

VERMONT YANKEE NUCLEAR POWER STATION

PROGRAM PROCEDURE

PP 7011

REVISION 13

VERMONT YANKEE FIRE PROTECTION AND SAFE SHUTDOWN

USE CLASSIFICATION: **INFORMATION**

RESPONSIBLE PROCEDURE OWNER: **Manager Programs and Component Engineering**

REQUIRED REVIEWS		Yes/No
E-Plan	10CFR50.54(q)	Yes
Security	10CFR50.54(p)	No
Probable Risk Analysis (PRA)		No
Reactivity Management		No

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1.0 PURPOSE, SCOPE, AND DISCUSSION

1.1. Purpose

The fire protection and safe shutdown program at Vermont Yankee uses a defense-in-depth concept to achieve a high degree of fire safety to assure that safe shutdown capability is always available. The defense in depth concept:

- Reduces the potential of fires starting;
- Rapidly detects, controls and promptly extinguishes those fires that do occur;
- Provides adequate protection (including physical separation) for structures, systems, and components so that a fire will not prevent the safe shutdown of the plant; and
- Prevents the release of a significant amount of radioactive material when fires occur.

1.2. Scope

The fire protection and safe shutdown program description include:

1.2.1. Identifying the key organizations and positions that are responsible for the programs;

1.2.2. The roles and responsibilities of key positions responsible for implementing the programs;

1.2.3. The features necessary to implement the fire protection program such as:

- Administrative controls;
- Personnel requirements for fire prevention and manual fire suppression activities;
- Fire barriers;
- Automatic and manually operated fire detection and suppression systems; and
- The means to limit fire damage to structures, systems, and components so that the capability to shut down safely is continuously ensured.

1.2.4. The features necessary to implement the safe shutdown program such as:

- Maintenance of the safe shutdown analysis, and
- Providing compensatory measures required when safe shutdown capability is unavailable.

The fire protection program applies to all systems, structures, and components within the Protected Area and to selected areas within the Owner Controlled Area, as defined in plant procedures. The safe shutdown program applies to the specific plant systems, structures, equipment and fire protection features credited in the safe shutdown analysis for achieving and maintaining safe shutdown in the event of a design basis fire.

1.3. Discussion

The fire protection and safe shutdown program is implemented on a day to day basis by the Fire Protection Engineer (FPE), the Safe Shutdown Analysis Engineer, the Shift Manager and the Shift Technical Advisor, and the Manager of Training and Development. Organizational responsibilities are defined in Section 3.0, PRIMARY RESPONSIBILITIES.

2.0 DEFINITIONS

- 2.1. Safe Shutdown Program - The Vermont Yankee safe shutdown program ensures compliance with safe shutdown analysis requirements and commitments.

The program encompasses the documents, systems, procedures and personnel used to support safe shutdown. It includes documentation that safe shutdown can be achieved in the event of a fire in any fire area or zone at the station. The program establishes fire area and zone boundaries and includes specific fire protection features used to demonstrate the ability to achieve and maintain safe shutdown for any area or zone.

- 2.2. Authority Having Jurisdiction (AHJ) - The National Fire Protection Association (NFPA) defines the authority having jurisdiction as the "organization, office, or individual responsible for 'approving' equipment, an installation, or a procedure." The phrase is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Depending on the interests involved, the AHJ may be a government official, an insurance company representative, or the property owner or his agent. In the case of Vermont Yankee, while it is recognized that the Nuclear Regulatory Commission (NRC) must approve some of the changes made to the fire protection program, a qualified plant representative can approve most changes. For this reason, the FPE has been delegated as the AHJ for the Vermont Yankee plant.

For those changes that require NRC approval, the FPE is responsible for securing that approval before allowing the change to be implemented. Changes to the fire protection program are made according to Generic Letter 86-10 and Section 3.F of the VY Operating License.

- 2.3. Fire Protection Program - The fire protection program ensures compliance with the fire protection license requirements and commitments.

The program encompasses the documents, components, procedures and personnel utilized in carrying out the activities of fire protection. It includes such things as fire prevention, detection, annunciation, control, confinement, suppression, extinguishment, administrative procedures, fire brigade organization, inspection and maintenance, training, quality assurance, surveillance, and testing.

3.0 PRIMARY RESPONSIBILITIES

3.1. Supervisor, Plant Programs

The Plant Program Supervisor has the following responsibilities:

- 3.1.1. Provides direction to the FPE and safe shutdown engineer to ensure program effectiveness;
- 3.1.2. Ensures dedicated system-based engineering oversight and expertise focused on maximizing system performance, reliability and availability of the fire protection systems, and supporting the overall compliance with the VY design and licensing basis; and
- 3.1.3. Ensures that all design changes are reviewed for fire protection and safe shutdown impact.

3.2. Fire Protection Engineer (FPE)

The FPE has the overall oversight and responsibility for implementing the fire protection activities necessary to maintain the effectiveness and technical accuracy of the fire protection program. The FPE has the following specific responsibilities:

- 3.2.1. Provide protection against the effects of fires through the development of “defense in depth” fire protection strategies.
- 3.2.2. Inspect plant areas of fire protection concerns.
- 3.2.3. Resolves all fire protection-related issues.
- 3.2.4. Investigate all fires.
- 3.2.5. Maintain the fire protection program described in LRA Appendix B, Section B.1.12.1 (Ref BVY 06-009. [License Renewal Commitment A-16922])
- 3.2.6. Maintain the fire water program described in LRA Appendix B, Section B.1.12.2 (Ref BVY 06-009. [License Renewal Commitment A-16923])

3.3. Safe Shutdown Analysis Engineer

The Safe Shutdown Analysis Engineer has the following responsibilities:

- 3.3.1. Functions as the safe shutdown analysis program owner,
- 3.3.2. Ensures that the Safe Shutdown Capability Analysis (SSCA) is maintained as a living document that complies with safe shutdown and plant specific commitments,
- 3.3.3. Establishes and maintains configuration control procedures that ensure compliance with the safe shutdown analysis,
- 3.3.4. Review of all design change documents determined to have potential impact on safe shutdown commitments,
- 3.3.5. Review of design changes and temporary modifications for safe shutdown analysis impact,
- 3.3.6. Assists in determining compensatory measures for safe shutdown equipment removed from service,
- 3.3.7. Review of plant operating procedures determined to have potential impact on safe shutdown commitments,
- 3.3.8. Provide assistance to the FPE to ensure that the SSCA is integrated with the fire protection program,
- 3.3.9. Maintain cognizance and awareness of industry issues and trends which affect our position and expectations on safe shutdown compliance, and
- 3.3.10. Provides input to Training Department to ensure training complies with commitments and requirements required for maintaining safe shutdown capability.

3.4. Manager, Operations

The Operations Manager has the following responsibilities:

- 3.4.1. Fire brigade owner,
- 3.4.2. Ensures that adequate numbers of operating personnel are available to satisfy minimum shift staffing necessary for both safe shutdown from outside the Control Room in the event of a fire, and for fire brigade staffing requirements,
- 3.4.3. Develops operational procedures consistent with the SSCA and training on those procedures,
- 3.4.4. Conducts fire protection systems and equipment surveillances,

- 3.4.5. Assists the Training Department with scheduling drills and annual fire brigade training,
- 3.4.6. Ensures that adequate firefighting equipment is available for the on site emergency response organization,
- 3.4.7. The Shift Technical Advisor administers the fire protection permit elements of the program covering combustibles and ignition sources, with the technical assistance and oversight of the FPE,
- 3.4.8. The Shift Technical Advisor, with FPE input and Shift Manager authorization, controls fire protection systems impairments, restorations, and associated compensatory actions, and
- 3.4.9. Operations reviews and provides input to Fire Brigade Pre-Fire Plans.

3.5. Manager, Training

The Training Manager has the following responsibilities:

- 3.5.1. Scheduling, conducting, documenting and reporting for the fire brigade drills,
- 3.5.2. Scheduling, conducting, documenting and reporting fire watch qualifications,
- 3.5.3. Preparation of training plans and materials for operators to implement a safe shutdown with a fire in the plant, and
- 3.5.4. Preparation of training material and training in the General Employee Training for fire protection.
- 3.5.5. Ensuring the training and qualification of the Fire Protection Instructors.

3.6. Manager, Maintenance

The Maintenance Manager is responsible for ensuring appropriate and timely inspections, tests, repair, and maintenance on fire protection systems and equipment.

3.7. Manager, Emergency Preparedness

The Emergency Preparedness Manager is responsible for establishing the agreement with the Vernon and Brattleboro Fire Departments for the provision of off-site firefighting support.

4.0 PROCEDURE

4.1. Fire Protection and Safe Shutdown Program

4.1.1. Fire protection program scope

The fire protection and safe shutdown program encompasses the following:

- 4.1.1.1. Fire protection and safe shutdown organization,
- 4.1.1.2. Fire prevention and safe shutdown control activities,
- 4.1.1.3. Passive fire protection features, such as physical separation, fire-rated barriers, penetration seals, structural steel coating, safe shutdown lights, and encapsulated raceways,
- 4.1.1.4. Active fire protection features, such as the fire water supply system, fire detection systems, fire dampers, and water and gas suppression systems,
- 4.1.1.5. Manual firefighting equipment, such as fire extinguishers, fire hose stations, fire hydrants, and fire brigade equipment,
- 4.1.1.6. Drawings, data bases, calculations, studies, etc., which describe or analyze the fire protection or compliance to fire protection and safe shutdown requirements,
- 4.1.1.7. Procedures that implement the fire protection and the safe shutdown program,
- 4.1.1.8. Training conducted in accordance with the fire protection and safe shutdown program,
- 4.1.1.9. Maintenance, testing, and inspection of active and passive fire protection features, and
- 4.1.1.10. Manual fire suppression activities.

4.1.2. Fire Protection Program Documents

The major documents used to administer and control the fire protection program are described below. These documents should be reviewed or consulted whenever changes to the program or physical plant are being planned.

4.1.2.1. Vermont Yankee Fire Protection and Safe Shutdown Program (PP 7011)

The fire protection and safe shutdown program defines the methods and controls for ensuring compliance with 10CFR50.48; 10CFR50, Appendix A; 10CFR50, Appendix R; and Branch Technical Position (BTP) APCSB 9.5-1, Appendix A.

4.1.2.2. Fire Hazards Analysis (FHA)

An analysis of plant areas is performed to determine the potential for fire within an area, and for fire damage to the structure, systems, or components in the area. The FPE performs this analysis. The analysis of each area includes a description of the barrier construction, barrier penetrations, ventilation, drainage, equipment located in the area, permanent combustibles in the area, and fire protection features of the area. Additionally, this document contains the design feature commitments associated with the various analyzed areas.

4.1.2.3. Safe Shutdown Capability Analysis (SSCA)

An analysis which demonstrates Vermont Yankee's compliance with the requirements of 10CFR50, Appendix R, Section III G, Fire Protection of Safe Shutdown Capability; Section III.J, Emergency Lighting; Section III.L, Alternative Shutdown; and Section III.O, Oil Collection.

4.1.2.4. Fire Brigade Pre-Fire Plans

Fire Brigade Pre-Fire Plans provides the fire brigade leader and Control Room operators pertinent information on a given plant area to help the fire brigade if they are fighting a fire in that area. (Appendix R, Section I commitment)

4.1.2.5. Fire Protection Commitment Reference Manual

The Fire Protection Commitment Reference Manual is a reference document that is used to capture historical and current fire protection-related commitments and agreements.

4.1.2.6. Plant Fire Prevention and Fire Protection (AP 0042)

The Plant Fire Prevention and Fire Protection procedure establishes the requirements for the control of site specific combustible material storage, and impairments of fire systems to prevent or minimize the effects of a fire at Vermont Yankee. This procedure also provides a control mechanism for tracking system impairments and instituting compensatory measures to minimize the effects that those impairments may have on safety.

4.1.2.7. VY Fire Protection Program Combustible Loading Worksheets (ENN-SEP-FP-001)

VY Fire Protection Program Combustible Loading Worksheets provides a tabulation of combustible loading within a specified area.

4.1.2.8. Hazards Evaluation Interim Spent Fuel Storage Installation (ISFSI) and Haul Path

The Hazard Evaluation Summary demonstrates that the assumptions regarding site-specific hazards affecting the cask are not exceeded at the site, and that the ISFSI operations do not place the plant outside of the licensing basis.

4.2. Regulatory Requirements and Compliance

4.2.1. Requirements

The fire protection and safe shutdown program at Vermont Yankee has been developed to comply with, and is based upon the requirements of:

- 4.2.1.1. 10CFR50.48, Fire Protection
- 4.2.1.2. 10CFR50 Appendix A, Fire Protection
- 4.2.1.3. 10CFR50, Appendix R, Sections III.G, III.H, III.I, III.J, III.K.5, III.L, and III.O
- 4.2.1.4. Appendix A to Branch Technical Position APCSB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976"
- 4.2.1.5. Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls, and Quality Assurance, August 4, 1977

This program establishes the manner in which Vermont Yankee complies with these requirements and guidelines.

Vermont Yankee shall implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report for the facility and as approved in the SER dated January 13, 1978, and supplemental SERs, 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, subject to the following provision:

Vermont Yankee may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

4.2.2. Licensing and Compliance

The Vermont Yankee License, Technical Specifications, Technical Requirements Manual, Updated Final Safety Analysis Report (UFSAR), Fire Hazard Analysis (FHA), and Safe Shutdown Capability Analysis form the basis for the Vermont Yankee fire protection and safe shutdown program.

- 4.2.2.1. Fire Protection and Safe Shutdown Program, (PP 7011), ensures compliance with fire protection commitments; and ensures that the program is reviewed and maintained in accordance with license requirements.

Noncompliance with the fire protection and safe shutdown program is evaluated by the corrective action process (EN-LI-102) and reported as necessary in accordance with 10CFR50.72 and 10CFR50.73.

- 4.2.2.2. Facility Operating License DPR-28, Amendment 43, 1/13/78, requires the completion of the modifications identified in the NRC's Fire Protection Safety Evaluation Report (SER) dated January 13, 1978.
- 4.2.2.3. Technical Requirements Manual (TRM), sets the Limiting Condition for Operation (LCO), the surveillance, and the administrative controls related to some of the fire protection program; these requirements and their bases are contained in Sections 3.13/4.13, 6.1.E, and 6.5.A.7.
- 4.2.2.4. Technical Specifications (TS), contain an administrative control related to the fire protection program; this control is contained in Section 6.4.G.
- 4.2.2.5. Updated Final Safety Analysis Report (UFSAR), Volume III, Section 10.11 contains licensing basis information for the VY fire protection systems. Fire brigade training is described in Section 13.3.3.
- 4.2.2.6. Fire Hazard Analysis (FHA) and the Safe Shutdown Capability Analysis (SSCA), details compliance with the applicable requirements of 10CFR50, Appendix R, and Branch Technical Position APCS9.5-1, Appendix A.

4.2.3. License Renewal and Period of Extended Operation Aging Management Program Surveillance and Testing

- 4.2.3.1. Fire damper frames will be inspected for corrosion. [License Renewal Commitment #8 [Ref. BVY 06-009]]
- 4.2.3.2. Diesel engine sub-systems (including the fuel supply line) will be observed while the pump is running. [License Renewal Commitment #9 [Ref. BVY 06-009]]
- 4.2.3.3. Sprinkler testing will be performed when sprinklers have been in place for 50 years. This sampling will be repeated every 10 years. [License Renewal Commitment #10 [Ref. BVY 06-009]]
- 4.2.3.4. Wall thickness evaluations of fire protection piping will be performed on system components using non-intrusive techniques (e.g., volumetric testing) to identify evidence of loss of material due to corrosion. [License Renewal Commitment #11 [Ref. BVY 06-009]]
- 4.2.3.5. The fire water system program will include fire hydrant gasket inspections and flow tests. [License Renewal Commitment #31 [Ref. BVY 06-009]]
- 4.2.3.6. Fire hydrant hose testing, inspection, and replacement, if necessary, will be in accordance with NFPA code specifications for fire hydrant hoses. [License Renewal Commitment #49 [Ref. BVY 07-009]]

4.3. Emergency Lighting

Emergency lighting required to support the safe shutdown of the plant is provided in the Safe Shutdown Capability Analysis. Emergency lighting is tested and maintained to ensure it can perform its intended function when required.

4.4. Communications

Communications within the plant consist of the Gaitronics systems telephones, sound-powered telephones, and portable radios. The fire brigade and operators performing safe shutdown activities use portable radios, backed up by the Gaitronics systems as needed and available.

4.5. Fire Protection Program Administrative and Technical Controls

This section provides an overview of the administration, control, and implementation of the fire protection program.

4.5.1. Program Changes and Associated Review and Approval

4.5.1.1. Fire protection and safe shutdown program documents are revised, controlled and transmitted to permanent plant records as required by approved procedures.

4.5.2. Modification

4.5.2.1. Fire protection system design changes are performed in accordance with approved procedures.

4.5.2.2. A fire protection and safe shutdown evaluation is performed for plant modifications to ensure that adequate fire protection measures are maintained, combustible loading considerations are addressed, the overall fire protection program is not degraded, fire protection and safe shutdown documentation is updated/maintained, compliance with 10CFR50, Appendix R has not been affected, and requirements and guidelines of regulatory agencies have been considered.

4.5.3. Maintenance Control

4.5.3.1. Maintenance performed on fire protection systems is performed in accordance with approved procedures.

4.5.3.2. Periodic surveillances and tests are performed on fire protection equipment.

4.5.3.3. All fire protection and surveillance documentation shall have lifetime document retention.

4.5.4. Control of Combustibles

4.5.4.1. Combustibles are controlled through approved procedures for use and staging of transient combustible materials within the power block and other plant areas. Combustibles are controlled to reduce the severity of a fire that might occur in a given area.

4.5.5. Control of Hot Work and Ignition Sources

4.5.5.1. Hot work and ignition sources are controlled through the use of approved procedures to protect plant equipment, structures and personnel from fires resulting from work involving ignition sources (Hot Work).

4.5.6. Fire Protection Impact Reviews

4.5.6.1. Fire protection impact reviews are performed to evaluate any potential adverse impact on the fire protection program imposed by engineering/design changes, procedure changes, temporary modifications or analyses.

4.5.7. Fire Protection Engineering Evaluations

4.5.7.1. A Fire Protection Engineering Evaluation (FPEE) provides the documentation required to justify, pursuant to Generic Letter 86-10, the demonstration that an existing condition does not compromise the ability to achieve and maintain safe shutdown or compromise the ability of the fire protection system or feature to perform its function or meet fire protection program requirements.

4.5.8. Assessment of Information Notices, Generic Letters, Bulletins, etc.

The Entergy Operating Experience process provides for review of NRC Information Notices, Generic Letters, Bulletins, industry operating experience, and other relevant documents that provide information on fire protection and fire safe shutdown issues. The responsible organizations for addressing the applicable issues are determined upon assessment of the issues identified in the documents.

4.6. Emergency Response

Effective handling of fire emergencies is an important aspect of the fire protection program. The fire brigade provides the onsite fire response. Individual firefighting plans are covered in the Fire Brigade Pre-Fire Plans. Additional support is available when needed through agreements with the Vernon and Brattleboro Fire Departments. Fire emergency actions are also addressed in the station Emergency Plan. (Appendix R, Sections H and I commitments)

4.6.1. Fire Brigade

4.6.1.1. A fire brigade is maintained on site at all times.

4.6.1.2. The fire brigade includes members with knowledge of plant safety-related systems to understand the effects of fire and fire suppressants on safe shutdown capability.

4.6.1.3. Fire brigade composition is determined by the current licensing basis.

4.6.2. Security

4.6.2.1. Security provides access to the security controlled area for the fire brigade and offsite fire response personnel during fire emergencies. This includes traffic and crowd control, when necessary.

4.6.3. Radiological Protection

4.6.3.1. Radiological Protection (RP) personnel provide radiological support for the fire brigade to advise the brigade on radiological hazards and assist in radiological decontamination efforts if necessary. RP personnel also provides radiological support for offsite fire response personnel.

4.6.4. Firefighting Equipment

4.6.4.1. Firefighting equipment is provided throughout the plant. The location and availability of firefighting equipment is designed to minimize delays in obtaining equipment by the fire brigade for fire emergencies.

4.6.4.2. Firefighting equipment may be staged adjacent to or at the access to areas/locations to facilitate equipment availability. This may be necessary to address equipment surveillance test concerns relative to life safety and ALARA practices.

4.6.4.3. Fire brigade equipment is inspected and tested in accordance with approved station procedures.

4.6.5. Fire Brigade Training Program Description

- 4.6.5.1. A training program for the fire brigade is maintained by the Training Department, with technical input and review by the FPE. The training program meets or exceeds the requirements of NFPA 27-1975 and Appendix R, Section III, Paragraph I.
- 4.6.5.2. Fire brigade training ensures that the fire brigade's capability to combat fire is established and maintained. Prior to initial training and annual requalification thereafter, team members are medically evaluated to ensure the ability to perform strenuous physical activity, to wear special respiratory equipment, and for unescorted access to nuclear plants.
- 4.6.5.3. The training program consists of initial (classroom and practical) training and recurrent training which includes periodic instruction meetings, fire drills and annual fire brigade training.

4.7. Fire Protection System Disablements And Compensatory Actions

4.7.1. Disablement

- 4.7.1.1. Fire protection disablements are controlled to maximize the availability of the active and passive fire protection systems and features.
- 4.7.1.2. Fire protection systems and features are intended to remain fully operational to the maximum extent possible. However, it is expected that outages or disablements will occur to support plant or fire protection-related modifications or maintenance.

4.7.2. Compensatory Actions

- 4.7.2.1. Compensatory actions for disabled fire protection systems or features generally consist of fire watches. Alternate compensatory actions such as additional/alternative fire protection equipment may be used on a case-by-case basis. Alternative actions are considered in instances where personal safety risk exceeds life safety thresholds.
- 4.7.2.2. In the event an alternative compensatory action is considered, an evaluation should be performed by the FPE to demonstrate technical equivalency to standard compensatory actions.
- 4.7.2.3. If alternative actions differ from compensatory measures provided in the Technical Requirements Manual, a Process Applicability Determination (PAD) should be conducted in accordance with approved procedures.
- 4.7.2.4. Impairments requiring compensatory actions shall be corrected in a timely manner. The expectation is to promptly complete the corrective actions at the first available opportunity and eliminate the reliance on compensatory measures associated with degraded or inoperable fire protection features. For further discussion on timeliness of resolution, refer to EN-OP-104, Operability Determinations, and associated regulatory guidance, [RIS 2005-05, 2005-20]. (CR-VTY-2010-00454)
- 4.7.2.5. The VY insurance carrier should be notified of impairments to facility fire protection systems that are anticipated to exceed 48 hours. See AP 0042, Plant Fire Prevention and Fire Protection.

4.7.3. Administrative Controls for Safe Shutdown Components

Administrative controls are recommended for 3 different cases involving out of service safe shutdown components during plant operation.

- 4.7.3.1. A safe shutdown component is found out of service (not planned) and is governed by a Technical Specification/Technical Requirements Manual with an allowable out of service time of less than or equal to 14 days.
- 4.7.3.2. A safe shutdown component is found out of service (not planned) and is not governed by a Technical Specification/Technical Requirements Manual with an allowable out of service time of less than or equal to 14 days.
- 4.7.3.3. A safe shutdown component is intentionally removed from service (e.g., planned maintenance).

When the plant is shutdown, (<212 deg F) safe shutdown equipment may be taken out of service with no specific safe shutdown administrative controls. During an outage the fire protection program provides assurance that the "probability and effect of fires" will be minimized.

4.8. Quality Assurance

Vermont Yankee has developed augmented quality assurance for fire protection, as discussed in Section 4.11 of this procedure, Fire Protection Design Considerations, which satisfies the requirements for fire protection established by Appendix A to BTP APCS 9.5-1.

Fire protection systems and equipment are classified as non-nuclear safety. For those fire protection systems providing protection specifically for safety-related structures, systems, and components, a classification of Q3 (historically NNS-OQA) is applied and described in Section 4.11 of this procedure.

4.9. Audits of the Fire Protection Program

Audits are conducted of fire protection equipment and the fire protection program implementation in accordance with the Entergy QAPM to verify continued compliance with NRC requirements and Vermont Yankee commitments.

4.10. Assessments of the Fire Protection Program

Self-assessments and functional area assessments are performed for the fire protection program using the guidance in EN-LI-104 and EN-DC-329.

4.11. Fire Protection Design Considerations

4.11.1. Fire Protection for Safety-Related and Non-Safety Related Areas

Fire protection systems are classified as non-nuclear safety (NNS). Design changes affecting fire protection systems that protect safety-related systems, structures, or components, and non-safety related areas, will follow the requirements established by the design control process. The use of the design change process is intended to ensure that controls, reviews, and documentation are adequate.

4.11.2. Review of Design Changes for Fire Protection Considerations

During the design of systems, components, or structures, the design engineer should:

4.11.2.1. Ascertain what fire protection is already in the area, and

4.11.2.2. Check the design to ascertain what fire load (BTU content) will be added to an area (oil in pump motors, cable insulation, and other combustibles).

4.11.2.3. Be alert for building modifications which inadvertently separate existing fire suppression systems or detection systems from those fire areas which they are designed to protect.

During the review of modifications that could affect the plant fire protection system, the FPE should:

- 4.11.2.4. Evaluate the need for additional fire protection in an area if a change occurs in the amount or type of combustible materials in the area.
- 4.11.2.5. Check the system under design to determine what fire hazards will be added to an area (high temperature piping, oil lines, batteries, etc.). If necessary, determine the best method to mitigate these hazards or to augment the fire protection in the area.
- 4.11.2.6. If there is existing fire protection in the area, review the system design to assure that inadvertent operation of that fire protection will not incapacitate the function of the system under design, or that the new system will not interfere with the existing detection or suppression system.
- 4.11.2.7. Determine what the physical and electrical separation requirements should be for the system under design. The general design criterion is that a single fire cannot destroy the ability to perform any of the three following functions, and any change has to meet this criterion. During the design of any new system or addition to an existing system, these three functions shall be maintained:
 - Ability of plant to safely shut down and maintain safe shutdown,
 - Minimize radioactive releases to the environment,
 - Preserve the operability of safeguards systems and components in the event of fire.

4.11.3. Design of Fire Protection Systems

The design of fire protection systems should be performed in accordance with applicable National Fire Protection Association (NFPA) codes and standards, and the fire insurance carrier, NSO/NEIL.

4.11.4. Detailed Design Criteria

In the design of fire protection systems, the following detailed design criteria should be considered.

4.11.4.1. Material Requirements

In general, materials used in fire protection design should have been tested and listed by Underwriters Laboratories (UL) and/or approved by Factory Mutual (FM) Laboratories, or other independent, nationally recognized, testing laboratories. Any material or component that has been tested and is approved for use will be listed and will have a UL listing or FM label. A listing of approved materials and designs is contained in the Factory Mutual Approval Guide and in the Underwriters Laboratory Product Directories such as:

- Building materials
- Fire resistance index
- Fire protection equipment

4.11.4.2. Non-UL Listed Materials

Some materials or systems have not been tested by UL. In general, these have been tested by the manufacturer to other standards, such as ASTM or NFPA. If it is necessary to procure these types of materials, the engineer should determine what tests have been made to other standards. If a material has been designated as non-combustible, non-flammable or fire retardant, the design engineer should find out exactly what these words mean before specifying that material. If there is any doubt as to what is meant, the engineer should consult with the FPE before specifying the material.

4.11.4.3. Prohibited Materials

There is no blanket statement that can be made on prohibited materials. Use of plastics should be minimized. In general, non-combustible materials should be chosen over combustible materials. Materials that give off corrosive or toxic gases when burned should be avoided. If a combustible material is used, its effect on the combustible loading and fire hazards in the area should be carefully examined.

The addition of combustible materials in safety-related areas shall be limited to the fullest extent practicable. (1978 Fire Protection Safety Evaluation Report, Section 8.0.)

4.11.5. Quality Requirements

In specifying quality assurance requirements for the design, procurement, installation and testing of fire protection systems and components, these systems are non-nuclear safety.

Fire protection equipment is commercially available material and not expected to meet nuclear safety-related requirements. In some cases, additional testing is warranted to ensure purchased fire protection equipment and components are adequately designed for the expected installation environment without generating nuisance alarms or requiring frequent maintenance. Another example might be where inadvertent spray on safety-related equipment is a concern; therefore, the fire suppression system may need to be seismically supported.

Fire protection components and systems are designed and fabricated according to the appropriate NFPA codes and standards. In addition, for nuclear power plants, guidelines and conditions have been developed in BTP 9.5-1 that should be used when designing and procuring these components and systems. The purpose of the Quality Assurance Program for fire protection equipment is to ensure that the specifications, guidelines and conditions are followed, and that deviations are controlled and documented in the design package.

Quality assurance for procurement of fire protection equipment protecting safety-related areas or equipment will be in accordance with approved procurement procedures.

The quality of fire protection systems and components is assured through conformance with the appropriate NFPA codes and standards. The following documentation is required from the designers, vendors, and installers of fire protection equipment and systems purchased by Vermont Yankee for use in safety-related areas or where safety-related equipment will be affected by such fire protection systems or equipment.

A Certificate of Compliance stating that the system or equipment was designed, manufactured, and/or installed in compliance with the requirements of the appropriate NFPA code or standard.

5.0 REFERENCES AND COMMITMENTS

5.1. Technical Specifications and Site Documents

- 5.1.1. Facility Operating License DPR-28, License Condition 3
- 5.1.2. Updated Final Safety Analysis Report, Sections 10.11 and 13.3.3.
- 5.1.3. Technical Requirements Manual, Sections 3.13/4.13, 6.1.E, and 6.5.A.7
- 5.1.4. Technical Specifications, Section 6.4.G
- 5.1.5. Vermont Yankee Fire Hazard Analysis (FHA)
- 5.1.6. Vermont Yankee Fire Protection Commitment Reference Manual
- 5.1.7. Vermont Yankee Fire Brigade Pre-Fire Plans (FBPFP)
- 5.1.8. Vermont Yankee Safe Shutdown Capability Analysis (SSCA)
- 5.1.9. Entergy Quality Assurance Program Manual
- 5.1.10. Vermont Yankee Emergency Plan
- 5.1.11. Vermont Yankee Fire Protection Program Combustible Loading Worksheets
- 5.1.12. Hazards Evaluation Interim Spent Fuel Storage Installation (ISFSI) and Haul Path

5.2. Administrative Limits

- 5.2.1. None

5.3. Codes, Standards, and Regulations

- 5.3.1. Branch Technical Position (Auxiliary Power and Control Systems Branch) 9.5-1, Appendix A
- 5.3.2. 10CFR40.48, Fire Protection
- 5.3.3. 10CFR50, Appendix A, General Design Criterion 3, Fire Protection
- 5.3.4. 10CFR50 Safe Shutdown, Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979
- 5.3.5. 10CFR50.65, Maintenance Rule
- 5.3.6. RIS-05-07, Compensatory Measures to Satisfy the Fire Protection Program Requirements
- 5.3.7. RIS-05-20, Revision to Guidance Formerly Contained in NRC Generic Letter 91-18, "Information to Licensees Regarding Two NRC Inspection Manual Sections on Resolution of Degraded and Nonconforming Conditions and on Operability"
- 5.3.8. RIS-05-20, Att. 1, NRC Inspection Manual Part 9900: Technical Guidance Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety.
- 5.3.9. NEI 00-01, Rev latest, "Guidance for Post-Fire Safe Shutdown Circuit Analysis"
- 5.3.10. Reg Guide 1.189, Fire Protection for Operating Nuclear Power Plants
- 5.3.11. NRC Enforcement Guidance Memo 09-002, Issued November 2, 2009, RE: RG 1.189
- 5.3.12. NFPA Codes and Standards
 - 5.3.12.1. The fire protection program relies on standards for design and installation of fire protection systems. Deviations from NFPA Codes and Standards shall be properly justified and documented. The NFPA Standard that is applicable to specific fire protection systems depends on the date of system installation.
- 5.3.13. NFPA Fire Protection Handbook

5.3.14. VOSHA Regulations

- 5.3.14.1. VOSHA, Subpart L, Fire Protection Requirements apply to the fire protection program. Vermont Yankee meets the intent of VOSHA requirements by maintaining a program in accordance with federal requirements. VY will comply with VOSHA fire protection requirements unless a basis is provided and documented.

5.3.15. Vermont Division of Fire Safety

- 5.3.15.1. Vermont Yankee shall comply with the Vermont Fire and Building Safety Codes in accordance with Vermont statute. Construction drawings and specifications should be forwarded to the local regional office for review and approval when required.

Access and egress lighting, emergency lighting, and exit signs shall meet the requirements of NFPA 101 and 29CFR1910.37 for these areas.

5.3.16. NSO/NEIL Property Loss Standards, current edition

5.4. Commitments

- 5.4.1. Letter, USNRC to VYNPC, Issuance of Amendment No. 168 to Facility Operating License No. DPR-28, NVEY 99-21, dated February 24, 1999
- 5.4.2. License Renewal Commitment #8 (A-16777) [Ref. BVY 06-009]
- 5.4.3. License Renewal Commitment #9 (A-16778) [Ref. BVY 06-009]
- 5.4.4. License Renewal Commitment #10 (A-16779) [Ref. BVY 06-009]
- 5.4.5. License Renewal Commitment #11 (A-16780) [Ref. BVY 06-009]
- 5.4.6. License Renewal Commitment #31 (A-16801) [Ref. BVY 06-009]
- 5.4.7. License Renewal Commitment #49 (A-16819) [Ref. BVY 06-009]
- 5.4.8. License Renewal Commitment (A-16922) [Ref. BVY 06-009]
- 5.4.9. License Renewal Commitment (A-16923) [Ref. BVY 06-009]

5.5. Supplemental References

The following procedures are used to implement the Vermont Yankee Fire Protection and Safe Shutdown Program:

- 5.5.1. Fire Brigade Training Program Description
- 5.5.2. EN-AD-103, Document Control and Records Management Activities
- 5.5.3. EN-DC-115, Engineering Change Process
- 5.5.4. EN-DC-126, Engineering Calculation Process
- 5.5.5. EN-DC-127, Control of Hot Work and Ignition Sources
- 5.5.6. EN-DC-128, Fire Protection Impact Reviews
- 5.5.7. EN-DC-161, Control of Combustibles
- 5.5.8. EN-DC-167, Classification of Structures, Systems, Components and Parts
- 5.5.9. EN-DC-179, Preparation of Fire Protection Engineering Evaluations
- 5.5.10. EN-DC-329, Engineering Programs Control and Oversight
- 5.5.11. EN-LI-102, Corrective Action Process
- 5.5.12. EN-LI-104, Self Assessment and Benchmark Process
- 5.5.13. EN-MA-118, Foreign Material Exclusion
- 5.5.14. EN-SEP-FP-001, VY Fire Protection Program Transient Combustibles Worksheets
- 5.5.15. EN-TQ-125, Fire Brigade Drills
- 5.5.16. FTK-ESPP-G00020, Prepare FP Engineering Evaluation
- 5.5.17. FTK-ESPP-G00021, Appendix R – Safe Shutdown Analysis
- 5.5.18. FTK-ESPP-G00022, Fire Protection Program Engineer
- 5.5.19. FTK-ESPP-G00055, Prepare Fire Hazard Analysis
- 5.5.20. FTK-ESPP-G00056, Prepare Fire Protection Impact Review
- 5.5.21. AP 0042, Plant Fire Prevention and Fire Protection
- 5.5.22. OP 0046, Installation and Repair of Fire Barrier Penetration Seals, Fire Breaks, and Flood Seals
- 5.5.23. AP 0077, Barrier Control Process
- 5.5.24. OP 2186, Fire Suppression Systems
- 5.5.25. OP 3020, Fire Emergency Response Procedure
- 5.5.26. OP 3126, Shutdown Using Alternate Shutdown Methods
- 5.5.27. OP 4001, Plant Fire Extinguisher Service and Issue
- 5.5.28. OP 4002, Integrity Surveillance of Fire Detectors and Fire Suppression Systems
- 5.5.29. OP 4019, Surveillance of Plant Fire Barriers and Fire Rated Assemblies
- 5.5.30. OP 4103, Fire Protection Equipment Surveillance
- 5.5.31. OP 4104, Fire Hose Hydro Test Surveillance
- 5.5.32. OP 4105, Fire Protection Systems Surveillance
- 5.5.33. OP 4221, Surveillance of Gas Fire Extinguishing Systems
- 5.5.34. OP 4339, Surveillance of Fire Protection Detectors/Instruments
- 5.5.35. OP 4392, Trip Test of Fire System Water Flow Alarms
- 5.5.36. OP 4393, Test of the Cable Vault, Switchgear Rooms, and Intake Structure CO₂ Systems
- 5.5.37. OP 4395, Check of Computer/Heating Ventilation Air Conditioning (HVAC) Shutdown Circuits and Computer Room Halon Actuation System
- 5.5.38. OP 4602, Sampling of Firefighting Foam for Annual Analysis
- 5.5.39. OP 4800, General Safety Surveillance
- 5.5.40. OP 5327, Calibration of Plant Fire Protection System Instruments

6.0 FINAL CONDITIONS

6.1. This procedure shall be retained per EN-AD-103.

7.0 ATTACHMENTS

- 7.1. Appendix A Deleted
- 7.2. VYPPF 7011.01 Deleted
- 7.3. Figure 1 Sample Pre-Fire Plan

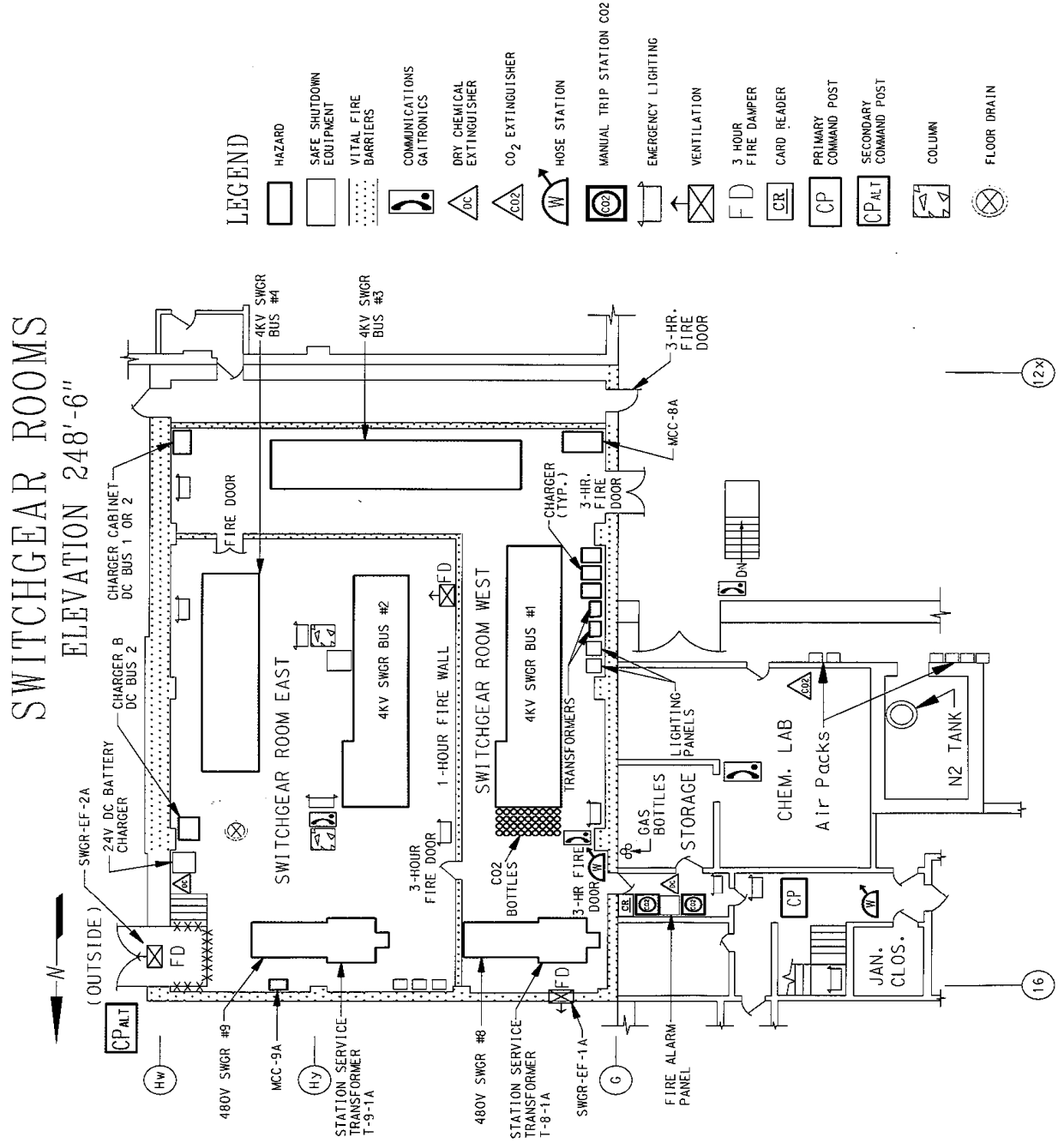
8.0 QA REQUIREMENTS CROSS REFERENCE

	Source Document	Section	Procedure Section
8.1	QAPM	B.2	All
8.2	QAPM	B.14	All
8.3	QAPM	B.15	All
8.4	ANSI N45.2.11-74	2	All
8.5	ANSI N45.2.11	All	All
8.6	10CFR50.48	All	All
8.7	10CFR50	Safe Shutdown	All

FIGURE 1

SAMPLE PRE-FIRE PLAN

PFP-CB-3



REV. DATE 5/7/01

FIGURE 1 (Continued)

MAJOR SAFE SHUTDOWN EQUIPMENT:

PPF-CB-3

- POWER DISTRIBUTION **DIVISION I:** (W. SGR.) 4160V SG BUS NO. 3, 480V SG BUS NO. 8; **DIVISION II:** (E. SWG.) 4160V SG BUS NO. 4, 480V SG BUS NO. 9

SYSTEMS AFFECTED (REF TABLE 4-1 OF SSD CAPABILITY ANALYSIS):

- EAST - HALF OF SWITCHGEAR
- WEST - HALF OF SWITCHGEAR

VENTILATION:

- SUPPLY: MAKE UP AIR FROM THE EAST SWITCHGEAR ROOM ABOVE THE EAST DOUBLE DOOR.
- EXHAUST: SWGR-EF-1A
- DAMPERS AUTOMATICALLY CLOSE ON DETECTION AND TEMPERATURE (165°F) WITH 5 MINUTE DELAY ON EXHAUST FAN DAMPERS AFTER DETECTION

POTENTIAL HAZARDS:

ORDINARY COMBUSTIBLES

- CABLE INSULATION

ELECTRICAL $\geq 460V$ AC, $\geq 120V$ DC

- 4KV AND 480V SWITCHGEAR BUSES, MCC-8A AND MCC-9A, CHARGER CABINETS AND TRANSFORMERS

CHEMICAL

- NONE

EXPOSURES

- CABLE PENETRATIONS TO CABLE VAULT
- REDUNDANT SWITCHGEAR ROOM

PRESSURIZED VESSELS

- CO₂ BOTTLES (W. SWGR.)

FLAMMABLE/COMBUSTIBLE GASES/LIQUIDS

- TRANSFORMERS - SILICONE OIL (215 GALLONS EACH)

LIFE SAFETY

- CO₂ GAS

RADIOLOGICAL

- CHEM WASTE LINE LOCATED SOUTH WALL OF EAST SWITCHGEAR ROOM, MIDDLE OF WEST SWITCHGEAR ROOM

DETECTION AND SUPPRESSION:

- AUTOMATIC DETECTION SYSTEM IN THE EAST AND WEST SWITCHGEAR ROOMS.
- CO₂ SUPPRESSION SYSTEM IS ACTUATED BY AUTOMATIC DETECTION.

CAUTIONS!!!

- DE-ENERGIZE ELECTRICAL EQUIPMENT INVOLVED, WHERE POSSIBLE.
- TOTAL FLOODING CO₂ SYSTEM INSTALLED. IF ACTUATED, WILL RESULT IN OXYGEN-DEFICIENT ATMOSPHERE.
- OPEN EXTERIOR ADMIN. BLDG. DOORS (NORTH AND WEST DOORS) AND ANY CLOSED HALLWAY DOORS AT ADMIN. BLDG. 248'-6" LEVEL.
- ESTABLISH VENTILATION OUT OF THE LOWER LEVEL ADMIN BLDG. USING TWO SMOKE EJECTORS.

SPECIALIZED FIRE FIGHTING EQUIPMENT:

- CO₂ MONITORS
- E-RATED NOZZLES OR WATER MIST EXTINGUISHERS

SMOKE REMOVAL

DUCT SMOKE OUT EAST DOOR. PRESSURIZE THE SWITCHGEAR ROOM FROM THE ADMIN BUILDING WITH A SMOKE EJECTOR.

NOTE:

TO BE EFFECTIVE, THE CO₂ CONCENTRATION MUST BE MAINTAINED FOR AT LEAST 20 MINUTES. HOWEVER, BRIEF OPENINGS OF THE DOOR TO THE SWITCHGEAR ROOM MAY BE DONE TO ALLOW THE INVESTIGATION OR RESCUE TEAM TO ENTER THE ROOM TO CHECK IF THE FIRE IS OUT.