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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

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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

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Agenda

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

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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

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Special Inspection Team

Team Leader	**Ray Powell,** *Branch Chief, RI*
Deputy Team Leader	**George Malone,** *Sr. Resident Inspector IP2*
Team Members	**Beth Sienel,** *Resident Inspector VY*
	Thomas Burns, *Reactor Inspector, RI*
	David Jeng, *Sr. Structural Engineer, NRO*
	Alexander Tsirigotis, *Structural Engineer, NRR*

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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

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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

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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

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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

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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

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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

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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

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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**

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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

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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)

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End of the Presentation

Nuclear Regulatory Commission

Region I

King of Prussia, Pennsylvania

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