



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

November 8, 2010

Mr. Michael Colomb
Site Vice President
Entergy Nuclear Operations, Inc.
Vermont Yankee Nuclear Power Station
185 Old Ferry Road
P.O. Box 500
Brattleboro, VT 05302-0500

SUBJECT: VERMONT YANKEE NUCLEAR POWER STATION - NRC TRIENNIAL FIRE
PROTECTION INSPECTION REPORT 05000271/2010008

Dear Mr. Colomb:

On October 1, 2010, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Vermont Yankee Nuclear Power Station. The enclosed inspection report documents the inspection results, which were discussed on October 1, 2010, with Mr. Michael Romeo 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. The inspectors also reviewed mitigation strategies for addressing large fires and explosions.

Based on the results of this inspection, one finding of very low safety significance (Green) was identified. This finding was also determined to be a violation of NRC requirements. However, because of the very low safety significance, and because it was entered into your corrective action program, the NRC is treating this finding as a non-cited violation (NCV) consistent with Section 2.3.2 of the NRC Enforcement Policy. If you contest the NCV in this report, you should provide a written response within 30 days of the date of this inspection report with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Senior Resident Inspector at Vermont Yankee. In addition, if you disagree with the characterization of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region I, and the NRC Senior Resident Inspector at Vermont Yankee.

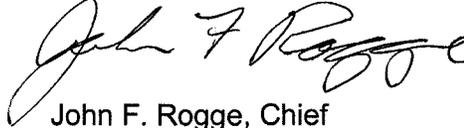
In accordance with Title 10 of the Code of Federal Regulations Part 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS).

M. Colomb

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Sincerely,

A handwritten signature in black ink, appearing to read "John F. Rogge". The signature is fluid and cursive, with the first name "John" being the most prominent.

John F. Rogge, Chief
Engineering Branch 3
Division of Reactor Safety

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

Enclosure: Inspection Report No. 05000271/2010008
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

M. Colomb

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ADAMS is accessible from the NRC Web Site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

John F. Rogge, Chief
Engineering Branch 3
Division of Reactor Safety

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.: 50-271

License No.: DPR-28

Report No.: 05000271/2010008

Licensee: Entergy Nuclear Operations, Inc.

Facility: Vermont Yankee Nuclear Power Station

Location: Vernon, Vermont 05354-9766

Dates: September 13, 2010 through October 1, 2010

Inspectors: J. Lilliendahl, Reactor Inspector, DRS (Team Leader)
W. Cook, Senior Reactor Analyst, DRS
D. Orr, Senior Reactor Inspector, DRS
M. Patel, Reactor Inspector, DRS

Approved by: John F. Rogge, Chief
Engineering Branch 3
Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000271/2010008; 09/13/2010 – 10/01/2010; Vermont Yankee Nuclear Power Station; Triennial Fire Protection Team Inspection.

The report covered a two-week triennial fire protection team inspection by specialist inspectors. One finding of very low significance was identified. This finding was determined to be a non-cited violation. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" and the cross-cutting aspect is determined using IMC 0310, "Components Within the Cross-Cutting Areas." Findings for which the significance determination process (SDP) does not apply may be Green or be assigned a severity level after NRC management review. 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.

Cornerstone: Mitigating Systems

Green. The team identified a Green, Non-Cited Violation of the Vermont Yankee Nuclear Power Station Facility Operating License, Condition 3.F, in that Entergy failed to implement and maintain in effect all provisions of the approved Fire Protection Program as described in the Final Safety Analysis Report. Specifically, Entergy failed to assure that reactor vessel water level would remain below the reactor core isolation cooling (RCIC) system steam line for postulated alternate shutdown fire scenarios that spuriously started a reactor feedwater pump (RFP). Entergy initiated condition report CR-VTY-2010-04682 and promptly revised the alternate shutdown procedure to additionally trip all running condensate pumps. The additional action prevented a single spurious operation from restarting or precluding a trip of the RFPs.

This finding was more than minor because it was associated with the External Factors attribute (fire) of the Mitigating Systems Cornerstone and adversely affects the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the availability of the RCIC system was not ensured for postulated fires in alternate shutdown areas. The team used Phase 1 of IMC 0609, Appendix F, Fire Protection Significance Determination Process, to determine that this finding was of very low safety significance (Green) because the Vermont Yankee Nuclear Power Station alternate shutdown system also includes safety relief valves and a residual heat removal train that can be utilized for reactor pressure and water level control. This finding did not have a cross-cutting aspect because the most significant contributor of the performance deficiency was not reflective of current licensee performance. (Section 1R05.01)

REPORT DETAILS

Background

This report presents the results of a triennial fire protection inspection conducted in accordance with NRC Inspection Procedure (IP) 71111.05T, "Fire Protection." The objective of the inspection was to assess whether Entergy has implemented an adequate fire protection program and that post-fire safe shutdown capabilities have been established and are being properly maintained at the Vermont Yankee Nuclear Power Station. The following fire areas (FAs) and fire zones (FZs) were selected for detailed review based on risk insights from the Vermont Yankee Nuclear Power Station Individual Plant Examination (IPE)/Individual Plant Examination of External Events (IPEEE):

- Cable Vault (ASD FZ2);
- East Switchgear Room (FA4);
- Emergency Diesel Generator Room 'B' (FA9); and,
- Reactor Building Elevation 252' North (RB3).

Inspection of these areas/zones fulfills the inspection procedure requirement to inspect a minimum of three samples.

The inspection team evaluated the licensee's fire protection program (FPP) against applicable requirements which included plant Technical Specifications, Operating License Condition 3.F, NRC Safety Evaluations, 10 CFR 50.48, and 10 CFR 50, Appendix R. The team also reviewed related documents that included the Updated Final Safety Analysis Report (UFSAR), the fire hazards analysis (FHA), and the safe shutdown capability analysis (SSCA).

The team also evaluated licensee mitigating strategies for addressing large fires and explosions as required by Operating License Condition 3.N.

Specific documents reviewed by the team are listed in the attachment.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R05 Fire Protection (IP 71111.05T)

.01 Post-Fire Safe Shutdown From Outside Main Control Room (Alternative Shutdown) and Normal Shutdown

a. Inspection Scope

Methodology

The team reviewed the safe shutdown analysis, operating procedures, piping and instrumentation drawings (P&IDs), electrical drawings, the UFSAR, and other supporting

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documents to verify that hot and cold shutdown could be achieved and maintained for fires that rely on shutdown from outside the control room. This review included verification that shutdown from outside the control room could be performed both with and without the availability of offsite power. Plant walkdowns were also performed to verify that the plant configuration was consistent with that described in the safe shutdown and fire hazards analyses. These inspection activities focused on ensuring the adequacy of systems selected for reactivity control, reactor coolant makeup, reactor decay heat removal, process monitoring instrumentation, and support systems functions. The team verified that the systems and components credited for use during this shutdown method would remain free from fire damage. The team verified that the transfer of control from the control room to the alternative shutdown location(s) would not be affected by fire-induced circuit faults (e.g., by the provision of separate fuses and power supplies for alternative shutdown control circuits).

Similarly, for fire areas that utilize shutdown from the control room, the team also verified that the shutdown methodology properly identified the components and systems necessary to achieve and maintain safe shutdown conditions.

Operational Implementation

The team verified that the training program for licensed and non-licensed operators included alternative shutdown capability. The team also verified that personnel required for safe shutdown using the normal or alternative shutdown systems and procedures are trained and available onsite at all times, exclusive of those assigned as fire brigade members.

The team reviewed the adequacy of procedures utilized for post-fire shutdown and performed an independent walk through of procedure steps to ensure the implementation and human factors adequacy of the procedures. The team also verified that the operators could be reasonably expected to perform specific actions within the time required to maintain plant parameters within specified limits. Time critical operator actions, which were verified, included restoration of alternating current (AC) electrical power, establishing the remote shutdown and local shutdown panels, establishing reactor coolant makeup, and establishing decay heat removal.

Specific procedures reviewed for alternative shutdown, including shutdown from outside the control room included the following:

- OP 3126, Shutdown Using Alternative Shutdown Methods

The team reviewed manual actions to ensure that they had been properly reviewed and approved and that the actions could be implemented in accordance with plant procedures in the time necessary to support the safe shutdown method for each fire area. The team also reviewed the periodic testing of the alternative shutdown transfer capability and instrumentation and control functions to ensure the tests are adequate to ensure the functionality of the alternative shutdown capability.

b. Findings

Introduction. The team identified a Green, Non-Cited Violation (NCV) of the Vermont Yankee Nuclear Power Station (VYNPS) Facility Operating License, Condition 3.F, in that Entergy failed to implement and maintain in effect all provisions of the approved FPP as described in the Final Safety Analysis Report (FSAR). Specifically, Entergy failed to assure that reactor vessel water level (RVWL) would remain below the reactor core isolation cooling (RCIC) system steam line for postulated alternate shutdown fire scenarios that spuriously started a reactor feedwater pump (RFP).

Description. While evaluating the alternate shutdown (ASD) capability for VYNPS, the team questioned whether Entergy appropriately evaluated a fire in the control room or cable vault that could spuriously start or prevent tripping a RFP. One method of the VYNPS ASD strategy relied on operating the RCIC pump from a remote ASD panel for RVWL makeup. Water in the RCIC steam line may render the RCIC system inoperable or require additional operator actions to recover the RCIC system. The immediate actions for the VYNPS ASD procedure, OP 3126, Shutdown Using Alternate Shutdown Methods, included actions to isolate all pumps, such as RFPs and the high pressure coolant injection pump, which could spuriously operate and overfill the RVWL to the steam lines. However, the team noted that during a control room evacuation, VYNPS secured reactor feedwater by only one means; operators were directed to place the RFP control switches in pull-to-lock. The team considered that a single spurious operation at the onset of the fire could restart a RFP or prevent its trip from the main control room. Subsequent steps in OP 3126 directed operators to remove breaker closing coil fuses at 4kV busses and trip any closed RFP breakers to secure all RFPs. Although the subsequent actions to locally disable the RFP breakers would not be subject to fire damage and spurious operation, the local actions would require several minutes to complete. During such time, a single RFP could be postulated to overfill RVWL above the RCIC steam line.

Entergy reviewed the team's issue and concluded a single spurious operation could potentially restart a RFP or prevent its trip due to fire damage in the control room or cable vault. Entergy promptly initiated a procedure change to OP 3126 to include an additional control room action prior to evacuation that would prevent a single spurious operation to restart a RFP or prevent it from tripping. The revised procedure included a step to secure all running condensate pumps. The team considered this an effective corrective action to resolve the issue.

VYNPS Operating License, Condition 3.F, requires in part that Entergy shall implement and maintain in effect all provisions of the approved FPP as described in the FSAR. FSAR Section 10.11.3 describes the SSCA as a document detailing compliance with the subject requirements (10 CFR Part 50, Appendix R and BTP APCS 9.5-1, Appendix A). The VYNPS SSCA Revision 9 Section 2.2.1.8 requires that safe shutdown shall not be adversely affected by loss of all automatic function (signals, logic) from the circuits located in the fire area or fire zone in conjunction with one worst case spurious actuation or signal resulting from the fire. Additionally, Section 2.2.1.8 requires every possible spurious actuation or signal shall be evaluated individually, and mitigation of the effects of each possible spurious actuation shall be demonstrated taken on a one-at-a-time

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basis. Entergy did not meet this requirement and failed to evaluate the spurious restart of a RFP or its failure to trip and subsequent effects on the RCIC system.

Analysis. Entergy's failure to ensure the RCIC system was not made unavailable due to a spurious restart or failure to trip of the RFP was a performance deficiency. This finding was more than minor because it was associated with the External Factors attribute (fire) of the Mitigating Systems Cornerstone and adversely affects the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the availability of the RCIC system was not ensured for postulated fires in alternative shutdown areas.

The team used Phase 1 of IMC 0609, Appendix F, Fire Protection Significance Determination Process (SDP), to determine that this finding was of very low safety significance (Green). In accordance with Phase 1, a low degradation rating was assigned because the VYNPS alternate shutdown system is designed to utilize either RCIC for RVWL control with the aid of safety relief valves (SRVs) for pressure control, or the residual heat removal (RHR) system for RVWL with the aid of SRVs for reactor depressurization. Additionally, the inspectors verified that OP 3126 provided the necessary procedure instructions to establish and maintain hot shutdown with SRVs and the RHR system. Low degradation findings screen to Green in task 1.3.1 of the Fire Protection SDP.

The team determined that no cross-cutting aspects were associated with this finding. Entergy last performed a major revision and design review of the SSCA in October 1996. Because the error occurred more than three years ago, the cross-cutting aspect is not indicative of current licensee performance.

Enforcement. VYNPS Operating License, Condition 3.F, requires in part that Entergy shall implement and maintain in effect all provisions of the approved FPP as described in the FSAR. FSAR Section 10.11.3 describes the SSCA as a document detailing compliance with the subject requirements (10 CFR Part 50, Appendix R and BTP APCS 9.5-1, Appendix A). The VYNPS SSCA Revision 9 Section 2.2.1.8 requires that safe shutdown shall not be adversely affected by loss of all automatic function (signals, logic) from the circuits located in the fire area or fire zone in conjunction with one worst case spurious actuation or signal resulting from the fire. Additionally, Section 2.2.1.8 requires every possible spurious actuation or signal shall be evaluated individually, and mitigation of the effects of each possible spurious actuation shall be demonstrated taken on a one-at-a-time basis. Contrary to the above, on September 29, 2010, the NRC identified that Entergy did not meet this requirement and had not historically met this requirement for the control room and cable vault fire areas and failed to protect the RCIC system from a postulated fire-induced circuit failure resulting in the spurious restart or failure to trip of a RFP. Because this finding was of very low safety significance (Green) and has been entered into Entergy's corrective action program (CR-VTY-2010-04682), this violation is being treated as a NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000271/2010008-001, Fire Scenario Resulting in Loss of Reactor Core Isolation Cooling System)**

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.02 Protection of Safe Shutdown Capabilities

a. Inspection Scope

The team reviewed the FHA, safe shutdown analyses and supporting drawings and documentation to verify that safe shutdown capabilities were properly protected. The team ensured that separation requirements of Section III.G of 10 CFR 50, Appendix R were maintained for the credited safe shutdown equipment and their supporting power, control, and instrumentation cables. This review included an assessment of the adequacy of the selected systems for reactivity control, reactor coolant makeup, reactor heat removal, process monitoring, and associated support system functions.

The team reviewed the licensee's procedures and programs for the control of ignition sources and transient combustibles to assess their effectiveness in preventing fires and in controlling combustible loading within limits established in the FHA. A sample of hot work and transient combustible control permits were also reviewed. The team performed plant walkdowns to verify that protective features were being properly maintained and administrative controls were being implemented.

b. Findings

No findings were identified.

.03 Passive Fire Protection

a. Inspection Scope

The team walked down accessible portions of the selected fire areas to observe material condition and the adequacy of design of fire area boundaries (including walls, fire doors, and fire dampers), and electrical raceway fire barriers to ensure they were appropriate for the fire hazards in the area.

The team reviewed installation/repair and qualification records for a sample of penetration seals to ensure the fill material was of the appropriate fire rating and that the installation met the engineering design. The team also reviewed similar records for the fire protection wraps to ensure the material was of an appropriate fire rating and that the installation met the engineering design.

b. Findings

No findings were identified.

.04 Active Fire Protection

a. Inspection Scope

The team reviewed the design, maintenance, testing, and operation of the fire detection and suppression systems in the selected plant fire areas. This included verification that the manual and automatic detection and suppression systems were installed, tested, and maintained in accordance with the National Fire Protection Association (NFPA) code of record, or as NRC approved exemptions, and that each suppression system would control and/or extinguish fires associated with the hazards in the selected areas. A review of the design capability of the suppression agent delivery systems were verified to meet the code requirements for the hazards involved. The team also performed a walkdown of accessible portions of the detection and suppression systems in the selected areas as well as a walkdown of major system support equipment in other areas (e.g. fire pumps, carbon dioxide storage tanks, and supply system) to assess the material condition of the systems and components.

The team reviewed electric and diesel fire pump flow and pressure tests to ensure that the pumps were meeting their design requirements. The team also reviewed the fire main loop flow tests to ensure that the flow distribution circuits were able to meet the design requirements.

The team assessed the fire brigade capabilities by reviewing training, qualification, and drill critique records. The team also reviewed pre-fire plans for the selected fire areas to determine if appropriate information was provided to fire brigade members and plant operators to identify safe shutdown equipment and instrumentation, and to facilitate suppression of a fire that could impact post-fire safe shutdown capability. In addition, the team inspected the fire brigade equipment to determine operational readiness for fire fighting.

b. Findings

No findings were identified.

.05 Protection From Damage From Fire Suppression Activities

a. Inspection Scope

The team performed document reviews and plant walkdowns to verify that redundant trains of systems required for hot shutdown are not subject to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems. Specifically, the team verified that:

- A fire in one of the selected fire areas would not directly, through production of smoke, heat, or hot gases, cause activation of suppression systems that could potentially damage all redundant safe shutdown trains;

- A fire in one of the selected fire areas (or the inadvertent actuation or rupture of a fire suppression system) would not directly cause damage to all redundant trains (e.g. sprinkler caused flooding of other than the locally affected train); and,
- Adequate drainage is provided in areas protected by water suppression systems.

b. Findings

No findings were identified.

.06 Alternative Shutdown Capability

a. Inspection Scope

Alternative shutdown capability is discussed in Section 1R05.01 of this report.

.07 Circuit Analysis

a. Inspection Scope

The team verified that the licensee performed a post-fire safe shutdown analysis for the selected fire areas and the analysis appropriately identified the structures, systems, and components important to achieving and maintaining safe shutdown. Additionally, the team verified that the licensee's analysis ensured that necessary electrical circuits were properly protected and that circuits that could adversely impact safe shutdown due to hot shorts, shorts to ground, or other failures were identified, evaluated, and dispositioned to ensure spurious actuations would not prevent safe shutdown.

The team's review considered fire and cable attributes, potential undesirable consequences, and common power supply/bus concerns. Specific items included the credibility of the fire threat, cable insulation attributes, cable failure modes, and actuations resulting in flow diversion or loss of coolant events.

The team also reviewed cable raceway drawings for a sample of components required for post-fire safe shutdown to verify that cables were routed as described in the cable routing matrices.

Cable failure modes were reviewed for the following components:

- Safety Relief Valve – RV-2-71B;
- Reactor Pressure Transmitter – PT 2-3-56A;
- RCIC Steam Supply Valves V13-15 and V13-16;
- Emergency Diesel Generator DG-1-1A Output Breaker; and,
- Suppression Chamber Spray Bypass Valve – V-10-34A.

The team reviewed circuit breaker coordination studies to ensure equipment needed to conduct post-fire safe shutdown activities would not be impacted due to a lack of coordination. Additionally, the team reviewed a sample of circuit breaker maintenance

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records to verify that circuit breakers for components required for post-fire safe shutdown were properly maintained in accordance with procedural requirements.

b. Findings

No findings were identified.

.08 Communications

a. Inspection Scope

The team reviewed safe shutdown procedures, the safe shutdown analysis, and associated documents to verify an adequate method of communications would be available to plant operators following a fire. During this review the team considered the effects of ambient noise levels, clarity of reception, reliability, and coverage patterns. The team also inspected the designated emergency storage lockers to verify the availability of portable radios for the fire brigade and for plant operators. The team also verified that communications equipment such as repeaters and transmitters would not be affected by a fire.

b. Findings

No findings were identified.

.09 Emergency Lighting

a. Inspection Scope

The team observed the placement and coverage area of eight-hour emergency lights throughout the selected fire areas to evaluate their adequacy for illuminating access and egress pathways and any equipment requiring local operation and/or instrumentation monitoring for post-fire safe shutdown. The team also verified that the battery power supplies were rated for at least an eight-hour capacity. Preventive maintenance procedures, the vendor manual, completed surveillance tests, and battery replacement practices were also reviewed to verify that the emergency lighting was being maintained in a manner that would ensure reliable operation.

b. Findings

No findings were identified.

.10 Cold Shutdown Repairs

a. Inspection Scope

The team verified that the licensee had dedicated repair procedures, equipment, and materials to accomplish repairs of components required for cold shutdown which might

be damaged by the fire to ensure cold shutdown could be achieved within the time frames specified in their design and licensing bases. The team verified that the repair equipment, components, tools, and materials (e.g. pre-cut cables with prepared attachment lugs) were available and accessible on site.

b. Findings

No findings were identified.

.11 Compensatory Measures

a. Inspection Scope

The team verified that compensatory measures were in place for out-of-service, degraded or inoperable fire protection and post-fire safe shutdown equipment, systems, or features (e.g. detection and suppression systems and equipment, passive fire barriers, or pumps, valves or electrical devices providing safe shutdown functions or capabilities). The team also verified that the short term compensatory measures compensated for the degraded function or feature until appropriate corrective action could be taken and that the licensee was effective in returning the equipment to service in a reasonable period of time.

b. Findings

No findings were identified.

.12 Large Fires and Explosions Mitigation Strategies

a. Inspection Scope

The team reviewed the licensee's preparedness to handle large fire or explosions by reviewing a number of mitigating strategies to verify they continue to meet operating license condition 3.N by determining that:

- Procedures are being maintained and adequate;
- Equipment is properly staged and is being maintained and tested; and,
- Station personnel are knowledgeable and can implement the procedures.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES [OA]

4OA2 Identification and Resolution of Problems

.01 Corrective Actions for Fire Protection Deficiencies

a. Inspection Scope

The team verified that the licensee was identifying fire protection and post-fire safe shutdown issues at an appropriate threshold and entering them into the corrective action program. The team also reviewed a sample of selected issues to verify that the licensee had taken or planned appropriate corrective actions.

Additionally, the team reviewed condition reports (CRs) associated with the licensee's review of circuits for multiple spurious operations (MSOs) scenarios that used the guidance provided in NEI 00-01, Revision 2, "Guidance for Post-Fire Safe Shutdown Circuit Analysis" and Regulatory Guide 1.189, Revision 2, "Fire Protection for Nuclear Power Plants."

Specific CRs reviewed by the team are listed in the attachment.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

The team presented their preliminary inspection results to Mr. Michael Romeo, and other members of the site staff at an exit meeting on October 1, 2010. No proprietary information was included in this inspection report.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

SUPPLEMENTAL INFORMATION**KEY POINTS OF CONTACT****Licensee Personnel**

M. Anderson	Fire Protection Engineer
S. Aprea	Shift Manager
P. Couture	Licensing Specialist
J. DeVincentis	Licensing Engineer
M. Empey	Fire Protection Engineer
P. Johnson	Appendix R Engineer
D. Jones	Assistant Operations Manager
R. Meister	Licensing Specialist
S. Nelson	Fire Protection Instructor
D. Phillips	Instrument and Controls Engineer
W. Pittman	Assistant Manager Operations Support
A. Robertshaw	Design Engineer
P. Rose	Shift Manager, Operations

NRC

J. Rogge, Chief, Engineering Branch 3, Division of Reactor Safety
 D. Spindler, Senior Resident Inspector, Vermont Yankee Nuclear Power Station
 H. Jones, Resident Inspector, Vermont Yankee Nuclear Power Station

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**Opened and Closed**

05000271/2010008-01	NCV	Fire Scenario Resulting in Loss of Reactor Core Isolation Cooling System
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LIST OF DOCUMENTS REVIEWED**Fire Protection Licensing Documents**

BVY 97-9, VY NPC letter to NRC, Response to Request for Additional Information Regarding 10CFR50, Appendix R Exemptions, Dated 1/15/97
 NRC Safety Evaluation Report Dated 1/13/1978
 NRC Supplemental Safety Evaluation Reports Dated 9/12/79, 2/20/80, 4/15/80, 7/3/80, 10/24/80, 11/10/81, 1/13/83, 7/24/84, 3/25/86, 12/1/86, 12/8/89, 11/29/90, 8/30/95, 3/23/97, 6/9/97, 8/12/97, 3/6/98, 3/31/98, 9/2/98, and 2/24/99
 Updated Final Safety Analysis Report, Rev. 23
 Vermont Yankee Fire Protection Commitment Reference Manual, Rev. 2

Calculations

Fire Hazards Analysis, Rev. 11
SEP-FP-001, Combustible Loading Worksheets Program Section, Rev. 5
Vermont Yankee Nuclear Power Plant Safe Shutdown Capability Analysis, Rev. 9
VTC-1087, 4160VAC and 480VAC Relay and Breaker Coordination, Rev. 1
VYC-1507, Appendix R Safe Shutdown Analysis for VYNPS, Rev. 2
VYC-1835, ADS System Nitrogen Bottle Sizing for 72 Hour Standby Period, Dated 11/20/99
VYC-1917, Cycle Independent Analysis for Appendix R Events, Dated 10/22/99
VYC-2374, Suppression Pool Temperature for App R without Containment Overpressure, Rev. 0

Procedures

AP 0042, Plant Fire Prevention and Fire Protection, Rev. 53
EN-DC-127, Control of Hotwork and Ignition Sources, Rev. 7
EN-DC-128, Fire Protection Impact Reviews, Rev. 4
EN-DC-161, Control of Combustibles, Rev. 4
EN-TQ-125, Fire Brigade Drills, Rev. 1
OP-4800, General Safety Surveillance, Rev. 38
PP 7011, Vermont Yankee Fire Protection and Appendix R Program, Rev. 10

Operations Procedures

ARS 21001, 3-A-2 Alarm Response Sheet, Rev. 17
EOP-1, RPV Control, Rev. 4
OP-0150, Auxiliary Operator Rx Bldg Rounds, Rev. 9
OP-2191, Containment Air System, Rev. 29
OP-3020, Fire Emergency Response Procedure, Rev. 56
OP-3126, Shutdown Using Alternate Shutdown Methods, Rev. 40 and 41
OPOT-3121-01, Inadvertent Opening of a Relief Valve, Rev. 00

Completed Tests/Surveillances

DP 4107, Alternate Shutdown Surveillance Toolbox/Equipment Inventory Completed 11/27/09
OP 4105.02, Eighteen Month Fire Pump Operational Performance and Capacity Check, Completed 10/4/07, 4/6/09 and 7/6/09
OP 4105.06, Three Year Hydraulic Check of Outside Fire Loop, Completed 7/14/05 and 10/13/08
OP 4121.07, RCIC Valve Operability Test from Alternate Shutdown Control Panel CP-82-1, CP-83-3 – Once Every Other Cycle, Completed 6/6/07 and 5/23/10
OP 4121.08, RCIC Pump Operability and Full Flow Test from Alternate Shutdown Control Panel CP-82-1 – Once Every Other Cycle, Completed 6/6/07 and 5/23/10
OP 4121.12, RCIC Control Switch Exercise from Alternate Shutdown Control Panels CP-82-1 and CP-82-3, Completed 4/29/10
OP 4122.01, Relief Valve Operability from Control Room, Completed 11/09/08
OP 4122.02, Relief Valve Operability from RCIC Room, Completed 11/08/08
OP 4124.08, Valve Operability from ASP CP-82-2, Completed 6/4/07 and 5/17/10
OP 4124.09, Pump Operability from ASP CP-82-2, Completed 6/4/07 and 5/21/10
OP 4126.15, Diesel Generator Alternate Shutdown Operability Test, Completed 10/14/08
OP 4142, Vernon Tie Alternate Shutdown Capability Test, Completed 6/1/07

Drawings and Wiring Diagrams

5920-11893, Reactor Building 252'/232' Preaction Sprinkler System, Rev. 07
5920-12727, Sh. 1, Diesel Generator Rooms A and B Sprinkler System Upgrade, Rev. 0
5920-611, ADS Logic, Rev. 12
B-191301, Sh. 1179, RCIC Logic System Sh.1, Rev. 19
B-191301, Sh. 1184, RCIC System Instrumentation, Rev. 23
B-191301, Sh. 1188, RCIC Steam Supply Line Isolation Valve V13-15, Rev. 19
B-191301, Sh. 1188A, RCIC Steam Supply Line Isolation Valve V13-15 MCC Connection
Details, Rev. 5
B-191301, Sh. 1189, RCIC Steam Supply Line Isolation Valve V13-16, Rev. 19
B-191301, Sh. 1279, Suppression Chamber Spray Bypass Valve V10-34A, Rev. 11
B-191301, Sh. 1657, CRP 9-8 ERFIS Analog Inputs, Rev. 1
B-191301, Sh. 311, 4KV SWGR 4 Instrument and Relaying, Rev. 15
B-191301, Sh. 312, 4KV SWGR Transducers, Rev. 6
B-191301, Sh. 328A, 4KV Emergency Diesel Generators DG-1-1A and DG-1-1B Breaker, Rev. 12
B-191301, Sh. 331, 4KV SWGR Bus-4, Diesel Generator DG-1-1A, Rev. 22
B-191301, Sh. 613, Diesel Generator 1-1A Metering and Relaying, Rev. 9
B-191301, Sh. 621, Diesel Generator 1-1A Differential Relay, Rev. 4
B-191301, Sh. 750, Auto Blowdown System Logic A, Rev. 12
B-191301, Sh. 751, Auto Blowdown System Logic B, Rev. 17
B-191301, Sh. 752, Auto Blowdown System RV2-71A, Rev. 16
B-191301, Sh. 753, Auto Blowdown System RV2-71B, Rev. 16
B-191301, Sh. 865, ECCS Analog Trip Division II, Rev. 13
B-191500, Sheet 268, Fire Barrier Seal Drawing, Rev. 3
B-191500, Sheet 269, Fire Barrier Seal Drawing, Rev. 3
G-191145, General Arrangement Turbine Building Operating Floor Plan, Rev. 25
G-191148, Sh. 1, General Arrangement Reactor Building Plans, Rev. 23
G-191148, Sh. 2, General Arrangement Reactor Building Plans, Rev. 27
G-191160, Sh. 4, Flow Diagram Instrument Air System, Rev. 21
G-191163, Sh. 1, Flow Diagram Fire Protection System Inner Loop, Rev. 42
G-191163, Sh. 2, Flow Diagram Fire Protection System Outer Loop, Rev. 15
G-191163, Sh. 3, Flow Diagram Fire Protection System Low Pressure CO2, Rev. 8
G-191163, Sh. 4, Flow Diagram Cable Vault High Pressure CO2 System, Rev. 1
G-191299, 4KV Auxiliary One Line Diagram, Rev. 31
G-191300, Sh. 1, 480V Auxiliary One Line Diagram, Rev. 21
G-191358, Reactor Building Lighting Plan, Rev. 15
G-191372, Sh. 1, 125VDC One Line Diagram, Rev. 68
G-191372, Sh. 2, 125VDC One Line Diagram, Rev. 24
G-191372, Sh. 3, 125VDC One Line Diagram, Rev. 18
G-191372, Sh. 4, 120/240V Vital AC and Instrument AC One Line Diagram, Rev. 27

Pre-Fire Plans

Fire Brigade Pre-Fire Plans, Vermont Yankee Nuclear Power Stations, Rev. 0

Operator Safe Shutdown Training

ALT SD 25.5 Power Point Slides, Dated 7/14/06
Licensed Operator Requalification Training Program Description, Appendix C, Rev. 20
Licensed Operator Training Attendance Records, 4/27/09-10/16/09

Licensed Operator Training Program Description, Appendix B – Reactor Operator, Rev. 12
 LOT-00-301, Reactor Shutdown and Cooldown, Rev. 14
 LOT-00-602, Operational Transient (OT) Procedures, Rev. 28
 LOT-00-612, Shutdown Using Alternate Shutdown Methods, Rev. 20

Miscellaneous Documents

9140050313, Luminator Series Emergency Lighting Products Vendor Manual, Rev. 14
 Fire Protection System Health Report, First and Second Quarters 2010
 Fire Protection System Impairment Permit (2004-36)
 Hotwork and Ignition Source Permits, Dated 7/20/10, 7/27/10, 8/4/10, 8/16/10, and 8/24/10
 OP 3126 Timeline Data for all Operating Crews, Dated 9/8/2010

Transient Combustible Evaluations

2010-039
 2010-040
 2010-041
 2010-042
 2010-043

Modifications and Fire Protection Engineering Evaluations

EDCR 96-417, Switchgear Low Pressure CO2 System, Dated 1/10/00
 ER-05-0400, Replace Hemyc Firewrap with 3M Firewrap to Protect Cables C1335J1SII and C1335J2SII, Rev. 0
 FPEE 26, Fire Seal Evaluation for Penetrations in Walls Separating the East and West Switchgear Rooms, Rev. 2
 PDCR 79-06, Cable Vault High Pressure CO2 System, Dated 10/1/79

Condition Reports

CR-VTY-2008-01391	CR-VTY-2009-03273	CR-VTY-2010-04325*
CR-VTY-2008-01432	CR-VTY-2009-03386	CR-VTY-2010-04346*
CR-VTY-2008-01508	CR-VTY-2010-00408	CR-VTY-2010-04481*
CR-VTY-2008-01510	CR-VTY-2010-00501	CR-VTY-2010-04495*
CR-VTY-2008-01512	CR-VTY-2010-00563	CR-VTY-2010-04504*
CR-VTY-2008-01532	CR-VTY-2010-00618	CR-VTY-2010-04620*
CR-VTY-2008-01539	CR-VTY-2010-00724	CR-VTY-2010-04660*
CR-VTY-2008-01542	CR-VTY-2010-02032#	CR-VTY-2010-04663*
CR-VTY-2008-01545	CR-VTY-2010-03054#	CR-VTY-2010-04682*
CR-VTY-2008-05678	CR-VTY-2010-04312*	
CR-VTY-2009-01206	CR-VTY-2010-04319*	

Licensee identified during multiple spurious operations review of RG 1.189, Rev. 2 & NEI 00-01, Rev. 2.

* Identified as a result of this inspection

Work Orders

00107330	04003712	51643240	52208153
00107331	06000045	51693405	52210534
00107332	51077366	51693419	52217265
00107334	51077367	51701309	52223234
00107336	51078055	52029698	52224511
00107340	51078354	52032552	52225458
00107561	51097412	52032553	52225650
00117158	51210404	52039666	52227183
00156253	51546413	52187701	52233943
00159461	51546414	52188885	52260528
00165457	51551105	52188886	
00222430	51564890	52206678	
00249431	51568852	52206679	

Fire Brigade Training and Drills/Critiques

FBI-02-000, VY Fire Brigade Training, Fire Hazards Analysis and Fire Preplans, Rev. 2

FBI-07-000, VY Fire Brigade Training, Strategy and Tactics, Rev. 5

FBL-01-001, VY Fire Brigade Leader Training, Rev. 0

Fire Brigade Drill Critique Records, 1/20/09 - 9/13/10

Fire Brigade Training Program Description, Rev. 10

Large Fires and Explosions Mitigation Strategies Documents

AP-3150, Rev. 0

DPF-4107, Rev. 14

ON-3157, Rev. 9

ON-3177, Rev. 8

OP-2111, Rev. 62

PP-7019, Rev. 3

Quality Assurance Audits and Self Assessments

QA-09-2008-VTY-1, Fire Protection Audit, Dated 2/28/08

QA-09-2010-VY-1, QA Audit Report Fire Protection, Dated 3/8/10

QS-2008-VY-14, Followup of Fire Protection Audit, Dated 9/24/08

LIST OF ACRONYMS

AC	Alternating Current
ADAMS	Agencywide Documents Access and Management System
ASD	Alternate Shutdown
CFR	Code of Federal Regulations
CR	Condition Report
DRP	Division of Reactor Projects
DRS	Division of Reactor Safety
FA	Fire Area
FHA	Fire Hazards Analysis
FPP	Fire Protection Program
FSAR	Final Safety Analysis Report
FZ	Fire Zone
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IPE	Individual Plant Examination
IPEEE	Individual Plant Examination of External Events
IR	Inspection Report
KV	Kilovolt
MSO	Multiple Spurious Operations
NCV	Non-Cited Violation
NFPA	National Fire Protection Association
NRC	Nuclear Regulatory Commission
P&ID	Piping and Instrumentation Drawing
PARS	Publicly Available Records System
RCIC	Reactor Core Isolation Cooling
RFP	Reactor Feedwater Pump
RHR	Residual Heat Removal
RVWL	Reactor Vessel Water Level
SCBA	Self-Contained Breathing Apparatus
SDP	Significance Determination Process
SRV	Safety Relief Valve
SSCA	Safe Shutdown Capability Analysis
UFSAR	Updated Final Safety Analysis Report
VYNPS	Vermont Yankee Nuclear Power Station