September 27, 2012

UNRESTRICTED | ILLIMITÉ
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Canadian Nuclear Safety Commission,
P.O. Box 1046, Station 'B',
280 Slater Street,
Ottawa, Ontario K1P 5S9.

To Whom It May Concern,

Subject: **Candu Energy Inc. Comments on Draft Omnibus Amendments to Regulatory Documents Addressing Lessons Learned from the Fukushima Daiichi Event**

Please find attached Candu Energy Inc. (Candu Energy) comments on the draft omnibus amendments for the following regulatory documents:

- S-294, *Probabilistic Safety Assessment (PSA) for Nuclear Power Plants;*
- S-296 and G-296, *Developing Environmental Protection Policies, Programs and Procedures at Class I Nuclear Facilities and Uranium Mines and Mills;*
- G-306, *Severe Accident Management Programs for Nuclear Reactors;* and
- RD-310, *Safety Analysis for Nuclear Power Plants;*

Sincerely,

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Attachments:

1. Candu Energy Comments on S-294, Probabilistic Safety Assessment (PSA) for Nuclear Power Plants
2. Candu Energy Comments on S-296 and G-296, Developing Environmental Protection Policies, Programs and Procedures at Class I Nuclear Facilities and Uranium Mines and Mills
3. Candu Energy Comments on G-306, Severe Accident Management Programs for Nuclear Reactors
4. Candu Energy Comments on RD-310, Safety Analysis for Nuclear Power Plants

Attachment 1

Candu Energy Comments on S-294, Probabilistic Safety Assessment (PSA) for Nuclear Power Plants

Sec. #	Excerpt of Text from Section	Issue with Proposed Text	Suggested Changes
Preface	*This regulatory document sets out the requirements of the Canadian Nuclear Safety Commission (CNSC) with respect to the probabilistic safety assessment (PSA). When published, this document will amend/supersede S-294, Probabilistic Safety Assessment (PSA) for Nuclear Power Plants. This document has been amended to clarify or add criteria reflecting lessons learned from the Fukushima nuclear event of March 2011. The amendments were made to address findings from INFO-0824, CNSC Fukushima Task Force Report, as applicable to S-294.*	Candu Energy agrees with the proposed change.	-
1	*The purpose of this regulatory document, when incorporated into a licence to construct or operate a nuclear power plant (NPP) or other legally enforceable instrument, is to assure that the licensee conducts a "probabilistic safety assessment (PSA)" in accordance with defined requirements*	Candu Energy agrees with the proposed change.	-
2	*This regulatory document sets out the requirements for the PSA that a licensee who constructs or operates a NPP shall conduct, when required by the applicable licence or other legally enforceable instrument.*	Candu Energy agrees with the proposed change.	-
4	*The following International Atomic Energy Agency (IAEA) safety standards documents or updated versions, provide general guidance for conducting quality PSAs* *1.IAEA safety standard SSG-3, Development and Application of Level 1 Probabilistic Safety Assessment for Nuclear Power Plants, and* *2. IAEA safety standard SSG-4, Development and Application of Level 2 Probabilistic Safety Assessment for Nuclear Power Plants*	This is not a Fukushima related change. If this change is retained it should be recognized as a change that is not driven by the Fukushima lessons learned.	-

Sec. #	Excerpt of Text from Section	Issue with Proposed Text	Suggested Changes
5.0	*The licensee shall carry out the following activities:*	-	-
5.1	*Perform a Level 1 and Level 2 PSA for each NPP.* *Radioactive sources other than the reactor core, such as the irradiated fuel bay, shall be considered. Multi-unit impacts, if applicable, shall be included.* *The PSA shall include:* *1. a systematic analysis, to give confidence that the design will comply with the general safety objectives* *2. demonstration that a balanced design has been achieved* *3. confidence that small deviations in plant parameters that could give rise to severely abnormal plant behaviour ("cliff-edge effects") will be prevented;* *4. assessments of the probabilities of occurrence for severe core damage states, and assessments of the risks of major radioactive releases to the environment.* *5. site-specific assessments of the probabilities of occurrence, and the consequences of external hazards* *6. identification of plant vulnerabilities and systems for which design improvements or modifications to operational procedures could reduce the probabilities of severe accidents, or mitigate their consequences* *7. assessment of the adequacy of emergency procedures* *8. assessment of insights into the severe accident*	Although Candu Energy agrees with the intent, the scope of this change goes beyond the Fukushima lessons learned. Cliff-edge effects can be covered by sensitivity analysis; the term "*sensitivity analysis*" is preferred. Further clarification is required regarding item 3, and this clarification should be included in a future revision to GD-310.	Candu Energy suggest that the text for Item 3 be changed to: *"confidence that small deviations in plant parameters that could give rise to severely abnormal plant behaviour ("sensitivity analysis") will be prevented;"*

Sec. #	Excerpt of Text from Section	Issue with Proposed Text	Suggested Changes
	management program		
5.2	*Establish and apply a formal management system or quality assurance program for conducting a PSA, such as the Canadian Standards Association (CSA) Standard N286-05, Management system requirements for Nuclear Power Plants. The computer codes used for the PSA models shall comply with CSA N286.7-99, Quality Assurance of Analytical, Scientific and Design Computer Programs for Nuclear Power Plants.*	Candu Energy agrees with the proposed change.	-
5.3	*The PSA models reflect the plant as built and operated (including multi-unit impacts), as closely as reasonably achievable within the limitations of PSA technology, and consistent with the risk impact;*	Candu Energy suggest changing "*including multi-unit impacts*" to "*including impacts for multiple units at a site*"	Candu Energy suggest that the text be changed to: "*The PSA models reflect the plant as built and operated (including impacts for multiple units at a site), as closely as reasonably achievable within the limitations of PSA technology, and consistent with the risk impact;*"
5.4	*Update the PSA models every five years or sooner if major changes occur in the facility.*	Although Candu Energy agrees with the intent, this is not a Fukushima related change.	-
5.5	*Ensure that the PSA models are developed using assumptions and data that are realistic and practical. Supporting deterministic safety analysis shall be provided.*	This is not a Fukushima related change. In addition, further clarification is required on the CNSC expectations for "*Supporting deterministic safety analysis shall be provided*". This is vague and general statement that could be	-

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		easily misinterpreted. Therefore, it would be helpful to include further clarification in a future revision to GD-310.	
5.6	*The level of detail of the PSA is consistent with the facility testing, maintenance and configuration management programs, and with the intended uses of the PSA.*	Candu Energy agrees with the proposed change.	-
5.7	*Seek CNSC acceptance of the methodology and computer codes to be used for the PSA, prior to using them for the purpose of this document.* *• The methodology shall state the intended PSA applications.* *• The methodology shall be suitable for the intended PSA applications.* *• The computer codes used for PSA and for the supporting deterministic safety analyses shall be developed, validated, and used in accordance with a quality assurance program that meets the requirements of CSA N286.7-99.*	Although Candu Energy agrees with the intent, the proposed changes are not all related to the Fukushima lessons learned.	-
5.8	*Include all potential site-specific initiating events and potential hazards, namely: (a) internal initiating events caused by random component failures and human error; (b) internal hazards (e.g., internal fires and floods, turbine missiles) and (c) external hazards, both natural (e.g., earthquakes, high winds, external floods) and human-induced, but non-malevolent (e.g., airplane crashes, accidents at nearby industrial facilities).* *Also, include potential combinations of external hazards. Examples include seismic, floods, or fire.* *The screening criteria of hazards shall be acceptable to the CNSC.*	Although Candu Energy agrees with the intent, the proposed changes are not all related to the Fukushima lessons learned. Furthermore, some of the text should be included in a regulatory guide, rather than in a regulatory requirements document.	Candu Energy suggest that the text be changed to: *"Include all potential site-specific initiating events and potential hazards, namely: (a) internal initiating events and internal hazards and (b) external hazards, both natural and human-induced, but non-malevolent.* *Also, include credible combinations of external hazards. Examples include seismic, floods, or fire. The screening criteria of*

Sec. #	Excerpt of Text from Section	Issue with Proposed Text	Suggested Changes
	The licensee may, with the agreement of "persons authorized" by the Commission Tribunal, choose an alternative analysis method to conduct the assessment of external events (internal hazards and external hazards).		*hazards shall be acceptable to the CNSC."*
5.9	*Include all operational states of the NPP (full power, low power, and shutdown).*	The proposed change is not related to the Fukushima lessons learned.	
5.10	*Include sensitivity analysis, uncertainty analysis and importance measures in the PSA.*	-	-
5.11	*The PSA results may be repeated and reaffirmed.*	The proposed change is not related to the Fukushima lessons learned. In addition, further clarification is required on the CNSC expectations for this requirement in the context of ensuring PSA quality. This clarification should be included in a future guidance document.	-
5.12	*The licensee shall provide comprehensive and detailed documentation of the PSA, including assumptions, methodology, simplifications and results. It should include significant contributors and vulnerabilities, which would support the regulatory review and assessment of the PSA.*	The proposed change is not related to the Fukushima lessons learned.	-

Attachment 2
Candu Energy Comments on S-296 and G-296, Developing Environmental Protection Policies, Programs and Procedures at Class I Nuclear Facilities and Uranium Mines and Mills

Sec. #	Excerpt of Text from Section	Issue with Proposed Text	Suggested Change
Preface S-296	*Preface* *This regulatory document sets out the requirements of the Canadian Nuclear Safety Commission (CNSC) with respect to the environmental protection policies, programs and procedures.* *When published, this document will amend/supercede S-296, Environmental Protection Policies, Programs and Procedures at Class I Nuclear Facilities and Uranium Mines and Mills. The document has been amended to clarify or add criteria reflecting lessons learned from the Fukushima nuclear event of March 2011. Amendments to the accompanying guidance document address findings from INFO-0824, CNSC Fukushima Task Force Report.* …	Candu Energy agrees with the proposed change.	-
Preface G-296	*Preface* *This regulatory document sets out the expectations and guidance of the Canadian Nuclear Safety Commission (CNSC) with respect to the environmental protection policies, programs and procedures.* *When published, this document will amend/supercede G-296, Developing Environmental Protection Policies, Programs and Procedures at Class I Nuclear Facilities and Uranium Mines and Mills. This document has been amended to clarify or add criteria reflecting lessons learned from the Fukushima nuclear event of March 2011. The amendments were made to address findings from INFO-0824, CNSC Fukushima Task Force Report, as applicable to G-296.*	Candu Energy agrees with the proposed change.	-

Sec. #	Excerpt of Text from Section	Issue with Proposed Text	Suggested Change
	…		
5.3.3	*Other Considerations* *As a further consideration, the EMS should address environmental emergency preparedness and response in terms of:* *1. the proposed measures to prevent or mitigate the effects of accidental releases of nuclear substances and hazardous substances on the environment* *2. the proposed measures to ensure the availability and accessibility of environmental monitoring instrumentation during emergency situations* *3. the inclusion of environmental monitoring instrumentation and equipment layouts in emergency plans* ~~*2.*~~*4. the health and safety of persons [27][28]*	For items 2 and 3, additional clarification and guidance around the type (fixed or portable) of instrumentation to meet these requirements will be helpful. Since emergency preparedness and response requires flexibility,, an optimized approach should be based on a combination of fixed and portable environmental monitoring instrumentation. Use of portable environmental monitoring would be based on survey teams to achieve the required results.	Given this, it is suggested that the proposed items 2 and 3 be combined as follows: "2. The provisions for environmental monitoring instrumentation are included in emergency plans to ensure these are adequately robust against severe situations."

Attachment 3
Candu Energy Comments on G-306, Severe Accident Management Programs for Nuclear Reactors

Sec. #	Excerpt of Text from Section	Issue with Proposed Text	Suggested Change
Preface	*Preface* *This regulatory document sets out the expectations and guidance of the Canadian Nuclear Safety Commission (CNSC) with respect to severe accident management programs.* *When published, this document will amend/supercede G-306, Severe Accident Management Programs for Nuclear Reactors. This document has been amended to clarify or add criteria reflecting lessons learned from the Fukushima nuclear event of March 2011. The amendments were made to address findings from INFO-0824, CNSC Fukushima Task Force Report, as applicable to G-306.*	Candu Energy agrees with the proposed change.	-
6.1	*Risk Assessment* *The results of probabilistic risk assessment should assist the licensee to:* *1. Verify that SAM would be effective for representative severe accident sequences, including multi-unit events, events triggered by natural and human-induced external hazards, and extended station blackout accidents;*	Additional clarification on the meaning of "extended station blackout accidents" versus "station blackout accidents" is needed. The assumptions that need to be considered for a station blackout event should be further clarified and include: 1. the loss of offsite power resulting from a switchyard-related or grid-related event due to random faults, or an external event, such as a grid disturbance, or weather	-

Sec. #	Excerpt of Text from Section	Issue with Proposed Text	Suggested Change
		events such as high winds, snow, and ice loading that affects the offsite power system either throughout the grid or at the plant, and 2. the loss of offiste power resulting from a fire, flood, or seismic activity. A duration for the station blackout event should be established to differentiate between a "station blackout event" and an "extended station blackout event". The requirement for a duration for SBO versus extended SBO can then be related to guidance on minimum time periods before crediting use of onsite alternate AC power soruces and offsite alternate AC power sources. Candu Energy recommends further discussion with the nuclear industry before including guidance on durations for SBO and extended SBO in G-306.	
7.2	*Evaluation of Systems and Equipment* *Plant design capabilities for severe accident management – such as containment venting, hydrogen mitigation, and coolant make-up provisions – should be identified.* *For all systems and equipment which are expected to*	While Candu Energy generally agrees with this proposed revision to G-306, there are two concerns: 1. From the perspective of the design of a new nuclear power	To address Candu Energy's concern, it is suggested that the text be revised by replacing *"verified to function"* with *"reasonably assured to function"*. Hence, the revised text would be:

Sec. #	Excerpt of Text from Section	Issue with Proposed Text	Suggested Change
	perform in certain manners or conditions that were not considered in their original design, the licensee should conduct an assessment of their potential availability, effectiveness, and limitations for use in support of a SAM program. Existing systems may warrant design enhancement, if the assessment reveals that the potential consequences of severe accidents are such that the existing systems may not provide the desired preventive and mitigating capabilities. *Essential plant monitoring features and instrumentation for diagnosis of plant state should be identified, and verified to function reliably and provide meaningful data under severe accident conditions.*	plant, the guidance in Section 7.2 is not explicitly reflected in draft CNSC document GD-337. 2. For severe accident conditions, which are expected to be outside of the design basis of a nuclear power plant, "verified to function reliably" is not appropriate. The same level of confidence for reliable operation of plant monitoring features and instrumentation that is expected for normal operation, anticipated operational occurrences and design basis accidents cannot be practically provided for design extension conditions. By definition, design extension conditions, and the associated severe accident conditions are conditions beyond the range explicitly taken into account in the design basis.	*"Essential plant monitoring features and instrumentation for diagnosis of plant state should be identified, and reasonably assured to function reliably and provide meaningful data under severe accident conditions."*
7.3	*Assessment of Material Resources* *The licensee should perform an assessment to determine the availability of coolant, energy, and other material resources that may be required for the effective completion of SAM actions.* *For procurement of external resources (equipment, power, water and staff), the licensee should assess the adequacy of arrangements with other organizations, to ensure availability, timing and access to these resources during*	Candu Energy agrees with the proposed change.	-

Sec. #	Excerpt of Text from Section	Issue with Proposed Text	Suggested Change
	accidents, with consideration of potential challenges posed by common cause/external events. These arrangements should be formalized and documented.		
9.2	*Personnel Training* *The licensee should provide operating staff and emergency groups with training commensurate with their respective roles in accident management, enabling them to:* *1. understand their roles and responsibilities within the SAM program* *2. learn about severe accident phenomena and processes* *3. become familiar with the activities to be carried out* *4. enhance their ability to perform in stressful conditions* *5. verify the effectiveness and improve the clarity of SAM procedures and guidelines* *Training programs should address the roles to be performed by different groups, and include drills and exercises to enable assessment of the interactions between the various groups involved in SAM.* *The licensee should develop a set of drills to cover multi-unit events and events triggered by external events.* *To the extent practicable, the licensee should use simulator training, because it provides a realistic and interactive environment and is an efficient method for enhancing human response in complex situations.*	Candu Energy agrees with the proposed change.	-
10	*Validation and review* *The licensee should validate a SAM program upon its establishment, to confirm its effectiveness, usability, technical accuracy and scope. This validation should include modeling of selected accident scenarios with and without consideration of accident management actions, as*	Candu Energy agrees with the intent.	Candu Energy suggests the following change to the text: "An assessment methodology should be employed to demonstrate with a high level of

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	well as drills and exercises. *A validation assessment should be undertaken, to confirm that operator actions are possible, accounting for variables such as ease of access, possible radiation fields, presence of debris, fires or flooding, and staff complement.* *The licensee should also perform periodic reviews of a SAM program, provisions, guidelines and procedures, to reflect changes in plant design, operational modes, or organizational responsibilities.* *The reviews should address new information that has been derived from drills, exercises, training programs, safety analyses, experimental research or other sources.*		confidence that the means (such as intervention of emergency response crews or mitigating equipment) is available and can be deployed to permit the necessary operator actions to take place in the range of localized working environments that could exist."
Glossary	*Alternate AC power* *An alternating current power source that is available to, and located at (or nearby) a reactor facility, and is characterized by the following:* *1. is connectable to but not normally connected to the offsite or onsite standby and emergency AC power systems* *2. has minimum potential for common mode failure with offsite power to the onsite standby and emergency AC power sources* *3. is available in a timely manner after the onset of station blackout* *4. has sufficient capacity and reliability for operating all the systems required for coping with station blackout, and*	Candu Energy agrees with the definition of Alternate AC power. However, Candu Energy suggests that some additional clarification is needed for the definition of station blackout. To achieve greater clarity, the complete loss of ac power from offsite and onsite main generator, standby and emergency power sources needs to be defined as: - the loss of supply of AC power to essential and non-essential switchgear buses in a nuclear power plant, - the unavailability of standby and	Candu Energy suggests the following change to the text: "A complete loss of alternating current (AC) power from offsite and onsite main generator, standby and emergency power sources (i.e., loss of offsite electric power system concurrent with turbine trip and unavailability of the onsite emergency ac power system). Note that it does not include: - the loss of available AC power to buses fed by station batteries through inverters, - the assumption of a concurrent single failure

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	for the duration of time required to bring and maintain the plant in a safe shutdown state. *station blackout (SBO)* *A complete loss of alternating current (AC) power from offsite and onsite main generator, standby and emergency power sources. Note that it does not include failure of uninterruptible AC power supplies (UPS) and DC power supplies. It also does not include failure of alternate AC power.* *Note: See also definition for alternate AC power in this document.*	emergency power sources that automatically start up and connect in response to the loss of offsite power and a turbine trip, - excluding a concurrent single failure, and - excluding a concurrent design basis accident. Furthermore, Candu Energy suggests that the definition of station blackout should exclude assumptions of failure to standby AC power sources that are dedicated to powering SSCs that are complementary design features, provided the applicable requirements are met.	- the assumption of a concurrent design basis accident, - failure of alternate AC power (Note: See also definition for alternate AC power in this document.), nor - the assumption of failure of standby AC power sources that are dedicated to powering SSCs that are complementary design features, provided the applicable requirements are met.

Attachment 4

Candu Comments on RD-310, Safety Analysis for Nuclear Power Plants

Sec. #	Excerpt of Text from Section	Issue with Proposed Text	Suggested Change
Preface	*This regulatory document was developed pursuant to the requirements and obligations set forth in the General Nuclear Safety and Control Regulations and in the Class I Nuclear Facilities Regulations, where a safety analysis report demonstrating the safety of the nuclear facility must be submitted to the Canadian Nuclear Safety Commission (CNSC).* *When published, this document will amend/supercede RD-310, Safety Analysis for Nuclear Power Plants. This document has been amended to clarify or add criteria reflecting lessons learned from the Fukushima nuclear event of March 2011. The amendments were made to address findings from INFO-0824, CNSC Fukushima Task Force Report, as applicable to RD-310.* *This document identifies high-level regulatory information for a licence applicant's preparation and presentation of a safety analysis. The information required adheres to high standards and is consistent with modern national and international practices addressing issues and elements that control and enhance nuclear safety. In particular, it establishes a more modern risk-informed approach to the categorization of accidents, one that considers a full spectrum of possible events including the events of greatest*	Candu Energy agrees with the proposed change.	-

Sec. #	Excerpt of Text from Section	Issue with Proposed Text	Suggested Change
	consequence to the public. …		
5.2.1	*The licensee shall use a systematic process to identify events, event sequences, and event combinations ("events" hereafter in this document) that can potentially challenge the safety or control functions of the NPP. The licensee shall also identify events that may potentially lead to fission product releases, including those related to irradiated fuel pools and fuel handling systems. This process shall be based on regulatory requirements and guidance, past licensing precedents, operational experience, engineering judgment, results of deterministic and probabilistic assessments, and any other systematic reviews of the design.* *The identification of events shall account for all operating modes, including low power operation and shutdown modes. Common-cause events affecting multiple reactor units on a site shall be considered. The list of identified events shall be reviewed for completeness during the design and analysis process and modified as necessary.* …	Candu Energy agrees with the proposed changes. Candu Energy suggests that GD-310 be revised to include clarification on "low power operation and shutdown modes".	Candu Energy suggests changing "irradiated fuel pools" to "irradiated fuel bays" to be more consistent with terminology currently in use at Canadian nuclear power plants.
5.2.2	*5.2.2 Scope of Events* *The list of events identified for the safety analysis shall include all credible:* *1. component and system failures or malfunctions* *2. operator errors* *3. common-cause internally and externally initiated events, including those affecting multiple reactor units on a site*	Candu Energy agrees with the proposed change.	-

Sec. #	Excerpt of Text from Section	Issue with Proposed Text	Suggested Change
5.3.3	*Acceptance Criteria* *5.3.3 Beyond Design Basis Accidents* *Analysis for BDBAs shall be performed as part of the safety assessment to demonstrate that:* *1. The nuclear power plant, as designed, can meet the established safety goals.* *2. The accident management program and design provisions, 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.*	Candu Energy agrees with the proposed change. However, Candu Energy suggests that "long-term availability" be changed to "availability". It is understood that the duration of availability of cooling water, material and power supplies must be sufficient to ensure a stable shutdown condition for the plant until accident management measures are no longer required.	-
5.4.2	*Analysis Method* *The analysis method shall include the following elements: …* *...* *6. Conducting calculations, including performing sensitivity analysis and identifying, where necessary, margins to cliff-edge effects.* *7. An event should be analyzed from its initial steady state up to the pre-defined stable state in the long-term;* …	While Candu Energy generally agrees with the high level requirement in Item 6, additional clarification is needed in GD-310 to explain the expectations for "*where necessary, margins to cliff-edge effects.*" Cliff-edge effects can be covered by sensitivity cases. The term "cliff-edge effects" was introduced in regulatory requests for assessments of existing nuclear power plants' capabilities for coping with initial lessons learned from the Fukushima Dai-ichi event. Formal addition of requirements to identify "cliff-edge effects" in safety analyses requires more guidance.	-

Sec. #	Excerpt of Text from Section	Issue with Proposed Text	Suggested Change
		Candu Energy agrees with the proposed change to Item 7, because it is consistent with the requirements in RD-337 for the design of new nuclear power plants.	
5.4.4	*Analysis Assumptions* *Assumptions made to simplify the analysis, as well as assumptions concerning the operating mode of the nuclear power plant, the availability and performance of the systems, and operator actions, shall be identified and justified.* *The analysis of AOO and DBA shall:* *1. apply the single-failure criterion to all safety systems and their support systems* *2. account for consequential failures that may occur as a result of the initiating event* *3. credit actions of systems only when the systems are qualified for the accident conditions, or when their actions could have a detrimental effect on the consequences of the analyzed accident* *4. account for the possibility of the equipment being taken out of service for maintenance* *5. account for the possibility of the equipment being rendered inoperable during a prolonged period required to maintain the plant in a stable, cold and depressurized state, following an accident* *6. credit operator actions only when there are* *a) unambiguous indications of the need for such actions* *b) adequate procedures and sufficient time to perform the required actions*	Candu Energy agrees with the proposed change to Item 5, because it is consistent with the requirements in RD-337 for the design of new nuclear power plants.	-

Sec. #	Excerpt of Text from Section	Issue with Proposed Text	Suggested Change
	c) environmental conditions that do not prohibit such actions		
Glossary	Glossary cliff-edge effect A large increase in the severity of consequences caused by a small change of conditions. Note: Cliff-edges can be caused by changes in the characteristics of the environment, the event or changes in the plant response.	Candu Energy considers "cliff-edge effect" to be within the sensitivity analyses. Hence, as noted in the comment Section 5.4.2 item 6, more guidance is needed in GD-310 on the expectations for identifying and analyzing for cliff-edge effects.	-