

1 Q. What are the annual power and energy requirements of each industrial customer of
2 Newfoundland Hydro?

3

4

5 A. Table A below provides NLH’s 2010 PLF forecast of annual energy and firm power
6 requirements of existing and planned industrial customers of NLH. The 2010 PLF
7 forecast was used in Nalcor’s DG2 analysis.

8

Table A - NLH Industrial Customer Firm Energy and Demand Forecast as per 2010 PLF, May 2010

	Teck (Duck Pond)		North Atlantic Refining		Kruger		Vale	
	<u>GWh</u>	<u>MW</u>	<u>GWh</u>	<u>MW</u>	<u>GWh</u>	<u>MW</u>	<u>GWh</u>	<u>MW</u>
2010	65	9.0	248	30.5	96	26.0	0	0
2011	65	9.0	240	30.5	96	26.0	1	5.0
2012	52	7.0	255	30.5	97	26.0	90	40.0
2013	45	7.0	243	30.5	96	26.0	350	80.0
2014	0	0.0	254	30.5	96	26.0	570	80.0
2015-2029	0	0.0	248	30.5	96	26.0	640	80.0

Table B - NLH Industrial Customer Firm Energy and Demand Forecast as per Operating Load Forecast, June 2011

	Teck (Duck Pond)		North Atlantic Refining		Kruger		Vale	
	<u>GWh</u>	<u>MW</u>	<u>GWh</u>	<u>MW</u>	<u>GWh</u>	<u>MW</u>	<u>GWh</u>	<u>MW</u>
2011	75	9.5	221	30.5	83	23.0	1	5.0
2012	76	9.5	255	30.5	136	23.0	31	5.0
2013	76	9.5	255	40.5	132	23.0	82	23.0
2014	45	7.0	310	40.5	132	23.0	299	60.0
2015	0	0	294	40.5	132	23.0	585	80.0
2016	0	0	310	40.5	132	23.0	727	92.0
2017	0	0	294	40.5	132	23.0	733	92.0

9

10

11 Table B above provides NLH’s latest industrial customer forecast as of June 2011.

12

13 Industrial customer forecasts will be reviewed again at DG3.

1 Q. What is the annual capacity and energy capability of each industrial customer that
2 has its own generation?

3

4

5 A. Corner Brook Pulp and Paper is the industrial customer that has its own generation.
6 As per Table 3-1 of Exhibit 16 - *Generation Planning Issues July 2010 Update Report*,
7 its net capacity is 121.4 MW. Average energy capability is 879 GWh/yr and firm
8 energy capability is 793 GWh/yr.

1 Q. With reference to Exhibit 68; Air Emission Controls Assessment - Holyrood Thermal
2 Generating Station - Final Report p. 31 has four recommendations. The first
3 recommendation is as follows: *“adopt the use of fuel oils with one percent sulphur*
4 *content. This would achieve the objective of a 50 percent reduction in SO₂ emissions*
5 *using the least cost option as determined by a Net Present Worth analysis as*
6 *presented in Appendix B.”* With Nalcor’s switch to 0.7% sulphur No. 6 fuel at
7 Holyrood, have the emission targets identified in the study been met?

8
9

10 A. The emissions targets in the study are:

11

12 1. Reduce particulates by 20 percent from current levels, including fine
13 particulate matter (PM₁₀).

14

15 Nalcor undertook standardized in-stack testing of emission rates before the
16 change in fuel specification in 2005; after a change in fuel specification to a
17 maximum 1% S content in 2007; and after a change in fuel specification to a
18 maximum 0.7% S in 2009. When the tested emission rates are normalized
19 for differences in production rates at the time of testing, the results confirm
20 that fine particulate rates were reduced by 20 percent or more as a result of
21 the changes in fuel specification.

22

23 2. Maintain opacity at not more than 20 percent during normal operation, soot
24 blowing or transients.

25

26 This objective was not fully achieved as a result of the fuel specification
27 changes. Holyrood maintains continuous opacity monitoring in each stack

1 that records opacity levels at 6 minute intervals as required by the *Air*
2 *Pollution Control Regulations*. Although a very high percentage of the
3 opacity readings are well below the 20 percent level, opacity measurements
4 do continue to show short periods of greater than 20 percent opacity after
5 the change in fuel specification.

6

7 3. Maintain oxides of sulphur at no more than that equivalent to burning 1
8 percent sulphur content fuel.

9

10 Holyrood conducts analysis of samples of all fuel shipments and has
11 confirmed that all shipments received since the change in fuel specification
12 have contained less than 1 percent sulphur. With confirmation that the fuel
13 contains less than 1 percent sulphur, this objective was achieved.

14

15 To summarize, while the change in fuel specification achieved the particulate and
16 SOx reduction objectives, it did not achieve the opacity reduction objective.

1 Q. Further to PUB-Nalcor-123, the final three recommendations on p. 31 of Exhibit 68
2 involve follow-up work to be completed by Nalcor. Please describe the specific
3 activities undertaken by Nalcor for each of these recommendations and the
4 individual results realized.

5
6

7 A. The specific activities undertaken by Nalcor for each of these recommendations and
8 the individual results realized are as follows:

9

10 **(1) Review the available improvements in burners and combustion system**
11 **technologies to optimize the fuel combustion within the existing furnaces.**

12

13 Due to the limited number of options available for optimised emissions related to
14 burner technology, it was decided to focus on power consumption or boiler
15 efficiency. NLH has reviewed replacing some existing motors with variable-speed
16 drive motors, refitting the current soot blowers and integrating the blower control
17 with an intelligent soot blowing system and upgrading the forced draft (FD) fans
18 and ductwork on all units.

19

20 From 2008 through 2010 Holyrood has completed an annual Energy Management
21 System target to reduce emissions through exceeding the five-year rolling average
22 guide curve. This has involved assessing and implementing a prioritized list of
23 projects for guide curve improvements. Five-year rolling average guide curve
24 improvements were documented in each of these years.

1 **(2) Undertake follow up testing after the change of fuel is implemented to**
2 **quantify the reduction in particulate emissions and opacity.**

3
4 Please see PUB-Nalcor-123 for details of follow up testing and results.

5
6 **(3) Conduct further investigation on the use of fuel additives for a trial program in**
7 **the event that additional treatment for particulate reduction becomes necessary.**

8
9 A test of the fuel additive COMATE was conducted in unit 1 in 2005, during the
10 stack testing program. Comate is an abrasive additive intended to reduce ash
11 buildup in the boiler and increase efficiency. However, this resulted in increased
12 particulate emission rates. This potential was identified on page 4-4 of the SGE
13 Acres report, page 21 of Exhibit 68 and seen as a general limitation for use of fuel
14 additives to meet required objectives.

1 Q. Please provide a copy of the Provincial Certificate of Approval currently governing
2 the operation of the Holyrood Thermal Generating Station. Is the Holyrood Thermal
3 Generating Station currently operating within the guidelines of this Certificate of
4 Approval?

5
6

7 A. Please see the attached Provincial Certificate of Approval currently governing the
8 operation of the Holyrood Thermal Generating Station (*PUB-Nalcor-125a NLH -*
9 *Holyrood - Final COA August 31, 2011.pdf*), issued by the Department of
10 Environment and Conservation.

11

12 The Holyrood Thermal Generating Station is currently operating within the terms
13 and conditions of this Certificate of Approval.



GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR
Department of Environment and Conservation

CERTIFICATE OF APPROVAL

Pursuant to the Environmental Protection Act, SNL 2002 c E-14.2 Section 83

Issue Date: *August 31, 2011*

Approval No. AA11-085563

Expiration: *August 31, 2016*

File No. 716.008

Proponent: **Newfoundland and Labrador Hydro**
P.O. Box 29
Holyrood, NL
A0A 2R0

Attention: Mr. Mike Manuel, Manager – Health, Safety and Environment

Re: **Holyrood Thermal Generating Station**

Approval is hereby given for: the operation of a Thermal Generating Station, including power house, wastewater treatment plant, hazardous waste landfill and associated works located at Holyrood, NL.

This certificate of approval does not release the proponent from the obligation to obtain appropriate approvals from other concerned provincial, federal and municipal agencies. Nothing in this certificate of approval negates any regulatory requirement placed on the proponent. Where there is a conflict between conditions in this certificate of approval and a regulation, the condition in the regulation shall take precedence. Approval from the Department of Environment and Conservation shall be obtained prior to any significant change in the design, construction, installation, or operation of the facility, including any future expansion of the works. This certificate of approval shall not be sold, assigned, transferred, leased, mortgaged, sublet or otherwise alienated by the proponent without obtaining prior approval from the Minister.

This certificate of approval is subject to the terms and conditions as contained in Appendix 'A' attached hereto, as may be revised from time to time by the Department. Failure to comply with any of the terms and conditions may render this certificate of approval null and void, may require the proponent to cease all activities associated with this certificate of approval, may place the proponent and its agent(s) in violation of the *Environmental Protection Act*, and will make the proponent responsible for taking such remedial measures as may be prescribed by the Department. The Department reserves the right to add, delete or modify conditions to correct errors in the certificate of approval or to address significant environmental or health concerns.



Dexter Pittman
For **MINISTER**

APPENDIX "A"

TERMS AND CONDITIONS FOR APPROVAL No. AA11-085563

August 31, 2011

General

1. This Certificate of Approval is for the operation of a Thermal Generating Station, including power house, wastewater treatment plant, hazardous waste landfill and associated works located at Holyrood, Newfoundland. Future expansion or change of activities will require a separate Certificate of Approval.
2. Any inquiries concerning this approval shall be directed to the St. John's office of the Pollution Prevention Division (telephone: (709) 729-2556; or facsimile: (709) 729-6969).
3. In this Certificate of Approval:
 - **accredited** means the formal recognition of the competence of a laboratory to carry out specific functions;
 - **acutely lethal** means that the effluent at 100% concentration kills more than 50% of the rainbow trout subjected to it during a 96-hour period, when tested in accordance with the ALT;
 - **administrative boundary** means the boundary surrounding the Thermal Generating Station outside of which the ambient air quality standards, outlined in Schedule A of the *Air Pollution Control Regulations, 2004*, apply;
 - **air contaminant** means any discharge, release, or other propagation into the air and includes, but is not limited to, dust, fumes, mist, smoke, particulate matter, vapours, gases, odours, odorous substances, acids, soot, grime or any combination of them;
 - **ALT (acute lethality test)** means a test conducted as per Environment Canada's Environmental Protection Service reference method EPS/1/RM-13 Section 5 or 6;
 - **blanketed** means to cover a vessel with a lid that is specifically designed to contain vapours;
 - **BOD₅** means biochemical oxygen demand (5 day test);
 - **CEMS** means the continuous emissions monitoring system used to measure gaseous releases of SO₂, NO_x, CO₂, CO and O₂ from each boiler;
 - **CO** means carbon monoxide;
 - **CO₂** means carbon dioxide;

- **Department** means the Department of Environment and Conservation and its successors;
- **Director** means the Director of the Pollution Prevention Division of the Department;
- **discharge criteria** means the maximum allowable levels for the parameters listed in Table 3;
- **effluent** means wastewater resulting from the Thermal Generating Station operations, including process water, boiler blow-down water, wash-down water, cooling water and leachate from the landfill;
- **grab sample** means a quantity of undiluted effluent collected at any given time;
- **hazardous waste** means a product, substance or organism that is intended for disposal or recycling, including storage prior to disposal or recycling, and that:
 - (a) is listed in Schedule III of the *Export and Import of Hazardous Waste Regulations under the Canadian Environmental Protection Act, 1999*;
 - (b) is included in any of Classes 2 to 6, and 8 and 9 of the *Transportation of Dangerous Goods Regulations* under the *Transportation of Dangerous Goods Act, 1992*; or
 - (c) exhibits a hazard classification of a gas, a flammable liquid, an oxidizer, or a substance that is dangerously reactive, toxic, infectious, corrosive or environmentally hazardous;
- **HYDRO** means Newfoundland and Labrador Hydro;
- **Landfill Operations Manual** means the *Hydro Procedure Manual for the Controlled Waste Landfill* (most recent version);
- **licenced** means has a Certificate of Approval issued by the Minister to conduct an activity;
- **liquid waste** is defined by the *Slump Test* (Canadian Standards Association test method A23.2-5C for determining the slump of concrete). The liquid waste slump test involves placing the waste in a 30 cm open inverted cone. The cone is removed and the immediate decrease (slump) in height of the waste material is measured. If the material slumps such that the original height is reduced by 15 cm or more, the waste is considered liquid;
- **leachate holding pond** means the detention pond for leachate control prior to transfer to the on-site wastewater treatment plant;
- **malfunction** means any sudden, infrequent and not reasonably preventable failure of air pollution control equipment, wastewater treatment equipment, process equipment, or a process to operate in a normal or usual manner. Failures caused in part by poor maintenance or careless operation are not malfunctions;
- **Minister** means the Minister of the Department;

- **NO_x** means oxides of nitrogen;
- **NO₂** means nitrogen dioxide;
- **O₂** means oxygen;
- **PCBs** means polychlorinated biphenyls;
- **PM₁₀** means particulate matter with a diameter of 10 µm or less;
- **PM_{2.5}** means particulate matter with a diameter of 2.5 µm or less;
- **proficiency testing** means the use of inter-laboratory comparisons to determine the performance of individual laboratories for specific tests or measurements;
- **QA/QC** means Quality Assurance/Quality Control;
- **register(ed)** in the context of storage tanks, means that information regarding the storage tank system has been submitted to a Government Service Centre office and a registration number has been assigned to the storage tank system. In the context of source testing, registered means source testing results that have been submitted to and approved by the department in accordance with the *Procedural Guide for Source Emission Testing* (GD-PPD-016.1);
- **regulated substance** means a substance subject to discharge limit(s) under the *Environmental Control Water and Sewage Regulations, 2003*;
- **SO₂** means sulfur dioxide;
- **SOP** means Standard Operating Procedure;
- **spill or spillage** means a loss of gasoline or associated product in excess of 70 litres from a storage tank system, pipeline, tank vessel or vehicle, or of any volume of a regulated substance onto or into soil or a body of water;
- **stack** means a chimney, flue, conduit or duct arranged to conduct an air contaminant into the environment;
- **storage tank system** means a tank and all vent, fill and withdrawal piping associated with it installed in a fixed location and includes a temporary arrangement;
- **TDS** means total dissolved solids;
- **TPH** means total petroleum hydrocarbons;
- **TSP** means total suspended particulate with diameters less than 100µm. For the purposes of this approval, TSP shall be measured using a high volume TSP sampler;
- **TSS** means total suspended solids;
- **used lubricating oil** means lubricating oil that as a result of its use, storage or

handling, is altered so that it is no longer suitable for its intended purpose but is suitable for refining or other permitted uses;

- **used oil** means a used lubricating oil or waste oil;
- **waste oil** means an oil that as a result of contamination by any means or by its use, is altered so that it is no longer suitable for its intended purpose, and
- **wastewater treatment plant** means HYDRO's treatment plant for wastewater streams resulting from periodic cleaning of boiler fireside equipment, and includes the periodic basin, the batch reactor, filter press and all associated works.

4. All necessary measures shall be taken to ensure compliance with all applicable acts, regulations, policies and guidelines, including the following, or their successors:

- *Environmental Protection Act;*
- *Water Resources Act;*
- *Air Pollution Control Regulations, 2004;*
- *Environmental Control Water and Sewage Regulations, 2003;*
- *Halocarbon Regulations;*
- *Storage and Handling of Gasoline and Associated Products Regulations, 2003;*
- *Used Oil Control Regulations;*
- *Storage of PCB Waste Regulations, 2003;*
- *Sampling of Water and Wastewater - Industrial Effluent Applications Guidance Document;*
- *Ambient Air Monitoring Guidance Document;*
- *Accredited Laboratory Policy;*
- *Compliance Determination Guidance Document;*
- *Stack Emission Testing Guidance Document; and*
- *Plume Dispersion Modelling Guidance Document.*

This Approval provides terms and conditions to satisfy various requirements of the above listed acts, regulations, Departmental policies and guidelines. If it appears that all of the pertinent requirements of these acts, regulations, policies and guidelines are not being met, then a further review of the works shall be conducted, and suitable pollution control measures may be required by the Minister.

5. All reasonable efforts shall be taken to minimize the impact of the operation on the environment. Such efforts include minimizing the area disturbed by the operation, minimizing air or water pollution, finding alternative uses, acceptable to the Director, for waste or rejected materials, and considering the requirement for the eventual rehabilitation of disturbed areas when planning the development of any area on the facility property.
6. HYDRO shall provide to the Department, within a reasonable time, any information, records, reports or access to data requested or specified by the Department.
7. HYDRO shall keep all records or other documents required by this Approval at the Thermal Generating Station location for a period of not less than three (3) years, beginning the day they were made. These records shall be made available for review by officials of the Department when requested.

8. Should HYDRO wish to deviate in any way from the terms and conditions of this Certificate of Approval, a written request detailing the proposed deviation shall be made to the Minister. HYDRO shall comply with the most current terms and conditions until the Minister has authorized otherwise. In the case of meeting a deadline requirement, the request shall be made at least 60 days ahead of the applicable date as specified in this Approval or elsewhere by the Department.

Waste Management

9. All waste generated at the Thermal Generating Station is subject to compliance with the *Environmental Protection Act*. All non-industrial waste shall be placed in closed containers and, on at least a weekly basis, removed from the site. If required, industrial waste shall be disposed of by a licenced operator. These wastes shall be disposed of at an authorized waste disposal site with the permission of the owner/operator of the site.
10. A Waste Management Plan for the Thermal Generating Station has been submitted to the Department. The Waste Management Plan shall be implemented with the goal to minimize any adverse effects on the environment. Every year the Waste Management Plan shall be reviewed and revised as necessary, accounting for expanding or alteration of activities. All proposed revisions shall be submitted to the Director for review. The Department will acknowledge receipt of the Plan and/or revisions, and shall provide any review comments within a reasonable time frame.
11. HYDRO shall ensure that all volatile chemical and solvent wastes, if they can not be reused, are placed in suitable covered containers for disposal in a manner acceptable to the Department. Disposal of liquid wastes at waste disposal sites in the province is not considered an acceptable alternative.
12. Disposal of hazardous waste in a municipal or regional waste disposal site in this Province is prohibited. Transporters of hazardous waste shall have an approval issued by the Minister. Those generating hazardous waste shall have a waste generators number issued by the Director and shall also complete the required information outlined in the Waste Manifest Form.

Noise

13. A Noise Management Plan for the Thermal Generating Station has been submitted to the Department. Every year the Noise Management Plan shall be reviewed and revised as necessary. All proposed revisions shall be submitted to the Director for review. The Department will acknowledge receipt of the Plan and/or revisions, and shall provide any review comments within a reasonable time frame.

Chemical Operations

14. All chemical loading and blending shall be performed in a controlled environment with an effort to minimise or eliminate the release of any fugitive emissions or odours.

Spill Prevention and Containment

15. Areas in which chemicals are used or stored shall have impermeable floors and dykes or curbs and shall not have a floor drain system, nor shall it discharge to the environment. Areas inside the dykes or curbs shall have an effective secondary containment capacity of at least **110%** of the chemical storage tank capacity, in the case of a single storage container. If there is more than one storage container, the dyked area shall be able to retain no less than **110% of the capacity of the largest container or 100 % of the capacity of the largest container plus 10% of the aggregate capacity of all additional containers, whichever is greater**. These dyked areas shall be kept clear of material that may compromise the capacity of the dyke system. Once a year, the dykes shall be visually inspected for their liquid containing integrity, and repairs shall be made when required. Once every ten years, the dykes shall be inspected, by a means other than visual inspection, for their liquid containing integrity, and repairs shall be made when required.
16. All on site storage of petroleum shall comply with the *Storage and Handling of Gasoline and Associated Products Regulations, 2003*, or its successor. Storage tank systems shall be registered with the Government Service Centre. All aboveground storage tanks shall be clearly and visibly labelled with their GAP registration numbers.
17. Where applicable, all tanks and fuel delivery systems shall be inspected to appropriate American Petroleum Institute or Underwriters' Laboratories of Canada standards, or any other standards acceptable to this Department. The required frequency of inspections may be changed at the discretion of the Director.
18. HYDRO shall maintain an inventory of all petroleum and chemical storage tanks. This inventory shall include a plan showing location, registration number (where applicable), identification number, material stored, capacity, annual throughput, tank material, tank type, tank diameter, tank height, tank colour, roof type, year of manufacture, date of installation, date of last inspection, failure history, maintenance history, dyke capacity and date of next planned inspection. An update of any significant changes to the inventory shall be submitted to the Director.

Contingency Plan

19. A contingency plan for the Thermal Generating Station has been submitted to the Department. Copies of the plan shall be placed in convenient areas throughout the facility so that employees can easily refer to it when needed. HYDRO shall ensure that all employees are aware of the plan and understand the procedures and the reporting protocol to be followed in the event of an emergency. An annual response exercise is recommended for response personnel. Every year, as a minimum, the plan shall be reviewed and revised as necessary. Any proposed significant revisions shall be submitted to the Director for review. Changes which are not considered significant include minor variations in equipment or personnel characteristics which do not effect implementation of the plan.
20. Every time HYDRO implements the plan, information shall be recorded for future reference. This will assist in reviewing and updating the plan. The record is to consist of all incidents with environmental implications, and include such details as: date; time of day; type of incident (i.e. liquid spill, gas leak, granular chemical spill, equipment malfunction, etc.); actions taken; problems encountered; and other

relevant information that would aid in later review of the plan performance. Each incident report shall be submitted to the Director as per the **Reporting** section.

Site Decommissioning and Restoration Plan

21. A plan to restore areas disturbed by the operation shall be submitted to the Director for review at least ten (10) months before the time that closure of the Thermal Generating Station is determined. For guidance on the preparation of the plan, refer to Appendix B. Wherever possible, the plan shall promote progressive reclamation of disturbed areas. HYDRO shall proceed through a phased environmental site assessment process to closure.

Heavy Fuel Oil

22. HYDRO shall analyse each delivery of Heavy Fuel Oil for the parameters listed in Table 1. Analysis shall be on a representative sample of the Heavy Fuel received.

Table 1: Fuel Analysis Program			
Parameters			Frequency
A.P.I Gravity @ 60 °F	Density (kg/m ³ @ 15 °C)	Flash Point	Every Batch Delivered
Pour Point	Viscosity cSt @ 51 °C	Viscosity SFS @ 122 °F	
Sulphur % by Weight	BTU's per US Gallon	Ash % by weight	
Sediment % by weight	Water % by volume	Asphaltenes % by weight	
Aluminum	Nickel	Silicon	
Sodium	Vanadium		

23. HYDRO shall maintain, and submit to the Director as per the **Reporting** section, a record of all Heavy Fuel received. The record shall include:
- name of the supplier;
 - date and volume of Heavy Fuel unloaded;
 - the certificate of analysis for each batch of Heavy Fuel delivery received; and
 - the name of the laboratory where the analysis was performed.
24. HYDRO is permitted to accept and burn alternative fuel only with the written approval of the Department.

Sulfur in Fuel

25. HYDRO shall not burn any fuel with sulphur content greater than **0.7 %** by weight.

Used Oil

26. Used oil shall be retained in an approved tank or closed container, and disposed of by a company licenced for handling and disposal of used oil products.
27. HYDRO shall submit a revised SOP for the handling and storage of used oil to the

Director by **November 30, 2011**. The SOP shall, as minimum, detail procedures for the storage, handling and recording of volumes and quality of used oil.

Wastewater Flows and Treatment

28. The Thermal Generating Station's once-through cooling water shall be obtained from Indian Pond, and shall be discharged directly to Conception Bay.
29. The Thermal Generating Station's south-east floor drains shall be routed through an oil/water separator and then to Indian Pond through the storm water collection system.
30. The Thermal Generating Station's south-west floor drains shall be routed through a grease trap and an oil/water separator and then to the cooling water discharge piping associated with Units No. 1 & 2.
31. The Thermal Generating Station's north-east and north-west floor drains shall be routed through a grease trap and oil/water separator and then to a 900 m³ equalization basin (continuous basin).
32. All oil/water separators shall be checked routinely to ensure they are working properly. A log of these checks shall be maintained.
33. Wastewater streams resulting from daily operations, including raw water clarification, filter backwashes, boiler blowdown and other similar activities shall be directed to the continuous basin. Any flow or drainage from the continuous basin shall be discharge to Indian Pond.
34. Demineralizer regeneration wastewater flows may be directed to the seal pit associated with Units No. 1 & 2, during such times that at least one cooling water pump is active.
35. Wastewater streams resulting from periodic events where water is used to clean boiler fireside equipment, including air pre-heater wash flows, fireside boiler wash flows and boiler acid wash flows, shall be directed to a 900 m³ equalization basin (periodic basin). Any flow or drainage from the periodic basin shall be directed to the wastewater treatment plant.
36. Any flow or drainage from the wastewater treatment plant shall be discharged to the cooling water intakes for Units No. 1 & 2.
37. Effluent from the dewatering of filter cake shall be re-cycled through the wastewater treatment plant.
38. All solid waste generated from the wastewater treatment plant operations shall be directed to the hazardous waste landfill.

Effluent Monitoring and Discharge

39. HYDRO shall perform an Effluent Monitoring Program as per Table 2. All results shall be submitted to the Director as per the **Reporting** section.

Table 2: Effluent Monitoring Program					
Location	Parameters				Frequency
Batch Reactor	Aluminum	Iron	Magnesium	Nickel	Grab sample prior to each batch release †
	Vanadium	pH	TSS		
	ALT				Grab sample from each batch following new addition of wastewater to the periodic basin
Continuous Basin Outfall	Iron	Nickel	Vanadium	pH	Weekly Grab
	TSS	TPH			Monthly Grab
† Grab samples for all parameters shall be taken from the batch reactor at the same time.					

40. Refer to Table 3 for the discharge criteria.

Table 3 - Effluent Discharge Criteria	
Parameter	Allowable Limits *
Iron	10
Nickel	0.5
Vanadium	0.5
pH	5.5 – 9.0 pH units
TSS	30
TPH	15
* Units are in mg/L unless otherwise specified	

41. If effluent is determined to be acutely lethal for three consecutive ALTs, HYDRO shall implement a toxicity identification evaluation (TIE) to identify the toxin, and from this develop measures to prevent or reduce the toxin. The report, written as a result of these identification activities, shall be submitted to the Director for review, **within 60 days** of the third consecutive failed acutely lethal test result. After review of the report, the Director may place additional requirements upon the proponent for treatment of effluent prior to discharge.

Water Chemistry Analysis

42. HYDRO shall perform a Water Chemistry Analysis Program four times per calendar year and not less than thirty (30) days apart, as per Table 4. All results shall be submitted to the Director as per the **Reporting** section.

43. HYDRO shall inform the Department as per **Reporting** section the date and duration of the usage of the **Copper Ion Injection** in their system.

Table 4 - Water Chemistry Analysis Program						
Location	Parameters					
1. Cooling water intake at Indian Pond (grab sample)	General Parameters - must include the following:					
	nitrate + nitrite	colour	magnesium	reactive silica	TDS (calculated)	
2. Cooling water outfall stream, prior to release into Conception Bay (grab sample)	nitrate	sodium	alkalinity	orthophosphate	phenolics	
	nitrite	potassium	sulfate	phosphorous	carbonate (CaCO ₃)	
	ammonia	calcium	chloride	DOC	hardness (CaCO ₃)	
	pH	sulphide	turbidity	conductance	bicarbonate (CaCO ₃)	
	TSS	Metals Scan - must include the following:				
	3. Continuous Basin outfall stream, prior to release into Indian Pond (grab sample)	aluminum	boron	iron	nickel	tin
antimony		cadmium	lead	selenium	titanium	
arsenic		chromium	manganese	silver	uranium	
barium		cobalt	molybdenum	strontium	vanadium	
beryllium		copper	mercury	thallium	zinc	
bismuth						

Environmental Effects Monitoring

44. HYDRO shall perform an Environmental Effects Monitoring study to monitor the impacts of the discharge of cooling water, the continuous basin’s water and the wastewater treatment plant’s treated water on Conception Bay. The study design shall be submitted to the Director for review by **June 30, 2013**. The results of the completed study shall be submitted to the Director for review by **June 30, 2015**. Recommendations from the review will be incorporated into subsequent studies.

Hazardous Waste Landfill Operations

45. HYDRO shall operate the hazardous waste landfill in the manner as described in the **Landfill Operations Manual**. Any revision or changes to the **Landfill Operations Manual** shall be submitted to the Director for review and approval prior to such revision or changes being made.
46. Only waste identified in the **Landfill Operations Manual** shall be placed in the hazardous waste landfill. These include: bottom and fly ash, periodic basin sludge, continuous basin sludge, wastewater treatment plant filter-cake, filter sand, raw-water treatment ion exchange resins, and clean-up from chemical spills. In addition, Bunker C ash from institutions, such as hospitals, may be disposed of in space efficient containers in the hazardous waste landfill. HYDRO shall notify the Department prior to deposition of ash from sources other than from the Thermal Generating Station.
47. Liquid waste shall not be disposed of in the hazardous waste landfill.
48. The Department reserves the right to require some form of pre-treatment of waste before placement in the site.

- 49. HYDRO shall periodically review opportunities for reuse and/or recycling of the waste types disposed of in the site.
- 50. HYDRO shall maintain a landfill security fence with a sign affixed to the fence identifying the site as a hazardous waste containment system. This sign shall identify the owner of the landfill and a contact phone number. The sign and its placement shall be acceptable to the Department.
- 51. No activities shall occur within the fenced area of the landfill, except for the deposition of waste; extraction of leachate; or other maintenance requirements of the landfill cap or the landfill.
- 52. HYDRO shall conduct an annual inspection program as per the *Landfill Operations Manual*.
- 53. Leachate accumulated in each of the hazardous waste landfill collection systems, including the leachate holding pond, shall be removed as required so that leachate does not overflow the collection system.
- 54. Any flow or drainage from the leachate holding pond shall be directed to the periodic basin. Leachate shall not be discharged directly to the environment without prior authorization by the Department.

Hazardous Waste Landfill Monitoring

- 55. HYDRO shall perform an Environmental Monitoring Program as depicted in the *Landfill Operations Manual*, including monitoring of: groundwater quality and levels, surface water quality, leachate leakage, liner integrity and physical movement of the landfill.
- 56. HYDRO shall perform a Groundwater Monitoring Program as per Table 5. This Monitoring program shall be performed throughout the operational life of the landfill, and during the twenty five (25) years following closure.

Table 5: Groundwater Monitoring Program							
Location			Parameters				Frequency
Monitoring Wells:							
BH-1	BH-2	BH-3	Aluminum	Iron	Magnesium	Nickel	Every Four Months
BH-4	BH-5	BH-6	Vanadium				
		BH-7					
Monitoring Wells:							
BH-1	BH-2	BH-3	Antimony	Arsenic	Barium	Beryllium	Annually
BH-4	BH-5	BH-6	Bismuth	Cadmium	Calcium	Cobalt	
		BH-7	Chromium	Copper	Lead	Manganese	
			Mercury	Molybdenum	Phosphorus	Potassium	
			Selenium	Silver	Sodium	Zinc	
			VOC's	TDS	pH		

57. HYDRO shall perform a Surface Water Monitoring Program as per Table 6. This monitoring program shall be performed throughout the operational life of the landfill, and during the twenty five (25) years following closure.

Table 6: Surface Water Monitoring Program				
Location	Parameters			Frequency
Three (3) locations from the upstream drainage ditch (i.e. background).	VOCs			Annually
	Cadmium	Chromium (total)	Iron	Monthly (provided water is flowing in the ditches during the month)
Lead	Mercury	Nickel		
Vanadium	pH	TDS		
TSS				
Three (3) locations from the downstream drainage ditch.				

58. The total monthly flow:

- from the primary and secondary leachate collection systems;
- from the leachate holding pond to the periodic basin; and
- through the primary cell and holding pond leak detection manholes;

shall be accurately measured and recorded. This record and all results from the Groundwater and Surface Water Monitoring Programs shall be submitted to the Director as per the **Reporting** section.

59. HYDRO shall submit an annual Landfill Operating Report to the Director by **February 28** of the subsequent year. This report shall include:

- results of the Environmental Monitoring Program; and
- summaries of all materials placed in the landfill site including: waste characterization reports, volumes of waste deposited in the landfill, source(s) of the waste, identification of contaminants of concern, and copies of the hazardous waste manifest forms.

Ambient Air

60. HYDRO shall operate an ambient air monitoring program as per the conditions in this Approval and its amendments. Approval shall be obtained from the Director prior to purchase or installation of any monitoring equipment.

61. Site locations and parameters to be monitored are outlined in Table 7.

Table 7 - Ambient Air Monitoring Program	
Monitoring Sites	Parameter
Butter Pot	PM _{2.5} , SO ₂ , NO _x , NO ₂
Green Acres	TSP, PM _{2.5} , SO ₂ , NO _x , NO ₂ , Nickel*, Vanadium*
Indian Pond	TSP, PM _{2.5} , SO ₂ , NO _x , NO ₂
Lawrence Pond	TSP, PM _{2.5} , SO ₂ , NO _x , NO ₂
Lower Indian Pond Drive	TSP, PM _{2.5} , SO ₂ , NO _x , NO ₂ , Nickel*, Vanadium*
Main Gate	TSP, PM _{2.5} , Nickel*, Vanadium*
* Nickel and vanadium analysis shall be performed on all TSP samples for these sites	

- 62. Ambient air monitoring shall be done in accordance with the *Ambient Air Monitoring Guidance Document (GD-PPD-065)*, or its successors.
- 63. Frequency of non-continuous TSP sampling shall coincide with the 6-day National Air Pollution Surveillance (NAPS) schedule. Sampling results shall be submitted as per the *Reporting* section.
- 64. Non-continuous TSP shall be determined by the United States EPA Test Method: "Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-Volume Method), or alternate method approved by the Director.
- 65. HYDRO shall operate and maintain a meteorological station at **Green Acres** site in accordance with the guidelines specified in the United States EPA document "Quality Assurance Handbook for Air Pollution Measurement Systems - Volume IV: Meteorological Measurements Version 2.0 (Final)," EPA- 454/B-08-002, March 2008, or its successors. Parameters to be measured and recorded shall include: wind speed, wind direction, ambient air temperature, relative humidity, barometric pressure and precipitation. All results from this station shall be submitted in an acceptable digital format annually or as otherwise specified by the Department, as per the *Reporting* section.
- 66. Information regarding calibrations, site visits and maintenance for all continuous ambient air monitors shall be recorded into the DR DAS electronic logbook. Specific information regarding non-continuous TSP monitors, including but not limited to slopes, intercepts, initial and final masses, times, flows, etc. shall be submitted electronically, as per the *Reporting* section.

Continuous Opacity Monitoring System

- 67. Opacity of emissions from each boiler at the Thermal Generating Station shall be continuously measured and recorded using a Continuous Opacity Monitoring System (COMS) that meets all the requirements of *Performance Specification 1 (PS-1) - Specifications and Test Procedures for Opacity Continuous Emission Monitoring Systems in Stationary Sources*, of the United States Code of Federal Regulations - 40 CFR Part 60, Appendix B. Minimum QA/QC requirements are specified to assess the quality of COMS performance. Daily zero and span checks, quarterly performance audits, and annual zero alignment checks are required to

assure the proper functioning of the COMS and the accuracy of the COMS data. These shall be recorded in a written log and a copy made available on request.

68. The United States EPA Federal Register Test Method 203 - Determination of the Opacity of Emissions from Stationary Sources by Continuous Opacity Monitoring Systems shall be used to determine compliance with the *Air Pollution Control Regulations, 2004*.
69. Monthly opacity data reports, in digital format, shall be submitted in the form of six minute arithmetic averages of instantaneous readings, as per the *Reporting* section. Each six minute average data point shall be identified by date, time and average percent opacity.

Continuous Emissions Monitoring System

70. Emissions from each boiler at the Thermal Generating Station shall be measured and recorded using an automated CEMS that meets the requirements of Environment Canada's *Protocols and Performance Specifications for Continuous Monitoring of Gaseous Emissions from Thermal Power Generation (EPS 1/PG/7)*, or its successor. Notwithstanding this, application of specific requirements of EPS 1/PG/7 to the CEMS may be modified subject to approval by the Director.
71. Monthly CEMS data reports containing one-hour arithmetic averages of emission rates of SO₂, NO_x, CO₂, CO and O₂ (all expressed in ppmv) shall be submitted in digital format, as per the *Reporting* section.

Administrative boundary

72. Under this approval the Administrative Boundary shall be established as the land boundary of the Thermal Generating Station property, as indicated on the land boundary map submitted to the Department on *December 7, 2005*.

Stack Emissions Testing and Dispersion Modelling

73. Stack emissions testing shall be done in accordance with the *Stack Emission Testing Guidance Document (GD-PPD-016.1)*. Dispersion modelling shall be done in accordance with the *Plume Dispersion Modelling Guidance Document (GD-PPD-019)*. Determination of frequency of stack emissions testing and dispersion modelling shall be done in accordance with the *Compliance Determination Guidance Document (GD-PPD-009.2)*.
74. HYDRO shall be required to complete the next stack emissions testing and Dispersion Modelling by the end of 2013. once every four years if it has been shown, via a registered dispersion model, that the operation is in compliance with section 3(2) and Schedule A of the *Air Pollution Control Regulations, 2004*. If it has been shown, via a registered dispersion model, that the operation is not in compliance with section 3(2) and Schedule A of the *Air Pollution Control Regulations, 2004*, then the facility shall complete stack emissions testing every two years.
75. Plume dispersion modelling results shall be submitted to the Department within *120*

days of completion of the stack emissions testing.

76. HYDRO as per 2009 dispersion modelling report shall complete and submit the next round of stack testing and dispersion modelling by the end of the year **2013**.

Annual Air Emissions Reporting

77. HYDRO shall submit an annual Air Emission Report to the Director by **February 28** of the subsequent year. This report shall include:
- total fuel consumption;
 - the weighted average sulfur content of the fuel;
 - the fuel specific gravity;
 - the estimated, or, if available, the monitored annual emissions of the following flue gas constituents: SO₂, NO_x, NO₂, CO₂, CO and particulate; and
 - the actual calculations including factors, formulae and/or assumptions used.

Analysis and QA/QC

78. Unless otherwise stated herein, all solids and liquids analysis performed pursuant to this Approval shall be done by either a contracted commercial laboratory or an in-house laboratory. Contracted commercial laboratories shall have a recognized form of accreditation. In-house laboratories have the option of either obtaining accreditation or submitting to an annual inspection by a representative of the Department, for which HYDRO shall be billed for each laboratory inspection in accordance with Schedule 1 of the **Accredited Laboratory Policy (PD:PP2001-01.02)**. Recommendations of the Director stemming from the annual inspections shall be addressed within six (6) months; otherwise further analytical results shall not be accepted by the Director.
79. If HYDRO wishes to perform in-house laboratory testing and submit to an annual inspection by the Department then a recognized form of proficiency testing recognition shall be obtained for compliance parameters for which this recognition exists. The compliance parameters are listed in the **Effluent and Monitoring** section. If using a commercial laboratory, HYDRO shall contact that commercial laboratory to determine and to implement the sampling and transportation QA/QC requirements for those activities.
80. The exact location of each sampling point shall remain consistent over the life of the monitoring programs, unless otherwise approved by the Director. A sketch or diagram clearly identifying each sampling location shall be submitted to the Director.
81. HYDRO shall bear all expenses incurred in carrying out the environmental monitoring and analysis required under conditions of this Approval.

Monitoring Alteration

82. The Director has the authority to alter monitoring programs or require additional testing at any time when:

- pollutants might be released to the surrounding environment without being detected;
- an adverse environmental effect may occur; or
- it is no longer necessary to maintain the current frequency of sampling and/or the monitoring of parameters.

83. HYDRO may, at any time, request that monitoring program or requirements of this Approval be altered by:

- requesting the change in writing to the Director; and
- providing sufficient justification, as determined by the Director.

The requirements of this Approval shall remain in effect until altered, in writing, by the Director.

Reporting

84. Monthly reports containing the environmental compliance monitoring and sampling information required in this Approval, as summarized in Table 8, shall be received by the Director, in digital format (e-mail or CD), within 30 calendar days of the reporting month. All related laboratory reports shall be submitted with the monthly report, in spreadsheet format (Microsoft Excel or a format easily transferable to Excel), and either Adobe Portable Document Format (PDF) or hardcopy format. Digital report submissions, if e-mailed, shall be sent to the following address: <<statenv@gov.nl.ca>>

Table 8 - Monthly Reporting Requirements	
Section	Condition(s)
Heavy Fuel Oil	22
Effluent Monitoring and Discharge	39
Water Chemistry Analysis	42
Copper Ion Injection System	43
Hazardous Waste Landfill Monitoring	56, 57, 58
Ambient Air	63, 65, 66
Continuous Opacity Monitoring System	69
Continuous Emissions Monitoring System	71

85. All incidents of:

- *Contingency Plan* implementation; or
- non-conformance of any condition within this approval; or
- spillage or leakage of a regulated substance; or
- whenever discharge criteria is, or is suspected to be, exceeded; or
- verbal/written complaints of an environmental nature from the public received by HYDRO related to the Thermal Generating Station, whether or not they are received anonymously;

shall be immediately reported, within one working day, to a person or message manager or facsimile machine by phoning (709) 729-2556 or faxing (709) 729-6969.

A written report including a detailed description of the incident, summary of contributing factors, and an action plan to prevent future incidents of a similar nature, shall be submitted to the Director. The action plan shall include a description of actions already taken and future actions to be implemented, and shall be submitted within thirty days of the date of the initial incident. The address for written report submission is:

Director, Pollution Prevention Division
Department of Environment and Conservation
P.O. Box 8700
St. John's, NL
A1B 4J6
Telephone: (709) 729-2556
Facsimile: (709) 729-6969

86. Any spillage or leakage of gasoline or associated product shall be reported immediately through the Canadian Coast Guard at 1-(709)-772-2083.

Liaison Committee

87. The Department recognizes the benefits, and at times the necessity, of accurate, unbiased communication between the public and industrial operations which have an impact on the properties and residents in the area. The Department encourages the formation and regular meeting of a Liaison Committee comprised of representatives of HYDRO, the Department and independent members of the general population of Holyrood and Conception Bay South. Regular meetings of the Liaison Committee will provide a clear conduit of communication between concerned citizens and HYDRO.

Expiration

88. This Certificate of Approval expires ***August 31, 2016***.
89. Should the proponent wish to continue to operate the Thermal Generating Station beyond this expiry date, a written request shall be submitted to the Director for the renewal of this approval. Such request shall be made prior to ***March 01, 2016***.

APPENDIX B

Industrial Site Decommissioning and Restoration Plan Guidelines

As part of the Department of Environment and Conservation's ongoing commitment to minimize the residual impact of industrial activities on the environment of the province, the Department requires that HYDRO develop a decommissioning and restoration plan for the Thermal Generating Station at Holyrood and its associated property. The guidelines listed below are intended to provide some general guidance as to the expectations of the Department with regard to the development of a decommissioning and restoration plan, and to identify areas that are of particular concern or interest. The points presented are for consideration, and are open to interpretation and discussion.

Decommissioning and restoration plans are intended to present the scope of activities that HYDRO shall undertake at the time of final closure and/or decommissioning of the industrial properties. Where it is useful and practical to do so HYDRO is encouraged to begin undertaking some of the activities outlined in the plan prior to final closure and decommissioning. The objectives of the restoration work to be undertaken can be summarized as follows:

- to ensure that abandoned industrial facilities do not endanger public health or safety;
- to prevent progressive degradation and to enhance the natural recovery of areas affected by industrial activities;
- to ensure that industrial facilities and associated wastes are abandoned in a manner that will minimize the requirement for long term maintenance and monitoring;
- to mitigate, and if possible prevent, the continued loadings of contaminants and wastes to the environment. The primary objective shall be to prevent the release of contaminants into the environment. Where prevention is not practical due to technical or economic limitations then activities intended to mitigate the consequence of such a release of contaminants shall become the objective of restoration work;
- to return affected areas to a state compatible with the original undisturbed condition, giving due consideration to practical factors including economics, aesthetics, future productivity and future use; and
- to plan new facilities so as to facilitate eventual rehabilitation.

The decommissioning and restoration plan should:

- identify areas of known historical or current contamination;
- identify past or existing operational procedures and waste management practices that have, or may have, resulted in site contamination;
- highlight the issues or components to be addressed;
- identify operational procedures and waste management practices that can prevent or reduce site contamination;
- consider future land use, regulatory concerns and public concerns;

- enable estimation of the resources and time frame required to decommission the facility and restore the site to a condition acceptable to the Department;
- enable financial planning to ensure the necessary funds for decommissioning and restoration are set aside during the operational life of the facility, and;
- include arrangements for appropriate project management to ensure successful completion of the decommissioning and restoration program.

Cc: Mr. Kevin Power, P.Eng. - Head
Environmental Protection Section
Environment Canada
6 Bruce Street
Donovans Industrial Park
Mount Pearl, NL
A1N 4T3

Mr. Kevin King - Operations Manager
Government Service Centre (GSC)
5 Mews Place
P.O. Box 8700
St. John's, NL
A1B 4J6

Mr. Gary Corbett - Chief Administrative Officer
Town of Holyrood
P.O. Box 100
Holyrood, NL

Mr. Keith Arns - Chief Administrative Officer
Town of Conception Bay South
P.O. Box 280
Conception Bay South, NL
A1W 1M8

1 Q. With Reference to Exhibit 44, Holyrood Thermal Generating Station – Condition
2 Assessment and Life Extension Study p. 6 of 725, Section Overall Plant Assessment
3 states: “*Holyrood is also expected to be able to meet its 2041 end of life date for*
4 *operation in a synchronous condensing mode, but will require some further*
5 *substantial equipment refurbishments and replacements specific to that role. These*
6 *are identified later in the report, but examples of these would include generator*
7 *rewinds, powerhouse and pump house roof replacements, switching yard breakers*
8 *and motorized switches refurbishments/replacements, and synchronous condensing*
9 *conversions.*” Have the costs of these refurbishments and replacements been
10 included in the CPW analysis?

11

12

13 A. Exhibit 44, *Holyrood Thermal Generating Station – Condition Assessment and Life*
14 *Extension Study p. 6 of 725, Section Overall Plant Assessment* was completed after
15 the CPW analysis was carried out. Therefore, the particular equipment
16 refurbishments and replacements identified in that report were not included in the
17 CPW analysis.

1 Q. Further to PUB-Nalcor-126, with the retirement of these synchronous condensers in
2 2041, what additional equipment will be added to the system to provide the
3 necessary reactive power requirements?
4

5
6 A. While the condition assessment report in PUB-Nalcor-126 addressed the life of
7 Holyrood up to 2041, the report did not discuss or draw conclusions on the
8 potential remaining useful life of the assets at 2041. A decision to refurbish or
9 replace the synchronous condensers will be made prior to 2041.

1 Q. Further to PUB-Nalcor-126, have the costs of these additions been included in the
2 CPW analysis?

3

4

5 A. Further to PUB-Nalcor-127 the Holyrood condition assessment report did not
6 address the potential remaining useful life of the assets at 2041. As a result no
7 costs for replacement have been included in the CPW analysis.

1 Q. Further to the response to CA/KPL-Nalcor-15, define what is meant by “open
2 markets” and explain how the Newfoundland electrical system falls within “open
3 markets” for the purpose of the treatment of costs for investment in power
4 generation facilities.

5
6

7 A. In its response to CA/KPL-Nalcor-15, Nalcor indicated that while generation facilities
8 in open markets are typically not regulated on selling price, transmission
9 investments are generally recovered on a cost of service based model.

10

11 In this context, an “open market” is one in which a competitive wholesale energy
12 and capacity market has been established. In such a market, an independent entity
13 (commonly referred to as an independent system operator) administers a
14 competitive bid process to establish wholesale clearing prices for electricity that
15 provide sufficient supply to meet prevailing demand requirements. Examples of
16 open markets include New England and New York. Another common feature of
17 open markets is that transmission services are provided pursuant to an open access
18 transmission tariff (OATT).

19

20 For example, Nalcor currently obtains transmission access from Hydro Quebec
21 pursuant to its OATT. A consequence of Nalcor’s use of Quebec’s transmission
22 system is, upon request, Nalcor must provide transmission access on a reciprocal
23 basis to Hydro Quebec on terms similar to those under which Hydro Quebec
24 provides them to Nalcor, and also under terms under which Nalcor provides service
25 to its corporate affiliates.

1 As a result, Nalcor wishes to ensure that its treatment of transmission investment is
2 consistent with the treatment of transmission investments in other markets.

3
4 While CA/KPL-Nalcor-15 did not address the treatment of generation investments,
5 Nalcor did note in its response that in open markets, generation investments are
6 typically not regulated on selling price. The presence of an open market, however,
7 is not a prerequisite to the exclusion of power generation investments from
8 regulation.

9
10 In Newfoundland and Labrador, precedents exist for both regulated and non-
11 regulated arrangements for investments in power generation investments.

1 Q. The Nalcor website has an information sheet titled “*Lower Churchill Project Capital*
2 *Expenditures*” that states as of December 30, 2010 the cumulative expenditures for
3 the Lower Churchill Project were \$350 million. Provide the total expenditures to
4 September 30, 2011 including all work completed or in progress by SNC Lavalin and
5 other engineering, financial, legal and all other services. In the response, provide
6 the same level of detail as provided on the Nalcor website in the information sheet
7 “*Lower Churchill Project Capital Expenditures*”.

8

9

10 A. There has been \$406.4 million, including interest charges of \$78.9 million, invested
11 in the Lower Churchill Project since the 1970s. At December 31, 2003, \$118.7
12 million spent between the 1970s up to 2003 was written off. This money was spent
13 on a number of project expenses for the Lower Churchill Project that was for work
14 outside Phase 1 (Muskrat Falls and the Labrador Island Transmission Link) and
15 Phase 2 (Gull Island). Expenditures to September 30, 2011 includes all work
16 completed or in progress by SNC Lavalin and other engineering, financial, legal and
17 all other services.

18

19 The following provides details as of September 30, 2011 of cumulative expenditures
20 on evaluating the development of the Lower Churchill Project (including write-
21 downs and recoveries). Please note that all amounts are reported below in millions
22 of dollars.

23

24 Please note the expenditures below are shown separately for Phase 1 (Muskrat
25 Falls and the Labrador Island Transmission Link) and Phase 2 (Gull Island) of the
26 project, whereas they were combined on the website.

Nalcor Energy - Lower Churchill Project				
Expenditure Summary (incl. write-downs and recoveries)				
		As of: September 30, 2011		
Expenditure Category	Expenditures Written Off At December 31, 2003 ¹	Muskrat Falls & Labrador Island Transmission Link Expenditures	Gull Island Expenditures	Total Expenditures
General Administration	17.2	6.6	7.8	31.6
Project Management	0.0	54.6	27.0	81.6
Feasibility Engineering	77.1	38.5	34.9	150.5
Environmental Assessment	1.2	18.0	34.9	54.1
Aboriginal Affairs	0.4	3.0	9.1	12.5
Project Financing	0.3	8.0	6.2	14.5
Sub-Total	96.2	128.7	119.9	344.9
Interest Charges	34.7	12.2	32.0	78.9
Recovery ²	(12.3)	(1.5)	(3.6)	(17.4)
Total	118.7	139.4	148.3	406.4
Notes:				
(1) Includes GIPCo and Lower Churchill Development Company.				
(2) Recoveries : \$12.3M from Federal Government share of LCDC; \$5.1M of recoveries from HQ share of LHP (68/32 working relationship) on agreed expenditures.				