

April 30, 2018

ATTN: Document Control Desk  
Director, Division of Spent Fuel Management  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

REFERENCE: Docket No. 50-186     71-9337     71-9338  
University of Missouri-Columbia Research Reactor  
Renewed Facility Operating License No. R-103

SUBJECT:     Written report, in accordance with 10 CFR 71.1, as required by 10 CFR 71.95(b) [for NRC Docket Nos. 71-9337 and 71-9338] regarding conditions in the Certificates of Compliance for the SAFEKEG-LS Design No. 3979A and the SAFEKEG-HS Design No. 3977A that were not met during shipment

Dear Sir or Madam:

The University of Missouri Research Reactor (MURR) submits this letter to report a condition pursuant to 10 CFR 71.95(b) regarding the use of the SAFEKEG-LS and SAFEKEG-HS Type B(U) shipping containers, NRC Docket Nos. 71-9337 and 71-9338, respectively.

The following is a description of the event, reported in accordance with 10 CFR 71.95(c):

*(1) Brief abstract of the event*

Between April 4 and May 10, 2017, four (4) shipments of Type B quantities of radioactive materials were made that were not in full compliance with the Certificate of Compliance applicable to the container used in the individual shipments. Specifically, repairs were performed on shipping container closure studs and as part of that repair, a securing mechanism, Loctite, was found to have been passed its expiration date at the time of repair. Subsequent investigation discovered that the repairs involved only the two (2) following shipping containers: SAFEKEG-LS No. 0006 and SAFEKEG-HS No. 0008. One (1) shipment occurred using the SAFEKEG-LS and three (3) shipments occurred using the SAFEKEG-HS that were affected by using the expired Loctite. Upon discovery of this nonconformance, an investigation began on May 10, 2017, to ascertain which shipping containers were affected so that corrective actions could commence.

*(2) Narrative description of the event*

On May 9, 2017, it was discovered by members of the MURR Shipping and Hot Cell Groups that Loctite 270 appeared to have been used past its expiration date when conducting repairs on one of the studs on each

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of the two (2) shipping containers in question. A date of "1/2017" was printed on the end of the Loctite 270 tube but no indication is noted on the tube as to whether or not this is the date of manufacture or expiration date. Subsequent investigation, obtained by examining Material Specification Sheets and the Loctite tube, indicated that this was indeed the expiration date.

Loctite 270 is specified to act as a securing device to the threaded studs that are attached to, and secured into, the shipping keg body (container) and used to secure the lid to the shipping keg. In the case of both the SAFEKEG-LS and -HS containers, a repair was conducted on one (1) of the eight (8) studs used to secure the lid to the container body. Repair is usually conducted when, upon receipt inspection of the container, one (1) or more of the studs is found to be damaged. Upon further investigation, it was determined that SAFEKEG-LS No. 0006 was repaired on February 15, 2017, using the expired Loctite and that SAFEKEG-HS No. 0008 was repaired on March 22, 2017, using the same expired Loctite. In both cases, only one (1) stud was damaged and replaced using the expired Loctite. Subsequent investigation determined that SAFEKEG-HS No. 0008 was used for three (3) shipments after the nonconforming repair. These shipments occurred on April 4, April 18, and May 3, 2017. Additionally, it was determined that SAFEKEG-LS No. 0006 was used for one (1) shipment on May 10, 2017. This shipping container was prepared for shipment the previous day, May 9, 2017, and was in transit by the time the investigation determined that it was one of the affected shipping containers. It should also be noted that SAFEKEG-HS No. 0008 was with a customer at the time of this discovery (from the May 3, 2017, shipment) and the MURR Shipping Group was awaiting its return so that it could be repaired.

After the expired Loctite was discovered, an attempt to procure a new batch of Loctite 270 was initiated. While attempting to order, it was discovered that this type of Loctite (270) was a British model number and not available in the United States. An attempt was made to find a suitable substitute that could be used in its place. This was found to be Loctite 263; however, this particular part number is not specified in the Safety Analysis Report (SAR) for the shipping containers. A materials specification deviation was issued at MURR to allow for the substitution of Loctite 263 (which is available in the U.S.) for Loctite 270, after conferring with the manufacturer that they were essentially the same item. This deviation is documented in DEV 17-11 issued on May 11, 2017. Subsequent to this deviation, a request was made to Croft Associates Limited, Oxfordshire, United Kingdom (owner of the Certificates of Compliance), to amend both SARs for the SAFEKEG-LS and SAFEKEG-HS shipping containers to allow the use of the substitute Loctite 263.

The SAFEKEG-HS was used to ship irradiated Ir-192 metal to Alpha-Omega Services in Vinton, LA for the April 4 (30,891 GBq) and April 18, 2017 (28,172 GBq), shipments and to Mallinckrodt Medical, BV in Petten, The Netherlands for the May 3, 2017 (34,673 GBq), shipment. The SAFEKEG-LS was used to ship Po-210 (843 GBq) contained in bismuth metal for the May 10, 2017, shipment. These are routine shipments from MURR for isotopes that are used for both medical and industrial uses.

### *(3) Assessment of safety consequences of the event*

Upon return of the two (2) affected shipping containers to MURR and subsequent inspection there did not appear to be any issue with either of the repaired studs that had been repaired with the expired Loctite 270. Thus, we believe the safety consequences of this event to be minimal.

*(4) Description of corrective actions*

Upon discovery of the use of the nonconforming Loctite 270, SAFEKEG-HS No. 0008 was removed from service prior to repair with the conforming Loctite 263. SAFEKEG-LS No. 0006 was removed from service upon its return to MURR after the May 10, 2017, shipment. To ensure that all closure studs met the requirements of the SAR and Certificates of Compliance, all eight (8) studs on both the LS and HS shipping containers were removed, cleaned, and re-installed using the conforming Loctite 263. Both shipping containers were repaired with the conforming Loctite 263 and returned to service on June 1, 2017. Additionally, this event was entered into the MURR Corrective Action Program (CAP) as CAP No. 17-0069 to document the use of the nonconforming Loctite 270 and any corrective actions taken with regards to this event. Any additional improvements or corrective actions will be considered and documented in that CAP entry.

*(5) Reference to similar events*

The above noted description of the reported event are, to our knowledge, the only occurrences of this particular issue.

*(6) License contact*

For further discussion of this incident, please contact Ron Dobe, Interim Reactor Health Physics Manager at 573-882-5218 or DobeR@missouri.edu.

*(7) Extent of exposure of individuals*

There were no excess exposures to individuals above those that occur as a result of the normal shipment of these materials due to the result of these events.

Sincerely,



Matthew R. Sanford  
Interim Reactor Facility Director

xc: Mr. Geoffrey Wertz, U.S. Nuclear Regulatory Commission  
Mr. William Schuster, U.S. Nuclear Regulatory Commission  
Reactor Advisory Committee  
Reactor Safety Subcommittee  
Croft Associates Limited