Q. The response to P2-PUB-NLH-64 states that a Level 2 assessment of the gas turbine plant at Holyrood was conducted in 2011. At the Technical Conference on October 13, 2011, it was stated that the Level 2 assessment was completed under the project approved for the Phase 1 assessment at the Holyrood Plant. Confirm whether this is correct and provide the revised scope for the Phase 1 study to provide for a Level 2 assessment of the gas turbine plant.

A. Yes, the Level 2 assessment of the gas turbine plant at Holyrood was conducted in 2011 under the Phase 1 assessment of the Holyrood Plant. While completing the Phase 1 assessment of the Holyrood plant in 2010, it was recognized that a more detailed analysis of the gas turbine plant needed to be undertaken as an additional scope of work to the approved project. In March of 2011 Hydro filed the "Capital Expenditures and Carryover Report for Year Ending December 31, 2010" with the Board. It identified a scope change to the condition assessment project as identified by Item 5 on page 20 of that report. AMEC had performed the Level 1 assessment and was invited to submit a proposal to perform the more detailed Level 2 assessment of the gas turbine plant.

The following is a description of the scope of work provided to AMEC (CONSULTANT) to perform the Level 2 assessment.

<u>Scope of Work</u>

To perform a detailed condition assessment and life extension study of the gas turbine plant located at Holyrood Thermal Generating Station (HTGS) with recommendations and cost estimates to extend the life of the gas turbine plant as a highly reliable operation to the year 2020.

Hydro has four field reports which were recently prepared by manufactures of gas turbine plant major equipment components. These reports will be made available to the CONSULTANT. The reports are described as follows.

1. Rolls Wood Group (OEM rep. for Rolls-Royce Gas Generator Engine)
   Rolls Wood Group (RWG) has the OEM rights to the AVON model gas generator engine. They have prepared a field inspection report with refurbishment estimates.

2. Greenray (OEM rep. for Power Turbine and Gearbox)
   Greenray Turbines (Lincoln) Limited has the OEM rights to the AEI power turbine and gearbox. They have prepared a field inspection report related to the power turbine and the gearbox.

3. Siemens (OEM rep. for Generator)
   Siemens has the OEM rights to the AEI 14.150 MW generator. They have prepared a field inspection report related to the generator.

4. Braden Manufacturing (Inlet Air and Exhaust Stack Systems)
   Braden Manufacturing is a company that specializes in the design and manufacturing of combustion turbine air filtration systems, air inlet systems, and exhaust systems. They have performed a site inspection of the gas turbine air inlet plenum, air filtration system, air inlet plenum support structure, exhaust stack and exhaust stack support structure to make recommendations to refurbish/replace.

In preparing the study the CONSULTANT shall complete the following tasks:

1. Conduct Equipment Inspections – Balance of Plant (BOP)

CONSULTANT shall develop a plan, including a schedule, to perform detailed inspections of the remaining gas turbine balance of plant systems and sub systems and document any defects. Following the completion of the inspection, the CONSULTANT shall make recommendations for refurbishment work complete with cost estimates, including a schedule, that are required to extend the life of the balance of plant systems until the year 2020. The OEM's and other specialist shall be consulted as required to assist in the study. CONSULTANT shall contact OEM's and other specialist to provide this information to CONSULTANT.

The remaining gas turbine BOP systems and sub systems that are to be addressed by this study shall include but not be limited to the following:

1. Fuel oil system:
    - i. Fuel tanks;
    - ii. Fuel oil piping;
    - iii. Fuel offloading pumps;
    - iv. Valves;
    - v. Fuel supply pumps (to the gas turbine);
    - vi. Strainers and filters;
    - vii. Fuel flow meter; and
    - viii. Fire system trip valve

2. Electrical and controls
    - i. Foxboro DCS system

ii. DCS logic
iii. MCC
iv. Switchgear
v. Governor system
vi. Battery room

3. Compressed air system
i. Compressor unit
ii. Instrument air dryer
iii. Control panel
iv. Nitrogen back-up bottle supply

4. Building
i. Structure
ii. Fire protection system
iii. Crane hoist and track system

2. Major Upgrades and Repairs

A number of major upgrades and repairs have been performed on the HTGS gas turbine and balance of plant since it went into service in 1986. CONSULTANT shall obtain and review plant records pertaining to equipment major upgrades and repairs and evaluate their impact in achieving 2020 service life.

3. Determine Remaining Equipment Life

CONSULTANT shall estimate the remaining lifetimes of the gas turbine plant major components and systems along with the balance of plant. It is anticipated that this will require consultation with OEM's and review the historical life cycle information for similar type facilities in order to determine the industry trend and

confirm or challenge the ability to extend the life of the gas turbine plant to 2020. CONSULTANT shall consult with OEM's and other specialists to substantiate its position on this point.

4. Determine Annual Operating and Maintenance Cost

Following completion of the recommended refurbishment tasks, CONSULTANT shall determine the annual operating and maintenance (O&M) cost for the gas turbine plant up to the year 2020. In addition, CONSULTANT shall also estimate the annual O&M cost up to the year 2020 without completing the recommended refurbishment work. CONSULTANT shall contact OEM's and other specialist as required to provide this information to CONSULTANT.