



January 14, 2013

To: Louise Levert, Secretariat, Canadian Nuclear Safety Commission, E-mail: interventions@cnscccsn.gc.ca

And To: Sierra Club Atlantic (New York) Chapter

RE: CNSC invitation of December 14, 2012 Ref. 2012-H-09

During the December 3-6, 2012 public hearing on the draft environmental assessment (EA) screening report for the proposed Ontario Power Generation (OPG) Darlington refurbishment project, the Canadian Nuclear Safety Commission accepted the undertaking from Environment Canada to provide a written confirmation of its conclusion that it is not necessary for OPG to submit a notification under article 5 of the *Canada-US Air Quality Agreement* (AQA or Agreement). The Commission also accepted Sierra Club's request for an opportunity to respond. We thank the Commission for this opportunity.

This is Sierra Club Canada and Ontario Chapter's preliminary response to Environment Canada's submission. We observe that Environment Canada fails to provide the basis for its legal and factual conclusions. SCC requests that Environment Canada be directed to disclose and produce any documents, agreements, protocols or other understandings that may support on the scope of the AQA and the adequacy of Atmospheric TSD report. The AQA is applicable to this proceeding, including for the reasons outlined by SCC below.

1. BACKGROUND – Notification Requirements under the AQA

1.1 AQA contains General Obligations

Sierra Club Canada disputes that the AQA is limited to dealing with so-called common pollutants. While it is true that there is an Annex concerning specific objectives respecting Sulphur Dioxide and Nitrogen Oxides, there are also general obligations. The general objective of the Agreement as set out in Article III is "to control transboundary air pollution between the two countries". To this end, the Parties "shall", in accordance with Article V, undertake environmental impact assessment, prior notification, and, as appropriate, mitigation measures.¹ As set out below, the new *2012 Great Lakes Water Quality Agreement* requires not only notification, but also a response.

¹ AQA, Article III - General Air Quality Objective

1.2 AQA Includes Tritium

Moreover, the definition of transboundary air pollution is not limited to common pollutants associated with Acid Rain. Transboundary air pollution is broadly defined: "Transboundary air pollution" means air pollution whose physical origin is situated wholly or in part with the area under the jurisdiction of one Party and which has adverse effects, other than effects of a global nature, in the area under the jurisdiction of the other Party.²

Further, and finally, no distinction in definition or treatment is made in the Agreement between a common, hazardous or toxic air pollutant. According to the AQA, air pollution "means the introduction by man, directly or indirectly, of substances into the air resulting in deleterious effects of such a nature as to endanger human health, harm living resources and ecosystems and material property and impair or interfere with amenities and other legitimate uses of the environment, and "air pollutants" shall be construed accordingly."³

According to the AQA 2012 Report respecting Consultation and Notification Concerning Significant Transboundary Air Pollution, the Parties' joint efforts are not limited to common pollutants: "The United States and Canada initiated notification procedures in 1994, to identify potential new sources and modifications to existing sources of transboundary air pollution within 100 kilometers (62 miles) of the border. Additionally, the governments can provide notifications for new or existing sources outside of the 100 km region if they believe there is potential for transboundary air pollution. Since the publication of the last Progress Report in 2010, the United States has notified Canada of three additional sources for a total of 64 U.S. notifications. Canada has notified the United States of three additional sources, for a total of 58 Canadian notifications."⁴

We say, and OPG admits, Tritium is a substance emitted from nuclear facilities that causes air pollution resulting in deleterious effects that endanger human health and the environment.

1. The general objective of the Parties is to control transboundary air pollution between the two countries.

2. To this end, the Parties shall: 1. in accordance with Article IV, establish specific objectives for emissions limitations or reductions of air pollutants and adopt the necessary programs and other measures to implement such specific objectives; 2. in accordance with Article V, undertake environmental impact assessment, prior notification, and, as appropriate, mitigation measures; 3. carry out coordinated or cooperative scientific and technical activities, and economic research, in accordance with Article VI, and exchange information, in accordance with Article VII; 4. establish institutional arrangements, in accordance with Articles VIII and IX; and 5. review and assess progress, consult, address issues of concern, and settle disputes, in accordance with Articles X, XI, XII and XIII.

² AQA, Article 1.2

³ AQA, Article 1.1

⁴ Transboundary notification information is available on the government websites of each country at www.epa.gov/ttn/gei/uscadata.html for the United States and www.ec.gc.ca/Air/default.asp?lang=En&n=9C1DAE11-1 for Canada.

1.3 AQA Requires Notification

Because substances such as tritium are likely to cause significant transboundary air pollution⁵, Article V requires that the Parties “shall” undertake environmental impact assessment, prior notification, and, as appropriate, mitigation measures.⁶ Moreover, notification and consultation is required where the parties recognize that the air pollution is of joint concern.⁷ The Parties recognize that the air pollution from nuclear facilities is of joint concern.

The 1991 Great Lakes Science Advisory Board Report to the International Joint Commission at section 11.3.1 on the Siting Nuclear Reactors on Drinking Water Reservoirs identified that the concern is threefold: 1) low level emissions as a result of operational spills, 2) the possibility of major emissions from a catastrophe comparable to that at Chernobyl, and 3) the implications of the aging and obsolescence of a plant and its infrastructure. Indeed, we feature the issue of aging concrete integrity in our submissions.

The Board concludes that there is a need to address: a binational energy policy for the Great Lakes basin, with a view to the ecological implications of the various options, including conservation. Nuclear energy and fossil fuel options should be reevaluated to assess the ecological implications relative to the Great Lakes Basin Ecosystem, together with the issues of risk assessment and risk perception.

We echo this recommendation in our submissions that the IJC Nuclear Task Force also compile a public inventory of proposed licensing applications for new and extended nuclear facilities. This list of licensing applications should be maintained and updated on a public registry, to enable meaningful cumulative impact and risk assessment.

1.4 2012 Great Lakes Water Quality Agreement Requires Notification and Response

The most recent expression of this joint concern is contained in the 2012 *Great Lakes Water Quality Agreement*. Notification and Response is required where planned activities concerning, *inter alia*, nuclear facilities, could lead to a pollution incident or could have significant cumulative impact on the Great Lakes.⁸ Contrary to Environment Canada’s unsubstantiated position, the proposed facility does meet the

⁵ “How NOT to Extend the Life of Aging Nuclear Reactors in Ontario”, SCC, 2012, <http://www.sierraclub.ca/en/node/5357> and “Sierra Club Canada Submission To The Darlington New Nuclear Power Plant Project Joint Panel”, SCC 2011, <http://www.sierraclub.ca/en/publications/sierra-club-canada-submission-darlington-new-nuclear-power-plant-project-joint-panel>

⁶ AQA, Article V - Assessment, Notification, and Mitigation - 1. Each Party shall, as appropriate and as required by its laws, regulations and policies, assess those proposed actions, activities and projects within the area under its jurisdiction that, if carried out, would be likely to cause significant transboundary air pollution, including consideration of appropriate mitigation measures.

⁷ AQA, Article V Assessment, Notification, and Mitigation, 6. If either Party becomes aware of an air pollution problem that is of joint concern and requires an immediate response, it shall notify and consult the other Party forthwith.

⁸ AQA, Article 6, Notification and Response(c) the Parties shall notify each other, through the Great Lakes Executive Committee, of planned activities that could lead to a pollution incident or that could have a significant cumulative impact on the Waters of the Great Lakes, such as: (i) the storage and transfer of nuclear waste or radioactive materials...(vi) nuclear facilities...”.

notification criteria of the AQA, requiring OPG to complete and return to Environment Canada the notification application form.

1.5 Scope of Environmental Assessment

Further, we say the Agreement requires an independent, comprehensive and public environmental impact assessment. The regional study area in OPG's EIS respecting the Atmosphere is inappropriately limited to 1 KM into Lake Ontario.⁹ As set out in the original CNSC Scoping Information Document, the geographic scope was to encompass the areas of the environment that could reasonably be expected to be affected by the Project, or which may be relevant to the assessment of cumulative environmental effects. This direction continues to be unfulfilled.

2. Environment Canada's Analysis

Based on Environment Canada's narrow, inadequately documented and clearly unreasonable interpretation of the AQA's general objectives and notification criteria outlined above, it provided a purported factual foundation to conclude that there is "unlikely to be a significant transboundary air pollution issue". It relied upon the analysis contained in the Atmospheric TSD. Instead of disclosing that the scope of that assessment was limited to non-radiological emissions, it baldly concluded that the TSD:

"provided the results of air dispersion modeling conducted in order to determine emission levels from the Darlington nuclear plant. The results of the air dispersion modeling predicted that the Environment concentrations of steam generator chemicals evaluated in air at the closest sensitive receptors for all modeled parameters were less than 60% of their respective 24 hour criteria and less than 4% of their respective derived annual criteria. The modeling predicts that steam generator chemicals are not being released in quantities to be considered significant locally and therefore the emissions are unlikely to be a "significant transboundary air pollution" issue."

2.1 SCC provides a number of responses to this submission.

2.1.1 The Atmospheric TSD only considers the non-radiological environmental components of Air Quality.¹⁰ While we are concerned about the likely increase in common pollutants associated with this proposal, we have focused our submissions on Tritium as a test case.

2.1.2 The only potential source of air pollution the TSD considered related to exhaust from steam generation. This narrow assessment fails to consider both land-based and atmospheric inputs from leaks, accidents and other general operations such as the Active Ventilation System and Active Plant Drainage

⁹ SCC/SCO Submissions Highlights and p.33; also see Atmospheric Environment Technical Support Document, Darlington Nuclear Generating Station Refurbishment and Continued Operation Environmental Assessment," December 2011, "Atmospheric TSD".

¹⁰ Atmospheric TSD, 1.3 Scope of the Atmospheric Environmental Component... "Environment component addresses only the non-radiological air quality; the radiological air quality is addressed in the Radiation and Radioactivity Environment component." Sierra Club has already made detailed and critical submissions on the Radiation TSD, see *supra* fn. 4, Highlights and pgs. 24-27.

Systems.¹¹ The significant 2009 Tritium Spill, for example, released water containing 44,807,000 Bq/L (1,211 µCi/kg) of Tritium and 58.8 mg/kg of hydrazine. In any event, at 3.1.2 Air Quality (non-radiological) of the TSD, it is reported that “There are no MOE annual AAQCs for the non-radioactive chemical substances that may be released to the atmosphere from the steam generators at DNGS.”

Despite low and non-existent standards, accidents and the huge range of likely endangerment activities outlined for the project in Annex 1 below, OPG declares: “Because there are no likely effects of radioactivity on humans, no mitigation measures are Identified”, see 5.7.6 Mitigation Measures, OPG’s EIS.

2.1.3 We were unable to locate the Emission Summary Dispersion Modelling (ESDM) Report prepared in support of the DNGS Certificate of Approval (OPG 2011), referenced in APPENDIX B, AIR QUALITY MODEL PARAMETERS, of the Atmospheric TSD, and mentioning Tritium but without any context or data.

3. Conclusion

Environment Canada has failed to provide adequate disclosure and production of the information relied upon in this Atmospheric TSD and in support of its narrow interpretation on the scope of the AQA Sierra Club Canada requests the opportunity to make further and other submissions when the requested production and any other new and relevant information are provided.

¹¹ According to OPG at 2.5.3.1, gaseous emissions at DNGS are generated as follows: Radioiodine is a product of fission reactions which is usually contained within the sealed fuel bundle elements. Gaseous radioiodine may escape into the Primary Heat Transport System (PHTS) if a small defect occurs in a fuel element seal, Radioactive noble gases are a product of fission reactions and can also be released to the PHTS if a small defect occurs in a fuel element seal. Noble gases cannot be effectively filtered but strict quality control in the manufacturing and testing of fuel elements has resulted in very low noble gas emissions (such emissions are monitored), Gaseous tritium in the form of tritiated water vapour is produced in heavy water systems that are exposed to the neutron-rich environment of the reactor core when a deuterium atom (heavy hydrogen isotope) in a heavy water molecule absorbs a neutron. Ventilation systems continuously monitor for tritium releases and the heavy water is detritiated in the TRF, and Radioactive particulates are formed as products of fission reactions or by neutron absorption in various materials (called “activation products”) and released to the Reactor Building or Irradiated Fuel Bays atmosphere.

Importantly, OPG’s assessment failed to consider the impacts of the potential release from the dewatering of the reactors because with its assessment model only “long term changes to the site were simulated as opposed to short-term effects that may be associated with dewatering, for example”, see 5.6.3. Yet OPG admits that initial dewatering may result in a temporary increase in radiological emissions from Reactor Building ventilation exhaust and from the RLWMS. As described in Section 2.5.3.1, radioactive airborne emissions are monitored and released through the Active Ventilation System.

Annex 1

Table 5.7-1: Project-Environment Interactions with Likely Measurable Changes in the Radiation and Radioactivity Environment, OPG EIS.

Project Works and Activities	Rationale
REFURBISHMENT PHASE	
Mobilization and Preparatory Works	Preparation of reactor vaults is expected to result in gamma radiation that will interact with the terrestrial and human components of the radiation and radioactivity environment.
Shutdown, Defuelling and Dewatering of the Reactors	Defuelling and dewatering the reactors is expected to interact with all components of the radiation and radioactivity environment through air and water emissions, and gamma radiation.
Construction of Retube Waste Storage and Other Support Buildings	Construction of buildings associated with the Project is not expected to interact with the radiation and radioactivity environment; however, workers will be exposed to radiation that they would not routinely be exposed to.
Removal of Reactor Components and Placement of Wastes into Storage	Removal of reactor components and placement of wastes into storage is expected to interact with all components of the radiation and radioactivity environment through air and water emissions, gamma radiation and alpha radiation.
Transportation of Refurbishment L&ILW to Off-site Waste Management Facility	Transportation of Refurbishment L&ILW to an off-site facility is expected to increase the gamma radiation (in terrestrial environment) and increase the doses to workers and members of the public.
Balance of Plant Repair, Maintenance and Upgrades	Balance of plant repair, maintenance and upgrades is expected to increase the radiation dose to workers.
Refilling, Refuelling and Restarting the Reactors	Refuelling and restarting the reactors is expected to interact with all components of the radiation and radioactivity environment through air and water emissions, and gamma radiation.