Q. **Re: 2012 Capital Plan**

On page 20 of the 2012 Capital Plan Hydro states that it "…*proposes to submit only those projects necessary for the safe, reliable operation of the plant as a generator up to the time of decommissioning.*" and further that the projects proposed are considered to be the minimum amount essential to fulfill its mandate. For each project in Phase 2 explain how the project is required for the safe, reliable operation of the Holyrood Thermal Generating Station and to allow Hydro to meet its mandate in the context of the "*minimum amount*" required.

A. The projects included in the 2012 Capital Plan for Holyrood are:

1. Rewind Generator Units 1 and 2
2. Upgrade Marine Terminal
3. Replace Fuel Oil Heat Tracing
4. Install Plant Operator Training Simulator
5. Upgrade Stack Breeching Unit 2
6. Upgrade Forced Draft Fan Ductwork Unit 2
7. Replace Beta Attenuation Monitoring Analyzers
8. Overhaul Unit 1 Turbine
9. Condition Assessment and Life Extension Phase 2
10. Upgrade Stack Breeching Unit 1
11. Refurbish Fuel Storage Facility

The following pages contain explanations of why each project is required for the safe, reliable operation of Holyrood while allowing Hydro to meet its mandate of minimum amount.

1. Rewind Generator Units 1 and 2

In 2005 Hydro's generator service provider, General Electric (GE), recommended that the stators for Units 1 and 2 should be rewound in the near future. In 2011 engineering consultant AMEC confirmed the GE findings for each stator and stated *"there is no doubt that the windings have deteriorated extensively in service. … it is considered appropriate to proceed with the installation of a new stator winding..".* Rewinding the stators at this time will ensure reliable operation as the plant continues to meet projected generating requirements to 2020 but will also extend the life of the stator as the generator operates beyond 2020 as a synchronous condenser. Allowing the stator to remain in service and potentially fail in-situ, would be more costly than this planned rewind.

2. Upgrade Marine Terminal

This project is required to maintain fuel supply to the plant. Without refurbishment, there is a risk that further deterioration may render the dock not usable or that the harbor pilots or ship captains may refuse to dock ships at the terminal. There is no other method of maintaining fuel supply to the plant.

The proposed scope of work is limited to refurbishing only those systems that are critical to the safe and reliable operation of delivering fuel to the plant. It is limited to that required to maintain the integrity of the key systems identified in the report submitted in the Application until the Marine Terminal is decommissioned in 2020.

3. Replace Fuel Oil Heat Tracing

This project is required to ensure fuel tankers can offload when scheduled so the plant can receive a reliable supply of fuel, necessary for the continued reliable generation of power to 2020. The scope of work is to replace an existing heat trace system that has not been working properly since 2004. Since that time,

deterioration has progressed to the point that the system has had to be modified so that is can continue to provide some heating service. However, the modification is causing accelerated deterioration and the system is not reliable.

From a safety perspective a heat trace system that is not working properly can result in blockage of the pipelines during tanker ship unloading with the potential to over pressure the system. If a rupture was to occur it would be a safety hazard for workers in the area and would also be an environmental hazard.

4. Install Plant Operator Training Simulator

The Operator Training Simulator will provide a means for accelerating the training program for new operators in the shortened lifespan of the plant. In light of the shutdown of the Holyrood plant and the development of new industries such as the Long Harbour nickel processing plant, which could provide long-term job opportunities for Holyrood operators, it is anticipated that there will be a loss of operator staff. New replacement operators will be required and they will need to complete training in a shorter period of time than in the past to ensure the required number of qualified operators are available until the power generation equipment is decommissioned in 2020. In the event that Holyrood's experienced operators retire, in addition to operators leaving to pursue long-term employment elsewhere, a sudden and severe shortage will drastically impair the ability to provide operators for the plant. Hydro is required to have a prescribed number of qualified operators to be in attendance and they are responsible for Holyrood's safe and reliable operation. The prudent, minimum effort is to arrange for a robust training program, which will be provided by the simulator.

5. Upgrade Stack Breeching Unit 2

It has been determined and verified by third parties (service contractor and

engineering consultant) that much of the breeching system (i.e. expansion joints, supports structures, insulation system and localized areas of the steel casing) is in very poor condition. Remedial measures are required related to all breeching major sub systems to ensure that the full breeching system is able to provide reliable service to its projected decommissioning date of 2020. Four alternatives have been considered for refurbishment of the breeching and the proposed alternative is the most cost effective. It is the minimal amount of work required.

6. Upgrade Forced Draft Fan Ductwork Unit 2

This project is required to ensure reliable operation of Unit 2 to its projected decommissioning date of 2020. The geometry of the existing FD fan ducts causes air flow turbulence which creates high vibration levels. Excessive vibration can cause failure of adjacent ductwork thereby reducing the reliability of the unit. In 2006 there was a forced outage on Unit 2 as a result of high vibration levels. If upgrades are not made, there is serious concern that a forced outage will be experienced again before the projected equipment decommissioning date of 2020 and the minimum prudent action is this upgrade.

7. Replace Beta Attenuation Monitoring Analyzers

Holyrood received a directive from the Department of Environment and Conservation on March 26, 2010. It indicated that upon expiry of its Certificate of Approval, Holyrood shall upgrade or replace its $PM_{2.5}$ monitoring equipment installed at each ambient air monitoring station with analyzers that are approved by the Department of Environment and Conservation. In order for Holyrood to comply with this directive, its beta attenuation monitoring analyzers must be replaced with analyzers that are acceptable to the Department of Environment and Conservation. Therefore, this project as presented is required at this time.

8. Overhaul Unit 1 Turbine

Reference the following details as found in the Capital Budget Application Volume II, Tab 24, pages 6 and 7, in the report Unit 1 Turbine Generator Major Overhaul. "For many years the North American standard for such major overhauls was based on a 6 year cycle. This frequency was in agreement with the original equipment manufacturer's guidelines and was acceptable to the utility industry in general. In the late 1990's, in an effort to reduce operating costs, utilities began scrutinizing their Turbine Generator major overhauls, and in particular the 6 year schedules, to determine the viability of extending the overhaul frequency. Following comprehensive reviews, the utility industry, in general, endorsed the findings which resulted in the major overhauls being extended from the traditional 6 years to a 9 year frequency.

In 2003, Holyrood undertook a similar initiative and contracted Hartford Steam Boiler Inspection and Insurance Company (HSB) to review its Turbine Generation operation using their proprietary "Turbine Outage Optimization Program (TOOP)" to determine if Holyrood could extend its current overhaul program to a longer interval. All aspects of the Turbine Generator were reviewed (design, construction, historical experience, operation, maintenance, inspections and monitoring). Their findings were detailed in separate reports which included risk ranking, outage extension calculations, conclusions and recommendations. The reports concluded that all three units could extend their major overhauls from the previous 6 year to a 9 year frequency provided some upgrading and repairs were completed and instrumentation installed to enhance the existing turbine monitoring program. (Appendix D). Hydro completed an analysis of the reports and determined that the upgrades and improved monitoring required to extend the major overall frequency was warranted as a cost savings measure without jeopardizing the safe and reliable

operation of either unit. The necessary upgrades were completed for all three units and the maintenance plan for major overhauls revised to the 9 year frequency."

The last major overhaul was completed on Unit 1 in 2003. Therefore, Unit 1 must be overhauled in 2012 to meet the revised nine-year frequency. Based on this, the project is required for the safe, reliable operation of Holyrood while allowing Hydro to meet its mandate of minimum amount.

9. Condition Assessment and Life Extension Phase 2

In 2009, Hydro received approval from the Board to complete a Level 1 condition assessment of the Holyrood plant with consideration to its projected future operating requirements. AMEC was contracted to complete the assessment and make recommendations for a Level 2 assessment. The scope of work for the proposal includes only the highest priority recommendations, from a safety and reliability perspective, put forth in the Level 1 assessment. They represent a minimal amount of the recommendations that need to be acted upon at this time.

10. Upgrade Stack Breeching Unit 1

It has been determined, and verified by third parties (service contractor and engineering consultant), that much of the breeching system (i.e. expansion joints, supports structures, insulation system and localized areas of the steel casing) is in very poor condition. Remedial measures are required related to all breeching major sub systems to ensure that the full breeching system is able to provide reliable service to its projected decommissioning date of 2020. Seven alternatives have been considered for refurbishment of the breeching and the proposed alternative is the most cost effective. It is the minimal amount of work required.

11. Refurbish Fuel Storage Facility

There are four fuel storage tanks at Holyrood. Two have been refurbished in recent years but the other two have deficiencies and are not in reliable condition. This project is required to refurbish a third fuel oil storage tank, Tank No. 3. If the project is approved, three of the four tanks at Holyrood will be in reliable condition to the end of the projected decommissioning date of 2020. At least three tanks, in good condition, are required to ensure a reliable fuel supply to the plant.

In 2003, Tank No. 3 was last inspected internally by a certified API inspection company and it was determined that 195 patches had to be installed on its floor. It was recommended that this would extend the life of the floor by five-six years when another internal inspection would be required to determine any additional refurbishment that would need to take place to extend the life of the floor further. In 2012, it will be three years beyond the recommended six years.

When the fuel tank was originally constructed, attention to safety features was not as strong as it is today. Roof access platforms and handrails were not provided in areas where they would be today. This project provides these safety features. In addition, improvements to the dyke drainage system in 2009 required discontinuing winter access to the inside of the dyke from the east road entry. The most practical alternative for worker entry to the inside of the dyke was from the west road whereby workers would need to climb over steeply inclined dyke walls and a pipe rack. To mitigate the safety hazard in climbing over these obstacles this project includes the installation of access steps.

A large portion of the scope of work for this project is associated with replacement/refurbishment of the tank floor. It is included because, based on the most recent 2003 inspection, Hydro expects that when another internal inspection

is completed in 2012 it will determine that the floor will need to be replaced. However, if the inspection determines that the floor does not need to be replaced, or lesser cost patching can be applied, then the least cost solution will be implemented. The scope of work for the project will be the minimal amount to ensure reliability and mitigate safety hazards.