

Bruce Power Comments on draft REGDOC-1.2.3 – Licence Application Guide: Licence to Prepare Site for a Deep Geological Repository (DGR)

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#	Section	Industry Issue	Suggested Change	MAJOR or Clarification	Impact on Industry
0.	Overview	<p>Industry appreciates the opportunity to comment on this draft REGDOC. To ensure its requirements and operational impacts are fully understood, licensees would welcome the opportunity to review future drafts as well to offer constructive feedback before this document is submitted to the Commission for approval and publication.</p> <p>During a collective review of this initial version, subject matter experts from Nuclear Waste Management Organization, Bruce Power, Ontario Power Generation, New Brunswick Power, and Canadian Nuclear Laboratories identified the following three themes to which many of our MAJOR comments relate to:</p> <ol style="list-style-type: none"> 1. This document lacks consistency with CSA N292.7. Since the CSA N292.7 is referenced frequently within this REGDOC, these inconsistencies will add confusion. <ol style="list-style-type: none"> a. The figure provided in Section 2 is an example of many of these inconsistencies. 2. The document references many CSA standards and other REGDOCs that are not in scope for a Licence to Prepare Site (LTPS) for a DGR. 3. Throughout the document, there appears to be requirements listed that come from the NPP Licence Application Guide (LAG); the requirements for many of the SCAs are more onerous or wouldn't be expected for a DGR LAG. <p>Specific examples are provided in the table below along with other requests for clarification.</p>			
1.	General	Most of the REGDOCs/CSAs referenced are not scoped for DGR	Consider developing separate codes/regulations or expanding on the scope to include DGR.	MAJOR	Creates significant barriers to any organization considering undertaking a DGR. The risks, complexity, and costs of licencing a DRG should not be the same as an NPP.
2.	General	Technical scope for a DGR appears to have been copied almost entirely from REGDOC-1.1.3 Licence Application Guide: Licence to operate a Nuclear Power Plant.	Consider the technical scope in relation to a DGR. Similar comments have been made about SMR regulations being "too stringent" for the intent of preparing for a DGR.	MAJOR	Creates significant barriers to any organization considering undertaking a DGR. The risks, complexity, and costs of licensing a DRG should not be the same as an NPP.
3.	General	Several sections request nuclear-specific information (e.g., sources) without a clear path on how/where to obtain information.	Consult with NRCAN on the division of responsibilities and possible contacts to support the application.	Clarification	
4.	General	Draft timelines should be developed within the REGDOC 1.2 series. It is understood that such a project and licencing phase(s) will take considerable time, but these timelines should be recognized in the regulatory framework for use in the business case development and to raise awareness for an organization preparing to make an application.	Consider consulting with NRCAN and the mining industry.	Clarification	
5.	General	Reference to CSA N292.7 does not include the year of publication, while other referenced CSA standards include.	Change " CSA N292.7 " to " <u>CSA N292.7-22</u> " throughout the document including the appendices.	Clarification	

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6.	Section 1.1., 2 nd paragraph	<p>The DGR facility is defined as “facility where radioactive waste is placed in a deep, stable, geological formation (usually several hundred metres or more below the surface). The facility is engineered to isolate and contain radioactive waste to provide the long-term isolation of nuclear substances from the biosphere. The facility is engineered to isolate and contain radioactive waste to provide the long-term isolation of nuclear substances from the biosphere.”</p> <p>This definition reflects that included in the CNSC REGDOC-3.6, Glossary, and is also consistent with the definition of a <i>geological disposal facility</i> in the IAEA Nuclear Safety and Security Glossary (2022 Interim Edition), “A facility for radioactive waste disposal located underground (usually several hundred metres or more below the surface) in a stable geological formation to provide long term isolation of radionuclides from the biosphere.”</p> <p>However, this definition does not include the surface facilities associated with the underground repository, such as the Used Fuel Packaging Plant, and it is unclear whether the draft REGDOC-1.2.3 would apply to these facilities.</p>	The definition of the DGR facility needs to be clarified to explicitly include the surface facilities associated with the underground repository, and REGDOC 1.2.2 (once approved) should be referenced.	MAJOR	Ambiguous requirements will increase the regulatory uncertainty for the proponents and operators of a DGR.
7.	Section 1.1., 3 rd paragraph	This document tends to align the start of the post-closure period with the completion of decommissioning and abandonment of the site. This may be logical from a licensing point of view, but unreasonable from technical and management point of view. Once the DGR is closed by sealing the shafts or ramps, the multiple barriers system has been fully completed and the waste has been fully isolated. From this moment, the post-closure safety case takes effect, and the post-closure monitoring would start. Decommissioning of surface facilities is an important	Suggested revision: <i>“the pre-closure period encompasses site preparation, construction, operation and closure of the underground repository, including the decommissioning of ancillary facilities”</i>	<i>Clarification</i>	

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		licensing step, but does not necessarily affect the post-closure safety or performance. Also, decommissioning of surface facility does not necessarily happen together with the closure of the repository. It may be possible that some surface structures/facilities are kept for post-closure monitoring or institutional control purposes. Aligning post-closure period with licencing stages is not consistent with CSA N292.7.			
8.	Section 1.1, 4 th paragraph, 4 th bullet points	<p>The document requires information in an application</p> <ul style="list-style-type: none"> demonstrates that the site is suitable for a facility's full lifecycle. <p>This requirement may be difficult to meet because:</p> <ol style="list-style-type: none"> The word "suitable" is ambiguous and lacks definition. It is not very clear if the DGR lifecycle in this document includes the post-closure period that lasts indefinitely. Assuming the lifecycle includes post-closure, it is difficult to fully prove the site will remain good for the full lifecycle due to the large uncertainties associated with the time frame. 	<p>Suggest revising the bullet point as follows:</p> <p><i>"demonstrates that the site <u>characteristics are is consistent with the post-closure safety case suitable for a facility's full lifecycle.</u>"</i></p> <p>The above statement is consistent with the idea that suitability is answered by both site characterization and safety case.</p>	Clarification	
9.	Section 1.1 and figure on page 7	Both Section 1.1 and figure on Page 7 acknowledges the DGR lifecycle and differentiation between pre-closure (i.e., site preparation, construction, operation, and closure) from the post-closure period. Under the Nuclear Safety Control Act what licence application will move a DGR from closure or into the post-closure period?	Provide clarification of the licence type for the post-closure period.	Clarification	
10.	Section 1.2	Is the intention of the document to provide guidance for geologic disposal facilities shallower than several hundred meters below the surface? Shallower geologic disposal is not in the list of exclusions in Section 1.2.	Provide clarification in the scope.	Clarification	
11.	Section 1.3	Since the Impact Assessment Act (IAA) clearly links to the NSCA and CNSC – should the IAA not be cited in the relevant legislation?	Consider an IAA reference as well as Environmental Assessment regulations and provincial environmental requirements.	MAJOR	Significant costs and complexities associated with the broad range of regulations cited in this draft are likely to deter potential applicants.

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			Furthermore, consider a clear distinction in CNSC oversight regarding nuclear and environmental aspects and those under other federal/provincial jurisdictions.		
12.	Section 1.3	<p>The list is confusing; for an example with regards to Class I Nuclear Facilities Regulations:</p> <ul style="list-style-type: none"> ● <i>section 3</i> ● <i>subsections 14(1), (2)</i> ● <i>paragraphs 3(a), (b), (d), (d.1), (e), (f), (g), (h), (i) and (k), 4(a), (b), (c), (d) and (e)</i> <p>Does bullet #3 “paragraphs 3(a), (b)...” refer to the same section 3 listed in bullet #1? However, a few items have been removed from the list, like. 3(c).</p>	Simplify the list and consider adding an Appendix, similar to draft RegDoc-1.2.2, October 2021.	<i>Clarification</i>	
13.	Section 2, Figure - Title: Pre-closure and post-closure licensing stages and lifecycle activities for a deep geological repository	The first row in the figure shows the “Lifecycle” of a DGR and includes “post institutional control” as a lifecycle stage. The definition of lifecycle in the latest version of REGDOC-3.6 is “ <i>The various stages of a nuclear facility’s lifespan, including site selection, site preparation, construction, operation, decommissioning and abandonment.</i> ” This definition does not include the post institutional control which is post abandonment. The figure seems inconsistent with the REGDOC-3.6 definition.	<p>Revise the figure to shade the “Post institutional control” in a different way and add a note to indicate that post institutional control is not considered a lifecycle stage per nuclear regulations.</p> <p>Alternatively, keep the figure as is and add a revised definition of lifecycle stages to the document, which includes the post institutional control as a lifecycle stage.</p>	<i>Clarification</i>	
14.	Section 2, Figure - Title: Pre-closure and post-closure licensing stages and lifecycle activities for a deep geological repository	<p>The figure indicates the post-closure period starts after the site is released from CNSC control. However, Figure A.1 in CSA N292.7 indicates that post-closure period starts when the DGR is closed, while a post-closure monitoring period is still under the CNSC control. There are two questions:</p> <ul style="list-style-type: none"> ● What is the starting point of the post-closure period (closure of the DGR or release from CNSC control)? ● Does the CNSC control cover the post-closure monitoring activities and these activities are 	Seeking clarity for the starting point of the post-closure period and licensing coverage on post-closure monitoring in the document.	<i>Clarification</i>	

Bruce Power Comments on draft REGDOC-1.2.3 – Licence Application Guide: Licence to Prepare Site for a Deep Geological Repository (DGR)

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		considered part of “Closure” and “License to decommission”?			
15.	Section 2 , Figure - Title: Pre-closure and post-closure licensing stages and lifecycle activities for a deep geological repository	<p>The figure shows “indigenous and public engagement”, “site evaluation”, “site characterization” and “post-closure safety case” all extend beyond release of CNSC control. CSA N292.7 Figure A.1 shows these activities all stops before release from CNSC control.</p> <p>In addition, the last bullet in Section 1.1 requires the proponent “demonstrates that the site is suitable for a facility’s full lifecycle.”</p> <p>It is unclear what activities would be required to be maintained during institutional controls with respect to site evaluation, site characterization and post-closure safety case, and under what jurisdiction.</p>	<p>Seeking clarity on the inconsistency with the CSA N292.7.</p> <p>If these activities are required to continue beyond release from CNSC control, please answer the following questions:</p> <ul style="list-style-type: none"> • Who is responsible to regulate these activities? • How should the outcomes from these activities be used and for what purpose? <p>Suggest either deleting ‘site evaluation’, ‘site characterization’ and ‘post-closure safety case’ activities from the graphic or adding clarification text with respect to the regulatory requirements for these activities after the closure of the DGR facility.</p>	<i>Clarification</i>	
16.	Section 2 , Figure - Title: Pre-closure and post-closure licensing stages and lifecycle activities for a deep geological repository	The figure shows “site characterization” in parallel with “site evaluation”. CSA N292.7 Section 6 indicates that site characterization is a subset of site evaluation, which is inconsistent.	Seeking clarity on the inconsistency with the CSA N292.7 on site evaluation and site characterization.	<i>Clarification</i>	
17.	Section 2 , Figure - Title: Pre-closure and post-closure licensing stages and lifecycle activities for a deep geological repository	The design phase is shown to be completed at the end of construction; what happens with construction that continues in parallel with the Operation phase? Also, design will continue in Operations to support improvements and optimization.	Continue the Design Line through Operations	<i>Clarification</i>	

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18.	Section 2.2.	It would be beneficial, if it is not in the referenced documents, to have a Canadian equivalent to Table 1 in IAEA SSG-14 to be included to explain this concept.	Clearly reference or, if not available, provide a Canadian equivalent to Table 1 in IAEA SSG-14.	Clarification	
19.	Section 3	There are SCAs which may not be applicable during the licence to prepare the site so some of these sections are misleading (e.g., <i>Radiation protection</i>), especially since the licence to prepare the site does not permit the licensee to process, handle or store radioactive substances (as mentioned elsewhere in the document).	Review the citing of all 14 SCAs in this REGDOC to identify only those applicable for the LTPS.	MAJOR	Unnecessary reference to SCAs that are not relevant to the LTPS increase administrative burden.
20.	Section 3.1, bullets on Management System – a work schedule	Last bullet “A work schedule” appears to be incomplete or is unclear on what it means – the licensing package will include a work schedule, however, it’s not clear how it should be a requirement of the management system.	Add more text to clarify this bullet.	Clarification	
21.	Section 3.1, bullets on Management System – policy for the use of contractor’s resources...	The prescriptive nature of requiring a policy for the use of contractors isn’t clear – suggest changing this requirement to any type of control.	policy for the use of management of contractors’ resources to supplement in-house capability.	Clarification	
22.	Section 3.1, bullets on Management System – procedures to control the effectiveness....	The following bullet: <i>procedures to control the effectiveness of assessments and engineering activities performed in the different stages of the site evaluation process, including records of all work carried out during site evaluation and characterization, which must include a description of the measures for preservation of the records</i> seems like an odd mix of activities. The required expectation from this bullet is not clear.	Recommend reviewing the bullet and providing clarity around the required expectation.	Clarification	
23.	Section 3.1, bullets on contractual obligation	The following statement and bullets are premature for a Licence to Prepare Site application:	Remove these bullets. At this point this is premature. A company would not be procuring components for the nuclear facilities until the construction phase.	MAJOR	Additional administrative burden on the applicant without any benefit to nuclear safety.

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		<p><i>The applicant must also ensure, as a contractual obligation, that:</i></p> <ul style="list-style-type: none"> <i>the applicant and the CNSC will have right of access to the premises of any supplier carrying activities specified in the application</i> <i>all sub-suppliers will provide right of access to their premises by those clients who are suppliers</i> 			
24.	Section 3.1, bullets on contractual obligation	The wording for sub-suppliers is unclear – should the CNSC choose to keep the two bullets in the regdoc (see comment above), suggest similar language as the first bullet.	<p>all sub-suppliers will provide right of access to their premises by those clients who are suppliers</p> <p><u>the applicant and the CNSC will have right of access to the premises of any sub-supplier carrying activities specified in the licence</u></p>	Clarification	
25.	Section 3.1, last paragraph	It is unclear the purpose of this statement - Implies the licensees do not use qualified staff. Contradictory if required to comply with N286-12 which requires the workers to be qualified.	Delete unnecessary/redundant requirement.	Clarification	
26.	Section 3.2	<p>“...including worker training, is addressed under the management system SCA.”</p> <p>This supports the redundancy identified in s. 3.1 comment.</p>	Delete unnecessary/redundant requirement from s. 3.1.	Clarification	
27.	Section 3.3	Some of the content described at Operating performance may be more applicable under other SCAs (e.g., the second bulleted list are risk or hazards that would be covered under a safety analysis or conventional health and safety).	Move second bulleted list to Conventional Health and Safety section.	Clarification	
28.	Section 3.3, last paragraph	The text states: “Where risks to the health and safety of either workers or the public could be higher than for a conventional project, the applicant should provide credible research supporting the potential consequences and measures to mitigate the risks. For example, if site investigation has indicated the presence of a sub-surface hazardous substance, the applicant should provide an	Suggest revising the text to: Where risks to the health and safety of either workers or the public could be higher than for a conventional project <u>are identified</u> , the applicant should provide credible research supporting the potential	Clarification	

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		<p><i>investigation of the effects of that substance, if unearthed, on the health and safety of workers and the local public.”</i></p> <p>It is unclear how the applicant should establish if the “risks to health and safety... could be higher than for a conventional project”.</p>	consequences and measures to mitigate the risks.		
29.	Section 3.4, 1 st bullet	The current wording in Section 3.4 might be interpreted as requiring a full analysis at the site preparation stage, where some of the data might not be fully available until the Licence to Operate licence application stage. A graded approach should be applied.	When referring to the safety analysis for later licensing stages of a DGR, under different CNSC licences, the text in this section should be revised and “preliminary” should be used. For example, <u>preliminary</u> safety analysis of operational and post-closure activities.	MAJOR	Ambiguous requirements will increase the regulatory uncertainty for the proponents and operators of a DGR.
30.	Section 3.4	Under Safety Analysis, the pre-closure portion is referred to as an “analysis” whereas the post-closure portion is referred to as an “assessment”. Furthermore, Section 3.6 refers to a “pre- [and post-] closure safety assessment. REGDOC-2.11.1 (Waste Management, Volume III) states that “Safety assessment is often used interchangeably with safety analysis”. If these terms can be used interchangeably with no difference in meaning, suggest defining safety analysis and stating that the terms “analysis” and “assessment” can be used interchangeably.	Add the definition of a safety analysis in the REGDOC with a note that “ <u>Safety assessment is often used interchangeably with safety analysis.</u> ”	Clarification	
31.	Section 3.4, 4 th bullet	<p>The fourth bullet says the applicant must include:</p> <p><i>“• considerations for both design-basis events and beyond-design-basis events for the operational phase, with a focus on the concept of potential cliff-edge effects when analyzing external hazards, where a small change of conditions may lead to a catastrophic increase in the severity of consequences.”</i></p> <p>The <u>operational phase</u> covers activities and timescales that go beyond the activities under the licence to prepare site. Is this interpreted as the portion of the operational phase</p>	<p>It is suggested that the fourth bullet is deleted:</p> <p>“considerations for both design-basis events and beyond-design-basis events for the operational phase, with a focus on the concept of potential cliff-edge effects when analyzing external hazards, where a small change of conditions may lead to a catastrophic increase in the severity of consequences.”</p>	MAJOR	Ambiguous requirements will increase the regulatory uncertainty for the proponents and operators of a DGR.

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		that is only relevant to the activities required for preparation of site?			
32.	Section 3.4	The last bullet (<i>a post-closure safety assessment that is in accordance with REGDOC-2.11.1 Volume III</i>) should include the adjective “preliminary” to align with IAEA SSG 14.	Add “ <u>preliminary</u> ” in front of “post-closure”.	Clarification	
33.	Section 3.4, last paragraph	“The applicant should have a credible program for managing safety issues, which includes a research and development program.” What defines a R&D Program and why does it need to be a requirement?	Seeking clarity on the expectations for an R&D program and the rationale for why it is a requirement.	Clarification	
34.	Section 3.5, last line	This sentence: <i>For structure design and system design at the site preparation stage for a DGR facility, the applicant should propose design descriptions and guides.</i> doesn’t appear to be adding any additional detail or guidance to the REGDOC. Clarity on deliverables or explanation on what this sentence is adding to the requirements already provided in this section is requested.	Either delete this sentence or add clarity to the requirement (such as “conceptual of preliminary).	MAJOR	Ambiguous requirements will increase the regulatory uncertainty for the proponents and operators of a DGR.
35.	Section 3.6	It is unclear how SSCs as defined in REGDOC-2.6.3 apply to the features of the repository essential to the performance of the repository through the post-closure period, including the geosphere, the engineered sealing materials, the used fuel container, and the used fuel. Aging management plans for these components through the operations period would not be meaningful. Aging management should ensure that these SSCs are as described at the start of the post-closure period.	Suggest revised text: <i>The application must include a preliminary aging management plan, listing all <u>identifying key</u> SSCs important to safety during the lifecycle of the facility, and in particular addressing any such SSCs that are part of the LTPS, to provide for the timely detection and mitigation of the aging effects to ensure integrity and functional capacity of the SSCs throughout the pre-closure period and ensure that they are described in the pre- and post-closure safety assessments (see Safety Analysis). For more information, see Appendix A of REGDOC-2.6.2, Aging Management [9].</i>	Clarification	

Bruce Power Comments on draft REGDOC-1.2.3 – Licence Application Guide: Licence to Prepare Site for a Deep Geological Repository (DGR)

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36.	Section 3.7	The licensed activity in the site preparation stage does not include any radioactive waste. Is the radiation protection (RP) program meant for radiation source used for construction/inspection (e.g., X-ray examination)?	Seeking clarity on the scope for the RP program in the site preparation stage.	Clarification	
37.	Section 3.8	Conventional Health & Safety	Seeking clarity on whether this section is just for the site preparation phase? If so, this should be clearly stated.	Clarification	
38.	Section 3.9	Defining baseline characteristics would have been part of the site selection process while continuing to collect baseline data could be activities part of the site preparation activities.	For site preparation, environmental monitoring consists of defining baseline characteristics and of monitoring the effects of site preparation activities on the environment.	Clarification	
39.	Section 3.10	Requirements for an Emergency Preparedness (EP) Program seems premature for this phase.	Seeking clarity on the scope for EP program in the site preparation phase.	Clarification	
40.	Section 3.10	The requirement to demonstrate a fire response capability as described in CSA N393:22 is for facilities that handle radioactive substances. During the site preparation phase, there will not be any radioactive substances, therefore, this CSA standard shouldn't apply at this time.	Remove reference to CSA N393:22, but keep the requirement to describe the fire protection program.	Clarification	
41.	Section 3.12	CSA N290.7 – scope should be reviewed for the appropriateness and applicability to DGR site preparation phase.	Review the scope of CSA N290.7 for applicability to DGR at the site preparation phase.	Clarification	
42.	Section 3.15	REGDOC 3.1.2 – scope should be reviewed for the appropriateness and applicability to DGR site preparation phase.	Review the scope of REGDOC 3.1.2 for applicability to DGR at the site preparation phase.	Clarification	
43.	Section 4.12	Considering the duration of the DGR, it would seem much too early to request cost projections.	Seeking clarity on the scope of tentative cost projections appropriate for this stage of development. Lessen rework for later changes to financial projections or misunderstandings leading up to cost estimates.	Clarification	
44.	Appendix A	Since the LTPS does not permit the licensee to process, handle or store radioactive substances (as mentioned elsewhere in the document) a number of the CSA standards	Review the list of standards in the Appendix to identify which are applicable for the LTPS.	Clarification	

Bruce Power Comments on draft REGDOC-1.2.3 – Licence Application Guide: Licence to Prepare Site for a Deep Geological Repository (DGR)

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		listed will not be applicable at the site preparation phase. While the licensee needs to demonstrate a management system framework meets the regulatory requirements for any specific safety and control area has been addressed, some of those functions are not required until the applicant is licenced to possess, handle, or store radioactive substances onsite.			
45.	Appendix A	This appendix mentions CSA N292.6 as a reference document. N292.6 is being withdrawn because of the restructuring of the N292 series. The N292 TC recently voted on this matter.	Seeking clarity whether N292.6 is still applicable.	<i>Clarification</i>	
46.	Appendix A, Physical design, Site characterization	CSA N292.7-22 should be included as a reference document. Section 2.2 points to this standard, so the appendix should be consistent.	Add CSA N292.7-22 as a reference document.	<i>Clarification</i>	
47.	Appendix A, Physical design, Facility design	CSA N292.2-13 was listed as a reference document. It was the consensus that N292.2 (the dry storage standard) would not apply to the DGR. The DGR programs would not interface with the Dry Storage Container (DSC) as the responsibility of opening the DSCs and transferring the fuel to transportation package falls on the utilities.	Remove reference to N292.2.	<i>Clarification</i>	
48.	Appendix A, Physical design, Structure, system and component design	<p>CSA N285.0 is listed as a reference document. N285 is specific for NPP and reactor design. It is not appropriate for the design of Class IB facilities, even with the graded approach. REGDOC 1.2.2 (Draft) would be the appropriate guide.</p> <p>CSA N285 is specific for the pressure boundary of NPPs. For reactors in the NPPs, the pressure boundary is the major system (the entire reactor is a pressurized system), and N285 would address the primary structural safety needs. In a nuclear substance processing facility, e.g., the used fuel packaging plant. Pressure boundary is not the key. The key aspect of safety is on handling and manipulations of nuclear substance, radiation protection and containment, which is not addressed by N285.</p>	Remove reference to CSA N285 and replace with REGDOC-1.2.2.	MAJOR	Following N285 to design the SCCs in a Class IB facility may create a significant burden without increasing safety. For example, N285 is structured around the classified process system, e.g., Class 1, 2, 3 and 6. Per the definitions for these classes, most (if not all) process systems in a used fuel packaging plant would be Class 6. Design of Class 6 is referred to CSA B51 which goes to ASME B31. It would be more efficient and logical to identify the design guide commensurate with the need and refer to the appropriate standards without cycling around. REGDOC-1.2.2 provides a flexible and more reasonable framework

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					for the physical design of the facilities. It is better than pointing to N285 (which can be misleading).
49.	Appendix A , Physical design, Structure, system and component design	Some ASME codes are listed as reference documents. These codes are at the technical detail level and only address some specific applications (i.e., pressure boundary construction). Why aren't other technical codes and standards listed here, such as those governing automation, electric/electronic equipment, lifting equipment, control system, human interface, etc. The calling of references here seems random and lack of focus. It is better to limit the references to high-level requirements and guidance (i.e., REGDOCs, CSA standards) and not to include those at the detail level.	Remove all ASME codes from the reference list.	<i>Clarification</i>	
50.	Appendix A , Waste management, Decommissioning plans	Reference list does not include CSA N292.7-22. Clause 14 of N292.7 provides guidance on repository closure.	Add CSA N292.7-22 as a reference document.	<i>Clarification</i>	
64.	Appendix A , Table 1	Unclear whether this list is guidance or requirements?	Revise text to confirm the list is for guidance purposes.	<i>Clarification</i>	