

June 17, 2010

Mr. Donis Shaw
Licensing Manager
Transnuclear, Inc.
7135 Minstrel Way, Ste. 300
Columbia, MD 21045

SUBJECT: APPLICATION FOR REVISION TO CERTIFICATE OF COMPLIANCE NO. 9302
FOR THE MODEL NO. NUHOMS®-MP197 PACKAGING, DOCKET NO. 71-9302
– SUPPLEMENTAL INFORMATION NEEDED

Dear Mr. Shaw:

By letter dated April 20, 2010, you submitted responses to Request for Additional Information (RAI) for an application for revision to Certificate of Compliance (CoC) No. 9302 for the Model No. NUHOMS®-MP197 packaging (MP197). Staff performed an acceptance review of your RAI responses to determine if the responses contain sufficient technical information in scope and depth to allow the staff to complete the detailed technical review.

This letter is to advise you that based on our acceptance review, the application does not contain sufficient technical information. The information needed to continue our review is described in the enclosure to this letter as Request for Supplemental Information (RSI). Staff included observations to allow you to start earlier on items containing the potential to be asked at a later date. Responses to observations are not required for staff to begin a detailed technical review. Observations are not the result of a detailed technical review and may be resolved once staff begins a detailed review. In order to schedule our technical review, the RSI responses should be provided by July 5, 2010. If the RSI responses are not received by this date, we may suspend review of the application. If you have any questions regarding this matter, please contact Chris Staab of my staff at (301) 492-3321 or me at (301) 492-3294.

Sincerely,

/RA/

Eric Benner, Chief
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material
Safety and Safeguards

Docket No. 71-9302
TAC No. L24336

Enclosure: Request for Supplemental Information
and Observations

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Eric Benner Chief,
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Docket No. 71-9302

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Enclosures: Request for Supplemental Information
and Observations

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TRANSNUCLEAR, INC.

DOCKET NO. 71-9302

REQUEST FOR SUPPLEMENTAL INFORMATION (RSI) AND OBSERVATIONS
RELATED TO THE PROPOSED MP-197 AMENDMENT

All references to individual RAIs are from NRC "Request for Additional Information for Review of the Model No. NUHOMS[®]-MP 197 Packaging, Docket No. 71-9302," dated April, 10, 2010.

Structural

RSI-1: Develop and submit to the staff an estimate of the gap(s) between the closure lid and contents based on various payloads anticipated for the MP 197-HB package. Include the effect of the gap(s) on the fuel cladding integrity under a Hypothetical Accident Condition (HAC) drop scenario, considering the "delayed strike" scenario as associated with a design minimum gap, and maximum potential gap as applicable.

In Appendix A.2.13.11 of the revised Safety Analysis Report (SAR) for MP 197-HB, Transnuclear, Inc. (TN) has considered an end-drop load of about 55g, fuel-to-cask gap of 0.5", an initial bowing of 0.0150", internal pressure of 1,059 psi, and a reduced fuel cladding thickness by 0.027" to account for oxidation. The resultant maximum principal strain for a 14 x 14 High Burnup fuel assembly has been reported as 0.64%. Using permissible strain rate of 1.5%, TN claims that fuel assembly cladding will not fail in the event of HAC 30 ft. end drop.

The staff does not concur with the analysis presented by TN in the revised SAR, based on similar issues related to the TN-40 application, dated June 29, 2007 that is currently being reviewed by the staff. An independent analysis has predicted that gaps of 1" or higher will cause significant plastic strain in the fuel cladding. An acceptable strain at failure, for the high burn up cladding for regulatory drop under an HAC is in the range from 1.0% to 3.0%.

This information is required by the staff to verify the compliance with 10 CFR 71.71 and 10 CFR Part 71.73 regulations.

RSI-2: Provide the revised evaluation of the lid, and the lid bolts for various Dry Storage Cannister designs that are anticipated to be shipped in the MP 197-HB package, based on the results of the revised analysis as requested in RSI-1 above. Closure bolts stresses for shipping casks shall meet the acceptance criteria of NUREG/CR-6007 - "Stress Analysis of Closure Bolts for Shipping Casks."

This information is required by the staff to verify the compliance with 10 CFR 71.71 and 10 CFR Part 71.73 regulations.

RSI-3: Provide nodal acceleration comparisons at the gage locations for the LS-DYNA analysis corresponding to the 1/3 scale 20 degree slapdown test gage locations.

The applicant used averaged accelerations from all accelerometers at cross-sections, but did not provide individual comparisons of the accelerations. There are 12 gage locations, the accelerations obtained in the test should be compared to those on the nearest node to the gage

location in the LS-DYNA analysis (plot of gage data and nearest gage location acceleration plots). Results are requested for only the reference slapdown analysis as an example of the procedures followed.

This information is required to assure compliance with 10 CFR 71.73(c)(1).

Criticality

RSI-1: Provide more detailed information regarding the operation of the DARWIN code package for determining spent fuel isotopic compositions.

Proprietary RAI 6-7 from the NRC "Request for Additional Information for Review of the Model No. NUHOMS[®]-MP 197 Packaging, Docket No. 71-9302," requested a full description of the DARWIN depletion module of the CRISTAL code package used to provide a correction to the SAS2H calculated isotopic correction factors. Although the applicant provided a response to this RAI, including a description of the code system and several references, several key details of the code are still unclear. In particular, the applicant should describe how the material cross-sections are processed by the code, specifically the method that calculates the self-shielding. Additionally, the applicant should specifically describe the operation of the PEPIN2 module in calculating the depletion isotopics from the APOLLO2 multi-group flux solution.

This information is required in order for the staff to ensure that the package will meet the criticality safety requirements of 10 CFR 71.55 and 71.59.

Shielding

RSI-1: Provide an evaluation to justify that the source terms used in the shielding analysis are conservative, as requested in RAI 5-8.

The concern associated with RAI 5-8 is not necessarily the appropriateness of using SAS2H to determine the source terms for the shielding evaluations. A significant concern arises from the proximity of the resulting dose rates to the regulatory limits, including the limit for the package side contact dose rates. The uncertainty values described in the application exceed the margins between the calculated dose rates and their associated regulatory limits. It is not clear from the current RAI response how (and to what level) the various uncertainties in the source term (described in the application) are compensated for by conservatisms stated to be included in the source term models. An evaluation (including quantitative support) is needed to demonstrate that the credited conservatisms adequately compensate for the source term uncertainties such that the uncertainties need not be included in the shielding calculations.

As noted earlier, the concerns also include the contact dose rates on the package side. While Table 5-1 indicates the regulatory limit is 1000 mrem/hr, the correct limit is 200 mrem/hr. That is because the package is not enclosed; the proposed personnel barrier does not enclose the package and so cannot be considered an enclosure for purposes of 10 CFR 71.47 or 49 CFR 173.441 dose rate limits. The calculated contact dose rate in Table 5-1 for the package side is within a few percent of this limit.

Observation pertaining to this RSI - It is unclear to the staff why this response is considered proprietary since it appears to only summarize and draw conclusions based on information from publicly available documents, with other information being general in nature.

This information is needed to enable a review to confirm compliance with 10 CFR 71.47 and 71.51.

RSI-2: Include justification of the applicability of the peaking factors in Tables A.5-15 and A.5-16 to fuel with axial blankets as part of response and application modifications for RAI 5-9.

RAI 5-9 requested justification for the factors' applicability, or the basis for their being bounding, for all assemblies. It is not clear that the current response addresses fuel (both Pressurized Water Reactor (PWR) and Boiling Water Reactor (BWR)) with axial blankets. Note that assembly parameters in at least some DSCs that could represent the limiting, or bounding, burnup, enrichment, and cooling time combinations for shielding considerations may not be high burnup fuel.

This information is needed to enable a review to confirm compliance with 10 CFR 71.47 and 71.51.

RSI-3: Provide the information regarding the response functions and the basis for their use for HAC analyses.

RAI 5-18 applies to all response functions. The current application, though, as supplemented, provides information only for those response functions used for Normal Conditions for Transport (NCT) analyses. The application indicates, however, that response functions are also used for HAC analyses. Information regarding these HAC response functions, such as their development and validation/verification, appears to be lacking in the application. Information similar to that provided for the NCT response functions should be provided for the HAC response functions. Staff notes that it may be helpful if the response functions for at least a few DSCs (PWR and BWR) for both NCT and HAC conditions were provided. Staff notes that this was done for the applicant's TN-40 Part 71 application, dated June 29, 2007.

Observation pertaining to this RSI - It is unclear to the staff why this response is considered proprietary. The response does not discuss anything that is not already described in other applications (like TN-40), that do not make the same information proprietary. Furthermore, the modifications to the application apparently associated with this response are not marked proprietary. The applicant included response functions as a non-proprietary part of that application.

This information is needed to enable a review to confirm compliance with 10 CFR 71.47 and 71.51.

Observation pertaining to Chapters A.7 and A.8 - These two chapters are incorporated by reference as conditions of the Certificate of Compliance (CoC) in their entirety. Some parts of Chapter A.8 were marked explicitly as part of the CoC as part of the RAI response. It should be clear that the whole chapter is part of the CoC. Also, some parts of these chapters are marked proprietary. The applicant should consider revising these chapters to only include non-proprietary information, as material referenced by the CoC must be publicly available.

Observation 1: Clarify the statement, in response to RAI 5-3, that the response function and fuel qualification calculations are done to ensure that all DSCs are similar from a shielding standpoint.

It is not clear what is meant by this statement or how the calculations are done to ensure this condition.

This information is needed to enable a review to confirm compliance with 10 CFR 71.47 and 71.51.

Observation 2: Clarify the meaning of the statement in response to RAI 5-4 that describes how the impact limiter crush depth in the shielding evaluations ensures the package surface perimeter for the dose rate calculations is at the cask outer surface.

The meaning of this statement is not clear. Other statements in the application's shielding chapter indicate some credit is taken for the impact limiters in the HAC dose rate and response function calculations, at least in the location of the package surface perimeter, such that the package surface perimeter is not the cask outer surface where the impact limiters are located.

This information is needed to enable a review to confirm compliance with 10 CFR 71.51.

Observation 3: Provide evaluations for fuel debris.

In responding to RAI 5-16, the applicant provided new evaluations for damaged fuel for NCT and HAC conditions. It is not clear in the application, as supplemented, that fuel that will be loaded into a DSC as fuel debris, a subclass of damaged fuel in some DSCs, was considered. While not all DSCs may allow fuel debris as part of the proposed contents, the shielding evaluation should address fuel debris and provide appropriate bases and justification for assumptions made in the evaluation, including for source term calculations for debris. It is not clear to the staff that fuel debris was considered or that the damaged fuel evaluations, provided in response to RAI 5-16 capture fuel debris. It is also not clear whether the fuel qualification and response function development accounts for damaged fuel and fuel debris. The adequacy of the fuel qualification and response functions for damaged fuel and fuel debris should be justified.

This information is needed to enable a review to confirm compliance with 10 CFR 71.47 and 71.51.