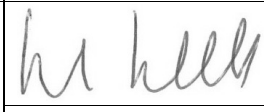
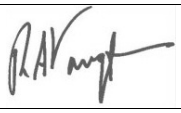
SAFKEG LS Response Matrix to the First Request for Additional Information (RAI) from the Nuclear Regulatory Commission

Docket No. 71-9337 and TAC No. L24639

Title	SAFKEG LS Response Matrix to the First Request for Additional Information (RAI) from the Nuclear Regulatory Commission	Number	CTR 2012/10
		Issue	A
		File Reference	CTR2012-10-A-v2-RAV-Response to NRC RAI 2012-08-03.docx
Compiled		Checked	
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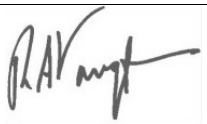
Approved		Date	05 September 2012
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1	General Description Review	
1.1	Identify the components classified as important to safety and their classification category (A, B, or C), or identify where this information appears in the application; i.e., SAR section, licensing drawing(s), etc. Per the guidance in NUREG-6407, components should be identified as either important to safety (ITS) or not important to safety, and ITS components should be further classified as Category A, B, or C. Quality records for Category A, B, and C components must also be maintained as described in NUREG-6407 in conjunction with the record retention requirements identified in 10 CFR 71.91 and 71.135. This information is typically provided on the licensing drawings submitted with the application. This information is necessary to satisfy the requirements in 10 CFR Part 71.101 and 71.107.	Component classification (ITS) has been included on all the licensing drawings.
1.2	On licensing drawing 1C-6044, identify the physical meaning of "3.100 Ø 2.985" as well as the correct dimension; i.e., 3.100 Ø 2.985 vs. 3.100 Ø 2.895. On licensing drawing 1C-6044, Figure 1 identifies the o-ring thickness as 3.100 Ø 2.985, and Figure 2 identifies the o-ring thickness as 3.100 Ø 2.895. The o-rings appear solid from the licensing drawings, and it is unclear why two dimensions are provided. This information is necessary to satisfy the requirements in 10 CFR Part 71.33.	Drawing 1C-6044 has been corrected to identity the nominal diameter and the maximum and minimum allowance for all the O-rings.
1.3	Describe how testing the containment vessel lid top component before machining surface 'C' meets the intent of the ANSI N14.5 fabrication leakage rate test when the component is tested before it is in its	A further fabrication leak test has been added. The finished containment vessel lid top shall be leak tested in accordance with the requirements in drawing 1C-6045 and section 8 of the SARP.

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	fully manufactured state, or clarify if a fabrication leakage rate test is performed on the containment vessel lid top after machining surface 'C'. Licensing drawing 1C-6045, note 2.b. states, "This item is to be helium leak tested in accordance with ANSI N14.5 at the component stage before machining away surface 'C' as indicated below." Table 1 of ANSI N14.5 "Containment boundary test requirements" states the purpose of the fabrication leakage rate test is, "To demonstrate that each packaging, as fabricated, provides the required level of containment." Machining surface 'C' could induce material defects that would not be detected if the fabrication helium leakage rate test is performed prior to machining. However, such defects would be detected if a fabrication leakage rate test is performed on the containment vessel lid top at a later time after machining surface 'C'. This information is necessary to satisfy the requirements in 10 CFR Part 71.51(a) and 71.85(a).	
1.4	Identify the codes and standards applicable to the structural design and fabrication of the package. Provide justification for the removal of the statement from Section 4.1 of the SAR, "The containment system is designed and fabricated in accordance with ASME B&PV Code Section III, Subsection NB" with the replacement of the statement in Section 4.1 of the SAR, "The containment system is designed and fabricated in accordance with licensing drawings 1C-6044, 1C-6045, and 1C-6046 in Section 1.3.2." Similar statements were also changed in Section 2.3.1 of the SAR. Section 2.5.1.2 of NUREG-1609 provides guidance on identifying codes and standards for Category I	Tables 2-8 and 2-9 have been added to section 2.1.4 of the SARP to clarify the codes and standards used. The text in sections 2.1.4, 2.3.1 and 4.1 have been updated to reflect these changes. Drawing 1C-6040 has been updated with a note to indicate that AMSE Section III is not used in its entirety.

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	transportation packages such as the SAFKEG-LS, and Section 2.5.3.1 of NUREG-1609 states that, if fabrication specifications are prescribed by an acceptable code or standard (e.g., ASME, AWS), the code or standard should be identified on the engineering drawings. Also, unless the application justifies otherwise, the code or standard used to design the package should also be used to fabricate the package. In addition, § 71.31(c) requires the applicant to describe and justify the basis and rationale used to formulate the package quality assurance program in the absence of any codes and standards. This information is necessary to satisfy the requirements in 10 CFR Part 71.31(c).	
2	Structural Review	
2.1	Identify the bounding stress design margin for NCT. The following statement appears on page 2-34 of the SAR: "The g values applied to the model for the drop on the side of the package are low; however the results are bounded by the results of the drop on the corner of the package as the corner drop test has far higher g values applied". This statement contradicts information in Table 2-29 which identifies the lowest design margin as 0.28 as a free drop on side in hot condition under NCT for which the governing stress type is bearing stress under the bolts. This information is required by the staff to determine compliance with 10 CFR 71.71(c)(7).	The g used in the calculation for the top drop is 112 g whereas the measured value was 273g. The smallest design margin occurred under the bolts for the drop on the side and the drop on the top corner under the hot conditions. This small design margin is due to the thermal stress on the bolts. At -40°C the design margin under the bolts is much larger. NCT 11 and 12 used an axial deceleration of 264g and radial of 278g. It is proposed that as cases 11 and 12 resulted in acceptable loading, it stands to reason that cases 9 and 10, with a lower radial deceleration (273g vs 278g) and zero value axial deceleration, would therefore also meet the regulatory criteria. In general, it would be considered that a corner impact would impose greater loading on components (due to the smaller contact area) than the equivalent side impact. The discussion on page 2-34 has been clarified to containing the information above.
2.2	Explain the inconsistent references to ASTM 279/279M. Drawing No. 2C-6175, Rev. C was changed to remove reference ASTM 279/279M. The reason given for the change is that the standard does not exist. However, Section 2.2.1, Material Properties and Specifications, Table	There were typographical errors in table 2-8, these have been corrected.

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	2-8 lists specification ASTM A279/A279M throughout. This information is needed to ensure compliance with 10 CFR 71.31(c).	
2.3	Explain how moisture cannot develop/form and/or identify steps taken to prevent water from forming/developing between the encased cork material and stainless steel. An air gap exists between the encased cork and the stainless steel vessel. Temperature inversions may allow water to form between the encased cork and the stainless steel. Over time, this could cause the stainless steel vessel to corrode especially if in the presence of slight fabrication imperfections. This information is needed to ensure compliance with 10 CFR 71.43(d).	We do not consider moisture between the encased cork material and stainless steel of the keg to be a problem for the following reasons. We have over 30 years experience with use of cork in drums [aka Celotex in 6m drums] and have never found water present on maintenance. The keg liner is loosely fitted to the cork in the keg and the therefore the space between the cork and the keg is open to “breath” and would dry out if any water [e.g. from condensation] were to accumulate temporarily. However, we agree that it is desirable to remove any water that might be present and we have added the following to section 7 of the SARP Check for presence of water by removing the steel keg liner and inverting the keg – the presence of water will be evident by it running out of the keg. Drying to be carried out by holding the keg in an oven at 80 dec C for 24 hours should any water be found, following by the above check.
8	Maintenance Review	
8.1	Resolve the conflicting design pressures given in Section 8.1.3 of the SAR. For the pressure test in the second sentence of Section 8.1.3, the corrected maximum design pressure of 10 bar gauge is not equal to a design pressure of 102 psig. This information is necessary to determine compliance with 10 CFR Part 71.85(b).	There was a typographical error which has been corrected. The maximum design pressure is 10 bar gauge (145 psig).

During the review process for the RAI Croft have made some additional changes to the drawings and the SARP, these have been identified in the following table:

Section of SARP	Change Made	Justification for Change
1.3 Licensing drawings 1C-6045 and 1C-6046	Altered helicoil note to allow the use of oversize inserts as an alternative to standard size inserts.	This helicoil is for the attachment of the lifting ring to the CV lid. The inclusion of the oversize inserts allows correction if there is an issue with the original helicoil.
1.3 Licensing drawings 2C-6175 and 2C-6172	Added a 3 mm hole into the lid of the stainless steel and larger cavity tungsten insert.	This hole assists with the bubble leakage test of the insert for use with liquid contents. This hole is not required currently as the inserts are not carrying liquids. We are planning to add liquids on a later application when this hole will be required. By allowing manufacture with this hole now will save later machining of the inserts when liquids will be carried.