

## OPG Comments on REGDOC-2.6.3, Fitness for Service: Aging Management

Item	Document Section/ Excerpt of Section	Industry Issue	Suggested Change(s)	Major Comment (only complete if major comment)	Impact on Industry (only complete if major comment)
1	General	REGDOC 2.6.3 refers to the CSA N284.5 standard throughout document, whereas the correct CSA reference is CSA N285.5.	<p>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”</p> <p>Replace in Page 6 &amp; in Page 13, and in References.</p>		
2	Preface Section, Page i Important Note Box	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 so that all text is visible.		
3	Preface Section Page i Important Note Box First Sentence (see also Glossary definition 'licensing basis')	<p>The first line states: “Where referenced in a license either directly or indirectly (such as through licensee-referenced documents), this document is part of the licensing basis for a regulated facility or activity.”</p> <p>The implication of this statement is that any document the utility references becomes part of the licensing basis. This should not be the case.</p> <p>There is a definition of licensing basis in the REGDOC 2.6.3 document which is slightly different in wording from that approved by the Commission in the INFO document. The wording potentially expands the documents comprising the licensing basis from that previously understood.</p>	<p>The statement, in the first line, has to be consistent with the INFO document on licensing basis</p> <p>There is an approved definition in the INFO document.</p> <p>It is recommended to use the consistent definition rather than using new wording which potentially changes licensing basis as understood by the licensee.</p>		
4	General	Reference numbers in text are not aligned with list of references provided on pages 28 and 29.	Please align the references with the list on pages 28 and 29.		
5	General	This document does not specifically address station “System Health Monitoring” and their important role in station aging management.	<p>Add under section 4.4.3, a reference to system health monitoring</p> <p>It is recommended to add a reference to the “System Health Monitoring” in sections relevant to “Aging Evaluation” and “Condition Assessment”, i.e. sections 4.4 and 4.5. This change will allow the industry to demonstrate compliance with REGDOC 2.6.3 through system health monitoring and avoid duplication of efforts.</p>	<p>For example, as per OPG practice, System Performance Monitoring Plans (SPMPs) and System Health Reports contain the elements of aging evaluation, according to the REGDOC Section 4.4, i.e.</p> <ul style="list-style-type: none"> <li>1-understanding aging</li> <li>2-preventive actions to minimize and control aging degradation</li> <li>3-methods for detection, monitoring, and trending of aging effects</li> <li>4-methods for mitigating aging</li> </ul>	Allows industry to show compliance with certain requirements of REGDOC 2.6.3 through system health monitoring.

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				<p>effects and corrective actions</p> <p>As required by the REGDOC, the procedure and results of aging evaluations are documented in SPMPs and System Health Reports.</p> <p>System Health Reporting plays a major role in implementation of aging management programs at site.</p>	
6	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, instead use the terms AM program or AM plan where appropriate	Major Comment	If the industry comment is not implemented, there can be confusion that could lead to inconsistencies across the industry.
7	General	Industry understands that REGDOC-2.6.3 is intended to apply to all licensees whether they are 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 Program.	Major comment.	The impact of not addressing industry comments here is that smaller licensees will be adversely impacted in terms of program effort
8	General Comment regarding SSC AMPs	The 'AMPs' for the individual SSCs could be plans rather than programs	<p>The document should recognize that some licensees use life cycle management plans, others use aging management plans.</p> <p>It is recommended that the guidance sections of the text (such as Section 4.6) be revised to acknowledge that AMPs include different types of plans or programs such as: Aging Management Plans, Life Cycle Management Plans, Engineering and Component Programs, etc.</p>		
9	Section 2 General Concepts	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	There is no CSA Standard for NPP Aging Management. It is suggested that the CNSC and industry 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	A CSA document for NPP Aging Management would provide specifics on Scoping and Screening method, Condition Assessment method, and Aging Evaluation and Record Keeping methods, which are developed based on the best	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

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		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”.	standard is developed to REPLACE REGDOC 2.6.3.	industry practices and regulatory standards.	achieve the intended goal of the standard.
10	<b>Section 2.2 Page 6, 4th paragraph</b> “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.”		
11	<b>Section 2.2 Page 6 1<sup>st</sup> and 3<sup>rd</sup> paragraphs</b>	The use of pronouns, e.g. “they” and “themselves” are often unclear as to the subject to which ‘they’ refer to.  It is recommended to avoid using pronouns to refer to program, processes, or plans in this regulatory document and in such cases, to remove ‘they’, and ‘themselves’ and replace them with clearer statements.	Page 6, second paragraph: While each of these facility programs ...  It is suggested to remove “in themselves” and replace 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, <del>in themselves</del> , provides a complete program or process for managing the aging of SSCs.”  Page 6, fourth paragraph: “They typically do not include passive,”  Replace with: “Reliability and Maintenance programs [14, 15] typically do not include passive, long-life SSCs”		
12	<b>Section 2.2 Page 4 Item 2</b>  “The PLAN activity	There is no special reason for using an example (underlined) here while other steps do not.  The activity of making provisions for spare parts and long-term service agreements with suppliers is listed in Section 4.7	Revise the text by removing the last sentence:  “The PLAN activity involves coordinating, integrating, and modifying existing programs and activities that relate to managing the aging of a system, structure or		

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	<p>involves ... <b><u>This activity includes making provisions for spare parts and long-term service agreements with suppliers.</u></b></p>	<p>Management of technological obsolescence, under Guidance.</p>	<p>component, and if necessary, developing new programs.” <del>This activity includes making provisions for spare parts and long-term service agreements with suppliers.</del></p>		
13	<p><b>Section 2.2 Page 4 Subsection 3 The DO activity ...</b> 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>		
14	<p><b>Section 2.2 Page 5</b> “In practice, effective aging management requires the involvement and support of many internal and external organizations, and essential facility programs and processes. <u>Examples include...</u>”</p>	<p>These are not examples of support of many internal and external organizations, these are guidelines, standards, etc.</p>	<p>Retain the primary bullets, e.g. safety analysis and remove the specific examples of the standards and regulatory documents, i.e. change to:</p> <p>“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> <ul style="list-style-type: none"> <li>• safety analysis</li> <li>• design, engineering change control</li> <li>• periodic and in-service inspection program</li> <li>• equipment reliability</li> <li>• maintenance programs</li> <li>• environmental qualification programs</li> <li>• operating procedures, chemistry programs</li> <li>• operating experience, significant events analysis and research programs”</li> </ul>		
15	<p><b>Section 2.2 Page 7 2nd paragraph</b></p>	<p>The examples in this paragraph will create confusion.</p> <p>“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>Remove examples from text:</p> <p><del>“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</del></p>		

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			fatigue monitoring.”		
16	<b>Page 7, Section 3.0, “Proactive Strategy for Aging Management”</b>	<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 &amp; 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 &amp; SSP may be mentioned.</p>	<p>Add to Guidance section:</p> <p>“SAP &amp; 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>		
17	<p><b>Section 3.1 Design Guidance Last sentence on Page 8 and 1st paragraph on Page 9.</b></p> <p>... 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...</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 the following text from the document:</p> <p><del>“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.”</del></p>		
18	<p><b>Section 3.1.1 Aging management content in safety analysis reports Guidance Page 9 2<sup>nd</sup> item: Safety-significant SSCs...</b></p>	<p>The second item under “Guidance” uses the term “safety-significant,” which is not defined.</p>	<p>Add definition of “safety-significant” to the Glossary.</p>		

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19	<p><b>Section 3.1.1 Aging management content in safety analysis reports Guidance Page 9</b></p>	<p>The following portion of Section 3.1.1 is too detailed and belongs in the next revision of RD-310:</p> <p>“The safety analysis report for the NPP should address the following items relating to aging management:</p> <ol style="list-style-type: none"> <li>1. an outline of the proactive strategy for aging management and prerequisites for its implementation</li> <li>2. safety-significant SSCs of the NPP that could be affected by aging</li> <li>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</li> <li>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</li> <li>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</li> </ol>	<p>Remove the following text from the document:</p> <p><del>“The safety analysis report for the NPP should address the following items relating to aging management:</del></p> <ol style="list-style-type: none"> <li><del>1. an outline of the proactive strategy for aging management and prerequisites for its implementation</del></li> <li><del>2. safety-significant SSCs of the NPP that could be affected by aging</del></li> <li><del>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</del></li> <li><del>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</del></li> <li><del>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.”</del></li> </ol>		
20	<p><b>Section 3.4.2 Long term operation, Guidance Page 12</b></p>	<p>Section 3.4.2, Guidance, the sentence:</p> <p>“For the current fleet of reactors in Canada, this is operation beyond approximately 30 years or 210,000 effective full-power hours.”</p> <p>suggests a design life of 30 years or 210,000 EFPH:</p> <p>Thirty (30) years was an initial commercial assumption for CANDU NPPs and not a design life.</p>	<p>Remove sentence:</p> <p><del>“For the current fleet of reactors in Canada, this is operation beyond approximately 30 years or 210,000 effective full-power hours.”</del></p>	<p>Major Comment.</p>	<p>If this sentence is not removed, it may lead to confusion and misinformation regarding the safe operation of our NPPs.</p>
21	<p><b>Section 3.5 - Decommissioning</b></p>	<p>It is not clear when a licensee has ‘decommissioned’ a component/ system. Need a clear definition of when Aging Management is no longer required.</p>	<p>Define when the Aging Management of a decommissioned component / system is no longer required.</p> <p>Suggest stating that:</p> <p>“An Ageing Management Program is no longer required when the residual risks are at or below acceptable levels. For example, for reactor components it is after the reactor is defueled and drained, and is ready for safe storage.”</p>		
22	<p><b>Section 4.1 Item 4</b></p>	<p>The 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</p>	<p>Remove Guidance, Item 4, consideration of external organizations for specific services related o AM.</p>		

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	Page 14	REGDOC.			
23	Section 4.3, Page 16 Guidance, Item 6 Page 16	<p>“To ensure that the aging evaluation is resource-effective, arrange the final list of elements and components into related categories.”</p> <p>This level of detail should not be specified and is not required in the REGDOC.</p> <p>“Component Grouping” is a known practice in condition assessment. This helps effectiveness, but is not necessary. In practice, the process is iterative and needs a few revisions to get to it right. The list of elements and categories are further sub-divided and revised based on the results of the aging evaluation results.</p>	<p>Remove item 6 from the REGDOC:</p> <p><del>“To ensure that the aging evaluation is resource-effective, arrange the final list of elements and components into related categories.”</del></p>		
24	Section 4.5 Condition assessments Page 19.	<p>The Requirements in this section are in “shall” and ‘should” statements.</p> <p>It appears that the section is missing the Guidance title, after the second paragraph.</p> <p>The “should requirements” i.e. 3rd paragraph, items 1 to 3, and the “may” requirement, i.e. last paragraph are considered as guidance.</p> <p>Also, it is recommended to acknowledge that utilities perform condition assessments as part of existing program and processes, including: Life Cycle Management Plans, Component Condition Assessments, System Condition Assessments, and System Performance Monitoring Plans and System Health Reports.</p>	<p>Add the following title after the second paragraph on Page 19:</p> <p>“Guidance</p> <p>The condition assessment should provide ...”</p> <p>Acknowledge that utilities perform condition assessments as part of existing program and processes, including: Life Cycle Management Plans, Component Condition Assessments, System Condition Assessments, and System Performance Monitoring Plans and System Health Reports.</p>	Major comment.	If comment not implemented, it could lead to inconsistent compliance.
25	Section 4.5 Condition assessments Page 19. Second paragraph, last sentence.	<p>The REGDOC text states that:</p> <p>” [condition assessments] may be required before an NPP returns to service after a shutdown period or SSC lay-up.”</p> <p>It is recommended to clarify that shutdown means “extended shutdown” as specified in the guidance of Section 3.4.3, page 13, Guidance, first line.</p>	<p>Suggest revising the text:</p> <p>Change to:</p> <p>“...may be required before an NPP returns to service after an <u>extended</u> shutdown period or SSC lay-up.”</p> <p>Add in the guidance, or the glossary, the definition of extended shutdown, i.e.</p> <p>“Extended shutdowns are reactor shutdowns lasting for a period exceeding one year and exclude regular maintenance outages. “</p>		



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26	Section 4.7 Management of technological obsolescence Page 20	Obsolescence may be addressed in several licensee managed processes or by a dedicated program. The wording in this section suggests that the only option is to have a dedicated program.	Replace text: “The licensee shall establish a program for management of technological obsolescence. The provisions for the management of obsolescence shall be documented.”  with:  “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.”		
27	Section 4.7 Management of technological obsolescence Page 20	While the IAEA NS G-2.12 document provides guidance on the management of obsolescence, it does not use the term “technological obsolescence.”	Add the definition of obsolescence to the glossary and replace all references to “technological obsolescence” with simply “obsolescence.”  Suggest using the terminology in alignment with the IAEA NS G-2.12, Page 28, and Section 5: Management of Obsolescence.	Major comment.	Not addressing this comment could lead to inconsistencies with compliance to the requirements of this REGDOC.
28	Section 4.8 Guidance Page 21 Definition of “safety analysis” in this REGDOC.	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.  The referenced REGDOC S-294 does not explicitly define aging management methodologies to be applied to PSA.	1- Remove the wording: “ <b>including safety analysis [4, 5, 6], maintenance [15], and reliability programs [14].</b> ” 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, <del>including safety analysis [4, 5, 6], maintenance [15], and reliability programs [14].</del> ”  2- Move the wording “ <b>including safety analysis [4, 5, 6], maintenance [15], and reliability programs [14].</b> ” to the guidance section of Section 4.8.		
29	Section 4.10 Review and Improvements Page 21 3rd paragraph. “In accordance with S-99,	It is recommended to document all the reporting requirements in the updated RD99.1, not in the REGDOC 2.6.3.	Remove the sentence:  “ <del>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.</del> ”		



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30	<p><b>Section 4.10 Guidance</b> <b>Page 22</b> <b>3<sup>rd</sup> paragraph</b></p> <p>” 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.</p> <p>Licensees’ corrective action programs require a causal analysis which will determine whether an apparent cause analysis or a root cause analysis is required, depending on the safety significance.</p>	<p>Change to:</p> <p>“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>		
31	<p><b>Section 4.10 Guidance, first paragraph</b> <b>Page 21</b></p> <p>Annual reviews of the AMP.</p>	<p>REGDOC states that: “The reviews should be conducted on an annual basis and documented.”</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.</p>	<p>Revise the requirement for annual review to:</p> <p>“AM plan review should be conducted on a periodic basis consistent with the existing cycle for the major program elements.”</p>		