Funding the perpetual care of nuclear waste management sites – A brief review

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Introduction

During the Fall 2013 Panel hearings relating to Ontario Power Generation's (OPG) proposed Deep Geological Repository for nuclear waste, it became evident there was still confusion relating to how perpetual care costing may be properly undertaken. For this reason, the Panel required that the Canadian Environmental Law Association provide examples of suggested methodologies for estimating cost for perpetual care for long-term undertakings. This document attempts to fulfill this request by providing a preliminary roadmap of different costing methodologies. It does so by proposing four references of particular relevance that the Panel may consider in its deliberations.

Ultimately, it is our contention (as well as the assertion of many others, including the referenced reports) that the appropriate costing of long-term nuclear waste storage – as well as the storage of other long-term wastes – is still in its infancy. For this reason, the suggested reports provide relevant guidelines and suggestions, but cannot provide either a definitive answer or even a formula that will lead to a definitive answer. In such situations the precautionary principle must be invoked, so as to ensure that to the greatest extent possible the costs of past decisions and actions are not unfairly borne by the many future generations to come. We hope the reviewed reports serve to highlight this point as well as provide a set of first steps towards ensuring the necessary resources are set aside to ensure the safe storage of nuclear waste in perpetuity.

Report 1 – Principles of Perpetual Care: The Giant Mine, Yellowknife, Northwest Territories (Raffensperger et al. 2011)

This report was prepared for Alternatives North for submission to the Mackenzie Valley Environmental Impact Review Board. It focuses on the long-term care of an abandoned gold mine near Yellowknife, NWT, which could be toxic for over 250,000 years.
The authors set out principles for caring forever for contaminated sites. They describe how these principles can be applied to various components of perpetual care, including financial mechanisms.

Although the report was developed for the Giant Mine and uses the mine as an example, the principles are adaptable to various contaminated sites and can be used as a flexible tool for communities struggling with a legacy of toxic or radioactive sites. Near the end of the report, some helpful questions for communities and decision makers are provided that encourage problem solving on various components of perpetual care, including financial mechanisms. The Joint Review Panel for the DGR Project can use this report as a helpful guide when evaluating OPG's costing model for care in perpetuity. OPG can also use the report as a guide in designing their funding approach.

Report 2 – Giant Mine Perpetual Care Funding Options (Taylor and Kenyon 2012)

This report was prepared for Alternatives North and Yellowknives Dene First Nation for submission to the Mackenzie Valley Environmental Impact Review Board. The report identifies and evaluates perpetual care funding options and makes recommendations on funding for the long-term care and maintenance (perpetual care requirements) for the Giant Mine in Yellowknife, NWT.

In addition to a thorough review of the Canadian system for the perpetual care of the Giant Mine site, the report presents details on a number of domestic and international examples of long-term funding programs. The Nuclear Waste Management Organization is one domestic example provided in order to demonstrate funding options for remediating and addressing the perpetual care needs of contaminated sites. An overview of the example is provided along with details on the perpetual funding requirements, plans and the strengths and limitations of the funding plans.

The review of domestic and international examples leads up to a set of criteria for evaluating perpetual care funding options. The Joint Review Panel can apply these criteria in evaluating OPG's costing model for the perpetual care of the DGR Project. OPG can also use these criteria in designing their funding approach.

Report 3 – The Theory and Practice of Perpetual Care of Contaminated Sites (Kuyek 2011)

This report was prepared for Alternatives North for submission to the Mackenzie Valley Environmental Impact Review Board regarding the environmental assessment of the Giant Mine in Yellowknife. The report is also intended for broader public distribution and discussion. It focuses on the long-term care of Giant Mine in Yellowknife, which as of 2010 had 237,000 tonnes or arsenic trioxide requiring long-term care. It does so through a series of 9 cases that include a review of the literature, and interviews with stakeholders from affected communities as well as the agencies responsible for managing the wastes.

The report provides a list of lessons learned relating to the long-term management of wastes, including: concerns of building trust and community involvement; maintaining control of access in the long-term (e.g. up to 10,000 years for a pilot project in New Mexico); ensuring that the responsible organization embodies the ideal characteristics for long-term care; maintaining public records for the indeterminate future; ensuring proper inspection and analysis; ensuring proper maintenance; planning for emergencies; ensuring funding mechanisms in limited growth economies; and taking an intergenerational perspective to the equity and fairness of passing off long-term wastes onto future generations.

The report may be of benefit to the Joint Review Panel in two ways. First, it describes a set of important themes and issues that must be considered in the assessment of OPG's approach to care in perpetuity of the nuclear waste. Second, the report provides some critical discussion of various funding approaches to perpetual care and contextualizes

them within relevant broader political and economic dynamics. Finally, as noted by the authors,

> *"There is also a significant similarity between the long term threat from the stored Giant arsenic and nuclear wastes: the most serious contamination from both is colourless, tasteless and odourless, and may cause total system failure to humans on exposure. Both can be absorbed through ingestion, inhalation and through the food chain. Unlike sites where toxins remain ugly, smelly or oozing after initial cleanup, the dangers from radiation or arsenic trioxide will not be immediately evident to those exposed" (p. 2).*

Report 4 – Financial Assurance Guideline (MOE 2011)

These Guidelines were prepared by the Ontario Ministry of the Environment (MOE) to ensure appropriate environmental protection in Ontario. The Guidelines attempt to address all the relevant financial considerations relating to compliance with environmental objectives and deadlines, and ensuring funds are available for future cleanup, decommissioning, remediation, etc. of contaminated sites requiring long-term monitoring. The Guidelines provide a relevant discussion of the various forms of financial assurance allowed by the MOE, as well as the means by which the amount of required financial assurance can be calculated.

The Guidelines are relevant for the Joint Review Panel as they relate to the management of contaminated sites in Ontario. However, the Guidelines do not explicitly address the perpetual care of nuclear and other radioactive wastes, although they do include perpetual care within their mandate. The funding calculations may provide perhaps a floor to the anticipated financial costs of perpetually caring for the proposed DGR.

References

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