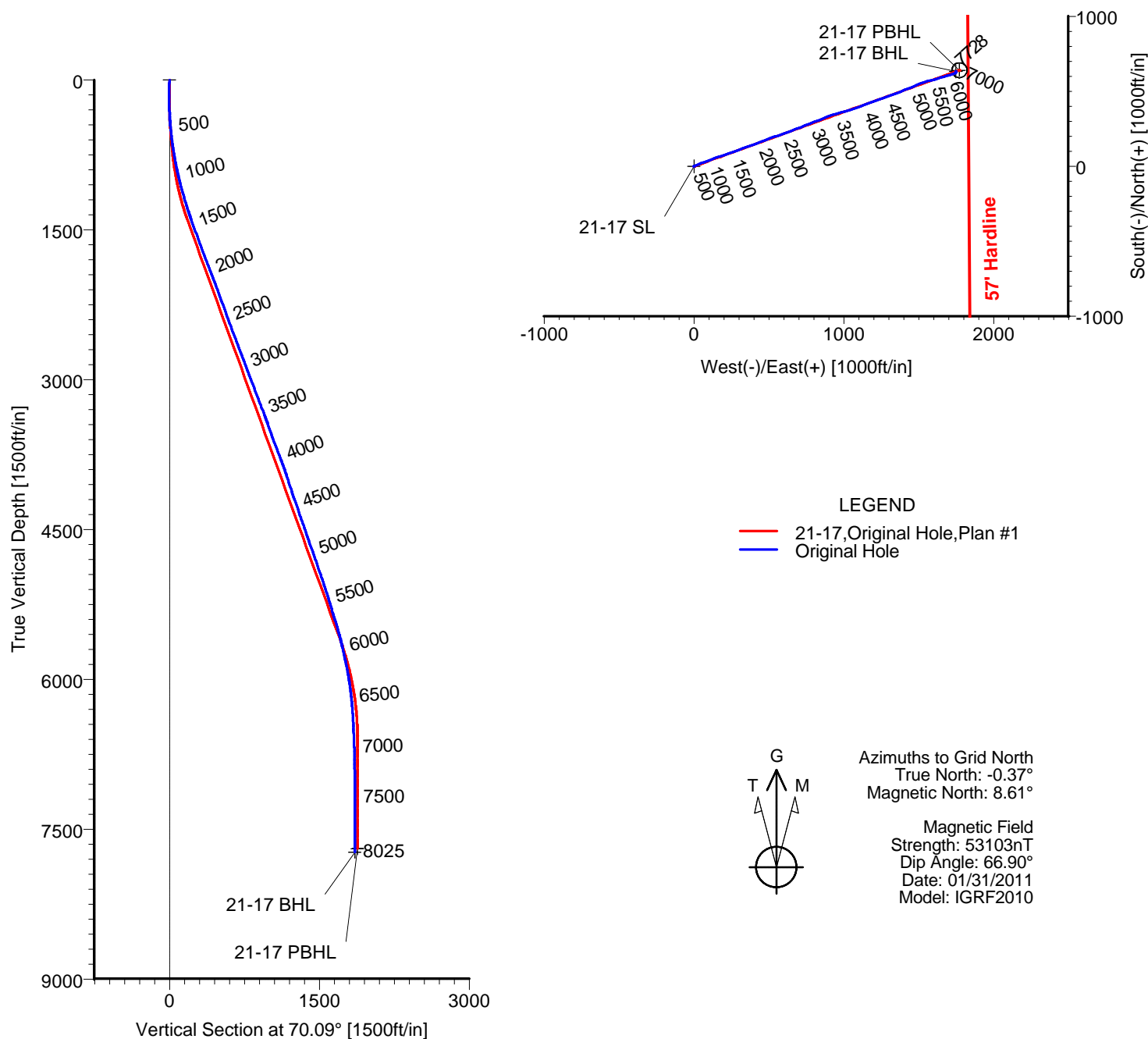


# ANADARKO PETROLEUM

Field: Weld County, CO  
Site: Elliot 5-17 Pad  
Well: 21-17  
Wellpath: Original Hole



## TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
21-17 SL	0.00	0.00	0.00	40°13'40.616N	104°55'13.984W	Point
21-17 PBHL	7695.00	641.37	1770.80	40°13'46.839N	104°54'51.099W	Circle (Radius: 50)
21-17 BHL	7727.88	633.78	1747.57	40°13'46.766N	104°54'51.399W	Point

Wellpath: (21-17/Original Hole)

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



DIRECTIONAL  
DRILLING SERVICES

Created By: Ivonne Gonzalez

Date: 02/25/2011

# 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> 21-17 <b>Wellpath:</b> Original Hole	<b>Date:</b> 02/25/2011 <b>Co-ordinate(NE) Reference:</b> <b>Vertical (TVD) Reference:</b> <b>Section (VS) Reference:</b> <b>Survey Calculation Method:</b>	<b>Time:</b> 08:12:28 Well: 21-17, Grid North 4813'KB+13'KB 4826.0 Well (0.00N,0.00E,70.09Azi) Minimum Curvature	<b>Page:</b> 1 <b>Db:</b> Adapti
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<b>Field:</b> Weld County, CO	
<b>Map System:</b> US State Plane Coordinate System 1983 <b>Geo Datum:</b> GRS 1980 <b>Sys Datum:</b> Mean Sea Level	<b>Map Zone:</b> Colorado, Northern Zone <b>Coordinate System:</b> Well Centre <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>Position Uncertainty:</b> 0.00 ft <b>Ground Level:</b> 4813.00 ft	<b>Northing:</b> 1326415.06 ft <b>Easting:</b> 3161797.25 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
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<b>Well:</b> 21-17  <b>Well Position:</b> +N/-S 0.00 ft +E/-W 0.00 ft <b>Position Uncertainty:</b> 0.00 ft	<b>Slot Name:</b> 21-17  <b>Latitude:</b> 40 13 40.616 N <b>Longitude:</b> 104 55 13.984 W
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<b>Wellpath:</b> Original Hole  <b>Current Datum:</b> 4813'KB+13'KB <b>Magnetic Data:</b> 01/31/2011 <b>Field Strength:</b> 53103 nT <b>Vertical Section:</b> Depth From (TVD) ft	<b>Height</b> 4826.00 ft	<b>Drilled From:</b> Surface <b>Tie-on Depth:</b> 0.00 ft <b>Above System Datum:</b> Mean Sea Level <b>Declination:</b> 8.98 deg <b>Mag Dip Angle:</b> 66.90 deg <b>+N/-S</b> ft <b>+E/-W</b> ft <b>Direction</b> deg
0.00	0.00	0.00 70.09

<b>Survey Program for Definitive Wellpath</b>				
<b>Date:</b> 02/25/2011	<b>Validated:</b> No	<b>Version:</b> 0		
<b>Actual From</b> ft	<b>To</b> ft	<b>Survey</b>	<b>Toolcode</b>	<b>Tool Name</b>
51.00	7980.00	Survey #1 (51.00-7980.00)	MWD	Std MWD
8025.00	8025.00	Survey #2 (8025.00-8025.00)	Project	Projection

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
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	TIE LINE
51.00	1.20	276.90	51.00	0.06	-0.53	-0.48	2.35	2.35	0.00	MWD
141.00	0.70	284.60	140.98	0.32	-2.00	-1.77	0.57	-0.56	8.56	MWD
231.00	0.50	62.80	230.98	0.63	-2.18	-1.83	1.25	-0.22	153.56	MWD
321.00	2.10	68.70	320.96	1.41	-0.29	0.20	1.78	1.78	6.56	MWD
427.00	4.90	71.20	426.75	3.58	5.80	6.67	2.64	2.64	2.36	MWD
518.00	6.50	68.00	517.29	6.76	14.26	15.71	1.79	1.76	-3.52	MWD
605.00	7.20	65.90	603.67	10.83	23.80	26.07	0.85	0.80	-2.41	MWD
700.00	9.00	64.90	697.72	16.41	35.96	39.40	1.90	1.89	-1.05	MWD
790.00	10.00	70.20	786.49	22.05	49.69	54.23	1.48	1.11	5.89	MWD
881.00	11.10	70.90	875.95	27.59	65.40	70.89	1.22	1.21	0.77	MWD
972.00	13.40	70.90	964.87	33.91	83.65	90.19	2.53	2.53	0.00	MWD
1062.00	15.10	70.50	1052.10	41.23	104.55	112.35	1.89	1.89	-0.44	MWD
1153.00	16.00	69.10	1139.77	49.66	127.44	136.74	1.07	0.99	-1.54	MWD
1244.00	16.50	70.20	1227.13	58.52	151.32	162.20	0.65	0.55	1.21	MWD
1335.00	18.00	73.00	1314.04	67.01	176.93	189.17	1.88	1.65	3.08	MWD
1426.00	19.90	70.90	1400.10	76.18	205.01	218.70	2.22	2.09	-2.31	MWD
1516.00	19.90	70.50	1484.73	86.31	233.92	249.33	0.15	0.00	-0.44	MWD
1607.00	20.10	69.10	1570.24	97.06	263.13	280.45	0.57	0.22	-1.54	MWD
1698.00	20.40	69.80	1655.62	108.11	292.62	311.95	0.42	0.33	0.77	MWD
1789.00	20.20	70.20	1740.96	118.91	322.29	343.52	0.27	-0.22	0.44	MWD
1880.00	21.10	72.30	1826.12	129.21	352.68	375.60	1.28	0.99	2.31	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> 21-17 <b>Wellpath:</b> Original Hole	<b>Date:</b> 02/25/2011 <b>Co-ordinate(NE) Reference:</b> Well: 21-17, Grid North <b>Vertical (TVD) Reference:</b> 4813'KB+13'KB 4826.0 <b>Section (VS) Reference:</b> Well (0.00N,0.00E,70.09Azi) <b>Survey Calculation Method:</b> Minimum Curvature	<b>Time:</b> 08:12:28 <b>Page:</b> 2 <b>Db:</b> Adapti
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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
1970.00	21.60	70.50	1909.94	139.67	383.72	408.35	0.92	0.56	-2.00	MWD
2061.00	20.80	67.70	1994.78	151.39	414.46	441.25	1.42	-0.88	-3.08	MWD
2151.00	19.90	68.70	2079.17	163.02	443.52	472.52	1.07	-1.00	1.11	MWD
2242.00	20.10	68.00	2164.68	174.50	472.45	503.63	0.34	0.22	-0.77	MWD
2334.00	19.90	70.50	2251.13	185.65	501.86	535.09	0.95	-0.22	2.72	MWD
2424.00	19.90	73.30	2335.76	195.17	530.97	565.70	1.06	0.00	3.11	MWD
2515.00	20.80	71.60	2421.08	204.72	561.14	597.32	1.18	0.99	-1.87	MWD
2606.00	21.10	70.50	2506.06	215.28	591.91	629.85	0.54	0.33	-1.21	MWD
2696.00	20.60	69.40	2590.17	226.26	622.00	661.88	0.71	-0.56	-1.22	MWD
2787.00	20.20	67.70	2675.46	237.86	651.53	693.58	0.79	-0.44	-1.87	MWD
2878.00	21.10	68.40	2760.62	249.85	681.29	725.65	1.03	0.99	0.77	MWD
2969.00	20.80	70.50	2845.60	261.27	711.75	758.18	0.89	-0.33	2.31	MWD
3060.00	20.20	67.70	2930.84	272.63	741.52	790.04	1.26	-0.66	-3.08	MWD
3151.00	21.10	68.00	3015.99	284.73	771.24	822.11	1.00	0.99	0.33	MWD
3242.00	20.90	69.80	3100.95	296.47	801.66	854.71	0.74	-0.22	1.98	MWD
3332.00	20.90	69.10	3185.03	307.74	831.73	886.81	0.28	0.00	-0.78	MWD
3423.00	21.10	67.00	3269.99	319.93	861.97	919.40	0.86	0.22	-2.31	MWD
3514.00	20.80	68.40	3354.97	332.28	892.07	951.90	0.64	-0.33	1.54	MWD
3605.00	19.70	74.00	3440.35	342.45	921.84	983.36	2.45	-1.21	6.15	MWD
3695.00	19.20	74.70	3525.22	350.54	950.70	1013.25	0.61	-0.56	0.78	MWD
3786.00	20.40	73.70	3610.84	358.94	980.35	1043.99	1.37	1.32	-1.10	MWD
3877.00	21.10	73.70	3695.93	367.99	1011.30	1076.17	0.77	0.77	0.00	MWD
3968.00	21.50	73.70	3780.72	377.26	1043.02	1109.16	0.44	0.44	0.00	MWD
4059.00	19.70	73.30	3865.89	386.35	1073.72	1141.12	1.98	-1.98	-0.44	MWD
4150.00	18.10	70.20	3951.99	395.55	1101.72	1170.57	2.08	-1.76	-3.41	MWD
4240.00	17.80	68.40	4037.61	405.35	1127.66	1198.30	0.70	-0.33	-2.00	MWD
4331.00	17.90	69.80	4124.23	415.30	1153.72	1226.19	0.48	0.11	1.54	MWD
4422.00	19.50	70.50	4210.42	425.20	1181.16	1255.36	1.78	1.76	0.77	MWD
4513.00	19.50	69.10	4296.20	435.69	1209.67	1285.74	0.51	0.00	-1.54	MWD
4604.00	19.20	68.00	4382.06	446.71	1237.73	1315.87	0.52	-0.33	-1.21	MWD
4694.00	19.00	70.20	4467.11	457.22	1265.24	1345.32	0.83	-0.22	2.44	MWD
4785.00	18.70	73.00	4553.23	466.50	1293.13	1374.70	1.05	-0.33	3.08	MWD
4876.00	19.70	69.40	4639.17	476.16	1321.44	1404.61	1.70	1.10	-3.96	MWD
4967.00	19.70	69.80	4724.84	486.86	1350.19	1435.28	0.15	0.00	0.44	MWD
5058.00	18.80	68.00	4810.75	497.64	1378.18	1465.27	1.18	-0.99	-1.98	MWD
5148.00	18.80	66.60	4895.95	508.84	1404.93	1494.24	0.50	0.00	-1.56	MWD
5239.00	19.00	68.40	4982.05	520.11	1432.16	1523.68	0.68	0.22	1.98	MWD
5330.00	18.50	66.30	5068.22	531.37	1459.16	1552.90	0.92	-0.55	-2.31	MWD
5421.00	17.60	67.30	5154.74	542.48	1485.07	1581.04	1.05	-0.99	1.10	MWD
5512.00	16.70	69.80	5241.69	552.31	1510.03	1607.86	1.28	-0.99	2.75	MWD
5602.00	17.10	70.90	5327.81	561.10	1534.67	1634.02	0.57	0.44	1.22	MWD
5693.00	16.50	76.10	5414.93	568.58	1559.86	1660.25	1.78	-0.66	5.71	MWD
5784.00	16.50	76.50	5502.18	574.71	1584.97	1685.95	0.12	0.00	0.44	MWD
5875.00	14.60	76.50	5589.85	580.40	1608.69	1710.19	2.09	-2.09	0.00	MWD
5966.00	12.40	72.00	5678.33	586.10	1629.14	1731.35	2.68	-2.42	-4.95	MWD
6056.00	13.20	74.40	5766.09	591.85	1648.23	1751.26	1.07	0.89	2.67	MWD
6147.00	11.40	73.30	5855.00	597.23	1666.85	1770.60	1.99	-1.98	-1.21	MWD
6238.00	10.40	73.70	5944.36	602.12	1683.35	1787.78	1.10	-1.10	0.44	MWD
6329.00	8.40	73.70	6034.13	606.29	1697.61	1802.61	2.20	-2.20	0.00	MWD
6420.00	7.00	73.70	6124.31	609.71	1709.31	1814.78	1.54	-1.54	0.00	MWD
6510.00	5.50	72.60	6213.77	612.54	1718.69	1824.56	1.67	-1.67	-1.22	MWD
6601.00	4.20	68.40	6304.44	615.07	1725.95	1832.25	1.48	-1.43	-4.62	MWD
6692.00	3.20	64.20	6395.25	617.40	1731.34	1838.11	1.14	-1.10	-4.62	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> 21-17 <b>Wellpath:</b> Original Hole	<b>Date:</b> 02/25/2011 <b>Co-ordinate(NE) Reference:</b> Well: 21-17, Grid North <b>Vertical (TVD) Reference:</b> 4813'KB+13'KB 4826.0 <b>Section (VS) Reference:</b> Well (0.00N,0.00E,70.09Azi) <b>Survey Calculation Method:</b> Minimum Curvature <b>Db:</b> Adapti
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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
6783.00	2.60	67.30	6486.14	619.30	1735.53	1842.69	0.68	-0.66	3.41	MWD
6874.00	2.30	64.50	6577.05	620.89	1739.08	1846.57	0.35	-0.33	-3.08	MWD
6964.00	1.80	68.70	6666.99	622.18	1742.03	1849.78	0.58	-0.56	4.67	MWD
7055.00	1.40	58.60	6757.96	623.27	1744.31	1852.30	0.54	-0.44	-11.10	MWD
7146.00	1.10	48.40	6848.94	624.43	1745.91	1854.20	0.41	-0.33	-11.21	MWD
7282.00	0.70	26.90	6984.92	626.04	1747.26	1856.02	0.38	-0.29	-15.81	MWD
7418.00	0.50	355.60	7120.91	627.37	1747.59	1856.79	0.28	-0.15	-23.01	MWD
7554.00	0.70	9.30	7256.91	628.79	1747.68	1857.35	0.18	0.15	10.07	MWD
7736.00	0.70	13.60	7438.89	630.96	1748.12	1858.51	0.03	0.00	2.36	MWD
7918.00	0.50	349.30	7620.88	632.82	1748.24	1859.25	0.18	-0.11	-13.35	MWD
7980.00	0.70	318.40	7682.88	633.37	1747.94	1859.15	0.60	0.32	-49.84	MWD
7992.12	0.70	318.40	7695.00	633.48	1747.84	1859.10	0.00	0.00	0.00	21-17 PBHL
8025.00	0.70	318.40	7727.88	633.78	1747.57	1858.95	0.00	0.00	0.00	21-17 BHL

### 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		
21-17 SL			0.00	0.00	0.00	1326415.06	3161797.25	40	13	40.616	N	104	55	13.984	W
21-17 PBHL			7695.00	641.37	1770.80	1327056.43	3163568.05	40	13	46.839	N	104	54	51.099	W
-Circle (Radius: 50)															
21-17 BHL			7727.88	633.78	1747.57	1327048.84	3163544.82	40	13	46.766	N	104	54	51.399	W