

Board Letter – July 12th, 2011

Q10. A report summarizing the components, corresponding cost estimates, and scheduled expenditures related to the refurbishment of the Holyrood Thermal Generating Station out to 2067, as a generating station.

Answer: A report summarizing the components, corresponding cost estimates, and scheduled expenditures related to the refurbishment of the Holyrood Thermal Generating Station out to 2067, as a generating station, has not been completed.

An initial condition report, *Holyrood Generating Station Condition Assessment and Life Extension Study – 2011* completed by AMEC, was submitted to the Board in April 2011. This report looked at requirements for operation to the DC Link in-service, then operating as a stand-by plant for five years and finally operating in synchronous condensing mode to 2041. From the recommendations of this report, a Phase Two report is being considered. The recommendations of this and any subsequent study will influence future Holyrood capital plans.

The 2010 generation expansion analysis considered an Isolated Island scenario that assumed Holyrood continued to operate as a generating station until the mid 2030's at which time it would be retired. In the absence of an in-depth condition assessment study engineering judgement was used to formulate an upgrade program to see the Holyrood facility through to retirement. This plan was included in Hydro's 2010 Capital Budget and 20 Year Plan as summarized in the attached sheets. While this plan is lacking detailed engineering it does offer a conservative order of magnitude representation of the sustaining capital required at the plant.

In addition to the sustaining capital the Provincial Energy Plan has committed to environmental improvements at Holyrood, should the plant continue to operate. These improvements include Stack Emissions Cleanup Equipment and the installation of Low NOx burners. The costs associated with these upgrades are also summarized in the attached sheets.

Once the Emission Cleanup equipment has been installed it will be possible to revert to using 2% sulphur fuel from the current 0.7% sulphur fuel.

NEWFOUNDLAND AND LABRADOR HYDRO
2010 CAPITAL BUDGET & FIVE YEAR PLAN
MASTER LIST

(\$,000)

29-Jul-09

| <u>PROJECT DESCRIPTION</u> | 2010 | 2011 | 2012 | 2013 | 2014 | Total |
|----------------------------|------|------|------|------|------|-------|
|----------------------------|------|------|------|------|------|-------|

THERMAL PLANTS **1296, 1297**

| <u>2010</u> | In-service \$ | | | | | |
|--|---------------|---------|---------|--|--|---------|
| HRD - Replace Programmable Logic Controllers | 1,207.9 | 747.1 | 901.7 | | | 2,856.7 |
| HRD - Refurbish Fuel Storage Facility | 2,500.2 | 2,499.8 | 2,732.0 | | | 7,732.0 |
| HRD - Install Unit 1 CR Condensate Drains & HP Heater Trip Level | 231.4 | | | | | 231.4 |
| HRD - Replace Pumphouse Motor Control Centres | 50.2 | 998.6 | | | | 1,048.8 |
| HRD - Replace Steam Seal Regulator - Unit 1 | 334.7 | 213.7 | | | | 548.4 |
| HRD - Improve On Site Paving and Drainage | 59.3 | | | | | 59.3 |
| HRD - Replace Fire Pump Diesel | 111.9 | 195.4 | | | | 307.3 |
| HRD - Install Warm Air Make-up Access | 170.4 | | | | | 170.4 |

| <u>2011</u> | In-service \$ | | | | | |
|--|---------------|---------|-------|-------|---------|---------|
| HRD - Replace Steam Seal Regulator - Unit 2 | | 181.6 | 411.2 | | | 592.8 |
| HRD - Install Unit 3 CR Condensate Drains & HP Heater Trip Level | | 216.8 | | | | 216.8 |
| HRD - Implement Demand Side Management Initiatives | | 113.5 | 146.8 | | | 260.3 |
| HRD - Upgrade Facilities to Reduce Business Continuity Risk | | 485.7 | 543.5 | 736.4 | | 1,765.6 |
| HRD - Upgrade Stack Breaching | | 4,688.7 | | | 2,912.0 | 7,600.7 |
| HRD - Hydrogen Systems Upgrade | | 1,020.6 | 446.4 | | | 1,467.0 |
| HRD - Install Support Vessel Access | | 126.0 | | | | 126.0 |
| HRD - Upgrade Electrical Equipment | | 233.7 | 220.3 | 306.4 | | 760.4 |

NEWFOUNDLAND AND LABRADOR HYDRO
2010 CAPITAL BUDGET & FIVE YEAR PLAN
MASTER LIST

(\$,000)

29-Jul-09

| <u>PROJECT DESCRIPTION</u> | <u>2010</u> | <u>2011</u> | <u>2012</u> | <u>2013</u> | <u>2014</u> | <u>Total</u> |
|--|----------------|-----------------|----------------|----------------|----------------|-----------------|
| <u>2012</u> | | | | | | |
| HRD - Upgrade Outside Access Ladders | | | 112.3 | | | 112.3 |
| HRD - Upgrade Unit 3 Relay Panel Controls | | | 372.0 | | | 372.0 |
| <u>2013</u> | | | | | | |
| HRD - Install Turbine Lube Oil Conditioners | | | | 337.9 | | 337.9 |
| HRD - Construct New Carpentry Shop | | | | 220.4 | | 220.4 |
| HRD - Replace Waste Water Basin Building | | | | 962.9 | | 962.9 |
| HRD - Install Weatherhoods for Ventilating Fans | | | | 175.1 | | 175.1 |
| <u>2014</u> | | | | | | |
| HRD - Upgrade Powerhouse Door and Siding | | | | | 133.0 | 133.0 |
| HRD - Install Units 1 to 3 Low NOx Burners | | | | | 107.1 | 107.1 |
| HRD - Upgrade Soot Blowing Controls - Units 1, 2 & 3 | | | | | 1,807.3 | 1,807.3 |
| HRD - Upgrade Opacity System | | | | | 1,168.4 | 1,168.4 |
| TOTAL THERMAL PLANTS | 4,666.0 | 11,721.2 | 5,886.2 | 2,739.1 | 6,127.8 | 31,140.3 |

NEWFOUNDLAND AND LABRADOR HYDRO
2010 CAPITAL BUDGET & FIVE YEAR PLAN
MASTER LIST
(\$,000)

| PROJECT DESCRIPTION | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 |
|---|------|------|------|------|------|--------|-------|--------|--------|--------|-------|-------|------|------|-------|------|------|------|---------------|
| Isolated Island | | | | | | | | | | | | | | | | | | | Direct 2010\$ |
| Holyrood if Lower Churchill doesn't go ahead | | | | | | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 |
| Unit 1 - Boiler | | | | | | | | 14,500 | | | 1,000 | | | | | | | | |
| Unit 1 - Turbine | | | | | | 5,450 | | | | | | | | | | | | | |
| Unit 1 - Generator | | | | | | | | | | | | | | | | | | | |
| Unit 1 - Stack & Breeching | | | | | | | | | | | | | | | | | | | |
| Unit 1 - CEMS | | | | | | | | | | | | | | | | | | | |
| Unit 1 - DCS | | | | | | | | | | | | | | | | | | | |
| Unit 1 - Steam Piping | | | | | | 340 | | 750 | | | | | | | | | | | |
| Unit 1 - Condensate System | | | | | | 250 | | 750 | | | | | | | | | | | |
| Unit 1 - Feedwater System | | | | | | 2,250 | | | | | | | | | | | | | |
| Unit 1 - Condensers | | | | | | | | 1,000 | 400 | | | | | | | | | | |
| Unit 1 - CW System | | | | | | | | | | | | | | | | | | | |
| Unit 1 - WAM & Air Preheat | | | | | | | 3,000 | | | | | | | | | | | | |
| Unit 1 - Inside Building Fuel System | | | | | | 550 | | | | | | | | | | | | | |
| Unit 1 - Transformer | | | | | | | | | | | | | | | | | | | |
| Unit 1 - Lube Oil System | | | | | | 500 | | | | | | | | | | | | | |
| Unit 2 - Boiler | | | | | | | | | 16,000 | | | 1,000 | | | | | | | |
| Unit 2 - Turbine | | | | | | | 5,000 | | | | | | | | | | | | |
| Unit 2 - Generator | | | | | | | | | | | | | | | | | | | |
| Unit 2 - Stack & Breeching | | | | | | | | | | | | | | | | | | | |
| Unit 2 - CEMS | | | | | | | | | | | | | | | | | | | |
| Unit 2 - DCS | | | | | | | | | | | | | | | | | | | |
| Unit 2 - Steam Piping | | | | | | | | | 750 | | | | | | | | | | |
| Unit 2 - Condensate System | | | | | | | | 250 | 750 | | | | | | | | | | |
| Unit 2 - Feedwater System | | | | | | 1,000 | | 750 | | 1,500 | | | | | | | | | |
| Unit 2 - Condensers | | | | | | 250 | | | 750 | 400 | | | | | | | | | |
| Unit 2 - CW System | | | | | | | | | | | | | | | | | | | |
| Unit 2 - WAM & Air Preheat | | | | | | 3,000 | | | | | | | | | | | | | |
| Unit 2 - Inside Building Fuel System | | | | | | | 550 | | | | | | | | | | | | |
| Unit 2 - Transformer | | | | | | | | | | | | | | | | | | | |
| Unit 2 - Lube Oil System | | | | | | | | | | | | | | | | | | | |
| Unit 3 - Boiler | | | | | | 11,000 | | | | 16,000 | | 1,000 | | | | | | | |
| Unit 3 - Turbine | | | | | | | 2,500 | | | | | | | | | | | | 2,500 |
| Unit 3 - Generator | | | | | | | | | | | | | | | | | | | |
| Unit 3 - Stack & Breeching | | | | | | | | 3,000 | | | | | | | | | | | |
| Unit 3 - CEMS | | | | | | | | | | | | | | | | | | | |
| Unit 3 - DCS | | | | | | | | | | | | | | | | | | | |
| Unit 3 - Steam Piping | | | | | | | | 300 | | 750 | | | | | | | | | |
| Unit 3 - Condensate System | | | | | | | | | | 750 | | | | | | | | | |
| Unit 3 - Feedwater System | | | | | | | | | | | 1,750 | | | | 1,500 | | | | |

NEWFOUNDLAND AND LABRADOR HYDRO
2010 CAPITAL BUDGET & FIVE YEAR PLAN
MASTER LIST
(\$,000)

| <u>PROJECT DESCRIPTION</u> | <u>2010</u> | <u>2011</u> | <u>2012</u> | <u>2013</u> | <u>2014</u> | <u>2015</u> | <u>2016</u> | <u>2017</u> | <u>2018</u> | <u>2019</u> | <u>2020</u> | <u>2021</u> | <u>2022</u> | <u>2023</u> | <u>2024</u> | <u>2025</u> | <u>2026</u> | <u>2027</u> | <u>2028</u> |
|---|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Unit 3 - Condensers | | | | | | | | | 250 | 750 | 150 | | | | | | | | |
| Unit 3 - CW System | | | | | | | | | | | | | | | | | | | |
| Unit 3 - WAM & Air Preheat | | | | | | | | 3,000 | | | | | | | | | | | |
| Unit 3 - Inside Building Fuel System | | | | | | | | 550 | | | | | | | | | | | |
| Unit 3 - Transformer | | | | | | | | | | | | | | | | | | | |
| Unit 3 - Lube Oil System | | | | | | | | | | | | | | | | | | | |
| Common - Stage 1 Pumphouse Bldg. Envelope | | | | | | | | | | | | | | | | | | | |
| Common - Stage 2 Pumphouse Bldg. Envelope | | | | | | | | | | | | | | | | | | | |
| Common - Powerhouse Bldg. Envelope | | | | | | | | | | | | | | | | | | | |
| Common - Fire Protection | | | | | | | | | | | | | | | | | | | |
| Common - Space Heating | | | | | | | | | | | | | | | | | | | |
| Common - Compressed Air and Gas | | | | | | | | | | | | | | | | | | | |
| Common - WW Treatment Bldg. Envelope | | | | | | | | | | | | | | | | | | | |
| Common - WW Treatment Bldg. Equipment | | | | | | | | | | | | | | | | | | | |
| Common - Water Treatment Plant Equipment | | | | | | | | | | | | | | | | | | | |
| Common - Raw Water System | | | | | | | | | | | | | | | | | | | |
| Common - General Service Cooling Water System | | | | | | | | | | | | | | | | | | | |
| Common - Fuel Storage System Supply to Plant | | | | | | 650 | | | | | | | | | | | | | |
| Common - General Plant Ventilations Systems | | | | | | | | | | | | | | | | | | | |
| Common - Hydrogen and CO2 Systems | | | | | | | | | | | | | | | | | | | |
| Common - Warehouse Buildings | | | | | | | | | | | | | | | | | | | |
| Common - Guardhouse | | | | | | | | | | | | | | | | | | | |
| Common - Ambient Air Monitoring Stations | | | | | | | | | 750 | | | | | | | | | | |
| Common - Fuel Unloading Dock and Bldg. Envelope | | | | | 600 | 150 | | | | | | | | | | 50 | | | |
| Common - Fuel Unloading Equipment | | | | | | | | | | | | 425 | | | | | | | |
| Common - Stack and Breaching | | | | | | | | | | | | | | | | | | | |
| Common - Studies | | | | | | | | | | | | | | | | | | | |
| Common - DCS and Electrical | | | | | | | | | | | | | | | | | | | |
| Stack Emissions Cleanup Equipment | | | | | | 581,976 | (In-service) | | | | | | | | | | | | |
| Holyrood Life Extension without LC Development | | | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 | (In-service) | | | | | | | | | | |
| Replace burner with low NOx burners | | | | | | 5,100 | 5,600 | 6,800 | | | | | | | | | | | |
| Upgrade soot blowing controls | | | | | | 3,500 | | | | | | | | | | | | | |
| Holyrood without Lower Churchill | | | 20,000 | 20,000 | 20,000 | 636,416 | 36,800 | 31,650 | 19,650 | 20,150 | 2,900 | 1,425 | 1,000 | 0 | 1,500 | 50 | 0 | 0 | 2,500 |

Note 1 Direct Dollars, except as noted.