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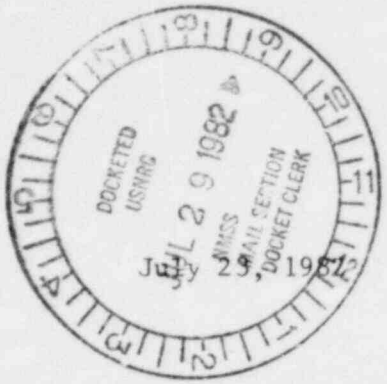

July 29, 1982

Mr. Charles MacDonald, Chief
Transportation Branch
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: HNDC HN-100 Series 1
Radioactive Materials Package
Certificate of Compliance No. 71-9086

Dear Mr. MacDonald:

In accordance with your May 6, 1982 request, (FCTC:CEW 71-9086) attached is a consolidated application for the renewal of Certificate of Compliance No. 71-9086 for the HN-100 Series 1 radioactive materials shipping cask. Eight copies of the following are enclosed:

(1) Safety Analysis Report for the HN-100 Series 1 Radwaste Shipping Cask, STD-R-02-006, Revision 0.

(2) Hittman Nuclear & Development Corporation Drawings Nos.: STD-02-028, Revision 3; STD-02-029, Revision 3; and STD-02-030, Revision 2.

The consolidated application has been revised to conform to the format specified in Regulatory Guide 7.9. Attachment A contains a summary of the pertinent changes and additions that have been made to the prior submittals. Attachment A also describes the drawing changes and the requested changes in the Certificate of Compliance.

In the reanalysis of these packages, it was found that the HN-100 Series 1, Unit 5 could have stresses in excess of yield in the tie-down lugs under the conditions specified in 10 CFR 71.31 (d)(1). Restrictions have been placed on the allowable weight of contents that may be carried in this specific cask. Attachment B contains the basis for restricting the weight of contents for Unit 5. It is proposed that the Certificate of Compliance include a weight restriction on contents for Unit 5.

FEE EXEMPT
add-on

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HITTMAN recognizes that the accompanying documentation in support of this application, which is stamped "Proprietary" will be placed in the Nuclear Regulatory Commission Public Document Room. These documents bear notices relative to the further dissemination and use of this information which must remain on file with this material.

Our letter of April 9, 1982, forwarded a check in the amount of $150 for the renewal of the subject Certificate of Compliance. If you have any questions or require additional information, please contact me.

Very truly yours,

Charles W. Mallory
Vice President, Engineering

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Attachments

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ATTACHMENT A

Radioactive Materials Package
Certificate of Compliance No. 9086
HNDC Model HN-100 Series 1
Application for Renewal

A. GENERAL

The application and safety analysis report for the HN-100 Series 1 casks, Certificate of Compliance No. 9086, has been revised to consolidate all prior submittals, incorporate additional analyses and to conform to the format requirements of U.S. Nuclear Regulatory Commission, Regulatory Guide 7.9. The specific changes and additions are summarized in the following sections.

B. CHANGES & ADDITIONS

Section 1.2.3.1

The type and form of contents has been expanded to include Type A quantities of source and transuranic materials and greater than Type A quantities of these materials in the form of low specific activity materials. Exempt quantities of fissile materials as defined by 10 CFR 71.9 may be transported.

Section 2.1.1

The key structural components of the package are defined with the criteria to assure safe operation.

Section 2.3

The HN-100 Series 1 casks were originally constructed over a period of four years by various fabricators. The materials used in each of the packages is defined with the certified yield and ultimate strength of the critical components. The yield strength of the tie-down lugs on one package (HN-100-5) is less than the other packages in this class and will be operated with a lower weight of contents unless modified.

Section 2.10.1.1

The cask may use one of three types of lift lugs. The minimum length of sling that can be used with the reinforced lift lugs is shown in the analysis. The radial lift lugs have been reduced in thickness to 2-1/8 inches and the weld has been increased to one inch.

Section 2.10.1.2

The analysis has been expanded to include the inadvertant use of tie-down lugs for lifting.

Section 2.10.2

The analysis of tie-down loads has been modified to include the weight of the cask only as a vertical component.

Section 2.10.2.12.3

The analysis has been expanded to include tear-out of the tie-down lugs due to shear.

Section 2.10.2.12.4

The analysis of the tie-down lug weld has been modified to include the moment due to the offset of the lug.

Section 2.10.2.12.13

The restrictions on the allowable weight of contents for HN-100 Series 1, Unit 5 are analyzed.

Section 2.10.1.14

The failure modes under excessive loads have been analyzed.

Section 2.10.3.1

The effects of a one foot drop on the corner have been analyzed using minimum strength steel to determine maximum deformation and with maximum strength steel to determine decelleration forces.

Section 2.10.3.1

The maximum decelleration force of 30 g's is used to calculate possible effect on the balance of the cask due to a bottom corner drop.

Section 2.10.3.2

The adequacy of the studs have been analyzed for a 30 g drop on the top corner.

Section 3

The thermal energy based on maximum loading is calculated and shown to have no effect.

Section 4

The adequacy of the bolts to withstand a one half atmosphere external pressure is analyzed and shown not to affect the seal.

Section 5

The shielding capabilities have been analyzed as a function of waste type, gamma energy and type of container.

Section 8

The HN-100 Series 1 casks were pressure tested when originally fabricated.

C. DRAWINGS

The drawings for the HN-100 Series 1 radwaste shipping cask have been redrawn to consolidate prior changes. The following are the current drawings for the casks:

STD-02-028, Revision 3 (Previously C001-5-9125)

STD-02-029, Revision 3 (Previously C001-5-9126)

STD-02-030, Revision 2 (Previously C001-5-9127)

Drawing number STD-02-028 has been changed to show the weld symbol for the weld attaching items 3 and 4 to the upper body corner.

Drawing number STD-02-029 has been changed as follows:

(1) The radial lift lug has been reduced in thickness from 2.5 inches to 2-1/8 inches. The attachment weld has been increased from a 3/4 inch to a one inch fillet.

(2) The weld between the inner shell and the base has been changed to reflect "as-built" conditions.

(3) The lift lug material listed in the bill of materials has been expanded to include A515 and A203.

D. REQUESTED CHANGES TO CERTIFICATE OF COMPLIANCE NO. 71-9086

It is requested that the following changes be made in Certificate of Compliance No. 9086:

Paragraph 1(b)

Revision No. 8.

Paragraph 5(a)(2)

A steel encased, lead shielded cask for low specific activity material. The cask is a right circular cylinder 81.5 inches high by 82.75 inches in diameter. The cask cavity is 73.5 inches high by 75.5 inches in diameter. The cask side wall consists of a 3/8-inch thick inner steel shell, a 1-3/4 inch lead shell, and a 7/8 inch thick outer steel shell. The base is a 4 inch thick steel plate which is welded to the inner and outer steel shells of the side wall. A steel flange is welded to the inner and outer steel shells of the side wall at the top. The lid is a 4 inch thick steel plate which is stepped to mate with the steel flange. The cask closure is sealed by a Viton or Buna-N O-ring gasket located between the lid and steel flange. Positive lid closure is accomplished by thirty, 1 inch studs. The lid contains a centrally located 4 inch stepped steel shield plug. The shield plug is sealed by a Viton or Buna-N O-ring gasket, and sixteen, 1/2 inch studs are used to provide positive closure.

Tie-down is accomplished by four tie-down lugs welded to the cask body. The tie-down lugs are constructed of A203 Grade E steel having a minimum yield strength of 61,000 psi. (Unit 5 has a minimum yield of 50,400 psi.) There are three cask lift lugs, three lid lift lugs and one shield plug lifting lug. The lift lugs are constructed of steel having a minimum yield strength of 43,900 psi. The shell of the cask is constructed of steel having a minimum yield strength of 42,000 psi. The package gross weight is 50,000 pounds.

Paragraph 5(a)(3)

The packaging is constructed in accordance with Hittman Nuclear & Development Drawings Nos.: STD-02-028, Revision 3; STD-02-029, Revision 3; and STD-02-030, Revision 2.

Paragraph 5(b)(1)

(1) Type and Form of Material

Process solids either dewatered, solid or solidified meeting the requirements for low specific activity radioactive materials, in secondary container. Materials may include by-product, source and transuranic materials of Type A quantities or greater than Type A quantities in the form of low specific activity material. Contents may include exempt quantities of fissile material (10 CFR 71.9).

Paragraph 5(b)(2)

(2) Maximum Quantity of Material per Package

Greater than Type A quantities of radioactive material with the weight of the contents, secondary containers and shoring not exceeding 14,500 pounds. (The maximum weight of contents for the HN-100 Series 1, Unit 5, is restricted to 11,620 pounds, unless modified to conform with the other units in this class.)

Paragraph 6

Shoring shall be placed between small secondary containers and the cask cavity to minimize movement during normal conditions of transport. Shoring is not required for containers or pallers designed to fit the cavity.

Paragraph 8

Prior to each shipment, the seal on the main cover and the seal on the shield plug cover, if opened, or if the security seal is broken, must be inspected. The seals must be replaced if the inspection shows any visable defects or every twelve (12) months, which ever occurs first.

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ATTACHMENT B

Radioactive Materials Package
Certificate of Compliance No. 9086
HNDC Model HN-100 Series 1

Restrictions on the Use of Unit 5

Calculated bearing stress in tie-down lugs under conditions specified in 10 CFR 71.31(d)(1): 53,476 psi

Certified yield strength of tie-down lugs used on HN-100 Series 1, Unit 5: 50,400 psi.

Reduction in load required to reduce stress in lift lugs to yield:

$$\frac{53,476 - 50,400}{53,476} = 5.75\%$$

Required reduction in package gross weight:

50,000 lbs x 57.5% = 2876 pounds

Allowable weight of contents to avoid stresses in excess of yield:

14,500 lbs - 2876 lbs = 11,623 lbs.