

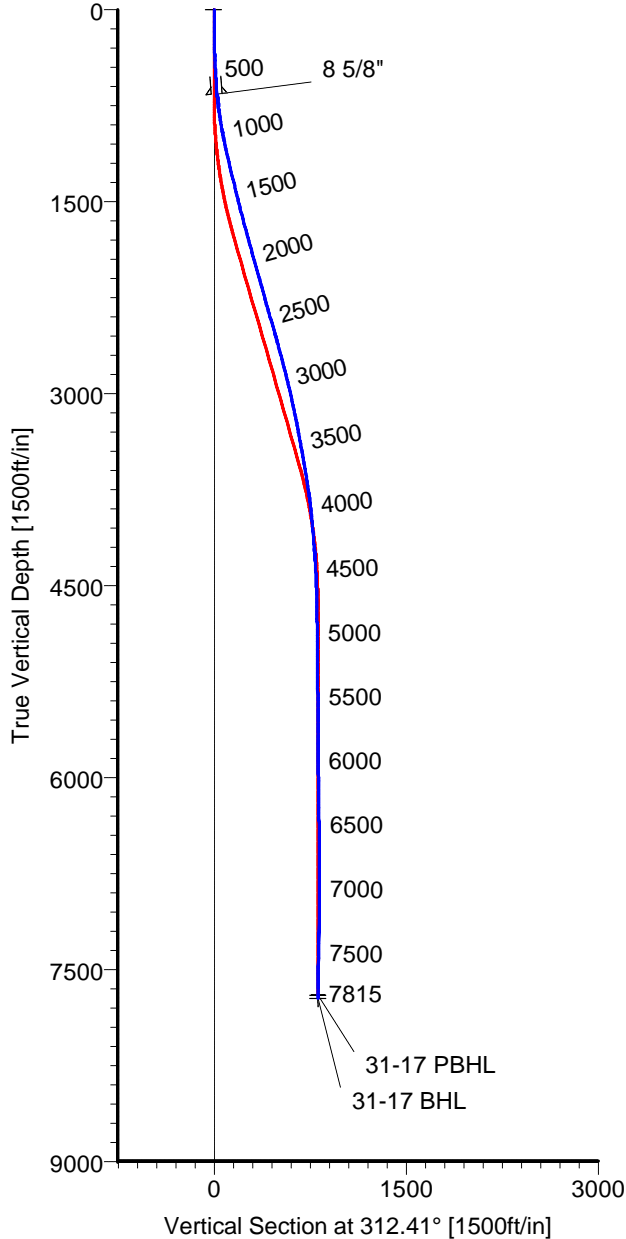
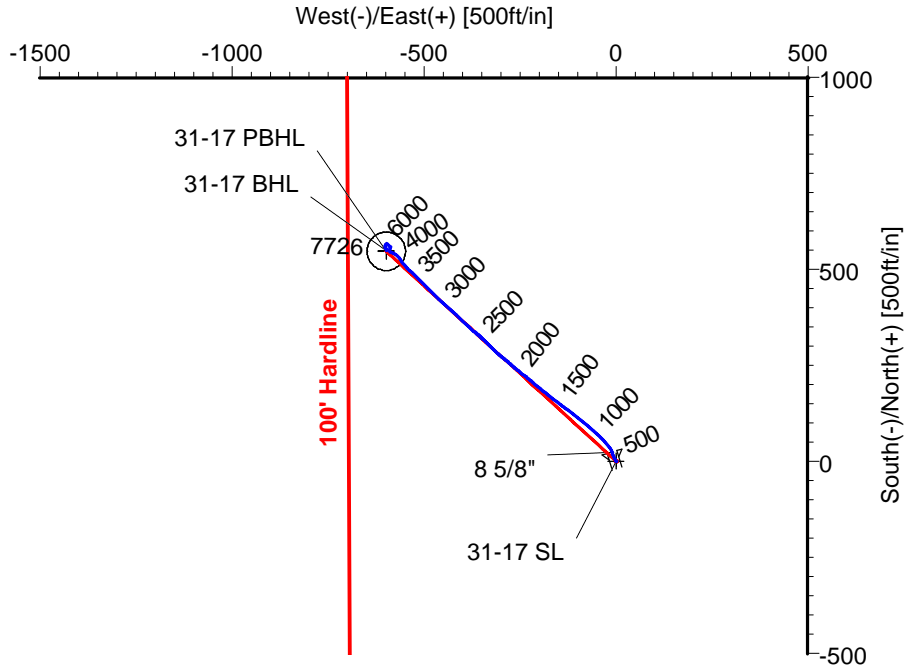
# ANADARKO PETROLEUM

Field: Weld County, CO  
Site: Elliot 5-17 Pad  
Well: 31-17  
Wellpath: Original Hole



Azimuths to Grid North  
True North: -0.37°  
Magnetic North: 8.61°

Magnetic Field  
Strength: 53105nT  
Dip Angle: 66.90°  
Date: 01/21/2011  
Model: IGRF2010



## CASING DETAILS

No.	TVD	MD	Name	Size
1	659.26	660.00	8 5/8"	8.625

## LEGEND

- 31-17, Original Hole, Plan #1
- Original Hole

## TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
31-17 SL	0.00	0.00	0.00	40°13'40.621N	104°55'14.758W	Point
31-17 PBHL	7700.00	546.87	-598.69	40°13'46.064N	104°55'22.431W	Circle (Radius: 50)
31-17 BHL	7725.76	549.06	-597.97	40°13'46.086N	104°55'22.421W	Point

Wellpath: (31-17/Original Hole)

Created By: Ivonne Gonzalez

Date: 02/18/2011

ALLIS CHALMERS DIRECTIONAL DRILLING SERVICES  
911 Regional Park Drive Houston, Texas 77060  
Phone: 713-934-9600 Fax: 713-934-9067



DIRECTIONAL  
DRILLING SERVICES

# Allis-Chalmers Energy, Inc.

## Survey Report

<b>Company:</b> ANADARKO PETROLEUM		<b>Date:</b> 02/18/2011		<b>Time:</b> 06:32:13		<b>Page:</b> 1	
<b>Field:</b> Weld County, CO		<b>Co-ordinate(NE) Reference:</b> Well: 31-17, Grid North					
<b>Site:</b> Elliot 5-17 Pad		<b>Vertical (TVD) Reference:</b> 4813'KB+13'KB 4826.0					
<b>Well:</b> 31-17		<b>Section (VS) Reference:</b> Well (0.00N,0.00E,312.41Azi)					
<b>Wellpath:</b> Original Hole		<b>Survey Calculation Method:</b> Minimum Curvature		<b>Db:</b> Sybase			

<b>Field:</b> Weld County, CO	
<b>Map System:</b> US State Plane Coordinate System 1983	<b>Map Zone:</b> Colorado, Northern Zone
<b>Geo Datum:</b> GRS 1980	<b>Coordinate System:</b> Well Centre
<b>Sys Datum:</b> Mean Sea Level	<b>Geomagnetic Model:</b> IGRF2010

<b>Site:</b> Elliot 5-17 Pad	
Centered on 21-17 Well	
<b>Site Position:</b>	
<b>From:</b> Geographic	<b>Northing:</b> 1326415.06 ft
<b>Position Uncertainty:</b> 0.00 ft	<b>Easting:</b> 3161797.25 ft
<b>Ground Level:</b> 4813.00 ft	<b>Latitude:</b> 40 13 40.616 N
	<b>Longitude:</b> 104 55 13.984 W
	<b>North Reference:</b> Grid
	<b>Grid Convergence:</b> 0.37 deg

<b>Well:</b> 31-17		<b>Slot Name:</b> 31-17	
<b>Well Position:</b>		<b>Latitude:</b> 40 13 40.621 N	
<b>+N/-S</b> 0.15 ft	<b>Northing:</b> 1326415.21 ft	<b>Longitude:</b> 104 55 14.758 W	
<b>+E/-W</b> -60.03 ft	<b>Easting :</b> 3161737.22 ft		
<b>Position Uncertainty:</b> 0.00 ft			

<b>Wellpath:</b> Original Hole		<b>Drilled From:</b> Surface	
<b>Current Datum:</b> 4813'KB+13'KB	<b>Height</b> 4826.00 ft	<b>Tie-on Depth:</b> 0.00 ft	
<b>Magnetic Data:</b> 01/21/2011		<b>Above System Datum:</b> Mean Sea Level	
<b>Field Strength:</b> 53105 nT		<b>Declination:</b> 8.99 deg	
<b>Vertical Section:</b> Depth From (TVD)	<b>+N/-S</b> ft	<b>Mag Dip Angle:</b> 66.90 deg	
		<b>+E/-W</b> ft	<b>Direction</b> deg
0.00	0.00	0.00	312.41

<b>Survey Program for Definitive Wellpath</b>				
<b>Date:</b> 02/18/2011		<b>Validated:</b> No		<b>Version:</b> 0
<b>Actual From</b>	<b>To</b>	<b>Survey</b>	<b>Toolcode</b>	<b>Tool Name</b>
51.00	7770.00	Survey #1 (51.00-7770.00)	MWD	Std MWD
7815.00	7815.00	Survey #2 (7815.00-7815.00)	MWD	Std MWD

<b>Survey</b>										
MD	Incl	Azim	TVD	+N/-S	+E/-W	VS	DLS	Build	Turn	Tool/Comment
ft	deg	deg	ft	ft	ft	ft	deg/100ft	deg/100ft	deg/100ft	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	TIE LINE
51.00	0.50	295.50	51.00	0.10	-0.20	0.21	0.98	0.98	0.00	MWD
141.00	0.40	299.70	141.00	0.42	-0.83	0.90	0.12	-0.11	4.67	MWD
231.00	1.20	336.60	230.99	1.44	-1.48	2.06	1.01	0.89	41.00	MWD
321.00	1.90	336.60	320.95	3.68	-2.44	4.28	0.78	0.78	0.00	MWD
428.00	3.00	333.10	427.85	7.80	-4.41	8.52	1.04	1.03	-3.27	MWD
518.00	3.90	337.00	517.69	12.72	-6.68	13.51	1.03	1.00	4.33	MWD
615.00	4.60	341.90	614.42	19.45	-9.17	19.89	0.81	0.72	5.05	MWD
660.00	5.03	343.13	659.26	23.06	-10.31	23.16	0.99	0.96	2.73	8 5/8"
667.00	5.10	343.30	666.24	23.65	-10.48	23.69	0.99	0.96	2.46	MWD
757.00	7.90	328.90	755.66	32.78	-14.83	33.06	3.58	3.11	-16.00	MWD
848.00	9.20	319.10	845.65	43.63	-22.82	46.28	2.14	1.43	-10.77	MWD
939.00	10.00	317.30	935.37	54.94	-32.95	61.38	0.94	0.88	-1.98	MWD
1030.00	11.80	313.10	1024.73	67.10	-45.10	78.55	2.16	1.98	-4.62	MWD
1120.00	12.70	309.90	1112.68	79.74	-59.41	97.64	1.25	1.00	-3.56	MWD
1211.00	13.40	311.70	1201.33	93.17	-74.95	118.18	0.89	0.77	1.98	MWD
1302.00	13.40	307.80	1289.85	106.65	-91.16	139.23	0.99	0.00	-4.29	MWD
1392.00	13.40	308.20	1377.40	119.49	-107.60	160.03	0.10	0.00	0.44	MWD
1483.00	14.10	306.10	1465.80	132.54	-124.84	181.56	0.94	0.77	-2.31	MWD
1574.00	14.60	307.10	1553.96	145.99	-142.94	204.00	0.61	0.55	1.10	MWD
1665.00	14.80	308.20	1641.98	160.09	-161.22	227.01	0.38	0.22	1.21	MWD
1755.00	15.10	308.20	1728.93	174.45	-179.47	250.17	0.33	0.33	0.00	MWD

# Allis-Chalmers Energy, Inc.

## Survey Report

<b>Company:</b> ANADARKO PETROLEUM <b>Field:</b> Weld County, CO <b>Site:</b> Elliot 5-17 Pad <b>Well:</b> 31-17 <b>Wellpath:</b> Original Hole	<b>Date:</b> 02/18/2011 <b>Co-ordinate(NE) Reference:</b> Well: 31-17, Grid North <b>Vertical (TVD) Reference:</b> 4813'KB+13'KB 4826.0 <b>Section (VS) Reference:</b> Well (0.00N,0.00E,312.41Azi) <b>Survey Calculation Method:</b> Minimum Curvature <b>Db:</b> Sybase
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### Survey

MD ft	Incl deg	Azim deg	TVD ft	+N/-S ft	+E/-W ft	VS ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft	Tool/Comment
1846.00	15.80	309.60	1816.64	189.68	-198.33	274.36	0.87	0.77	1.54	MWD
1937.00	15.70	310.60	1904.23	205.59	-217.22	299.04	0.32	-0.11	1.10	MWD
2028.00	15.70	307.80	1991.83	221.15	-236.30	323.62	0.83	0.00	-3.08	MWD
2118.00	15.70	308.20	2078.47	236.14	-255.49	347.90	0.12	0.00	0.44	MWD
2209.00	15.30	312.70	2166.17	251.90	-273.99	372.19	1.39	-0.44	4.95	MWD
2300.00	15.30	307.80	2253.95	267.40	-292.30	396.16	1.42	0.00	-5.38	MWD
2391.00	15.80	312.40	2341.62	283.11	-310.94	420.52	1.46	0.55	5.05	MWD
2482.00	16.00	314.50	2429.14	300.26	-329.03	445.44	0.67	0.22	2.31	MWD
2572.00	16.50	314.50	2515.54	317.91	-347.00	470.61	0.56	0.56	0.00	MWD
2663.00	15.10	308.90	2603.11	334.41	-365.44	495.36	2.27	-1.54	-6.15	MWD
2754.00	15.30	312.40	2690.92	349.95	-383.53	519.19	1.03	0.22	3.85	MWD
2844.00	14.60	313.40	2777.88	365.75	-400.54	542.41	0.83	-0.78	1.11	MWD
2935.00	13.70	312.40	2866.12	380.90	-416.83	564.65	1.02	-0.99	-1.10	MWD
3026.00	12.80	313.10	2954.69	395.05	-432.15	585.51	1.00	-0.99	0.77	MWD
3117.00	13.00	313.10	3043.40	408.93	-446.99	605.82	0.22	0.22	0.00	MWD
3208.00	12.10	311.30	3132.22	422.22	-461.62	625.60	1.08	-0.99	-1.98	MWD
3298.00	11.40	316.60	3220.34	434.91	-474.82	643.90	1.43	-0.78	5.89	MWD
3389.00	9.90	314.50	3309.77	446.93	-486.58	660.69	1.70	-1.65	-2.31	MWD
3480.00	10.70	314.10	3399.30	458.29	-498.23	676.95	0.88	0.88	-0.44	MWD
3571.00	10.20	314.80	3488.79	469.85	-510.01	693.44	0.57	-0.55	0.77	MWD
3662.00	9.70	314.50	3578.42	480.90	-521.20	709.15	0.55	-0.55	-0.33	MWD
3753.00	9.00	313.40	3668.21	491.16	-531.84	723.93	0.79	-0.77	-1.21	MWD
3843.00	8.60	315.20	3757.15	500.78	-541.69	737.69	0.54	-0.44	2.00	MWD
3934.00	6.90	317.30	3847.32	509.62	-550.20	749.94	1.89	-1.87	2.31	MWD
4025.00	5.80	322.90	3937.76	517.31	-556.68	759.90	1.39	-1.21	6.15	MWD
4116.00	4.80	330.00	4028.37	524.27	-561.35	768.05	1.31	-1.10	7.80	MWD
4206.00	4.80	316.90	4118.06	530.28	-565.81	775.40	1.22	0.00	-14.56	MWD
4297.00	5.10	315.90	4208.72	535.97	-571.23	783.23	0.34	0.33	-1.10	MWD
4388.00	3.20	297.60	4299.48	540.05	-576.29	789.72	2.52	-2.09	-20.11	MWD
4479.00	3.00	291.30	4390.35	542.09	-580.76	794.40	0.43	-0.22	-6.92	MWD
4661.00	1.90	288.10	4572.18	544.76	-588.07	801.59	0.61	-0.60	-1.76	MWD
4842.00	0.80	21.30	4753.14	546.87	-590.46	804.78	1.16	-0.61	51.49	MWD
5024.00	1.50	13.90	4935.10	550.36	-589.43	806.38	0.39	0.38	-4.07	MWD
5205.00	1.00	11.80	5116.06	554.21	-588.54	808.31	0.28	-0.28	-1.16	MWD
5387.00	0.80	12.80	5298.04	557.00	-587.93	809.75	0.11	-0.11	0.55	MWD
5568.00	0.20	317.30	5479.03	558.47	-587.86	810.69	0.39	-0.33	-30.66	MWD
5750.00	0.30	301.80	5661.03	558.95	-588.48	811.47	0.07	0.05	-8.52	MWD
5931.00	0.70	291.60	5842.02	559.61	-589.91	812.97	0.23	0.22	-5.64	MWD
6113.00	1.00	332.10	6024.00	561.42	-591.69	815.51	0.36	0.16	22.25	MWD
6295.00	0.70	332.40	6205.98	563.81	-592.95	818.05	0.16	-0.16	0.16	MWD
6476.00	1.00	298.30	6386.96	565.54	-594.85	820.62	0.32	0.17	-18.84	MWD
6657.00	0.70	256.80	6567.94	566.03	-597.32	822.77	0.37	-0.17	-22.93	MWD
6839.00	1.10	232.20	6749.92	564.71	-599.78	823.70	0.30	0.22	-13.52	MWD
7020.00	1.10	205.20	6930.89	562.07	-601.89	823.48	0.28	0.00	-14.92	MWD
7202.00	1.10	167.90	7112.86	558.78	-602.27	821.54	0.39	0.00	-20.49	MWD
7383.00	1.10	142.20	7293.82	555.71	-600.84	818.42	0.27	0.00	-14.20	MWD
7565.00	1.20	151.00	7475.79	552.67	-598.85	814.89	0.11	0.05	4.84	MWD
7747.00	0.70	181.60	7657.76	549.89	-597.96	812.35	0.38	-0.27	16.81	MWD
7770.00	0.70	181.20	7680.76	549.61	-597.96	812.17	0.02	0.00	-1.74	MWD
7789.24	0.70	181.20	7700.00	549.37	-597.97	812.02	0.00	0.00	0.00	31-17 PBHL
7815.00	0.70	181.20	7725.76	549.06	-597.97	811.81	0.00	0.00	0.00	31-17 BHL

# Allis-Chalmers Energy, Inc.

## Survey Report

<b>Company:</b> ANADARKO PETROLEUM <b>Field:</b> Weld County, CO <b>Site:</b> Elliot 5-17 Pad <b>Well:</b> 31-17 <b>Wellpath:</b> Original Hole	<b>Date:</b> 02/18/2011 <b>Time:</b> 06:32:13 <b>Page:</b> 3 <b>Co-ordinate(NE) Reference:</b> Well: 31-17, Grid North <b>Vertical (TVD) Reference:</b> 4813'KB+13'KB 4826.0 <b>Section (VS) Reference:</b> Well (0.00N,0.00E,312.41Azi) <b>Survey Calculation Method:</b> Minimum Curvature <b>Db:</b> Sybase
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### Targets

Name	Description	Dir.	TVD ft	+N/-S ft	+E/-W ft	Map Northing ft	Map Easting ft	<---- Latitude ---->			<--- Longitude --->				
								Deg	Min	Sec	Deg	Min	Sec		
31-17 SL			0.00	0.00	0.00	1326415.21	3161737.22	40	13	40.621	N	104	55	14.758	W
31-17 PBHL			7700.00	546.87	-598.69	1326962.08	3161138.53	40	13	46.064	N	104	55	22.431	W
-Circle (Radius: 50)															
31-17 BHL			7725.76	549.06	-597.97	1326964.27	3161139.25	40	13	46.086	N	104	55	22.421	W

### Casing Points

MD ft	TVD ft	Diameter in	Hole Size in	Name
660.00	659.26	8.625	9.875	8 5/8"