

November 25, 1996

Ms. Cathleen Roughan
Amersham Corporation
40 North Avenue
Burlington, MA 01803

Dear Ms. Roughan:

This refers to your application dated September 6, 1994, as supplemented on June 12, 1995, January 19, August 16, and October 10, 1996, requesting an amendment to Certificate of Compliance No. 9029 for the Model No. 676, 676E, 676A, 676AE, 676B, and 676BE packages.

In connection with our review, we need the information identified in the enclosure to this letter.

Please advise us within 30 days from the date of this letter when this information will be provided. Additional information requested by this letter should be submitted in the form of revised pages. If you have any questions regarding this matter, we would be pleased to meet with you and your staff. Bernard White is the project manager for our review of your application. Mr. White may be contacted at (301) 415-8515.

Sincerely,

Original /s/ by:

Cass R. Chappell, Chief
Package Certification Section
Spent Fuel Project Office
Office of Nuclear Material Safety
and Safeguards

Docket No. 71-9029

Enclosure: As stated

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| NAME | BHWhite | | LYang | | ERZiegler | | CRChappell | |
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1. Provide engineering analyses or test results which demonstrate that the supplemental lead shielding will remain in place under the normal condition of transport tests, and throughout the service life of the package. Show explicitly that the external dose rate for the package meets the limits specified in 10 CFR 71.47 under the normal condition of transport tests.

Note that we have previously requested the above information on supplemental lead shielding in our letters dated January 6, 1995; September 21, 1995; and July 23, 1996.

2. Revise the drawings to specify the maximum weight of the uranium shield and the maximum weight of the supplemental lead shielding (see item No. 3b, below). Specify the width and length of the retaining bars.
3. The January 19, 1996, supplement (pg 2-28) states that, as a result of the drop test, the four bolts that fasten one of the side frames sheared off and the side frame was detached. The other side frame remained connected, but was displaced about three inches from the shell at one end and about one inch at the other end. The top of the shipping cover was broken off, but most of the cover remained attached to the shell.

Provide the following information regarding drop and puncture testing of the package:

- a. Provide photographs, if available, which clearly show the damage sustained by the package due to the drop and puncture tests. Clarify the condition of the shipping cover plate following the tests. Provide a copy, if available, of the camcorder video that was taken of the tests.
- b. For the package specimen that was tested, specify the weight of its uranium shield, the weight of its supplemental lead shielding, and the total weight of the specimen package. Verify that each of these weights was not less than the corresponding weights shown on the drawings (see item No. 2, above). Clarify how and where the extra weight was added to the test specimen. Show that the structural and shielding performance of the test specimen was representative of an actual package, considering the location and distribution of the extra weight that was added to the test specimen.
- c. It is not clear that the package was drop or puncture tested in the most damaging orientation. Show that the package was tested in the most damaging orientation. This evaluation should consider the following:
 - (i) possible lateral movement of the uranium shield relative to the shell (e.g., this could possibly result from a 30-ft drop with the side frame in a horizontal position, or from a

puncture test with the pin impinging onto the exposed uranium shield after the side frame has been torn loose).

- (ii) possible stripping of the threads of the screw or nut that supports the retaining bar in a drop onto the bottom of the package or possible bending deformation of the retaining bar which supports the shielding (e.g., drop test impacting in the orientation shown in View 'D', on Drawing No. R67690, sheet 5).
 - (iii) possible damage to the lock mechanism during the puncture test if the package were oriented "end-on" so that the locking mechanism were to impinge directly onto the pin, with the center of gravity of the package directly above the point of contact. (Note that the shipping plate apparently was damaged during the 30-foot drop test).
- d. Evaluate the package for the effects of the 30-minute fire test, considering the damage that could be sustained during the drop and puncture tests. This evaluation should specifically include an evaluation of the temperature and strength of the screws which support the retaining bars, and the ability of these screws to support the weight of the shielding under the fire test condition. Discuss the condition of the uranium shielding and the "s" tube following the conclusion of the hypothetical accident condition test sequence (e.g. oxidation, eutectic, cracking, etc.).
- 4. The shipping plate appears to serve a safety function. Revise the operating procedures to include installation of the shipping plate prior to shipment and specify the torque that should be applied to the bolts which secure the shipping plate in place.
 - 5. Describe how the external dose rates were determined following the hypothetical accident condition tests. Show that the source assembly used for the dose rate measurements was located in the same position, relative to the uranium shielding, as the dummy source assembly at the conclusion of the test. Clarify that the dose rate was measured directly in front of the lock assembly in a manner that would have detected streaming from the "s" tube. Specify the dose rate value that was measured directly in front of the lock assembly.