Noble Energy

Weld County, CO (NAD 83)
Sec. 27-T11N-R61W
Fabrizius PC GK27-99HZ

Design: MWD Survey

Sperry Drilling Services

Final Survey Report

21 March, 2011

Well Coordinates: 1,573,079.59 N, 3,359,948.14 E (40° 53' 57.19" N, 104° 11' 52.66" W)
Ground Level: 5,216.00 ft

Local Coordinate Origin:	Centered on Well Fabrizius PC GK27-99HZ
Viewing Datum:	RKB 24' @ 5240.00ft (H&P 343)
TVDs to System:	N
North Reference:	Grid
Unit System:	API - US Survey Feet - Custom

Geodetic Scale Factor Applied
Version: 2003.16 Build: 431

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Design Report for Fabrizius PC GK27-99HZ - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,662.00	0.19	4.85	1,662.00	2.75	0.23	-2.74	0.01
First MWD Survey							
1,946.00	0.20	212.94	1,946.00	2.80	0.00	-2.80	0.13
2,325.00	0.33	130.00	2,324.99	1.54	0.48	-1.53	0.10
2,614.00	0.46	113.46	2,613.99	0.55	2.18	-0.50	0.06
2,901.00	0.12	205.17	2,900.98	-0.19	3.11	0.25	0.17
3,187.00	0.39	183.49	3,186.98	-1.43	2.92	1.49	0.10
3,474.00	1.00	247.26	3,473.96	-3.37	0.55	3.38	0.31
3,760.00	0.44	257.86	3,759.94	-4.57	-2.82	4.51	0.20
4,047.00	0.31	159.50	4,046.93	-5.53	-3.63	5.45	0.20
4,333.00	0.50	334.57	4,332.93	-5.12	-3.89	5.04	0.28
4,620.00	0.84	345.22	4,619.91	-1.96	-4.97	1.85	0.13
4,906.00	1.42	344.57	4,905.85	3.48	-6.44	-3.62	0.20
5,192.00	2.01	333.39	5,191.73	11.39	-9.63	-11.58	0.24
5,478.00	0.74	305.47	5,477.64	16.94	-13.38	-17.22	0.49
5,765.00	0.50	256.13	5,764.62	17.72	-16.11	-18.05	0.20
6,051.00	0.70	212.86	6,050.61	15.95	-18.27	-16.33	0.17
6,117.00	1.08	223.87	6,116.60	15.16	-18.92	-15.56	0.63
6,152.00	1.57	208.21	6,151.59	14.50	-19.37	-14.91	1.73
6,200.00	7.08	173.38	6,199.44	10.98	-19.34	-11.38	12.21
6,247.00	11.44	169.99	6,245.82	3.51	-18.20	-3.89	9.34
6,295.00	14.41	169.82	6,292.60	-7.06	-16.31	6.71	6.19
6,343.00	16.88	171.57	6,338.82	-19.83	-14.24	19.53	5.24
6,391.00	19.79	180.22	6,384.38	-34.86	-13.25	34.57	8.28
6,438.00	23.59	181.44	6,428.05	-52.22	-13.51	51.93	8.14
6,486.00	25.90	179.01	6,471.64	-72.31	-13.57	72.01	5.26
6,534.00	28.12	179.15	6,514.40	-94.10	-13.22	93.81	4.63
6,582.00	32.45	175.97	6,555.84	-118.27	-12.15	117.99	9.62
6,629.00	36.30	175.91	6,594.63	-144.74	-10.27	144.49	8.19
6,677.00	39.62	177.78	6,632.47	-174.21	-8.67	173.99	7.32
6,724.00	42.66	180.91	6,667.86	-205.12	-8.34	204.90	7.81
6,772.00	48.64	182.64	6,701.40	-239.41	-9.43	239.16	12.72
6,820.00	54.60	183.57	6,731.19	-276.96	-11.48	276.66	12.51
6,868.00	59.85	182.96	6,757.17	-317.24	-13.77	316.88	10.99
6,916.00	63.06	181.28	6,780.10	-359.37	-15.32	358.97	7.36
6,964.00	66.45	180.21	6,800.57	-402.77	-15.88	402.35	7.34
7,011.00	69.68	179.03	6,818.13	-446.36	-15.58	445.94	7.26
7,059.00	72.39	178.07	6,833.73	-491.74	-14.43	491.33	5.95
7,107.00	76.07	177.97	6,846.77	-537.90	-12.83	537.51	7.67
7,155.00	79.75	177.25	6,856.82	-584.78	-10.88	584.43	7.81
7,202.00	83.33	177.17	6,863.73	-631.21	-8.61	630.89	7.62
7,247.00	85.55	176.66	6,868.09	-675.93	-6.20	675.65	5.06
7,279.00	85.24	176.59	6,870.66	-707.77	-4.32	707.53	0.99
7,311.00	84.63	177.02	6,873.49	-739.60	-2.55	739.38	2.33
7,343.00	86.91	177.27	6,875.85	-771.47	-0.96	771.28	7.17
7,375.00	88.95	177.02	6,877.00	-803.41	0.63	803.24	6.42
7,406.00	89.14	176.87	6,877.52	-834.36	2.29	834.22	0.78
7,438.00	89.32	177.21	6,877.95	-866.31	3.94	866.20	1.20
7,470.00	89.44	177.36	6,878.30	-898.27	5.45	898.19	0.60

Design Report for Fabrizius PC GK27-99HZ - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
7,502.00	89.63	177.24	6,878.56	-930.24	6.96	930.18	0.70
7,550.00	90.49	177.45	6,878.51	-978.18	9.18	978.16	1.84
7,597.00	90.00	177.73	6,878.31	-1,025.14	11.16	1,025.15	1.20
7,645.00	91.30	179.46	6,877.76	-1,073.12	12.34	1,073.14	4.51
7,693.00	90.12	178.35	6,877.17	-1,121.11	13.25	1,121.14	3.37
7,741.00	90.99	178.80	6,876.70	-1,169.09	14.45	1,169.14	2.04
7,788.00	89.94	178.15	6,876.32	-1,216.07	15.70	1,216.13	2.63
7,836.00	90.74	179.22	6,876.03	-1,264.06	16.80	1,264.13	2.78
7,884.00	90.06	178.72	6,875.70	-1,312.05	17.66	1,312.13	1.76
7,932.00	90.62	179.07	6,875.41	-1,360.04	18.59	1,360.13	1.38
7,979.00	89.94	178.63	6,875.18	-1,407.03	19.53	1,407.13	1.72
8,027.00	90.06	178.26	6,875.18	-1,455.01	20.84	1,455.13	0.81
8,075.00	89.32	177.70	6,875.44	-1,502.98	22.53	1,503.12	1.93
8,123.00	89.63	177.22	6,875.88	-1,550.93	24.65	1,551.10	1.19
8,170.00	90.87	177.49	6,875.68	-1,597.88	26.82	1,598.09	2.70
8,218.00	92.53	178.49	6,874.26	-1,645.82	28.51	1,646.06	4.04
8,266.00	91.98	178.49	6,872.37	-1,693.77	29.77	1,694.02	1.15
8,314.00	90.86	177.83	6,871.18	-1,741.73	31.31	1,742.00	2.71
8,361.00	91.79	179.87	6,870.09	-1,788.70	32.25	1,788.99	4.77
8,409.00	90.62	178.50	6,869.08	-1,836.69	32.94	1,836.97	3.75
8,457.00	91.36	180.09	6,868.25	-1,884.67	33.53	1,884.96	3.65
8,505.00	90.12	178.02	6,867.63	-1,932.66	34.32	1,932.96	5.03
8,552.00	91.92	179.61	6,866.79	-1,979.64	35.29	1,979.94	5.11
8,648.00	91.42	179.10	6,864.00	-2,075.59	36.37	2,075.90	0.74
8,743.00	90.80	181.56	6,862.16	-2,170.56	35.82	2,170.84	2.67
8,839.00	88.64	180.48	6,862.63	-2,266.54	34.11	2,266.76	2.52
8,935.00	89.57	179.59	6,864.13	-2,362.53	34.06	2,362.72	1.34
9,030.00	90.56	177.93	6,864.02	-2,457.50	36.11	2,457.72	2.03
9,126.00	92.47	177.68	6,861.48	-2,553.39	39.79	2,553.67	2.01
9,221.00	91.17	178.11	6,858.46	-2,648.28	43.27	2,648.60	1.44
9,317.00	90.25	179.48	6,857.27	-2,744.25	45.29	2,744.59	1.72
9,412.00	90.25	179.33	6,856.86	-2,839.24	46.28	2,839.59	0.16
9,507.00	90.80	179.33	6,855.99	-2,934.23	47.39	2,934.58	0.58
9,603.00	90.31	179.28	6,855.06	-3,030.22	48.56	3,030.57	0.51
9,698.00	91.36	179.98	6,853.67	-3,125.20	49.17	3,125.55	1.33
9,794.00	90.19	179.46	6,852.37	-3,221.19	49.64	3,221.52	1.33
9,889.00	89.63	178.91	6,852.52	-3,316.18	50.99	3,316.52	0.83
9,985.00	89.75	179.44	6,853.04	-3,412.17	52.37	3,412.52	0.57
10,080.00	90.00	180.01	6,853.25	-3,507.17	52.83	3,507.50	0.66
10,176.00	89.94	179.59	6,853.30	-3,603.17	53.16	3,603.49	0.44
10,271.00	91.24	180.79	6,852.32	-3,698.16	52.85	3,698.45	1.86
10,367.00	89.88	178.30	6,851.38	-3,794.14	53.61	3,794.43	2.96
10,462.00	90.19	177.52	6,851.33	-3,889.08	57.07	3,889.42	0.88
10,557.00	91.05	177.64	6,850.30	-3,983.98	61.09	3,984.39	0.91
10,653.00	89.75	176.54	6,849.63	-4,079.86	65.96	4,080.34	1.77
10,748.00	90.31	176.59	6,849.58	-4,174.68	71.65	4,175.27	0.59
10,844.00	91.05	176.06	6,848.44	-4,270.48	77.80	4,271.17	0.95
10,948.00	91.36	176.27	6,846.25	-4,374.22	84.76	4,375.04	0.36
Final MWD Survey							
10,985.00	91.36	176.27	6,845.37	-4,411.13	87.16	4,411.99	0.00

Survey Projection to TD - Estimated BHL: 600' FSL, 845' FWL

Design Report for Fabrizius PC GK27-99HZ - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
1,662.00	1,662.00	2.75	0.23	First MWD Survey
10,948.00	6,846.25	-4,374.22	84.76	Final MWD Survey
10,985.00	6,845.37	-4,411.13	87.16	Survey Projection to TD
10,985.00	6,845.37	-4,411.13	87.16	Estimated BHL: 600' FSL, 845' FWL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (ft)	Origin +E/-W (ft)	Start TVD (ft)
Target	Fabrizius PC GK27-99HZ_I	178.80	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
1,662.00	10,985.00	Sperry MWD Surveys	MWD

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Fabrizius PC	0.00	0.00	0.00	0.00	0.00	1,573,079.59	3,359,948.14	40° 53' 57.192 N	104° 11' 52.656 W
- actual wellpath hits target center									
- Polygon									
Point 1				-854.00	141.00	1,573,220.59	3,359,094.12		
Point 2				4,194.00	226.00	1,573,305.59	3,364,142.23		
Point 3				4,232.00	-4,937.00	1,568,142.49	3,364,180.23		
Point 4				-745.00	-5,025.00	1,568,054.48	3,359,203.13		
Point 5				-854.00	141.00	1,573,220.59	3,359,094.12		
Fabrizius PC	0.00	0.00	0.00	0.00	0.00	1,573,079.59	3,359,948.14	40° 53' 57.192 N	104° 11' 52.656 W
- actual wellpath hits target center									
- Polygon									
Point 1				-254.00	-459.00	1,572,620.58	3,359,694.14		
Point 2				3,594.00	-374.00	1,572,705.58	3,363,542.22		
Point 3				3,632.00	-4,337.00	1,568,742.50	3,363,580.22		
Point 4				-145.00	-4,425.00	1,568,654.50	3,359,803.14		
Point 5				-254.00	-459.00	1,572,620.58	3,359,694.14		
Fabrizius PC	0.00	0.00	6,848.49	-4,411.30	92.43	1,568,668.20	3,360,040.57	40° 53' 13.596 N	104° 11' 52.296 W
- actual wellpath misses target center by 6.12ft at 10985.00ft MD (6845.37 TVD, -4411.13 N, 87.16 E)									
- Point									

North Reference Sheet for Sec. 27-T11N-R61W - Fabrizius PC GK27-99HZ

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.

Vertical Depths are relative to RKB 24' @ 5240.00ft (H&P 343). Northing and Easting are relative to Fabrizius PC GK27-99HZ

Coordinate System is US State Plane 1983, Colorado Northern Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is 105° 30' 0.000 W°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:40° 47' 0.000 N°

False Easting: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 1.00002086

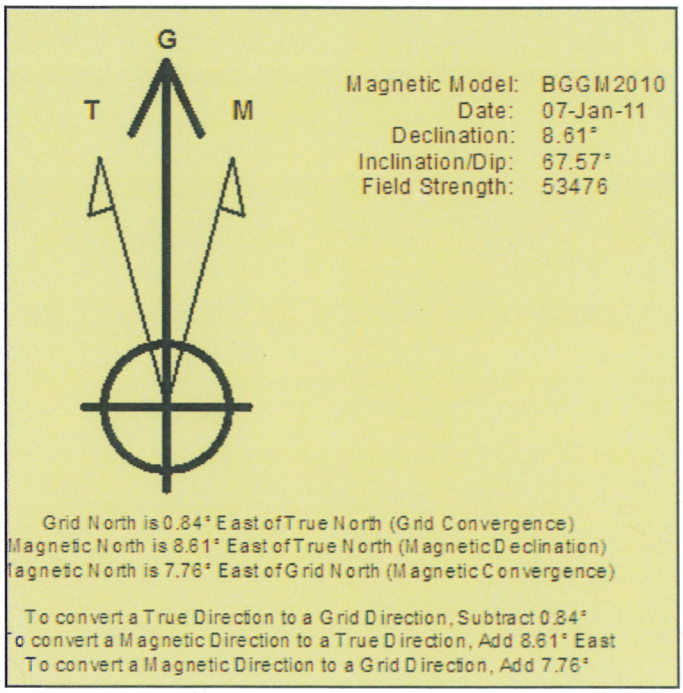
Grid Coordinates of Well: 1,573,079.59 ft N, 3,359,948.14 ft E

Geographical Coordinates of Well: 40° 53' 57.19" N, 104° 11' 52.66" W

Grid Convergence at Surface is: 0.84°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,985.00ft
the Bottom Hole Displacement is 4,412.00ft in the Direction of 178.87° (Grid).

Magnetic Convergence at surface is: -7.76° (7 January 2011, , BGGM2010)



Project: Weld County, CO (NAD 83)
Site: Sec. 27-T11N-R61W
Well: Fabrizius PC GK27-99HZ

Noble Energy

HALLIBURTON
Sperry Drilling

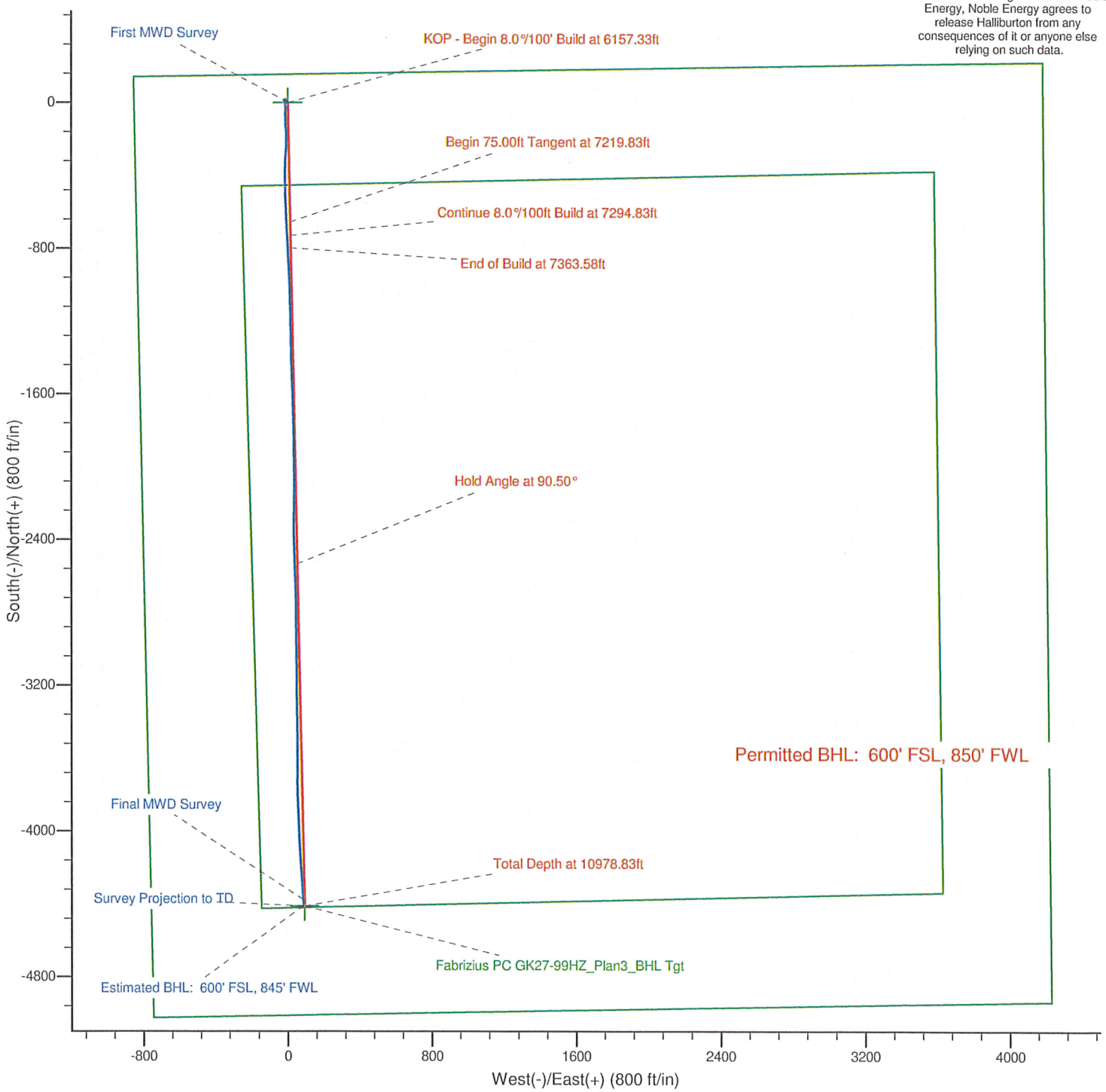
Azimuths to Grid North
True North: -0.84°
Magnetic North: 7.76°

Magnetic Field
Strength: 53476.1snT
Dip Angle: 67.57°
Date: 1/7/2011
Model: BGGM2010

LEGEND

Fabrizius PC GK27-99HZ,
MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Fabrizius PC GK27-99HZ well located at Weld County, CO. At the conclusion of the job Halliburton performed a final survey on the well. Noble Energy has requested that Halliburton provide them the distances from BHL to section lines from that final survey to allow Noble Energy to meet its requirements under Colorado law. These distances are generated by a mathematical algorithm based on rough data collected after the well is drilled. Halliburton considers it to be a rough estimate only and it is not to be relied upon in any application where accurate data is required. In consideration for Halliburton releasing this data to Noble Energy, Noble Energy agrees to release Halliburton from any consequences of it or anyone else relying on such data.



Project: Weld County, CO (NAD 83)
Site: Sec. 27-T11N-R61W
Well: Fabrizius PC GK27-99HZ

Noble Energy

HALLIBURTON
Sperry Drilling

Azimuths to Grid North
True North: -0.84°
Magnetic North: 7.76°

Magnetic Field
Strength: 53476.1snT
Dip Angle: 67.57°
Date: 1/7/2011
Model: BGGM2010

LEGEND

Fabrizius PC GK27-99HZ,
MWD Survey

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