



Canadian Nuclear
Safety Commission

Commission canadienne
de sûreté nucléaire

Record of Proceedings, Including Reasons for Decision

In the Matter of

Applicant Atomic Energy of Canada Limited

Subject Amendment of the Dedicated Isotope Facilities
(DIF) Non-Power Reactor Operating Licence at
the Chalk River Laboratories

Hearing Date March 26, 2010

RECORD OF PROCEEDINGS

Applicant: Atomic Energy of Canada Limited

Address/Location: Chalk River Laboratories, Chalk River, Ontario, K0J 1J0

Purpose: Amendment of the Dedicated Isotope Facilities (DIF) Non-Power Reactor Operating Licence at the Chalk River Laboratories

Application received: May 25, 2009

Date of hearing: March 26, 2010

Location: Canadian Nuclear Safety Commission (CNSC) 280 Slater St., Ottawa, Ontario

Members present: M. Binder, Chair

Secretary: K. McGee
Recording Secretary: P. Reinhardt

Licence: Amended

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Introduction

1. Atomic Energy of Canada Limited (AECL) has applied to the Canadian Nuclear Safety Commission¹ (CNSC) for an amendment to the Dedicated Isotope Facilities (DIF) Non-Power Reactor Operating Licence (NPROL) to reflect and set the parameters for the Extended Shutdown State (ESS) of the MAPLE 1 and MAPLE 2 reactors and the New Processing Facility (NPF). The MAPLE 1 and MAPLE 2 reactors and the NPF are located in Chalk River, Ontario. The current licence, NPROL-62.02/2011, expires on October 31, 2011.
2. AECL's Dedicated Isotope Facilities (DIF) project involved the MAPLE 1 and MAPLE 2 reactors and the NPF at the CRL. AECL discontinued the development of the MAPLE reactors and the NPF in the spring of 2008, and decided to place the two MAPLE reactors and the NPF into an ESS. At that time, the MAPLE reactors and the NPF were put in a Guaranteed Shutdown State as permitted by AECL current licence. In November 2008, AECL requested an amendment to the DIF NPROL to be allowed to declare the MAPLE 1 and MAPLE 2 reactors and the NPF in the ESS once the prerequisite work would be completed. Due to other priorities, the processing of this amendment was delayed until now.
3. AECL has now completed the activities permitted by the current operating licence to place these facilities into the ESS and request that the DIF NPROL be amended to reflect the present status. CNSC staff noted that in the ESS, staffing, surveillance, monitoring, and maintenance requirements in the DIF facilities are significantly reduced, reflecting the lower risk posed by the facilities.
4. CNSC staff provided a description of the status of the DIF facilities during the ESS:
 1. Nuclear material handling, storage and transfer systems, and isotope production systems are not operational;
 2. The AECL work permit system is still used for maintenance of operational facility systems such as ventilation and fire protection systems;
 3. AECL continues to comply with nuclear programs including radiation protection, environmental protection and security;
 4. Non-radiological hazards are limited to occupational hazards related to industrial environments;
 5. As commissioning activities have been discontinued after the cancellation of the project, commissioning details are removed from facilities' Final Safety Analysis Reports (FSARs);
 6. Building services and fire protection systems remain operational; and
 7. The remaining DIF organization is incorporated into the NRU responsibility envelope.

¹ 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.

Issue

5. In considering the application, the Commission was required to decide, pursuant to subsection 24(4) of the *Nuclear Safety and Control Act*² (NSCA):
 - a) if AECL is qualified to carry on the activity that the amended licences would authorize; and
 - b) if in carrying on that activity, AECL 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.

Hearing

6. The Commission, in making its decision, considered information presented for a hearing held on March 26, 2010 in Ottawa, Ontario. During the hearing, the Commission considered written submissions from CNSC staff (CMD 10-H101) and AECL (CMD 10-H101.1).

Decision

7. Based on its consideration of the matter, as described in more detail in the following sections of this *Record of Proceedings*, the Commission concludes that AECL has met the conditions of subsection 24(4) of the NSCA. Therefore,

the Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, amends the Non-Power Reactor Operating Licence, NPROL-62.02/2011, issued to Atomic Energy of Canada Limited for the MAPLE 1 and MAPLE 2 reactors and the New Processing Facility, all located in Chalk River, Ontario. The amended licence, NPROL-62.03/2011, remains valid until October 31, 2011.

8. The Commission includes in the licence the conditions as recommended by CNSC staff in CMD 10-H101.

Issues and Commission Findings

Technical Review of Application

9. CNSC staff reported the activities specific to the MAPLE 1 and MAPLE 2 reactors during the ESS:

² Statutes of Canada, S.C. 1997, c. 9.

1. No production, transfer, use, processing, packaging, or storage of Iodine-125 (I-125) or radioactive substances associated with the production of I-125 would be permitted;
 2. No transfer, use, packaging, or storage of heavy water or additional nuclear substances in quantities greater than regulatory exemption limits would be permitted;
 3. No generation of new radioactive waste would occur;
 4. No fuel or highly enriched uranium targets are present in the reactor cores;
 5. Remaining sources of radioactivity in the MAPLE 1 Reactor Pool and in radiation monitoring equipment will be maintained under the Radiation Protection provisions;
 6. Service halls would be used for activities consistent with preservation or maintenance, including equipment staging and preparation, storage of equipment/components;
 7. MAPLE reactor facilities' ventilation will remain connected to the Exhaust Air Filtration System (EAFS), which is shared with NRU; and
 8. Primary cooling system, including the reactor pools and associated systems, shutdown systems, and transition cooling systems isolated, drained and de-energized; reactor control systems will not be operational; active drain system isolated; process loads such as compressors, exhaust fans and pumps not required will be de-energized.
10. CNSC staff also reported the activities specific to the NPF during the ESS:
1. No production, transfer, use, processing, packaging, or storage of nuclear substances would be permitted;
 2. NPF hot cell and support systems equipment will be maintained;
 3. NPF would be used for training purposes of personnel on the use of manipulators at the mock-up station or within hot cells; and
 4. The general purpose lab would be used for non-radioactive work.

Environmental Protection

11. AECL confirmed that the active drain system will be isolated to prevent the possibility of active liquids entering the DIF facilities from the Wastewater Treatment Centre. AECL also added that for the MAPLE reactor facilities, all radioactive substances or radioactive by-products in liquid form will be collected in the sumps, and that the only identified potential non-radiological hazards emissions are also liquid waste from the process sumps. AECL noted that all liquid collected via the sumps will be drummed, sampled, analyzed, and compared to CRL's general acceptance criteria for discharges of wastewater. AECL noted that acceptable wastewater will be transferred to the Wastewater Treatment Centre for treatment and release and those liquids not acceptable for treatment will be collected and assessed to determine a proper disposal method.

12. CNSC staff added that, in regards to air emission, the MAPLE facilities are configured to only exhaust via the EAFS and that, during the ESS, the EAFS will continue to share its common ventilation duct with the NRU Reactor. CNSC staff noted that if there was an accident originating at the NRU Reactor, airborne radioactivity could potentially enter the MAPLE facilities via the shared duct, but that safety analysis has shown that the probability of such an event is about 1×10^{-6} events/year. CNSC staff confirmed that the occurrence of blowback is a very rare incident, and would cause potential gaseous airborne release. CNSC staff stated that air monitoring would be required following occurrence of a blowback event.
13. CNSC staff reviewed AECL's submission and concluded that AECL adequately address environmental protection concerns.

Radiation Protection

14. CNSC staff reported that AECL's ESS proposal requires adherence to its corporate radiation protection requirements and Radiation Protection Manual. CNSC staff confirmed that AECL must also continue to abide by the radiation protection requirements of the NSCA and applicable regulations.
15. CNSC staff reported that AECL provided supplementary information on radiation protection during a potential blowback event, and identified additional administrative controls to ensure the safety of workers. CNSC staff added that, to provide worker protection while in the ESS, radiation monitoring is required in the MAPLE facilities. CNSC staff added that during an NRU shutdown, tritium-in-air monitoring will be in operation, and, if the tritium-in-air monitor becomes unavailable or alarms, all workers in the DIF facilities will be evacuated. CNSC staff noted that dosimetry and emergency procedures are also identified as programs required during a blowback event.

Criticality

16. CNSC staff confirmed that AECL's submission contains sufficient technical and scientific justification to conclude that these facilities would be in a state in which criticality safety issues associated with fission chain reaction become irrelevant.

Fire Protection

17. CNSC staff reported that, with respect to protection from fire and explosion, the documentation in AECL's submission is acceptable for the facilities in the ESS, and noted that routine maintenance of fire protection systems will continue.

Personnel Certification

18. CNSC staff concluded that the proposed licence amendment to remove licence conditions and appendices related to certified personnel requirements are appropriate because, in the ESS, there is no fuel or highly enriched uranium targets present in the reactor cores. CNSC staff added that there is no longer a requirement for certification of DIF personnel.

Conclusion on Technical Review

19. CNSC staff has reviewed AECL's submission and found it to be complete. CNSC staff concluded that the hazards associated with ESS will be appropriately controlled. CNSC staff added that, during the ESS, no radioactive and fissile materials will be in the DIF facilities; therefore, the risk for significant consequence is small and limited to the potential for industrial work-place hazards. CNSC staff also confirmed that the Final Safety Analysis Reports had been updated to provide safety analyses that represent the probability and consequences for events during the ESS, and that the Operational Limits and Conditions documents had been updated to represent the safe operational limits for the ESS.
20. Finally CNSC staff confirmed that records for personnel exposure and doses, radiation dose rate information, effluent releases, radioactive waste generation management, and radiation and industrial safety measurements and observations will continue to be maintained as required by the *Class I Nuclear Facilities Regulations*³ and the *Radiation Protection Regulations*⁴.

Summary of the Proposed Changes

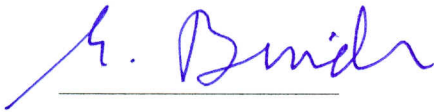
21. CNSC staff reported that, because AECL has requested to merge the DIF licence with the CRL site licence at the 2011 CRL site licence renewal, it did not work towards the DIF licence reformat at this time. CNSC staff noted that some DIF licence conditions are proposed to align with the CRL site licence to facilitate the potential integration of DIF and CRL licences in 2011 at the CRL site licence renewal. Some other conditions have been modified to reflect the current state of the facilities, and to update versions of referenced documents and fire protection systems requirements.

³ Statutes of Regulations, S.O.R./2000-204

⁴ Statutes of Regulations, S.O.R./2000-203

Application of the *Canadian Environmental Assessment Act*

22. Before making a licensing decision, the Commission must be satisfied that all applicable requirements of the *Canadian Environmental Assessment Act*⁵ (CEAA) have been fulfilled.
23. CNSC staff reported that the proposed amendment would allow the MAPLE 1 and MAPLE 2 reactors and the NPF, currently operating in Guaranteed Shutdown States, to be declared in the ESS, which constitutes a change in the existing physical activities at the licensed facility. Therefore, there is a “project” as defined in section 2 of the CEAA (i.e., operation in relation to a physical work).
24. CNSC staff reported that it had completed an Environmental Assessment (EA) determination. CNSC staff concluded that the 1997 screening report covered the ESS and that there is no requirement for a new EA pursuant to subsection 5(1) of the CEAA.
25. The Commission is satisfied that all applicable requirements of the CEAA have been fulfilled.



Michael Binder
President,
Canadian Nuclear Safety Commission

MAR 26 2010

Date

⁵ Statutes of Regulations, S.C. 1992, c. 37.