ISSUE REPORT

SOS GREAT LAKES

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ACCIDENTS, MALFUNCTIONS, MALEVOLENT ACTS, AND RELATED CONTINGENCY PLANS: THIRTY EXAMPLES OF FAILURE TO PROPERLY CONSIDER

Governing Documents

The Canadian Environmental Assessment Act (CEAA) 19(1), the Joint Review Panel Terms of Reference (JRP TOR) (Part IV (a) and (b)) and Section 12 of the Environmental Impact Statement Guidelines (EIS) require the identification and description of the probability of possible accidents, malfunctions, malevolent acts, and related contingency plans associated with the DGR 1 project, and the potential adverse environmental effects of these events.

Section 12 of the EIS Guidelines require:

> Early in the conduct of the environmental assessment, the accidents and malfunction scenarios to be considered in the environmental assessment will be subject to review and acceptance by the joint review panel or its technical support staff. Expected scenarios include, but are not limited to, container collapse/failure, and various degrees of barrier loss including total loss of barrier.
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> The proponent must describe:
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> • Specific malfunction and accident events that have a reasonable probability of occurring during the life of the project, including an explanation of how these events were identified for the purpose of this environmental assessment;
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> • Source, quantity, mechanism, rate, form and characteristics of contaminants and other materials (physical, chemical and radiological) likely to be released to the surrounding environment during the postulated malfunctions and accidents and the effect this will have on the environment and health and safety of the nuclear energy worker and the general public; and
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> • Any contingency, clean-up or restoration work in the surrounding environment that would be required during, immediately following, or in the longer term following the postulated malfunction and accident scenarios during, immediately following, or in the longer term following the postulated malfunction and accident scenarios.

Identification, Screening and Evaluation of Events

The JRP failed to ensure compliance with the Governing Documents by failing to require OPG to:

1. Identify, describe, and evaluate a sufficient quantity or quality of possible initiating events across the broad range of activities on and off the site during the site preparation, construction, operation, and decommissioning phases;

2. Consider the broad range of accidents and malfunctions that were possible during the post-closure period;

3. Consider radiological and non-radiological accidents and malfunctions separately (the JRP also did not hear evidence about cumulative effect);

4. Provide sufficient rationale for the screening process of possible malfunctions or accidents. Initiating events were eliminated that were indeed 'possible'; and, events that were not likely to occur on an annual basis were held to be, 'not credible';

5. Conclude that the following were 'unlikely or non-credible' events: ILRW package drop/hit, indoor fire, inadequate package sealing, major vehicle accident, container failure, cage fall, criticality, rock fall/rock burst, severe rainfall, severe snowfall, severe snow/ice, tornado, flooding above ground or below ground, external fire, aircraft crash, or meteor impact (all from page 8-2 EIS). The testimony had identified many high or low level potential accidents and malfunctions that would likely result in radiological and non-radiological contamination, due to single or multiple failures, with cumulative effects;

6. Identify and evaluate failures in systems and safety culture as possible cause of malfunctions or accidents over the life of the project;

7. Consider only the conventional non-radiological bounding events of spill and explosion (JRP Report 10.2.2 p 228). The evaluation of explosion did not include explosion during the operational or decommissioning phases, although testimony was given indicating the potential for explosion during operations and decommissioning;

8. Consider precedent-setting international failures of other DGRs in the assessment of unplanned events;

9. Consider possible initiating events across a broad range of activities that could occur during the phase of expansion of the DGR to accommodate decommissioning waste, or the potential cumulative effect of accidents and malfunctions of one project on the other;

10. Present evidence that unplanned events already proven to be credible events at the Bruce Nuclear Station could cause possible cumulative effects at the DGR;

11. Compare the environmental effects resulting from malevolent acts with the effects identified for accidents and malfunctions involving the DGR;

12. Provide sufficient quantitative or qualitative information on all radioactive, and all hazardous substances (including combinations of low level radiation and high level radiation) that could be

released to the environment, or other environmental effects that could be caused by accidents, malfunctions, or malevolent acts; and

13. Identify "magnitude, geographic extent, timing and duration, frequency and degree of irreversibility (are) combined to identify environmental consequence" (EIS Section 7.8.3) as a result of accidents, and malfunctions.

Safeguards, Accident Management, and Contingency Protocols

The Governing Documents also required a description of the safeguards that have been established by the proponent to protect against such occurrences and the contingency procedures and protocols to mitigate damage should they occur. Section 12 of the Guidelines also referred to accident management, typically relying heavily on the evacuation of personnel and of the population, as required. OPG was required to demonstrate that the requirements for adequate infrastructure external to the DGR site are met. The need for any necessary administrative measures was also required to be identified together with the responsibilities of organizations other than the OPG.

The JRP did not have sufficient evidence to find that safeguards had been designed or established, or that contingency procedures and protocols had been designed or established, especially since so few unplanned events had been identified by the proponent as 'probable'.

Examples include:

1. Disregard of cumulative effects of multiple events occurring simultaneously in combination, or one after the other;

2. The lack of adequate accommodation of total damaging effects of radionuclide content of waste;

3. Lack of provision for safeguards in overlapping phases of DGR development on site;

4. The lack of understanding of the overall geomorphology, direct and indirect hazards of process, that prevent the development of safeguards during the EIS process;

5. Limiting the substance of mitigation and safeguards to existing and enhanced practices, without emergency planning being laid out in relation to a full range of initiating events of varying degrees of significance;

6. No evidence that the responsible authorities that were identified are able to or have agreed to respond to the range or severity of emergencies on the site. Environment Canada notes that no spill response plan was submitted, nor was downstream effect mitigation or accident probability discussed. Environment Canada indicated that effluents from potential spills would have to be treated. Recommendations included a detailed spill plan and a plan to reduce potential for underground vehicular traffic accidents. Malfunction and Accident implementation measures are to be overseen by the Canadian Nuclear Safety Commission (CNSC). (JRP Report p. 233);

7. Evacuation through one or two shafts in case of emergency underground is not suitably explained for short or long term duration events, including all events radioactive and non-radioactive. This insufficiency is acute when one considers the potential addition of area to the DGR 1 for the purposes of expansion of decommissioning waste, and the expansion to suit additional of 200,000 cubic metres of added waste and area to the DGR 1 as designed. (The EIS and hearing evidence indicated that no further evacuation shafts are to be planned.);

8. Accident, malfunction, and malevolent act scenarios were not developed for underground evacuation;

9. Population evacuations were not investigated for unplanned event scenarios for radioactive or non-radioactive release situations, or for other events involving fire, explosion, contamination of air, land and or water;

10. Administrative and organizational scenarios were not prepared for EMS over each identified scenario or other scenarios, including transfer of responsibility (change) over time from one party or jurisdiction to another, temporal response chain or other required action through OPG, private contractor, municipal, county, provincial, federal or other response mechanisms for events including fire, explosion, decontamination, or emergency medical procedures;

11. No evidence that agreements have been reached between agents who would be responsible for emergency actions and mobilization on site, including overall responsibility or fiscal responsibility for emergency management on or off site;

12. OPG provided no description of the combined Emergency Management systems that would be required across the DGR, Western Waste Management Facility, Hydro Corridor and Bruce Nuclear Site, or how emergencies affecting water would be handled;

13. No emergency plans were included in the EIS. There was no demonstration that agreements have been reached, or processes defined or established for immediate or follow-on mitigation, repair, clean up or restoration due to potential malfunctions, accidents, malevolent acts, or unplanned events affecting one or multiple valued ecosystem components;

14. Contingency planning was wrongly limited to unplanned incidents, accidents and malevolent acts in the “pre-closure period”, and through recommendations to be addressed by OPG and/or the federal regulator in the future;

15. Section 4.4 of the Malfunctions, Accidents and Malevolent Acts Technical Support Document (OPG 2011) identifies select issues and measures that one would reasonably expect to be addressed and included in contingency plans, but does not include the plan or plans;

16. The JRP made at least four information requests of the OPG concerning contingency planning. OPG’s answers were not responsive; and

17. Further evidence of OPG’s deferral of contingency planning into the future is found in the OPG response to IR EIS-06-235, in which OPG states: Adaptive management will be incorporated into the EA follow-up plan for the decommissioning phase by including contingency procedures and plans to comply with/conform to regulatory standards or guidelines that are applicable at the time of decommissioning.

Summary

The JRP failed to require that OPG to fulfil the requirements of the Governing Documents, as evidenced by the 30 examples cited above. Instead, the JRP wrongly delegated most of the decisions to either the CNSC or OPG itself.

· Recommendation 10.1: OPG shall implement the mitigation measures and contingency plans identified in Table 5.3.3-1 and Section 5.5 of the Malfunctions, Accidents and Malevolent Acts Technical Support Document to the satisfaction of the CNSC, during site preparation, construction, and operations.

· Recommendation 10.2: In order to avoid significant adverse environmental effects, including effects to fish or fish habitat, due to malfunctions, accidents or malevolent acts, OPG shall develop and implement a detailed spill response plan for all phases of the project. The spill plan must be acceptable to the CNSC and include an assessment of containment methods, locations and strategies to demonstrate that spill mitigation will be deployed in time to prevent downstream effects.

· Recommendation 10.3: OPG shall develop and implement a plan, prior to site preparation, to reduce the likelihood of underground vehicular traffic accidents and rockfall accidents to the satisfaction of the CNSC;

· Recommendation 10.4: OPG shall implement the mitigation measures and contingency plans identified in Section 4.4 of the Malfunctions, Accidents and Malevolent Acts Technical Support Document, to the satisfaction of the CNSC; and,

· Recommendation 10.7: To the satisfaction of the CNSC, OPG shall seek and apply operational experience gained from malfunctions and accidents at international repositories, including but not limited to the WIPP, in its contingency, mitigation and other planning processes, during all phases of the project.

Malevolent Acts

Section 12 of the Guidelines also required OPG to address potential environmental effects that could result from intentional malevolent acts. While intentional malevolent acts are not accidents, OPG was required to compare the environmental effects resulting from malevolent acts with the effects identified for accidents and malfunctions involving the DGR. OPG did not evaluate this subject in a thorough manner and the JRP did not require OPG to correct the error.