July 9, 2007

Ms. Lori Podolak
Product Licensing Specialist
Regulatory Affairs Department
QSA Global, Inc.
40 North Avenue
Burlington, MA 01803

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR REVIEW OF THE MODEL NO. 770 PACKAGE

Dear Ms. Podolak:

By letter dated August 30, 2006, as supplemented on September 20, and October 31, 2006; and March 14, April 24, and May 4, 2007, QSA Global, Inc., submitted an amendment request to the U.S. Nuclear Regulatory Commission for Certificate of Compliance No. 9148.

In connection with the staff's review, we need the information identified in the enclosure to this letter. We request that you provide this information by August 9, 2007. Inform us at your earliest convenience, but no later than July 26, 2007, if you are not able to provide the information by that date. To assist us in re-scheduling your review, you should include a new proposed submittal date and the reasons for the delay.

Please reference Docket No. 71-9148 and TAC No. L24020 in future correspondence related to this request. The staff is available to meet to discuss your proposed responses. If you have any questions regarding this matter, I may be contacted at (301) 492-3285.

Sincerely,

/RA/

Jessica Glenny, Project Engineer
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

Docket No. 71-9148
TAC No. L24020

Enclosure: Request for Additional Information

Ms. Lori Podolak
Product Licensing Specialist
Regulatory Affairs Department
QSA Global, Inc.
40 North Avenue
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Request for Additional Information
QSA Global, Inc.
Docket No. 71-9148
Certificate of Compliance No. 9148
Model No. 770 Package

By application dated August 30, 2006, as supplemented on September 20, and October 31, 2006; and March 14, April 24, and May 4, 2007, QSA Global, Inc. (QSA or the applicant) requested approval of the Model No. 770 package. This request for additional information (RAI) identifies information needed by the U.S. Nuclear Regulatory Commission (NRC) staff in connection with its review of the amendment. The requested information is listed by chapter number and title in the applicant's safety analysis report (SAR). NUREG-1609, "Standard Review Plan for Transportation Package for Radioactive Material," and Regulatory Guide 7.9, "Standard Format and Content of Part 71 Applications for Approval of Packages for Radioactive Material," were used by the staff in its review of the application.

Each individual RAI describes information needed by the staff for it to complete its review of the application and/or the Safety Analysis Report (SAR) and to determine whether the applicant has demonstrated compliance with the regulatory requirements.

Section 1 General Information

1-1 Revise Drawing No. R77090, Sheet 2 of 6 to correct the typographical error of the dimension that was supposed to have been corrected in Revision G of this drawing.

As part of its response to the initial RAI questions, dated January 22, 2007, the applicant also submitted a Revision G to Drawing No. R77090. Revision G was to correct a typographical error of a dimension (on Sheet 2 of 6) that read "2 1/4 2x" on Revision F of the drawing. The dimension was to be corrected to read as "1 1/8 ± 1/8 2x." The staff notes that correction has not been completed. On the latest drawing revision, Revision H, the dimension now reads as "2 1/8 ± 1/8 2x." Thus, the correction has not been completely implemented.

This information is needed in accordance with 10 CFR 71.33(a).

1-2 Revise Drawing No. R77090, Sheet 5 of 6 to correct the allowable weight of supplemental lead shielding specified in Note 3.

The application requests authorization for the use of optional supplemental lead shielding to compensate for porosity in poured depleted uranium (DU) shields. The maximum thickness of the supplemental lead specified is 0.5 inches, while not exceeding a total weight of 55 lbs. Based on an estimated total surface area of the DU shield, 0.5 inches of supplemental lead would be much less than 55 lbs. It is assumed that the supplemental lead shielding will not be needed over the entire surface area of the DU shield. Note 3 should be revised to provide a reasonable maximum weight of lead expected to be needed to compensate for porosity (for example, not to exceed approximately 5 percent of the DU weight).

This information is required by the staff to assess compliance with 10 CFR 71.31(a)(1) and 71.33(a)(5).

Section 2 Structural Evaluation

2-1 Revise the application to provide an assessment of the package performance due to the extra weight of the lead shielding under drop test conditions, including the 30-foot drop test, and show that the package performance meets the requirements of 10 CFR Part 71.

In RAIs 2-4 and 2-5, NRC letter dated January 22, 2007, the staff questioned the validity of using the linear assumption for extrapolation to predict package performance under drop test conditions, considering the additional 55 lbs of lead are in excess of 10 percent of the DU shield weight. The staff does not agree with the response to the RAI provided in the letter dated March 14, 2007, because linear results may underestimate the deformation and package damage, particularly under 30-foot drop test conditions. Revise the application to include a structural analysis that accurately predicts the package behavior under 30-foot drop test conditions, or provide additional test data using a test specimen that includes the maximum amount of lead expected to be needed. Note that this concern may be mitigated when RAI Item 1-2, above, is resolved regarding the allowable lead weight.

This information is required by the staff to assess compliance with 10 CFR 71.31 (a)(1) and (2), 71.33, and 71.35(a).

Section 5 Shielding Evaluation

5-1 Provide a table in the shielding analysis that presents the hypothetical accident condition (HAC) dose rates for the proposed Cobalt-60 (Co-60) source in a Model No. 770 and 770B package that has lost its supplemental lead shielding.

In its response to question 5-1 of the RAI dated January 22, 2007, the applicant included dose rates for a loss of supplemental lead shielding in packages under HAC conditions. However, these dose rates were provided for all the proposed contents except the Co-60 contents. A table presenting these dose rates should be provided for the Co-60 contents.

This information is needed in accordance with 10 CFR 71.51.

5-2 Modify the title of the HAC dose rate tables for packages without supplemental lead shielding to remove the Model No. 770B.

In its response to question 5-1 of the RAI, dated January 22, 2007, the applicant provided two tables of dose rates for packages under HAC for each of the proposed contents. One HAC table is for packages without supplemental lead shielding. The other HAC table is for packages that have supplemental lead shielding but are assumed to lose the lead shielding under HAC conditions. From the package descriptions provided in the SAR, the Model No. 770B will always have supplemental lead shielding; thus, HAC dose rate tables for packages without supplemental lead shielding do not apply to the Model No. 770B package. Therefore, the Model No. 770B should be removed from the tables of HAC dose rates that are for packages without supplemental lead shielding.

This information is needed in accordance with 10 CFR 71.51.

5-3 Provide justification for the model used to determine the transmission factors for the supplemental lead shielding.

In response to question 5-1 of the RAI, dated January 22, 2007, the applicant modified the shielding analysis for HAC to include the affects of a loss of the lead shielding. This loss was included in the analysis through use of a transmission factor, calculated with MicroShield V5. However, the proposed model for the calculation accounts only for the 0.5 inches of lead and neglects the DU shield. QSA did not provide justification of the acceptability of using this model to determine these transmission factors.

The staff notes that the proposed model assumes that the rate of change in the dose rates with additional shielding thickness is constant. However, as the depth of shielding penetration increases, the effectiveness of additional shielding also increases for most of the proposed contents (Iridium-192 being the exception) because the gamma spectrum impacting upon the additional shielding is different from the spectrum emitted from the source. Additionally, staff calculations which include the DU shield indicate that the transmission rates are significantly higher than those determined by the applicant for all the proposed contents except the Iridium-192 contents and that, therefore, a model for the lead transmission rates should include the DU shield. Thus, the applicant should justify its model's adequacy and appropriateness, including the assumptions made in the model (e.g., ignoring the DU shield), for the analysis of the lead transmission rates for the Model No. 770 package. Alternatively, the applicant can revise the model to include the DU shield, justifying any assumptions in the revised model (e.g., the reference material(s) selected for the calculations). The shielding analysis should also be revised to account for changes in the lead transmission factors, as necessary.

This information is needed in accordance with 10 CFR 71.51.

Section 7 Package Operations

7-1 Confirm that the eight screws referred to in SAR Section 7.1.2.1.c, Paragraph 3, are the eight bolts referred to in SAR Sections 7.1.1.2.e and 7.1.2.1.d and revise the text to be consistent in describing the screws/bolts.

Paragraph 3 of SAR Section 7.1.2.1.c refers to eight 5/16-18 hex head screws that are used to secure the cover plate. SAR Sections 7.1.1.2.e and 7.1.2.1.d refer to eight 1/2-13 x 1 inch long bolts for securing the cover plate. Thus, it appears that the components for securing the cover plates to the Model Nos. 770 and 770B are being called two different things, different in at least the dimensions. Drawing No. R77090 refers to these items as 1/2-13 x 1 inch long hex head screws. It appears that the dimensions given in Paragraph 3 of SAR Section 7.1.2.1.c should be changed to reflect the correct dimensions of the securing bolts/screws.

This information is needed in accordance with 10 CFR 71.33(a).

7-2 Modify SAR Section 7.1.3.4 to indicate that for shipments of multiple radioisotopes in a single package the sum of the ratios of the curie quantity of each loaded isotope to the maximum allowed curie quantity of that isotope, were that isotope the only contents of the package, must be less than or equal to unity.

In its response to question 7-6 of the RAI, dated January 22, 2007, the applicant modified SAR Section 7.1.3.4 to state that when multiple isotopes are transported in the same package, the maximum capacity is limited by the requirements of 49 CFR 173.433(d). The regulation in 49 CFR 173.433(d) addresses determinations of maximum activities for multiple isotopes in a Type A package as well as exempt concentration limits and exempt consignment activity limits. The Model Nos. 770 and 770B packages are Type B packages; therefore, 49 CFR 173.433(d) does not appear to apply to these packages unless it is intended to restrict contents to meet the limits for Type A packages when multiple isotopes are loaded in a single (i.e., the same) package. Otherwise, the section should be revised to limit the contents such that the sum of the ratios of the curie quantity of each loaded isotope to the maximum allowed quantity for that isotope must be less than or equal to unity (as is done in Paragraph 7.1.d of the currently approved SAR); in other words, the contents of a package loaded with multiple isotopes shall meet the following:

$\sum \frac{q_i}{Q_{CoC,i}} \leq 1$, where q_i is the amount of radioisotope *i* loaded in the Model No .770, or 770B, package and $Q_{CoC,i}$ is the maximum amount of radioisotope *i* allowed in the package as specified in the certificate of compliance (CoC).

This information is needed in accordance with 10 CFR 71.33(b), 71.47, and 71.51.