

1 Q. In 2011, AMEC concluded that *“there is no reason why the [Holyrood] plant cannot*
2 *continue to generate electricity reliably to the year 2020”*. AMEC added *“There are*
3 *several pre-requisites to this, including continued and enhanced inspection and*
4 *maintenance programs, planned major equipment refurbishment such as generator*
5 *stator and rotor rewinds, controls and alarms upgrades, and switchgear and breaker*
6 *refurbishments and replacements.”* Please explain how Hydro fulfilled the “pre-
7 requisites” identified by AMEC.

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10 A. The 2011 report referenced in this RFI is the Phase 1 Level 1 Condition and Life
11 Assessment report, prepared by AMEC. The Level 1 condition assessment work was
12 performed in 2010, with the report submitted in 2011. In this report, AMEC
13 concluded that there is no reason why Holyrood cannot continue to generate
14 electricity reliably to the year 2020, and be able to fulfill a synchronous condensing
15 role until 2041. Several pre-requisites were listed; continued and enhanced
16 inspection and maintenance programs, planned major equipment refurbishment
17 such as generator stator and rotor rewinds, controls and alarm upgrades, and
18 switchgear and breaker refurbishments and replacements. Some of these pre-
19 requisites were made in reference to Holyrood being able to fulfill a synchronous
20 condensing role until 2041 and are not required for reliable generation of electricity
21 to 2020.

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23 The Recommendation Section of the 2011 Phase 1 Level 1 report contained details
24 of these pre-requisites. Please refer to Attachment 1 – AMEC Recommendations,
25 which presents the current status of each recommendation, and shows that the
26 pre-requisites have been fulfilled.

Recommendations and Status from 2010 Level 1 Condition Assessment	
Recommendation	Status
Overall and Station Wide	
Implement the recommended Level 1 and 2 condition assessment tasks, including augmented steam turbine and generator overhauls at their next normal overhaul date to the extent economically practical.	Completed/On going
Retain the 9 year major inspection/overhaul interval and minor 3 year valve outage timing for the steam turbines, subject to any unexpected changes in conditions found at their inspection/overhauls and, in particular, at their next inspection/overhaul. Undertake the steam turbine pre-outage activities as existing.	Completed/On going
Modify the generator inspection and overhaul interval back to every six years.	Completed/On going
Perform in 2011 limited generator testing, with rotor in and on all units but particularly on Unit 1, to the extent safe and economically practical to obtain baseline data. Undertake work needed to scope out the details of the inspection/testing and stator rewind during the 2012 Unit 1 outage.	Completed
In 2011 and 2012, carry out a detailed condition assessment of high pressure and temperature feedwater and steam lines on all units as a very high priority safety and reliability due diligence task. Plan and implement an extensive high pressure and temperature pipe hanger inspection program as part of the plant's PM, safety, and reliability due diligence programs.	Completed
Carry out Level 2 inspections and testing in 2012, 2013, and 2014 for Units 1, 2, and 3 respectively on boiler components as identified through level 1 condition assessment.	Completed
Carry out Level 2 inspections and testing in 2012, 2013, and 2014 for Units 1, 2, and 3 respectively on high pressure heater components as identified through level 1 condition assessment.	Not complete - Not identified by Amec as priority during level II condition assessments
Carry out Level 2 inspections and testing in 2012, 2013, and 2014 for Units 1, 2, and 3 respectively on deaerator components as identified through level 1 condition assessment.	Not complete - Not identified by Amec as priority during level II condition assessments
Carry out Level 2 inspections and testing on low pressure heaters in 2011 for Units 1, 2, and 3.	Not completed - Online condition monitoring has not yet indicated the need to undertake this work
Maintain existing programs for major equipment, pumps, and motor inspection scheduling and overall PM process	Completed/On going
Procure one spare 4 kV motor for each of the boiler feedwater pumps, the forced draft fans, condensate extraction pumps, and the cooling water pumps – primarily designed for Units 1 and 2, but with plans on how to use them with Unit 3 as necessary.	Motors on site for boiler feed pumps for all three units and stage 1 forced draft fan. Spare coils is strategy for other motors
Develop and implement an optimized plan for station switchgear (all units, common facilities), primarily breakers and motor control centres, addressing a combination of extensive replacement and sparing to maintain station reliability without interrupting normal unit operation.	Complete -Enhanced PM tactics, IR scanning, Overhauled MCCs, Update/enhance capital plan
Inspect all condensate polishers in 2011. Replace Units 1 and 2 remaining enunciator panels (Unit 3 enunciator panel was replaced in 2007). Assess the cost-benefit of replacing polisher control panels on all units considered obsolete in light of generation end of service timeline.	Enunciator panels complete
Site Conditions	
Negotiate to have the plant access road repaired to reduce probability of future accident.	Planned 2017 and 2018 capital
Develop an onsite road replacement/refurbishment plan in 2011 addressing issues over next five years.	Not completed - repairs to site roads completed as required
Close and manage existing on-site landfill in parallel with opening of a new on-site facility or expansion of the current one.	Not completed - not required at this time
Common Facilities	
Replace the electric heat tracing for the heavy fuel oil transfer pipe line from the off loading dock to the main storage tanks in 2010 or early 2011.	Completed

Internally inspect the heavy oil day tank in 2011 for regulatory purposes.	Completed
Perform transformer oil gas analyses in 2010 and 2011 and complete the Hydro transformer electrical testing as per the schedule	Replacing Rectifying transformers in 2016. TRO owns the remainder
Perform underwater inspections on circulating water intake and discharge structures and piping in 2011. Perform walk down or remote integrity inspections of the large concrete pipes from the pump houses to the condensers and to the discharge siphon pits and inspect the stop log structure in 2011.	Complete on Stage 1 - 2014. No intention for Stage 2 based on current operating plan
Develop a program to assess the condition of underground services (raw water, fire water, grounding, waste water piping, and lighting) as the current condition is not clear.	2014 Jewer Bailey assessment completed
Undertake Level 2 integrity inspections of single contingency failure candidates including the dam at Quarry Brook, the raw water supply line from the dam site to the Stage 1 pumphouse, and the original water treatment plant clarifier, sand filters, and clearwell.	QB dam valves upgraded. Annual dam inspection. 2015 camera inspection of raw water line
Develop a powerhouse and pumphouse roof replacement plan.	Completed/On going
Improve, refurbish or replace CEM systems, waste water basin discharge treatment systems, oil filled exciter transformers (if and when new PCB regulations are implemented), and the oily water separator and pipes.	CEM and RT planed for 2016. 2017 capital project for underground drainage
Develop a plan for a new building heating system (auxiliary boiler/steam or electric) needed after 2015. Assess and replace existing steam fed unit heaters and piping systems that are in poor condition.	On going study with Stantec
Refurbish or replace the existing powerhouse elevator in the 2012 to 2015 period, and assess the timing requirements for a new administration building elevator.	Completed
Repair the waste water basin building to address current corrosion, safe egress, and ventilation needs in 2012.	2019 Capital
Replace in 2011 the diesel fire pump, which is at end of life, in order to match the capacity requirements of the new fire protection system. Replace the electric firewater pump if capacity is less than the new requirement.	Completed
Replace the Stage 2 diesel generator in or about 2014.	Removed from 2019 Capital - not required
Replace the Stage 1 air compressors that are near their end of life in 2014 and 2015.	Unit 1 Replaced in 2015, Unit 2 scheduled to be replaced in 2016
Unit 1	
Undertake a generator stator rewind as part of the 2012 generator overhaul. Initiate planning early in 2011. Undertake the generator actions list in 2010 and 2011.	Approved for 2014/15 but pulled based on LCP announcement
Address issues and action with steam turbine, including wok on main and intercept valve issues, stud bolt issues, and turning gear issues as per sections 8, 9, and 10 of this report.	Major in 2012 - completed
Refurbish stack breeching per current plans.	Completed
Addition of reheat boiler tubes to improve reheat steam conditions and cycle efficiency.	Not completed - discussed with service providers but felt not feasible given limited remaining life
Repair of previously damaged (but not fully repaired) steam turbine elements or upgrading existing elements with more efficient designs.	Major in 2012 - completed
Unit 2	
Undertake a generator stator rewind as part of 2014 generator overhaul. Initiate pre-work early in 2013. Undertake early generator actions list in 2011.	Approved for 2014/15 but pulled based on LCP announcement
Address issues and actions with steam turbine, including work on main and intercept valve issues, stud bolt issues, and turning gear issues.	Major in 2014 - completed
Refurbish stack breeching per current plans.	Completed
Repair of previously damaged (but not fully repaired) steam turbine elements or upgrading existing elements with more efficient designs.	Major in 2014 - completed
Unit 3	
Undertake a generator rotor rewind at the next generator overhaul in 2016 or, with some additional reliability risk, between 2020 and 2022 subject to the findings of the 2016 inspection.	Complete 2016

Address issues and actions with the steam turbine, including work on main and intercept valve issues, and stud bolt issues.	Complete 2016
Assess the cost-benefit of replacing the existing steam turbine mechanical governor system in 2011 for implementation during the 2013 minor valve outage.	Not completed - not considered to be a feasible project given limited remaining life
Refurbish stack breeching per current plans.	Not completed - annual internal and external inspections have not confirmed the need to replace
For safety reasons, replace the Unit 3 control room relay panels as soon as practical to accommodate the current and required wiring.	Completed
Implement Unit 3 generator thrust bearing retrofit to address lateral movement during synchronous generator operation to eliminate long term vibration and damage.	Completed
Black Start Gas Turbine	
In 2010 inspect/assess the power turbine, gas turbine, gearbox, and generator without removing the unit to confirm major inspection/overhaul requirement.	Complete - Now turbine is obsolete
Complete 2010 boroscope inspections on gas and power turbine, combustor, and gearbox.	Complete - Now turbine is obsolete
Inspect and assess in 2010 the air intake and exhaust stack structure.	Complete - Now turbine is obsolete
Undertake in 2010 off-site overhaul of power turbine and gas turbine, and on-site or off-site gear-box inspection and gearbox seal replacement.	Complete - Now turbine is obsolete
Undertake in 2011 detailed inspection/testing of generator and electrical auxiliaries.	Complete - Now turbine is obsolete
Develop a design and implement the replacement the fuel handling and lube oil coolers inside an enclosure.	Complete - Now turbine is obsolete
Assess in 2010 the alternative of replacing the black start generator with a new or refurbished unit.	Complete - Now turbine is obsolete
Switchyard	
Implement identified Level 2 transformer gas in oil testing in 2010 and 2011. Catch up on backlogged electrical testing using full Hydro test protocol and report during these and future regularly scheduled electrical testing periods.	Completed
Considering the requirements going forward, assess the cost-benefit of additional transformer equipment sparing and configurational sparing possibilities. Undertake more frequent and complete Hydro condition monitoring.	Completed
Maintaining station reliability without interrupting normal unit operation, develop and implement an optimized plan for switchyard equipment such as switchgear (primarily older breakers) as well as other components such as potential transformers (PT's) and current transformers (CT's), addressing a combination of extensive refurbishment and/or replacement and sparing.	Completed
Management	
Upgrade the existing document management procedures, systems, and resources at the plant	Completed: Assets records database, review and update portion of HTGS procedures annually, ELAC Deployment letters to 40 of 60 people, term extension letters issued
Implement current station staffing plan, including some moderate additions in operational, on-site engineering support. Develop and implement a succession planning process.	In process and about 30% complete - ELAC