UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
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August 12, 2011

Mr. Michael Colomb
Site Vice President
Entergy Nuclear Operations, Inc.
Vermont Yankee Nuclear Power Station
185 Old Ferry Road
P.O. Box 500
Vernon, VT 05354

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION -
NRC COMPONENT DESIGN BASES INSPECTION REPORT
05000271/2011007

Dear Mr. Colomb:

On June 30, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at the Vermont Yankee Nuclear Power Station. The enclosed inspection report documents the inspection results, which were discussed on June 30, 2011, with you 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. In conducting the inspection, the team examined the adequacy of selected components and operator actions to mitigate postulated transients, initiating events, and design basis accidents. The inspection involved field walkdowns, examination of selected procedures, calculations and records, and interviews with station personnel.

Based on the results of this inspection, no findings 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 the public inspection in the NRC Public Docket Room or from the Publicly Available Records component of NRC's document system, Agencywide Documents Access and Management 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,

Lawrence T. Doerflein

Lawrence T. Doerflein, Chief
Engineering Branch 2
Division of Reactor Safety

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Sincerely,

/RA/

Lawrence T. Doerflein, Chief
Engineering Branch 2
Division of Reactor Safety

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Inspection Report 05000271/2011007
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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No:	50-271
License No:	DPR-28
Report No:	05000271/2011007
Licensee:	Entergy Nuclear Operations, Inc.
Facility:	Vermont Yankee Nuclear Power Station
Location:	Vernon, Vermont 05354-9766
Inspection Period:	June 6 - 30, 2011
Inspectors:	J. Schoppy, Senior Reactor Inspector, Division of Reactor Safety (DRS), Team Leader J. Brand, Reactor Inspector, DRS R. Fuhrmeister, Senior Reactor Inspector, DRS C. Williams, Reactor Inspector, DRS T. Ziev, Nuclear Safety Professional Development Program, Division of Reactor Projects (Trainee) C. Baron, NRC Mechanical Contractor J. Nicely, NRC Electrical Contractor
Approved By:	Lawrence T. Doerflein, Chief Engineering Branch 2 Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000271/2011007; 06/06/2011 - 06/30/2011; Vermont Yankee Nuclear Power Station; Component Design Bases Inspection.

The report covers the Component Design Bases Inspection conducted by a team of four NRC inspectors and two NRC contractors. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

No findings were identified.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R21 Component Design Bases Inspection (IP 71111.21)

.1 Inspection Sample Selection Process

The team selected risk significant components and operator actions for review using information contained in the Vermont Yankee Probabilistic Risk Assessment (PRA) and the U. S. Nuclear Regulatory Commission's (NRC) Standardized Plant Analysis Risk (SPAR) model for the Vermont Yankee Nuclear Power Station. Additionally, the team referenced the Risk-Informed Inspection Notebook for the Vermont Yankee Nuclear Power Station (Revision 2.1a) in the selection of potential components for review. In general, the selection process focused on components and operator actions that had a Risk Achievement Worth (RAW) factor greater than 1.3 or a Risk Reduction Worth (RRW) factor greater than 1.005. The components and actions selected were associated with both safety-related and non-safety related systems, and included a variety of components such as pumps, breakers, fans, transformers, transmitters, batteries, and valves.

The team initially compiled a list of components and operator actions based on the risk factors previously mentioned. Additionally, the team reviewed the previous component design bases inspection (CDBI) reports (05000271/2008008, 05000271/2006007, and 05000271/2004008) and excluded the majority of those components previously inspected. The team then performed a margin assessment to narrow the focus of the inspection to 17 components and five operating experience (OE) items. The team selected the torus and a primary containment isolation valve (CS V14-12B) for large early release fraction (LERF) implications. The team's evaluation of possible low design margin included consideration of original design issues, margin reductions due to modifications, or margin reductions identified as a result of material condition/equipment reliability issues. The assessment also included items such as failed performance test results, corrective action history, repeated maintenance, Maintenance Rule (a)(1) status, operability reviews for degraded conditions, NRC resident inspector insights, system health reports, and industry OE. Finally, consideration was also given to the uniqueness and complexity of the design and the available defense-in-depth margins.

The inspection performed by the team was conducted as outlined in NRC Inspection Procedure (IP) 71111.21. This inspection effort included walkdowns of selected components; interviews with operators, system engineers, and design engineers; and reviews of associated design documents and calculations to assess the adequacy of the components to meet design basis, licensing basis, and risk-informed beyond design basis requirements. Summaries of the reviews performed for each component and OE sample are discussed in the subsequent sections of this report. Documents reviewed for this inspection are listed in the Attachment.

.2 Results of Detailed Reviews

.2.1 Detailed Component and Operator Action Reviews (17 samples)

. 2.1.1 Start-Up Transformer T-3-1A

a. Inspection Scope

The team reviewed the system one-line diagrams, nameplate data, and loading requirements to determine the adequacy of the start-up transformer in meeting its design basis requirements, which include supplying preferred offsite power to the associated 4160Vac buses. The team reviewed periodic maintenance and testing practices to ensure that Entergy maintained the equipment in accordance with industry practices. The team reviewed load flow and protection/coordination calculations to verify that station offsite power would be available and unimpeded during accident/event conditions. The team reviewed offsite power connections and the Transmission Operator notification protocols for the 115/345kV switchyard. The team also reviewed system health reports, component maintenance history, and licensee corrective action program (CAP) reports to verify that Entergy monitored or prevented potential degradation. The team reviewed selected industry OE and the associated plant actions to address the applicable issues to verify that Entergy appropriately applied insights from the OE. The team interviewed system engineers and maintenance personnel in order to review the design and system functional requirements, as well as obtain historical performance and trend data. Finally, the team conducted walkdowns and visual inspections of the transformer and its associated auxiliaries, including its connection to the 115/345kV switchyard, to assess the installation configuration and material condition, and potential vulnerability of the transformer to external hazards.

b. Findings

No findings were identified.

.2.1.2 Suppression Pool (Torus)

a. Inspection Scope

The team reviewed documentation associated with the torus, interviewed station personnel, and performed several walkdowns of the torus area to verify the integrity and material condition of the torus and its structural supports. Specifically, the team reviewed the most recent torus report for desludging, the coating inspection and repair report, as well as recent visual inspection results, to verify the material condition of the torus interior and coating system. The team reviewed the most recent primary containment leakage rate test report to verify the acceptability of containment leakage. The team reviewed recent containment temperature and level data to verify that operators maintained the torus within the required limits. The team reviewed the most recent functional test and calibration results for the drywell/torus differential pressure instruments to verify that they would perform their required function. In addition, the team performed walkdowns of the

torus area to identify any potential issues with the torus and its associated vacuum breakers, to assess the material condition of the visible portions of the torus and supports, and to verify that there were no external hazards in the area. The team also reviewed corrective action documents and system health reports, and interviewed the responsible engineer to determine whether there were any adverse operating trends or existing issues affecting torus integrity or capability.

b. Findings

No findings were identified.

.2.1.3 Main Station Battery B-1-1-B

a. Inspection Scope

The team inspected the 'B' 125 volt direct current (VDC) battery to verify that it was capable of meeting its design basis requirements for a loss-of-coolant accident (LOCA) concurrent with a loss-of-offsite power (LOOP) or a station blackout (SBO) event. The team reviewed maintenance and test procedures, completed surveillance tests, the manufacturer's instructions, the associated 125 VDC design basis document (DBD), and the design calculations to verify that Entergy adequately maintained the capacity and condition of the 'B' 125 VDC battery in accordance with design requirements and vendor recommendations. The team verified that the design conditions and capacities were properly incorporated into procedures and instrument setpoints. The team reviewed the 125 VDC battery sizing calculations to determine whether adequate voltage and charge was available to support the associated loads. The team also reviewed corrective action documents and system health reports, and interviewed the system engineer to determine whether there were any adverse operating trends or existing issues affecting 'B' 125 VDC battery reliability. Finally, the team performed a visual examination of the 'B' 125 VDC battery, as well as the redundant 'A' 125 VDC battery, to assess the material condition and the presence of potential hazards to the 125 VDC batteries.

b. Findings

No findings were identified.

.2.1.4 Alternate Cooling System

a. Inspection Scope

The team evaluated the manual operator actions to align and start the alternate cooling system (ACS) given a loss of the service water (SW) intake concurrent with a LOOP using procedure OPOP-SW-2181, "Service Water/Alternate Cooling Operating Procedure." The team interviewed licensed operators and operator simulator instructors, reviewed associated response procedures and operator training, and observed licensed operators respond to a simulated demand to align and start the ACS from the main control room to independently assess the likelihood of cognitive or execution errors. The

team evaluated the available time margins to perform the actions to verify the reasonableness of Entergy's response procedures and risk assumptions. The team also conducted a complete walkdown of procedure OPOP-SW-2181 with station operators to independently evaluate the capability of operators to perform the necessary actions within the required time, to identify unforeseen operator challenges, and to independently assess Entergy's configuration control and the material condition of the associated risk significant structures, systems, and components (SSC). Finally, the team reviewed SW and ACS valve verification surveillances, pump testing results, system health reports, and equipment deficiency reports to assess the SW and ACS system availability and performance.

b. Findings

No findings were identified.

. 2.1.5 4KV Circuit Breaker 13

a. Inspection Scope

The team inspected the 4kV circuit breaker 13 to verify that it was capable of meeting its design basis requirements, which include distributing preferred offsite power to the non-safety related (from start-up transformer 3A to Bus 1) and safety-related portions of one 4160Vac switchgear division (from non-1E Bus 1 to 1E Bus 3). The team inspected the 4kV switchgear to verify it would operate during design basis events. The team reviewed selected calculations for electrical distribution system load flow/voltage drop, degraded voltage protection, short-circuit, and electrical protection and coordination. This review was conducted to assess the adequacy and appropriateness of design assumptions, and to verify that bus capacity was not exceeded and bus voltages remained above minimum acceptable values under design basis conditions. Additionally, the team reviewed the switchgear's protective device settings and breaker ratings to ensure that selective coordination was adequate for protection of connected equipment during worst-case, short-circuit conditions.

The team evaluated selected portions of Entergy's response to NRC Generic Letter (GL) 2006-02, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power," dated February 1, 2006. The team also reviewed Entergy's interface and coordination with the transmission system operator for plant voltage requirements and notification set points to ensure that Entergy established adequate controls and measures in accordance with their design and licensing bases. The team reviewed the degraded and loss of voltage relay protection schemes to verify that they adequately implemented design basis requirements. The team reviewed the preventive maintenance (PM) inspection and testing procedures to verify that Entergy maintained the breaker in accordance with industry and vendor recommendations. The team reviewed the 125 VDC voltage calculations to determine if adequate voltage would be available for the breaker open/close coils and spring charging motors. The team also reviewed system health reports, component maintenance history, and corrective action reports to verify that Entergy appropriately identified and resolved potential degradation

and deficiencies. Finally, the team performed a visual non-intrusive inspection to assess the installation configuration, material condition, and potential vulnerability to hazards.

b. Findings

No findings were identified.

.2.1.6 High Pressure Coolant Injection Steam Admission Valve (V23-14)

a. Inspection Scope

The team reviewed calculations and documentation associated with high pressure coolant injection (HPCI) steam admission motor operated valve (MOV) V23-14 to verify the capability of the valve to perform its required function. The MOV is required to automatically open to provide steam to the HPCI steam turbine whenever operation of the HPCI system is required. Specifically, the team reviewed MOV calculations and test results to verify the capability of the valve to open under the most limiting conditions. The team reviewed the design and operational provisions associated with potential pressure locking and thermal binding of the valve to verify that it would be available to open during various operating and transient conditions. The team reviewed the DC electrical power supply to the valve to verify that it would provide sufficient voltage under the most limiting conditions. The team also reviewed the functional logic testing of the control circuits associated with the valve to verify that they were subject to complete periodic testing, and to verify that the valve would open when required by any of its input signals. In addition, the team interviewed the system engineer and the valve component engineer to identify any known issues with the valve and to determine the basis for the valve's PM schedule. The team also reviewed corrective action documents and system health reports to determine whether there were any adverse operating trends or existing issues affecting the valve's performance or capability. The team also performed walkdowns of the valve and its associated support systems to verify that Entergy adequately maintained the valve's material condition and configuration control.

b. Findings

No findings were identified.

.2.1.7 125 Volt Direct Current Distribution Panel DC-2

a. Inspection Scope

The team inspected 125 VDC distribution panel DC-2 and its associated breakers to verify that they were capable of meeting their design basis requirements. The team reviewed maintenance and test procedures, the manufacturer's instructions, modifications, the associated 125 VDC DBD, and design calculations to verify that Entergy adequately maintained the capability and condition of distribution panel DC-2 in accordance with design requirements and vendor recommendations. The team reviewed Entergy's current DC-2 ground isolation troubleshooting plan, measurement results, and

associated engineering evaluations to independently assess Entergy's configuration control, risk management, corrective actions, and operability determinations. The team also reviewed corrective action documents and system health reports, and interviewed the system engineer to determine whether there were any additional adverse operating trends or existing issues affecting distribution panel DC-2 reliability. Finally, the team performed a visual examination of distribution panel DC-2 and a walkdown of its associated control room instrumentation to assess the material condition, configuration control, and the presence of potential hazards to the DC distribution system.

b. Findings

No findings were identified.

.2.1.8 Core Spray Injection Valve (CS V14-12B)

a. Inspection Scope

The team inspected the loop 'B' core spray (CS) injection valve (CS V14-12B) to verify that the valve was capable of performing its design basis functions. Valve CS V14-12B is a normally closed MOV with a safety function to open for CS injection and to close for primary containment isolation. The team reviewed the Updated Final Safety Analysis Report (UFSAR), Technical Specifications (TS), CS and primary containment isolation DBDs, system drawings, calculations, and procedures to identify the design basis requirements. The team reviewed periodic MOV diagnostic test results, valve inspection results, stroke-timing test data, leak rate test results, and logic system test results to verify acceptance criteria were met. The team verified that Entergy adequately monitored and maintained the MOV safety functions, torque switch settings, performance capability, and design margins. The team verified that testing results were used to trend stem nut wear to ensure an adequate stem nut replacement frequency. The team reviewed MOV weak link calculations to ensure the ability of the MOV to remain structurally functional while stroking under design basis conditions. The team verified that the valve analysis used the maximum differential pressure expected across the valve during worst case operating conditions. The team also reviewed thermal binding, pressure locking, and temperature induced pressure locking analyses to determine susceptibility. Additionally, the team reviewed degraded voltage conditions, thermal overload sizing and testing, and voltage drop calculation results to confirm that the valve would have sufficient voltage and power available to perform its safety function at degraded voltage conditions.

The team discussed the design, operation, and maintenance of the MOV with the engineering staff to evaluate performance history, maintenance, and overall component health. The team also conducted several walkdowns of CS V14-12B to assess the material condition and to verify the installed configuration was consistent with plant drawings and the design and licensing bases. Finally, the team reviewed corrective action documents and system health reports to determine if there were any adverse trends associated with the valve and to assess Entergy's problem identification, evaluation, and resolution.

b. Findings

No findings were identified.

.2.1.9 Cooling Tower Fan 2-1

a. Inspection Scope

The team inspected the safety related cooling tower fan 2-1 to verify that it was capable of meeting its design basis requirements. The team reviewed applicable portions of the UFSAR and drawings to identify the design basis requirements for the fan and associated portions of the cooling tower. The team reviewed calculations and surveillance test procedures to verify that the fan was capable of achieving design basis flow requirements during limiting design basis conditions and that test acceptance criteria were consistent with these requirements. The team interviewed design and system engineers to review the design and system functional requirements as well as historical test performance results. In addition, the team reviewed work orders and corrective action documents to identify failures or nonconforming issues, and to determine if deficiencies were being appropriately identified, evaluated, and corrected. The team also performed a review of the emergency operating procedures (EOP) associated with post-accident fan operation to ensure the capability of the component to perform as required under actual accident conditions. Finally, the team performed several walkdowns of the cooling tower, including once while it was in service, to visually inspect the physical/material condition of the fan and its support systems, including control room indication, and to ensure adequate configuration control.

b. Findings

No findings were identified.

.2.1.10 Vernon Tie Circuit Breaker (3V4)

a. Inspection Scope

The team inspected the Vernon Tie circuit breaker (3V4) to verify that it was capable of meeting its design basis requirements which include providing connection to an alternate emergency alternating current (AC) power source during an SBO event. The breaker is designed to tie either safety-related 4.16kV Bus 3 or 4 to the Vernon Hydroelectric Station (VHS) black start generating units, when allowed by plant conditions. The team reviewed one line diagrams and vendor equipment data to confirm the breaker ratings were sufficient to meet design basis conditions. The team reviewed the electrical analyses for loading and breaker trip unit coordination requirements to confirm the adequacy of the settings for bus tie operation. The team reviewed operating and PM procedures for conformance with design basis load conditions. The team reviewed the vendor manual, breaker inspection PMs, and testing procedures to determine if Entergy

maintained the breaker in accordance with industry standards and vendor recommendations.

The team reviewed the 125 VDC voltage calculations to determine if adequate voltage would be available for the breaker open/close coils and spring charging motors. The team also reviewed system health reports, component maintenance history, and the CAP database to verify that Entergy appropriately identified and resolved potential degradation and deficiencies. The team performed a visual non-intrusive inspection of circuit breakers 3V4, 3V, 4V, the Vernon tie transformer, and the VHS components that are required to function for the alternate AC (AAC) power source to assess the installed configuration, material condition, and potential vulnerability to hazards.

b. Findings

No findings were identified.

.2.1.11 Service Water Piping Supply to the Emergency Diesel Generators

a. Inspection Scope

The inspection team reviewed the portion of the safety-related SW piping system that provides cooling water to the emergency diesel generators (EDG) to verify the capability of the piping to perform its required function. Specifically, the team performed walkdowns of the piping within the SW intake, reactor building (including torus room), turbine building, and EDG rooms to verify the material condition of the piping and supports and to identify any potential hazards in the area. The team also performed a video "walkdown" of inaccessible portions of the piping located in the feedwater heater bay to assess the material condition.

The team interviewed the system engineer, station operators, in-service inspection (ISI) personnel, and design engineers to verify the capability of the SW piping to perform its required function under the most limiting conditions and to verify that Entergy adequately implemented activities related to SW piping corrosion control and inspection. The team reviewed operating procedures and interviewed station personnel to verify that SW could be restored to the EDGs if the normal SW supply (from the SW intake) was lost due to postulated events. The team also reviewed documentation associated with potential high energy line breaks (HELBs) in the vicinity of the SW piping and flooding within the EDG rooms to verify that the EDGs would be available to perform their required functions. Finally, the team reviewed corrective action documents and system health reports and interviewed the system engineer to determine whether there were any adverse operating trends or existing issues affecting SW piping integrity.

b. Findings

No findings were identified.

.2.1.12 Reactor Pressure Emergency Core Cooling System Permissive Transmitters

a. Inspection Scope

The team inspected the reactor pressure emergency core cooling system (ECCS) permissive transmitters (2-3-PT-56A-D) to verify that they were capable of meeting their design basis requirements. These transmitters function to provide redundant permissive signals to open the CS and low pressure coolant injection (LPCI) valves and input into the LPCI LOCA logic. Specifically, the team reviewed the CS and instrumentation DBDs, surveillance test procedures, completed surveillance test results, environmental qualification (EQ) data, the manufacturer's instructions, and applicable industry OE to verify that Entergy adequately maintained the transmitters in accordance with design requirements, TSs, and vendor recommendations. The team also reviewed corrective action documents and interviewed the system engineer to determine whether there were any adverse operating trends or existing issues affecting transmitter reliability. Finally, the team performed several walkdowns of the transmitter and master trip unit instrument racks in the reactor building, and independently compared local and control room pressure indications to assess the material condition, operating environment, potential instrument drift, configuration control, and the presence of potential hazards to these transmitters.

b. Findings

No findings were identified.

.2.1.13 480V Switchgear Bus 8

a. Inspection Scope

The team reviewed selected calculations for electrical distribution system load flow/voltage drop, short-circuit, and electrical protection and coordination to determine the adequacy of 1E Bus 8 of meeting its design basis requirements, which include supplying the required safety-related 480 volt loads under normal and accident conditions. The team reviewed the adequacy and appropriateness of design assumptions and calculations to verify that bus and circuit breaker capacity was not exceeded and bus voltages remained above minimum acceptable values under design basis conditions. The team reviewed the switchgear's protective device settings and breaker ratings to ensure that selective coordination was adequate for protection of connected equipment during worst-case short-circuit conditions. The team reviewed the vendor manual, breaker inspection PMs, and testing procedures to determine if Entergy maintained the breakers in accordance with industry standards and vendor recommendations. The team also reviewed system health reports, component maintenance history, and the CAP database to verify that Entergy appropriately identified

and resolved potential degradation and deficiencies. The team reviewed the 125 VDC voltage calculations to determine if adequate voltage would be available for the breaker open/close coils and spring charging motors. Finally, the team performed a visual non-intrusive inspection of observable portions of the safety-related 480Vac switchgear Bus 8 to assess the installed configuration, material condition, and the potential vulnerability to hazards.

b. Findings

No findings were identified.

.2.1.14 Service Water Pump P-7-1B

a. Inspection Scope

The team reviewed calculations and documentation associated with the 'B' SW pump (P-7-1B) to verify the capability of the pump to perform its required function. The pump is normally operated as needed and is designed to automatically start and provide cooling water to safety-related components under transient and accident conditions. Specifically, the team reviewed SW system flow calculations, pump surveillance test acceptance criteria, and pump test results to verify the capability of the pump to provide the required flow under the most limiting conditions. The team reviewed SW system flow trend data to verify the system calculations remained valid.

The team reviewed the AC electrical power supply to the pump to verify that it would provide sufficient voltage under the most limiting conditions, including potential transient high flow conditions and starting conditions. Specifically, the team reviewed calculations that establish voltage drop, protection and coordination, and motor brake horsepower (BHP) requirements for the motor power supply and feeder cable to verify that design bases and design assumptions have been appropriately translated into design calculations. The team also reviewed the modification to allow manual backwash of the SW strainers to verify it supported the required pump operation. In addition, the team interviewed the system engineer and the pump component engineer to identify any known issues with the pump and to determine the basis for the pump's PM schedule. Finally, the team performed walkdowns of the pump and associated equipment, including control room instrumentation, to verify that Entergy adequately maintained the material condition of the equipment and configuration control.

b. Findings

No findings were identified.

.2.1.15 Vernon Hydroelectric Station Offsite Power Tie Line

a. Inspection Scope

The team evaluated the manual operator actions to align the VHS to power 4160 Vac bus 3 or 4 following a LOOP using procedure OT-3122, Loss of Normal Power." The team interviewed Entergy licensed and non-licensed operators, reviewed associated operating procedures and operator training, observed licensed operators respond to a simulated demand to align the VHS, and interviewed TransCanada VHS personnel to independently assess their ability to perform the required actions to black-start one of the VHS units and power the 4160 Vac buses. The team evaluated the available time margins to perform the actions to verify the reasonableness of Entergy's operating procedures and risk assumptions.

The team also walked down the associated control room switching panels and instrumentation, the associated 13KV/4KV transformer and 4KV breakers (3V4, 3V, and 4V), and accessible areas at the VHS, and reviewed TransCanada's Vernon black-start procedure to independently assess configuration control and the material condition of the associated components. The team verified that Entergy inspected, maintained, and periodically tested the associated components. In particular, the team noted that Entergy used surveillance procedure OP-4142, "Vernon Tie and Delayed Access Power Source Backfeed Surveillance," to demonstrate the operability of the Vernon tie line and to demonstrate actual ability to power the required electrical loads. The team reviewed the test procedure and results to ensure that Entergy met the intent of the NRC approved testing program for this AAC credited power source and adequately tested the Vernon tie line. Finally, the team reviewed corrective action documents and system health reports, and interviewed engineers to determine whether there were any adverse operating trends or existing issues affecting Vernon tie line performance or capability.

b. Findings

No findings were identified.

.2.1.16 Residual Heat Removal Service Water Pump P-8-1B

a. Inspection Scope

The team inspected the 'B' residual heat removal service water (RHRSW) pump (P-8-1B) to determine whether it could fulfill its design basis functions of delivering sufficient cooling flow to the residual heat removal (RHR) system in the event of a plant transient or design basis accident and to provide cooling water flow for the ACS to remove decay heat if the SW pumps become unavailable. The team reviewed applicable portions of the UFSAR, TSs, DBDs, calculations, and procedures to identify the design basis requirements. The team reviewed recent RHRSW pump test results and trends in test data to verify that pump performance remained consistent with design basis requirements. The team reviewed system hydraulic calculations to ensure design requirements for flow and pressure were appropriately translated into acceptance criteria

in pump in-service testing (IST) procedures, taking into account setpoint tolerances and instrument inaccuracies. The team reviewed pump cooling requirements and operating procedures to ensure adequate pump cooling and minimum flow.

The team discussed the design, operation, and maintenance of the RHRSW pump with the engineering staff to evaluate performance history, maintenance, and overall component health. The team reviewed calculations that establish voltage drop, breaker protection and coordination, and motor BHP requirements for the motor power supply and feeder cable to verify that design bases and design assumptions have been appropriately translated into design calculations. The team also conducted walkdowns of the pump to assess the material condition and to verify the installed configuration was consistent with plant drawings and the design and licensing bases. Finally, the team reviewed corrective action documents, system health reports, and work orders to determine if there were any adverse trends associated with the pump and to assess Entergy's problem identification, evaluation, and resolution.

b. Findings

No findings were identified.

.2.1.17 480V Motor Control Center 8B

a. Inspection Scope

The team reviewed selected calculations for electrical distribution system load flow/voltage drop, short-circuit, and electrical protection and coordination to determine the adequacy of motor control center (MCC) 8B of meeting its design basis requirements, which include supplying the required safety-related 480 volt loads under normal and accident conditions. The adequacy and appropriateness of design assumptions and calculations were reviewed to verify that bus and circuit breaker capacity was not exceeded and bus voltages remained above minimum acceptable values under design basis conditions. The MCC's protective device settings and breaker ratings were reviewed to ensure that selective coordination was adequate for protection of connected equipment during worst-case short-circuit conditions. The team reviewed the vendor manual, breaker inspection PMs and testing procedures to determine if Entergy maintained the MCC breakers in accordance with industry standards and vendor recommendations. The team also reviewed system health reports, component maintenance history, and the CAP database to verify that Entergy appropriately identified and resolved potential degradation and deficiencies. The team performed independent temperature measurements, using a calibrated hand-held thermal hunter, of several 1E MCCs (MCC 9C in 'A' EDG room and MCC 8C in 'B' EDG room) to ensure the MCCs were operating within design parameters. Finally, the team performed a visual non-intrusive inspection of observable portions of the safety-related 480Vac MCC 8B to assess the installed configuration, material condition, and the potential vulnerability to hazards.

b. Findings

No findings were identified.

.2.2 Review of Industry Operating Experience and Generic Issues (5 samples)

The team reviewed selected OE issues for applicability at Vermont Yankee Nuclear Power Station. The team performed a detailed review of the OE issues listed below to verify that Entergy had appropriately assessed potential applicability to site equipment and initiated corrective actions when necessary.

.2.2.1 NRC Information Notice 2007-05: Vertical Deep Draft Pump Shaft and Coupling Failures

a. Inspection Scope

The team evaluated Entergy's applicability review and disposition of NRC Information Notice (IN) 2007-05. The NRC issued the IN to alert licensees to vertical deep draft pump shaft and coupling failures from intergranular stress corrosion cracking (IGSCC). The team's review included Entergy's evaluation of the specific materials installed in the SW pumps and the results of periodic inspections of pump shafts and couplings performed during pump PMs. The team also reviewed corrective action documents and system health reports, and interviewed the system engineer to determine whether there were any adverse operating trends or SW pump shaft and coupling failures.

b. Findings

No findings were identified.

.2.2.2 Operating Experience Smart Sample FY 2008-01 - Negative Trend and Recurring Events Involving Emergency Diesel Generators

a. Inspection Scope

NRC Operating Experience Smart Sample (OpESS) FY 2008-01 is directly related to NRC IN 2007-27, "Recurring Events Involving Emergency Diesel Generator Operability." The team reviewed Entergy's evaluation of IN 2007-27 and their associated corrective actions. The team reviewed Entergy's EDG system health reports, corrective action documents, maintenance procedures, work orders, leakage database, and surveillance test results to determine if Vermont Yankee was susceptible to the issues stated in the IN, and to verify that Entergy appropriately dispositioned EDG concerns. Additionally, the team independently walked down both EDGs, the fuel oil day tank rooms, the fuel oil transfer pumps, and the fuel oil storage tank on several occasions to inspect for indications of vibration-induced degradation on piping and tubing and for any type of

leakage (air, fuel oil, lube oil, jacket water). The team also performed post-run walkdowns, and interviewed operators and the EDG system engineer to ensure Entergy maintained appropriate configuration control and identified deficiencies at a low threshold.

b. Findings

No findings were identified.

.2.2.3 NRC Information Notice 2007-34: Operating Experience Regarding Electrical Circuit Breakers

a. Inspection Scope

The team evaluated Entergy's applicability review and disposition of NRC IN 2007-34. The NRC issued this IN to inform licensees about OE regarding low, medium, and high voltage circuit breakers, including problems with:

- Deficient fit-up with cubicles
- Inadequate or excessive tolerances and gaps
- Worn or misadjusted operating linkages
- Inadequate or inappropriate maintenance practices
- Configuration control errors
- Deficiencies from original design and refurbishment
- Design changes

The team reviewed the manufacturer's information, and procedures for medium and low voltage breaker routine maintenance and overhauls to determine whether scheduled maintenance activities were consistent with vendor recommendations. The team reviewed recent corrective action documents and completed maintenance and testing records to determine whether there were any adverse operating trends. In addition, the team conducted interviews with engineering personnel to assess knowledge of industry trends and OE. The team also conducted walkdowns of the accessible portions of 480 volt and 4160 volt breakers located throughout the plant to assess the material condition of the associated switchgear and MCCs, and to verify that the breaker configurations were consistent with the design and licensing bases.

b. Findings

No findings were identified.

.2.2.4 NRC Information Notice 2010-03: Failures of Motor-Operated Valves Due to Degraded Stem Lubricant

a. Inspection Scope

The team evaluated Entergy's applicability review and disposition of NRC IN 2010-03. The NRC issued the IN to inform licensees of recent failures and corrective actions for MOVs because of degraded lubricant on the valve stem and actuator stem nut threaded area. The team reviewed corrective action documents and maintenance procedures to ensure that Entergy adequately maintained applicable MOVs to preclude the degraded conditions described in the IN. The team conducted several risk-informed walkdowns of accessible MOVs to independently assess the material condition of MOV valve stem and actuator stem nut threaded areas and reviewed the PM history for a sample of valves.

b. Findings

No findings were identified.

.2.2.5 NRC Regulatory Issue Summary 2010-06: Inservice Inspection and Testing Requirements of Dynamic Restraints (Snubbers)

a. Inspection Scope

The team evaluated Entergy's applicability review and disposition of NRC RIS 2010-06. The NRC issued the Regulatory Issue Summary (RIS) to remind licensees of the ISI and testing requirements of dynamic restraints (snubbers) under 10 CFR 50.55a(b)(3)(v). The team reviewed corrective action documents, maintenance procedures, and work orders to ensure that Entergy complied with ISI and testing requirements. The team conducted several risk-informed walkdowns of accessible dynamic restraints to independently assess material conditions and reviewed the maintenance history for a sample of dynamic restraints.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems (IP 71152)

The team reviewed a sample of problems that Entergy had previously identified and entered into the CAP. The team reviewed these issues to verify an appropriate threshold for identifying issues and to evaluate the effectiveness of corrective actions. In addition, corrective action condition reports (CRs) written on issues identified during the inspection were reviewed to verify adequate problem identification and incorporation of the problem into the corrective action system. The specific corrective action documents that were sampled and reviewed by the team are listed in the Attachment.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

On June 30, 2011, the team presented the inspection results to Mr. Michael Colomb, Site Vice President, and other members of Entergy management. The team reviewed proprietary information and returned the associated documents to Entergy at the end of the inspection. The team verified that no proprietary information is documented in the report.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Entergy Personnel

M. Anderson, System Engineer
R. Busick, Operations Shift Manager
M. Colomb, Site Vice President
R. Current, Senior Electrical Instrumentation and Controls Engineer
J. Devincentis, Senior Licensing Engineer
V. Ferrizzi, Operations Shift Manager
M. Flynn, Electrical Design Engineer
D. Giard, Operations Specialist
G. Gibbs, System Engineer
D. Grimes, Civil/Structural Design Engineer
A. Haumann, Electrical Design Supervisor
P. Johnson, Senior Electrical Design Engineer
S. Jonasch, Senior System Engineer
D. Jones, Asst. Operations Manager
J. Klein, System Engineer
J. Mully, System Engineer
B. Neack, Senior System Engineer
M. Palionis, Senior Engineer, PRA
W. Pitman, Assistant Operations Manager
A. Robertshaw, Mechanical Design Engineer
J. Rogers, Design Engineering Manager
R. Scherman, System Engineer
J. Taylor, Superintendant Operations Requalification Training
R. Wanczyk, Licensing Manager

NRC Personnel:

C. Cahill, Senior Reactor Analyst
S. Rich, Resident Inspector
D. Spindler, Senior Resident Inspector

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Open and Closed

None

Attachment

LIST OF DOCUMENTS REVIEWED

Audits and Self-Assessments

LO-VTYLO-2008-00016, Margin Management Snapshot Benchmark, dated 2/25/09
LO-VTYLO-2010-00138, CDBI FSA Design Engineering Self Assessment Report, dated 5/25/11

Calculations

OTC-523, Required and Maximum Thrust Analysis for Motor Operated Valves, Rev. 0
VYC-125, Ventilation Changes for Diesel and HVAC Equip. Rooms, Rev. 2
VYC-526 Appendix A.1, ADLPIPE Input File Piping Reanalysis, Rev. 1
VYC-0684, RHR Service Water Pump Full Flow Test Acceptance, Rev. 0
VYC-715, Degraded Bus Voltage Monitoring Loop Accuracy, Rev. 1
VYC-791, MCC Loading Calculation, Rev. 7
VYC-830, Voltage Drop Calculation for VY Distribution Panels DC-1 and DC-2, Rev. 9
VYC-836, Diesel Generator Loading, Rev. 15
VYC-950, Torus Vent Sizing, Rev. 0
VYC-1053, MOV Voltage Analysis, Rev. 8
VYC-1087, 4160V & 480V Relay and Breaker Coordination, Rev. 1
VYC-1088, 4160/480V Short Circuit and Voltage Study, Rev. 6
VYC-1096, Hydrogen Generation from Main Station and Neutron Monitoring Batteries, Rev. 1
VYC-1143, System Level Review of Core Spray MOVs for GL 89-10, Rev. 2
VYC-1171, Electrical DB Review of Safety-Related MOVs for GL 89-10, Rev. 8
VYC-1183, Thermal Overload Heater Sizing for MOVs, Rev. 4
VYC-1188, 125 VDC Relay and Circuit Breaker Coordination, Rev. 1
VYC-1258, System Level Reviews of HPCI MOVs for GL 89-10, Rev. 4
VYC-1279, Service Water System Analysis, Rev. 4
VYC-1279B, SW Flow Analysis - Fire Water System Pressurization Line Orifice Failure, Rev. 1
VYC-1279C, Determine Maximum Allowable RHRSW Pump Degradation and Maximum Cooling Tower Flows, Rev. 4
VYC-1296, Circuit Breaker Sizing and Settings for Safety Related MOVs, Rev. 3
VYC-1314, Min PU Voltage for SCE MCC Devices, Rev. 3
VYC-1385, Pressure Locking Evaluation of Core Spray Valve, Rev. 1
VTC-1627, Diesel Generator Rooms Tornado Venting Analysis, Rev. 0
VYC-1700, 4.16kV Bus Protective Relay Settings Verification, Rev. 1
VYC-1803A, Thermal Performance of Alternate Cooling System for Design Conditions, Rev. 2
VYC-1803B, Validation of Revised Excel Program for Thermal Analysis of Alternate Cooling System, Rev. 8
VYC-1854, Ampacity for Safety-related Power Cables, Rev. 0
VYC- 2086, Service Water System Hydraulic Model Trending Analysis, Rev. 3
VYC-2153, 125 VDC Battery A-1 Electrical System Calculation, Rev. 1
VYC-2154, 125 VDC Battery B-1 Electrical System Calculation, Rev. 1
VYC-2405, Drywell Temperature Calculation for a Station Blackout Event at Extended Power Uprate, Rev. 0

VYC-2411, Assessment of Existing Cooling Tower Support Steel for New Fan Equipment Loads, Rev. 0
VYPC-98-007, Component Level Review of Reactor Water Cleanup (RWCU) MOVs for Generic Letter 89-10, Rev. 2

Corrective Action Condition Reports (CR-HQN-)

2007-00863
2011-00680*

* CR written as a result of this inspection

Corrective Action Condition Reports (CR-VTY-)

2003-1073	2009-1163	2011-1325	2011-2337*	2011-2503*
2004-2596	2009-1176	2011-1449	2011-2345*	2011-2504*
2004-2677	2009-1177	2011-1659	2011-2346*	2011-2505*
2004-2734	2009-1235	2011-1949	2011-2347*	2011-2507*
2004-2738	2009-1360	2011-1975	2011-2354*	2011-2518*
2006-1019	2009-1376	2011-2108*	2011-2355*	2011-2527*
2007-1490	2009-1944	2011-2147	2011-2356*	2011-2529
2008-0821	2009-3049	2011-2162	2011-2357*	2011-2542*
2008-3117	2009-4033	2011-2214	2011-2360*	2011-2556*
2008-3312	2010-2185	2011-2291	2011-2361*	2011-2557*
2008-3359	2010-2543	2011-2294*	2011-2363*	2011-2559*
2008-3423	2010-2636	2011-2296*	2011-2366	2011-2570*
2008-3834	2010-2775	2011-2297*	2011-2380*	2011-2575*
2008-4259	2010-3257	2011-2299*	2011-2388*	2011-2576*
2008-4391	2010-3400	2011-2300*	2011-2392	2011-2583*
2008-4624	2010-3413	2011-2301*	2011-2417	2011-2592*
2008-4899	2010-3577	2011-2302*	2011-2428	2011-2594*
2008-5167	2010-3717	2011-2312*	2011-2431*	2011-2595*
2008-5282	2010-3868	2011-2315*	2011-2443 *	2011-2598*
2008-5467	2010-3970	2011-2316*	2011-2464	2011-2599*
2009-0272	2010-5188	2011-2325*	2011-2468	2011-2609*
2009-0516	2010-5379	2011-2326*	2011-2480*	2011-2612*
2009-0965	2010-5469	2011-2328*	2011-2487*	2011-2635*
2009-1137	2011-0525	2011-2332*	2011-2490*	2011-2637*
2009-1147	2011-0982	2011-2334*	2011-2502*	2011-2640*

* CR written as a result of this inspection

Design and Licensing Bases

125 VDC Systems Design Basis Document, Rev. 23
Accident-Event Combinations Topical Design Basis Document, Rev. 6
BVY 06-038, Response to NRC GL 2006-02, Grid Reliability, dated 4/14/06
BVY 08-043, Update on Vermont Yankee Program Commitments Relative to Periodic Testing of Alternate AC Source, dated 8/14/08
Core Spray System Design Basis Document, Rev. 21
External Events Topical Design Basis Document, Rev. 2
FVY 82-68, Degraded Grid Undervoltage RAI, dated 6/8/82
HVAC Systems Design Basis Document, Rev. 24
Internal Flooding Topical Design Basis Document, Rev. 9
NRC Regulatory Guide 1.155, Station Blackout, dated August 1988
Nuclear Boiler Vessel Instrumentation System Design Basis Document, Rev. 10
NUMARC 87-00, Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors, Rev. 1
NVY 86-65, NRC Approval/SER for Degraded Grid Voltage Protection, dated 3/31/86
NVY 94-85, Supplemental Safety Evaluation of Station Blackout Analysis-Vermont Yankee Nuclear Power Station (TAC NO. M87808), dated 6/1/94
Primary Containment Isolation System Design Basis Document, Rev. 14
Reactor Protection System Design Basis Document, Rev. 17
Service Water, Residual Heat Removal Service Water, Alternate Cooling System Design Basis Document, Rev. 30

Drawings

5920-3992 Sh. 1, Emergency Diesel Generator DG-1-1A Engine Control, Rev. 1
5920-3992 Sh. 2, Emergency Diesel Generator DG-1-1B Engine Control, Rev. 0
5920-9342, Piping Isometric (Torus Catwalk), Rev. 1
B-191300 Sh. 25, Power Dist and Motor Data - 480V MCC-8B, Rev. 39
B-191300 Sh. 25B, Power Dist and Motor Data - 480V MCC-8B, Rev. 20
B-191301, Control Wiring Drawing Core Spray Valve V14-12B, Rev. 17
B-191301 Sh. 1439, Control Wiring Diagram HPCI Steam to Turbine Valve V23-14, Rev. 19
B-191304 Sh. 3, Relay List - 4160V Bus 3, Rev. 9
B-191305 Sh. 3, Relay and Breaker Settings - 480V Bus 8, Rev. 6
G-191159 Sh.1, Flow Diagram-Service Water System, Rev. 82
G-191159 Sh.2, Flow Diagram-Service Water System, Rev. 93
G-191168, Flow Diagram Core Spray System, Rev. 47
G-191169 Sh. 1, Flow Diagram High Pressure Coolant Injection System, Rev. 52
G-191169 Sh. 2, Flow Diagram High Pressure Coolant Injection System, Rev. 43
G-191298 Sh. 1, 345KV and 22KV One Line Diagram, Rev. 45
G-191298 Sh. 3, Main One Line Wiring Diagram, Rev. 2
G-191298 Sh. 4, 115KV Switchyard One Line Diagram, Rev. 1
G-191298 Sh. 5, Relay One Line Wiring Diagram, Rev. 4
G-191299, 4KV Auxiliary One Line Diagram, Rev. 29
G-191300 Sh. 1, One Line Diagram, SWGR Bus 8, Rev. 21
G-191300 Sh. 2, One Line Diagram, MCC-8B, Rev. 32
G-191372 Sh. 1, 125VDC One Line Wiring Diagram, Rev. 68

G-191372 Sh. 2, 125VDC One Line Diagram, Rev. 24
UFSAR Figure 10.8-1, Alternate Cooling System, Rev. 22

Engineering Evaluations

EC15732, Replace B RHRSW Pump With Hayward Tyler, Rev. 0
EC19321, MCC-DC-2A-2D Molded Case Circuit Breaker Replacement, Rev. 1
EC 20876, Address Bend Radius on Station Battery Intercell Jumpers, dated 7/7/10
EC 27171, Agastat Relay Replacement Policy, dated 9/16/03
EN-DC-126, Evaluation of EDG Heat Exchanger Performance Outside of Design Basis, dated 7/12/07
MPR-3514, Implementation of JOG MOV Program and Magnesium Rotor Inspection Schedule at VY, Rev. 1
OP5287, Evaluation of MOV Motor Control Center Testing, Rev. 4
OPVY-331/94, Evaluation of Deep Basin 85F Constraint on Alternate Cooling System Operability, dated 6/7/94
OTC-535, Thrust Analysis - Required and Maximum, Rev. 0
TE-2000-014, Technical Evaluation for Pipe Whip and Jet Impingement Design Basis, Rev. 1
VT-RPT-11-00004, RHRSW Pump Curve Rotating Assembly Supplied By Hayward Tyler, Rev. 0
VY SSCA, Safe Shutdown Capability Analysis, Rev. 9

Functional, Surveillance and Modification Acceptance Testing

ECT-15732-01, Performance Test of Replacement B RHRSW Pump, performed 3/24/11
EMST-BATT-4210-01, Weekly Surveillance of Safety Related Lead Acid Storage Batteries, performed 5/2/11
EMST-BATT-4210-02, Quarterly Surveillance of Safety Related Lead Acid Storage Batteries (B-1-1B), performed 2/23/11
OP 4124, RHRSW Valve Operability Test, Rev. 119, performed 4/15/11
OP 4126, Diesel Generator Surveillance Test, performed 3/4/11, 3/5/11, and 3/14/11
OP 4142, Vernon Tie and Delayed Access Power Source Backfeed Surveillance, performed 5/29/07
OP 4181, Service Water Manual Valve Exercising-Once Per Cycle, performed 5/11/98, 11/26/99, 10/22/02, 4/30/04, 11/10/05, 5/29/07, 11/7/08, 11/8/08, 11/21/08, 12/13/09, 4/4/10, 5/20/10, 5/21/10, and 4/12/11
OP 4100, ECCS Integrated Automatic Initiation Test, performed 5/16/10
OP 4379, Drywell/Torus Differential Pressure Functional/Calibration, performed 5/2/11
OPST-CS-4123-01B, Maintenance of Filled Core Spray B Discharge Piping, performed 5/16/11
OPST-CS-4123-02B, Core Spray B MOV/Injection Check Valve Closure Operability Test, performed 3/25/11
OPST-CS-4123-05B, Maintenance of Filled Core Spray B Discharge Piping when Normal Keepfill not Available, performed 11/2/10
STP-2007-01, Hydraulic Performance Test of the ACS System, performed 3/31/95 and 5/22/07
VYOPF 4028.19, Water Leakage Test - High Pressure V14-12B, V14-13B (V14-30B), performed 4/28/10

VYOPF 4030, Types "B" and "C" Primary Containment Leakage Rate Testing, performed 10/27/08
VYOPF 4123.04B, Pump "B" Discharge/Injection Check Valve Open Operability Test, performed 10/21/08
VYOPF 4124.06B, RHRSW Pump 'B' and Valve Operability and Full Flow Test Data, performed 2/23/11 and 3/14/11
VYOPF 4124.06D, RHRSW Pump 'D' and Valve Operability and Full Flow Test Data, performed 1/25/11
VYOPF 4124.15, RHRSW Valve Operability Test, performed 4/15/11
VYOPF 4124.25B, RHRSW Pump 'B' (P-8-1B) Comprehensive Test Data Sheet, performed 5/4/11
VYOPF 4124.25C, RHRSW Pump Comprehensive Test, performed 5/13/11
VYOPF 4125.04, Drywell and Torus Atmosphere O_2 Surveillance Using Chemistry Samples, performed 4/3/11, 4/10/11, 4/17/11, and 4/24/11
VYOPF 4142.01, Vernon Tie Surveillance, performed 11/24/99, 5/15/01, 10/19/02, 4/24/04, 11/6/05, and 5/31/07
VYOPF 4142.02, Vernon Tie Alternate Shutdown Capability Test, performed 6/2/07
VYOPF 4142.03, Delayed Access Power Source Backfeed Test, performed 4/25/10
VYOPF 4152.04, Drywell Equipment and Floor Drain Surveillance Quarterly Valve Operability, performed 5/23/11
VYOPF 4342.01, Reactor Pressure ECCS Permissive Functional, performed 4/12/11
VYOPF 4342.02, Reactor Pressure ECCS Permissive Transmitter Calibration, performed 3/19/10
VYOPF 5203.02, Shock Suppressor Functional Test, performed 4/26/10
VYOPF 5220.05, Limitorque Motor Operator Inspection Report, performed 5/24/11

Learning Organization (LO) Corrective Action Reports (LO-VTYLO-)

2011-00082*

* LO written as a result of this inspection

Maintenance Work Orders

00050656	00205843	52187880	52307109
00175460	51078165	52188707	52312557
00175819	51643292	52211888	52312558
00200034	51644012	52303612	94-08282

Miscellaneous

AP 0310 Appendix F, Lubricant Quick Reference, Rev. 28
Category A Commitment Review of SSFI88SMK30P1 Operations Department Memorandum, dated 5/26/89
Entergy Nuclear Vermont Yankee, LLC Nuclear Plant Interface Requirements (NPIRs), dated 3/31/10
ILRT-R-100520, Reactor Containment Building Integrated Leakage Test Report, dated 5/20/10
National Electrical Code, Chapter 5, Special Occupancies

NRC Enforcement Guidance Memorandum 2010-001, Dispositioning Violations of Inservice Examination and Testing Requirements for Dynamic Restraints (Snubbers), dated 6/1/10
Project No. 1904 NH/VT - 1, Dam Safety Inspection Report Federal Energy Regulatory Commission Office of Energy Projects Division of Dam Safety and Inspections (Vernon NATDAM # - NH00097), dated 7/31/08
Report No. RCN-010, Vermont Yankee RFO28 Torus Project Final Report, April - May 2010
SYSENG 2011-010, System Engineering Evaluation of Ground on DC-2, dated 6/6/11
VYAPF 0096.01, Revised Procedure Control Form - Procedure OP 4142, New Revision No. 14, dated 4/28/08

Non-Destructive Examinations

28-10.03-006, H-P-8-1A Pump Support VT-3 Examination Report, dated 4/13/10
28-10.03-007, H-P-7-1A Pump Support VT-3 Examination Report, dated 4/13/10
28-10.03-022, RSW-H181 VT-3 Examination Report, dated 4/20/10
28-10.03-026, RSW-H184 VT-3 Examination Report, dated 4/20/10
28-10.03-027, RSW-HD230B VT-3 Examination Report, dated 4/20/10
28-10.03-028, RSW-H257 VT-3 Examination Report, dated 4/21/10
QER-RFO28-1A-01, Torus Proper Visual Examination Record, dated 5/8/10

Normal and Special (Abnormal) Operations Procedures

6-C-9 Sh. 21004, HVAC Trouble/Batt Rm Exh Fan Flow Low Alarm Response, Rev. 14
8-P-2, BATT CHRG Fail DC-2 GRD CRP 9-8 Alarm Response, Rev. 15
ARS 21006 Sh. 8-J-9, 4KV Safety Bus Voltage LO, Rev. 15
OP 2140, 345/115 KV Electrical System, Rev. 53
OP 2145, Normal 125 VDC Operation, Rev. 50
OP 2192, Heating, Ventilating, and Air Conditioning System, Rev. 68
OP 4126, Diesel Generators Surveillance, Rev. 87
OP-4127, John Deere Diesel Generator Surveillance, Rev. 24
OP 4142, Vernon Tie and Delayed Access Power Source Backfeed Surveillance, Revs. 14-16
OP 4181.15, Cooling Tower Fan 2-1 Operability Test, Rev. 15
OPON-3150-01, Loss of Start-up Transformer(s), Rev. 3
OPON-3171-01, Loss of Bus 3, Rev. 0
OPOP-4KV-2142, 4 KV Electrical System, Rev. 0
OPOP-SW-2181, Service Water/Alternate Cooling Operating Procedure, Rev. 0
OPST-4028, Inservice Testing Valve Functional Testing, Rev. 0
OT 3122, Loss of Normal Power, Rev. 44

Operating Experience

LO-NE-CR 2007-00398, CA-08, NRC Information Notice 07-034: Operating Experience Regarding Electrical Circuit Breakers
NRC Generic Letter 89-10, Safety Related Motor Operated Valve Testing and Surveillance, dated 6/28/89
NRC Information Notice 94-48, Snubber Lubricant Degradation in High-Temperature Environments, dated 6/30/1994

NRC Generic Letter 96-05, Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves, dated 9/18/96
NRC Generic Letter 2008-01, Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems, dated 1/11/08
NRC Information Notice 90-53: Potential Failures of Auxiliary Steam Piping and the Possible Effects on the Operability of Vital Equipment, dated 8/16/90
NRC Information Notice 2006-06, Failure of Magnesium Rotors in Motor-Operated Valve Actuators, dated 11/20/06
NRC Information Notice 2006-29, Potential Common Cause Failure of Motor-Operated Valves as a Result of Stem Nut Wear, dated 12/14/06
NRC Information Notice 2007-05: Vertical Deep Draft Pump Shaft and Coupling Failures, dated 2/9/07
NRC Information Notice 2007-27, Recurring Events Involving Emergency Diesel Generator Operability, dated 8/6/07
NRC Information Notice 2010-03, Failures of Motor-Operated Valves Due to Degraded Stem Lubricant, dated 2/3/10
NRC Regulatory Issue Summary 2010-06, Inservice Inspection and Testing Requirements of Dynamic Restraints (Snubbers), dated 6/1/10

Operator Training

DOC 036, Simulator Training Module (Scenario 7), Rev. 1
JPM-20008, Alternate Cooling System Startup w/'B' RHRSW Pump OOS and Loss of Bus 3, Rev. 0
JPM-26204, Energize Bus 3 from the Vernon Tie Line, LNP, Rev. 8
JPM-26210F, Energize Bus 4 from the Vernon Tie Line, During a Station Blackout, Rev. 5
LOT-00-205, Residual Heat Removal System, Rev. 31
LOT-00-206, High Pressure Coolant Injection, Rev. 34
LOT-00-223, Primary Containment Design, Rev. 29
LOT-00-263, DC Electrical Distribution System, Rev. 29
LOT-00-276, Service Water System, Rev. 36
LOT-00-602, Operational Transient (OT) Procedure, Rev. 30
LOT-01-262, 4KV Electrical Distribution System, Rev. 29

Preventive Maintenance and Inspections

04-002832-000, MCC 8B Compt 3C PM, performed 11/12/05
103500, Doble Test Report for T-3-1A Transformer, performed 6/8/11
P-7-1A 3000, MTR BRG Upper Oil Analysis Report, dated 2/17/11
P-7-1B 3100, MTR BRG Upper Oil Analysis Report, dated 2/17/11
P-7-1C 3200, MTR BRG Upper Oil Analysis Report, dated 2/17/11
P-7-1D 3300, MTR BRG Upper Oil Analysis Report, dated 2/17/11
RATS-1A, Diesel Room Thermostat Calibration Data Sheet, dated 6/8/11
VYDPF 4107.06, Alternate Shutdown Surveillance Appendix R Toolbox/Equipment Inventory, performed 6/6/11
VYOPF 5220.05 Appendix A, V23-14 Limitorque Motor Operator Inspection, performed 5/24/11

Procedures

CHOP-SWS-4630-01, Service Water System Sampling and Treatment, Rev. 2
E018, Switchgear, 4KV PM Basis Identification, Rev. 3
E025, Relay, Time Delay Agastat PM Basis Identification, Rev. 4
E058, 480 VAC Switchgear PM Basis Identification, Rev. 8
E061, 480 Volt Motor Control Center PM Basis Identification, Rev. 6
E126, Start-up Transformer PM Basis Identification, Rev. 11
E134, Circuit Breakers, 4KV Cat II PM Basis Identification, Rev. 7
E135, Switchgear, 4KV PM Basis Identification, Rev. 8
E136, Circuit Breaker 4KV Cat IV PM Basis Identification, Rev. 7
E140, 480 VAC Switchgear Circuit Breakers PM Basis Identification, Rev. 5
EMMP-INSP-00216-22, Weekly Yard Readings and Brush Inspections, Rev. 4
EMMP-INSP-00216-24, Quarterly Transformer Readings, Rev. 0
ENN-SEP-IST-001, Inservice Testing Program Plan, Rev. 5
ENN-SEP-SW-002, Service Water Program, Rev. 1
MMMP-INSP-00216-21, Maintenance Department Weekly Equipment Inspections, Rev. 3
NPCC Directory 8, NPCC Regional Reliability Reference Directory #8 System Restoration, dated 10/22/10
OP 0023, Installation and Testing of Cable and Conduit, Rev. 16
OP 4100, ECCS Integrated Automatic Initiation Test, Rev. 50
OP 4181, Service Water Pump Capacity Test, Rev. 75
OP 4342, Reactor Pressure ECCS Permissive Functional/Calibration, Rev. 28
OP 4349, Core Spray Subsystem A/B Logic Functional/Calibration, Rev. 40
OP 5210, MCC Inspections, Rev. 34
OP 5219, Diagnostic Testing of Motor Operated Valves, Rev. 1
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LIST OF ACRONYMS

AAC	Alternate AC
AC	Alternating Current
ACS	Alternate Cooling System
ADAMS	Agencywide Documents Access and Management System
BHP	Brake Horsepower
CAP	Corrective Action Program
CDBI	Component Design Bases Inspection
CFR	Code of Federal Regulations
CR	Condition Report
CS	Core Spray
DBD	Design Basis Document
DC	Direct Current
DRS	Division of Reactor Safety
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
EOP	Emergency Operating Procedure
EQ	Environmental Qualification
GL	Generic Letter
HELB	High Energy Line Break
HPCI	High Pressure Coolant Injection
HQN	Headquarters Northeast
HVAC	Heating, Ventilation and Air Conditioning
IGSCC	Intergranular Stress Corrosion Cracking
IN	Information Notice
IP	Inspection Procedure
IPE	Individual Plant Examination
IPEEE	Individual Plant Examination of External Events
ISI	In-Service Inspection
IST	In-Service Test
JPM	Job Performance Measure
KV	Kilo-Volts
LERF	Large Early Release Fraction
LO	Learning Organization
LOCA	Loss-of-Coolant Accident
LOOP	Loss-of-Offsite Power
LPCI	Low Pressure Coolant Injection
MCC	Motor Control Center
MIC	Microbiologically Influenced Corrosion
MOV	Motor Operated Valve
NPCC	Northeast Power Coordinating Council
NRC	Nuclear Regulatory Commission
OE	Operating Experience
OP	Operating Procedure
OpESS	Operating Experience Smart Sample
PM	Preventive Maintenance
PRA	Probabilistic Risk Assessment

RAW	Risk Achievement Worth
RHR	Residual Heat Removal
RHRSW	Residual Heal Removal Service Water
RIS	Regulatory Issue Summary
RRW	Risk Reduction Worth
RWCU	Reactor Water Cleanup
SBO	Station Blackout
SPAR	Standardized Plant Analysis Risk
SSC	Structure, System, and Component
SSCA	Safe Shutdown Capability Analysis
SW	Service Water
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
VAC	Volts, Alternating Current
VDC	Volts, Direct Current
VHS	Vernon Hydroelectric Station
VY	Vermont Yankee