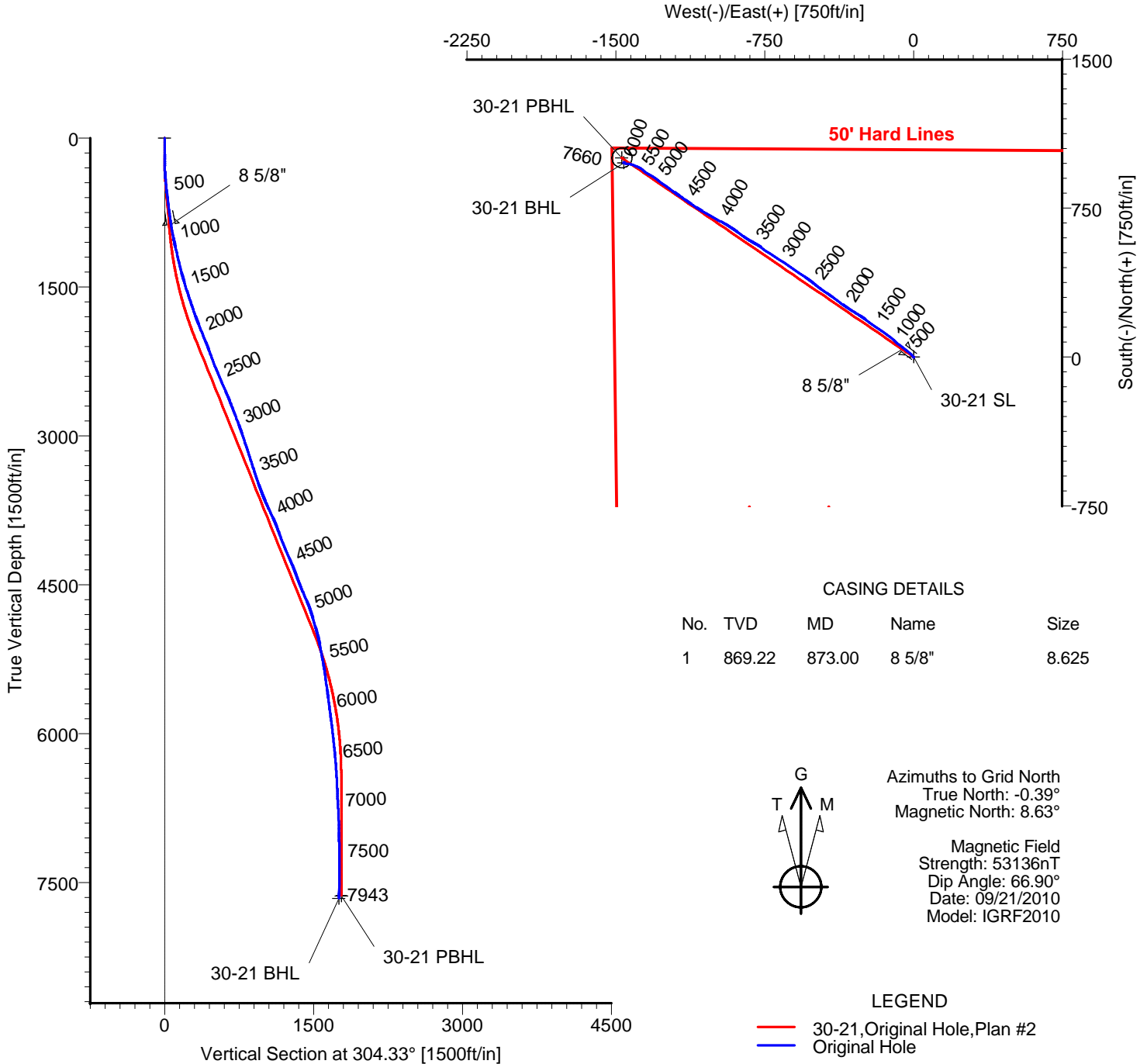


# ANADARKO PETROLEUM

Field: Weld County, CO  
Site: Burchfield 18-21 Pad  
Well: 30-21  
Wellpath: Original Hole



## TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
30-21 SL	0.00	0.00	0.00	40°12'56.628N	104°53'57.336W	Point
30-21 PBHL	7635.00	1002.51	-1468.09	40°13'06.633N	104°54'16.174W	Circle (Radius: 50)
30-21 BHL	7659.77	977.98	-1460.00	40°13'06.390N	104°54'16.072W	Point

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



**DIRECTIONAL  
DRILLING SERVICES**

Wellpath: (30-21/Original Hole)

Created By: Ivonne Gonzalez

Date: 09/27/2010

# Allis-Chalmers Energy, Inc.

## Survey Report

<b>Company:</b> ANADARKO PETROLEUM <b>Field:</b> Weld County, CO <b>Site:</b> Burchfield 18-21 Pad <b>Well:</b> 30-21 <b>Wellpath:</b> Original Hole	<b>Date:</b> 09/27/2010 <b>Co-ordinate(NE) Reference:</b> Well: 30-21, Grid North <b>Vertical (TVD) Reference:</b> 4775'GL+15'KB 4790.0 <b>Section (VS) Reference:</b> Well (0.00N,0.00E,304.33Azi) <b>Survey Calculation Method:</b> Minimum Curvature	<b>Time:</b> 09:20:00 <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
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<b>Site:</b> Burchfield 18-21 Pad Currently centered on 30-21  <b>Site Position:</b> <b>From:</b> Geographic <b>Position Uncertainty:</b> 0.00 ft <b>Ground Level:</b> 4775.00 ft	<b>Northing:</b> 1322003.56 ft <b>Easting:</b> 3167772.13 ft  <b>Latitude:</b> 40 12 56.628 N <b>Longitude:</b> 104 53 57.336 W <b>North Reference:</b> Grid <b>Grid Convergence:</b> 0.39 deg
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<b>Well:</b> 30-21  <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> 30-21  <b>Latitude:</b> 40 12 56.628 N <b>Longitude:</b> 104 53 57.336 W <b>Northing:</b> 1322003.56 ft <b>Easting :</b> 3167772.13 ft
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<b>Wellpath:</b> Original Hole  <b>Current Datum:</b> 4775'GL+15'KB <b>Magnetic Data:</b> 09/21/2010 <b>Field Strength:</b> 53136 nT <b>Vertical Section:</b> Depth From (TVD) ft	<b>Height</b> 4790.00 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> 9.02 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	0.00 304.33

<b>Survey Program for Definitive Wellpath</b>					
<b>Date:</b> 09/27/2010	<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>	
47.00	7898.00	Survey #1 (47.00-7898.00)	MWD	Std MWD	
7943.00	7943.00	Survey #2 (7943.00-7943.00)	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
47.00	0.90	139.50	47.00	-0.28	0.24	-0.36	1.91	1.91	0.00	MWD
168.00	0.50	130.70	167.99	-1.35	1.26	-1.80	0.34	-0.33	-7.27	MWD
289.00	2.50	313.80	288.96	0.14	-0.25	0.28	2.48	1.65	-146.20	MWD
430.00	5.00	317.30	429.64	6.78	-6.64	9.30	1.78	1.77	2.48	MWD
566.00	7.00	311.40	564.89	16.62	-16.87	23.30	1.54	1.47	-4.34	MWD
702.00	7.20	310.70	699.85	27.66	-29.55	40.00	0.16	0.15	-0.51	MWD
823.00	8.10	308.90	819.77	37.95	-41.93	56.03	0.77	0.74	-1.49	MWD
873.00	8.92	307.50	869.22	42.53	-47.75	63.41	1.70	1.65	-2.80	8 5/8"
920.00	9.70	306.40	915.60	47.09	-53.83	71.01	1.70	1.65	-2.34	MWD
1011.00	10.70	305.70	1005.16	56.57	-66.86	87.12	1.11	1.10	-0.77	MWD
1102.00	13.60	312.40	1094.12	68.72	-81.63	106.16	3.54	3.19	7.36	MWD
1193.00	13.20	312.80	1182.64	82.99	-97.15	127.03	0.45	-0.44	0.44	MWD
1284.00	13.60	308.20	1271.17	96.67	-113.18	147.98	1.25	0.44	-5.05	MWD
1375.00	14.60	306.80	1359.42	110.16	-130.77	170.12	1.16	1.10	-1.54	MWD
1465.00	17.40	303.30	1445.93	124.34	-151.11	194.91	3.29	3.11	-3.89	MWD
1556.00	17.40	305.70	1532.77	139.75	-173.53	222.12	0.79	0.00	2.64	MWD
1647.00	19.00	303.30	1619.21	155.83	-196.96	250.53	1.94	1.76	-2.64	MWD
1738.00	18.30	308.60	1705.44	172.88	-220.51	279.59	2.01	-0.77	5.82	MWD
1829.00	19.20	304.70	1791.61	190.31	-243.98	308.80	1.70	0.99	-4.29	MWD
1919.00	22.50	303.60	1875.71	208.27	-270.50	340.83	3.69	3.67	-1.22	MWD
2010.00	22.00	300.50	1959.94	226.55	-299.69	375.25	1.40	-0.55	-3.41	MWD

# Allis-Chalmers Energy, Inc.

## Survey Report

<b>Company:</b> ANADARKO PETROLEUM <b>Field:</b> Weld County, CO <b>Site:</b> Burchfield 18-21 Pad <b>Well:</b> 30-21 <b>Wellpath:</b> Original Hole	<b>Date:</b> 09/27/2010 <b>Co-ordinate(NE) Reference:</b> Well: 30-21, Grid North <b>Vertical (TVD) Reference:</b> 4775'GL+15'KB 4790.0 <b>Section (VS) Reference:</b> Well (0.00N,0.00E,304.33Azi) <b>Survey Calculation Method:</b> Minimum Curvature	<b>Time:</b> 09:20:00 <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
2101.00	22.20	304.00	2044.25	244.82	-328.63	409.45	1.46	0.22	3.85	MWD
2192.00	20.00	306.10	2129.15	263.61	-355.46	442.20	2.56	-2.42	2.31	MWD
2283.00	21.50	306.10	2214.24	282.60	-381.51	474.42	1.65	1.65	0.00	MWD
2373.00	21.50	306.10	2297.98	302.04	-408.16	507.39	0.00	0.00	0.00	MWD
2464.00	22.70	303.60	2382.30	321.58	-436.26	541.62	1.68	1.32	-2.75	MWD
2555.00	23.40	305.40	2466.03	341.76	-465.61	577.25	1.09	0.77	1.98	MWD
2646.00	23.40	308.90	2549.55	363.58	-494.41	613.33	1.53	0.00	3.85	MWD
2736.00	21.50	308.20	2632.73	385.00	-521.28	647.60	2.13	-2.11	-0.78	MWD
2827.00	22.00	303.30	2717.25	404.68	-548.63	681.28	2.07	0.55	-5.38	MWD
2918.00	20.40	303.30	2802.09	422.74	-576.14	714.19	1.76	-1.76	0.00	MWD
3009.00	20.60	305.40	2887.33	440.72	-602.44	746.05	0.84	0.22	2.31	MWD
3099.00	18.30	302.90	2972.19	457.57	-627.22	776.01	2.72	-2.56	-2.78	MWD
3190.00	19.40	304.00	3058.31	473.78	-651.74	805.41	1.27	1.21	1.21	MWD
3281.00	17.80	305.40	3144.55	490.29	-675.61	834.43	1.83	-1.76	1.54	MWD
3372.00	17.40	301.50	3231.30	505.46	-698.55	861.92	1.37	-0.44	-4.29	MWD
3463.00	18.30	301.90	3317.92	520.12	-722.28	889.79	1.00	0.99	0.44	MWD
3553.00	18.00	307.50	3403.44	536.05	-745.31	917.79	1.97	-0.33	6.22	MWD
3644.00	19.40	305.40	3489.64	553.37	-768.79	946.94	1.71	1.54	-2.31	MWD
3735.00	20.50	298.00	3575.19	569.61	-795.18	977.90	3.02	1.21	-8.13	MWD
3825.00	24.50	301.20	3658.33	586.68	-825.07	1012.21	4.65	4.44	3.56	MWD
3916.00	25.20	306.40	3740.91	607.96	-856.81	1050.42	2.52	0.77	5.71	MWD
4006.00	24.60	305.00	3822.54	630.07	-887.57	1088.30	0.93	-0.67	-1.56	MWD
4096.00	21.60	304.30	3905.32	650.15	-916.61	1123.60	3.35	-3.33	-0.78	MWD
4189.00	20.20	299.80	3992.20	667.78	-944.69	1156.73	2.29	-1.51	-4.84	MWD
4279.00	21.50	299.40	4076.31	683.60	-972.54	1188.65	1.45	1.44	-0.44	MWD
4370.00	23.20	299.40	4160.47	700.59	-1002.69	1223.13	1.87	1.87	0.00	MWD
4461.00	24.30	299.40	4243.76	718.58	-1034.62	1259.64	1.21	1.21	0.00	MWD
4551.00	22.00	299.40	4326.51	735.95	-1065.44	1294.89	2.56	-2.56	0.00	MWD
4642.00	19.50	303.60	4411.60	752.72	-1092.95	1327.06	3.20	-2.75	4.62	MWD
4733.00	22.00	304.70	4496.70	770.83	-1119.62	1359.30	2.78	2.75	1.21	MWD
4824.00	23.90	305.00	4580.49	791.11	-1148.73	1394.78	2.09	2.09	0.33	MWD
4915.00	22.70	304.70	4664.07	811.68	-1178.27	1430.77	1.33	-1.32	-0.33	MWD
5006.00	19.50	305.00	4748.95	830.40	-1205.15	1463.53	3.52	-3.52	0.33	MWD
5097.00	16.50	304.70	4835.49	846.47	-1228.22	1491.64	3.30	-3.30	-0.33	MWD
5188.00	16.40	307.90	4922.77	861.72	-1248.99	1517.39	1.00	-0.11	3.52	MWD
5278.00	13.90	306.80	5009.63	876.00	-1267.67	1540.87	2.80	-2.78	-1.22	MWD
5369.00	10.90	308.90	5098.50	887.95	-1283.12	1560.37	3.33	-3.30	2.31	MWD
5460.00	11.60	304.30	5187.75	898.51	-1297.38	1578.10	1.25	0.77	-5.05	MWD
5551.00	10.00	301.90	5277.14	907.84	-1311.64	1595.14	1.83	-1.76	-2.64	MWD
5642.00	7.90	297.70	5367.03	914.92	-1323.89	1609.25	2.42	-2.31	-4.62	MWD
5732.00	8.10	301.50	5456.15	921.11	-1334.77	1621.73	0.63	0.22	4.22	MWD
5823.00	7.90	297.00	5546.27	927.30	-1345.81	1634.33	0.72	-0.22	-4.95	MWD
5914.00	7.60	313.80	5636.45	934.31	-1355.73	1646.47	2.50	-0.33	18.46	MWD
6005.00	7.40	310.70	5726.67	942.29	-1364.51	1658.23	0.50	-0.22	-3.41	MWD
6095.00	7.70	307.10	5815.89	949.71	-1373.72	1670.02	0.62	0.33	-4.00	MWD
6186.00	6.90	297.30	5906.15	955.89	-1383.44	1681.53	1.62	-0.88	-10.77	MWD
6277.00	7.00	290.30	5996.49	960.33	-1393.49	1692.34	0.94	0.11	-7.69	MWD
6368.00	6.30	286.80	6086.87	963.69	-1403.48	1702.48	0.89	-0.77	-3.85	MWD
6458.00	5.80	289.90	6176.37	966.67	-1412.48	1711.59	0.66	-0.56	3.44	MWD
6595.00	4.80	282.50	6312.79	970.26	-1424.58	1723.62	0.88	-0.73	-5.40	MWD
6731.00	3.70	274.10	6448.41	971.81	-1434.52	1732.69	0.93	-0.81	-6.18	MWD
6866.00	2.80	270.60	6583.19	972.16	-1442.16	1739.19	0.68	-0.67	-2.59	MWD
7003.00	3.20	288.90	6720.01	973.43	-1449.12	1745.66	0.75	0.29	13.36	MWD

# Allis-Chalmers Energy, Inc.

## Survey Report

**Company:** ANADARKO PETROLEUM  
**Field:** Weld County, CO  
**Site:** Burchfield 18-21 Pad  
**Well:** 30-21  
**Wellpath:** Original Hole

<b>Date:</b>	09/27/2010	<b>Time:</b>	09:20:00	<b>Page:</b>	3
<b>Co-ordinate(NE) Reference:</b>	Well: 30-21, Grid North				
<b>Vertical (TVD) Reference:</b>	4775'GL+15'KB 4790.0				
<b>Section (VS) Reference:</b>	Well (0.00N,0.00E,304.33Azi)				
<b>Survey Calculation Method:</b>	Minimum Curvature				<b>Db:</b> 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
7139.00	2.30	310.00	6855.85	976.41	-1454.80	1752.04	0.99	-0.66	15.51	MWD
7275.00	1.10	310.30	6991.79	979.01	-1457.89	1756.05	0.88	-0.88	0.22	MWD
7412.00	0.30	286.80	7128.78	979.97	-1459.24	1757.70	0.61	-0.58	-17.15	MWD
7548.00	0.30	232.30	7264.78	979.85	-1459.86	1758.15	0.20	0.00	-40.07	MWD
7684.00	0.20	93.00	7400.78	979.62	-1459.90	1758.06	0.35	-0.07	-102.43	MWD
7820.00	0.50	191.80	7536.78	979.03	-1459.79	1757.63	0.42	0.22	72.65	MWD
7898.00	0.50	191.50	7614.77	978.36	-1459.93	1757.37	0.00	0.00	-0.38	MWD
7918.23	0.50	191.50	7635.00	978.19	-1459.96	1757.30	0.00	0.00	0.00	30-21 PBHL
7943.00	0.50	191.50	7659.77	977.98	-1460.00	1757.21	0.00	0.00	0.00	30-21 BHL

## Targets

Name	Description		TVD ft	+N/-S ft	+E/-W ft	Map Northing ft	Map Easting ft	<---- Latitude ---->			<--- Longitude --->		
	Dip.	Dir.						Deg	Min	Sec	Deg	Min	Sec
30-21 SL			0.00	0.00	0.00	1322003.56	3167772.13	40	12	56.628 N	104	53	57.336 W
30-21 PBHL			7635.00	1002.51	-1468.09	1323006.07	3166304.04	40	13	6.633 N	104	54	16.174 W
-Circle (Radius: 50)													
30-21 BHL			7659.77	977.98	-1460.00	1322981.54	3166312.13	40	13	6.390 N	104	54	16.072 W

## Casing Points

MD ft	TVD ft	Diameter in	Hole Size in	Name
873.00	869.22	8.625	9.875	8 5/8"