Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

CMD 20-H2.189

File / dossier : 6.01.07
Date: 2020-01-27
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Written submission from Markus Piro

Mémoire de Markus Piro

In the Matter of the

À l'égard de

BWXT Nuclear Energy Canada Inc., Toronto and Peterborough Facilities

BWXT Nuclear Energy Canada Inc., installations de Toronto et Peterborough

Application for the renewal of the licence for Toronto and Peterborough facilities

Demande de renouvellement du permis pour les installations de Toronto et Peterborough

Commission Public Hearing

Audience publique de la Commission

March 2 to 6, 2020

Du 2 au 6 mars 2020

Canada

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OntarioTech
Energy Systems
& Nuclear Science

January 27, 2020

Commission Secretariat
Canadian Nuclear Safety Commission
280 Slater Street
PO Box 1046, Station B
Ottawa, ON
K1P 5S9

RE: BWXT Nuclear Energy Canada Inc. Class IB License Renewal Intervention

To the honourable Secretariat,

This letter is intended to intervene by written submission in BWXT Nuclear Energy Canada (NEC) Inc.'s Class IB Fuel Facility Operating License renewal application to the Canadian Nuclear Safety Commission (CNSC). This application is intended to renew their current license, which expires Dec. 31, 2020, with an extension of ten years. In addition, BWXT NEC is requesting to add the capability to manufacture uranium dioxide (UO_2) fuel pellets at their Peterborough facility, which has been historically performed at their Toronto facility. Their application also mentions an Environmental Risk Assessment of expanding the Peterborough plant's capabilities to fabricate fuel. My intent of providing this letter is to offer an objective and independent perspective of this application as a subject matter expert on nuclear fuel.

Please allow me to introduce myself: I have earned a PhD in Nuclear Engineering from the Royal Military College of Canada in the area of nuclear fuel chemistry. After graduation, I was a Post-Doctoral Fellow at the Oak Ridge National Laboratory in Oak Ridge, TN, where I performed analyses relevant to fuel performance and safety. Then, I worked in the Fuel and Fuel Channel Safety branch of the Canadian Nuclear Laboratories in Chalk River, ON – mainly in the area of nuclear fuel safety. Currently, I am the Canada Research Chair in Nuclear Fuels and Materials at Ontario Tech University (recently rebranded from University of Ontario Institute of Technology) where I continue to work in nuclear fuel behaviour. I do not have any partnerships, arrangements, or commitments with BWXT NEC.

The perimeter of my assessment is bound by my knowledge and experience in the field without any direct or in-depth knowledge of the specific standard operating procedures executed by BWXT NEC. My assessment is based on reviewing recent annual compliance reports published by BWXT NEC in the open domain, the written submission application by BWXT NEC to the CNSC (file 6.01.07 dated 2019-12-19), and a brief tour of the Peterborough facility. The aforementioned documents are freely available for anyone to download from the BWXT NEC and CNSC web sites.

BWXT NEC currently supports the Canadian nuclear industry in manufacturing nuclear fuel bundles, which are comprised of natural UO_2 fuel pellets cladded in a zirconium alloy tube. These fuel bundles are used in nuclear generating stations in Canada to produce reliable, clean, safe, and cost-effective electricity. In Ontario, about 60% of electricity is generated by nuclear power. Both Bruce and Darlington Nuclear Generating Stations are undergoing major

refurbishment projects to extend the lifetime of both plants, which will require fuel over the coming decades in order to be operational. The Cameco Corporation also operates fuel and fuel bundle fabrication facilities in Port Hope and Cobourg, similar to BWXT NEC's operations in Toronto and Peterborough.

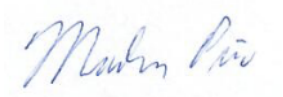
Generally speaking, the manufacturing process of CANDU fuel bundles begins with fabricating nuclear fuel pellets from UO_2 powder. This powder is pressed, sintered, and then ground to specific dimensions, according to design specifications. As is the case with all industrial processes, there are some risks to health and safety that require careful attention. Risks specific to fuel fabrication include the use of radioactive UO_2 powder, flammable gases, and the use of other industrial materials. Most of these hazards are common to any industrial plant. The use of radioactive materials is unique and requires additional Radiation Protection (RP) procedures. Uranium is mildly radioactive and is mined in northern Saskatchewan.

To mitigate the risk of contamination involving radioactive powders, there are a number of engineered barriers and monitoring systems that are commonly used in industry. For instance, hand-and-foot monitors are commonly used to test for personnel contamination of radioactive materials within the plant, automated airborne contamination monitors are used to measure airborne particulates to prevent inhalation and dispersal, and regular radiation monitoring in the periphery of the plant are all standard practice in the field. The RP practices described in the license extension application are consistent with best practices in industry. Furthermore, the activities by any license holder is regulated and regularly independently reviewed by the CNSC. It is standard practice that Nuclear Energy Workers have radiation dosimeters that measure radiation dose in accordance with the Radiation Protection Regulations. Over the course of the previous license period, none of the BWXT NEC workers exceeded regulatory dose limits. Also, regular air and water samples in the vicinity of both Toronto and Peterborough plants have demonstrated consistent values well below regulation limits. Some incidents have been summarized in §4.3.2 of the renewal application, which are fairly minor and have been followed up by appropriate corrective actions.

Based on my career in nuclear fuel engineering and the information that is available to me, I do not foresee any issues or concerns with the proposed application to extend BWXT NEC's license or to add the ability to fabricate nuclear fuel pellets at the Peterborough facility. The safety records of both Toronto and Peterborough plants operated by BWXT NEC have been very good, which are consistent with best practices used in industry. Radiation dose and contamination levels have been regularly monitored and are well below regulation limits. The proposal of leveraging practices used in the Toronto fuel fabrication facility to the Peterborough plant seems reasonable and logical.

Please do not hesitate to contact me by email or by phone if I may be of further service.

Sincerely,



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