

January 27, 2003

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

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION - NRC INTEGRATED
INSPECTION REPORT 50-271/02-08

Dear Mr. Thayer:

On December 28, 2002, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Vermont Yankee Nuclear Power Station. The enclosed report documents the inspection findings which were discussed on January 9, 2003, with Mr. M. Balduzzi and other 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.

Since the terrorist attacks on September 11, 2001, the NRC has issued two Orders (dated February 25, 2002, and January 7, 2003) and several threat advisories to licensees of commercial power reactors to strengthen licensee capabilities, improve security force readiness, and enhance access authorization. The NRC also issued Temporary Instruction 2515/148 on August 28, 2002, that provided guidance to inspectors to audit and inspect licensee implementation of the interim compensatory measures (ICMs) required by the February 25th Order. Phase 1 of TI 2515/148 was completed at all commercial nuclear power plants during calendar year (CY) '02, and the remaining inspections are scheduled for completion in CY '03. Additionally, table-top security drills were conducted at several licensees to evaluate the impact of expanded adversary characteristics and the ICMs on licensee protection and mitigative strategies. Information gained and discrepancies identified during the audits and drills were reviewed and dispositioned by the Office of Nuclear Security and Incident Response. For CY '03, the NRC will continue to monitor overall safeguards and security controls, conduct inspections, and resume force-on-force exercises at selected power plants. Should threat conditions change, the NRC may issue additional Orders, advisories, and temporary instructions to ensure adequate safety is being maintained at all commercial power reactors.

Jay K. Thayer

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Sincerely,

/RA/

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

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

Enclosure: Inspection Report 50-271/02-08
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. 50-271/02-08

Licensee: Entergy Nuclear Vermont Yankee, LLC

Facility: Vermont Yankee Nuclear Power Station

Location: 546 Governor Hunt Road
Vernon, Vermont
05354-9766

Dates: September 29 - December 28, 2002

Inspectors: David L. Pelton, Senior Resident Inspector
Edward C. Knutson, Resident Inspector
Frank J. Arner, Senior Project Engineer
Thomas F. Burns, Reactor Inspector
Suresh K. Chaudhary, Senior Reactor Engineer
Joseph T. Furia, Senior Health Physicist
Edwin H. Gray, Senior Reactor Inspector
Thomas Hipschman, Reactor Inspector
Jason C. Jang, Senior Health Physicist
Kenneth M. Jenison, Senior Project Engineer
James D. Noggle, Senior Health Physicist
David M. Silk, Senior Emergency Preparedness Inspector

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

SUMMARY OF FINDINGS

IR 05000271-02-08; Entergy Nuclear Vermont Yankee LLC; on 09/29-12/28/02; Vermont Yankee Nuclear Power Station; Unit 1. Routine Baseline Inspection Report.

This report covers a 13 week period of inspection by resident inspectors and announced inspections by regional inspectors in the areas of radiation protection, in-service inspection, and emergency preparedness. 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. Inspector Identified and Self-Revealing Findings

No findings of significance were identified.

B. Licensee Identified Findings

None.

REPORT DETAILS

Summary of Plant Status

At the beginning of the inspection period, Unit 1 was operating at 94 percent power, in a gradual power reduction due to fuel depletion. The reactor plant was shutdown on October 6, 2002 for its twenty-third refueling outage. A reactor plant startup was performed on October 25, 2002 and on October 27, 2002 operators synchronized the main generator to the grid. The reactor plant achieved full power on October 29, 2002 and, with the exception of minor power reductions for control rod pattern adjustments, continued at, or near, full power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection

a. Inspection Scope

The inspectors reviewed measures established by the licensee for dealing with the cold weather susceptibilities of the facility, as a whole, and on risk-significant mitigating systems equipment. The inspectors performed partial walkdowns of accessible portions of selected systems, reviewed the licensee's design basis documentation, and reviewed the licensee's Individual Plant Examination External Events (IPEEE) dated June 30, 1998. The inspectors evaluated the adequacy of the facility and specific systems against the requirements of Vermont Yankee Operating Procedure (OP) 2196, "Preparations for Cold Weather Operations," Revision 13 and OP 3127, "Natural Phenomena," Revision 16. The inspectors also reviewed event reports (ERs) to verify that those documents did not reveal issues that could affect the licensee's ability to deal with the cold weather susceptibilities. The inspectors verified the suitability of the following for dealing cold weather susceptibilities:

- Measures established for dealing with cold weather effects on service water and the alternate cooling system;
- Site preparations for cold weather operations; and
- The susceptibility of the high pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) systems to the effects of cold weather.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

1. Partial System Walkdowns

a. Inspection Scope

The inspectors performed four partial system walkdowns of risk significant systems to verify system alignment and to identify any discrepancies that would impact system operability. Observed plant conditions were compared with the standby alignment of equipment specified in the licensee'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:

- The RCIC system on October 2, 2002;
- The "A" and "B" emergency diesel generators (EDGs) on October 8, 2002;
- The "B" residual heat removal (RHR) subsystem on October 31, 2002; and
- The standby liquid control system on December 13.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

1. Routine Area Inspection

a. Inspection Scope

The inspectors identified fire areas important to plant risk based on a review of the licensee's Safe Shutdown Capability Analysis, Revision 6, dated December 23, 1999 as well as the IPEEE. Additional plant areas were selected based on their increased significance due to on-going plant maintenance. The inspectors toured plant areas important to safety in order to verify the suitability of the licensee'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 were inspected:

- The reactor building, 280-foot elevation on September 30, 2002;
- The reactor building, 303-foot elevation on September 30, 2002;
- The control room building, 248-foot elevation, west switchgear room on October 10, 2002;
- The turbine building, 228-foot and 248-foot elevations, low pressure heater bay, high pressure heater bay, and main condenser bay on October 25, 2002;
- The control room building, 260-foot elevation, cable vault on November 5, 2002;
- The reactor building, 213-foot elevation, torus room, on November 22, 2002;
- The control room building, 248-foot elevation, east switchgear on December 9, 2002;

- The turbine building, 248-foot elevation, “A” and “B” EDG rooms on December 10, 2002; and
- The intake structure on December 11, 2002.

b. Findings

No findings of significance were identified.

2. Plant Fire Drill

a. Inspection Scope

On November 12, the inspectors observed a plant fire drill that was conducted for the on-shift operations crew. The drill included off-site participation by a local fire department. The drill was conducted in accordance with “2002 Annual Off-Site Participation Fire Drill.” This drill involved a simulated fire in the station’s intake structure. The inspectors evaluated the fire brigade’s performance in the areas of:

- clarity and formality of communications with involved local volunteer fire department personnel and the main control room;
- ability to take timely actions;
- prioritization, interpretation, and verification of fire alarms;
- procedure use;
- oversight and direction from supervisors; and
- group dynamics.

Fire brigade performance in these areas was compared to the performance criteria contained in “2002 Annual Off-Site Participation Fire Drill” as well as licensee management expectations and guidelines as presented in OP 3020, “Fire Emergency Response Procedure,” Revision 25. The inspectors verified that the fire brigade crews completed the critical tasks listed in the drill package. For any weaknesses identified, the inspectors observed the licensee evaluators to verify that they also noted the issues and discussed them in the critique at the end of the drill.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

a. Inspection Scope

The inspectors reviewed the updated final safety analysis report (UFSAR) and IPEEE to identify areas affected by internal flooding. The inspectors performed walkdowns of areas containing risk-significant systems, structures, and components including:

- Reactor Building, 213-foot elevation, emergency core cooling system (ECCS) corner rooms.

Items which were focused on during this inspection included the condition of watertight doors and penetrations, curbing, and floor drains. The inspectors compared the conditions of the focus items to the recommendations and requirements of the licensee's UFSAR and IPEEE.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance

a. Inspection Scope

The inspectors selected a sample of heat exchangers and coolers for inspection to verify that the licensee was identifying potential deficiencies which could mask degraded performance and potential common cause heat sink performance problems that have the potential to increase risk. The sample was selected from systems that are ranked high in the plant specific risk assessment. The components selected for inspection were:

- Residual heat removal (RHR) system heat exchangers E-14-1A and E-14-1B;
- Reactor building closed cooling water (RBCCW) system heat exchangers E-8-1A and E-8-1B; and
- Reactor recirculation unit (RRU), southeast corner room cooler E-8.

The inspectors reviewed the licensee's test methodology, frequency of testing, test results and acceptance criteria for the above heat exchangers and cooler. The inspectors verified that tests were conducted in accordance with accepted industry practices and the acceptance criteria was consistent with design basis values. The inspectors verified that the tests properly reflected design basis specification values (flow rate, temperature and pressure). The inspectors reviewed documentation of test instrument calibration and verified recorded test data considered instrument inaccuracies and differences.

The inspectors reviewed the frequency of maintenance and cleaning of the heat exchangers and coolers listed above with the system engineers and ensured that these activities were scheduled and performed using trend data developed from periodic heat transfer tests and previously performed visual inspections (open and clean). The inspectors examined the trending of the measured data for the components inspected and assessed the licensee determination of the cause for any significant change in the trend and steps taken to disposition unexpected changes in performance.

The inspectors reviewed the methods and results of heat exchanger performance inspections and cleaning with the system engineer and determined that methods used were consistent with expected degradation. The inspectors reviewed the disposition of as-found results and determined the heat exchanger final condition was acceptable. Also, the inspectors reviewed the tube non-destructive test method (eddy current) and test frequency to determine if they were consistent with accepted industry practices and were sufficient to detect degradation prior to loss of heat removal capability.

The inspectors reviewed the results of the performance test of the replacement cooling coil installed in reactor recirculation unit (RRU) cooler RRU-8 to determine coil performance met design criteria described in the licensee's UFSAR and Technical Specifications (TS). The inspectors reviewed test data and trending analysis records and verified that chemical treatments were effective for control of corrosion and biotic fouling of service water and RHR service water.

b. Findings

No findings of significance were identified.

1R08 In-Service Inspection

a. Inspection Scope

The inspectors observed various activities during refuel outage 23 (RF0 23) including the calibration of equipment and ultrasonic testing (UT) of the reactor vessel head stainless steel clad for conditions identified in the General Electric Services Information Letter (GE SIL) No. 539. The inspectors reviewed the pre-inspection mockup UT examination work scope, UT technique and compared these to the requirements of the licensee's procedure for UT of the inner radius of feedwater shell-to-nozzle area. The inspectors reviewed the reactor pressure vessel (RPV) lower head-to-support skirt inspection preparations as well as the procedure for performance of the visual inspections. The inspectors observed the preparations and examination by automated UT of jet pump diffuser #10 as follow-up to a previously identified indication. The video-visual examination records for jet pump support beams 2, 3, 4, 5, 6, and 7 were also reviewed. The inspectors attended a flow accelerated corrosion (FAC) pre-job briefing regarding thickness scan method and grid identification convention. Finally, the inspectors reviewed the radiographs for a RCIC system modification flange-to-pipe welds RC4-S42 and RC4-S43 and compared the results to the American Society of Mechanical Engineering (ASME) Code and the licensee's radiographic procedural requirements.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

On December 11 and 18, the inspectors observed simulator examinations for two operating crews to assess the performance of the licensed operators and the ability of the licensee's Training and Operating Department staff to evaluate licensed operator performance. The crews were evaluated using As-Found Simulator Evaluation Guide (AFG) 24, "75% Power, High Main Turbine Vibration, Failure of Electrical Bus 2, Leak in the Drywell," Revision 1 and AFG 25, "Loss of Electrical Bus 3, "A" Main Feedwater Pump Trip, ATWS [anticipated transient without scram]," Revision 1.

The inspectors evaluated the crew's performance in the areas of:

- 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; and
- group dynamics.

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

- Vermont Yankee Administrative Procedure (AP) 0151, "Responsibilities and Authorities of Operations Department Personnel," Revision 9;
- AP 0153, "Operations Department Communication and Log Maintenance," Revision 20; and
- Vermont Yankee Department procedure (DP) 0166, "Operations Department Standards," Revision 3.

The inspectors verified that the crews observed completed the critical tasks listed in the above AFGs. The inspectors also compared simulator configurations with actual control board configurations. For any weaknesses identified, the inspectors observed the licensee evaluators to verify that they also noted the issues and discussed them in the critique at the end of each session.

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation

a. Inspection Scope

The inspectors reviewed the performance history of two risk-significant systems to assess the effectiveness of the licensee's maintenance activities. The inspectors also reviewed problem identification and resolution actions for these systems in accordance with station procedures and the requirements of 10 CFR 50.65(a)(1) and (a)(2), "Requirements for Monitoring the Effectiveness of Maintenance." The inspectors evaluated the performance criteria and goals and the maintenance-related corrective actions that were taken (or were planned to be taken) for the following systems:

- The 4 kilovolts (KV) safety-class electrical distribution system; and
- The 345KV safety-class electrical distribution system.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessment and Emergent Work Evaluation

a. Inspection Scope

The inspectors evaluated on-line risk management for one planned and four emergent 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 also compared these items and activities to requirements listed in procedures AP 0125, "Equipment Release," Revision 10 and AP 0172, "Work Schedule Risk Management - Online," Revision 1. The inspectors reviewed the following work activities to determine if they were effectively managed for on-line risk:

- The planned limiting condition for operation (LCO) maintenance period for the HPCI system;
- Licensee actions in response to a failed surveillance of a reactor building-to-torus vacuum relief valve;
- A carbon dioxide (CO₂) fire suppression system surveillance that was conducted coincident with an emergent electrical problem which had rendered the electric fire pump inoperable;
- Licensee actions in response to emergent speed control issues with the recirculation pump motor generators; and
- Identification and correction of a mechanical problem with one of the motor operated disconnects in the 345KV switch yard.

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-routine Plant Evolutions

a. Inspection Scope

The inspectors assessed the control room operators' performance during two non-routine evolutions. Specifically, the adequacy of personnel performance, procedure compliance, and use of the corrective action process were evaluated against the requirements and expectations contained in the following station procedures:

- AP 0151, "Responsibilities and Authorities of Operations Department Personnel," Revision 9;
- AP 0153, "Operations Department Communication and Log Maintenance," Revision 20; and
- DP 0166, "Operations Department Standards," Revision 3.

The inspectors verified adequate personnel response during the following non-routine evolutions:

- Portions of the reactor plant cool down for commencement of the refueling outage on October 6, 2002; and

- Portions of the plant startup from the refueling outage on October 26, 2002.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed a sample of operability determinations prepared by the licensee. The inspectors evaluated the selected operability determinations against the requirements and guidance contained in NRC Generic Letter 91-18, "Resolution of Degraded and Nonconforming Conditions," as well as procedure AP 0167, "Operability Determinations," Revision 0. The inspectors verified the adequacy of following evaluations of degraded or non-conforming conditions:

- The effect of discharge check valve minor seat leakage on RCIC system operability;
- "B" RHR subsystem operability following a potential water hammer event on October 30;
- Licensee assessment of the effect of a failed drywell sump high level alarm and degraded sump pump selector;
- Licensee operability evaluation regarding reactor building-to-torus vacuum breaker function following a failed surveillance of these valves;
- Licensee evaluation of the continued operability of the HPCI system with a leak in the oil supply line to the turbine overspeed device; and
- Licensee evaluation of continued operability of a circuit breaker that interfaces between the 345KV and 115KV switch yards, due to its effect on the availability of off-site power.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors reviewed post-maintenance test activities on risk significant systems to verify that the effect of the test on the plant had been evaluated adequately, test equipment was appropriate and controlled, the test was properly performed in accordance with station procedures, the test data met the required acceptance criteria contained in the licensee's TS, UFSAR, and in-service testing program, and that the test activity was adequate to verify system operability and functional capability following maintenance. The inspectors verified that systems were properly restored following testing and that discrepancies were appropriately documented in the corrective action process. The inspectors reviewed the following post maintenance testing (PMT) activities:

- A reactor pressure vessel post-outage pressure test on October 23, 2002;
- Post-refueling single rod scram time testing on October 23, 2002;
- Testing of the reactor pressure electronic pressure regulator (EPR) modification that was performed during the refueling outage on November 21, 2002; and
- Testing of the reactor vessel level control system modification that was performed during the refueling outage on November 21, 2002.

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

a. Inspection Scope

The inspectors observed portions of the reactor and plant shutdown to verify that control room personnel were appropriately focused on plant operations and that technical specification requirements were satisfied. During the outage, the inspectors reviewed equipment that had been taken out of service and verified compliance with technical specifications as well as verifying that adequate redundant systems or subsystems remained available to satisfy key safety functions. The inspectors also verified that configuration changes accounted for scheduler variances in equipment and system availabilities. At the conclusion of the outage, the inspectors performed a walkdown of the drywell to verify that debris and/or foreign material had not been left behind, following maintenance and testing, which could affect performance of the containment and core cooling systems. The inspectors observed portions of the reactor and plant startup to verify, on a sampling basis, that prerequisite conditions had been met and that control room personnel were appropriately focused on plant operations.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors reviewed and observed surveillance testing to verify that the test acceptance criteria 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 inspector observed pre-job briefs for the test activities. The inspectors verified that systems were properly restored following testing and that discrepancies were appropriately documented in the corrective action process. The inspectors verified that the following surveillance tests met all applicable requirements:

- Outage testing of the standby liquid control (SLC) system squib valves, performed in accordance with OP 4114 and OP 4203 on October 9, 2002;
- "B" core spray pump operability test, performed in accordance with OP 4123 on October 16, 2002;
- ECCS integrated automatic initiation test, performed in accordance with OP 4100 on October 18, 2002;
- RCIC turbine overspeed trip test performed using the Terry Turbine overspeed trip device, performed in accordance with OP 5296 on October 23, 2002; and
- "B" RHR and RHR service water pump quarterly surveillance, performed in accordance with OP 4124 on October 30, 2002.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modificationsa. Inspection Scope

The inspectors reviewed several temporary modifications to verify that they did not adversely affect the availability, reliability, or functional capability of risk-significant structures, systems, and components. Reviewed modifications were also compared to requirements and expectations contained in procedure AP 0020, "Control of Temporary and Minor Modifications," Revision 22. The inspectors verified that the following temporary modifications were appropriately documented and maintained in applicable requirements:

- Main transformer control panel temporary enclosure. This enclosure was installed on the main transformer control panel door due to an event related to overheating of wiring and components;
- Recirculation pump motor generator set speed monitoring. This equipment was installed to troubleshoot problems resulting from minor, uncontrolled pump speed variations caused by the reactor recirculation pump control system; and
- Low pressure CO₂ tent and heat trace." This equipment was installed in and around the low pressure CO₂ fire suppression system to eliminate adverse effects produced by ambient temperature and humidity variations.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP4 Emergency Action Level and Emergency Plan Changes

a. Inspection Scope

During an in-office inspection on November 14, 2002, the inspectors reviewed recent changes to emergency plan documents to determine if the changes resulted in a decrease of effectiveness of the emergency plan. A thorough review was conducted of aspects of these documents related to the risk significant planning standards (RSPS), such as classifications, notifications and protective action recommendations. A cursory review was conducted for non-RSPS documents. These changes were reviewed against 10 CFR 50.54(q) to ensure that the changes did not decrease the effectiveness of the emergency plan, and to ensure that the changes made continue to meet the standards of 10 CFR 50.47(b), "Emergency Plans," and the requirements of 10 CFR 50, Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities." These changes will be the subject of future inspections to ensure that the impact of the changes continue to meet NRC regulations. Documents reviewed during this inspection are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation

a. Inspection Scope

On December 11 and 18, 2002, the inspectors observed two licensed operator crews evaluate events using the station emergency action levels during simulator exams. The inspectors focused on the ability of licensed operators to perform event classification, make proper notifications, and develop protective action recommendations in accordance with the following station procedures:

- AP 0156, "Notification of Significant Events," Revision 24;
- AP 0153, Operations Department Communications and Log Maintenance," Revision 10; and
- AP 3125, "Emergency Plan Classification and Action Level Scheme (Implementing Procedure to the VY E-Plan)," revision 17.

b. Findings

No findings of significance were identified.

2. **RADIATION SAFETY**

Cornerstone: Occupational Radiation Safety2OS1 Access Control to Radiologically Significant Areasa. Inspection Scope

During the period of October 15-18, 2002, the inspectors performed inspections of exposure-significant work areas, high radiation areas, and airborne radioactivity areas and evaluated associated controls and surveys of these areas to determine if the controls were acceptable. Technical Specification (TS) 6.5, "High Radiation Area," and the requirements contained in 10 CFR 20, Subpart G, "Control of Exposure from External Sources in Restricted Areas," were utilized as the standard for evaluating access control barriers. The primary focus during this inspection was work being conducted during RFO 23. The inspectors obtained this information via interviews with licensee personnel; walkdown of systems, structures, and components; and review of records, procedures, and other pertinent documents. The inspectors focused their attention in the following areas:

- Communication of radiological conditions to workers;
- The setting of electronic pocket dosimeter alarm points;
- Adequacy of radiological protection department personnel coverage;
- Adequacy of radiological work permits (RWPs),
- Adequacy of area surveys, samples, postings, and barricades;
- Adequacy of work control instructions.

The inspectors reviewed the following work activities to determine if the radiological controls met applicable requirements:

- Testing and repairs to valves in the drywell (inboard main steam isolation valve and residual heat removal check valve);
- Reactor reassembly and:
- Eddy current testing.

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls

a. Inspection Scope

The inspectors performed an inspection of the licensee's as low as reasonably achievable (ALARA) planning and controls. The inspectors focused on work activities performed during RFO 23. The inspectors reviewed ALARA job evaluations, exposure estimates, and exposure mitigation requirements established for the following work activities (outage goals appear in parentheses):

- Leak rate testing (3.425 roentgen equivalent man (REM));
- Reactor vessel disassembly/reassembly (5.265 REM);
- Safety relief valve work (4.105 REM);
- Equipment staging (13.004 REM); and
- Insulation removal and installation (8.277 REM).

The inspectors compared ALARA plans with actual the exposure results achieved. The inspectors obtained this information via interviews with licensee personnel; walkdown of systems, structures, and components; and review of records, procedures, and other pertinent documents. The licensee established a goal of not more than 85 person-REM total exposure for RFO 23. Outage exposure was tracking approximately 2 person-REM below the goal through the first 12 days of the planned 16 day outage.

A review of actual exposure results versus initial exposure estimates for work was conducted including: Comparison of estimated and actual dose rates and person-hours expended; determination of the accuracy of estimates to actual results; and determination of the level of exposure tracking detail, exposure report timeliness, and exposure report distribution to support control of collective exposures to determine conformance with the requirements contained in 10 CFR 20.1101(b), "Radiation Protection Programs."

b. Findings

No findings of significance were identified.

2OS3 Radiation Monitoring Instrumentation

a. Inspection Scope

The inspectors performed a review of the use and maintenance of field instrumentation utilized by health physics technicians and plant workers to measure radioactivity. The inspectors obtained information via interviews with licensee personnel; walkdown of systems, structures, and components; and examination of records, procedures, or other pertinent documents. Proper use and maintenance of field instrumentation supports the licensee's program for the management of occupational exposure as required by 10 CFR 20.1201, "Occupational Dose Limits for Adults." Specific monitoring instrumentation reviewed included:

- Portable field survey instruments;

- Friskers;
- Portal monitors; and
- Small article monitors

The inspectors also reviewed instrument functional checks and certification of appropriate source checks.

b. Findings

No findings of significance were identified.

Cornerstone: Public Radiation Safety

2PS1 Gaseous and Liquid Effluents

a. Inspection Scope

The inspectors evaluated the effectiveness of the licensee's radioactive gaseous and liquid effluent control programs. The licensee's program was compared to requirements of the radioactive effluent controls specified in the Technical Specifications/Offsite Dose Calculation Manual (TS/ODCM).

The inspectors reviewed the various licensee reports, records, procedures, and program requirements listed in the Attachment to this report. The inspectors reviewed the results of surveillance testing of various systems focusing on: system differential pressure (delta P), in-place testing for high efficiency particulate air (HEPA) filters, in-place testing for charcoal filters, air capacity testing (flow rate), and laboratory tests for iodine collection efficiency. The following air treatment systems were included in this inspection:

- Standby gas treatment system air cleaning systems (trains A and B); and
- The augmented off-gas system.

The inspectors also reviewed the results of effluent radiation monitoring system (RMS) channel calibrations and flow monitor calibrations against TS/ODCM requirements for the following systems:

- RMS channel calibration of the following monitors:
 - The liquid radwaste discharge monitor;
 - The service water discharge monitor;
 - The reactor building closed cooling water monitor;
 - The steam jet air ejector noble gas monitor;
 - The augmented off-gas noble gas monitors;
 - The plant stack noble gas monitors; and
 - The plant stack wide range noble gas monitor;
- Flow monitor calibration of the following monitors:

- The augmented off-gas system flow rate monitors; and
- The plant stack system flow rate monitor.

The inspectors performed the following additional activities to determine that the licensee's radioactive gaseous and liquid effluent control programs were effective:

- Plant walkdowns to determine the availability of radioactive liquid/gaseous effluent RMS;
- Plant walkdowns for determining the availability of air cleaning systems and for determining the equipment material condition; and
- Observations of stack charcoal, particulate, and gas sampling techniques.

b. Findings

No findings of significance were identified.

4. **OTHER ACTIVITIES**

4OA1 Performance Indicator Verification

1. Mitigating Systems Performance Indicators

a. Inspection Scope

The inspectors reviewed licensee event reports, portions of operator logs, maintenance records, and maintenance rule system performance and availability data for the period of July, 2001 to October, 2002 to assess the accuracy and completeness of performance indicator (PI) data submitted by the licensee. The definitions provided in NEI 99-02, "Regulatory Assessment of Performance Indicator Guideline," Revision 2, were used to evaluate this information. The plant records reviewed by the inspectors included selected control room logs, event reports, and maintenance rule program records. The inspectors verified that the licensee accurately reported the following PIs:

- Emergency Alternating Current (AC) Power System Unavailability;
- High Pressure Injection System Unavailability;
- Heat Removal System Unavailability;
- Safety System Functional Failures; and
- Radiological Effluent Technical Specifications (RETS)/ODCM Radiological Effluent Occurrence.

b. Findings

No findings of significance were identified.

4OA2 Problem Identification and Resolution

1. Annual Sample Review

a. Inspection Scope

The inspectors reviewed actions taken by the licensee in response to a series of augmented off-gas (AOG) system radiation monitor indication increases which resulted from failed fuel elements. The inspectors reviewed associated ERs, control room operator logs, and plant computer data. Additionally, the inspectors reviewed numerous Vermont Yankee equipment strip chart recordings, tabulations of data, design calculations, reload calculations, engineering assessments, compensatory and diagnostic actions and operability determinations. Finally, several vendor analyses, one mid-cycle Vermont Yankee analysis and a GE GESTAR II software program (including its algorithm and the results of its application) were assessed. The inspectors reviewed these documents to ensure that the full extent of the issue was identified, an appropriate evaluation was performed, and appropriate corrective actions were specified. The inspectors evaluated actions taken by the licensee against the requirements of the licensee's corrective actions program as delineated in AP 009, "Event Reports," Revision 12 and Vermont Yankee Program Procedure (PP) 7017, "Corrective Action Program Procedure," Revision 1.

b. Findings and Observations

No findings of significance were identified. As it related to the failed fuel issues, the licensee's implementation of their corrective action program; the site design calculation and design calculation verification procedures; and the site management oversight, quality oversight and safety review practices were adequately implemented and responsive to the root and contributing causes of the identified fuel failures. Licensee quality assurance oversight and management in-process reviews identified and responded to several weaknesses with the implementation of corrective actions. This resulted in the effective identification and characterization of the root causes and the extent of conditions related to the failed fuel condition. Operating experience, generic implications, the coordination and application of vendor and third party experience, operator and engineer training, and procedure changes, were also considered and helped to identify and resolve issues in a manner commensurate with the problems identified. The site-wide organizational approach to the failed fuel problem identification, documentation, tracking, trending, resolution, and oversight were determined to be adequate.

2. Routine Review of Problem Identification and Resolution

a. Inspection Scope

The inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify these issues were being entered into the licensee's corrective action system at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. A listing of documents reviewed is included in the Attachment to this report.

b. Findings

No findings of significance were identified.

4OA3 Event Follow-up

1. (Closed) LER 50-271/2002-001-00, "Core Thermal Power [Potentially] Exceeded due to a Non-Conservative Moisture Carryover Assumption."

On October 3, 2001, as a result of information received from General Electric Nuclear Energy (GENE) in September 2001, the licensee determined that the potential existed to have operated above their licensed maximum power level of 1593 megawatts-thermal as set forth in License Condition g.3.a. Since initial start-up, the licensee had used a moisture carryover fraction value of 0.1 percent in their calorimetric calibration model. This value was based on guidance provided by GENE at that time. On October 3, 2001, the licensee received information from GENE that indicated that the use of a moisture carryover fraction of 0.1 percent would be non-conservative if the facilities actual moisture carryover fraction were less than 0.1 percent. Corrective actions taken by the licensee included an immediate change of the value of the moisture carryover fraction in their calorimetric calibration model from 0.1 percent to 0.0 percent (a more conservative value) and a commitment to perform testing to determine the actual moisture carryover fraction value. The licensee performed moisture carryover testing and determined that the average moisture carryover fraction was actually 0.029 percent. Since the actual value for moisture carryover fraction was less than the assumed value of 0.1 percent, the licensee's calorimetric calibration model was historically non-conservative. The licensee determined that the potential maximum change in core thermal power due to the non-conservatism was actually one order of magnitude less than the precision of the maximum critical power ratio (MCPR) limit evaluation process and was bounded by known uncertainties in the computer thermal power estimate. Therefore, the licensee concluded that the use of the non-conservative moisture carryover fraction did not represent a safety issue and did not meet reporting requirements of 10 CFR 50.72 or 50.73. The licensee issued this LER on a "voluntary" basis in accordance with NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73," Paragraph 5.1.4. The LER was reviewed by the inspectors and no findings of significance were identified. The licensee documented the issue in ER 2002-1937. This LER is closed.

4OA5 Other Activities

- .1 (Closed) FIN 50-271/2001-010-01, "Operational Safeguards Response Evaluation (OSRE) Force-On-Force."

The inspectors identified vulnerabilities with the licensee's protected strategy during an OSRE conducted the week of August 20, 2001. This issue was originally documented in inspection report (IR) 50-271/01-010 and characterized as a "Yellow" finding. The NRC conducted a supplemental inspection in accordance with NRC Inspection Procedure 95002, "Inspection for One Degraded Cornerstone or any Three White Inputs in a Strategic Performance Area," during the week of September 23, 2002. Based on the results of this supplemental inspection (as documented in IR 50-271/02-007) the NRC concluded that the licensee effectively evaluated this finding, identified the root

and contributing causes, and established and implemented appropriate corrective actions. This finding is closed.

40A6 Exit Meeting

On January 9, 2003, the resident inspectors presented the inspection results to Mr. M. Balduzzi, and other members of his staff who acknowledged the findings presented. The inspectors asked whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

SUPPLEMENTAL INFORMATIONa. Key Points of ContactLicensee Personnel:

J. Thayer, Site Vice President
 M. Balduzzi, Site Vice President, Operations
 K. Bronson, Plant Manager
 M. Desilets, Technical Support Manager
 D. Giorowall, Programs Supervisor
 M. Gosekamp, Superintendent of Operations Training
 D. Leach, Director of Engineering
 F. Marcussen, Manager of Security Operations
 C. Wamser, Operations Manager
 R. Wanczyk, Director of Nuclear Safety

NRC personnel:

J. White, Chief, Radiation Safety and Safeguards Branch

b. List of Items Opened, Closed, and DiscussedOpened

None.

Closed

50-271/2002-001-00	LER	Core Thermal Power [Potentially] Exceeded due to a Non-Conservative Moisture Carryover Assumption (Section 4OA3.1)
50-271/2001-010-01	FIN	Operational Safeguards Response Evaluation (OSRE) Force-On-Force (Section 4OA5.1)

c. List of Document Reviewed**Section 1R07: Heat Sink Performance**Procedures

OP 5265, "Service Water Component Inspection and Acceptance Criteria," Revision 4
 PP 7021, "Service Water Program," Revision 0
 OP 502, "Maintenance/Inspection of Safety Related Heat Exchangers," Revision 13
 PP 7601, "Service Water Chemical Treatment and Monitoring Program," Revision 1
 Vermont Yankee Non-Destructive Examination Procedure (NE) 8064, "Visual Examination Methods," Revision 1

Drawings

G-191159 Sh. 1, "Flow Diagram Service Water System"
G-191159 Sh. 2, "Flow Diagram Service Water System"
G-191173 Sh. 2, "Flow Diagram Fuel Pool Cooling & Cleanup System"

Calculations

VY2045RHR, "Phase I Calculation (Design Heat Transfer Rate)," Revision 0

Section 1R08: In-Service InspectionProcedures:

NE 8053, "Ultrasonic Thickness Measurements," Revision 1
NE 8058, "Ultrasonic Testing of Components," Revision 1
NE 8043, "Training and Qualification of NDE [non-destructive examination] Personnel,"
Revision 2
NE 8067, "RPV Internals Inspection Details," Revision 1

Section 1EP4: Emergency Action Level and Emergency Plan ChangesProcedures

AP 3125, "Emergency Plan Classification and Action Level Scheme," Revision 19
OP 3504, "Emergency Communications," Revision 34
OP 3505, "Emergency Preparedness Exercises & Drills," Revision 24
OP 3513, "Evaluations of Off-site Radiological Conditions," Revision 20
OP 3524, "Emergency Actions to Ensure Accountability & Security Response," Revision 1
OP 3533, "Post Accident Sampling of Reactor Coolant," Revision 6
OP 3534, "Post Accident Sampling of Plant Stack Gaseous Release," Revision 4
OP 3540, "Control Room Actions During an Emergency," Revision 1
OP 3541, "Activation of the TSC [technical support center]," Revision 1
OP 3542, "Operation of the TSC," Revision 1
OP 3544, "Operation of the Operations Support Center (OSC)," Revision 2
OP 3545, "Activation of the EOF [emergency operations facility]," Revision 1
OP 3546, "Operation of the Emergency Operations Facility / Recovery Center," Revision 1
Vermont Yankee Emergency Plan, Revision 36

Section 40A2.2: Routine Review of Problem Identification and ResolutionEvent Reports

2000-0703, "Adverse trend for cooling coil"
2001-0086, "No administrative controls have been established for the recovery, reduction, evaluation and reporting of meteorological data information"
2001-0088, "Records to document performance of set-point determination for the stack and AOG alarms could not be located"

2001-0090, "Magnetic tapes for the multi-channel analyzer (MCA) and meteorological data are not being transferred into permanent record storage"

2001-0429, "FP activity detected on floor of FO storage tank sump room"

2001-0688, "RAN-3125 no sample flow"

2001-0863, "Incomplete evaluation for use of condensate transfer as RHR keep fill"

2001-1509, "Unusual noise and vibration"

2001-1411, "Main steam hi 'current as requested set-point' out of administrative range of OP 4617"

2001-1991, "Program procedure PP 7015 R/1, 'Vermont Yankee In-service Inspection Program' Appendices A through G are not controlled in accordance with AP 6805 R/19, 'Document Control' procedure"

2001-2001, "Errors in the 90 day ASME Section XI reports"

2001-2212, "EDG 1A Oil Soaked Rag(s) - Lube Oil Sump"

2001-2474, "Increasing trends on AOG process rad monitors"

2001-2537, "Suspected fuel defect during normal plant operations"

2002-0285, "Programmatic issues with PM scheduled maintenance"

2002-0446, "Increase in off-gas activity following return from sequence exchange and suppression testing"

2002-0502, "Off-gas spike and step change after control rod weekly surveillance"

2002-0506, "Portable eyewash station found without inspection tag"

2002-0520, "EDG 1B Oil Soaked Rag - Lube Oil Sump"

2002-0529, "Adverse trend in FME program implementation"

2002-0566, "Potential adverse trend with regard to multiple fuel failures"

2002-0756, "Gauges not reading correctly (RBCCW)"

2002-0787, "House heating boiler rad monitor failed the monthly source check"

2002-0815, "Pinhole leak on lube oil heat exchanger DG-1-1A"

2002-0864, "Contamination caused false high stack gas sample activity"

2002-0918, "Incorrect procedure steps in procedures being utilized by the chemistry department"

2002-0993, "Spikes in stack gas activity"

2002-1189, "Measurements reveal cladding oxide thickness greater than expected for 2nd cycle fuel"

2002-1313, "Rad waste HVAC work delayed due to barrier breach concern"

2002-2103, "Spent fuel pool dose rates elevated due to water impurities"

2002-2194, "Potential leakage past RCIC-22 check valve"

2002-2518, "Water in RHR pump mechanical seal flow indicators"

2002-2595, "Eight hour report made to the NRC was incorrect"

2002-2633, "Automatic closing function of RCIC-30 not performed"

2002-2652, "Main transformer wiring overheating"

2002-2687, "Water hammer while opening RHR-25B"

2002-2688, "RHR-81B indicating mid-position"

2002-2700, "Operability Determination for leak identified on ER 2002-0815"

2002-2774, "Donated VY computers still had hard drives that contained VY material"

2002-2794, "Erroneous statement in 4.16/480 volt DBD [design basis document] concerning effect of bus transfer with EDG operating"

2002-2811, "RPS [reactor protection system] division RB1 cables found laying in an RA1 cable tray"

2002-2826, "Potential cable separation violations - RPS trays"

2002-2828, "Assumption used for IPEEE evaluation currently incorrect"

2002-2852, "Cable vault tray risers mislabeled"

2002-2978, "Outboard automatic oiler ["B" control rod drive system pump] level low out of specification"

d List of Acronyms

ADAMS	Automated Document Access Management System
AFG	As-Found Simulator Evaluation Guide
AP	Vermont Yankee Administrative Procedure
ALARA	As Low as is Reasonably Achievable
AOG	Augmented Off-Gas
CFR	Code of Federal Regulation
CO2	Carbon Dioxide
DP	Vermont Yankee Department Procedure
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
EOF	Emergency Operations Facility
ER	Event Report
GE	General Electric
GENE	General Electric Nuclear Energy
HPCI	High Pressure Coolant Injection
ICM	Interim Compensatory Measures
IPEEE	Individual Plant Evaluation of External Events
ISI	In-service Inspection
IR	Inspection Report
KV	Kilovolt
LER	Licensee Event Report
NRC	Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
OP	Vermont Yankee Operating Procedure
OSRE	Operational Safeguards Response Evaluation
PI	Performance Indicator
PMT	Post Maintenance Testing
PP	Vermont Yankee Program Procedure
RBCCW	Reactor Building Closed Cooling Water
RCIC	Reactor Core Isolation Cooling
RRU	Reactor Recirculation Unit
REM	Roentgen Equivalent Man
RFO	Refueling Outage
RHR	Residual Heat Removal
RMS	Radiation Monitoring System
RPV	Reactor Pressure Vessel
RSPS	Risk Significant Planning Standards
SLC	Standby Liquid Control
TS	Technical Specification
TSC	Technical Support Center
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic Testing
VY	Vermont Yankee

