

## **Joint Waste Owner Funding Formula**

### **Financing the Management of Nuclear Fuel Waste in Support of the Nuclear Fuel Waste Act**

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**Financing the Management of Nuclear Fuel Waste  
In Support of the Nuclear Fuel Waste Act**

**A Submission to the Nuclear Waste Management Organization by  
Ontario Power Generation, Hydro Quebec,  
New Brunswick Power and Atomic Energy of Canada Ltd.**

**The Joint Waste Owners (Ontario Power Generation, Hydro Quebec,  
New Brunswick Power and AECL) have submitted to NWMO a proposal for financing the  
management of nuclear fuel waste, in response to the requirements laid out in the Nuclear  
Fuel Waste Act.**

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## **FINANCING THE MANAGEMENT OF NUCLEAR FUEL WASTE IN SUPPORT OF THE NUCLEAR FUEL WASTE ACT**

### **1. Introduction**

The purpose of this submission is to address the requirements of Bill C-27 “An Act respecting the long-term management of nuclear fuel waste” as passed by the House of Commons on February 26, 2002 with respect to financing the management of nuclear fuel waste. The Act is cited as the “Nuclear Fuel Waste Act.”

### **2. Nuclear Fuel Waste Act (NFWA) Requirements**

The NFWA contains a number of requirements which relate to financing the management of nuclear fuel waste. These can be segregated into (a) those items requiring actions to be taken upon coming into force of the Act on November 15, 2002; (b) the requirements of the study report as per Section 13 of the Act and (c) the requirements of the annual reports after the date of decision of the Governor in Council. The following parts of this report extract sections from the NFWA dealing with the above requirements and indicates how these have been or will be addressed.

#### **2.(a) Actions upon coming into force of NFWA**

The following sections of the Act required actions upon coming into force of the Act. They relate primarily to the establishment of and contributions to the trust funds.

The Act states:

- 9.(1) Each nuclear energy corporation and Atomic Energy of Canada Limited shall maintain in Canada, either individually or jointly with one or more of the other nuclear energy corporations or Atomic Energy of Canada Limited, one trust fund with a financial institution incorporated or formed by or under an Act of Parliament or of the legislature of a province.**
- 10.(1) Each body mentioned in this subsection shall, either directly or through a third party, no later than 10 days after the day on which this Act comes into force, deposit to its trust fund maintained under subsection 9(1) the following respective amounts:**
- (a) Ontario Power Generation Inc, \$500,000,000;**
  - (b) Hydro Quebec, \$20,000,000;**
  - (c) New Brunswick Power Corporation, \$20,000,000; and**
  - (d) Atomic Energy of Canada Limited, \$10,000,000.**
- 10.(2) Each body mentioned in this subsection shall in each year, either directly or through a third party, no later than the anniversary of the day on which this Act comes into force, deposit to its trust fund maintained under subsection 9(1) the following respective amounts:**
- (a) Ontario Power Generation Inc, \$100,000,000;**
  - (b) Hydro Quebec, \$4,000,000;**
  - (c) New Brunswick Power Corporation, \$4,000,000; and**
  - (d) Atomic Energy of Canada Limited, \$2,000,000.**
- 10.(3) Subsection (2) ceases to apply on the day on which the Minister approves the amount of the deposit under paragraph 16(3)(a).**

- 10.(5) Each body mentioned in subsection (1) or (2) shall, either directly or through a third party, deposit to its trust fund maintained under subsection 9(1), no later than 30 days after the date of the decision of the Governor in Council under Section 15, the applicable amount referred to in subsection (1) or (2) plus an amount, if any, equal to the interest.**

Actions taken by the waste owners to satisfy the above requirements are as follows:

- 9.(1) All nuclear energy corporations and AECL have established trust funds in compliance with this requirement
- 10.(1) Initial deposits as specified have been made by all bodies
- 10.(2) Subsequent deposits as specified have been made by all bodies
- 10.(3) and 10.(5) No actions required at this time. Deposit specified will be made after the date of decision of the Governor in Council.

**2.(b) Study report requirements per Section 13 of NFWA**

The financial aspects of the study report which is to be submitted by November 2005 are in accordance with Section 13 of the Act.

The Act states:

- 13.(1) The study must set out, with respect to each proposed approach, a formula to calculate the annual amount required to finance the management of nuclear fuel waste. The report must explain the assumptions behind each term of the formula. The formula must include the following terms:**
- (a) the estimated total cost of management of nuclear fuel waste, which must take into account natural or other events that have a reasonable probability of occurring;**
  - (b) the estimated rate of return on the trust funds maintained under subsection 9(1);**
  - (c) the life expectancy of the nuclear reactors of each nuclear energy corporation and of Atomic Energy of Canada Limited; and**
  - (d) the estimated amounts to be received from owners of nuclear fuel waste, other than nuclear energy corporations and Atomic Energy of Canada Limited, in return for services of management of nuclear fuel waste.**
- 13.(2) The study must set out, with respect to each proposed approach, the respective percentage of the estimated total cost of management of nuclear fuel waste that is to be paid by each nuclear energy corporation and Atomic Energy of Canada Limited, and an explanation of how those respective percentages were determined.**
- 13.(3) The study must set out the form and amount of any financial guarantees for the management of nuclear fuel waste that have been provided by the nuclear energy corporations and Atomic Energy of Canada Limited under the Nuclear Safety and Control Act.**

The above requirements are satisfied as follows:

13.(1) The annual amount required to finance the management of nuclear fuel waste is taken as the sum of two components:

- (i) the annual amount required to be contributed to the trust funds set up in accordance with Section 9 (1) of the Act
- (ii) the annual amount required to be provided to the NWMO to fund their activities prior to receipt of a Construction Licence

The primary factors contributing to the determination of these amounts are in response to Sections 13.(1) (a) to (d) and 13.(2).

- (a) The estimated total cost of management of nuclear fuel waste for those approaches defined in the NFWA is as set out in the summary cost estimate reports. These reports include:
  - (i) Cost of Alternative Approaches for the Long-Term Management of Canada's Nuclear Fuel Waste – Deep Geologic Disposal Approach Rev 01 dated March 2004
  - (ii) Cost of Alternative Approaches for the Long-Term Management of Canada's Nuclear Fuel Waste – Centralized Extended Storage Facility Approach Rev 02 dated March 2004
  - (iii) Cost of Alternative Approaches for the Long-Term Management of Canada's Nuclear Fuel Waste – Reactor-Site Extended Storage Approach Rev 00 dated January 2004

These reports provide cost estimates for a range of potential fuel bundle quantities derived from a range of potential station lives from 30 to 50 years. This is discussed further in Section 13.(1)(c) below.

- (b) The cost estimates referenced above contain costs in constant 2002 M\$ and January 2004 present value M\$. The present value calculation is based on a discount rate of 5.75% which assumes a 3.25% real rate of return over a projected long-term average increase in the Ontario Consumer Price Index of 2.5%. This data will be updated after the decision of the Governor in Council as part of preparation of the first Annual Report required after this decision. Historical information available through Statistics Canada and the Bank of Canada shows that the yields of Canada long bonds have exceeded CPI (Ontario) by approximately 4.8% over the past 25 years.
- (c) The expected life of the pressure tubes and in some cases, steam generators and feeders in Candu reactors operating in Canada is a nominal 25 to 30 years and in some cases longer. The life of reactors is dependent on a decision to replace these components. Until such a decision is made, there is uncertainty in the life expectancy of all nuclear reactors. If pressure tubes and steam generators and other components are replaced, it is expected that reactor life will be 50 to 60 years. Given the uncertainty around reactor life, a conservative decision will be made on reactor life at the time of Governor in Council decision based on life extension programs in place or planned at that time. AECL will continue to generate a small amount of research reactor fuel in the future.

- (d) At this time, current cost estimates do not include any allowances for the amount of nuclear fuel waste to be received from waste owners other than OPG, HQ, NBP and AECL. Should this situation arise, it is proposed that new waste owners would contribute an amount per fuel bundle generated based on the full cost of the program on a present value basis. This would include payment for their share of fixed costs already incurred in order to become a member of the Joint Waste Owner (JWO) group of companies (OPG, HQ, NBP, AECL.)
- 13.(2) The percentage of the estimated cost which is to be paid by each nuclear energy corporation and AECL will be largely based on projections of used fuel arisings generated by each waste owner. For DGR and CES, the overall objective is to share actual costs of long-term management based on the number of fuel bundles, ie equal costs for each fuel bundle subject only to owner specific costs such as transportation. For RES, costs would be borne by the waste owner at each specific site. For shared facilities at a given location, costs would be shared based on waste fuel quantities at that location.

Current projected fuel bundles and percentage by waste owner to year end 2005 are as follows:

	<u>Number of Bundles</u>	<u>Percentage</u>
OPG	1,746,410	88.21
NBP	103,436	5.22
HQ	99,245	5.01
<u>AECL</u>	<u>30,682</u>	<u>1.55</u>
<b>Total</b>	<b>1,979,773</b>	<b>100.00</b>

The percentage ownership by waste owner will differ from these in the long term due to differences in end-of-life projections. In addition to CANDU fuel, AECL also has a small amount of research reactor fuel.

Trust fund contributions to be made by each producer will be reviewed as part of the Annual Report required post Governor in Council decision with comprehensive reviews conducted every five years. Contributions will be continually adjusted to reflect improved projections of overall costs and number of fuel bundles to be produced by each waste owner.

- 13.(3) Financial guarantees are provided in accordance with CNSC Regulatory Guide G-206 "Financial Guarantees for the Decommissioning of Licensed Activities". These have been provided by all waste owners but to this point have not been harmonized. Based on recent work conducted by the waste owners it is intended to harmonize financial guarantee values in the future.

Financial guarantees provided by OPG, HQ, NBP and AECL are as follows:

OPG: Effective July 31, 2003, OPG provided the CNSC with a Decommissioning Financial Guarantee which included a guarantee associated with used fuel arising from the operation of OPG owned facilities. The value of the used fuel guarantee required changes over time based of new arisings of used fuel. The guarantee covered a five-year period to year end 2007 and is updated annually by means of an annual report provided to the CNSC. For year 2005, the value of the guarantee for used fuel management is approximately \$4.5B stated in present value as of 01 January 2005. The total guarantee provided to

the CNSC covers management of nuclear waste and station/waste facility decommissioning. The guarantee is satisfied by actual accumulation of funds within segregated funds under the Ontario Nuclear Funds Agreement (ONFA) between OPG and the Province of Ontario, the NFWA trust fund, and a provincial guarantee for the balance. The year 2005 total financial guarantee is approximately 88% funded by the segregated funds/trust fund with the balance of 12% guaranteed by the Province of Ontario.

HQ: Hydro-Quebec has provided to the CNSC a financial guarantee of \$525 million stated in present value as of 01 January 2013. The guarantee is in the form of an expressed commitment of the Province of Quebec to Hydro-Quebec, which provides a continuous guarantee of payment until December 31, 2013. The guarantee covers both decommissioning and used fuel. The total guarantee is made up of \$205M for decommissioning and \$320M for used fuel projected arisings from the operation of Gentilly-2 until 2013.

NBP: NB Power has provided a financial guarantee for the lifetime management of irradiated fuel projected to be produced to the end of Point Lepreau Generating Station's current PROL licence (December 31, 2005). The financial guarantee is based on the present value of future costs to manage this fuel on an incremental fee for service basis. In year 2003, the present value was calculated at \$93.4M and this was fully funded through \$73.4M in the used fuel fund and \$20M in the Nuclear Fuel Waste Act fund. At March 31, 2004 the used fuel fund contained \$76M and the Nuclear Fuel Waste Act fund contained \$24M.

AECL: The AECL financial guarantee is in the form of an expressed commitment by the federal government to the CNSC. No specific dollar values are quoted in the commitment letter.

## **2(c) Annual reports post-government decision**

The government decision and the actions required after a government decision are covered by the following sections of the Act.

The Act states:

- 11.(1) Only the waste management organization may withdraw moneys from a trust fund maintained under subsection 9 (1).**
- 11.(2) The waste management organization may make withdrawals only for the purpose of implementing the approach that the Governor in Council selects under section 15.**
- 11.(3) The waste management organization may make the first withdrawal only for an activity in respect of which a construction or operating licence has, after the date of the decision of the Governor in Council under section 15, been issued under section 24 of the Nuclear Safety and Control Act.**
- 15. The Governor in Council, on the recommendation of the Minister, shall select one of the approaches for the management of nuclear fuel waste from among those set out in the study, and the decision of the Governor in Council shall be published in the Canada Gazette.**

- 16.(1)** The waste management organization shall, within three months after the end of each fiscal year of the organization, submit to the Minister a report of its activities for that fiscal year.
- 16.(2)** Each annual report after the date of the decision of the Governor in Council under Section 15 must include:
- (a)** the form and amount of any financial guarantees that have been provided during that fiscal year by the nuclear energy corporations and Atomic Energy of Canada Limited under the Nuclear Safety and Control Act and relate to implementing the approach that the Governor in Council selects under Section 15;
  - (b)** the updated estimated total cost of the management of nuclear fuel waste;
  - (c)** the budget forecast for the next fiscal year;
  - (d)** the proposed formula for the next fiscal year to calculate the amount required to finance the management of nuclear fuel waste and an explanation of the assumptions behind each term of the formula; and
  - (e)** the amount of the deposit required to be paid during the next fiscal year by each of the nuclear energy corporations and Atomic Energy of Canada Limited, and the rationale by which those respective amounts were arrived at.
- 16.(3)** The formula referred to in paragraph (2)(d) and the amount of each deposit referred to in paragraph (2)(e) are subject to the approval of the Minister when proposed in:
- (a)** the first annual report after the date of a decision of the Governor in Council under Section 15 or subsection 20(5); and
  - (b)** the first annual report after the issuance, under Section 24 of the Nuclear Safety and Control Act, of a construction or operating licence for an activity to implement the approach that the Governor in Council selects under Section 15.
- 16.(4)** If the Minister
- (a)** is not satisfied that the formula referred to in Paragraph (2)(d) will provide sufficient funds to implement the approach that the Governor in Council selects under Section 15.
  - (b)** is not satisfied that the amount of each deposit referred to in Paragraph (2)(e) is consistent with the formula referred to in Paragraph (2)(d).
- the Minister shall refuse to give the approval referred to in subsection (3) and shall direct the waste management organization to revise the relevant portions of the annual report and submit the revised annual report to the Minister within 30 days.
- 17.(1)** Each nuclear energy corporation and Atomic Energy of Canada Limited shall, either directly or through a third party, deposit to its trust fund maintained under subsection 9(1) its respective deposit specified in the annual report.



- (a) **if the Minister's approval under subsection 16(3) is not required, within 30 days after the annual report is submitted to the Minister under subsection 16(1); or**
- (b) **if the Minister's approval under subsection 16(3) is required, within 30 days after the date of that approval.**

The above requirements will be satisfied as follows:

11.(1), (2), (3) Withdrawals from the trust funds will be in accordance with this section.

15. The decision by the Governor in Council initiates activities required on the annual reports per subsection 16.(2)

16.(1) Annual reports will be submitted to the Minister by the NWMO within three months of fiscal year end.

16.(2)

- (a) The annual report to the Minister will provide details on financial guarantees required by waste owners and how these guarantees have been provided by each waste owner for that fiscal year. The report will relate to implementing the approach selected by the Governor in Council.
- (b) Cost estimates will be reviewed on an annual basis and updated where material changes have occurred and fully updated on a five-year cycle. The initial Annual Report will update the cost estimates referenced in 13.(1)(a) to capture details of the selected approach.
- (c) The budget forecast for the next fiscal year will be the NWMO budget for the coming year to move forward on the selected approach. Owner specific costs related to ongoing storage at owner sites will be the responsibility of each waste owner's budget, and not the NWMO.
- (d) The proposed formula for the next fiscal year would cover the (i) ongoing annual costs plus (ii) program costs covered by the trust fund.
  - (i) Ongoing annual costs would be shared by all waste owners based in part on total fuel bundle quantities projected to be generated by each waste owner. At this time, ongoing costs are covered by a Membership Agreement between OPG, HQ and NBP. AECL participation would need to be added for the next phase of the program after 2005.
  - (ii) Trust fund contributions would be based on fuel ownership projections by waste owner for shared costs and direct payment by waste owner for owner specific costs. This would be in accordance with requirements in section 13. Results would be covered under 16.(2)(e).
- (e) The amount of the deposit for the next fiscal year would be the result of applying the formula in (d) to the updated estimated cost and fuel arisings to arrive at the deposits required to the trust funds.

16.(3)

- (a) The first annual report after the date of decision is the first opportunity for Minister approval of the deposits after decision of Governor in Council. Approvals prior to this were for the formula only.

- (b) The first annual report after the issuance of a construction or operating licence would be an opportunity for Minister approval of a formula for additional deposits if required at the point of initiation of withdrawals from the trust funds.
- 16.(4) If approval is withheld, the re-submission process will follow this direction.
- 17.(1) The timing for contributions to the trust fund is based on annual report submission and Minister approval requirements. The Annual Report is due three months after fiscal year end and contribution within 30 days after that unless Minister approval is required which would prolong that period. This has particular application in the period between the initial Section 10 contributions and initial contributions post-government decision.