71-9168

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71-9168

FEB 10 1983

Chem-Nuclear Systems, Inc.
ATTN: Ms. Chryl A. Marsh
P.O. Box 1866
Belelvue, WA 98009

Gentlemen:

This refers to your application dated September 30, 1982, requesting an amendment to the Model No. CNS 8-120B packaging.

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

Please advise us within thirty (30) days from the date of this letter when this information will be provided. The 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.

Sincerely,

Original Signed by
CHARLES E. MACDONALD

Charles E. MacDonald, Chief
Transportation Certification Branch
Division of Fuel Cycle and
Material Safety, NMSS

Enclosure: As stated

OFFICE ▶	FCTC	FCTC	FCTC	FCTC	FCTC	FCTC	FCTC
SURNAME ▶	RHOdegaarden:alm	HWLee	EPEaston	CEWilliams	CRMarotta	WHLake	CEMacDonald
DATE ▶	02/07/83	02/9/83	02/8/83	02/9/83	02/9/83	02/09/83	02/10/83

Chem-Nuclear Systems, Inc
Model No. CNS 8-120B
Docket No. 71-9168

Encl to ltr dtd: FEB 10 1983

STRUCTURAL

1. Since the application was based on measured yield stress (45.0 ksi at 70°F) for the inner and outer cask cylindrical shells, indicate on the drawing that the A516 Gr.70 steel for the inner and outer shells must have minimum yield stress of 45.0 ksi at room temperature.

2. The analysis of the energy absorbing overpacks for the 30-foot drop (Sect. 2.7.1 and 2.10.1.1) should be expanded to provide the following information:

   a. Polyurethane foam samples should be tested to substantiate the material properties shown in Figure 2.3-1. Any tolerance or anticipated deviation from Figure 2.3-1 should be considered in the analysis of the overpack.

   b. Inasmuch as the overpack deformation behavior was analyzed by computer program, the final results - the deflection, force, and acceleration - should be utilized to show that energy balance has been satisfied.

   c. For the corner drop condition, part of the overpack crush plane was not supported due to the cylindrical end void. The unbacked foam is not effective in resisting crush and it should be excluded from the crush resistance computation. Also, the computed crush depth of 15.39 inches is much too large for the 18.5-inch thick foam. Show that the overpack will not bottom out for the 30-foot corner drop condition.

3. The following additional information is needed for the finite element analysis of the cask by the ANSYS computer code:

   a. List of all material and dimensional input to ANSYS including modulus of elasticity, poison's ratio, coefficient of thermal expansion, thickness, moment of inertia, area, spring constant, and etc.

   b. List of all load input to ANSYS. Show computations of how loads were generated and applied. Provide narrative and sketches as required.

   c. Describe the boundary conditions and any other internal constraints of the finite element structural model.

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d. List all of reaction/constraint forces for each loading condition. Show that the equilibrium conditions have been satisfied.

e. Provide stress and/or displacement profile at critical or representative sections of the cask for each loading condition.

DRAWING NO. C-110-E-0007, SHEETS 1 AND 2

1. Show the weld joint requirements for the long seams of the inner and outer shells of the cask body.

2. The drawing should identify the weld joints to be nondestructively tested, the test method to be used, and the code and/or standard which establish the test procedure and acceptance criteria.

3. Provide a note indicating the packaging is to be painted white as refererced in Section 3.4.1.1 of the application. (also, revise Section 8.0, Acceptance Tests and Maintenance, to take into account the color of the packaging.)

THERMAL

Our independent heat transfer calculations indicate most, if not all, of the lead will melt as a result of the 30-minute fire test. In analyzing the thermal behavior of the cask, the staff used an explicit finite differencing algorithm (HTAS1 and HEATING6, NUREG/CR-0200). We used a time step of 0.05 minutes and found the first 60 minutes after the start of the fire to be important. Based on the information available to us, we believe the difference between our results and yours may be due to an excessively large time step of 15 minutes.

Based on the above, we find the current package design unacceptable without additional thermal protection for the lead shielding.

SECTION 7.0 OPERATING PROCEDURE

1. Operations 7.1.3.3, 7.1.5, and 7.2.8 require the use of suitable lifting equipment. In each of these operations the instruction should be expanded to include the condition in the stress analysis which specifies a minimum angle of lift.

2. The "Note" at the bottom of page 7-1 should be clarified by citing the specific verification leak test required, i.e., leak test per 8.2.2.1 or 8.2.2.2.

3. The requirement for assembly verification leak testing as specified in Section 8.2.2.2 should be incorporated either by note or insertion of an addition step after operation 7.1.9.

4. Revise the operating procedures to provide details on water (liquid) removable from cask cavity which is not equipped with the optional cavity drain line. Package decontamination should be taken into account.

SECTION 8.0 ACCEPTANCE TEST AND MAINTENANCE

1. Identify the applicable codes and acceptance standards that will be used in the verification of weld integrity.

2. In Part 8.1.3, reference is made to Section 4.4.10. Please identify where this Section can be found.

3. The maintenance program should be specific regarding frequency of routine examinations and periodic testing.

4. Describe the procedure to be followed for periodic inspection of the containment vessel welds or describe the inspections to be performed during fabrication to assure the integrity of the containment vessel welds which are subsequently covered by stainless steel sheet.

5. Revise the leak test specifications (paragraphs 8.1.3 and 8.2.2) to include the conditions at test. The conditions should be equivalent to standard test conditions of ANSI N14.5.