Q. (a) Describe the function of Holyrood unit #3 as a synchronous condenser including what effect, if any, such use has on fuel consumption.

(b) Explain the synchronous condenser use impacts reported for 1992 and 2000 in Schedule V of R.J. Henderson's evidence, and provide similar numbers and explanations for each additional year since 1992 when such impacts have occurred. Explain why no impacts from condenser use are forecast for the 2002 test year, and explain under what conditions the condenser use could provide benefits in this test year.

(c) What benefits, if any, would accrue from equipping another unit at Holyrood to act as such a condenser?

A. (a) The synchronous condenser operation of Holyrood unit #3 is primarily designed to support transmission system voltages east of the Sunnyside terminal station without requiring that a prime mover be engaged on the unit. By operating unit #3 as a synchronous condenser, it is possible to reduce or eliminate generation from the Holyrood plant during certain periods of the year. This offers two benefits. First, by improving the flexibility of the thermal dispatch on the Island Interconnected system, it is possible to avail of opportunities to better use stored water in the event of high storage conditions. Second, by improving the flexibility of the thermal dispatch, it is possible to avail of opportunities to shut down one or more units earlier in the year, and similarly start units later in the year. This has the effect of increasing average unit loading, and hence

improving the thermal efficiency of the plant versus the case if no synchronous condenser were available.

The Holyrood unit #3 synchronous condenser does not directly use fuel to operate. Therefore, it primarily impacts fuel consumed by allowing more efficient use of the fuel as described above.

(b) The synchronous condenser use noted in Schedule V of R.J. Henderson's evidence reflects the consumption by all synchronous condensers on Hydro's system with the exception of Holyrood unit #3. Synchronous condenser energy consumption at Holyrood is not metered, and as a result, consumption by Holyrood unit #3 synchronous condenser is reflected in system losses. The table below summarizes synchronous condenser usage for the period 1993-1999 inclusive and also does not include Holyrood unit #3 usage.

	1993	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Synchronous Condenser Use (GWh)	4.66	6.40	1.00	1.94	2.10	7.36	6.31

The synchronous condenser use reported in Schedule V of R. J. Henderson's evidence and in the above table are for both Cat Arm generators, unit #7 at Bay d'Espoir and the gas turbines at Hardwoods and Stephenville. They are each operated periodically for system voltage support when the generator is not required to supply power and energy.

Synchronous condenser usage is not forecast for the test year, as synchronous condenser operation is highly dependent upon the

exigencies of load patterns, precipitation patterns, water storage conditions, and transmission requirements and falls well within the forecast variances in system losses which are also dependent on these factors.

(c) Equipping another unit at Holyrood with synchronous condenser capability will have limited benefit at this time. Hydro has recently finished installing additional reactive capability on the Avalon Peninsula in the form of capacitor banks at the Hardwoods and Oxen Pond terminal stations. The reactive capability of the capacitor banks in conjunction with the existing reactive capability of the Hardwoods gas turbine and Holyrood unit #3 synchronous condensers is sufficient to support voltages on the eastern portion of the system for the foreseeable future.