October 19, 2005

Mr. Jay K. Thayer
Site Vice President
Entergy Nuclear Operations, Inc.
Vermont Yankee Nuclear Power Station
P.O. Box 0500
185 Old Ferry Road
Brattleboro, VT 05302-0500

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION - NRC INTEGRATED INSPECTION REPORT 05000271/2005004

Dear Mr. Thayer:

On September 30, 2005, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Vermont Yankee Nuclear Power Station (VY). The enclosed report documents the inspection findings which were discussed on October 11, 2005, 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/

Clifford J. Anderson, Chief
Projects Branch 5
Division of Reactor Projects

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

Enclosure: Inspection Report 05000271/2005004
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.	50-271
Licensee No.	DPR-28
Report No.	05000271/2005004
Licensee:	Entergy Nuclear Operations, Inc.
Facility:	Vermont Yankee Nuclear Power Station
Location:	320 Governor Hunt Road Vernon, Vermont 05354-9766
Dates:	July 1, 2005 - September 30, 2005
Inspectors:	Beth E. Sienel, VY Senior Resident Inspector Gregory Bowman, Reactor Inspector, DRS Thomas F. Burns, Reactor Inspector, DRS Leonard Cheung, Reactor Inspector, DRS James Krafty, Reactor Inspector, DRS Sammy C. McCarver, Project Engineer, DRP James D. Noggle, Senior Health Physicist, DRS Amar Patel, Reactor Engineer, DRP William J. Raymond, Senior Resident Inspector, Pilgrim Chris Welch, Resident Inspector, Pilgrim
Approved by:	Clifford J. Anderson, Chief Projects Branch 5 Division of Reactor Projects

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SUMMARY OF FINDINGS

IR 05000271/2005004; 07/01/05 - 09/30/05; Vermont Yankee Nuclear Power Station; Routine Integrated Report.

This report covered a 13-week period of inspection by resident and regional reactor inspectors and a regional senior health physicist. No findings of significance were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

No findings of significance were identified.

B. Licensee Identified Findings

None.

REPORT DETAILS

Summary of Plant Status

Vermont Yankee (VY) Nuclear Power Station began the inspection period operating at or near full power. On July 25, 2005, an automatic reactor scram occurred as a result of a generator load reject following the structural failure of an insulator in the 345 kV switchyard. The reactor was returned to full power on July 29, following the completion of investigation, repair, and replacement activities associated with the forced outage. With the exception of planned power reductions for control rod pattern adjustments, the reactor operated at full power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

a. Inspection Scope (one sample)

The inspectors reviewed measures established by Entergy for ensuring warm weather availability and operability of the condensate storage tank (CST). The CST is a water source for several emergency core cooling systems. Maximum temperature for the water is an input to various design calculations. The inspectors reviewed completed VY operating procedure (OP) 0150, "Conduct of Operations and Operator Rounds," operator rounds sheets and the procedural guidance for monitoring the temperature of the CST. In addition, the inspectors reviewed condition reports (CRs) related to the effect of warm weather on the CST to ensure issues identified were properly addressed.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

a. Inspection Scope (three samples)

The inspectors performed three partial system walkdowns of 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 Entergy's system operating procedures. The inspectors also observed valve positions, the availability of power supplies, and the general condition of selected components to verify there were no obvious deficiencies. The inspectors verified the alignment of the following systems.

- "A" Train of the Emergency Diesel Generator (EDG) System while the Vernon Tie was unavailable for planned maintenance
- "A" Train of the Control Rod Drive (CRD) System following maintenance

- Reactor Core Isolation Cooling (RCIC) System following maintenance

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05Q)

a. Inspection Scope (nine samples)

The inspectors identified fire area important to plant risk based on a review of Entergy's Vermont Yankee Safe Shutdown Capability Analysis, the Fire Hazards Analysis, and the Individual Plant Examination External Events (IPEEE). The inspectors toured plant areas important to safety in order to verify 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 fire areas (FAs) and fire zones (FZs) were inspected.

- Fuel Oil Storage Tank and Transfer Pump House (FA 12)
- Radwaste Corridor (FA 13)
- Circulating Water System Pump Room (FZ 14)
- Service Water System Pump Room (FZ 15)
- West Cooling Tower (FA 16)
- RCIC Corner Room, 232 foot elevation (FZ RB1S)
- RCIC Corner Room, 213 foot elevation (FA RCIC)
- AOG Building (no fire designation)
- Discharge Structure (no FZ designation)

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope (one sample)

The inspectors reviewed Entergy's established flood protection barriers and procedures for coping with internal flooding in the southeast corner room which contains the "B" train of the core spray, residual heat removal (RHR), and RHR service water systems. The inspectors reviewed internal flooding design information for these systems contained in Entergy's IPEEE, the Updated Final Safety Analysis Report (UFSAR), and in the Internal Flooding Design Basis Document. The inspectors also conducted a walkdown of the area to ensure equipment and structures needed to mitigate an internal flooding event were as described in the above documents.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07A)

a. Inspection Scope (two samples)

The inspectors reviewed the results of the thermal performance tests of Reactor Recirculation Units (RRU) 7 and 8. The tests were conducted in accordance with OP 4181, "Service Water/Alternate Cooling System Surveillance," Section G, "RRU 7 and 8 Thermal Performance Testing." The inspectors discussed the testing with the system engineer and reviewed the completed surveillance forms and computer data reports to ensure that test results met acceptance criteria which considered differences between test and design basis accident conditions.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11Q)

a. Inspection Scope (one sample)

The inspectors observed a simulator session for one operating crew to assess the performance of the licensed operators and the ability of Entergy's Training and Operations Department staff to evaluate licensed operator performance. Crew performance was evaluated during simulated events involving anticipated transients without a scram and loss of coolant accidents under extended power uprate conditions.

The inspectors evaluated the crew's performance in the following areas.

- Clarity and formality of communications
- Ability to take timely actions
- Prioritization, interpretation, and verification of alarms
- Procedure use
- Control board manipulations
- Oversight and direction from supervisors
- Group dynamics

Crew performance in these areas was compared to Entergy management expectations and guidelines as presented in the following documents.

AP 0151	Responsibilities and Authorities of Operations Department Personnel
AP 0153	Operations Department Communication and Log Maintenance
DP 0166	Operations Department Standards

The inspectors also compared simulator configurations with actual control board configurations. For any weaknesses identified, the inspectors observed Entergy evaluators to verify that they also noted the issues to be discussed with the crew.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12Q)

a. Inspection Scope (two samples)

The inspectors performed two issue/problem-oriented inspections of actions taken by Entergy in response to an insulator failure in the 345 kV switchyard and 125 VDC Bus 1 unavailability during troubleshooting activities. The inspectors reviewed the UFSAR, system operating procedures, system maintenance rule scoping documents, applicable maintenance rule functional failure determinations, recent system health reports, the 3 year performance history for each system, and corrective actions taken in response to the equipment problems in accordance with station procedures and the requirements of 10 CFR 50.65. In addition, the inspectors discussed these items with the maintenance rule coordinator and designated system engineers to ensure maintenance rule functional failures and system unavailability were appropriately monitored.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessment and Emergent Work Evaluation (71111.13)

a. Inspection Scope (four samples)

The inspectors evaluated on-line risk management for four planned maintenance activities. The inspectors reviewed maintenance risk evaluations, work schedules, recent corrective actions, and control room logs to verify that other concurrent or emergent maintenance activities did not significantly increase plant risk. The inspectors compared reviewed items and activities to requirements listed in procedures AP 0125, "Plant Equipment," and AP 0172, "Work Schedule Risk Management - Online." The inspectors reviewed the following on-line work activities.

- Replacement of Hemyc fire wrap in the west switchgear room and cable vault
- Maintenance on battery charger BC-AS-1
- Planned maintenance on the Vernon tie
- Unavailability of a single RHR pump during planned troubleshooting of increased torus in leakage

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-routine Plant Evolutions (71111.14)

a. Inspection Scope (two samples)

The inspectors directly observed and assessed control room operator performance during the following two non-routine evolutions.

- Generator load reject and reactor scram with automatic main steam isolation valve closure and high pressure coolant injection and RCIC system initiations following a 345 kV insulator failure on July 25, 2005
- Power reduction to approximately 70% to support a planned control rod sequence exchange and turbine valve testing on September 21, 2005

Following the reactor scram, the inspectors reviewed plant computer data, operator logs, and Entergy's post-trip review and discussed the information with plant operations personnel to ensure any issues were properly evaluated. The adequacy of personnel performance, procedure compliance, and use of the corrective action process for both non-routine evolutions were evaluated against the requirements and expectations contained in technical specifications (TS) and the following station procedures, as applicable.

- AP 0151 Responsibilities and Authorities of Operations Department Personnel
- AP 0153 Operations Department Communication and Log Maintenance
- AP 0154 Post Trip Review
- DP 0166 Operations Department Standards
- OP 0105 Reactor Operations
- OP 2403 Control Rod Sequence Exchange with the Reactor Online

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope (three samples)

The inspectors reviewed three operability determinations prepared by Entergy. The inspectors evaluated operability determinations against the guidance contained in NRC Generic Letter 91-18, "Resolution of Degraded and Nonconforming Conditions," as well as Entergy procedure ENN-OP-104, "Operability Determinations." The inspectors verified the adequacy of the following evaluations of degraded or non-conforming conditions.

- "B" service water strainer wall thickness measurement below minimum acceptable
- RCIC suction pressure high
- 45-80 V ground on DC Bus 1

b. Findings

No findings of significance were identified.

1R16 Operator Workarounds (71111.16)

a. Inspection Scope (one sample)

The inspectors reviewed the cumulative effect of operator workarounds on the reliability, availability, and potential mis-operation of systems and the potential to affect the ability of operators to respond to plant transients and events. The inspectors reviewed the Operator Aggregate Impact Index and Operations Performance Indicators for June 2005 and the related identified operator burdens, control room deficiencies, and disabled or illuminated control room alarms and discussed them with responsible operations personnel to ensure they were appropriately categorized and tracked for resolution. In addition, control panel walkdowns were performed to identify if any potential workarounds existed that had not been previously identified in accordance with procedures DP 0166, "Operations Department Standards," and AP 0047, "Work Request."

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing (71111.19)

c. Inspection Scope (five samples)

The inspectors reviewed five post-maintenance testing (PMT) activities on risk-significant systems. The inspectors either directly observed the testing or reviewed completed PMT documentation to verify that the test data met the required acceptance criteria contained in the TS, UFSAR, and in-service testing program. Where testing was directly observed, the inspectors verified that installed test equipment was appropriate and controlled and that the test was performed in accordance with applicable station procedures. The inspectors also ensured that 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 after the following maintenance activities were completed.

- "A" CRD pump planned maintenance
- Battery charger BC-1-1A voltage regulator card replacement

- RCIC barometric condenser vacuum tank pressure switch sensing line replacement
- "A" service water pump discharge header pressure switch replacement
- CRD hydraulic control unit 22-11 replacement

b. Findings

No findings of significance were identified.

1R20 Refueling and Other Outage Activities (71111.20)

9. Forced Outage Following the 345 kV Insulator Failure on July 25, 2005

a. Inspection Scope (one sample)

The inspectors evaluated the following forced outage activities to verify that Entergy considered risk when developing outage schedules; adhered to administrative risk reduction methodologies for plant configuration control; and adhered to their operating license, TS requirements, and approved procedures:

- Monitoring of Shutdown Activities - The inspectors observed the shutdown of the reactor plant. The plant remained in hot shutdown throughout the forced outage.

- Control of Outage Activities - The inspectors reviewed the daily shutdown risk assessment to verify that Entergy addressed the outage's impact on defense-in-depth for the five shutdown critical safety functions: electrical power availability, inventory control, decay heat removal, reactivity control, and containment.

- Startup Activities - The inspectors observed portions of the startup of the reactor plant, including criticality and placement of the generator online, following the completion of the forced outage.

The inspectors also verified that Entergy identified problems related to the forced outage and entered them into their corrective action program.

b. Findings

No findings of significance were identified.

2. Refueling Outage 25

c. Inspection Scope (partial sample)

During the inspection period, Entergy finalized preparations for refueling outage (RFO) 25. The inspectors reviewed the following areas related to RFO 25:

- Refueling outage schedule risk review
- New reactor fuel inspection

The inspectors evaluated the outage schedule risk review against the requirements in program procedure (PP) 7102, “Work Management - Outages,” and AP 0173, “Work Schedule Risk Management - Outage.” New fuel inspections were evaluated against the requirements of procedures EN-NF-200, “Special Nuclear Material Control”; OP 1400, “Fuel Receipt and Preliminary Handling”; OP 1401, “New Fuel Inspection and Channeling”; and OP 1410, “Fuel Loading Schedule Generation.”

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope (5 samples)

The inspectors observed surveillance testing to verify that the test acceptance criteria specified for each test was consistent with TS and UFSAR requirements, 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 briefs for the test activities. The inspectors also verified that discrepancies were appropriately documented in the corrective action program. The inspectors verified that testing in accordance with the following procedures met the above requirements.

OP 4120	High Pressure Coolant Injection System Surveillance; Section E, “Pump Time to Rated Flow Rate Test - Once per Cycle”
OP 4121	Reactor Core Isolation Cooling System Surveillance; Section G, “RCIC Pump Time to Rated Flow Test and Pump Operability/Full Flow Test - Once per Cycle”
OP 4126	Diesel Generators Surveillance; Section B, “Monthly Diesel Generator Slow Start Operability Test,” for the “B” EDG
OP 4340	Reactor Low Pressure ECCS Valve Permissive Functional/Calibration; Section A, “Functional Test,” for the “C” and “D” Reactor Pressure Transmitters PT 2-3-52C/D
OP 4373	Torus Water Temperature Calibration

b. Findings

No findings of significance were identified

1R23 Temporary Plant Modifications (71111.23)

c. Inspection Scope (3 samples)

The inspectors reviewed three temporary modifications/temporary alterations (TAs) to ensure that the modifications did not adversely affect the availability, reliability, or functional capability of any risk-significant structures, systems, or components. The inspectors compared the information in the 2004 TM package to Entergy's TM requirements contained in AP 0020, "Control of Temporary and Minor Modifications." The inspectors compared the 2005 TA packages to Entergy's TA requirements contained in ENN-DC-136, "Temporary Alterations," which became effective on March 31, 2005. The inspectors observed the installation of the 2005 TAs and walked down the 2004 TM to verify that required tags were applied and that the modifications were properly maintained. The following modifications were reviewed:

TM 2004-027	Bypass of "A" Recirculation Pump Shaft Vibration Probe Signal (Alarm Only)
TA 2005-012	Bypass of V2-54A ["A" recirculation pump discharge bypass valve] Limit Switch from Recirculation "A" MG Set
TA 2005-014	Installation of Interposing Relay to Bypass V2-53A ["A" recirculation pump discharge valve] Grounded Control Wire

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06)

a. Inspection Scope (one sample)

The inspectors observed a September 8, 2005, emergency preparedness (EP) practice drill and the subsequent player and lead controller critiques. Entergy had preselected the drill notifications and protective action recommendations to be included in the EP drill performance indicator (PI). The inspectors reviewed the industry guidance provided by Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 3, and discussed the performance expectations and results with Entergy's EP staff to confirm correct implementation of the PI program. The inspectors also assessed the simulator control room operating crew's command and control, communications, and usage procedure.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas (71121.01)

a. Inspection Scope (sixteen samples)

During August 8 - 12, 2005, the inspectors conducted the following activities to verify that Entergy properly implemented physical, engineering, and administrative controls for access to high radiation areas, and other radiologically controlled areas, and that workers adhered to these controls when working in these areas. Implementation of the access control program was reviewed against the criteria contained in 10 CFR 20, TS, and the licensee's procedures.

(1) The following exposure significant work areas were evaluated to determine if radiological controls (e.g., surveys, postings, and barricades) were acceptable.

- accessible areas of the reactor building, turbine building, and radwaste building
- removal of scaffolding in the waste sludge tank room

(2) Radiation work permits (RWPs) associated with the above work activities were reviewed with respect to high radiation area controls including electronic dosimeter alarm set points.

(3) With respect to the work activities listed in (1) above, walk downs of these work areas were conducted with a radiation survey instrument to verify that RWP, procedural, and engineering controls were in place; licensee surveys and postings were complete and accurate; and air samplers were properly located.

(4) Work activities listed in (1) above were reviewed against the radiological control requirements as specified in the applicable RWPs and as low as is reasonably achievable (ALARA) reviews, as well as verbal instructions provided by radiation protection technicians during radiological briefings to workers.

(5) With respect to the work activities listed in (1) above, the conduct of necessary system breach surveys and evolving radiological hazards associated with work activities were observed to evaluate the RP job coverage (including audio and visual surveillance for remote job coverage) and contamination controls.

(6) During observations of work activities listed in (1) above, radiation worker performance was evaluated with respect to radiological work requirements and radiological briefing instructions.

(7) During observations of work activities listed in (1) above, RP technician performance was evaluated with respect to RP procedure and work activity radiological surveillance requirements.

(8) There were no internal exposure dose assessments for review that were greater than 50 mrem committed effective dose equivalent (CEDE) during 2005.

(9) The storage of highly activated or contaminated equipment in the spent fuel pool was observed with respect to preventing unauthorized removal from their submerged and shielded condition.

(10) There were no Occupational Exposure Performance Indicator occurrences for review during 2005.

(11) Observation of scaffold removal in the waste sludge tank room as a high radiation area work activity with significant dose rate gradients was reviewed with respect to exposure monitoring regulatory requirements.

(12) Current radiation procedural controls were reviewed relative to very high radiation area entries and procedural controls prior to commencing certain plant operations that have the potential to become very high radiation areas, such as traversing in-core probe withdrawal.

(13) The inspectors verified adequate posting and locking of all entrances to very high radiation areas, i.e., the entrance to the TIP room.

(14) Based on the condition reports reviewed (See Attachment), no repetitive deficiencies were identified for further followup.

(15) CRs reviewed (see Attachment) were evaluated with respect to traceable trends in radiation worker performance.

(16) CRs reviewed (see Attachment) were evaluated with respect to traceable trends in RP technician performance.

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls (71121.02)

a. Inspection Scope (three samples)

During August 8 - 12, 2005, the inspectors conducted the following activities to verify that Entergy was properly maintaining individual and collective radiation exposures as ALARA. Implementation of the ALARA program was reviewed against the criteria contained in 10 CFR 20.1101(b) and the licensee's procedures.

(1) Current VY collective exposure history was reviewed and indicated that for 2002 - 2004, VY averaged 139 person-rem per year, representing 3rd quartile performance.

(2) For the 2005 Fall refueling outage, work activities were selected that were estimated to result in the highest collective exposures during the outage. These included:

- miscellaneous drywell work, 15.71 person-rem
- staging, 15 person-rem
- routine RWPs, 9.9 person-rem
- safety relief valve work, 6.37 person-rem
- insulation activities, 6.176 person-rem
- shielding, 5.72 person-rem
- reactor disassembly/reassembly, 5.38 person-rem
- motor operated valve work, 4.959 person-rem
- miscellaneous valves, 4.833 person-rem
- control rod valve replacement, 4.427 person-rem

(3) Based on the work activities listed in (1) above, the ALARA work activity evaluations, exposure estimates, and exposure mitigation requirement plans were reviewed. In addition, interviews with principal work group supervisors were conducted with respect to the proposed ALARA plans.

(4) Source term historical records were reviewed indicating a two-fold increase in plant source term during the last 2 fuel cycles. Based on interviews with the ALARA, chemistry, and chemical engineering staffs, this increasing source term trend is expected to continue.

b. Findings

No findings of significance were identified.

Cornerstone: Public Radiation Safety

2PS1 Gaseous and Liquid Effluents (71122.01)

a. Inspection Scope (six samples)

During the period July 25 - 29, 2005, the inspectors conducted the following activities to verify that 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.

(1) The inspectors reviewed the solid radioactive waste system description in Section 9.2 and 9.3 of the UFSAR, the 2004 radiological effluent release report

for information on the types and amounts of radioactive waste disposed, and the scope of the licensee's audit program to verify that it met the requirements of 10 CFR 20.1101.

(2) The inspectors walked down the liquid and solid radioactive waste processing systems to verify that the current system configuration and operation agree with the descriptions contained in the UFSAR and in the Process Control Program (PCP); reviewed the status of any radioactive waste process equipment that was not operational and/or was abandoned in place; and verified that the changes were reviewed and documented in accordance with 10 CFR 50.59, as appropriate. The inspectors observed the sampling of radioactive waste sludge from its shipping/disposal container to determine if appropriate waste stream mixing and/or sampling procedures and methodology for waste concentration averaging provided representative samples of the waste product for the purposes of waste classification as specified in 10 CFR 61.55 for waste disposal.

(3) The inspectors reviewed the radio-chemical sample analysis results for each of the licensee's radioactive waste streams (powdered resin, bead resin, control rod drive filter, and Tri-Nuclear filters); reviewed the licensee's use of scaling factors and calculations with respect to these radioactive waste streams to account for difficult-to-measure radionuclides; verified that 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.

(4) The inspectors 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 is authorized to receive the shipment packages; and, observed radiation workers during the preparation and shipment of shipment no. 05-1216 on May 11, 2005 to Radiological Assistance Consulting and Engineering (RACE). The inspectors determined that the shipper was knowledgeable of the shipping regulations and that shipping personnel demonstrate 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.

(5) The inspectors sampled the following non-excepted package shipment records and reviewed these records for compliance with NRC and DOT requirements.

- 05-1216 DAW shipment to RACE on May 11, 2005
- 05-1212 Bead resin shipment to Studsvik on March 28, 2005
- 04-1181 20 CRDs shipped to Duratek on October 6, 2004
- 04-1191 Powdered resin shipped to Studsvik on November 9, 2004

- 04-1186 Diaphragms shipped to Alaron on October 26, 2004

(6) The inspectors reviewed the licensee's Licensee Event Reports, Special Reports, audits, State agency reports, and self-assessments related to the radioactive material and transportation programs performed since the last inspection to verify that identified problems are entered into the corrective action program for resolution. The inspectors also reviewed CRs written against the radioactive material and shipping programs since the previous inspection.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems (71152)

1. Routine Review of Identification and Resolution of Problems

a. Inspection Scope

The inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify 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 selected hard copies of condition reports (a listing of CRs reviewed is included in the Attachment to this report) and/or by attending daily screening meetings.

b. Findings

No findings of significance were identified.

2. Annual Sample Review - Degraded Voltage Relay Setpoint Calculations

a. Inspection Scope (one sample)

The inspectors reviewed Entergy's corrective actions to address non-cited violation (NCV) 05000271/2004008-03. This NCV was identified by the NRC during the Temporary Instruction (TI) 2515/158 engineering inspection in August 2004, and was associated with degraded voltage control. VY TS require a degraded voltage relay setpoint of 3700 +/- 40 Vac. Entergy's voltage calculations covered the minimum expected switchyard voltage of 3951 Vac for safety bus 3 and 3809 Vac for safety bus 4, but not the minimum allowable TS voltage of 3660 Vac. Entergy subsequently issued CRs 2004-2596 and 2004-2734 to document their corrective actions for resolving the

issues associated with the NCV. The licensee also issued CR 2004-2610 when they identified an error related to incorrect cable resistance in their calculation.

The inspectors reviewed Entergy's corrective actions documented in these condition reports to determine if they were adequate. The inspectors also reviewed the voltage calculations VYC-1088, "Vermont Yankee 4160/480 Volt Short Circuit/Voltage Study;" VYC-1042, "120 Vac Voltage Study;" and VYC-1171, "Electrical Design Basis Review of Safety-Related MOVs for Generic Letter 89-10," to confirm that they were properly revised using 3660 Vac as the minimum voltage at safety buses 3 and 4. In addition, the inspectors reviewed the degraded voltage setpoint calculation VYC-715, "Degraded Voltage Monitoring Loop Accuracy," and setpoint calibration procedure OP 4255, "Calibration of 4 kV Bus Degraded Grid Undervoltage Relays," to ensure that the degraded voltage setpoint was properly maintained and adequately controlled.

b. Findings and Observations

No findings of significance were identified. Calculations VYC-1088 and VYC-1042 were appropriately revised, and Entergy determined that safety-related electrical equipment would remain operable with a minimum voltage of 3660 Vac at safety buses 3 and 4. However, the inspectors identified that VY used an incorrect calibration tolerance (CT) in their acceptance criteria for the as-left degraded voltage setpoint. Calculation VYC-715 determined the total setpoint uncertainty, including the CT, for each of the four degraded voltage relays. To maintain the degraded voltage setpoint at the 4 kV bus in the +/- 40 Vac range, the calculation provided a CT of +/- 0.5 Vac (representing 17.5 Vac at the 4 kV bus). The inspectors reviewed the relay calibration record sheets, documented in VYOPF 4255.02, "Calibration of Degraded Grid Undervoltage Relays," which were used by the technicians to calibrate the relays. The inspectors found the prescribed as-left setpoint acceptance criteria to be 104.75 - 106.65 Vac, representing a CT of +/- 0.95 Vac. Using a CT of +/- 0.95 Vac would result in a change of +/- 49.1 Vac at the 4 kV bus. This could allow the 4 kV bus voltage to drop below 3660 Vac during degraded voltage conditions. This issue was evaluated by the inspectors and determined to be minor, because a review of completed calibration records did not identify any instances where as-left relay setting, including worst case calibration uncertainty, would have allowed degraded voltage to drop below 3660 Vac. VY issued condition report CR-VTY-2005-2350 to enter this issue into their corrective action program.

3. Annual Sample Review - Failure to Implement Adequate Design Control for Condensate Storage Tank Temperature

a. Inspection Scope (one sample)

The inspectors reviewed VY's corrective actions associated with NCV 05000271/2004008-07. This NCV was identified by the NRC during the TI 2515/158 engineering inspection, and was issued because a non-conservative condensate storage tank (CST) temperature input had been used in a design calculation for determining the available net positive suction head (NPSH) to the core spray pumps during transient conditions. Additionally, Vermont Yankee had not established a

maximum temperature limit for the CST, and in the past it had exceeded the analyzed temperature. The inspectors assessed VY's apparent cause evaluation and extent of condition review. The inspectors verified that any problems identified were appropriately evaluated, and that corrective actions were prioritized and implemented commensurate with the risk. Additionally, the inspectors selected a sample of calculations and performed an independent review of inputs and assumptions to verify they were conservative. This review included a sample of calculations completed by VY for the proposed power uprate. The inspectors also verified that VY had established appropriate temperature limits for the CST, and had actions in place if temperature exceeded these limits.

b. Findings and Observations

No findings of significance were identified. VY's apparent cause evaluation adequately assessed the issue, and appropriate corrective actions were developed to address the deficiencies. VY completed a thorough extent of condition review, which included a large sample of calculations, both for present conditions and for conditions that would exist following the proposed power uprate. However, the inspectors identified two examples where VY's evaluation missed non-conservative calculation inputs. In one case, a non-conservative CST temperature of 100 EF was used in a calculation for high pressure coolant injection pump NPSH. VY's administrative CST temperature limit was 120 EF, and any increase in temperature from 100 EF to 120 EF would reduce available NPSH. This non-conservatism was identified by VY during their extent of condition review, but due to an administrative error, it was dropped from the list of items to be corrected. Vermont Yankee also identified that a CST temperature of 100 EF was used in motor-operated valve torque and thrust calculations. VY determined that for this calculation, use of a lower CST temperature input was actually more conservative. However, VY did not evaluate the effect of using the minimum allowable CST temperature of 50 EF on the calculation results. Both of these issues were evaluated and determined to be minor, because in both cases there was only a small impact on available margin.

4OA3 Event Followup (71153)

4. (Closed) LER 05000271/2004003-01: Automatic Reactor Scram Due to a Main Generator Trip as a Result of an Isophase Bus Duct Two-Phase Electrical Fault.

On June 18, 2004, with the plant operating at full power, a turbine load reject scram occurred due to a two-phase electrical fault-to-ground on the 22 kV iso-phase bus. The inspectors reviewed Revision 0 of LER 2004-003, as documented in IR 050000271/2004005. Entergy submitted Revision 1 to document a change to the root cause of the event based on the results of laboratory analyses. The inspectors did not identify any additional findings during this review. This LER is closed.

4OA5 Other Activities

1. Temporary Instruction (TI) 2515/161 - Transportation of Reactor Control Rod Drives in Type A Packages

a. Inspection Scope

This area was inspected to verify that the licensee's radioactive material transportation program complies with specific requirements of 10 CFR Parts 20, 71, and DOT regulations contained in 49 CFR Part 173. The inspectors interviewed licensee personnel and determined the licensee had undergone refueling/defueling activities between January 1, 2002, and present, but it had not shipped irradiated control rod drives in Department of Transportation Specification 7A Type A packages.

b. Findings

No findings of significance were identified.

2. Power Uprate: Erosion-Corrosion/Flow Accelerated Corrosion (71004)

a. Inspection Scope (one sample)

The objective of this inspection was to determine whether Entergy erosion-corrosion/flow-accelerated-corrosion (EC/FAC) monitoring and maintenance were being accomplished in accordance with 10 CFR 50.65, the Maintenance Rule; licensee commitments to implement Generic Letter 89-08, "Erosion/Corrosion Induced Pipe Wall Thinning;" and licensee approved procedures. The inspectors reviewed the EC/FAC program to determine whether Entergy performed the required actions to detect adverse effects (wall thinning) on systems and components as a result of operating changes related to an extended power uprate such as increased flow in primary or secondary systems, including their interfacing systems. Responsibility for the implementation of the VY EC/FAC program is delegated, by controlled procedure, to the Design Engineering Mechanical/Structural Department. The Lead Design Engineer within the Design Engineering Department is delegated responsibility for overall program management, administration and execution.

The inspectors reviewed Entergy's implementation of a long term EC/FAC monitoring program to determine whether it was consistent with NUREG-144, GL 89-08 and the guidelines in Electric Power Research Institute (EPRI) Report NSAC-202L-R2. Also, the inspectors reviewed procedures and administrative controls to determine whether those procedures and controls ensure the structural integrity of high energy (two phase and single phase) carbon steel systems. The inspectors reviewed Entergy's established EC/FAC program to verify the degradation of piping and components was described in the procedures and the examination activities were properly managed, maintained and documented.

The inspectors reviewed the program to determine whether it was well defined and included systematic methods for predicting which systems and specific locations within those systems are susceptible to EC/FAC. Also, the inspectors reviewed the licensee EC/FAC activity to determine utilization of the industry sponsored predictive program (CHECWORKS) to verify the selection of the most susceptible locations for inspection and additional locations based on unique operating conditions. The inspectors noted the inspection results are compared to the locations predicted as most susceptible to high wear to verify the program predictive accuracy. The inspectors reviewed a portion of the inspection data and analysis of the most susceptible piping components to determine the results were clearly documented. Also, the inspectors reviewed how inspection data was trended to determine EC/FAC wear rates and identify the future inspection period. The inspectors reviewed CR 2005-2239 which identified a minor procedural non-compliance involving the update of the CHECWORKS predictive model following the 2002 and 2004 refuel outages.

A documentation review was performed to confirm examination activities were performed in accordance with the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code requirements. The inspectors reviewed the EC/FAC program to determine whether it contained specific guidance for actions such as additional inspection, engineering evaluation and repair or replacement of those components when wall thinning is detected. The inspectors reviewed the inspection procedures to determine that repair or replacement of components determined or predicted to wear below minimum wall thickness requirements was to be performed in accordance with Entergy's ASME Section XI program or the original design code requirements. Additionally, the inspector confirmed that the licensee's method of performing ultrasonic testing of carbon steel for material thickness measurement was adequately described in site approved procedures. The equipment used in the performance of the test(s) was within its calibration intervals and had been calibrated against known standards for the type of material and range of thickness to be measured. Personnel conducting the non-destructive examinations were documented as qualified to perform thickness measurements.

The inspectors selected the feedwater system for a detailed review of the licensee's EC/FAC monitoring effectiveness. The sample selection was based on the inspection procedure objectives and risk priority of those components and systems where accelerated wear rates were predicted to cause wall thinning. The inspectors performed a walkdown of plant piping and components to verify the as-built configuration of the plant was consistent with the plant-specific EC/FAC program sketches. Also, the inspectors verified selected high wear rate locations were accurately represented on the Corrosion Inspection Program Component Location Sketches. The inspectors examined eight EC/FAC program component sketches of the feedwater system which identified susceptible locations for EC/FAC during the initial system evaluation. The inspectors reviewed a minimum of fifteen locations that were identified as susceptible by the CHECWORKS predictive model. The inspectors reviewed the specified acceptance criteria for required wall thickness to determine that sufficient margin above the applicable code limits was provided to permit an evaluation and determination of appropriate corrective actions.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

Resident Exit

On October 11, 2005, the resident inspectors presented the inspection results to Mr. Jay Thayer and members of his staff. The inspectors asked whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Entergy Personnel

J. Devincentis, Licensing Manager
J. Dreyfuss, Director of Engineering
M. Hamer, Licensing
W. Maguire, General Plant Manager
N. Rademacher, Director of Nuclear Safety Assurance
J. Thayer, Site Vice President
C. Wamser, Operations Manager

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

05000271/2004003-01	LER	Automatic Reactor Scram Due to a Main Generator Trip as a Result of an Isophase Bus Duct Two-phase Electrical Fault (Section 4OA3.1)

Discussed

05000271/2004008-03	NCV	Degraded Voltage Relay Setpoint Calculations (Section 4OA2.2)
05000271/2004008-07	NCV	Failure to Implement Adequate Design Control for Condensate Storage Tank Temperature (Section 4OA2.3)

LIST OF DOCUMENTS REVIEWED

Section 2: Radiation Safety

Quality Control Surveillances: July 16, 2003; December 19, 2003; December 1, 2003; May 7, 2004; November 9, 2004; July 6, 2005

Shipping Records: 2003-13, 2004-69, 2005-25, 2005-46, 2005-43, 2005-51, 2005-03, 2005-27, 2005-36, 2005-45

DOT Spec 7A, Type A, 14-170 Transportation Cask engineering document no. 04-40-5101-060-R-23
Quality Assurance Audit no. QA-15-2004-VY-01: Radwaste/Process Control Program

NUPIC Audits: Duratek - Barnwell, March 2004; Duratek - Oakridge and Kingston, TN, May 2003; Studsvik, October 2004; RACE, May 2005

Procedures

AP 0504	Shipment of Radioactive Materials
AP 0508	TIP Room Entry, Rev. 11
AP 0541	Access to High and Very High Radiation Areas, Rev. 5
ENN-RW-102	Radioactive Shipping Procedure, Rev. 0
OP 2151	Liquid Radwaste, Rev. 3
OP 2153	Solid Radwaste, Rev. 24
OP-2511	14-170 and 8-120 Cask/Liner Handling, Rev. 32
PP-7504	Process Control Program, Rev. 4

Condition Reports

2004-0332	Adverse trend: Inleakage to condensate backwash receiving tank
2004-2318	Requirement of OP 2153, Step E.1.a is not always followed
2004-2785	PCP doesn't clearly identify responsibility for maintenance of non-maintenance rule radwaste systems
2004-3228	Inappropriate work planning for scaffold erection
2004-3570	Rework caused by inability to transfer cleanup resin to radwaste
2005-0064	Required radwaste training qualifications not being tracked by the training department
2005-0372	Unable to clear anticipated HRAs during RWCU resin transfer
2005-1163	Temporary shielding documentation discrepancies
2005-1857	OP 2153, Solid Radwaste, may not meet NRC Branch Technical Paper
2005-2094	Dose rates found to be above administrative limits for shipping
2005-2291*	Untimely implementation of corrective actions associated with CR 2005-1857

Section 4OA2.1: Routine Review of Identification and Resolution of Problems

Condition Reports

2004-2448	Spurious CRP 9-5-G-2 alarm
2005-0050	Electric fire pump discharge check valve (V76-3B) disassembly and inspection could not be performed as scheduled
2005-0561	Unexpected alarm during OP 4137
2005-0662	Spurious CRP 905 Drywell-Torus Delta-P Low Alarms received during testing
2005-1446	Operator burden performance indicator is red
2005-1746	RCIC vacuum tank sensing line leak
2005-1762	Ultrasonic thickness (UT) measurement below minimum acceptable
2005-1796	Repeat unexpected receipt of Battery Charger Fail/DC-1 Ground annunciator
2005-1812	Fluctuating voltage on bus DC-1
2005-1839	DC-1 ground detection reading increased from normal reading of approximately 2 volts to 38 volts
2005-1868	Control room panel alarm 9-8-–2 Battery charger fail/DC-1 GND in and out

2005-1895	Impact summary information for BC-1-1A troubleshooting work order not formally documented
2005-1909	OP4311 & OP4338 used incorrect values to calculate the H_20/psig conversion table
2005-2002	Walkdown of torus - post Fitzpatrick shutdown
2005-2008	Water found in East switchgear room
2005-2016	125 VDC BUS-1 ground indications
2005-2023	125 VDC Station Main subsystem exceeds unavailability criterion
2005-2061	Several “sympathy” alarms received during the performance of surveillance testing
2005-2079*	Notification procedures not in place for state estimator being out of service
2005-2080	Surveillance forms for RRU-7 & 8 were not brought to Shift Manager for review until 2 months later
2005-2171	Existing DC-1 positive high resistance ground fault isolated to recirc “A” control logic
2005-2228	RCIC suction pressure high alarm
2005-2264*	Criticality information not logged in the control room log
2005-2344*	DCW-16A, diesel cooling water to turbo charger valve, operator broken
2005-2350*	As-left calibration tolerance in Form VYOP 4255.02 does not agree with OP 4255 body or VYC-0715
2005-2472*	NRC Resident observed inconsistency in verifying post maintenance testing was controlled and completion documented
2005-2527	CST temperature at the high end of the limit

* Inspector-identified issues

Section 4OA2.3: Annual Sample Review - Failure to Implement Adequate Design Control for Condensate Storage Tank Temperature

Procedures

VYOPF 0150.01, “Auxiliary Operator Round Sheet Outside,” Revision 43

Calculation Documents

VYC-1310	Core Spray Pump NPSH Available from Condensate Storage Tank, Revision 0
VYC-1808	Core Spray and Residual Heat Removal Pump Net Positive Suction Head Margin Following a Loss of Coolant Accident With Fibrous Debris on the Intake Strainers, Revision 7
VYC-1825	Analysis of Suppression Pool Temperature for Relief Valve Discharge Transients, Revision 0
VYE-1068	HPCI Hydraulic Calculation, Revision 0

Condition Reports

2004-2600	Operability statement for CR 2002-2942 wasn’t fully conservative
2004-2650	VYC 2295 assumed a CST temperature of 90F for EPU

2004-2807	OPL-3A for EPU listed a lower CST temperature than actually historically recorded on VYOPF 0150.01

Miscellaneous Documents

Core Spray System Design Basis Document, Revision 1
High Pressure Coolant Injection System Design Basis Document, Revision 2
Residual Heat Removal System Design Basis Document, Revision 2

Section 4OA5.2: Power Uprate: Erosion-Corrosion/Flow Accelerated Corrosion

Procedures

5-15-2000	FAC Susceptible Piping Identification
AP 0070	ASME Section XI Repair and Replacement Procedure, Rev 3
DP 0072	Structural Evaluation of Thinned Wall Piping Components
EN-OE-100	Operating Experience Program, Rev 1
ENN-EP-S-005	Flow Accelerated Corrosion Component Scanning and Gridding Standard, Rev 0
ENN-NDE-2.10	Certification of NDE Personnel, Rev 1
ENN-NDE-9.05	Ultrasonic Thickness Examination, Rev 0
PP 7028	Piping Flow Accelerated Corrosion Inspection Program Including Component Gridding Guidelines
PP 7031	Vermont Yankee Engineering Program, Rev 1

Condition Report

2005-2239	CHECWORKS Predictive Models Not Updated

Corrective Action Report

2003-00327, 1	Perform a Focused Self Assessment of the FAC Program
2003-00327, 2	Perform “Snapshot” Self Assessment of the VY FAC Program
2003-00327, 3	Develop Formalized Communication, Operations & FAC Program
2003-00327, 4	Conversion of Location Sketches to Plant Drawings
2003-00327, 5	Adopt ENN FAC Program Procedure ENN-DC-315
2003-00327, 6	Incorporate Evaluations and/or Calculations into Program

Self Assessments

2000-002	Self Assessment Report of 5-31-2000
2001-004	Self Assessment Report of 4-19-2001
2001-007	Self Assessment Report of 4-17-2001
2002-003	Self Assessment Report of 12-6-2002
10-27-2004	Design Engineering Focused Self Assessment Report

LIST OF ACRONYMS

ADAMS	Automated Document Access Management System
ALARA	As Low As Is Reasonably Achievable
ASME	American Society of Mechanical Engineers
CEDE	Committed Effective Dose Equivalent
CFR	Code of Federal Regulations
CR	Condition Report
CRD	Control Rod Drive
CST	Condensate Storage Tank
CT	Calibration Tolerance
DAW	Dry Active Waste
DOT	U. S. Department of Transportation
EC/FAC	Erosion-Corrosion/Flow-Accelerated Corrosion
EDG	Emergency Diesel Generator
EP	Emergency Preparedness
FA	Fire Area
FZ	Fire Zone
HPCI	High Pressure Coolant Injection
IPEEE	Individual Plant Examination External Events
kV	Kilovolt
LER	Licensee Event Report
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NPSH	Net Positive Suction Head
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
ON	Vermont Yankee Off-Normal Procedure
OP	Vermont Yankee Operating Procedure
PCP	Process Control Program
PMT	Post Maintenance Testing
PP	Vermont Yankee Program Procedure
RACE	Radiological Assistance Consulting and Engineering
RCIC	Reactor Core Isolation Cooling
RFO	Refueling Outage
RHR	Residual Heat Removal
RP	Radiation Protection
RRU	Reactor Recirculation Unit
RWP	Radiation Work Permit
SDP	Significance Determination Process
TA	Temporary Alteration
TI	Temporary Instruction
UFSAR	Updated Final Safety Analysis Report
Vac	Alternating Current Volt
VY	Vermont Yankee