Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

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Supplementary Information
Oral Presentation

Revised presentation from
Safety Probe International

Renseignements supplémentaires
Exposé oral

Présentation révisée de
Safety Probe International

In the Matter of the

**BWXT Nuclear Energy Canada Inc.,
Toronto and Peterborough Facilities**

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

Commission Public Hearing

March 2 to 6, 2020

À l'égard de

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

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

Audience publique de la Commission

Du 2 au 6 mars 2020

Canada

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BWXT Nuclear Energy Canada Inc.

Application to renew licence for the Toronto and Peterborough Facilities

Oral Submission of

Safety Probe International

March 2-6, 2020

Helmy Ragheb, *PhD, P.Eng.*

Contents

- Observations for the Toronto facility
- Observations for the proposed pelleting process at Peterborough facility
- Issues arising from the Applicant's submission.
- Recommendations

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Toronto Facility

Observations

Will the Applicant manufacture enriched fuel pellets in Toronto or Peterborough?

- BWXT Application: Page 7, item **2.2 Processes and Materials** states:

"*.. BWXT NEC also can periodically ship pellets to the United States of America for use in Boiling Water (BWR) commercial power reactors*"

- **Fact**: BWRs can only use **enriched** fuel.
- **Question**: Will the Applicant manufacture enriched pellets and ship them to the USA?

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Risks of Fire and Flooding at Toronto

- Two unplanned events involving potential for fire(2017) and flooding coincident with prolonged power outage (2018)
- Contaminated water was collected and processed through the Building's Water Effluent Treatment System.
- **Question**:
  - Where was the contaminated water released? Has it been released in the city sewer/storm system?
  - Was public informed of the methods of disposing of contaminated effluents?

Peterborough Facility

Observations

Pelleting in Peterborough:
Impact on Design and Emission

- At **Peterborough**, only a **single** uranium process emission point exists which is used to open and empty welded fuel elements.
- At **Toronto**, there are **six** stacks that filter uranium dust and exhaust to the atmosphere due to the fuel pelleting operations.
- Uranium emissions are expected to **increase** from the combined pelleting operations and fuel bundling process.
- Emissions are controlled by the **design** of machines, material handling equipment, and dust collection systems.

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A New Design Requires a Safety Analysis Report (SAR)

The Class I Nuclear Facilities Regulations (CINFR)

Section 5(f):

Requires that an application to construct a Class I nuclear facility include a preliminary SAR and

Section 6(c)

Requires that an application for a licence to operate include a final SAR. A safety analysis must include an analysis of the postulated sequences and consequences of conditions that could arise from initiating events and associated hazards (*See details in Note*)

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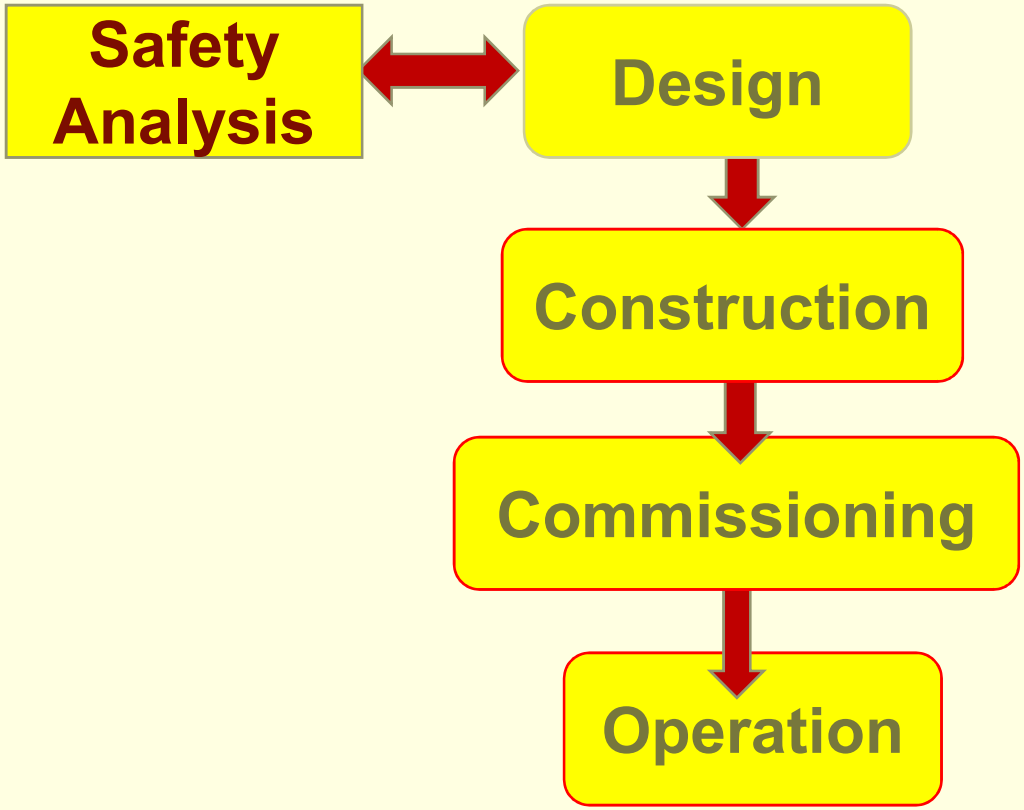
Safety Analysis should be performed during the Design

IAEA Safety of Nuclear Fuel Cycle Facilities No. SSR-4

Section 6.65

" The safety analysis and the design are **interactive and iterative processes** undertaken to ensure an adequate level of safety"

Safety Analysis and Facility Development Phases



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Is it a Modification or a new Design?

IAEA Safety of Nuclear Fuel Cycle Facilities No. SSR-4

Section 3.3: (Footnote 8)

"Although the utilization and modification of nuclear fuel cycle facilities are activities that are normally included under operation, in some cases they are considered separate stages in the authorization process, ……

CNSC Authorization Without Completed Safety Analysis

- CNSC staff recommend that the Commission take the following actions:
  - Renew the licence held by BWXT to operate its two facilities for a period of 10 years, with **authorization to conduct pelleting operations** at the Peterborough facility.

Issues Arising from the New Facility Configuration

1. No SAR submitted for the new facility configuration

The BWXT application **does NOT include an SAR** for the proposed newly constructed/ modified facility that merges two distinct processes:

New pelleting +**existing** fuel bundle manufacturing, creating a new plant configuration.

Rather,

The application included updated SARs for two separate facilities in Toronto and Peterborough.

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2. CNSC's Authorization: Not based on SAR

"BWXT's request for authorization to conduct pelleting operations at the Peterborough facility is acceptable, as:

- The requested activities are **within this facility's current operating limits.**
- BWXT has the required management system programs and resources in place to implement pelleting operations at the Peterborough facility.
- The **hazards** associated with the proposed activities are well characterized and controlled, and
- BWXT's operations would remain protective of the public and the environment."

- **Question**: How can hazards be characterized or limits be derived without completing first the safety analysis of the new configuration?

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3. CNSC assessment not based on new integrated configuration

- "*CNSC staff evaluated the information provided in the SARs for* ***both*** ***the Toronto and the Peterborough facilities*** *and determined that BWXT has adequately assessed the hazards associated with licensed activities and has demonstrated an adequate level of protection over a broad range of operating conditions*."
- CNSC assessment was based on **two old** existing design configurations and **NOT the new** integrated configuration

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4. CNSC's stack re-evaluation not conducted at the design stage

- "*The stack re-evaluation would be reviewed by CNSC staff* ***prior of the conduct of pelleting operations*** *to assure adequate protective measures are in place*."
- Re-evaluation of the stack should be conducted **much earlier at the design stage**, taking into account safety analysis predictions of hazards and their consequences.
- Re-evaluation **just prior to operation** does not allow correction of design deficiencies that may be identified.

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Summary of Issues

1. BWXT did not submit an SAR for the proposed new integrated facility configuration at Peterborough.
2. CNSC accepted BWXT's request for authorization to conduct pelleting operations at the Peterborough facility based BWXT's past performance and not based on new safety analysis.
3. CNSC assessment was not based on new integrated configuration at Peterborough facility.
4. CNSC's stack re-evaluation is not conducted at the design stage, but planned to be contucted prior to operation.

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Recommendations of

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1. **Modify the proposed licence condition 5.2 to require the Applicant to submit:**
   a. **A preliminary Safety Analysis Report (SAR) for the Peterborough plant covering the new configuration that includes the pelleting process. The SAR is to be submitted for approval by the CNSC 90 days before the implementation of any modifications to the existing facility at Peterborough.**
   b. **A final SAR for approval by the CNSC following the commissioning and prior to the operation of the facility.**
2. **The CNSC to expedite issuing REGDOC 2.4.4 "*Safety Analysis for Class 1B facilities*.**

Background Notes

What is Safety Analysis?

Safety analysis is a systematic evaluation of the potential hazards associated with the conduct of a proposed activity or facility and considers the effectiveness of preventative measures and strategies in reducing the effects of such hazards.

Contents of Safety Analysis Report

IAEA Safety of Nuclear Fuel Cycle Facilities No. SSR-4
Section 3.6 – 3.7

- Any restrictions on inputs to and outputs from the facility
- The application of the safety principles and criteria in the design for the protection of workers, the public and the environment.
- Analysis of the hazards associated with the operation of the facility
- Demonstration of compliance with the regulatory requirements and criteria.
- Analyses of accidents and of the safety features incorporated in the design for preventing accidents or minimizing the likelihood of their occurrence and for mitigating their consequences in accordance with the concept of defence in depth.
- Identification of the safety functions, associated safety limits and items important to safety

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