



## **BY MAIL AND EMAIL**

Canadian Nuclear Safety Commission  
c/o Louise Levert  
Secretariat  
280 Slater St., P.O. Box 1046  
Ottawa, Ontario K1P 5S9  
E-mail: [interventions@cnsccsn.gc.ca](mailto:interventions@cnsccsn.gc.ca)

April 21, 2010

Dear Ms Levert:

**Re: Request to Intervene regarding an application by OPG for renewal of Licence PROL 04.13/2010, Pickering A Nuclear Generating Station**

Lake Ontario Waterkeeper (LOW) is writing to request to intervene in the May 21, 2010 Canadian Nuclear Safety Commission hearing on Ontario Power Generation's application for a renewal of its operating licence for the Pickering A Nuclear Generating Station (Licence PROL 04.13/2010).

Lake Ontario Waterkeeper (LOW) is a grassroots environmental charity that uses research, education, and legal tools to protect and restore a swimmable, drinkable, fishable Lake Ontario. We are a non-political organization focusing on research and justice issues in the general public interest. LOW has extensive experience working on issues related to the nuclear industry. We have worked in and around the Pickering community for more than eight years, and have knowledge of the local environmental, social, and cultural matters related to the Commission's licencing decision. LOW has presented our research findings to the Commission on a number of occasions in writing and in person, including with respect to the Pickering B NGS, Cameco's Port Hope operations, and nuclear waste management at Port Granby and Welcome. We are a funded participant in the Darlington New Build Environmental Assessment and have commissioned expert scientific reports on the impacts of nuclear power facilities on the environment.

**600 Bay Street, Suite 410. Toronto, ON M5G 1M6**

**T 416-861-1237** [ADMIN@WATERKEEPER.CA](mailto:ADMIN@WATERKEEPER.CA) [WWW.WATERKEEPER.CA](http://WWW.WATERKEEPER.CA)

PROUD MEMBER OF WATERKEEPER ALLIANCE



LOW's concerns with the licencing of Pickering A focus on the plant's impacts on the integrity of Lake Ontario as aquatic and fish habitat, a place for recreation, and a source of drinking water for millions of people. Our specific environmental and procedural concerns are summarized in the attached comment and will be presented by our Counsel, Joanna Bull, to the Commission on May 21, 2010.

Sincerely,

Mark Mattson  
President and Waterkeeper

**600 Bay Street, Suite 410. Toronto, ON M5G 1M6**

**T 416-861-1237 ADMIN@WATERKEEPER.CA WWW.WATERKEEPER.CA**

**PROUD MEMBER OF WATERKEEPER ALLIANCE**

## CONTEXT

Ontario Power Generation Inc. (OPG) has applied to the Canadian Nuclear Safety Commission (CNSC or the Commission) for an amendment to the power reactor operating licence for its Pickering Nuclear Generating Station (NGS) A (Pickering A) located in Pickering, Ontario. The current licence, PROL 04.13/2010, expires on June 30, 2010. OPG has requested a five-year licence term. If granted, the company will have to apply for another licence in 2015 to take the plant to its estimated end of life in 2020.

OPG is seeking a renewal of its licence pursuant to section 24 of the *Nuclear Safety and Control Act* [NSCA], which gives the Commission the authority to issue, renew, suspend, amend, revoke, or replace a licence to operate a nuclear facility. In order to renew OPG's licence to operate Pickering A, the Commission must be satisfied that OPG:

- (a) is qualified to carry on the activity that the licence will authorize the licensee to carry on; and
- (b) will, in carrying on that activity, make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.

**In order to ensure that OPG has made adequate provision for the protection of the environment, the Commission can include any term or condition in the licence that it considers necessary for the purposes of the NSCA.**

The Pickering NGS A facility consists of four nuclear reactors and their associated equipment designed to produce electrical power. OPG has requested that the new operating licence cover Units 1, 2, 3, and 4. Units 1 and 4 are operating, while units 2 and 3 are being placed in a safe storage state. Pickering A sits on the shores of Lake Ontario beside OPG's Pickering B NGS. Both plants rely on a shared once-through cooling system.

OPG applied for and was granted a licence and environmental assessment approval to refurbish the four reactors at Pickering B in 2008. In February 2010, OPG announced that it will not complete a full refurbishment of Pickering B. Instead, the company will spend \$288 million to continue to operate the plant until 2020. OPG predicts that Pickering A could continue to operate, based on the condition of its pressure tubes, until the mid-2020's. However, because Pickering A and B share an interconnected system

**600 Bay Street, Suite 410. Toronto, ON M5G 1M6**

**T 416-861-1237 ADMIN@WATERKEEPER.CA WWW.WATERKEEPER.CA**

**PROUD MEMBER OF WATERKEEPER ALLIANCE**

required for high power output, the company plans to shutdown both plants concurrently in 2020. Despite this linkage, OPG has stated that it may change plans and continue to operate Pickering A's Units 1 and 4 after Pickering B is shutdown if "circumstances dictate" and it is safe and economic to do so. The decommissioning process is expected to take 40 years for Pickering, and site restoration is estimated for 2062.

## COMMENTS

### Cooling water from Pickering A has negative effects on fish and fish habitat.

Pickering A NGS shares a common direct once-through cooling water system with the adjacent Pickering B, also operated by OPG. The attached report by cooling water systems experts, Pisces Conservation Ltd., was prepared for Lake Ontario Waterkeeper in 2009. It provides a comparative overview of the various cooling water technologies available for use in power plants and the environmental impacts associated with each.

In direct once-through cooling systems, water is pumped from a source, like Lake Ontario, via large water inlet channels directly to the plant. After passing via heat exchangers or condensers, the heated water is discharged directly back into the surface water. The heat is transferred from the turbine steam water to the coolant through the wall of the condenser tubes. The Pisces report notes that **once-through cooling water systems, like the one used at Pickering NGS, is the most environmentally damaging of all the alternative technologies.**

In 2008, Pickering B underwent a screening level environmental assessment to determine whether that plant could be refurbished. Information about the impacts of both Pickering A and B on fish and fish habitat contained in the Screening Report indicated that the plants' once-through cooling system has a significant impact on fish through thermal pollution, fish impingement, and fish entrainment.

**Thermal pollution:** Thermal plumes, ice cover, and reduced drinking water quality are potential environmental effects from the operation of the Pickering NGS. Thermal plumes have been shown to attract fish that then suffer cold water shock when leaving the plume

or when the plant is shutdown for outages, causing the fish significant harm.<sup>1</sup> They are also associated with increased longevity and productivity of bacteria and Cladophora algae.

The Pickering B Screening Report stated that increased surface water temperatures can, “accelerate embryo development, alter the timing of emergence, growth and downstream migration of juveniles, reduce metabolic efficiencies of food conversion into growth (i.e. due to thermal stress and oxygen deficiency), alter adult spawning migration and spawning timing, increase susceptibility to disease and shift the competitive advantage of salmonoids over non-salmonoid species”. Sinking plumes in winter may affect whitefish egg and larvae, and “thermal effects of the PNGS effluent may affect the physiology of fish”. The combined thermal plume from Pickering A and B in operation ranges from 150 to 800 hectares at the water surface year round, and 50 to 300 hectares at the bottom during cold weather.

**Fish health:** Fish impingement occurs when larger organisms, including fish, are sucked against intake screens and deposited in the “screenhouse trash bin”. Entrainment occurs when smaller organisms like fish eggs are sucked through the debris screen and killed within the cooling system. According to the Pickering B Screening Report, an estimated 5531 kg of fish are impinged and entrained as part of operations at Pickering each year, but the actual amount may be 2.5 times higher. In its decision to approve the Screening Report for the Pickering B refurbishment on December 10, 2008, the CNSC found that approximately 800,000 adult fish and up to 62 million fish eggs and fish larvae are destroyed at the plant each year.

**The Commission has identified these effects on fish as a major problem at Pickering and OPG has not made adequate provision in response to protect the environment.**

In its decision to accept the Pickering B refurbishment Screening Report, the Commission found that the level of fish impingement at the Pickering plant was unacceptably high and must be addressed by OPG. OPG staff informed the Commission that the company was considering the use of a net or of sonar, which CNSC staff reported could reduce fish kills by 80%.

---

<sup>1</sup> Smyth, A.G. and Sawyko, P.M. (2000) “Field and laboratory evaluations of the effects of “cold shock” on fish resident in and around a thermal discharge: an overview”. 3(Supplemental 1) Environmental Science and Policy 225.

In October 2008, the Commission issued a request under section 12(2) of the *General Nuclear Safety and Control Regulations*, requiring OPG to take action on the fish impacts of its Pickering operations. Based on ongoing fish mortality due to impingement and entrainment, and OPG's failure to implement available mitigation measures, the Commission stated that, "on-going fish mortality constitutes an unreasonable risk to the environment as OPG has not met its obligations to take all reasonable precautions to protect the environment in accordance with subsection 12(1)(c) of the *General Nuclear Safety and Control Regulations*".

Based on estimates of possible fish mortality reductions provided by DFO, the CNSC's request states that fish impingement mortality at Pickering should be reduced by 80 to 95%, and entrainment mortality should be reduced by 60 to 90%. The request asks OPG to:

- install interim mitigation measures (like a multi-sensory acoustic/strobe light system) in 2009;
- develop detailed engineering plans to implement mitigation measures to meet the CNSC's targets and to ensure there is no population level impact on Northern Pike and Brown Bullhead at the plant in 2010; and
- implement measures to meet the fish mortality reduction targets and a monitoring program to verify they are met in 2012.

Since that request was issued, OPG has tested the installation of a barrier net around the cooling water intake. No other mitigation measures, like a sonar or multi-sensory acoustic/strobe light system, have been tested or implemented. The net was first installed in October 2009, then removed in mid-November. It will be reinstalled in April, when OPG plans to monitor the net to determine its effectiveness. The results of that monitoring will be assessed in July 2011. OPG staff have said that the net will not be in place during the winter due to winter ice effects.

During Day One of the current Pickering A licence renewal hearing, Member Graham asked OPG why a year-round measure was not being implemented to stop fish mortality, since fish swim all year, and the water near nuclear plants does not freeze due to the thermal plume. OPG staff responded that there are ice effects because the net surrounds the intake, rather than the output pipe, and because divers are not able to access the net in the winter to make repairs. Member Graham did not accept these reasons, stating that there must be some technology that could block fish throughout the year, and there are

**600 Bay Street, Suite 410. Toronto, ON M5G 1M6**

**T 416-861-1237 ADMIN@WATERKEEPER.CA WWW.WATERKEEPER.CA**

**PROUD MEMBER OF WATERKEEPER ALLIANCE**

divers that work throughout the winter in other provinces. He stated that OPG has a major problem with fish mortality and with the warm water plume affecting larvae.

The Commission also questioned OPG about the long timelines for implementing a solution for impingement and entrainment, and the lack of any plan to address thermal pollution at the plant. Both Member Harvey and the Chairman indicated that the timelines suggested by OPG to address this problem were not sufficient. The Chairman noted that, at the current rate of progress, Pickering may reach the end of its life with a, “nice engineering study, but no solution”.<sup>2</sup>

LOW submits that this major problem is appropriately and necessarily a licencing issue. Section 24 of the *NSCA* states that, before it can issue a licence, the Commission must be satisfied that OPG will, in carrying on that activity, make adequate provision for the protection of the environment. While the 2008 screening decision indicated that OPG would consider two options, a net and sonar system, the sonar option was not discussed with the Commission on February 17th. Neither was the multi-sensory acoustic/strobe light system suggested in the 12(2) request discussed at that hearing. It is not apparent that OPG is making adequate provisions to protect the environment at Pickering. LOW submits that, if a licence is issued for Pickering A, terms and conditions must be included to ensure that OPG takes more timely and effective year-round action to reduce its impact on fish and fish habitat in accordance with the Commission’s stated targets.

### **The CNSC cannot reasonably issue a licence renewal while OPG is not in compliance with the *Fisheries Act*.**

As stated above, the Commission can only issue a licence renewal for Pickering A if it is satisfied that OPG has made adequate provision for the protection of the environment. Making adequate provision for the protection of the environment includes, on the face of it, complying with environmental law. Currently, OPG is not complying with Canada’s *Fisheries Act*. According to the CNSC and OPG itself, the Pickering plant destroys fish and fish habitat through entrainment and impingement. Thermal pollution from the plant may constitute the deposit of a deleterious substance. It would not be reasonable for the Commission to conclude that OPG has made adequate provision for the protection of the environment while the company continues to violate Canadian environmental law. It would therefore not be reasonable for the Commission to issue a licence renewal for Pickering A.

---

<sup>2</sup> Transcript, CNSC Public Hearing, OPG: Application for a renewal of the Pickering Nuclear Generating Station A Operating Licence (17 February 2010) at 120.

Under section 36(3) of Canada's *Fisheries Act*, no one is permitted to deposit a deleterious substance in water frequented by fish without authorizing regulations made by Governor in Council. Section 35(1) prohibits the harmful alteration, disruption or destruction of fish habitat without regulations made under the *Fisheries Act* or under conditions authorized by the Minister of Fisheries and Oceans. The release of water at a temperature higher than the surrounding lake water could constitute the deposit of a deleterious substance and the harmful alteration, disruption or destruction of fish habitat. Section 34(1)(b) of the *Fisheries Act* defines "deleterious substance" as:

(b) any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, **by heat or other means**, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water...

Further, section 32 of the *Fisheries Act* prohibits the destruction of fish by any means (including impingement or entrainment), except as authorized by the Ministry of Fisheries and Oceans or by regulations made under the *Fisheries Act*.

The Commission can only renew the Pickering A licence if it can ensure that OPG has made adequate provisions to protect the environment, as mandated by s.24 of the *NSCA*. The *Fisheries Act* represents current federal standards for environmental protection. LOW submits that it would be unreasonable for the Commission to find that OPG has made adequate provisions to protect the environment while violating federal environmental law. **If OPG continues to violate the *Fisheries Act* by destroying fish and depositing thermal pollution into Lake Ontario, a decision to issue a licence renewal for Pickering A will not be in compliance with s.24 of the *NSCA* and will be vulnerable to judicial review.**

600 Bay Street, Suite 410. Toronto, ON M5G 1M6

T 416-861-1237 ADMIN@WATERKEEPER.CA WWW.WATERKEEPER.CA

PROUD MEMBER OF WATERKEEPER ALLIANCE

## RECOMMENDATIONS

In order to issue a licence renewal to OPG for the Pickering A NGS, the Commission must ensure that the company has made adequate provisions to protect the environment.

1. If a licence is issued, it must include terms and conditions that require OPG to take timely and effective action to stop the unacceptable level of fish kills at the plant, including through impingement, entrainment, and thermal pollution. OPG should be required to implement a system that will prevent fish impingement and entrainment effectively and year round.
2. The Commission cannot reasonable issue a licence renewal while OPG is not in compliance with Canada's *Fisheries Act*. Before a licence renewal can be issued pursuant to the *NSCA*, the Commission must be satisfied that no *Fisheries Act* violations are occurring at Pickering A.

600 Bay Street, Suite 410. Toronto, ON M5G 1M6

T 416-861-1237 ADMIN@WATERKEEPER.CA WWW.WATERKEEPER.CA

PROUD MEMBER OF WATERKEEPER ALLIANCE