

Record of Proceedings, Including Reasons for Decision

In the Matter of

Applicant Ontario Power Generation Inc.

Subject Application for Construction of the Pickering
Waste Management Facility Phase II

Date December 23, 2004

RECORD OF PROCEEDINGS

Applicant: Ontario Power Generation Inc.

Address/Location: 700 University Avenue, Toronto, Ontario, M5G 1X6

Purpose: Application for Construction of the Pickering Waste Management Facility Phase II at the Pickering Nuclear Generating Station

Application received: January 31, 2002

Date(s) of hearing: September 17, 2004
November 17, 2004

Location: Canadian Nuclear Safety Commission (CNSC) Public Hearing Room, 280 Slater St., 14th. Floor, Ottawa, Ontario

Members present: L.J. Keen, Chair A.R. Graham
C.R. Barnes M. J. McDill
J.A. Dosman M. Taylor

General Counsel: J. Lavoie
Secretary: M.A. Leblanc
Recording Secretary: S. Gingras

Applicant Represented By	Document Number
• K. Nash, V.P. Nuclear Waste Management	CMD 04-H24.1
• K. Mombourquette, Director, Nuclear Waste Projects	CMD 04-H24.1A
• A. Khan, Manager, Safety Assessment and Licensing Department	CMD 04-H24.1B
• J. Peters, Section Manager, Environmental Assessment	CMD 04-H24.1C
CNSC Staff	Document Number
• H. Rabski	CMD 04-H24
• R. Lojk	
• K. Klassen	
Intervenor	Document Number
City of Pickering	CMD 04-H24.2

Licence: Issued
Date of Decision: November 17, 2004

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1. Introduction

Ontario Power Generation Inc. (OPG) has applied to the Canadian Nuclear Safety Commission (CNSC¹) for permission to construct Phase II of the Pickering Waste Management Facility (PWMF) at the Pickering Nuclear Generating Station (NGS) site.

The PWMF is a Class 1B nuclear facility which consists of the retube components storage area and Phase I of a used fuel dry storage area for spent fuel from the Pickering NGS. Phase I of the used fuel dry storage area consists of a Dry Storage Container (DSC) processing building and two DSC storage buildings with a total capacity to store 654 DSCs. The Phase I storage buildings are currently projected to reach capacity in early 2008. The proposed Phase II of the PWMF would involve the construction two additional DSC storage buildings, each with a capacity for 500 DSCs. The proposed Phase II storage buildings would be of similar design to Phase I structures.

Issues:

In considering OPG's application for amendment of the existing facility licence to allow Phase II to proceed, the Commission is required to decide, pursuant to subsection 24(4) of the *Nuclear Safety and Control Act*² (NSCA):

- a) if OPG is qualified to carry on the activity that the amended licence would authorize; and
- b) if, in carrying on that activity, OPG would 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.

Public Hearing:

The Commission considered information presented for a public hearing held on September 17, 2004 and November 17, 2004 in Ottawa, Ontario. The hearing was conducted in accordance with the *Canadian Nuclear Safety Commission Rules of Procedure*³. During the public hearing, the Commission received written submissions and heard oral presentations from CNSC staff (CMD 04-H24 and CMD 04-H24.A) and OPG (CMD 04-H24.1, CMD 04-H24.1A and CMD 04-H24.1B). The Commission also considered a written intervention from the City of Pickering (CMD 04-H24.2).

¹ In this *Record of Proceedings*, the *Canadian Nuclear Safety Commission* is referred to as the "CNSC" when referring to the organization and its staff in general, and as the "Commission" when referring to the tribunal component.

² R.S. 1997, c. 9

³ SOR/2000-211 31 May, 2000

2. Decision

Based on its consideration of the matter, as described in more detail in section 3 of this *Record of Proceedings*, the Commission concluded that OPG is qualified to carry on the activity that the licence will authorize. The Commission also determined that OPG, in carrying on that activity, will 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. Therefore,

the Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, amends the Waste Facility Operating Licence, held by Ontario Power Generation Inc., Toronto, Ontario to permit the construction of the Pickering Waste Management Facility Phase II. The amended licence (WFOL-W4-350.02/2008) is valid until March 31, 2008, unless suspended, amended, revoked or replaced.

The Commission includes in the amended licence the conditions recommended by CNSC staff, as set out in the draft licence attached to CMD 04-H24.

3. Issues and Commission Findings

In making its licensing decision under section 24 of the *Nuclear Safety and Control Act*, the Commission considered a number of issues relating to OPG's qualifications to carry out the proposed activities, and the adequacy of the proposed measures for protecting the environment, the health and safety of persons, national security and international obligations to which Canada has agreed. The Commission's findings on these issues are outlined below.

3.1 Radiation Protection

As part of its evaluation of the adequacy of the provisions for protecting the health and safety of persons, the Commission considered the past performance and future plans of OPG in the area of radiation protection at the PWF.

In its submission, OPG explained that its defense-in-depth safety philosophy ensures that all radionuclide emissions and doses to workers and the public remain below the regulatory limits and as low as reasonably achievable (ALARA).

CNSC staff reported that it has reviewed OPG's ALARA Occupational Radiation Safety Management Program Assessment, and has concluded that the existing ALARA program and targets would remain acceptable during the construction and subsequent operation of the Phase II. That assessment included a detailed review of OPG's shielding analysis for the proposed storage buildings, radiation assessment for the Phase II construction, and radiation ALARA assessment for its operation.

OPG stated that its other used fuel dry storage facilities (the PWMF Phase I at Pickering NGS and the Western Waste Management Facility located at the Bruce NGS) routinely operate contamination free, and that there have been no public safety events at those facilities. OPG reported that the estimated doses to the public from those facilities have remained at less than 0.1% of the regulatory limit of 1 mSv/year and that occupational doses are also well below regulatory limits. CNSC staff expressed its concurrence with this summary of the operating performance at OPG's other used fuel dry storage facilities of similar design.

With respect to the proposed PWMF Phase II, OPG predicted that radiation dose rates at the security fence will be approximately 0.16 $\mu\text{Sv/h}$, which is below the dose rate target of 0.5 $\mu\text{Sv/h}$ for non-nuclear energy workers. Furthermore OPG predicted that, under both normal and postulated malfunction and accident situations at the expanded PWMF, the resulting dose rate at the Pickering NGS site and exclusion area boundaries would remain well below the regulatory limit for members of the public.

CNSC staff noted that the proposed activities under the amended licence would not involve the use or handling of nuclear substances. OPG is only seeking permission to construct the Phase II buildings at this time. Subsequent approvals from the Commission would be required before used fuel could be moved to, and stored in, the Phase II buildings.

Based on this information, the Commission is satisfied that OPG has made, and will continue to make, adequate provisions for the protection of persons from radiation at the PWMF.

3.2 Environmental Protection

To determine whether OPG will make adequate provisions to protect the environment from the PWMF Phase II, the Commission considered the potential for the proposed activities to adversely affect the environment.

OPG reported that radioactivity in the liquid emissions (site drainage) from the similar Western Waste Management Facility (WWMF) and existing PWMF have been below minimum detection levels, and that airborne emissions have been negligible. OPG does not expect any emissions from the seal-welded DSCs during storage. OPG also reported that there have been no reportable spills of non-radioactive contaminants during the current licence periods. CNSC staff concurred with this summary of operating performance at the WWMF and PWMF. CNSC staff noted that the DSCs in storage at those facilities remain free of contamination and that no radioactivity has been detected in the storage building sumps or surface runoff.

In its submission, CNSC staff reported that OPG's proposed environmental monitoring program for Phase II is acceptable and would be included in the larger Pickering NGS Environmental Monitoring Program.

An environmental assessment (Screening Report) was performed for this project in accordance with the requirements of the *Canadian Environmental Assessment Act* (CEAA)⁴. The results

⁴ R.S. 1992, c.37

were presented to the Commission at a public hearing on April 28, 2004, following which the Commission concluded that the project was not likely to cause significant adverse environmental effects. At the same time, the Commission also established a framework for the environmental assessment follow-up program. CNSC staff recommended that the Commission include a condition in the amended licence for Phase II construction that would require OPG to implement the follow-up program in a manner acceptable to the Commission or a person authorized by the Commission. In response to this recommendation, OPG stated that it would develop the details of the EA follow-up monitoring plan as part of the detailed design phase of the project in 2005, and that a final plan would be submitted to the CNSC for acceptance prior to the planned start of construction in 2006. CNSC staff noted that OPG will be required to conduct a number of inspection/monitoring activities prior to the construction phase, some of which will also be identified in the EA follow-up program.

With respect to the planned pre-construction inspections and monitoring, the Commission questioned whether any non-radiological contamination has been found on the site. In response, OPG reported that a survey of all potentially contaminated sites at the Pickering NGS, including the proposed PWSMF Phase II location, was carried out as part of an earlier EA for the proposed restart of the Pickering A NGS. All contaminated areas identified were subsequently cleaned up.

Based on the above information, the Commission is satisfied that OPG has made, and will continue to make, adequate provision for the protection of the environment during the proposed construction of the PWSMF. The Commission concurred with the licence condition proposed by CNSC staff, which requires OPG to implement the EA follow-up program in a manner acceptable to the Commission or a person authorized by the Commission.

3.3 Conventional Health and Safety

As part of its evaluation of the adequacy of provisions for protecting the health and safety of persons, the Commission considered the past performance and future plans of OPG in the area of conventional (non-radiological) health and safety at the PWSMF.

OPG reported that no lost-time accidents have occurred at the similar WWSMF and the PWSMF since they became operational. OPG attributes this good safety performance, in large part, to the efforts taken to incorporate human factors into the design of these facilities. Similar factors are incorporated into the PWSMF Phase II design.

The Commission questioned whether there would be any risks to the health and safety of workers involved in the construction activities. In response, CNSC staff reported that it has reviewed OPG's occupational health and safety program for the construction and operation of the project, and is satisfied that OPG would make adequate provisions for conventional worker health and safety. OPG pointed to the absence of lost-time accidents at its facilities during the past ten years as evidence of the effectiveness of its program. Part of this program includes monthly safety meetings with the workers.

Based on this information, the Commission is satisfied that OPG has made, and will continue to make, adequate provision for the protection of persons from conventional (non-radiological) hazards during the construction of the PWSMF Phase II.

3.4 Design and Operations

The Commission considered the adequacy of the design and the current and past operating performance at the PWSMF as a further indication of OPG's qualifications and provisions for protecting the environment, persons, national security and international obligations.

Design Adequacies:

a) Dry Storage Containers

OPG reported that it modified the DSC design so that it could accommodate the longer fuel bundles in use, and that the DSC shielding analyses was updated accordingly. CNSC staff stated that it is satisfied with the safety of both versions of the DSC design, and noted that both have been certified in accordance with the CNSC's *Packaging and Transport of Nuclear Substance Regulations*⁵.

In response to questions from the Commission regarding the management of a damaged or corroded DSC, OPG stated that the affected DSC could be safely isolated until a case-specific corrective action plan is developed and approved.

b) Storage Buildings

With reference to the design of the existing storage buildings at the PWSMF and WWSMF, the Commission questioned whether any design improvements were planned for the PWSMF Phase II structures. In response, OPG stated that the buildings differ from one site to another depending on various factors, including weather conditions and proximity to the public (aesthetic appearance). Design improvements may be made in the future based on operating experience.

OPG reported that a geotechnical investigation performed at the site confirmed its suitability for the construction of the proposed buildings. The design includes a slab-on-grade foundation without a basement. CNSC staff indicated its acceptance of the foundation design.

Noting the relatively high water table at the site, the Commission questioned OPG on how groundwater would be prevented from entering the buildings. In response, OPG explained how the foundations, sumps and site drainage have been designed to prevent flooding of the buildings.

The Commission also questioned whether the distance of the buildings from Lake Ontario (approximately 40 meters) would meet shoreline setback requirements. In response, OPG

⁵ SOR/2000-208, 31 May, 2000

verified that the proposed location meets all provincial, municipal and Conservation Authority requirements pertaining to commercial buildings in proximity to Lake Ontario.

The Commission questioned whether tornado and airplane crashes threats were taken into account in the design of the facility. In response, OPG stated that, due to the very low probability of occurrence, an aircraft accident was not considered to be a credible design-basis accident for the PWMF. However, as noted during the earlier environmental assessment of the project, even in the unlikely event that a DSC is breached, the radiological consequences could be safely managed. Concerning tornado threats, OPG stated that the design of the facility had been assessed against design based tornado conditions.

Further with respect to these types of events, CNSC staff stated that OPG's assessment of the robustness of storage facility buildings and DSCs was found to be acceptable by CNSC staff following a preliminary review. A further detailed review is underway.

Operations:

With respect to the existing operations at the PWMF Phase I, CNSC staff stated that it does not expect the proposed construction activities at Phase II to have any substantive effect on the operation, inspection, maintenance and monitoring programs at Phase I.

Conclusion on Design and Operations:

Based on the above information and considerations, the Commission is satisfied with the proposed design of the PWMF Phase II. The Commission also concludes that the past operating performance at the PWMF Phase I provides a positive indication of the design adequacy and OPG's ability to carry out the proposed construction activities under the amended licence.

3.5 Quality Management

In its assessment of OPG's ability to sustain compliance and acceptable performance, the Commission considered OPG's quality management for the proposed construction activities.

OPG reported that the Quality Assurance Program used for this project satisfies all of the quality principles identified by the CSA-N286 series of QA standards. OPG added that the contractor's QA program will address design, equipment and material procurement, construction, commissioning and turnover to OPG. OPG further explained that the contractor would be responsible for implementing this program to the satisfaction of OPG.

CNSC staff reported that the design verification work planning done on this project has been consistent with OPG's practices on similar projects which have been assessed and approved by the CNSC. CNSC staff added that it has reviewed and accepted OPG's construction verification plan and procedures.

Based on the above information, the Commission is satisfied that the quality assurance measures for the proposed construction activities at the PWMF Phase II are satisfactory.

3.6 Fire Protection

With respect to the protection of persons and the environment during fire emergencies that could arise at the PWMF Phase II, OPG stated that fire protection provisions, including material usage, would meet fire protection requirements. CNSC staff confirmed that there would be specific arrangements for fire units to respond to a fire at the facility if required. CNSC staff noted that the fire assessment determined that, because of the lack of combustible materials in the buildings and the robustness of the DSCs, there would likely be no significant consequences from a fire at the facility.

OPG reported that it carried out an assessment of the potential impact of a blast wave generated by an explosion in a hazardous material storage building located nearby the DSC Storage Building 4. A similar relevant study was conducted by OPG for the Darlington Used Fuel Dry Storage Facility. OPG concluded from these assessments that the probability of such an explosion was very low. OPG also concluded that the integrity of the stored DSCs would not be compromised by the collapse of the DSC storage building. CNSC staff concurred with OPG's conclusions in this regard.

OPG further noted that the results of a third party review of the fire protection system design would be submitted to the CNSC as part of the documentation in support of an operating licence request.

Based on this information, the Commission is satisfied that, for the PWMF Phase II construction, OPG will be adequately prepared for fire emergencies.

3.7 Security

With regard to the maintenance of security at the project site during the proposed construction activities, OPG noted that security at the PWMF is part of a comprehensive, integrated security program at the Pickering NGS, and that the new facility will meet the requirements of the *Nuclear Security Regulations*⁶ and CNSC Order 01-1.

CNSC staff explained that the PWMF Phase II project, which would contain category II nuclear material as defined in the *Nuclear Security Regulations*, would be located in a protected area, and that the security provisions for Phase II would be similar to those already in place for the Pickering NGS protected area.

OPG reported that it had previously submitted a security report for the PWMF Phase II as part of its construction approval application. CNSC staff added that it has reviewed the required security information and finds it to be complete.

⁶ SOR/2000-209, 31 May, 2000

Based on this information, the Commission is satisfied that OPG will continue to make adequate provision for maintaining security at the PWMF.

3.8 Decommissioning Plan and Financial Guarantee

With respect to the decommissioning plans for the PWMF, OPG reported that it has prepared and submitted to the CNSC a Preliminary Decommissioning Plan (PDP) for the PWMF, in accordance with CNSC Regulatory Guide G-219, *Decommissioning Planning for Licensed Activities*. OPG stated that it plans to further update the PDP in 2007 if the facility is approved for operation. CNSC staff stated that it is satisfied with the information provided.

Concerning the financial guarantees for the PWMF decommissioning, OPG noted that the decommissioning of the PWMF is included within the decommissioning financial guarantees for all Class 1 facilities owned by OPG, which the CNSC has accepted. OPG provides the CNSC with an annual report on the status of the financial guarantees. CNSC staff noted that because the structures for Phase II are simple and uncontaminated, the relatively low cost to decommission them does not warrant revision of OPG's consolidated financial guarantee at this time. However, a financial guarantee that includes Phase II decommissioning costs would be required in connection with any application to amend the PWMF licence to permit Phase II operation.

Based on this information, the Commission considers the Detailed Decommissioning Plan and related arrangement for updating the financial guarantee to be acceptable for the purpose of this application.

3.9 Public Information

With respect to the CNSC's requirement that licensees maintain acceptable public information programs, OPG reported that it carried out an extensive stakeholder consultation program as part of the environmental assessment process for this project, and that it has maintained its toll-free information line and its web site on the project to maintain a point of contact with the community. OPG also noted that presentations were continuing with the Durham Nuclear Health Committee and the Pickering Community Advisory Group to keep them apprised of the ongoing work and progress. CNSC staff stated that it considered OPG's public information program on the project to be adequate.

The City of Pickering, in its intervention, requested that it be kept informed and involved in all future issues related to all aspects of nuclear waste storage.

The Commission questioned OPG on how information from the monitoring programs is shared with the City of Pickering. In response, OPG stated that it has recently been in discussion with the City of Pickering on this issue and that it is open to discussing any matter of concern to the City.

Based on the above information, the Commission is satisfied that OPG has an adequate public information program in place for the PWMF.

3.10 Non-Proliferation and Safeguards

With respect to OPG's provisions for ensuring maintenance of Canada's international obligations for safeguards and non-proliferation, OPG stated that the facility supports the IAEA activities by providing an IAEA inspector with prompt access to the site, office facilities, safety escorts, personal protective equipment, power and lighting for surveillance, as well as access to OPG operations staff to respond to any queries. OPG further reported that permanent safeguards seals had been incorporated into the DSC design. CNSC staff added that the safeguards provisions for Phase II would be based on the proven systems in place at Phase I, and at the WWMF located at the Bruce site.

CNSC staff stated that it finds the safeguards provisions for Phase II to be adequate. CNSC staff further noted that the OPG's PWMF operating licence does not permit the import or export of materials or prescribed equipment.

Based on this information, the Commission is satisfied that OPG has made, and will continue to make, adequate provisions in the areas of safeguards and non-proliferation at the PWMF that are necessary for maintaining national security and measures necessary for implementing international agreements to which Canada has agreed.

3.11 Canadian Environmental Assessment Act

Before making a licensing decision, the Commission must be satisfied that all applicable requirements of the CEEA have been fulfilled.

On April 28, 2004, after completing a screening environmental assessment of the project under the CEEA, the Commission concluded that the proposed Phase II project is not likely to cause significant adverse effects on the environment, taking into account appropriate mitigation measures. Therefore, no further environmental assessment is required before the Commission may make a licensing decision on this matter.

4. Conclusion

The Commission has considered the information and submissions of the applicant, CNSC staff and an intervenor as presented in the material available for reference on the record.

The Commission is satisfied that OPG is qualified to carry on the activity that the amended licence would authorize. The Commission is also satisfied that OPG, in carrying on that activity, will 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.

The Commission therefore, pursuant to section 24 of the *Nuclear Safety and Control Act*, amends Waste Facility Operating Licence WFOL-W4-350.01/2008, held by Ontario Power Generation Inc., Toronto, Ontario. The Commission includes in the amended licence the conditions recommended by CNSC staff, as set out in the draft licence attached to CMD 04-H24. The amended licence (WFOL-W4-350.02/2008) is valid until March 31, 2008, unless suspended, amended, revoked or replaced.

Marc A. Leblanc
Secretary,
Canadian Nuclear Safety Commission

Date of decision: November 17, 2004

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