March 17, 2015

Mr. Kevin Tuite
President and Chief Executive Officer
WMG, Inc.
16 Bank Street
Peekskill, NY 10566

SUBJECT: REQUEST FOR SUPPLEMENTAL INFORMATION FOR THE REVIEW OF THE MODEL NO. WMG-150B PACKAGE

Dear Mr. Tuite:

On January 2, 2015, WMG, Inc., submitted an application for approval of the Model No. WMG-150B package as a Type B(U)-96 package. The staff performed an acceptance review of your application to determine if it contained sufficient technical information in scope and depth to allow the staff to complete a 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 as request for supplemental information (RSI) in the enclosure to this letter. Please note that addressing these RSIs does not preclude the staff from issuing further requests for additional information (RAIs) during the course of the detailed technical review of this application.

In order to schedule our technical review, the RSI responses should be provided by April 9, 2015. If the RSI responses are not received by this date, the application may not be accepted for review and the staff may discontinue any further review.

Please reference Docket No. 71-9366 and TAC No. L24977 in future correspondence related to this request. If you have any questions regarding this matter, I may be contacted at (301) 287-0759.

Sincerely,

/RA/

Pierre Saverot, Project Manager
Spent Fuel Licensing Branch
Division of Spent Fuel Management
Office of Nuclear Material Safety
and Safeguards

Docket No. 71-9366
TAC No. L24977

Enclosure: Request for Supplemental Information

Mr. Kevin Tuite
President and Chief Executive Officer
WMG, Inc.
16 Bank Street
Peekskill, NY 10566

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REQUEST FOR SUPPLEMENTAL INFORMATION
AND OBSERVATIONS
FOR THE
MODEL NO. WMG-150B PACKAGE

DOCKET NO. 71-9366

This request for supplemental information (RSI) identifies information needed by the staff in connection with its acceptance review of the WMG, Inc., Safety Analysis Report, revision No. 0, dated January 2015.

The requested information is listed by chapter number and title in the application.

The staff performed the acceptance review of the application using the guidance in NUREG 1609, “Standard Review Plan for Transportation Packages for Radioactive Material."

Chapter 1 General Information

1-1 Provide a detailed description of the characteristics of each type and form of permitted contents of the package, including the identification of the main isotopes and radioactive constituents.

The application, as submitted, does not address important aspects such as the type of radionuclides in the contents. Also, it is not clear that the proposed contents preclude materials containing significant sources of neutron radiation. Thus, the application should describe clearly the radionuclides proposed to be shipped in the package and provide an evaluation for these radionuclides. The staff also notes that contents that have the capacity to induce stress corrosion cracking of the containment boundary or degrade the seals must be prohibited.

This information is required to determine compliance with 10 CFR 71.31(a), 71.33(b), 71.35(a), 71.47 and 71.51.

Licensing Drawings

1-2 Categorize all components listed in the Bill of Materials on the licensing drawings following the guidance of NUREG/CR6407. Clarify their safety classification and acceptance criteria (if applicable) used to characterize the components.

All components should have their safety category indicated on the Bill of Materials according to NUREG/CR 6407, i.e., Category A, B, or C, for components important to safety.

This information is required to determine compliance with 10 CFR 71.33(a)(5).

1-3 Item 323 is not shown on the Bill of Materials. Provide details and dimensions of this item on the licensing drawings and clarify its integration into the impact limiter.

Section 2.5.1.4.1 of the application mentions item 323 which appears to be a lifting lug for the impact limiter; however, no impact limiter lifting lugs are shown on the drawings and the adjoining angle made of A36 steel.

This information is required to determine compliance with 10 CFR 71.33 and 10 CFR 71.45.

Observations

1-4 Indicate, on the drawings, what welding process, weld filler material, and welding notes will be used at each of the welds specified on the plans along with their associated welding calculations.

Base material welding calculations have been provided in the application, but the welds themselves were not. Weld filler material and welding process have not been provided. Reference to the ASME codes alone is insufficient.

This information is required to determine compliance with 10 CFR 71.45, 10 CFR 71.71, and 10 CFR 71.73.

1-5 Identify the bolting ring on the licensing drawings.

Section 2.1.1.1 of the application mentions a bolting ring but this item and associated nomenclature are not clearly marked on the plans.

This information is required to determine compliance with 10 CFR 71.33.

1-6 Specify on the drawings and associated calculations the minimum shackle pin diameter to be used to lift any lifting lug on the plans.

All calculations assume a shackle or lifting device that is as large as the opening in the lifting lug.

This information is required to determine compliance with 10 CFR 71.45.

1-7 Provide a reference to the WMG, Inc., approved quality assurance program on the drawings.

Drawings should provide a reference to the NRC approved quality assurance program.

This information is required to determine compliance with 10 CFR 71.31 and 10 CFR 71.37.

1-8 Clarify, on the drawings, which lugs will be used to lift the cask, primary lid, secondary lid, and which lugs will be rendered inoperable during each part of the lifting operations.

Staff is concerned that the wrong lug may be used for lifting operations. Indicate which lugs will be rendered inoperable during lifting operations in Section 7 of the application and on the drawings.

This information is required to determine compliance with 10 CFR 71.33 and 10 CFR 71.45(b)(2).

1-9 Clarify lifting lug details on the body of the package.

Sheet 7 of the licensing drawings shows lugs that appear to be attached directly to the package body, but is unclear how the heat shield, wire wrap, etc., will be modified in this area to accommodate the lug.

This information is required to determine compliance with 10 CFR 71.33 and 10 CFR 71.45.

Chapter 2 Structural and Materials Evaluation

2-1 Provide a detailed description of the lead pouring process used for this application. Discuss whether qualified procedures and personnel are utilized. Discuss whether trace elements may exist, as introduced during the pour, in addition to those which may be acceptable under ASTM B29 specification. Provide justification why ASTM A543, Type B, Classes 1 and 2 materials are not susceptible to liquid metal embrittlement (LME) when in contact with liquid lead. Provide history, experience, and available research literature.

Drawing WMG-150B-DW-004-P71, sheet 1 of 8, note 14, states that the lead pour will be continuous and the lead integrity will be ensured by a gamma scan. No other specific information is provided concerning the reliability of the steel shell following the lead pour and literature suggests that plain carbon and low-alloy steels may be embrittled by exposure to liquid lead (LME).

This information is required to determine compliance with 10 CFR 71.33(a)(5)(iii), and 71.39.

2-2 Include, in the evaluation, stresses that are incurred by the pouring of lead into scenarios for both normal conditions of transport (NCT) and hypothetical accident conditions (HAC).

Lead pouring and subsequent shrinkage when cooling introduces stresses into the package design that should be included under NCT and HAC.

This information is required to determine compliance with 10 CFR 71.71, and 10 CFR 71.73.

2-3 Provide a traceable evaluation to demonstrate that the LS-DYNA finite element analysis (FEA) model is properly benchmarked for predicting rigid body decelerations of the package under free-drop analyses.

To benchmark the FEA model for the drop analyses, the application references, and relies on, the Model No. 3-60B package designed and analyzed by Energy*Solutions.* Calibration of the Model No. 3-60B package is based on a vitrified high level waste cask that was physically drop-tested by BAM. However, since the WMG-150B package is not owned by Energy*Solutions,* it is unclear to the staff what specificities of the BAM tests and the Energy*Solutions'* benchmark evaluation, which could be proprietary, are applicable and can be used for benchmarking the WMG-150B FEA model.

This information is required to determine compliance with 10 CFR 71.71 and 71.73.

2-4 Provide missing references and files and ensure that they are correctly annotated in the application and on the supplied CDs. Provide a summary table of references and their corresponding names and locations on the CDs provided to staff for their review.

Reference 2-23 is labeled as Reference 3-8 on the CD's. Additionally, References 119-9 and 119-7 mentioned in Reference 2-24 cannot be found on the CDs or are mislabeled. Additional missing references include 1-4, 2-27, Appendix B (Section 8), WMG-150B-ES-002-P71 (Section 8), and ANSYS files used in Reference 2-24 for conducting increased and reduced pressure analysis, and bolt tightening. Please ensure and confirm that all references mentioned in the application, as well as the references contained within, are also provided.

This information is required to determine compliance with 10 CFR 71.31(a)(1), 10 CFR 71.71, and 10 CFR 71.73.

Observations

2-5 Provide additional clarification and justification regarding the overall package weight, content to package weight, and package aspect ratio used in ANSYS/LS-DYNA modeling and the safety factors obtained from ANSYS/LS-DYNA modeling.

The WMG-150B package weighs 62,000 lbs and is expected to carry a 15,500 lbs payload (for a total gross weight of 77,500 lbs.) The aspect ratio (overall length to overall width) of the WMG-150B package, its overall weight, its contents weight to cask weight ratio, and its construction materials, are dissimilar either to the vitrified high level waste cask used for drop testing at BAM or to the Model No. 3-60B package.

Moreover, since the WMG-150B model is calibrated to another model, i.e., the 3-60B package, and not to an actual drop test, staff is concerned with the potential for error propagation. This is already apparent in the application, where the WMG-150B modeling technique is quoted, in Reference 2-15, to come within 5% of the values presented in the safety analysis report for the Model No. 3-60B. Moreover, the WMG-150B application states, in Section 2.7.1.3, "Corner Drop," that the smallest factor of safety for all components is 1.03, with some other components having a safety factor of 1.05. Therefore, the corner drop analysis, conducted for the WMG-150B package, could have a factor of safety less than 1.

Therefore, staff is concerned with the reliability of the methodology used in the application for the WMG-150B package

This information is required to determine compliance with 10 CFR 71.71 and 71.73.

2-6 Provide and update contents to canister impact calculations.

Section 1.2.2.3 of the application indicates that contents density varies from 0.5g/cc to 12g/cc. A single 55 gallon drum with these specified densities could weigh more than 10,000 lbs. However, Section 2.7.1.10 of the application assumes that two 5,000 lb drums are shored. In the HAC drop scenarios, the contents could impact a lid at a slightly oblique angle and at an off centered location, as the package overall makes contact with an unyielding surface. Lids, bolts, and the bottom plate could be damaged by such a scenario, in addition to any lead shielding in the vicinity. Cumulative damage should be examined, as the lids, bottom plate, and bolts may be damaged first by the package impact followed by the impact of contents.

This information is required to determine compliance with 10 CFR 71.73.

2-7 Specify the use of tamper resistance seals on the licensing drawings and provide details as to how they function.

Tamper resistance devices are mentioned in the application, but no details are provided on their use and operation.

This information is required to determine compliance with 10 CFR 71.33 and 10 CFR 71.43(b).

2-8 Provide details, configuration, and material specifications for the shoring material used for contents packaging.

Shoring is mentioned in 2.7.1.10 of the application with regards to the packaging of canister contents but no details have been provided with regards to the material the shoring is made of or its configuration. This information should be described in the application and on the licensing drawings.

This information is required to determine compliance with 10 CFR 71.71 and 10 CFR 71.73.

2-9 Provide and clarify the wire wrap details and calculations used to attach the stainless steel heat shield to the outer shell of the canister.

Wire wrap is mentioned on the plans; however, the spacing of the wire, and the tack weld spacing are not specified. Staff is concerned with the heat shield ability to stay in place in the HAC fire scenario, for the reduced external pressure loading under NCT, and the fatigue life of unobservable tack welds.
This information is required to determine compliance with 10 CFR 71.71 and 10 CFR 71.73.

2-10 Incorporate actual welded conditions into the finite element analyses.

Several components such as lifting lugs and plates appear to have been modeled in ANSYS and LS-DYNA, for both NCT and HAC, with full penetration welds. However, plans and calculations show otherwise: see lifting lug item 201, on sheet 7, as an example.

This information is required to determine compliance with 10 CFR 71.45, 10 CFR 71.71, and 10 CFR 71.73.

2-11 Provide details and calculations on the impact of vibrations, incident to travel, on the package.

Staff is concerned with possible fatigue issues that can arise from the dynamic response of the package, incident to NCT, regarding tie down lugs, lifting lugs, and bolts.

This information is required to determine compliance with 10 CFR 71.71.

2-12 Provide additional analyses of the package orientations used for drop evaluations for both NCT and HAC.

Package orientations used in Reference 2-7 appear to be incomplete. Reversed package orientations of those shown in Figures 1-d through 1-g should also be included in the analyses to accommodate the scenario where the bottom end of the package (opposite end of where the lids are located) strikes first. Both cold and hot scenarios should be examined for all package orientations.

This information is required to determine compliance with 10 CFR 71.71 and 10 CFR 71.73.

2-13 Evaluate additional package components for the puncture scenario.

Puncture, as described in 10 CFR 71.73, was not considered with respect to the outer stainless steel shield. Specifically, a glancing blow by the bar described in the puncture test could tear the shield and create a thermal “hot spot” for the HAC thermal scenario.

In addition, primary lifting lugs, secondary lift lugs, impact limiter lifting lugs, upper and lower guide plates, primary and secondary lid, and tie down lifting lugs have not been examined for a similar scenario in which these devices may be separated from the package body.

Staff is concerned that glancing blows and direct impact by the bar mentioned in the puncture test may also damage the lead shielding in those areas. The vent port region should also be examined for a direct impact as localized stresses may be observed.

This information is required to determine compliance with 10 CFR 71.73.

2-14 Perform a water immersion analysis.

Section 2.7.6 of the application states that a water immersion test (10 CFR 71.73(c)(6)) is not necessary since a value of 25 *psig* was used for the external test mentioned in Section 2.6.4 of the application. However, a value of only *20 psia* was used in both Section 2.6.4 and Reference 2-24 of the application. 10 CFR 71.73(c)(6) specifies that an equivalent amount of water to produce *21.17 psig* is adequate, which equates to *35.87 psia,* the value that should be used in this calculation.

This information is required to determine compliance with 10 CFR 71.73.

2-15 Describe and provide the dimensions of the sealing surface and of the O-ring grooves.

A sealing surface is mentioned in Section 7.1.1.2.4 of the application, but the surface itself is not defined or clearly identified in the drawings.

This information is required to determine compliance with 10 CFR 71.33(a)(5).

2-16 Verify and clarify the dimensions of the impact limiters. The Impact limiter analysis in Reference 2-25 does not appear to use the same impact limiter dimensions as those specified on the licensing drawings.

Impact limiters, as analyzed in Reference 2-7, do not appear to incorporate the lug recesses shown at the lifting lugs in the finite element analysis and on the drawings. In addition, the height of the recesses of the impact limiters at the lifting lugs on the drawings does not indicate how deep they have to be (see Primary Lift Lug Fit-Up detail sheet 7 of 8 of the drawings). This could affect HAC drop evaluations.

This information is required to determine compliance with 10 CFR 71.33 and 71.73.

2-17 Provide the validation and verification results for ANSYS 15 results.

Reference 2-27 describes the validation and verification results for ANSYS 14.0.3. However, many, if not most, results are based on ANSYS 15 results.

This information is required to determine compliance with 10 CFR 71.71 and 10 CFR 71.73.

2-18 Include the lifting lugs and backing angle into the impact limiter analysis.

It does not appear that the lifting lugs and backing angle were used in the LS-DYNA analysis of impact limiters (Reference 2-25).

This information is required to determine compliance with the requirements of 10 CFR 71.71 and 10 CFR 71.73.

2-19 Provide stresses in the seal components for NCT and HAC conditions.

Stress summaries are provided for several components under NCT and HAC. However, stresses found in the inner bearing rings, primary lid seal ring, secondary lid seal ring and inner O-rings, have not been provided.

This information is required to determine compliance with the requirement of 10 CFR 71.71 and 10 CFR 71.73.

Chapter 3 Thermal Evaluation

3-1 Provide thermal models that adequately capture the thermal characteristics of the WMG-150B package during NCT and HAC.

The thermal models prepared by the applicant to perform the thermal evaluation during NCT and HAC did not include the contents of the WMG-150B package. Summary tables of temperatures did not include any limiting temperatures for the package's radioactive contents.

The information is required to determine compliance with 10 CFR 71.71 and 71.73

Chapter 4 Containment Evaluation

Observations

4-1 Provide the American Society of Nondestructive Testing (ASNT) certification level of the examiner for development and approval of helium and pressure change leakage rate testing procedures, considering that industry standards indicate that this should be performed by a Level III examiner.

The applicant described the leakage tests in Section 8.1.4 of the application for acceptance leak tests and Section 8.2.2 for periodic and maintenance leak test, without identifying the ANST Level of the examiner.

ANSI/ASNT CP-189-2006, "Standard for Qualification and Certification of Nondestructive Testing Personnel," which provides the minimum training, education, and experience requirements for nondestructive testing personnel, states that a nondestructive testing personnel Level III examiner has the qualifications to develop and approve written instruction for conducting the leak testing.

This information is required to determine compliance with 10 CFR 71.37, 10 CFR 71.87, and 10 CFR 71.119.

4-2 Clarify the scope of the containment boundary.

The applicant stated in Section 1.2.1.3 that the containment boundary consists of the inner steel shell of the cask body together with closure features comprised of the primary and secondary bearing and seal rings, inner O-rings, pressurization port, cask lids and cap screws and in Section 4.1.1 that the package "containment vessel" is defined as the inner shell of the shielded transport cask and the primary and secondary lids, together with the associated O-rings.

1) The applicant should clarify (i) whether the containment boundary includes the baseplate and the joining welds or not, (ii) the location of the inner O-rings, and (iii) if

the cap screws serve as the containment boundary. The applicant should provide a complete and clear description of the containment boundary.

2) Revise Figure 2-1, or add another figure, to clearly demonstrate, on the figure, that the containment boundary completely encloses the package cavity.

This information is required to determine compliance with 10 CFR 71.33 and 71.51.

4-3 Provide descriptions of (1) the characteristics of the sealed metal cavity-filler canister, (2) the corresponding installation and removal procedures, and (3) the metals suitable as the cavity-filler canister in the leak test.

The applicant stated in Section 8.1.4.2 Test Procedure that (optional) the sealed metal cavity-filler canister may be inserted into the package cavity in the leakage tests to reduce the volume of tracer test gas required to conduct the tests. The applicant noted that the cavity-filler canister should not obstruct the pressurization port penetration. The canister metal must be chemically compatible with the cask liner and the test gas.

The applicant needs to provide more information on (1) the characteristics of this sealed metal cavity-filler canister, (2) the installation and removal procedures, and (3) the list of the canister materials to ensure that the canister material will not interact with or be penetrated by the test gases (helium) and will not thermally expand to cover the drain opening during the leak tests.

This information is required to determine compliance with 10 CFR 71.43(d).

Chapter 5 Shielding Evaluation

5-1 Justify how using MORSE-SGC with the SAS3 interface from SCALE is conservative for calculating dose rates of the WMG-150B package with the proposed contents.

MORSE-SGC is a shielding analysis code originally developed in the 70's that uses the Monte Carlo method to solve particle transport problems. In a previous meeting with the applicant, staff cautioned the applicant on the use of such a legacy shielding code, as it is no longer supported by its developer (ORNL) and any errors are no longer reported or corrected. Staff noted that SAS3 requires the user to determine the biasing scheme outside the code and manually enter it and that the convergence of the calculations has to be carefully examined. More important to staff is the fact that there is no information available for SAS3 benchmarking, except a sample problem presented in NUREG/CR-0200. The applicant was reminded that it would need to provide all validation and verification information, as applicable to this package design, for staff to even consider the use of this code in an application. Staff also reminded the applicant that SAS3 has been shown to underestimate the dose rate by a factor of almost 3 and that RAIs were generated on that topic for another applicant.

The applicant states in Section 5.0 of the SAR that the "MORSE results were benchmarked with MCNP for the most limiting shielding case." However, this benchmark result was not provided in the SAR, nor was there any further discussion of the details of this benchmark or how this calculation was performed. In addition, it is not

clear what the “limiting shielding case” is, not withstanding, whether benchmarking this limiting case establishes that other cases with different geometries and materials that may not be limiting are benchmarked. As such, it is not clear whether dose rates calculated with SAS3 can be assured to be below regulatory limits.

The staff requests that the applicant provide validation and verification information appropriate to this specific application for the MORSE-SCG code using SAS3 or the applicant should provide the details of the MCNP benchmarking case and justify that this benchmark is applicable to other non-limiting cases.

This information is required to determine compliance with 10 CFR 71.47 and 71.51.

5-2 Provide a description of the contents that is sufficient to enable an adequate evaluation of the package.

The current content descriptions in the application address some properties of the contents, such as form, but do not address other important aspects such as the radionuclides in the contents. The shielding evaluation only addresses a small Cobalt-60 source, however the types of contents that the applicant proposes to ship (resins, filters, filter media) will contain other gamma emitting nuclides other than Co-60. Section 1.2.2 of the SAR states: “The activity of all radionuclides shall not exceed 3,000 A2 and shall be less than 100 curies of Co-60 or equivalent, subject to the shielding limitations (Chapter 5) determined in accordance with Attachment 7-1 in Chapter 7.” Although the staff has found describing maximum contents in terms of A2 acceptable for beta and alpha emitting nuclides, which in general do not challenge the package shielding, the staff does not accept this practice for gamma emitting nuclides (see Regulatory Issue Summary 2013-04, available on the NRC public website: http://pbadupws.nrc.gov/docs/ML1303/ML13036A135.pdf)

Thus, the application should discuss other non-Co-60 gamma emitting nuclides, provide limits for these nuclides, and provide evaluations for these radionuclides supporting the Co-60 equivalency in Attachment 7-1. This equivalency appears to equate only total energy per second to that of Co-60. However, energy per second alone does not take into account the effectiveness of the shielding for any particular gamma. Higher energy gammas will be less likely to be stopped by the shield than lower energy gammas. For all nuclides intended to be shipped, the applicant should justify that the energy per second equivalency is bounded by the Co-60 analyses. In addition due to the nature of the content, allowing no neutron emitters would be far too restrictive as it is likely that there will be some neutron emitting contaminants and the applicant should provide a very small limit that is bounding to the content, but not challenging to the package shielding.

This information is needed to confirm compliance with 10 CFR 71.31(a), 71.33(b), 71.35(a), 71.47, and 71.51.

Observations

5-3 Justify assuming a uniform source distribution for modeling the package.

The applicant analyses assume a uniform distribution. There is no basis given in the SAR for this assumption, and non-uniformity could lead to a non-conservative dose rates. Provide a basis for this assumption. Discuss the possibility for reconfiguration and how contents are ensured to maintain uniformity at all times.

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

5-4 Explain how the densities of shielding materials assumed in the shielding analysis bound the actual density of shielding materials in the WMG-150B package.

As stated in SAR Section 5.1.1, "The material densities for the shielding analysis were taken from the default materials provided with the SCALE package for Carbon Steel (7.82 g/cc), Stainless Steel (7.94 g/cc) and Lead (11.34 g/cc) as appropriate." The Bill of Materials in Drawing WMG-150B-DW-004-P71 specifies the materials used for shielding, but it is not apparent that the density of these materials is bounded by those used in the shielding analysis. The applicant should discuss how they ensure that the densities used are bounded by those of the actual package fabrication.

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

5-5 Justify the binning of the Co-60 photons for use in the MORSE code.

As stated in SAR Section 5.2.1, "The gamma photons per second were then binned to conform to the SCALE standard 18 gamma energy groups for input into the SAS3 program as summarized in Table 5-2." Table 5-2 shows nearly all of the gamma energy going into the bin from 1 to 1.33 Mev. As these are propagated through the SAS3 code, the average bin energy will be used, somewhere around 1.165MeV, and since Co-60 has 2 gammas emitted nearly 100% of the time, 1 at 1.173 and 1 at 1.332 MeV, the energy of these will both be under represented. As such, the applicant should justify this binning of the Co-60 gamma photons and discuss how it adequately accounts for the Co-60 gammas. The applicant should discuss any additional measures that were taken to ensure that the Co-60 gammas were represented accurately or conservatively.

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

Chapter 7 Operating Procedures

Observations

7-1 Indicate when the welds, and the exterior part of the package, are inspected prior to each pre-loading.

The application indicates when lid bolts, seals, and interior portions of the package are inspected for each preloading, but does not mention the inspection of the exterior parts of the package and of all accessible welds.

This information is required to determine compliance with 10 CFR71.85 and 71.87.

Chapter 8 Acceptance Tests and Maintenance Program

8-1 Provide a quantitative value of the damage mentioned for the package components, as outlined in the maintenance program in Section 8.2 of the application.

Quantify severe corrosion, pitting, thread damage to bolts, etc., in terms of section loss, as mentioned in Section 8.2 of the application, for bolts, bolt holes, washers, and O-rings and when such items must be replaced, as a function of section loss, in the maintenance program.

This information is required to determine compliance with 10 CFR 71.87.

8-2 Provide acceptance criteria for foam testing per WMG, Inc., specification. Provide evidence that the as-poured foam density will be consistent with the acceptance test density. Confirm that all foam impact-limiting materials will have the mechanical properties bounded by the structural analyses used in the application at the maximum and minimum temperatures of NCT.

The applicant proposes to use foam "Type FR-3700 or FR-6700 or equivalent" with the foam being procured based on WMG specifications ES-002-P71.

Staff has always been opposed to vague wording, such as "equivalent" or "similar," in safety analysis reports (SARs). What is "equivalent" to one applicant may not be "equivalent" for another applicant. All materials must have specified characteristics in accordance with recognized Codes and Standards, particularly for "important to safety" components. Defining "equivalency" by some critical characteristics meeting or exceeding those specified for the designated material is not acceptable for staff because it does not provide the means to determine how "equivalency" will be confirmed.

An understanding of the specific acceptance criteria and basis for evaluation is critical for all important to safety components. For components and materials that are not fabricated per acceptable consensus standards, the basis for the design is needed.

This information is required to determine compliance with 10 CFR 71.43.

8-3 Revise the application to clarify that the seal manufacturer, seal part / drawing number, seal core, jacket, and lining materials, as well as specific material combinations of those materials, surface finish range, and minimum and maximum seal and groove dimensions (or dimensions with tolerances) are seal parameters that are subject to NRC approval.

The applicant proposes to use its own Commercial Grade Dedication process to procure seals, while mentioning only two critical seal parameters, in Section 8.1.5 of the application, i.e., 10 hours at 380°F and 1,000 hours at 160°F. Each seal manufacturer proposes specific seal designs to meet the reliability, sealing requirements, and life and recovery of the package seals. Specific seal materials and combinations of seal materials ensure there will be no chemical, galvanic, or other reactions. In addition, the surface finish can impact the performance of the seal. These parameters, as well as the seal and groove dimensions, are all part of the seal / groove design which is an important to safety component not subject to change without NRC approval.

An understanding of the specific acceptance criteria and basis for evaluation is critical for all important to safety components. For components and materials that are not fabricated per acceptable consensus standards, the basis for the design is needed.

This information is required to determine compliance with 10 CFR 71.33, 71.43(d), 71.51(a)(1) and (2).

8-4 Describe in detail the maintenance leak testing procedures of the package.

Maintenance leak testing should be described according to ANSI N.14.5.

This information is required to determine compliance with 10 CFR 71.51 and 71.93(b).