REGDOC-2.5.2, *Design of Reactor Facilities*, Version 2

Comments received from public consultation / Commentaires reçus dans le cadre du processus de consultation

REGDOC-2.5.2, *Design of Reactor Facilities*, Version 2 was posted for consultation from January 19 to May 20, 2021.

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1.	Terrestrial Energy Inc. (TEI)	General changes	In this draft version 2 of REGDOC-2.5.2 (including its posted summary), CNSC has clarified that the scope of the document contains regulatory requirements and guidance only for the design of new water-cooled reactor facilities. It can thus be inferred that this draft version 2 is not applicable to non-water-cooled (new) reactor facilities. The title of REGDOC-2.5.2 should be changed to "Design of Water-Cooled Reactor Facilities" to avoid confusion.
2.	Canadian Nuclear Laboratories, NB Power, Ontario Power Generation (OPG), and Bruce Power	General Changes	This initial draft does not follow the CNSC's usual practice of having REGDOCs serve standalone documents. It contains multiple references to other documents, standards and codes, many of which are either outdated or superseded by newer versions. Often, they are not linked to specific requirements and guidelines, which make their purpose and value unclear. Suggested Change: For future drafts, CNSC staff is urged to minimize or delete references – including document revision numbers – to ensure they will remain relevant through the review cycle of this REGDOC. Consideration should be given to only listing references in the body of the document that are applicable to REGDOC-2.5.2. An appendix could then be added to list the non-applicable references. MAJOR comment Impact on Industry: Citing multiple, outdated references is an error-likely situation that generates confusion and increases the risk of compliance issues. Designers will be better served if this REGDOC contain only reactor facility design requirements and references to a few, truly relevant documents. All other information should be addressed in the construction license, as per REGDOC-1.1.2: Licence Application Guide: Licence to Construct a Reactor Facility, or catalogued in an appendix. To aid CNSC staff during its next editing round, industry has listed several outdated or incorrectly referenced documents below: •Section 2.2.4, update the reference to "CNSC, REGDOC-2.3.2 Version 2, Accident Management: Severe Accident Management Programs for Nuclear Reactors, Ottawa, Canada, 20135" •Section 2.2.4, update the reference for IAEA NS-G-2.15 to "International Atomic Energy Association (IAEA), Specific Safety Guide NS-SG-2.154, Severe Accident Management Programmes for Nuclear Power Plants, Vienna, 20019" •Section 3.1, update the reference to "CSA Group, N286, Management system requirements for nuclear facilities." Also update to indicate that CSA N286.7 and N286.7.1 have been merged. •Section 3.7, CNSC, RD/GD-369 has been superseded. Update reference to REGDOC-1.1.2 •Section 4.4, under Additional information, 2nd bullet, update to current CSA standard: "Guidelines for calculating

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			the radiological consequences to the public of a release of airborne radioactive material for nuclear reactor accidents." •Section 4.5, Additional information , update to latest applicable REGDOC-1.1.1, Site Evaluation and Site Preparation for New Reactor Facilities. •Section 5.2.4, Additional information, Reference to CNSC guidance document is outdated and reference should be to REGDOC-2.11.2 (Published January 2021) • Section 5.4.2, Additional information, 2nd bullet, update to include reference to latest applicable REGDOC-1.1.1, Site Evaluation and Site Preparation for New Reactor Facilities. •Section 5.4.2, Additional information, 4th bullet, update to include reference to latest applicable standard: National Building Code of Canada, Ottawa, Canada, 2015.- Section 5.6, Guidance, update to include reference to latest applicable REGDOC-2.6.1, Reliability Programs for Nuclear Power Plants. •Section 5.8, Additional information, 2nd bullet, the active standard is CSA N290.13 Environmental qualification of equipment for nuclear power plants •Section 5.12.1 specifies the NFCC and NBCC 2010 editions. Do not cite versions to ensure REGDOC remains relevant through its review cycle period. •Section 5.17, Additional requirements, update to reference to latest applicable REGDOC-2.6.3, Aging Management. •Section 5.20, Additional information, 2nd bullet, update to reference REGDOC-2.10.1, Nuclear Emergency Preparedness and Response, Version 2. • Section 5.21, Additional information, 2nd bullet, update to include reference to latest applicable REGDOC-2.2.5, Minimum Staff Complement. • Section 5.21, Additional information, 3rd and 4th bullets, update to reference to latest applicable REGDOC-2.5.1, General Design Considerations: Human Factors. •Section 5.21, Additional information, 5th bullet, update to reference to latest applicable REGDOC-2.2.1, Human Factors. •Section 5.22.3 Guidance, update to include reference to active standard CSA N291, Requirements for safety-related structures for nuclear power plants. • Additional information, 5th bullet, update to reference latest applicable REGDOC-2.12.1, High-Security Facilities, Volume II: Criteria for Nuclear Security Systems and Devices- Additional information, 6th bullet, update to reference latest applicable REGDOC-2.2.4, Fitness for Duty, Volume III: Nuclear Security Officer Medical, Physical, and Psychological Fitness • Additional information, 7th bullet, update to reference latest applicable REGDOC-2.12.3, Security of Nuclear Substances: Sealed Sources and Category I, II and III Nuclear Material, Version 2.1 • Additional information, 8th bullet, update to reference latest applicable REGDOC-1.1.1, Site Evaluation and Site Preparation for New Reactor Facilities • Additional information, 9th bullet, update to reference latest applicable REGDOC-2.12.3, Security of Nuclear

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			Substances: Sealed Sources and Category I, II and III Nuclear Material, Version 2.1 • Section 5.23, Additional information, 1st and 2nd bullets, update to reference latest applicable REGDOC-2.13.1, Safeguards and Nuclear Material Accountancy. • Section 5.24, Additional information, 1st bullet Update to include reference to latest applicable REGDOC-2.11.2, Decommissioning. • Section 6.10.4, Additional information, 3rd bullet, update to reference latest applicable REGDOC-2.10.1, Nuclear Emergency Preparedness and Response, Version 2- Section 6.11, • Additional information, 1st bullet, update to reference latest applicable REGDOC-2.11, Framework for Radioactive Waste Management and Decommissioning in Canada • Section 6.12, Guidance, update to reference latest applicable REGDOC-2.4.3, Nuclear Criticality Safety, Version 1.1 (which superseded both documents). • Section 7.3, Additional information, 1st bullet, update to reference REGDOC-1.1.1, Site Evaluation and Site Preparation for New Reactor Facilities • Section 7.3, 2nd bullet, update reference to REGDOC-1.1.2, Licence Application Guide: Licence to Construct a Nuclear Power Plant • Section 8.2, Additional information, bullets 1 to 4, update to reference REGDOC-2.9.1, Environmental Protection: Environmental Principles, Assessments and Protection Measures, Version 1.2."
3.	Canadian Nuclear Laboratories, NB Power, Ontario Power Generation (OPG), and Bruce Power	General Changes	Cross references to various sections of the document are not properly cited. Suggested Change: Industry recognizes this is an initial draft that will be editorially reviewed ahead of publication. To help that process, licensees have compiled the list of incorrect references below: •Section 2.2.3, last line, “The safety analyses are discussed in further detail in section 9.0.” There is no specific discussion about safety analyses in section 9.0. •Section 5.5., Guidance says “in accordance with the criteria in section 7.1.” This should be section 5.1. •Section 4.4, final paragraph points readers to section 4.2.1 and 4.2.2. This should be sections 2.2.1 and 2.2.2 •Section 5.2, final sentence refers readers to sections 6.1.2 and 6.1.3. This should be sections 5.1.2 and 5.1.3 Section 5.3.1, Reference of OLCs in the section is incorrectly quoted as 4.3.3. This should be section 2.3.3. Section 5.3.1, Guidance says, “and will meet the requirements of section 4.1.1 of this regulatory document.” This should be section 2.1.1- Section 5.3.2, Anticipated operational occurrences, reference to section 4.2.1 should be replaced with 2.2.1 • Section 5.3.2, says “dose acceptance criterion provided in section 4.2.1.” This should be section 2.2.1. Section 5.3.2 Guidance “In accordance with the requirements of section 4.3.1” This should be section 2.3.1. • Section 5.3.3, says “DBA will not exceed the dose acceptance criterion provided in section 4.2.1.” This should be section 2.2.1. • Section 5.3.3, the 2nd sentence refers readers to section 4.2.1. This should be section 2.2.1 • Section 5.3, Guidance section says “see also section 7.3.2 … for guidance common to AOOs and DBAs.” This

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			should be section 5.3.2- Section 5.4 says "For further information on the safety analysis for the identified PIEs, refer to section 9.0 of this document." There is no specific discussion about safety analyses in section 9.0. Should this be section 7? • Section 5.4.1, Guidance -"civil design takes into account loads generated by internal hazards in the environmental loading category consistent with section 7.15." This should be section 5.15. • Section 5.4.2 Guidance -"Malevolent acts, including aircraft crashes, are considered separately in section 7.22." This should be section 5.22. • Section 5.12.3 – Guidance "As indicated in section 7.12.2" and "detailed in section 7.12.3." Correct section numbers are 5.12.2 and 5.12.3, respectively. • Section 5.12.3 Environmental protection and nuclear safety – Guidance says, "As indicated in section 7.12.2, the NBCC and the NFCC cover the minimum…" There is no Section 7.12.2 in this REGDOC • Section 5.13.1"as described in section 7.3.4." Correct section to cite is 5.3.4. • Section 5.15.1, Guidance says "… can be found in sections 7.13 and 7.22, respectively." There are no sections 7.13 and 7.22 in this REGDOC • Section 5.26 says "Further requirements for the design of experimental devices are in section 8.1.1." Correct section to cite is Appendix B. • Section 6.1.1 Guidance: "reactor core design requirements in section 8.1 are met." Correct section to cite is 6.1. • Section 6.4.2 "Section 7.6.2 requires that the shutdown…" Correct section to cite is 5.6.2- Section 6.5 Guidance: "Section 8.5 requires that the ECCS…" Correct section to cite is 6.5. • Section 6.5 Guidance: "Sections 7.14 and 7.16 describe…" Correct sections to cite are 5.14 and 5.16. • Section 6.6 says, "… any other relevant factors detailed in section 4.4.1 of this document." Correct section to cite is 2.4.1. • Section 6.10.2, Guidance says, "Refer to section 8.10.1 for other applicable design guidance and expectations" Correct section to cite is 6.10.1. • Section 6.14 "requirements in section 8.3" and "requirements set out in section 8.2." Correct sections to cite are 6.3 and 6.2, respectively. • Section 6.14 says "When a steam supply system is installed, the system design shall meet the applicable requirements in section 8.3." There is no section 8.3 • Section 7.3, says "As discussed in section 9.1, the first step of the hazard analysis is to identify PIEs." Correct section to site is 7.1."
4.	Canadian Nuclear Laboratories	General Changes	New requirements and guidelines have been added and none eliminated in this version of REGDOC- 2.5.2. The changes are not extensive, but no plants have been designed and built to meet these requirements. Suggested Change: CNSC staff is urged to confirm:- If they have investigated the practicality of meeting these requirements by comparing to International practices and experiences.- As per comment #1, if it is practical to assume any new water-cooled reactors will be designed, built and operated in Canada with this document in place.

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			MAJOR comment Impact on Industry: While the changes are not extensive, they are likely cost-prohibitive and significantly more difficult to achieve compared to existing requirements.
5.	Canadian Nuclear Laboratories, NB Power, Ontario Power Generation (OPG), Bruce Power	General Changes	This REGDOC could be improved with more consistent use of language and a review schedule aligned with associated documents like REGDOC- 2.4.1, Deterministic Safety Analysis. Suggested Change: For enhanced clarity in future drafts, CNSC staff is encouraged to: Limit the use of words like "also" and "all." In 2.1.2, the reader should not get the impression "all possible accidents" can be considered in the design as this would be a massive set. Words like "practical" should be used. Similarly, phrases like "will be below prescribed limits" should be "are to be below." In section 2.2.2, the use of the word "all" in the phrase "all event sequences" -- and the lack of a cut-off frequency --makes this an excessive requirement to document. Apply consistent terminology throughout its documents. For example, in Section 1.2 conventional safety or protection is discussed but Section 2.1 does not include conventional protection as one of the three complementary safety objectives. Section 2.1 refrains from mentioning worker protection. Amend its document review cycle. REGDOC- 2.5.2 is being revised yet REGDOC-2.4.1, Deterministic Safety Analysis does not have the same revision schedule. To avoid a configuration mistake between these documents, each should be produced as a stand-alone, self-contained REGDOC to avoid future confusion.
6.	Candu Energy Inc.	General Changes	The REGDOC does not achieve clarity on the implication of adding a new facility to a site with existing facilities. The document should clearly define what requirements would have to be shown to be met by a site as a whole when a new reactor design is proposed to be added to a site (i.e., accounting for the impact of existing reactor facilities on the site), and what requirements apply only to the new reactor facility design. Suggested Change: Suggest a new section, distinct from General Design Requirements and from System-Specific Requirements, called Site Requirements. Suggest that General Design Requirements be renamed Overall Reactor Facility Requirements." Impact: Without a clear definition of how to manage multifacility sites, new build prospects in Canada may be severely curtailed.
7.	A. Lee, AG Lee Consulting	General comment	The change in terminology from "nuclear power plants" to "reactor facilities" needs to be closely reviewed throughout the document because the term "plant" is used throughout the text from REGDOC-2.5.2 version 1.Also some clarification is needed to clarify "reactor facility" versus "nuclear power plant" when merging RD-367 with REGDOC-2.5.2 version 1. REGDOC-3.6 has the following definition for "reactor facility": "Any fission or fusion reactor, including structures, systems and components: • that are necessary for shutting down the reactor, ensuring that it can be kept in a safe shutdown state • that may contain radioactive material and which cannot be reliably isolated from the reactor whose failure can

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			lead to a limiting accident for the reactor • that are tightly integrated into the operation of the nuclear facility - that are needed to maintain security and safeguards." Also, REGDOC-3.6 has a definition for "nuclear facility": that includes "a nuclear fission or fusion reactor or subcritical nuclear assembly," and "where applicable, the land on which the facility is located, a building that forms part of, or equipment used in conjunction with, the facility and any system for the management, storage or disposal of a nuclear substance. By making a change in terminology to "reactor facility" from "nuclear power plant" an inconsistency with the Nuclear Security Regulations may be introduced. Section 1 in the Nuclear Security Regulations states "nuclear power plant means a nuclear facility consisting of any fission-reactor installation that has been constructed to generate electricity on a commercial scale.
8.	A. Lee, AG Lee Consulting	General comment, use of “reactor facility”	The change from "NPP" in REGDOC-2.5.2, version 1 to "reactor facility" needs to consider the differences between the definitions of "reactor facility" and "nuclear facility" in REGDOC-3.6. In particular, the definition of "nuclear facility" differs from the definition of "reactor facility" by including "where applicable, the land on which the facility is located, a building that forms part of, or equipment used in conjunction with, the facility and any system for the management, storage or disposal of a nuclear substance. " The differences in the two definitions have an impact on the scope and extent of application of many design requirements in REGDOC-2.5.2, version 2.
9.	A. Lee, AG Lee Consulting	General comment, use of the term "plant design"	Since REGDOC-3.6 defines "plant design envelope" and "design envelope" identically, it would be better to use the term "design envelope", since it is neutral.
10.	Canadian Nuclear Laboratories, NB Power, Bruce Power, Ontario Power Generation (OPG)	Preface	Pertaining to the preface: Industry has the following additional questions and concerns with the Preface: •Even for a new facility, the design may predate these requirements and its references. •Where the reference to REGDOC-3.5.3 is used to explain the graded approach, it’s unclear whether there is an obligation on the CNSC to record the risk reduction reasons for a decision to add a design requirement to the licensing basis of an existing plant. "Suggested Change: "For added clarity, staff is urged to: 3. Explain how the CNSC would review such an application.4. Clarify the CNSC’s obligation to record the risk reduction reasons for a decision to add a design requirement to the licensing basis of an existing plant. The Preface should make it clear to all readers that requirements of REGDOC-2.5.2 are not to be added to other standards unless they explicitly state that the requirements only apply to new plants and the design basis of existing stations is retained.
11.	P. Hader, Consultant	New paragraph in section 1.2	This paragraph is straightforward, it's meaning is understandable and it does provide clear expectations regarding multi-reactor facility.
12.	Canadian Nuclear	New paragraph in section 1.2	The new text refers to accident conditions rather than DBA or DEC. This is too broad.

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	Laboratories		Suggested Change: Either add a sentence to explain that accident conditions in this design requirements document means DBA and DEC or change the 3rd sentence to read: 'In addition, the applicant shall ensure that the impact on the safety of all reactors on the site due to interactions between reactors, common-cause failure events, and any sharing of SSCs between reactors is assessed for normal operation, anticipated operational occurrences (AOOs), DBA and DEC.'
13.	Canadian Nuclear Laboratories, NB Power, Bruce Power, Ontario Power Generation (OPG)	New paragraph in section 1.2	Industry believes the Scope does not clearly differentiate between new and existing reactors. Specifically, the newly added 4th paragraph is unclear since there is a potential to have one or more reactors at a facility that are already operating. As currently written, this paragraph could mistakenly be read as suggesting existing reactors would be subjected to this REGDOC's requirement. Suggested Change: CNSC staff is urged to: Amend the 2nd sentence of the 4th paragraph so it reads, "The design of each new reactor facility shall also satisfy the safety and design requirements in this document."- Clarify the phrase "on the site." At what distance would CNSC staff assume this requirement does not apply? If, for instance, there is an existing CANDU reactor on site, does the old facility need to meet the requirements of this REGDOC if a new facility is built? Does the old facility also have to provide justification of the impact of the new facility on the existing facilities? MAJOR comment Impact on Industry: Without clarifying that this REGDOC does not impose its requirements on existing reactors, it could challenge any future development at an existing facility and impose significant, potential challenges to an existing licensee.
14.	Candu Energy Inc.	New paragraph in section 1.2	Issue: The new paragraph on multi-reactor sites includes requirements and does not describe the scope of the document in respect to multi-reactor sites. The scope already says that it applies to design of new reactor facilities. Given that there is no qualification to this, it already applies to any design which has more than one reactor on the site. Suggested Change: Delete the paragraph and ensure that the noted requirements are placed in the appropriate sections on safety objectives, definition of initiating events to be considered in design and sharing of SSCs. Impact: Repetition of requirements and inclusion of requirements in Introduction creates risk of noncompliance.
15.	Canadian Nuclear Laboratories (CNL), NB Power, Bruce Power, Ontario Power Generation (OPG)	Section 2	Industry seeks clarification on the following: 1. The 1st paragraph is unclear when it says, 'The safety objectives and concepts described in this section apply to a reactor facility during operation or during an accident.' This can potentially be interpreted as multiple units within the same facility -- or each unit -- being considered a 'facility. Suggested Change: To reduce confusion and increase compliance, staff is urged to: 1. Clearly define reactor facility. Does it mean a facility containing multiple units? Or, does each unit comprise of a facility? For SMRs, multiple units combine to meet the power requirements for a site. Or, in some designs, multiple modules within the same containment are defined as a facility."

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16.	Candu Energy Inc.	Section 2	'The safety objectives and concepts described in this section apply to a reactor facility During operation or during an accident.' -- Elsewhere, the draft states that safety objectives apply to the site. Suggested Change: Section 2 should be revised to align with the CNSC approach on site requirements vs. facility requirements Impact: Without a clear definition of how to manage multifacility sites, new build prospects in Canada may be severely curtailed.
17.	A. Lee, AG Lee Consulting	New text in section 2.2.2	For the SRF, the use of "or" between "any release to the environment that requires temporary evacuation of the local population" and "a release to the environment of more than 1015 becquerels of iodine-131" does appear to be appropriate. The phrase "a release to the environment of more than 1015 becquerels of iodine-131" is an example of specific accident conditions for a CANDU reactor that is the original technical basis for the SRF safety goal in REGDOC-2.5.2. For the LRF, the use of "or" between "any release to the environment that requires long-term relocation of the local population" and "a release to the environment of more than 1014 becquerels of cesium-137" also does not appear to be appropriate. The phrase "a release to the environment of more than 1014 becquerels of cesium-137" is an example of specific accident conditions for a CANDU reactor that is the original technical basis for the LRF safety goal in REGDOC-2.5.2. I also recommend that guidance be added under section 2.2.2 to provide the original basis for the SRF and LRF for use with CANDU reactors and explain describe how other water-cooled reactor technologies are expected to implement SRF and LRF for other reactor technologies that are not based on fuel assemblies in pressure tubes. There is information available in E-doc #3336969-v1, Staff Position on Safety Goals, Ottawa (2007) that can be used to provide the guidance.
18.	Canadian Nuclear Laboratories	New text in section 2.2.2	Licensees have the following major concerns with the subsections on small and large release frequency: 1. The 3rd paragraph in the subsection on large release frequency does not differentiate between sites with existing reactors and new ones. 2. The phrase “any releases” in both subsections is not practical to implement. 3. Evacuation needs are generally based on existing provincial nuclear emergency response plans. The addition of temporary evacuation/long term evacuation to the safety analysis frequency may differ from province to province, which may be a limiting factor for design from one province to another. In Ontario, the PNERP is reviewed and revised every five years. The temporary evacuation/long term relocation values could change, which may become very limiting to the licensee as written. 4. As per comment #1, the large release frequency section needs to be clarified for applicability to reactor types which use fuel in forms that are not like the typical solid form factor structure (e.g. molten, graphite pebbles, etc.). Suggested Change: Staff is urged to: 1. Amend the 3rd paragraph to read, “The applicant shall ensure that the impact on the safety of new reactors on the site

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			due…" 2. Remove the phrase "any releases" from future drafts and provide more guidance as to how scenarios leading to such releases can be quantified. 3. Clarify the applicability of functional containment designs and Emergency Planning Zone (EPZ) concepts. The draft needs to define the boundary of the EPZ to make this requirement meaningful. Amend the 5th paragraph to read, "The sum of frequencies or a release to the environment of ...". Amend the 6th paragraph to read, "The sum of frequencies of the local population or a release to the environment of …" 4. Explain how licensees can define core damage frequency for reactors where fuel may not fail even for the worst case accident? Or if the fuel is already in molten condition? MAJOR comment Impact on Industry: Without changes, compliance to these subsections would be challenging. Specifically: 1. As per previous comments, this REGDOC should differentiate between sites with operating reactors versus completely new sites. Or, it should provide some guidance on how far operating reactors can be separated without impacting the requirements on existing reactors. 2. The term "any release" is not a hard, concrete limit that can be assessed, measured or predicted so it can be reported and prevented. In Ontario, temporary evacuation is determined based on the PNERP Protection Action Limits (PALs). Any release threshold should be defined in agreement with the PALs values. Also, some more guidance as to how such scenarios leading to such releases can be quantified would be necessary to make the implementation of this requirement practical. 3. As written, this requirement may vary for licensees from province to province as evacuation needs are generally based on existing provincial nuclear emergency response plans. Additionally, with no reference to revision/version, these plans may change over time when revisions are made to various provincial plans. 4. Industry needs to understand the applicability of this REGDOC to non-water cooled reactor designs.
19.	Canadian Nuclear Laboratories, Bruce Power, NB Power, Ontario Power Generation (OPG)	New text in section 2.2.2	Licensees seek additional clarifications regarding the section on safety goals: 1. It's unclear what is considered short-term and long-term relocation. 2. The small release frequency goal reads more like a short-lived release frequency than a small release frequency. 3. Requiring temporary evacuation of the local population as a quantitative safety goal depends on the dose/risk averted, which depends on the direction of the wind and other meteorological conditions. 4. The long-term relocation release and the Cs-137 release are not the same frequency. The long-term relocation release and the Cs-137 release are not the same frequency. 6. There is a typo at the end of the 1st paragraph in the guidance section "…Level 1 PSA is "sufficiency low" Suggested Change: Clarify: 1. What is considered short-term and long-term relocation. 2. The small release frequency goal should be two sentences. The temporary evacuation release and the I-131 release are two related but unequal goals. 3. Whether the probability of exceeding the evacuation dose is to be calculated for each event sequence and the

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			conditional probability of evacuation for a projected local population for each event is to be multiplied by the event's frequency of occurrence when summed (convolved) with other event sequences. 4. The large release quantitative goal. 6. Change to “sufficiently low”
20.	Candu Energy Inc.	New text in section 2.2.2	Issue: 'The applicant shall ensure that the impact on the safety of all reactors on the site due to interactions between reactors, common-cause failure events, and any sharing of SSCs between reactors is assessed for normal operation, AOOs and accident conditions.' Suggested Change: Section 2 should be revised to align with the CNSC approach on site requirements vs. facility requirements Impact: Without a clear definition of how to manage multifacility sites, new build prospects in Canada may be severely curtailed.
21.	Candu Energy Inc.	New text in section 2.2.2	Issue: Definitions of small release and large release should be singular. Either defer to local emergency regulations related to temporary evacuation/long term relocation OR establish a national standard for these thresholds. Suggested Change: Maintain specific activity thresholds Impact: Complicates compliance
22.	P. Hader, Consultant	New section 2.4	The paragraph needs to include a requirement to document the graded approach that is applied, if a graded approach is being applied. This is to ensure there is clarity in the application of the graded approach being applied.
23.	A. Lee, AG Lee Consulting	New section 2.4	The inclusion of "could" is unnecessary in "When a graded approach is applied, factors to be considered could include: " I recommend deleting "could". I also recommend that a bullet point be added for "design of a multi-reactor site".
24.	Canadian Nuclear Laboratories, Ontario Power Generation (OPG), Bruce Power, NB Power	New section 2.4	The new section on graded approach points to REGDOC-3.5.3, Regulatory Fundamentals, which is rather generic and open to interpretation for applicability to all design features of the reactor, including core damage frequency and operator action times. This may not be the intent of the graded approach philosophy. Suggested Change: Amend this section to provide more specific guidance on what a successful graded approach should look like to meet regulatory expectations. For example, what should some of the important steps or key elements of the systematic method or process need to address? What would the acceptance criteria be to satisfy the regulatory expectations for a graded approach? Core damage frequency should be a definite measure for the graded approach. So should the time for an operator to take a required, mitigating action following a DBA. This is an excellent list to be used to evaluate and use graded approach for non-water cooled reactors. For non-water cooled reactors, where EPZ is at the site boundary and functional containment concept is acceptable, these should also be considered as factors in the applicability of graded approach.

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25.	Canadian Nuclear Laboratories, Ontario Power Generation (OPG), Bruce Power, NB Power	Section 2.4.1	As per comment #1, the bulleted list of factors to consider when a graded approach is applied is incomplete and fails to connect to the overall objectives. It should include consideration of types and effectiveness of inherent and passive safety features. As current SMRs introduce a number of inherent safety features, this can be used as a basis for using a graded approach on the traditionally used safety requirements. Suggested Change: Amend the section to: Include inherent and passive features on the list of justifications for application of a graded approach.- Make each bullet into a sentence to allow for more clarity. For example, does it mean that if the power is less than 1 MW then the SRF and the LRF requirements are screened out on the basis that their I-131 and Cs-137 inventories are insufficient to reach their release thresholds? Does it mean that fuel handling events involving a couple of fuel bundles are screened out of the safety goal analysis? Does it mean that if the reactor cannot be refuelled, does not have highly enriched fuel and has no facility for irradiating heavy water, etc. that safeguard requirements are screened out? MAJOR comment Impact on Industry: As written, the draft does not fully reflect modern SMR designs that include many innovative, inherent and passive safety features.
26.	Candu Energy Inc.	Section 2.4.1	Issue: This section creates differences from REGDOC-3.5.3 Suggested Change: Delete 2.4.1. We consider the factors identified to be a good suggestion, though and recommend that they be included in REGDOC-3.5.3. Impact: Complicates compliance
27.	A. Lee, AG Lee Consulting	New section 5.22.5	By adding a new section on prescribed information relating to the physical security protection system, inexperienced users of the NSCA and Regulations may not fully understand the applicability of section 21(1) (a) and (b) of the General Nuclear Safety and Control Regulations. Section 21(1) (a) and (b) refer to aspects of a nuclear weapon or nuclear explosive device , and some users of REGDOC-2.5.2, version 2, may not associate the design of their reactor facility with aspects of a nuclear weapon or nuclear explosive device. It may be useful to add some guidance to clarify the applicability of section 21(1) (a) and (b) of the General Nuclear Safety and Control Regulations. Also, prescribed information is defined in section 1(4) of the Nuclear Non-Proliferation Import and Export Control Regulations with respect to import and export of controlled nuclear information. It would be useful to include some guidance on this aspect of prescribed information since many SMR vendors are based outside of Canada, but are seeking to build their reactor facilities in Canada.
28.	Canadian Nuclear Laboratories, Bruce Power,	New section 5.22.5	Industry seeks several clarifications and suggestions regarding the sentence on Prescribed Information. Suggested Change: Staff is urged to: 1. Clarify what it means to be ‘encompassed’ e.g. “Prescribed information to be encompassed by the physical security

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	NB Power, Ontario Power Generation (OPG)		protection system for the reactor facility shall be identified…" 2. Change the phrase 'Physical Security Protection System' and use 'Physical Protection System instead. The latter is used in SOR/2000-209. e.g. "Physical Protection System – all of the physical protection measures in place at a nuclear facility." 3. Consider that the term 'nuclear facility' is used throughout SOR/2000-202 and -209, while REGDOC 2.5.2 uses 'reactor facility' 4. Clarify what it means to be 'complete and in compliance'? What about just 'in compliance'? e.g. "Prescribed information …shall be complete and in compliance with section 21(1)" "
29.	Canadian Nuclear Laboratories, Bruce Power, NB Power, Ontario Power Generation (OPG)	New section 5.22.5	Prescribed information is too broad. Qualify the statement to be design related prescribed information only
30.	Canadian Nuclear Laboratories, Bruce Power, NB Power, Ontario Power Generation (OPG)	New section 5.25	Regarding the 'Provision for Extended Shutdown,' this new requirement is best handled by the operators and not the designers since the operators maintain the chemistry of the water and air around the fuel depending on the shutdown state. Suggested Change: Remove the clause. MAJOR comment Impact on Industry: This new requirement would increase the complexity of the systems interfacing with the fuel or the fuel itself.
31.	Canadian Nuclear Laboratories, Bruce Power, NB Power, Ontario Power Generation (OPG)	New section 5.25	Licensees seek additional clarity on the passage which reads, 'Provision shall be made in the design to meet the needs arising in long shutdown periods, such as the needs for maintaining the conditions of the nuclear fuel, the coolant or the moderator; for the inspection, periodic testing and maintenance of the relevant SSCs of the facility; and for providing physical protection. Special consideration shall be given to long-lived neutron poisons, which may affect the restarting of the reactor. 'This needs to be clarified in the context new reactors at a facility where existing reactors maybe undergoing extended shutdowns for refurbishments or decommissioning. Suggested Change: Clarify applicability of this provision for existing reactors at a facility during various stages of lifecycle (e.g. maintenance outages, refurbishment, decommissioning, etc.)
32.	Candu Energy Inc.	New section 5.25	Issue: Extended shutdown is an ill-defined term. The definition of normal operation in 5.3 already includes the shutdown state with a requirement to define a set of requirements and limitations and the guidance includes that the

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			permissible periods of operation at different configurations be identified. Suggested Change: Delete 5.25 Impact: Open ended requirement complicates compliance. Also, the material is redundant to existing requirements.
33.	A. Lee, AG Lee Consulting	New section 5.26	The new section 5.26 would be better placed as a new subsection under section 3.3, Design control measures.
34.	A. Lee, AG Lee Consulting	New section 5.26	The new section 5.26 should be placed immediately after section 5.11, Guaranteed shutdown state, like it is in RD-367.
35.	Ultra Safe Nuclear	New section 5.26	Pertaining to the last paragraph in this section: "Vendor intention is not to include the Adjacent Plant into the Nuclear Safety Case Suggested Change: To start the sentence 'Where required… '. MAJOR comment Impact on Industry: Including independent adjacent facilities making use of heat, steam or power produced by the reactor facility within the scope of Nuclear License will affect the licensing times durations and cost.
36.	Terrestrial Energy Inc. (TEI)	New section 5.26	In last paragraph of section 5.26 (on page 84) it is stated that 'The safety case shall also be made with consideration of utilization or modification of equipment that is not part of the reactor facility (e.g., independent adjacent facilities making use of heat, steam or power produced by the reactor facility)'. It is not clear what is meant by this paragraph/requirement, and what is expected, that would be different than the requirements/expectations for performing external hazard analysis. A clarification/guidance on this aspect from CNSC should be provided in the document.
37.	Canadian Nuclear Laboratories, Bruce Power, NB Power, Ontario Power Generation (OPG)	New section 5.26	Regarding the 'Provision for Utilization and Modification,' it is impracticable to assume the designer of a Nuclear Power Plant can predict every maintenance activity and proposed modification state. This requirement is more for the future Operator to ensure they do not put the reactor in an unanalyzed state. Suggested Change: Move the clause to a REGDOC for operators rather than designers.
38.	Canadian Nuclear Laboratories,	New section 5.26	Licensees believe: 1.the 3rd paragraph is unclear when it says, 'Every proposed utilization or modification of equipment (e.g., experimental devices) included in the reactor facility that may have a major significance for safety shall be designed in

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	Bruce Power, NB Power, Ontario Power Generation (OPG)		accordance with the same principles as applied to the reactor facility.' 2. The term 'experimental devices' in the 4th paragraph should be explained because power reactors do not include experimental devices. Does it include lead test assemblies or carrier bundles for example? Suggested Change: Clarify: 1. The intent of the 3rd paragraph as it doesn't reflect a graded approach. Applying the same standards as an operating reactor goes too far. It should be standards commensurate with the complexity and risk. 2. The 4th paragraph to indicate it does not include testing.
39.	Candu Energy Inc.	New section 5.26	Issue: This new section seems to be associated with changes to existing facilities to use them in novel ways or otherwise modify a design. These seems to be out of scope for this REGDOC, which is for design of new reactor facilities. The requirements seem to be ill-defined – for example, an independent adjacent facility making use of power produced by the facility is the grid. Having the safety case consider utilization or modification of the entire electrical grid seems to not be practical. Also, it is problematic to distinguish "experimental devices that penetrate the reactor boundaries" from any other SSC of the reactor. Lastly, the section refers to a section that does not exist (8.1.1) – presume that Appendix B is what is intended). If something is included in a reactor facility it is part of the facility and already covered by the REGDOC. Suggested Change: Delete 5.26 Impact: Inclusion of redundant, unclear requirement complicates compliance.
40.	Ultra Safe Nuclear	New text in section 6.1	Pertaining to the last paragraph in this section: "Periodic verification requirements to be described in more detail." The proposed requirement will affect designs where the reactor core and vessel are designed not to be opened during operating lifetime.
41.	Canadian Nuclear Laboratories, Bruce Power, NB Power, Ontario Power Generation (OPG)	New text in section 6.1	Licensees have significant concern with the new requirement to avoid prompt criticality as per the final bullet on page 85, which reads, 'The design of the reactor core shall be such that: …prompt criticality is avoided in any postulated accident unless it is demonstrated (e.g. experimentally, operating experience) that the resulting energy deposition does not result in damage to fuel or the reactor coolant boundary.' As per comment #1, avoidance of prompt criticality is not design-neutral. Different reactor designs have different relationships between the degree of supercriticality and period such that prompt criticality is not a universally-applicable threshold. Prompt criticality does not relate to a specific safety concern (whether fissions are caused by prompt or delayed neutrons per se does not change the hazard associated with the resulting fissions, it is the combination of the magnitude and rate of change of the resulting power production that is a potential concern). Also, the requirement to avoid any damage to the fuel is inconsistent with the known possibility of achieving acceptable radiological consequences in a design for which some accidents can involve some number of fuel sheath failures. Suggested Change: Staff is urged to delete the requirement as it is a technology-specific requirement impacting CANDU reactors. A guideline or target would be more practical, with guidance provided with respect to the margin to

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			the ac-acceptance criteria and the extent of the conservatisms in the calculations. MAJOR comment Impact on Industry: As written, this requirement cannot be met or has small margins for some CANDU reactors. The requirement is excessive, as CANDU reactors - which do not meet this requirement - have been shown to be safe and efficient when compared to other societal means of energy production. A designer cannot gain full operating experience to assure the Regulator without being allowed to build a reactor, so it doubtful this example is a practical one. Experiments and experimental reactors would be prohibitively expensive.
42.	Canadian Nuclear Laboratories, Bruce Power, NB Power, Ontario Power Generation (OPG)	New text in section 6.1	Licensees seek further clarification regarding several items in the section on the reactor core. Specifically, the 1st paragraph and its associated bullets are a non-specific desire rather than a 'specific requirement.' The safety margin is not quantified and it is difficult to understand how the safety margins is achieved through defence in depth as Did provides an alternate means to resolve a concern without either of them specify the margin. Suggested Change: Staff is urged to: •Change the title to “Core and system specific requirements” • Clarify whether the acceptance criteria in the yellow shaded text are those in the preceding yellow shaded text “…to ensure the reactor facility …meets the acceptance criteria” • Clarify what is meant by the term “critical experiments,” which is open to a lot of interpretation. • Replace the term “state of the art tools” with “qualified tools.” State-of-art may not be sufficient in some cases, and may not be needed in others. In and of itself, state of the art is meaningless for determining adequacy or appropriateness of codes used in analysis • Clarify “and comparison, where possible, with reactor experiments” to be experimental test reactors, commissioning or OPEX.- Add CSA N286.7 to “The qualification should be based on proven practices for validation and verification, using the acceptable codes and standards.” • Clarify what is meant by 'the use factor.' "
43.	Candu Energy Inc.	New text in section 6.1	‘The design shall provide the following safety functions under normal operation and transient and accident conditions:- prevention of unacceptable transients and instabilities- prevention of progression of AOOs to DBAs- reactor shutdown, as necessary- safe shutdown state of the reactor' The above should not make use of the term 'safety function' as this is already defined differently. The first two bullets are re-statements of the first 3 levels of defense-in-depth, the 3rd and 4th are special cases of the control safety function." Suggested Change: Delete the added text as it is redundant to existing requirements. Impact: Repetition of requirements creates needless complication.

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44.	Candu Energy Inc.	New text in section 6.1	‘The design of the reactor core shall incorporate safety margins as part of defence in depth to ensure that the permissible design limits, taking into account engineering tolerances and uncertainties associated with reactor behaviour under accident conditions, are not exceeded.’ The above is a re-statement of a requirement for Level 1 defense in depth specifically for design of the core. It is redundant. Suggested Change: Delete the new text Impact: Repetition of requirements creates needless complication.
45.	Candu Energy Inc.	New text in section 6.1	‘Appropriate neutronic, thermal-hydraulic, mechanical, material, chemical and irradiation-related considerations associated with the reactor as a whole shall be taken into account in the design of fuel elements and assemblies, reflectors and other core components.’ The above is redundant to the immediately following list of 5 requirements. In addition, use of the terminology 'fuel elements and assemblies, reflectors and other core components' should be aligned with the 'reactor core and associated structures and cooling systems' language that follows, which is clearer and more comprehensive. Suggested Change: Delete the new text Impact: Repetition of requirements creates needless complication.
46.	Candu Energy Inc.	New text in section 6.1	Issue: "power oscillations can be reliably detected and controlled.” This is more stringent a requirement than even the related guidance, which is that ‘Power oscillations that could result in conditions exceeding specified acceptable fuel design limits should be reliably and readily detected and suppressed.' Suggested Change: The requirement should be qualified to oscillations that could result in limits being exceeded, consistent with the guidance Impact: A requirement to detect any oscillation (regardless of magnitude) cannot be met.
47.	Candu Energy Inc.	New text in section 6.1	Avoidance of prompt criticality is not design-neutral. Different reactor designs have different relationships between degree of supercriticality and period such that prompt criticality is not a universally-applicable threshold. Prompt criticality does not relate to a specific safety concern (whether fissions are caused by prompt or delayed neutrons per se does not change the hazard associated with the resulting fissions, it is the combination of the magnitude and rate of change of the resulting power production that is a potential concern). Also, the requirement to avoid any damage to the fuel is inconsistent with the known possibility of achieving acceptable radiological consequences in a design for which some accidents can involve some number of fuel sheath failures. Suggested Change: The requirement should be deleted. The requirement could be reworded to 'in any postulated

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			accident involving supercriticality, the magnitude of reactivity insertion, combined with the changes in the reactor period, shall be such that the resulting energy deposition does not result in core damage.' This is effectively a restatement of the first bullet, and so this entire requirement should be deleted. Impact: New requirement does not contribute to improved safety.
48.	Canadian Nuclear Laboratories, NB Power, Bruce Power, Ontario Power Generation (OPG)	New text in section 6.1.1	Additional clarity is sought in a number of other areas in the section on fuel elements, assemblies and design. Suggested Change: Staff is urged to: 1. Amend the phrase, "These analyses shall be supported by data from experiments and from experience with irradiation" by appending "through destructive and non-destructive inspections conducted periodically." 2. Change "Fuel rod failures could occur during DBAs and DECs, and are accounted for in the safety analysis." To "Fuel rod failures could occur during some DBAs and DECs, and are accounted for in the safety analysis." 3. Clarify the phrase, "The thermal hydraulic design should be such that sufficient margin exists with regard to maintaining adequate heat transfer from the fuel to the reactor coolant system, to prevent unacceptable fuel sheath overheating." It is not always possible to prevent overheating, but the design should limit it. 4. Clarify the newly-added 9th and 10th paragraphs, which read, "Analyses shall be performed to show that the intended irradiation conditions and limits in the reactor core (such as fission density, total fissions at the end of lifetime and neutron fluence) are acceptable and will not lead to undue deformation or swelling of the fuel elements. The anticipated upper limit of possible deformation or other changes shall be evaluated. These analyses shall be supported by data from experiments and from experience with irradiation. There shall be provisions in the design to monitor the integrity of the fuel." This needs to be clarified for applicability for nonsolid nuclear fuels (molten salt reactors) or graphite clad fuel form factors (HTGRs).
49.	Candu Energy Inc.	New text in section 6.1.1	'Analyses shall be performed to show that the intended irradiation conditions and limits in the reactor core (such as fission density, total fissions at the end of lifetime and neutron fluence) are acceptable and will not lead to undue deformation or swelling of the fuel elements. The anticipated upper limit of possible deformation or other changes shall be evaluated. These analyses shall be supported by data from experiments and from experience with irradiation.' The above is redundant to the existing text that states: 'Fuel design limits shall be established to include, at a minimum, limits on fuel power or temperature, limits on fuel burnup, and limits on the leakage of fission products in the reactor cooling system. The design limits shall reflect the importance of preserving the fuel matrix and cladding, as these are first and second barriers to fission product release, respectively. The design shall account for all known degradation mechanisms, with allowance being made for uncertainties in data, calculations, and fuel fabrication.' Suggested Change: Delete the new requirement Impact: Repetition of requirements creates needless complication.
50.	Candu Energy Inc.	New text in section 6.1.1	'There shall be provisions in the design to monitor the integrity of the fuel.' -- This requirement is too broad. Fuel defect monitoring in CANDU is performed with gaseous fission product monitoring and (in some cases) delayed neutron monitoring. These systems cannot detect all aspects of fuel integrity (e.g., a small pinhole defect in a low

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			power element is likely to be undetected). Suggested Change: Suggest 'There shall be provisions in the design to detect loss of cladding integrity that could impact the safety case.' Impact: "Requirements should be achievable.
51.	Candu Energy Inc.	New text in section 6.1.2	'The design shall provide the means for detecting and controlling reactivity...' -- Reactivity cannot be detected as it is not a physical parameter per se. Suggested Change: 'The design shall provide the means for determining and controlling reactivity...' -- This is more correct. Impact: Requirement should be reworded to be more correct.
52.	Canadian Nuclear Laboratories, NB power, Bruce Power, Ontario Power Generation (OPG)	New text in section 6.4	Licensees have significant concerns with the new requirement, which reads, "No single failure in the shutdown system shall prevent the system from fulfilling its safety function when required." This suggests SFC is required for each special safety system. This requirement is excessive given other requirements already specified in such as Sections 5.6, 5.6.1 and 5.6.2. The reliability requirements would make the probability of the SDS being unavailable -- a BDBA event -- yet the designer is forced to treat it using DBA rules. Also, as written, this new requirement is redundant to section 5.6.2, though differences in wording complicate the issue of compliance. The new requirement is also redundant to other existing requirements in Section 6.4, which already calls for at least one means of shutdown being independently capable of fulfilling its function on the assumption of a single failure, with an additional requirement of redundancy in the fastacting means of shutdown if inherent core characteristics are unable to maintain the reactor within specified limits in the event of failure of the first fast-acting means (which applies the single failure criterion to the second shutdown means if it is to be potentially needed for AOOs and DBAs). Suggested Change: Delete this requirement. Common requirements should be put in one place to avoid duplication and confusion. MAJOR comment Impact on Industry: The requirement is excessive as it imposes the SFC in addition to: a) all components of a shutdown system b) all components of shutdown systems, c) two trip parameters where direct parameters are not practicable, d) a maintenance, testing, inspection and repair requirements, based on Section 5.6.2, and e) common cause failures, based on Section 5.6.1. International OPEX shows no reactor in the world can meet these requirements. Section 5.6.2 recognizes there needs to be exceptions to the SFC as not all systems, structures and components.
53.	Candu Energy Inc.	New text in section 6.4	'No single failure in the shutdown system shall prevent the system from fulfilling its safety function when required.' This new requirement is redundant to section 5.6.2, but differences in wording simply complicates the issue of

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			compliance. The new requirement is also redundant to other existing requirements in Section 6.4. (6.4 already calls for at least one means of shutdown being independently capable of fulfilling its function on the assumption of a single failure, with an additional requirement of redundancy in the fast-acting means of shutdown if inherent core characteristics are unable to maintain the reactor within specified limits in the event of failure of the first fast-acting means (which applies the single failure criterion to the second shutdown means if it is to be potentially needed for AOOs and DBAs) Suggested Change: The new requirement should be deleted. Impact: Repetition of requirements creates needless complication.
54.	Candu Energy Inc.	Comment on new text in section 6.4	'Trip parameters shall take into account the effects of SSC aging on effectiveness.' -- This new requirement is redundant to the existing requirement that there shall be no gap in trip coverage within the OLCs for any operating condition, taking into account plant aging. Suggested Change: The new requirement should be deleted. Impact: Repetition of requirements creates needless complication.
55.	Canadian Nuclear Laboratories, NB Power, Bruce Power, Ontario Power Generation (OPG)	New text in section 6.4.1	Licensees have concern with the new requirement, which reads, "Trip parameters shall take into account the effects of SSC aging on effectiveness." Trip parameter set points may need to be adjusted over time to deal with aging. The new requirement is redundant to the existing requirement that there shall be no gap in trip coverage within the OLCs for any operating condition, taking into account plant aging. Suggested Change: Staff is urged to adjust the wording to reflect having an ongoing margin management program, but key aging mechanisms should be identified in design to ensure they can be monitored to ensure effective trip parameter coverage. The designer needs to allow for flexibility in the design for the operators to adjust the trip set points as the interfacing systems age. MAJOR comment Impact on Industry: Having the shutdown system trip parameters design itself account for aging, puts an excessive design requirement on the trip parameters. Without know the interfacing system designs, the trip parameter designer would not know how to account for aging of the interfacing systems.
56.	Canadian Nuclear Laboratories, NB Power, Bruce Power, Ontario Power	New text in section 6.5	Adding the phrase, "When required …" in these sections does not provide guidance to the designer about when the requirement is compulsory. Suggested Change: Was the intent to make this technology neutral and to say an alternate means of cooling is required at all times? The approach of 'when needed' could be used for applicability to other systems described in this document (e.g. using functional containment vs. structural containment) that are CANDU specific or water-cooled reactor

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	Generation (OPG)		specific. However, as per comment #1, this document needs to be technology neutral. This identical comment was also submitted for section 6.6.1.
57.	Candu Energy Inc.	New text in section 6.5	Issue: The addition of "where required" is ambiguous. Suggested Change: Change text to 'Designs in which a DBA involving a loss of reactor coolant that exceeds makeup capability is possible, shall be equipped with an emergency core cooling system (ECCS). This is a safety system whose function to transfer heat from the reactor core for such DBAs.' Impact: Improve clarity of requirement.
58.	A. Lee, AG Lee Consulting	New text in section 6.6	Since confinement is defined as a safety function, the second paragraph should be revised to: "The means of confinement shall be designed to ensure that a release of radioactive material following an accident involving disruption of the core is within acceptable limits. The means of confinement shall include physical barriers designed to prevent or mitigate an unplanned release of radioactive material to the environment during normal operation, AOOs, DBAs and, to the extent practicable, BDBAs." The second and third sentences in the fifth paragraph should be revised to: "The extent to which the means of confinement is automated and the conditions for which its manual overriding is warranted shall be identified. The following features shall be incorporated into the design of the means of confinement".
59.	Canadian Nuclear Laboratories, NB Power, Bruce Power, Ontario Power Generation (OPG)	New text in section 6.6	Licensees seek additional information on the new requirements on containment and means of confinement. Specifically: 1. The 2nd paragraph which says, 'The confinement shall be designed to ensure that a release of radioactive material following an accident involving disruption of the core is within acceptable limits. The confinement shall include physical barriers designed to prevent or mitigate an unplanned release of radioactive material to the environment during normal operation, AOOs, DBAs and, to the extent practicable, BDBAs.' The containment boundary design provisions help ensure containment can be isolated from the reactor vault and containment. The requirement seems to be implying for those systems in confinement design provisions without operator intervention will act as an additional containment boundary. 2. The use of BDBA in the 2nd last bullet, which reads, 'The barriers shall be designed with suitable margins for the highest calculated pressure and temperature loads expected in DBA and selected BDBA conditions.' 3. Having a 'shall' statement in the 3rd paragraph and then a graded approach isn't clear. Licensees believe this is more appropriate as a 'should' statement. Suggested Change: For future drafts, staff is urged to: 1. Clarify if operator actions are considered in conjunction with design provisions e.g., cleanup of a spill. 2. For design purposes, here and throughout the document, replace "BDBA" with 'DEC.' DECs are the only BDBA conditions for which complementary design features are to be implemented according to the present REGDOC 2.5.2 and not for all BDBAs. Accordingly, amend the 2nd last bullet to read, 'The barriers shall be designed with suitable

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			margins for the highest calculated pressure and temperature loads expected in DBA and selected DEC conditions.' 3. Amend the 3rd paragraph to read, 'To achieve confinement, the means of confinement should require:' MAJOR comment Impact on Industry: As written, the 2nd paragraph implies confinement provisions are very similar to containment and the vast majority of penetrations from HTS and Moderator Auxiliary systems will require automatic isolation. For example, D20 transfers during outages where the moderator is drained will require additional design provisions to ensure the moderator is not spilled during transfer to the upgrader storage tanks. Has a comparison done from a Nuclear Safety perspective to show this requirement has value from a benefit-cost perspective given dose limits are being met by Operating Stations and the OPEX shows no serious events have occurred? The 3rd paragraph doesn't reflect a graded approach and appears to be prescriptive, which isn't the goal of the rest of the document.
60.	Candu Energy Inc.	New text in section 6.6	The text of 6.6 should be rewritten, particularly the particularly the bullet list of the requirements for the means of confinement. Another concern is the sentence 'The confinement shall be designed to ensure that a release of radioactive material following and accident involving disruption of the core is within acceptable limits.' This equates confinement with the function fulfilled by containment and ignores other sources of radioactive material that could be released in an accident and for which confinement is also needed. The text of this section should address the fact the safety function of confinement is achieved in respect to the reactor core by a containment system, but that in addition some degree of confinement needs to be provided for any radioactive material that is outside containment. For those cases, only a subset of the measures in the bullet list of requirements may be required in order to ensure that dose limits and safety goals are achieved by the licensed facility. The section as written does not give sufficient consideration to design features (such as an irradiated fuel bay) with radioactive material outside containment and how in such configurations the means of providing confinement may not need to apply all of the listed 'requirements'. Suggested Change: Rewriting along the suggested lines Impact: Definition of requirements that cannot be met.
61.	Candu Energy Inc.	New text in section 6.6	"The bullet list of requirement should be better aligned with the leak-tight envelope, systems to control internal pressure and release of radioactive material to the environment following an accident, the 4 subsystems and the potential for (but not an absolute requirement for) provision of shielding as defined in Section 6.6.1." Suggested Change: "Rewriting along the suggested lines" Impact: "Inconsistent expressions of requirements creates compliance complications."
62.	Canadian Nuclear Laboratories, NB Power, Bruce Power,	Comment on new text in section 6.6.1	Adding the phrase, "When required …" in these sections does not provide guidance to the designer about when the requirement is compulsory. Suggested Change: Was the intent to make this technology neutral and to say an alternate means of cooling is required at all times? The approach of 'when needed' could be used for applicability to other systems described in this document

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	Ontario Power Generation (OPG)		(e.g. using functional containment vs. structural containment) that are CANDU specific or water-cooled reactor specific. However, as per comment #1, this document needs to be technology neutral. This identical comment was also submitted for section 6.5.
63.	Candu Energy Inc.	New text in section 6.6.1	Where required, each nuclear reactor facility shall be installed within a containment structure, so as to minimize the release of radioactive materials to the environment during operational states and DBAs'. It is not clear what 'Where required' means. Required by which particular regulation? Since this document is a major one for water cooled new builds plants it should be very clear what the basis for evaluate whether a design needs a containment structure. Suggested Change: The basis for whether containment is required should be clearly defined. Impact: Ambiguous requirements lead to uncertainty and potential for inconsistency amongst how different designs are regulated.
64.	A. Lee, AG Lee Consulting	New text in section 6.13.5	Recommend changing "radiological and hazardous releases" to "radiological and hazardous materials releases".
65.	Candu Energy Inc.	New section 6.14	Issue: A statement that section 6.3 and 6.2 apply is redundant. (Note typo – text actually uses 8.3 and 8.2) Suggested Change: Delete section 6.14 Impact: Redundant content does not improve safety
66.	A. Lee, AG Lee Consulting	New section 6.15	Section 5(i), (j) and (k) require adequate measures to be taken to prevent the release of hazardous substances to the environment in the event of the failure of an auxiliary system containing hazardous material. There should be a requirement in section 6.15 regarding prevention of releases of hazardous substances to the environment in the event of an auxiliary system failure.
67.	Canadian Nuclear Laboratories, NB Power, Bruce Power, Ontario Power Generation (OPG)	New section 6.15	Clarification is sought on the new section on Auxiliary Systems, which currently reads, 'The failure of any auxiliary system, irrespective of its importance to safety, shall not be able to jeopardize the safety of the reactor facility. Adequate measures shall be taken to prevent the release of radioactive material to the environment in the event of the failure of an auxiliary system containing radioactive material.' Suggested Change: Please clarify the statement. The phrase 'jeopardize the safety of the reactor facility' is vague. Currently, the Operators can resolve situations when tritium hazards are present. Does this clause imply design measures with respect to DiD must ensure (prevent) this? Or, can Operators with personal protective equipment be used to mitigate the situation as an alternative to design measures?
68.	Candu Energy Inc.	New section 6.15	The failure of any auxiliary system, irrespective of its importance to safety, shall not be able to jeopardize the safety of the reactor facility' is an ill-defined requirement. The requirements of safety classification apply to all SSCs and must include consideration of consequences of failure and this drives identification of their importance to safety. Therefore,

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			any auxiliary system whose failure could lead to safety consequences is a system important to safety and so must be designed commensurate with this. Suggested Change: Remove the identified requirement. Impact: Issue addressed by the requirement to apply safety classification to all SSCs.
69.	A. Lee, AG Lee Consulting	New text in Appendix B	Appendix B should include some clarification and guidance to account for "experimental devices" that are fuel assemblies in the reactor core for irradiation as part of a fuel qualification program for new fuel designs, e.g., lead test fuel assemblies in PWRs and BWRs and multiple fuel channel demonstration irradiations in pressure tube reactors such as CANDU reactors.
70.	Canadian Nuclear Laboratories, NB Power, Bruce Power, Ontario Power Generation (OPG)	New text in Appendix B	Appendix B appears misplaced since it is not referenced in the body of the document (pages 1 to 141). Experiments are not allowed to be run in operating nuclear reactors. Suggested Change: Delete Appendix B or make it specific for research reactors.
71.	Candu Energy Inc.	New text in Appendix B	This appendix seems to simply state that any experimental device that are part of a nuclear reactor facility are still SSCs and part of the design. The entire Appendix seems to be redundant to the existing requirements. Suggest that, at most, the scope section of the REGDOC explicitly state that if a reactor facility includes SSCs that are for experimental devices, these SSCs must meet the applicable requirements of the REGDOC. Suggested Change: Delete the appendix and modify the REGDOC scope section as suggested. Impact: Repetition of requirements creates needless complication.