Chapter 5 – Shielding Evaluation

Question

What document, consistent with the fuel composition, specifically address the impact of the transuranic constituents on the shielding evaluation for the TN-B1?

Response

See attachment titled “Fuel Composition” as it is also applicable to this response.

On 27 January 2017 the NRC sent AREVA (now Framatome) a letter with the subject “Application for Model No. TN-B1 Transportation Package – Supplemental Information Needed” (ML17030A006). RSI 5-1 of that letter requested additional information on the shielding evaluation.

AREVA/Framatome replied to the NRC letter on 17 February 2017 (ML17061A531). In that letter we provided attachment E, FS1-0015020 Rev1 (NP) "TN-B1 Shipment of ATRIUM 11 Assemblies" (Non - Proprietary), as a response to RSI 5-1. This analysis used BLEU fuel as the limiting case and demonstrated that the ATRIUM 11 in the TN-B1 gives off no significant gamma or neuron radiation.

On 2 March 2017 the NRC sent AREVA (now Framatome) a letter with the subject “Application for Model No. TN-B1 Transportation Package – Accepted For Review” (ML17061A488).

Framatome did not receive any RAI’s regarding the submitted shielding evaluation subsequent to the NRC accepting the application for review. Subsequent to the approval of revision 1 to CoC No 9372 on 21 June 2018, Framatome initiated inquiries as to why the additional limitation in clause 7 of the approved CoC reading “ATRIUM 11x11 fuel shall contain only commercial grade uranium, i.e. cannot be made from down-blended low enrichment fuel or reprocessed uranium” was added.

The NRC response to Framatome’s inquires expressed concerns regarding the adequacy of the previously provided shielding evaluation. Framatome responded to those concerns expressing our belief that the evaluation was adequate, but acknowledged that the linkage to the defined contents of the package, as shown in Table 1-2 “Quantity of Radioactive Material (Type A and Type B)”, Table 1-3 “Type B Quantity of Radioactive Material” and Table 1-4 “Isotopes and A2 Fractions” of the SAR could be improved.

As a result we have done a new shielding analysis (FS1-0039661 “TN-B1 Shielding Evaluation) with a more direct reference to tables 1-2, 1-3 and 1-4 of the SAR. The results of this analysis shows that shipments of ATRIUM 11 will meet the dose rate limits of 10 CFR 71.47(a), 10 CFR 71.51(a)(2), and 49 CFR 173.441(a) for both the Normal Conditions of Transport (NCT) and the Hypothetical Accident Condition (HAC).

It should be noted during the review of the new analysis (FS1-0039661) that the HAC condition was evaluated using information previously submitted to the NRC. Specifically FS1-0025122 “AREVA TN-B1 ATRIUM-11 Fuel Assembly Shipping Container Drop Analyses” was used. This document was previously submitted as an attachment to the letter sent to the NRC on 18 November 2016 (TJT 16:036 dtd 18 November 2016; ML16330A001).