




UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION I  
475 ALLENDALE ROAD  
KING OF PRUSSIA, PA 19406-1415

April 30, 2004

MEMORANDUM TO: Cliff Anderson, Manager  
Special Inspection

Todd Jackson, Leader  
Special Inspection

FROM: A. Randolph Blough, Director  
Division of Reactor Projects 

SUBJECT: SPECIAL INSPECTION CHARTER - TWO SPENT FUEL ROD  
SEGMENTS UNACCOUNTED FOR IN THE VERMONT YANKEE  
SPENT FUEL POOL

A NRC special inspection has been established in response to information received from Entergy that two spent fuel rod segments are unaccounted for in the Vermont Yankee spent fuel pool. On April 20, 2004, Entergy Nuclear Vermont Yankee (Entergy) informed the NRC resident inspector that two spent fuel rod segments were not found in the documented location within Vermont Yankee's spent fuel pool. Entergy followed up with a report to the NRC on April 21, 2004, issued a press release, and subsequently mobilized an investigation team to locate the missing fuel rod segments or determine what happened to them.

The NRC decided, based on a number of factors, that it is appropriate to charter a special inspection to assess the key elements of Entergy's investigation effort. Key factors in this NRC decision included the large scope and complexity of the licensee's investigation, the need for focused specialist oversight by NRC, and the need to evaluate potential generic implications. The NRC decision recognizes that it is highly unlikely that the material is in the public domain. Given the extensive array of radiation detectors at the site, it is very probable that the potentially missing fuel fragments are in a controlled located designed to deal with radioactive material.

The inspection will review the results of Entergy's investigation, assess Entergy's determination of the root cause, determine whether Entergy and its predecessor were in compliance with applicable regulations, and identify which findings or observations may have generic implications.

The special inspection commenced on April 22, 2004. The inspection will primarily consist of on-site activities but may include some in-office activities. The length of the inspection will depend on Entergy's schedule to complete its investigation. For planning purposes, it is expected that the on-site portion of the special inspection will be completed 30 days after the issuance of Entergy's report documenting its investigation. An exit meeting, that is open for public observation, will be held after the on-site and in-office inspection activities are completed. An inspection report will be issued within 30 days following the exit meeting for the inspection.

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The members of the special inspection are:

**Manager:** Clifford Anderson, Chief, Projects Branch 5

**Leader:** Todd Jackson, Region 1

**Members:** Amar Patel, Region 1

Other members will be assigned as needed. The resident inspectors will assist with in-plant verifications as coordinated through the Team Manager.

The charter for the special inspection and details of the inspection scope are attached. The special inspection shall be conducted in accordance with Inspection Procedure 93812, "Special Inspection" and this memorandum.

**Attachments:** Special Inspection Charter

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## Attachment

### CHARTER FOR VERMONT YANKEE SPECIAL INSPECTION

In March 2004, the resident inspectors performed inspections in accordance with TI 2515/154, "Spent Fuel Material Control and Accounting at Nuclear Power Plants." The inspectors determined that Entergy performed an annual inventory of items stored in the spent fuel pool. The inspectors identified that although Entergy and its predecessor had been performing an annual inventory of the spent fuel pool, the annual inventory did not verify that two fuel rod segments contained in a special container stored on the bottom of the pool were still present in the container.

Entergy's records indicate that the two fuel rod segments were inserted into the container for storage in 1980 after they had broken off from spent fuel rods during a fuel reconstitution effort. The fuel rod segments were approximately 17 inches and 7 inches in length. Instead of performing a "piece count" inventory to verify the fuel rod segments were in the container, Entergy personnel ensured the container remained upright and in place at the bottom of the spent fuel pool.

In response to questions from the NRC, Entergy performed an initial, cursory visual check in March 2004 and concluded that the fuel rod segments appeared to be in the container. On April 20, 2004, Entergy performed a more detailed, inspection, using better equipment, i.e., a boroscope, and determined that the initial inspection had been in error and neither of the fuel rod segments were in the container.

Entergy established a Special Nuclear Material Investigation Team. The mission statement for the Entergy investigation team is to: establish a high degree of confidence that the fuel rod segments are/are not likely to be in the spent fuel pool, identify other possible disposal locations and develop a working impact analysis for these potential offsite storage/disposal paths, complete a root cause analysis for this issue, support internal and external stakeholder needs, and document the findings of the team in a final report. Entergy expects to complete its investigation by the end of May 2004.

A special inspection will evaluate Entergy's investigation and conclusions regarding the possible disposition of the fuel rod segments. The special inspection should:

1. Conduct a thorough and systematic review of Entergy's investigation into the circumstances that led to the unaccountability of the two fuel rod segments in the Vermont Yankee spent fuel pool. Determine the adequacy of Entergy's investigation and conclusion regarding the location of the two fuel rod segments, based upon its completeness and thoroughness of fuel pool inspections, records reviews, and interviews.
2. Assess the determination of root cause assigned by Entergy. Identify alternative causes if appropriate. Develop independent conclusions regarding the cause(s) of the loss of accountability of the spent fuel rods.
3. Assess the adequacy of Entergy's investigation regarding its conclusion on the accuracy of the accountability for the remainder of the spent fuel material in the spent fuel pool.

4. **Independently verify selected sets of records and interviews.**
5. **Determine whether Entergy was in compliance with applicable regulations.**
6. **Assess the adequacy of Entergy's radiological characterization of each fuel rod segment.**
7. **Conduct regular briefings for NRC internal stakeholders to allow the appropriate NRC internal stakeholders to brief external stakeholders.**
8. **Identify those findings or observations that may have generic implications.**
9. **Document the inspection findings, observations and conclusions in a special inspection report in accordance with IP 93812 within 30 days of the exit meeting.**
10. **Conduct an inspection exit that is open for public observation.**