):</b> 15000 lbf
<b>RPM (ROTARY):</b> 50 rpm	<b>DRAG UP:</b> 110000 lbf
<b>RPM (MOTOR):</b> 167 rpm	<b>DRAG DN:</b> 106000 lbf

— **BHA / MOTOR / BIT INFORMATION:** —

**Weatherford®**

# Daily Activity Report

Drilling Services  
v4.2.2674**Day 3 - 2012/08/28**

<b>BHA:</b> 3	<b>HOLE SIZE:</b> 8.75 in	<b>SECTION TYPE:</b> Build & Hold	<b>SURVEY TYPE:</b> Positive Pulse MWD
<b>MANFCT.:</b> Weatherford	<b>STABILIZER:</b> No	<b>SERIAL#:</b> 675-1716	<b>MODEL:</b> QLE7850
<b>SETTING:</b> 1.5 °	<b>KICKPAD:</b> No	<b>SIZE:</b> 6 3/4" (171mm)	<b>LOBE CFG.:</b> 7/8
<b>MANFCT:</b> Hughes	<b>BIT TYPE:</b> HUGHES	<b>TYPE:</b> DP505F	<b>MTR HRS THIS DAY:</b> 14
<b>IADC BIT GRADE:</b> ? / ? / ? / ? / ? / ? / ? / TD			<b>MTR HRS TO DATE:</b> 14
			<b>NOZZLES:</b> 0.648 in <sup>2</sup> TFA

<b>BHA:</b> 4	<b>HOLE SIZE:</b> 8.75 in	<b>SECTION TYPE:</b> Curve	<b>SURVEY TYPE:</b> Positive Pulse MWD
<b>MANFCT.:</b> Weatherford	<b>STABILIZER:</b> No	<b>SERIAL#:</b> 675-4019	<b>MODEL:</b> ME6770
<b>SETTING:</b> 2.38 °	<b>KICKPAD:</b> No	<b>SIZE:</b> 6 3/4" (171mm)	<b>LOBE CFG.:</b> 7/8
<b>MANFCT:</b> Hughes	<b>BIT TYPE:</b> HUGHES	<b>TYPE:</b> DP505F	<b>MTR HRS THIS DAY:</b> 2.5833333333333333
<b>IADC BIT GRADE:</b> 1 / 2 / CT / ? / X / I / FC / TD			<b>MTR HRS TO DATE:</b> 2.5833333333333333
			<b>NOZZLES:</b> 0.648 in <sup>2</sup> TFA

**PUMP PARAMETERS**

<b>PRESSURE ON BTM:</b> 2800	<b>PRESSURE OFF BTM:</b> 2200	<b>TOTAL FLOW RATE:</b> 598.00 gal/min
<b>PUMP 1:</b> TYPE: PZ-11	<b>EFF.:</b> 95.0%	<b>SPM:</b> 78.00
<b>PUMP 2:</b> TYPE: PZ-11	<b>EFF.:</b> 95.0%	<b>SPM:</b> 78.00
<b>PUMP 3:</b> TYPE:	<b>EFF.:</b> 100.0%	<b>SPM:</b> 0.00
	<b>LINER:</b> 6.00 in	<b>STROKE VOL.:</b> 3.8438 gal/stk
	<b>LINER:</b> 6.00 in	<b>STROKE VOL.:</b> 3.8438 gal/stk
	<b>LINER:</b> 0.00 in	<b>STROKE VOL.:</b> 0.0000 gal/stk

**MUD RECORD**

<b>MUD TYPE:</b> Water	<b>VISC:</b> 28 sec/qt	<b>WTR LOSS:</b> 28 cc/30min	<b>PV:</b> 2 cP	<b>YP:</b> 3 lb/100 ft <sup>2</sup>	<b>pH:</b> 8.2
<b>DENSITY:</b> 8.4 lb/gal	<b>GEL 0/10:</b> 0.00 lb/100 ft <sup>2</sup>	<b>SAND:</b> 0.01	<b>SOLIDS:</b> 0.4	<b>OIL:</b> 0	<b>TEMP:</b> 108 °F
<b>LIQUID BASE:</b> Water		<b>LIQUID RATE:</b> 0 gal/min	<b>GAS TYPE:</b>		<b>GAS RATE:</b> 0 cu ft/min

**COMMENTS:**

Drill F/ 4593 to 6363'

TD Build, Hold &amp; Drop

POOH to P/U curve assembly.

**CUSTOMER SIGNATURE:**

**Weatherford®**

# Daily Activity Report

**Drilling Services**  
v4.2.2674**Day 4 - 2012/08/29****FILE #:** 4027075**WELL NAME:** Cannon 16N-E3HZ**SERVICE CO.:** Weatherford Drilling Services**JOB TYPE:** Horizontal**COMPANY:** Anadarko Petroleum Corporation**SURVEY TYPE:** HEL LWD**RIG & NO:** Helmerich & Payne 307**SURFACE LOCATION:** Weld County**FIELD / LOCATION:** Wattenburg / CO / USA**DIR Supervisor:** Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry, Trevor Cunningham**MWD Supervisor:** Rusty Komrs**Other:** Cory Langford**MWD Trainee:** James Asher**GROUND ELEV:** 4840 ft**START DEPTH:** 6363.0 ft**PROGRESS:** 897.0 ft**DAILY COST:** USD\$17227.50**KB ELEV:** 4865 ft**END DEPTH:** 7260.0 ft**AVG. ROP.:** 46.2 ft/hr**PREVIOUS COST:** USD\$63442.50**TOTAL COST:** USD\$80670.00**WORK STATUS:** Operating*(All units are imperial.)*

TIME	DAILY ACTIVITY	HRS	DPTH	BHA	TIME	DAILY ACTIVITY	HRS	DPTH	BHA
00:00-00:20	Orienting With Motor	0.33	6387	4	12:05-12:10	Circ & Accumulate Surveys	0.08	6838	4
00:20-00:30	Rotating With Motor	0.17	6394	4	12:10-12:25	Orienting With Motor	0.25	6856	4
00:30-00:35	Circ & Accumulate Surveys	0.08	6394	4	12:25-12:35	Rotating With Motor	0.17	6869	4
00:35-00:50	Rig Service	0.25	6394	4	12:35-12:40	Circ & Accumulate Surveys	0.08	6869	4
00:50-01:25	Orienting With Motor	0.58	6417	4	12:40-13:15	Orienting With Motor	0.58	6899	4
01:25-02:05	Rotating With Motor	0.67	6426	4	13:15-13:25	Rotating With Motor	0.17	6901	4
02:05-02:10	Circ & Accumulate Surveys	0.08	6426	4	13:25-13:30	Circ & Accumulate Surveys	0.08	6901	4
02:10-02:35	Orienting With Motor	0.42	6440	4	13:30-13:55	Orienting With Motor	0.42	6932	4
02:35-02:45	Rotating With Motor	0.17	6458	4	13:55-14:00	Circ & Accumulate Surveys	0.08	6932	4
02:45-02:55	Circulating - See Comments - SPR	0.17	6458	4	14:00-14:30	Orienting With Motor	0.50	6949	4
02:55-03:00	Circ & Accumulate Surveys	0.08	6458	4	14:30-14:45	Rotating With Motor	0.25	6964	4
03:00-03:25	Rotating With Motor	0.42	6489	4	14:45-14:50	Circ & Accumulate Surveys	0.08	6964	4
03:25-03:40	Circ & Accumulate Surveys	0.25	6489	4	14:50-15:30	Orienting With Motor	0.67	6988	4
03:40-04:00	Orienting With Motor	0.33	6497	4	15:30-15:40	Rotating With Motor	0.17	6996	4
04:00-04:20	Rotating With Motor	0.33	6521	4	15:40-15:45	Circ & Accumulate Surveys	0.08	6996	4
04:20-04:25	Circ & Accumulate Surveys	0.08	6521	4	15:45-16:20	Orienting With Motor	0.58	7025	4
04:25-04:55	Orienting With Motor	0.50	6531	4	16:20-16:25	Rotating With Motor	0.08	7027	4
04:55-05:10	Rotating With Motor	0.25	6552	4	16:25-16:30	Circ & Accumulate Surveys	0.08	7027	4
05:10-05:40	Circ & Accumulate Surveys	0.50	6552	4	16:30-17:30	Orienting With Motor	1.00	7059	4
05:40-06:30	Orienting With Motor	0.83	6584	4	17:30-17:35	Circ & Accumulate Surveys	0.08	7059	4
06:30-06:45	Other - See Comments - RERACK HWDP	0.25	6584	4	17:35-18:20	Orienting With Motor	0.75	7090	4
06:45-07:05	Circ & Accumulate Surveys	0.33	6584	4	18:20-18:25	Circ & Accumulate Surveys	0.08	7090	4
07:05-07:40	Orienting With Motor	0.58	6616	4	18:25-19:00	Orienting With Motor	0.58	7114	4
07:40-07:45	Circ & Accumulate Surveys	0.08	6616	4	19:00-19:15	Rotating With Motor	0.25	7114	4
07:45-08:00	Orienting With Motor	0.25	6632	4	19:15-19:20	Circ & Accumulate Surveys	0.08	7122	4
08:00-08:10	Rotating With Motor	0.17	6647	4	19:20-19:55	Orienting With Motor	0.58	7140	4
08:10-08:15	Circ & Accumulate Surveys	0.08	6647	4	19:55-20:10	Rotating With Motor	0.25	7154	4
08:15-08:35	Orienting With Motor	0.33	6673	4	20:10-20:15	Circulating - See Comments - SPR	0.08	7154	4
08:35-08:40	Rotating With Motor	0.08	6679	4	20:15-20:25	Circ & Accumulate Surveys	0.17	7154	4
08:40-08:50	Circ & Accumulate Surveys	0.17	6679	4	20:25-21:10	Orienting With Motor	0.75	7179	4
08:50-09:20	Orienting With Motor	0.50	6711	4	21:10-21:25	Rotating With Motor	0.25	7185	4
09:20-09:30	Circ & Accumulate Surveys	0.17	6711	4	21:25-21:30	Circ & Accumulate Surveys	0.08	7185	4
09:30-09:55	Orienting With Motor	0.42	6743	4	21:30-21:55	Orienting With Motor	0.42	7197	4
09:55-10:05	Circ & Accumulate Surveys	0.17	6743	4	21:55-22:15	Rotating With Motor	0.33	7217	4
10:05-10:40	Orienting With Motor	0.58	6771	4	22:15-22:20	Circ & Accumulate Surveys	0.08	7217	4
10:40-10:45	Rotating With Motor	0.08	6775	4	22:20-22:50	Orienting With Motor	0.50	7225	4
10:45-10:50	Circ & Accumulate Surveys	0.08	6775	4	22:50-23:15	Rotating With Motor	0.42	7248	4
10:50-11:25	Orienting With Motor	0.58	6806	4	23:15-23:20	Circ & Accumulate Surveys	0.08	7248	4
11:25-11:30	Circ & Accumulate Surveys	0.08	6806	4	23:20-23:40	Rig Service	0.33	7248	4



**Weatherford®**

# Daily Activity Report

Drilling Services  
v4.2.2674**Day 4 - 2012/08/29**

11:30-12:00	Orienting With Motor	0.50	6833	4	23:40-24:00	Orienting With Motor	0.33	7260	4
12:00-12:05	Rotating With Motor	0.08	6838	4			0.00		

**TIME SUMMARY (hrs):**

<b>MOTOR DRILL:</b> 19.42	<b>ORIENTING HRS:</b> 14.67	<b>ROTARY DRILL:</b> 0.00
<b>TIME DRILL:</b> 0.00	<b>ROTATING HRS:</b> 4.75	<b>MOTOR HRS:</b> 23.17
<b>MOTOR REAM:</b> 0.00		<b>TRIP:</b> 0.00
<b>CIRC:</b> 3.75	<b>ROTARY DRILL:</b> 0.00	<b>OTHER:</b> 0.83
<b>MOTOR HRS:</b> 23.17	<b>DRILL HRS:</b> 19.42	<b>TOTAL HRS:</b> 24.00

**DRILLING PARAMETERS:**

<b>ROTARY TORQUE:</b> 9000 ft-lb	<b>STRING WEIGHT</b> 145000 lbs
<b>WOB SLIDING (HI):</b> 14000 lbf	<b>WOB ROTATE (HI):</b> 20000 lbf
<b>WOB SLIDING (LO):</b> 5000 lbf	<b>WOB ROTATE (LO):</b> 15000 lbf
<b>RPM (ROTARY):</b> 25 rpm	<b>DRAG UP:</b> 171000 lbf
<b>RPM (MOTOR):</b> 167 rpm	<b>DRAG DN:</b> 128000 lbf

**BHA / MOTOR / BIT INFORMATION:**

<b>BHA:</b> 4	<b>HOLE SIZE:</b> 8.75 in	<b>SECTION TYPE:</b> Curve	<b>SURVEY TYPE:</b> Positive Pulse MWD
<b>MANFCT.:</b> Weatherford	<b>STABILIZER:</b> No	<b>SERIAL#:</b> 675-4019	<b>MODEL:</b> ME6770
<b>SETTING:</b> 2.38 °	<b>KICKPAD:</b> No	<b>SIZE:</b> 6 3/4" (171mm)	<b>LOBE CFG.:</b> 7/8
<b>MANFCT:</b> Hughes	<b>BIT TYPE:</b> HUGHES	<b>TYPE:</b> DP505F	<b>MTR HRS THIS DAY:</b> 23.166666666666667
<b>IADC BIT GRADE:</b> 1 / 2 / CT / ? / X / I / FC / TD			<b>NOZZLES:</b> 0.648 in <sup>2</sup> TFA

**PUMP PARAMETERS**

<b>PRESSURE ON BTM:</b> 2500	<b>PRESSURE OFF BTM:</b> 2100	<b>TOTAL FLOW RATE:</b> 598.00 gal/min
<b>PUMP 1:</b> TYPE: PZ-11	<b>EFF.:</b> 95.0%	<b>SPM:</b> 78.00
<b>PUMP 2:</b> TYPE: PZ-11	<b>EFF.:</b> 95.0%	<b>SPM:</b> 78.00
<b>PUMP 3:</b> TYPE:	<b>EFF.:</b> 100.0%	<b>SPM:</b> 0.00
	<b>LINER:</b> 6.00 in	<b>STROKE VOL.:</b> 3.8438 gal/stk
	<b>LINER:</b> 6.00 in	<b>STROKE VOL.:</b> 3.8438 gal/stk
	<b>LINER:</b> 0.00 in	<b>STROKE VOL.:</b> 0.0000 gal/stk

**MUD RECORD**

<b>MUD TYPE:</b> Water	<b>VISC:</b> 35 sec/qt	<b>WTR LOSS:</b> 7.8 cc/30min	<b>PV:</b> 8 cP	<b>YP:</b> 7 lb/100 ft <sup>2</sup>	<b>pH:</b> 8.4
<b>DENSITY:</b> 9.7 lb/gal	<b>GEL 0/10:</b> 2.00 lb/100 ft <sup>2</sup>	<b>SAND:</b> 0.02	<b>SOLIDS:</b> 4.3	<b>OIL:</b> 0	<b>TEMP:</b> 0 °F
<b>LIQUID BASE:</b> Water		<b>LIQUID RATE:</b> 0 gal/min	<b>GAS TYPE:</b>		<b>GAS RATE:</b> 0 cu ft/min

**COMMENTS:**

Drill F/ 6363 to 7225

@ 6417 we had just put in a 23 ft slid and motor stalled twice while sliding. We went to rotate @ company mans request with the drill string torquing and stalling at 14k torque and diff as high 1250 it is not wanting to let us drill. Note Company men didn't mud up prior to kop. We started kick off at 6262 with a mud wt. 8.7 and a vis. of 28 @ Company mans request we were to go head and start kicking off and they would mud up while building the curve. Mud wt. at 6417 is a 9.0 with a 35 vis. Note mud up wt. for kick off is 9.4 9.8 with 40 vis.

@ 6426 do to mud properties are rop rotating was only 35' per hr and sliding was 50' per hr. with mud wt. of 9.1 and vis of 34 Company man instantly started acting like he didn't know we were not mudded up to wt. and vis. But yet this was discussed prior during the pre. tour meeting.

@ 03:00 a.m @ 6458 M.D. the rig reported that we were ready to start pumping lube sweets for the sliding. with 19 deg of inc. in the hole. and Continuing mud up.

@ MD. of 6458 we were 35' above the line and 4.5 right with 18.10 deg of angle and 9 deg ahead of plan putting in a tangent with rotation only needing a BRN OF 7.4 Company man requested for me to slide down and i told him no that i would not slide down and would rotate a tangent gaining the line and would go back to sliding when needing a BRN OF 10 Deg. My Reason for letting us get so far above is do to the loss of BR when drilling through the sharon springs.

@ 7185 M.D. and 80 DEG TVD OF 6908 in the hole Anadarko had a target TVD Change from 6924 to 6910 they realized that i was already 2 ft away from knew target Tvd of 6910 so they told me to just keep going for Tvd target of 6924 or above.

**CUSTOMER SIGNATURE:**





# Daily Activity Report

Drilling Services  
v4.2.2674

Day 5 - 2012/08/30

FILE #: 4027075

WELL NAME: Cannon 16N-E3HZ

SERVICE CO.: Weatherford Drilling Services

JOB TYPE: Horizontal

COMPANY: Anadarko Petroleum Corporation

SURVEY TYPE: HEL LWD

RIG & NO: Helmerich & Payne 307

SURFACE LOCATION: Weld County

FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry, Trevor Cunningham

MWD Supervisor: Rusty Komrs

Other: Cory Langford

MWD Trainee: James Asher

GROUND ELEV: 4840 ft

START DEPTH: 7260.0 ft

PROGRESS: 40.0 ft

DAILY COST: USD\$17227.50

KB ELEV: 4865 ft

END DEPTH: 7300.0 ft

AVG. ROP.: 37.0 ft/hr

PREVIOUS COST: USD\$80670.00

TOTAL COST: USD\$97897.50

WORK STATUS: Operating

(All units are imperial.)

TIME	DAILY ACTIVITY	HRS	DPTH	BHA	TIME	DAILY ACTIVITY	HRS	DPTH	BHA
00:00-00:25	Orienting With Motor	0.42	7280	4	03:00-03:30	Flow Test - FLOW CHECK	0.50	7300	4
00:25-00:30	Circ & Accumulate Surveys	0.08	7280	4	03:30-08:15	POOH To Run Casing - TOH KOP 6262	4.75	7300	4
00:30-01:10	Orienting With Motor	0.67	7300	4	08:15-09:00	Lay Down Directional Tools	0.75	7300	4
01:10-01:15	Circ & Accumulate Surveys	0.08	7300	4	09:00-24:00	Wait On Orders	15.00	7300	4
01:15-03:00	Circ & Condition Hole	1.75	7300	4			0.00		

## TIME SUMMARY (hrs):

MOTOR DRILL:	1.08	ORIENTING HRS:	1.08	ROTARY DRILL:	0.00
TIME DRILL:	0.00	ROTATING HRS:	0.00	MOTOR HRS:	3.00
MOTOR REAM:	0.00			TRIP:	4.75
CIRC:	1.92	ROTARY DRILL:	0.00	OTHER:	16.25
MOTOR HRS:	3.00	DRILL HRS:	1.08	TOTAL HRS:	24.00

## DRILLING PARAMETERS:

ROTARY TORQUE:	11000 ft-lb	STRING WEIGHT	145000 lbs
WOB SLIDING (HI):	40000 lbf	WOB ROTATE (HI):	25000 lbf
WOB SLIDING (LO):	15000 lbf	WOB ROTATE (LO):	18000 lbf
RPM (ROTARY):	25 rpm	DRAG UP:	176000 lbf
RPM (MOTOR):	118 rpm	DRAG DN:	123000 lbf

## BHA / MOTOR / BIT INFORMATION:

BHA: 4	HOLE SIZE: 8.75 in	SECTION TYPE: Curve	SURVEY TYPE: Positive Pulse MWD
MANFCT.: Weatherford	STABILIZER: No	SERIAL#: 675-4019	MODEL: ME6770
SETTING: 2.38 °	KICKPAD: No	SIZE: 6 3/4" (171mm)	LOBE CFG.: 7/8
MANFCT: Hughes	BIT TYPE: HUGHES	TYPE: DP505F	MTR HRS THIS DAY: 3
IADC BIT GRADE: 1 / 2 / CT / ? / X / I / FC / TD			MTR HRS TO DATE: 28.75
			NOZZLES: 0.648 in <sup>2</sup> TFA

## PUMP PARAMETERS

PRESSURE ON BTM: 2700	PRESSURE OFF BTM: 1800	TOTAL FLOW RATE: 422.00 gal/min
PUMP 1: TYPE: PZ-11	EFF.: 95.0% SPM: 110.00	LINER: 6.00 in
PUMP 2: TYPE: PZ-11	EFF.: 95.0% SPM: 0.00	LINER: 0.00 in
PUMP 3: TYPE:	EFF.: 100.0% SPM: 0.00	LINER: 0.00 in
		STROKE VOL.: 3.8438 gal/stk
		STROKE VOL.: 0.0000 gal/stk
		STROKE VOL.: 0.0000 gal/stk

## MUD RECORD

MUD TYPE: Water	VISC: 39 sec/qt	WTR LOSS: 5.6 cc/30min	PV: 14 cP	YP: 13 lb/100 ft <sup>2</sup>	pH: 8.8
DENSITY: 9.9 lb/gal	GEL 0/10: 3.00 lb/100 ft <sup>2</sup>	SAND: 0.05	SOLIDS: 7.3	OIL: 0	TEMP: 130 °F
LIQUID BASE: Water		LIQUID RATE: 0 gal/min	GAS TYPE:		GAS RATE: 0 cu ft/min

## COMMENTS:

Drill f/ 7225 to 7300 T.D. for Curve.

Circulate & POOH To Run Casing.

CUSTOMER SIGNATURE: \_\_\_\_\_

**Weatherford®**

# Daily Activity Report

Drilling Services  
v4.2.2674

Day 6 - 2012/08/31

FILE #: 4027075

WELL NAME: Cannon 16N-E3HZ

SERVICE CO.: Weatherford Drilling Services

JOB TYPE: Horizontal

COMPANY: Anadarko Petroleum Corporation

SURVEY TYPE: HEL LWD

RIG &amp; NO: Helmerich &amp; Payne 307

SURFACE LOCATION: Weld County

FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry, Trevor Cunningham

MWD Supervisor: Rusty Komrs

Other: Cory Langford

MWD Trainee: James Asher

GROUND ELEV: 4840 ft

START DEPTH: 7300.0 ft

PROGRESS: 856.0 ft

DAILY COST: USD\$26830.00

KB ELEV: 4865 ft

END DEPTH: 8156.0 ft

AVG. ROP.: 116.8 ft/hr

PREVIOUS COST: USD\$97897.50

TOTAL COST: USD\$124727.50

WORK STATUS: Operating

(All units are imperial.)

TIME	DAILY ACTIVITY	HRS	DPTH	BHA	TIME	DAILY ACTIVITY	HRS	DPTH	BHA
00:00-07:15	Wait On Orders	7.25	7300	4	18:40-19:20	Orienting With Motor	0.67	7809	5
07:15-09:10	Handle Directional Tools	1.92	7300	5	19:20-19:30	Rotating With Motor	0.17	7840	5
09:10-10:45	Work On MWD - PROGRAM LWD	1.58	7300	5	19:30-19:45	Orienting With Motor	0.25	7850	5
10:45-11:00	Undefined - See Comments - TEST LWD	0.25	7300	5	19:45-19:55	Rotating With Motor	0.17	7872	5
11:00-13:20	RIH	2.33	7300	5	19:55-20:00	Circ & Accumulate Surveys	0.08	7872	5
13:20-15:10	Drill Out Flt, Shoe & Cmmt	1.83	7300	5	20:00-21:30	Orienting With Motor	1.50	7914	5
15:10-16:00	Rotating With Motor	0.83	7398	5	21:30-21:40	Rotating With Motor	0.17	7935	5
16:00-16:05	Circ & Accumulate Surveys	0.08	7398	5	21:40-21:45	Circ & Accumulate Surveys - check shot	0.08	7935	5
16:05-16:30	Rotating With Motor	0.42	7493	5	21:45-22:00	Rotating With Motor	0.25	7967	5
16:30-16:35	Circ & Accumulate Surveys	0.08	7493	5	22:00-22:10	Circulating - See Comments - SPR	0.17	7967	5
16:35-17:15	Rotating With Motor	0.67	7588	5	22:10-22:15	Circ & Accumulate Surveys	0.08	7967	5
17:15-17:20	Circ & Accumulate Surveys	0.08	7588	5	22:15-22:35	Orienting With Motor	0.33	7987	5
17:20-17:40	Rotating With Motor	0.33	7682	5	22:35-23:00	Rotating With Motor	0.42	8061	5
17:40-17:45	Circ & Accumulate Surveys	0.08	7682	5	23:00-23:05	Circ & Accumulate Surveys	0.08	8061	5
17:45-18:10	Orienting With Motor	0.42	7702	5	23:05-23:25	Rotating With Motor	0.33	8156	5
18:10-18:35	Rotating With Motor	0.42	7777	5	23:25-23:30	Circ & Accumulate Surveys	0.08	8156	5
18:35-18:40	Circ & Accumulate Surveys	0.08	7777	5	23:30-24:00	Rig Service	0.50	8156	5

## TIME SUMMARY (hrs):

MOTOR DRILL:	7.33	ORIENTING HRS:	0.00	ROTARY DRILL:	0.00
TIME DRILL:	0.00	ROTATING HRS:	0.00	MOTOR HRS:	10.17
MOTOR REAM:	0.00			TRIP:	2.33
CIRC:	2.83	ROTARY DRILL:	0.00	OTHER:	11.50
MOTOR HRS:	10.17	DRILL HRS:	7.33	TOTAL HRS:	24.00

## DRILLING PARAMETERS:

ROTARY TORQUE:	9000 ft-lb	STRING WEIGHT	130000 lbs
WOB SLIDING (HI):	15000 lbf	WOB ROTATE (HI):	22000 lbf
WOB SLIDING (LO):	5000 lbf	WOB ROTATE (LO):	12000 lbf
RPM (ROTARY):	45 rpm	DRAG UP:	176000 lbf
RPM (MOTOR):	247 rpm	DRAG DN:	123000 lbf

## BHA / MOTOR / BIT INFORMATION:

BHA: 4	HOLE SIZE: 8.75 in	SECTION TYPE: Curve	SURVEY TYPE: Positive Pulse MWD
MANFCT.: Weatherford	STABILIZER: No	SERIAL#: 675-4019	MODEL: ME6770
SETTING: 2.38 °	KICKPAD: No	SIZE: 6 3/4" (171mm)	LOBE CFG.: 7/8
MANFCT: Hughes	BIT TYPE: HUGHES	TYPE: DP505F	MTR HRS THIS DAY: 0
IADC BIT GRADE: 1 / 2 / CT / ? / X / I / FC / TD			NOZZLES: 0.648 in² TFA
			MTR HRS TO DATE: 28.75

BHA: 5	HOLE SIZE: 6.125 in	SECTION TYPE: Lateral 1	SURVEY TYPE: HEL LWD
MANFCT.: Weatherford	STABILIZER: No	SERIAL#: 475-1103	MODEL: ME6770
SETTING: 1.5 °	KICKPAD: No	SIZE: 5" (127mm)	LOBE CFG.: 6/7
MANFCT: Security	BIT TYPE: Security PDC Bit	TYPE: FXD54	MTR HRS THIS DAY: 10.166666666666666
IADC BIT GRADE: ? / ? / ? / ? / ? / ? / ? / ?			MTR HRS TO DATE: 10.166666666666666



**Weatherford®**

# Daily Activity Report

Drilling Services

v4.2.2674

Day 6 - 2012/08/31

## PUMP PARAMETERS

PRESSURE ON BTM: 2900

PRESSURE OFF BTM: 2100

TOTAL FLOW RATE: 299.00 gal/min

PUMP 1: TYPE: PZ-11

EFF.: 95.0%

SPM: 78.00

LINER: 6.00 in

STROKE VOL.: 3.8438 gal/stk

PUMP 2: TYPE: PZ-11

EFF.: 95.0%

SPM: 0.00

LINER: 0.00 in

STROKE VOL.: 0.0000 gal/stk

PUMP 3: TYPE:

EFF.: 100.0%

SPM: 0.00

LINER: 0.00 in

STROKE VOL.: 0.0000 gal/stk

## MUD RECORD

MUD TYPE: Water

VISC: 39 sec/qt

WTR LOSS: 5.2 cc/30min

PV: 11 cP

YP: 9 lb/100 ft<sup>2</sup>

pH: 9.7

DENSITY: 9.9 lb/gal

GEL 0/10: 3.00 lb/100 ft<sup>2</sup>

SAND: 0.05

SOLIDS: 7.9

OIL: 2

TEMP: 128 °F

LIQUID BASE: Water

LIQUID RATE: 0 gal/min

GAS TYPE:

GAS RATE: 0 cu ft/min

## COMMENTS:

Wait on Prders to P/U Lateral BHA.

Tag cement @ 7095, drill cement float, shoe out from 7095 to 7300

Drill F/ 7300 to 8156

CUSTOMER SIGNATURE: \_\_\_\_\_

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# Daily Activity Report

Drilling Services  
v4.2.2674**Day 7 - 2012/09/01****FILE #:** 4027075**WELL NAME:** Cannon 16N-E3HZ**SERVICE CO.:** Weatherford Drilling Services**JOB TYPE:** Horizontal**COMPANY:** Anadarko Petroleum Corporation**SURVEY TYPE:** HEL LWD**RIG & NO:** Helmerich & Payne 307**SURFACE LOCATION:** Weld County**FIELD / LOCATION:** Wattenburg / CO / USA**DIR Supervisor:** Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry**MWD Supervisor:** Rusty Komrs**Other:** Cory Langford**MWD Trainee:** James Asher**GROUND ELEV:** 4840 ft**START DEPTH:** 8156.0 ft**PROGRESS:** 2899.0 ft**DAILY COST:** USD\$20550.00**KB ELEV:** 4865 ft**END DEPTH:** 11055.0 ft**AVG. ROP.:** 149.3 ft/hr**PREVIOUS COST:** USD\$124727.50**TOTAL COST:** USD\$145277.50**WORK STATUS:** Operating*(All units are imperial.)*

TIME	DAILY ACTIVITY	HRS	DPTH	BHA	TIME	DAILY ACTIVITY	HRS	DPTH	BHA
00:00-00:15	Rotating With Motor	0.25	8166	5	11:45-12:20	Rotating With Motor	0.58	9581	5
00:15-00:35	Orienting With Motor	0.33	8181	5	12:20-12:25	Circ & Accumulate Surveys	0.08	9581	5
00:35-01:05	Rotating With Motor	0.50	8251	5	12:25-12:40	Orienting With Motor	0.25	9601	5
01:05-01:15	Circ & Accumulate Surveys	0.17	8251	5	12:40-13:10	Rotating With Motor	0.50	9676	5
01:15-01:50	Rotating With Motor	0.58	8346	5	13:10-13:15	Circ & Accumulate Surveys	0.08	9676	5
01:50-01:55	Circ & Accumulate Surveys	0.08	8346	5	13:15-13:45	Rotating With Motor	0.50	9771	5
01:55-02:25	Rotating With Motor	0.50	8441	5	13:45-13:50	Circ & Accumulate Surveys	0.08	9771	5
02:25-02:35	Circulating - See Comments - SPR	0.17	8441	5	13:50-14:05	Orienting With Motor	0.25	9786	5
02:35-02:40	Circ & Accumulate Surveys	0.08	8441	5	14:05-14:30	Rotating With Motor	0.42	9865	5
02:40-03:10	Rotating With Motor	0.50	8536	5	14:30-14:35	Circ & Accumulate Surveys	0.08	9865	5
03:10-03:15	Circ & Accumulate Surveys	0.08	8536	5	14:35-15:05	Rotating With Motor	0.50	9961	5
03:15-03:55	Rotating With Motor	0.67	8631	5	15:05-15:10	Circ & Accumulate Surveys	0.08	9961	5
03:55-04:00	Circ & Accumulate Surveys	0.08	8631	5	15:10-15:40	Rotating With Motor	0.50	10055	5
04:00-04:25	Rotating With Motor	0.42	8727	5	15:40-15:45	Circ & Accumulate Surveys	0.08	10055	5
04:25-04:30	Circ & Accumulate Surveys	0.08	8727	5	15:45-16:20	Rotating With Motor	0.58	10150	5
04:30-04:40	Rotating With Motor	0.17	8732	5	16:20-16:25	Circ & Accumulate Surveys	0.08	10150	5
04:40-05:20	Orienting With Motor	0.67	8767	5	16:25-16:45	Orienting With Motor	0.33	10162	5
05:20-05:40	Rotating With Motor	0.33	8822	5	16:45-17:25	Rotating With Motor	0.67	10246	5
05:40-05:55	Gamma Rerun	0.25	8822	5	17:25-17:30	Circ & Accumulate Surveys	0.08	10246	5
05:55-06:00	Circ & Accumulate Surveys	0.08	8822	5	17:30-17:55	Rotating With Motor	0.42	10341	5
06:00-06:25	Orienting With Motor	0.42	8832	5	17:55-18:00	Circ & Accumulate Surveys	0.08	10341	5
06:25-06:50	Rotating With Motor	0.42	8917	5	18:00-18:30	Rotating With Motor	0.50	10436	5
06:50-07:15	Circ & Accumulate Surveys	0.42	8917	5	18:30-18:35	Circ & Accumulate Surveys	0.08	10436	5
07:15-07:35	Orienting With Motor	0.33	8917	5	18:35-19:10	Rotating With Motor	0.58	10531	5
07:35-08:00	Rotating With Motor	0.42	9011	5	19:10-19:15	Circ & Accumulate Surveys	0.08	10531	5
08:00-08:10	Gamma Rerun	0.17	9011	5	19:15-20:00	Rotating With Motor	0.75	10626	5
08:10-08:15	Circ & Accumulate Surveys	0.08	9011	5	20:00-20:05	Circ & Accumulate Surveys	0.08	10626	5
08:15-08:50	Rotating With Motor	0.58	9107	5	20:05-20:55	Rotating With Motor	0.83	10721	5
08:50-08:55	Circ & Accumulate Surveys	0.08	9107	5	20:55-21:00	Circ & Accumulate Surveys	0.08	10721	5
08:55-09:30	Rotating With Motor	0.58	9201	5	21:00-21:20	Rotating With Motor	0.33	10816	5
09:30-09:35	Circ & Accumulate Surveys	0.08	9201	5	21:20-21:25	Circ & Accumulate Surveys	0.08	10816	5
09:35-09:45	Orienting With Motor	0.17	9217	5	21:25-21:55	Rotating With Motor	0.50	10910	5
09:45-10:15	Rotating With Motor	0.50	9296	5	21:55-22:50	Rig Service	0.92	10910	5
10:15-10:20	Circ & Accumulate Surveys	0.08	9296	5	22:50-22:55	Circ & Accumulate Surveys	0.08	10910	5
10:20-10:40	Orienting With Motor	0.33	9316	5	22:55-23:30	Rotating With Motor	0.58	11005	5
10:40-11:00	Rotating With Motor	0.33	9391	5	23:30-23:40	Circ & Condition Hole - Ream F 10973-11005	0.17	11005	5
11:00-11:05	Circ & Accumulate Surveys	0.08	9391	5	23:40-23:45	Circ & Accumulate Surveys	0.08	11005	5
11:05-11:40	Rotating With Motor	0.58	9486	5	23:45-24:00	Rotating With Motor	0.25	11055	5
11:40-11:45	Circ & Accumulate Surveys	0.08	9486	5			0.00		

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# Daily Activity Report

Drilling Services

v4.2.2674

Day 7 - 2012/09/01

TIME SUMMARY (hrs):			DRILLING PARAMETERS:		
MOTOR DRILL: 19.42	ORIENTING HRS: 3.08	ROTARY DRILL: 0.00	ROTARY TORQUE: 10000 ft-lb	STRING WEIGHT	0 lbs
TIME DRILL: 0.00	ROTATING HRS: 16.33	MOTOR HRS: 22.67	WOB SLIDING (HI): 35000 lbf	WOB ROTATE (HI):	18000 lbf
MOTOR REAM: 0.00		TRIP: 0.00	WOB SLIDING (LO): 30000 lbf	WOB ROTATE (LO):	15000 lbf
CIRC: 3.25	ROTARY DRILL: 0.00	OTHER: 1.33	RPM (ROTARY): 50 rpm	DRAG UP:	0 lbf
MOTOR HRS: 22.67	DRILL HRS: 19.42	TOTAL HRS: 24.00	RPM (MOTOR): 247 rpm	DRAG DN:	0 lbf

## — BHA / MOTOR / BIT INFORMATION: —

BHA: 5      HOLE SIZE: 6.125 in      SECTION TYPE: Lateral 1      SURVEY TYPE: HEL LWD  
 MANFCT.: Weatherford      STABILIZER: No      SERIAL#: 475-1103      MODEL: ME6770      LOBE CFG.: 6/7  
 SETTING: 1.5 °      KICKPAD: No      SIZE: 5" (127mm)      MTR HRS THIS DAY: 22.666666666666667      MTR HRS TO DATE: 32.83333333333333  
 MANFCT: Security      BIT TYPE: Security PDC Bit      TYPE: FXD54      NOZZLES: 0.648 in<sup>2</sup> TFA  
 IADC BIT GRADE: ? / ? / ? / ? / ? / ? / ? / ?

## — PUMP PARAMETERS —

PRESSURE ON BTM: 3300	PRESSURE OFF BTM: 2300	TOTAL FLOW RATE: 284.83 gal/min
PUMP 1: TYPE: PZ-11	EFF.: 95.0%      SPM: 78.00	LINER: 6.00 in      STROKE VOL.: 3.8438 gal/stk
PUMP 2: TYPE: PZ-11	EFF.: 95.0%      SPM: 0.00	LINER: 0.00 in      STROKE VOL.: 0.0000 gal/stk
PUMP 3: TYPE:	EFF.: 100.0%      SPM: 0.00	LINER: 0.00 in      STROKE VOL.: 0.0000 gal/stk

## — MUD RECORD —

MUD TYPE: Water      VISC: 39 sec/qt      WTR LOSS: 5.2 cc/30min      PV: 11 cP      YP: 9 lb/100 ft<sup>2</sup>      pH: 9.7  
 DENSITY: 9.9 lb/gal      GEL 0/10: 3.00 lb/100 ft<sup>2</sup>      SAND: 0.05      SOLIDS: 7.9      OIL: 2      TEMP: 128 °F  
 LIQUID BASE: Water      LIQUID RATE: 0 gal/min      GAS TYPE:      GAS RATE: 0 cu ft/min

## — COMMENTS: —

Drill Ahead in Lateral F/ 8156' - 11055

CUSTOMER SIGNATURE: \_\_\_\_\_



# Daily Activity Report

Drilling Services  
v4.2.2674

Day 8 - 2012/09/02

FILE #: 4027075

WELL NAME: Cannon 16N-E3HZ

SERVICE CO.: Weatherford Drilling Services

JOB TYPE: Horizontal

COMPANY: Anadarko Petroleum Corporation

SURVEY TYPE: HEL LWD

RIG & NO: Helmerich & Payne 307

SURFACE LOCATION: Weld County

FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Terrell Lowry

MWD Supervisor: Rusty Komrs

Other: Cory Langford

MWD Trainee: James Asher

GROUND ELEV: 4840 ft

START DEPTH: 11055.0 ft

PROGRESS: 195.0 ft

DAILY COST: USD\$0.00

KB ELEV: 4865 ft

END DEPTH: 11250.0 ft

AVG. ROP.: 80.6 ft/hr

PREVIOUS COST: USD\$145277.50

TOTAL COST: USD\$145277.50

WORK STATUS: Operating

(All units are imperial.)

TIME	DAILY ACTIVITY	HRS	DPTH	BHA	TIME	DAILY ACTIVITY	HRS	DPTH	BHA
00:00-00:15	Rotating With Motor	0.25	11101	5	01:20-02:25	Orienting With Motor	1.08	11226	5
00:15-00:25	Back Reaming - REAM F 11077-11101	0.17	11101	5	02:25-02:45	Rotating With Motor	0.33	11250	5
00:25-00:30	Circ & Accumulate Surveys	0.08	11101	5	02:45-02:50	Circ & Accumulate Surveys	0.08	11250	5
00:30-01:10	Rotating With Motor	0.67	11196	5	02:50-05:00	Circ & Condition Hole	2.17	11250	5
01:10-01:15	Circ & Accumulate Surveys	0.08	11196	5	05:00-05:30	Other - See Comments - Flow Check	0.50	11250	5
01:15-01:20	Rotating With Motor	0.08	11201	5			0.00		

## TIME SUMMARY (hrs):

MOTOR DRILL:	2.42	ORIENTING HRS:	1.08	ROTARY DRILL:	0.00
TIME DRILL:	0.00	ROTATING HRS:	1.33	MOTOR HRS:	5.00
MOTOR REAM:	0.00			TRIP:	0.00
CIRC:	2.58	ROTARY DRILL:	0.00	OTHER:	0.50
MOTOR HRS:	5.00	DRILL HRS:	2.42	TOTAL HRS:	5.50

## DRILLING PARAMETERS:

ROTARY TORQUE:	12200 ft-lb	STRING WEIGHT	128000 lbs
WOB SLIDING (HI):	25000 lbf	WOB ROTATE (HI):	25000 lbf
WOB SLIDING (LO):	12000 lbf	WOB ROTATE (LO):	18000 lbf
RPM (ROTARY):	50 rpm	DRAG UP:	194000 lbf
RPM (MOTOR):	247 rpm	DRAG DN:	62000 lbf

## BHA / MOTOR / BIT INFORMATION:

BHA: 5	HOLE SIZE: 6.125 in	SECTION TYPE: Lateral 1	SURVEY TYPE: HEL LWD
MANFCT.: Weatherford	STABILIZER: No	SERIAL#: 475-1103	MODEL: ME6770
SETTING: 1.5 °	KICKPAD: No	SIZE: 5" (127mm)	LOBE CFG.: 6/7
MANFCT: Security	BIT TYPE: Security PDC Bit	TYPE: FXD54	MTR HRS THIS DAY: 5
IADC BIT GRADE: ? / ? / ? / ? / ? / ? / ? / ?			MTR HRS TO DATE: 37.833333333333
NOZZLES: 0.648 in² TFA			

## PUMP PARAMETERS

PRESSURE ON BTM: 3500	PRESSURE OFF BTM: 2700	TOTAL FLOW RATE: 299.00 gal/min
PUMP 1: TYPE: PZ-11	EFF.: 95.0% SPM: 78.00	LINER: 6.00 in
PUMP 2: TYPE: PZ-11	EFF.: 95.0% SPM: 0.00	LINER: 0.00 in
PUMP 3: TYPE:	EFF.: 100.0% SPM: 0.00	LINER: 0.00 in
		STROKE VOL.: 3.8438 gal/stk
		STROKE VOL.: 0.0000 gal/stk
		STROKE VOL.: 0.0000 gal/stk

## MUD RECORD

MUD TYPE: Water	VISC: 40 sec/qt	WTR LOSS: 5.6 cc/30min	PV: 12 cP	YP: 12 lb/100 ft²	pH: 9
DENSITY: 9.8 lb/gal	GEL 0/10: 3.00 lb/100 ft²	SAND: 0.5	SOLIDS: 0.1	OIL: 0	TEMP: 227 °F
LIQUID BASE: Water		LIQUID RATE: 0 gal/min	GAS TYPE:		GAS RATE: 0 cu ft/min

## COMMENTS:

Drill F/ 11005 to 11250 T.D. Giving Anadarko there 20' set back .

CUSTOMER SIGNATURE: \_\_\_\_\_

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# Daily Activity Report

Drilling Services  
v4.2.2674

Day 9 - 2012/09/03

FILE #: 4027075

WELL NAME: Cannon 16N-E3HZ

SERVICE CO.: Weatherford Drilling Services

JOB TYPE: Horizontal

COMPANY: Anadarko Petroleum Corporation

SURVEY TYPE: HEL LWD

RIG &amp; NO: Helmerich &amp; Payne 307

SURFACE LOCATION: Weld County

FIELD / LOCATION: Wattenburg / CO / USA

2012/09/03

No personnel have been recorded for this date.

GROUND ELEV: 4840 ft

START DEPTH: 11250.0 ft

PROGRESS: 0.0 ft

DAILY COST: USD\$0.00

KB ELEV: 4865 ft

END DEPTH: 11250.0 ft

AVG. ROP.: 0.0 ft/hr

PREVIOUS COST: USD\$145277.50

WORK STATUS:

(All units are imperial.)

TOTAL COST: USD\$145277.50

TIME	DAILY ACTIVITY	HRS	DPTH	BHA	TIME	DAILY ACTIVITY	HRS	DPTH	BHA
		0.00					0.00		

## TIME SUMMARY (hrs):

MOTOR DRILL: 0.00	ORIENTING HRS: 0.00	ROTARY DRILL: 0.00
TIME DRILL: 0.00	ROTATING HRS: 0.00	MOTOR HRS: 0.00
MOTOR REAM: 0.00		TRIP: 0.00
CIRC: 0.00	ROTARY DRILL: 0.00	OTHER: 0.00
MOTOR HRS: 0.00	DRILL HRS: 0.00	TOTAL HRS: 0.00

## DRILLING PARAMETERS:

ROTARY TORQUE:	STRING WEIGHT: 0 lbs
WOB SLIDING (HI): 0 lbf	WOB ROTATE (HI): 0 lbf
WOB SLIDING (LO): 0 lbf	WOB ROTATE (LO): 0 lbf
RPM (ROTARY):	DRAG UP: 0 lbf
RPM (MOTOR):	DRAG DN: 0 lbf

## BHA / MOTOR / BIT INFORMATION:

BHA:	HOLE SIZE:	SECTION TYPE:	SURVEY TYPE:
MANFCT.:	STABILIZER:	SERIAL#:	MODEL:
SETTING:	KICKPAD:	SIZE:	MTR HRS THIS DAY:
MANFCT:	BIT TYPE:	TYPE:	NOZZLES:
IADC BIT GRADE:			LOBE CFG.: MTR HRS TO DATE:

## PUMP PARAMETERS

PRESSURE ON BTM: 0	PRESSURE OFF BTM: 0	TOTAL FLOW RATE: 0.00 gal/min
PUMP 1: TYPE: PZ-11	EFF.: 95.0% SPM: 0.00	LINER: 0.00 in STROKE VOL.: 0.0000 gal/stk
PUMP 2: TYPE: PZ-11	EFF.: 95.0% SPM: 0.00	LINER: 0.00 in STROKE VOL.: 0.0000 gal/stk
PUMP 3: TYPE:	EFF.: 100.0% SPM: 0.00	LINER: 0.00 in STROKE VOL.: 0.0000 gal/stk

## MUD RECORD

MUD TYPE:	VISC: 0 sec/qt	WTR LOSS: 0 cc/30min	PV: 0 cP	YP: 0 lb/100 ft²	pH: 0
DENSITY: 0 lb/gal	GEL 0/10: 0.00 lb/100 ft²	SAND: 0	SOLIDS: 0	OIL: 0	TEMP: 0 °F
LIQUID BASE:		LIQUID RATE: 0 gal/min	GAS TYPE:		GAS RATE: 0 cu ft/min

## COMMENTS:

CUSTOMER SIGNATURE:

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# Daily Activity Report

Drilling Services  
v4.2.2674

Day 10 - 2012/09/04

FILE #: 4027075

WELL NAME: Cannon 16N-E3HZ

SERVICE CO.: Weatherford Drilling Services

JOB TYPE: Horizontal

COMPANY: Anadarko Petroleum Corporation

SURVEY TYPE: HEL LWD

RIG &amp; NO: Helmerich &amp; Payne 307

SURFACE LOCATION: Weld County

FIELD / LOCATION: Wattenburg / CO / USA

2012/09/04

No personnel have been recorded for this date.

GROUND ELEV: 4840 ft

START DEPTH: 11250.0 ft

PROGRESS: 0.0 ft

DAILY COST: USD\$0.00

KB ELEV: 4865 ft

END DEPTH: 11250.0 ft

AVG. ROP.: 0.0 ft/hr

PREVIOUS COST: USD\$145277.50

WORK STATUS:

(All units are imperial.)

TOTAL COST: USD\$145277.50

TIME	DAILY ACTIVITY	HRS	DPTH	BHA	TIME	DAILY ACTIVITY	HRS	DPTH	BHA
		0.00					0.00		

## TIME SUMMARY (hrs):

MOTOR DRILL: 0.00	ORIENTING HRS: 0.00	ROTARY DRILL: 0.00
TIME DRILL: 0.00	ROTATING HRS: 0.00	MOTOR HRS: 0.00
MOTOR REAM: 0.00		TRIP: 0.00
CIRC: 0.00	ROTARY DRILL: 0.00	OTHER: 0.00
MOTOR HRS: 0.00	DRILL HRS: 0.00	TOTAL HRS: 0.00

## DRILLING PARAMETERS:

ROTARY TORQUE:	STRING WEIGHT: 0 lbs
WOB SLIDING (HI): 0 lbf	WOB ROTATE (HI): 0 lbf
WOB SLIDING (LO): 0 lbf	WOB ROTATE (LO): 0 lbf
RPM (ROTARY):	DRAG UP: 0 lbf
RPM (MOTOR):	DRAG DN: 0 lbf

## BHA / MOTOR / BIT INFORMATION:

BHA:	HOLE SIZE:	SECTION TYPE:	SURVEY TYPE:
MANFCT.:	STABILIZER:	SERIAL#:	MODEL:
SETTING:	KICKPAD:	SIZE:	MTR HRS THIS DAY:
MANFCT:	BIT TYPE:	TYPE:	NOZZLES:
IADC BIT GRADE:			LOBE CFG.:
			MTR HRS TO DATE:

## PUMP PARAMETERS

PRESSURE ON BTM: 0	PRESSURE OFF BTM: 0	TOTAL FLOW RATE: 0.00 gal/min
PUMP 1: TYPE: PZ-11	EFF.: 95.0% SPM: 0.00	LINER: 0.00 in STROKE VOL.: 0.0000 gal/stk
PUMP 2: TYPE: PZ-11	EFF.: 95.0% SPM: 0.00	LINER: 0.00 in STROKE VOL.: 0.0000 gal/stk
PUMP 3: TYPE:	EFF.: 100.0% SPM: 0.00	LINER: 0.00 in STROKE VOL.: 0.0000 gal/stk

## MUD RECORD

MUD TYPE:	VISC: 0 sec/qt	WTR LOSS: 0 cc/30min	PV: 0 cP	YP: 0 lb/100 ft²	pH: 0
DENSITY: 0 lb/gal	GEL 0/10: 0.00 lb/100 ft²	SAND: 0	SOLIDS: 0	OIL: 0	TEMP: 0 °F
LIQUID BASE:		LIQUID RATE: 0 gal/min	GAS TYPE:		GAS RATE: 0 cu ft/min

## COMMENTS:

CUSTOMER SIGNATURE: \_\_\_\_\_



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# Daily Activity Report

Drilling Services  
v4.2.2674

Day 11 - 2012/09/05

FILE #: 4027075

WELL NAME: Cannon 16N-E3HZ

SERVICE CO.: Weatherford Drilling Services

JOB TYPE: Horizontal

COMPANY: Anadarko Petroleum Corporation

SURVEY TYPE: HEL LWD

RIG &amp; NO: Helmerich &amp; Payne 307

SURFACE LOCATION: Weld County

FIELD / LOCATION: Wattenburg / CO / USA

2012/09/05

No personnel have been recorded for this date.

GROUND ELEV: 4840 ft

START DEPTH: 11250.0 ft

PROGRESS: 0.0 ft

DAILY COST: USD\$0.00

KB ELEV: 4865 ft

END DEPTH: 11250.0 ft

AVG. ROP.: 0.0 ft/hr

PREVIOUS COST: USD\$145277.50

WORK STATUS:

(All units are imperial.)

TOTAL COST: USD\$145277.50

TIME	DAILY ACTIVITY	HRS	DPTH	BHA	TIME	DAILY ACTIVITY	HRS	DPTH	BHA
		0.00					0.00		

## TIME SUMMARY (hrs):

MOTOR DRILL: 0.00	ORIENTING HRS: 0.00	ROTARY DRILL: 0.00
TIME DRILL: 0.00	ROTATING HRS: 0.00	MOTOR HRS: 0.00
MOTOR REAM: 0.00		TRIP: 0.00
CIRC: 0.00	ROTARY DRILL: 0.00	OTHER: 0.00
MOTOR HRS: 0.00	DRILL HRS: 0.00	TOTAL HRS: 0.00

## DRILLING PARAMETERS:

ROTARY TORQUE:	STRING WEIGHT: 0 lbs
WOB SLIDING (HI): 0 lbf	WOB ROTATE (HI): 0 lbf
WOB SLIDING (LO): 0 lbf	WOB ROTATE (LO): 0 lbf
RPM (ROTARY):	DRAG UP: 0 lbf
RPM (MOTOR):	DRAG DN: 0 lbf

## BHA / MOTOR / BIT INFORMATION:

BHA:	HOLE SIZE:	SECTION TYPE:	SURVEY TYPE:
MANFCT.:	STABILIZER:	SERIAL#:	MODEL:
SETTING:	KICKPAD:	SIZE:	MTR HRS THIS DAY:
MANFCT:	BIT TYPE:	TYPE:	NOZZLES:
IADC BIT GRADE:			LOBE CFG.:
			MTR HRS TO DATE:

## PUMP PARAMETERS

PRESSURE ON BTM: 0	PRESSURE OFF BTM: 0	TOTAL FLOW RATE: 0.00 gal/min
PUMP 1: TYPE: PZ-11	EFF.: 95.0% SPM: 0.00	LINER: 0.00 in STROKE VOL.: 0.0000 gal/stk
PUMP 2: TYPE: PZ-11	EFF.: 95.0% SPM: 0.00	LINER: 0.00 in STROKE VOL.: 0.0000 gal/stk
PUMP 3: TYPE:	EFF.: 100.0% SPM: 0.00	LINER: 0.00 in STROKE VOL.: 0.0000 gal/stk

## MUD RECORD

MUD TYPE:	VISC: 0 sec/qt	WTR LOSS: 0 cc/30min	PV: 0 cP	YP: 0 lb/100 ft²	pH: 0
DENSITY: 0 lb/gal	GEL 0/10: 0.00 lb/100 ft²	SAND: 0	SOLIDS: 0	OIL: 0	TEMP: 0 °F
LIQUID BASE:		LIQUID RATE: 0 gal/min	GAS TYPE:		GAS RATE: 0 cu ft/min

## COMMENTS:

CUSTOMER SIGNATURE: \_\_\_\_\_



# BHA REPORTS

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**Weatherford®**

# BHA Report

Drilling Services  
v4.2.2674

## BHA 1 - Build & Hold Section

FILE #: 4027075

WELL NAME: Cannon 16N-E3HZ

SERVICE CO.: Weatherford Drilling Services

JOB TYPE: Horizontal

COMPANY: Anadarko Petroleum Corporation

SURVEY TYPE: HEL LWD

RIG &amp; NO: Helmerich &amp; Payne 307

SURFACE LOCATION: Weld County

FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry

MWD Supervisor: Rusty Komrs

BHA SURVEY TYPE: Positive Pulse MWD

HOLE SIZE: 8.75 in

QTY	COMPONENT	MANFCT.	SERIAL #	MODEL	O.D.	I.D.	F.N.	BOT. CONN.	TOP CONN.	LEN.	C.LEN.
1	HUGHES	Hughes	7141759	DP505F	8.75	0	0		4 1/2" REG Pin	1.00 ft	1.00 ft
1	Weatherford Motor	Weatherford	675-43581	ME4570	7.75	0	0	4 1/2" REG Box	4 1/2" REG Box	26.84 ft	27.84 ft
1	Muleshoe	Weatherford	AES 675-36616	UBHO	6.78	4	0	4 1/2" IF Pin	4 1/2" IF Box	3.27 ft	31.11 ft
1	NMDC	Weatherford	43135	SLNMDC	6.89	2.75	0	4 1/2" IF Pin	4 1/2" IF Box	30.42 ft	61.53 ft
1	Flex NMDC	Weatherford	675-21892	FNMDC	6.75	2.75	0	4 1/2" IF Pin	4 1/2" IF Box	29.75 ft	91.28 ft
1	X/O Sub	Weatherford	DR8975	X/O Sub	6.75	2.75	0	4 1/2" IF Pin	4 1/2" XH Box	3.85 ft	95.13 ft
41	4 1/2" HWDP	Rig	Rig	41 jts.	4.5	2.75	0	4 1/2" XH Pin	4 1/2" XH Box	1243.53	1338.66 ft
1	X/O Sub	Rig	Rig	X/O Sub	5.125	2.78	0	4 1/2" XH Pin	XT-39 Box	2.29 ft	1340.95 ft
4	4" HWDP	Rig	Rig	15 STDS	4	2.75	0	XT-39 Pin	XT-39 Box	122.12 ft	1463.07 ft

(O.D. units are in; I.D. units are in; FNeck units are ft)

### GENERAL INFORMATION

DATES RUN: 2012/08/26 TO 2012/08/26  
 DEPTH IN: 819.00 ft      ANGLE IN: 0.00 °  
 DEPTH OUT: 1017.00 ft      ANGLE OUT: 0.00 °  
 DRILL HRS: 1.83      BUILD: 0.00 °  
 ORIENTING HRS: 0.00      HOLE MADE: 165.00 ft  
 ROTATING HRS: 1.83      AVG R.O.P.: 90.16 ft/hr

### MOTOR INFORMATION

MANFCT. Weatherford      SETTING: 1.81 °  
 SERIAL #: 675-43581      KICK PAD: No  
 MODEL: ME4570      STABILIZER: No  
 LOBE CFG: 4/5      MOTOR HRS: 3.08  
 BIT TO BEND: 3.87

### PUMP INFORMATION

PUMPS	PUMP 1	PUMP 2	PUMP 3
EFFICIENCY:	95.0%	95.0%	100.0%
S.P.M.:	78	78	0
STROKE VOLUME:	3.8438 gal/stk	3.8438 gal/stk	0.0 gal/stk
TOTAL FLOW RATE:	598 gal/min		
PUMP PRESSURE:	OFF BTM: 700 psi	ON BTM: 1700 psi	

### MUD INFORMATION

MUD TYPE: Water      LIQUID BASE: Water  
 DENSITY: 8.45 lb/gal      TEMP: 125 °F  
 VISCOSITY: 28 sec/qt      pH: 7.9  
 WTR LOSS: 28 cc/30min      SAND: 0.01      LIQUID RATE: 0 gal/min  
 PLAST VISC: 2 cP      SOLIDS: 0.7      GAS TYPE:  
 YIELD PT: 3 lb/100 ft²      OIL: 0      GAS RATE: 0 cu ft/min

### BIT INFORMATION

MANFCT: Hughes      TYPE: DP505F      IADC BIT GRADE: 1 / 1 / ? / ? / ? / ? / ? / DMF  
 NOZZLES: 0.648 in² TFA

### REASON FOR BHA CHANGE

Motor Failure

### FORMATION CHARACTERISTICS

We don't know what formation wants to do because we only drilled 200' before having a downhole Motor FAILURE.

### MWD COMMENTS

MWD tool performed as expected. a 60 degree orifice was ran with a 6 3/4" pulser. We were only drilling for 3 hours so our battery consumption is still very low. Downhole temp was 125 degrees before downhole motor FAILURE.



**Weatherford®**

# BHA Report

Drilling Services  
v4.2.2674

## BHA 1 - Build & Hold Section

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### SIDETRACKING PROCEDURE COMMENTS

NA

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### RUN SUMMARY

We were not able to determine build rates because the motor FAILED and I couldn't slide due to the motor being locked up. The rest of the BHA looked good when pulled.



**Weatherford®**

# BHA Report

Drilling Services  
v4.2.2674

## BHA 2 - Build & Hold Section

FILE #: 4027075

JOB TYPE: Horizontal

RIG & NO: Helmerich & Payne 307

WELL NAME: Cannon 16N-E3HZ

COMPANY: Anadarko Petroleum Corporation

SURFACE LOCATION: Weld County

SERVICE CO.: Weatherford Drilling Services

SURVEY TYPE: HEL LWD

FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry

MWD Supervisor: Rusty Komrs

BHA SURVEY TYPE: Positive Pulse MWD

HOLE SIZE: 8.75 in

QTY	COMPONENT	MANFCT.	SERIAL #	MODEL	O.D.	I.D.	F.N.	BOT. CONN.	TOP CONN.	LEN.	C.LEN.
1	HUGHES	Hughes	7141759	DP505F	8.75	0	0		4 1/2" REG Pin	1.00 ft	1.00 ft
1	Weatherford Motor	Weatherford	675-43582	QME4570	7.75	0	0	3 1/2" REG Box	3 1/2" IF Box	26.82 ft	27.82 ft
1	Muleshoe	Weatherford	AES 675-36616	UBHO	6.78	4	0	4 1/2" IF Pin	4 1/2" IF Box	3.27 ft	31.09 ft
1	NMDC	Weatherford	43135	SLNMDC	6.89	2.75	0	4 1/2" IF Pin	4 1/2" IF Box	30.42 ft	61.51 ft
1	Flex NMDC	Weatherford	675-21892	FNMD	6.75	2.75	0	4 1/2" IF Pin	4 1/2" IF Box	29.75 ft	91.26 ft
1	X/O Sub	Weatherford	DR8975	X/O Sub	6.75	2.75	0	4 1/2" IF Pin	4 1/2" XH Box	3.85 ft	95.11 ft
41	4 1/2" HWDP	Rig	Rig	41 jts.	4.5	2.75	0	4 1/2" XH Pin	4 1/2" XH Box	1243.53	1338.64 ft
1	X/O Sub	Rig	Rig	X/O Sub	5.125	2.78	0	4 1/2" XH Pin	XT-39 Box	2.29 ft	1340.93 ft
4	4" HWDP	Rig	Rig	15 STDS	4	2.75	0	XT-39 Pin	XT-39 Box	122.12 ft	1463.05 ft

(O.D. units are in; I.D. units are in; FNeck units are ft)

### GENERAL INFORMATION

DATES RUN: 2012/08/26 TO 2012/08/27  
 DEPTH IN: 1017.00 ft ANGLE IN: 0.51 °  
 DEPTH OUT: 4593.00 ft ANGLE OUT: 2.39 °  
 DRILL HRS: 20.33 BUILD: 1.88 °  
 ORIENTING HRS: 2.03 HOLE MADE: 3576.00 ft  
 ROTATING HRS: 18.30 AVG R.O.P.: 175.90 ft/hr

### MOTOR INFORMATION

MANFCT. Weatherford  
 SERIAL #: 675-43582  
 MODEL: QME4570  
 LOBE CFG: 4/5  
 BIT TO BEND: 3.5  
 SETTING: 1.81 °  
 KICK PAD: No  
 STABILIZER: No  
 MOTOR HRS: 25.00

### PUMP INFORMATION

PUMPS	PUMP 1	PUMP 2	PUMP 3
EFFICIENCY:	95.0%	95.0%	100.0%
S.P.M.:	78	78	0
STROKE VOLUME:	3.8438 gal/stk	3.8438 gal/stk	0.0 gal/stk
TOTAL FLOW RATE:	598 gal/min		
PUMP PRESSURE:	OFF BTM: 2000 psi	ON BTM: 3200 psi	

### MUD INFORMATION

MUD TYPE: Water  
 LIQUID BASE: Water  
 DENSITY: 8.4 lb/gal  
 TEMP: 108 °F  
 VISCOSITY: 26 sec/qt  
 pH: 8.2  
 WTR LOSS: 28 cc/30min  
 SAND: 0.01  
 LIQUID RATE: 0 gal/min  
 PLAST VISC: 2 cP  
 SOLIDS: 0.4  
 GAS TYPE:  
 YIELD PT: 3 lb/100 ft²  
 OIL: 0  
 GAS RATE: 0 cu ft/min

### BIT INFORMATION

MANFCT: Hughes TYPE: DP505F IADC BIT GRADE: ???/??/??/??/??  
 NOZZLES: 0.648 in² TFA

### REASON FOR BHA CHANGE

Motor FAILURE

### FORMATION CHARACTERISTICS

Formation wanted to drop and turn hard towards the west while holding a tangent.

### MWD COMMENTS

MWD tool performed as expected. a 60 degree orifice was ran with a 6 3/4" pulser. Battery consumption is still very low. Downhole temp was 150 degrees before downhole motor FAILURE.



**Weatherford®**

# BHA Report

Drilling Services  
v4.2.2674

## BHA 2 - Build & Hold Section

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### SIDETRACKING PROCEDURE COMMENTS

NA

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### RUN SUMMARY

Average build rates experienced were 15 degrees per 100' Condition of BHA looked good when pulled. We experienced chunking of the motor and were getting a lot of stator rubber over the shakers. This was a 1.81 MBTB motor. 600 gpm was ran through it per upper managements request. RPM's ran were 40-50. No other problems were encountered.

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# BHA Report

Drilling Services  
v4.2.2674

## BHA 3 - Build & Hold Section

FILE #: 4027075

WELL NAME: Cannon 16N-E3HZ

SERVICE CO.: Weatherford Drilling Services

JOB TYPE: Horizontal

COMPANY: Anadarko Petroleum Corporation

SURVEY TYPE: HEL LWD

RIG &amp; NO: Helmerich &amp; Payne 307

SURFACE LOCATION: Weld County

FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry, Trevor Cunningham

MWD Supervisor: Rusty Komrs

BHA SURVEY TYPE: Positive Pulse MWD

HOLE SIZE: 8.75 in

QTY	COMPONENT	MANFCT.	SERIAL #	MODEL	O.D.	I.D.	F.N.	BOT. CONN.	TOP CONN.	LEN.	C.LEN.
1	HUGHES	Hughes	7141759	DP505F	8.75	0	0		4 1/2" REG Pin	1.00 ft	1.00 ft
1	Weatherford Motor	Weatherford	675-1716	QLE7850	7.73	0	0	4 1/2" REG Box	4 1/2" IF Box	27.90 ft	28.90 ft
1	Muleshoe	Weatherford	AES 675-36616	UBHO	6.78	4	0	4 1/2" IF Pin	4 1/2" IF Box	3.27 ft	32.17 ft
1	NMDC	Weatherford	43135	SLNMDC	6.89	2.75	0	4 1/2" IF Pin	4 1/2" IF Box	30.42 ft	62.59 ft
1	Flex NMDC	Weatherford	675-21892	FNMD	6.75	2.75	0	4 1/2" IF Pin	4 1/2" IF Box	29.75 ft	92.34 ft
1	X/O Sub	Weatherford	DR8975	X/O Sub	6.75	2.75	0	4 1/2" IF Pin	4 1/2" XH Box	3.85 ft	96.19 ft
41	4 1/2" HWDP	Rig	Rig	41 jts.	4.5	2.75	0	4 1/2" XH Pin	4 1/2" XH Box	1243.53	1339.72 ft
1	X/O Sub	Rig	Rig	X/O Sub	5.125	2.78	0	4 1/2" XH Pin	XT-39 Box	2.29 ft	1342.01 ft
4	4" HWDP	Rig	Rig	15 STDS	4	2.75	0	XT-39 Pin	XT-39 Box	122.12 ft	1464.13 ft

(O.D. units are in; I.D. units are in; FNeck units are ft)

### GENERAL INFORMATION

DATES RUN: 2012/08/28 TO 2012/08/28  
 DEPTH IN: 4687.00 ft    ANGLE IN: 1.33 °  
 DEPTH OUT: 6262.00 ft    ANGLE OUT: 1.15 °  
 DRILL HRS: 11.08    BUILD: -0.18 °  
 ORIENTING HRS: 1.83    HOLE MADE: 1669.00 ft  
 ROTATING HRS: 9.25    AVG R.O.P.: 150.63 ft/hr

### MOTOR INFORMATION

MANFCT. Weatherford    SETTING: 1.50 °  
 SERIAL #: 675-1716    KICK PAD: No  
 MODEL: QLE7850    STABILIZER: No  
 LOBE CFG: 7/8    MOTOR HRS: 14.00  
 BIT TO BEND: 6.53

### PUMP INFORMATION

PUMPS	PUMP 1	PUMP 2	PUMP 3
EFFICIENCY:	95.0%	95.0%	100.0%
S.P.M.:	78	78	0
STROKE VOLUME:	3.8438 gal/stk	3.8438 gal/stk	0.0 gal/stk
TOTAL FLOW RATE:	598 gal/min		
PUMP PRESSURE:	OFF BTM: 2200 psi	ON BTM: 2800 psi	

### MUD INFORMATION

MUD TYPE: Water    LIQUID BASE: Water  
 DENSITY: 8.4 lb/gal    TEMP: 108 °F  
 VISCOSITY: 28 sec/qt    pH: 8.2  
 WTR LOSS: 28 cc/30min    SAND: 0.01    LIQUID RATE: 0 gal/min  
 PLAST VISC: 2 cP    SOLIDS: 0.4    GAS TYPE:  
 YIELD PT: 3 lb/100 ft<sup>2</sup>    OIL: 0    GAS RATE: 0 cu ft/min

### BIT INFORMATION

MANFCT: Hughes    TYPE: DP505F    IADC BIT GRADE: ???/??/??/??/??/??/??/??/??  
 NOZZLES: 0.648 in<sup>2</sup> TFA

### REASON FOR BHA CHANGE

TD Straight hole

### FORMATION CHARACTERISTICS

Formation drilled as expected. The Sussex had a tendency to drift towards the north from vertical.

### MWD COMMENTS

Mud Pulse MWD performed as expected. a 60 degree orifice was used with a 6 3/4" pulser. Down hole temp at TD was 159 degrees and battery consumption was 18% consumed.



**Weatherford®**

# BHA Report

Drilling Services  
v4.2.2674

## BHA 3 - Build & Hold Section

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### SIDETRACKING PROCEDURE COMMENTS

NA

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### RUN SUMMARY

Build rates experienced were 7 degrees per 100'. Condition of BHA looked good when pulled. No problems encountered.



**Weatherford®**

# BHA Report

## BHA 4 - Curve Section

**Drilling Services**  
v4.2.2674**FILE #:** 4027075**JOB TYPE:** Horizontal**RIG & NO:** Helmerich & Payne 307**WELL NAME:** Cannon 16N-E3HZ**COMPANY:** Anadarko Petroleum Corporation**SURFACE LOCATION:** Weld County**SERVICE CO.:** Weatherford Drilling Services**SURVEY TYPE:** HEL LWD**FIELD / LOCATION:** Wattenburg / CO / USA**DIR Supervisor:** Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry, Trevor Cunningham**MWD Supervisor:** Rusty Komrs**BHA SURVEY TYPE:** Positive Pulse MWD**HOLE SIZE:** 8.75 in

QTY	COMPONENT	MANFCT.	SERIAL #	MODEL	O.D.	I.D.	F.N.	BOT. CONN.	TOP CONN.	LEN.	C.LEN.
1	HUGHES	Hughes	7141759	DP505F	8.75	0	0		4 1/2" REG Pin	1.00 ft	1.00 ft
1	Weatherford Motor	Weatherford	675-4019	ME6770	7.75	0	0.65	4 1/2" REG Box	4 1/2" IF Box	27.58 ft	28.58 ft
1	Muleshoe	Weatherford	AES 675-36616	UBHO	6.78	4	0	4 1/2" IF Pin	4 1/2" IF Box	3.27 ft	31.85 ft
1	NMDC	Weatherford	43135	SLNMDC	6.89	2.75	0	4 1/2" IF Pin	4 1/2" IF Box	30.42 ft	62.27 ft
1	Flex NMDC	Weatherford	675-21892	FNMDC	6.75	2.75	0	4 1/2" IF Pin	4 1/2" IF Box	29.75 ft	92.02 ft
1	X/O Sub	Weatherford	DR8975	X/O Sub	6.75	2.75	0	4 1/2" IF Pin	4 1/2" XH Box	3.85 ft	95.87 ft
41	4 1/2" HWDP	Rig	Rig	41 jts.	4.5	2.75	0	4 1/2" XH Pin	4 1/2" XH Box	1243.53	1339.40 ft
1	X/O Sub	Rig	Rig	X/O Sub	5.125	2.78	0	4 1/2" XH Pin	XT-39 Box	2.29 ft	1341.69 ft
4	4" HWDP	Rig	Rig	15 STDS	4	2.75	0	XT-39 Pin	XT-39 Box	122.12 ft	1463.81 ft

(O.D. units are in; I.D. units are in; FNeck units are ft)

**GENERAL INFORMATION**

**DATES RUN:** 2012/08/28 TO 2012/08/31  
**DEPTH IN:** 6262.00 ft **ANGLE IN:** 0.53 °  
**DEPTH OUT:** 7300.00 ft **ANGLE OUT:** 82.01 °  
**DRILL HRS:** 22.58 **BUILD:** 81.48 °  
**ORIENTING HRS:** 17.83 **HOLE MADE:** 1038.00 ft  
**ROTATING HRS:** 4.75 **AVG R.O.P.:** 45.97 ft/hr

**MOTOR INFORMATION**

**MANFCT.** Weatherford **SETTING:** 2.38 °  
**SERIAL #:** 675-4019 **KICK PAD:** No  
**MODEL:** ME6770 **STABILIZER:** No  
**LOBE CFG:** 7/8 **MOTOR HRS:** 28.75  
**BIT TO BEND:** 6.35

**PUMP INFORMATION**

PUMPS	PUMP 1	PUMP 2	PUMP 3
<b>EFFICIENCY:</b>	95.0%	95.0%	100.0%
<b>S.P.M.:</b>	78	0	0
<b>STROKE VOLUME:</b>	3.8438 gal/stk	0.0 gal/stk	0.0 gal/stk
<b>TOTAL FLOW RATE:</b>	299 gal/min		
<b>PUMP PRESSURE:</b>	<b>OFF BTM:</b> 2100 psi	<b>ON BTM:</b> 2900 psi	

**MUD INFORMATION**

**MUD TYPE:** Water **LIQUID BASE:** Water  
**DENSITY:** 9.9 lb/gal **TEMP:** 128 °F  
**VISCOSITY:** 39 sec/qt **pH:** 9.7  
**WTR LOSS:** 5.2 cc/30min **SAND:** 0.05 **LIQUID RATE:** 0 gal/min  
**PLAST VISC:** 11 cP **SOLIDS:** 7.9 **GAS TYPE:**  
**YIELD PT:** 9 lb/100 ft<sup>2</sup> **OIL:** 2 **GAS RATE:** 0 cu ft/min

**BIT INFORMATION**

**MANFCT:** Hughes **TYPE:** DP505F **IADC BIT GRADE:** 1 / 2 / CT / ? / X / 1 / FC / TD  
**NOZZLES:** 0.648 in<sup>2</sup> TFA

**REASON FOR BHA CHANGE**

T.D. Curve section.

**FORMATION CHARACTERISTICS**

Formation Characteristics were good it got a little sticky in some spots and a little ratty when trying to slide but over all was a good run.

**MWD COMMENTS**

Mud Pulse MWD performed as expected. a 60 degree orifice was used with a 6 3/4" pulser. Down hole temp at TD was 175 degrees and battery consumption was 25% consumed. No problems encountered.



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**SIDETRACKING PROCEDURE COMMENTS**

NA

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**RUN SUMMARY**

Average Buildup Rates experienced were 12 deg per 100' BHA looked good when pulled. Objective achieved with building the curve. No problems encountered.

**Weatherford®**

# BHA Report

Drilling Services  
v4.2.2674

## BHA 5 - Lateral 1 Section

FILE #: 4027075

WELL NAME: Cannon 16N-E3HZ

SERVICE CO.: Weatherford Drilling Services

JOB TYPE: Horizontal

COMPANY: Anadarko Petroleum Corporation

SURVEY TYPE: HEL LWD

RIG &amp; NO: Helmerich &amp; Payne 307

SURFACE LOCATION: Weld County

FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry, Trevor Cunningham

MWD Supervisor: Rusty Komrs

BHA SURVEY TYPE: HEL LWD

HOLE SIZE: 6.125 in

QTY	COMPONENT	MANFCT.	SERIAL #	MODEL	O.D.	I.D.	F.N.	BOT. CONN.	TOP CONN.	LEN.	C.LEN.
1	Security PDC Bit	Security	11889637	FXD54	6.125	0	0		3 1/2" REG Pin	1.00 ft	1.00 ft
1	Weatherford Motor	Weatherford	475-1103	ME6770	5.5	0	0.5	3 1/2" REG Box	3 1/2" IF Box	28.26 ft	29.26 ft
1	IB Stabilizer	Stabil Drill	SD 20001	Stabilizer	4.88	3.5	3.2	3 1/2" REG Pin	3 1/2" REG Box	5.11 ft	34.37 ft
1	SAGR	Weatherford	NW21692	LWD/Azi. GR	4.75	2.5	6.74	3 1/2" IF Pin	3 1/2" IF Box	14.21 ft	48.58 ft
1	Split IDS	WEATHERFORD	NW21691	LWD / Svy Snsr	4.75	2.5	3.36	3 1/2" IF Pin	3 1/2" IF Box	12.19 ft	60.77 ft
1	MFR	Weatherford	NW21690	LWD/Resistivity	4.75	2.5	7.33	3 1/2" IF Pin	3 1/2" IF Box	29.27 ft	90.04 ft
1	HEL LWD	Weatherford	NW21491	LWD/ Pulser	4.75	2.5	10.43	3 1/2" IF Pin	3 1/2" IF Box	14.60 ft	104.64 ft
1	NMDC	Weatherford	43546	Slick NMDC	4.84	2.75	0	3 1/2" IF Pin	3 1/2" IF Box	30.99 ft	135.63 ft
1	X/O Sub	Weatherford	44887	X/O Sub	5.04	2.625	0	3 1/2" IF Pin	XT-39 Box	2.68 ft	138.31 ft
1	Gost Reamer	Rig	SD80246	Ghost Reamer	5.01	2.5	0	XT39 Pin	XT39 Box	6.39 ft	144.70 ft
129	4" Drill Pipe	Rig	Rig	43 STDS	4	3.5	0	XT-39 Pin	XT-39 Box	4075.86	4220.56 ft
45	4" HWDP	Rig	Rig	15 STDS	4	2.75	0	XT-39 Pin	XT-39 Box	1373.84	5594.40 ft

(O.D. units are in; I.D. units are in; FNeck units are ft)

### GENERAL INFORMATION

DATES RUN: 2012/08/31 TO 2012/09/02  
 DEPTH IN: 7300.00 ft ANGLE IN: 90.26 °  
 DEPTH OUT: 11250.00 ft ANGLE OUT: 87.90 °  
 DRILL HRS: 29.17 BUILD: -2.36 °  
 ORIENTING HRS: 7.33 HOLE MADE: 3950.00 ft  
 ROTATING HRS: 21.83 AVG R.O.P.: 135.41 ft/hr

### MOTOR INFORMATION

MANFCT. Weatherford  
 SERIAL #: 475-1103  
 MODEL: ME6770  
 LOBE CFG: 6/7  
 BIT TO BEND: 6.08  
 SETTING: 1.50 °  
 KICK PAD: No  
 STABILIZER: No  
 MOTOR HRS: 37.83

### PUMP INFORMATION

PUMPS	PUMP 1	PUMP 2	PUMP 3
EFFICIENCY:	95.0%	95.0%	100.0%
S.P.M.:	78	0	0
STROKE VOLUME:	3.8438 gal/stk	0.0 gal/stk	0.0 gal/stk
TOTAL FLOW RATE:	299 gal/min		
PUMP PRESSURE:	OFF BTM: 2700 psi	ON BTM: 3500 psi	

### MUD INFORMATION

MUD TYPE: Water  
 LIQUID BASE: Water  
 DENSITY: 9.8 lb/gal  
 TEMP: 227 °F  
 VISCOSITY: 40 sec/qt  
 pH: 9  
 WTR LOSS: 5.6 cc/30min  
 SAND: 0.5  
 LIQUID RATE: 0 gal/min  
 PLAST VISC: 12 cP  
 SOLIDS: 0.1  
 GAS TYPE:  
 YIELD PT: 12 lb/100 ft²  
 OIL: 0  
 GAS RATE: 0 cu ft/min

### BIT INFORMATION

MANFCT: Security TYPE: FXD54 IADC BIT GRADE: ?/?/?/?/?/?/?/?  
 NOZZLES: 0.648 in² TFA

### REASON FOR BHA CHANGE

### FORMATION CHARACTERISTICS

### MWD COMMENTS



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# BHA Report

Drilling Services  
v4.2.2674

## BHA 5 - Lateral 1 Section

—SIDETRACKING PROCEDURE COMMENTS—

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—RUN SUMMARY—

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# MOTOR REPORTS

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**Weatherford**

# Motor / RSS Evaluation Report

Drilling Services  
v4.2.2674

## BHA 1 - Build & Hold Section, Motor #675-43581

FILE #: 4027075 WELL NAME: Cannon 16N-E3HZ SERVICE CO.: Weatherford Drilling Services  
 JOB TYPE: Horizontal COMPANY: Anadarko Petroleum Corporation SURVEY TYPE: HEL LWD  
 RIG & NO: Helmerich & Payne 307 SURFACE LOCATION: Weld County FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry  
 MWD Supervisor: Rusty Komrs

BHA SURVEY TYPE: Positive Pulse MWD

HOLE SIZE: 8.75 in

**GENERAL INFORMATION:**

BHA #: 1 START DEPTH: 819.00 ft  
 DATE IN: 2012/08/26 END DEPTH: 1017.00 ft  
 DATE OUT: 2012/08/26 HOLE MADE: 165.00 ft  
 ANGLE IN: 0.00 ° AVG ROP: 90.16 ft/hr  
 ANGLE OUT: 0.00 °  
 ORIENTING HRS: 0.00 ROTATING HRS: 1.83

**MOTOR INFORMATION:**

MANFCT: Weatherford  
 SERIAL #: 675-43581  
 MODEL: ME4570  
 LOBE: 4/5 BIT TO BEND: 3.87 ft  
 SETTING: 1.81 ° KICKPAD: No  
 STABILIZER: No

**DRILLING INFORMATION:**

BIT TYPE: DP505F IADC BIT GRADE: 1 / 1 / ? / ? / ? / ? / ? / DMF  
 BIT PRESS DROP: 0.00 psi TOTAL FLOW RATE: 598.00 gal/min PUMP PRESS: (OFF) 700.00 psi  
 MTR PRESS DROP: 0.00 psi NOZZLES: 0.648 in<sup>2</sup> TFA (ON) 1700.00 psi

**MUD INFORMATION:**

MUD TYPE: Water LIQUID BASE: Water (All units are imperial.)  
 DENSITY: 8 lb/gal VISCOSITY: 28 sec/qt  
 SAND: 0.010 WATER LOSS: 28.00 cc/30min LIQUID RATE: 0.00 gal/min  
 SOLIDS: 0.700 PLASTIC VISC: 2.0 cP GAS TYPE:  
 OIL: 0.000 YIELD POINT: 3.0 lb/100 ft<sup>2</sup> GAS RATE: 0.00 cu ft/min  
 TEMP: 125 °F pH: 7.9

**TIME INFORMATION:**

CIRCULATING HOURS: 1.25  
 REAMING HOURS: 0.00  
 TIME DRILL HOURS: 0.00  
 MOTOR DRILL HOURS: 1.83  
 MOTOR HOURS THIS RUN: 3.08  
 PREVIOUS HOURS: 0.00  
 TOTAL MOTOR HOURS: 3.08  
 TOTAL BRT HOURS: 3.08

**MOTOR EVALUATION COMMENTS:**

WFT Motor 4570 SN (675-43581) FAILED! This motor had a total of 3.08 hours on it. This motor was locked up from the very beginning. Once on surface I pumped through it to double check and the bit box would not turn. We were running 600 gpm through this Motor and it was verified we could do so through upper management.

**REASON FOR BHA CHANGE:**

Motor Failure

**COMMENTS FROM LAST DAY RAN:**

Drill Ahead F/ 852' -2602'

Nipple up / Test BOP's/ Rig service/ Change quill out for 4 1/2 HWDP.



**Weatherford®**

# Motor / RSS Evaluation Report

Drilling Services  
v4.2.2674

## BHA 1 - Build & Hold Section, Motor #675-43581

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Note. When the surface rig was drilling surface they thought they had dropped a fish downhole. They P/U a milltooth bit and drilled Flt equipment and to check for fish. Nothing was found. They plugged the hole back with CMT so we could get our casing test.

Drill CMT Only.

While spudding this well we were not getting ROP expected in rotation and had no Diff. pressure while drilling. Also, we were running more WOB than usual in this section of the well. WOB exceeded 35K to try to achieve desired ROP but it was never accomplished. While sliding I could not even drill a foot. WOB would immediatly stack out and I had everything but the blocks on it. WOB exceeded 35K while sliding and on similar wells in the area at this depth of 1,000' I normally would slide with 5K WOB.

POOH to check BHA

We wanted to double check to make sure we didn't tear this bit up if there is a fish downhole. Also Take a good look at the motor to make sure it is in operational condition.

WFT Motor 4570 SN (675-43581) FAILED! This motor had a total of 3.08 hours on it. This motor was locked up from the very beginning. Once on surface I pumped through it to double check and the bit box would not turn. We were running 600 gpm through this Motor and it was verified we could do so through upper managment.

**Weatherford®**

# Motor / RSS Evaluation Report

Drilling Services  
v4.2.2674

## BHA 2 - Build & Hold Section, Motor #675-43582

FILE #: 4027075

WELL NAME: Cannon 16N-E3HZ

SERVICE CO.: Weatherford Drilling Services

JOB TYPE: Horizontal

COMPANY: Anadarko Petroleum Corporation

SURVEY TYPE: HEL LWD

RIG &amp; NO: Helmerich &amp; Payne 307

SURFACE LOCATION: Weld County

FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry

MWD Supervisor: Rusty Komrs

BHA SURVEY TYPE: Positive Pulse MWD

HOLE SIZE: 8.75 in

**GENERAL INFORMATION:**

**BHA #:** 2  
**DATE IN:** 2012/08/26  
**DATE OUT:** 2012/08/27  
**ANGLE IN:** 0.51 °  
**ANGLE OUT:** 2.39 °  
**ORIENTING HRS:** 2.03  
**START DEPTH:** 1017.00 ft  
**END DEPTH:** 4593.00 ft  
**HOLE MADE:** 3576.00 ft  
**AVG ROP:** 175.90 ft/hr  
**ROTATING HRS:** 18.30

**MOTOR INFORMATION:**

**MANFCT:** Weatherford  
**SERIAL #:** 675-43582  
**MODEL:** QME4570  
**LOBE:** 4/5  
**SETTING:** 1.81 °  
**BIT TO BEND:** 3.5 ft  
**KICKPAD:** No  
**STABILIZER:** No

**DRILLING INFORMATION:**

**BIT TYPE:** DP505F  
**BIT PRESS DROP:** 0.00 psi  
**MTR PRESS DROP:** 0.00 psi  
**IADC BIT GRADE:** ?/?/?/?/?/?/?/?/?  
**TOTAL FLOW RATE:** 598.00 gal/min  
**NOZZLES:** 0.648 in<sup>2</sup> TFA  
**PUMP PRESS:** (OFF) 2000.00 psi  
**(ON)** 3200.00 psi

**MUD INFORMATION:**

**MUD TYPE:** Water  
**DENSITY:** 8 lb/gal  
**SAND:** 0.010  
**SOLIDS:** 0.400  
**OIL:** 0.000  
**TEMP:** 108 °F  
**LIQUID BASE:** Water  
**VISCOSITY:** 26 sec/qt  
**WATER LOSS:** 28.00 cc/30min  
**PLASTIC VISC:** 2.0 cP  
**YIELD POINT:** 3.0 lb/100 ft<sup>2</sup>  
**pH:** 8.2  
**LIQUID RATE:** 0.00 gal/min  
**GAS TYPE:**  
**GAS RATE:** 0.00 cu ft/min  
 (All units are imperial.)

**TIME INFORMATION:**

**CIRCULATING HOURS:** 4.67  
**REAMING HOURS:** 0.00  
**TIME DRILL HOURS:** 0.00  
**MOTOR DRILL HOURS:** 20.33  
**MOTOR HOURS THIS RUN:** 25.00  
**PREVIOUS HOURS:** 0.00  
**TOTAL MOTOR HOURS:** 25.00  
**TOTAL BRT HOURS:** 25.00

**MOTOR EVALUATION COMMENTS:**

WFT Motor 4570 MBTB SN (675-43582) FAILED! This motor had a total of 24 hours on it. We experienced chunking of the motor and were getting a lot of stator rubber over the shakers. This was a 1.81 MBTB motor. 600 gpm was ran through it per upper managements request. RPM's ran were 40-50.

**REASON FOR BHA CHANGE:**

Motor FAILURE

**COMMENTS FROM LAST DAY RAN:**

Drill F/ 2506 to 4418'

Motor failed at 4418'. We experienced chunking of the motor and were getting a lot of stator rubber over the shakers. This was a 1.81 MBTB motor. 600 gpm was ran through it per upper managements request. RPM's ran were 40-50.





**Weatherford®**

# Motor / RSS Evaluation Report

Drilling Services

v4.2.2674

**BHA 2 - Build & Hold Section, Motor #675-43582**

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POOH For Motor

**Weatherford®**

# Motor / RSS Evaluation Report

Drilling Services  
v4.2.2674

## BHA 3 - Build & Hold Section, Motor #675-1716

FILE #: 4027075

JOB TYPE: Horizontal

RIG &amp; NO: Helmerich &amp; Payne 307

WELL NAME: Cannon 16N-E3HZ

COMPANY: Anadarko Petroleum Corporation

SURFACE LOCATION: Weld County

SERVICE CO.: Weatherford Drilling Services

SURVEY TYPE: HEL LWD

FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry, Trevor Cunningham

MWD Supervisor: Rusty Komrs

BHA SURVEY TYPE: Positive Pulse MWD

HOLE SIZE: 8.75 in

**GENERAL INFORMATION:**

**BHA #:** 3  
**DATE IN:** 2012/08/28  
**DATE OUT:** 2012/08/28  
**ANGLE IN:** 1.33 °  
**ANGLE OUT:** 1.15 °  
**ORIENTING HRS:** 1.83  
**START DEPTH:** 4687.00 ft  
**END DEPTH:** 6262.00 ft  
**HOLE MADE:** 1669.00 ft  
**AVG ROP:** 150.63 ft/hr  
**ROTATING HRS:** 9.25

**MOTOR INFORMATION:**

**MANFCT:** Weatherford  
**SERIAL #:** 675-1716  
**MODEL:** QLE7850  
**LOBE:** 7/8  
**SETTING:** 1.50 °  
**BIT TO BEND:** 6.53 ft  
**KICKPAD:** No  
**STABILIZER:** No

**DRILLING INFORMATION:**

**BIT TYPE:** DP505F  
**BIT PRESS DROP:** 0.00 psi  
**MTR PRESS DROP:** 0.00 psi  
**IADC BIT GRADE:** ? / ? / ? / ? / ? / ? / ? / TD  
**TOTAL FLOW RATE:** 598.00 gal/min  
**NOZZLES:** 0.648 in<sup>2</sup> TFA  
**PUMP PRESS:** (OFF) 2200.00 psi  
**(ON)** 2800.00 psi

**MUD INFORMATION:**

**MUD TYPE:** Water  
**DENSITY:** 8 lb/gal  
**SAND:** 0.010  
**SOLIDS:** 0.400  
**OIL:** 0.000  
**TEMP:** 108 °F  
**LIQUID BASE:** Water  
**VISCOSITY:** 28 sec/qt  
**WATER LOSS:** 28.00 cc/30min  
**PLASTIC VISC:** 2.0 cP  
**YIELD POINT:** 3.0 lb/100 ft<sup>2</sup>  
**pH:** 8.2  
**LIQUID RATE:** 0.00 gal/min  
**GAS TYPE:**  
**GAS RATE:** 0.00 cu ft/min  
 (All units are imperial.)

**TIME INFORMATION:**

**CIRCULATING HOURS:** 2.92  
**REAMING HOURS:** 0.00  
**TIME DRILL HOURS:** 0.00  
**MOTOR DRILL HOURS:** 11.08  
**MOTOR HOURS THIS RUN:** 14.00  
**PREVIOUS HOURS:** 0.00  
**TOTAL MOTOR HOURS:** 14.00  
**TOTAL BRT HOURS:** 14.00

**MOTOR EVALUATION COMMENTS:**

WFT Motor SN (675-1716) 7850 performed as expected. This Motor had a total of 14 Hours on it. Motor looked good and drained good when laid down. This motor had 1/8" of play in it when squat tested.

**REASON FOR BHA CHANGE:**

TD Straight hole

**COMMENTS FROM LAST DAY RAN:**

Drill F/ 4593 to 6363'

TD Build, Hold & Drop

POOH to P/U curve assembly.

**Weatherford®**

# Motor / RSS Evaluation Report

Drilling Services  
v4.2.2674

## BHA 4 - Curve Section, Motor #675-4019

FILE #: 4027075

WELL NAME: Cannon 16N-E3HZ

SERVICE CO.: Weatherford Drilling Services

JOB TYPE: Horizontal

COMPANY: Anadarko Petroleum Corporation

SURVEY TYPE: HEL LWD

RIG &amp; NO: Helmerich &amp; Payne 307

SURFACE LOCATION: Weld County

FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry, Trevor Cunningham

MWD Supervisor: Rusty Komrs

BHA SURVEY TYPE: Positive Pulse MWD

HOLE SIZE: 8.75 in

**GENERAL INFORMATION:**

**BHA #:** 4  
**DATE IN:** 2012/08/28  
**DATE OUT:** 2012/08/31  
**ANGLE IN:** 0.53 °  
**ANGLE OUT:** 82.01 °  
**ORIENTING HRS:** 17.83  
**START DEPTH:** 6262.00 ft  
**END DEPTH:** 7300.00 ft  
**HOLE MADE:** 1038.00 ft  
**AVG ROP:** 45.97 ft/hr  
**ROTATING HRS:** 4.75

**MOTOR INFORMATION:**

**MANFCT:** Weatherford  
**SERIAL #:** 675-4019  
**MODEL:** ME6770  
**LOBE:** 7/8  
**SETTING:** 2.38 °  
**BIT TO BEND:** 6.35 ft  
**KICKPAD:** No  
**STABILIZER:** No

**DRILLING INFORMATION:**

**BIT TYPE:** DP505F  
**BIT PRESS DROP:** 0.00 psi  
**MTR PRESS DROP:** 0.00 psi  
**IADC BIT GRADE:** 1 / 2 / CT / ? / X / I / FC / TD  
**TOTAL FLOW RATE:** 299.00 gal/min  
**NOZZLES:** 0.648 in<sup>2</sup> TFA  
**PUMP PRESS:** (OFF) 2100.00 psi  
**(ON)** 2900.00 psi

**MUD INFORMATION:**

**MUD TYPE:** Water  
**DENSITY:** 10 lb/gal  
**SAND:** 0.050  
**SOLIDS:** 7.900  
**OIL:** 2.000  
**TEMP:** 128 °F  
**LIQUID BASE:** Water  
**VISCOSITY:** 39 sec/qt  
**WATER LOSS:** 5.20 cc/30min  
**PLASTIC VISC:** 11.0 cP  
**YIELD POINT:** 9.0 lb/100 ft<sup>2</sup>  
**pH:** 9.7  
**LIQUID RATE:** 0.00 gal/min  
**GAS TYPE:**  
**GAS RATE:** 0.00 cu ft/min  
 (All units are imperial.)

**TIME INFORMATION:**

**CIRCULATING HOURS:** 6.17  
**REAMING HOURS:** 0.00  
**TIME DRILL HOURS:** 0.00  
**MOTOR DRILL HOURS:** 22.58  
**MOTOR HOURS THIS RUN:** 28.75  
**PREVIOUS HOURS:** 0.00  
**TOTAL MOTOR HOURS:** 28.75  
**TOTAL BRT HOURS:** 29.25

**MOTOR EVALUATION COMMENTS:**

Weatherford motor 675-4019 7850 Performed as expected. This motor only has 22 drill hrs total. Motor looked good and drained good when laid down. This motor had 1/8" of play in it when squat tested.

**REASON FOR BHA CHANGE:**

T.D. Curve section.

**COMMENTS FROM LAST DAY RAN:**

Wait on Prders to P/U Lateral BHA.

Tag cement @ 7095, drill cement float, shoe out from 7095 to 7300

Drill F/ 7300 to 8156

**Weatherford®**

# Motor / RSS Evaluation Report

Drilling Services  
v4.2.2674

## BHA 5 - Lateral 1 Section, Motor #475-1103

FILE #: 4027075

WELL NAME: Cannon 16N-E3HZ

SERVICE CO.: Weatherford Drilling Services

JOB TYPE: Horizontal

COMPANY: Anadarko Petroleum Corporation

SURVEY TYPE: HEL LWD

RIG &amp; NO: Helmerich &amp; Payne 307

SURFACE LOCATION: Weld County

FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry, Trevor Cunningham

MWD Supervisor: Rusty Komrs

BHA SURVEY TYPE: HEL LWD

HOLE SIZE: 6.125 in

**GENERAL INFORMATION:**

BHA #: 5  
 DATE IN: 2012/08/31  
 DATE OUT: 2012/09/02  
 ANGLE IN: 90.26 °  
 ANGLE OUT: 87.90 °  
 ORIENTING HRS: 7.33

START DEPTH: 7300.00 ft  
 END DEPTH: 11250.00 ft  
 HOLE MADE: 3950.00 ft  
 AVG ROP: 135.41 ft/hr  
 ROTATING HRS: 21.83

**MOTOR INFORMATION:**

MANFCT: Weatherford  
 SERIAL #: 475-1103  
 MODEL: ME6770  
 LOBE: 6/7  
 SETTING: 1.50 °

BIT TO BEND: 6.08 ft  
 KICKPAD: No  
 STABILIZER: No

**DRILLING INFORMATION:**

BIT TYPE: FXD54  
 BIT PRESS DROP: 0.00 psi  
 MTR PRESS DROP: 0.00 psi

IADC BIT GRADE: ? / ? / ? / ? / ? / ? / ? / ? / ?  
 TOTAL FLOW RATE: 299.00 gal/min  
 NOZZLES: 0.648 in<sup>2</sup> TFA

PUMP PRESS: (OFF) 2700.00 psi  
 (ON) 3500.00 psi

**MUD INFORMATION:**

MUD TYPE: Water  
 DENSITY: 10 lb/gal  
 SAND: 0.500  
 SOLIDS: 0.100  
 OIL: 0.000  
 TEMP: 227 °F

LIQUID BASE: Water  
 VISCOSITY: 40 sec/qt  
 WATER LOSS: 5.60 cc/30min  
 PLASTIC VISC: 12.0 cP  
 YIELD POINT: 12.0 lb/100 ft<sup>2</sup>  
 pH: 9.0

LIQUID RATE: 0.00 gal/min  
 GAS TYPE:  
 GAS RATE: 0.00 cu ft/min

(All units are imperial.)

**TIME INFORMATION:**

CIRCULATING HOURS: 8.67  
 REAMING HOURS: 0.00  
 TIME DRILL HOURS: 0.00  
 MOTOR DRILL HOURS: 29.17

MOTOR HOURS THIS RUN: 37.83  
 PREVIOUS HOURS: 0.00

TOTAL MOTOR HOURS: 37.83  
 TOTAL BRT HOURS: 37.83

**MOTOR EVALUATION COMMENTS:****REASON FOR BHA CHANGE:****COMMENTS FROM LAST DAY RAN:**

Drill F/ 11005 to 11250 T.D. Giveing Anadarko there 20' set back .



# SLIDE REPORT

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# Slide Sheet Report

Drilling Services

v4.2.2674

BHA 1 - 2012/08/26 TO 2012/08/26

FILE #: 4027075

JOB TYPE: Horizontal

RIG & NO: Helmerich & Payne 307

WELL NAME: Cannon 16N-E3HZ

COMPANY: Anadarko Petroleum Corporation

SURFACE LOCATION: Weld County

SERVICE CO.: Weatherford Drilling Services

SURVEY TYPE: HEL LWD

FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry

MWD Supervisor: Rusty Komrs

BHA NO: 1	DATES RUN: 2012/08/26 TO 2012/08/26	SECTION: Build & Ho	TOOLFACE OFFSET: 114.6 °	SURVEY OFFSET: 58 ft
MOTOR SETTING: 1.81 °	KICKPAD: No	STABILIZER: No	MODEL: ME4570	SERIAL NO: 675-43581
			BHA SURVEY TYPE: Positive Pulse MWD	

(Distances are shown in feet.)

BIT DEPTH DRILLED	SURVEY DEPTH	INC	AZM	TF	----- ORIENTING -----			----- ROTATING -----			SLIDE SEEN	BUR	BUR	COMMENTS
					FROM	TO		FROM	TO					
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Totals:					0.00 ft			0.00 ft						
Percentages:					0.0%			0.0%						
Time:					0.00 hrs			1.83 hrs						
Percentages:					0.0%			100.0%						



# Slide Sheet Report

Drilling Services

v4.2.2674

BHA 2 - 2012/08/26 TO 2012/08/27

FILE #: 4027075

JOB TYPE: Horizontal

RIG & NO: Helmerich & Payne 307

WELL NAME: Cannon 16N-E3HZ

COMPANY: Anadarko Petroleum Corporation

SURFACE LOCATION: Weld County

SERVICE CO.: Weatherford Drilling Services

SURVEY TYPE: HEL LWD

FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry

MWD Supervisor: Rusty Komrs

BHA NO: 2	DATES RUN: 2012/08/26 TO 2012/08/27	SECTION: Build & Ho	TOOLFACE OFFSET: 207.4 °	SURVEY OFFSET: 58 ft
MOTOR SETTING: 1.81 °	KICKPAD: No	STABILIZER: No	MODEL: QME4570	SERIAL NO: 675-43582
			BHA SURVEY TYPE: Positive Pulse MWD	

(Distances are shown in feet.)

BIT DEPTH DRILLED	SURVEY DEPTH	INC	AZM	TF	----- ORIENTING -----			----- ROTATING -----			SLIDE SEEN	BUR /ft	BUR /100ft	COMMENTS
					FROM	TO	FEET	FROM	TO	FEET				
1017.00	79.00	959.00	0.51	0.00	320 M	1017.00	1032.00	15.00	1032.00	1096.00	64.00	0.00	0.00	0.00
1096.00	91.00	1038.00	1.91	318.73	310 M	1096.00	1111.00	15.00	1111.00	1187.00	76.00	15.00	0.09	1.77
1187.00	90.00	1129.00	5.05	329.25	30 L	1187.00	1197.00	10.00	1197.00	1277.00	80.00	15.00	0.21	3.45
1277.00	93.00	1219.00	6.63	326.63	45 L	1277.00	1287.00	10.00	1287.00	1370.00	83.00	10.00	0.16	1.76
1370.00	188.00	1312.00	7.88	318.17	60 L	1370.00	1378.00	8.00	1378.00	1558.00	180.00	10.00	0.13	1.34
1558.00	285.00	1500.00	9.14	307.43	85 L	1558.00	1563.00	5.00	1563.00	1843.00	280.00	8.00	0.16	0.67
1843.00	95.00	1785.00	8.68	290.75	85 R	1843.00	1849.00	6.00	1849.00	1938.00	89.00	5.00	-0.09	-0.16
1938.00	189.00	1880.00	8.42	295.31	90 R	1938.00	1948.00	10.00	1948.00	2127.00	179.00	6.00	-0.04	-0.27
2127.00	285.00	2069.00	7.44	298.70	85 R	2127.00	2137.00	10.00	2137.00	2412.00	275.00	10.00	-0.10	-0.52
2412.00	284.00	2354.00	6.29	310.35	10 L	2412.00	2422.00	10.00	2422.00	2696.00	274.00	10.00	-0.12	-0.40
2696.00	664.00	2638.00	6.24	302.31	20 R	2696.00	2721.00	25.00	2721.00	3360.00	639.00	10.00	0.00	-0.02
3360.00	191.00	3302.00	6.18	313.63	35 L	3360.00	3380.00	20.00	3380.00	3551.00	171.00	25.00	0.00	-0.01
3551.00	189.00	3493.00	5.98	298.93	HS	3551.00	3572.00	21.00	3572.00	3740.00	168.00	20.00	-0.01	-0.10
3740.00	190.00	3682.00	8.11	303.29	LS	3740.00	3752.00	12.00	3752.00	3930.00	178.00	21.00	0.10	1.13
3930.00	94.00	3872.00	4.11	302.91	LS	3930.00	3940.00	10.00	3940.00	4024.00	84.00	12.00	-0.33	-2.11
4024.00	394.00	3966.00	2.39	296.62	LS	4024.00	4038.00	14.00	4038.00	4418.00	380.00	10.00	-0.17	-1.83

Totals:	201.00 ft	3200.00 ft
Percentages:	5.9%	94.1%
Time:	2.03 hrs	18.30 hrs
Percentages:	10.0%	90.0%



# Slide Sheet Report

Drilling Services

v4.2.2674

BHA 3 - 2012/08/28 TO 2012/08/28

FILE #: 4027075

JOB TYPE: Horizontal

RIG & NO: Helmerich & Payne 307

WELL NAME: Cannon 16N-E3HZ

COMPANY: Anadarko Petroleum Corporation

SURFACE LOCATION: Weld County

SERVICE CO.: Weatherford Drilling Services

SURVEY TYPE: HEL LWD

FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry, Trevor Cunningham

MWD Supervisor: Rusty Komrs

BHA NO: 3	DATES RUN: 2012/08/28 TO 2012/08/28	SECTION: Build & Ho	TOOLFACE OFFSET: 32.96 °	SURVEY OFFSET: 58 ft
MOTOR SETTING: 1.50 °	KICKPAD: No	STABILIZER: No	MODEL: QLE7850	SERIAL NO: 675-1716
			BHA SURVEY TYPE: Positive Pulse MWD	

(Distances are shown in feet.)

BIT		SURVEY					----- ORIENTING -----			----- ROTATING -----			SLIDE	BUR	BUR	COMMENTS
DEPTH	DRILLED	DEPTH	INC	AZM	TF		FROM	TO	FEET	FROM	TO	FEET	SEEN	/ft	/100ft	
4971.00	285.00	4913.00	1.33	291.04	111 M		4971.00	4991.00	20.00	4991.00	5256.00	265.00	0.00	0.00	0.00	
5256.00	569.00	5198.00	0.90	308.59	128 M		5256.00	5281.00	25.00	5281.00	5825.00	544.00	20.00	-0.02	-0.15	
5825.00	285.00	5767.00	1.55	200.29	20M		5825.00	5845.00	20.00	5845.00	6110.00	265.00	25.00	0.03	0.11	
6110.00	6262.00	6052.00	1.15	186.22	20M		6110.00	6125.00	15.00	6125.00	12372.00	6247.00	20.00	-0.02	-0.14	

Totals:	80.00 ft	7321.00 ft
Percentages:	1.1%	98.9%
Time:	1.83 hrs	9.25 hrs
Percentages:	16.5%	83.5%





# Slide Sheet Report

Drilling Services

v4.2.2674

BHA 4 - 2012/08/28 TO 2012/08/31

FILE #: 4027075

JOB TYPE: Horizontal

RIG & NO: Helmerich & Payne 307

WELL NAME: Cannon 16N-E3HZ

COMPANY: Anadarko Petroleum Corporation

SURFACE LOCATION: Weld County

SERVICE CO.: Weatherford Drilling Services

SURVEY TYPE: HEL LWD

FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry, Trevor Cunningham

MWD Supervisor: Rusty Komrs

BHA NO: 4	DATES RUN: 2012/08/28 TO 2012/08/31	SECTION: Curve	TOOLFACE OFFSET: 211.9 °	SURVEY OFFSET: 58 ft
MOTOR SETTING: 2.38 °	KICKPAD: No	STABILIZER: No	MODEL: ME6770	SERIAL NO: 675-4019
			BHA SURVEY TYPE: Positive Pulse MWD	

(Distances are shown in feet.)

BIT		SURVEY				----- ORIENTING -----			----- ROTATING -----			SLIDE	BUR	BUR	COMMENTS
DEPTH	DRILLED	DEPTH	INC	AZM	TF	FROM	TO	FEET	FROM	TO	FEET	SEEN	/ft	/100ft	
6262.00	38.00	6204.00	0.53	193.62	180 M	6262.00	6300.00	38.00	6300.00	6300.00	0.00	0.00	0.00	0.00	
6300.00	31.00	6242.00	0.85	190.24	175 M	6300.00	6331.00	31.00	6331.00	6331.00	0.00	0.00	0.00	0.84	
6331.00	32.00	6273.00	3.84	177.97	180 M	6331.00	6363.00	32.00	6363.00	6363.00	0.00	11.00	0.27	9.65	
6363.00	31.00	6305.00	7.81	171.40	20 R	6363.00	6387.00	24.00	6387.00	6394.00	7.00	32.00	0.12	12.41	
6394.00	32.00	6336.00	11.90	169.72	20 R	6394.00	6417.00	23.00	6417.00	6426.00	9.00	31.00	0.13	13.19	
6426.00	63.00	6368.00	15.51	172.66	20 R	6426.00	6440.00	14.00	6440.00	6489.00	49.00	32.00	0.11	11.28	
6489.00	32.00	6431.00	19.55	175.35	70 R	6489.00	6497.00	8.00	6497.00	6521.00	24.00	47.00	0.09	6.41	
6521.00	31.00	6463.00	19.50	176.05	70 R	6521.00	6531.00	10.00	6531.00	6552.00	21.00	9.00	-0.01	-0.16	
6552.00	32.00	6494.00	19.11	178.96	HS	6552.00	6584.00	32.00	6584.00	6584.00	0.00	5.00	-0.08	-1.26	
6584.00	32.00	6526.00	19.09	182.00	HS	6584.00	6616.00	32.00	6616.00	6616.00	0.00	8.00	0.00	-0.06	
6616.00	31.00	6558.00	20.84	182.35	HS	6616.00	6632.00	16.00	6632.00	6647.00	15.00	11.00	0.16	5.47	
6647.00	32.00	6589.00	24.31	181.12	HS	6647.00	6673.00	26.00	6673.00	6679.00	6.00	31.00	0.11	11.19	
6679.00	32.00	6621.00	26.97	179.37	HSR	6679.00	6711.00	32.00	6711.00	6711.00	0.00	32.00	0.08	8.31	
6711.00	32.00	6653.00	28.36	177.05	25R	6711.00	6743.00	32.00	6743.00	6743.00	0.00	17.00	0.08	4.34	
6743.00	32.00	6685.00	31.10	176.99	HSR	6743.00	6771.00	28.00	6771.00	6775.00	4.00	26.00	0.11	8.56	
6775.00	31.00	6717.00	34.64	176.77	30R	6775.00	6806.00	31.00	6806.00	6806.00	0.00	32.00	0.11	11.06	
6806.00	32.00	6748.00	37.82	178.35	HS	6806.00	6833.00	27.00	6833.00	6838.00	5.00	31.00	0.10	10.26	
6838.00	31.00	6780.00	41.64	179.43	HS	6838.00	6856.00	18.00	6856.00	6869.00	13.00	28.00	0.14	11.94	
6869.00	32.00	6811.00	44.48	181.44	HS	6869.00	6899.00	30.00	6899.00	6901.00	2.00	31.00	0.09	9.16	
6901.00	31.00	6843.00	46.99	181.10	HS	6901.00	6932.00	31.00	6932.00	6932.00	0.00	27.00	0.09	7.84	
6932.00	32.00	6874.00	49.62	180.46	10R	6932.00	6949.00	17.00	6949.00	6964.00	15.00	18.00	0.15	8.48	
6964.00	32.00	6906.00	53.19	18.33	HS	6964.00	6988.00	24.00	6988.00	6996.00	8.00	30.00	0.12	11.16	
6996.00	31.00	6938.00	56.53	179.73	HSR	6996.00	7025.00	29.00	7025.00	7027.00	2.00	32.00	0.10	10.44	
7027.00	32.00	6969.00	57.87	177.70	HS	7027.00	7059.00	32.00	7059.00	7059.00	0.00	16.00	0.08	4.32	
7059.00	31.00	7001.00	60.21	177.46	20 R	7059.00	7090.00	31.00	7090.00	7090.00	0.00	24.00	0.10	7.31	

(Distances are shown in feet.)

# Slide Sheet Report

**BHA 4 - 2012/08/28 TO 2012/08/31**

**Drilling Services**

v4.2.2674

BIT		SURVEY				----- ORIENTING -----			----- ROTATING -----			SLIDE	BUR	BUR	COMMENTS
DEPTH	DRILLED	DEPTH	INC	AZM	TF	FROM	TO	FEET	FROM	TO	FEET	SEEN	/ft	/100ft	
7090.00	32.00	7032.00	63.47	178.41	20 R	7090.00	7114.00	24.00	7114.00	7122.00	8.00	29.00	0.11	10.52	
7122.00	32.00	7064.00	67.60	178.75	15 R	7122.00	7140.00	18.00	7140.00	7154.00	14.00	32.00	0.13	12.91	
7154.00	31.00	7096.00	71.43	178.87	20 R	7154.00	7179.00	25.00	7179.00	7185.00	6.00	32.00	0.12	11.97	
7185.00	32.00	7127.00	74.78	178.98	HS	7185.00	7197.00	12.00	7197.00	7217.00	20.00	23.00	0.15	10.81	
7217.00	31.00	7159.00	77.87	179.48	20 R	7217.00	7225.00	8.00	7225.00	7248.00	23.00	18.00	0.17	9.66	
7248.00	32.00	7190.00	80.31	180.32	HS	7248.00	7280.00	32.00	7280.00	7280.00	0.00	25.00	0.10	7.87	
7280.00	20.00	7222.00	82.01	180.66	HS	7280.00	7300.00	20.00	7300.00	7300.00	0.00	12.00	0.14	5.31	

<b>Totals:</b>	787.00 ft	251.00 ft
<b>Percentages:</b>	75.8%	24.2%
<b>Time:</b>	17.83 hrs	4.75 hrs
<b>Percentages:</b>	79.0%	21.0%



# Slide Sheet Report

Drilling Services

v4.2.2674

BHA 5 - 2012/08/31 TO 2012/09/02

FILE #: 4027075

JOB TYPE: Horizontal

RIG & NO: Helmerich & Payne 307

WELL NAME: Cannon 16N-E3HZ

COMPANY: Anadarko Petroleum Corporation

SURFACE LOCATION: Weld County

SERVICE CO.: Weatherford Drilling Services

SURVEY TYPE: HEL LWD

FIELD / LOCATION: Wattenburg / CO / USA

DIR Supervisor: Josh Monroe, Charles Apodaca, Jacob Hofer, Terrell Lowry, Trevor Cunningham

MWD Supervisor: Rusty Komrs

BHA NO: 5	DATES RUN: 2012/08/31 TO 2012/09/02	SECTION: Lateral 1	TOOLFACE OFFSET: 15.90 °	SURVEY OFFSET: 55 ft
MOTOR SETTING: 1.50 °	KICKPAD: No	STABILIZER: No	MODEL: ME6770	SERIAL NO: 475-1103
				BHA SURVEY TYPE: HEL LWD

(Distances are shown in feet.)

BIT		SURVEY				----- ORIENTING -----			----- ROTATING -----			SLIDE	BUR	BUR	COMMENTS
DEPTH	DRILLED	DEPTH	INC	AZM	TF	FROM	TO	FEET	FROM	TO	FEET	SEEN	/ft	/100ft	
7682.00	95.00	7627.00	90.26	185.50	90 L	7682.00	7702.00	20.00	7702.00	7777.00	75.00	0.00	0.00	0.00	
7777.00	95.00	7722.00	90.88	186.03	90 L	7777.00	7819.00	42.00	7819.00	7872.00	53.00	20.00	0.03	0.65	
7872.00	95.00	7817.00	91.05	185.33	90 L	7872.00	7914.00	42.00	7914.00	7967.00	53.00	40.00	0.00	0.18	
7967.00	189.00	7912.00	90.79	181.62	95 L	7967.00	7987.00	20.00	7987.00	8156.00	169.00	42.00	-0.01	-0.27	
8156.00	571.00	8101.00	90.86	179.25	90 L	8156.00	8171.00	15.00	8171.00	8727.00	556.00	22.00	0.00	0.04	
8727.00	95.00	8672.00	87.71	176.53	50 R	8727.00	8762.00	35.00	8762.00	8822.00	60.00	15.00	-0.21	-0.55	
8822.00	95.00	8767.00	88.46	178.20	HS	8822.00	8832.00	10.00	8832.00	8917.00	85.00	35.00	0.02	0.79	
8917.00	284.00	8862.00	88.85	178.09	20 R	8917.00	8937.00	20.00	8937.00	9201.00	264.00	10.00	0.04	0.41	
9201.00	95.00	9146.00	90.12	178.72	45 R	9201.00	9217.00	16.00	9217.00	9296.00	79.00	20.00	0.06	0.45	
9296.00	285.00	9241.00	89.75	180.56	HS	9296.00	9316.00	20.00	9316.00	9581.00	265.00	16.00	-0.02	-0.39	
9581.00	190.00	9526.00	89.38	180.56	HS	9581.00	9601.00	20.00	9601.00	9771.00	170.00	20.00	-0.02	-0.13	
9771.00	379.00	9716.00	90.68	179.68	HS	9771.00	9786.00	15.00	9786.00	10150.00	364.00	20.00	0.07	0.68	
10150.00	1046.00	10095.00	90.18	180.20	HS	10150.00	10162.00	12.00	10162.00	11196.00	1034.00	15.00	-0.03	-0.13	
11196.00	0.00	11141.00	87.90	178.43	45 R	11196.00	11221.00	25.00	11221.00	11196.00	-25.00	12.00	-0.19	-0.22	

Totals:	312.00 ft	3202.00 ft
Percentages:	8.9%	91.1%
Time:	7.33 hrs	21.83 hrs
Percentages:	25.1%	74.9%