

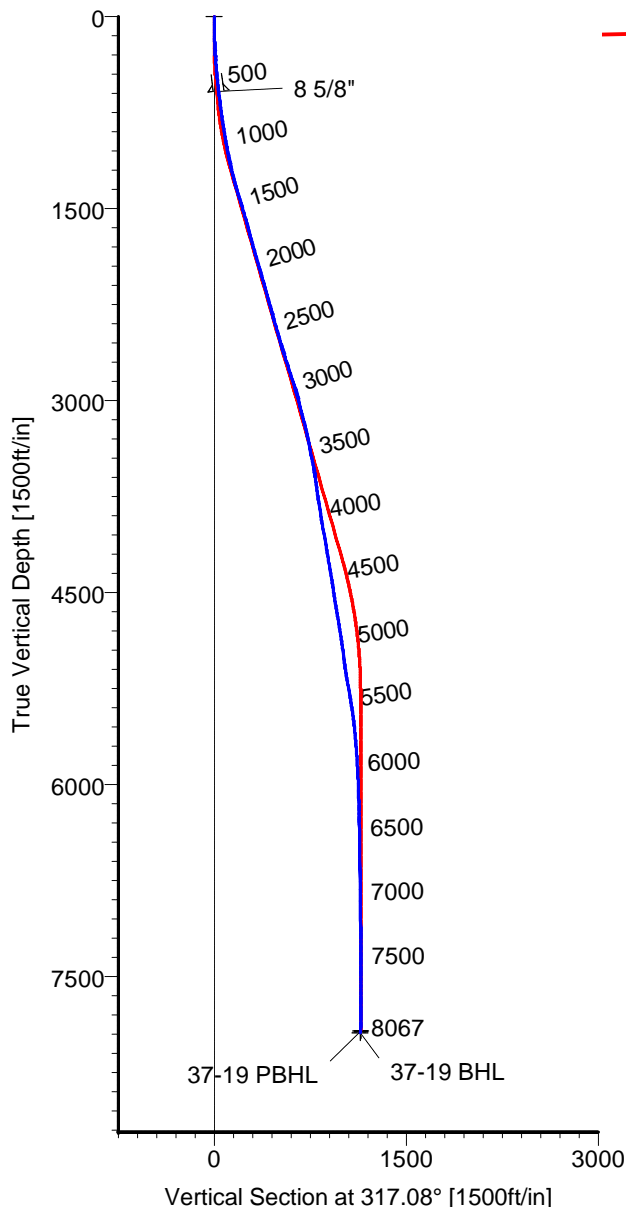
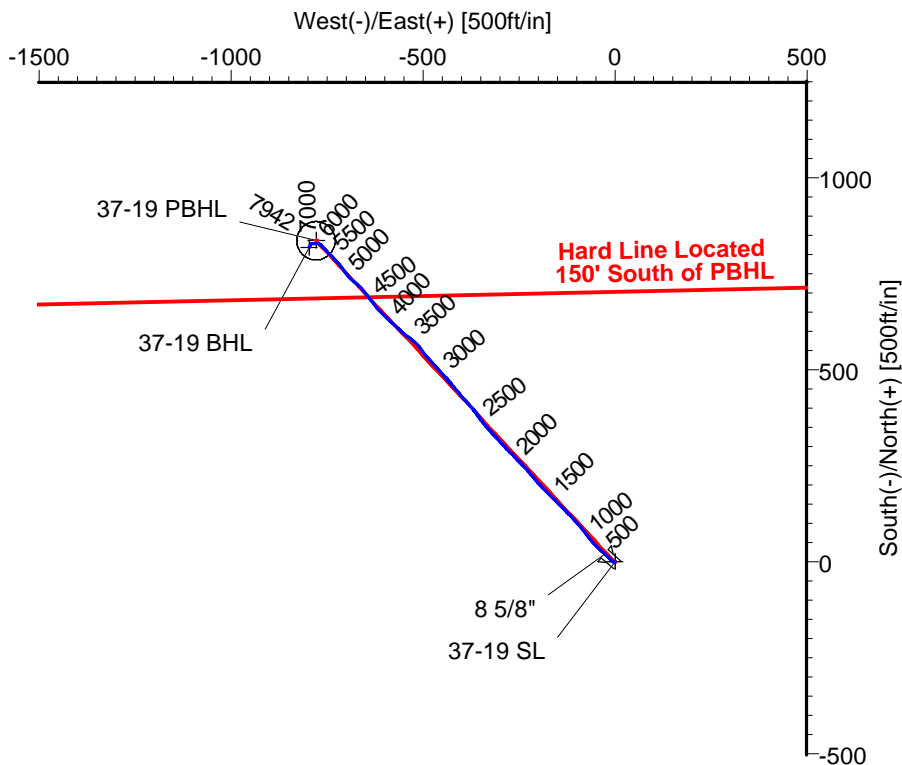
ANADARKO PETROLEUM

Field: Weld County, CO
Site: Miller 1-30 Pad
Well: 37-19
Wellpath: Original Hole



Azimuths to Grid North
True North: -0.44°
Magnetic North: 8.57°

Magnetic Field
Strength: 53167nT
Dip Angle: 66.92°
Date: 06/14/2010
Model: IGRF2010



CASING DETAILS

No.	TVD	MD	Name	Size
1	584.60	586.00	8 5/8"	8.625

LEGEND

- 37-19, Original Hole, Plan #1a
- Original Hole

TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
37-19 SL	0.00	0.00	0.00	40°12'03.699N	104°48'46.569W	Point
37-19 PBHL	7925.00	836.73	-778.12	40°12'12.027N	104°48'56.513W	Circle (Radius: 50)
37-19 BHL	7942.06	819.42	-796.17	40°12'11.858N	104°48'56.748W	Point

Wellpath: (37-19/Original Hole)

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

Created By: Ivonne Gonzalez

Date: 11/17/2010



DIRECTIONAL
DRILLING SERVICES

Allis-Chalmers Energy, Inc.

Survey Report

Company: ANADARKO PETROLEUM Field: Weld County, CO Site: Miller 1-30 Pad Well: 37-19 Wellpath: Original Hole	Date: 11/17/2010 Co-ordinate(NE) Reference: Vertical (TVD) Reference: Section (VS) Reference: Survey Calculation Method:	Time: 09:23:51 Well: 37-19, Grid North SITE 4933.0 Well (0.00N,0.00E,317.08Azi) Minimum Curvature	Page: 1 Db: Adapti
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Field: Weld County, CO Map System: US State Plane Coordinate System 1983 Geo Datum: GRS 1980 Sys Datum: Mean Sea Level	Map Zone: Colorado, Northern Zone Coordinate System: Well Centre Geomagnetic Model: IGRF2010
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Site: Miller 1-30 Pad Currently centered on 17-30 Site Position: From: Geographic Position Uncertainty: 0.00 ft Ground Level: 4920.00 ft	Northing: 1316822.56 ft Easting: 3191904.58 ft Latitude: 40 12 3.697 N Longitude: 104 48 46.775 W North Reference: Grid Grid Convergence: 0.44 deg
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Well: 37-19 Well Position: +N/-S 0.34 ft +E/-W 16.02 ft Position Uncertainty: 0.00 ft	Slot Name: 37-19 Latitude: 40 12 3.699 N Longitude: 104 48 46.569 W Easting : 3191920.60 ft
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Wellpath: Original Hole Current Datum: SITE Magnetic Data: 06/14/2010 Field Strength: 53167 nT Vertical Section: Depth From (TVD) ft	Drilled From: Surface Tie-on Depth: 0.00 ft Above System Datum: Mean Sea Level Declination: 9.01 deg Mag Dip Angle: 66.92 deg +N/-S ft +E/-W ft Direction deg
0.00	0.00

Survey Program for Definitive Wellpath			
Date: 11/17/2010	Validated: No	Version: 0	
Actual From ft	To ft	Survey	Toolcode Tool Name
44.00	8022.00	Survey #1 (44.00-8022.00)	MWD Std MWD
8067.00	8067.00	Survey #2 (8067.00-8067.00)	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
44.00	0.90	256.80	44.00	-0.08	-0.34	0.17	2.05	2.05	0.00	MWD
105.00	1.10	267.40	104.99	-0.21	-1.39	0.79	0.45	0.33	17.38	MWD
166.00	1.60	274.40	165.97	-0.18	-2.82	1.79	0.86	0.82	11.48	MWD
226.00	2.10	304.30	225.94	0.51	-4.57	3.48	1.78	0.83	49.83	MWD
286.00	3.30	307.80	285.87	2.19	-6.84	6.26	2.02	2.00	5.83	MWD
347.00	4.60	314.80	346.73	4.99	-9.96	10.43	2.27	2.13	11.48	MWD
425.00	4.90	315.90	424.46	9.58	-14.50	16.89	0.40	0.38	1.41	MWD
516.00	6.20	314.80	515.03	15.84	-20.69	25.69	1.43	1.43	-1.21	MWD
586.00	6.60	311.58	584.60	21.17	-26.38	33.47	0.77	0.58	-4.60	8 5/8"
602.00	6.70	310.90	600.49	22.39	-27.78	35.31	0.77	0.60	-4.25	MWD
693.00	7.20	311.30	690.82	29.63	-36.07	46.27	0.55	0.55	0.44	MWD
800.00	8.10	314.80	796.87	39.37	-46.46	60.47	0.95	0.84	3.27	MWD
892.00	9.50	318.30	887.78	49.61	-56.11	74.54	1.63	1.52	3.80	MWD
983.00	10.00	322.50	977.47	61.48	-65.92	89.91	0.96	0.55	4.62	MWD
1074.00	10.70	320.80	1066.99	74.30	-76.07	106.21	0.84	0.77	-1.87	MWD
1165.00	13.00	320.80	1156.04	88.78	-87.88	124.85	2.53	2.53	0.00	MWD
1256.00	14.30	318.00	1244.47	105.06	-101.87	146.30	1.60	1.43	-3.08	MWD
1347.00	16.00	316.20	1332.30	122.47	-118.07	170.08	1.94	1.87	-1.98	MWD
1437.00	17.40	315.20	1418.51	140.97	-136.14	195.94	1.59	1.56	-1.11	MWD
1528.00	16.40	315.50	1505.58	159.79	-154.73	222.38	1.10	-1.10	0.33	MWD
1619.00	15.70	315.50	1593.03	177.73	-172.36	247.53	0.77	-0.77	0.00	MWD

Allis-Chalmers Energy, Inc.

Survey Report

Company: ANADARKO PETROLEUM Field: Weld County, CO Site: Miller 1-30 Pad Well: 37-19 Wellpath: Original Hole	Date: 11/17/2010 Co-ordinate(NE) Reference: Well: 37-19, Grid North Vertical (TVD) Reference: SITE 4933.0 Section (VS) Reference: Well (0.00N,0.00E,317.08Azi) Survey Calculation Method: Minimum Curvature	Time: 09:23:51 Page: 2 Db: 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
1710.00	14.80	315.50	1680.82	194.80	-189.14	271.45	0.99	-0.99	0.00	MWD
1800.00	15.50	319.70	1767.70	212.17	-204.97	294.96	1.45	0.78	4.67	MWD
1891.00	16.00	318.30	1855.28	230.81	-221.18	319.64	0.69	0.55	-1.54	MWD
1982.00	17.10	317.60	1942.51	250.06	-238.55	345.56	1.23	1.21	-0.77	MWD
2073.00	15.80	314.80	2029.78	268.67	-256.36	371.32	1.67	-1.43	-3.08	MWD
2163.00	15.70	315.90	2116.40	286.04	-273.53	395.74	0.35	-0.11	1.22	MWD
2254.00	15.70	318.70	2204.01	304.14	-290.22	420.36	0.83	0.00	3.08	MWD
2345.00	14.80	314.80	2291.81	321.58	-306.60	444.28	1.50	-0.99	-4.29	MWD
2436.00	16.40	318.70	2379.46	339.42	-323.33	468.74	2.10	1.76	4.29	MWD
2527.00	16.00	320.40	2466.84	358.73	-339.80	494.10	0.68	-0.44	1.87	MWD
2618.00	15.80	325.40	2554.37	378.60	-354.83	518.88	1.52	-0.22	5.49	MWD
2708.00	18.00	320.40	2640.48	399.40	-370.65	544.89	2.93	2.44	-5.56	MWD
2799.00	18.10	318.30	2727.00	420.79	-389.02	573.06	0.72	0.11	-2.31	MWD
2890.00	17.80	319.00	2813.57	441.84	-407.55	601.09	0.41	-0.33	0.77	MWD
2981.00	17.60	319.40	2900.26	462.78	-425.63	628.74	0.26	-0.22	0.44	MWD
3071.00	14.80	319.00	2986.68	481.79	-442.03	653.83	3.11	-3.11	-0.44	MWD
3162.00	14.80	316.60	3074.66	499.01	-457.64	677.07	0.67	0.00	-2.64	MWD
3253.00	14.10	318.70	3162.78	515.78	-472.94	699.77	0.96	-0.77	2.31	MWD
3344.00	12.80	320.40	3251.29	531.88	-486.68	720.92	1.49	-1.43	1.87	MWD
3435.00	11.10	321.50	3340.31	546.50	-498.56	739.71	1.88	-1.87	1.21	MWD
3526.00	11.10	319.40	3429.61	560.01	-509.71	757.20	0.44	0.00	-2.31	MWD
3617.00	10.20	316.90	3519.04	572.54	-520.92	774.01	1.11	-0.99	-2.75	MWD
3707.00	8.60	305.70	3607.84	582.29	-531.83	788.58	2.69	-1.78	-12.44	MWD
3798.00	7.60	304.30	3697.93	589.65	-542.33	801.12	1.12	-1.10	-1.54	MWD
3889.00	8.80	312.70	3788.00	597.76	-552.42	813.93	1.86	1.32	9.23	MWD
3980.00	8.80	312.40	3877.93	607.18	-562.67	827.81	0.05	0.00	-0.33	MWD
4071.00	10.20	312.00	3967.68	617.26	-573.80	842.77	1.54	1.54	-0.44	MWD
4162.00	9.90	313.40	4057.28	628.03	-585.47	858.60	0.43	-0.33	1.54	MWD
4252.00	9.90	310.60	4145.94	638.38	-596.97	874.01	0.53	0.00	-3.11	MWD
4343.00	9.50	316.20	4235.64	648.89	-608.10	889.29	1.13	-0.44	6.15	MWD
4434.00	9.70	318.70	4325.37	660.07	-618.36	904.46	0.51	0.22	2.75	MWD
4525.00	9.50	323.30	4415.10	671.85	-627.91	919.59	0.87	-0.22	5.05	MWD
4615.00	8.00	324.00	4504.05	682.87	-636.03	933.19	1.67	-1.67	0.78	MWD
4706.00	9.20	324.70	4594.02	693.94	-643.96	946.69	1.32	1.32	0.77	MWD
4797.00	10.10	318.20	4683.74	705.82	-653.48	961.88	1.55	0.99	-7.14	MWD
4888.00	9.20	314.50	4773.45	716.87	-663.99	977.13	1.20	-0.99	-4.07	MWD
4979.00	8.80	309.50	4863.33	726.40	-674.55	991.29	0.96	-0.44	-5.49	MWD
5069.00	7.40	312.40	4952.43	734.68	-684.14	1003.89	1.62	-1.56	3.22	MWD
5160.00	7.40	316.20	5042.67	742.86	-692.52	1015.60	0.54	0.00	4.18	MWD
5251.00	8.80	323.60	5132.76	752.70	-700.71	1028.37	1.92	1.54	8.13	MWD
5342.00	10.20	323.60	5222.51	764.79	-709.62	1043.29	1.54	1.54	0.00	MWD
5432.00	10.20	317.30	5311.09	777.06	-719.76	1059.18	1.24	0.00	-7.00	MWD
5523.00	8.50	316.90	5400.88	787.89	-729.82	1073.96	1.87	-1.87	-0.44	MWD
5614.00	7.20	318.00	5491.03	797.04	-738.23	1086.39	1.44	-1.43	1.21	MWD
5705.00	5.60	316.20	5581.46	804.48	-745.12	1096.53	1.77	-1.76	-1.98	MWD
5795.00	4.60	315.90	5671.10	810.24	-750.67	1104.53	1.11	-1.11	-0.33	MWD
5886.00	4.10	317.60	5761.84	815.27	-755.40	1111.43	0.57	-0.55	1.87	MWD
5977.00	3.20	323.30	5852.65	819.70	-759.11	1117.21	1.07	-0.99	6.26	MWD
6068.00	2.60	320.10	5943.54	823.32	-761.95	1121.80	0.68	-0.66	-3.52	MWD
6158.00	1.90	305.30	6033.47	825.75	-764.48	1125.30	1.00	-0.78	-16.44	MWD
6249.00	1.60	292.30	6124.42	827.11	-766.89	1127.93	0.54	-0.33	-14.29	MWD
6340.00	1.40	285.30	6215.39	827.88	-769.14	1130.03	0.30	-0.22	-7.69	MWD
6430.00	1.20	283.20	6305.37	828.39	-771.11	1131.74	0.23	-0.22	-2.33	MWD

Allis-Chalmers Energy, Inc.

Survey Report

Company: ANADARKO PETROLEUM Field: Weld County, CO Site: Miller 1-30 Pad Well: 37-19 Wellpath: Original Hole	Date: 11/17/2010 Co-ordinate(NE) Reference: Well: 37-19, Grid North Vertical (TVD) Reference: SITE 4933.0 Section (VS) Reference: Well (0.00N,0.00E,317.08Azi) Survey Calculation Method: Minimum Curvature	Page: 3 Db: 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
6521.00	1.10	276.50	6396.35	828.70	-772.91	1133.20	0.18	-0.11	-7.36	MWD
6703.00	0.90	280.40	6578.32	829.16	-776.05	1135.67	0.12	-0.11	2.14	MWD
6884.00	0.90	278.60	6759.30	829.63	-778.85	1137.92	0.02	0.00	-0.99	MWD
7065.00	1.40	267.40	6940.26	829.74	-782.47	1140.47	0.30	0.28	-6.19	MWD
7247.00	1.20	268.10	7122.22	829.58	-786.60	1143.16	0.11	-0.11	0.38	MWD
7429.00	0.70	258.90	7304.19	829.30	-789.59	1144.99	0.29	-0.27	-5.05	MWD
7610.00	0.50	221.30	7485.18	828.49	-791.20	1145.50	0.24	-0.11	-20.77	MWD
7792.00	1.40	209.30	7667.16	825.96	-792.81	1144.74	0.50	0.49	-6.59	MWD
7973.00	1.60	204.10	7848.09	821.72	-794.92	1143.08	0.13	0.11	-2.87	MWD
8022.00	1.60	210.00	7897.07	820.51	-795.54	1142.61	0.34	0.00	12.04	MWD
8049.94	1.60	210.00	7925.00	819.83	-795.93	1142.38	0.00	0.00	0.00	37-19 PBHL
8067.00	1.60	210.00	7942.06	819.42	-796.17	1142.24	0.00	0.00	0.00	37-19 BHL

Targets

Name	Description	Dir.	TVD ft	+N/-S ft	+E/-W ft	Map Northing ft	Map Easting ft	<--- Latitude ---> Deg Min Sec			<--- Longitude ---> Deg Min Sec				
37-19 SL			0.00	0.00	0.00	1316822.90	3191920.60	40	12	3.699	N	104	48	46.569	W
37-19 PBHL			7925.00	836.73	-778.12	1317659.63	3191142.48	40	12	12.027	N	104	48	56.513	W
-Circle (Radius: 50)															
37-19 BHL			7942.06	819.42	-796.17	1317642.32	3191124.43	40	12	11.858	N	104	48	56.748	W

Casing Points

MD ft	TVD ft	Diameter in	Hole Size in	Name
586.00	584.60	8.625	9.875	8 5/8"