

1 Q. The costs estimated by Stantec for the ESP and FGD installations in their report are
2 totaled at \$450 million. The price carried in document “Exhibit 5 Summary Capital
3 Cost Estimate” is \$582 million. In discussions with Nalcor on August 17, 2011,
4 Nalcor indicated that there was a capital budget input sheet that was submitted to
5 the System Planning Department which developed these costs. Please describe the
6 progression of these costs from \$450 million to \$582 million.

7

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9 A. The \$450 million total cost in the Stantec report, Table 8.1 (see Exhibit 5L-i:
10 *Precipitator and Scrubber Installation Study – Holyrood Thermal Generating Station*
11 *– Final Report, November 21, 2008*) is in third quarter 2008 dollars and does not
12 include overhead cost, AFUDC or other owner’s costs. The \$582 million cost carried
13 in document “Exhibit 5 Summary Capital Cost Estimate” is in-service in 2015 and
14 includes corporate overheads, escalation and AFUDC.

15

16 Please see the following page for a copy of the Capital Budget Proposal sheets and
17 the detailed calculation showing the progression from \$450 million to \$582 million.

Prepared by:

CAPITAL BUDGET PROPOSAL

Capital Cost Estimate & Cash Flow Requirements

Holyrood Precipitator/Scrubber Installation

| Escalation | AFUDC = | 2010 Fiscal Year Prepared: | | | | | | | | | | Total Project | 1170 Cost Recoveries |
|----------------------|---------|----------------------------|---------------|-----------------|-------------|-----------------|-------------------|----------|-------------|-------------------------------|----------|---------------|----------------------|
| | | 7.5% Annual | 0.61% Monthly | 1.83% Quarterly | Effective | Corp OH @ 0.81% | In-Service: Other | | | | | | |
| 2009 = | 1.4% | 2010 = | 0.5% | 2011 = | 1.7% | 2012 = | 2.3% | 2013 = | 3.0% | Effective Contingency @ 11.7% | | | |
| 2014 = | 3.1% | 2015 = | 2.0% | 2016 = | 1.5% | 2017 = | 2.7% | 2018 = | 2.7% | Est. Base: 2009, January | | | |
| 2020 = | 2.5% | 2021 = | 2.5% | 2022 = | 2.5% | 2023 = | 2.5% | 2024 = | 2.5% | 2019 = 2.5% | | | |
| | | | | | | | | | | 2025 = 2.5% | | | |
| Cost Type / Period | 1110 | 1120 | 1130 | 1135 | 1140 | 1145 | 1150 | 1160 | 1175 | 1165 | | | |
| | Labour | O/T | Material | Consultant | Equip. Rent | Travel | Contract Work | Corp. OH | Contingency | EscIn | AFUDC | | |
| TOTAL PROJECT | 5,151.3 | 0.0 | 0.0 | 31,833.6 | 0.0 | 704.9 | 360,433.0 | 4,577.9 | 59,718.4 | 30,393.6 | 76,442.5 | 569,254.7 | 0.0 |

All figures in thousands of dollars.

| | |
|----------------------|-------------------------|
| Labour | 5,151.3 |
| Consultant | 31,833.6 |
| Travel | 704.9 |
| Contract Work | 360,433.0 |
| Contingency | 59,718.4 |
| Total Directs | 457,841.2 2009\$ |

| | | |
|----------------------|------------------|-------------------------------------|
| Total Directs | 457,841.2 | 2009\$ |
| Corp. OH | 4,577.9 | |
| Escalation | 30,393.6 | |
| AFUDC | 76,442.5 | |
| Total Project | 569,254.7 | 2014\$ See Cover - Contingency Date |

2.2% 12,523.6 Escalated from 2014 In-Service to 2015 In-service.

581,778.3 2015\$

The Total from Table 8.1 Stantec Report (Exhibit 5L-i) = \$450,000 From Appendix A, this is in 3rd quarter 2008 dollars.

As stated in Section 8.1 of the Stantec Report, the estimate does not include overhead costs, AFUDC or other owner's cost.

The original Capital Budget Proposal was prepared in 2009 for an in-service date of 2014. For the 2010 generation expansion runs, the Total Project Cost was escalated to 2015\$, to coincide with the proposed 2015 in-service date.

1 Q. Please provide the Operating & Maintenance Cost Summary for Holyrood Station for the
2 next five years for the two options being considered. Also, include the O&M Cost Summary
3 for extending the operation of the Holyrood facility out to 2033 under the Isolated Island
4 Option, and converting the plant to synchronous condenser operation for an additional five
5 years and shutting the plant down under the Infeed Option.

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7

8 A. The annual Operating and Maintenance Cost Summaries for Holyrood Station for both the
9 Isolated Island Option and the Infeed Option are given in MHI-Nalcor-49.2 Operating and
10 PPA Costs.

11

12 As noted in earlier onsite meetings, Operating and Maintenance Costs for synchronous
13 condenser operation in the Infeed Option, after Holyrood shuts down in 2021, were not
14 included.

15

16 The annual O&M costs for the Holyrood site, including the synchronous condensers, were
17 estimated to be \$6.6 million (\$2010) starting in 2021, escalating annually by 2.8%. This
18 estimate is considered to be a maximum, given that opportunities to share the work forces
19 at Holyrood and the Soldiers Pond converter station and to automate the synchronous
20 condensers to provide for remote operation have not been considered in this initial
21 analysis.

22

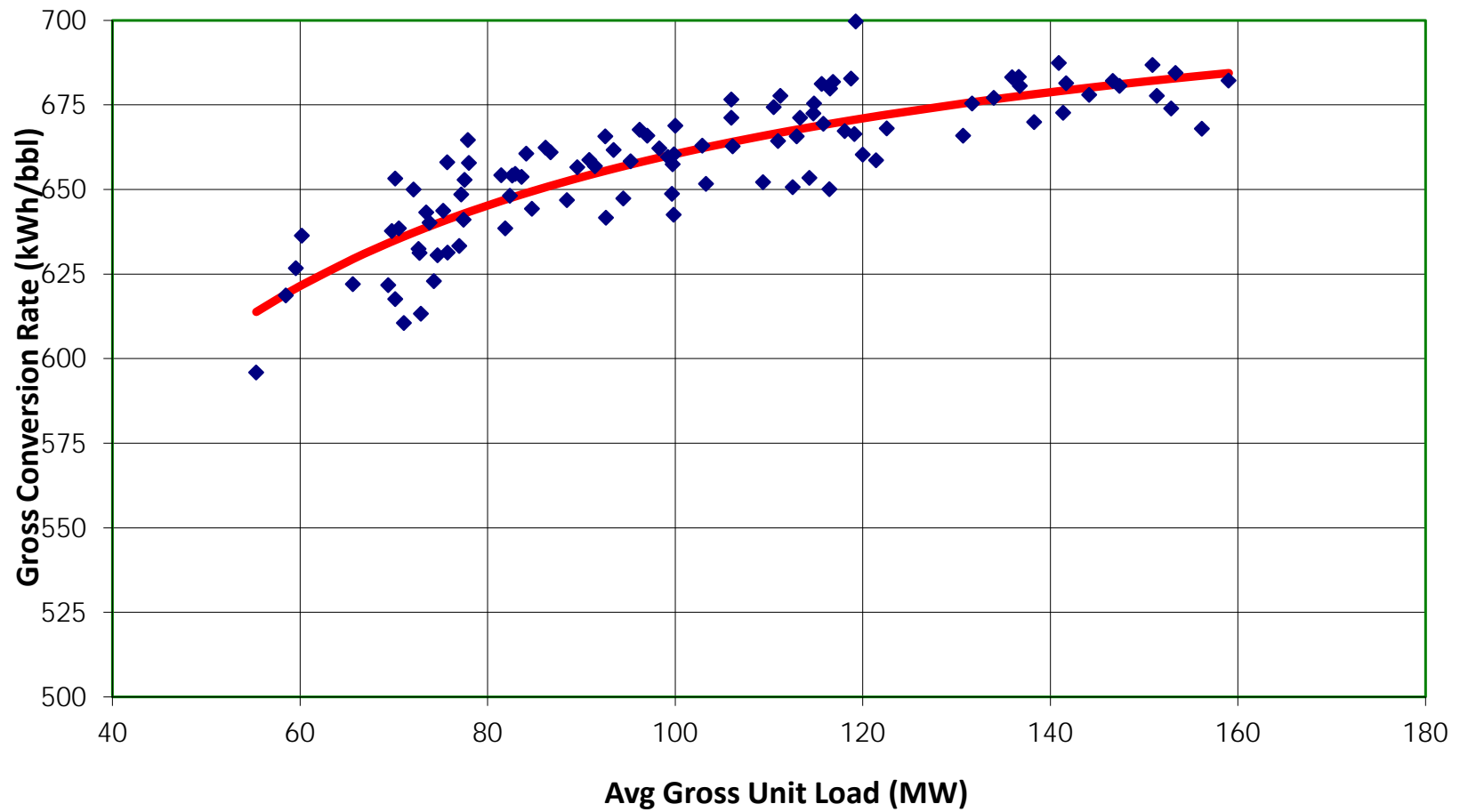
23 These optimization opportunities will be considered prior to converting Holyrood to
24 synchronous condenser operation.

1 Q. Please provide the statistical efficiency chart which indicates the kWhr/barrel of oil
2 consumed in relation to the MWs generated for each unit at Holyrood.

3

4 A. The efficiency chart for the Holyrood plant is shown on the next page. The chart is
5 only available on a plant basis as detailed fuel usage is not tracked at the unit level.

Holyrood Conversion Rate vs Average Gross Unit Loading 2001-2010



◆ Actual Gross Conversion Rate — 2001-2010 Best Fit

1 Q. What costs are included in line items HRD DCL1 and HRD DCL2 in document CE-39
2 MHI-Nalcor-1 CPWDetails? Please describe the components of and how the costs
3 were developed?

4

5

6 A. Several years after the DCL between Labrador and the Island is constructed, the
7 Holyrood Thermal Plant will be decommissioned (except for the unit generators,
8 which will be converted to run as synchronous condensers).

9

10 In the absence of an in-depth study, engineering judgment was used to formulate
11 the decommissioning program. This program was included in Hydro's 2010 Capital
12 Budget and 20 Year Plan as summarized below.

13

14 HRD DCL 1

15

16 1) Remove and Decommission Common Electrical and Mechanical Equipment

17 \$ 1,241,910 2021

18

19 2) Removal of Redundant Equipment (Boiler, Turbine, Stack, Auxiliaries) Unit 1

20 \$2,554,603 2023

21

22 3) Removal of Redundant Equipment (Boiler, Turbine, Stack, Auxiliaries) Unit 2

23 \$2,554,603 2023

24

25 4) Removal of Redundant Equipment (Boiler, Turbine, Stack, Auxiliaries) Unit 3

26 \$2,554,603 2023

27

| | | | |
|----|--|-------------|------|
| 1 | 5) Remove Fuel Storage Tanks | \$3,868,325 | 2025 |
| 2 | | | |
| 3 | 6) Remove Boiler House Building | \$2,677,756 | 2025 |
| 4 | | | |
| 5 | <u>HRD DCL 2</u> | | |
| 6 | | | |
| 7 | 6) Remove Boiler House Building | \$5,405,341 | 2027 |
| 8 | | | |
| 9 | 7) Secure Land Fill and Soil Remediation | \$4,307,830 | 2028 |
| 10 | | | |
| 11 | 8) Remove Marine Terminal | \$2,165,356 | 2029 |

1 Q. How were decommissioning costs for Holyrood developed? Where are the costs
2 captured in the CPWDetails document? Do the decommissioning costs include
3 asbestos removal and site remediation?
4

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6 A. The decommissioning costs for Holyrood are included in HRD DCL1 and HRD DCL2.
7 Please see MHI-Nalcor-105 for more detail.
8

9 The costs are captured in the “Fixed Charges” section of the CE-39 MHI-Nalcor-1
10 CPWDetails document.
11

12 Given the high level nature of the estimates, the costs associated with any asbestos
13 removal have not been fully assessed within the context of site remediation.
14 However, virtually all the asbestos at Holyrood was removed during the 2005-2007
15 asbestos removal program. The relatively low amount remaining is being managed
16 through the Holyrood Asbestos Management Plan (AMP).
17

18 As noted in MHI-Nalcor-105, some site remediation is included in the estimates, but
19 again, given the high level nature of the estimates, the total amount included in the
20 estimates for remediation cannot be confirmed. It should be noted that as Hydro
21 would still be using the site, the site as a whole would not be remediated.

1 Q. In discussion with Nalcor at the meeting of August 17, 2011, \$100 million (\$20
2 million per year from 2012 to 2016) is included to upgrade Holyrood based on the
3 recommendations of the AMEC Life Extension Study. Please provide the life
4 extension cost estimate, and basis for the costs for operation of Holyrood Station
5 until 2033 as per the Isolated Island Option.

6

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8 A. The AMEC study is a multi phase undertaking, of which phase one has been
9 completed. Phase one is an initial review of the areas and systems of the plant
10 identifying those that require more detailed study in order to establish capital cost
11 requirements to ensure safe reliable operation until 2020 as a generating facility
12 and as a synchronous condenser operation thereafter. The AMEC report does not
13 address life extension expenditures required for expected operations under the
14 Isolated Island alternative.

15

16 The \$100 million cost was not based on work by AMEC but is an initial screening
17 level estimate prepared by Nalcor. In preparing this estimate, Nalcor benchmarked
18 its estimate based on discussions with two other utilities undertaking life extension
19 work. One had performed life extension work on a plant so actual costs were
20 known, while the other had just completed a life extension assessment on plants
21 similar to Holyrood.

22

23 Please see *Exhibit 28 - PUB letter July 12 No 10 HTGS.pdf* for the detail and basis for
24 Holyrood operating until 2033 as per the Isolated Island Option.

25

1 Q. The AMEC Newfoundland and Labrador Hydro, Holyrood Thermal Generating
2 Station Condition Assessment & Life Extension Study report indicates the number of
3 starts for each steam turbine. However, the report does not differentiate the type
4 of start ie. cold, warm or hot, which has an impact on life of the turbine. It is our
5 understanding that the plant maintains a summary of the number of starts and type
6 of start each year for each steam turbine. Please provide the summary of starts for
7 as far back as records have been maintained.

8

9

10 A. The following table contains unit start data available back to 1991. Please note that
11 records are not kept distinguishing between hot and warm starts. Accordingly,
12 starts were only categorized as either being cold or hot (ie, "not cold").

| Holyrood Unit Start Data: 1991-2010 | | | | | | | | | |
|-------------------------------------|------------|-----------|------------|------------|-----------|------------|------------|-----------|------------|
| Year | Unit 1 | | | Unit 2 | | | Unit 3 | | |
| | Hot | Cold | Total | Hot | Cold | Total | Hot | Cold | Total |
| 1991 | 11 | 2 | 13 | 19 | 4 | 23 | 3 | 5 | 8 |
| 1992 | 21 | 1 | 22 | 11 | 4 | 15 | 8 | 4 | 12 |
| 1993 | 13 | 1 | 14 | 12 | 5 | 17 | 9 | 4 | 13 |
| 1994 | 8 | 1 | 9 | 3 | 4 | 7 | 16 | 5 | 21 |
| 1995 | 7 | 1 | 8 | 10 | 4 | 14 | 15 | 5 | 20 |
| 1996 | 8 | 3 | 11 | 16 | 5 | 21 | 5 | 4 | 9 |
| 1997 | 4 | 3 | 7 | 7 | 1 | 8 | 8 | 2 | 10 |
| 1998 | 7 | 2 | 9 | 4 | 5 | 9 | 3 | 1 | 4 |
| 1999 | 5 | 4 | 9 | 10 | 2 | 12 | 4 | 2 | 6 |
| 2000 | 7 | 4 | 11 | 9 | 2 | 11 | 3 | 1 | 4 |
| 2001 | 14 | 2 | 16 | 8 | 2 | 10 | 8 | 3 | 11 |
| 2002 | 9 | 4 | 13 | 10 | 3 | 13 | 13 | 2 | 15 |
| 2003 | 4 | 3 | 7 | 12 | 2 | 14 | 9 | 3 | 12 |
| 2004 | 9 | 3 | 12 | 10 | 2 | 12 | 5 | 4 | 9 |
| 2005 | 5 | 1 | 6 | 10 | 3 | 13 | 11 | 3 | 14 |
| 2006 | 16 | 3 | 19 | 5 | 2 | 7 | 8 | 1 | 9 |
| 2007 | 19 | 2 | 21 | 7 | 2 | 9 | 8 | 3 | 11 |
| 2008 | 10 | 7 | 17 | 6 | 3 | 9 | 6 | 1 | 7 |
| 2009 | 10 | 2 | 12 | 3 | 3 | 6 | 3 | 1 | 4 |
| 2010 | 4 | 2 | 6 | 8 | 4 | 12 | 7 | 1 | 8 |
| Totals | 191 | 51 | 242 | 180 | 62 | 242 | 152 | 55 | 207 |

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Note that the total starts listed in Sections 8.1.1.1, 8.1.2.2 and 8.1.4.2 in the AMEC report do not match the above table as the information in the AMEC report includes operation prior to 1991 when tracking hot versus cold starts commenced.

1 Q. In discussions with staff at the Holyrood facility on Aug. 19, 2011 a relevant report
2 was identified. Please provide the report prepared by Hatch related to upgrades
3 and life extension of the Holyrood marine terminal.

4

5

6 A. Please see attached Exhibit 65. In reviewing the Exhibit, the following should be
7 noted:

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9 • The attached report was developed with a view to extending marine terminal
10 life to approximately 2020. In the Isolated Island Scenario, marine terminal life
11 would have to be extended well beyond 2020, and accordingly the scope and
12 cost of expenditures associated with the marine terminal life extensions would
13 be substantially larger.

14 • The marine terminal work was excluded from the scope of the AMEC life
15 extension study.

16

17 To the extent that the Labrador Interconnected alternative has a CPW preference
18 over the Isolated Island alternative, any increased scope and cost of extending the
19 life of the terminal beyond 2020 would further increase the CPW preference of the
20 Labrador Interconnected alternative. Consequently, further study is not warranted.

1 Q. In discussions with staff at the Holyrood facility on Aug. 19, 2011 a relevant report
2 was identified. Please provide the report where ABB carried out an investigation
3 around 2005/06 for Holyrood on various options and provided a study report on the
4 viability of different fuels, combustion technologies and backend emission control
5 strategies.

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8 A. The requested report that deals with different fuels, combustion technologies and
9 backend emission control strategies would have had to have been either the 2002
10 report conducted by Alstom, or the 2004 report conducted by Hatch; ABB was not
11 involved with emissions studies for the plant. Please see attached Exhibits-66 & 68.

12

13 It should be noted that the current Certificate of Approval for Holyrood specifies
14 that fuel with no greater than 0.7 percent sulphur content be used, so any
15 recommendations contained in these reports relating to fuel selection must be
16 considered in light of the plant's current approved conditions.