MAY 2 3 1988

MEMORANDUM FOR: Jesse L. Funches, Director Program Management, Policy Development and Analysis Staff, NMSS

FROM:

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Robert F. Burnett, Director Division of Safeguards and Transportation, NMSS

SUBJECT: HEARING BEFORE THE SUBCOMMITTEE ON SURFACE TRANSPORTATION, HOUSE COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION (MAY 25, 1988)

Enclosed are proposed questions related to the subject hearing scheduled for May 25, 1988.

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Robert F. Burnett, Director Division of Safeguards and Transportation, NMSS

Enclosure: As stated

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QUESTION 1: Describe the process the NRC uses to certify a transportation cask. Is this process different from DOE's, and if so, why? Is actual physical testing of models involved? Why or why not?

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- QUESTION 2: What is the NRC doing to assure shipments are transported safely?
- QUESTION 3: What types of accidents have occurred during the transportation of radioactive materials and radioactive waste? Which are the most common and how frequently do these occur? Which are the most serious, and how frequently do these occur?
- QUESTION 4: What are NRC views and comments on H.R. 4069, the proposed amendment to the Hazardous Materials Transportation Act?
- QUESTION 5: At the present time, when is NRC certification of DOE shipping casks required and when is it not required?

QUESTION 1: Describe the process the NRC uses to certify a transportation cask. Is this process different from DOE's, and if so, why? Is actual physical testing of models involved? Why or why not?

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### ANSWER 1 :

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Applicants for approval of transportation casks must demonstrate to the NRC that the design can safely withstand conditions likely to occur in both normal and accident conditions of transport. Casks must be evaluated for a series of hypothetical accident conditions which include: (1) a 30-foot drop test onto an essentially unyielding surface; (2) a 40-inch drop test onto a 6-inch diameter pin; and (3) a 30-minute fire test. Applicants must demonstrate that, following the test sequence, the cask design would meet NRC requirements for containment of radioactive material, maintaining external radiation levels within acceptable limits and maintaining the contents in a sub-critical condition. Under the regulations, this demonstration may be by means of full scale testing, scale model testing, engineering analysis, or a combination of these methods.

No full-scale physical tests have been conducted on current NRC-licensed casks. Engineering analysis has been the primary means used to demonstrate that cask designs meet NRC regulations. However, in some instances, scale model testing has been used to supplement and to confirm the engineering analysis. We understand that DOE intends to conduct scale model tests of all the casks that will be used for NWPA shipments. The results of these tests will serve to confirm or validate the engineering analyses that will also be performed on the casks.

Before a cask design can be used, the NRC must issue a certificate of compliance (approval). Any number of casks may be fabricated to the approved design, provided the fabrication is conducted under a quality assurance program approved

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by the NRC. To use an approved cask, licensees must first register with the NRC. Operation and shipment of the cask must be in accordance with the terms and conditions of the approval.

The process DOE uses to certify casks is very similar to NRC's. DOE has established an independent group to perform the technical review and has formal training courses for the reviewers. Many of the DOE reviewers have also spent one or two weeks working at NRC to observe the NRC review process.

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QUESTION 2: What is the NRC doing to assure shipments are transported safely?

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### ANJWER 2:

The NRC is actively involved in ensuring that nuclear shipments are transported in a safe manner. First, we review large quantity and fissile material transport package designs to ensure that the material will be transported in a safe container. NRC has sponsored a research program which evaluated the performance of spent fuel casks (NUREG/CR-4829, "Shipping Container Response to Severe Highway and Railwa Accidents," February 1987). This study showed that even under severe highway and railway accident conditions the casks would still perfirm their safety functions. Second, we have an active safety inspection program in which NRC inspects 100% of the initial spent fuel assembly shipments from a nuclear reactor's spent fuel pool to another storage location. Once it has been established that the shipments are conducted in accordance with our requirements, our inspection frequency is then lowered. Third, NRC has developed safeguards requirements for spent fuel shipments to ensure the physical protection of the shipment. Transport routes are reviewed and approved by NRC prior to the shipment. A document has been issued which shows routes which have been used in the past or are currently approved for specific shipments (NUREG-0725, "Public Information Circular for Shipments of Irradiated Reactor Fuel," Rev. 6, April 1988). Other safeguards measures include components such as immobilization devices on cargo vehicles, communications, driver and escort training, arrangements with law enforcement officials along the route, notification of governors, and armed escorts through high density population areas which combine to enhance the protection of public health and safety. Finally, the staff also has worked with the Department of Transportation in public forums to provide informational exchange with State agencies on the technical needs that are required to deal with public safety in the shipment of spent fuel.

QUESTION 3: What types of accidents have occurred during the transportation of radioactive materials and radioactive waste? Which are the most common and how frequently do these occur? Which are the most serious, and how frequently do these occur?

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### ANSWER 3:

The U.S. Department of Transportation (DOT) is the primary federal agency which maintains and analyzes accident/incident data on hazardous materials transportation. In the analysis of radioactive materials transportation experience, an event is considered to be an "accident" if the transport vehicle is involved with an incident ranging from a minor collision to a major collision, overturn, etc. as contrasted to "handling" incidents wherein the vehicle is not involved.

The radioactive materials incident report data on file with DOT for the 14 year period 1971 to 1985 indicates that there were 167 transportation accidents involving shipment of radioactive material, with the majority occurring in the highway mode. In these accidents, 14% of the events involved some package failure, however, of the 2602 total packages involved, only 3% had failures. Close examination of those failures reveals that:

- No Type B packages have ever released their contents because of exposure to accident conditions of transport\* (Type B packages contain high amounts of radioactivity and therefore are required to survive severe accident conditions);
- \* NRC and DOT are reviewing a recent accident in which a radioactive source may have been released from a radiography device (Type B) due to accident conditions.

# ANSWER 3. (Continued)

- o where there have been releases, Type A or Industrial type packages have been involved (such packages are limited in the amount of radioactivity contained, and therefore are not required to survive severe accident conditions);
- o the vast majority of the packages which have been exposed to accident conditions have experienced no packaging failure and many that experienced failure did not release their contents.

No serious transportation accidents have occurred wherein life-threatening levels of radiation or radioactivity release have been experienced. The most serious events which have occurred involved three separate highway accidents involving truckloads of 55 gallon drums of uranium ore concentrate ("yellowcake") in Colorado (1977), Kansas (1979), and North Dakota (1985). In two accidents, speeding appeared to be the cause of truck overturn, and in the third, collision with a train occurred. In each accident, many of the drums were thrown from the vehicle and ruptured, releasing large amounts of yellowcake. Extensive cleanup campaigns were necessitated, however, health effects due to radioactivity were essentially nil, and in each case, ordinary industrial hygiene precautions were taken to prevent exposure to airborne radioactivity. QUESTION 4: What are NRC views and comments on H.R. 4069, the proposed amendment to the Hazardous Materials Transportation Act?

## ANSWER 4:

The NRC staff has the proposed amendment under review. NRC comments on the amendment will be provided at a later date.

QUESTION 5: At the present time, when is NRC certification of DOE shipping casks required and when is it not required?

#### ANSWER 5:

The transportation of source, special nuclear, or byproduct material by the Department of Energy is not subject, under the Atomic Energy Act of 1954, as amended, to regulation by the NRC. That statute generally extends NRC jurisdiction to any "person" engaged in specified activities, but excludes "the [Atomic Energy] Commission" and its legal successors from the scope of this definition. DOE is a successor to AEC insofar as it exercises functions authorized by the Atomic Energy Act.

In view of this background, there is no requirement under the Atomic Energy Act for DOE to comply with NRC transport regulations. DOE must only comply with NRC transport regulations when specifically required to do so by law, e.g. Public Law 100-203 requires DOE transportation of radioactive waste under NWPA in packages that have been certified for such purpose by the NRC.