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UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

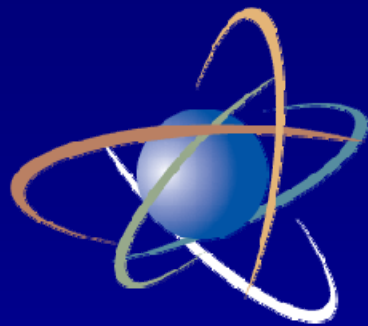
Results of the NRC Special Inspection of the Vermont Yankee Cooling Towers

October 14, 2008

Latchis Theatre

Brattleboro, VT

ML083380527



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Karl Farrar

Regional Counsel- USNRC Region I

Meeting Facilitator



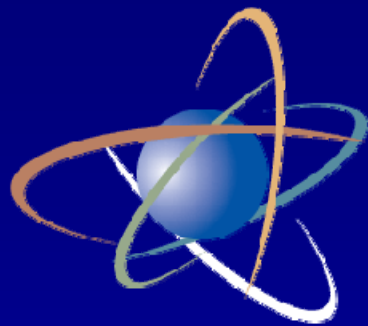
Purpose of Today's Meeting

- **NRC will discuss the results of the special inspection of the Vermont Yankee cooling tower leakage on July 11, 2008 and September 16, 2008**
- **Entergy will discuss its inspection and maintenance activities associated with the cooling towers**
- **Provide an opportunity for the public to ask questions with respect to the cooling towers**



Agenda

- **Opening Remarks**
- **NRC Special Inspection Results**
- **Entergy Presentation**
- **Break**
- **Public Questions**



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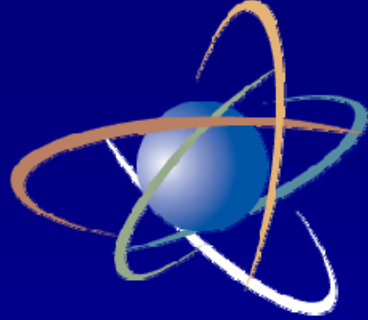
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Samuel Collins

NRC Region I, Regional Administrator

Opening Remarks



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George Malone

Senior Resident Inspector, Indian Point Unit 2

&

Deputy Team Leader

Vermont Yankee Special Inspection Team



Special Inspection Team

Team Leader

Ray Powell,

Branch Chief, RI

Deputy Team Leader

George Malone,

Sr. Resident Inspector IP2

Team Members

Beth Siemel,

Resident Inspector VY

Thomas Burns,

Reactor Inspector, RI

David Jeng,

Sr. Structural Engineer, NRO

Alexander Tsirigotis,

Structural Engineer, NRR

Why A Special Inspection?

- **The process to decide whether to perform a special inspection is based on an evaluation of risk and non-risk based factors**
- **In this case, the risk associated with the event was determined to be very low, and below the threshold to conduct a special inspection**
- **However, several other non-risk based factors led to the decision to conduct a special inspection**
 - **Repetitive nature of the issue**
 - **Need to ensure that the safety function was unaffected by potential common causes of the failures**
 - **Interest of the public, and the need for openness**

SIT Charter Objectives

- Evaluate the cause of the July 11, 2008, cooling tower leak
- Evaluate the cause of the September 16, 2008, cooling tower leak
- Evaluate the applicability of the causes to the nuclear safety function of cooling tower #2
- Evaluate the adequacy of Entergy's corrective actions from the August 2007 collapse and determine if there is any connection between the events

Cooling Tower Design

- **Two cooling towers**
 - Tower 1 (East) and Tower 2 (West)
- **Each tower contains 11 cells**
 - Designated as cell 1-1 through cell 1-11, and as cell 2-1 through 2-11
- **The towers provide supplemental cooling for:**
 - Compliance with Vermont state thermal discharge limit, and
 - Removal of residual reactor heat in the event of a loss of service water

Cooling Tower Design

- Only cell 2-1 performs the nuclear safety function of the cooling towers
- Cell 2-1 must meet more robust design requirements and is built to withstand an earthquake
- To protect cell 2-1, cell 2-2 is also designed to withstand an earthquake. The connections between cell 2-2 and the other non-safety cells are designed to “break-away” from cells 2-1 and 2-2 during an earthquake, protecting the safety cell



August 2007 Event

- **August 21st – a portion of cell 2-4 collapsed**
- **Entergy identified two root causes for the collapse:**
 - **Degradation of multiple vertical wooden columns**
 - **Inadequate inspection program that did not require a hands on inspection to detect degraded columns**
- **NRC Inspection Report 05000271/2007004 documented a non-cited violation for Entergy's failure to incorporate operating experience into its inspection program**

July 2008 Event

- **July 11th – an operator observed that the circulating water piping in cell 1-1 was sagging**
- **The operator also noted that water was leaking from one of the piping slip joints – about 60 gpm**
- **Entergy identified that four horizontal supports for the piping had failed**
- **Entergy inspection of cells 2-1 and 2-2 did not identify any significant degradation, and they were determined to be able to perform their design function**
- **The NRC inspected cells 2-1 and 2-2 and agreed with Entergy's conclusion**

September 2008 Event

- **September 16th – an operator identified abnormal leakage from a piping slip joint in cell 1-3, about 60 gpm**
- **The leak was caused by the loss of some packing material in the piping slip joint**
- **Entergy determined that this event did not have the same root cause as the July 11th event**
- **The NRC inspected this issue and agreed with Entergy's assessment**

Special Inspection Results

- **Finding** – Entergy did not verify the technical adequacy of a design change prior to placing in service the circulating water system in the East cooling tower. Very low safety significance (Green).
 - Some wooden vertical columns were replaced with fiberglass reinforced plastic (FRP) columns
 - The wood-FRP joints were overloaded due to an incomplete design analysis
 - Specifically, the overload was due to missing support clips on the FRP columns that supported the wooden horizontal pipe supports

Special Inspection Results

- Conclusions
 - The Special Inspection Team did not identify any deficiencies that would challenge the safety function of cells 2-1 or 2-2
 - The problems with the cooling towers are well understood by Entergy
 - Entergy is taking adequate corrective actions to ensure that the cooling tower safety-related function remains unaffected
 - The finding is of very low safety significance
 - The NRC will continue to monitor Entergy's corrective actions associated with the cooling towers

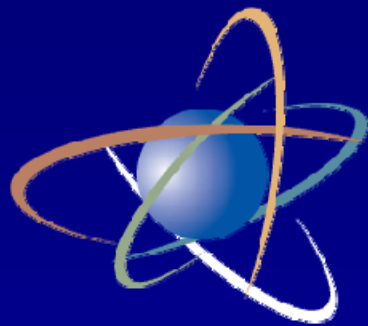
References

- **NRC Main Web Page**
 - <http://www.nrc.gov>
- **Reactor Oversight Process**
 - <http://www.nrc.gov/NRR/Oversight/ASSESS/index.html>
- **Public Electronic Reading Room**
 - <http://www.nrc.gov/reading-rm.html>
 - **Special Inspection Report 05000271/2008009 ML082840367**
 - **Inspection Report 05000271/2007004 contains information on the August 2007 event ML073110213**
- **Public Reading Room**
 - **1-800-397-4209 (toll free)**



NRC Representatives

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End of the Presentation

Nuclear Regulatory Commission

Region I

King of Prussia, Pennsylvania

October 14, 2008