

Dr. K. P. Singh, President  
Holtec International  
555 Lincoln Drive West  
Marlton, New Jersey 08053

SUBJECT: ALLEGATION NMSS-2000-A-0011

Dear Dr. Singh:

By letter dated July 11, 2000, Holtec International (Holtec) provided information regarding concerns with Holtite-A material supplied by Holtec. Holtec has also provided other information regarding Holtite-A and NS-4-FR material supplied by NAC International, Inc., by correspondence and NRC inspection.

In order to continue our review of this information and resolve these concerns, the staff requires additional information that is listed in the enclosure to this letter. We request that you conduct the necessary inspections or investigations to provide a response to NRC within 30 days of the date of this letter. Your response should include the requested information. The records of your completed action should also be available for NRC inspection.

Please submit your response to ADDRESSEE ONLY: Mr. Wayne Hodges, Deputy Director, Spent Fuel Project Office. Please do not submit any other copies to NRC or the Document Control Desk. If your response contains personal privacy, proprietary, or safeguards information, such information shall be contained in a separate attachment, appropriately marked, so that it will not be subject to public disclosure. The affidavit required by 10 CFR 2.790(b) must accompany your response if proprietary information is included.

The response requested by this letter and the accompanying enclosure is not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, Pub. L. 96-511.

F-57

K.P. Singh

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Your cooperation is appreciated. If you have any questions or need additional information concerning this request, please contact me at 301-415-2398.

Sincerely,

M. Wayne Hodges, Deputy Director  
Technical Review Directorate  
Spent Fuel Project Office  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: Request for Additional Information

K.P. Singh

- 2 -

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Sincerely,

M. Wayne Hodges, Deputy Director  
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Spent Fuel Project Office  
Office of Nuclear Material Safety  
and Safeguards

Enclosure: Request for Additional Information

DISTRIBUTION:  
NMSS-2000-A-0011

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OFC:	NMSS OAC	E	SFPO	E	SFPO	E	SFPO	E	SFPO	E	SFPO	E
NAME:	RLO'Connell		KLathrop		MWaters		KGruss		SBaggett		EEaston	
DATE:	/ /00		/ /00		/ /00		/ /00		/ /00		/ /00	
OFC:	NMSS OAC	E	SFPO	E	SFPO	E	SFPO	E	SFPO	E	SFPO	E
NAME:	JGuttman		WHodges									
DATE:	/ /00		/ /00									

OFFICIAL RECORD COPY

**- Request for Additional Information -**

1. Provide the exact chemical composition (including the molecular structure or chemical formula) of the Holtite-A resin, hardener, fire retardant and other additives (e.g., hindering additives, stabilizers). Provide this information directly from the chemicals suppliers' documentation and/or data. (Please do not respond by referring to NAC NS-4-FR raw materials.)
2. Identify and provide supporting justifications for the following Holtite-A characteristics:
  - a. the total gamma and neutron dose and dose rate performance limits at ambient and the Hi-Star 100 storage cask normal operating condition temperatures;
  - b. the specific gravity for both the material that is poured during installation and for the fully cured (hardened) material. Also, indicate whether the specific gravity value of 1.68 g/cm<sup>3</sup> is for the material that is poured or for the fully cured (hardened) material; and
  - c. the protocol, or procedures, for measuring the viscosity of the poured material and fully cured materials.
3. Provide the bases and relevant justifications for specifying the Holtite-A formulation (e.g., the proportions or amounts of raw ingredients) as identified on page 7 of Report # HI-2002396, "Holtite A: Development History and Thermal Performance Data." Also, specifically, describe the impacts that a change in this formulation would have on the Holtite-A shielding performance. Describe and justify the acceptable variations in the formulation (using test data) that would support the shielding performance as described in the Holtec Hi-Star 100 Safety Analysis Report (SAR).
4. Clarify the meaning of the first sentence in the first full paragraph below the formula on page 10 of the May 9<sup>th</sup>, 2000, Commonwealth Edison Company Audit Report (#SR-2000-289), with respect to the Holtite-A formulation identified on page 7 of Report # HI-2002396. The sentence starts with, "Increasing the amount of..." This sentence seems to contradict the formulation described in Report # HI-2002396.
5. Section 6.9 of Procedure HPP-70718-10, Rev. 2, specifies the curing period of time prior to moving the overpack. Provide the test data and associated justification to show that this amount of time is sufficient to complete the Holtite-A curing process. Also, describe and justify the chemical structure and composition of Holtite-A and the expected distribution and amount of voids in Holtite-A material associated with material cured for this amount of time.
6. Identify the fabrication and installation steps (e.g., mixing, final pouring, etc.) that require the use of vacuum equipment. Justify: (1) the bases for the use of this equipment, (2) its impact on the creation of voids in the final Holtite-A product as supported by test

Enclosure

data, and (3) whether the supporting test data to examine the distribution and amount of voids was conducted under atmospheric conditions (e.g., without a vacuum).

7. Identify the names, chemical structures, removal techniques and purposes of all solvents used in the mixing, pouring, and curing processes and all preparation phases (e.g., preparation of mixing equipment for each batch) of the Holtite-A installation. Also, describe the effects that any residual solvents may have on the degradation or off-gassing of Holtite-A.
8. In reference to Section 6.2.5 of Procedure HPP-5014-3, identify the criteria and/or protocol (or procedures) the Chief Scientist uses to determine (1) when a sample should be removed from the furnace, (2) when the sample has reached a stable weight, and (3) when a sufficient duration has elapsed. In the context of this section, describe the meaning of "...sufficient duration has elapsed." Additionally, provide the basis (e.g., consensus specification or standard, independent development supported by test data, etc.) for the development of the thermal testing procedures.
9. In reference to Report # HI-2002396,
  - a. Resubmit Figures 4.1 through 4.22 and Figure 5.1 through 5.17 with error bars around the data points;
  - b. Provide the justification for using an ordinary saw cutter to prepare the thermal test samples (as opposed to a diamond saw), and identify the geometry (e.g., size and shape) of the Holtite-A and NS-4-FR samples used to conduct the thermal tests;
  - c. Provide the justification for the appearance of a bias in the thermal test data which included testing of 4 samples from two batches of Holtite-A and 15 samples from one batch of NS-4-FR;
  - d. Identify the specific gravity values of the Holtite-A and NS-4-FR samples at the conclusion of thermal testing;
  - e. Provide photographs or digital images of the cross section of the Holtite-A and NS-4-FR samples that were subjected to the thermal tests to assist the staff in determining the impacts of the manufacturing and thermal testing protocol on the creation of voids; and
  - f. Indicate the chemical composition and provide the spectrographic data (e.g., data from a gas chromatography) of the gaseous species that were released from the Holtite-A and NS-4-FR samples during thermal testing.

10. Provide all thermal and radiation test data generated, to date, that demonstrate the shielding performance of Holtite-A beyond 200 days. Using Holtec generated data, justify how the accelerated thermal and radiation tests demonstrate that Holtite-A provides the level of shielding as described in the Holtec Hi-Star 100 SAR (i.e., adequate shielding is presumed if the loss of hydrogen from Holtite-A is less than 4 weight percent over the 20-year license period at SAR calculated temperatures which are lower than those used in the thermal tests).
11. Provide data related to the demonstration of Holtite-A shielding performance where the test temperature was reduced over time.
12. Provide data from radiation experiments that may have been conducted on the thermally treated samples. Include information related to total absorbed dose and dose-rate effects on the shielding properties for these tests.
13. Provide the quality assurance procedures and records used to ensure that the raw materials of Holtite-A, as specified on page 7 of Report # HI-2002396, are the same materials being used during installation of Holtite-A.

~~- SENSITIVE ALLEGATION MATERIAL -~~

ROUTING AND TRANSMITTAL SLIP

Date: September 16, 2003

NAME	INITIALS	DATE
B. O'Connel		
K. Lathrop		
M. Waters		
K. Gruss		
S. Baggett		
E. Easton		
J. Guttman		
W. Hodges		
Secretary (dispatch)		

\*\*\*\*\*  
ACTION: \_\_\_\_\_ APPROVAL:   X   FOR YOUR INFO: \_\_\_\_\_  
NOTE & RETURN: \_\_\_\_\_ PREPARE REPLY: \_\_\_\_\_ COORDINATION: \_\_\_\_\_  
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\*\*\*\*\*EDO/NMSS TICKET NO(s).:

DUE TO DIVISION:

DUE TO NMSS:

DUE TO EDO:

\*\*\*\*\*  
MEMORANDUM/LETTER TO: K. P. Singh, President

FROM: M. Wayne Hodges, Deputy Director SFPO

SUBJECT: ALLEGATION NMSS-2000-A-0011

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REMARKS:

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ORIGINATOR: Kirke Lathrop PHONE: (301) 415-8553

SECRETARY:

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~~- SENSITIVE ALLEGATION MATERIAL -~~