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July 24, 2018
FS–18–0176

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

SUBJECT: 1) BRR Package Amendment Request, Docket No. 71-9341 and EPID No. L-2018-LLA-0028

2) Letter from Nishka Devaser to Philip Noss of June 26, 2018, transmitting a Request for Additional Information (RAI)

Dear Mr. Devaser:

Orano Federal Services LLC (Orano FS) hereby submits Revision 12 of the Safety Analysis Report (SAR) for the BRR Package, which includes changes made in response to the NRC RAI referenced above.

Our response to the RAI is provided in Attachment A. Minor changes were also made to one of the licensing drawings. All changes are discussed and justified in Attachment A. Revisions made to the SAR are marked with a change bar in the margin and show Revision 12 in the header. Note that pages not changed will show various earlier revision numbers in the header.

As a reminder, Orano FS would also like to request correction of a typographical error we discovered in the Certificate of Compliance (CoC), Revision 5, issued by the NRC on July 21, 2016. In Table 1.4 of the CoC, for TRIGA Fuel ID 201, the fuel OD should be corrected from 1.44 inches to 1.41 inches, consistent with the dimension given in Table 1.2-1 of the BRR package SAR. Of note, this discrepancy has no safety consequences.

Included with this letter is one paper copy of the SAR update pages and one CD containing the PDF file "BRRC SAR Complete Rev. 12.pdf" (37,620 kb, 777 pages). The CD is contained within an envelope labeled, "BRR package SAR Revision 12, Electronic Copy of Document, Docket 71-9341 EPID No. L-2018-LLA-0028".

To update a paper copy of the SAR, replace the cover sheet, Table of Contents, drawing 1910-01-01-SAR, and pages 5.6-2 through 5.6-7. An extra cover sheet and spine sheet are provided to update the binder.

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Should you have any questions regarding this submittal, please contact me at (233) 552-1321 or via email (phil.noss@orano.group).

Yours Truly,

Phil Noss

Philip Noss
Licensing Manager
Orano Federal Services LLC

Copies:

Attention: Nishka Devaser, Project Manager (incl. changed pages and CD)
U. S. Nuclear Regulatory Commission
11545 Rockville Pike
Rockville, MD 20852

Donald Darrington, Idaho National Laboratory (incl. changed pages and CD)

Ken Wahlquist, Idaho National Laboratory (incl. changed pages and CD)

Dr. Ethan Balkin, DOE-SC Isotope Programs (incl. changed pages and CD)

Richard J. Smith, Project Manager, Orano Federal Services LLC

Tess Klatt, Contracts, Orano Federal Services LLC

Attachments:

Attachment A, Response to RAI, BRR Package Amendment, Docket 71-9341, L-2018-LLA-0028

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Attachment A

Response to RAI, BRR Package Amendment
Docket 71-9341, L-2018-LLA-0028

Shielding Evaluation

1. Demonstrate how the calculated dose rates for the package containing the 1 kCi source at discrete locations can be scaled up to represent a package configuration that contains different sources with varying strengths.

   The applicant stated in Section 5.6.2.1 of the SAR (ADAMS Accession No. ML 18044A 164) that a 1 kCi Co-60 source is modeled and scaled as needed to match the Co-60 payload of the different package configurations. Source intensity, gamma energy release rate, and total source decay heat for the 1 kCi modeled Co-60 source are shown in Table 5.6-2 alongside scaled values for Type 1 and Type 2 payloads. However, the configurations are not uniform. Therefore, it is not clear to the staff how the scaling is performed for the nonuniform source configuration.

   The staff requests that the applicant provide an explanation, with justification, on how the model using a 1 kCi source can be scaled up when the source is not uniform. This information is needed to verify compliance with the external dose rate regulations in 10 CFR 71.47 and 10 CFR 71.51(a)(2).

Response: While various Co-60 isotope production target activities are present in the bounding Type 1 and Type 2 isotope production target payloads, only a 1 kCi Co-60 source is modeled in ORIGEN since the necessary characteristics for subsequent analysis (source intensity, total decay heat, and gamma energy release rate) scale proportional to activity. A 1 kCi Co-60 source was only selected for modeling in ORIGEN due to the ease of multiplicative scaling. As detailed below, the characteristics of the 1 kCi Co-60 source are scaled at various points to explicitly model different activity Co-60 isotope production targets. In both shielding and thermal modeling, the non-uniformity of the Type 1 and Type 2 payloads is accounted for. As a result, all MCNP-calculated dose rates and gamma heating rates do not require scaling. While Table 5.6-2 only shows the properties of the ORIGIN-modeled 1 kCi Co-60 source alongside scaled up totals for the Type 1 and Type 2 payloads, it is not intended to be a comprehensive representation of all scaling used in analysis of the isotope

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production target payloads. SAR Section 5.6.2.1, *Gamma Source*, has been revised for clarity. There are no other changes to the SAR text.

Revisions to drawing 1910-01-01-SAR

In reviewing the SAR, it was found necessary to make some minor changes to SAR drawing 1910-01-01-SAR, Rev. 5. These are detailed as follows:

a) Make threaded inserts mandatory in the closure bolt attachment holes and lifting attachment bolt holes, instead of optional.

Discussion and Justification: Item 24 on the drawing is a heavy duty insert which may be used in the (12) closure bolt attachment holes and in the (4) lifting attachment bolt holes. Previously, item 24 has shown flag note 30, which made them optional. With this change, flag note 30 has been removed from item 24, making the thread inserts mandatory. In addition, on sheet 4 of the drawing, in zones D-1 and C-1, the associated bolt hole callouts have been revised accordingly. Note that flag note 30 is retained as-is, since it can refer to other threaded holes on the cask. This change is considered desirable to ensure that all future casks fabricated must include these strong inserts. Of note, the single existing BRR cask has always included these same (item 24) thread inserts in all of the corresponding holes.

b) Revise the inner diameter and height of the personnel barrier.

Discussion and Justification: A review of the drawing showed that the fitup between the personnel barrier (see sheet 3) and the cask could be improved by increasing the inner diameter from (45.6) inches to (46.0) inches and reducing the height from (50.3) inches to (49.8) inches. These small changes will have no affect on the function of the component.

c) Correct a drafting error.

Discussion and Justification: During the finalization and plotting of Rev. 5 of this drawing, the CAD software allowed the lower impact limiter attachment lugs to "drift" out of position. This can be seen on sheet 2, zone B-2 of Rev. 5, where the incorrect reference dimension (45.7) is shown. On all prior revisions of the drawing, the correct dimension of (45.3) is shown. This drafting/plotting error has been corrected. It had no effect on any safety evaluation.

The revised drawing is provided as Rev. 6.