




**SAFKEG-LS 3979A**  
**SAR Update Matrix for Addition of Extra Contents**

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## 1 Notes on methodology and content

This Update Matrix (CTR 2015/06) details the changes in the SAFKEG-LS 3979A SAR in updating from Rev 4 to Rev 5.

The update to SAR Rev 5 is to allow a Bi-210/Po-210 Target, to be carried in the steel insert, as listed in Contents Type 3. It also allows the correction of a minor typographical error on a licensing drawing and the replacement of keg studs during maintenance.

This Update Matrix (CTR 2015/06) provides the following.

- Justification for the changes in the SAFKEG-LS 3979A SAR in updating from Rev 4 to Rev 5
- Details of SAR changes - List of all changes to the SAR - Table 1
- Question and Response Matrix Table – Table 2 [Blank at this stage]
- List of SAR page changes [Appendix B]

It is proposed that this document (CTR 2015/06) will be updated to include responses to any further questions and will thereby fully document all issues including any questions and responses for the entire SAR update.

## 2 Justification for the changes in the SAFKEG-LS 3979A SAR in updating from Rev 4 to Rev 5

MURR wish to carry irradiated Bi-210/Po-210 targets in the stainless steel insert. The update to SAR Rev4 is to allow the inclusion of Bi-210 and Po-210 to the contents list of contents Type 3. While the SAR is being updated the opportunity, to correct a minor typographical error on one of the licensing drawings and clarify the replacement of damaged keg studs in Section 8, is taken.

### 3 SAR Changes

This table contains notes on all the SAR Page Changes and supporting Document Changes for Rev 5 (from Rev 4).

**Table 1 Summary of SAR Page Changes and Supporting Document Changes for Rev 5**

Summary of SAR Page Changes and Supporting Document Changes for Rev 5			
SAR Page or Doc	Location	Change	Reason for Change
Chapter 0 - Contents			
All pages	Header	Page Rev status amended to Rev 5  All changes are shown in red and sidelined.	Changes required solely to record the current issue status of SAR pages and references.
Page 0-2	Table	Name amended	Editorial/Update.
Page 0-2	Date box	Date amended	Update.
Chapter 1 - General Information			
Page 1-27	Table	Page Rev status amended to Rev 5  Bi-210 and Po-210 added to the contents list.	Allows MURR to ship Bi-210/Po-210 irradiated targets.
Chapter 2 - Structural Evaluation			
None		None	
Chapter 3 - Thermal Evaluation			
None		None	
Chapter 4 - Containment Evaluation			

Summary of SAR Page Changes and Supporting Document Changes for Rev 5			
SAR Page or Doc	Location	Change	Reason for Change
None		None	
Chapter 5 - Shielding Evaluation			
5-12	Table 5-5	Page Rev status amended to Rev 5  Bi-210 and Po-210 added to the table	Allows MURR to ship Bi-210/Po-210 irradiated targets.
5-12a	Table 5-5	Page Rev status amended to Rev 5  Extra page	Accommodates the increased size of table due to addition of nuclides.
Chapter 6 - Criticality Evaluation			
None		None	
Chapter 7 - Operating Procedure			
None		None	
Chapter 8 - Acceptance Tests & Maintenance Program			
Page 8-7	Section 8.2.3.2	Page Rev status amended to Rev 5  Addition of the use of an equivalent threadlocker to position the studs.  Allow the replacement of any damaged keg closure studs	Loctite 270 is difficult to source in the US so we have allowed the purchase of an equivalent threadlocker.  The keg studs can be replaced if damaged in accordance to section 8.2.3.2 (8), however MURR requested that we clarified the replacement of studs by adding this extra sentence.

## 4 NRC Questions and Croft Responses

This section is provided to document all NRC Questions and Croft Responses.

**Table 2 - Question and First Response Matrix Table**

Q#	Review Question	Croft Response	Changed Item
1.1	<p>Identify the following information relative to the keg closure studs (item 16) on licensing drawing 0C-6042:</p> <ul style="list-style-type: none"> <li>a. the manufacturing techniques used to fabricate the keg closure studs, and</li> <li>b. the source of replacement studs for package users.</li> </ul> <p>There is very little detail about the keg closure studs on licensing drawing 0C-6042. Consequently, staff is uncertain of how the closure studs are manufactured and from whom replacement studs are procured.</p> <p>This information is needed to ensure compliance with 10 CFR 71.107.</p>	<p>A separate view of item 16 has been added to drawing 0C-6042 to provide better understanding of how the keg closure studs are manufactured.</p> <p>The keg closure studs are all procured through Croft. Procurement is controlled by our NRC approved quality system.</p>	0C-6042
2.1	<p>Provide the following information for the requested change associated with Loctite 270:</p> <ul style="list-style-type: none"> <li>a. the drawing(s) which show the use of Loctite 270, and</li> <li>b. how “equivalent” fastening materials will be evaluated to ensure form, fit, and function as well as to preclude material degradation of other Safkeg components.</li> </ul> <p>The use of Loctite 270 is cited in Section 8.2.3.2, paragraph 4, of the safety analysis report, but it is not defined on licensing drawing 0C-6042, Rev. E. Revise drawing 0C- 6042 to identify the critical characteristics and constituents of Loctite 270 or an equivalent, and their importance to safety classification category per NRC guidance.</p> <p>This information is needed to ensure compliance with 10</p>	<p>Item 19 Loctite 270 or Loctite 263 has been added to the item list on drawing 0C-6042. A note had also been added to the drawing to clarify the use of Loctite.</p> <p>The phase or equivalent has been removed from section 8.2.3.2 and replaced with Loctite 263.</p> <p>Loctite 270 can no longer be procured in the US with Loctite recommending the use of Loctite 263 as the replacement. The datasheets for both products have been attached to this response to demonstrate that both are identical.</p>	0C-6042 SAR section 8.2.3.2

Q#	Review Question	Croft Response	Changed Item
	CFR 71.33.		
5.1	<p>Modify the shielding evaluation to use the ANSI/ANS-6.1.1-1977 dose conversion factors (DCFs).</p> <p>The DCFs in ICRP 51 are for calculating effective dose equivalent as well as dose to organs. These differ from dose rate which is measured at the time of shipment to determine compliance with the limits in 10 CFR Part 71. The 10 CFR Part 71 limits are in line with the dose rate quantities calculated using ANSI/ANS-6.1.1-1977 DCFs. The application addresses the difference between ICRP 51 DCFs and ANSI/ANS-6.1.1-1977 DCFs as a source of uncertainty. However, depending on the gamma energies, the uncertainties in dose rates could be significant. Thus, the applicant should use the ANSI/ANS-6.1.1-1977 DCFs in its shielding evaluation.</p> <p>This information is needed to confirm compliance with 10 CFR 71.47 and 71.51.</p>	<p>Report CTR 2015/10 has been produced which identifies the maximum variation that exists between the ICRP 51 and ANS results over a range of energies. This provides a correction factor to apply to the shielding results.</p> <p>The correction means that the dose rates exceed the non exclusive use limits, therefore section 5 has been updated to allow the package to be shipped under exclusive use should the package dose rate exceed 2 mSv/hr</p>	CTR 2015/10 Section 5.2, 5.5.3

**Appendix A      New or edited SAR pages provided in the SAR at Rev 5**

<b>Chapter</b>	<b>Pages</b>
0	All (0-1 to 0-13)
1	1-27
5	5-12, 5-12a
8	8-7



## Appendix B New or edited Supporting Documents provided in the SAR at Rev 5

Related SAR Section or Doc	Document Reference		Title
Chapter 1 - General Information			
Documents in Section 1.3.3, Licensing Drawings			
Update	1C-6040	G	Cover sheet for Safkeg-LS design No. 3979A (licensing drawing)
Update	0C-6042	E	Keg design no.3979A (licensing drawing)
Documents in Section 1.3.4 Supporting Documents			
Update	PCS 036	D	Package Contents Specification for Safkeg-LS - Package Design No 3979A
Chapter 2 – Shielding Evaluation			
Documents in Section 5.5.2			
Update	CTR 2009/22	B	SAFKEG LS 3979A: Package Activity Limits Based on Shielding