



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION I  
475 ALLENDALE ROAD  
KING OF PRUSSIA, PA 19406

January 31, 2008

Mr. Theodore A. Sullivan  
Site Vice President  
Entergy Nuclear Operations, Inc.  
Vermont Yankee Nuclear Power Station  
Vernon, VT 05354

**SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION – NRC INTEGRATED  
INSPECTION REPORT 05000271/2007005**

Dear Mr. Sullivan:

On December 31, 2007, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Vermont Yankee Nuclear Power Station. The enclosed inspection report documents the inspection results, which were discussed on January 8, 2008, with you and members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations, and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, no findings of significance were identified.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web Site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Raymond J. Powell, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

Docket No. 50-271  
License Nos. DPR-28

Enclosure: Inspection Report No. 05000271/2007005  
w/ Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.: 50-271

License No.: DPR-28

Report No.: 0500271/2007005

Licensee: Entergy Nuclear Operations, Inc.

Facility: Vermont Yankee Nuclear Power Station

Location: 320 Governor Hunt Road  
Vernon, Vermont 05354-9766

Dates: October 1, 2007 through December 31, 2007

Inspectors: R. Fernandes, Sr. Resident Inspector, Division of Reactor Projects (DRP)  
B. Sienel, Resident Inspector, DRP  
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## SUMMARY OF FINDINGS

IR 05000271/2007005; 10/01/2007 – 12/31/2007; Vermont Yankee Nuclear Power Station;  
Routine Integrated Report.

This report covered a 13-week period of inspection by resident and region-based inspectors. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings

No findings of significance were identified.

B. Licensee-Identified Violations

None.



## REPORT DETAILS

### Summary of Plant Status

Vermont Yankee (VY) Nuclear Power Station began the inspection period operating at approximately 100 percent power. On October 3, power was reduced to approximately 92 percent to maintain condenser backpressure during low river flow and reduced cooling tower capacity conditions. Power was restored to 100 percent on October 4. Between October 5 and 18, operators periodically reduced reactor power, with a low of approximately 79 percent on October 6, to maintain condensate temperature to control feedwater chemistry. On October 18, power was returned to 100 percent. On December 13, a downpower to approximately 63 percent was performed for a planned control rod pattern adjustment and main turbine valve and main steam isolation valve (MSIV) testing. Power was returned to 100 percent on December 14. With the exception of minor power reductions to support rod pattern adjustments, VY remained at 100 percent power through the end of the inspection period.

### 1. REACTOR SAFETY

#### **Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity**

#### 1R01 Adverse Weather Protection (71111.01)

##### a. Inspection Scope (1 sample)

The inspectors reviewed measures established by Entergy to ensure the cold weather availability and operability of the emergency diesel generators (EDGs), service water (SW), and 345 KV systems. The inspectors performed walkdowns of accessible portions of these systems and compared actual system alignments and operation to the requirements of VY Operating Procedures (OP) 2196, "Seasonal Preparedness;" OP 2192, "Heating, Ventilating, and Air Conditioning System;" and OP 3127, "Natural Phenomena." In addition, the inspectors reviewed condition reports (CRs) related to cold weather to determine if Entergy had properly identified and addressed known deficiencies.

##### b. Findings

No findings of significance were identified.

#### 1R04 Equipment Alignment (71111.04Q)

##### a. Inspection Scope (2 samples)

The inspectors performed partial system walkdowns of the following risk-significant systems to verify system alignment and to identify any discrepancies that could impact system operability. Observed plant conditions were compared to the standby alignment of equipment specified in applicable OPs and piping and instrumentation drawings. The

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inspectors observed valve positions, power supply availability, and the general condition of selected components. Finally, the inspectors evaluated other elements, such as material condition, housekeeping, and component labeling. A listing of documents reviewed is provided in the Attachment.

- “A” Core Spray system while the “B” Residual Heat Removal (RHR) and “B” RHR Service Water (RHRSW) systems were out-of-service for planned maintenance; and
- High Pressure Coolant Injection (HPCI) system while the Reactor Core Isolation Cooling (RCIC) system was out-of-service for planned maintenance.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope (6 samples)

The inspectors selected fire areas (FAs) important to plant risk, based on a review of Entergy’s Safe Shutdown Capability Analysis, the Fire Hazards Analysis, and the Individual Plant Examination External Events. The inspectors toured these areas to determine the suitability of Entergy’s control of transient combustibles and ignition sources, and the material condition and operational status of fire protection systems, equipment, and barriers. The following FAs and fire zones (FZs) were inspected:

- Fuel Oil Storage Tank and Transfer Pump House (FA 12);
- Radwaste Corridor (FA 13);
- “A” ECCS Corner Room (FZ RB1);
- Control Room (FZ-1);
- Start-up Transformer Area; and
- Main and Auxiliary Transformers.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Regualification Program (71111.11)

.1 Regualification Activities Review by the Resident Staff (71111.11Q)

a. Inspection Scope (1 sample)

The inspectors observed a simulator-based licensed operator regualification annual exam on October 31, 2007. The inspectors evaluated crew performance in the areas of clarity and formality of communications; ability to take timely actions; prioritization, interpretation, and verification of alarms; procedure usage; control board manipulations; and command and control. Crew performance in these areas was compared to Entergy

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management expectations and guidelines. The inspectors also compared the simulator configuration with the actual control board configuration. Finally, the inspectors observed the Entergy evaluators discuss identified weaknesses with the crew and/or individual crew members, as appropriate. A listing of documents reviewed is provided in the Attachment.

b. Findings

No findings of significance were identified.

.2 Biennial Review of the Licensed Operator Requalification Program (71111.11B)

a. Inspection Scope

On December 18, 2007, a region-based inspector conducted an in-office review of results of the licensee-administered annual operating tests and comprehensive written exams for 2007. The inspection assessed whether pass rates were consistent with the guidance of NRC Inspection Manual Chapter (IMC) 0609, Appendix I, "Operator Requalification Human Performance SDP." The inspector verified that:

- Crew failure rate was less than 20 percent. (Crew failure rate was 0 percent)
- Individual failure rate on the dynamic simulator test was less than or equal to 20 percent. (Individual failure rate was 2.2 percent)
- Individual failure rate on the walk-through test was less than or equal to 20 percent. (Individual failure rate was 0 percent)
- Individual failure rate on the comprehensive written exam was less than or equal to 20 percent. (Individual failure rate was 2.2 percent)
- Overall pass rate among individuals for all portions of the exam was greater than or equal to 75 percent. (Overall pass rate was 95.6 percent)

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Resident Quarterly Review (71111.12Q)

a. Inspection Scope (1 sample)

The inspectors reviewed Entergy's evaluation of a degraded condition involving cross connection of safety-related 125V busses DC-1 and DC-2. The inspectors reviewed Entergy's implementation of the Maintenance Rule, 10 CFR 50.65, to determine if the

condition was appropriately evaluated against applicable Maintenance Rule functional failure criteria, as found in Entergy scoping documents and procedures. The inspectors discussed this issue with the Maintenance Rule coordinator to determine if it was appropriately tracked against the system's performance criteria and if the system was appropriately classified in accordance with Maintenance Rule implementation guidance. Documents reviewed during the inspection are listed in the Attachment.

b. Findings

No findings of significance were identified.

.2 Periodic Evaluations (71111.12B)

a. Inspection Scope (5 samples)

The inspector reviewed the two most recent 10 CFR 50.65 (a)(3) periodic evaluations to determine whether Entergy adequately balanced the reliability and unavailability for structures, systems, and components (SSCs) contained within the scope of the Maintenance Rule. The inspector also reviewed the resultant Entergy Maintenance Rule Program adjustments and corrective actions since the last inspection. The inspector reviewed the following risk significant SSCs with degraded performance and/or conditions to assess the effectiveness of Entergy's (a)(3) activities:

- Condensate storage and transfer system "A" pump in (a)(1) status;
- HPCI returned to (a)(2) status in June 2007;
- 480 VAC electrical essential subsystem in (a)(2) status;
- RCIC in (a)(2) status; and
- RHR "B" pump in (a)(2) status.

The inspector walked down accessible portions of the above SSCs with system engineers to evaluate the effectiveness of Entergy's maintenance efforts. The inspector also reviewed a sample of problems that Entergy identified and entered into their corrective action program. The inspector reviewed these issues to determine whether Entergy had an appropriate threshold for identifying issues and to evaluate the effectiveness of corrective actions related to the Maintenance Rule Program. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

a. Inspection Scope (3 samples)

The inspectors evaluated online risk management for three planned maintenance activities. The inspectors reviewed maintenance risk evaluations, maintenance plans,

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work schedules, and control room logs to determine if concurrent or emergent maintenance activities significantly increased the plant risk. The inspectors compared reviewed items and activities to requirements listed in AP 0125, "Plant Equipment," and AP 0172, "Work Schedule Risk Management - Online." The inspectors also walked down areas of the plant containing equipment that was determined to have higher risk significance during the following work activities:

- Maintenance on the "A" RHR and RHRSW systems and orange risk configuration;
- Maintenance on the RCIC system and green risk configuration; and
- Maintenance on cooling tower (CT) cell 2-1 and yellow risk configuration.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope (4 samples)

The inspectors reviewed four operability evaluations prepared by Entergy. The inspectors evaluated the operability evaluations against the guidance contained in NRC Regulatory Issue Summary 2005-20, Revision to Guidance Formerly Contained in NRC Generic Letter 91-18, "Information to Licensees Regarding Two NRC Inspection Manual Sections on Resolution of Degraded and Nonconforming Conditions and on Operability," as well as Entergy procedure EN-OP-104, "Operability Determinations." A list of documents reviewed is provided in the Attachment. The inspectors also discussed the conditions with operators and system and design engineers, as necessary. The inspectors reviewed the adequacy of the following degraded or non-conforming conditions:

- High DC voltage on DC-2;
- Fuel oil storage tank seven day supply doesn't account for suction line vortexing height;
- High feedwater copper levels; and
- Reactor building isolation valve HVAC-10 closed limit switch sticking.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope (6 samples)

The inspectors reviewed post-maintenance testing (PMT) activities on risk-significant systems. The inspectors either observed the PMT or reviewed completed PMT documentation to evaluate if the test data met the required acceptance criteria

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contained in the applicable work order (WO), Technical Specification (TS), Updated Final Safety Analysis Report (UFSAR), and/or in-service testing program. When testing was directly observed, the inspectors determined whether installed test equipment was appropriate and controlled, and whether the test was performed in accordance with applicable station procedures. The inspectors also determined whether the test activities were adequate to ensure system operability and functional capability following maintenance, systems were properly restored following testing, and any discrepancies were appropriately documented in the corrective action program. The inspectors reviewed the PMTs performed for the following maintenance activities:

- Mechanical preventive maintenance on alternate cooling system (ACS) cooling tower cell CT 2-1 per WO 51206203;
- RCIC turbine bearing disassembly and shaft inspection per WO 51078746;
- RCIC suction valve operator inspection per WO 51203461;
- "B" EDG fuel oil strainer test gauge per WO 00110168;
- "A" RHR heat exchanger cleaning and baffle plate inspection per WO 51214918; and
- "A" SW strainer per WO 51195747.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope (4 samples)

The inspectors observed surveillance testing to determine if the test acceptance criteria specified for each test was consistent with TS and UFSAR requirements, the test was performed in accordance with the written procedure, the test data was complete and met procedural requirements, and the system was properly returned to service following testing. The inspectors observed selected pre-job briefings for the test activities. The inspectors also determined if discrepancies were appropriately documented in the corrective action program. The inspectors reviewed the following surveillance testing:

- Monthly operational check of fire pumps per OP 4105, "Fire Protection System Surveillance;"
- Standby Fuel Pool Cooling system operability and discharge check valve test per OP 4179, "Standby Fuel Pool Cooling Surveillance;"
- HPCI quarterly surveillance test per OP 4120, "High Pressure Coolant Injection Surveillance;" and
- MSIV full closure timing and reactor protection system (RPS) relay actuation functional test per OP 4113, "Main and Auxiliary Steam System Surveillance."

b. Findings

No findings of significance were identified.

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**Cornerstone: Emergency Preparedness**1EP6 Drill Evaluation (71114.06)a. Inspection Scope (1 sample)

The inspectors observed a simulator-based licensed operator requalification exam provided to operators on August 8, 2007. The inspectors focused on the operations crew's performance related to making the proper event classification determinations and notifications. The inspectors discussed the performance expectations and results with the lead instructor. (This inspection activity was conducted in the previous inspection quarter.)

b. Findings

No findings of significance were identified.

**2. RADIATION SAFETY****Cornerstone: Public Radiation Safety (PS)**2PS2 Radioactive Materials Processing and Shipping (71122.02)a. Inspection Scope (6 samples)

During the period October 15-18, 2007, the inspector conducted the following activities to determine whether the licensee's radioactive material processing and transportation programs complied with the requirements of 10 CFR 20, 61, and 71; and Department of Transportation (DOT) regulations 49 CFR 170-189.

- The inspector reviewed the solid radioactive waste system description in the UFSAR, the 2005 and 2006 radiological effluent release reports for information on the types and amounts of radioactive waste disposed, and the scope of the licensee's audit program to determine whether it meets the requirements of 10 CFR 20.1101.
- The inspector walked down the liquid and solid radioactive waste processing systems to determine whether the current system configuration and operation agree with the descriptions contained in the UFSAR and in the Process Control Program. The inspector reviewed the status of any radioactive waste process equipment that was not operational and/or was abandoned in place to determine whether the changes were reviewed and documented in accordance with 10 CFR 50.59, as appropriate. The inspector also reviewed the current processes for transferring and dewatering of radioactive waste resin and sludge discharges into shipping/disposal containers to determine whether waste stream mixing and/or sampling procedures, and methodology for waste concentration averaging, provide representative samples

of the waste product for the purposes of waste classification as specified in 10 CFR 61.55 for waste disposal.

- The inspector reviewed the radio-chemical sample analysis results for each of the licensee's radioactive waste streams; reviewed the licensee's use of scaling factors and calculations with respect to these radioactive waste streams to account for difficult-to-measure radionuclides; determined whether the licensee's program assures compliance with 10 CFR 61.55 and 10 CFR 61.56 as required by Appendix G of 10 CFR Part 20; and reviewed the licensee's program to ensure that the waste stream composition data accounts for changing operational parameters and thus remains valid between the annual or biennial sample analysis update.
- The inspector observed shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifests, shipping papers provided to the driver, and licensee verification of shipment readiness; verified that the receiving licensee was authorized to receive the shipment packages; and observed radiation workers during the preparation and shipment of a dry active waste shipment 2007-106 on October 17, 2007, to Duratek and a surface contaminated equipment shipment 2007-107 to FitzPatrick Nuclear Power Plant on October 18, 2007. The inspector determined that the shipper was knowledgeable of the shipping regulations and that shipping personnel demonstrated adequate skills to accomplish the package preparation requirements for public transport with respect to NRC Bulletin 79-19 and 49 CFR Part 172, Subpart H, and verified that the licensee's training program provides training to personnel responsible for the conduct of radioactive waste processing and radioactive material shipment preparation activities.
- The inspector sampled the following non-excepted package shipment records and reviewed these records for compliance with NRC and DOT requirements:
  - 2006-61, irradiated reactor hardware shipment to Barnwell Disposal Facility on September 14, 2006;
  - 2006-62, filters, dry activated waste, and irradiated hardware shipment to Barnwell Disposal Facility on September 27, 2006;
  - 2007-15, reactor cleanup resin shipment to Studsvik on March 20, 2007;
  - 2007-29, mixed resin shipment to Studsvik on May 15, 2007;
  - 2007-39, contaminated laundry shipment to Unitech on May 14, 2007;
  - 2007-72, surface contaminated equipment shipment to ROV Technologies on June 13, 2007; and
  - 2007-106, dry active waste shipment to Duratek on October 17, 2007.
- The inspector reviewed Licensee Event Reports (LERs), Special Reports, audits, State agency reports, and self-assessments related to the radioactive material and transportation programs performed since the last inspection to determine whether identified problems are entered into the corrective action program for resolution. The inspector also reviewed CRs written against the radioactive material and shipping programs since the previous inspection to determine whether problems



identified were properly characterized and applicable causes and corrective actions were specified commensurate with the safety significance of the issues.

b. Findings

No findings of significance were identified.

**4. OTHER ACTIVITIES [OA]**

4OA1 Performance Indicator Verification (71151)

a. Inspection Scope (8 samples)

Mitigating Systems Cornerstone

The inspectors reviewed Entergy submittals for the five Mitigating Systems Performance Index (MSPI) performance indicators (PIs) listed below for the period from July 1, 2006, through September 30, 2007. The inspectors reviewed portions of operator logs, maintenance rule out-of-service logs, criticality data, Consolidated Data Entry MSPI Derivation Reports for the unavailability index and unreliability index for each system, monitored component demands, and demand failure data. The inspectors discussed the methods of compiling the data with cognizant system engineers and the MSPI engineering lead and licensing coordinator to verify the accuracy of the reported PI data. PI information was also discussed with NRC headquarters personnel responsible for MSPI development and implementation. The PI definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, and AP 0094, "NRC Performance Indicator Reporting," were also used to verify the completeness of the PI data reported during this period. Additional documents reviewed are listed in the Attachment to this report. The following PIs were reviewed:

- MSPI, Emergency AC Power System;
- MSPI, High Pressure Injection System;
- MSPI, Heat Removal System;
- MSPI, Residual Heat Removal System; and
- MSPI, Cooling Water Systems.

Physical Protection Cornerstone

The inspectors performed a review of PI data submitted by Entergy for the Physical Protection Cornerstone. The review was conducted of Entergy's programs for gathering, processing, evaluating, and submitting data for the Fitness-for-Duty, Personnel Screening, and Protected Area Security Equipment PIs. The inspector verified that the PIs had been properly reported as specified in NEI 99-02. The review included the licensee's tracking and trending reports, personnel interviews, and security event reports for the PI data collected since the last security baseline inspection. The inspector noted from the licensee's submittal that there were no reported failures to

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properly implement the requirements of 10 CFR 73 and 10 CFR 26 during the reporting period.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (PI&R) (71152)

.1 Reviews of Items Entered into the Corrective Action Program

a. Inspection Scope

The inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to determine whether they were being entered into Entergy's corrective action program at an appropriate threshold and that adequate attention was being given to timely corrective actions. Additionally, in order to identify repetitive equipment failures and/or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into Entergy's corrective action program. This review was accomplished by reviewing the description of each new CR and/or by attending daily CR screening meetings. A listing of CRs that required inspector follow-up and other documents reviewed is included in the Attachment.

b. Findings

No findings of significance were identified.

.2 Semi-Annual Trend Review

a. Inspection Scope (1 sample)

The inspectors performed a review of Entergy's corrective action program and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review nominally considered the six-month period of July 2007 through December 2007. The inspectors compared their results with the results contained in Entergy's quarterly trend reports; operation logs; and CRs. The corrective actions assigned to address the individual issues were reviewed for adequacy.

b. Assessment and Observations

No findings of significance were identified. However, the inspectors noted that the station was challenged during the period by several equipment performance issues. Although the inspectors noted the specific causes of the equipment issues were varied, the inspectors will continue to monitor equipment performance to ensure specific trends are appropriately identified.

.3 Annual Sample: Review of the Root Cause Analysis (RCA) for the “A” SW Pump Operational Challenges

a. Inspection Scope (1 sample)

The inspectors reviewed actions taken by Entergy to resolve challenges to the operation of the “A” SW pump. This sample was selected based on a history of maintenance issues that resulted in short term inoperability. The inspectors reviewed applicable CRs and discussed equipment performance issues with system, component, and design engineering. A listing of CRs and other documents reviewed is included in the Attachment.

b. Assessments and Observations

No findings of significance were identified. Previous NRC review of the March 2, 2007, unplanned unavailability resulted in the issuance of a Green inspection finding (FIN 05000271/2007002-01) for Entergy’s failure to establish minimum thread engagement for the “A” SW pump packing gland studs. The inspectors determined that Entergy’s planned and completed corrective actions to address the collective significance of the various equipment issues, including returning the SW pumps to a six year preventive maintenance cycle, appeared to be appropriate.

.4 Annual Sample: Review of the Root Cause Analyses for the Partial Collapse of CT Cell 2-4

a. Inspection Scope (1 sample)

The inspectors reviewed the CRs associated with the August 21, 2007, partial collapse of a non-safety cell of the west cooling tower. The CRs reviewed included a RCA of the physical collapse of the CT Cell 2-4, and a separate RCA for the human performance deficiencies identified during Entergy’s review of the event. The inspectors evaluated the thoroughness of the RCAs, including the extent-of-condition, and the completed and planned corrective actions, including the corrective actions to preclude recurrence. The two primary CRs that included the RCAs are listed below; the other documents reviewed are listed in the Attachment to this report.

- CR-VTY-2007-3243, Partial Failure of Cooling Tower Cell 2-4; and
- CR-VTY-2007-3646, Evaluate the Human Performance Issues Associated with Organization and Programmatic Causes of the August 2007 Cooling Tower Failure.

b. Assessment and Observations

No findings of significance were identified. The inspectors considered the investigations associated with the RCAs to be detailed and thorough. The investigations by Entergy revealed that the maintenance had been primarily focused on repair versus identification of deteriorating conditions, and that acceptance criteria were not clearly delineated in the inspection procedures. In addition, much of the inspection was conducted by

contractors and there was insufficient oversight by the licensee. Entergy's RCA appropriately concluded that they had failed to incorporate operating experience into the inspection procedures for the cooling towers. The completed and planned corrective actions for future inspections appear acceptable.

The event was previously discussed in IR 05000271/2007004, and an NCV (NCV 05000271/2007004-01) was identified for inadequate use of Operating Experience.

.5 Annual Sample: Review of Improper Locked High Radiation Area Entry

a. Inspection Scope (1 sample)

A regional inspector reviewed Entergy's RCA of an August 17, 2006, event involving a locked high radiation area entry into the reactor water cleanup phase separator valve aisle which was made without conducting a survey. CR VTY-2006-2600 documented Entergy's investigation including a RCA and completed corrective actions to prevent recurrence of this issue.

b. Findings and Observations

No findings of significance were identified. Entergy provided a complete and accurate identification of the problem including the conditions that led up to the performance deficiencies. The RCA appropriately identified the root cause (i.e., the radiation protection technician failed to implement procedural requirements for locked high radiation area entry) and associated contributing causes. The corrective actions addressed the identified causes and included development of a locked high radiation area entry checklist to ensure all procedural requirements were met for future entries.

The event was previously discussed in IR 05000271/2007003, and an NCV (NCV 05000271/2007010-01) was identified for the failure to conduct a radiological survey.

4OA3 Event Followup (71153)

(Closed) LER 05000271/2007-003-00, Reactor Trip Caused by Turbine Stop Valve Closure due to Inadequate Preventive Maintenance

On August 30, 2007, a reactor trip occurred while performing maintenance on a turbine stop valve. The maintenance activity resulted in the closure of all four turbine stop valves, which actuated the RPS logic (three of four turbine stop valves less than 90 percent open with reactor power greater than 25 percent) which shutdown the reactor as designed. The issue was previously reviewed by the inspectors and documented in NRC Inspection Report 05000271/2007004 as a finding (FIN 05000271/2007004-2). No additional findings of significance were identified. This LER is closed.

4OA6 Meetings, including Exit

Exit Meeting Summary

On January 8, 2008, the resident inspectors presented the inspection results to Mr. Theodore Sullivan, Site Vice President, and other members of the VY staff. The inspectors confirmed that no proprietary information was provided or examined during the inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

**SUPPLEMENTAL INFORMATION**

**KEY POINTS OF CONTACT**

Entergy Personnel

J. Dreyfuss, Director of Nuclear Safety  
W. Maguire, General Manager of Plant Operations  
D. Mannai, Licensing Manager  
N. Rademacher, Director of Engineering  
T. Sullivan, Site Vice President  
G. Von Der Esch, Acting Operations Manager  
S. Wender, Radiation Protection Manager

**LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

Closed

05000271/2007003-00      LER      Reactor Trip Caused by Turbine Stop Valve Closure due to Inadequate Preventive Maintenance

**LIST OF DOCUMENTS REVIEWED**

**Section 1R04: Equipment Alignment**

CR 2007-4273 Discrepancy between valve lineup and P&ID  
G-191168 Flow Diagram Core Spray System  
G-191169 Flow Diagram High Pressure Coolant Injection System  
OP 2120 High Pressure Coolant Injection System  
OP 2123 Core Spray

**Section 1R11: Licensed Operator Requalification Program**

Administrative Procedure 0151, Responsibilities and Authorities of Operations Department Personnel  
Administrative Procedure 0153, Operations Department Communication and Log Maintenance  
Department Procedure 0166, Operations Department Standards  
Licensed Operator Requal Training Program Instructor Guide LOR-26-301, Revision 1

**Section 1R12: Maintenance Effectiveness**Audits and Self-Assessments

LO-VTYLO-2007-00119, Self Assessment - Vermont Yankee 10CFR50.65 Maintenance Rule Program, 8/20/07 through 8/24/07

SYSENG 2007-031, RFO 26 - Maintenance Rule Assessment, dated 9/10/07

Vermont Yankee Cycle 23 Maintenance Rule Periodic Assessment for the Period: 11/01/2002 - 5/03/2004

Vermont Yankee Cycle 24 Maintenance Rule Periodic Assessment for the Period: 5/03/2004 - 11/10/2005

Corrective Action Condition Reports (CR-VTY-)

2007-04206	2006-03819	2007-03275	2006-02362	2007-00765
2007-04193	2007-03801	2007-03171	2007-01932	2006-00660
2007-04178	2007-03753	2007-03098	2007-01929	2007-00371
2007-04177	2007-03747	2007-03030	2006-01792	2007-00338
2007-04175	2007-03626	2007-02641	2007-01489	2007-00156
2007-04039	2006-03465	2007-02540	2007-01369	2006-00137
2007-03828	2006-03457	2007-02464	2006-01115	

Drawings

G-191169 SH. 1, Flow Diagram High Pressure Coolant Injection System, Revision 48

G-191172, Flow Diagram Residual Heat Removal System, Revision 66

G-191176 SH. 1, Flow Diagram Condensate & Demineralized Water Transfer System, Revision 41

G-191304 SH. 2, 480V AUX One Line Diagram MCC-7A, 7D, 7F, Revision 15

Maintenance Rule Monitoring

125DC SSC performance history 9/30/04 – 09/30/07

Maintenance Rule Expert Panel Meeting Minutes, dated 2/8/07 (2007-02), 3/22/07 (2007-03), 4/19/07 (2007-04), 6/18/07 (2007-05), 8/7/07 (2007-06), 9/19/07 (2007-07)

Maintenance Rule Action Plan/Performance Evaluation for CST - Pump Train "A", dated 9/20/07

Maintenance Rule Action Plan/Performance Evaluation for HPCI System, dated 11/29/05

Maintenance Rule Action Plan/Performance Evaluation for RCIC System, dated 10/22/07

Maintenance Rule - Monthly Detail Report, dated 10/3/07

MR96-0012, Maintenance Rule (a)(1) to (a)(2) Disposition Memorandum, dated 6/11/07

NRC Regulatory Guide 1.160, Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, Revision 2

NUMARC 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, Revision 3

VY Maintenance Rule - SSC Status Change Report, dated 9/30/07

VY Maintenance Rule - State of the System Report 480 Volts AC Electrical, dated 9/30/07

VY Maintenance Rule - State of the System Report Condensate Storage and Transfer, dated 9/30/07

VY Maintenance Rule - State of the System Report HPCI, dated 9/30/07

VY Maintenance Rule - State of the System Report Reactor Core Isolation Cooling, dated 9/30/07

VY Maintenance Rule - State of the System Report Residual Heat Removal, dated 9/30/07

VY Maintenance Rule - System Annunciator Report, dated 9/30/07

#### Miscellaneous

CR 2007-3171 Apparent Cause Evaluation, RCIC Turbine Trip Throttle Valve Tripped During Oil Sampling, dated 9/12/07

OP 2145, Normal 125VDC Operation, dated 5/31/07

OP 4121, Reactor Core Isolation Cooling System Surveillance, dated 8/14/07

OP 4215, Main Station Battery Performance/Service Test, dated 5/10/07

Outage Performance Report - Refueling Outage 26, dated 6/6/07

PMCR Detailed Report, PMCRs dated 5/1/04 - 11/30/05

RF26-211, Scope Change Request - Relief Valve Testing, dated 5/24/07

Risk-Informed Inspection Notebook for Vermont Yankee Nuclear Power Station, Revision 2.1

VYOPF 4030.02, V23-3 Type C Test data Sheet, dated 5/24/07

VY-RPT-04-00004 Table 4.5, System Risk-Ranking by RAW, Revision 1

VYSE-MRL-2007-022, EN-MA-125 Troubleshooting Plan per W.O. 00105839, Rev. 0 Update 2

#### Operating Experience

NRC Information Notice 86-14: Supplement 2: Overspeed Trips of AFW, HPCI AND RCIC Turbines, dated 8/26/91

NRC Information Notice 86-40: Degraded Ability to Isolate the Reactor Coolant System from Low-pressure Coolant Systems in BWRs, dated 6/5/86

NRC Information Notice 2000-01: Operational Issues Identified in Boiling Water Reactor Trip and Transient, dated 2/11/00

NRC Information Notice 2001-14: Problems with Incorrectly-installed Swing-check Valves, dated 10/3/01

#### Procedures

10CFR50.65 Maintenance Rule Scoping Basis Document 480 Volts AC Electrical (480AC), Revision 4

10CFR50.65 Maintenance Rule Scoping Basis Document Condensate Storage and Transfer (CST), Revision 2

10CFR50.65 Maintenance Rule Scoping Basis Document Control Rod Drive (CRD), Revision 5  
10CFR50.65 Maintenance Rule Scoping Basis Document Freeze Protection (FPP), Revision 4

10CFR50.65 Maintenance Rule Scoping Basis Document Heating, Ventilation & Air Conditioning (HVAC), Revision 4

10CFR50.65 Maintenance Rule Scoping Basis Document HPCI, Revision 4

10CFR50.65 Maintenance Rule Scoping Basis Document Main Steam (MS), Revision 3

10CFR50.65 Maintenance Rule Scoping Basis Document Main Turbine Generator (TG), Revision 3

10CFR50.65 Maintenance Rule Scoping Basis Document Plant Level Criteria (PLANT), Revision 1

10CFR50.65 Maintenance Rule Scoping Basis Document RCIC, Revision 5

10CFR50.65 Maintenance Rule Scoping Basis Document RHR, Revision 5

10CFR50.65 Maintenance Rule Scoping Basis Document Service Air (SA), Revision 5



10CFR50.65 Maintenance Rule Scoping Basis Document SW, Revision 8  
10CFR50.65 Maintenance Rule Scoping Basis Document SSCs and MPAC Systems "Not in Scope" (NIS), Revision 5  
EN-DC-203, Maintenance Rule Program, Revision 0  
EN-DC-204, Maintenance Rule Scope and Basis, Revision 0  
EN-DC-205, Maintenance Rule Monitoring, Revision 0  
EN-DC-206, Maintenance Rule (a)(1) Process, Revision 0  
EN-DC-207, Maintenance Rule Periodic Assessment, Revision 0  
OP 4121, Reactor Core Isolation Cooling System Surveillance, Revision 77

#### System Health Reports & Trending

Automatic Depressurization System Health Report, 3<sup>rd</sup> Qtr 2007, Rev. 0  
480 Volt AC System Health Report, 3<sup>rd</sup> Qtr 2007, Rev. 0  
Condensate Storage and Transfer System Health Report, 3<sup>rd</sup> Qtr 2007, Rev. 0  
Core Spray System Health Report, 3<sup>rd</sup> Qtr 2007, Rev. 0  
Emergency Diesels & Auxiliaries System Health Report, 3<sup>rd</sup> Qtr 2007, Rev. 0  
Fuel Oil System Health Report, 3<sup>rd</sup> Qtr 2007, Rev. 0  
HPCI System Health Report, 3<sup>rd</sup> Qtr 2007, Rev. 1  
RCIC System Health Report, 3<sup>rd</sup> Qtr 2007, Rev. 1  
Residual Heat Removal System Health Report, 3<sup>rd</sup> Qtr 2007, Rev. 0  
Service Water System Health Report, 3<sup>rd</sup> Qtr 2007, Rev. 0  
SSC Performance History - 480 VAC, dated 11/1/05 - 10/31/07  
SSC Performance History - CST, dated 11/1/05 - 10/31/07  
SSC Performance History - HPCI, dated 11/1/05 - 10/31/07  
SSC Performance History - RCIC, dated 11/1/05 - 10/31/07  
SSC Performance History - RHR, dated 11/1/05 - 10/31/07  
Standby Liquid Control System Health Report, 3<sup>rd</sup> Qtr 2007, Rev. 0

#### Section 1R15: Operability Evaluations

CR 2006-2846  
CR 2007-3054  
CR 2007-3678  
CR 2007-3814  
CR 2007-3953  
CR 2007-4566  
CR 2007-4675  
HVAC Design Basis Document  
OP 0150 Conduct of Operations and Operator Rounds  
OP 4612 Reactor Water System Sampling  
Operations Night/Standing Order Log, 12/7/07  
VY Technical Specifications

#### Section 2PS2: Radioactive Materials Processing and Shipping

Quality Assurance Audit no. QA-15-2005-VY-1: VY Radiological Waste Program  
NUPIC Audits: Duratek - Barnwell, September 2005; RACE, October 2005, Studsvik, November 2006

QA Surveillance reports: QS-2005-VY-015, QS-2005-VY-019  
Procedures: Process Control Program, PP 7504, Rev. 5,  
Radioactive Shipping Procedure, EN-RW-102, Rev. 4  
Scaling Factors, EN-RW-104, Rev. 3

Condition Reports:

VTY-2006-1896	VTY-2006-2921	VTY-2006-1079	VTY-2007-0665
VTY-2007-1371	VTY-2007-3815	VTY-2007-3950	

**Section 40A1: Performance Indicator Verification**

CR 2006-2660  
CR 2007-4443  
CR 2007-4452  
VY-RPT-05-00005 VY Program Model Inputs for MSPI, Revision 1  
VY-RPT-06-00001 VY MSPI Bases Document, Revision 0  
Work schedule for work week 730 7/23-29/07

**Section 40A2: Identification and Resolution of Problems**

Operability Evaluation for CR-VTY-2007-1151  
CR-VTY-2007-1151, Brass Flakes in Extruded Packing Material on A Service Water Pump  
CR-VTY-2007-0652, A Service Water Pump Packing Leakage Excessive  
CR-VTY-2007-1579, Service Water A Pump Excessive Packing leakage-Repeat Issue  
CR-VTY-2007-3223, Fan on Cooling Tower Cell 2-4 is Rubbing  
CR-VTY-2007-3235, Evidence of Structural Damage/Degradation of Cooling Tower Cell 2-4  
CR-VTY-2007-3243, Partial Failure of Cooling Tower Cell 2-4  
CR-VTY-2007-3275, BLD – Cooling Towers Subsystem Above Maintenance Rule Condition  
Monitoring Criteria  
CR-VTY-2007-3646, Evaluate the Human Performance Issues Associated with Organization  
and Programmatic Causes of the August 2007 Cooling Tower Failure  
VYSE-MRL-2007-040, 10CFR50.65 Maintenance Rule Performance Evaluation/Action Plan for  
Buildings – Cooling Tower Subsystem, Original Revision, approved 11/13/07  
NEIL-01-02R: Cooling Tower Structural Concerns, dated 08/21/07

**LIST OF ACRONYMS**

ACE	apparent cause evaluation
ADAMS	Agencywide Documents Access and Management System
AP	Administrative Procedure
CFR	Code of Federal Regulations
CR	condition report
CT	cooling tower
DOT	U. S. Department of Transportation
ECCS	emergency core cooling system
EDG	emergency diesel generator

FA	fire area
FZ	fire zone
HPCI	high pressure coolant injection
IMC	Inspection Manual Chapter
LER	licensee event report
MR	Maintenance Rule
MSIV	Maintenance Steam Isolation Valve
MSPI	Mitigating Systems Performance Index
NCV	non-cited violation
NEI	Nuclear Energy Institute
NEIL	Nuclear Electric Insurance Limited
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
OP	Vermont Yankee operating procedure
PARS	Publicly Available Records System
PI	performance indicator
PI&R	problem identification and resolution
PMT	post maintenance testing
PS	Public Radiation Safety
RCA	root cause analysis
RCIC	reactor core isolation cooling
RHR	residual heat removal
RHRSW	residual heat removal service water
RP	radiation protection
RPS	reactor protection system
SDP	significance determination process
SSC	structures, systems, and components
SW	service water
TS	technical specification
UFSAR	Updated Final Safety Analysis Report
VY	Vermont Yankee
WO	work order