

Bruce Power Comments on REGDOC-2.6.3, Fitness for Service Aging Management

Item	Document Section/ Excerpt of Section	Industry Issue	Suggested Change(s) (if applicable)	Major Comment	Impact on Industry, if major comment
1	General	Incorrectly refer to CSA N284.5 Standard throughout document, where it is clear reference should be to CSA N285.5 Standard.	Replace “CSA N284.5 Periodic inspection of CANDU nuclear power plant containment components” with “CSA N285.5 Periodic inspection of CANDU nuclear power plant containment components” Replace in Page 6 & in Page 13, References.	No	Editorial comment
2	Preface Section, Page i “Important Note”	The “Important note” box is cut off. There are words that are not legible at the bottom of the box.	Increase the size of the box.	No	Editorial comment
3	General	Reference numbers in text are not aligned with list of references provided on pages 28 and 29.	Fix cross references to list on pages 28/29.	No	Editorial comment
4	General	Document does not specifically address the role of station “System Health monitoring programs” and their important role in station aging management.	Suggest adding under section 4.4.3 a reference to system health monitoring	Yes	By including system health monitoring in the document, it allows industry to demonstrate compliance with REGDOC 2.6.3 through system health monitoring
5	General	The document uses the term “AMPS” to refer to Aging Management programs (section 1.1), however throughout the document the term AMPS also refers to aging management plans.	Recommend not using the acronym AMPS use the terms AM program or AM plan where appropriate	Yes	If not addressed there may be confusion which could lead to inconsistency across the industry
6	General	Bruce Power understands that REGDOC-2.6.3 is intended to apply to all licensees whether they be a multi-unit NPP, a single unit NPP or a research reactor. It is understood that the goal of an aging management program as described by REGDOC-2.6.3 remains the same regardless of the type of nuclear facility.	It should be acknowledged that the fundamental differences in design, management structure, and complexity of each type of facility may dictate different approaches to achieve the common goal of an Aging Management Programme.	Yes	Smaller licensees will be adversely impacted in terms of program effort if this comment is not addressed.

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7	General Comment SSC AMPs	The 'AMPs' for the individual SSCs are plans rather than programs	The document should recognize that some licensees use life cycle management plans, others use Aging management plans	No	Editorial comment
8	Section 2 <i>General Concepts</i>	REGDOC-2.6.3 acknowledges CSA (including several CSA Standards/Series, e.g. CSA N285, N286, N287, N290.13) as an example of an “external outside support organization”. REGDOC-2.6.3 states that “in practice”, aging management requires the “involvement and support” of CSA standards (and other regulatory documents). In other words, these various CSA standards can, and do, serve as governance documents, or specific references, for elements of a station aging management program. REGDOC-2.6.3 goes on to say that these various CSA standards “contribute to aging management” but “that is not their primary purpose”.	No CSA Standard exists for NPP Aging Management. The CNSC and industry should consider the development of a CSA Standard specific to NPP Aging to provide clarity and specificity to implementation of an aging management program. Suggest that within the 5 year revision cycle for REGDOC 2.6.3 that a CSA standard be developed based on best industry practice and international standards (IAEA) to replace the REGDOC.	Yes	From a utility’s perspective, CSA Standards provide very specific requirements for program content, and hence, clarity. CSA standard development is also a collaborative effort between regulatory authorities, industry participants, and experts to produce a specific set of purposeful and practical requirements to achieve the intended goal of the standard.

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9	Page 6, “Inspection and surveillance programs provide information used to confirm the current condition or fitness for service of these SSCs, but this information addresses only the CHECK activity in figure 1.	Assuming “these SSC’s” refers to reactor components, fuel channels, feeders, SGs etc., this statement disregards the information submitted to the regulator in accordance with CSA N285.4, which requires that the NPP submit inspection and assessment reports that must demonstrate the component remains fit for service until next PIP window. Therefore, N285.4 does not just require a CHECK of the current condition, it requires projecting forward. If component is not fit for service, standard requires the NPP to disposition (i.e. ACT by saying why it’s OK to return to power), set path forward (i.e. PLAN future inspection or mitigating action), execute subsequent inspection/maintenance (i.e. DO).	Suggest replacing with “ Inspection and surveillance programs provide information used to confirm the current condition or fitness for service of these SSCs. ”	No	Editorial comment
10	Section 2.2 (page 6)	<p>The personifications used (e.g. ‘they’, ‘themselves’ are often not clear as to what the topic subject to which ‘they’ refers to. It is recommended to avoid these Personifications in an industry standard and regulatory document.</p> <p>It is recommended to remove ‘they’, and ‘themselves’ and replace with clear statements.</p>	<p>Page 6, second paragraph: While each of these facility programs ...</p> <p>Remove “in themselves”.</p> <p>Replaces with “While each of these facility programs and processes contribute to aging management, this is usually not their primary purpose or focus; none of these programs or processes, in themselves, provides a complete program or process for managing the aging of SSCs.”</p> <p>Page 6, fourth paragraph: “They typically do not include passive,”</p> <p>Replace with: “Reliability and Maintenance programs [14, 15] typically do not include passive, long-life SSCs”</p>	No	Editorial comment

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11	<p>2.2 The PLAN activity involves coordinating, integrating, and modifying existing programs and activities that relate to managing the aging of a system, structure or component, and if necessary, developing new programs. <i>This activity includes making provisions for spare parts and long-term service agreements with suppliers.</i></p>	<p>Do not see a special reason for using an example (<i>italicized</i>) here while other steps do not follow the same path.</p>	<p>The PLAN activity involves coordinating, integrating, and modifying existing programs and activities that relate to managing the aging of a system, structure or component, and if necessary, developing new programs. i.e. remove the last sentence in section 2.2 subsection 2</p>	<p>No</p>	<p>Editorial comment</p>
12	<p>2.2 The DO activity is the minimization of expected degradation of a system, structure or component through its “careful” operation ...</p>	<p>The use of the term “careful” will lead to ambiguity</p>	<p>Remove the word careful</p>	<p>No</p>	<p>Editorial comment</p>

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13	<p>2.2 In practice, effective aging management requires the involvement and support of many internal and external organizations, and essential facility programs and processes. “Examples include:”</p>	<p>These are not examples of support of many internal and external organizations, these are guidelines, standards, etc.</p>	<p>Retain the bullets “safety analysis “ etc but remove the specific examples of the standards</p>	<p>No</p>	<p>Editorial comment</p>
14	<p>2.2 “SSC-specific or mechanistic-based AMPs should be established and implemented in accordance with the licensee’s integrated AMP framework, and should address the attributes of an effective AMP as presented in Appendix A. The scope of the AMP for SSCs should be commensurate with the importance to safety, design function and required performance of the SSCs, and its effect on the safe operation of the NPP. For example, the critical life-limiting NPP SSCs of current</p>	<p>The examples “. . . For example, the critical life-limiting NPP SSCs of current CANDU reactors – such as fuel channels, heat transport feeder piping, steam generators, reactor assembly and structures, and containment structures – will have detailed life cycle management plans, as will their SSC-specific AMPs. Other types of mechanistic-based AMPs include flow-accelerated corrosion and fatigue monitoring “add confusion</p>	<p>Suggest removing “. For example, the critical life-limiting NPP SSCs of current CANDU reactors – such as fuel channels, heat transport feeder piping, steam generators, reactor assembly and structures, and containment structures – will have detailed life cycle management plans, as will their SSC-specific AMPs. Other types of mechanistic-based AMPs include flow-accelerated corrosion and fatigue monitoring “</p>	<p>No</p>	<p>Editorial comment</p>

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	CANDU reactors – such as fuel channels, heat transport feeder piping, steam generators, reactor assembly and structures, and containment structures – will have detailed life cycle management plans, as will their SSC-specific AMPs. Other types of mechanistic-based AMPs include flow-accelerated corrosion and fatigue monitoring “				
15	Page 7, Section 3.0 “Proactive Strategy for Aging Management”	<p>The lifecycle phases of a NPP are documented as: design, construction, commissioning, operation, and decommissioning. However there are other phases referred to as Stabilization Activities Phase (SAP) and Storage and Surveillance Phase (SSP)</p> <p>SAP & SSP phases may be considered as a subset of decommissioning. Safety concerns could be any equipment related to irradiated fuel bay operations, shutdown cooling, and core de-fuelling activities (fuelling machines and fuel transfer system equipment). Since section 3.5 is very brief on decommissioning, no major change is recommended. SAP & SSP may be mentioned.</p>	<p>Add to the guidance section:</p> <p>“SAP & SSP phases may be considered as a subset of decommissioning.”</p> <p>In addition, further explanation for section 3.5 guidance might be required.</p>	No	Editorial comment

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16	<p>3.1 In refurbishment projects, the change-out of all of the pressure tubes is considered a “replacement” activity and the change-out of all the feeder pipes is considered a “repair” activity. In both of these examples, aging management should be an important consideration in the design (e.g., selection of improved materials, increased wall thickness), fabrication (stress relief of feeder pipe bends), and commissioning (baseline measurements) of these repair and replacement activities.</p>	<p>The determination of whether an activity is a repair or a replacement is already addressed in CSA N285.0 and should not be addressed here</p>	<p>Remove “In refurbishment projects, the change-out of all of the pressure tubes is considered a “replacement” activity and the change-out of all the feeder pipes is considered a “repair” activity. In both of these examples, aging management should be an important consideration in the design (e.g., selection of improved materials, increased wall thickness), fabrication (stress relief of feeder pipe bends), and commissioning (baseline measurements) of these repair and replacement activities.”</p>	<p>Yes</p>	<p>This issue is addressed in another document (CSA Standard) already covered in the licence. There is a risk that the definitions will be interpreted differently. We suggest this not be included in the document as it does not add any value.</p>
17	<p>3.1.1</p>	<p>The second item under “Guidance” uses the term “safety significant” which is not defined</p>	<p>Suggest adding to glossary</p>	<p>No</p>	<p>Please define</p>

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18	3.1.1	<p>The following portion of Section 3.1.1 is too detailed and belongs in the next revision of RD-310 “The safety analysis report for the NPP should address the following items relating to aging management:</p> <ol style="list-style-type: none"> 1. an outline of the proactive strategy for aging management and prerequisites for its implementation 2. safety-significant SSCs of the NPP that could be affected by aging 3. assumptions, methods, acceptance criteria, and data used to account for the effects of the aging of SSCs in the safety analysis, including any time-limited assumptions and failure data for probabilistic safety assessments 4. critical service conditions, operational limits and conditions, and any other parameters to be monitored and/or controlled that affect aging assumptions used in safety analyses or equipment qualification 5. data and information to be collected for aging management in order to confirm that safety analysis assumptions and acceptance criteria continue to be met 	<p>Remove “The safety analysis report for the NPP should address the following items relating to aging management:</p> <ol style="list-style-type: none"> 1. an outline of the proactive strategy for aging management and prerequisites for its implementation 2. safety-significant SSCs of the NPP that could be affected by aging 3. assumptions, methods, acceptance criteria, and data used to account for the effects of the aging of SSCs in the safety analysis, including any time-limited assumptions and failure data for probabilistic safety assessments 4. critical service conditions, operational limits and conditions, and any other parameters to be monitored and/or controlled that affect aging assumptions used in safety analyses or equipment qualification 5. data and information to be collected for aging management in order to confirm that safety analysis assumptions and acceptance criteria continue to be met” 	Yes	<p>There is a concern, similar to comment 16 above that requirements between 2 documents will be interpreted differently. All safety analysis requirements should be contained in RD-310. We suggest that the document reference RD-310 for safety analysis requirements.</p>
19	3.4.2 Long term operation,	<p>Section 3.4.2 suggests a design life of 30 years or 210,000 EPFH. 30 years was an initial commercial assumption for our NPPs and not a design life</p>	<p>Please remove sentence “For the current fleet of reactors in Canada, this is operation beyond approximately 30 years or 210,000 effective full-power hours”</p>	Yes	<p>This statement is inaccurate and if incorporated into the document it will lead to confusion and misinformation regarding the safe operation of our plants.</p>

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20	Section 4.1 External organizations required for specific aging management services should be considered.	Need for external organizations for aging management services is an internal commercial business management decision for the utility, and should not be included in the REGDOC.	Remove requirement for consideration of external organizations.	No	Editorial comment
21	Section 4.3, Guidance, Item 6 To ensure that the aging evaluation is resource-effective, arrange the final list of elements and components into related categories.	This level of detail should not be specified in the REGDOC.	Remove from the REGDOC.	No	Editorial comment
22	Section 4.5 Condition assessments Page 19.	The Requirements in this section are in “shall” and “should” statements. It appears that the section is missing the Guidance title, after the second paragraph.	Add the following title, after the second paragraph on Page 19. Guidance The condition assessment should provide ...	Yes	Although this appears to be an editorial omission, not correcting it may lead to compliance issues.
23	Section 4.5 Condition assessments Page 19. Second paragraph, last sentence.	The REGDOC text states that: Condition Assessment may be required before an NPP returns to service after a shutdown period or SSC lay-up It is better to clarify that shutdown means “extended shutdown” as specified in the guidance of Section 3.4.3, page 13, Guidance, first line:	Revise the text: Condition Assessment may be required before an NPP returns to service after an extended shutdown period or SSC lay-up. Add in the guidance or the glossary the definition of the extended shutdown. “Extended shutdowns are reactor shutdowns lasting for a period exceeding one year, and exclude regular maintenance outages. “	No	Editorial comment

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24	4.7 Management of technological obsolescence	Obsolescence may be addressed in several licensee managed processes or by a dedicated program .The wording in this section suggest that the only option is to have a dedicated program	<p>Revise the text from: “The licensee shall establish a program for management of technological obsolescence. The provisions for the management of obsolescence shall be documented.”</p> <p>To “The licensee shall have a managed process for obsolescence. The provisions for the management of obsolescence shall be documented in the licensee’s management system.”</p>	No	Editorial comment
25	4.7 Management of technological obsolescence	There is lack of clarity on the term obsolescence and technological obsolescence .	It is recommended to add definition of obsolescence to the glossary, and remove reference to technological obsolescence . Suggest using the definition in IAEA NS G-2.12.	Yes	Not including a definition of “ obsolescence ” and the use of the term “ technological obsolescence ” may lead to inconsistency in compliance to requirements of this REGDOC.

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26	<p>Section 4.8 Definition of 'safety analysis' in the REGDOC.</p>	<p>In the REGDOC, 'safety analysis' includes reference to the Probabilistic Safety Assessment (PSA) standard S-294. This implies that PSA is part of safety analysis, and as per Section 3.4.1, the effects of aging on PSA shall be evaluated. There is currently no regulatory guidance on how to incorporate aging into PSA. The same comment applies for Section 3.4.2 Item 3 - there is no regulatory guidance currently available to include time-limited assumptions in PSA for the period of long-term operation.</p> <p>The referenced REGDOC S-294 does not explicitly define aging management methodologies to be applied to PSA</p>	<ol style="list-style-type: none"> 1. Suggest removing the wording “including safety analysis [4, 5, 6], maintenance [15], and reliability programs [14].” From the sentence All supporting programs and activities that are credited as an integral part of the NPP aging management shall be identified, and their interfaces and information requirements defined in the overall integrated AMP framework document, including safety analysis [4, 5, 6], maintenance [15], and reliability programs [14]. 2. Move the wording “including safety analysis [4, 5, 6], maintenance [15], and reliability programs [14].” to the guidance section of Section 4.8 	Yes	There is no current approved guidance or methodology for including the effects of aging in a PSA. Therefore it is not possible to be in compliance with this document. We also note that any PSA requirements should be included in S-294 (or its replacement REGDOC).
27	<p>Section 4.10 Review and Improvements 3rd paragraph. “In accordance with S-99</p>	All reporting requirements should be documented in the updated RD99.1 and not addressed here	Remove the sentence “In accordance with S-99, Reporting Requirements for Operating Nuclear Power Plants [16], licensees are required to report the discovery of information that may reveal an aging effect or hazard that is different in nature, significantly greater in probability, or greater in magnitude than was previously provided to the CNSC in licensing documents”	Yes	There is no need to include this statement in the document as the requirement is covered by the reporting requirements document (currently S-99).

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28	<p>4.10 ...sentence” Whenever an AMP deficiency is identified, the licensee should assess its significance and, where appropriate, conduct a root-cause determination and take corrective actions “</p>	<p>The reference to a root cause determination may not be appropriate based on safety significance. Licensees’ corrective action programs require a causal analysis which will determine either an apparent cause analysis or a root cause analysis depending on safety significance</p>	<p>Suggest change to “Whenever an AM Program deficiency is identified, the licensee should assess its significance and, where appropriate, conduct a causal analysis and take corrective actions</p>	<p>No</p>	<p>Editorial comment</p>
29	<p>Section 4.10, Guidance Annual reviews of the AMP.</p>	<p>The timing of AMP review should be tied to the existing cycle for the major program elements, such as update of the LCMPs, update of the programmatic documentation, or periodic safety review. Examples of systems that would not be appropriate candidates for annual review are containment, feeders, pressure tubes, steam generators.</p>	<p>Revise the requirement for annual review to ‘AM plan review should be conducted on a periodic basis consistent with the existing cycle for the major program elements “.</p>	<p>Yes</p>	<p>It is not possible to conduct annual reviews of aging management plans for a number of components as there will be no inspection data available to conduct the review against.</p>