Public Consultation Comments Table (2)
Fukushima Omnibus Amendments Project

Tableau des commentaires de la consultation publique (2)
Projet omnibus de modifications relatives à Fukushima

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Second consultation / Deuxième consultation

Part 0: General
Partie 0 : Général

	General Général	Organization/ Organisation	Comments/Commentaires	CNSC Response / Réponse de la CCSN
1.	General	Bruce Power	Subject: Submission of Bruce Power Comments on REGDOC 2.4.1 and REGDOC 2.4.2 Please find attached the Bruce Power comments on REGDOC 2.4.1 and 2.4.2 for the Second Round consultation. In the attachments Bruce Power has identified “critical comments”. These are comments that we believe must be addressed for the documents to be acceptable to Bruce Power for inclusion in our operating licences. Please note that while Bruce Power has worked with our industry members on these comments, our submission is not identical to the others. If there are any questions regarding our comments, please feel free to contact myself.	The specific issues identified are addressed in the appropriate Parts and sections below for each document.
2.	General	OPG	Re: OPG Comments for the Industry Consultation on draft REGDOC-2.4.1 and REGDOC-2.4.2 The purpose of this e-mail is to provide written submission of OPG comments for the industry consultation on draft REGDOC-2.4.1, Deterministic Safety Analysis and REGDOC-2.4.2, Probabilistic Safety Assessment. OPG has met with industry partners, i.e. Bruce Power, New Brunswick Power, AECL and CANDU Energy Inc., to discuss issues related to these two proposed regulatory documents and each will be providing a separate submission of comments to the CNSC. While OPG’s comments are generally similar to other partners, there are some differences. Furthermore, while all items should be dispositioned, items identified as “Major Comments” are of particular concern to the nuclear industry and should be given more weight. Please find attached below Tables listing OPG comments on REGDOC-2.4.1 and 2.4.2. To assist in the dispositioning, the Tables	The specific issues identified are addressed in the appropriate Parts and sections below for each document.

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			have been provided in both PDF and WORD formats. If you have any questions regarding this submission, please contact the undersigned.	
3.	General	AECL	The purpose of this letter is to provide AECL's comments on CNSC regulatory documents REGDOC-2.4.1 and 2.4.2. AECL has collaborated with Bruce Power, New Brunswick Power Nuclear and Ontario Power Generation to review the proposed REGDOCS in detail and these comments are provided in attachments A and B respectively. There are fourteen comments of significant concern that are identified in these attachments. These need resolution to ensure either consistent application or clarity of the requirements. AECL is prepared to meet cooperatively with the CNSC to clarify any comments or concerns. If you require any further information or have any questions regarding details of this submission, please contact me as below.	The specific issues identified are addressed in the appropriate Parts and sections below for each document.
4.	General	CCNB	I would like to thank the CNSC for granting the additional consultation for the Fukushima Omnibus regulations as I had requested during the first round of consultations. This has enabled me to provide additional comments based on the CNSC disposition of the comments received during the first round of consultation, and recent public hearings and meetings	The specific issues identified are addressed in the appropriate Parts and sections below for each document.

Part A: REGDOC-2.4.1, *Deterministic Safety Analysis*
Partie A : REGDOC-2.4.1, Analyses déterministes de la sûreté

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5.	General	Bruce Power OPG AECL NB Power		REGDOC-2.4.1 is not consistent with the terminology and definition of BDBA plant states defined in REGDOC-2.5.2. For example, Design Extension Conditions are a subset of BDBA, which would include SA conditions, but this is not discussed in 2.4.1. Consistent terminology should be used throughout the regulatory documents. In particular, terminology related to Design Extension Conditions should be correctly reflected in REGDOC 2.4.1 and should be included in the Glossary. The attached figure 1 showing the delineation of the plant conditions considered in the design should be included. The figure that the industry and CNSC previously proposed to the IAEA (and the one closely captured in SSR2/1) is shown at the end of this table. This figure should be included in REGDOC 2.4.1 as well as in REGDOC 2.5.2. *Impact on industry, if major comment.* Major comment. Consistency in definition of BDBA and SA events is important to ensure consistency of the analysis methodology and results between deterministic and probabilistic analyses	Agreed to include additional information in REGDOC-2.4.1 to explain the relationships between DECs and plant states, and consistency with REGDOC-2.5.2, REGDOC-2.5.2 is limited in scope to design of NPPs. It uses the term DEC to refer to the subset of BDBA that are considered in the design. It also uses the term BDBA to refer to the unbounded set of all accidents less frequent than DBA. REGDOC-2.4.1 applies to deterministic safety analysis of all reactor facilities. It considers the whole spectrum of accidents from normal operation to BDBA (down to a cut-off frequency as per section 4.2.2). Despite these differences in scope between REGDOCs 2.4.1 and 2.5.2, DECs have been added to REGDOC-2.4.1 section 4.2.3 by adding the following footnote to item 3: **In accordance with draft REGDOC-2.5.2, *Design of Reactor Facilities: Nuclear Power Plants,* the subset of BDBAs that are considered in the design of a new NPP are referred to as Design Extension Conditions (DECs).** For clarification, additional guidance is added to section 4.2.3, following paragraph 1 and its list. **Note that DEC does not replace BDBA in most occurrences in REGDOC-2.4.1 since analysis**

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					will consider lower frequency events than DECs, for example in searching for cliff edge effects, or in analysis of bounding events. A figure similar to that suggested by industry has been added to section 4.2.3. The revised plant state Figure 1 (see below) from REGDOC-2.5.2 section 7.2 is reproduced in section 4.2.3 as guidance for consistency, with the following explanatory text adapted from that document: **Plant states include Operational states and Accident conditions (that includes BDBA). However, as established in REGDOC-2.5.2, Design of Reactor Facilities: Nuclear Power Plants, the design authority establishes the plant design envelope, which is a subset of all plant states,and that are considered in the design: normal operation, AOOs, DBAs and DECs (see Figure 1).**
6.	General	Bruce Power AECL NB Power		There is certain ambiguity when using terms multi-unit stations and multiple units at a site. Replace multi-unit station with multi-unit site. Define multi-unit site to mean a site at which we either have one or more multi-unit stations or multiple units at a site. Clarification.	Agreed conceptually to clarify use of the terms. For consistency with draft REGDOC-2.5.2, the term “multiple reactor units at a site” has been used. It is not considered necessary to define a multi-unit station or a multi-unit site. Changes made to sections 4.2.2.4, 4.3.3 Guidance, and 4.4.2.4.
7.	General	OPG		There is certain ambiguity when using terms multi-unit stations and multiple units at a site. Replace “multi-unit station” with “multi-unit site” and define “multi-unit site” to mean:	Agreed conceptually to clarify use of the terms. For consistency with draft REGDOC-2.5.2, the term “multiple units at a site” has been used. It is not considered necessary to define a multi-unit

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				"A site at which there exists one or more multi-unit stations, or multiple units at a site." Clarification	station or a multi-unit site. Changes made to sections 4.2.2.4, 4.3.3 Guidance, and 4.4.2.4.
8.	General and 1.4	Bruce Power OPG AECL NB Power		The references are not internally consistent between the regulatory documents and some of the referenced regulatory documents have been superseded or will shortly be superseded. For example there is reference to RD337 rather than REGDOC 2.5.2. Also, in the reference section the new REGDOC on PRA is incorrectly referenced as REGDOC 2.4.3 rather than 2.4.2. There is also inconsistency with reference to IAEA from REGDOC 2.5.2 – Section 9.4, which lists two different IAEA standards, among others. The references should be internally consistent between REGDOCs and should refer to the correct and most recent IAEA documents. *Impact on industry, if major comment.* Major comment. Consistency in document references internally at CNSC and with IAEA is important to ensure consistency and of requirements.	The practice is to reference currently published documents, but for clarity the qualification "or successor documents" is included as noted below: 1) Cross references to RD-337 have been revised to add "**or successor documents**" to address the currently active project to update RD-337. Remaining references between regulatory documents have been corrected. 2) References to IAEA documents SSG-2 and NS-G-1.2 have been added. The references to IAEA documents for research reactors have been retained since they are relevant to Part 2 of REGDOC-2.4.1.
9.	4.2.1	Bruce Power OPG AECL NB Power	The identification of events shall account for all operating modes, including low power operation and shutdown modes.	The wording should be the same as the wording we recommended for REGDOC 2.4.2. The identification of events will include at-power and shutdown states. The deterministic analysis should also be performed for other states where the reactor is expected to operate for extended periods of time and which are not covered by the at-power and shutdown analysis.	Agreed. For consistency in approach with REGDOC-2.4.2,, section 4.2.1, para 2, 1st sentence, text changed to: **The identification of events will include at-power and shutdown states. The deterministic analysis should also be performed for other states where the reactor is expected to operate for extended periods of time and that are not covered by the at-power and shutdown**

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				Impact on industry, if major comment. Major comment. The clarifying words will provide internal consistency between REGDOCs 2.4.1 and 2.4.2. Major comment.	**analysis**.
10.	4.2.3.3	Bruce Power OPG AECL NB Power	The 4th paragraph states: "Note: Although the CANDU heat transport system header is considered a vessel, its failure has to be postulated in the safety analysis."	Suggest replacing "has to" with "should". Clarification.	Agreed. Text changed as suggested for clarification of intent.
11.	4.3.3	Bruce Power OPG AECL NB Power	A safety assessment for BDBAs shall be performed to demonstrate that: 1. The NPP as designed can meet the requirements for release limits established as the safety goals. A deterministic safety analysis provides consequence data for accident sequences to use in the PSA. 2. The accident management program and design provisions	The second bullet should be changed to: 2. The accident management program and design provisions put in place to handle the accident management needs are effective, taking into account the availability of cooling water, material and power supplies. This can include the use of complementary design features intended to address Design Extension Conditions. Replace in the document "complementary design features" with "additional safety features" (and "design features" with "safety features"). This will bring the document in consistence with IAEA documents. In the requirements section item (1), replace "the NPP as designed can" with "the NPP as designed may".	Text for Item 2. CNSC agrees conceptually to address the impact statement provided, and the text is updated to clarify the intent. For greater clarity, text for item 2 changed so that specific terminology is not necessary: **The procedures and equipment put in place to handle accident management needs are effective, taking into account the availability of cooling water, material and power supplies; consideration can be given to the plant's full design capabilities, including the possible use of safety, non-safety, and temporary systems, beyond their originally intended function**. This is consistent with REGDOC-2.5.2 section 7.3.4.1. It includes any available equipment. Exact terminology such as "design features", "safety

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			put in place to handle the accident management needs are effective, taking into account the long-term availability of cooling water, material and power supplies.	*Impact on industry, if major comment.* The change will allow certain credits to be taken for EME and additional safety features for BDBAs. The CNSC and industry are already progressing this way in PRA space. Critical comment/ clarification (Bruce Power, NB Power) Major comment (OPG) Major comment/ clarification (AECL)	features" or "complementary design features" is not really needed here, However, the term "complementary design features "is maintained elsewhere in the document for consistency with REGDOC-2.5.2..It is clarified that "**additional safety features**" is an alternative term used internationally. <u>Text for item 1</u>. This is a requirement to demonstrate that a required condition is met, and the use of "may" is inappropriate in this context. However, for greater clarity, text changed to "*The NPP as designed meets the requirements…*"
12.	4.4.2.6	Bruce Power OPG AECL NB Power		Wording on "…margins to cliff-edge effects" were retained by the CNSC without further clarification. (Industry had requested this in their earlier comments.) CNSC indicated in the Comments Table that the term "cliff-edge effect" is used internationally, and is maintained for consistency of approach. Provide in the document in a guidance section an explanation of "margins to cliff-edge-effects" Request for clarification/Minor change (Bruce) Clarification (OPG) Request for clarification (AECL, NB Power)	Agreed to provide clarification text. The following additional guidance for cliff-edge effects has been added to section 4.4.2.6, paragraph 1: "**A systematic process should be used to identify parameters with small margins to a cliff-edge, such as fuel dryout, pressure boundary failure and tank depletion. Where the likelihood is considered to be high and the potential impact large, sensitivity calculations should explore the impact of passing these thresholds**."
13.	4.4.2	Bruce Power OPG AECL NB Power		Now contains the stand-alone statement (instead of a bullet, as was previously) "An event should be analyzed from its initial steady state up to the predefined long-term stable state.". In the Comments Table, CNSC points to the guidance now shown under 4.4.2.6 (second paragraph) on	Agreed that for clarity of intent, text to reference the applicable guidance section is added, item 6 of section 4.4.2 revised as follows: **6. conducting calculations, including:** **a) performing sensitivity analysis and**

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				the duration of transients to be considered in analysis as related to "long-term". Suggest adding cross-reference in Section 4.4.2 of Draft REGDOC-2.4.1 to Section 4.4.2.6. Request for clarification/Minor Change (Bruce, AECL, NB Power) Clarification (OPG)	**identifying, where necessary, margins to cliff-edge effects** **b) analyzing the event from the initial steady state up to a predefined long-term stable state considering guidance for duration in section 4.4.2.6.** This change will align the requirement with the applicable guidance in section 4.4.2.6. Note that a similar structure has been applied to the equivalent requirement in Part II, section 8.4.1.
14.	4.4.2.6	Bruce Power OPG AECL NB Power		The 1st paragraph discusses "cliff-edge" effects. The discussion regarding 'cliff-edge' effects should align with the definition provided in Glossary and be consistent. Clarification	For consistency, text removed from the end of paragraph 1 of section 4.4.2.6: "~~– such as abrupt changes in plant response, or accident consequences resulting from a change in parameter values~~"
15.	4.4.4 (5)	Bruce Power OPG AECL NB Power	"The analysis of AOO and DBA shall… (5) account for the possibility that, following an accident, the equipment required to maintain the plant in a stable, cold and depressurized state may be rendered inoperable during a prolonged period"	Industry concern: Equipment that is relied upon to function following an accident is designed, procured, maintained and tested to confirm it will operate reliably when called upon to do so. In addition, the design of the power plant is based upon redundant trains of equipment performing critical safety functions. Based on these considerations, a failure of a critical safety function following an AOO or DBA would constitute a very low probability BDBA. Furthermore, there are a large number of potential combinations of postulated losses of equipment. Modeling combinations of equipment failures is already within the scope of the PRA. Performing a	Agreed. Text changed as suggested to clarify the intent: **The analysis of AOO and DBA shall… (5) show that the plant can be maintained in a stable, cold and depressurized state for a prolonged period**.

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				deterministic analysis of these combinations of failures results in a potentially unbounded scope of analytical work that is likely to be of little safety benefit. Finally, in the prolonged period following an accident, there is a large amount of time available to deploy symptom-based accident management provisions to stop an accident from progressing to a more severe damage state. These mitigating measures, which are largely based on the deployment of portable near-site equipment, have been installed at all Canadian nuclear power plants in the aftermath of Fukushima, and will be effective in responding to almost any conceivable equipment failure in the prolonged period following an accident. "The analysis of AOO and DBA shall… (5) show that the plant can be maintained in a stable, cold and depressurized state for a prolonged period." *Impact on industry, if major comment.* Major comment. – Rationale from Industry: • Consistent with international practice • Captures the essence of the safety issue • Ensures that the scope of the deterministic analysis is tractable and focused on the maximum safety benefit • Currently addressed through Probabilistic Safety	

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				Assessment Major comment	
16.	4.4.4.4 (Page 29 Final paragraph and page 30 - table 3)	Bruce Power OPG AECL NB Power		Under this sub-section on Guidance for shutdown means for reactors with engineered safety, there are three references to “minimum expectations”. In addition, two statements containing the word “require” are noted. “Two shutdown means are always required for each reactor design scenario.” “If the consequences of a failure to shutdown may challenge the containment, then two fast-acting shutdown means are required (reactor design scenario 2).” Regarding dual trip parameter coverage, as part of continued dialogue with CNSC under the COG Safety Analysis Improvement (SAI) Task Team and the CSA N290.1 Technical Subcommittee, Industry views that dual parameter trip coverage for every accident and every operating state should only be considered on an as-practicable basis, especially given international practice and historical experience (e.g., effective primary NOP trips for Slow Loss of Regulation events). Replace occurrences of “minimum expectations” with “performance objectives”. “Two shutdown means <u>should be the performance objective</u> for each reactor design scenario.” “If the consequences of a failure to shutdown may challenge the containment, then two fast-acting shutdown means <u>should be the performance</u>	1) Agreed. The term “minimum expectations” is replaced with “**performance objectives**”. 2) It is not necessary to repeat requirements that exist in other documents therefore the notes to Table 3 that were intended as guidance information have been deleted. 3) Agreed. Text added after table 3: **For accident scenarios with slow or no power increase, two parameter trip coverage should be demonstrated if practicable.** CNSC staff notes the industry plan to update the *Principles and Guidelines for Deterministic Safety Analysis*. The text appears to be in line with the REDGDOC-2.4.1 guidance, however detailed comments on the modified principles can be provided at a later time. It is noted that CSA-N290.1 (2013) has been recently published.

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				objective (reactor design scenario 2)." Regarding dual trip parameter coverage, the following change is suggested. Suggest adding at the end of Section 4.4.4.4 - Subsection on "Guidance for shutdown mean for reactors with engineered safety" (after Table 3): "For accident scenarios with slow or no power increase, two parameter trip coverage is demonstrated only if practicable." *Impact on industry, if major comment:* "For scenarios where analysis is being performed not to demonstrate trip coverage, but to provide support such as EQ room conditions analysis for equipment survivability, a backup trip parameter is demonstrated only if practicable." Current Industry plan is to include updated wording in the upcoming Rev 03 of the Principles and Guidelines for Deterministic Safety Analysis to address dual trip parameter coverage. The current draft text is as follows: "3.3.2 Shutdown Systems To demonstrate compliance with design requirements in CSA N290.1-13 and to reflect CNSC guidance provided in GD-310, the least effective of two trip parameters, of the least effective SDS, should be credited, where practicable. For CANDU stations, an exception to the CSA N290.1-13 two trip parameter requirement has been permitted for selected cases where a backup	

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				trip is not available on each SDS and the primary trip is direct, such as Neutron Overpower (NOP) trip for slow loss of regulation. As part of RD-310 and CSA N290.1-13 implementation such exceptions are continued, but the case for lack of backup trip coverage based on practicability should be supported on a case-by-case basis as outlined in Section 4.0. Appendix D Section D.5 discusses the SDS backup trip coverage exemption further." Critical comment (Bruce, NB Power) Major comment (OPG, AECL)	
17.	4.4.4.5	Bruce Power OPG AECL NB Power	The 3rd paragraph states: "Times for operator actions in new plants are established in the proposed REGDOC-2.5.2, *Design of Reactor Facilities: New Nuclear Power Plants*."	This paragraph should be deleted because REGDOC-2.5.2 covers the new designs and it is not applicable to the operating plants. The times for operator actions provided in the bullets above are consistent with the current practice at the operating stations, and they should be retained in REGDOC-2.4.1. *Impact on industry, if major comment.* If this paragraph is kept in the document, it will confuse the operator action times listed in the above bullets with the ones that are applicable to new designs. Industry will provide comments in future on the draft REGDOC-2.5.2 Critical comment (Bruce, NB Power) Major comment (OPG, AECL)	The text is maintained conceptually for clarity and to avoid confusion, and it should not be subject to misinterpretation. REGDOC-2.4.1 explicitly states the operator action times for existing plant and refers to draft REGDOC-2.5.2 for the operator action times for new NPPs. However, to underline the distinction between existing and new NPPs, paragraph 3 is changed to: **Times for operator actions in new nuclear power plants are established in the proposed REGDOC-2.5.2, Design of Reactor Facilities: Nuclear Power Plants** **Note: New nuclear power plants referenced in this section are those first licensed after 2013**. Additionally, the Preface text describing the more current general approaches for the application of

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					regulatory documents for new and existing plants and grading replaces the text derived from the older documents that described the expectations at the time of publication and introduction of the original source documents.
18.	8.3.3	Bruce Power OPG AECL NB Power	the accident management program is capable of providing mitigation for BDBAs, to the extent practicable, taking into account the long-term availability of cooling water, material and power supplies	Same comment as for Section 4.3.3 above. *Impact on industry, if major comment.* See Section 4.3.3 above. Major comment	Text changed as follows to clarify the intent, and to align with changes to section 4.3.3: **The procedures and equipment put in place to handle accident management needs are effective, taking into account the availability of cooling water, material and power supplies: Consideration can be given to the plant's full design capabilities, including the possible use of safety, non-safety, and temporary systems, beyond their originally intended function.**
19.	8.4.1	Bruce Power OPG AECL NB Power		Text revised for alignment of structure and requirement with Section 4.2.1 above.	Text revised for alignment with section 4.2.1 above as follows: • **conducting calculations, including:** **a) performing sensitivity analysis and identifying, where necessary, margins to cliff-edge effects** **b) analyzing the event from the initial steady state up to a predefined long-term stable state**
20.	8.4.2	Bruce Power OPG AECL NB Power	account for the possibility that, following an accident, the equipment required to maintain the plant in a stable state, may be rendered inoperable during a prolonged period	Same comment as for Section 4.4.4 above *Impact on industry, if major comment.* See Section 4.4.4 above. Major comment	Agreed. To clarify the intent and to align with changes to section 4.4.4, text of 10th bullet changed to: "The analysis of AOO and DBA shall… **(10) show that the plant can be maintained in a stable, cold and depressurized state for a prolonged period**."

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21.	App B	Bruce Power OPG AECL NB Power	The 2nd sentence in the 1st paragraph states: "Appendix B provides guidance on the application of the derived acceptance criteria specified in this guidance document."	Suggest deleting "guidance". "Appendix B provides guidance on the application of the derived acceptance criteria specified in this document." Clarification	Agreed. Text deleted as suggested. ~~Appendix B provides guidance on the application of the derived acceptance criteria specified in this document.~~
22.	App C	Bruce Power OPG AECL NB Power	Appendix C: "Examples of Acceptance Criteria" is new, with Table C.1 on acceptance criteria for AOO and Table C.2 on DBA. Appendix C is only cited from Section 8.3.4 (under Part II of REGDOC-2.4.1 for Small Reactor Facilities).	Change the title of Appendix C to refer to small reactors. Request for clarification/Minor Change (Bruce, AECL, NB Power) Clarification (OPG)	Agreed. For clarification, title of Appendix B changed to "***Examples of Derived Acceptance Criteria for NPPs***" Title of Appendix C changed to "***Examples of Acceptance Criteria for Small Reactor Facilities***".
23.	Glossary	Bruce Power OPG AECL NB Power	Definitions of the following terms: - Accident - Common cause vs. common cause failure - Confinement vs. confinement boundary - Containment - Design basis accident - Deterministic safety	The definitions provided in this section are not consistent with those provided in REGDOC-2.5.2. Please ensure consistency. Clarification	CNSC has reviewed the definitions and has revised them as appropriate to provide consistent definitions across the documents. An attached table (Appendix A below) shows the updated common definitions.

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			analysis - Postulated Initiating Event		

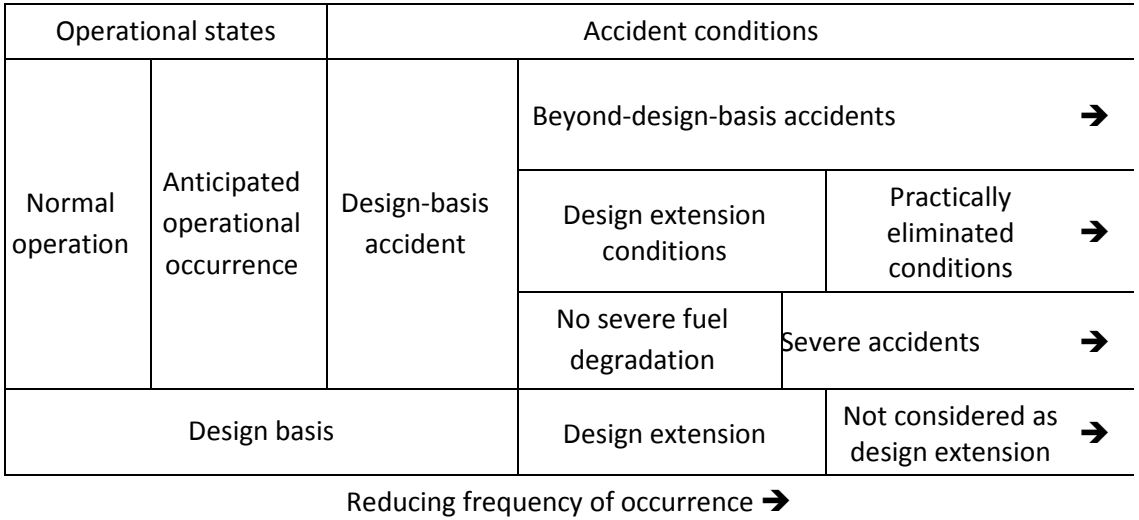
Figure 1: Plant States (for inclusion in Definitions Section) : [Plant state figure proposed by industry: See General comment # 5 above.]

<table>
<tr><td colspan="2">Operational States</td><td colspan="3">Accident Conditions</td></tr>
<tr><td rowspan="2">Normal Operation</td><td rowspan="2">Anticipated Operational Occurrences</td><td rowspan="2">Design Basis Accidents</td><td colspan="2">Beyond Design Basis Accidents</td></tr>
<tr><td colspan="2">Design Extension Conditions</td><td rowspan="2">Additional Beyond Design Basis Accidents (including additional sequences that may evolve into Severe Accidents)*</td></tr>
<tr><td colspan="3">Design Basis</td><td>No Core Melt</td><td>Severe Accidents (Core Melt)</td></tr>
<tr><td colspan="3"></td><td colspan="2">Considered in Design</td><td></td></tr>
<tr><td colspan="6">Reduced Frequency of Occurrence ---></td></tr>
</table>

***The likelihood of Severe Accident Sequences included here resulting in significant radioactive releases should be practically eliminated.**

New Figure 1 added to section 4.2.3 (from REGDOC-2.5.2) See General comment # 5 above.

Figure 1: Plant states considered in the design



Part B: REGDOC-2.4.2, *Probabilistic Safety Assessment (PSA) for Nuclear Power Plants*
Partie B : REGDOC-2.4.2, Études probabilistes de sûreté (EPS) pour les centrales nucléaires

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24.	General	Greenpeace		Re: REGDOC-2.4.2, Probabilistic Safety Assessment (PSA) for Nuclear Power Plants To whom it may concern, Please accept Greenpeace's comments on the August 2013 version of REGDOC-2.4.2, Probabilistic Safety Assessment (PSA) for Nuclear Power Plans. In response to the CNSC staff's portrayal during the August Commission meeting regarding the public disclosure procedures for probabilistic Risk Assessments (PRA), which are also referred to as Probabilistic Safety Assessments (PSA), Greenpeace sent a letter to the Commission highlighting how: "the Commission has provided no direction or requirements to CNSC staff and reactor operators requiring either the publication of PRA results and more specifically requirements regarding what PRA results should be released that aren't security sensitive." This has allowed licensees to behave in a self-regulated manner. That letter and a supporting document are attached to this submission. Greenpeace did not have the resources to comment on initial Fukushima Omnibus Amendments Project, but motivated by staff's erroneous portrayal of PSA public disclosure procedures, Greenpeace provides	The main purpose of this project is to update the regulatory framework based on the CNSC Fukushima Task Force and External Advisory Committee recommendations, and integrated action plans in a timely manner. It is one of the early projects to address the initial lessons learned from the Fukushima incident, and the CNSC regulatory framework work plan will continue to address new lessons learned as they develop. However, for PSA, it was also determined that certain elements needed to be modernized to align with international developments. Some of the key lessons learned are the inclusion of new information and requirements such as objectives of PSA, and to consider external and internal hazards, and multiple unit events at a site, and they have been added to this regulatory document as well as other development projects, (and not just in PSA exclusively). Guidance is added in this document for public disclosure to support the RD/GD-99.3 to provide more direction to the industry around disclosure for PSA. In addition, the draft document was revised to include guidance for descriptions and high level summaries for PSA, including those methodologies and screening criteria, subject to appropriate security information considerations. This provides sufficient balance for the purposes of public

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				the comments below on REGDOC-2.4.2. Greenpeace also made a made a number of recommendations regarding PSAs in our oral and written submissions to the Commission on the Fukushima Action Plan on May 2, 2012. Those comments also inform this submission. Greenpeace is of the view that REGDOC-2.4.2: • Omits significant lessons from Fukushima regarding Probabilistic Risk Assessment; and, • Provides inadequate direction to industry on information disclosure. Greenpeace is concerned that a key lesson from the Fukushima disaster is not being transparently addressed in this consultation, but behind closed doors with industry. Specifically, Fukushima highlighted the need to consider the risk posed to society and the environment by reactor sites instead of individual reactors at a site. In Greenpeace's view, the risks posed by nuclear sites to health and safety of Canadians are not properly addressed in REGDOC-2.4.2. However, the consideration of how site-level risk is being addressed outside of this process and excluding public comment. According to the Licence Conditions Handbook for the Pickering nuclear station, CNSC staff are working "…jointly with industry in consultation with the international community on the concept-level metrics and/or re-define safety goals, for a multi-unit PSA."	information, while addressing information and security considerations. Specifically, guidance has been added to the section 5 as follows. **The public information should include high-level summaries for PSA, including those for methodologies and screening criteria (subject to the necessary security considerations).** CNSC is following the international developments for the identification of the risk metrics that can be used to take into account the risk posed by multiple unit sites. This requires the development of a whole site PSA methodology, and discussions with PSA practitioners. The Establishment of "Safety goals" by CNSC as part of its regulatory framework will be considered as appropriate and will be developed following the standard process, which includes public consultation with all stakeholders.

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				Greenpeace finds it unacceptable that only industry is being consulted on the development of site level risk limits for nuclear stations in Canada. Greenpeace would like to remind CNSC staff that the Nuclear Safety and Control Act (NSCA) mandates the CNSC to prevent unreasonable risk to Canadian society. This requires assessing the cumulative radiological risk posed by nuclear sites. REGDOC-2.4.2 currently overlooks this responsibility by focusing probability of initiating events without equal attention to the potential offsite consequences that dominate the risk to the health and safety of Canadians and the environment. As will be discussed, this unbalanced approach also negatively impacts information disclosure. The lack of focus on the cumulative risk posed by nuclear sites in REGDOC-2.4.2 and the Commission's decision to allow set risk standards shows that the Commission has yet to fully accept Fukushima's lessons.	
25.	General	Greenpeace		Re : Lack of public disclosure requirements for Probabilistic Risk Assessments Dear Commissioners, This letter is to express Greenpeace's concern regarding the portrayal of the public disclosure requirements for industry Probabilistic Risk Assessments (PRA) by CNSC staff and licensees at today's meeting of the Commission. I feel the record must be corrected regarding PRA accessibility and appropriate action should be taken to ensure the public interest is properly accounted	Guidance is added in this document for public disclosure to support the RD/GD-99.3 to provide more direction to the industry around disclosure for PSA. In addition, the draft document was revised to include guidance for descriptions and high level summaries for PSA, including those methodologies and screening criteria, subject to appropriate security information considerations. This provides sufficient balance for the purposes of public information, while addressing information and security considerations. Specifically, guidance has been added to the

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				for in future Commission decisions. Specifically, I would like to make this clear: the Commission has provided no direction or requirements to CNSC staff and reactor operators requiring either the publication of PRA results and more specifically requirements regarding what PRA results should be released that aren't security sensitive. This lack of direction and requirements by the Commission has allowed licensees to behave in a self-regulated manner. This has allowed licensees to put their business interests before the public interest and, I believe, negatively affected Commission decisions. As mentioned by president Binder during today's meeting, the Commission made a decision in 2008 against the disclosure of PRAs due to security concerns. This decision was made in response to a Greenpeace request for the Pickering PRA findings to aid in its review of OPG's request for a licence renewal for the station. Greenpeace stated at the time it did not want PRA information that could be used with malevolent intent. Instead Greenpeace asked the Commission "…to consider where the appropriate place is to draw the line between addressing between security concerns and information disclosure." Despite Greenpeace's request for Commission leadership in determining the balance between security concerns and the public interest, the	section 5 as follows. **The public information should include high-level summaries for PSA, including those for methodologies and screening criteria (subject to the necessary security considerations).**

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				Commission's ruled against the release of the Pickering PRA in its entirety. The Commission justified its decision based on "security concerns." Since that time, OPG has used this Commission decision whenever it has not wanted to release PRA information. This has allowed OPG and other licensees to decide when and what is released from their PRAs. Here are few examples of how this has negatively affected public discussions and Commission decisions: • OPG did not make its PRA summary report available during the public consultation on the scope of the environmental assessment guidelines for the proposed Darlington refurbishment. As most of you will recall, OPG's treatment of accidents in its recent Darlington PRA was highly contested and had an undeniable impact on the conclusions of the environmental review and follow up. • OPG completed a PRA for the Pickering "A" station in 2009 for internal events. Notably, OPG did not release a summary its PRA results before the recent relicensing hearings. • To Greenpeace's knowledge, neither Bruce Power nor New Brunswick Power have proactively released the summaries of their PRA reports. • OPG has since opposed the release of just "source term" information from its PRAs citing the security justification used in the CNSC's 2008 ruling. In 2011 Ontario's Information and Privacy Commissioner deferred to the CNSC's on release of	

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				PRA information based on security concerns support OPG's refusal to release the "source term" information from its PRAs. Notably, since that time a former OPG staff member has written to the Information Commission's office asking it to reopen the decision because, despite OPG's claims, source term information should not be a security concern. I have attached this letter. This, however, highlights how the Commission's carte blanche ruling in 2008 has negatively impacted decisions by other government agencies and allowed OPG to self-regulate. Again, there are two major issues: First, there is no requirement that licensees must release PRA information at all. This has allowed licensees to decide when and if they release such summaries. This has meant that in some instances PRA information has not been available to inform Commission discussions. The second issue requiring Commission guidance is what information should be released from PRAs. Based on the Commission's 2008 ruling, licensees have been able to cite "security concerns" whenever it wants to withhold information. I have access to a number of historic PRAs in Greenpeace's archives. After reviewing these documents it is clear licensees are using security concerns as a pretext to withhold information on cost/benefit decisions and environmental impacts from accident scenarios. I would like to reiterate the intent of my 2008 request. I ask the Commission to consider where the line should be drawn between security concerns	

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				and the public interest, which is served through information disclosure. While Greenpeace did not have capacity to comment on the Fukushima Omnibus changes last year, we did make a number of recommendations regarding the publication and treatment of PRAs in our oral and written submissions to the Commission on the Fukushima Action Plan on May 2, 2012. It is clear from the conditions placed on OPG and CNSC staff in the Commissions recent decision on the relicensing of the Pickering nuclear station that Greenpeace's access to information from the Pickering B PRA (which, as noted, Greenpeace also asked for during the 2008 relicensing process) assisted the Commission in making its decision. (Please note that while Greenpeace has some concerns with the Pickering relicensing decision, we have publicly commended it.) To conclude, there are no requirements regarding the public disclosure of reactor PRAs. This has allowed licensees to determine if, when and what they release. Industry has used the pretext of "security concerns" to withhold non security related information. In Greenpeace's view this is contrary to the public interest. I will not resubmit my 2008 request for ruling today. I would, however, respectfully request the Commission consider the impact of that decision and establish a public consultation process for defining public disclosure requirements for industry PRAs.	

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26.	General	Greenpeace		According the Licence Conditions Handbook for the Pickering nuclear station, CNSC staff are working "…jointly with industry in consultation with the international community on the concept-level metrics and/or re-define safety goals, for a multi-unit PSA." Greenpeace submits that this industry-led development of site-level risk limits is unacceptable. It also undermines the legitimacy of the current Fukushima amendment process. It is important that deliberations on how new risks limits are developed are public to ensure reactor operator interests are not being put ahead of public safety. *Recommendation:* Request: Will Commission staff proactively make available all correspondence with industry and the international community on the redefinition of safety goals? Request: Will Commission staff please clarify the plan for developing and approving redefined safety goals?	CNSC is following the international developments for the identification of the risk metrics that can be used to take into account the risk posed by multiple unit sites. This requires the development of a whole site PSA methodology, and discussions with PSA practitioners. The Establishment of "Safety goals" by CNSC as part of its regulatory framework will be considered as appropriate and will be developed following the standard process, which includes public consultation with all stakeholders.
27.	General	CCNB		My comments will be mainly on REGDOC-2_4_2_Probabilistic Safety Assessment (PSA) for Nuclear Power Plants. An overriding comment is that it seems the Regulatory Framework is going in a direction that requirements as well as guidance are included in the same document. I support this direction. However REGDOC 2.4.2 does not do this. It is my suggestion that a high priority be put on the development of guidance for inclusion in this document before it is sent for approval to the	The current suite of documents has focused on the initial lessons learned from the Fukushima Daiichi event, and consolidate several existing documents. Guidance has been added as appropriate. CNSC regulatory framework process and work plan has incorporated continuing Fukushima lessons learned from the actions in the newly consolidated Action Plan on Fukushima as presented to the Commission in August 2013. Text is further refined to clarify the intent based on stakeholder feedback. Additionally, guidance was

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				commission, and possibly one more round of consultations. The licencees are spending a lot of money on PSAs and they should not have to suffer regulatory uncertainty that comes by not having proper guidance developed for them. Not having proper guidance has caused a lot of confusion at public meetings and licencing hearings, which would be solved with the addition of proper guidance. Conclusions: As the Regulatory document stands in its current form, it is very confusing, lacking detail, lacking guidance, and imposes a lot of regulatory uncertainty on the licencees. I recommend proper guidance using the comments already received be added to the document and one more round of consultations. I also request to be able to present to the commissioners when they are asked to finalize this document. It is not fair or democratic to allow the licencees this opportunity and not the public that also participated in the consultation process. Not many members of the public are engaged enough in the nuclear industry to comment on regulatory documents, but when people do take their time to help improve the regulatory framework based on their experiences you should give them the same opportunities as the licencees. I also support the comments made by Greenpeace.	considered and added as appropriate (if still needed) based on comments received from both consultations. The level of information is appropriate for those trained in the field.
28.	3	Greenpeace		The current objectives of REGDOC-2.4.2 make reference to International Atomic Energy Agency	One of the key lessons learned that is introduced in a series of CNSC regulatory documents, including

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				guides, but don't refer to the role of PSA as a measure of compliance with the Canadian Safety and Control Act (NSCA). The NSCA gives the CNSC the responsibility to limit risk to Canadian society. Specifically, Section 3 of the NSCA states its purpose is for "the limitation to a reasonable level and in manner that is consistent with Canada's international obligations associated with the development, production and use of nuclear energy." Section 9 of the NSCA gives the CNSC the following mandate: "prevent unreasonable risk, to the environment and to the health and safety of persons, associated with that development, production, possession or use" of nuclear power. Both Sections 3 and 9 of the NSCA require the CNSC to put limits on risk. Probabilistic Risk Assessment uses probability and consequence to evaluate risk. Currently, the CNSC has set risk limits in RD-377 for new reactors. These goals use the estimated probability of accidents per "Reactor Year" (RY) as the metric to limit risk. The CNSC, however, has continued to rely on the risks limits developed by reactor operators for existing reactors. The risk limits set by operators for existing reactors and contained in RD-337 misrepresent the total risk of multi-unit nuclear stations. This is because they only consider the risk posed by each reactor individually. The risk posed by the six unit Pickering station is arguably six times more than the single unit Point Lepreau reactor in New Brunswick. This significant loophole, which is based on the estimated probability of an accident a single reactor, contravenes the goals and the objectives of the NSCA. The NSCA is intended to limit and prevent	PSA, deterministic safety analysis, severe accident management and others, is that multiple unit events at a site should be considered. Section 3 added to REGDOC-2.4.2 provides the important direction on the overall objectives and criteria of the PSA program, and is consistent with the intent of section 3 and 9 of the NCSA and modern international approaches for PSA. It assists in setting considerations and criteria for performing a PSA in order to identify the significant contributors to risk. PSA is used to inform and prioritize decisions on operational and design improvements. Off-site consequences are not currently assessed by means of PSA. However, it should be noted that supporting information for decisions on off-site emergency plans are addressed deterministically by a conservative bounding consequence scenario. Additionally, specific new regulatory documents and CSA standards are being developed to address emergency response and emergency management. The international development of level 3 PSA is not sufficiently mature to be used for regulatory purposes. Level 2 PSA results contain the necessary information to assess plant safety and provide insights into plant vulnerabilities and adequacy of design, operating procedures and mitigation. Level 3 PSA, as it is based on the result of the Level 2 PSA and would contain more uncertainty, would not add to the information required for regulatory purposes.

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				unreasonable risk to Canada society. The implicit assumption in the current version of REGDOC-2.4.2 is that risk as measure by the probability of a single reactor. This contravenes the goals of the NSCA and should be corrected. Risk measured by the criteria laid out in the NSCA would consider the total cumulative risk posed by nuclear sites licenced by the CNSC, and not simply individual reactors. This is especially important post Fukushima, which saw three reactors at one site release large amounts of radioactive material. Preventing unreasonable risk to Canadian society requires assessing the cumulative risk posed by sites with nuclear facilities in Canada. REGDOC-2.4.2 should provide guidance to ensure that PSA provide information on the total risk posed by nuclear sites licensed by the CNSC. *Recommendation:* An additional objective should be added to the objectives section. Specifically, an objective of PRA is to "provide a public assessment of the risk posed by nuclear sites to the health, and safety of persons and the environment."	However, while not yet appropriate for regulatory use, CNSC is monitoring the latest development in the application of level 3 PSA to determine if it can be applied practically to support regulatory oversight of NPPs. RD/GD-99.3, *Public Information and Disclosure* establishes general requirements for public information programs. Specific guidance for PSA has been added in REGDOC-2.4.2 section 5.
29.	3	Greenpeace		PSA or PRA is used by operators and the CNSC to determine whether upgrades to nuclear stations are warranted to reduce risk to Canadian society. Risk is both the probability of an event and its consequences. At present, RECDOC-2.4.2 focuses on the probabilities of events, but neglects to provide direction on the publication of consequence information. Offsite consequences information is necessary to assess the full risk of the station. If	Section 3 added to REGDOC-2.4.2 provides the important direction on the overall objectives and criteria of the PSA program, and is consistent with the intent of section 3 and 9 of the NCSA and modern international approaches for PSA. It assists in setting considerations and criteria for performing a PSA in order to identify the significant contributors to risk. PSA is used to inform and prioritize decisions on

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				this information is not available, Greenpeace believes PSA becomes easier to manipulate by reactor operators that have an interested in avoiding station upgrades. It is noteworthy that in response to Fukushima, the Nuclear Regulatory Commission directed staff to "improve guidance for estimating offsite economic costs based on up-to-date data and advancements in accident consequence assessment knowledge (e.g., SOARCA insights, the current Level 3 probabilistic risk assessment project, and Fukushima follow-up activities), as applicable." REGDOC-2.4.2 currently has an imbalanced approach to risk, focusing on information requirements for accident probabilities. As highlighted with the NRC decision, it is necessary post Fukushima to end the CNSC's historic practice of ignoring accident consequences if an event is beyond a cut-off probability. Fukushima also highlights the need for greater transparency on how cost-benefit decisions are made regarding nuclear station upgrades to avoid regulatory capture. *Recommendation:* An additional objective should be added the objectives section. Specifically, an objective of PRA is to: "provide information on offsite consequences to enable transparent decisions on the cost and benefits of station upgrades.	operational and design improvements. Off-site consequences are not currently assessed by means of PSA. However, it should be noted that supporting information for decisions on off-site emergency plans are addressed deterministically by a conservative bounding consequence scenario. Additionally, specific new regulatory documents and CSA standards are being developed to address emergency response and emergency management. The international development of level 3 PSA is not sufficiently mature to be used for regulatory purposes. Level 2 PSA results contain the necessary information to assess plant safety and provide insights into plant vulnerabilities and adequacy of design, operating procedures and mitigation. Level 3 PSA, as it is based on the result of the Level 2 PSA and would contain more uncertainty, would not add to the information required for regulatory purposes. However, while not yet appropriate for regulatory use, CNSC is monitoring the latest development in the application of level 3 PSA to determine if it can be applied practically to support regulatory oversight of NPPs.
30.	3	Greenpeace		Objective "g" states PSA is intended to "assess the adequacy of emergency procedures."	The text has been revised to clarify the intent of objective "g" as follows, and includes clarifying

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				Greenpeace strongly supports this objective. It should also be noted that hundreds of non-industry interveners requested the CNSC review the adequacy of emergency plans for major accidents (large radioactive releases) during the environmental review of the proposed life-extension of the Darlington nuclear station. The CNSC, however, refused due to the CNSC's historic use of 1E-6 as cut-off probability for assessing accident consequences. The continuation of this pre-Fukushima approach to risk assessment can be seen throughout REGDOC-2.4.2 and should be corrected. Probabilistic Risk Assessment uses probability and consequence to evaluate risk. REGDOC-2.4.2 in its current form puts most of its emphasis on the probability side of the equation and fails to provide direction to the reactor operators on the requirements for the disclosure of consequence information that is needed to properly evaluate risk. In regard to objective "g" assessing the adequacy of emergency procedures and plans requires the release of information related to the radiological hazards, specifically source term information, that would occur in accident conditions. Information disclosure requirements need to be revised to ensure the public has access to information needed to evaluate the adequacy of emergency plans. *Recommendation:* Staff should review and revise REGDOC-2.4.2 to ensure there are adequate requirements for the disclosure of information related to accident consequences so that objective "g" will be	guidance requested by industry and other stakeholders: **3g. assess the adequacy of emergency operating procedures. PSA insights should be used as part of the systematic way for maintaining the emergency operating procedures, as these procedures are subject to improvements throughout an NPP's lifetime** Objective "g" is intended to relate to on-site accident management operating procedures during an emergency in order to put the reactor in a safe state following an abnormal condition. This objective does not relate to the adequacy of off site emergency plan which are assessed by different means, and outlined in draft REGDOC-2.10.1, *Nuclear Emergency Preparedness and Response*. Section 3 added to REGDOC-2.4.2 provides the important direction on the overall objectives and criteria of the PSA program, and is consistent with the intent of section 3 and 9 of the NCSA and modern international approaches for PSA. It assists in setting considerations and criteria for performing a PSA in order to identify the significant contributors to risk. PSA is used to inform and prioritize decisions on operational and design improvements. Off-site consequences are not currently assessed by means of PSA. However, it should be noted that supporting information for decisions on off-site emergency plans are addressed deterministically by a conservative bounding consequence scenario.

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				meaningfully implemented	Additionally, specific new regulatory documents and CSA standards are being developed to address emergency response and emergency management. The international development of level 3 PSA is not sufficiently mature to be used for regulatory purposes. Level 2 PSA results contain the necessary information to assess plant safety and provide insights into plant vulnerabilities and adequacy of design, operating procedures and mitigation. Level 3 PSA, as it is based on the result of the Level 2 PSA and would contain more uncertainty, would not add to the information required for regulatory purposes. However, while not yet appropriate for regulatory use, CNSC is monitoring the latest development in the application of level 3 PSA to determine if it can be applied practically to support regulatory oversight of NPPs. RD/GD-99.3, *Public Information and Disclosure* establishes general requirements for public information programs. Specific guidance for PSA has been added in REGDOC-2.4.2 section 5.
31.	3 a	CCNB	to provide a systematic analysis, to give confidence that the design will comply with the fundamental safety objectives	This section is very vague and needs to be clarified. I still contend that there is a dire need to either implement RD-152 or portions of it included in this document, to eliminate all of the confusion recently regarding the application of safety goals. “Fundamental safety objectives”, which according to the CNSC’s disposition of comments received, is in reference to safety goals, is very unclear. It is currently very confusing because the term is only	CNSC had considered developing a regulatory document on this subject, however, based on stakeholder input, it was decided that the document was not necessary as it would provide guidance to staff for application of requirements that already existed in other regulatory documents. Elements of RD-152, as appropriate, are included in other regulatory documents such as RD-337 (and successor documents). Further clarification was

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				defined in RD-337 which is only for new builds, and the reference is very loose and the crosswalk is unclear. The commissioners at the annual public meeting expressed their desire for all of the crosswalks between regulations to be clear, yet I do not see an attempt to do so in this revision of the document. The crosswalks for the term "Fundamental safety objectives" to new builds, existing, continued operation, and refurbished reactors needs to be added to this document. This was the original intent of my request to implement RD-152 and have it referenced in this document, which it seems the commissioners agree with me in concept. It seems that there is also a crosswalk between "Fundamental safety objectives" and RD-360, and possibly RD-98 which is also unclear. The need for this clarification was evident at the recent Pickering hearings where I requested that OPG add the wind LRF to the rest of the PSA models so that the total risk could be compared to the safety goal limits and targets. OPG responded that "there is not yet an accepted methodology for calculating risk aggregation." This is somewhat true for existing reactors because the definition of "Fundamental safety objectives" is only defined for a "New" reactor in RD-337, but is not defined for existing reactors. In RD-337 the accepted methodology for calculating risk aggregation for new reactors is simply "The sum of frequencies of all event sequences", because RD-152 had never been published OPG was confused. This put the commissioners into a very precarious position, as they had to decide to believe me and the CNSC	added however in the section 3 which provides the important direction on the overall objectives of the PSA program, and is consistent with modern international approaches for PSA. CNSC is following the international developments for the identification of the risk metrics that can be used to take into account the risk posed by multiple unit sites. This requires the development of a whole site PSA methodology, and discussions with PSA practitioners. The Establishment of "Safety goals" by CNSC as part of its regulatory framework will be considered as appropriate and will be developed following the standard process, which includes public consultation with all stakeholders. Additional guidance was added as requested by industry and stakeholders in section 3, Objectives of PSA, and particularly regarding "fundamental safety objectives" provided in section 3, objective (a). as follows: a). to provide a systematic analysis to give confidence that the design will comply with the fundamental safety objectives The fundamental safety objective, as established in IAEA N-SF-1, is to protect people and the environment from harmful effect of ionizing radiation. Additionally, the terms and definitions in the REGDOC-2.4.1 have been updated and revised to ensure that the terms are used consistently across several projects and documents such as REGDOC-

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				staff or OPG because the regulatory framework was not clear. There are many examples of the risk aggregation being simply the sum of frequencies of all event sequences. Below is a list of examples: -RD-337 -Draft RD-152 -Transcripts and CMD's for the Point Lepreau licensing hearings. -CNSC staff added all of the risks together for the Pickering licensing, including wind for the core damage frequency Safety goals in general are very confusing within the regulatory framework. Some are limits, some are goals and some are targets, and the terminology does not seem to be consistent between industry and the CNSC staff. The terminology has consistently caused confusion at commission meetings and hearings. The CNSC should define the terminology they want to use so it is well documented, consistent, and not lead to confusion. What is also confusing is what amount of radiation constitutes a Large Release. For new reactors it is defined in RD-337 as "10^{14} becquerel of cesium-137" but I am not aware if this is the same for existing reactors. This should be clarified in this revision.	2.5.2, *Design of Reactor Facilities*, the draft successor document to RD-337.
32.	4.1	Bruce Power OPG	Perform a Level 1 and Level 2 PSA for each NPP. Radioactive sources	Add the following sentence: "For radioactive sources other than the reactor core, when appropriate to do so, the licensee may, choose an alternate analysis method to conduct the	Agree in principle. Text and guidance is added as follows to clarify alternative methods may be considered for assessments for regulatory purposes.

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		AECL NB Power	other than the reactor core – such as the spent fuel pool (also called irradiated fuel bay) – shall be considered. Multi-unit impacts, if applicable, shall be included.	assessment using industry standards or best practice." *Impact on industry, if major comment:* It is important to provide an option for an alternate method to conduct an assessment of the risk for other radioactive sources that may not involve a full Level 1 and Level 2 PSA. This may be more appropriate for characterizing risk for such scenarios. This proposed wording for other radioactive hazards is consistent with the wording in Section 4.8 for external events. Critical comment (Bruce, NB Power) Major comment (OPG, AECL)	**For radioactive sources outside the reactor core, the licensee may, with the agreement of persons authorized by the Commission, choose an alternate analysis method to conduct the assessment.**
33.	4.1	Greenpeace		As noted, risk is a combination of both probability and consequence. The CNSC's pre-Fukushima approach, however, was to ignore consequences above an arbitrary cut-off probability. In light of Fukushima, the CNSC needs to abandon this approach. At an international level major accidents with offsite impacts are occurring approximately once a decade. This highlights a significant uncertainty in the CNSC's risk assessments. In this context, the consideration of accident consequences becomes especially important to prevent unreasonable risk to Canadian society. As discussed in objective "g" of REGDOC-2.4.2, risk assessments should be used to "assess the adequacy of emergency procedures." For offsite impacts, this requires modeling the consequences of accident scenarios that were before Fukushima simple dismissed. Level 3 PSAs consider	Upon further consideration, it has been confirmed that no change is necessary. It has to be noted that level 1 and 2 PSA do provide an analysis of consequences for all ranges of probability scenarios, including scenarios much less frequent than 10-6 /yr. For regulatory purpose, the level 2 PSA assessment including the consequences evaluated as part of the level 2 PSA in terms of release categories are sufficient to ensure proper design and operation of the NPP. Level 3 PSA does not provide any new insights into plant operation. It provides insights into how weather patterns and off site emergency measures can affect the off site consequences. The necessary regulatory decision making in the area of off site emergency planning can be done with the use of an

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				consequences. In previous iterations of REGDOC-2.4.2 CNSC staff refused to require Level 3 PSAs because "the decision has been made to set the Safety Goals such that compliance can be checked with a Level 2 PSA results". As discussed in prior comments, under the NSCA the CNSC is required to provide objective information to Canadians on nuclear risks and put limits on these risks. REGD0C-2.4.2 should seek to provide not simply compliance with arbitrary safety goals, but provide a credible portrayal of the risk posted by nuclear sites to Canadians. The consequence information provided by level 3 PSAs is needed to assess the adequacy of emergency planning as well as inform cost benefit decisions on station upgrades to reduce risk. Level 3 PSAs are also needed to provide an objective portrayal of the full risk of nuclear stations in Canada. *Recommendation:* The section should read "Perform level 1, level 2 and level 3 PSA for each nuclear power plant site."	appropriately selected conservative scenario or release source term and an atmospheric dispersion model. This is in line with the international approach in this area. The international development of level 3 PSA is not sufficiently mature to be used for regulatory purposes. Level 2 PSA results contain the necessary information to assess plant safety and provide insights into plant vulnerabilities and adequacy of design, operating procedures and mitigation. Level 3 PSA, as it is based on the result of the Level 2 PSA and would contain more uncertainty, would not add to the information required for regulatory purposes. However, while not yet appropriate for regulatory use, CNSC is monitoring the latest development in the application of level 3 PSA to determine if it can be applied practically to support regulatory oversight of NPPs.
34.	4.2	CCNB	Conduct the PSA under the management system or quality assurance program established in the licensing basis.	In my previous comments I suggested a review section similar to RD-310, and I still contend that there is a need for it. I have a lot of experience at quality management. I have helped implement 3 ISO 9001 quality management systems for engineering firms. Even though the PSA is conducted under a management system or quality assurance program, I doubt that it contains the very specific review procedures like what is a requirement in RD-310. As well these CSA documents are not available for review unless	The licensing basis for NPPs already includes requirements for management systems or quality assurance programs, including for programs such as PSA and safety analysis. CSA N286 is the standard used in the normal licensing basis requirement for NPPs. It is the management system standard beyond ISO9001 developed uniquely for the specific needs of the nuclear sector. It provides the licensee with the management control tools for its programs and activities, reviews, and supports regulatory oversight..

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				members of the public can afford them, because they cost hundreds of dollars. I would like to suggest that the CNSC set up a program that interested members of the public can be supplied with requested CSA standards paid for by either the licencee's or the CNSC.	It has been recognized that access to CSA Standards would be useful for stakeholders who are reviewing CNSC regulatory documents. Therefore, arrangements have been made with CSA Group to make free read-only public access to nuclear Standards referenced in licensing to be made available. Additional supporting guidance is added as follows: **The CSA N286, management system requirements standard and CSA N286.7, *Quality assurance of analytical, scientific and design computer programs for nuclear power plants* are referenced in the licensing basis of the operating nuclear power plants. PSA should be developed consistent with the management system.**
35.	4.4	Greenpeace		It has been Greenpeace's experience that nuclear operators do not necessarily make PSA information available when it is needed to inform decisions. For example at re-licensing hearings or at the outset of environmental reviews. Staff should correct this situation with guidance in REGDOC-2.4.2. *Recommendation:* An additional line should be added to section 4.4: "These PSA updates should be publicly available for re-licensing reviews as well as at the outset of environmental reviews."	PSA updates are reviewed and assessed during normal licensing and compliance activities, and public information and disclosure requirements are established in another program document (RD/GD-99.3) for reference in the licence. Guidance is added in this document for public disclosure to support the RD/GD-99.3 to provide more direction to the industry around disclosure for PSA. In addition, the draft document was revised to include guidance for descriptions and high level summaries for PSA, including those methodologies and screening criteria, subject to appropriate security information considerations. This provides sufficient balance for the purposes of public information, while addressing information and

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					security considerations. Specifically, guidance has been added to the section 5 as follows. **The public information should include high-level summaries for PSA, including those for methodologies and screening criteria (subject to the necessary security considerations).**
36.	4.5	Bruce Power OPG AECL NB Power	Ensure the PSA models are developed using assumptions and data that are both realistic and practical. Supporting deterministic safety analysis or engineering assessment shall be provided.	Revise the wording as follows: "Ensure the PSA models are developed using assumptions and data that are both realistic and practical, and, where required, supported by deterministic analysis or engineering assessments." *Impact on industry, if major comment:* In some cases, it may be justified to use assumptions and data that are appropriate for the calculations without a requirement for supporting deterministic safety analysis or a formal engineering assessment. In all cases an appropriate rationale will be provided. Major comment.	Agreed. The revised wording clarifies the intent and reflects application of this section. **Ensure the PSA models are developed using assumptions and data that are both realistic and practical and, where required, supported by deterministic analysis or engineering assessments.**
37.	4.6	Bruce Power NB Power	The level of detail of the PSA shall be consistent with the facility testing, maintenance and configuration management programs, and the	Revise the wording as follows: "The level of detail shall be consistent with the facility testing, maintenance and configuration management programs, and should be consistent with the intended uses of the PSA." *Impact on industry, if major comment:* The intended application of the PSA can be varied	Agreed. The revised wording clarifies the intent and reflects the application of this section. **The level of detail shall be consistent with the facility testing, maintenance and configuration management programs, and should be consistent with the intended uses of the PSA.**

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			intended uses of the PSA.	and may evolve. While many of the intended applications are understood by those preparing the assessment, It is incumbent on the user to assess the particular application as to its appropriateness at the time of its application. Major comment.	
38.	4.6	OPG AECL	The level of detail of the PSA shall be consistent with the facility testing, maintenance and configuration management programs, and the intended uses of the PSA.	Revise the wording as follows: "The level of detail shall be consistent with the facility testing, maintenance and configuration management programs, and should be consistent with the intended uses of the PSA." *Impact on industry, if major comment:* The intended application of the PSA can be varied and may evolve. While many of the intended applications are understood by those preparing the assessment, It is incumbent on the user to assess the particular application as to its appropriateness at the time of its application. In all cases, it is necessary to seek CNSC acceptance of the methodology. Major comment.	Agreed. The revised wording clarifies the intent and reflects application of this section. **The level of detail shall be consistent with the facility testing, maintenance and configuration management programs, and should be consistent with the intended uses of the PSA.**
39.	4.7	OPG AECL	Seek CNSC acceptance of the methodology and computer codes to be used for the PSA, before using them for the purposes of this document. The methodology shall be	Revise the wording of the 2nd sentence as follows: "The methodology should be suitable to support the objectives of the PSA (set forth in section 3 of this document) and to support the intended PSA applications." *Impact on industry, if major comment:* Under some circumstances, the methodology may	Agreed. The wording is revised and guidance is added for clarification as follows: **The methodology <u>should</u> be suitable to support the objectives of the PSA (set forth in section 3 of this document) and to support the intended PSA applications.** **Guidance**

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			suitable to support the objectives of the PSA (set forth in section 4 of this document) and to support the intended PSA applications.	be for specific objectives only, and this will be noted. The intended application of the PSA can be varied and may evolve. While many of the intended applications are understood by those preparing the assessment, It is incumbent on the user to assess the particular application as to its appropriateness at the time of its application. In all cases, it is necessary to seek CNSC acceptance of the methodology. Major comment.	**Acceptance of the methodology prior to actual PSA development aims to help ensure this methodology can support the PSA's objectives.** **The computer codes that support the analytical methods should be adequate for the purpose and scope of the analysis.** **.**
40.	4.7	Bruce Power NB Power	Seek CNSC acceptance of the methodology and computer codes to be used for the PSA, before using them for the purposes of this document. The methodology shall be suitable to support the objectives of the PSA (set forth in section 4 of this document) and to support the intended PSA applications.	1) Delete the requirement for CNSC acceptance of methodology and computer codes. 2) Revise the wording of the 2nd sentence as follows: "The methodology shall meet the generally accepted requirements and standards and be suitable to support the objectives of the PSA (set forth in section 3 of this document) and to support the intended PSA applications." *Impact on industry, if major comment:* CNSC should be defining requirements for acceptable methodology and computer codes. In the absence of this, they should accept industry standards and best practice. While CNSC staff evaluation of industry practice is certainly expected this evaluation needs to be against a defined Standard. Simply stating "CNSC Acceptance" is not a reasonable standard. Critical comment	1) The acceptance of the methodology and computer codes is current good practice that should be retained. 2) Agreed. The wording is revised and guidance is added for clarification as follows: **The methodology <u>should</u> be suitable to support the objectives of the PSA (set forth in section 3 of this document) and to support the intended PSA applications.** **Guidance** **Acceptance of the methodology prior to actual PSA development aims to help ensure this methodology can support the PSA's objectives.** **The computer codes that support the analytical methods should be adequate for the purpose and scope of the analysis.**

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41.	4.7	CCNB	Methodology and computer codes Seek CNSC acceptance of the methodology and computer codes to be used for the PSA, before using them for the purposes of this document. The methodology shall be suitable to support the objectives of the PSA (set forth in section 3 of this document) and to support the intended PSA applications.	Currently the CNSC staff accepts the PSA methodologies, but for the recent Pickering hearings the commissioners set precedence and put that authority back into their hands with only recommendations from CNSC staff. I think that the commissioners should always have to accept the methodologies, as they form part of the licencing basis and so that they can undergo public scrutiny. After the commission has approved them they can delegate the authority to manage them under similar change procedures as the LCH. Currently the CNSC staff is using Staff review guides to accept PSA methodologies. These review guides are not available to the public and licencees. I find this unacceptable, and it gives un-needed regulatory uncertainty for the licencees. If the methodologies form part of the licencing basis they also need to be made public through the licencee's public information program.	The acceptance of the methodology and computer codes is current good practice is being retained. However, final licensing decisions that include such supporting information are made with Commission approval. The wording is revised and guidance is added for clarification as follows: **The methodology should be suitable to support the objectives of the PSA (set forth in section 3 of this document) and to support the intended PSA applications.** **Guidance** **Acceptance of the methodology prior to actual PSA development aims to help ensure this methodology can support the PSA's objectives.** **The computer codes that support the analytical methods should be adequate for the purpose and scope of the analysis.** Guidance is added in this document for public disclosure to support the RD/GD-99.3 to provide more direction to the industry around disclosure for PSA. In addition, the draft document was revised to include guidance for descriptions and high level summaries for PSA, including those methodologies and screening criteria, subject to appropriate security information considerations. This provides sufficient balance for the purposes of public information, while addressing information and security considerations. Specifically, guidance has been added to the

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					section 5 as follows. **The public information should include high-level summaries for PSA, including those for methodologies and screening criteria (subject to the necessary security considerations).**
42.	4.8	Greenpeace		Climate change is changing the nature and likelihood of extreme weather events. These changes currently considered in PSA modeling. This oversight should be corrected with guidance in REGDOC-2.4.2. *Recommendation:* An additional line should be added to section 4.8. Specifically: "There should be consideration of how the nature and likelihood of external hazards may change due to climate change."	In general, CNSC agrees that the provisions for regular reviews of PSA are used to re-confirm the validity of the PSA, the assessments, assumptions, and inputs, including consideration of changes in climate and weather. As it is already included, no change is necessary.
43.	4.8	CCNB	Site-specific initiating events and potential hazards Include all potential site-specific initiating events and potential hazards, namely: a. internal initiating events and internal hazards b. external hazards, both natural and human-induced, but	The screening criteria need to also be made public, and subject to the commissioner's approval and not the CNSC staff.	Agreed. Guidance is added in this document for public disclosure to support the RD/GD-99.3 to provide more direction to the industry around disclosure for PSA. In addition, the draft document was revised to include guidance for descriptions and high level summaries for PSA, including those methodologies and screening criteria, subject to appropriate security information considerations. This provides sufficient balance for the purposes of public information, while addressing information and security considerations. Specifically, guidance has been added to the section 5 as follows. **The public information should include high-level**

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			non-malevolent Also include potential combinations of the external hazards. The screening criteria of hazards shall be acceptable to the CNSC. The licensee may, with the agreement of "persons authorized" by the Commission, choose an alternate analysis method to conduct the assessment of external events (internal hazards and external hazards).		**summaries for PSA, including those for methodologies and screening criteria (subject to the necessary security considerations).** This document sets out the principles and direction for how PSAs are conducted, and is applied by qualified PSA experts, with regulatory oversight by the CNSC. Final decisions on licensing are made with Commission approval. .
44.	4.9	Bruce Power OPG AECL NB Power	Include all operational states of the NPP (full power, low power and shutdown)	Replace with: "Include at-power and shutdown states. A PSA shall also be performed for other states where the reactor is expected to operate for extended periods of time and which are not covered by the at-power and shutdown PSAs." *Impact on industry, if major comment:* This recognizes that a case may be made for the application of the at-power or shutdown state PSA to cover other scenarios (ie, may be appropriately bounding). Particular states where the reactor is	Agreed as it adds clarity of intent of the requirements. Revise the wording as follows: **Include at-power and shutdown states. A PSA shall also be performed for other states where the reactor is expected to operate for extended periods of time and that are not covered by the at-power and shutdown PSAs.**

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				expected to operate for extended periods which are not covered would have to be explicitly considered. Major comment.	
45.	5	Bruce Power OPG AECL NB Power	PSA Guidance	It is anticipated that the CNSC will be issuing the guide on the additional direction on the requirements set in this document. Clarification	The draft was amended to add guidance applicable to this project. The CNSC will continue to monitor use this document and will include additional guidance in future as appropriate. .
46.	5	Greenpeace		This section fails to give operators guidance on the release of consequence information. As noted, this information is needed to assess the adequacy of offsite emergency plans as well as the economic, environmental, social and human health effects. This undermines several of the documents objectives included in section 3 and should be corrected. At present, nuclear operators are using security related concerns as a pretext to withhold information needed to assess the adequacy of emergency procedures as well as offsite effects. This makes it impossible to have a proper understanding of the risk posed by a nuclear site. Without consequence information reviews of the costs and benefits of engineered upgrades to reduce risk vulnerable to manipulation by station operators. This should be corrected. Greenpeace also has in its possession past PRA's for the Bruce, Darlington and Pickering stations. It is noteworthy that there are significantly higher levels of consequence information. In the appendix to this submission, an extract from the Bruce B PRA from 1999 can be found. It provides information and	The document was revised to clarify that REGDOC 2.4.2 is not intended to provide a means to assess off-site emergency plans. These plans are assessed by other means. Objective "g" of section 3 relates to assessing the effectiveness of on-site and internal accident management procedures during and emergency. However, it should be noted that supporting information for decisions on off-site emergency plans are addressed deterministically by a conservative bounding consequence scenario. Additionally, specific new regulatory documents and CSA standards are being developed to address emergency response and emergency management. Text is revised to better explain this intent as follows: **3g. assess the adequacy of emergency operating procedures. PSA insights should be used as part of the systematic way for maintaining the emergency operating procedures, as these procedures are subject to**

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				offsite health and property financial risks from the station. This information is not a security concern, but is currently being withheld by operators. Greenpeace would also like to highlight that Ontario Power Generation has cited security concerns as a pretext for blocking the release source term information from its PRAs. Again, source term information has nothing to do with security or how to trigger an accident. This is supported by the attached document from a former OPG staffer explaining why source term information is not a security concern. REGDOC-2.4.2 needs, then, to provide clear guidance on the disclosure of consequences information to meet the objectives of the guide and provide credible information on the risk posed by Canadian nuclear stations. *Recommendation:* Two additional lines should be added to Section 5. Specifically, “Non security related information related to the offsite risks posed to the health and safety of Canadians and the environment shall be made available as part PSA summary results.” “Information needed to assess the adequacy of offsite emergency procedures should be made available to stakeholders and provincial emergency management agencies.”	**improvements throughout an NPP’s lifetime.** The other objectives listed in section 3 ensure that all the insights from the PSA are taken into account. Supporting guidance as appropriate has been added for the objectives and other sections where suggested by industry and other stakeholders. Off-site consequences are not currently assessed by means of approach. This is consistent with the international approach in this area. The international development of level 3 PSA is not sufficiently mature to be used for regulatory purposes. Level 2 PSA results contain the necessary information to assess plant safety and provide insights into plant vulnerabilities and adequacy of design, operating procedures and mitigation. Level 3 PSA, as it is based on the result of the Level 2 PSA and would contain more uncertainty, would not add to the information required for regulatory purposes. However, while not yet appropriate for regulatory use, CNSC is monitoring the latest development in the application of level 3 PSA to determine if it can be applied practically to support regulatory oversight of NPPs. Guidance is added in this document for public disclosure to support the RD/GD-99.3 to provide more direction to the industry around disclosure for PSA. In addition, the draft document was revised to include guidance for descriptions and high level summaries for PSA, including those methodologies and screening criteria, subject to appropriate

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					security information considerations. This provides sufficient balance for the purposes of public information, while addressing information and security considerations. Specifically, guidance has been added to the section 5 as follows. **The public information should include high-level summaries for PSA, including those for methodologies and screening criteria (subject to the necessary security considerations).**
47.	5	CCNB	Guidance on public disclosure In accordance with licensees' public information programs established under RD/GD-99.3, Public Information and Disclosure, a summary of the results and assumptions of PSA should be made available to interested stakeholders. It should be noted that any information pertaining to the specific fault	It is nice to see an attempt at transparency and addition of proper guidance with this addition. However instead of just the summary of the results and assumptions, the methodologies and screening criteria also need to be made publicly available, as I had suggested in the first round of consultation and for the Darlington hearings. The methodologies and screening criteria can be subject to the same clause of security sensitive information as the summary. Methodologies form part of the licencing basis and the CNSC is required to provide that regulatory information to the public under the NSCA. Currently only guidance documents are referenced for the methodologies in the LCH, but many of these documents have similar information that is not exactly the same and contain more than one way to do things. Only actually making the methodologies publicly available can the public as well as the commissioners understand what was actually committed to in the methodologies and therefore the	Guidance is added in this document for public disclosure to support the RD/GD-99.3 to provide more direction to the industry around disclosure for PSA. In addition, the draft document was revised to include guidance for descriptions and high level summaries for PSA, including those methodologies and screening criteria, subject to appropriate security information considerations. This provides sufficient balance for the purposes of public information, while addressing information and security considerations. Specifically, guidance has been added to the section 5 as follows. **The public information should include high-level summaries for PSA, including those for methodologies and screening criteria (subject to the necessary security considerations).**

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			sequences and vulnerabilities of a facility include security sensitive information and is subject to applicable information security provisions.	licencing basis. This has led to a lot of confusion recently at Pickering as well as Point Lepreau. Dr. Jammal at the annual public meeting also suggested that the methodologies be made public. With the addition of this new guidance on public disclosure I would like to recommend as I did in the previous consultation that the following section of the NSCA be added as relevant legislation. 9. The objects of the Commission are (b) to disseminate objective scientific, technical and regulatory information to the public concerning the activities of the Commission and the effects, on the environment and on the health and safety of persons, of the development, production, possession and use referred to in paragraph (a). The crosswalk to RD-99.3 should also be made.	

Appendix A – REGDOC-2.4.1, 2.4.2 and 2.5.2 Disposition Tables (Common definitions)

Term	REGDOC-2.4.1 (and REGDOC-2.4.2 where identified)	REGDOC-2.5.2	Proposed definition for both documents
accident	Any unintended event, including operating errors, equipment failures or other mishaps, the consequences or potential consequences of which are not negligible from the point of view of protection or safety.	Any unintended event (including operating errors, equipment failures or other mishaps), whose consequences or potential consequences of are not negligible from the point of view of protection or safety. Note: For the purposes of this document, accidents include design-basis accidents and beyond-design-basis accidents. Accidents exclude anticipated operational occurrences, which have negligible consequences from the perspective of protection or safety.	Any unintended event (including operating errors, equipment failures or other mishaps) the consequences or potential consequences of which are not negligible from the point of view of protection or safety. Note: For the purposes of this document, accidents include design-basis accidents and beyond-design-basis accidents. Accidents exclude anticipated operational occurrences, which have negligible consequences from the perspective of protection or safety.
common cause	A cause for a concurrent failure of two or more structures, systems or components; for example, natural phenomena (earthquakes, tornadoes, floods, etc.), design deficiency, manufacturing flaws, operation and maintenance errors, and human-induced destructive events.	N/A	Remove from 2.4.1
common-cause event		An event that leads to common-cause failures.	Remove from 2.5.2
common-cause failure	A concurrent failure of two or more structures, systems or components due to a single specific event or cause, such as natural phenomena (earthquakes, tornadoes, floods, etc.), design deficiency, manufacturing flaws, operation and maintenance errors, and human-induced destructive events.	A concurrent failure of two or more structures, systems or components due to a single specific event or cause, such as natural phenomena (earthquakes, tornadoes, floods etc.), design deficiency, manufacturing flaws, operation and maintenance errors, human induced destructive events and others.	A concurrent failure of two or more structures, systems or components due to a single specific event or cause, such as natural phenomena (earthquakes, tornadoes, floods, etc.), design deficiency, manufacturing flaws, operation and maintenance errors, and human-induced destructive events.

Term	REGDOC-2.4.1 (and REGDOC-2.4.2 where identified)	REGDOC-2.5.2	Proposed definition for both documents
confinement		A continuous boundary without openings or penetrations (such as windows) that prevents the transport of gases or particulates out of the enclosed space.	Remove from 2.5.2
confinement boundary	A continuous boundary without openings or penetrations and that prevents the release of radioactive materials out of the enclosed space		A continuous boundary without openings or penetrations and that prevents the release of radioactive materials out of the enclosed space.
containment	A method or physical structure designed to prevent the release of radioactive substances. This term is typically used in power reactors documentation	A confinement structure designed to maintain confinement at both high temperature and pressures, and for which isolation valving on penetrations is permitted.	A method or physical structure designed to prevent the release of radioactive substances.
design-basis	The range of conditions and events taken into account in the design of structures, systems and components of a nuclear power plant or a nuclear facility, according to established criteria, such that the facility can withstand them without exceeding authorized limits for the planned operation of safety systems. The design basis includes the design description, design manuals, design drawings and the safety analysis report.	The range of conditions and events taken explicitly into account in the design of the facility, according to established criteria, such that the facility can withstand them without exceeding authorized limits by the planned operation of safety systems.	The range of conditions and events taken explicitly into account in the design of the facility, according to established criteria, such that the facility can withstand them without exceeding authorized limits by the planned operation of safety systems.
design-basis accident (DBA)	Accident conditions for which a nuclear power plant or a reactor facility is designed according to established design criteria, and for which damage to the fuel and the release of radioactive material are kept within regulated limits.	Accident conditions for which a nuclear power plant is designed, according to established design criteria, and for which the damage to the fuel and the release of radioactive material are kept within authorized limits.	Accident conditions for which a nuclear power plant or a reactor facility is designed according to established design criteria, and for which damage to the fuel and the release of radioactive material are kept within authorized regulated limits.

Term	REGDOC-2.4.1 (and REGDOC-2.4.2 where identified)	REGDOC-2.5.2	Proposed definition for both documents
deterministic safety analysis	An analysis of a nuclear power plant's or a reactor facility's response to an event performed using predetermined rules and assumptions (e.g., those concerning the initial facility operational state, availability and performance of the facility systems and operator actions). Deterministic safety analysis can use conservative or best-estimate methods.	An analysis of nuclear power plant responses to an event, performed using predetermined rules and assumptions (e.g., those concerning the initial operational state, availability and performance of the systems and operator actions). Deterministic analysis can use either conservative or best-estimate methods.	An analysis of a reactor facility's response to an event performed using predetermined rules and assumptions (e.g., those concerning the initial facility operational state, availability and performance of the facility systems and operator actions). Deterministic safety analysis can use conservative or best-estimate methods.
external event	(REGDOC-2.4.2) An event unconnected with the operation of a facility or with the conduct of an activity and that could have an effect on the safety of the facility or activity. External events include internal hazards and external hazards (REGDOC-2.4.1) used, not defined		Events unconnected with the operation of a facility or the conduct of an activity that could have an effect on the safety of the facility or activity. Note: Typical examples of external events for nuclear facilities include earthquakes, tornadoes, tsunamis and aircraft crashes.

Term	REGDOC-2.4.1 (and REGDOC-2.4.2 where identified)	REGDOC-2.5.2	Proposed definition for both documents
external hazard	(REGDOC-2.4.2) Hazards that originate from the sources located outside the site of the nuclear power plant. Examples of external hazards are seismic hazards, external fires (e.g., fires affecting the site and originating from nearby forest fires), external floods, high winds and wind induced missiles, offsite transportation accidents, releases of toxic substances from offsite storage facilities, and severe weather conditions. (REGDOC-2.4.1) not used or defined		An event of natural or human-induced origin that originates outside the site and whose effects on the reactor facility are considered hazardous. Note: Examples of external hazards are seismic hazards, external fires (e.g., fires affecting the site and originating from nearby forest fires), external floods, high winds and wind induced missiles, offsite transportation accidents, releases of toxic substances from offsite storage facilities, and severe weather conditions. Consistent with REGDOC-2.5.2. The examples are also included in the body text of the document as guidance as follows Examples of external hazards are seismic hazards, external fires (e.g., fires affecting the site and originating from nearby forest fires), external floods, high winds, offsite transportation accidents, releases of toxic substances from offsite storage facilities, and severe weather conditions.
internal event	(REGDOC-2.4.2) Any event that proceeds from a human error or from a failure of a structure, system or component. (REGDOC-2.4.1) not used or defined	An event internal to the nuclear power plant that results from human error or failure in a structure, system or component.	Any event that proceeds from a human error or from a failure of a structure, system or component.

Term	REGDOC-2.4.1 (and REGDOC-2.4.2 where identified)	REGDOC-2.5.2	Proposed definition for both documents
internal hazard	(REGDOC-2.4.2) Hazards that originate from the sources located on the site of the nuclear power plant (both inside and outside plant buildings). Examples of internal hazards are internal fires, internal floods, turbine missiles, onsite transportation accidents and releases of toxic substances from onsite storage facilities. (REGDOC-2.4.1) not used or defined		Hazards that originate from the sources located on the site of the reactor facility (both inside and outside plant buildings). The examples are moved into the body text of the document as guidance as follows. Examples of internal hazards are internal fires, internal floods, turbine missiles, onsite transportation accidents and releases of toxic substances from onsite storage facilities.
items important to safety	(REGDOC-2.4.1) An item that is part of a safety group and/or whose malfunction failure could lead to radiation exposure (REGDOC-2.4.2) not used or defined		An item that is part of a safety group and/or whose malfunction failure could lead to radiation exposure
postulated initiating event	(REGDOC-2.4.1) An event identified in the design as leading to either an anticipated operational occurrence or accident conditions. A postulated initiating event is not necessarily an accident itself; rather, it is the event that initiates a sequence that may lead to an anticipated operational occurrence, a design-basis accident or a beyond-design-basis accident, depending on the additional failures that occur. (REGDOC-2.4.2) not used or defined	An event identified in the design as capable of leading to an anticipated operational occurrence, or a design-basis accident, or a beyond-design-basis accident. This means that a postulated initiating event is not necessarily an accident itself; rather it is the event that initiates a sequence that may lead to an anticipated operational occurrence, a design-basis accident, or a beyond-design-basis accident, depending on the additional failures that may occur.	An event identified in the design as capable of leading to either an anticipated operational occurrence or accident conditions. Note: A postulated initiating event is not necessarily an accident itself; rather, it is the event that initiates a sequence that may lead to an anticipated operational occurrence, a design-basis accident or a beyond-design-basis accident, depending on the additional failures that occur.

Term	REGDOC-2.4.1 (and REGDOC-2.4.2 where identified)	REGDOC-2.5.2	Proposed definition for both documents
probabilistic safety assessment	(REGDOC-2.4.2) For a nuclear power plant or nuclear fission reactor, a comprehensive and integrated assessment of the safety of the reactor facility. The safety assessment considers the probability, progression and consequences of equipment failures or transient conditions, to derive numerical estimates that provide a consistent measure of the safety of the reactor facility, as follows: • A level 1 PSA identifies and quantifies the sequences of events that may lead to the loss of core structural integrity and massive fuel failures • A level 2 PSA starts from the level 1 results, analyzes the containment behaviour, evaluates the radionuclides released from the failed fuel, and quantifies the releases to the environment • A level 3 PSA starts from the level 2 results , analyzes the distribution of radionuclides in the environment and evaluates the resulting effect on public health		A comprehensive and integrated assessment of a reactor facility. The safety assessment considers the probability, progression and consequences of equipment failures or transient conditions, to derive numerical estimates that provide a consistent measure of the safety of the reactor facility as follows: • A level 1 PSA identifies and quantifies the sequences of events that may lead to the loss of core structural integrity and massive fuel failures • A level 2 PSA starts from the level 1 results, analyzes the containment behaviour, evaluates the radionuclides released from the failed fuel, and quantifies the releases to the environment • A level 3 PSA starts from the level 2 results , analyzes the distribution of radionuclides in the environment and evaluates the resulting effect on public health Note: A PSA may also be referred to as a probabilistic risk assessment

Term	REGDOC-2.4.1 (and REGDOC-2.4.2 where identified)	REGDOC-2.5.2	Proposed definition for both documents
probabilistic safety assessment	(REGDOC-2.4.1) A comprehensive and integrated assessment of a reactor facility. The safety assessment considers the probability, progression and consequences of equipment failures or transient conditions, to derive numerical estimates that provide a consistent measure of the safety of the reactor facility as follows: • A level 1 PSA identifies and quantifies the sequences of events that may lead to the loss of core structural integrity and massive fuel failures • A level 2 PSA starts from the level 1 results, analyzes the containment behaviour, evaluates the radionuclides released from the failed fuel, and quantifies the releases to the environment • A level 3 PSA starts from the level 2 results , analyzes the distribution of radionuclides in the environment and evaluates the resulting effect on public health		See above
shutdown state	(REGDOC-2.4.2) Shutdown A subcritical reactor state with a defined margin to prevent a return to criticality without external actions. (REGDOC-2.4.1) Shutdown state A subcritical reactor state with a defined margin to prevent a return to criticality without external actions.	A state characterized by subcriticality of the reactor. At shutdown, automatic actuation of safety systems may be blocked and support systems may remain in abnormal configurations.	shutdown state A subcritical reactor state with a defined margin to prevent a return to criticality without external actions NB: Also change in REGDOC-2.4.2

Term	REGDOC-2.4.1 (and REGDOC-2.4.2 where identified)	REGDOC-2.5.2	Proposed definition for both documents
structures, systems and components	(REGDOC-2.4.1) A general term encompassing all of the elements of a facility or activity that contribute to protection and safety. Structures are the passive elements: buildings, vessels, shielding, etc. A system comprises several components, assembled in such a way as to perform a specific (active) function. A component is a discrete element of a system. Examples are wires, transistors, integrated circuits, motors, relays, solenoids, pipes, fittings, pumps, tanks and valves. (REGDOC-2.4.2) used but not defined	A general term encompassing all of the elements of a facility or activity that contribute to protection and safety. Structures are the passive elements: buildings, vessels, shielding, etc. A system comprises several components, assembled in such a way as to perform a specific (active) function. A component is a discrete element of a system. Examples are wires, transistors, integrated circuits, motors, relays, solenoids, pipes, fittings, pumps, tanks and valves, etc.	A general term encompassing all of the elements of a facility or activity that contribute to protection and safety. Note: Structures are the passive elements: buildings, vessels, shielding, etc. A system comprises several components, assembled in such a way as to perform a specific (active) function. A component is a discrete element of a system. Examples are wires, transistors, integrated circuits, motors, relays, solenoids, pipes, fittings, pumps, tanks and valves, etc.
uncertainty analysis	(REGDOC-2.4.2) The process of identifying and characterizing the sources of uncertainty in the analysis, evaluating their impact on the probabilistic safety assessment results, and developing, to the extent practicable, a quantitative measure of this impact. (REGDOC-2.4.1) The process of identifying and characterizing the sources of uncertainty in the safety analysis, evaluating their impact on the analysis results, and developing – to the extent practicable – a quantitative measure of this impact.		The process of identifying and characterizing the sources of uncertainty in the safety analysis, evaluating their impact on the analysis results, and developing – to the extent practicable – a quantitative measure of this impact.