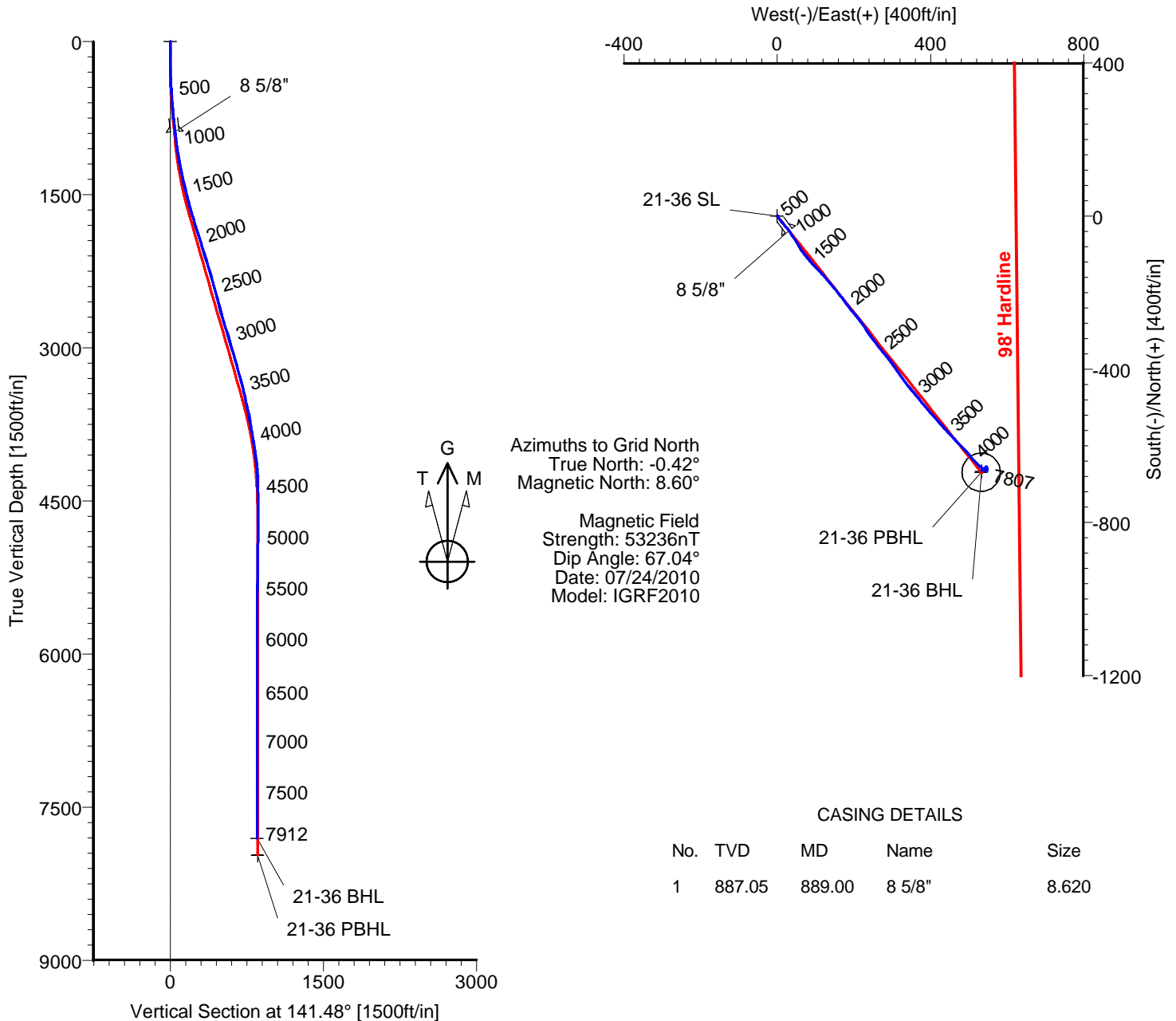


# ANADARKO PETROLEUM

Field: Weld County, CO  
Site: Berhardt State 3-36 Pad  
Well: 21-36  
Wellpath: Original Hole



## CASING DETAILS

No.	TVD	MD	Name	Size
1	887.05	889.00	8 5/8"	8.620

## LEGEND

- 21-36,Original Hole,Plan #1
- Original Hole

## TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
21-36 SL	0.00	0.00	0.00	40°21'41.472N	104°50'37.464W	Point
21-36 BHL	7806.88	-666.43	533.68	40°21'34.847N	104°50'30.634W	Point
21-36 PBHL	7969.00	-669.10	532.61	40°21'34.821N	104°50'30.648W	Circle (Radius: 50)

Wellpath: (21-36/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

# Allis-Chalmers Energy, Inc.

## Survey Report

<b>Company:</b> ANADARKO PETROLEUM				<b>Date:</b> 07/09/2010		<b>Time:</b> 09:21:49		<b>Page:</b> 1	
<b>Field:</b> Weld County, CO				<b>Co-ordinate(NE) Reference:</b> Well: 21-36, Grid North					
<b>Site:</b> Berhardt State 3-36 Pad				<b>Vertical (TVD) Reference:</b> 4887'GL+13'KB 4900.0					
<b>Well:</b> 21-36				<b>Section (VS) Reference:</b> Well (0.00N,0.00E,141.48Azi)					
<b>Wellpath:</b> Original Hole				<b>Survey Calculation Method:</b> Minimum Curvature <b>Db:</b> Adapti					

<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> Berhardt State 3-36 Pad					
<b>Site Position:</b>		<b>Northing:</b> 1375221.77 ft		<b>Latitude:</b> 40 21 41.472 N	
<b>From:</b> Geographic		<b>Easting:</b> 3182883.65 ft		<b>Longitude:</b> 104 50 37.464 W	
<b>Position Uncertainty:</b> 0.00 ft				<b>North Reference:</b> Grid	
<b>Ground Level:</b> 4887.00 ft				<b>Grid Convergence:</b> 0.42 deg	

<b>Well:</b> 21-36		<b>Slot Name:</b> 21-36			
<b>Well Position:</b> +N/-S 0.00 ft		<b>Northing:</b> 1375221.77 ft		<b>Latitude:</b> 40 21 41.472 N	
+E/-W 0.00 ft		<b>Easting:</b> 3182883.65 ft		<b>Longitude:</b> 104 50 37.464 W	
<b>Position Uncertainty:</b> 0.00 ft					

<b>Wellpath:</b> Original Hole		<b>Drilled From:</b> Surface	
<b>Current Datum:</b> 4887'GL+13'KB		<b>Tie-on Depth:</b> 0.00 ft	
<b>Magnetic Data:</b> 07/24/2010		<b>Above System Datum:</b> Mean Sea Level	
<b>Field Strength:</b> 53236 nT		<b>Declination:</b> 9.03 deg	
<b>Vertical Section: Depth From (TVD)</b>		<b>Mag Dip Angle:</b> 67.04 deg	
ft	+N/-S ft	+E/-W ft	Direction deg
0.00	0.00	0.00	141.48

<b>Survey Program for Definitive Wellpath</b>				<b>Version:</b> 0	
<b>Date:</b> 07/09/2010		<b>Validated:</b> No		<b>Toolcode</b>	
<b>Actual From</b>		<b>To</b>		<b>Tool Name</b>	
ft	ft	Survey			
77.00	7731.00	Survey #1 (77.00-7731.00)		MWD	Std MWD
7912.00	7912.00	Survey #2 (7912.00-7912.00)		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
77.00	0.20	108.20	77.00	-0.04	0.13	0.11	0.26	0.26	0.00	MWD
138.00	0.50	149.50	138.00	-0.30	0.36	0.46	0.61	0.49	67.70	MWD
198.00	0.50	155.60	198.00	-0.77	0.60	0.98	0.09	0.00	10.17	MWD
258.00	1.20	153.20	257.99	-1.57	1.00	1.85	1.17	1.17	-4.00	MWD
320.00	2.10	139.10	319.96	-3.01	2.03	3.62	1.58	1.45	-22.74	MWD
381.00	2.50	145.80	380.91	-4.95	3.51	6.06	0.79	0.66	10.98	MWD
475.00	4.00	142.30	474.76	-9.24	6.67	11.38	1.61	1.60	-3.72	MWD
566.00	4.20	142.60	565.53	-14.40	10.63	17.89	0.22	0.22	0.33	MWD
657.00	5.30	140.90	656.21	-20.31	15.31	25.42	1.22	1.21	-1.87	MWD
748.00	5.60	139.10	746.80	-26.93	20.87	34.06	0.38	0.33	-1.98	MWD
839.00	6.00	140.10	837.34	-33.93	26.83	43.25	0.45	0.44	1.10	MWD
889.00	6.29	144.08	887.05	-38.15	30.11	48.60	1.03	0.58	7.95	8 5/8"
922.00	6.50	146.50	919.84	-41.18	32.20	52.27	1.03	0.63	7.34	MWD
1013.00	7.90	147.20	1010.12	-50.73	38.43	63.62	1.54	1.54	0.77	MWD
1103.00	8.90	146.50	1099.16	-61.73	45.62	76.71	1.12	1.11	-0.78	MWD
1194.00	11.00	149.70	1188.78	-75.10	53.89	92.32	2.39	2.31	3.52	MWD
1285.00	11.60	145.10	1278.02	-90.10	63.51	110.05	1.19	0.66	-5.05	MWD
1376.00	12.50	140.90	1367.02	-105.25	74.95	129.02	1.38	0.99	-4.62	MWD
1466.00	14.60	138.80	1454.51	-121.34	88.57	150.10	2.40	2.33	-2.33	MWD
1557.00	14.40	135.20	1542.61	-138.00	104.10	172.80	1.01	-0.22	-3.96	MWD
1648.00	15.70	137.30	1630.49	-155.08	120.42	196.33	1.55	1.43	2.31	MWD

# Allis-Chalmers Energy, Inc.

## Survey Report

**Company:** ANADARKO PETROLEUM  
**Field:** Weld County, CO  
**Site:** Berhardt State 3-36 Pad  
**Well:** 21-36  
**Wellpath:** Original Hole

**Date:** 07/09/2010 **Time:** 09:21:49 **Page:** 2  
**Co-ordinate(NE) Reference:** Well: 21-36, Grid North  
**Vertical (TVD) Reference:** 4887'GL+13'KB 4900.0  
**Section (VS) Reference:** Well (0.00N,0.00E,141.48Azi)  
**Survey Calculation Method:** Minimum Curvature **Db:** Adapti

### 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
1738.00	16.90	140.50	1716.87	-174.12	137.00	221.56	1.66	1.33	3.56	MWD
1829.00	17.20	140.50	1803.87	-194.71	153.97	248.23	0.33	0.33	0.00	MWD
1920.00	17.90	143.70	1890.64	-216.37	170.81	275.66	1.31	0.77	3.52	MWD
2011.00	16.90	142.30	1977.47	-238.10	187.18	302.86	1.19	-1.10	-1.54	MWD
2101.00	16.50	139.10	2063.68	-258.11	203.55	328.71	1.11	-0.44	-3.56	MWD
2192.00	18.20	145.10	2150.54	-279.54	220.14	355.81	2.71	1.87	6.59	MWD
2283.00	17.10	146.10	2237.26	-302.30	235.73	383.33	1.25	-1.21	1.10	MWD
2373.00	15.10	143.00	2323.72	-322.65	250.17	408.24	2.42	-2.22	-3.44	MWD
2464.00	15.50	141.60	2411.50	-341.64	264.86	432.25	0.60	0.44	-1.54	MWD
2555.00	15.70	140.20	2499.15	-360.63	280.29	456.72	0.47	0.22	-1.54	MWD
2646.00	13.90	142.30	2587.13	-378.74	294.86	479.96	2.06	-1.98	2.31	MWD
2737.00	16.20	145.80	2675.00	-397.89	308.68	503.55	2.72	2.53	3.85	MWD
2827.00	17.40	144.40	2761.16	-419.22	323.57	529.51	1.41	1.33	-1.56	MWD
2918.00	17.40	142.60	2847.99	-441.09	339.75	556.70	0.59	0.00	-1.98	MWD
3009.00	15.50	138.40	2935.27	-461.00	356.09	582.45	2.46	-2.09	-4.62	MWD
3100.00	17.20	141.90	3022.59	-480.68	372.47	608.05	2.16	1.87	3.85	MWD
3191.00	16.70	138.80	3109.64	-501.10	389.39	634.56	1.13	-0.55	-3.41	MWD
3281.00	15.50	138.40	3196.10	-519.83	405.89	659.49	1.34	-1.33	-0.44	MWD
3372.00	15.50	138.80	3283.79	-538.07	421.97	683.78	0.12	0.00	0.44	MWD
3463.00	13.90	138.40	3371.81	-555.39	437.24	706.84	1.76	-1.76	-0.44	MWD
3554.00	12.70	136.60	3460.37	-570.84	451.37	727.72	1.39	-1.32	-1.98	MWD
3645.00	12.00	135.20	3549.26	-584.82	464.91	747.09	0.84	-0.77	-1.54	MWD
3736.00	12.30	135.60	3638.23	-598.45	478.35	766.14	0.34	0.33	0.44	MWD
3827.00	9.70	138.80	3727.55	-611.15	490.19	783.44	2.93	-2.86	3.52	MWD
3917.00	10.00	140.20	3816.22	-622.86	500.18	798.83	0.43	0.33	1.56	MWD
4008.00	9.70	135.60	3905.88	-634.41	510.61	814.35	0.93	-0.33	-5.05	MWD
4099.00	8.30	138.80	3995.76	-644.83	520.30	828.54	1.63	-1.54	3.52	MWD
4190.00	7.20	130.00	4085.93	-653.43	528.99	840.69	1.77	-1.21	-9.67	MWD
4280.00	5.10	122.20	4175.41	-659.19	536.70	849.99	2.51	-2.33	-8.67	MWD
4371.00	3.00	117.30	4266.18	-662.44	542.24	855.99	2.34	-2.31	-5.38	MWD
4462.00	1.10	139.50	4357.11	-664.20	544.92	859.03	2.22	-2.09	24.40	MWD
4553.00	0.70	139.80	4448.10	-665.28	545.85	860.46	0.44	-0.44	0.33	MWD
4643.00	0.70	142.30	4538.10	-666.14	546.54	861.56	0.03	0.00	2.78	MWD
4825.00	0.70	21.00	4720.09	-665.98	547.62	862.11	0.67	0.00	-66.65	MWD
5006.00	1.40	7.30	4901.06	-662.76	548.29	860.00	0.41	0.39	-7.57	MWD
5188.00	0.90	347.90	5083.02	-659.15	548.28	857.18	0.34	-0.27	-10.66	MWD
5370.00	0.50	301.90	5265.01	-657.34	547.30	855.15	0.36	-0.22	-25.27	MWD
5552.00	0.50	279.70	5447.00	-656.78	545.85	853.81	0.11	0.00	-12.20	MWD
5733.00	0.50	312.80	5628.00	-656.11	544.49	852.44	0.16	0.00	18.29	MWD
5915.00	0.70	74.10	5809.99	-655.27	544.97	852.08	0.58	0.11	66.65	MWD
6097.00	0.10	260.00	5991.99	-654.99	545.89	852.43	0.44	-0.33	-95.66	MWD
6278.00	0.30	233.00	6172.99	-655.30	545.35	852.34	0.12	0.11	-14.92	MWD
6459.00	0.50	222.40	6353.98	-656.17	544.44	852.46	0.12	0.11	-5.86	MWD
6641.00	0.30	222.40	6535.98	-657.11	543.59	852.66	0.11	-0.11	0.00	MWD
6823.00	0.30	190.10	6717.97	-657.93	543.18	853.05	0.09	0.00	-17.75	MWD
7004.00	0.70	253.70	6898.97	-658.71	542.04	852.94	0.35	0.22	35.14	MWD
7186.00	1.10	248.80	7080.95	-659.65	539.34	852.00	0.22	0.22	-2.69	MWD
7368.00	0.90	241.80	7262.92	-660.96	536.45	851.22	0.13	-0.11	-3.85	MWD
7549.00	0.70	214.70	7443.90	-662.54	534.57	851.29	0.23	-0.11	-14.97	MWD
7731.00	0.50	190.80	7625.89	-664.23	533.79	852.13	0.17	-0.11	-13.13	MWD
7912.00	0.90	178.50	7806.88	-666.43	533.68	853.78	0.23	0.22	-6.80	21-36 BHL

# Allis-Chalmers Energy, Inc.

## Survey Report

<b>Company:</b> ANADARKO PETROLEUM <b>Field:</b> Weld County, CO <b>Site:</b> Berhardt State 3-36 Pad <b>Well:</b> 21-36 <b>Wellpath:</b> Original Hole	<b>Date:</b> 07/09/2010 <b>Time:</b> 09:21:49 <b>Page:</b> 3 <b>Co-ordinate(NE) Reference:</b> Well: 21-36, Grid North <b>Vertical (TVD) Reference:</b> 4887'GL+13'KB 4900.0 <b>Section (VS) Reference:</b> Well (0.00N,0.00E,141.48Azi) <b>Survey Calculation Method:</b> Minimum Curvature <b>Db:</b> Adapti
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### Targets

Name	Description		TVD ft	+N/-S ft	+E/-W ft	Map Northing ft	Map Easting ft	<---- Latitude ----><--- Longitude --->		
	Dip.	Dir.						Deg	Min	Sec
21-36 SL			0.00	0.00	0.00	1375221.773182883.65		40	21	41.472 N
21-36 BHL			7806.88	-666.43	533.68	1374555.343183417.33		40	21	34.847 N
21-36 PBHL			7969.00	-669.10	532.61	1374552.673183416.26		40	21	34.821 N
-Circle (Radius: 50)										

### Casing Points

MD ft	TVD ft	Diameter in	Hole Size in	Name
889.00	887.05	8.620	9.870	8 5/8"