



Supplementary Information

Presentation from the Radiation Safety Institute of Canada

In the Matter of the

Ontario Power Generation Inc.

Applicability of the Darlington New Nuclear Project environmental assessment and plant parameter envelope to selected reactor technology

Commission Public Hearing

January 2024

Renseignements supplémentaires

Présentation de l'Institut de radioprotection du Canada

À l'égard d'

Ontario Power Generation Inc.

Applicabilité de l'évaluation environnementale et de l'enveloppe des paramètres de la centrale à la technologie de réacteur sélectionnée pour le projet de nouvelle centrale nucléaire de Darlington

Audience publique de la Commission

Janvier 2024

Applicability of the Darlington New Nuclear Project environmental assessment and plant parameter envelope to the BWRX-300

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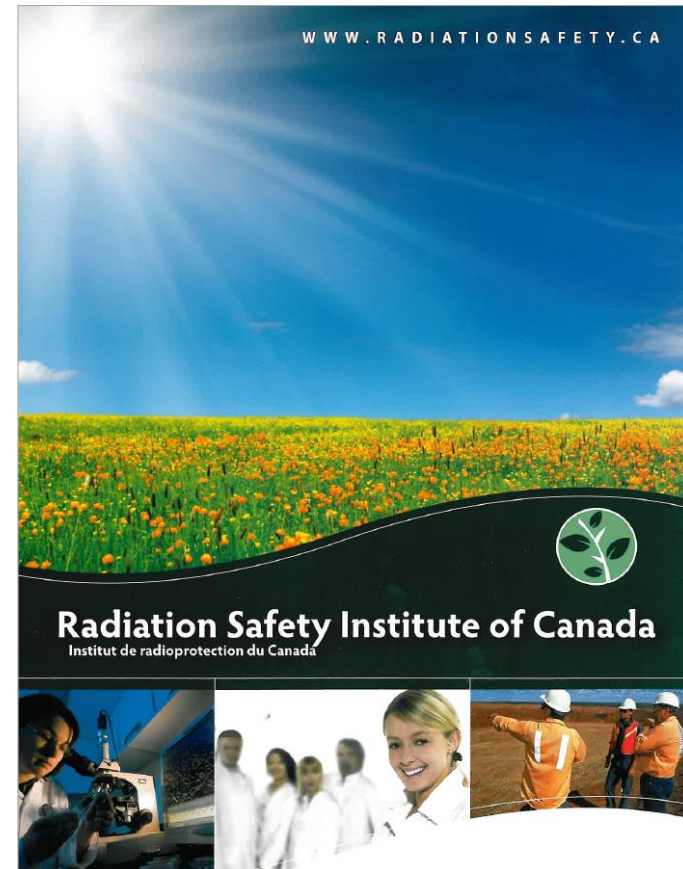


January 2024

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- The Radiation Safety Institute of Canada
 - Who we are
 - What we do
- Public concerns to be addressed:
 - Radioactive waste
 - Airborne radioactive emissions

- Independent
- Not-for-profit
- Charitable organization
- Sole concern is radiation safety



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**Radiation Safety
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Education

- Professional Certificate Courses in Radiation Safety
- Worker and Awareness Education
- Tailor-made Courses



Consulting

- Radiation Safety Workplace Audits
- CNSC Licence Support
- EMF Surveys and X-Ray Equipment Inspections



Laboratory

- Radon testing
- Personal Alpha Dosimetry
- Instrument Calibration
- Leak Testing



Awareness

- Free Information Service in Radiation Safety
- Public Education
- Public Policy

Free of charge information service in radiation safety:

Toll free line: 1-800-263-5803

Website: www.radiationsafety.ca

Email: info@radiationsafety.ca

- Two things:
 - RSIC is *only* concerned with radiation safety
 - We believe that radiation safety is the *prime public concern* with an environmental assessment of a nuclear reactor
- The majority of the DNNP material is not directly related to radiation safety issues, but rather to environmental issues that would arise regardless of the structure being constructed

- In reviewing the material, RSIC focused on issues related to the BWRX-300 that could lead to greater radiation exposures to workers and the public than other reactor choices
- We were aware that, regardless of reactor choice, members of the public were concerned about possible increased release of airborne radioactive contaminants and increased problems with solid radioactive waste

Reactor	EPR	AP1000	ACR-1000	EC6	BWRX-300
MWe(net)	1580	1037	1085	686	300
Airborne Radioiodine (Bq/y)/MWe	9.53E+05	1.86E+07	1.47E+04	2.33E+04	6.44E+07
Airborne Total (without H-3)/Mwe	1.12E+12	3.95E+11	5.47E+10	5.44E+10	7.33E+10
Airborne Total (H-3)/MWe	4.22E+09	1.25E+10	4.61E+10	3.57E+11	3.23E+09

Airborne source term scaled by net MWe of each reactor: data from Table 4.1. Note that the BWRX-300 has the *highest amount of airborne radioiodine per MWe*, but has less airborne emissions than other reactors when all radioisotopes are considered

Solid waste activity produced

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Reactor:	AP1000	ACR-1000	EC6	BWRX-300
MWe(net)	1037	1085	686	300
total solid waste (Bq/y)	6.16E+13	1.48E+14	7.64E+13	4.92E+13
total solid waste per net electrical energy (Bq/y)/Mwe	5.94E+10	1.36E+11	1.11E+11	1.64E+11

From the table above, the BWRX-300 will produce more active waste per unit of power produced than any of the other reactors considered

- One way of comparing different waste “source terms” (i.e., different combinations of radioisotopes emitted as waste) is to compare the calculated “unconditional clearance level” for each waste source term
- For example, some radioisotopes, such as Iron-55 (Fe-55), have a large unconditional clearance level (1000 Bq/g), while others, such as Cobalt-60 (Co-60) have small unconditional clearance levels (e.g., 0.1 Bq/g)

Reactor	Solid waste unconditional clearance level (Bq/g)
ACR-1000	0.87
AP-1000	0.32
EC6	0.87
BWRX-300	0.25

Unconditional clearance levels calculated for the solid waste source term provided in Table 4.5 of N-REP-01200-1000

Note that the lower the unconditional clearance level, the greater likelihood that materials that have only minor contamination would need to be considered as “radioactive waste” and need special handling and disposal procedures

The BWRX-300 source term is the least favourable of the 4 reactor solid waste terms

- BWRX-300 produces more solid waste per unit of electrical energy produced than the other reactors considered
- There are concerns that SMRs do not reduce the generation of geochemically mobile fission products from spent nuclear fuel and as result will add to the management challenges of onsite dry storage of used fuel and disposal.
- Given the suspected impact on nuclear waste management and disposal we would suggest that a detailed breakdown of the design parameters be submitted for the used fuel storage facility, to improve the confidence on all safety concerns surrounding repository design integrity and to further assert that these issues will not affect the conclusion of the EIS.

- Based on a review of the PPE and EIS, assuming all planned mitigation procedures are implemented, the BWRX-300 appears to be an acceptable choice within the confines of the presented PPE
- The Darlington New Nuclear Project environmental assessment appears to the RSIC's reviewers to be applicable to OPG's selected reactor technology
- The one proviso is that the selection is a unit that releases more radioactive material per unit of electrical power produced than other potential units, which could be of public concern

Thank you



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