UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 27, 2015

Mr. Paul Triska
Vice President, Technical Services
AREVA Inc.
7135 Minstrel Way, Suite 300
Columbia, MD 21045

SUBJECT: APPLICATION FOR APPROVAL OF THE SPENT FUEL CASK DESIGN FOR THE NUHOMS® EOS, DOCKET NO. 72-1042 ACKNOWLEDGEMENT OF WITHDRAWAL (TAC NO. L24976)

Dear Mr. Triska:

By letter dated December 19, 2014, as supplemented February 16, 2015, and April 3, 2015, AREVA Inc. (AREVA), submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for approval of a spent fuel storage cask design, developed by AREVA and designated the NUHOMS® EOS System.

The staff performed an acceptance review of your application to determine if the application contained sufficient technical information in scope and depth to allow the staff to complete the detailed technical review. The application does not provide sufficient information to address Title 10 of the *Code of Federal Regulations* (10 CFR) 72.236(e), which states that the spent fuel storage cask must be designed to provide redundant sealing of confinement systems.

In a letter dated February 2, 2015, the staff requested that AREVA supplement its December 19, 2014, submittal to provide sufficient information to address 10 CFR 72.236(e). Based on the information provided in your safety analysis report (SAR) Revision 1, dated February 16, 2015, and SAR Revision 2, dated April 3, 2015, the staff is unable to evaluate the dry shield canister analysis for the top cover plates-to-shell welds as part of the EOS confinement boundary. Specifically, the finite element analysis modeling of the welds has not been demonstrated with reasonable assurance that the calculated stress margins are applicable for assessing the weld structural performance.

By letter dated April 24, 2015, AREVA requested to withdraw the application from NRC review. The NRC acknowledges your request to withdraw the application. NRC staff activities on the review have ceased and the associated Technical Assignment Control number has been closed.

Specific deficiencies are identified in the enclosure to this letter, which should be resolved before resubmitting the application.

If you have any questions, please contact me at (301) 415-0262.

Sincerely,

/RA/
Chau-John Nguyen, Sr. Project Manager
Spent Fuel Licensing Branch
Division of Spent Fuel Management
Office of Nuclear Material Safety
and Safeguards

Docket No.: 72-1042

TAC No.: L24976

Enclosure: As stated

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Docket No.: 72-1042

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Enclosure: As stated

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APPLICATION FOR APPROVAL OF THE SPENT FUEL CASK DESIGN

FOR THE NUHOMS® EOS

DOCKET NO. 72-1042

STAFF IDENTIFIED ISSUES FOR NON-ACCEPTANCE FOR REVIEW

By letter dated December 19, 2014, as supplemented February 16, 2015, and April 3, 2015, AREVA Inc., submitted an application to the U.S. Nuclear Regulatory Commission (NRC) for approval of a spent fuel storage cask design, developed by AREVA and designated the NUHOMS® EOS System.

The staff performed an acceptance review of your application to determine if the application contained sufficient technical information in scope and depth to allow the staff to complete the detailed technical review. The application does not provide sufficient information to address 10 CFR 72.236(e), which states that the spent fuel storage cask must be designed to provide redundant sealing of confinement systems. Specific deficiencies in the application are provided below.

Appendix 3.9.1, DSC Shell Structural Analysis
Safety Analysis Report, Revision 2

Section 3.9.1.2.2

1. The staff is unaware of the previous use by AREVA of the stress limit criterion, 0.8[Min (3.6 S_m), S_u], introduced in Table 3.9.1-4 of the SAR, Rev. 2, for the primary membrane stress category in evaluating the partial penetration cover plate-to-shell welds. In reviewing spent fuel storage cask systems, the staff considers the subject partial penetration weld as exception to the full penetration weld required of an equivalent of the ASME Code, Section III, Subsection NB nuclear Class 1 component. As such, justification and compensatory measure must be provided for staff review and approval. Specifically, at issue is an increase of 50% over the commonly used primary membrane stress allowable of 2.4 S_m to 3.6 S_m for the base criterion formulation. For an entire circumference of the cover plate connected to the DSC with partial penetration weld, the staff is unsure whether the proposed "primary local membrane stress P_L" category meets the intent of the ASME Code rules for the DSC construction.

Section 3.9.1.2.3

2. The second paragraph, page 3.9.1-4, states, "The nominal radial gaps between the cover plates and DSC shell are modeled using contact elements that preserve the geometric gap where there is no weld. The modeled gap is conservative because the entire load is transferred through the welds and the side drop analyses confirm that these gaps do not close"

   The first part of the above statement cannot be corroborated with the finite element analysis (FEA) models depicted in Figure 3.9.1-5 in that both OTCP and ITCP are

shown to be in contact with the DSC shell. The staff notes that radial gaps must sufficiently be annotated in the sketches to ensure FEA geometry and boundary conditions are properly reflected. For instance, Section B-B, Sheet 2 of 6, Drawing EOS01-1005-SAR clearly depicts that, beyond the ½" partial penetration weld, there is a large cover plate cut gap between the OTCP and the DSC shell that is not represented by the FEA model.

The second part of the statement alluding to a "no gap closure" assumption for the DSC does not appear to be supportable by the FEA results. Although stress intensity fringe plots of Figure 3.9.1-14 are presented for the normal internal pressure load case, the OTCP is, nevertheless, shown in contact with the DSC shell where maximum membrane-plus-bending stress intensity also develops. The SAR must provide FEA sketches on how the radial gaps between the cover plates and the DSC shell are implemented for stress analysis. Effects of gap presence on the calculated weld stress should also be subject to a sensitivity analysis.

3. Referring to Figure 3.9.1-5, the cover plate-to-shell welds are seen grossly misrepresented by the "bar-shape," in lieu of "cube-shape," solid element implementation. The FEA discretization suggests a radial dimension of about ¾" for the weld, which is greater than those for the ½" and 3/16" partial penetration welds of the OTCP and ICTP, respectively. The staff notes that the "over-sized" welds tend to result in non-conservative stress results given that FEA solutions are derived from the averaged behavior of a weld modeled twice as big its nominal size. For an appropriate weld size, a sensitivity analysis needs to also be performed for discretizing the weld into layers in the radial direction.

Section 3.9.1.2.4

4. For the 30 psi internal pressure load case reported, the mesh sensitivity addresses only the axisymmetric loading and response, which does not apply to the half-symmetric DSC side drop. As such, contrary to the noted basis in Figure 3.9.1-19 for stress linearization path, which continues circumferentially through the entire volume, the reported sensitivity analysis is incomplete. The sensitivity analysis should also be performed for other path selection criteria and applicable load cases to demonstrate that both P_m and P_m+P_b stress intensities in the cover plates-to-shell welds are insensitive to the stress linearization path selected.