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DTE Energy

10 CFR 71.95

June 16, 2017
NRC-17-0046

U. S. Nuclear Regulatory Commission
Washington D C 20555-0001

Attention: Document Control Desk
Director, Division of Spent Fuel Management,
Office of Nuclear Material Safety and Safeguards

Reference: Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

Subject: 10 CFR 71.95 Report - Failure to Observe
Certificate of Compliance Conditions for the TN-RAM Cask

DTE Electric Company (DTE) hereby submits the enclosed report providing the information required by 10 CFR 71.95(a)(3) for instances in which the conditions of approval in the Certificate of Compliance for the TN-RAM Cask (Certificate of Compliance #9233) were not observed in making a shipment. The circumstances described in this report are specific to DTE at the Fermi 2 nuclear plant.

This letter contains no new regulatory commitments.

Should you have any questions or require additional information, please contact Mr. Scott Maglio, Manager Nuclear-Licensing at (734) 586-5076.

Sincerely,

Keith J. Polson
Site Vice President

Enclosure: Failure to Observe Certificate of Compliance Conditions
for the TN-RAM Cask

cc: NRC Project Manager
NRC Resident Office
Reactor Projects Chief, Branch 5, Region III
Regional Administrator, Region III
Supervisor, Electric Operators,
Michigan Public Service Commission (kindsch1@michigan.gov)
John Vera (NRC PM for the TN-RAM, SFM Licensing Branch)

Enclosure to
NRC-17-0046

Fermi 2 NRC Docket No. 50-341
Operating License No. NPF-43

Failure to Observe Certificate of Compliance Conditions for the TN-RAM Cask

10 CFR 71.95 Report - Failure to Observe Certificate of Compliance Conditions for the TN-RAM Cask

1. Abstract

This report provides the information required by 10 CFR 71.95, "Reports," for instances in which the conditions of approval in the Certificate of Compliance (CoC) Number 9233, for the model TN-RAM shipping cask, were not observed in making a shipment. The circumstances described in this report are applicable specifically to DTE Electric Company (DTE) at the Fermi 2 nuclear power plant. On April 21, 2017 DTE received notification from AREVA TN, the cask CoC holder, that operation of the TN-RAM has not included any controls to render the impact limiter lifting lugs inoperable during transport operations as required by transport regulations. The cask CoC holder reviewed the NRC 10 CFR 71.87(h) regulatory requirements for operating controls and procedures and determined that use of the cask without rendering the impact limiter lifting lugs inoperable is a practice that did not follow the conditions of the cask CoC. This gap has existed since the cask initial fabrication and use in 1989. DTE leased and used the TN-RAM cask for 4 shipments in 1998 and 1 shipment in 1999. Both engineering and administrative controls have been implemented by the cask CoC holder to prevent inadvertent use of the impact liner lifting lugs for lifting or tie-down of the cask. No failure of the impact liner lifting lugs occurred during any DTE use of the TN-RAM and there are no known instances of lifting or tie-down of the TN-RAM using the lifting lugs. In addition, no individuals were exposed to radiation or radioactive materials as a result of not rendering the impact limiter lifting lugs inoperable during transport operations.

2. Narrative Description of Event

The model TN-RAM cask is a cylindrical, steel encased, lead shielded packaging designed for the transport of radioactive waste containers. The cask is normally leased for use for specific projects. DTE Energy leased the cask for a Spent Fuel Pool Clean-out campaign from November 1998 through January 1999 for a total of 5 shipments.

The TN-RAM package has trunnions intended as attachment points for lifting and tie-down. The trunnions are a structural part of the package that is designed to meet the requirements of the regulation for lifting and tie-down. Attachment (lifting lugs) points for lifting the impact limiters during installation and removal are a structural part of the impact limiters that are part of the TN-RAM package.

On April 21, 2017 DTE received notification from AREVA TN, the cask CoC holder, that attachment points on the impact limiter would not withstand the static force required for lifting and tie-down in 10 CFR 71.45 as these attachment points were not intended for package lifting or tie-down. The impact limiter lifting lugs were likely not rendered inoperable for transport operations as required by 10 CFR 71.87(h) and 49 CFR 173.410(b), as specific covers were never designed or installed by the cask CoC holder for this purpose. Based on information from the cask CoC holder, these discrepancies have existed since the

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cask initial fabrication. As the cask was used without rendering the impact limiter lifting lugs inoperable, the conditions of approval in the CoC were not observed in making these shipments.

Immediate action by the cask CoC holder was taken to install a cover on each impact limiter lifting lug retained by a bolt installed in the lifting lug through hole, which renders the attachment point inoperable. In addition to installing the cover, a durable marking, stating "IMPACT LIMITER LIFTING ONLY," was placed near each impact limiter lifting lug to identify the intended use of the lifting lugs.

i. **Status of inoperable components or systems**
The TN RAM cask system is a Type B transportation package design approved by the NRC (71-9233). The package is a steel encased lead shielded cask with wood impact limiters attached at both ends. The impact limiters are a packaging component that is required by the NRC approval of the package design. Impact limiters protect the cask shell and contents by absorbing shocks from impacts incidental to normal and accident transportation conditions. The cask shell is a right circular cylinder with trunnions welded to the outer shell for lifting and tie-down. The overall dimensions of the packaging are approximately 178 inches long and 92 inches of diameter with the impact limiters installed. The cask body is approximately 129 inches long with an outer diameter of 51 inches. The maximum gross weight of the package is approximately 80,000 lbs. The structural evaluation for tie-down and lifting devices in the TN-RAM SAR states that other than the trunnions there are no other structural parts of the package which can be used for tie down attachments. When the cask was last on the Fermi 2 site in 1999 there were no inoperable components or systems relevant to this 10 CFR 71.95 report. There was a 10 CFR 71.95 report submitted in 2014 by DTE Energy when AREVA-TN notified DTE Energy of As-Built discrepancies.

ii. **Dates and approximate times of occurrences**
The cask was used 5 times between November 1998 and January 1999 (see detail below) and the non-compliance with the cask CoC was discovered on April 21, 2017.

iii. **Cause of Error**
A Fermi 2 Corrective Action Program (CAP) report was issued when the potential 10 CFR 71.95 notification was received from AREVA-TN for the TN-RAM cask. The CAP investigation determined that the cause was a legacy configuration control issue.

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Neither TN-RAM Safety Analysis Report (SAR) Ch. 7—Operations or previous versions of Operations and Maintenance Manual OM-7 included a requirement to render the attachment points that are structural parts of the package but not designed for intended package lifting or tie-down inoperable during all phases of transport operation. The most recent version of OM-7 however, did add a requirement to render the impact limiter lifting lugs inoperable by installing a bolt through the lug, or other similar method.

A tarp which is installed over the support frame during cask transport is considered a control to render the impact limiter lugs inoperable. However, the lifting lugs are accessible when the tarp and support frame are removed for handling operations. Transport operations include the preparation of the package for transport (installing impact limiters), securing the package to the trailer for transit (tie-down), and receiving the package (removing impact limiters).

The TN-RAM SAR contains loading and handling guidelines that include general instructions for removal of the impact limiters using a "suitable crane and two legged sling", rotating and lifting the cask using a "suitable crane hook" to "engage the lift beam to the two front trunnions", and removal and installation of "front and rear trunnion tie-downs." The Operations and Maintenance Manual for the TN-RAM (OM-7) expands on the handling guideline and describes the trunnions intended purpose for lifting and tie-down of the cask. OM-7 also describes the impact limiter lifting lugs as "located such that the limiter is balanced when it is lifted." The glossary of terms in OM-7 defines lifting lugs as "attachments provided on the impact limiters for handling operations," lift beams as "devices for cask lifting and handling operations," and trunnions as "handling attachments provided for cask primary lifting, support and tie-down." These definitions describe the intended purpose of attachment points. The design of the impact limiter rigging equipment is sized for attachment to the lifting lugs, and lift beams are specialized lifting devices that are designed for attachment to the trunnions. Tie-down members for the TN-RAM are trailer support pedestals specially designed for attachment to the trunnions.

Without the limiter lifting lugs rendered inoperable, rigging equipment or tie-down members could inadvertently be attached to the limiter lift lugs. However, lifting or tie-down of the TN-RAM using the lifting lugs would require intentional misuse of the rigging equipment and tie-down members, and violate operational controls and the procedures described above for handling the cask. A method for rendering the lift lugs inoperable is required to prevent attachment to these points during preparation and receipt phases of transport operations. The tarp does not

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meet the intent of the requirement in the regulation to render the attachment point inoperable during all phases of transport operations.

iv. Failure Mode, Mechanism, and Effects

No failure of the impact limiter lifting lugs occurred. The impact limiter lifting lugs are intended only for lifting the impact limiter during removal and installation while the TN-RAM package is attached to the transportation trailer. The impact limiter shell is a structural part of the packaging that retains the wood shock absorber. The shell is sealed to protect the wood material from environmental conditions incident to routine use.

The impact limiter lifting lugs are designed for a safety factor against yield that is consistent with accepted industry standards for material handling using standard rigging equipment.

The nominal design weight of the impact limiter is 3695 lbs. The most likely failure mechanism in the attachment point on the impact limiter would be a tensile breakage of the lifting lug. Attempting to lift the package using the impact limiter lifting lugs would not result in damage to the structural impact limiter shell that would impair the ability to meet transport requirements.

In addition, the lifting lugs were not intended to tie-down the TN-RAM during transport. The stress applied to the lifting lugs used at attachment points for tie-down would be different than for the intended use to lift the impact limiters. A review of the impact limiter lifting design basis indicates that the lifting lugs would not withstand the stress applied by static forces required for tie-down in 10 CFR 71.45(a) or static force required by DOT for Protection Against Shifting and Falling Cargo (49 CFR 393)

v. Systems or Secondary Functions Affected

Impact limiter lifting lugs are designed for the single purpose of lifting the impact limiter. No other systems or secondary functions are affected.

vi. The Method of Discovery of Each Component or System Failure or Procedural Error

Failure to render the impact limiter lugs inoperable was noted during routine operation of the TN-RAM by the cask CoC holder.

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vii. **For each human performance-related root cause, a discussion of the cause(s) and circumstances**
There is no known instance of lifting or tie-down of the TN-RAM using the lifting lugs during nearly 30 years operating experience. Approved operational procedures and controls in place were followed since first use of the cask, but they did not require the impact limiter lifting lugs be rendered inoperable during all phases of transport operations.

viii. **Manufacturer and Model Number**
Manufacturer: Transnuclear (AREVA-TN)
Model Number: TN-RAM

ix. **Quantities and chemical and physical form(s) of the package contents**
Each DTE shipment consisted of a 57.8 cubic feet disposal container with various irradiated hardware, chemical form - metal oxides in solid form.
Shipment 1, 11/21/1998 containing 7,480 Ci
Shipment 2, 12/2/1998 containing 9,440 Ci
Shipment 3, 12/9/1998 containing 9,360 Ci
Shipment 4, 12/19/1998 containing 7,780 Ci
Shipment 5, 1/11/1999 containing 8,400 Ci

3. **Assessment of Safety Consequences**
No failure of the impact limiter lifting lugs occurred as a result of not rendering the lifting lugs inoperable during all phases of transport operations. The lifting lugs when used as intended have been evaluated to meet industry standards for rigging and material handling. Attempting to lift the TN-RAM using the lifting lugs would have resulted in a yielding and tensile failure of the lifting lug. The structural shell of the impact limiter would not likely have been damaged due to attempting to lift the package using the lifting lugs. Using the impact limiter lifting lugs as tie-down attachment points could generate stresses in the impact limiter shell that could result in tears or cracks, although this has not been specifically analyzed. Undetected during the normal use or periodic inspections, these defects would have allowed moisture ingress and eventual degradation of the wood impact absorbing material that would impair the performance of the package during normal and accident transport conditions.

4. **Corrective Actions**
Both engineering and administrative controls have been implemented by the cask CoC holder to prevent inadvertent use of the impact limiter lugs for lifting or tie-down of the package. The engineering control is a cover for each impact limiter lifting lug that is retained by a bolt installed in the lifting lug through hole to render the attachment point inoperable. The lifting

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lug covers prevent attachment of rigging equipment or tie down members to the impact limiters lift lugs during transport. The administrative control identifies the intended use of the impact limiter lifting lugs by a durable marking near each impact limiter lifting lug stating "IMPACT LIMITER LIFTING ONLY."

5. **Previous Similar Events**
   The cask CoC holder communicated this condition has existed throughout the industry for any use of the TN-RAM from 1989 until April 19, 2017

6. **Contact for Additional Information**
   Bryan A. Weber
   DTE Electric Company - Principle Technical Specialist
   (734) 586-4926
   Bryan.Weber@dteenergy.com

7. **Extent of Exposure of Individuals to Radiation or Radioactive Materials**
   No individuals were exposed to radiation or radioactive materials as a result of not rendering the impact limiter lifting lugs inoperable during transport operations.