Q. Please provide, dating back to at least 1998:

- The changes in forced outage rates used in the Strategist model as a function of time
- The reasons why such changes were thought to be appropriate
- The equivalent reserve requirement corresponding to the 2.8 LOLH for each new set of forced outage rates employed
- Any associated notifications to the Public Utilities Board regarding such changes or the impacts on reserves.

A. Please see Table 1 for the changes in forced outage rates used in the Strategist model as a function of time and for the equivalent reserve requirement corresponding to the 2.8 LOLH for each new set of forced outage rates employed. As Reserve Margin corresponding to 2.8 LOLH was not required by the Public Utilities Board, it was not routinely calculated. As a result, this figure is not available for all years.

Up to 2006, the Derating Adjusted Forced Outage Rates (DAFOR) used as a basis for Strategist modeling were derived from the Canadian Electrical Association's (CEA) Annual Report on Generation Equipment Status. The 2006 update was based on statistics from CEA's 2004 Report. The average performance data from January 1, 2000, through December 31, 2004, were used in the development of FOR input data into Strategist.

As noted in the *Forced Outage Rates - 2006 Update, NLH, December 2006*[1] report, for Hydro hydraulic units, data representing the operating experience of Hydro's facilities were used. For other hydraulic units, the Canadian average, based on the appropriate size classification, was used. For Holyrood units, combustion turbines, and diesels, the Canadian average performance data for fossil units, for the appropriate size classification was used.

Since 2006, Hydro's actual generating unit DAFORs have been monitored to determine the appropriateness of the DAFORs used in Strategist and they have not been changed, although due to recent high DAFORs in 2013 and 2014, a sensitivity of +2% is being used for the Holyrood units, and +10% for the older combustion turbines, above the base case assumptions. Please see the response to GT-PUB-NLH-008[2] from Hydro's Application, *Supply & Install 100MW Combustion Turbine Generator* for Hydro's actual thermal FORs since 2003 and a discussion of the appropriateness of the current DAFORs.

There have been no significant changes to the DAFORs since the 2006 update referenced above, and therefore no additional reporting to the Board was required. As noted earlier, as Reserve Margin corresponding to 2.8 LOLH was not a criteria required by the Board, it was not routinely calculated.

[1] http://www.pub.nl.ca/applications/MuskratFalls2011/files/exhibits/Exhibit26-ForcedOutageRates2006Update.pdf.
[2] http://www.pub.nl.ca/applications/nlh2014capital/NLHCBSUPP2014/100MWTurbine/files/rfi/GT-PUB-NLH-008.pdf.

Changes in Forced Outage Rates Used in Hydro's Strategist Model Since 1997

Generating Units	1997		1999	2001		2002		2003		2004		2005		2006	
	DAFOR	UFOP		DAFOR	UFOP	DAFOR	UFOP	DAFOR	UFOP	DAFOR	UFOP	DAFOR	UFOP	DAFOR	UFOP
	percent	percent		percent	percent	percent	percent	percent	percent	percent	percent	percent	percent	percent	percent
NLH - Hydro	1.04			0.86		0.66		0.86		1.00		0.91		0.9	
Holyrood - Units 1,2,3	11.95			9.58		9.58		9.58		9.88		9.87		9.64	
Gas Turbine - Existing		10.03			8.4		8.4		8.4		8.67		9.15		10.62
Diesel		1.18			1.18		1.18		1.18		1.18		1.18		1.18
NP Hydro	3.1			3.1		3.1		3.1		3.1		3.1		3.2	
DLP Hydro	3.1			3.1		3.1		3.1		3.1		3.1		3.2	
A/P Hydro	3.1			3.1		3.1		3.1		2.2		2.2		2.3	
Reserve at 2.8 LOLH	N/A		18.0%			18.5%		N/A		16.0%		16.2%		15.1%	

Notes:

1. Data between 1997 and 2001 was not available.
2. As Reserve Margin corresponding to 2.8 LOLH was not required by the Public Utilities Board, it was not routinely calculated. As a result, this figure is not available for all years.

Table 1