



# INDUSTRIAL TESTING LABORATORIES inc.

2350 Seventh Blvd.

St. Louis, Missouri 63104

Chemists

Engineers

Metallurgists

314/771-7111

I.T.L. REPORT NO. 87-5-77

ONE HOUR FIRE ENDURANCE TEST

CONDUCTED ON A LADDER CABLE TRAY

WITH A P-1000 UNISTRUT ATTACHMENT

PROTECTED WITH THE THERMO-LAG 330

FIRE BARRIER SYSTEM

DATE OF ISSUE:

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TESTING  
LABORATORIES  
inc.

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ONE HOUR FIRE ENDURANCE TEST CONDUCTED  
ON A LADDER CABLE TRAY WITH A P-1000  
UNISTRUT ATTACHMENT PROTECTED WITH THE  
THERMO-LAG 330 FIRE BARRIER SYSTEM

TEST DATE:

7 MAY 1987

TEST LOCATION:

THERMAL SCIENCE, INC.  
2200 CASSENS DRIVE  
ST. LOUIS, MISSOURI 63026

APPROVED BY:  
INC.

INDUSTRIAL TESTING LABORATORIES,  
2350 SEVENTH BOULEVARD  
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DATE OF ISSUE:  
REVISION 1:

26 JUNE 1987  
29 JUNE 1987

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ONE HOUR FIRE ENDURANCE TEST CONDUCTED ON A  
CABLE TRAY WITH A P1000 UNISTRUT ATTACHMENT  
PROTECTED WITH THE  
THERMO-LAG 330 FIRE BARRIER SYSTEM

1.0 INTRODUCTION AND SUMMARY

1.1 Introduction

This report presents the results obtained from performing a one hour ASTM E119 type fire endurance test, followed by a water hose stream test, on a modified ladder cable tray test assembly, protected with a 0.500 inch minimum thickness of the THERMO-LAG 330 Fire Barrier System.

The test assembly consisted of a 12" x 4" ladder cable tray modified to include a 21-3/4" long L-shaped P1000 unistrut section welded to one side of the cable tray.

The P1000 unistrut section, commencing at the point of attachment to the cable tray and measuring around the exterior of the attachment, was protected with a 0.500 inch minimum dry film thickness of THERMO-LAG Prefabricated Panels. Four (4) thermocouples were mounted one inch outside the protected section in order to monitor the temperature along a nine (9) inch length of the unistrut.

The cable tray was also enclosed with a 0.500 inch minimum dry film thickness THERMO-LAG Prefabricated Panel fire barrier. The panels were fastened to the tray by 0.5" by 0.020" minimum stainless steel banding material, installed alternately at a maximum of 12 inch intervals.

A total of 42 generic power and instrumentation cables were installed in the cable tray test assembly.

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In addition, a flared transition design was installed on the upper leg of the cable tray at its junction with the penetration through the concrete slab, and a caulked-in flared transition design was installed on the lower leg at its penetration through the concrete slab.

The fire test was conducted in accordance with the applicable sections of the American Nuclear Insurers Bulletin #5(79), "ANI/MAERP Standard Fire Endurance Test Method to Qualify a Protective Envelope for Class 1E Electrical Circuits".

All of the materials comprising the THERMO-LAG 330 Fire Barrier System were manufactured and applied in accordance with all applicable sections of Thermal Science's ("TSI") Nuclear Quality Assurance Program Manual/Quality Control Operating Procedures Manual, which has been previously accepted by the American Nuclear Insurers. The design configuration used in this test program is described in Section 7.0 of this test report.

## 1.2 Summary

Based on the results and observations of this test:

- (1) The test assembly, as described in Section 1.1, was exposed to the standard time/temperature environment of ASTM E119 for 60 minutes, followed by a 2 1/2 minute minimum water hose stream test. Following the test, the power, control, and instrumentation cables were tested and found to function with no loss of circuit integrity.
- (2) The recorded cable surface temperatures in the cable tray section of the test assembly during exposure to the 60 minute fire endurance test did not exceed:
  - A. Average Cable Surface Temperature 133.5F
  - B. Maximum Individual Cable Surface Temperature 165.6F
- (3) The thermal gradient over the nine inch distance within the P-1000 unistrut section after 60 minutes exposure to the fire endurance test was as follows:

| <u>TC/No.</u> | <u>Location</u>               | <u>Temperature(F)</u> |
|---------------|-------------------------------|-----------------------|
| 25            | 2 3/4" to right of Cable Tray | 119.9                 |
| 26            | 1 3/4" from front of Unistrut | 371.2                 |
| 27            | 3 3/4" from front of Unistrut | 498.3                 |
| 28            | 5 3/4" from front of Unistrut | 615.5                 |
| 29            | 7 3/4" from front of Unistrut | 846.8                 |

These findings show that a P-1000 unistrut section protected a 0.500 inch minimum thickness Prefabricated Panel fire barrier and extending nine (9) inches, as measured from its interface with the outer periphery of the fire barrier, limited the surface temperature at the adjoining section of the unistrut to the cable tray to 119.9F.

- (4) The P1000 unistrut, when protected with a 0.500 inch minimum dry film thickness Prefabricated Panel, along a span of nine (9) inches as measured into the fire zone from the point of penetration through the fire barrier did not degrade the electrical integrity of the protected assembly.
- (5) The transition sections, installed at the junction of the upper and lower legs of the cable tray and concrete access slab of the test furnace, functioned successfully as evidenced by the relative uniformity of temperature measurements at all locations in the test assembly and by the fact that they did not allow the penetration of smoke, flames, and water into the test assembly.

These recorded temperatures were below the 325F maximum established for the cable surface temperatures by jurisdictional authorities.

## 2.0 PURPOSE

The purpose of this test was to:

- 1) Demonstrate that the fire barrier design tested herein meets the applicable performance criteria of ANI;s Bulletin #5(79) and the 325F cable surface limitation imposed by jurisdictional authorities.
- 2) Demonstrate by test that a P1000 unistrut, when protected with a 0.500 inch nominal thickness of the THERMO-LAG Prefabricated Panel, along a span of 9 inches as measured into the fire zone from the point of penetration through the fire barrier, will not degrade the electrical integrity of the protected assembly.

## 3.0 TEST LOCATION

The test was conducted on 7 May 1987 at the laboratory facilities of TSI in St. Louis, Mo., by its personnel and under the direct supervision and total control of Industrial Testing Laboratories, Inc. of St. Louis, Mo.

## 4.0 TEST PLAN STANDARDS AND REFERENCES

The fire endurance test was conducted in accordance with applicable sections of the ASTM E119 Standard Time/Temperature Test Method, and was followed by a water hose stream test, in accordance with the following:



American Nuclear Insurer's (ANI)

Bulletin #5(79)

"ANI/MAERP Standard Fire Endurance  
Test Method to Qualify a Protective  
Envelope for Class 1E Electrical  
Circuits"

American Society for Testing and Materials (ASTM)

ASTM E119

"Standard Method of Fire Tests of  
Building Construction and Materials"

National Fire Protection Association (NFPA)

Standard 251

"Standard Method of Fire Tests of  
Building Construction and Materials"

4.1 ASTM E119 Fire Endurance Test

Paragraph 3.4.1 of ANI's Bulletin #5(79) states that "the protective envelope shall be exposed to the standard time/temperature curve found in ASTM E119-76 (revised to E119-81) for a minimum of one hour." In this test, the test assembly was exposed to the standard time/temperature environment presented in ASTM E119-76 (A2.1) for a minimum period of one (1) hour. The standard time/temperature curve is presented herein as Figure 1.

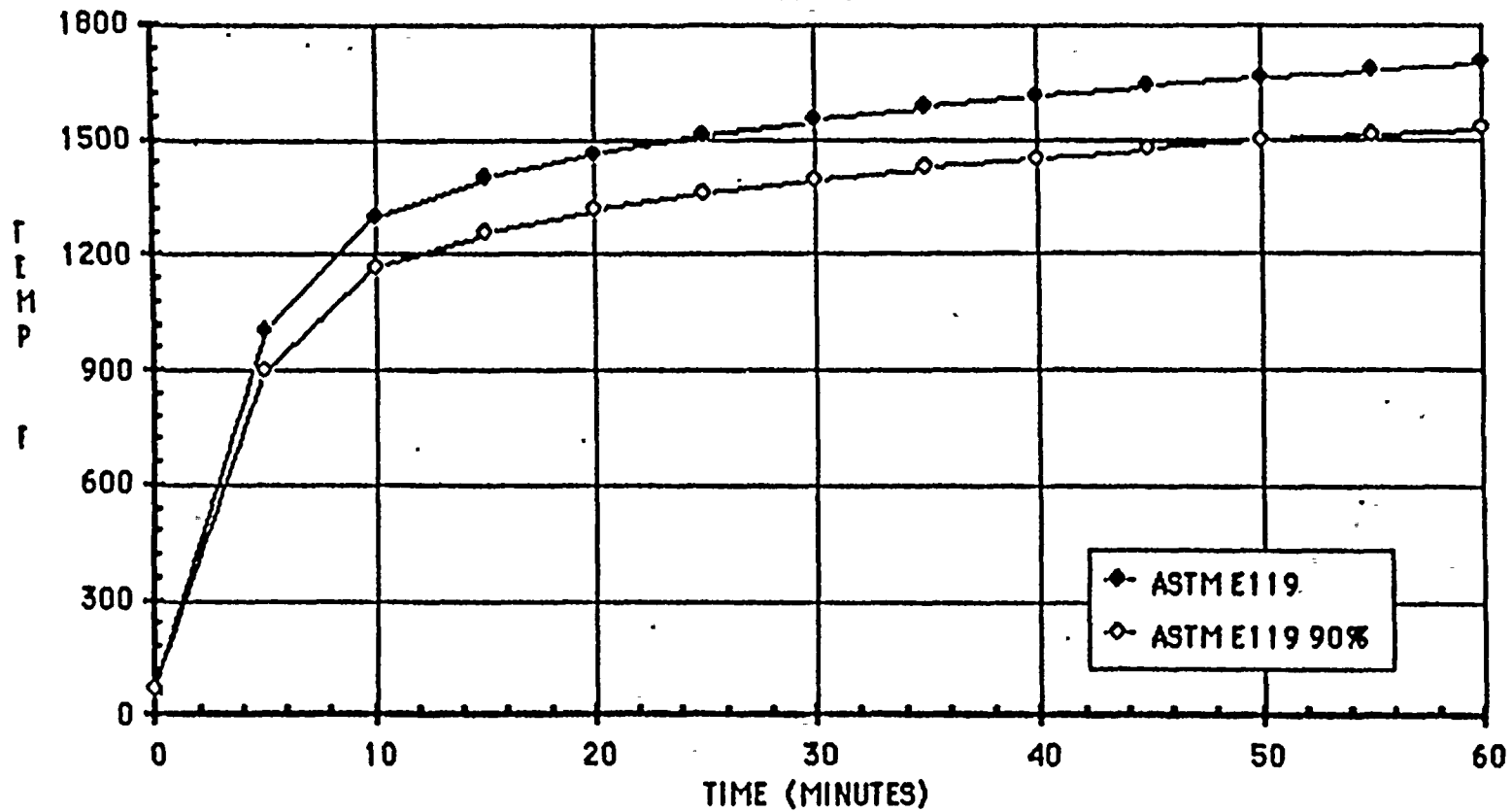
The required accuracy of the temperature control requirement under this test program is that the area under the test/temperature curve shall be within ten percent (10%) of the corresponding area under the standard time/temperature curve.

The authorities having jurisdiction over the fire safety and safe hot shutdown of nuclear power generating plants require that a limiting temperature of 325F, as measured on the surface of the protected power, control and instrumentation cables not be exceeded in the course of the fire exposure.

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FIGURE 1

ASTM E119 TEST METHOD TIME/TEMPERATURE  
RELATIONSHIP FOR ONE HOUR FIRE ENDURANCE  
TEST



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5



#### 4.2 Water Hose Stream Test

In accordance with Paragraph 3.4.2(1) of ANI's Bulletin #5(79), the test assembly was exposed to a 2 1/2 minute minimum water hose stream test, applied to the exposed surface of the test article, within three (3) minutes after the completion of the fire endurance test. A water pump was used to provide the water hose stream during the test. The hose was delivered through a 2 1/2 inch national standard playpipe, equipped with a 1 1/8 inch type, at a nozzle pressure of 30 psi. The tip of the nozzle was held at a distance of 20 feet from the test assembly. The length of the hose was 150 feet.

#### 4.3 Electrical Circuit Integrity Monitoring

Paragraph 3.5 of ANI's Bulletin #5(79) required that circuits contained in a test article do not de-energize during exposure to the fire endurance and water hose stream tests. A required test condition is to continuously monitor a sufficient number of electrical circuits in the test assembly to detect failure; circuit to circuit (conductor to conductor short circuits), circuit to system (conductor continuity), and circuit to ground (conductor or ground). A schematic diagram of the three monitoring channels utilized in this test program are shown in Figure 2.

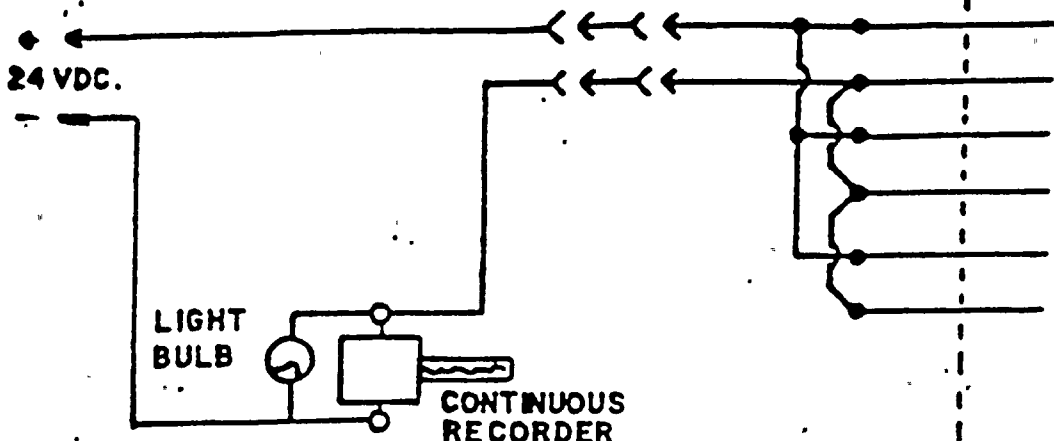
In this test program, all cables were energized using a 24 volt, DC power source to monitor circuit integrity during the fire endurance and water hose stream tests. Selected cables in each test assembly were instrumented for each of the three parameters. The test assemblies were grounded during the tests.

The three cable groups in each cable test assembly were wired in series and continuously monitored during the fire endurance and water hose stream test, using both a Multi-Light Display Panel and an Eight Channel Event Recorder as follows:

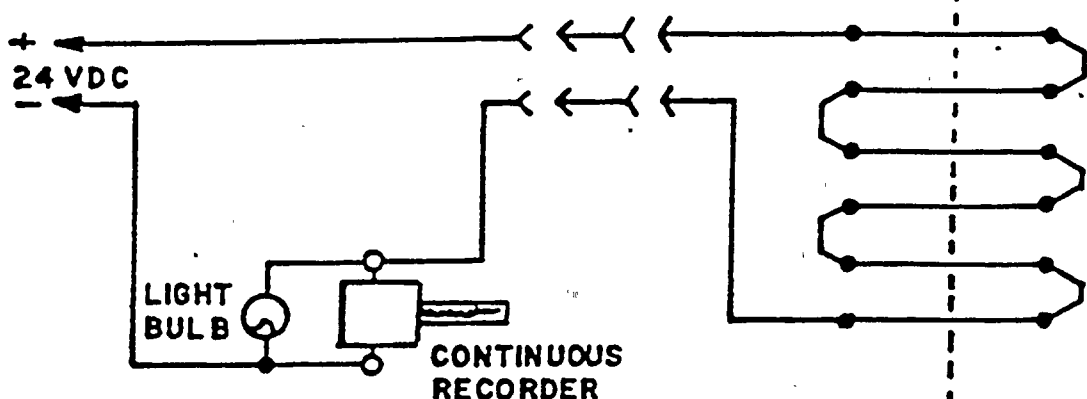
- 1) Power, control and/or instrumentation cables in the assembly were connected as a short circuit detection circuit as shown in Figure 2A.
- 2) Power, control and/or instrumentation cables in the assembly were connected as a continuity monitoring circuit as shown in Figure 2B.
- 3) Power, control and/or instrumentation cables in the assembly were connected as a ground detection circuit as shown in Figure 2C.

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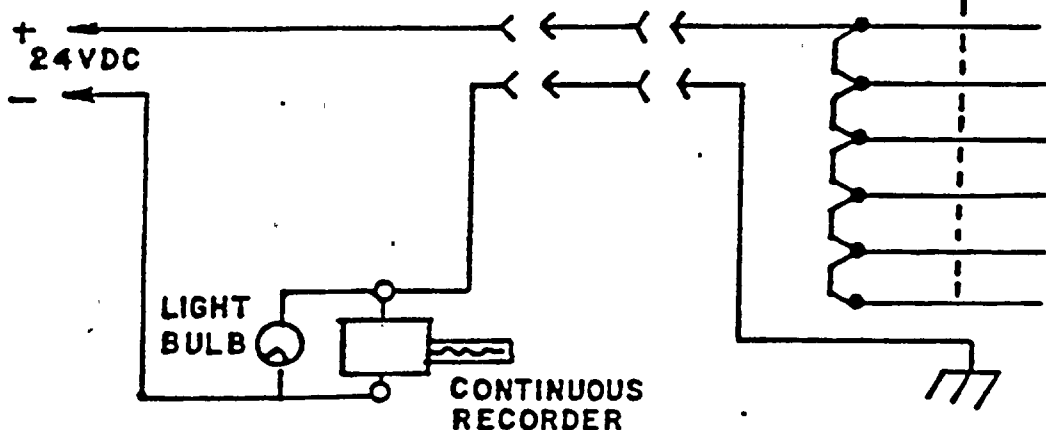




A-TYPICAL CIRCUIT TO CIRCUIT MONITORING CHANNEL



B-TYPICAL CIRCUIT TO SYSTEM MONITORING CHANNEL



C-TYPICAL CIRCUIT TO GROUND MONITORING CHANNEL

|   |  |                  |      |   |           |
|---|--|------------------|------|---|-----------|
| <b>TOLERANCES</b><br><small>(EXCEPT AS NOTED)</small> |  | <b>REVISIONS</b> |      | <b>151, INC.</b> 3260 BRANNON AVE.<br>ST. LOUIS, MO. 63139. |           |
|   |  |                  |      |   |           |
| DECIMAL   |  | NO.              | DATE | BY  |           |
| ±   |  | 1                |      |   |           |
| FRACTIONAL  |  | 2                |      |   |           |
| ±   |  | 3                |      |   |           |
| ANGULAR   |  | 4                |      |   |           |
| ±   |  | 5                |      |   |           |
|   |  |                  |      | CHECK'D   | DATE      |
|   |  |                  |      | TRACED  | 7-17-1982 |
|   |  |                  |      | APP'D   |           |
|   |  |                  |      | MATERIAL  |           |
|   |  |                  |      | SCALE   | NONE      |
|   |  |                  |      | DRAWING NO.   |           |

**CABLE INTEGRITY MONITORING CIRCUITS.**

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CABLE INTEGRITY MONITORING CIRCUITS.

The Multi-Light Display Panel and Event Recorder will be wired in such a manner that the monitoring circuits will be energized, and in the event of a test cable failure:

- 1) Circuit to Circuit: Light will go on and event recorder will indicate the condition;
- 2) Circuit to System: Light will go out and event recorder will indicate the condition;
- 3) Circuit to Ground: Light will go on and event recorder will indicate the condition.

The circuit to circuit and circuit to ground circuits were manually checked at the conclusion of the water hose stream test with a test lead to verify that the monitoring circuits were functioning during both the fire endurance and water hose stream tests.

Figure 3 shows a photograph of a typical Multi-Light Display Panel and an Eight Channel Event Recorder used to monitor circuit continuity.

#### 5.0 DESCRIPTION OF TSI'S HIGH TEMPERATURE TEST FURNACE

TSI's High Temperature Test Furnace is constructed of a steel plate lined with high temperature insulative material and has exterior dimensions of 49 1/2" in width, 77" in depth and 66 3/4" in height. The bottom section of the furnace is made of 1/4" steel plate and is lined with a 5" layer of three (3) different types of Fiberfrax Durablanket.

The furnace interior is 36" wide by 71" deep by 50 1/2" high. The bottom section is further insulated with approximately 5" of Monocast 50 in order to protect the test assembly from lower end temperature effects. The entire furnace is mounted on 4 inch "H" beam supports.

A total of eleven (11) burners are arranged in two groups of four on two opposite sides and one grouped of three at the adjoining wall. The burners are staggered to provide more uniform flaming in the proximity of the test article. A schematic of TSI's High Temperature Test Furnace is shown in Figure 4.

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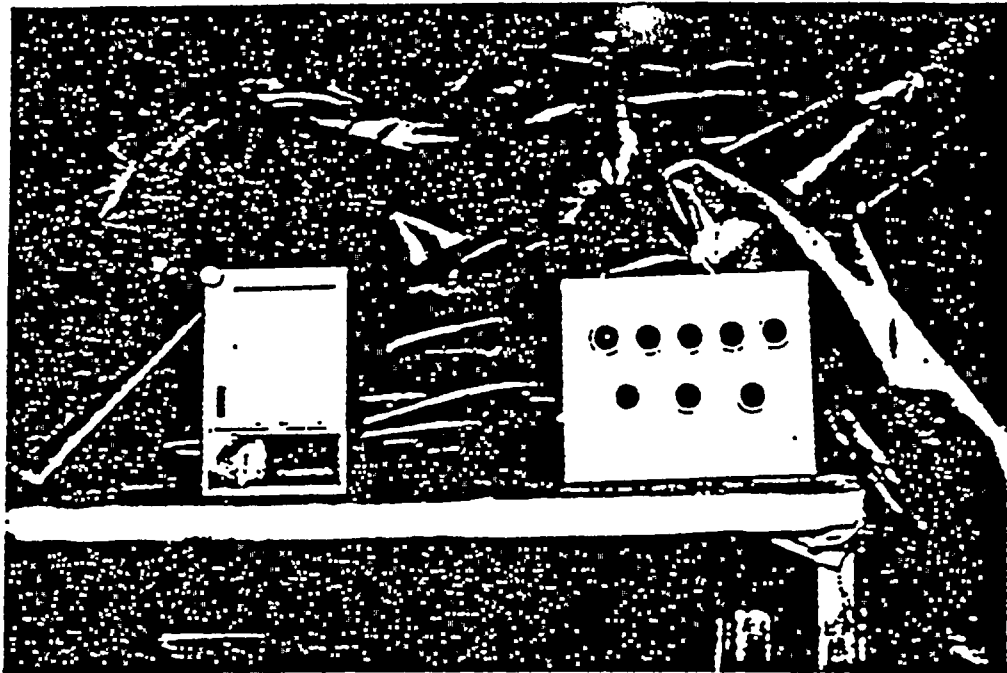


FIGURE 3

PHOTOGRAPH OF THE EIGHT-CHANNEL EVENT RECORDER

AND

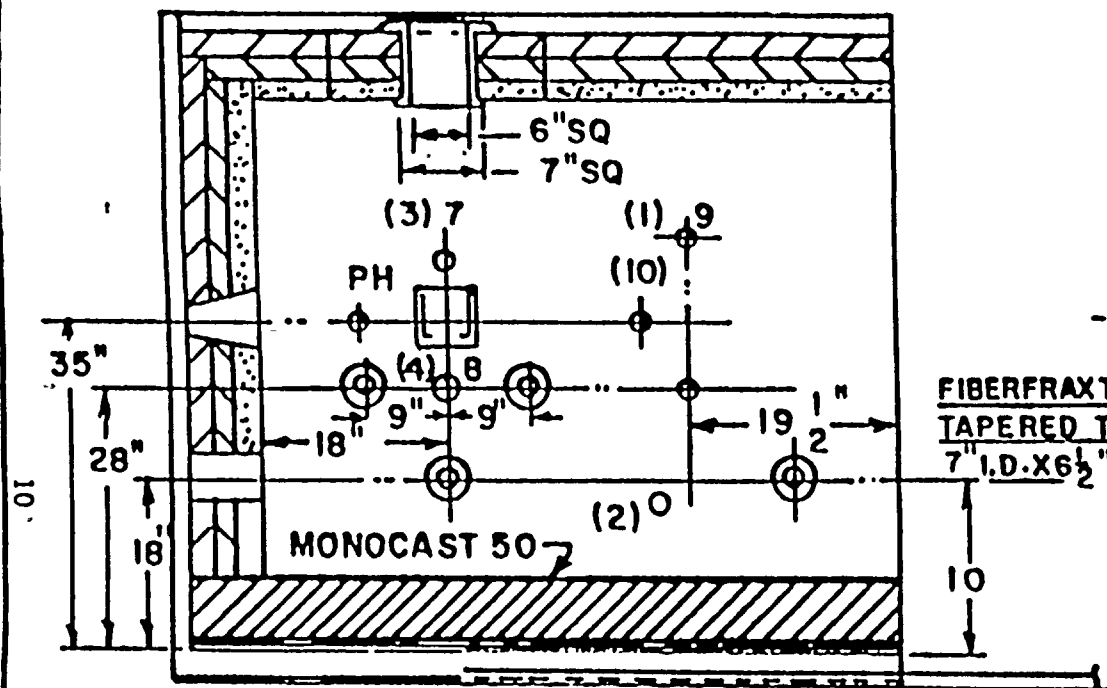
THE MULTI-LIGHT DISPLAY PANEL



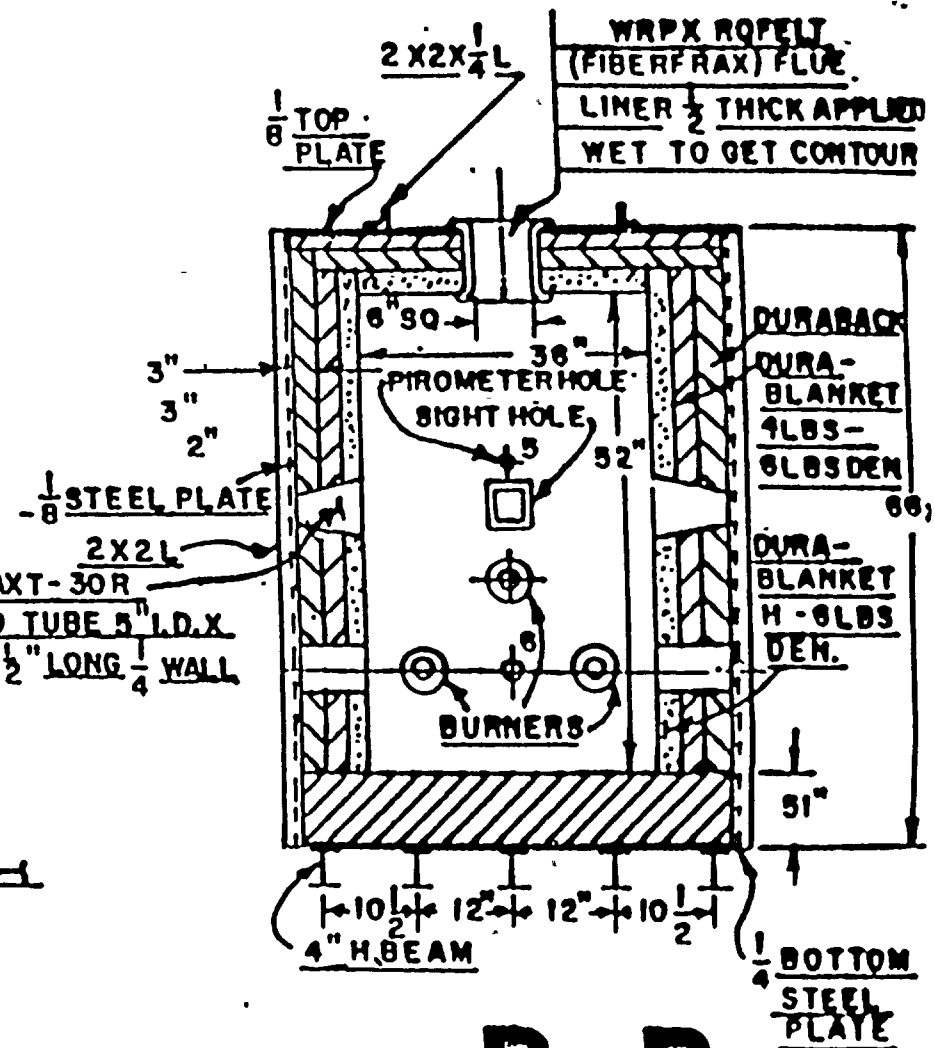
EIGHT CHANNEL  
EVENT RECORDER

MULTI-LIGHT  
DISPLAY PANEL

13-M301-57-1



SECTION **A-A**



SECTION **B-B**

|                                     |               |  |   |
|-------------------------------------|---------------|--|---|
| <b>TSI</b> - ST. LOUIS, MO.         |               | CASSENS DRIVE<br>ST. LOUIS, MISSOURI 63026 |   |
| SCALE NONE                          | DATE 12-14-84 | DESIGNED BY <i>Handwritten Signature</i>   | CHECKED BY <i>Handwritten Signature</i> |
| TSI'S HIGH TEMPERATURE TEST FURNACE |               |  |   |

13-M301-57-1



The furnace air temperature is monitored by eight (8) shielded chromel/alumel thermocouples. These eight (8) monitoring thermocouples, are located as follows:

- 3 Thermocouples at the left wall
- 3 Thermocouples at the right wall
- 2 Thermocouples at the wall adjoining the two walls

In addition, two (2) informational thermocouples are located:

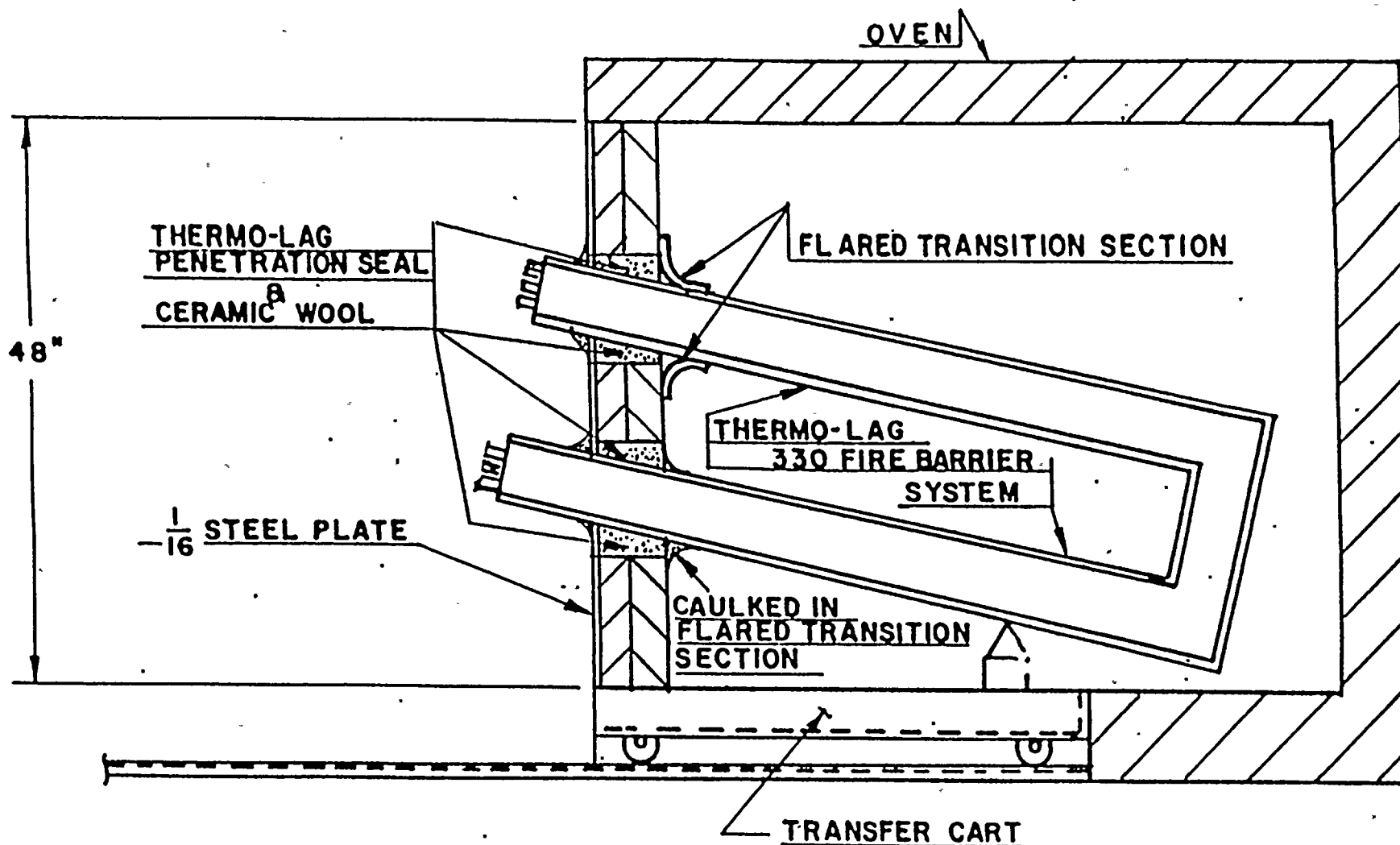
- 1 Thermocouple at the center of the plenum provided by the "U" cross section of a typical test article
- 1 Thermocouple at approximately midway underneath the lower run of a typical test assembly

Two exhaust blowers are provided to remove the flue gases and provide adequate furnace draft from efficient burner operations. In addition, outside air and cooling water are bled into the flue to facilitate draft and temperature control of the exhaust gases.

As installed in the test furnace, the wall section of the test assembly will serve as the furnace access door. The general arrangements of the cable tray test article and the wall section of the test assembly with the high temperature test furnace is shown in Figure 5.

#### 5.1 Transfer Cart

The transfer cart is used to move the test article into the test furnace and then remove it upon completion of the fire test. It is also used to transport the test article from the test furnace to the water hose spray area. The transfer cart is approximately 50 inches long by 18 inches wide and has 4 inch diameter wheels. The transfer cart is attached to the wall section of the test assembly which comprises one side of the test furnace.



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|   |                    |  |  |
|---|--------------------|--|--|
| <b>TST</b> TST, Inc.                                      |                    | 2200 CASSENS DRIVE<br>ST LOUIS, MISSOURI 63026 |  |
| SCALE NONE  | APPROVED BY        | DESIGNED BY                                    |  |
| DATE 5-5-87   | <i>[Signature]</i> | REVISED  |  |
| GENERAL ARRANGEMENT OF A TEST ARTICLE IN THE TEST FURNACE |                    |  |  |



## 6.0 TEST ASSEMBLY

The test assembly was comprised of a 12 inch by 4 inch ladder cable tray section arranged in a block letter "U" configuration. The approximate length and height of the test assembly was 5 feet and 3 feet, for a total combined fire exposed length of 8 foot minimum.

The P1000 unistrut section had cross-sectional dimensions of 1 5/8" by 1 5/8", a weight per square foot of circa 3.51 lbs., with an overall length of 21-3/4". The unistrut was welded to one side of the ladder cable tray.

### 6.1 Cable Installation

A total of 42 generic power and instrumentation cables were installed in the test assembly. These generic cables were:

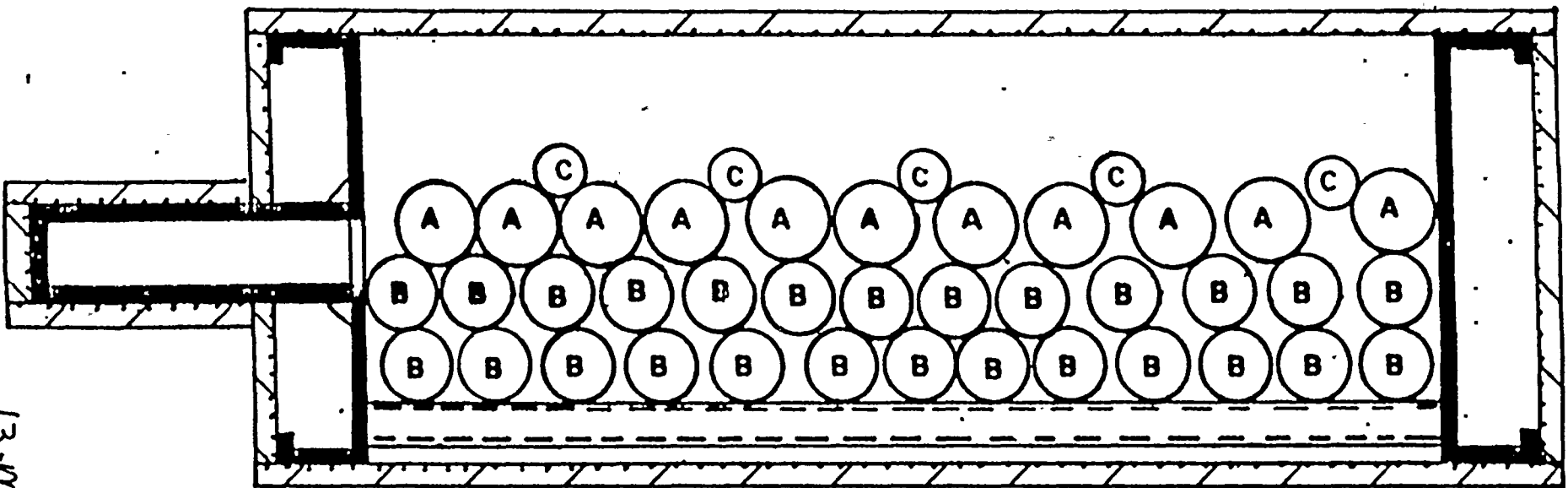
| <u>Cable Description</u> | <u>Type</u>     | <u>Quantity</u> |
|--------------------------|-----------------|-----------------|
| 300 MCM                  | Power           | 26              |
| 6AWG/3CDR                | Power           | 11              |
| 14/2C XLP/PVC            | Instrumentation | 5               |

The location of the cables in the tray are shown in Figure 6.

### 6.2 Opening Sealant

Fire stops comprised of 50% ceramic wool material and 50% THERMO-LAG 330-1 Subliming Trowel Grade Material were inserted in the upper and lower openings in the concrete slab between the cable tray penetrations and the cement slab. Those sections of the cable tray and their protruding cables located on the non-fire side of the test assembly were wrapped with 2 inches of ceramic blanket to minimize any major heat transfer with the ambient laboratory environment.

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A = 11 3C // 6AWG

B = 26 300 MCM

C = 5 14 / 2C

|   |                    |                          |  |
|---|--------------------|--------------------------|--|
| <b>TST</b> TST, Inc.                        |                    | 2200 CASSENS DRIVE       |  |
|   |                    | ST LOUIS, MISSOURI 63026 |  |
| SCALE NONE                                  | DESIGNED BY        | CHECKED BY               |  |
| DATE 5-5-87                                 | <i>[Signature]</i> |                          |  |
| GENERAL ARRANGEMENT OF CABLES IN CABLE TRAY |                    |                          |  |



## 7.0

FIRE BARRIER SYSTEM

A one (1) hour fire rated design of the THERMO-LAG 330 Fire Barrier System was installed on the ladder cable tray section of the test assembly using a Prefabricated Panel Ready Access Design to completely enclose that portion of the cable tray located on the fire side of the furnace access door. Prefabricated Panel Sections were also used to enclose the unistrut attachment for a distance of 9 inches from its intersection with the cable tray and to construct the flared transition design used to join the upper and the lower legs of the protected cable tray to the furnace access door at its upper and lower penetration junction.

The Prefabricated Panels were fabricated from THERMO-LAG Stress Skin Type 330-69 and THERMO-LAG 330-1 Subliming Material.

The installation of the Prefabricated Panel Ready Access Design was accomplished by cutting the number of pieces required to form the fire barrier from 0.500 inch minimum dry film thickness THERMO-LAG Prefabricated Panels and then mounting the sections on the cable tray using 0.5" x 0.020" minimum stainless steel banding material. The stainless steel banding material was placed at the interface of the cable tray and the upper wall opening, and then at 12 inch maximum intervals along the cable tray. The installation of the Prefabricated Panel Sections on the unistrut attachment was accomplished in the same manner except that the stainless steel banding material was placed at approximately 2 1/2 inch intervals. The joints and edges of the installed Prefabricated Panels were caulked with THERMO-LAG 330-1 Subliming Trowel Grade Materials.

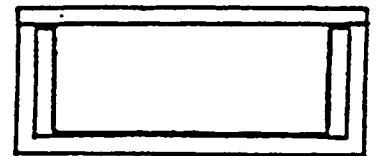
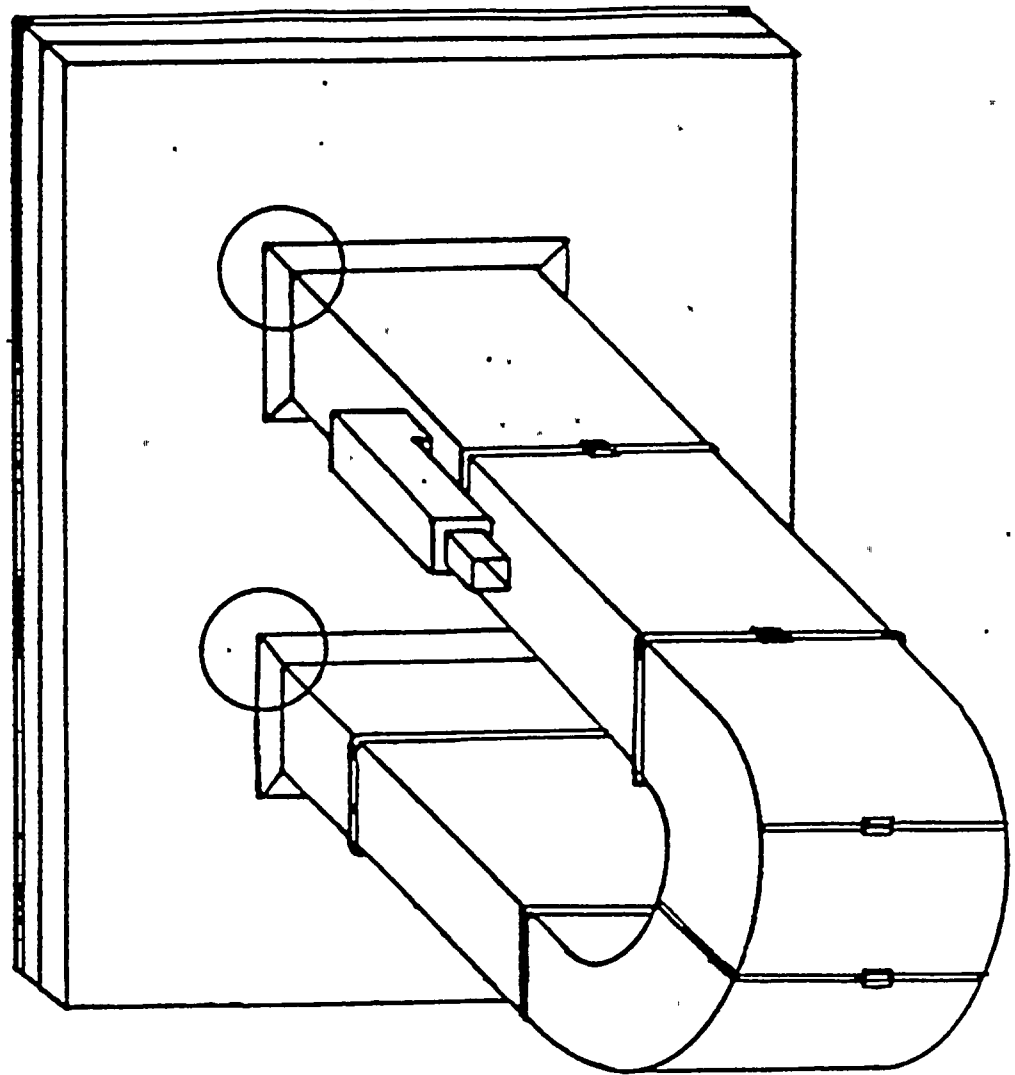
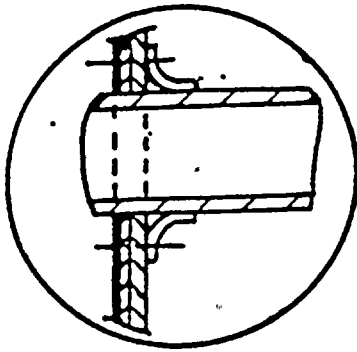
The installation of the flared transition designs was initiated by cutting pieces from a 0.500 inch minimum dry film thickness THERMO-LAG Prefabricated Panel and then forming each piece into a flanged section by making a 90 degree bend along its centerline. The flanged sections were then attached to the furnace access door using two machine bolts per flanged section.

The installation was performed in accordance with all applicable sections of TSI's Nuclear Quality Assurance Program Manual/Quality Control Operating Procedures Manual.

A schematic drawing of the one (1) hour fire rated THERMO-LAG 330 Fire Barrier Design, applied to the test assembly, is shown in Figure 7.

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|  |             |                                |                  |
|--|-------------|--------------------------------|------------------|
| <b>TET</b>   |             | 2200 CASSENS DRIVE             |                  |
| TET, Inc.  |             | ST LOUIS, MISSOURI 63026       |                  |
| SCALE NONE   | DATE 5-5-87 | APPROVED BY <i>[Signature]</i> | DESIGNED BY DJMP |
| SCHEMATIC DRAWING OF THE THERMO-LAG 330 FIRE BARRIER PROTECTED TEST ASSEMBLY |             | REVISION                       |                  |
|  |             | FIGURE 7                       |                  |

8.0 TEST MATERIALS

8.1 THERMO-LAG Stress Skin Type 330-69

This material provides a strong mechanical base for the THERMO-LAG 330-1 Subliming Material. It is an open weave, self stiffened steel mesh, having a 0.017 inch minimum strand diameter, 56 minimum mesh size and a weight per square yard of 1.75 pounds, minimum. This material was used in the fabrication of the THERMO-LAG 330 Prefabricated Panels.

8.2 THERMO-LAG 330-1 Subliming Material

This material provides the required level of fire resistance. It is a water based, subliming, thermally activated, fire resistive coating which volatilizes at fixed temperatures, exhibits a volume increase through the formation of a multi-cellular matrix, and blocks heat to protect the substrate material to which it is applied. In addition to this material being used to fabricate the THERMO-LAG 330 Prefabricated Panels, it is also used in a trowel grade consistency to trowel and caulk areas where required.

8.3 THERMO-LAG 330 Prefabricated Panels

The THERMO-LAG 330 Prefabricated Panels were comprised on an initial layer of the THERMO-LAG Stress Skin Type 330-69, a minimum dry film thickness of 0.500 inches of the THERMO-LAG 330-1 Subliming Material, and an outer layer of the THERMO-LAG Stress Skin Type 330-69.

The above materials are rated as non-combustible with a flame spread, fuel contributed and smoke developed of less than 25.

9.0 TEST INSTRUMENTATION

The test instrumentation used to conduct this test program consisted of:

- ....One (1) 2280B Data Logger, Serial Number 3465002
- ....One (1) Twelve (12) Point Chart Type Thermocouple Temperature Recorder
- ....One (1) Digital Temperature Readout Instrument
- ....One (1) Multi-Point Display Panel
- ....One (1) Eight (8) Channel Event Recorder

This instrumentation was calibrated in accordance with applicable sections of TSI's Nuclear Quality Assurance and Quality Control Operating Procedures Manual, and the calibration records are on file at the offices of TSI.

#### 10.0 THERMOCOUPLES

Thermocouples used in this test program consisted of shielded and unshielded chromel/alumel thermocouples. Shielded 1/4" chromel thermocouples were used to record the air temperature inside the ASTM E119 high temperature test furnace. Unshielded thermocouples were used to record the cable surface temperature of the test article during the test.

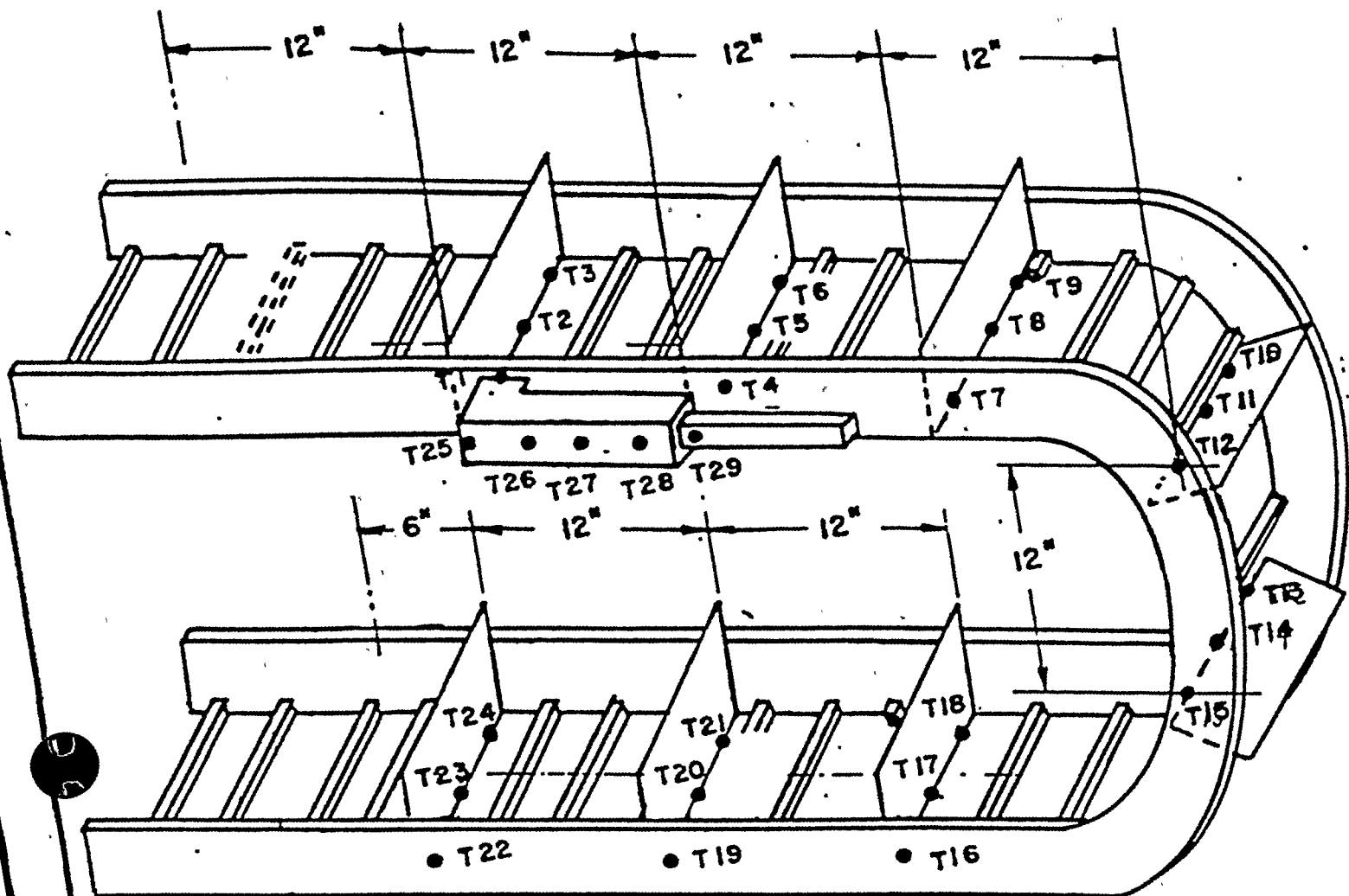
#### 10.1 High Temperature Test Furnace Thermocouples

A total of ten (10) shielded chromel/alumel thermocouples were used to monitor the furnace air temperature in the test program. These thermocouples, as shown in Figure 4, were located in the High Temperature Test Furnace as follows:

- A) Three (3) thermocouples were located at the East Wall
- B) Three (3) thermocouples were located at the West Wall
- C) Two (2) thermocouples were located at the South Wall adjoining the two walls
- D) One (1) thermocouple was located at the center of the plenum
- E) One (1) thermocouple was located approximately midway underneath the test article

#### 10.2 Test Assembly Thermocouples

Twenty-nine (29) thermocouples were used to measure the cable surface temperatures in the test assembly. Twenty-four of these thermocouples were located in eight (8) cross-sectional areas along the cable tray section of the test assembly. The other five (5) were located along the unistrut attachment as is shown in Figure 8.



|                           |  |                             |  |
|---------------------------|--|-----------------------------|--|
| <b>TST</b> TST, Inc.      |  | 2200 CASSENS DRIVE          |  |
| SCALE NONE                |  | ST LOUIS, MISSOURI 63026    |  |
| DATE 5-5-87               |  | DRAWN BY <i>[Signature]</i> |  |
| LOCATION OF THERMOCOUPLES |  | REVIEWED                    |  |
|                           |  | FIGURE                      |  |

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11.0 TEST OBSERVATIONS

11.1 Details of the One Hour Fire Endurance Test

- A. The total exposure to the ASTM E119 time/temperature environment for the one (1) hour fire endurance test was 60 minutes.

Electrical cable surface temperature measurements were recorded once every two and one-half minutes using the 2280B Data Logger.

B. Visual Observations

1. Only light volatiles were observed coming from within the test articles at any time during the one (1) hour fire exposure period.

11.2 Details of the Water Hose Stream Test

- A. As required by Paragraph 3.4.2(1) of ANI's Bulletin #5(79), a water hose stream test was conducted immediately following the fire endurance test.

1. A water pump was used to conduct the required water hose stream test.
2. A 2 1/2 inch diameter national standard playpipe equipped with a 1 1/8 inch tip was used..
3. The nozzle discharge pressure during the water hose stream test exceeded the 30 psi minimum required in ANI's Bulletin #5(79). Prior to the test, the nozzle discharge pressure was tested and calibrated so that a predetermined 30 psi was applied to the test assembly during the water hose stream test.
4. The nozzle distance from the test article was maintained at a maximum of 20 feet.
5. The length of the water hose was 150 feet.

B. Visual Observations Made During the Water Hose Stream Test

1. The duration of the water hose stream test was 3 minutes, as compared to ANI's requirement of 2 1/2 minute, minimum.
2. The virgin phase of the THERMO-LAG 330-1 Subliming Material remaining after the fire endurance test did not separate from the test article during the water hose stream test.

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3. Examination of the cables after the completion of the test indicated that none of the electrical insulation of the cables were damaged. Further examination of the nylon tie wires used in retaining the cables within the test article showed no evidence of damage.

#### 11.3 Details of the Electrical Circuit Integrity Monitoring

- A. As required by Paragraph 3.5 of ANI's Bulletin #5(79), a sufficient number of electrical cables were monitored in the test article throughout the fire endurance and water hose stream tests. The purpose of this monitoring was to detect failure on a circuit to circuit, circuit to system and circuit to ground basis. All electrical cables, which were selected for circuit continuity monitoring, were located in thermally critical areas immediately adjacent to the walls of the test article.
- B. Visual Observations Made During the Electrical Circuit Monitoring
  1. An eight (8) channel event recorder and a multi-light display panel were used in parallel to conduct the circuit integrity monitoring.
  2. Power, control and/or instrumentation cables in the test circuit of the test assembly were connected as a short circuit detection circuit. No failures were observed during either the fire endurance or water hose stream test.
  3. Power, control and/or instrumentation cables in the test circuit of the test assembly were connected as continuity monitoring circuit. No failures were observed during either the fire endurance or water hose stream test.
  4. Power, control and/or instrumentation cables in the test circuit of the test assembly were connected as ground short circuit detection circuit. No failures were observed during either the fire endurance or water hose stream test.

Specific cables in the test assembly instrumented for monitoring the cable integrity during the fire endurance and water hose stream test are shown in Table 1.

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TABLE 1  
THERMOCOUPLE CHANNEL ASSIGNMENT FOR  
MONITORING ELECTRICAL CIRCUIT INTEGRITY  
WITHIN THE TEST ASSEMBLY

FUNCTION LEGEND:

P = Power Cables  
C = Control Cables  
I = Instrumentation Cables

| <u>CHANNEL<br/>ASSIGNMENT</u> | <u>MONITORING CHANNEL</u> | <u>CABLE<br/>TYPE</u> | <u>CABLE<br/>DESCRIPTION</u> |
|-------------------------------|---------------------------|-----------------------|------------------------------|
| 1                             | Circuit to Ground         | P                     | 300 MCM                      |
| 2                             | Circuit to System         | I                     | 14/2                         |
| 3                             | Circuit to Circuit        | P                     | 6AWG/3CDR                    |



## 12.0 TEST RESULTS

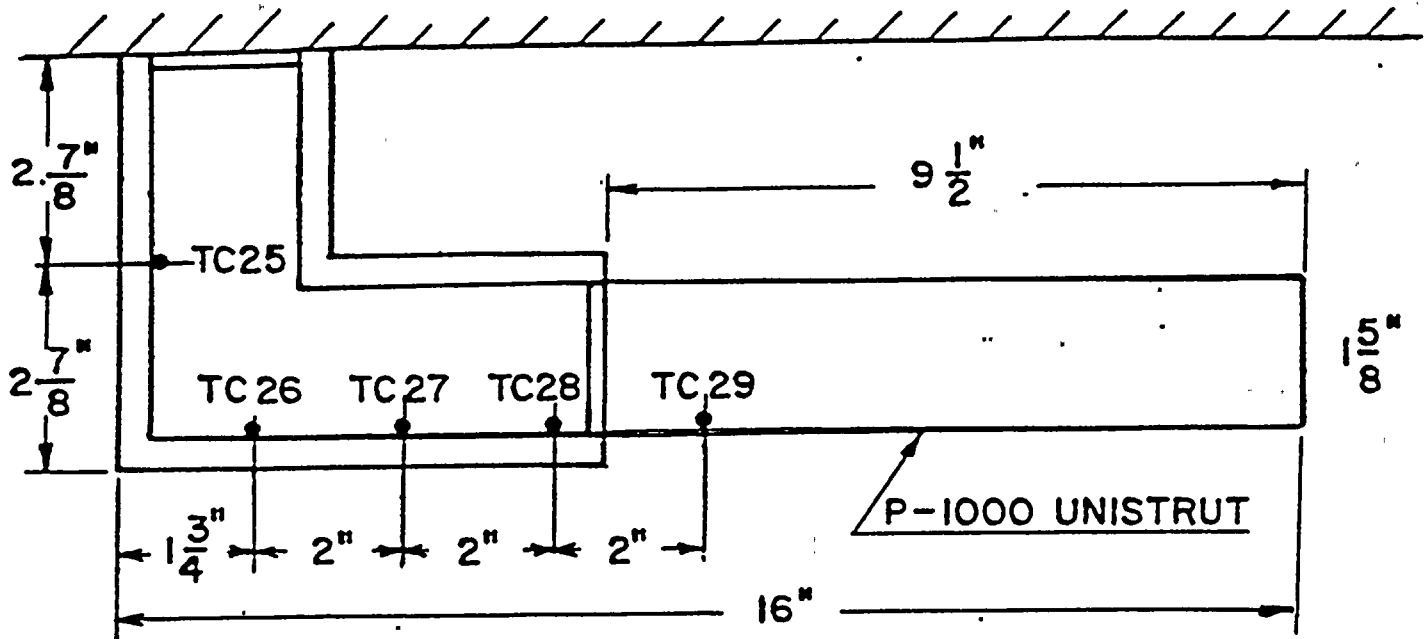
The fire endurance and water hose stream tests conducted on the test assembly as described in this test report, demonstrate the capability of the fire barrier system to meet the test criteria specified in ANI's Bulletin #5(79) for one hour fire resistance. These test results are as follows:

1. The test assembly contained power and instrumentation cables.
2. The test assembly was exposed to the standard ASTM E119 time/temperature environment for a minimum of one (1) hour, followed by a 3 minute water hose stream test.
3. Observations during exposure of the test assembly to the oriented and uniformly distributed water hose stream demonstrated its resistance to the penetration of water during the test.
4. Circuit integrity was continuously monitored during both the fire endurance and water hose stream test, with no loss of circuit integrity in any of the test circuits.
5. Examination of the cables within the test assembly, following the fire endurance and water hose stream tests, indicated that they were all intact, functional and free from heat or fire damage.
6. The recorded cable surface temperatures in the ladder cable tray section, during exposure to the ASTM E119 type fire endurance test, as presented in Table 2 and Figure 10, did not exceed:
  - A. Average Thermocouple Surface Temperature 133.5F
  - B. Maximum Individual Thermocouple Surface Temperature 165.6F
7. The thermal gradient over the nine inch distance within the THERMO-LAG protected section of the P1000 unistrut section after 60 minutes exposure to the fire endurance test as shown in Table 3 was as follows:

| <u>THERMOCOUPLE NO</u> | <u>LOCATION</u>                     | <u>TEMPERATURE - F</u> |
|------------------------|-------------------------------------|------------------------|
| 25                     | 2 3/4" from the right of Cable Tray | 119.9F                 |
| 26                     | 1 3/4" from the front of unistrut   | 371.2F                 |
| 27                     | 3 3/4" from the front of unistrut   | 498.3F                 |
| 28                     | 5 3/4" from the front of unistrut   | 615.5F                 |
| 29                     | 7 3/4" from the front of unistrut   | 846.8F                 |



— CABLE TRAY —



|   |              |                                |                   |
|---|--------------|--------------------------------|-------------------|
| <b>TST</b>  |              | 2200 CASSENS DRIVE             |                   |
| TST, Inc.   |              | ST LOUIS, MISSOURI 63026       |                   |
| SCALE NONE  | DATE 6-20-87 | APPROVED BY <i>[Signature]</i> | DESIGNED BY DUMPI |
| THERMAL GRADIENT IN UNISTRUT ATTACHMENT<br>AFTER ONE HOUR ASTM E119 FIRE EXPOSURE CABLE<br>TRAY |              | FIGURE 9                       |                   |

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These findings, as delineated in Figure 11, show that a P-1000 unistrut section protected a 0.500 inch minimum thickness Prefabricated Panel fire barrier and extending nine (9) inches, as measured from its interface with the outer periphery of the fire barrier, limited the surface temperature at the adjoining section of the unistrut to the cable tray to 119.9F.

8. The P1000 unistrut, when protected with a 0.500 inch minimum dry film thickness Prefabricated Panel, along a span of nine (9) inches as measured into the fire zone from the point of penetration through the fire barrier did not degrade the electrical integrity of the protected assembly.
9. The transition sections, installed at the junction of the upper and lower legs of the cable tray and concrete access slab of the test furnace, functioned successfully as evidenced by the relative uniformity of temperature measurements at all locations in the test assembly and by the fact that they did not allow the penetration of smoke, flames, and water into the test assembly.
10. A comparison of the ASTM E119 test method time/temperature curve with the actual range of temperatures recorded during the fire endurance test is shown in Figure 12.
11. Throughout the fire endurance and water hose stream test, the multi-light display panel remained in its prescribed lighted and non-lighted positions. The lights were energized in the circuit to system monitoring system, while the lights in the circuit to ground/circuit to circuit monitoring systems were not. The eight (8) channel Event Recorder also indicated no circuit failures or faults during the fire endurance and/or water hose stream tests.

These test results indicate that the THERMO-LAG 330 Fire Barrier System, as tested, met the prerequisites specified by the American Nuclear Insurers and the cable surface temperature limitation established by the jurisdictional authorities.

TABLE 2

AVERAGE AND MAXIMUM OF ALL CABLE SURFACE  
TEMPERATURES RECORDED WITHIN THE CABLE TRAY  
DURING THE ONE HOUR FIRE ENDURANCE TEST

| <u>TIME</u><br><u>(Minutes)</u> | <u>AVERAGE TEMPERATURE</u><br><u>(F)</u> | <u>MAXIMUM TEMPERATURE</u><br><u>(F)</u> |
|---------------------------------|--|--|
| 0                               | 71.6                                     | 73.0                                     |
| 5                               | 71.8                                     | 73.7                                     |
| 10                              | 72.8                                     | 81.8                                     |
| 15                              | 75.2                                     | 98.3                                     |
| 20                              | 78.4                                     | 106.6                                    |
| 25                              | 82.6                                     | 110.4                                    |
| 30                              | 88.4                                     | 117.8                                    |
| 35                              | 98.5                                     | 129.2                                    |
| 40                              | 104.6                                    | 141.8                                    |
| 45                              | 112.2                                    | 148.0                                    |
| 50                              | 119.1                                    | 156.5                                    |
| 55                              | 126.2                                    | 161.1                                    |
| 60                              | 133.5                                    | 165.6                                    |

FIGURE 10

AVERAGE AND MAXIMUM OF ALL CABLE SURFACE TEMPERATURES  
RECORDED WITHIN THE CABLE TRAY TEST ASSEMBLY DURING  
THE ONE HOUR ASTM E119 FIRE ENDURANCE TEST

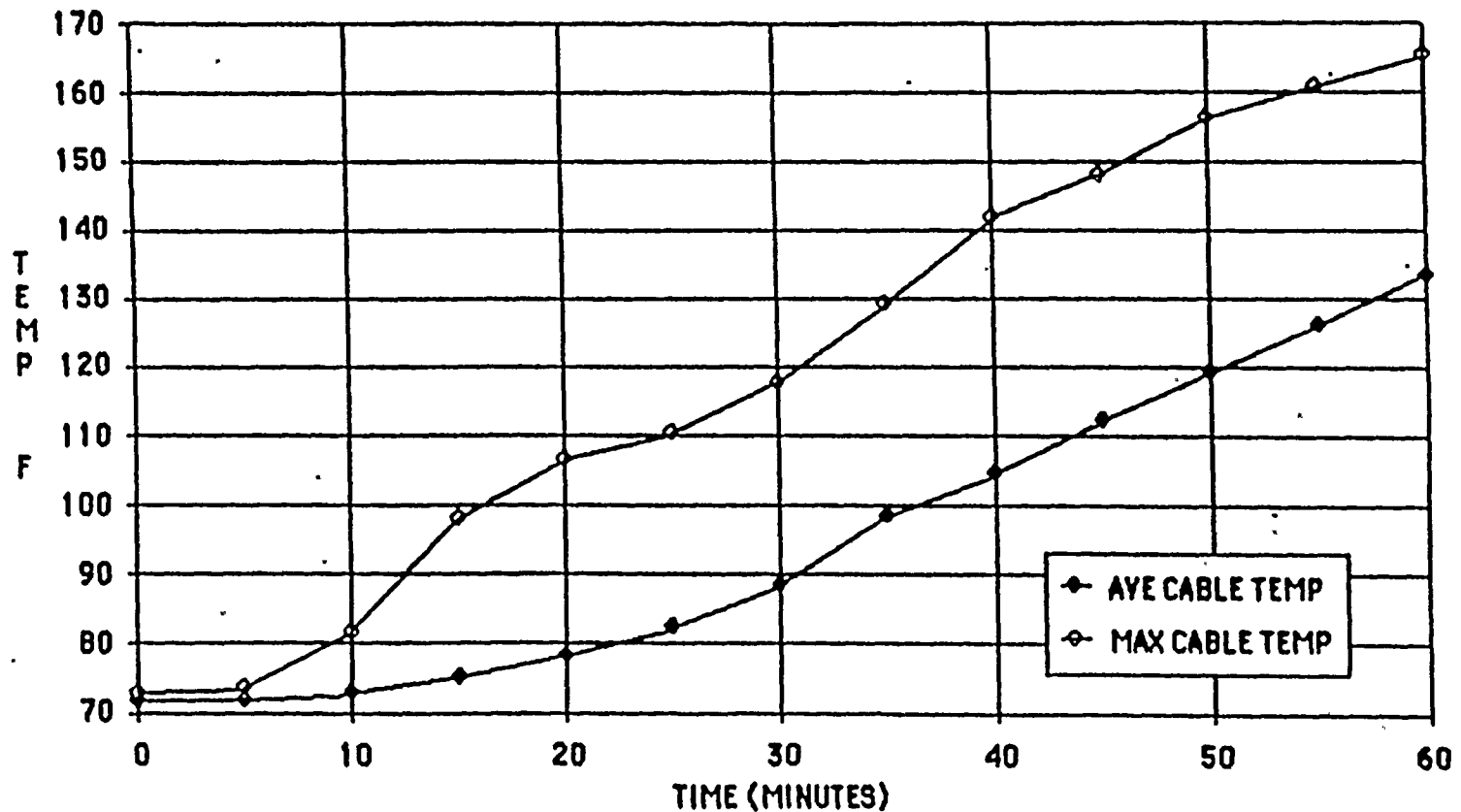




TABLE 3

P-1000 UNISTRUT SURFACE  
TEMPERATURES RECORDED DURING  
THE ONE HOUR FIRE ENDURANCE TEST

| <u>TIME</u><br><u>(Minutes)</u> | <u>TEMPERATURE(F)</u> |              |              |              |              |
|---------------------------------|-----------------------|--------------|--------------|--------------|--------------|
|                                 | <u>TC#25</u>          | <u>TC#26</u> | <u>TC#27</u> | <u>TC#28</u> | <u>TC#29</u> |
| 0                               | 72.3                  | 75.2         | 76.2         | 76.8         | 78.2         |
| 5                               | 72.7                  | 78.0         | 85.9         | 104.4        | 139.0        |
| 10                              | 74.0                  | 100.8        | 119.6        | 161.9        | 250.9        |
| 15                              | 76.4                  | 142.3        | 176.4        | 245.6        | 379.7        |
| 20                              | 79.7                  | 176.6        | 231.4        | 317.6        | 482.5        |
| 25                              | 83.4                  | 219.1        | 276.1        | 374.2        | 555.6        |
| 30                              | 87.6                  | 238.5        | 318.6        | 419.3        | 612.6        |
| 35                              | 92.2                  | 259.7        | 346.1        | 455.8        | 658.2        |
| 40                              | 97.1                  | 277.5        | 372.0        | 486.9        | 694.3        |
| 45                              | 102.5                 | 295.8        | 399.1        | 517.3        | 738.0        |
| 50                              | 108.0                 | 318.1        | 429.4        | 551.4        | 768.4        |
| 55                              | 113.9                 | 335.0        | 464.3        | 586.4        | 804.6        |
| 60                              | 119.9                 | 371.2        | 498.3        | 615.5        | 846.8        |



1  
2  
3  
4  
5

FIGURE 11

P-1000 UNISTRUT SURFACE TEMPERATURES  
RECORDED DURING THE ONE HOUR FIRE ENDURANCE TEST

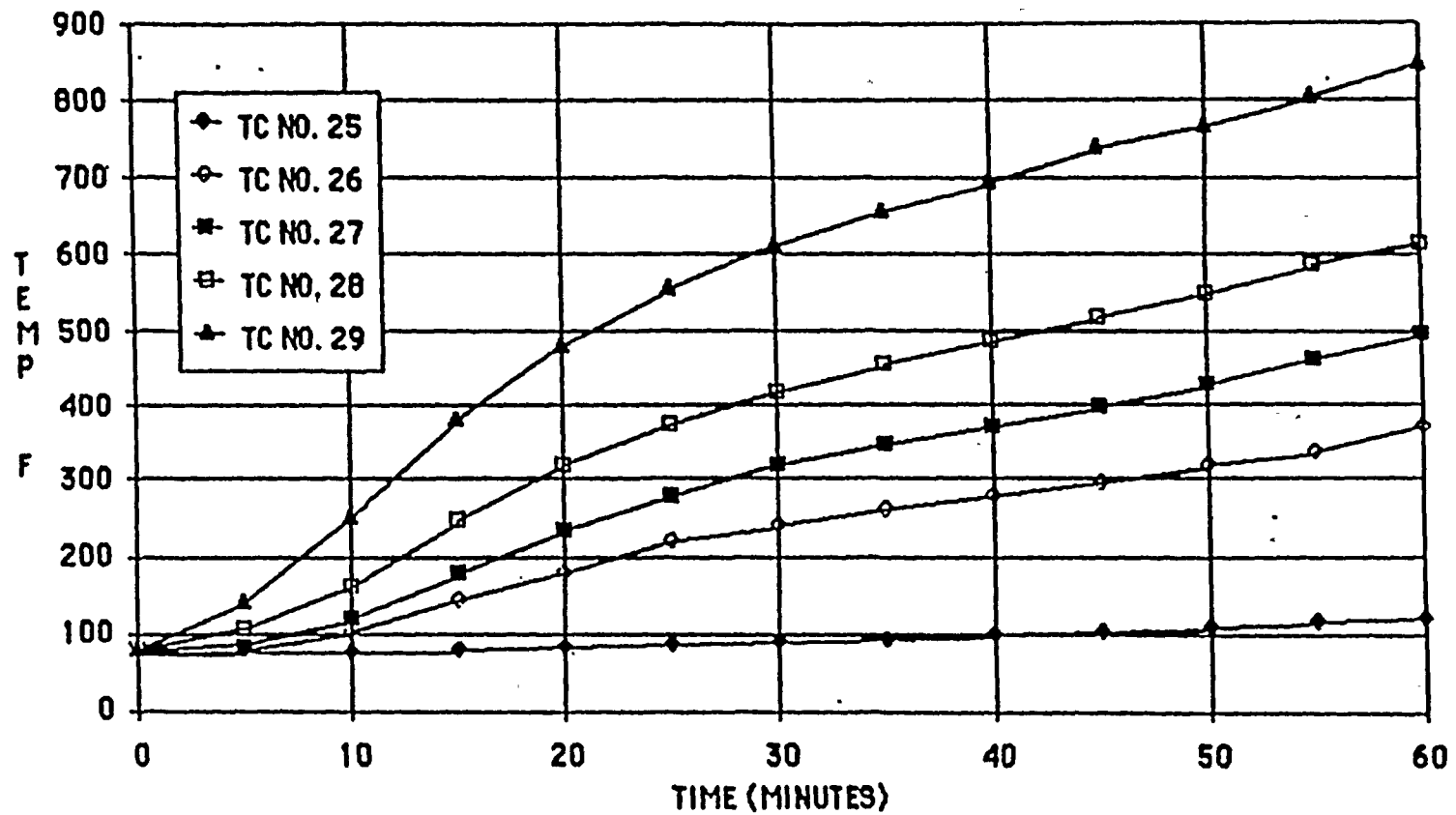
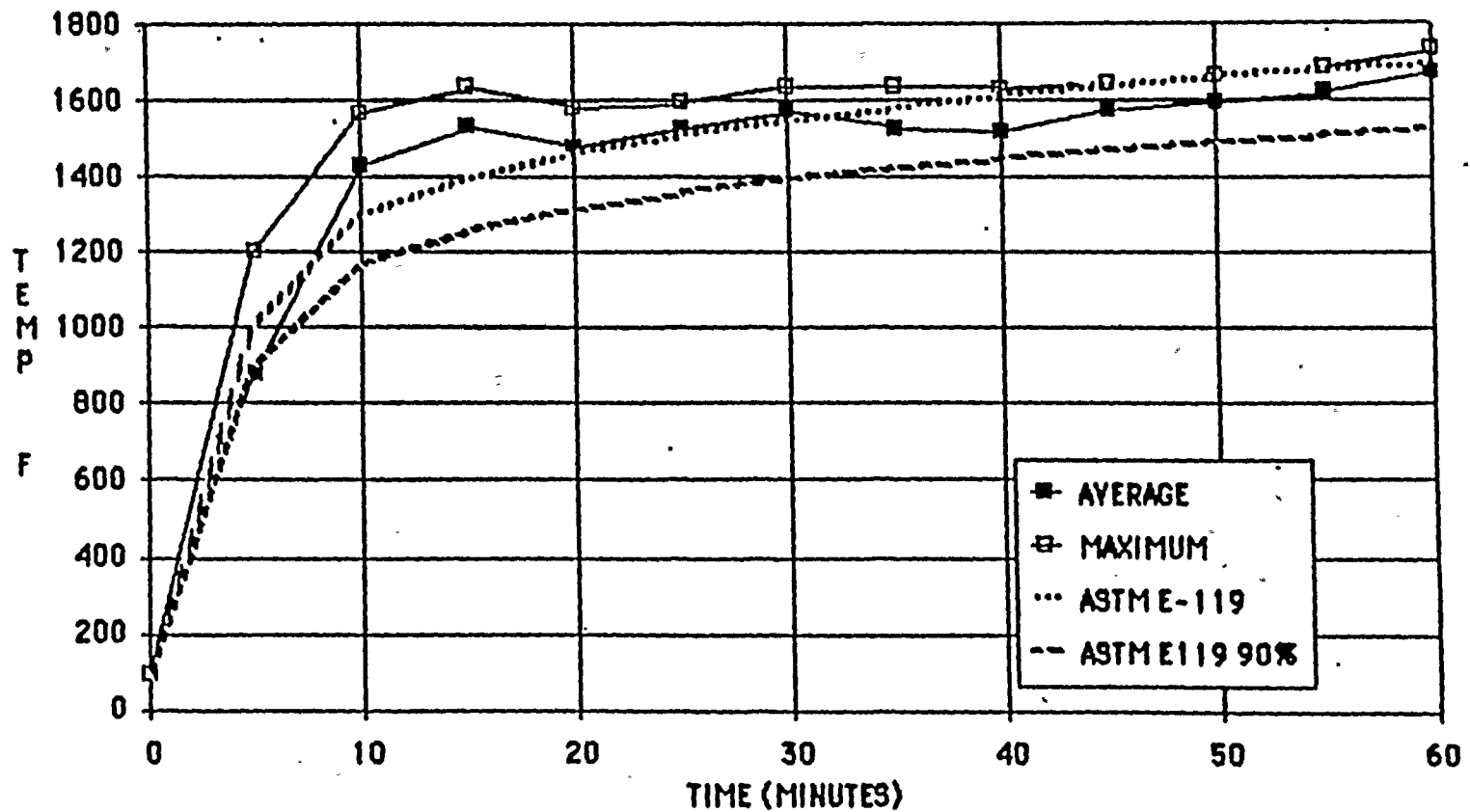


FIGURE 12

COMPARISON OF THE ASTM E119 TIME/TEMPERATURE CURVE  
WITH THE ACTUAL RANGE OF TEMPERATURES RECORDED  
DURING THE ONE HOUR FIRE ENDURANCE TEST



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## WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION

## 1.0 EXECUTIVE SUMMARY

1.1 INTRODUCTION

This report documents a re-evaluation of the Fire Protection Program at the Washington Public Power Supply System's Nuclear Plant No. 2 (WNP-2). In part, the re-evaluation effort was undertaken to resolve concerns and issues identified by the Nuclear Regulatory Commission (NRC) staff in their 1985 Systematic Assessment of Licensee Performance (SALP) Report (issued July 1986) and in several inspections of the facility by the NRC regional staff during the first half of calendar year 1986.

A plan outlining the re-evaluation approach and major milestones was submitted to the NRC Region V staff on September 16, 1986 (1). Major elements of the reassessment included:

- 1) Reassessment of fire protection requirements and commitments.
- 2) Re-examination of program responsibilities and administration.
- 3) Evaluation of program implementation (including both operational phase and construction phase implementation).

The re-evaluation efforts were accomplished utilizing Supply System engineers and fire protection professionals in combination with fire protection experts from Ebasco Services, Inc., and Factory Mutual Corporation. Ebasco was retained to independently assess Supply System compliance with NRC requirements/commitments and with applicable NFPA codes. Ebasco also assisted in the evaluation of operational phase fire protection program implementation by performing a fire detection system walkdown/inspection. The re-examination of program responsibilities, organizational structure, and administration was completed by Supply System senior management. Supply System Quality Assurance and Engineering staffs performed and documented an assessment of the adequacy of design and construction activities associated with the WNP-2 fire protection systems/features during the construction phase. Finally, the Supply System corporate Quality Assurance Department performed a detailed audit of fire protection implementation activities (2) during September 1986 using Mr. P. H. Dobson of Factory Mutual Corporation and several Supply System QA engineers. Mr. Dobson is a Registered Fire Protection Engineer with nuclear plant experience.

Documentation of the re-evaluation effort is contained in four reports listed below. These reports are discussed briefly in this Executive Summary and are included as Appendices:

| <u>Appendix Number</u> | <u>Report Title</u>   | <u>Prepared By</u>            | <u>Areas Covered</u>   |
|------------------------|---|-------------------------------|--|
| I                      | WNP-2 Fire Protection Program Re-Evaluation,<br>February 1987   | Ebasco                        | NRC Requirement/<br>Commitment Compliance<br>(Section 3.0)<br><br>QA Program Assessment<br>(Section 4.0)<br><br>Detector Walkdown<br>(Section 5.0) |
| II                     | Assessment of Fire Protection Program Responsibilities and Administration,<br>December 1986   | Supply System,<br>Management  | Organizational Structure Responsibilities<br><br>Administrative Improvements   |
| III                    | Assessment of WNP-2 Fire Protection Procedures and Procedural Conformance,<br>January 1987  | Supply System<br>Fire Marshal | Procedure Adequacy and Conformance   |
| IV                     | An Evaluation of the Adequacy of Design and Construction Activities for the Fire Protection Program During the Construction Phase of WNP-2, February 1987 | Supply System<br>Engr. & QA   | Past Design and Construction Adequacy  |

In addition, the September 1987 Quality Assurance audit of the fire protection program (2) and associated corrective action responses substantially address the issue of operational phase implementation of the WNP-2 Fire Protection Program. This audit is considered an integral element of the re-evaluation; however, the audit report and associated responses are not included in this report except by reference. The results of the audit are discussed briefly in Section 1.4.1 of this Executive Summary.

## 1.2 REQUIREMENTS RE-EVALUATION

This task involved the re-evaluation of the WNP-2 Fire Protection Program requirements and commitment baseline. In early November 1986, Ebasco Services, Inc., was retained by the Supply System to conduct an independent review of the WNP-2 Fire Protection Program and related documents to define the requirements/commitment basis and to evaluate compliance with licensing requirements/commitments.

The method employed by Ebasco for this review was to first identify discrete elements of Branch Technical Position (BTP) CMEB 9.5-1, the applicable portions of Generic Letter 86-10, and the various NFPA Codes in

effect at WNP-2. BTP CMEB 9.5-1 was used for this review even though the Supply System's commitment for WNP-2 was to evaluate the plant against BTP APCSB 9.5-1. This was done primarily because the NRC staff used BTP CMEB 9.5-1 for its licensing review. As noted in the WNP-2 SER (NUREG 0892), the staff acknowledged the WNP-2 for use of BTP APCSB 9.5-1 and agrees to account for any differences in their review.

Ebasco then identified applicable WNP-2 commitments and compared these to the requirements matrix. The WNP-2 FSAR, Amendment 37 and related correspondence was the basis for a description of the WNP-2 Fire Protection Program.

The scope of Ebasco's contract was limited to specific areas as discussed in Section 1.2 and 1.3 of its report. These scope limitations generally were based upon: 1) the existence of a Supply System effort which already covered the area (e.g., the safe shutdown analysis method, fire brigade, administrative controls, etc.); 2) areas of the plant which do not contain safety related systems or associated circuits; and 3) verification of building design, installation, construction, and as-built documentation.

We believe these limitations in Ebasco's scope of work are reasonable because fire brigade and administrative controls are already the subject of an ongoing review as discussed in Reference 1 and elsewhere in this document. In addition, the Supply System is in the process of finalizing a three-year 100% reanalysis of the Appendix R safe shutdown analysis. To date, this effort has expended approximately 22,000 engineering manhours. During the period of this review, audits conducted by the NRC (NRR and Region V) resulted in requests for additional information, Supply System responses, and follow-up discussions regarding compliance with Appendix R safe shutdown criteria. The Supply System has responded to and resolved all issues raised by the NRC staff to date. NRC review of the high impedance fault analysis and the high-to-low pressure interface (both discussed in Appendix IV of this report) remain to be completed.

Once the requirements/commitment baseline had been established and evaluated, Ebasco evaluated program implementation against applicable requirements. This evaluation was based on documentation (such as design drawings, plant procedures, etc.) and interviews with cognizant Supply System personnel.

The results of Ebasco's effort reveal that, with the exception of several deficiencies that had already been identified and corrected, WNP-2 is in substantial compliance with its fire protection commitments as presented in the FSAR, Amendment 37, and related correspondence on the WNP-2 docket. Further, this evaluation indicates that WNP-2 meets the intent of applicable regulatory guidance documents and NFPA codes. In some areas Ebasco has recommended potential improvements for consideration by the Supply System. In no case has a situation been identified which calls into question the safe shutdown capability of the plant or the overall adequacy of the installed fire protection systems.

### 1.3 RE-EVALUATION OF PROGRAM RESPONSIBILITIES AND ADMINISTRATION

This task involved re-evaluation of the Supply System organization and definition of responsibilities for the program. The evaluation results were submitted to Region V on January 2, 1987 (3). As a result of the re-evaluation, a new position on the plant staff (WNP-2 Fire Marshal) was created to improve program implementation and the role of the Supply System's registered Fire Protection Engineer at WNP-2 was strengthened. Responsibilities were clarified among the various Supply System organizations who are involved in Fire Protection. Also, several administrative improvement initiatives were identified, including increased fire protection review of plant modifications, procedural clarifications, and enhanced open item tracking.

### 1.4 EVALUATION OF PROGRAM IMPLEMENTATION

This task involved two major elements. The first consisted of an independent assessment of the adequacy of operational phase Fire Protection Program implementation. The second element involved assessment of the adequacy of design and construction practices associated with fire protection related systems during the construction of WNP-2. Each of these elements is discussed briefly below.

#### 1.4.1 Operational Phase Implementation Assessment

The following sub-tasks were included in this assessment and are discussed individually below:

- o QA Audit 86-376, September 1986 (2)
- o Assessment of Procedural Compliance (Appendix II)
- o Review of WNP-2 Fire Protection QA Program (Appendix I, Ebasco Report, Section 4.0)
- o Fire Detection System Evaluation (Appendix I, Ebasco Report, Section 5.0)

#### QA Audit

QA Audit 86-376 was a regularly scheduled audit of the WNP-2 Fire Protection Program as required by the WNP-2 Technical Specifications, Section 6.5.2.8.1. The audit scope included an evaluation of existing programmatic documents to verify continued adherence to NRC requirements, inspections of plant areas for which fire protection is provided, and examination of fire barriers, fire detection systems, and fire extinguishing systems. This audit was conducted utilizing the services of an outside independent fire protection consultant. The outline for the planning and execution of this audit was derived from NRC Generic Letter 82-21, "Technical Specification for Fire Protection Audits."

The results of the audit are detailed in the audit report dated October 6, 1986, and in responses which define corrective actions completed or planned. In general the audit related primarily to implementation of existing commitments and compliance with procedures. None of the audit findings were of safety significance in the context of safe nuclear operation and safe shutdown of WNP-2.

#### Procedural Compliance

This task (documented in Appendix II) involved an assessment of the adequacy of, and compliance with the following plant procedures.

- o 1.3.10, Rev. 4-C -- Fire Protection Program
- o 1.3.19, Rev. 8-C -- Housekeeping
- o 1.3.35, Rev. 1-C -- Fire Protection Program Controls
- o 1.3.36, Rev. 1-C -- Fire Protection Program Training

The review concluded that these procedures are adequate but need minor revisions to clarify responsibilities, update information, correct wording, and incorporate changes to implement corrective action from the Quality Assurance audit. The review identified a need to improve compliance with procedures in some areas. Actions are in progress to improve training, controls, and enforcement of procedural compliance.

#### Fire Protection QA Program

Ebasco was requested to perform a limited assessment of the WNP-2 Fire Protection QA Program. The results of the assessment are set forth in Appendix I, Section 3 (Items 2.86 to 2.96) and Section 4. Ebasco concludes that the WNP-2 Fire Protection QA Program maintained subsequent to August 1980 committed to meet the requirement of BTP ASCSB 9.5-1. Ebasco stated that a detailed audit would be necessary to determine compliance status. The Supply System did not request Ebasco to perform such an audit for the following reasons:

- o Prior to August 1980, the majority of the Fire Protection Systems were covered under the Quality Class II construction QA program. While QA audits of construction contractors performing Quality Class II work were not required, QA surveillances were performed of these contractors by the Supply System and Burns and Roe. All issues from these surveillances were satisfactorily resolved.
- o The reverification of Completed Safety Related Work (RCSW) task force conducted a review of the fire protection contractor and subcontractor in April of 1981. This review indicated satisfactory performance by the contractor for his scope of work.
- o Subsequent QA audits by Bechtel Power Corporation in 1981 and 1982 of the fire protection contractor and subcontractor were performed and satisfactorily closed.

- o During the operational phase (subsequent to Licensing in December of 1983), Supply System Corporate QA has performed annual audits of fire protection activities at WNP-2 in accordance with the Technical Specifications. These audits routinely confirm FPQA program implementation adequacy.
- o Results of the engineering evaluation in Appendix IV of this report indicate that with the exception of identified deficiencies, the design and construction of fire protection physical plant features during the construction phase were adequate.

#### Fire Detection System Evaluation

This task was performed by Ebasco and is documented in Appendix I, Section 3, Items 1.159 through 1.166 and Section 5.0 of the Ebasco Report. It resulted in a finding that the detection system is not in full compliance with NFPA 72D. Certain detectors would have to be added or relocated and several other system changes would be required to achieve full compliance. The changes identified by Ebasco necessary for verbatim code compliance have been evaluated by the Supply System with the conclusion that no modification to the detection system is required to provide prompt, adequate detection of fire. The current detection system installation was reviewed and approved by the NRC staff prior to licensing. Current detector configuration generally meets the intent of NFPA 72D. Deviation from the code is not considered to be of safety significance because detection time would not be significantly improved by implementing detector relocations necessary for strict code compliance and detectors are not required for safe shutdown (i.e., they provide early warning for the purpose of manual fire fighting).

As noted in Section 1.5 of this summary, the WNP-2 FSAR will be clarified with respect to the approved commitments and system configurations.

#### 1.4.2 Adequacy of Fire Protection System Design and Construction at WNP-2

This task involved an evaluation by Supply System engineering and QA staffs of the adequacy of design and construction activities associated with the WNP-2 Fire Protection Program. The report contains a review of the results of previous design and construction verification efforts, fire protection LERs and NCRs, NRC findings and open items, Quality Assurance audits, and the inter-organizational task force evaluations of the Fire Protection Program initiated in mid-1986. This information was used to:

- o assess the adequacy of the construction phase implementation of the Fire Protection Program, including design requirements;
- o assess generic implications of identified problems; and
- o determine whether additional physical quality reverification should be undertaken.

The results of this task are documented in detail in the report included here as Appendix IV. The following conclusions were reached:

- o Deficiencies have been properly identified and have been or are being properly evaluated and resolved.
- o With the exception of identified deficiencies, the design and construction of fire protection physical plant features during the construction phase were adequate.
- o No further physical reverification is warranted.
- o The evaluation raised no generic concerns with the exception of the issue relating to cable derating.

#### 1.5 SUMMARY OF THE STATUS OF MAJOR FIRE PROTECTION ISSUES

The status of several issues which have received or are still receiving an increased level of attention by Supply System management are summarized in this section. These issues are each discussed in more detail in the appendices.

##### Organizational Improvements to Enhance Fire Protection Program Implementation

Supply System organizational responsibilities have been more clearly defined (see Appendix II and Reference 4) and a new position, WNP-2 Fire Marshal, has been created to improve Fire Protection Program coordination. The organizational arrangement associated with WNP-2 Fire Protection is fully consistent with NRC regulations and guidance. These strengthened management controls are serving to ensure more effective program implementation.

##### Control of Combustibles

NRC inspections during 1986 raised certain concerns associated with housekeeping and administrative control of combustibles within the plant. Plant Procedures PPM 1.3.10, Fire Protection Program; PPM 1.3.19, Housekeeping; and PPM 1.3.35, Fire Protection Program Controls, have all been evaluated for adequacy and effectiveness. Where appropriate, changes have been made including: a) establishment of Area Coordinators, b) independent management reviews, and c) use of the newly created position of WNP-2 Fire Marshal to enforce compliance, when necessary.

##### Modification of Fire Protection License Condition per Generic Letter 86-10

The Supply System has submitted FSAR Amendment No. 37 for NRC staff review and has requested a license amendment to modify the Fire Protection License Condition No. 14 as suggested by Generic Letter 86-10 (5).

## FSAR Update - Requirement Baseline

Prior to initiation of the Ebasco re-evaluation of the WNP-2 Fire Protection requirements/commitments baseline, it was felt by the Supply System and the NRC staff that the FSAR was not as clear as it could be regarding applicable Plant Fire Protection requirements and commitments. The Ebasco review reinforced this impression.

A primary conclusion drawn by Ebasco's review is that a need exists to clarify and consolidate various commitments contained in the FSAR, Section 9.5.1 and Appendix F, Fire Hazards Analysis. The problems of clarity and consolidation are not safety significant; however, the Supply System believes that the prudent course is to accept the Ebasco recommendation to update the FSAR to consolidate and clarify the commitments previously approved by the NRC.

### Thermolag Fire Barrier Adequacy

The adequacy of thermolag fire barrier was raised during the March 1986 NRC Audit. This issue was reviewed by the Supply System and three areas of concern were noted: 1) less than the approved amount of thermolag material installed on the heat flow paths into the cable trays, 2) use of installation methods that were not tested and/or approved, and 3) not providing the non-combustible covering for the full 20 feet in the cable spread room, 484 foot level Radwaste Building.

The first issue deals with the amount of thermolag required on seismic support steel to assure that temperatures inside the fire barrier envelope remain under 325 F during an ASTM E-119 test. During construction, nine inches of thermolag was installed on the cable tray seismic support steel that could conduct heat into the fire protected envelope. Testing performed by the vendor subsequent to the initial WNP-2 installation has shown 18" to be adequate for a three (3) hour fire. For areas where a three hour barrier has been committed to, additional thermolag has been added to the heat flow paths to provide 18" of protection. Analytical results indicate that adequate protection is provided for all other areas by the original nine-inch covering. This is discussed in more detail in Appendix IV.

The second issue pertains to the use of a configuration for the conduit protective barrier that had not been tested and approved. Fire tests for the configuration will be completed by April 1987. The need for additional corrective actions will be determined based on test results. In the interim potentially affected areas are maintained on a fire watch in accordance with the requirements of the WNP-2 Technical Specifications.

The third issue involves the adequacy of the thermolag covering provided for the the 20-foot exclusion zone in the cable spreading room and the amount of area actually covered by thermolag. In several areas, the 20-foot thermolagged zone was in fact between 17 and 19 feet wide. Additional thermolag has since been installed to meet the commitment for

20 feet and work is in progress based on fire testing to ensure that a one hour barrier is provided. When on-going work is complete, the installation will provide adequate fire protection in the cable spreading room and will conform to the configuration approved by the NRC at the time of licensing.

#### Fire Detection System

The fire detection system was designed in the early 1970's. Installation began in the late 1970's and was completed in the early 1980's. The system was field reviewed by Supply System fire protection personnel, NRC fire protection personnel, and the authorized nuclear inspector (ANI) in mid-1983. During reviews by the NRC staff, changes were required by the staff before the system would be accepted. After these reviews, all parties agreed that the fire detection system was satisfactory and met applicable requirements. While the detection system does not meet strict NFPA code compliance interpretation (see the Ebasco Report, Appendix I), we believe the installed detection system meets the intent of the NFPA code and will provide adequate early warning of a fire. No change to the originally approved system is planned.

#### Fire Mains

An evaluation of all fire protection piping beneath plant structures has been completed. Specific to the underground main beneath the Diesel Generator Building, it is concluded that the design does not violate the intent of NFPA 24. Calculations show that the main will not be damaged by building settlement. The main was hydrotested twice in 1986. The main may not survive a safe shutdown earthquake, but its failure would not degrade plant structures or debilitate safety related equipment. Other safety related buildings were included along with the Diesel Generator Building in our evaluations. As a result of these evaluations, design changes are being planned to:

- a) sleeve one of the fire mains under the Diesel Generator Building and
- b) add five (5) fire isolation valves to the fire main system.

#### Emergency Lighting

The Supply System conducted a complete review of the adequacy of existing WNP-2 emergency lighting. The purpose was to assure that all access, egress, and operator control areas were provided with sufficient lighting to allow for safe post-fire shutdown.

Design direction has been issued to enhance lighting in the following areas:

- a) Main Control Room
- b) Remote Shutdown Room
- c) Alternate Remote Shutdown Room
- d) SM-8 Switchgear Room
- e) Diesel Generator 2 Control Room

### Ampacity/Cable Derating

The Supply System has conducted a review of Class 1E and non-Class 1E cabling routed with Class 1E power cable sizing criteria. The purpose was to assure that proper derating criteria have been applied for all installed conditions.

The results of this review indicate that no additional derating (i.e., resizing of cable) was necessary for any of the power cables reviewed.

### Safe Shutdown Analysis

Several NRC staff concerns arose as a result of audits conducted regarding the WNP-2 Appendix R Safe Shutdown Analysis. This resulted in additional staff requests for information which have been satisfactorily responded to. The status of the remaining NRC concerns is as follows:

- a) Finalizing of the High Impedence Fault Analysis - The analysis is scheduled for completion by April 30, 1987. No plant modifications are expected based on work done to date.
- b) High-to-Low Pressure System Interface Valve Power Removal - The Supply System has removed power from RHR V-123 A and B but believes removal of power from RHR V-8 or V-9 to be contrary to plant safety. NRR is reviewing the Supply System position.

### 1.6 FUTURE ACTIONS

Several follow-on actions are planned as a result of the Supply System's Fire Protection Re-Evaluation. An overall, detailed milestone schedule is being maintained by the Supply System to track all related future activities. Our current planning assumes approval of the proposed fire protection license amendment without major changes. A preliminary milestone schedule for significant tasks is shown below:

| <u>Task</u>   | <u>Schedule<br/>Completion<br/>Date</u> |
|---|---|
| 1) Complete thermolag configuration testing   | 4/87                                    |
| 2) Issue revised Nuclear Operating Standard (NOS)<br>No. 39 on Fire Protection  | 6/87                                    |
| 3) Implement emergency lighting improvements  | 6/87                                    |
| 4) Complete all Plant procedure revisions identified<br>by the fire protection re-evaluations   | 9/87                                    |
| 5) Complete planned fire main design modifications<br>(assumes planned design modification can be<br>implemented on as-built fire main configuration) | 10/87                                   |

- |    |  |      |
|----|--|------|
| 6) | Document in a report justifications for deviations from NFPA codes                               | 9/87 |
| 7) | Correct thermolag configurations if required based on the test program                           | 6/88 |
| 8) | Complete update of the FSAR to clarify requirements basis (part of the routine 1988 FSAR update) | 9/88 |

## 1.7 CONCLUSIONS

The results of these evaluations have been improved documentation of the WNP-2 Fire Protection Program requirements and commitments and several management initiatives to improve program implementation. Major conclusions are summarized as follows:

- 1) The Ebasco evaluation of the WNP-2 Fire Protection Program requirement basis has produced a detailed documentation of compliance by WNP-2 with NRC and NPFA code guidelines. Any deviation from guidelines or codes are judged to be technically acceptable or improvement initiatives are being implemented.
- 2) A new organizational position, WNP-2 Fire Marshal, has been added as a result of the reviews. This new position will provide an additional resource to perform fire protection tasks and is expected to improve the Supply System's ability to execute effective Fire Protection Program implementation. This organizational change was implemented by the Supply System in January 1987.
- 3) Program policies and procedures were found to be adequate. However, several minor areas needing improvement and updating have been identified. Procedure revisions to effect these changes have been initiated. Improved management monitoring and control of implementation activities is warranted and being undertaken.
- 4) Previous fire protection program review activities and related non-conformances were reviewed with the conclusion that the previous WNP-2 design and construction of fire protection systems was adequate and no further re-assessment of construction phase activities is necessary.
- 5) Based on the independent Ebasco review and our internal Supply System evaluations, the installed Fire Protection System and existing Fire Protection Programs are adequate to ensure safe shutdown capability and continued safe operation of WNP-2.

## 1.8 REFERENCES

- 1) Letter, G. C. Sorensen to J. B. Martin (NRC), "Fire Protection Re-Evaluation Program," Letter No. G02-86-0883, dated September 16, 1986.

- 2) Washington Public Power Supply System, Corporate Licensing and Assurance Audit 86-376, "WNP-2 Fire Protection Program," Audit dated September 8-12, 1986.
- 3) Letter, G. C. Sorensen to J. B. Martin (NRC), "WNP-2 Fire Protection Program Re-Evaluation," Letter No. G02-87-0001, dated January 2, 1987.
- 4) Letter, G. C. Sorensen to Document Control Desk, "License No. NPF 21, Request for Amendment to License Condition 2.c.(14) and Removal of Fire Protection Requirements from Technical Specifications," Letter No. G02-87-0046, dated February 10, 1987.
- 5) Generic Letter 86-10, "Implementation of Fire Protection Requirements," dated April 24, 1986.
- 6) Letter, G. C. Sorensen to Document Control Desk, "Fire Protection Program," Letter No. G02-87-0034, dated January 29, 1987.
- 7) Letter, E. G. Adensam (NRC) to G. C. Sorensen, "Fire Protection Program for WPPSS Nuclear Project No. 2 - License No. NFP 21," dated February 5, 1987.

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION

1.0 GENERAL DESCRIPTION

1.1 Purpose

Review the WNP-2 Fire Protection Program (FPP) documentation to identify areas where the Program deviates from Standard Review Plan NUREG-0800 Rev. 3 Branch Technical Position (BTP) CMEB 9.5-1 Rev. 2; examine deviations to determine compliance with commitments made by the Supply System; and make recommendations regarding identified deviations.

1.2 Scope

1.2.1 Review under the direction of the Supply System's Fire Protection Engineer, the WNP-2 FPP base commitment document; FSAR Section 9.5.1, Amendment 37 against BTP CMEB 9.5-1 F.P. guidelines.

1.2.2 Identify compliance or deviation(s) from NRC F.P. guidelines.

1.2.3 Where deviations are identified, evaluate to determine if the deviation constitutes a potential failure to comply with WNP-2 commitments. If so, determine the extent of NRC Staff acceptance of the deviation.

1.2.4 Verify formal deviations taken from NRC criteria described in Appendix A to BTP APCSB 9.5-1, technical requirements of Appendix R to 10CFR50, or applicability of BTP CMEB 9.5-1 criteria to WNP-2 FPP commitments.

1.2.5 Review implementation of the WNP-2 FPP based on design documents, procedures, input from Supply System cognizant personnel, or walkdown(s) as required, and assess the implementation compliance status.

1.2.6 Provide overall recommendations for clarification of WNP-2 FPP commitments or potential improvements.

1.2.7 Excluded from this effort are:

- a. Safe Shutdown Analysis in case of fire (Appendix R to 10CFR50) methodology, Alternative or Dedicated Shutdown, Safe Shutdown Capability.
- b. Fire protection systems within NRC's jurisdiction covering areas which do not contain safety related systems, equipment or associated circuits required for Plant Safe Shutdown in case of a fire.
- c. Verification of installation, construction and installation documentation of the fire protection equipment, systems or components.
- d. Review of Fire Brigade and Building Design.

1.3 Description of the Report Scope

1.3.1 The basis of WNP-2 FPP re-evaluation (at this time) is not a re-verification of the FPP, but instead is a re-evaluation based on Washington Power Supply System (Supply System) input, and limited to areas containing safety related systems required for Plant safe shutdown in case of fire. Although not safety related, the underground yard fire protection main, the fire pumps and water supplies were evaluated because they are instrumental to insure that the fire suppression agent is delivered when needed to protect the Plant safety related systems required for safe shutdown in case of a fire. The evaluation by Ebasco Services Incorporated (Ebasco) is further restricted to those WNP-2 commitments made to the NRC up to and including the PSAR Amendment 37, set forth in correspondence between Supply System and NRC through October 1986. The NRC guidelines for fire protection, NFPA Codes and Standards, and other applicable criteria were reviewed only as they applied directly or indirectly to protect WNP-2 areas containing safety related systems, equipment and components required for plant safe shutdown in case of a fire. Areas within NRC jurisdiction which do not have safety related equipment or systems required for plant safe shutdown (such as areas where a

fire could potentially cause release of radioactivity to the atmosphere) were excluded from the scope of this review. These include the Turbine Building, Radwaste and Decontamination Areas.

1.3.2 The detailed scope of work for Ebasco was defined in Supply System Interoffice Memorandum No. 58400-CDE-0050-86 dated November 7, 1986; formally revised by mutual agreement between Supply System and Ebasco, via letter EBW2-FP-86-0001. They are in the supply system contracts file.

1.3.3 The Administrative controls were assessed only through the review of WNP-2 project procedures highlighted by WNP-2 engineers.

1.3.4 The WNP-2 Quality Assurance (QA) program was reviewed only for adequacy based on documentation provided by the Supply System. Ebasco scope of work did not include review of the QA program implementation.

1.3.5 The Safe Shutdown Analysis in case of fire (Appendix R to 10CFR50) and all related aspects were specifically excluded from the Ebasco scope of work.

1.3.6 The fire protection for remote safety related panels was limited to the assessment of the panels separation from other safety related areas.

1.3.7 Also excluded from the scope of Ebasco review were Special Protection Guidelines and Record Storage Areas, Cooling Towers and Miscellaneous Areas.

#### 1.4 Names and Biographical Sketches of Reviewers

Names and Biographical sketches of the Ebasco Fire Protection and Quality Assurance Engineers who performed the WNP-2 Fire Protection Re-Evaluation are:

|                                   |                         |                    |
|-----------------------------------|-------------------------|--------------------|
| <u>Fire Protection Engineers:</u> | Margereta A. Serbanescu | - Team Leader      |
|                                   | Joseph Grande           | - Lead Engineer    |
|                                   | Max A. deVries          | - Support Engineer |
|                                   | Omer Semen              | - Support Engineer |

|                                    |                   |                 |
|------------------------------------|-------------------|-----------------|
| <u>Quality Assurance Engineer:</u> | Robert J. Nespeco | - Lead Engineer |
|------------------------------------|-------------------|-----------------|

The resumes of above listed engineers are on file with the Supply System.

M. A. SERBANESCU - FIRE PROTECTION SUPERVISOR AND TEAM LEADER

Ebasco utilized the services of M. A. Serbanescu as Fire Protection Supervisor and Team Leader for the Washington Nuclear Project Unit No. 2.

Mrs. Serbanescu brings 13 years of engineering experience in fire protection for nuclear power plants, including preparation of design criteria, system design descriptions, fire protection program development, safety analysis reports, fire hazards analysis, safe shutdown analysis in case of fire (Appendix R to 10CFR50). She was responsible for development of fire protection systems from basic criteria through procurement, installation, and startup, and was directly involved in preparation or evaluation of fire protection programs for a large number of Nuclear power plants.

In her 13 years of experience in fire protection, out of which 8 are at Ebasco, Mrs. Serbanescu has been involved in fire protection engineering, and licensing activities on total 13 nuclear projects, out of which 9 were at Ebasco. She was involved in Ebasco Nuclear Standardization program fire protection systems design description and criteria for all types of reactors.

Mrs. Serbanescu possesses a Masters degree in Mechanical Engineering from the Politechnic Institute of Bucharest, Romania. She qualifies as a "Member" of the Society of Fire Protection Engineers, she is a member of National Fire Protection Association and prepared and presented technical paper about fire protection considerations in power plant design and construction.

J. GRANDE - FIRE PROTECTION PRINCIPAL ENGINEER AND LEAD ENGINEER

Ebasco utilized the services of J. Grande as Fire Protection Principal Engineer for the Nuclear Project Unit No. 2 Washington.

Mr. Grande brings 26 years of experience in design, engineering and construction of fire protection for Fossil and Nuclear power plants, institutional, industrial and commercial projects including preparation of System Design Descriptions, design criteria, all technical writing (specification reports, studies, etc.), client liaison, vendor and contractor supervision and was heavily involved in fire hazard and risk evaluation analysis and PSAR efforts.

In his 26 years of experience in fire protection out of which 9 are at Ebasco, Mr. Grande has been involved in fire protection engineering activities on 7 Nuclear power plants.

Mr. Grande attended New York Community College.

#### M. A. deVRIES - FIRE PROTECTION ENGINEER AND SUPPORT ENGINEER

Ebasco utilized the services of M. A. deVRIES as Fire Protection Engineer for the Washington Nuclear Project Unit No. 2.

Mr. deVRIES has 10 years of engineering experience in fire protection of power plants including system design descriptions, safety analysis reports, fire hazards analysis, and safe shutdown analysis in case of fire (Appendix R to 10CFR50).

During his 7 years with Ebasco, Mr. deVRIES has been involved in fire protection engineering activities on 5 Ebasco nuclear projects.

Mr. deVRIES possesses a Bachelor of Science degree in Mechanical Engineering and Master of Science degree in Management Science, both from Fairleigh Dickinson University, Teaneck, New Jersey. He is a "Member" of the Society of Fire Protection Engineers and Associate Member of the American Society of Mechanical Engineers.

#### O. SEMEN - FIRE PROTECTION ENGINEER AND SUPPORT ENGINEER

Ebasco utilized the services of O. Semen as Fire Protection Engineer for the Washington Nuclear Project Unit No. 2.

Mr. Semen brings 8-1/2 years of engineering experience in fire protection for fossil, nuclear fueled electric generating stations and commercial projects, including preparation of design criteria, system design description, safety analysis reports, fire hazards analysis and safe shutdown analysis in case of fire (Appendix R 10CFR50).

He was responsible for development of fire protection systems from basis criteria throughout procurement, installation and startup for a large number of Nuclear power plants.

In his 8-1/2 years of experience in engineering, out of which 7 are at Ebasco, Mr. Semen has been involved in fire protection engineering on total of 7 nuclear and 3 fossil projects.

Mr. Semen possesses a Bachelor of Engineering in Mechanical Engineering (B.E.M.E.) from the City College of New York.

ROBERT J. NESPECO - PROJECT QUALITY ASSURANCE ENGINEER AND LEAD ENGINEER

Ebasco utilized the services of R. J. Nespeco as Project Quality Assurance Engineer for the Washington Nuclear Project Unit No. 2.

Mr. Nespeco brings 19 years of experience in Quality Assurance, Engineering, Technical Management and Project Administration. Twelve of those years have been with Ebasco working in various phases of nuclear power plant design and retrofit activities. These activities include responsibility for the development and management of major project quality assurance programs; development and implementation of quality assurance plans for equipment specification and procurement; review of supplier quality assurance programs; technical management of projects; and development of engineering procedures.

Mr. Nespeco has a BME from City College of New York, is a member of ASME, and a Registered Professional Engineer in the States of New York and Florida.

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION

- 2.0 LICENSING AND DESIGN REQUIREMENTS (NRC BTB CMEB 9.5-1; NRC Generic Letter 86-10; Reference Sources: NFPA Codes and Standards, NRC BTP APCSB 9.5-1, Appendix R to 10CFR50, ASTM, etc.)
- 

ITEM NO./CRITERIA

- 2.1 BTP CMEB 9.5-1, "C. POSITION, 1. Fire Protection Program Requirements  
a. Fire Protection Program

A fire protection program should be established at each nuclear power plant. The program should establish the fire protection policy for the protection of structures, systems, and components important to safety at each plant and the procedures, equipment, and personnel required to implement the program at the plant site.

- (1) The fire protection program should be under the direction of an individual who has been delegated authority commensurate with the responsibilities of the position and who has available staff personnel knowledgeable in both fire protection and nuclear safety."

NRC GENERIC LETTER 86-10: No additional guidance.

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- 2.2 BTP CMEB 9.5-1, Item C.1.a, Fire Protection Program (Cont'd): "(2)  
The fire protection program should extend the concept of defense-in-depth to fire protection in fire areas important to safety, with the following objectives:

- o to prevent fires from starting;
- o to detect rapidly, control, and extinguish promptly those fires that do occur;
- o to provide protection for structures, systems, and components important to safety so that a fire that is not promptly extinguished by the fire suppression activities will not prevent the safe shutdown of the plant."

NRC GENERIC LETTER 86-10: No additional guidance.

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- 2.3 BTP CMEB 9.5-1, Item C.1.a, Fire Protection Program (Cont'd): "(3)  
Responsibility for the overall fire protection program should be assigned to a person who has management control over all organizations involved in fire protection activities. Formulation and assurance of program implementation may be delegated to a staff composed of personnel prepared by training and experience in fire protection and personnel prepared by training and experience in nuclear plant safety to provide a balanced approach in directing the fire protection program for the nuclear power plant."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.4 BTP CMEB 9.5-1, Item C.1.a.3, Fire Protection Program (Cont'd): "(3) The Staff should be responsible for:

- (a) Fire protection program requirements, including consideration of potential hazards associated with postulated fires, with knowledge of building layout and systems design.
- (b) Post-fire shutdown capability.
- (c) Design, maintenance, surveillance and quality assurance of all fire protection features (eg, detection systems, suppression systems, barriers, dampers, doors, penetration seals, and fire brigade equipment).
- (d) Fire prevention activities (administrative controls and training).
- (e) Fire brigade organization and training.
- (f) Prefire planning."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.5 BTP CMEB 9.5-1, Item C.1.a., Fire Protection Program (Cont'd): "(4) The organizational responsibilities and lines of communication pertaining to fire protection should be defined between the various positions through the use of organizational charts and functional descriptions of each position's responsibilities. The following positions/organizations should be designated:

- (a) The upper level offsite management position which has management responsibility for the formulation, implementation, and assessment of the effectiveness of the nuclear plant fire protection program."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.6 BTP CMEB 9.5-1, Item C.1.a.4, Fire Protection Program (Cont'd): "(b) The offsite management position(s) directly responsible for formulating, implementing, and periodically assessing the effectiveness of the fire protection program for the licensee's nuclear power plant including fire drills and training conducted by the fire brigade and plant personnel. The results of these assessments should be reported to the upper level management position responsible for fire protection with recommendations for improvements or corrective actions as deemed necessary."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.7 BTP CMEB 9.5-1, Item C.1.a.4, Fire Protection Program (Cont'd): "(c) The onsite management position responsible for the overall administration of the plant operations and emergency plans which include the fire protection and prevention program and which provide a single point of control and contact for all contingencies."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.8 BTP CMEB 9.5-1, Item C.1.a.4, Fire Protection Program (Cont'd): "(d)  
The onsite position(s) which:

- i. Implements periodic inspections to: minimize the amount of combustibles in safety-related areas; determine the effectiveness of housekeeping practices; assure the availability and acceptable condition of all fire protection systems/equipment, emergency breathing apparatus, emergency lighting, communication equipment, fire stops, penetration seals and fire-retardant coatings; and assures the prompt and effective corrective actions are taken to correct conditions adverse to fire protection and preclude their recurrence.
- ii. Is responsible for the fire fighting training for operating plant personnel and the plant's fire brigade; design and selection of equipment; periodic inspection and testing of fire protection systems and equipment in accordance with established procedures, and evaluate test results and determine the acceptability of the systems under test.
- iii. Assists in the critique of all fire drills to determine how well the training objectives have been met.
- iv. Reviews and evaluates proposed work activities to identify potential transient fire loads.
- v. Implements a program for indoctrination of all plant contractor personnel in appropriate administrative procedures which implement the fire protection program, and the emergency procedures relative to fire protection.
- vi. Implements a program for instruction of personnel on the proper handling of accidental events such as leaks or spills of flammable materials that are related to fire protection."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.9 BTP CMEB 9.5-1, Item C.1.a.4, Fire Protection Program (Cont'd): "(e)  
The onsite position responsible for fire protection quality assurance. This position should be responsible for assuring the effective implementation of the fire protection program by planned inspections, scheduled audits, and verification that the results of these inspections or audits are promptly reported to cognizant management personnel."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.10 BTP CMEB 9.5-1, Item C.1.a.4, Fire Protection Program (Cont'd): "(f)  
The positions which are part of the plant fire brigade:

- i. the plant fire brigade positions should be responsible for fighting fires. The authority and responsibility of each fire brigade position relative to fire protection should be clearly defined.
- ii. The responsibilities of each fire brigade position should correspond with the actions required by the fire fighting procedures.
- iii. The responsibilities of the fire brigade members under normal plant conditions should not conflict with their responsibilities during a fire emergency.

- iv. The minimum number of trained fire brigade members available on-site for each operating shift should be consistent with the activities required to combat the most significant fire. The size of the fire brigade should be based upon the functions required to fight fires with adequate allowance for injuries.
- v. The recommendations for organization, training, and equipment of "Private Fire Brigades" as specified in NFPA No. 27-1975, including the applicable NFPA publications listed in the Appendix to NFPA No. 27, are considered appropriate criteria for organizing, training, and operating a plant fire brigade."

NRC GENERIC LETTER 86-10: No additional guidance

REF. SOURCE: NFPA 27.

2.11 BTP CHERB 9.5-1, Item C.1.a, Fire Protection Program (Cont'd): "(5) Personnel Qualifications

- (a) The position responsible for formulation and implementation of the fire protection program should have within his organization or as a consultant a fire protection engineer who is a graduate of an engineering curriculum of accepted standing and shall have completed not less than 6 years of engineering attainment indicative of growth in engineering competency and achievement, 3 years of which shall have been in responsible charge of fire protection engineering work. These requirements are the eligibility requirements as a Member in the Society of Fire Protection Engineers..
- (b) The fire brigade members' qualifications should include satisfactory completion of a physical examination for performing strenuous activity, and of the fire brigade training described in Position C.3.d.
- (c) The personnel responsible for the maintenance and testing of the fire protection systems should be qualified by training and experience for such work.
- (d) The personnel responsible for the training of the fire brigade should be qualified by training and experience for such work.
- (6) The following NFPA publications should be used for guidance to develop the fire protection program:
  - No. 4 - "Organization for Fire Services"
  - No. 4A - "Organization of a Fire Department"
  - No. 6 - "Industrial Fire Loss Prevention"
  - No. 7 - "Management of Fire Emergencies"
  - No. 8 - "Management Responsibilities for Effects of Fire on Operations"
  - No. 27 - "Private Fire Brigades"
- (7) On sites where there is an operating reactor and construction or modification of other units is underway, the superintendent of the operating plant should have the lead responsibility for site fire protection.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA 4, NFPA 4A, NFPA 6, NFPA 27.

2.12 BTP CMEB 9.5-1, Item C.1.a, Fire Protection Program (Cont'd): "b.  
Fire Hazards Analysis

The fire hazards analysis should demonstrate that the plant will maintain the ability to perform safe shutdown functions and minimize radioactive releases to the environment in the event of a fire.

The fire hazards analysis should be performed by qualified fire protection and reactor systems engineers to (1) consider potential in situ and transient fire hazards; (2) determine the sequences of fire in any location in the plant on the ability to safely shut down the reactor or on the ability to minimize and control the release of radioactivity to the environment; and (3) specify measures for fire prevention, fire detection, fire suppression, and fire containment and alternative shutdown capability as required would be for each fire area containing structures, systems, and components important to safety that are in conformance with NRC guidelines and regulations."

NRC GENERIC LETTER 86-10: "To identify plant specific situations in which seismic events could initiate a fire in a specific plant area, the fire protection engineer and systems engineer performing the fire hazards analysis should be concerned with in-situ combustible materials which can be released in a manner such that they could contact in-situ ignition sources by a seismic event. An example of this would be the rupture of the RCP lube oil line directly above the reactor coolant piping. The fire protection engineer should also be concerned with seismic induced ignition sources, electrical or mechanical, which could contact nearby in-situ combustible materials.

Where plant systems are designed to prevent the release of combustible materials caused by a seismic event, such as a dike around a fuel oil tank transformer, or seismic supports for hydrogen lines, then no fire need be arbitrarily assumed to take place in the fire hazards analysis.

The post-seismic procedures should include a damage survey, and a determination of whether any fires were initiated as a result of the seismic event."

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2.13 BTP CMEB 9.5-1, Item C.1.b, Fire Hazards Analysis (Cont'd): "Worst case" fires need not be postulated to be simultaneous with non-fire-related failures in safety systems, plant accidents, or the most severe natural phenomena."

NRC GENERIC LETTER 86-10: "For those plants reviewed under Appendix A, our position is (A.4): Postulated fires or fire protection system failures need not be considered concurrent with other plant accidents or the most severe natural phenomena."

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2.14 BTP CMEB 9.5-1, Item C.1.b, Fire Hazards Analysis (Cont'd): "On multiple-reactor sites, unrelated fires in two or more units need not be postulated to occur simultaneously. Fires involving facilities shared between units and fires due to man-made site-related events that have a reasonable probability of occurring and affecting more than one reactor unit (such as an aircraft crash) should be considered."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.15 BTP CMEB 9.5-1, Item C.1.b, Fire Hazards Analysis (Cont'd): "Because fire may affect safe shutdown systems and because the loss of function of systems used to mitigate the consequences of design basis accidents under post-fire conditions does not per se impact public safety, the need to limit fire damage to systems required to achieve and maintain safe shutdown conditions is greater than the need to limit fire damage to those systems required to mitigate the consequences of design basis accidents. Three levels of fire damage limits are established according to the safety function of the structure, system or component:

| <u>Safety Function</u> | <u>Fire Damage Limits</u>  |
|------------------------|--|
| Hot Shutdown           | One train of equipment necessary to achieve hot shutdown from either the control room or emergency control station(s) must be maintained free of fire damage by a single fire, including an exposure fire.   |
| Cold Shutdown          | Both trains of equipment necessary to achieve cold shutdown may be damaged by a single fire, including an exposure fire, but damage must be limited so that at least one train can be repaired or made operable within 72 hours using onsite capability. |
| Design Basis Accidents | Both trains of equipment necessary for mitigation of consequences following design basis accidents may be damaged by a single exposure fire."  |

NRC GENERIC LETTER 86-10: No additional guidance.

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2.16 BTP CMEB 9.5-1, Item C.1.b, Fire Hazards Analysis (Cont'd): "The most stringent fire damage limit should apply for those systems that fall into more than one category. Redundant systems used to mitigate the consequences of other design basis accidents but not necessary for safe shutdown may be lost to a single exposure fire. However, protection shall be provided so that a fire within only one such system will not damage the redundant system."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.17 BTP CMEB 9.5-1, Item C.1.b, Fire Hazards Analysis (Cont'd): "The fire hazards analysis should separately identify hazards and provide appropriate protection in locations where safety-related losses can occur as a result of:

- (1) Concentrations of combustible contents, including transient fire loads due to combustibles expected to be used in normal operations such as refueling, maintenance, and modifications;
- (2) Continuity of combustible contents, furnishings, building materials, or combinations thereof in configurations conducive to fire spread;
- (3) Exposure fire, heat, smoke, or water exposure, including those that may necessitate evacuation from areas that are required to be attended for safe shutdown;
- (4) Fire in control rooms or other locations having critical safety-related functions;
- (5) Lack of adequate access or smoke removal facilities that impede fire extinguishment in safety-related areas;
- (6) Lack of explosion-prevention measures;
- (7) Loss of electric power or control circuits;
- (8) Inadvertent operation of fire suppression systems."

NRC GENERIC LETTER 86-10: "Neither the industry nor the staff has been able to develop criteria for establishing design basis fire conditions for a single "design basis fire" because the in-situ and potential transient combustibles vary widely in different areas of the plant. However, the establishment of a specific "design basis fire" for individual fire areas or zones is a prerequisite to performance of a valid fire hazards analysis.

The protection for redundant/alternate shutdown systems within a yard area would be determined on the bases of the largest "design basis fire" (see response to question 3.8.2) that is likely to occur and the resulting damage. The boundaries of such damage would have to be justified with a fire hazards analysis. The analysis should consider the degree of spatial separation between divisions; the presence of in-situ and transient combustibles, including vehicular traffic; grading; available fire protection; sources of ignition; and the vulnerability and criticality of the shutdown related systems. See Sections #3, #4 and #6 of the "Interpretations of Appendix R."

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2.18 BTP CMEB 9.5-1, Item C.1.b, Fire Hazards Analysis (Cont'd): "The fire hazards analysis should verify that the NRC fire protection program guidelines have been met. The analysis should list applicable elements of the program, with explanatory statements as needed to identify location, type of system, and design criteria. The analysis should identify and justify any deviations from the regulatory guidelines. Justification for deviations from the regulatory guidelines should show that an equivalent level of protection will be achieved. Deletion of a protective feature without compensating alternative protection measures will not be acceptable, unless it is clearly demonstrated that the protective measure is not needed because of the design and arrangement of the particular plant."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.19 BTP CMEB 9.5-1, Item C.1, Fire Protection Program (Cont'd): "c. Fire Suppression System Design Basis  
(1) Total reliance should not be placed on a single fire suppression system. Appropriate backup fire suppression capability should be provided."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.20 BTP CMEB 9.5-1, Item C.1.c, Fire Suppression System Design Basis (Cont'd): "(2) A single active failure or a crack in a moderate-energy line (pipe) in the fire suppression system should not impair both the primary and backup fire suppression capability. For example, neither the failure of a fire pump, its power supply or controls, nor a crack in a moderate-energy line in the fire suppression system, should result in loss of function of both sprinkler and hose standpipe systems in an area protected by such primary and backup systems."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.21 BTP CMEB 9.5-1, Item C.1.c, Fire Suppression System Design Basis (Cont'd): "(3) As a minimum, the fire suppression system should be capable of delivering water to manual hose stations located within hose reach of areas containing equipment required for safe plant shutdown following the safe shutdown earthquake (SSE). In areas of high seismic activity, the staff will consider on a case-by-case basis the need to design the fire detection and suppression systems to be functional following the SSE."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.22 BTP CMEB 9.5-1, Item C.1.c, Fire Suppression System Design Basis (Cont'd): "(4) The fire protection systems should retain capability for (a) natural phenomena of less severity and greater frequency than the most severe natural phenomena (approximately once in 10 years) such as tornadoes, hurricanes, floods, ice storms, or small-intensity earthquakes that are characteristic of the geographic region, and (b) potential man made site-related events such as oil barge collisions or aircraft crashes that have a reasonable probability of occurring at a specific plant site. The effects of lightning strikes should be included in the overall plant fire protection program."

NRC GENERIC LETTER 86-10: "We have considered California as being a high seismic activity area."

Our guidelines on the seismic design of fire protection systems installed in safety related areas are delineated in Regulatory Guide 1.29 "Seismic Design Classification," paragraph C.2. The failure of any system should not affect a system from performing its safety function."

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2.23 BTP CMEB 9.5-1, Item C.1.c, Fire Suppression System Design Basis (Cont'd): "(5) The consequences of inadvertent operation of, or a crack in a moderate energy line in, the fire suppression system should meet the guidelines specified for moderate-energy systems outside containment in SRP Section 3.6.1."

NO GENERIC LETTER 86-10: No additional guidance.

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2.24 BTP CMEB 9.5-1, Item C.1, Fire Protection Program (Cont'd): "d. Alternative or Dedicated Shutdown  
Alternative or dedicated shutdown capability should be provided where the protection of systems whose functions are required for safe shutdown is not provided by established fire suppression methods or by Position C.5.6."

NRC GENERIC LETTER 86-10: Refer to Criteria Item No: 118, 119, 120.

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2.25 BTP CMEB 9.5-1, Item - C.1, Fire Protection Program (Cont'd): "e. Implementation of Fire Protection Programs

(1) The fire protection program (plans, personnel and equipment) for buildings storing new reactor fuel and for adjacent fire areas that could affect the fuel storage area should be fully operational before fuel is received at the site. Such adjacent areas include those whose flames, hot gases, and fire-generated toxic and corrosive products may jeopardize safety and surveillance of the stored fuel."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.26 BTP CMEB 9.5-1, Item C.1.e, Implementation of Fire Protection Programs (Cont'd): "(2) The fire protection program for an entire reactor unit should be fully operational prior to initial fuel loading in that reactor unit."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.27 BTP CMEB 9.5-1, Item C.1.e, Implementation of Fire Protection Programs (Cont'd): "(3) On reactor sites where there is an operating reactor and construction or modification of other units is under way, the fire protection program should provide for continuing evaluation of fire hazards. Additional fire barriers, fire protection capability, and administrative controls should be provided as necessary to protect the operating unit from construction fire hazards."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.28 BTP CMEB 9.5-1, Item C, Position (Cont'd):  
"2. Administrative Controls

Administrative controls should be used to maintain the performance of the fire protection system and personnel. These controls should establish procedures to: a. Prohibit bulk storage of combustible materials inside or adjacent to safety-related buildings or systems during operation or maintenance periods. Regulatory Guide 1.39 provides guidance on housekeeping, including the disposal of combustible materials."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.29 BTP CMEB 9.5-1, Item C.2, Administrative Controls (Cont'd): "b. Govern the handling and limitation of the use of ordinary combustible materials, combustible and flammable gases and liquids, high efficiency particulate air and charcoal filters, dry ion exchange resins, or other combustible supplies in safety-related areas."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.30 BTP CMEB 9.5-1, Item C.2, Administrative Controls (Cont'd): "c. Govern the handling of and limit transient fire loads such as combustible and flammable liquids, wood and plastic products, or other combustible materials in buildings containing safety-related systems or equipment during all phases of operating, and especially during maintenance, modification, or refueling operations."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.31 BTP CMEB 9.5-1, Item C.2, Administrative Controls (Cont'd): "d. Designate the onsite staff member responsible for the inplant fire protection review of proposed work activities to identify potential transient fire hazards and specify required additional fire protection in the work activity procedure."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.32 BTP CMEB 9.5-1, Item C.2, Administrative Controls (Cont'd): "e. Govern the use of ignition sources by use of a flame permit system to control welding, flame cutting, brazing, or soldering operations. A separate permit should be issued for each area where work is to be done. If work continues over more than one shift, the permit should be valid for not more than 24 hours when the plant is operating or for the duration of a particular job during plant shutdown."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.33 BTP CMEB 9.5-1, Item C.2, Administrative Controls (Cont'd): "f. Control the removal from the area of all waste, debris, scrap, oil spills, or other combustibles resulting from the work activity immediately following completion of the activity, or at the end of each work shift, whichever comes first."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.34 BTP CMEB 9.5-1, Item C.2, Administrative Controls (Cont'd): "g. Govern leak testing; similar procedures such as air flow determination should use one of the commercially available techniques. Open flames or combustion-generated smoke should not be permitted."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.35 BTP CMEB 9.5-1, Item C.2, Administrative Controls (Cont'd): "h. Maintain the periodic housekeeping inspections to ensure continued compliance with these administrative controls."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.36 BTP CMEB 9.5-1, Item C.2, Administrative Controls (Cont'd): "i. Control the use of specific combustibles in safety-related areas. All wood used in safety-related areas during maintenance, modification, or refueling operation (such as lay-down blocks or scaffolding) should be treated with flame-retardant. Equipment or supplies (such as new fuel) shipped in untreated combustible packing containers may be unpacked in safety-related areas if required for valid operating reasons. However, all combustible materials should be removed from the area immediately following unpacking. Such transient combustible material, unless stored in approved containers, should not be left unattended during lunch breaks, shift changes, or other similar periods. Loose combustible packing material such as wood or paper excelsior, or polyethylene sheeting, should be placed in metal containers with tight-fitting self-closing metal covers."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.37 BTP CMEB 9.5-1, Item C.2, Administrative Controls (Cont'd): "j. Disarming of fire detection or fire suppression systems should be controlled by a permit system. Fire watches should be established in areas where systems are so disarmed."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.38 BTP CMEB 9.5-1, Item C.2, Administrative Controls (Cont'd): "k. Successful fire protection requires testing and maintenance of the fire protection equipment and the emergency lighting and communication. A test plan that lists the individuals and their responsibilities in connection with routine tests and inspections of the fire detection and protection systems should be developed. The test plan should contain the types, frequency, and detailed procedures for testing. Procedures should also contain instructions on maintaining fire protection during those periods when the fire protection system is impaired or during periods of plant maintenance, eg; fire watches or temporary hose connections to water systems."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.39 BTP CMEB 9.5-1, Item: C.2, Administrative Controls (Cont'd): "1. Control actions to be taken by an individual discovering a fire, for example, notification of control room, attempt to extinguish fire, and actuation of local fire suppression systems."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.40 BTP CMEB 9.5-1, Item: C.2, Administrative Controls (Cont'd): "m. Control actions to be taken by the control room operator to determine the need for brigade assistance upon report of a fire or receipt of alarm on control room annunciator panel, for example, announcing location of fire over PA system, sounding fire alarms, and notifying the shift supervisor and the fire brigade leader of the type, size and location of the fire."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.41 BTP CMEB 9.5-1, Item: C.2, Administrative Control (Cont'd): "n. Control actions to be taken by the fire brigade after notification by the control room operator of a fire, for example, assembling in a designated location, receiving directions from the fire brigade leader, and discharging specific fire fighting responsibilities, including selection and transportation of fire fighting equipment to fire location, selection of protective equipment, operating instructions for use of fire suppression systems, and use of preplanned strategies for fighting fires in specific areas."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.42 BTP CMEB 9.5-1, Item: C.2, Administrative Controls (Cont'd): "o. Define the strategies for fighting fires in all safety-related areas and areas presenting a hazard to safety-related equipment. These strategies should designate: (1) Fire hazards in each area covered by the specific prefire plans."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.43 BTP CMEB 9.5-1, Item C.2.o, Administrative Controls (Cont'd): "(2) Fire extinguishants best suited for controlling the fires associated with the fire hazards in that area and the nearest location of these extinguishants."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.44 BTP QMEB 9.5-1, Item C.2.o, Administrative Controls (Cont'd): "(3) Most favorable direction from which to attack a fire in each area in view of the ventilation direction, access hallways, stairs, and doors that are most likely to be free of fire, and the best station or elevation for fighting the fire. All access and egress routes that involve locked doors should be specifically identified in the procedure with the appropriate precautions and methods for access specified."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.45 BTP QMEB 9.5-1, Item C.2.o, Administrative Controls (Cont'd): "(4) Plant systems that should be managed to reduce the damage potential during a local fire and the location of local and remote controls for such management (eg; any hydraulic or electrical systems in the zone covered by the specific fire fighting procedure that could increase the hazards in the area because of overpressurization or electrical hazards)."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.46 BTP QMEB 9.5-1, Item C.2.o, Administrative Controls (Cont'd): "(5) ~~Vital heat-sensitive system components that need to be kept cool while fighting a local fire.~~ Particularly hazardous combustibles that need cooling should be designated."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.47 BTP QMEB 9.5-1, Item C.2.o, Administrative Controls (Cont'd): "(6) Organization of fire fighting brigades and the assignment of special duties according to job title so that all fire fighting functions are covered by any complete shift personnel complement. These duties include command control of the brigade, transporting fire suppression and support equipment to the fire scenes, applying the extinguishant to the fire, communication with the control room, and coordination with outside fire departments."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.48 BTP QMEB 9.5-1, Item C.2.o, Administrative Controls (Cont'd): "(7) Potential radiological and toxic hazards in fire zones."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.49 BTP CMEB 9.5-1, Item C.2.o, Administrative Controls (Cont'd): "(8) Ventilation system operation that ensures desired plant air distribution when the ventilation flow is modified for fire containment or smoke clearing operation."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.50 BTP CMEB 9.5-1, Item C.2.o, Administrative Controls (Cont'd): "(9) Operations requiring control room and shift engineer coordination or authorization."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.51 BTP CMEB 9.5-1, Item C.2.o, Administrative Controls (Cont'd): "(10) Instructions for plant operators and general plant personnel during fire."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.52 BTP CMEB 9.5-1, Item C, Position (Cont'd): "3. Fire Brigade  
a. The need for good organization, training, and equipping of fire brigades at nuclear power plant sites requires that effective measures be implemented to ensure proper discharge of these functions. The guidance in Regulatory Guide 1.101, "Emergency Planning for Nuclear Power Plants," should be followed as applicable."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.53 BTP CMEB 9.5-1, Item C.3, Fire Brigade (Cont'd): "b. A site fire brigade trained and equipped for fire fighting should be established to ensure adequate manual fire fighting capability for all areas of the plant containing structures, systems, or components important to safety. The fire brigade should be at least five members on each shift. The brigade leader and at least two brigade members should have sufficient training in or knowledge of plant safety-related systems to understand the effects of fire and fire suppressants on safe shutdown capability. The qualification of fire brigade members should include an annual physical examination to determine their ability to perform strenuous fire fighting activities. The shift supervisor should not be a member of the fire brigade. The brigade leader shall be competent to assist the potential safety consequences of a fire and advise control room personnel. Such competence by the brigade leader may be evidenced by possession of an operator's license or equivalent knowledge of plant safety-related systems."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.54 BTP CMBB 9.5-1, Item C.3, Fire Brigade (Cont'd): "c. The minimum equipment provided for the brigade should consist of personal protective equipment such as turnout coats, boots, gloves, hard hats, emergency communications equipment, portable lights, portable ventilation equipment, and portable extinguishers. Self-contained breathing apparatus using full-face positive-pressure masks approved by NIOSH (National Institute for Occupational Safety and Health -- approval formerly given by the U.S. Bureau of Mines) should be provided for fire brigade, damage control, and control room personnel. At least 10 masks shall be available for fire brigade personnel. Control room personnel may be furnished breathing air by a manifold system piped from a storage reservoir if practical. Service or rated operating life shall be a minimum of one-half hour for the self-contained units."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.55 BTP CMBB 9.5-1, Item C.3.c, Fire Brigade (Cont'd): "At least two extra air bottles should be located onsite for each self-contained breathing unit. In addition, an onsite 6-hour supply of reserve air should be provided and arranged to permit quick and complete replenishment of exhausted supply air bottles as they are returned. If compressors are used as a source of breathing air, only units approved for breathing air shall be used; compressors shall be operable assuming a loss of offsite power. Special care must be taken to locate the compressor in areas free of dust and contaminants."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.56 BTP CMBB 9.5-1, Item C.3, Fire Brigade (Cont'd): "d. The fire brigade training program shall ensure that the capability to fight potential fires is established and maintained. The program shall consist of an initial classroom instruction program followed by periodic classroom instruction, fire fighting practice, and fire drills."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.57 BTP CMBB 9.5-1, Item C.3.d, Fire Brigade (Cont'd): "(1) The initial classroom instruction should include: (a) Indoctrination of the plant fire fighting plan with specific identification of each individual's responsibilities."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.58 BTP CMBB 9.5-1, Item C.3.d.1, Fire Brigade (Cont'd): "(b) Identification of the type and location of fire hazards and associated types of fires that could occur in the plant."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.59 BTP CMEB 9.5-1, Item C.3.d.1, Fire Brigade (Cont'd): "(c) The toxic and corrosive characteristics of expected products of combustion."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.60 BTP CMEB 9.5-1, Item C.3.d.1, Fire Brigade (Cont'd): "(d) Identification of the location of fire fighting equipment for each fire area and familiarization with the layout of the plant, including access and egress routes to each area."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.61 BTP CMEB 9.5-1, Item C.3.d.1, Fire Brigade (Cont'd): "(e) The proper use of available fire fighting equipment and the corrective method of fighting each type of fire. The types of fires covered should include fires in energized electrical equipment, fires in cables and cable trays, hydrogen fires, fires involving flammable and combustible liquids or hazardous process chemicals, fires resulting from construction or modification (welding), and record file fires."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.62 BTP CMEB 9.5-1, Item C.3.d.1, Fire Brigade (Cont'd): "(f) The proper use of communication, lighting, ventilation, and emergency breathing equipment."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.63 BTP CMEB 9.5-1, Item C.3.d.1, Fire Brigade (Cont'd): "(g) The proper method for fighting fires inside buildings and confined spaces."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.64 BTP CMEB 9.5-1, Item C.3.d.1, Fire Brigade (Cont'd): "(h) The direction and coordination of the fire fighting activities (fire brigade leaders only)."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.65 BTP QMEB 9.5-1, Item C.3.d.1, Fire Brigade (Cont'd): "(i) Detailed review of fire fighting strategies and procedures.

Note: Item (i) may be deleted from the training of no more than two of the nonoperations personnel who may be assigned to the fire brigade."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.66 BTP QMEB 9.5-1, Item C.3.d.1, Fire Brigade (Cont'd): "(j) Review of the latest plant modifications and corresponding changes in fire fighting plans.

Note: Item (j) may be deleted from the training of no more than two of the nonoperations personnel who may be assigned to the fire brigade."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.67 BTP QMEB 9.5-1, Item C.3.d.1, Fire Brigade (Cont'd): "(k) Training of the plant fire brigade should be coordinated with the local fire department so that responsibilities and duties are delineated in advance. This coordination should be part of the training course and should be included in the training of the local fire department staff."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.68 BTP QMEB 9.5-1, Item C.3.d.1, Fire Brigade (Cont'd): "(l) Local fire departments should be provided training in operational precautions when fighting fires on nuclear power plant sites and should be made aware of the need for radiological protection of personnel and the special hazards associated with a nuclear power plant site."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.69 BTP QMEB 9.5-1, Item C.3.d.1, Fire Brigade (Cont'd): "(2) The instruction should be provided by qualified individuals who are knowledgeable, experienced, and suitably trained in fighting the types of fires that could occur in the plant and in using the types of equipment available in the nuclear power plant."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.70 BTP CMEB 9.5-1, Item C.3.d, Fire Brigade (Cont'd): "(3) Instruction should be provided to all fire brigade members and fire brigade leaders."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.71 BTP CMEB 9.5-1, Item C.3.d, Fire Brigade (Cont'd): "(4) Regular planned meetings should be held at least every 3 months for all brigade members to review changes in the fire protection program and other subjects as necessary."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.72 BTP CMEB 9.5-1, Item C.3.d, Fire Brigade (Cont'd): "(5) Periodic refresher training sessions shall be held to repeat the classroom instruction program for all brigade members over a 2-year period. These sessions may be concurrent with the regular planned meetings."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.73 BTP CMEB 9.5-1, Item C.3.d, Fire Brigade (Cont'd): "(6) Practice. (a) Practice sessions should be held for each shift fire brigade on the proper method of fighting the various types of fire that could occur in a nuclear power plant. These sessions shall provide brigade members with experience in actual fire extinguishment and the use of emergency breathing apparatus under strenuous conditions encountered in fire fighting."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.74 BTP CMEB 9.5-1, Item C.3.d.6, Fire Brigade Practice (Cont'd): "(b) These practice sessions should be provided at least once per year for each fire brigade member."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.75 BTP CMEB 9.5-1, Item C.3.d, Fire Brigade (Cont'd): "(7) Drills (a) Fire brigade drills should be performed in the plant so that the fire brigade can practice as a team."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.76 BTP CMEB 9.5-1, Item C.3.d.7, Fire Brigade Drills (Cont'd): "(b) Drills should be performed at regular intervals not to exceed 3 months for each shift fire brigade. Each fire brigade member should participate in each drill, but must participate in at least two drills per year.

A sufficient number of these drills, but not less than one for each shift fire brigade per year, should be unannounced to determine the fire fighting readiness of the plant fire brigade, brigade leader, and fire protection systems and equipment. Persons planning and authorizing an unannounced drill should ensure that the responding shift fire brigade members are not aware that a drill is being planned until it is begun. Unannounced drills should not be scheduled closer than 4 weeks.

At least one drill per year should be performed on a "back shift" for each shift fire brigade.

NRC GENERIC LETTER 86-10: No additional guidance.

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2.77 BTP CMEB 9.5-1, Item C.3.d.7, Fire Brigade Drills (Cont'd): "(c) The drills should be preplanned to establish the training objectives of the drill and should be critiqued to determine how well the training objectives have been met. Unannounced drills should be planned and critiqued by members of the management staff responsible for plant safety and fire protection. Performance deficiencies of a fire brigade or of individual fire brigade members should be remedied by scheduling additional training for the brigade or members.

Unsatisfactory drill performance should be followed by a repeat drill within 30 days."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.78 BTP CMEB 9.5-1, Item C.5.d.7, Fire Brigade Drills (Cont'd): "(d) These drills should provide for local fire department participation periodically (at least annually)."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.79 BTP CMEB 9.5-1, Item C.5.d.7, Fire Brigade Drills (Cont'd): "(e) At 3-year intervals, a randomly selected unannounced drill should be critiqued by qualified individuals independent of the licensee's staff. A copy of the written report from such individuals should be available for NRC review."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.80 BTP CMEB 9.5-1, Item C.5.d.7, Fire Brigade Drills (Cont'd): "(f) Drills should as a minimum include the following: 1. Assessment of fire alarm effectiveness, time required to notify and assemble fire brigade, and selection, placement, and use of equipment and fire fighting strategies."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.81 BTP CMEB 9.5-1, Item C.5.d.7.f, Fire Brigade Drills (Cont'd): "ii. Assessment of each brigade member's knowledge or his or her role in the fire fighting strategy for the area assumed to contain the fire. Assessment of the brigade members' conformance with established plant fire fighting procedures and use of fire fighting equipment, including self-contained emergency breathing apparatus, communication equipment, and ventilation equipment, to the extent practicable."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.82 BTP CMEB 9.5-1, Item C.5.d.7.f, Fire Brigade Drills (Cont'd): "iii. The simulated use of fire fighting equipment required to cope with the situation and type of fire selected for the drill. The area and type of fire chosen for the drill should differ from those used in the previous drills so that brigade members are trained in fighting fires in various plant areas. The situation selected should simulate the size and arrangement of a fire that could reasonably occur in the area selected, allowing for fire development due to the time required to respond, to obtain equipment, and organize for the fire, assuming loss of automatic suppression capability."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.83 BTP CMEB 9.5-1, Item C.5.d.7.f, Fire Brigade Drills (Cont'd): "iv. Assessment of brigade leader's direction of the fire fighting effort as to thoroughness, accuracy and effectiveness."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.84 BTP CMEB 9.5-1, Item C.5.d, Fire Brigade (Cont'd): "(8) Records Individual records of training provided to each fire brigade member, including drill critiques, should be maintained for at least 3 years to ensure that each member receives training in all parts of the training program. These records of training should be available for NRC review. Retraining or broadened training for fire fighting within buildings should be scheduled for all those brigade members whose performance records show deficiencies."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.85 BTP CMEB 9.5-1, Item C.5.d, Fire Brigade (Cont'd): "(9) Guidance Documents: NFPA 27, "Private Fire Brigade," should be followed in organization, training and fire drills. This standard also is applicable for the inspection and maintenance of fire fighting equipment. Among the standards referenced in this document, NFPA 197, "Training Standard on Initial Fire Attacks," should be utilized as applicable. NFPA booklets and pamphlets listed in NFPA 27 may be used as applicable for training references. In addition, courses in fire prevention and fire suppression that are recognized or sponsored by the fire protection industry should be utilized."

NRC GENERIC LETTER 86-10: No additional guidance

REF. SOURCES: NFPA 27, NFPA 197

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2.86 BTP CMEB 9.5-1, Item C, Position (Cont'd): "4. Quality Assurance Program

The quality assurance (QA) programs of applicants and contractors should ensure that the guidelines for design, procurement, installation, and testing and the administrative controls for the fire protection systems for safety-related areas are satisfied. The QA program should be under the management control of the QA organization. This control consists of (1) formulating a fire protection QA program that incorporates suitable requirements and is acceptable to the management responsible for fire protection or verifying that the program incorporates suitable requirements and is acceptable to the management responsible for fire protection, and (2) verifying the effectiveness of the QA program for fire protection through review, surveillance, and audits. Performance of other QA program functions for meeting the fire protection program requirements may be performed by personnel outside of the QA organization. The QA program for fire protection should be part of the overall plant QA program. It should satisfy the specific criteria listed below."

NRC GENERIC LETTER 86-10: No additional guidance

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2.87 BTP CMEB 9.5-1, Item C.4, Quality Assurance Program (Cont'ds): "a. Design and Procurement Document Control

Measures should be established to ensure that the guidelines of the regulatory position of this guide are included in design and procurement documents and that deviation therefrom are controlled."

NRC GENERIC LETTER 86-10: No additional guidance

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2.88 BTP CMEB 9.5-1, Item C.4, Quality Assurance Program (Cont'd): 'b.  
Instructions, Procedures, and Drawings  
Inspections, tests, administrative controls, fire drills, and training that govern the fire protection program should be prescribed by documented instructions, procedures, or drawings and should be accomplished in accordance with these documents."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.89 BTP CMEB 9.5-1, Item C.4, Quality Assurance Program (Cont'd):  
"c. Control of Purchased Material, Equipment, and Services  
Measures should be established to ensure that purchased material, equipment, and services conform to the procurement documents."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.90 BTP CMEB 9.5-1, Item C.4, Quality Assurance Program (Cont'd): "d.  
Inspection  
A program for independent inspection of activities affecting fire protection should be established and executed by or for the organization performing the activity to verify conformance with documented installation drawings and test procedures for accomplishing the activities."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA 13, NFPA 14, NFPA 15, NFPA 20, NFPA 24, NFPA 72D,  
NFPA 72E

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2.91 BTP CMEB 9.5-1, Item C.4, Quality Assurance Program (Cont'd): "e.  
Test and Test Control  
A test program should be established and implemented to ensure that testing is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. The tests should be performed in accordance with written test procedures; test results should be properly evaluated and acted on."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: Same as for Item 2.90 above.

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2.92 BTP CMEB 9.5-1, Item C.4, Quality Assurance Program (Cont'd):  
"f. Inspection, Test, and Operating Status  
Measures should be established to provide for the identification of items that have satisfactorily passed required tests and inspections."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: Same as for Item 2.90 above.

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2.93 BTP CMEB 9.5-1, Item C.4, Quality Assurance Program (Cont'd):

"g. Nonconforming Items

Measures should be established to control items that do not conform to specified requirements to prevent inadvertent use or installation."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.94 BTP CMEB 9.5-1, Item C.4, Quality Assurance Program (Cont'd):

"h. Corrective Action

Measures should be established to ensure that conditions adverse to fire protection, such as failures, malfunctions, deficiencies, deviations, defective components, uncontrolled combustible material and nonconformances, are promptly identified, reported, and corrected."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.95 BTP CMEB 9.5-1, Item C.4, Quality Assurance Program (Cont'd):

"i. Records

Records should be prepared and maintained to furnish evidence that the criteria enumerated above are being met for activities affecting the fire protection program."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.96 BTP CMEB 9.5-1, Item C.4, Quality Assurance Program (Cont'd):

"j. Audits

Audits should be conducted and documented to verify compliance with the fire protection program, including design and procurement documents, instructions, procedures and drawings, and inspection and test activities."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.97 BTP CMEB 9.5-1, Item C, Position (Cont'd): "5. General Plant Guidelines

a. Building Design

- (1) Fire barriers with a minimum fire-resistance rating of 3 hours should be provided to:
  - (a) Separate safety-related systems from any potential fires in nonsafety-related areas that could affect their ability to perform their safety function;
  - (b) Separate redundant divisions or trains of safety-related systems from each other so that both are not subject to damage from a single fire;
  - (c) Separate individual units on a multiple unit site unless the requirements of General Design Criterion 5 are met with respect to fires."

NRC GENERIC LETTER 86-10: "The documentation required to verify the rating of a fire barrier should include the design description of the barrier and the test reports that verify its fire rating. Reference can be made to UL listed designs."

"Usually exterior walls are designated as a fire area boundary; therefore, they are evaluated by the guidelines of Appendix A. A FHA should be performed to determine the rating of exterior walls, if required by the above criteria."

Fire barriers relied upon to protect shutdown related systems to meet the requirements of III.G.2 need to have a fire rating of either one or three hours. 10CFR 50.48 references BTP APCSB 9.5-1, where the fire protection definitions are found. Fire rating is defined:

"Fire Rating - the endurance period of a fire barrier or structure; it defines the period of resistance to a standard fire exposure before the first critical point in behavior is observed (see NFPA 251)."

The acceptance criteria contained in Chapter 7 of NFPA 251, "Standard Methods of Fire Tests of Building Construction and Materials," pertain to non-bearing fire barriers. These criteria stipulate that transmission of heat through the barrier "shall not have been such as to raise the temperature on its unexposed surface more than 250°F above its initial temperature."

The ambient air temperature at the beginning of a fire test usually is between 50°F and 90°F. It is generally recognized that 75°F represents an acceptable norm. The resulting 325°F cold side temperature criterion is used for cable tray wraps because they perform the fire barrier function to preserve the cables free of fire damage. It is clear that cable begins to degrade at 450°F is free of fire damage at 325°F.

During the Appendix A review, licensees began to propose fire barriers to enclose cable tray, conduit, fuel lines, coolant lines, etc. Industry did not have standard rating tests for such components or for electrical, piping or bus duct penetrations. The NRC issued a staff position giving acceptance criteria for electrical penetration tests. These criteria require an analysis of any temperature on the unexposed side of the barrier in excess of 325°F. In the past, manufacturers designed their own qualification tests. Nuclear Insurers, and the Institute of Electrical and Electronic Engineers have issued tests for some of these components. These tests usually exposed the component to the ASTM E-119 time temperature curve, but all had different acceptance criteria. Conduit and cable tray enclosure materials accepted by the NRC as 1 hour barrier prior to Appendix R (e.g. some Kaowool and 3M materials) and already installed by the licensee need not be replaced even though they may not have met the 325°F criteria. However, for newly identified conduit and cable trays requiring such wrapping, new material which meets the 325°F criterion should be used, or justification should be provided for use of material which does not meet the 325°F criterion. This may be based on an analysis demonstrating that the maximum recorded temperature is sufficiently below the cable insulation ignition temperature.

Where exact replication of a tested configuration cannot be achieved, the field installation should meet all of the following criteria:

- (1) The continuity of the fire barrier material is maintained.
- (2) The thickness of the barrier is maintained.
- (3) The nature of the support assembly is unchanged from the tested configuration.
- (4) The application or "end use" of the fire barrier is unchanged from the tested configuration. For example, the use of a cable tray barrier to protect a cable tray which differs in configuration from those that were tested would be acceptable. However, the use of structural steel fire proofing to protect a cable tray assembly may not be acceptable.
- (5) The configuration has been reviewed by a qualified fire protection engineer and found to provide an equivalent level of protection.

If a fire area boundary was described as a rated barrier in the 1977 fire hazards analysis, and was evaluated and accepted in a published SER, the fire area boundary need not be reviewed as part of the reanalysis for compliance with Section III.G of Appendix R. Openings in the fire barriers, if any, should have been specifically identified and justified in the fire hazards analysis performed in the Appendix A process. If openings in the fire area boundaries were not previously evaluated, such an evaluation should be performed as a basis for assessing compliance with Appendix R. See Items #4 and #6 of the "Interpretations of Appendix R."

In BTP APCSB 9.5-1, Fire Barrier is defined as:

"Fire Barrier - those components of construction (walls, floors, and roofs) that are rated by approving laboratories in hours for resistance to fire to prevent the spread of fire.

The term "fire area" as used in Appendix R means an area sufficiently bounded to withstand the hazards associated with the fire area and, as necessary, to protect important equipment within the fire area from a fire outside the area. In order to meet the regulation, fire area boundaries need not be completely sealed with floor-to-ceiling and/or wall-to-wall boundaries. Where fire area boundaries were not approved under the Appendix A process, or where such boundaries are not wall-to-wall or floor-to-ceiling boundaries with all penetrations sealed to the fire rating required of the boundaries, licensees must perform an evaluation to assess the adequacy of fire area boundaries in their plants to determine if the boundaries will withstand the hazards associated with the area and protect important equipment within the area from a fire outside the area. This analysis must be performed by at least a fire protection engineer and, if required, a systems engineer. Although not required, licensees may submit their evaluations for Staff review and concurrence. In any event, these analyses must be retained by the licensees for subsequent NRC audits.

Exterior walls and their penetrations should be qualified as rated barriers when (1) they are required to separate a shutdown-related division(s) inside the plant from its redundant (alternate) counterpart outside the plant in the immediate vicinity of the exterior wall, (2) they separate safety related areas from non-safety related areas that present a significant fire threat to the safety related areas, or (3) they are designated as a fire barrier in the FSAR or FHA."

REF. SOURCES: ASTM E-119, 10CFR50.48, Appendix R to 10CFR50,  
BTP APCSB 9.5-1, Appendix A to BTP APCSB 9.5-1, NFPA 251

2.98 BTP CMEB 9.5-1, Item C.5.a, Building Design (Cont'd): "(2) Appropriate fire barriers should be provided within a single safety division to separate components that present a fire hazard to other safety-related components or high concentrations of safety-related cables within that division."

NRC GENERIC LETTER 86-10: Same as for Item 2.97 above.

REF. SOURCES: Same as for Item 2.97 above.

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2.99 BTP CMEB 9.5-1, Item C.5.a, Building Design (Cont'd): "(3) Openings through fire barriers for pipe, conduit, and cable trays which separate fire areas should be sealed or closed to provide a fire-resistive rating at least equal to that required of the barrier itself. Openings inside conduit larger than 4 inches in diameter should be sealed at the fire barrier penetration. Openings inside conduit 4 inches or less in diameter should be sealed at the fire barrier unless the conduit extends at least 5 ft on each side of the fire barrier and is sealed either at both ends or at the fire barrier with noncombustible material to prevent the passage of smoke and hot gases. Fire differentials should be qualified by test to maintain the barrier integrity under such conditions."

NRC GENERIC LETTER 86-10: Same guidance as for Item 2.97 above.

REF. SOURCES: Same as for Item 2.97.

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2.100 BTP CMEB 9.5-1, Item C.5.a.3, Building Design (Cont'd): "Penetration designs should utilize only noncombustible materials and should be qualified by tests. The penetration qualification tests should use the time-temperature exposure curve specified by ASTM E-119, "Fire Test of Building Construction and Materials." The acceptance criteria for the test should require that:

- (a) The fire barrier penetration has withstood the fire endurance test without passage of flame or ignition of cables on the unexposed side for a period of time equivalent to the fire-resistance rating required of the barrier.
- (b) The temperature levels recorded for the unexposed side are analyzed and demonstrate that the maximum temperature does not exceed 325°F.
- (c) The fire barrier penetration remains intact and does not allow projection of water beyond the unexposed surface during the hose stream test. The stream shall be delivered through a 1-1/2 inch nozzle set at a discharge angle of 30° with a nozzle pressure of 75 psi and a minimum discharge of 75 gpm with the tip of the nozzle a maximum of 5 ft from the exposed face; or the stream shall be delivered through a 1-1/2 inch nozzle set at a discharge angle of 15° with a nozzle pressure of 75 psi and a minimum discharge of 75 gpm with the tip of the nozzle a maximum of 10 ft from the exposed face; or the stream shall be delivered through a 2-1/2 inch national standard playpipe equipped with 1-1/8 inch tip, nozzle pressure of 30 psi, located 20 ft from the exposed face."

NRC GENERIC LETTER 86-10: Same guidance as 2.97.

REF. SOURCES: ASTM E-119, ANI File No. N-219.

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2.101 BIF CMB 9.5-1, Item C.5.a, Building Design (Cont'd) "(4)  
Penetration openings for ventilation systems should be protected by fire dampers having a rating equivalent to that required of the barrier (see NFPA-90A, "Air Conditioning and Ventilating Systems"). Flexible air duct coupling in ventilation and filter systems should be noncombustible."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA 80, NFPA 90A, ANI File No. N-219.

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2.102 BIF CMB 9.5-1, Item C.5.a, Building Design (Cont'd) "(5) Door openings in fire barriers should be protected with equivalently rated doors, frames, and hardware that have been tested and approved by a nationally recognized laboratory. Such doors should be self-closing or provided with closing mechanisms and should be inspected semiannually to verify that automatic hold-open, release, and closing mechanisms and latches are operable. (See NFPA 80, "Fire Doors and Windows.")

One of the following measures should be provided to ensure they will protect the opening as required in case of fire:

- (a) Fire doors should be kept closed and electrically supervised at a continuously manned location;
- (b) Fire doors should be locked closed and inspected weekly to verify that the doors are in the closed position;
- (c) Fire doors should be provided with automatic hold-open and release mechanism and inspected daily to verify that doorways are free of obstructions; or
- (d) Fire doors should be kept closed and inspected daily to verify that they are in the closed position.

NRC GENERIC LETTER 86-10: Where a door is part of a fire area boundary, and the modification does not effect the fire rating (for example, installation of security "contacts"), no further analysis need be performed. If the modifications could reduce the fire rating (for example, installation a vision panel), the fire rating of the door should be reassessed to ensure that it continues to provide adequate margin considering the fire loading on both sides. Since this reassessment pertains to the establishment of a valid fire area boundary, an exemption is not required. See Section #4 of the "Interpretations of Appendix E."

REF. SOURCES: NFPA 80, NFPA 90A, ANI File No. N-219.

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2.103 BTP CMEB 9.5-1, Item C.5.a.5, Building Design (Cont'd): "The fire brigade leader should have ready access to keys for any locked fire doors."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.104 BTP CMEB 9.5-1, Item C.5.a.5, Building Design (Cont'd): "Areas protected by automatic total flooding gas suppression systems should have electrically supervised self-closing fire doors or should satisfy option (a) above." (C.5.a)

NRC GENERIC LETTER 86-10: No additional guidance.

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2.105 BTP CMEB 9.5-1, Item C.5.a, Building Design (Cont'd): "(6) Personnel access routes and escape routes should be provided for each fire area. Stairwells outside primary containment serving as escape routes, access routes for firefighting, or access routes to areas containing equipment necessary for safe shutdown should be enclosed in masonry or concrete towers with a minimum fire rating of 2 hours and self-closing Class B fire doors."

NRC GENERIC LETTER 86-10 - No additional guidance.

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2.106 BTP CMEB 9.5-1, Item C.5.a, Building Design (Cont'd): "(7) Fire exit routes should be clearly marked."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.107\* BTP CMEB 9.5-1, Item C.5.a, Building Design (Cont'd): "(8) Each cable spreading room should contain only one redundant safety division. Cable spreading rooms should not be shared between reactors. Cable spreading rooms should be separated from each other and from other areas of the plant by barriers having a minimum fire resistance of 3 hours."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.108 BTP CMB 9.5-1, Item C.5.a, Building Design (Cont'd): "(9) Interior wall and structural components, thermal insulation materials, radiation shielding materials, and soundproofing should be noncombustible. Interior finishes should be noncombustible."

NRC GENERIC LETTER 86-10 - No additional guidance.

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2.109 BTP CMB 9.5-1, Item C.5.a, Building Design (Cont'd): "Materials that are acceptable for use as interior finish without evidence of test and listing by a nationally recognized laboratory are the following:

- o Elastar, acoustic plaster, gypsum plaster board (gypsum wallboard), either plain, wallpapered, or painted with oil- or water-base paint;
- o Ceramic tile, ceramic panels;
- o Glass, glass blocks;
- o Brick, stone, concrete blocks, plain or painted;
- o Steel and aluminum panels, plain, painted, or enameled;
- o Vinyl tile, vinyl-asbestos tile, linoleum, or asphalt tile on concrete floors.

NRC GENERIC LETTER 86-10: No additional guidance.

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2.110 BTP CMB 9.5-1, Item C.5.a, Building Design (Cont'd): "(10) Metal deck roof construction should be noncombustible and listed as "acceptable for fire" in the UL Building Materials Directory, or listed as Class I in the Factory Mutual System Approval Guide."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.111 BTP CMB 9.5-1, Item C.5.a, Building Design (Cont'd): "(11) Suspended ceiling and their supports should be of noncombustible construction. Concealed spaces should be devoid of combustibles except as noted in Position C.6.b."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.112 BTP CMB 9.5-1, Item C.5.a, Building Design (Cont'd): "(12) Transformers installed inside fire areas containing safety-related systems should be of the dry-type or insulated and cooled with noncombustible liquid. Transformers filled with combustible fluid that are located indoors should be enclosed in a transformer vault (see Section 450(c) of NFPA 70, "National Electrical Code")."

NRC GENERIC LETTER 86-10 - No additional guidance.

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2.113 BTP CMEB 9.5-1, Item C.5.a, Building Design (Cont'd): "(13) Outdoor oil-filled transformers, should have oil spill confinement features or drainageaway from the buildings. Such transformers should be located at least 50 ft distant from the building, or by ensuring that such building walls within 50 ft of oil-filled transformers are without openings and have a fire-resistance rating of at least 3 hours."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.114 BTP CMEB 9.5-1, Item C.5.a, Building Design (Cont'd): "(14) Floor drains sized to remove expected fire-fighting water flow without flooding safety-related equipment should be provided in those areas where fixed water fire suppression systems are installed. Floor drains should also be provided in other areas where hand hose lines may be used if such fire-fighting water could cause unacceptable damage to safety-related equipment in the area (see NFPA-92, "Waterproofing and Draining of Floors"). Where gas suppression systems are installed, the drains should be provided with adequate seals or the gas suppression system should be sized to compensate for the loss of the suppression agent through the drains. Drains in areas containing combustible liquids should have provisions for preventing the backflow of combustible liquids to safety-related areas through the interconnected drain systems. Water drainage from areas that may contain radioactivity should be collected, sampled, and analyzed before discharge to the environment."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.115 Lightning Protection should be provided for the reactor building, cooling towers and stacks.

REF. SOURCES: NRC BTP APCSB 9.5-1.

NRC GENERIC LETTER 86-10: No additional guidance.

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2.116 BTP CMEB 9.5-1, Item C.5, Position (Cont'd): "b. Safe Shutdown Capability

- (1) Fire protection features should be provided for structures, systems, and components important to safe shutdown. These features should be capable of limiting fire damage so that:
- (a) One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) is free from fire damage; and
  - (b) Systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) can be repaired within 72 hours.

NRC GENERIC LETTER 86-10: "Section III.G was written after NRC's multi-discipline review teams had visited all operating power plants. From these audits, the NRC recognized that it is not practical and may be impossible to subdivide some portions of an operating plant into fire areas. In addition, the NRC recognized that in some cases where fire areas are designated, it may not be possible to provide alternate shutdown capability independent of the fire area and, therefore, would have to be evaluated on the basis of fire zones within the fire area. The NRC also recognized that because some licensees had not yet performed a safe shutdown analysis, these analyses, may identify new unique configurations.

To cover the large variation of possible configurations, the requirements of Section III.G were presented in three parts:

- o Section III.G.1 requires one train of hot shutdown systems to be free of fire damage and damage to cold shutdown systems be limited.
- o Section III.G.2 provides certain separation, suppression and detection requirements within fire area; where such requirements are met, analysis is not necessary.
- o Section III.G.3 requires alternative dedicated shutdown capability for configurations that do not satisfy the requirements of III.G.2 or where fire suppressants released as a result of fire fighting, rupture of the system or inadvertent operation of the system may damage redundant equipment. If alternate shutdown is provided on the basis of rooms or zones, the provision of fire detection and fixed suppression is only required in the room or zone under consideration."

"Section III.L.5 of Appendix R states that when in the alternative or dedicated shutdown mode, "equipment and systems comprising the means to achieve and maintain cold shutdown conditions shall not be damaged by fire; or the fire damage to such equipment and systems shall be limited so that the systems can be made operable and cold shutdown can be achieved within 72 hours." This is not to be confused with the requirements in Section III.G.1.b of Appendix R.

Section III.G.1.b contains the requirements for normal shutdown modes utilizing the control room or emergency control station(s) capabilities. The fire areas falling under the requirements of III.G.1.b are those for which an alternative or dedicated shutdown capability is not being provided. For these fire areas, Section III.G.1.b requires only the capability to repair the systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) within 72 hours, not the capability to repair and achieve cold shutdown within 72 hours as required for the alternative or dedicated shutdown modes by Section III.L (noted above).

With regard to areas involving normal shutdown, however, Section I of Appendix R states that repairs must be made using only onsite capabilities. After repairs are made, cold shutdown can be achieved on a reasonable schedule using any available power source.

Section III.G.1 requires that the one train of systems needed to achieve and maintain hot shutdown be free of fire damage. Thus, the systems needed are to be completely protected from the fire regardless of time. If the intent of the question concerns how long these systems must operate, these systems must be capable of operating until the systems needed to achieve and maintain cold shutdown are available.

One train of systems necessary to achieve and maintain hot shutdown conditions must be free of fire damage. PWR licensees have demonstrated the capability to achieve and maintain stable hot shutdown conditions without the use of pressurizer heaters by utilizing the charging pump and a water solid pressurizer for reactor coolant pressure control.

As stated in Section III.G.1, one train of systems needed to achieve and maintain hot shutdown conditions must be free of fire damage. Systems necessary to achieve and maintain cold shutdown can be repaired within 72 hours. Thus, if this certain equipment necessary only in the cooldown phase, is used to achieve cold shutdown, it can be repaired within 72 hours. If the certain equipment is maintaining hot shutdown while repairs are being made, one train must be free of fire damage. See also Section #2 of the "Interpretations of Appendix R."

It continues to be our position that torus (suppression pool) level indication is the preferred post-fire monitoring instrumentation in order to confirm the availability of the torus (suppression pool) as a heat sink. We recognize that existing analyses indicate that suppression pool level is not significantly changed during emergency shutdown conditions. However, we believe the operator should be able to confirm that spurious operations or other unanticipated occurrences have not affected the torus function. An analysis of torus level change by itself is not considered an acceptable basis.

Safe shutdown capabilities including alternative shutdown capabilities are all designed for some maximum level of fire damage (system unavailabilities, spurious actuations). Since the extent of the fire cannot be predicted, it seems prudent to have the post-fire shutdown procedures guide the operator from full system availability to the minimum shutdown capability.

As for repair procedure, similar conditions exists. A repair procedure can be written based on the maximum level of damage that is expected. This procedure would then provide shutdown capability without accurately predicting likely fire damage.

The NRC does not have requirements, nor do we propose any requirements regarding whether post-fire operating procedures should be based upon fire areas, systems or be symptom-based. We suggest that the post-fire shutdown capabilities designs be reviewed with the plant operation staff and procedures written with their input.

The only requirement for post-fire operating procedures is for those areas where alternative shutdown is required. For other areas of the plant, shutdown would be achieved utilizing one of the two normal trains of shutdown system. Shutdown in degraded modes (one train unavailable) should be covered by present operator training and abnormal and emergency operating procedures. If the degraded modes of operation are not presently covered, we would suggest that the operation staff of the plant determine whether additional training or procedures needed.

Other than the criteria of Section III.L, no specific post-fire shutdown procedure guidance has been developed. The inspection process will be flexible in this regard as long as the licensee can show compliance with the criteria of Section III.L."

REF. SOURCE: Appendix R to 10 CFR50.

2.117 BTP CMB. 9.5-1, Item C.5.b, Safe Shutdown Capability (Cont'd): "(2) To meet the guidelines of Position C5.b.1, one of the following means of ensuring that one of the redundant trains is free of fire damage should be provided:

- (a) Separation of cables and equipment and associated circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming a part of or supporting such fire barriers should be protected to provide fire resistance equivalent to that required of the barrier;
- (b) Separation of cables and equipment and associated circuits of redundant trains by a horizontal distance of more than 20 ft with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system should be installed in the fire area; or
- (c) Enclosure of cable and equipment and associated circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic fire suppression system should be installed in the fire area."

NRC GENERIC LETTER 86-10: "Appendix R to 10 CFR Part 50 utilizes the term "free of fire damage." In promulgating Appendix R, the Commission has provided methods acceptable for assuring that necessary structures, systems and components are free of fire damage (see Section III.G.2a, b and c), that is, the structure, system or component under consideration is capable of performing its intended function during and after the postulated fire, as needed. Licensees seeking exemptions from Section III.G.2 must show that the alternative proposed provides reasonable assurance that this criterion is met. Note also that Section III.G.2 applies only to equipment needed for hot shutdown. Therefore, an exemption from III.G.2 for cold shutdown equipment is not needed. The term "damage by fire" also includes damage to equipment from the normal or inadvertent operation of fire suppression systems.

The NRC does not define the structural steel supporting fire barriers. This steel is identified by the licensee. Our position regarding the need to protect the structural steel, which forms a part of or supports fire barriers, is consistent with sound fire protection engineering principles as delineated in both NFPA codes and standards, and the Fire Protection Handbook.

It is not necessary to protect structural steel in existing fire barriers where those barriers were approved in an Appendix A SER.

If the failure of any structural steel member due to a fire could result in significant degradation of the fire barrier, it must be protected.

To meet the separation criteria of Section III.G.2 and III.G.3 of Appendix R, high impedance faults should be considered for all associated circuits located in the fire area of concern. Thus, simultaneous high impedance faults (below the trip point for the breaker on each individual circuit) for all associated circuits located in the fire area should be considered in the evaluation of the safe shutdown capability. Clearing such faults on associated circuits which may affect safe shutdown may be accomplished by manual breaker trips governed by written procedures. Circuit coordination studies need not be performed if it is assumed that shutdown capability will be disabled by such high impedance faults and appropriate written procedures for clearing them are provided.

Sections III.G.2 and III.L.7 of Appendix R define the circuit failure modes as hot shorts, open circuits, and shorts to ground. For consideration of spurious actuations, all possible functional failure states must be evaluated; that is, the component could be energized or de-energized by one or more of the above failure modes. Therefore, valves could fail open or closed; pumps could fail running or not running; electrical distribution breakers could fail open or closed. For three-phase AC circuits, the probability of getting a hot short on all three phases in the proper sequence to cause spurious operation of a motor is considered sufficiently low as to not require evaluation except for any cases involving Hi/Lo pressure interfaces. For ungrounded DC circuits, if it can be shown that only two hot shorts of the proper polarity without grounding could cause spurious operation, no further evaluation is necessary except for any cases involving Hi/Lo pressure interfaces.

We would postulate that a "hot short" condition exists until action has been taken to isolate the given circuit from the fire area, or other actions as appropriate have been taken to negate the effects of the spurious actuation. We do not postulate that the fire would eventually clear the "hot short."

The term "fire area" as used in Appendix R means an area sufficiently bounded to withstand the hazards associated with the area and, as necessary, to protect important equipment within the area from a fire outside the area. In order to meet the registration, fire area

boundaries need not be completely sealed floor-to-ceiling, wall-to-wall boundaries. However, all unsealed openings should be identified and considered when evaluating the effectiveness of the overall barrier. Where fire area boundaries are not wall-to-wall, floor-to-ceiling boundaries with all penetrations sealed to the fire rating required of the boundaries, licensees must perform an evaluation to assess the adequacy of fire boundaries in their plants to determine if the boundaries will withstand the hazards associated with the area. This analysis must be performed by at least a fire protection engineer and, if required, a systems engineer. Although not required, licensees may submit their evaluations for staff review and concurrence. However, if certain cable penetrations were identified as open SER items at the time Appendix R became effective, Section III.M of the rule applies (see 10 CFR 50.48(b)), and any variation from the requirements of Section III.M requires an exemption. In any event, these analyses must be retained by the licensees for subsequent NRC audits.

Sections III.G.2.b and III.G.2.c of Appendix R state that "In addition, fire detectors and automatic fire suppression system shall be installed in the fire area ..." Other provisions of Appendix R also use the phrase "fire detectors and an automatic fire suppression system in the fire area ..." (see e.g., Section III.G.2.e).

In order to comply with these provisions, suppression and detection sufficient to protect against the hazards of the area must be installed. In this regard, detection and suppression providing less than full area coverage may be adequate to comply with the regulation. Where full area suppression and detection is not installed, licensees must perform an evaluation to assess the adequacy of partial suppression and detection to protect against the hazards in the area. The evaluation must be performed by a fire protection engineer and, if required, a systems engineer. Although not required, licensees may submit their evaluations to the staff for review and concurrence. In any event, the evaluations must be retained for subsequent NRC audits. Where a licensee is providing no suppression or detection, an exemption must be requested.

The staff is always available to consult with utility representatives and provide guidance as to the acceptability of a particular fire protection configuration in individual plant areas. See also Section #5 of the "Interpretations of Appendix R."

With the erection of a partial qualified one-hour rated barrier for portions of the circuits with less than 20 ft. separation, if 20 feet of horizontal separation existed between the redundant unprotected portions of the circuits without intervening combustibles or fire hazards, and if the fire area was protected by automatic fire detection and suppression, compliance with Section III.G.2.b would be achieved.

These types of configuration have to be evaluated on a case-by-case basis by the NRC.

If more than negligible quantities of combustible materials (such as isolated cable runs) exist between redundant shutdown divisions, an exemption request should be filed. ["Negligible quantity" is an admittedly judgmental criterion, and this judgment should be made by a qualified fire protection engineer and documented for later NRC audit.] Justifications for such exemptions have been based on the following factors:

1. A relatively large horizontal spacial separation between redundant divisions; all cables qualified to IEEE-383;
2. The presence of an automatic fire suppression system over the intervening combustible (such as a cable tray fire suppression system);
3. The presence of fire stops to inhibit fire propagation in intervening cable trays;
4. The likely fire propagation direction of burning intervening combustibles in relation to the location of the vulnerable shutdown division;
5. The availability of compensating active and passive fire protection.

Any future changes in the cable configuration due to modifications could be handled under 50.59. See the provisions of the license condition.

There is no specific definition of "no intervening combustible." The regulation is focused on the absence of in-situ exposed combustibles. Noncombustible materials would not be considered as intervening combustibles.

In BTP CMEB 9.5-1, noncombustible material is defined as:  
"Noncombustible Material"

- a. A material which in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat.
- b. Material having a structural base of noncombustible material, as defined in a., above, with a surfacing not over 1/8-inch thick that has a flame spread rating not higher than 50 when measured using ASTM E-84 Test "Surface Burning Characteristics of Building Materials."

In Generic Letter 83-33, it is instated

"Staff Position: Section III.G.2.b required the "separation ... with no intervening combustibles ..." To meet this requirement, plastic jackets and insulation of grouped electrical cables, including those which are coated, should be considered as intervening combustibles."

For fire protection, "no intervening combustibles" means that there is no significant quantities of in-situ materials which will ignite and burn located between redundant shutdown systems. The amount of such combustibles that has significance is a judgmental decision. As with

other issues, if the licensee's fire protection engineer is concerned that the quantity of combustibles between shutdown divisions may not be considered insignificant by an independent reviewer, an exemption could be requested, or the staff consulted.

Transient materials are not considered as an intervening combustible; however, they must be considered as part of the overall fire hazard within an area.

Cables that are in cable trays which are either open or fully enclosed should also be considered as intervening combustibles. Cables coated with a fire retardant material are also considered as intervening combustibles.

However, cables coated with a fire retardant material, or cables in cable trays having solid sheet metal bottom, sides and top, if protected by automatic fire detection and suppression systems and if the design is supported by a fire hazards analysis, have been found acceptable under the exemption process.

Only oil in closed containers which are in accordance with NFPA 30 or electrical cables in metal conduits are not considered as intervening combustibles. In-situ oil in open sumps is considered to be an intervening combustible; in-situ oil in closed sumps equivalent to NFPA Standard-30 containers is not considered to be an intervening combustible.

Partial sprinkler coverage must be properly justified and documented.

See Item #5 of the "Interpretations of Appendix R."

"... suppression less than full area coverage may be adequate to comply with the regulation. Where full area suppression and detection is not installed, licensees must perform an evaluation to assess the adequacy and necessity of partial suppression and detection in an area. The evaluation must be performed by a fire protection engineer and, if required, a systems engineer. Although not required, licensees may submit their evaluations to the staff for review and concurrence. In any event, the evaluations must be retained for subsequent NRC audits ... Compliance with Section III.G.2 cannot be based on rooms or zones.

See also Sections #5 and #6 of the "Interpretations of Appendix R."

REF. SOURCES: 10CFR50, Appendix R to 10CFR50, Generic Letter 83-33, ASTM E-84, NFPA 30.

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2.118 BTP CHER 9.5-1, Item C.5.b, Safe Shutdown Capabilities (Cont'd): "(3) If the guidelines of Positions C5.b.1 and C5.b.2 cannot be met, then alternative or dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area, room, or zone under consideration should be provided."

NRC GENERIC LETTER 86-10: "Section III.G.3 of Appendix R provides for "alternative or dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area, room, or zone under consideration. While independence is clearly achieved where alternative shutdown equipment is outside the fire area under consideration, this is not intended to imply that alternative shutdown equipment in the same fire area but independent of the room or the zone cannot result in compliance with the regulation." The "room" concept must be justified by a detailed fire hazards analysis that demonstrates a single fire will not disable both normal shutdown equipment and the alternative shutdown capability.

The control room fire area contains the controls and instrumental redundant shutdown systems in close proximity (i.e., usually separation is a few inches). Because it is possible to provide shutdown capability that is physically and electrically independent of the fire area, it is our opinion that alternative or dedicated shutdown capability and its associated circuits for the control room be independent of the cables system and components in the control room fire area.

The damage to the system in the control room for a fire that causes evacuation of the control room cannot be predicted. A bounding analysis should be made to assure that safe conditions can be maintained from outside the control room. This analysis is dependent on the specific design. The usual assumptions are:

1. The reactor is tripped in the control room.
2. Offsite power is lost as well as automatic starting of the onsite ac generators and the automatic function of valves and pumps whose control circuits could be affected by a control room fire.

The analysis should demonstrate that capability exists to manually achieve safe shutdown conditions from outside the control room by restoring ac power to designated pumps, assuring that valve lineups are correct, and assuming that any malfunctions of valves that permit the loss of reactor coolant can be corrected before unrestorable conditions occur.

Note that the only manual action in the control room prior to evacuation usually given credit for is the reactor trip. For any additional control room actions deemed necessary prior to evacuation, a demonstration of the capability of performing such actions would have to be provided. Additionally, assurance would have to be provided that such actions could not be negated by subsequent spurious actuation signals resulting from the postulated fire.

After the fire, the operators could return to the control room when the following conditions have been met:

1. The fire has been extinguished and so verified by appropriate fire protection personnel.

2. The control room has been deemed habitable by appropriate fire protection personnel and the shift supervisor.
3. Damage has been assessed and, if necessary, corrective action has been taken to assure necessary safety, control and information systems are functional (some operators may assist with these tasks) and the shift supervisor has authorized return of plant control to the control room.
4. Turnover procedures which assure an orderly transfer of control from the alternate shutdown panel to the control room has been completed.

After returning to the control room, the operators can take any actions compatible with the condition of the control room. Controls in any area (cabinet) where the fire occurred would not be available. Smoke and fire suppressant damage in other areas (cabinets) must also be assessed and corrective action taken before controls in such cabinets are deemed functional. Controls in undamaged area (cabinets) could be operated as required. Minor modifications inside the control room may be performed to reach cold shutdown.

Section III.G recognizes that the need for alternate or dedicated shutdown capability may have to be considered on the basis of a fire area, a room or a fire zone. The alternative or dedicated capability should be independent of the fire area where it is possible to do so (see Supplementary Information for the final rule Section III.G). When fire areas are not designated or where it is not possible to have the alternative or dedicated capability independent of the fire area, careful consideration must be given to the selection and location of the alternative or dedicated shutdown capability to assure that the performance requirement set forth in Section III.G.1 is met. Where alternate or dedicated shutdown is provided for a room or zone, the capability must be physically and electrically independent of that room or zone. The vulnerability of the equipment and personnel required at the location of the alternative or dedicated shutdown capability to the environments produced at that location as a result of the fire or fire suppressants must be evaluated. These environments may be due to the hot layer, smoke, drifting suppressants, common ventilation systems, common drain systems or flooding. In addition, other interactions between the locations may be possible in unique configurations.

If alternate shutdown is provided on the basis of rooms or zones, the provision of fire detection and fixed suppression is only required in the room or zone under consideration.

The remote shutdown systems recommended under Chapter 7 of the SRP are needed to meet GDC 19. These remote shutdown systems need to be redundant and physically independent of the control room in order to meet GDC 19. For GDC 19, damage to the control room is not considered. Alternate shutdown systems for Appendix R need not be redundant but must be both physically and electrically independent of the control room.

These statements are meant to indicate that the alternative shutdown capability should be powered from an onsite power system independent (both electrically and physically) from the area under consideration. Further, if the normal emergency onsite power supplies (diesel generators) are not available because of fire damage, then a separate and independent onsite power system shall be provided. As an example, some plants are utilizing a dedicated onsite diesel generator or gas turbine to power instrumentation and control panels which are a part of the alternative shutdown capability.

Existing remote shutdown capabilities previously reviewed and approved under Appendix A to BTP APCSB 9.5-1 do not categorically comply with Section III.G.3 of Appendix R. Licensees were requested to re-analyze their plants to determine compliance with Section III.G. If the licensee chooses to use the option of III.G.3 for provision of safe shutdown capability for certain areas, the criteria of Section III.L are applicable to that capability for that area.

The definitional process mentioned considers an alternative shutdown capability provided under the Appendix A review as a redundant shutdown capability under the Appendix R review. This definitional process is incorrect. For the purpose of analysis to Section III.G.2 criteria, the safe shutdown capability is defined as one of the two normal safe shutdown trains. If the criteria of Section III.G.2 are not met, an alternative shutdown capability is required. The alternative shutdown capability may utilize existing remote shutdown capabilities and must meet the criteria of Sections III.G.3 and III.L of Appendix R.

Although 10 CFR 50.48(b) does not specifically include Section III.L with Sections III.G, J and O of Appendix R as a requirement applicable to all power reactors licensed prior to January 1, 1979, the Appendix, read as a whole, and the Court of Appeals decision on the Appendix, Connecticut Light and Power, et al. v. NRC, 673 F2d. 525 (D.C. Cir., 1982), demonstrate that Section III.L applies to the alternative safe shutdown option under Section III.G if and where that option is chosen by the licensee. This does not preclude licensees from proposing and justifying other methods, e.g., see Section #1, Process Monitoring Instrumentation, of the "Interpretations of Appendix R."

REF. SOURCES: 10CFR50.48, Appendix R to 10CFR50, Chapter 7 of the Standard Review Plan, General Design Criteria 19, Appendix A to BTP APCSB 9.5-1.

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2.119 BTP QMEB 9.5-1, Item C.5, Position (Cont'd): "c. Alternative or Dedicated Shutdown Capability

(1) Alternative or dedicated shutdown capability provided for a specific fire area should be able to achieve and maintain subcritical reactivity conditions in the reactor, maintain reactor coolant inventory, achieve and maintain hot standby\* conditions for a PWR (hot shutdown\* for a BWR) and achieve cold shutdown\* conditions within 72 hours and maintain cold shutdown conditions thereafter. During the post-fire shutdown, the reactor coolant system process

variables shall be maintained within those predicted for a loss of normal ac power, and the fission product boundary integrity shall not be affected; ie, there shall be no fuel clad damage, rupture, or any primary coolant boundary, or rupture of the containment boundary.

\* As defined in the Standard Technical Specifications."

NRC GENERIC LETTER 86-10: "Per the criteria of Section III.L of Appendix R a loss of offsite power shall be assumed for a fire in any fire area concurrent with the following assumptions:

- a. The safe shutdown capability should not be adversely affected by any one spurious actuation or signal resulting from a fire in any plant area; and
- b. The safe shutdown capability should not be adversely affected by a fire in any plant area which results in the loss of all automatic function (signals, logic) from the circuits located in the area in conjunction with one worst case spurious actuation or signal resulting from the fire; and
- c. The safe shutdown capability should not be adversely affected by a fire in any plant area which results in spurious actuation of the redundant valves in any one high-low pressure interface line.

If the system is being used to provide its design function, it generally is considered redundant. If the system is being used in lieu of the preferred system because the redundant components of the preferred system do not meet the separation criteria of Section III.G.2, the system is considered an alternative shutdown capability. Thus, for the example above, it appears that the condensate system is providing alternative shutdown capability in lieu of separating redundant components of the RHR System. Fire detection and a fixed fire suppression system would be required in the area where separation of redundant components of the RHR System is not provided. However, in the event of a turbine building fire, the RHR System would be used for safe shutdown and is not considered an alternative capability. However, one train of the RHR System must be separated from the turbine building."

REF. SOURCE: Appendix R to 10 CFR 50.

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- 2.120 BTP QMB 9.5-1, Item C.5.c, Alternative or Dedicated Shutdown Capability (Cont'd): "(2) The performance goals for the shutdown functions should be:
- (a) The reactivity control function should be capable of achieving and maintaining cold shutdown reactivity conditions.
  - (b) The reactor coolant makeup function should be capable of maintaining the reactor coolant level above the top of the core for BWRs and be within the level indication in the pressurizer for PWRs.

- (c) The reactor heat removal function should be capable of achieving and maintaining decay heat removal.
- (d) The process monitoring function should be capable of providing direct readings of the process variables necessary to perform and control the above functions.
- (e) The supporting functions should be capable of providing the process cooling, lubrication, etc, necessary to permit the operation of the equipment used for safe shutdown functions."

NRC GENERIC LETTER 86-10: "Diagnostic instrumentation is instrumentation, beyond that previously identified in Attachment 1 to I&E Information Notice 84-09, needed to assure proper actuation and functioning of a safe shutdown equipment and support equipment (e.g., flow rate, pump discharge pressure). The diagnostic instrumentation needed depends on the design of the alternative shutdown capability. Diagnostic instrumentation, if needed, will be evaluated during the staff's review of the licensee's proposal for the alternative shutdown capability.

Section III.L.2.d of Appendix R to 10 CFR Part 50 states that "the process monitoring function shall be capable of providing direct readings of the process variables necessary to perform and control" the reactivity control function. In I&E Information Notice 84-09, the staff provides a listing of instrumentation acceptable to and preferred by the staff to demonstrate compliance with this provision. While this guidance provides an acceptable method for compliance with the regulation, it does not exclude other alternative methods of compliance. Accordingly, a licensee may propose to the staff alternative instrumentation to comply with the regulation (e.g., boron concentration indication). While such a submittal is not an exemption request, it must be justified based on a technical evaluation."

REF. SOURCE: Appendix R to 10CFR50.

2.121 BTP CMEB 9.5-1, Item C.5.c, Alternative or Dedicated Shutdown (Cont'd): "(3) The shutdown capability for specific fire areas may be unique for each such area, or it may be one unique combination of systems for all such areas. In either case, the alternative shutdown capability shall be independent of the specific fire area(s) and shall accommodate post-fire conditions where offsite power is available and where offsite power is not available for 72 hours. Procedures shall be in effect to implement this capability."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: Appendix R to 10CFR50.

2.122 BTP CMEB 9.5-1, Item C.5.c., Alternative or Dedicated Shutdown  
(Cont'd): "(4) If the capability to achieve and maintain cold shutdown will not be available because of fire damage, the equipment and systems comprising the means to achieve and maintain the hot standby or hot shutdown condition shall be capable of maintaining such conditions until cold shutdown can be achieved. If such equipment and systems will not be capable of being powered by both onsite and offsite electric power systems because of fire damage, an independent onsite power system shall be provided. The number of operating shift personnel, exclusive of fire brigade members, required to operate such equipment and systems shall be onsite at all times.

NRC GENERIC LETTER 86-10: No additional guidance.

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2.123 BTP CMEB 9.5-1, Item C.5.c., Alternative or Dedicated Shutdown  
(Cont'd): "(5) Equipment and systems comprising the means to achieve and maintain cold shutdown conditions should not be damaged by fire; or the fire damage to such equipment and systems should be limited so that the systems can be made operable and cold shutdown achieved within 72 hours. Materials for such repairs shall be readily available onsite and procedures shall be in effect to implement such repairs. If such equipment and systems used prior to 72 hours after fire will not be capable of being powered by both onsite and offsite electric power systems because of fire damage, an independent onsite power system should be provided. Equipment and systems used after 72 hours may be powered by offsite power only."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: Appendix R to 10CFR50.

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2.124 BTP CMEB 9.5-1, Item C.5.c., Alternative or Dedicated Shutdown  
(Cont'd): "(6) Shutdown systems installed to ensure post-fire shutdown capability need not be designed to meet seismic Category I criteria, single failure criteria, or other design basis accident criteria, except where required for other reasons, e.g., because of interface with or impact on existing safety systems, or because of adverse valve actions due to fire damage."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.125 BTP CMEB 9.5-1, Item C.5.c., Alternative or Dedicated Shutdown  
(Cont'd): "(7) The safe shutdown equipment and systems for each fire area should be known to be isolated from associated circuits in the fire area so that hot shorts, open circuits, or shorts to ground in the associated circuits will not prevent operation of the safe shutdown equipment. The separation and barriers between trays and conduits containing associated circuits of one safe shutdown division and trays and conduits containing associated circuits or safe shutdown cables from the redundant division, or the isolation of these associated circuits from the safe shutdown equipment, should be such that a postulated fire involving associated circuits will not prevent safe shutdown."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.126 BTP CMEB 9.5-1, Item C.5, Position (Cont'd): "d. Control of Combustibles (1) Safety-related systems should be isolated or separated from combustible materials. When this is not possible because of the nature of the safety system of the combustible material, special protection should be provided to prevent a fire from defeating the safety system function. Such protection may involve a combination of automatic fire suppression, and construction capable of withstanding and containing a fire that consumes all combustibles present. Examples of such combustible materials that may not be separable from the remainder of its system are:

- (a) Emergency diesel generator fuel oil day tanks.
- (b) Turbine-generator oil and hydraulic control fluid systems.
- (c) Reactor coolant pump lube oil system."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.127 BTP CMEB 9.5-1, Item C.5.d, Control of Combustibles (Cont'd): "(2) Bulk gas storage (either compressed or cryogenic), should not be permitted inside structure housing safety-related equipment. Storage of flammable gas such as hydrogen should be located outdoors or in separate detached buildings so that a fire or explosion will not adversely affect any safety-related systems or equipment. (Refer to NFPA 50A, "Gaseous Hydrogen Systems.")"

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: NFPA 50A.

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2.128 BTP CMEB 9.5-1, Item C.5.d.2, Control of Combustibles (Cont'd): "Care should be taken to locate high pressure gas storage containers with the long axis parallel to building walls. This will minimize the possibility of wall penetration in the event of a container failure. Use of compressed gases (especially flammable and fuel gases) inside buildings should be controlled. (Refer to NFPA 6, "Industrial Fire Loss Prevention.")"

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: PPM 1.3.10 and 1.3.35.

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2.129 BTP CMEB 9.5-1, Item C.5.d, Control of Combustibles (Cont'd): "(3) The use of plastic materials should be minimized. In particular, halogenated plastics such as polyvinyl chloride (PVC) and neoprene should be used only when substitute noncombustible materials are not available. All plastic materials, including flame and fire retardant materials, will burn with an intensity and smoke production in a range similar to that of ordinary hydrocarbons. When burning, they produce heavy smoke that obscures visibility and can plug air filters, especially charcoal and HEPA. The halogenated plastics also release free chlorine and hydrogen chloride when burning which are toxic to humans and corrosive to equipment."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.130 BTP CMEB 9.5-1, Item C.5.d, Control of Combustibles (Cont'd): "(4) Storage of flammable liquids should, as a minimum, comply with the requirements of NFPA 30, "Flammable and Combustible Liquids Code."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: PPM 1.3.10 and 1.3.35.

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2.131 BTP CMEB 9.5-1, Item C.5.d, Control of Combustibles (Cont'd): "(5) Hydrogen lines in safety-related areas should be either designed to seismic Class I requirements, or sleeved such that the water pipe is directly vented to the outside, or should be equipped with excess flow valves so that in case of a line break, the hydrogen concentration in the affected areas will not exceed 2%."

NRC GENERIC LETTER 86-10: "All PWR's have a hydrogen line going to the Volume Control Tank (Make-up Tank) that needs to be protected."

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2.132 BTP CMEB 9.5-1, Item C.5, Position (Cont'd): "c. Electrical Cable Construction, Cable Trays, and Cable Penetrations

1) Only metal should be used for cable trays. Only metallic tubing should be used for conduit. Thin-wall metallic tubing should not be used. Flexible metallic tubing should only be used in short lengths to connect components to equipment. Other raceways should be made of noncombustible material."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.133 BTP CMEB 9.5-1, Item C.5.e, Electrical Cable Construction, Cable Trays and Cable Penetrations (Cont'd): "(2) Redundant safety-related cable systems outside the cable spreading room should be separated from each other and from potential fire exposure hazards in nonsafety-related areas by fire

barriers with a minimum fire rating of 3 hours. These cable trays should be provided with continuous line-type heat detectors and should be accessible for manual fire fighting. Cables should be designed to allow wetting down with fire suppression water without electrical faulting. Manual hose stations and portable hand extinguishers should be provided."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.134 BTP CMEB 9.5-1, Item C.5.e.2, Electrical Cable Construction, Cable Trays and Cable Penetration (Cont'd): " Safety-related cable trays of a single division that are separated from redundant divisions by a fire barrier with a minimum rating of 3 hours and are normally accessible for manual firefighting should be protected from the effects of a potential exposure fire by providing automatic water suppression in the area where such a fire could occur. Automatic area protection, where provided, should consider cable tray arrangements and possible transient combustibles to ensure adequate water coverage for areas that could present an exposure hazard to the cable system."

NRC GENERIC LETTER 86-10: "In general cable tray supports should be protected, regardless of whether there is a sprinkler system. However, they need not be protected if (1) the qualification tests were performed on wrapped cable trays with unprotected supports, and the supports are shown to be adequate, or (2) an analysis is performed, which takes into account the fire loading and automatic suppression available in the area, and which demonstrates that the unprotected support(s) will not fail and cause a loss of the cable tray fire barrier required for the postulated fire. An exemption is not required; however, the qualification tests and applicability or the structural evaluation should be documented and available for audit."

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2.135 BTP CMEB 9.5-1, Item C.5.e.2, Electrical Cable Construction, Cable Trays and Cable Penetrations (Cont'd): " Manual hose standpipe system may be relied upon to provide the primary fire suppression (in lieu of automatic water suppression systems) for safety-related cable trays of a single division that are separated from redundant safety divisions by a fire barrier with a minimum rating of 3 hours and are normally accessible for manual fire fighting if all of the following conditions are met:

- (a) The number of equivalent\* standard 24-inch wide cable trays (both safety-related and nonsafety-related) in a given fire area is six or less;
- (b) The cabling does not provide instrumentation, control or power to systems required to achieve and maintain hot shutdown; and

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\* Trays exceeding 24 in. should be counted as two trays; trays exceeding 48 in. should be counted as three trays, regardless of tray fill.

(c) Smoke detectors are provided in the area of these cable routings, and continuous line-type heat detectors are provided in the cable trays.

NRC GENERIC LETTER 86-10: No additional guidance.

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2.136 BTP CNEB 9.5-1, Item C.5.e.2, Electrical Cable Construction, Cable Trays and Cable Penetrations (Cont'd): "Safety-related cable trays that are not accessible for manual fire fighting should be protected by a zoned automatic water system with open-head deluge or open directional spray nozzles arranged so that adequate water coverage is provided for each cable tray. Such cable trays should also be protected from the effects of a potential exposure fire by providing automatic water suppression in the area where such a fire could occur."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.137 BTP CNEB 9.5-1, Item C.5.e.2, Electrical Cable Construction, Cable Trays and Cable Penetrations (Cont'd): "In other areas where it may not be possible because of other overriding design features necessary for reasons of nuclear safety to separate redundant safety-related cable systems by 3-hour rated fire barriers, cable trays should be protected by an automatic water system with open-head deluge or open directional spray nozzles arranged so that adequate water coverage is provided for each cable tray. Such cable trays should also be protected from the effects of a potential exposure fire by providing automatic water suppression in the area where such a fire could occur. The capability to achieve and maintain safe shutdown considering the effects of a fire involving fixed and potential transient combustibles should be evaluated with and without actuation of the automatic suppression system and should be justified on a suitably defined basis."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.138 BTP CNEB 9.5-1, Item C.5.e.2, Electrical Cable Construction, Cable Trays and Cable Penetrations (Cont'd): "(3) Electric cable construction should, as a minimum, pass the flame test in the current IEEE Std 383. (This does not imply that cables passing this test will not require fire protection.)"

NRC GENERIC LETTER 86-10: No additional guidance.

REF SOURCE: IEEE Standard 383.

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2.139 BTP APCSB 9.5-1, NRC Regulatory Guide 1.75: "Electrical cables should be in accordance with Regulatory Guide 1.75."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: BTP APCSB 9.5-1, NRC Regulatory Guide 1.75

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2.140 BTP CMEB 9.5-1, Item C.5.e.2, Electrical Cable Construction, Cable Trays and Cable Penetrations (Cont'd): "(4) Cable raceways should be used only for cables."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.141 BTP CMEB 9.5-1, Item C.5.e.2, Electrical Cable Construction, Cable Trays and Cable Penetrations (Cont'd): "(5) Miscellaneous storage and piping for flammable or combustible liquids or gases should not create a potential exposure hazard to safety-related systems."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.142 BTP CMEB 9.5-1, Item C.5, Position (Cont'd): "f. Ventilation (1) The products of combustion and the means by which they will be removed from each fire area should be established during the initial stages of plant design. Consideration should be given to the installation of automatic suppression systems as a means of limiting smoke and end heat generation. Smoke and corrosive gases should generally be discharged directly outside to an area that will not affect safety-related plant areas. The normal plant ventilation system may be used for this purpose if capable and available. To facilitate manual fire fighting, separate smoke and heat vents should be provided in specific areas such as cable spreading rooms, diesel fuel oil storage areas, switchgear rooms, and other areas where the potential exists for heavy smoke conditions (see NFPA 204 for additional guidance on smoke control)."

NRC GENERIC LETTER 86-10: No additional guidance.

REF SOURCE: NFPA 204.

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2.143 BTP CMEB 9.5-1, Item C.5.f, Ventilation (Cont'd): "(2) Release of smoke and gases containing radioactive materials to the environment should be monitored in accordance with emergency plans as described in the guidelines of Regulatory Guide 1.101, "Emergency Planning for Nuclear Power Plants." Any ventilation system designed to exhaust potentially radioactive smoke or gases should be evaluated to ensure that inadvertent operation or single failures will not violate the radiologically controlled areas of the plant design."

This requirement includes containment functions for protecting the public and maintaining habitability for operations personnel."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: Regulatory Guide 1.101.

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2.144 BTP QMB 9.5-1, Item C.5.f, Ventilation (Cont'd): "(3) Special protection for ventilation power and control cables may be required. The power supply and controls for mechanical ventilation systems should be run outside the fire area served by the system where practical."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.145 BTP QMB 9.5-1, Item C.5.f, Ventilation (Cont'd): "(4) Engineered safety feature filters should be protected in accordance with the guidelines of Regulatory Guide 1.52. Any filter that includes combustible materials and is a potential exposure fire hazard that may affect safety-related components should be protected as determined by the fire hazards analysis."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: Regulatory Guide 1.52.

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2.146 BTP QMB 9.5-1, Item C.5.f, Ventilation (Cont'd): "(5) The fresh air supply intakes to areas containing safety-related equipment or systems should be located remote from the exhaust air outlets and smoke vents of other fire areas to minimize the possibility of contaminating the intake air with the products of combustion."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.147 BTP QMB 9.5-1, Item C.5.f, Ventilation (Cont'd): "(6) Stairwells should be designed to minimize smoke infiltration during a fire."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.148 BTP QMB 9.5-1, Item C.5.f, Ventilation (Cont'd): "(7) Where total flooding gas extinguishing systems are used, area intake and exhaust ventilation dampers should be controlled in accordance with NFPA 12, "Carbon Dioxide Systems," and NFPA 12A, "Halon 1301 Systems," to maintain the necessary gas concentration.

NRC GENERIC LETTER 86-10: No additional guidance

REF. SOURCES: NFPA 12, NFPA 12A.

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2.149 Filters: All filters shall be UL Class I except as follows:

HEPA Filters shall be in compliance with the requirements of UL 586 as accepted by ANSI/ASME 509. The UL seal certifying compliance with the requirements of UL-586 should be acceptable evidence that the filters meet fire and hot air resistance requirements.

NRC GENERIC LETTER 86-10 - No Additional Guidance

REF. SOURCES: UL 586, ANSI/ASME 509.

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2.150 Charcoal Filters: All charcoal filters shall be gasketless type. Safety related units (except control room units), which may be provided with airflow bleed systems to remove decay heat so that charcoal is kept well below ignition temperature of 644°F.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: Regulatory Guide 1.52

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2.151 Charcoal Filters: High adsorber temperature instrumentation using thermistor cable shall be provided in each charcoal bed arranged to sound alarms in the control room at two temperature settings below charcoal ignition temperature. Isolation valves are provided for shield buildings ECCS units to isolate manually in case of fire.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: Regulatory Guide 1.52

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2.152 Filters: Roll-o-mat Filters may be UL Class 2, as they are only available as UL Class 2, because of entrapment material on the media to enhance filter efficiency.

Fixed manual Water Spray Systems shall be provided for the nonsafety related charcoal filters located in the Reactor and Reactor Auxiliary Buildings, by installation of a hose coupling on each filter housing, which will bring the water supply manually from an adjacent hose station.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: ANI File No. N-219, Ebasco, UL (Underwriter's Laboratory)

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2.153 Smoke and Heat Vent: Provisions for smoke and heat vent or power venting should be provided for each building.

NRC GENERIC LETTER 86-10: No additional guidance

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2.154 BTP CMEB 9.5-1, Item C.5, Position (Cont'd): "g.  
Lighting and Communication - Lighting and two-way voice communication are vital to safe shutdown and emergency response in the event of fire."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.155 BTP CMEB 9.5-1, Item C.5.f, Lighting and Communication (Cont'd):  
"Suitable fixed and portable emergency lighting and communication offices should be provided as follows:

- (1) Fixed self-contained lighting consisting of fluorescent or sealed-beam units with individual 8-hour minimum battery power supplies should be provided in areas that must be manned for safe shutdown and for access and egress routes to and from all fire areas. Safe shutdown areas include those required to be manned if the control room must be evacuated."

NRC GENERIC LETTER 86-10: "The level of illumination provided by emergency lighting in access routes to and in areas where shutdown functions must be performed is a level that is sufficient to enable an operator to reach that area and perform the shutdown functions. At the remote shutdown panels the illumination levels should be sufficient for control panel operators.

The bases for estimating these levels of lighting are the guidelines contained in Section 9.5.3 of the Standard Review Plan, which are based on industry standards (i.e., Illuminating Engineering Society Handbook).

Where a licensee has provided emergency lighting per Section III.J Appendix R, we would expect that the licensee verify by field testing that this lighting is adequate to perform the intended tasks."

REF. SOURCE: Appendix R to 10CFR50.

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2.156 BTP CMEB 9.5-1, Item C.5.g, Lighting and Communication (Cont'd): "(2) Suitable sealed-beam battery-powered portable hand lights should be provided for emergency use by the fire brigade and other operations personnel required to achieve safe plant shutdown."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.157 BTP CMEB 9.5-1, Item C.5.g, Lighting and Communications (Cont'd): "(3) Fixed emergency communications independent of the normal plant communication system should be installed at preselected stations."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.158 BTP CMEB 9.5-1, Item C.5.g, (Cont'd): "(4) A portable radio communications system should be provided for use by the fire brigade and other operations personnel required to achieve safe plant shutdown. This system should not interfere with the communications capabilities of the plant security force. Fixed repeaters installed to permit use of portable radio communication units should be protected from exposure fire damage. Praoperational and periodic testing should demonstrate that the frequencies used for portable radio communication will not affect the actuation of protective relays."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.159 BTP CMEB 9.5-1, Item C, Position (Cont'd): "6. Fire Detection and Suppression

a. Fire Detection

"(1) Detection systems should be provided for all areas that contain or present a fire exposure to safety-related equipment."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA-13, NFPA-72E, NFPA-70, NFPA-90A.

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2.160 BTP CMEB 9.5-1, Item C.6.a, Fire Detection (Cont'd): "(2) Fire detection systems should comply with the requirements of Class A systems as defined in NFPA 72D, "Standard for the Installation, Maintenance, and Use of Proprietary Protective Signaling Systems," and Class I circuits as defined in NFPA 70, "National Electrical Code."

NRC GENERIC LETTER 86-10: No additional guidance

REF. SOURCES: Same as Item 2.159 above.

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2.161 BTP CMB 9.5-1, Item C.6.a, Fire Detection (Cont'd): "(3) Fire detectors should be selected and installed in accordance with NFPA 72E, "Automatic Fire Detectors." Preoperational and periodic testing of pulsed line-type heat detectors should demonstrate that the frequencies used will not affect the actuation of protective relays in other plant systems."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: Same as Item 2.159 above.

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2.162 BTP CMB 9.5-1, Item C.6.a, Fire Detection (Cont'd): "(4) Fire detection systems should give audible and visual alarm and annunciation in the control room. Where zoned detection systems are used in a given fire area, local means should be provided to identify which detector zone has actuated. Local audible alarms should sound in the fire area."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: Same as Item 2.159 above.

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2.163 BTP CMB 9.5-1, Item C.6.a, Fire Detection (Cont'd): "(5) Fire alarms should be distinctive and unique so they will not be confused with any other plant system alarms."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: Same as Item 2.159 above.

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2.164 BTP CMB 9.5-1, Item C.6.a, Fire Detection (Cont'd): "(6) Primary and secondary power supplies should be provided for the fire detection system and for electrically operated control valves for automatic suppression systems. Such primary and secondary power supplies should satisfy provisions of Section 2220 of NFPA 72D. This can be accomplished by using normal offsite power as the primary supply with a 4-hour battery supply as secondary supply; and by providing capability for manual connection to the Class 1E emergency power bus within 4 hours of loss of offsite power. Such connection should follow the applicable guidelines in Regulatory Guides 1.6, 1.32, and 1.75."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA-72D.

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2.165 Each Local Control Panel (LCP) should display local alarm, trouble, normal and actuation lights. A fire condition sensed by a detector, energizes a zone light on the LCP, initiates an audible alarm at the fire zone, and any automatic action for fire suppression system. The condition shall be indicated on the MFCP.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA - 72D.

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2.166 "Manual Fire Alarm Stations should be provided throughout the plant and are readily accessible for employee use in signaling a fire condition. In addition to initiating a fire alert, designated manual fire alarm stations may be used to actuate water flow to associated sprinkler or water spray systems."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA - 72A, NFPA - 72D.

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2.167 BTP CMEB 9.5-1, Item C.6.b, Fire Protection Water Supply System  
"(1) An underground yard fire main loop should be installed to furnish anticipated water requirements. NFPA 24, "Standard for Outside Protection," gives necessary guidance for such installation. It references other design codes and standards developed by such organizations as the American National Standards Institute (ANSI) and the American Water Works Association (AWWA). Type of pipe and water treatment should be design considerations with tuberculation as one of the parameters. Means for inspecting and flushing the systems should be provided."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA-24, NFPA-26, NFPA-72D.

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2.168 BTP CMEB 9.5-1, Item C.6.b, Fire Protection Water Supply (Cont'd):  
"(2) Approved visually indicating sectional control valves such as post-indicator valves should be provided to isolate portions of the main for maintenance or repair without shutting off the supply to primary and backup fire suppression systems serving areas that contain or expose safety-related equipment."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.169 BTP CMEB 9.5-1, Item C.6.b, Fire Protection Water Supply (Cont'd):  
"(3) Valves should be installed to permit isolation of outside hydrants from the fire main for maintenance or repair without interrupting the water supply to automatic or manual fire suppression systems in any area containing or presenting a fire hazard to safety-related or safe shutdown equipment."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: NFPA-24.

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2.170 BTP CMEB 9.5-1, Item C.6.b, Fire Protection Water Supply (Cont'd):  
"(4) The fire main system piping should be separate from service or sanitary water system piping, except as described in Position C.5.c.(4)."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: NFPA-24.

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2.171 BTP CMEB 9.5-1, Item C.6.b, Fire Protection Water Supply System (Cont'd): "(5) A common yard fire main loop may serve multi-unit nuclear power plant sites if cross-connected between units. Sectional control valves should permit maintaining independence of the individual loop around each unit. For such installation, common water supplies may also be utilized. For multiple-reactor sites with widely separated plants (approaching 1 mile or more), separate yard fire main loops should be used."

NRC GENERIC LETTER 86-10: No additional guidance

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2.172 BTP CMEB 9.5-1, Item - C.6.b, Fire Protection Water Supply System (Cont'd): "(6) If pumps are required to meet system pressure or flow requirements, a sufficient number of pumps should be provided to ensure that 100% capacity will be available assuming failure of the largest pump or loss of offsite power (eg; three 50% pumps or two 100% pumps). This can be accomplished, for example, by providing either: (a) Electric motor-driven fire pump(s) and diesel-driven fire pump(s); or (b) Two or more seismic Category II Class 1E electric motor-driven fire pumps connected to redundant Class 1E emergency power buses (see Regulatory Guides 1.6, 1.32, and 1.75)."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA-24, NFPA-20.

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2.173 BTP CMEB 9.5-1, Item C.6.b, Fire Protection Water Supply (Cont'd):  
"Individual fire pump connections to the yard fire main loop should be separated with sectionalizing valves between connections. Each pump and its driver and controls should be located in a room separated from the remaining fire pumps by a fire wall with a minimum rating of 3 hours. The fuel for the diesel fire pump(s) should be separated so that it does not provide a fire source exposing safety-related equipment. Alarms indicating pump running, driver availability, failure to start, and low fire-main pressure should be provided in the control room."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA-24, NFPA-20.

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2.174 BTP CMEB 9.5-1, Item C.6.b, Fire Protection Water Supply (Cont'd)  
"The fire pump installation should conform to NFPA 20, "Standard for the Installation of Centrifugal Fire Pumps."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA-24, NFPA-20.

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2.175 Pumps should start automatically on progressive drops in fire main water pressure as follows: 1. The motor driven fire pump starts automatically when the pressure in the fire loop drops to approximately 105 psig, 2. If the pressure continues to drop, at 95 psig the diesel driven fire pump start automatically.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: Supply System Engineering

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2.176 Both pumps should be stopped manually at the pumphouse.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: NFPA - 20

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2.177 Pressure relief valves shall be located on the fire pump discharge.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: NFPA -20

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2.178 A fire pump test discharge header may be provided of adequate capacity to accommodate initial acceptance flow and periodic performance tests.

NRC GENERIC LETTER 86-10: No additional guidance.

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2.179 Power for the electric motor driven fire pump should be supplied from 6190 V power center, supplied from a switchgear.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: Supply System Engineering

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2.180 The discharge of flow test water should be sent back to the fire water storage tanks.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: Good Engineering Practice

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2.181 Water discharged from the pressure relief valves on the fire pumps and jockey pumps may be returned to the fire water storage tanks.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: Good Engineering Practice

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2.182 BTP QMER 9.5-1, Item C.6.b, Fire Protection Water Supply (Cont'd):  
"(7) Outside manual hose installation should be sufficient to provide an effective hose stream to any onsite location where fixed or transient combustibles could jeopardize safety-related equipment. Hydrants should be installed approximately every 250 ft on the yard main system. A hose house equipped with hose and combination nozzle and other auxiliary equipment recommended in NFPA 24, "Outside Protection," should be provided as needed, but at least every 1,000 ft. Alternatively, mobile means of providing hose and associated equipment, such as hose carts or trucks, may be used. When provided, such mobile equipment should be equivalent to the equipment supplied by three hose houses."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.183 Fire hydrants should be non-freeze type. Hose houses should be installed adjacent to each hydrant.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: NFPA - 24

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2.184 BTP CMEB 9.5-1, Item C.6.b, Fire Protection Water Supply (Cont'd):  
"(8) Threads compatible with those used by local fire departments should be provided on all hydrants, hose couplings, and standpipe risers."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.185 BTP CMEB 9.5-1, Item C.6.b, Fire Protection Water Supply (Cont'd):  
"(9) Two separate, reliable freshwater supplies should be provided. Saltwater or brackish water should not be used unless all fresh-water supplies have been exhausted. If tanks are used, two 100% (minimum of 300,000 gallons each) system capacity tanks should be installed. They should be so interconnected that pumps can take suction from either or both. However, a failure in one tank or its piping should not cause both tanks to drain. Water supply capacity should be capable of refilling either tank in 8 hours or less."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA-22.

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2.186 BTP CMEB 9.5-1, Item C.6.b, Fire Protection Water Supply (Cont'd):  
"(10) Common tanks are permitted for fire and sanitary or service water storage. When this is done, however, minimum fire water storage requirements should be dedicated by passive means, for example, use of a vertical standpipe for other water services. Administrative controls, including locks for tank outlet valves are unacceptable as the only means to ensure minimum water volume."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.187 BTP CMEB 9.5-1, Item C.6.b, Fire Protection Water Supply (Cont'd):  
"(11) The fire water supply should be calculated on the basis of the largest expected flow rate for a period of 2 hours, but not less than 300,000 gallons. This flow rate should be based (conservatively) on 500 gpm for manual hose streams plus the largest design demand of any sprinkler or deluge system as determined in accordance with NFPA 13 or NFPA 15. The fire water supply should be capable of delivering this design demand over the longest route of the water supply system."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.188 BTP CMEB 9.5-1, Item C.6.b, Fire Protection Water Supply (Cont'd):

"(12) Freshwater lakes or ponds of sufficient size may qualify as sole source of water for fire protection but require separate redundant suction in one or more intake structures. These supplies should be separated so that a failure of one supply will not result in a failure of the other supply."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.189 BTP CMEB 9.5-1, Item C.6.b, Fire Protection Water Supply (Cont'd):

"(13) When a common water supply is permitted for fire protection and the ultimate heat sink, the following conditions should also be satisfied:

(a) The additional fire protection water requirements are designed into the total storage capacity, and (b) Failure of the fire protection system should not degrade the function of the ultimate heat sink."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.190 BTP CMEB 9.5-1, Item C.6.b, Fire Protection Water Supply (Cont'd):

"(14) Other water systems that may be used as one of the two fire water supplies should be permanently connected to the fire main system and should be capable of automatic alignment to the fire main system. Pumps, controls and power supplies in these systems should satisfy the requirements for the main fire pumps. The use of other water systems for fire protection should not be incompatible with their functions required for safe plant shutdown. Failure of the other system should not degrade the fire main system."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.191 BTP CMEB 9.5-1, Item C.6.c, Water Sprinkler and Hose Systems:

"(1) Sprinkler systems and manual hose station standpipes should have connections to the plant underground water main so that a single active failure or a crack in a moderate-energy line cannot impair both the primary and backup fire suppression systems. Alternatively, headers fed from each end are permitted inside buildings to supply both sprinkler and standpipe systems, provided steel piping and fittings meeting the requirements of ANSI B31.1, "Power Piping," are used for the headers up to and including the first valve supplying the sprinkler systems where such headers are part of the seismically analyzed hose standpipe system. When provided, such headers are considered an extension of the yard main system. Each sprinkler and standpipe system should be equipped with OS&Y (outside screw and yoke) gate valve or other approved

shutoff valve and waterflow alarm. Safety-related equipment that does not itself require sprinkler water fire protection but is subject to unacceptable damage if wet by sprinkler water discharge should be protected by water shields or baffles."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA-13, NFPA-14, NFPA-15.

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2.192 BTP CMEB 9.5-1, Item C.6.c, Water Sprinkler and Hose Systems (Cont'd): "(2) Control and sectionalizing valves in the fire water systems should be electrically supervised or administratively controlled. The electrical supervision signal should indicate in the control room. All valves in the fire protection system should be periodically checked to verify position (see NFPA 26, "Supervision of Valves")."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.193 BTP CMEB 9.5-1, Item C.6.c, Water Sprinkler and Hose Systems (Con'd): "(3) Fixed water extinguishing systems should conform to requirements of appropriate standards such as NFPA 13, "Standard for the Installation of Sprinkler Systems," and NFPA 15, "Standard for Water Spray Fixed Systems."

NRC GENERIC LETTER 86-10: Chapter 4 of NFPA-13 provides guidance as to the location of sprinkler heads in relation to common obstructions. In general, to achieve complete area-wide coverage, sprinklers should be located at the ceiling, with additional sprinklers provided below significant obstructions such as wide HVAC ducts and "shielded" or solid bottom stacked cable trays. To the extent that an existing or proposed sprinkler system design deviates from this concept, the design would have to be justified by a fire hazards analysis. See also Section #5 of the "Interpretations of Appendix R.

Individual plant areas are diverse in nature. The designer should determine the particular water density or occupancy classification. Those areas which contain a limited quantity of in-situ and anticipated transient combustibles and which feature contents such as tanks and piping, may be considered as "Ordinary Hazard (Group 1)," as defined by NFPA Standard No. 13. For those areas containing large amounts of cables or flammable liquids, an occupancy classification of "Extra Hazard" may be warranted. The decision as to which classification should be applied should be made by a qualified fire protection engineer.

Once the occupancy classification is determined, the minimum water density should be based on the Density Curves in Table 2.2.1(B) of NFPA 13. Any density equal to or in excess of the curves would be in conformance with our guidelines as delineated in Section C.6.c of BTP CMEB 9.5-1.

Sprinkler heads should be located at the ceiling. Sprinkler heads at other locations may be necessary depending upon the hazard and the cumulative effect of the obstruccharge of water from the sprinkler head. The sprinkler system design should meet NFPA 13.

Suppression systems installed in connection with Appendix A may or may not have to be extended as a result of III.G. The licensee must analyze each area where suppression is required by III.G, and where only partial suppression has been provided, determine if the coverage is adequate for the fire hazard in the area. The licensee may consult with the staff during this review. In any event, the Appendix R analysis showing that the suppression provided is adequate must be retained and available for NRC audit. See also Section #5 of the "Interpretatons of Appendix R."

Section III.G.2 requires an automatic suppression system. Our guidelines would recommend that the system be in accordance with an NFPA Code. If deviations are made from the Code, they should be identified in the FSAR or FHA.

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2.194 Wet Type Sprinkler Systems should be one step automatic fire suppression systems supplied through piping systems charged with water. Each system should consist of an alarm check valve, piping and fusible link sprinkler heads. Water will be discharged on the fire upon melting of fusible links.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: NFPA - 13.

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2.195 Preaction Sprinkler Systems should be two step automatic fire suppression systems containing air under a supervisory pressure of 10-15 psi downstream from the preaction valve. Each system should consist of a pre-action valve, a fire detection system, piping and fusible link sprinkler heads. When a detector senses fire, the pre-action valve shall be actuated and water shall flow into the piping system. Water shall be discharged on the fire upon melting of fusible links.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: NFPA - 13.

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2.196 Multicycle Sprinkler Systems shall be pre-action systems modified so that the water flow control valve shall shut off automatically when the fire is extinguished and shall reopen by the automatic fire detection system if the fire redevelops. Each multicycle sprinkler system shall be hydraulically designed.

In the event of damage to the detection circuit, the sprinkler system shall be capable of being switched to low-pressure air system operation mode, maintaining the protection, alarms and supervision of this sprinkler system.

When controlled by the fire detection system, the multicycle system shall automatically cycle "on" whenever any detector senses heat or "off" after all the detectors in the detection system sense that the temperature has decreased below their actuation point.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA - 13, NFPA - 15. Does not apply to WNP-2.

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2.197 Water Spray Systems shall consist of open water spray heads supplied through hydraulically designed piping systems, with water flow controlled by a deluge valve actuated either automatically or manually.

Water spray system shall be actuated automatically by the operation of the thermal fire detection system installed in the same area of coverage as the spray heads. When the detection system senses fire, the deluge valve shall open and the water shall flow into the piping system.

NRC GENERIC LETTER 86-10: No additional guidance

REF. SOURCE: NFPA - 15.

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2.198 BTP CMEB 9.5-1, Item C.6.c, Water Sprinkler and Hose Systems (Cont'd): "(4) Interior manual hose installation should be able to reach any location that contains, or could present a fire exposure hazard to, safety-related equipment with at least one effective hose stream. To accomplish this, standpipes with hose connections equipped with a maximum of 100 ft of 1-1/2 in. woven jacket, lined fire hose and suitable nozzles should be provided in all buildings on all floors. Individual standpipes should be at least 4 in. in diameter for multiple hose connections and 2-1/2 in. in diameter for single hose connections. These systems should follow the requirements of NFPA 14, "Standpipe and Hose Systems," for sizing, spacing, and pipe support requirements."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: NFPA-14.

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2.199 BTP CMEB 9.5-1, Item C.6.c, Water Sprinkler and Hose Stations (Cont'd): "(4) Hose stations should be located as dictated by the fire hazard analysis to facilitate access and use for fire fighting operations. Alternative hose stations should be provided for an area if the fire hazard could block access to a single hose station serving that area."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.200 BTP CMEB 9.5-1, Item C.6.c, Water Sprinkler and Hose Stations (Cont'd):

"(4) Provisions should be made to supply water at least to standpipes and hose connections for manual fire fighting in areas containing equipment required for safe plant shutdown in the event of a safe shutdown earthquake. The piping system serving such hose stations should be analyzed for SSE loading and should be provided with supports to ensure system pressure integrity. The piping and valves for the portion of hose standpipe system affected by this functional requirement should, as a minimum, satisfy ANSI B31.1, "Power Piping." The water supply for this condition may be obtained by manual operator actuation of valves in a connection to the hose standpipe header from a normal Seismic Category I water system such as the essential service water system. The cross connection should be (a) capable of providing flow to at least two hose stations (approximately 75 gpm per hose station) and (b) designed to the same standards as the Seismic Category I water system; it should not degrade the performance of the Seismic Category I water system."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: ANSI B31.1 "Power Piping", SSE Loading ASME Section VIII.  
Does not apply to WNP-2.

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2.201 BTP CMEB 9.5-1, Item C.6.c, Water Sprinkler and Hose Stations (Cont'd):

"(5) The proper type of hose nozzle to be supplied to each area should be based on the fire hazard analysis. The usual combination spray/straight-stream nozzle should not be used in areas where the straight stream can cause unacceptable mechanical damage. Fixed fog nozzles should be provided at locations where high-voltage shock hazards exist. All hose nozzles should have shutoff capability. (Guidance on safe distances for water application to live electrical equipment may be found in the "NFPA Fire Protection Handbook.")"

NRC GENERIC LETTER 86-10: No additional guidance.

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2.202 BTP CMEB 9.5-1, Item C.6.c, Water Sprinkler and Hose Stations (Cont'd):

"(6) Fire hose should be hydrostatically tested in accordance with the recommendations of NFPA 1962, "Fire Hose - Care, Use, Maintenance." Hose stored in outside hose houses should be tested annually. Interior standpipe hose should be tested every 3 years."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.203 BTP CMEB 9.5-1, Item C.6.c, Water Sprinkler and Hose Stations (Cont'd):

"(7) Certain fires, such as those involving flammable liquids, respond well to foam suppression. Consideration should be given to use of mechanical low-expansion foam systems, high-expansion foam generators, or aqueous film-forming foam (AFFF) systems, including the AFFF deluge system. These systems should comply with the requirements of NFPA 11, NFPA 11A, NFPA 11B, and NFPA 16, as applicable."

NRC GENERIC LETTER 86-10: No additional guidance.

2.204 Hose connections with 50 ft of 1-1/2" fire hose and adjustable nozzles should be located at approximately 100 ft intervals.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: NFPA - 14.

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2.205 Hose stations throughout the plant should be designed in accordance with NFPA - 14, Class 2, provided at approximately 100 foot spacing.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: NFPA - 14.

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2.206 Individual standpipe shall be 2-1/2, 3 or 4 in. diameter for multiple hose connections.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: Supply System Engineering.

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2.207 Hydraulic Calculations per NFPA-13 and 15 shall verify that 3 and 2-1/2 in. standpipes deliver adequate flows and pressures.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA-13, NFPA-15.

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2.208 BTP CHB 9.5-1, Item C.6, Fire Detection and Suppression (Cont'd):  
"d. Halon Suppression Systems

Halon fire extinguishing systems should comply with the requirements of NFPA 12A and NFPA 12B, "Halogenated Fire Extinguishing Agent Systems - Halon 1301 and Halon 1211." Only UL-listed or FM-approved agents should be used. Provisions for locally disarming automatic Halon systems should be key locked and under strict administrative control. Automatic Halon extinguishing systems should not be disarmed unless controls as described in Position C.2.c. are provided."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA-12A, UL, FM.

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2.209 BTP CMEB 9.5-1, Item C.6.d, Halon Suppression System (Cont'd): "In addition to the guidelines of NFPA 12A and 12B, preventive maintenance and testing of the systems, including check-weighing of the Halon cylinders, should be done at least quarterly."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: NFPA-12A.

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2.210 BTP CMEB 9.5-1, Item C.6.d, Halon Suppression Systems (Cont'd): "Particular consideration should also be given to: (1) Minimum required Halon concentration, distribution, soak time, and ventilation control; (2) Toxicity of Halon; (3) Toxicity and corrosive characteristics of the thermal decomposition products of Halon; and (4) Location and selection of the activating detectors."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.211 BTP CMEB 9.5-1, Item C.6, Fire Detection and Suppression (Cont'd):

"e. Carbon Dioxide Suppression Systems

Carbon dioxide extinguishing systems should comply with the requirements of NFPA 12, "Carbon Dioxide Extinguishing Systems." Where automatic carbon dioxide systems are used, they should be equipped with a predischage alarm system and a discharge delay to permit personnel egress. Provisions for locally disarming automatic carbon dioxide systems should be key locked and under strict administrative control. Automatic carbon dioxide extinguishing systems should not be disarmed unless controls as described in Position C.2.c. are provided."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.212 BTP CMEB 9.5-1, Item C.6.e, Carbon Dioxide Suppression Systems (Cont'd): "Particular consideration should also be given to: (1) Minimum required CO<sub>2</sub> concentration, distribution, soak time, and ventilation control; (2) Anoxia and toxicity of CO<sub>2</sub>; (3) Possibility of secondary thermal shock (cooling) damage; (4) Conflicting requirements for venting during CO<sub>2</sub> injection to prevent overpressurization versus sealing to prevent loss of agent; and (5) Location and selection of the activating detectors."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: NFPA-12.

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2.213 BTP CMEB 9.5-1, Item C.6,

"f. Portable Extinguishers"

Fire extinguishers should be provided in areas that contain, or could present a fire exposure hazard to, safety-related equipment in accordance with guidelines of NFPA 10, "Portable Fire Extinguishers, Installation, Maintenance and Use." Dry chemical extinguishers should be installed with due consideration given to possible adverse effects on safety-related equipment installed in the area."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA-10, Regulatory Guide 1.78, Use of Extinguishing Agents in Habitable Areas.

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2.214 BTP CMEB 9.5-1, Item C, Position (Cont'd): "7. Guidelines for Specific Plant Areas"

a. Primary and Secondary Containment

(1) Normal Operation - Fire protection requirements for the primary and secondary containment areas should be provided for hazards identified by the fire hazards analysis."

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2.215 BTP CMEB 9.5-1, Item C.7.a, Primary and Secondary Containment (Cont'd): "Examples of such hazards include lubricating oil or hydraulic fluid system for the primary coolant pumps, cable tray arrangements and cable penetrations, and charcoal filters. Because of the general inaccessibility of primary containment during normal plant operation, protection should be provided by automatic fixed systems. The effects of postulated fires within the primary containment should be evaluated to ensure that the integrity of the primary coolant system and the containment is not jeopardized assuming no action is taken to fight the fire."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.216 BTP CMEB 9.5-1, Item C.7.a, Primary and Secondary Containment (Cont'd): "(a) Operation of the fire protection systems should not compromise the integrity of the containment or other safety-related systems. Fire protection activities in the containment areas should function in conjunction with total containment requirements such as ventilation and control of contaminated liquid and gaseous release."

NRC GENERIC LETTER 86-10: No additional guidance.

2.217 BTP CMEB 9.5-1, Item C.7.a, Primary and Secondary Containment (Cont'd): "(b) Inside noninerted containment one of the fire protection means stated in Positions C.5.b.1 and C.5.b.2 or the following fire protection means should be provided: separation of cables and equipment and associated nonsafety circuits of redundant trains by a noncombustible radiant energy shield having a minimum fire rating of one-half hour."

NRC GENERIC LETTER 86-10: "Inside some containments, there are large concentrations of cables converging at electrical penetration areas. In some cases, where the penetrations were grouped by division, shields were placed between the divisions so that radiant energy from a fire involving the cables of one division would not degrade or ignite cables of the other divisions. These shields also directed the convective energy from the fire away from the surviving division. These shields were usually constructed of 1/2-inch marine board in a metal frame. Appendix R, Section III.G.f refers to these shields as "a noncombustible radiant energy shield." The guidelines in BTP CMEB 9.5-1, Section C.7.a(1)b. indicate that these shields should have a fire rating of 1/2 hour. In our opinion any material with a 1/2 hour fire rating should be capable of performing the required function.

The guidelines of BTP CMEB 9.5-1 relating to a fire-rated radiant energy shield are being considered in current reviews of NIOI plants. However, to the extent that an applicant can justify that a proposed radiant energy shield can achieve an equivalent level of safety, NRC has been accepting shields that have not been tested against the acceptance criteria of ASTM E-119.

In Appendix R reviews, NRC has accepted non-fire-rated radiant energy shields that have been demonstrated by fire hazards analysis to provide an acceptable level of protection against the anticipated hazard of a localized fire within the containment. NRC has also accepted fire-rated metal-sheathed mineral insulated cables, as a radiant energy shield in specific configurations."

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2.218 BTP CMEB 9.5-1, Item C.7.a, Primary and Secondary Containment (Cont'd): "(c) In primary containment, fire detection systems should be provided for each fire hazard. The type of detection used and the location of the detectors should be the most suitable for the particular type of fire hazard identified by the fire hazard analysis."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.219 BTP CMEB 9.5-1, Item C.7.a.(c), Primary and Secondary Containment (Cont'd): "A general area fire detection capability should be provided in the primary containment as backup for the above described hazard detection. To accomplish this, suitable smoke or heat detectors compatible with the radiation environment should be installed."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.220. BTP CMEB 9.5-1, Item C.7.a, Primary and Secondary Containment (Cont'd): "(d) Standpipe and hose stations should be inside PWR containments and BWR containments that are not inerted. Standpipe and hose stations inside containment may be connected to a high quality water supply of sufficient quantity and pressure other than the fire main loop if plant-specific features prevent extending the fire main supply inside containment. For BWR dry wells, standpipe and hose stations should be placed outside the dry well with adequate lengths of hose, no longer than 100 ft, to reach any location inside the dry well with an effective hose stream."

NRC GENERIC LETTER 86-10: No Additional guidance.

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2.221 BTP CMEB 9.5-1, Item C.7.a(d), Primary and Secondary Containment (Cont'd): "The containment penetration of the standpipe system should meet the requirements of General Design Criterion 56 and should be Seismic Category I and Quality Group B."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.222 BTP CMEB 9.5-1, Item C.7.a, Primary and Secondary Containment (Cont'd): "(e) The reactor coolant pumps should be equipped with an oil collection system if the containment is not inerted during normal operation. The oil collection system should be so designed, engineered, and installed that failure will not lead to fire during normal or design basis accident conditions and that there is reasonable assurance that the system will withstand the safe shutdown earthquake."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: Appendix R to 10CFR50.

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2.223 BTP CMEB 9.5-1, Item C.7.a(e), Primary and Secondary Containment (Cont'd): "Such collection systems should be capable of collecting lube oil from all potential pressurized and unpressurized leakage sites in the reactor coolant pump lube oil systems. Leakage should be collected and drained to a vented closed container that can hold the entire lube oil system inventory. A flame arrester is required in the vent if the flash point characteristics of the oil present the hazard of fire flashback. Leakage points to be protected should include lift pump and piping overflow lines, lube oil cooler, oil fill and drain lines and plugs, flanged connections on oil lines, and lube oil reservoirs where such features exist on the reactor coolant pumps. The drain line should be large enough to accommodate the largest potential oil leak."

NRC GENERIC LETTER 86-10: "Where the RCP lube oil system is capable of withstanding the safe shutdown earthquake (SSE), the analysis should assume that only random oil leaks from the joints could occur during the lifetime of the plant. The oil collection/system, therefore, should be designed to safely channel the quantity of oil from one pump to a vented closed container. Under this set of circumstances, the oil collection system would not have to be seismically designed.

An exemption is required for a non-seismically designed oil collection system. The basis for this exemption would be that random leaks are not assumed to occur simultaneously with the seismic event. However, the Rule, as written, does not make this allowance.

If the reactor coolant pump, including the oil system, is seismically designed and the nearby hot surfaces of piping are protected by seismically designed splash shields such that any spilled lube oil would contact only cold surfaces, and it could be demonstrated by engineering analysis that sump and splash shields would be capable of preventing a fire during normal and design basis accident conditions, the safety objective of Section III.0 would be achieved. The justification for the exemption should provide reasonable assurance that oil from all potential pressurized and unpressurized leakage points would be safely collected and drained to the sump. The sump should be shown capable of safely containing all of the anticipated oil leakage. The analysis should verify that there are no electric sources of ignition."

REF. SOURCE: Appendix R to 10CFR50.

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2.224 BTP CMEB 9.5-1, Item C.7.a, Primary and Secondary Containment (Cont'd): "(f) For secondary containment areas, cable fire hazards that could affect safety should be protected as described in Position C.5.e(2). The type of detection system for other fire hazards identified by the fire hazards analysis should be the most suitable for the particular type of fire hazard."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.225 BTP CMEB 9.5-1, Item C.7.a, Primary and Secondary Containment (Cont'd): "(2) Refueling and Maintenance - Refueling and maintenance operations in containment may introduce additional hazards such as contamination control materials, decontamination supplies, wood planking, temporary wiring, welding, and flame cutting (with portable compressed-gas fuel supply). Possible fires would not necessarily be in the vicinity of fixed detection and suppression systems. Management procedures and controls necessary to ensure adequate fire protection for transient fire loads are discussed in Position C.1."

NRC GENERIC LETTER 86-10: No additional guidance.

2.226 BTP CMEB 9.5-1, Item C.7.a(2), Primary and Secondary Containment (Cont'd): "Adequate self-contained breathing apparatus should be provided near the containment entrances for fire fighting and damage control personnel. These units should be independent of any breathing apparatus or air supply systems provided for general plant activities and should be clearly marked as emergency equipment."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.227 BTP CMEB 9.5-1, Item C.7, Guidelines for Specific Plant Areas (Cont'd): "b. Control Room Complex

The control room complex (including galleys, office spaces, etc) should be protected against disabling fire damage and should be separated from other areas of the plant by floors, walls, and roof having minimum fire-resistance ratings of 3 hours. Peripheral rooms in the control room complex should have automatic water suppression and should be separated from the control room by noncombustible construction with a fire-resistance rating of 1 hour. Ventilation system openings between the control room and peripheral rooms should have automatic smoke dampers that close on operation of the fire detection or suppression system. If a halon flooding system is used for fire suppression, these dampers should be strong enough to support the pressure rise accompanying halon discharge and seal tightly against infiltration of halon into the control room. Carbon dioxide flooding systems are not acceptable for these areas."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.228 BTP CMEB 9.5-1, Item C.7.b, Control Room Complex (Cont'd): "Manual fire fighting capability should be provided for both: (1) Fire originating within a cabinet, console, or connecting cables; and (2) Exposure fires involving combustibles in the general room area."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.229 BTP CMEB 9.5-1, Item C.7.b, Control Room Complex (Cont'd): "Portable Class A and Class C fire extinguishers should be located in the control room. A hose station should be installed immediately outside the control room."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: NFPA-10.

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2.230 BTP CMEB 9.5-1, Item C.7.b, Control Room Complex (Cont'd): "Nozzles that are compatible with the hazards and equipment in the control room should be provided for the manual hose station. The nozzles chosen should satisfy actual fire fighting needs, satisfy electrical safety, and minimize physical damage to electrical equipment from hose stream impingement."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: NFPA-14.

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2.231 BTP CMEB 9.5-1, Item C.7.b, Control Room Complex (Cont'd): "Smoke detectors should be provided in the control room, cabinets, and consoles. If redundant safe shutdown equipment is located in the same control room cabinet or console, additional fire protection measures should be provided. Alarm and local indication should be provided in the control room."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA-72D, NFPA-72E.

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2.232 BTP CMEB 9.5-1, Item C.7.b, Control Room Complex (Cont'd): "Breathing apparatus for control room operators should be readily available."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.233 BTP CMEB 9.5-1, Item C.7.b, Control Room Complex (Cont'd): "The outside air intake(s) for the control room ventilation system should be provided with smoke detection capability to alarm in the control room to enable manual isolation of the control room ventilation system and thus prevent smoke from entering the control room."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.234 BTP CMEB 9.5-1, Item C.7.b, Control Room Complex (Cont'd): "Venting of smoke produced by fire in the control room by means of the normal ventilation system is acceptable; however, provision should be made to permit isolation of the recirculating portion of the normal ventilation system. Manually operated venting of the control room should be available to the operators."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.235 BTP CMEB 9.5-1, Item C.7.b, Control Room Complex (Cont'd): "All cables that enter the control room should terminate in the control room. That is, no cabling should be routed through the control room from one area to another. Cables in underfloor and ceiling spaces should meet the separation criteria necessary for fire protection."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.236 BTP CMEB 9.5-1, Item C.7.b, Control Room Complex (Cont'd): "Air-handling functions should be ducted separately from cable runs in such spaces; i.e., if cables are routed in underfloor or ceiling spaces, these spaces should not be used as air plenums for ventilation of the control room. Fully enclosed electrical raceways located in such underfloor and ceiling spaces, if over 1 sq ft in cross-sectional area, should have automatic fire suppression inside. Area automatic fire suppression should be provided for underfloor and ceiling spaces if used for cable runs unless all cable is run in 4-in. or smaller steel conduit or the cables are in fully enclosed raceways internally protected by automatic fire suppression."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.237 BTP CMEB 9.5-1, Item C.7.b, Control Room Complex (Cont'd): "There should be no carpeting in the control room."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.238 BTP CMEB 9.5-1, Item c, Cable Spreading Room

"The primary fire suppression in the cable spreading room should be an automatic water system such as closed-head sprinklers, open-head deluge system, or open directional water spray system. Deluge and open spray systems should have provisions for manual operation at a remote station; however, there should be provisions to preclude inadvertent operation. Location of sprinkler heads or spray nozzles should consider cable tray arrangements and possible transient combustibles to ensure adequate water coverage for areas that could present exposure hazards to the cable system. Cables should be designed to allow wetting down with water supplied by the fire suppression system without electrical faulting."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.239 BTP CMEB 9.5-1, Item C.7.c, Cable Spreading Room (Cont'd): "Open-head deluge and open directional spray systems should be zoned."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.240. BTP CMEB 9.5-1, Item C.7.c, Cable Spreading Room (Cont'd): "The use of foam is acceptable."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.241 Foam Systems shall be automatically actuated by thermal detection limited discharge suppression systems utilizing a three percent solution of Aqueous Film Forming Foam (AFFF). The system shall be equipped with nozzles, foam maker, foam liquid storage tank and line proportioner sized for a flow application rate of 0.16 gpm per sq ft.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: NFPA-11B. Does not apply to WNP-2.

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2.242 BTP CMEB 9.5-1, Item C.7.c, Cable Spreading Room (Cont'd): "Cable spreading rooms should have: (1) At least two remote and separate entrances for access by fire brigade personnel; (2) An aisle separation between tray stacks at least 3 ft wide and 8 ft high; (3) Hose stations and portable extinguishers installed immediately outside the room; (4) Area smoke detection; and (5) Continuous line-type heat detectors for cable trays inside the cable spreading room."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA-14, NFPA-10.

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2.243 BTP CMEB 9.5-1, Item C.7.c, Cable Spreading Room (Cont'd): "Drains to remove fire fighting water should be provided. When gas systems are installed, drains should have adequate seals or the gas extinguishing systems should be sized to compensate for losses through the drains."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.244 BTP CMEB 9.5-1, Item C.7.c, Cable Spreading Room (Cont'd): "A separate cable spreading room should be provided for each redundant division. Cable spreading rooms should not be shared between reactors. Each cable spreading room should be separated from the others and from other areas of the plant by barriers with a minimum fire rating of 3 hours. If this is not possible, a dedicated system should be provided."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: ANI File No. N-219.

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2.245 BTP CMEB 9.5-1, Item C.7.c, Cable Spreading Room (Cont'd): "The ventilation system to each cable spreading room should be designed to isolate the area upon actuation of any gas extinguishing system in the area. Separate manually actuated smoke venting that is operable from outside the room should be provided for the cable spreading room."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.246 BTP CMEB 9.5-1, Item C.7, Guidelines for Specific Plant Areas (Cont'd): "d. Plant Computer Rooms

Computer rooms for computers performing safety-related functions that are not part of the control room complex should be separated from other areas of the plant by barriers having a minimum fire-resistance rating of 3 hours and should be protected by automatic detection and fixed automatic suppression. Computers that are part of the control room complex but not in the control room should be separated and protected as described in Position C.7.b. Computer cabinets located in the control room should be protected as other control room equipment and cable runs therein. Nonsafety-related computers outside the control room complex should be separated from safety-related areas by fire barriers with a minimum rating of 3 hours and should be protected as needed to prevent fire and smoke damage to safety-related equipment."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.247 BTP CMEB 9.5-1, Item C.7, Guidelines for Specific Plant Areas (Cont'd): "e. Switchgear Rooms

Switchgear rooms containing safety-related equipment should be separated from the remainder of the plant by barriers with a minimum fire rating of 3 hours. Redundant switchgear safety divisions should be separated from each other by barriers with a 3-hour fire rating. Automatic fire detectors should alarm and announce in the control room and alarm locally. Cables entering the switchgear room that do not terminate or perform a function there should be kept at a minimum to minimize the combustible loading. These rooms should not be used for any other purpose. Fire hose stations and portable fire extinguishers should be readily available outside the area."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: ANI File No. N-219.

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2.248 BTP CMEB 9.5-1, Item C.7.e, Switchgear Rooms (Cont'd): "Equipment should be located to facilitate access for manual firefighting. Drains should be provided to prevent water accumulation from damaging safety-related equipment (see NFPA 92M, "Water-proofing and Draining of Floors"). Remote manually actuated ventilation should be provided for venting smoke when manual fire suppression effort is needed (see Position C.5.f)."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.249 BTP CMEB 9.5-1, Item C.7, Guidelines for Specific Plant Areas

(Cont'd): "f. Remote Safety-Related Panels

Redundant safety-related panels remote from the control room complex should be separated from each other by barriers having a minimum fire rating of 3 hours. Panels providing remote shutdown capability should be separated from the control room complex by barriers having a minimum fire rating of 3 hours. Panels providing remote shutdown capability should be electrically isolated from the control room complex so that a fire in either area will not affect shutdown capability from the other area. The general area housing remote safety-related panels should be provided with automatic fire detectors that alarm locally and alarm and annunciate in the control room. Combustible materials should be controlled and limited to those rewired for operation. Portable extinguishers and manual hose stations should be readily available in the general area."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.250 BTP CMEB 9.5-1, Item C.7, Guidelines for Specific Plant Areas

(Cont'd): "g. Safety-Related Battery Rooms

Safety-related battery rooms should be protected against fires and explosions. Battery rooms should be separated from each other and other areas of the plant by barriers having a minimum fire rating of 3 hours inclusive of all penetrations and openings. DC switchgear and inverters should not be located in these battery rooms. Automatic fire detection should be provided to alarm and annunciate in the control room and alarm locally. Ventilation systems in the battery rooms should be capable of maintaining the hydrogen concentration well below 2 vol-%. Loss of ventilation should be alarmed in the control room. Standpipe and hose and portable extinguishers should be readily available outside the room."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.251 BTP CMEB 9.5-1, Item C.7, Guidelines for Specific Plant Areas

(Cont'd): "h. Turbine Building

The turbine building should be separated from adjacent structures containing safety-related equipment by a fire barrier with a minimum rate of 3 hours. The fire barriers should be designed so as to maintain structural integrity even in the event of a complete collapse of the turbine structure. Openings and penetrations in the fire barrier should be minimized and should not be located where the turbine oil system or generator hydrogen cooling system creates a direct fire exposure hazard to the barrier. Considering the severity of the fire hazards, defense in depth may dictate additional protection to ensure barrier integrity."

NRC GENERIC LETTER 86-10: No additional guidance.

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**2.252 Turbine Generator Buildings** - are separated by a 3-hour fire wall beneath the operating floor. The following areas should be enclosed in 3-hour fire resistance rated barriers with openings protected by Class A type fire doors:

- 1) Lube Oil Batch Tank Room,
- 2) Main Turbine Oil Reservoir Room,
- 3) Auxiliary Room,
- 4) Switchgear Rooms and
- 5) Battery Rooms.

**NRC GENERIC LETTER 86-10:** No additional guidance.

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**2.253 Turbine Generator Building (Cont'd):** Hydraulically calculated wet type sprinkler systems should be provided in the following areas of the turbine building:

- 1) Beneath the Turbine Generator Operating Floor,
- 2) Beneath the Mezzanine Floor, extended to include the condenser pit,
- 3) Turbine Building Unloading Bay,
- 4) Lube Oil Batch Tank Room and
- 5) Main Turbine Oil Reservoir Room.

**NRC GENERIC LETTER 86-10:** No additional guidance.

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**2.254 Turbine Generator Building (Cont'd):** Hydraulically calculated Water Spray Systems should be provided in the following areas of the turbine building:

- a) Hydrogen Seal Oil Unit,
- b) Steam Generator Pumps and
- c) Turbine Generator Bearings.

**NRC GENERIC LETTER 86-10:** No additional guidance.

**REF. SOURCES:** NFPA-15.

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**2.255 Turbine Generator Building (Cont'd):** Design of automatic sprinkler systems and for the fixed spray protection in the Turbine Building should be based on largest water demand with largest flow of 1000 gpm for hose streams and largest portion of the fire loop out of service.

**NRC GENERIC LETTER 86-10:** No additional guidance.

**REF. SOURCES:** NFPA-13, NFPA-15.

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2.256 Turbine Generator Building (Cont'd): In the turbine building, hydraulically balanced automatic sprinkler systems should be designed to provide density of .30 gpm/sq ft for any, including the most remote 3,000 sq ft area and density of .20 gpm/sq ft for any 10,000 sq ft area. Coverage for each system does not exceed 25,000 sq ft.

NRC GENERIC LETTER 86-10: No additional guidance.

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2.257 Turbine Generator Building (Cont'd): Steam generator feed pumps in the Turbine Building may be located in a curbed area and protected by automatic water spray system. Fire protection engineering acceptable alternative to enclosing such equipment within 3-hour fire resistive rating barriers.

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: Fire protection engineering acceptable alternative to enclosing such equipment within 3 hour fire resistance rating barriers.

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2.258 BTP CMEB 9.5-1, Item C.7.1, Guidelines for Specific Plant Areas (Cont'd): "Diesel Generator Areas  
Diesel generators should be separated from each other and from other areas of the plant by fire barriers having a minimum fire-resistance rating of 3 hours."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.259 BTP CMEB 9.5-1, Item C.7.1, Diesel Generator Areas (Cont'd):  
"Automatic fire suppression should be installed to combat any diesel generator or lubricating oil fires; such systems should be designed for operation when the diesel is running without affecting the diesel. Automatic fire detection should be provided to alarm and annunciate in the control room and alarm locally. Hose stations and portable extinguishers should be readily available outside the area. Drainage for firefighting water and means for local manual venting of smoke should be provided."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.260 BTP CMEB 9.5-1, Item C.7.1, Diesel Generator Areas (Cont'd): "Day tanks with total capacity up to 1100 gallons are permitted in the diesel generator area under the following conditions:

- (11) The day tank is located in a separate enclosure with a minimum fire-resistance rate of 3 hours, including doors or penetrations. These enclosures should be capable of containing the entire contents of the day tanks and should be protected by an automatic fire suppression system, or
- (22) The day tank is located inside the diesel generator room in a diked enclosure that has sufficient capacity to hold 110% of the contents of the day tank or is drained to a safe location."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.261 BTP CMEB 9.5-1, Item C.7, Guidelines for Specific Plant Areas (Cont'd): "j. Diesel Fuel Oil Storage Areas

Diesel fuel oil tanks with a capacity greater than 1,100 gallons should not be located inside buildings containing safety-related equipment. If aboveground tanks are used, they should be located at least 50 ft from any building containing safety-related equipment or, if located within 50 ft, they should be housed in a separate building with construction having a minimum fire-resistance rating of 3 hours. Potential oil spills should be confined or directed away from buildings containing safety-related equipment. Totally buried tanks are acceptable outside or under buildings (see NFPA 30, "Flammable and Combustible Liquids Code," for additional guidance)."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: NFPA-30.

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2.262 BTP CMEB 9.5-1, Item C.7.j, Diesel Fuel Oil Storage Areas (Cont'd): "Aboveground tanks should be protected by an automatic fire suppression system."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.263 BTP CMEB 9.5-1, Item C.7, Guidelines for Specific Plant Areas (Cont'd): "k. Safety-Related Pumps

Pump houses and rooms housing redundant safety-related pump trains should be separated from each other and from other areas of the plant by fire barriers having at least 3-hour ratings. These rooms should be protected by automatic fire detection and suppression unless a fire hazards analysis can demonstrate that a fire will not endanger other safety-related equipment required for safe plant shutdown. Fire detection should alarm and annunciate in the control room and alarm locally. Hose stations and portable extinguishers should be readily accessible."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.264 BTP CMEB 9.5-1, Item C.7.k, Safety-Related Pumps (Cont'd): "Floor drains should be provided to prevent water accumulation from damaging safety-related equipment (see Position C.5.a.(14))."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.265 BTP CMEB 9.5-1, Item C.7.k, Safety-Related Pumps (Cont'd): "Provisions should be made for manual control of the ventilation system to facilitate smoke removal if required for manual firefighting operation (see Position C.5.f)."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.266 BTP CMEB 9.5-1, Item C.7, Guidelines for Specific Plant Areas (Cont'd): "1. New Fuel Area  
Hand portable extinguishers should be located within this area. Also, hose stations should be located outside but within hose reach of this area. Automatic fire detection should alarm and annunciate in the control room and alarm locally. Combustibles should be limited to a minimum in the new fuel area. The storage area should be provided with a drainage system to preclude accumulation of water."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCES: NFPA-10, NFPA-14, NFPA-72D, NFPA-72E

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2.267 BTP CMEB 9.5-1, Item C.7.1, New Fuel Area (Cont'd): "The storage configuration of new fuel should always be so maintained as to preclude criticality for any water density that might occur during fire water application."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.268 BTP CMEB 9.5-1, Item C.7, Guidelines for Specific Plant Areas (Cont'd): "m. Spent Fuel Pool Area  
Protection for the spent fuel pool area should be provided by local hose stations and portable extinguishers. Automatic fire detection should be provided to alarm and annunciate in the control room and to alarm locally."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.269 BTP CMEB 9.5-1, Item C.7, Guidelines for Specific Plant Areas (Cont'd): "n. Radwaste and Decontamination Areas  
Fire barriers, automatic fire suppression and detection, and ventilation controls should be provided."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.270 BTP CMEB 9.5-1, Item C.7, Guidelines for Specific Plant Areas

(Cont'd): "o. Safety-Related Water Tanks

Storage tanks that supply water for safe shutdown should be protected from the effects of an exposure fire. Combustible materials should not be stored next to outdoor tanks."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.271 BTP CMEB 9.5-1, Item C.7, Guidelines for Specific Plant Area

(Cont'd): "p. Records Storage Areas

Records storage areas should be so located and protected that a fire in these areas does not expose safety-related systems or equipment (see Regulatory Guide 1.88, "Collection, Storage, and Maintenance of Nuclear Power Plant Quality Assurance Records")."

NRC GENERIC LETTER 86-10: No additional guidance.

REF. SOURCE: Regulatory Guide 1.88 - NFPA-232.

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2.272 BTP CMEB 9.5-1, Item C.7, Guidelines for Specific Plant Areas

(Cont'd): "q. Cooling Tower

Cooling towers should be of noncombustible construction or so located and protected that a fire will not adversely affect any safety-related systems or equipment. Cooling towers should be of noncombustible construction when the basins are used for the ultimate heat sink or for the fire protection water supply."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.273 BTP CMEB 9.5-1, Item C.7, Guidelines for Specific Plant Areas

(Cont'd): "r. Miscellaneous Areas

Miscellaneous areas such as shops, warehouses, auxiliary boiler rooms, fuel oil tanks, and flammable and combustible liquid storage tanks should be so located and protected that a fire or effects of a fire, including smoke, will not adversely affect any safety-related systems or equipment."

NRC GENERIC LETTER 86-10: "An exterior yard area without fire barriers should be considered as one fire area. The area may consist of several fire zones. The boundaries of the fire zones should be determined by a FHA."

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2.274 Administration and Service Building: This building should be separated from the Reactor Auxiliary Building and the Turbine Building by 3-hour fire resistive barriers.

NRC GENERIC LETTER 86-10: No additional guidance.

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2.275 Miscellaneous Buildings: The following areas inside this building should be separated from other areas by 3-hour fire resistant barriers: Nonsafety Chiller Room, Mechanical Equipment Room, Vault, Hot Machine Shop, Decontamination Area, Machine Shop, Warehouse and Storage Area.

NRC GENERIC LETTER 86-10: No additional guidance.

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2.276 Administration and Service Building: Automatic Wet Pipe Sprinkler Systems should be provided in the Vault and Mechanical Equipment Room of the Administration and Service Building.

NRC GENERIC LETTER 86-10: No additional guidance.

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2.277 Outdoor Oil Filled Transformers: Building walls within 50 ft of the outdoor oil filled transformers should be of 2-hour fire resistive construction and should be blank.

NRC GENERIC LETTER 86-10: No additional guidance.

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2.278 Yard Transformers: Two-hour fire barriers may be provided between all Main and Standby Transformers spaced less than 50 ft apart.

NRC GENERIC LETTER 86-10: No additional guidance.

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2.279 Yard Transformers: Transformer yard drainage pits should be capable of containing the oil from the largest transformer, and the water from two deluge systems operating simultaneously for a discharge period of 10 minutes.

NRC GENERIC LETTER 86-10: No additional guidance.

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2.280 Yard Transformers: Station, Main, Auxiliary, Standby and Start-up transformers should be provided with hydraulically calculated water Spray Deluge Systems.

NRC GENERIC LETTER 86-10: No additional guidance.

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2.281 BTP CMEB 9.5-1, Item - C., Position (Cont'd): "8. Special Protection Guidelines

a. Storage of Acetylene-Oxygen Fuel Gases

Gas cylinder storage locations should not be in areas that contain or expose safety-related equipment or the fire protection systems that serve those safety-related areas. A permit system should be required to use this equipment in safety-related areas of the plant (also see Position C.2)."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.282 BTP CMEB 9.5-1, Item - C.8.a, Storage of Acetylene Oxygen Fuel Gases (Cont'd): "b. Storage Areas for Ion Exchange Resins  
Unused ion exchange resins should not be stored in areas that contain or expose safety-related equipment."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.283 BTP CMEB 9.5-1, Item C.8.a, Storage of Acetylene Oxygen Fuel Gases (Cont'd): "c. Hazardous Chemicals  
Hazardous chemicals should not be stored in areas that contain or expose safety-related equipment."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.284 BTP CMEB 9.5-1, Item C.8.a, Storage of Acetylene Oxygen Fuel Gases (Cont'd): "d. Materials Containing Radioactivity  
Materials that collect and maintain radioactivity such as spent ion exchange resins, charcoal filters, and HEPA filters should be stored in closed metal tanks or containers that are located in areas free from ignition sources or combustibles. These materials should be protected from exposure to fires in adjacent areas as well. Consideration should be given to requirements for removal of decay heat from entrained radioactive materials."

NRC GENERIC LETTER 86-10: No additional guidance.

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2.285 NRC GENERIC LETTER 86-10, Licensing Policy: "The basic elements required in the fire protection plan are described in 10 CFR 50.48(a). The fire protection program that implements that plan should include the details of the fire hazards analysis. The plan and program may be separate or combined documents and must be kept current with the fire hazards analysis up-dated prior to making modifications. We would expect that the fire protection plan and program will be incorporated as part of the PSAR and therefore, would be updated and submitted to the NRC in conformance with the requirements of 10 CFR 50.71(e)."

REF. SOURCES: 10CFR50.48, 10CFR50.71.

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2.286 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "For plants licensed prior to January 1, 1979 and for those modifications which deviate from the previously accepted fire protection configurations, the exclusion of the applicability of Sections of Appendix R other than III.G, III.J, and III.O is limited to those features "accepted by the NRC staff as satisfying the provisions of Appendix A to Branch Technical Position BTP APCSB 9.5-1 reflected in staff fire protection safety evaluation reports issued prior to the effective date of the rule." No reanalysis is required except for proposed modifications which would alter previously approved features. This position is based directly on CFR 50.48(b)."

REF. SOURCE: Appendix R to 10CFR50, 10 CFR50.48, Appendix A to APCSB 9.5-1.

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2.287 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "If a future modification involves a change to a license condition or technical specification, a license amendment request must be submitted. When a modification not involving a technical specification or license condition is planned, the evaluation made in conformance with 10 CFR 50.59 to determine whether an unreviewed safety question is involved must include an assessment of the modification's impact on the existing fire hazards analysis for the area. This part of the evaluation must be performed by the person responsible for the fire safety program for the plant. The assessment must include the effect on combustible loading and distribution and the consideration of whether circuits or components, including associated circuits, for a train of equipment needed for safe shutdown are being affected or a new element introduced in the area. If this evaluation concludes that there is no significant impact, this conclusion and its basis must be documented as part of the 50.59 evaluation and be available for future inspection and reference. If the evaluation finds that there is an impact that could result in the area either not being in conformance with Appendix R, or some other aspect of the approved fire protection program, or being outside the basis for an exemption that was granted for the area involved, the licensee must either make modifications to achieve conformance or justify and request exemption (or, for the post 1979 plants, approval) from the NRC."

REF. SOURCE: 10CFR50.59.

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2.288 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "In response to the first two questions above, once the time period allowed by a schedule in 50.48 has run out, the schedule cannot be reinstituted by exemption. In such a situation the licensee is in violation of the regulation and should notify the Region proposing compensatory measures and a schedule for gaining compliance either with the provisions of Appendix R or with the provisions of an approved technical exemption. If a technical exemption is involved but is not yet applied for, the schedule for that action should be included and the licensee runs the risk that if the technical exemption is denied, a violation of the regulation has been incurred."

REF. SOURCE: 10CFR50.

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2.289 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "Requests for scheduler exemptions may be made under 10 CFR 50.12, but such requests will be granted sparingly based upon the following criteria:

1. The utility has, since the promulgation of Appendix R in 1980, proceeded expeditiously to meet the Commission's requirements."

REF. SOURCE: 10CFR50.

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2.290 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "2. The delay is caused by circumstances beyond the utility's control, or immediate implementation would cause undue hardship (e.g., plant shutdown to effect a minor modification).

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2.291 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "3. The proposed schedule for completion represents a best effort under the circumstances."

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2.292 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "4. Adequate interim compensatory measures will be taken until compliance is achieved."

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2.293 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "The significance of a deviation must be judged as part of a fire hazards analysis. The conclusion of this analysis is always subject to review by the NRC inspector."

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2.294 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "If licensees propose changes to their NRC approved modifications, they must submit their new proposal and revised schedule for implementation for NRC approval."

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2.295 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "Changes must be justified as to (1) the reason for the change, (2) the basis for the revised schedule, and (3) the interim measures that will be provided to assure post fire shutdown capability until the final modifications are implemented. Whether or not enforcement action will be taken based upon continued noncompliance with Appendix R will be decided by the NRC Regional Administrator in consultation with NRC Headquarters."

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2.296 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "Deviations from the codes should be identified and justified in the PSAR or PHA."

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2.297 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "An exemption is not required for NFPA codes. NRC guidelines reference certain NFPA codes as guidelines to the systems acceptable to the staff, and therefore such codes may be accorded the same status as Regulatory Guides."

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2.298 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "When the applicant/licensee states that its design "meets the Intent of the NFPA Codes" and does not identify any deviations from such codes, NRC and the Regions expect that the design conforms to the code and the design is subject to inspection against the NFPA codes."

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2.299 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "Some cables are being developed for high temperature (e.g., 1700°F) applications. An exemption would be required if such cable is used in lieu of the alternatives of III.G.2 or III.G.3 in a pre-1979 plant. A deviation from the guidelines would be required for similar applications in a post 1979 plant."

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2.300 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "Post-1979 plants are subject to:" "GDC 3."

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2.301 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): Post - 1979 plants are subject to: "10 CFR 50.48(a) and (e)."

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2.302 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): Post - 1979 plants are subject to: "The guidelines identified in the footnotes to 50.48(a)."

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2.303 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): Post - 1979 plants are subject to: "Guidelines documents issued after January 1, 1979."

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2.304 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): Post - 1979 plants are subject to: "Commitments made to meet the requirements of Appendix R; or specific sections such as III.G, III.J, III.O; and Appendix A to BTP APSCB 9.5-1; or BTP CMEB 9.5-1, which includes the requirements of Appendix R\* and the previous guidance documents incorporated into the Branch Technical Position.

\*A deficiency in the BTP CMEB 9.5-1 has been noted in that a requirement in Appendix R Section III.G.3.b to provide alternative or dedicated shutdown capability in an area where both redundant safe shutdown trains could be damaged by suppression activities or inadvertent operation or rupture of fire suppression systems is not included. This requirement will be added in the next revision of the BTP."

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2.305\* NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "The license for each plant licensed after January 1, 1979 contains a license condition which identifies by reference the approved fire protection program for that plant."

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2.306 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "A licensee can achieve compliance with III.G.1(G) by demonstrating that one train of cold shutdown equipment will remain free of fire damage. He is not limited to the three alternatives in III.G.2. See Item #3, "Interpretations of Appendix R."

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2.307 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "Fire Protection Guidance Issued Since January 1, 1975.

#### IE Information Notices

No. 83-41: Actuation of fire suppression systems causing inoperability of safety related equipment."

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2.308 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance - IE Notices (Cont'd): "No. 83-69: Improperly installed fire dampers at nuclear power plants."

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2.309 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance - IE Notices (Cont'd): "No. 83-83: Use of portable radio transmitters inside nuclear power plants."

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2.310 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance - IE Notices (Cont'd): "\*No. 84-09: Lessons Learned From NRC Inspections of Fire Protection Safe Shutdown Systems (10 CFR 50, Appendix R).

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\*Staff positions regarding the need for certain exemptions delineated in this guidance document have been revised per the "Interpretations of Appendix R".

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2.311 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance (Cont'd): "Standard Review Plan 9.5.1, Rev. 1 Fire Protection System, dated 5/1/76."

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2.312 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance - SRP (Cont'd): "9.5.1, Rev. 2 Fire Protection Program, dated 03.78."

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2.313 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance - SRP (Cont'd): "9.5.1, Rev. 3 Fire Protection Program, July 1981."

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2.314 NRC GENERIC LETTER 86-10, Licensing Policy (Cont'd): "Generic Letters

NOTE: The following documents were obtained from the Palisades File Docket No 50-255. Similar documents should be in the file for other operating facilities. The dates may vary slightly.

1. Letter dated 9/28/76 - Enclosing App. A to BTP APCSB 9.5-1 and supplementary guidance on information needed for fire protection program evaluation."

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2.315 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance - Generic Letters (Cont'd): "2. Letter dated 12/1/76 - Enclosing sample Technical Specifications and an errata sheet."

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2.316 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance - Generic Letters (Cont'd): "3. Letter dated 8/19/77 - Enclosing Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance."

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2.317 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance -  
Generic Letters (Cont'd): "4. Letter dated 6/8/78 - Re: Manpower  
Requirements for operating reactors."

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2.318 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance -  
Generic Letters (Cont'd): "5. Letter dated 9/7/79 - Re: Minimum fire  
brigade shift size."

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2.319 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance -  
Generic Letters (Cont'd): "6. Letter dated 9/14/79 - Enclosing staff  
positions - safe shutdown capability."

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2.320 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance -  
Generic Letters (Cont'd): "7. Letter dated 10/31/80 - Enclosing new 10 CFR  
50.48 regarding fire protection schedules for operating nuclear power plants."

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2.321 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance -  
Generic Letters (Cont'd): "8. Letter dated 11/24/80 - Enclosing a copy of  
revised 10CFR50.48 and new App. R to 10CFR50, and a summary of open items from  
the SER for the BTP APCSB 9.5-1 Review."

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2.322 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance -  
Generic Letters (Cont'd): "9. Letter dated 2/20/81 - Generic Letter 81-12  
identifying information needed for NRC review of modifications for alternative  
shutdown capability."

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2.323 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance -  
Generic Letters (Cont'd): "10. Letter dated 4/7/82 - Provided clarification  
to Generic Letter 81-12 and guidance on information needed for NRC review of  
exemption requests."

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2.324 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance -  
Generic Letters (Cont'd): "11. Letter dated 10/6/82 - Generic Letter 82-21;  
provided criteria for annual, biennial, and triennial audits required by  
Technical Specifications."

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2.325 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance -  
Generic Letters (Cont'd): "12. Letter dated 10/19/83 - Generic  
Letter 83-33; NRC Positions on Certain Requirements of Appendix R to 10CFR50.

\*Staff positions regarding the need for certain exemptions delineated in this  
guidance document have been revised per the "Interpretations of Appendix R".

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2.326 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance (Cont'd): "Staff Generic Positions

1. Letter, Denton to Bernsen, dated 4/20/82 - Control room fires."

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2.327 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance - Staff Generic Positions (Cont'd): "2. SECY 83-269, dated July 5, 1983 - Attachments B and C."

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2.328 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance - Staff Generic Positions (Cont'd): "3. Memo, Eisenhut to Olshinski, dated 12/30/83 - Physical independence of electrical systems."

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2.329 NRC GENERIC LETTER 86-10, Licensing Policy, Fire Protection Guidance - Staff Generic Positions (Cont'd): "4. Memo, Eisenhut to Jordan, dated 10/24/83 - Bullet resistant fire doors."

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2.330 NRC GENERIC LETTER 86-10, Deviation from Guidance Documents, Licensing Policy (Cont'd): If a utility determines that a deviation from a guidance document exists, an exemption request does not need to be filed.

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2.331 NRC GENERIC LETTER 86-10, Staff Interpretations of Appendix R, Licensing Policy (Cont'd): Staff positions are initiated when our experience shows that generic issues are identified that require clarification. These positions are reviewed for accuracy and consistency by the cognizant Division Directors. Usually, they are not issued for comment. However, Generic Letter 83-33 was commented on by the NUFGP (Nuclear Utility Fire Protection Group) since it was initiated, in part, at their request.

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2.332 NRC GENERIC LETTER 86-10, Dissemination of New Staff Positions, Licensing Policy (Cont'd): "The Staff positions on generic subjects are considered for issuance in Generic Letters from ONRR and Information Notices or Bulletins from OIAE. Staff positions issued for specific questions on specific plants are not given generic promulgation because they normally involve plant specific design considerations."

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2.333 NRC GENERIC LETTER 86-10, Coordination Study Update, Licensing Policy (Cont'd): "We would expect that as circuit modifications are made, the design package would address the electrical protection required and the effects of this protection on the coordination of the protection for the power distribution system. This type of consideration should be included in the evaluation required by 10 CFR 50.59 Changes, Tests and Experiments. The design package and modification evaluation could not be complete without consideration of the coordination study. Therefore, we would expect that the coordination studies would be current with the last circuit modification made."

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2.334 NRC GENERIC LETTER 86-10, Exemption Request Treshhold, Licensing Policy (Cont'd): "The licensee must develop its criteria for an exemption request threshold. Request is not needed for each and every possible deviation from Appendix R."

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2.335 NRC GENERIC LETTER 86-10, Penetration Designs Not Laboratory Approved, Licensing Policy (Cont'd): No exemption requests are needed for penetration designs reviewed and approved by NRC but not classified by an approval laboratory.

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2.336 NRC GENERIC LETTER 86-10, Individual versus Package Exemptions, Licensing Policy (Cont'd): "Future exemptions should be submitted individually, if they are independent of each other."

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2.337 NRC GENERIC LETTER 86-10, Exemption Request Licensing Policy (Cont'd): See Enclosure 2 of NRC's letter to all licensees dated April-May 1982 for level of detail needed in an exemption request.

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2.338 NRC GENERIC LETTER 86-10, Exemption Request Licensing Policy (Cont'd): Exemption requests for future modifications should be submitted under 10CFR50.12.

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2.339 NRC GENERIC LETTER 86-10, Post January 1, 1979 Plants and Exemption Requests Licensing Policy (Cont'd): Deviations from the requirements of Section III.G, III.J and III.O should be identified and justified in the FSAR or FHA and the deviation would probably require a license amendment to change the license condition.

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2.340 NRC GENERIC LETTER 86-10, NRC Approval for BTP CMEB 9.5-1 Deviations Licensing Policy (Cont'd): Compliance with guidelines in the BTP CMEB 9.5-1 is only required to the extent that they were incorporated in the approved Fire Protection Program as identified in the license condition.

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2.341 NRC GENERIC LETTER 86-10, Inspection Policy Safety Implications Appendic R Violations (Cont'd): "III.G.2 provides alternatives to ensure that one of the redundant trains is free of fire damage. Fire spread within one area cannot be predicted, but damage is limited to one fire area. Determination of the Appendix R violations that have "important safety implications" are based on the equipment, components, and systems that are located in the same fire area that are needed for safe shutdown or can adversely affect safe shutdown, and are not protected by the features of III.G.2, III.G.3 or an approved alternative."

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2.342 NRC GENERIC LETTER 86-10, Inspection Policy Uniform Enforcement throughout Regions: "Each Region evaluates violations in accordance with the NRC Enforcement Policy, 10CFR2, Appendix C. The Policy provides guidance for the determination of appropriate enforcement sanctions for violations. The Office of Inspection and Enforcement provides guidance for and monitors Regional implementation of the Policy to ensure a uniform application. In addition, the policy requires that all escalated enforcement actions be approved by the Director of the Office of Inspection and Enforcement."

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2.343 NRC GENERIC LETTER 86-10, Inspection Policy, NTOL Inspections: "NTOLs will be subject to the Appendix R audit; the TI 2515/62 is being revised to reflect the appropriate requirements for NTOLs' and it is our intent to conduct such inspections prior to issuing the operating license."

10CFR50.48 requires each such plant to have a fire protection plan. Their operating license will contain a specific license condition to implement their approved fire protection program which must identify deviations from Appendix R. The fire protection inspections will be against the particular license conditions."

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2.344 NRC GENERIC LETTER 86-10, Inspection Policy Future Temporary Instruction 2515/62: "The NRC plans to issue a new or revised version of Temporary Instruction 2515/62 for future Appendix R audits."

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2.345 NRC GENERIC LETTER 86-10, Inspection Policy Documentation Supplied by Licensee: "The documentation listing provided in TI-2515/62 does not restrict the inspection team from enhancing inspection efficiency by requesting a licensee to provide additional relevant documentation. A new listing of documentation for TI-2515/62 is not being developed."

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2.346 NRC GENERIC LETTER 86-10, Inspection Policy, Subsequent Inspections: "The Appendix R inspections are conducted on a sample basis. These inspections do not certify that all possible items of noncompliance with Appendix R have been identified. The inspection results do provide a basis for a determination of the adequacy of a licensee's Appendix R reanalysis, modification and preparation."

When a noncompliance with Appendix R requirements is identified, a notice of violation will be issued to ensure adequate corrective action. In those cases in which the licensee believes that the staff has invoked a reinterpretation of adequacy in areas which had previously been reviewed, NRC's procedures for appeal would be applicable."

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2.347 NRC GENERIC LETTER 86-10, Inspection Policy: "Subsequent to an Appendix R inspection, the NRC will not provide a list of items reviewed and found to be in conformance with Appendix R."

We do list the areas inspected and where non-compliances were not found."

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2.348 NRC GENERIC LETTER 86-10, Inspection Review, Inspection Policy: "To the extent that a licensee's submittal to NRR is comprehensive and sufficiently detailed, the basis for the OI&E Appendix R inspection will be the assumptions, shutdown paths and equipment selections approved by NRR. If the inspection results in new information that casts doubt upon the approved configuration, the Regional inspectors have the responsibility to resolve such doubts."

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2.349 NRC GENERIC LETTER 86-10, Inspection Policy, List of Shutdown Equipment: "Regional Inspectors will use the lists of shutdown equipment the licensee has identified in his fire protection plan."

Generic Letter 81-12 and its clarification documents expect licensees to show how they will shutdown if a fire area is not provided with redundant train separation. Inherent within this expectation is the assumption that the licensee will identify the equipment to be used. It is because the licensees have not had fire hazard analyses at all for non-alternative shutdown fire areas that the inspectors to date have resorted to using the only lists available (the alternative shutdown equipment list used by NRR in their reviews).

It is unlikely there would not be a list of at least those systems to be used for alternate shutdown, since 10CFR50.48 requires NRR review and approval of the means of alternate shutdown." End of available criteria to date.

REF. SOURCES: 10CFR50.48 and Generic Letter 81-12.

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2.350 NRC GENERIC LETTER 86-10, Inspection Policy (Cont'd): "The NRC plans to issue a new or revised version of Temporary Instruction 2515/62 for future Appendix R audits."

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2.351 NRC GENERIC LETTER 86-10, Inspection Policy (Cont'd): "The documentation listing provided in TI-2515/62 does not restrict the inspection team from enhancing inspection efficiency by requesting a licensee to provide additional relevant documentation. A new listing of documentation for TI-2515/62 is not being developed."

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2.352 NRC GENERIC LETTER 86-10, Inspection Policy (Cont'd): "The Appendix R inspections are conducted on a sample basis. These inspections do not certify that all possible items of noncompliance with Appendix R have been identified. The inspection results do provide a basis for a determination of the adequacy of a licensee's Appendix R reanalysis, modification and preparation."

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2.353 NRC GENERIC LETTER 86-10, Inspection Policy (Cont'd): "When a noncompliance with Appendix R requirements is identified, a notice of violation will be issued to ensure adequate corrective action. In those cases in which the licensee believes that the staff has invoked a reinterpretation of adequacy in areas which had previously been reviewed, NRC's procedures for appeal would be applicable."

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2.354 NRC GENERIC LETTER 86-10, Inspection Policy (Cont'd): "Subsequent to an Appendix R inspection, the NRC will not provide a list of items reviewed and found to be in conformance with Appendix R."

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2.355 NRC GENERIC LETTER 86-10, Inspection Policy (Cont'd): "We do list the areas inspected and where non-compliances were not found."

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2.356 NRC GENERIC LETTER 86-10, Inspection Policy (Cont'd): "To the extent that a licensee's submittal to NRR is comprehensive and sufficiently detailed, the basis for the OIAE Appendix R inspection will be the assumptions, shutdown paths and equipment selections approved by NRR. If the inspection results in new information that casts doubt upon the approved configuration, the Regional inspectors have the responsibility to resolve such doubts."

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2.357 NRC GENERIC LETTER 86-10, Inspection Policy (Cont'd): "Regional Inspectors will use the lists of shutdown equipment the licensee has identified in his fire protection plan."

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2.358 NRC GENERIC LETTER 86-10, Inspection Policy (Cont'd): "Generic Letter 81-12 and its clarification documents expect licensees to show how they will shutdown if a fire area is not provided with redundant train separation. Inherent within this expectation is the assumption that the licensee will identify the equipment to be used. It is because the licensees have not had fire hazard analyses at all for non-alternative shutdown fire areas that the inspectors to date have resorted to using the only lists available (the alternative shutdown equipment list used by NRR in their reviews)."

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2.359\* NRC GENERIC LETTER 86-10, Inspection Policy (Cont'd): "It is unlikely there would not be a list of at least those systems to be used for alternate shutdown, since 10 CFR 50.48 requires NRR review and approval of the means of alternate shutdown." End of available criteria to date.

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status                                    | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks   |
|-------------------|---|---------------------------|---|---|--|---|
| 2.4               | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Positions A1 and A2, Amendment No. 37; and Position B5, Amendment No. 19; and Section F.4, Compliance with Appendix R, Items F.4.2.h and F.4.2.k, Amendment No. 37. | Not needed                | WNP-2 FSAR Section 9.5.1 Amendment 33 and PPH's: 1.1.3, 1.3.10, 1.3.35, 1.3.36, 1.3.7, 1.3.12, 1.3.29, 1.4.2, 1.7.8, 1.14.2, 1.14.3, Volume 7 as applicable, QA Program, Volume 10 as applicable. | In compliance with Plant Commitments, meets the intent of the criteria. | Same as for Item 2.1 and see Remarks.                                  | Criteria Item Nos. 2.4.b, 2.4.e, and 2.4.f are not part of this review. |
| 2.5 through 2.7   | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Positions A.1, A.2, and B.5, Amendment No. 37; and Section F.4, Compliance with Appendix R, Items F.4.2.h and F.4.2.k, Amendment No. 37.                            | Not needed                | WNP-2 FSAR Section 9.5.1 Amendment No. 33 and PPH 1.3.10, 1.1.3, 1.3.35, 1.3.36.  | In compliance with Plant Commitments, meets the intent of the criteria. | No mandatory change, however, see Remarks for Criteria Item 2.1.       |   |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation                                    | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program  | Remarks   |
|-------------------|--|--|---|---|---|---|
| 2.1               | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position A1, Amendment No. 19; and Section F.4, Compliance with Appendix R, Item F.4.3, Amendment No. 37. | Not needed   | WNP-2 FSAR Section 9.5.1, Amendment No. 33.                                     | In compliance, meets the intent of this criteria. Was approved by the WRC in the SER for 9.5.1. | No change, however, we recommend the Supply System to prepare a Project Procedure or an independent document to be WNP-2 fire protection program implementation document. | Revise the FSAR to consolidate and clarify the previously approved commitments. This remark applies for most part of this evaluation. |
| 2.2               | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System; and Appendix F, Fire Protection Evaluation; Amendment No. 37.   | Not needed, FSAR Section 9.5.1 and Appendix F meet the intent of the criteria. | WNP-2 FSAR Section 9.5.1, Amendment No. 33.                                     | In compliance, meets the intent of this criteria.   | No change   | Same as for Item 2.1.   |
| 2.3               | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position A1, Amendment No. 37.  | Not needed   | WNP-2 FSAR Section 9.5.1 Amendment No. 33 and PPH 1.1.3, 1.3.10, 1.3.35 1.3.36. | In compliance with Plant Commitments and meets the intent of this criteria.                     | No change, see Item 2.1 also, prepare a chart to reflect the fire protection responsibilities at WNP-2, by personnel title and names.                                     | Same as for Item 2.1.   |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation                                     | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program              | Remarks  |
|-------------------|---|---------------------------|--|---|---|--|
| 2.8               | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Positions A1, A2, B3 and B5, Amendment No. 37, and Section F.4, Compliance with Appendix R, Items F.4.2.h, F.4.2.i, F.4.2.j and F.4.2.k, Amendment No. 37. | Not needed                | 1. WNP-2 FSAR Section 9.5.1 and Appendix F, Amendment No. 33.<br>2. WNP-2 PPH's. | In compliance with Plant Commitments. In compliance with the intent of this criteria. | Revise the FSAR and WNP-2 fire protection program to reflect the Plant Commitments. | Fire Brigade activities were not evaluated, because they are not part of the scope of this review. |
| 2.9               | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Positions C4 and C9, Amendment No. 37.   | Not needed                | WNP-2 Fire Protection quality assurance program.                                 | Refer to Criteria Items: 2.86 through 2.96.   | Refer to Criteria Items: 2.86 through 2.96.   |  |
| 2.10              | Not evaluated, see Remarks  |                           |  |   |   | Plant Fire Brigade criteria item does not constitute part of this review.                          |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program  | Remarks  |
|-------------------|---|---------------------------|--|--|---|--|
| 2.11              | <p>Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.6, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.1 Introduction, Amendment No. 37; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Positions A1, B4 and B5, Amendment No. 37; and Section F.4, Compliance with Appendix R, Amendment No 37.</p> <p>There is no specific reference in the FSAR to the NFPA publications listed in 2.11.6.</p> | Not needed                | <p>FSAR Section 9.5.1 Amendment No. 33 and WNP-2 PPH's; 1.9.1, 1.3.36, 13.10.11, 13.10.12, 13.10.13, 1.3.10, 1.3.19, 1.3.36, 13.2.1, 4.12.4.1, 13.1.1, 13.2.1, 13.14.6, 1.3.10, 13.14.4.</p> | <p>1. In compliance with Plant Commitments,</p> <p>2. Criteria Items 2.11.5.b and 2.11.6.d were not evaluated, see Remark 1.</p> <p>3. The following NFPA publications were used as applicable for guidance to develop the WNP-2 Fire Protection Program:</p> <p>NFPA 4A, and 27. Also, see Remark 3.</p> <p>NFPA 27 was used, as applicable for guidance for WNP-2 Recommendations for Organization, Training and Equipment of Fire Brigades. WNP-2 meets the intent of NFPA 27. Specific differences are set forth below:</p> <p>Paragraphs 24(a) and 24(d) Fire Brigade Chiefs Duty</p> <p>Paragraph 71-11th paragraph Maintenance Repair</p> <p>Paragraph 73 Lists of Equipment</p> <p>4. Criteria Item 2.11.7 does not apply. Remark 4.</p> | <p>1. Revise the FSAR to consolidate and clarify the Plant Commitments as approved by the NRC.</p> <p>2. Clarify the plant status against the NFPA guidance documents.</p> <p>3. For NFPA 27, evaluate to include in the Fire Brigade Chief duty responsibilities of Paragraphs 24(a) and 24(d), explain why complying with Paragraphs 71 and 73 is not practical at WNP-2.</p> | <p>1. Criteria Items 2.11.5.b and 2.11.5.d do not constitute part of this review.</p> <p>2. Criteria Item 2.11.7 does not apply. WNP-2 is a one reactor site.</p> <p>3. The following NFPA publications do not apply to WNP-2:</p> <p>NFPA 4, the plant has only a fire brigade not a fire department; NFPA 6 and 8 were not used at WNP-2 they will be employed at the Supply System Corporate Level.</p> <p>4. WNP-2 is a single reactor site.</p> <p>5. Revise the FSAR to consolidate and clarify the Plant commitments approved by the NRC.</p> |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation             | WNP-2 Fire Protection Program Status               | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks  |
|-------------------|---|---------------------------|--|--|--|--|
| 2.12              | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Amendment No. 37; and Appendix F, Fire Protection Evaluation; Section F.1, Introduction, Amendment No. 37; Section F.2, Fire Hazards Analysis, Amendment No. 37; and Section F.4, Compliance with Appendix R, Items F.4.3.6 and F.4.4, Amendment No. 37. | Not needed                | FSAR Section 9.5.1 and Appendix F.                       | In compliance with Plant Commitments. See Remarks. | No change, however, we recommend to rewrite the Fire Hazards Analysis (FHA) to consolidate all the information and commitments in one report, not all over the Appendix F as presently done. | 1. WNP-2 Primary containment is inerted during normal operation.<br>2. Same as Item 2.1. |
| 2.13              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation, Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position A4, Amendment No. 19; and Section F.4, Compliance with Appendix R, Items F.4.3 and F.4.4, Amendment No. 37.                       | Not needed                | FSAR Appendix F, Sections F.3 and F.4, Amendment No. 37. | In compliance with Plant Commitments.              | Evaluate the response to NRC Position A4 from FSAR Appendix F, Section F.3 to determine the use of NFPA 78 in the design of WNP-2 lightning protection system.                               | NFPA 78 was not part of the scope of this review.  |
| 2.14              | Does Not Apply (DNA). See Remarks.  |                           |  |  |  | WNP-2 is a single unit reactor.  |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation    | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|---|---------------------------------------|--|---------|
| 2.15              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.1, Introduction, Amendment No. 37; and Section F.4, Compliance with Appendix R, Items F.4.4.1 and F.4.4.3, Amendment No. 37.   | Not needed                | FSAR Appendix F, Section F.4, Amendment No. 37. | In compliance with Plant Commitments. | No change, however, see Item 2.12.                                     |         |
| 2.16              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.1, Introduction, Amendment No. 37; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position D1(a), Amendment No. 37; and Section F.4, Compliance with Appendix R, Items F.4.3 and F.4.4, Amendment No. 37. | Not needed                | FSAR Appendix F, Section F.3, Amendment No. 37. | In compliance                         | No change  |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation                       | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks   |
|-------------------|---|--|--|--|--|---|
| 2.17              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.1, Introduction, Amendment No. 37; Section F.2, Fire Hazards Analysis, Amendment No. 37; and Section F.4, Compliance with Appendix R, Amendment No. 37.   | Not needed   | FSAR Appendix F, Section F.2, Amendment No. 37.                    | In compliance with Plant Commitments.  | <ol style="list-style-type: none"> <li>1. Locate or re-create the FHA Combustible load calculations for actual (as built) plant conditions.</li> <li>2. Update the FHA to consolidate and clarify the Plant Commitments as described in criteria Item 2.17.</li> <li>3. Evaluate the backup documentation for the FHA to be kept current and readily available.</li> </ol> | The Plant FIA is a live document which is kept current throughout the life span of the Plant. |
| 2.18              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.1, Introduction, Amendment No. 37; Section F.2, Fire Hazards Analysis, Amendment No. 37; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Amendment No. 37; and Section F.4, Compliance with Appendix R, Amendment No. 37. | For specific deviations refer to criteria items where they are listed. | FSAR Appendix F, Sections F.1, F.2, F.3 and F.4, Amendment No. 37. | <ol style="list-style-type: none"> <li>1. In compliance with Plant Commitments.</li> <li>2. The FHA verified that WNP-2 fire protection program commitments met the intent of the NRC applicable guidelines.</li> <li>3. Deviations are identified. Some justifications are provided.</li> </ol> | <ol style="list-style-type: none"> <li>1. See Item 2.12</li> <li>2. Update the FHA and the FSAR to identify any deviations from the NRC guidelines, provide technical justification to show that an equivalent level of protection is achieved, or an acceptable fire protection measure is in place.</li> </ol>   |   |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|
| 2.19              | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.3, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position A3, Amendment No. 19. | Not needed                | <ol style="list-style-type: none"> <li>For detail description of primary and backup suppression for each fire area refer to FSAR Appendix F Section F.2.</li> <li>For detail list of implementing documents refer to Criteria Items: 2.213, (Later)</li> </ol> | In compliance.                       | No change  |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WHP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WHP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken   | WHP-2 Fire Protection Program Implementation  | WHP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WHP-2 Fire Protection Program  | Remarks |
|-------------------|---|---|---|---|---|---------|
| 2.20              | <p>Yes, in compliance as described in FSAR Section 3.6; Section 9.5.1, Fire Protection System, Subsection 9.5.1.3, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position A4, Amendment No. 19; with the exception that both Primary and Backup Fire Suppression Systems are connected to the same riser in the following safety-related areas:</p> <p>a) Control Room Emergency Filter Units (with standpipe cross-connection).</p> <p>b) Standby Gas Treatment Filter Unit.</p> <p>c) Reactor Building Sump Vent Filter Units.</p> | <p>Yes. See Supply System response to NRC Position in Amendment No. 19 dated October 1981 filed with NRC prior to fuel load date of 12/23/83.</p> | <p>1. WHP-2 Flooding Analysis.</p> <p>2. Pressure drop calculations for fire suppression systems.</p> | <p>1. In compliance with Plant Commitments.</p> <p>2. Flooding analysis or pressure drop calculations could not be located at the time of this reviews.</p> | <p>1. No change due to deviation taken prior to 12/23/83.</p> <p>2. Update the FHA to reflect these deviations.</p> <p>3. Locate or re-create the flooding analysis and pressure drop calculations.</p> |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|

2.21 DNA - See Remarks

1. For plants for which construction permits were issued prior to July 1, 1976, the Guidelines of Appendix A to BTP APCSB 9.5-1 do not require standpipe systems to be capable of delivering water to hose stations after a safe shutdown earthquake. For NRC approval see Safety Evaluation Report Supplement No. 3 (SSER 3) page 9-5 second paragraph.
2. Eastern Washington is not considered to have high seismic activity in accordance with UBC.

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks |
|-------------------|---|--|--|--|--|---------|
| 2.22              | Yes, in compliance as described in FSAR Section 3.7; Section 9.5.1, Fire Protection System, Subsections 9.5.1.1.4, and 9.5.1.3, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position A4, Amendment No. 19; and Section F.4, Compliance with Appendix R, Item F.4.4, Amendment No. 37. | Yes, natural phenomena of less severity and greater frequency than the most severe natural phenomena (approximately once in 10 years) was not described. | Supply System to provide.                    | <ol style="list-style-type: none"> <li>1. In compliance with Plant Commitments.</li> <li>2. Lightning protection is provided.</li> <li>3. Seismic Category I criteria used for fire protection systems in safety related areas.</li> </ol> | No changes appear to be needed at this time.   |         |
| 2.23              | Yes, in compliance as described in FSAR Section 3.6; Section 9.5.1, Fire Protection System, Subsection 9.5.1.3, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E 3(a), Amendment No. 24, and Position A5, Amendment No. 37.   | Not needed   | WNP-2 Flooding Analysis.                     | <ol style="list-style-type: none"> <li>1. In compliance with Plant Commitments.</li> <li>2. Flooding analysis could not be located at the time of this review.</li> </ol>  | <ol style="list-style-type: none"> <li>1. No change.</li> <li>2. Locate, or re-create the flooding analysis calculations.</li> </ol> |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WMP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WMP-2 Commitment To Compliance With Fire Protection Criteria | Formal Deviation(s) Taken | WMP-2 Fire Protection Program Implementation | WMP-2 Fire Protection Program Status | Recommended Option(s) For Improvement Of WMP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|

2.28  
(Cont'd)

standards, or evaluate the FSAR commitment in Appendix F, Section F.3, Position B1.

g. Describe the Industrial Safety and Fire Protection Involvement in the Design Control and Procurement Document Control for new/additional fire protection equipment, systems and components, as applicable.

h. Clarify the Shift Support Supervisor or Shift Manager Interface with Fire Protection Engineer.

1. Clarify the Fire Watch responsibilities Item 1.3.10.5.J.1 by explaining the exact sequence of actions he or she needs to do. (Example: "first to contact the Shift Manager/Control Room to activate the fire brigade and then take action possible to control the fire".

2. PPM's 1.9.1 and 1.9.12. Revise these procedures and Industrial Safety and Fire Protection Manual to describe in more detail the fire protection portion interface in Plant activities related with fire safety, fire hazards, plant operation, plant modifications, correlation with fire codes and authorities having jurisdiction over various portions of the Plant fire protection.

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks  |
|-------------------|--|---------------------------|---|---------------------------------------|--|--|
| 2.28              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.6-1, Subsection F.3.2, Compliance Evaluation, Positions B1, B2 and G1, Amendment No. 37; and Section F.4, Compliance with Appendix R, Item F.4.2.k, Amendment No. 37. | Not needed                | PPM 1.1.3, 1.2.1, 1.3.7, 1.3.10, 1.3.19, 1.3.35, 1.3.36, 1.4.2, 1.9.1, 1.9.12, 1.14.2 and 1.14.3. | In compliance with Plant commitments. | <p>1. PPM 1.3.10 should be reviewed by the Supply System Fire Protection Engineer, expanded and clarified as follows:</p> <ul style="list-style-type: none"> <li>a. The "Purpose" should include Life Safety and Plant Safe Shutdown in case of a fire.</li> <li>b. The "Discussion" should be expanded and reworded for clarity and consistency.</li> <li>c. Revise and clarify the "Definitions" of "Fire Protection System" and "Fire Hazards Analysis".</li> <li>d. Delete the reference to NFPA 803 from Item 1.3.10.6.A.2. WNP-2 is not following this NFPA. Evaluate if Appendix R to 10CFR50 technical criteria should be added.</li> <li>e. Clarify the interface of the Plant with the Fire Protection Engineering in Industrial Safety Group. Provide an interface chart.</li> <li>f. Describe the Industrial Safety and Fire Protection involvement in assuring that Administrative Procedures required to maintain the WNP-2 fire protection system and personnel performance are in accordance with the applicable NFPA codes and</li> </ul> | Refer to Item 2.11 for information about the NFPA Codes and Standards applicable to WNP-2. |

**WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WPP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE**

| Criteria Item No. | WPP-2 Commitment in Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WPP-2 Fire Protection Program Implementation | WPP-2 Fire Protection Program Status                     | Recommended Option(s) for Improvement of WPP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|--|--|---------|
| 2.31              | Yes, in compliance as described in FSAR, Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position A1, Amendment No. 37; and Section F.4, Compliance with Appendix R, Item F.4.3.C, Amendment No. 37. | Not needed                | PPH's 1.1.3, 1.3.10, 1.3.35 and 1.3.36.      | In compliance with Plant commitments. Refer to Item 2.3. | Refer to Items 2.3 and 2.28.   |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WPP-2 FIRE PROTECTION PROGRAM EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WPP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WPP-2 Fire Protection Program Implementation                            | WPP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WPP-2 Fire Protection Program  | Remarks  |
|-------------------|---|---------------------------|---|---------------------------------------|---|--|
| 2.29              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Positions A1, B3, G2, and G4, Amendment No. 37; and Section F.4, Compliance with Appendix R, Item F.4.2.K, Amendment No. 37. | Not needed                | PPH's 1.3.7, 1.3.10, 1.3.35, 1.3.36, 1.13.2, 1.14.1, 1.14.2 and 1.14.3. | In compliance with Plant commitments. | <ol style="list-style-type: none"> <li>1. Change PPH 1.3.10 as described in Item 2.28.</li> <li>2. Clarify Appendix F, Section F.3, Subsection F.3.2, Position G4 response. Delete "IEPA and charcoal filters are handled in accordance with 49CFR, Section 171-178". Add "IEPA filters are collected in plastic bags, compacted in Radwaste Building, then placed in metal containers with cover, which meets the requirements of 49CFR, Paragraphs 173.411 or 173.412.</li> </ol> | A sprinkler is planned to be added in area where IEPA filters are compacted. |
| 2.30              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position B3, Amendment No. 37; and Section F.4 Compliance with Appendix R, Items F.4.2.k and F.4.3.c, Amendment No. 37.      | Not needed                | PPH's same as for Item 2.29.  | In compliance with Plant commitments. | Same as for Item 2.29.  |  |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|---|---------------------------|--|---------------------------------------|--|---------|
| 2.33              | Yes, Incompliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position B3, Amendment No. 37; and Section F.4, Compliance with Appendix R, Item F.4.3.c, Amendment No. 37.               | Not needed                | Same as Item 2.29.                           | In compliance with Plant commitments. | Revise PPM 1.3.10, see Item 2.28.                                      |         |
| 2.34              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position B3, Amendment No. 37; and Section F.4, Compliance with Appendix R, Items F.4.2.k and F.4.3.c, Amendment No. 37. | Not needed                | Same as Item 2.29.                           | In compliance with Plant commitments. | Revise PPM 1.3.10, see Item 2.28.                                      |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks                |
|-------------------|---|---------------------------|--|---------------------------------------|--|------------------------|
| 2.32              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position B3, Amendment No. 37; and Section F.4, Compliance with Appendix R, Items F.4.2.k and F.4.3.c, Amendment No. 37. | Not needed                | Same as Item 2.29.                           | In compliance with Plant commitments. | Revise PPM 1.3.10, as recommended in Item 2.28.                        | Same as for Item 2.11. |

**WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE**

| Criteria Item No: | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks   |
|-------------------|---|---------------------------|---|--|--|---|
| 2.37              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Positions B3 and B5, Amendment No. 37; and Section F.4, compliance with Appendix R, Item F.4.2.k, Amendment No. 37.        | Not needed                | PPH 1.3.10 and 1.3.35.  | In compliance with Plant commitments.  | Revise PPH 1.3.10 as recommended in Item 2.28.   | Approved by the NRC in Technical Specification 3.7.6. |
| 2.38              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position B5, as applicable, Amendment No. 37; and Section F.4, Compliance with Appendix R, Item F.4.2.k, Amendment No. 37. | Not needed                | PPH 1.1.3, 1.3.7, 1.3.10, Volume 7 and Volume 10 procedures, as indicated by Supply System. | Apparently, in compliance with Plant Commitments. PPH's 1.1.3 and 1.3.10 list responsibilities of various WNP-2 personnel, and PPH 1.3.7 describes maintenance work request. Required, however, is "a test plan that lists the individuals and their responsibilities in connection with routine tests and inspections of the fire detection and protection systems. The plan contains the type, frequency and detailed procedures for testing". A test plan and list of individuals in connection with routine tests and inspections of fire detection and protection could not be located. | Evaluate other WNP-2 plant procedures (not reviewed by Ebasco) and locate the procedure(s) where the test plan and list of individuals appears, and frequency of testing is described. If it cannot be found, create one, or update an existing plant procedure to include this. Please note that dedicated, trained crews assigned for testing and maintenance of fire protection and detection systems present an asset and an advantage to the plant operation.<br><br>The individual procedures covering specific testing and maintenance appeared to be adequate. |   |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|---|---------------------------|--|---------------------------------------|--|---------|
| 2.35              | Yes in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position B2, Amendment No. 37; and Section F.4, Compliance with Appendix R, Item F.4.2.k, Amendment No. 37.               | Not needed                | PPM 1.3.19.                                  | In compliance with Plant commitments. | No change  |         |
| 2.36              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position B3, Amendment No. 37; and Section F.4, Compliance with Appendix R, Items F.4.2.k and F.4.3.c, Amendment No. 37. | Not needed                | Same as for Item 2.29.                       | In compliance with Plant commitments. | Revise PPM 1.3.10 as recommended for Item 2.28.                        |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WHP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WHP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken  | WHP-2 Fire Protection Program Implementation | WHP-2 Fire Protection Program Status | Recommended Option(s) For Improvement Of WHP-2 Fire Protection Program | Remarks   |
|-------------------|---|----------------------------|--|--------------------------------------|--|---|
| 2.40              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E1(b), Amendment No. 37, | Not elevated. See Remarks. | PPH Volume 4.                                | Not evaluated, see Remarks.          | Not evaluated, see Remarks.  | Only PPH's designated by Supply System Engineers were part of the scope of this review. These PPH's were in Volumes 1, 2, 7 and 10. |
| 2.41 through 2.51 | Not evaluated. See Remarks.   |                            |  |                                      |  | Strategies for fighting fires or prefire plans did not constitute part of the scope of this review.                                 |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks  |
|-------------------|--|---------------------------|--|---------------------------------------|--|--|
| 2.39              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position 84, Amendment No. 37. | Not needed                | PPM 1.3.10, 1.3.35 and 1.3.36                | In compliance with Plant commitments. | Update PPM 1.3.10, as recommended in Item 2.28. In addition, include manual actuation of a local automatic suppression system to the action to be taken by a person discovering a fire and explain how to do it. | Plant Pre-fire plans were not reviewed, as they were not part of the scope of this report. |



WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status    | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks  |
|-------------------|--|---------------------------|--|---|--|--|
| 2.52 through 2.85 | See Remarks  |                           |  |   |  | Fire Brigade evaluation is excluded from the scope of this report. |
| 2.86              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position C1, Amendment No. 37. | Not needed                | Project Manual Instruction 4-9 Paragraph 5.0. Acceptable between 5/80 and present. See criteria 2.87 through 2.96.   | Could not be assessed without an audit. | An audit is required to assess status.                                 |  |
| 2.87              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position C1, Amendment No. 37. | Not needed                | <ul style="list-style-type: none"> <li>- Project Manual Instruction 4-9 Paragraph 5.0.</li> <li>- CSMWP-2-017.</li> <li>- WNP-2-017.</li> <li>- TDP E 2.1.</li> <li>- EI 2.1.</li> <li>- PPM 1.4.1.</li> </ul> For the period 5/80-present | Could not be assessed without an audit. | An audit is required to assess status.                                 |  |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status    | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|---|---------------------------|---|---|--|---------|
| 2.88              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position C2, Amendment No. 29. | Not needed                | <ul style="list-style-type: none"> <li>- Project Manual Instruction 4-9 Paragraph 5.0.</li> <li>- Bechtel Construction Work/Plan Procedure Program Manual.</li> <li>- WPPSS Test &amp; Startup Program Manual.</li> <li>- PPM 1.2.1-1.2.6.</li> </ul> For the period 5/80-present                           | Could not be assessed without an audit. | An audit is required to assess status.                                 |         |
| 2.89              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position C3, Amendment No. 37. | Not needed                | <ul style="list-style-type: none"> <li>- Project Manual Instruction 4-9 Paragraph 5.0.</li> <li>- PCH GWP/P-4-5.</li> <li>- PCN GWP/P-12-8.</li> <li>- PPM 1.3.13.</li> <li>- WPPSS Test &amp; Startup Program Manual.</li> <li>- PPM 1.15.2.</li> <li>- PPM 1.3.39.</li> </ul> For the period 5/80-present | Could not be assessed without an audit. | An audit is required to assess status.                                 |         |
| 2.90              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position C4, Amendment No. 37. | Not needed                | <ul style="list-style-type: none"> <li>- Project Manual Instruction 4-9 Paragraph 5.0.</li> <li>- Bechtel CQCH Section III.</li> <li>- WPPSS Test &amp; Startup Program Manual.</li> <li>- PQC-01.</li> </ul> For the period 5/80-present   | Could not be assessed without an audit. | An audit is required to assess status.                                 |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status    | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|---|---------------------------|---|---|--|---------|
| 2.91              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position C5, Amendment No. 37. | Not needed                | <ul style="list-style-type: none"> <li>- Project Manual Instruction 4-9 Paragraph 5.0.</li> <li>- WPPSS Test &amp; Startup Program Manual.</li> <li>- Index of Surveillance Procedures Related to Fire Protection.</li> </ul> For the period 5/80-present                 | Could not be assessed without an audit. | An audit is required to assess status.                                 |         |
| 2.92              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position C6, Amendment No. 37. | Not needed                | <ul style="list-style-type: none"> <li>- Project Manual Instruction 4-9 Paragraph 5.0.</li> <li>- WPPSS Test and Startup Program Manual.</li> <li>- PPH 1.3.8.</li> </ul> For the period 5/80-present   | Could not be assessed without an audit. | An audit is required to assess status.                                 |         |
| 2.93              | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position C7, Amendment No. 37. | Not needed                | <ul style="list-style-type: none"> <li>- Project Manual Instruction 4-9 Paragraph 5.0.</li> <li>- PHI 4-4.</li> <li>- PHI 4-4.1.</li> <li>- PHI 4-13.4.</li> <li>- WPPSS Test &amp; Startup Program Manual.</li> <li>- PPH 1.3.12.</li> </ul> For the period 5/80-present | Could not be assessed without an audit. | An audit is required to assess status.                                 |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No.  | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status    | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks                                 |
|--------------------|--|---------------------------|--|---|--|---|
| 2.94               | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position C8, Amendment No. 37.  | Not needed                | <ul style="list-style-type: none"> <li>- Project Manual Instruction 4-9 Paragraph 5.0.</li> <li>- WNP-2 QAP Sect. C #19.</li> <li>- PHI 4.13.3.</li> <li>- WPPSS Test &amp; Startup Program Manual.</li> <li>- PPM 1.3.12.</li> </ul> For the period 5/80-present                | Could not be assessed without an audit. | An audit is required to assess status.                                 |   |
| 2.95               | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position C9, Amendment No. 37.  | Not needed                | <ul style="list-style-type: none"> <li>- Project Manual Instruction 4-9 Paragraph 5.0.</li> <li>- Bechtel Construction Work/Plan Procedure Program Manual.</li> <li>- WPPSS Test &amp; Startup Program Manual.</li> <li>- PPM 1.6 series.</li> </ul> For the period 5/80-present | Could not be assessed without an audit. | An audit is required to assess status.                                 |   |
| 2.96               | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position C10, Amendment No. 37. | Not needed                | <ul style="list-style-type: none"> <li>- Project Manual Instruction 4-9 Paragraph 5.0.</li> <li>- WNP-2 QAP Section C #5.</li> <li>- CQAI-18-1.</li> <li>- DCQAP QAR 18.</li> <li>- PQAP QAP-20.</li> </ul> For the period 5/80-present  | Could not be assessed without an audit. | An audit is required to assess status.                                 |   |
| 2.97 through 2.125 | See Remarks  |                           |  |   |  | Excluded from the scope of this report. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks   |
|-------------------|--|---------------------------|--|---------------------------------------|--|---|
| 2.126             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.1.1 and 9.5.1.1.2, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position D2(a), Amendment No. 37. | Not needed                | Architectural Drawings Series "A". Civil Drawings Series "S". General Arrangement Drawings Series "H". | In compliance with Plant Commitments. | No change  | <p>Fire Resistance ratings are not shown on the drawings. Construction details are shown, from which fire resistance ratings can be derived.</p> <p>2.126(b) Turbine-generator Oil and Hydraulic Control Fluid Systems are not within the scope of this re-review.</p> <p>2.126(c) Reactor Recirculation Pump Lube Oil Collection System is not provided as the Primary Containment is inerted.</p> |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken           | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks  |
|-------------------|--|-------------------------------------|---|---------------------------------------|--|--|
| 2.127             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position D2(b), Amendment No. 37, | No, see recommendation and Remarks, | Site Map WNP-2 FSK-353, General Arrangement Drawings Series "H", PPH 1.3.10 and PPH 1.3.35.                     | In compliance with Plant Commitments. | Request Formal Deviation for the location of compressed gas cylinders located in the Reactor Building used for H <sub>2</sub> O <sub>2</sub> System. | There are ten Class A gas cylinders in the Reactor Building at El. 522. The 2% and 6% hydrogen in Argon, 2% and 6% oxygen in Argon is non-flammable and will not adversely affect any safety related systems or equipment. |
| 2.128             | See Remarks  |                                     |   |                                       |  | Not part of the scope of this review.  |
| 2.129             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position D2(c), Amendment No. 37. | Not needed                          | Architectural Drawings Series "A". Contract Documents 210, 210A and 218. PPH 1.14.2. Contract Document FFC 006. | In compliance with Plant Commitments. | Revise FSAR F.3-52 to delete: d. "Water tight boot seals on pipes in Reactor Building exterior walls and on interior walls below Elev. 471'-0".      |  |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WHP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WHP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken  | WHP-2 Fire Protection Program Implementation   | WHP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WHP-2 Fire Protection Program   | Remarks   |
|-------------------|---|--|--|--|--|---|
| 2.130             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.1.2, 9.5.1.1.3 and 9.5.1.1.5 Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Subsection F.3.2, Position APCSB 9.5-1, Compliance Evaluation, Position D2(b), Amendment No. 37; F9 and F10, Amendment No. 19 with the exception of the Diesel Generator Oil Day Tanks. | Yes. See Supply System Response to NRC Position D2(d), F9 and F10 in Amendment No. 19 dated October 1981 filed with NRC prior to fuel load date of 12-23-83. Letter of July 1, 1983 Supply System see SSER 4 page 9-5. | Contract Documents, 24, 53 and 215. Drawings M-512 Sheet 1, M-512 Sheet 4, S-857, DO-448-1, DO-447-1.8, DO-446-1.8, DO-442-1.11, S-858, M-512 Sheet 3. PPM 1.3.10, 1.3.35, 1.3.19. | In compliance with Plant Commitments.<br><br>Flammable or combustible liquids are not stored in safety areas, except for the diesel oil in the diesel generator oil day tank rooms.<br><br>NFPA-30 was extensively used as guidance for control of combustibles. Specific differences are set forth below:<br><br>a. Paragraph 2254 - Slope of vent pipe<br><br>b. Paragraph 2263 - Slope of fill & discharge lines<br><br>c. Paragraph 2265 - Fill and emptying connections<br><br>d. Paragraph 2342 - Valves on connecting lines to the tank<br><br>e. Paragraph 2348 - Overflow prevention devices<br><br>f. Paragraph 2630 - Hydrostatic test for tanks and connections<br><br>g. Paragraph 5241 - Emergency Drainage System | 1. Revise the FSAR to clarify and consolidate the previously approved commitments.<br><br>2. Provide overflow prevention devices per Paragraph 2348.<br><br>3. Recommend the evaluation of the following NFPA-30 Paragraphs for feasibility and applicability to WHP-2: 2254, 2263, 2265, 2342, 5241.<br><br>4. Paragraph 2630 is not in accordance with the code and justify its equivalency.<br><br>5. Evaluate WHP-2 commitment to have combustible liquids protected in compliance with NFPA-31 (1974) as classified under NFPA-32 (1973) in FSAR Subsection 9.5.1.1.1. See remarks. | 1. Only safety related areas were evaluated as part of this report.<br><br>2. NFPA-31 and 32 were not part of the scope of this report. |

WASHINGTON PUBLIC POWER SUPPLY ST.  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation                                  | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program  | Remarks  |
|-------------------|---|--|---|---------------------------------------|---|--|
| 2.131             | DNA, see Remarks  |  |   |                                       |   | <p>1. Per tele-con with Jim Parker, WNP-2 Mechanical Engineer on 12/12/86, there is no hydrogen piping routed through the safety-related areas or equipment.</p> <p>2. WNP-2 is a BWR.</p> |
| 2.132             | Yes, in compliance as described in FSAR Section 9.6.1, Fire Protection System, Subsection 9.6.1.2.6, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position D3(a), Amendment No. 19; with the exception that it does not address material for cable trays, conduit and the use and non-use of flexible metallic tubing and thin-walled metallic tubing respectively. | Yes. See Supply System response to NRC Position D3(a) in Amendment No. 19 dated October 1981 filed with NRC prior to fuel load date of 12/23/83. | Contract Document 210, Electrical Design Drawing No. 02-217-0084 Sheets 1-72. | In compliance with Plant Commitments. | No design change. Update FSAR F.3 Position D3(a) to indicate material for cable trays, conduit and the use and non-use of flexible metallic tubing and thin walled metallic tubing. |  |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No.   | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks   |
|---------------------|--|---------------------------|--|---------------------------------------|--|---|
| 2.133 through 2.137 | Does Not Apply (DNA). See Remarks.   |                           |  |                                       |  | Redundant cables and associated circuits required for Safe Plant Shutdown in case of fire are protected to meet the separation criteria of Appendix R to 10CFR 50 Section III. G. Smoke Detectors are provided in areas where cable is present. Manual hose stations and portable extinguishers are located throughout the plant. |
| 2.138               | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position A3(f), Amendment No. 37. | Not needed                | Contract Document 218.                       | In compliance with Plant Commitments. | No change  |   |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation                       | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program  | Remarks |
|-------------------|--|---------------------------|--|---------------------------------------|---|---------|
| 2.139             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position D3(E), Amendment No. 37. | Not needed                | Contract Document 218.   | In compliance.                        | No change.  |         |
| 2.140             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position D3(h), Amendment No. 37. | Not needed                | Contract Document 218, Design Drawing No. 02-217-0084 Sheets 1-72. | In compliance.                        | No change.  |         |
| 2.141             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position D2(b), Amendment No. 37. | Not needed                | PPM 1.3.35.  | In compliance with Plant Commitments. | Revise FSAR to state "Miscellaneous storage and piping for flammable or combustible liquids or gases does not create a potential exposure hazard to safety-related systems". Revise F.3 Position D2(b). |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WHP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WHP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WHP-2 Fire Protection Program Implementation   | WHP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WHP-2 Fire Protection Program | Remarks        |
|-------------------|--|---------------------------|--|---------------------------------------|--|----------------|
| 2.169             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1 and 9.5.1.2.1.1, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.4, Compliance with Section F.4, Appendix R, Item 1.C, Amendment No. 24.   | Not needed                | Flow Diagram Fire Protection System Drawings No. M-515, M-573, M-741 series and Isometric Drawings. Contract Documents 206, 215, 217 and 224. PPH Vol. 7 (Surveillance). | In compliance with plant commitments. | No design change.  | See item 2.167 |
| 2.170             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.2.1 and 9.5.1.2.1.1, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E2(a), Amendment No. 24. | Not needed                | Flow Diagram Fire Protection System Drawings No. M-515, M-573, M-741 series and Isometric Drawings. Contract Documents 206, 215, 217 and 224.                            | In compliance.                        | No design change.  | See Item 2.167 |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|

|       |                   |                                      |
|-------|-------------------|--------------------------------------|
| 2.171 | DNA, see Remarks. | WNP-2 is a single reactor unit site. |
|-------|-------------------|--------------------------------------|

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM R2-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks  |
|-------------------|---|--|--|---------------------------------------|--|--|
| 2.172             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1, Amendment No. 30; and Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E2(c), Amendment No. 19. | Yes. See Supply System response to NRC position E2(c) in Amendment No. 19 dated October 1981 filed with NRC prior to fuel load date of 12/23/83. | Flow Diagram Fire Protection System Drawings No. M-515, M-573, M-509. Plant Drawings No. EWD-62E-027, -028, -029, -031, -032 and -053. Contract Documents 29, 206, 215 and 250. Calculation No. E/I-02-85-07. Document 51573 - Transmittal No. 2 B&R File No. 5-1573. System 62 Acceptance Test Report. Pump Performance Curve FP-P-110. | In compliance with Plant Commitments. | No change, revise the FSAR to provide these clarifications.            | <ol style="list-style-type: none"> <li>Section 9.5.1.2.1.1 Amendment No. 36 states that the capacity of the fire water pumps is based on the maximum probable water demand of 2385 gpm (1885 gpm for a fixed sprinkler system and 500 gpm for hoses). However the original SER states that the largest single fire suppression system water demand is 2564 gpm which includes 750 gpm for hose streams. Clarify which is the appropriate Plant maximum water demand for automatic systems and hose streams.</li> <li>Verify what the fire protection calculations indicate.</li> </ol> |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No: | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks        |
|-------------------|--|--|---|---------------------------------------|--|----------------|
| 2:173             | Yes. In compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1, Amendment No. 30; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E2(c), Amendment No. 19; with the exception that three fire pumps and their drivers and controls are each separated by more than 20 feet in lieu of separation by three hour fire rated walls. | Yes. See Supply System response to NRC position E2(c) in Amendment No. 19 dated October 1981 filed with NRC prior to fuel load date of 12/23/83. | Flow Diagram Fire Protection System Drawings No. M-515, M-573, M-609. Plant Drawings No. EWD-62E-027, -028, -029, -031, and -053. Contract Documents 29, 206, 215 and 250. Calculation No. E/I-02-85-07. Document 51573 - Transmittal No. 2 BAR File No. 5-1573. System 62 Acceptance Test Report. Pump Performance Curve FP-P-110. | In compliance with Plant Commitments. | No change, however update the FSAR to clarify this position.           | See Item 2.167 |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program  | Remarks   |
|-------------------|--|---------------------------|--|--|---|---|
| 2.174             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1.1 Amendment No. 36 and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E2(c), Amendment No. 37. | Not needed                | <p>Flow Diagram Fire Protection System Drawings No. H515, H573, H892 and H509. Plant Drawings No. EMD-62E-027, -028, -029, -031, -032, and -053. Drawings No. E502, E503 and E515. Contract Documents 29, 206, 215 and 250. Calculation Nos. E/1-02-85-07, 2.06.08 and 2.03.09. Contract Document 51573 - Transmittal No. 2. B&amp;R File No. 5-1573. System 62 Acceptance Test Report. Pump Performance Curve FP-P-110.</p> <p>Vendor manuals FP-P-1 and FP-P-110.</p> <p>(CVI 02-29-00, 3T and CVI 02-324-00, 2). ANI Annual Pump Test Reports.</p> <p>ANI Acceptance Letter dated 2/5/82.</p> <p>Technical Specifications 3.7.6.1 and 4.7.6.1.2.</p> <p>PPM's Vol. 1 (Administrative) Vol. 7 (Surveillance) Vol. 10 (Maintenance), as applicable.</p> <p>PHR's 02-84-1071-OF1 02-84-1623.</p> <p>DCP 0284-1623, 0A.</p> | <p>NFPA-20 was extensively used as guidance for the installation of the Plant Fire Pumps. Review of the compliance status was complicated by Paragraphs 1-7 of the 1974 edition (the code evaluated against) which allowed use of the previous edition for existing installations. In that pumps had been purchased and installed prior to the implementation date of the 1974 code, Paragraphs 1-7 may have made the previous code the applicable code for WNP-2. The previous code edition (1959) is not as restrictive as the 1974 edition. The WNP-2 may have been in compliance with applicable provisions of this earlier edition. In any event, the installed system configuration meets the intent of NFPA-20. Specific differences are set forth below:</p> <p>a. Paragraph 1-6.1 Complete Plans &amp; Date</p> <p>b. Paragraph 2-4.4 - Over pressure protection.</p> <p>c. Paragraph 2-4.5 - Jockey Pump</p> | <ol style="list-style-type: none"> <li>1. Evaluate WNP-2 status of compliance with NFPA No. 20 1959-1972 edition for the three vertical 2000 gpm fire pumps and NFPA No. 20 1980 addition for the horizontal 2500 gpm fire pump.</li> <li>2. Compare the above-suggested results with WNP-2 status of compliance against NFPA No. 20 1974 edition.</li> <li>3. Update the FSAR to clarify the Plant status of compliance with NFPA-20.</li> <li>4. Based on the WNP-2 status of compliance with NFPA No. 20 1974 edition, the following are recommended: <ol style="list-style-type: none"> <li>1. Install a Jockey pump. Refer to PHR 02-84-1623.</li> <li>2. Change wiring per 6-2.2 and 6-3.1.</li> <li>3. Correct cable marking (7-3.7.2)</li> <li>4. Secure the batteries (8-2.6.5)</li> <li>5. Lock the cabinets, if feasible (9-1.3.4)</li> <li>6. Wire the circuits as needed (9.1.4.2) and evaluate the remote alarms</li> </ol> </li> </ol> | <ol style="list-style-type: none"> <li>1. The 3 Vertical turbine 2000 gpm fire pumps in the Circulating Water Pump House were designed in the 1972 time frame. NFPA-20 1959-1972 appear to have been used in the design effort. However, the horizontal 2500 gpm was designed in 1982 and used NFPA-20-1980.</li> <li>The WNP-2 FSAR lists the NFPA-20-1974 as code of reference. This variation of standards used in design and for reference has caused problems in evaluating the compliance as stated in FSAR.</li> <li>2. No documentation concerning acceptance test is available per NFPA-20 Paragraph 4-5.1.1.</li> </ol> |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks |
|-------------------|--|---------------------------|--|---|--|---------|
| 2.174<br>(Cont'd) |  |                           |  | <ul style="list-style-type: none"> <li>d. Paragraph 2-6.1 - Pressure gages</li> <li>e. Paragraph 2-6.2 - Pressure gages</li> <li>f. Paragraph 2-8.6 - Floor Pitch</li> <li>g. Paragraph 2-9.7.1 - Penetration Clearance</li> <li>h. Paragraph 2-10.3.1 - Hose Valves for Testing</li> <li>i. Paragraph 3-4.1(h) Splash Shield</li> <li>j. Paragraph 3-5.1 Mountings</li> <li>k. Paragraph 6-2.2 Power Source</li> <li>l. Paragraph 6-3.1 Power Source</li> <li>m. Paragraph 6-5.4.2 Name Plate</li> <li>n. Paragraph 7-1.1.3 Labels</li> <li>o. Paragraph 7-3.7.2 Cable Markings</li> <li>p. Paragraph 8-2.6.5 Battery Location</li> <li>q. Paragraph 8-3.1 Pump Room Drainage</li> </ul> | <ul style="list-style-type: none"> <li>7. Recommend the evaluation of the following Paragraphs, for feasibility and applicability:<br/>1-6.1, 2-4.4, 2-6.1, 2-6.2, 2-8.6, 2-9.7.1, 2-10.3.1, 3-4.1(h), 8.3.1, 8.6.4, 9.1.4.2</li> <li>8. List the following items as not in accordance with the code, and justify their equivalency based on engineering analysis and backup documentation for Paragraphs: 3-5.1, 6-5.4.2, 7-1.1.3.</li> </ul> |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|--|--|---------|
| 2.174<br>(Cont'd) |  |                           |  | <ul style="list-style-type: none"> <li>r. Paragraph 8-6.4<br/>Fuel Supply Main-<br/>tenance</li> <li>s. Paragraph 9-1.3.4<br/>Locked Cabinets</li> <li>t. Paragraph 9-1.4.2<br/>Remote Alarm &amp;<br/>Signal Devices</li> </ul> |  |         |
| 2.175             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1.1, Amendment No. 30. | Not needed                | Contract Documents 29, 206, 215 and 250.     | In compliance with Plant Commitments   | No change.   |         |
| 2.176             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1.1, Amendment No. 30. | Not needed                | Contract Document 29.                        | In compliance  | No change  |         |

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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program  | Remarks   |
|-------------------|---|---------------------------|---|--|---|---|
| 2.177             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1.1, Amendment No. 30.  | Not needed                | Flow Diagram Fire Protection System Drawings No. M-515 and M-573, Contract Document 29.   | Pressure relief valves are provided for diesel driven fire pumps.<br><br>In compliance with Plant Commitments and WPPA-20 Paragraph 2-9.6.1. | No change   | Pressure relief valves are not required for the electric driven fire pumps. |
| 2.178             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1.1, Amendment No. 30.  | Not needed                | Flow Diagram Fire Protection System Drawings No. M-515 and M-573, Contract Document 215.  | In compliance with Plant Commitments and WPPA-20, Paragraphs 2-10.1 and 2-10.3.  | No change   |   |
| 2.179             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E2(c), Amendment No. 19. | Not needed                | Contract Document 217, Electrical Wiring Diagram EWD-62E Sheets 000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 036A, 039, 040, 041, 042 and 053.<br><br>Drawings E502, E503 Sheet 6, E504, E508.<br><br>Design Drawing 02-217-0084, Sheets. 1-72. | In compliance with Plant Commitments.  | Revise FSAR F.3 Position E2(c) to indicate that power for the electric motor driven fire pump is supplied from a 6.9 kV switchgear, 480 V Power Center. |   |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks   |
|-------------------|--|---------------------------|---|--|--|---|
| 2.180             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1.1, Amendment No. 30. | Not needed                | Contract Documents 215 and 206. Flow Diagram Fire Protection System Drawings No. M-515 and M-573. | In compliance with Plant Commitments and NFPA-20, Paragraphs 2-10.1, 2-10.2 and 2-10.3.  | No change  | Discharge water from hose headers terminate to areas outside buildings. |
| 2.181             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1.1, Amendment No. 30. | Not needed                | Contract Documents 215 and 206. Flow Diagram Fire Protection System Drawings No. M-515 and M-573. | In compliance with Plant Commitments for circulating water pump house (CWPH) this is done. For the storage tank the fire pump relief valve the water is discharged outdoors. The corresponding jockey pump does not have any recirculation. (this pump is used very infrequently). | No change  |   |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken   | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program                                      | Remarks                                      |
|-------------------|--|---|--|---------------------------------------|---|--|
| 2.182             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1.1, Amendment No. 33; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E2(g), Amendment No. 24; with the exception that hydrants are approximately every 300 feet. | Yes, See Supply System response to NRC Position E2(g) Amendment No. 24 dated May 1982 filed with NRC prior to fuel load date of 12/23/83. | Flow Diagram Fire Protection System Drawings No. M-515, M-573, and M-741 series. Contract Documents 206, 214 215, 217, 223, 224 and 231. | In compliance with Plant Commitments. | No change. Meets the intent of criteria and provides an equivalent level of protection.                     | Mobile means are not provided, nor required. |
| 2.183             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1.1, Amendment No. 33; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E2(g), Amendment No. 24.  | Not needed  | Contract Documents 206 and 215.  | In compliance with Plant Commitments. | Revise FSAR F.3, Position E2(g) and Section 9.5.1.2.1.1 to indicate that fire hydrants are non-freeze type. |  |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program  | Remarks |
|-------------------|---|--|---|--|---|---------|
| 2.184             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E2(g), Amendment No. 24.   | Not needed   | Contract Documents 206, 215, 217, and 224.  | Yes, in compliance as confirmed per telcon dated 11/20/86 from S. Allen (Supply System) to R. Quiellen (Hanford Fire Department).  | No change   |         |
| 2.185             | Yes, in compliance with the intent as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5.1, Subsection F.3.2, Compliance Evaluation, Position E2(d), Amendment No. 19; and Section F.4, Compliance with Appendix R, Item F.4.2.a, Amendment No. 24. Meets the intent of this guideline. | Yes, was described in FSAR Amendments No. M-573 and M-741 series. 19 and 24. NRC approved this configuration in their original SER, Pages 9-32 and 9-34. | Flow Diagram Fire Protection System Drawings No. M-515, Contract Documents 206, 215, 217, and 224. Specification 15175-0002-2 PPH 2.8.3 and Amfuei's Technical Advisory 101. Drawings C896, C906, CFD 389-1. DCP 84-1071-0G and OH. PPH Vol. 2 (F.P. System Operation). | In compliance with with Plant Commitments.<br><br>Two separate, reliable freshwater supplies are provided. One tank and one equivalent water supply which is the circulating water pumphouse (CWPH) basin.<br><br>Vertical fire pumps take suction from the CWPH basin. A horizontal diesel driven fire pump takes suction from the storage tank. The storage tank is the backup water supply for CWPH basin, in the unlikely event that the CWPH basin needs to be drained. | No design change, however, Update the FSAR to include the following:<br><br>Delete: "A backup water supply is provided by a 280,000 gallon dedicated water supply in a 300,000 gallon storage tank located on the opposite side of the plant site. The backup tank can be refilled in approximately twelve hours."<br><br>Revise FSAR Section F.3, position E2(d) to include a description of a new backup 400,000 gallon dedicated bladder tank refillable within eight hours. |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks   |
|-------------------|---|--|---|---|--|---|
| 2-186             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3-2, Compliance Evaluation, Position E2(d), and with Section F.4, Compliance with Appendix R, Item 1.a Amendment No. 19; with the exception that the primary water protection system is drawn from the Circulating Water Pumphouse basin. This water source is reliable but is not dedicated solely to fire protection. The circulating water pumps draw from the basin at a lower elevation than the fire pumps. However, for the fire pump water source to be depleted, there must be a failure of the circulating water system piping. In addition, the circulating water system is a closed system. This arrangement has been reviewed and accepted by American Nuclear Insurers (ANI). | Yes. See Supply System response to NRC Position E2(d) in Amendment No. 19 dated October 1981 filed with NRC prior to fuel load date of 12/23/83. | Flow Diagram Fire Protection System Drawings No. M-515, M-573 and M-741 series, Contract Documents 206, 215, 217 and 224. | <ol style="list-style-type: none"> <li>1. In compliance with Plant Commitments.</li> <li>2. Based on its review the NRC found the water supply system to meet the guidelines of BTP CNEB Section C.6.b, which includes the water supply.</li> <li>3. The Supply System is in process of installing a 400,000 gallon fabric tank.</li> </ol> | No change  | The existing design provides an equivalent level of protection with the criteria. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks   |
|-------------------|--|---------------------------|--|---------------------------------------|--|---|
| 2.187             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1.1, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E2(d), Amendment No. 19; and Position E2(e), Amendment No. 24. | Not needed                | Flow Diagram Fire Protection System Drawings No. M-515, M-573 and M-741 series. Contracts Documents 206, 215, 217 and 224. | In compliance with Plant Commitments. | No change  | For calculations refer to transmittal No. 1651 of Contract 217.   |
| 2.188             | DNA - see Remarks  |                           |  |                                       |  | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E2(f), Amendment No. 19. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
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FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|

2.189 DNA - see Remarks

Not applicable as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E2(f), Amendment No. 19.

2.190 DNA - see Remarks

Not applicable as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E2(f), Amendment No. 19.

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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program                       | Remarks |
|-------------------|--|--|--|---|--|---------|
| 2.191             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.1.5, 9.5.1.2.1, 9.5.1.2.1.1, 9.5.1.2.1.2, 9.5.1.2.1.3, 9.5.1.3 and Table 9.5-5 Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E3(a), Amendment No. 24. | Yes, as noted in FSAR Section F.3, Position E3(a), Amendment No. 24 filed with the NRC prior to fuel load date of 12/23/83. NRC found this acceptable in SER, SSER 3 and SSER 4. | Flow Diagram Fire Protection System Drawings No. M-515, M-573 and M-741 series. Contract Documents 206, 215, 217, and 224. | In compliance with Plant Commitments.<br><br>1. Sprinkler and standpipe systems have connections to the Plant underground water main which preclude a single active failure to impair both the primary and backup fire suppression systems except for the manual deluge systems protecting the HVAC Sump Vent Filter Units and Standby Gas Treatment Filter Units located in the Reactor Building.<br><br>2. Each sprinkler, pre-action and water spray is provided with an approved isolation valve and waterflow. Standpipe systems have equivalent means for shutoff such as the nearest Post Indicator Valve in the yard. There are no alarms on the standpipes. Water shields or baffles are provided as required. | Revise and update the FSAR to reflect and clarify the Plant previously approved commitments. |         |

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|-------------------|--|---|--|---|---|---|
| 2.192             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E3(b), Amendment No. 19. | Yes, as noted in Technical Specification 3/4.7.6 and FSAR Amendment 19. | Contract Documents 217 and 218. PPM 1.3.29. PPM 1.3.8, Electrical Wiring Diagram EWD-62E, Sheets 000, 001 002, 003, 004, 005, 006, 007 008, 009, 010, 027, 028, 029 030, 031, 032, 036A, 039, 040, 041, 042 and 053. Drawing Nos. E502, E503 Sheet 6, E504, E508. Design Drawing 02-217-0084, Sheets 1-72.<br><br>PPM's Vol. 7 (Surveillance) and Vol. 1 (Administrative). PPM System E12.1. | In compliance with Plant Commitments.<br><br>Electrical supervision of valves with alarm in the Control Room is provided for the water flow control valves installed upstream of automatic suppression systems release valves and for FP-V-16A and FP-V-16B sectionalizing valves located in the yard. Only for these valves monitoring are in conformance with NFPA-26 Class II, Proprietary Supervisory Service System, except for partial compliance with paragraph 801, where no record is provided. The valves electrical supervision is done via Class B supervised circuits as defined in NFPA 720. Lack of recorder was approved by the Authorities having jurisdiction and is therefore considered an acceptable deviation. All other valves are either locked open and a program of management supervision was instituted approved. | Revise the FSAR to clarify the previously approved Plant Commitments and clarify the degree of commitment to conformance to NFPA-26 and 720 as applicable to valve supervision. | For the degree of commitment to compliance and conformance with NFPA-72D refer to Item No. 2.160. |

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|-------------------|--|--|---|--|---|--|
| 2.193             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.2.1.2, 9.5.1.2.1.3, and 9.5.1.2.1.4, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E3(c), Amendment No. 19. | Yes.<br>Refer to:<br><br>Letter of October 4, 1982, WNP-2 proposed to deviate automatic fire suppression systems from seven areas. (Refer to NRC SSER 3 page 9-3). The NRC SSER 3 finds this acceptable.<br><br>Supply System letter G02-83-0981, of October 28, 1983, G.C. Sorensen to A. Schwenker, Subject: Response to Fire Protection Site Audit Concerns, WNP-2 committed to install additional sprinkler heads and adjust the baffle plates to provide complete protection cover- | Contract Documents 217 and 02. Flow Diagram Fire Protection System Drawings No. M-515, M-508 and M510. Pipe Isometric Drawings CVI 02-215-00, 14362, 14363 and 2750. CVI 02-250-03, Sheet 206. Design Drawing 02-217-0084 Sheets 1-72. Drawing EWD-62E-036A. Drawings A520, A521, and A508. FSAR F.A of Appendix 'F'. Plant Procedure Manuals: Volume 7 (Surveillance) Volume 10 (Maintenance) and as applicable. PED E-249 EP 2.1. | NFPA-13 and NFPA-15 were used as guidance at WNP-2 for Sprinkler Systems and Water Spray Fixed Systems respectively. The systems configuration meets the intent of NFPA-13 and NFPA-15. Specific differences are set forth below:<br><br>NFPA-13 Paragraphs:<br><br>1-5.2(a) - Maintenance & Instruction Charts by Contractor<br><br>1-5.2(b) - Care and Maintenance of Sprinkler Systems by Contractor<br><br>1-9.1 - Suppression System Working Plans Submitted to The Authority Having Jurisdiction<br><br>1-12 - Contractor's Material and test Certificate<br><br>2-9.2.2 - Water supply pressure gage<br><br>3-8.1 - Test pipe for wet systems<br><br>3-11.2.2 - Joining of welding piping<br><br>3-13.1.2 - Drain valves and test valves of approved type<br><br>3-13.2.3(d) - Inspection | Revise and update the FSAR to clarify the Plant previously approved commitments and the status of compliance with NFPA-13 and 15. The clarifications should include Engineering Analysis and back-up documentation.<br><br>Based on the WNP-2 status of compliance following are recommended:<br><br>NFPA 13:<br><br>1. Justify deviation from Paragraph 3.14.1.5, Pipe hangers are seismic Category I which are a more conservative design than NFPA and are required for nuclear safety.<br><br>2. Justify deviation from Paragraph 3-11.2.2, as welded pipe was provided for nuclear safety reasons and seen by NRC Inspector during the WNP-2 Site Audit.<br><br>3. Evaluate the following paragraphs for feasibility and applicability to WNP-2: 2-9.2.2, 3-8.1, 3-15.7.1, 3-15.7.2, 3-15.7.3, 4-4.19, 4-4.20.<br><br>4. List the following paragraphs as not in conformance with the code and of valves controlling | 1. The wet pipe sprinkler systems evaluated are located in the Main Control Room living quarters and circulating water pumphouse. They fall under NFPA-13 guidelines.<br><br>2. The Pre-Action Sprinkler Systems are covered by NFPA-15, as they are direction water sprays using closed heads. They are systems 65, 66, 79, 80, 81, 82, 83, 84.<br><br>3. The manual deluge systems protecting the charcoal filters were approved by the Authority Having Jurisdiction - American Nuclear Insurers<br><br>4. The existing design provides an equivalent |

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|-------------------|--|---|--|--|--|---|
| 2.193<br>(Cont'd) |  | age for the area housing the diesel generators. (Refer to WRC SSER 4 page 9-8). The WRC SSER 4 finds this acceptable. |  | <p>Sprinkler System</p> <p>3-14.1.5 - Pipe hangers</p> <p>3-15.7.1 - Spare Sprinklers</p> <p>3-15.7.2 - Sprinkler Wrench</p> <p>3-15.7.3 - Quantity of spare sprinklers</p> <p>4-4.19 - Baffles for sprinklers</p> <p>4-4.20 - Sprinkler locations in small rooms</p> <p>NFPA-15 Paragraphs:</p> <p>2031 - Spray Nozzles Obstructed by debris</p> <p>2042 - Galvanized Pipe</p> <p>2052 - Rubber Gaskets</p> <p>2101 - Pressure Gages</p> <p>4020 - Design guides for the Water Spray Systems</p> <p>4032(b) - Nozzle location and density requirement</p> <p>4033(c)(3) - Protection of Structural Supports</p> | <p>Justify their equivalency based on engineering analysis and backup documentation:</p> <p>1-5.2(a), 1-5.2(b), 1-9.1 (partial compliance), 1-12 (partial compliance), 3-13.1.2, 3-13.2.3(d) - approved by Plant Technical Specification 3/4.7.6, 3-14.1.5.</p> <p><u>NFPA 15</u></p> <ol style="list-style-type: none"> <li>List paragraph 4111 as an approved deviation by ANI and provide its description.</li> <li>List paragraph 6018, inspection of spray nozzles, as approved deviation by technical specification 4.7.6.2.</li> <li>Investigate response time of detectors per paragraph 8051.</li> <li>Evaluate the following paragraphs for feasibility and applicability to WNP-2: 2042, 2052, 2101, 4021, 4032(b), 4033(c)(3), 4052(a)(1), 4062(b), 4063, 4101, 6001, 6002, 6003, 6013, 6017, 6019.</li> </ol> | <p>level of protection.</p> <p>5. The WRC recognized that the fixed automatic suppression systems were designed to the provisions of NFPA 13 and 15 and found the design to be in compliance with BTP CHEB 9.5-1 Section C.5.c.</p> |

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|-------------------|--|---|--|--|---|---------|
| 2.193<br>(Cont'd) |  | Supply System letter, G02-83-0597, of July 1, 1983, G D Bunhey to A Schwencer, Subject: Response to Fire Protection Site Audit Concerns, WNP-2 committed to install additional sprinkler heads and to adjust sprinklers to correct all sprinkler pattern deficiencies. (Refer to NRC SSER 4 page 9-6) the NRC SSER 4 finds this acceptable.<br><br>NRC letter dated 4/13/83, D Kubick to R Ferguson, Subject: Fire Protection Site Audit WNP-2.<br><br>WNP-2 SSER 4 Paragraph 9.5.1.6(1).<br><br>Technical Specification 4.7.6.2. |  | 4052(a)(1) - Disposal of liquids<br><br>4062(b) - Remote tripping devices<br><br>4063 - Accessibility drains for low points<br>4101 - Hanger support for piping<br><br>4111 - Strainers<br><br>6001 - Training for Maintenance and care for Spray System<br><br>6002 - Instructions for Maintenance and care for Spray System<br><br>6003 - Inspections of Spray Systems<br><br>6013 - Inspections of piping<br><br>6017 - Valve Supervision<br><br>6018 - Inspection of spray nozzles<br><br>6019 - Flushing of underground mains<br><br>8051 - Response time for detectors | 5. List the following paragraph as not in conformance with the code and justify its equivalency based on engineering analysis and backup documentation: 2031. |         |

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|-------------------|---|----------------------------------|---|---|--|---------|
| 2.194             | Yes, in compliance as described in FSAR Section 9.5-1, Fire Protection System, Subsection 9.6.1.2.1.2 Amendment No. 30; and Appendix F, Fire Protection Evaluation; Section F-3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E3(c), Amendment No. 19. | Yes, see Item 2.193 for details: | Contract Document 217. Flow Diagram Fire Protection System Drawings No. M-515 and M-508. Pipe Isometric Drawings CVI 02-215-00 14362, 14363 and 2750. CVI 02-250-03 Sheet 206. Drawing EWD-62E-036A. Drawings A508, A520 and A521. PPM 10.29.17. PED E-249. EP 2.1. | Meets the intent of this guideline. The wet pipe sprinkler system installed in the Main Control Room living quarters is a welded pipe system, has a UL listed check valve and a UL listed water flow alarm. The system was designed to the provisions of NFPA 13 and the design was found by the NRC in compliance with BTP CHED 9.5-1 Section C.5.c. Refer to Item 2.193 for discussion of NFPA-13 status. | Revise and update the FSAR to clarify the Plant previously approved commitments and the status of compliance with NFPA 13. Refer to Item 2.193 for details |         |

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|-------------------|--|---------------------------|--|---|---|---------|
| 2.195             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1.2 Amendment No. 30; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E3(c), Amendment No. 19. | Not needed                | <p>Contract Documents 217 &amp; 02. Flow Diagram Fire Protection System Drawings No. M515, M-508 &amp; M-510. Pipe Isometric Drawings CVI 02-215-00 14362, 14363 and 2750. Design Drawing 02-217-0084, Sheets 1-72. FSAR F.4 of Appendix F.1: Tech. Spec. 4.7.6.2. PPM Vol. 1 (Administrative). PPM Vol. 2 (Fire Protection Operation), PPM Vol. 13 (Emergency), PPM Vol. 7 (Surveillance), PPM Vol. 10 (Maintenance), PPM Vol. 4 (Alarm Response).</p> <p>Electrical Wiring Diagram EWD-62E Sheets 000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 036A, 039, 040, 041, 042 and 053. Drawing Nos. E501, E503 Sheet 6, E504, E508. DCP 02-85-0088, OA. PED 217-E-0249. Instruction Manuals 02-999-00 and 02-217-03.</p> | Meet the intent of this guideline. The WNP-2 pre-action sprinkler systems are closed nozzles/heads directional water spray pattern systems and follow the design criteria of NFPA 15. Refer to Item 2.193 for discussion of NFPA 15 status. | Revise and update the FSAR to clarify the Plant previously approved commitments and the status of compliance with NFPA 15. Refer to Item 2.193 for discussion of NFPA 15 recommendations. |         |

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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|

2,196 DNA - see Remarks

Multicycle sprinkler systems are not utilized.

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|-------------------|--|---|---|---|---|---|
| 2.197             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.1.5, 9.5.1.2.1.4, and Table 9.5-5 Amendment No. 36. Does not address hydraulically designed piping systems. | Not needed, meets the intent of the commitment to compliance.<br><br>Technical Specification 4.7.6.2. | Contract Documents 18 and 216, Flow Diagram Fire Protection System Drawings No. M-515, M-508, & M510. Pipe Isometric Drawings CVI 02-215-00, 14362, 14363 and 2750.<br><br>DCP 02-85-0088, OA.<br>PED 217-E-0249.<br>Instruction Manuals 02-999-00 and 02-217-03. | In compliance with this guideline. The only (deluge) water spray systems which constitute part of this evaluation are the manually actuated systems protecting the charcoal filter units: HVAC Sump Vent and Stand-by Gas Treatment located in the Reactor Building, and HVAC Emergency Exhaust located in the Control Room. These systems do not comply with NFPA 15. However, they were approved by American Nuclear Insurers (ANI), and therefore are considered to be an acceptable alternative to the Code requirements. | No design change. Revise and update the FSAR to clarify the Plant status and previously approved commitments. | 1. The NRC recognized that NFPA 15 was used in all SER's that fire protection systems were "designed to the provisions of NFPA 15" and "found the design to be in compliance with BTP CMEB 9.5-1 Section C.5.c."<br><br>2. See Technical Specification 4.7.6.2. |

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|-------------------|--|--|--|--|---|---|
| 2.198             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.2.1, 9.5.1.2.1.1 and Table 9.5-5 Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APSCB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E3(d), Amendment No. 37. | Yes. By letter of March 4, 1983, WNP-2 proposed to utilize 150 feet of hose to protect all areas of the Reactor Building. One hundred feet of hose will be pre-connected to the hose outlets. The remaining 50 feet of hose will be connected only if required to suppress a fire in a remote area. This was accepted by HRC SSER 3 page 9-5.<br><br>Technical Specifications 3/4.7.6, 4.7.6.2a. | Contract Documents 215 and 217. Flow Diagram Fire Protection System Drawing No. M-515, Plant Procedure Manuals: 7.4.7.6.1.1.4, 7.4.7.6.4, 7.4.7.6.4b, 1.3.35, 7.4.7.6.4.1; | In compliance with Plant Commitments.<br><br>150 ft. of hose was approved by HRC. Individual standpipes are in excess of at least 4 in. in diameter for multiple hose connections.<br><br>NFPA No. 14 was extensively used as guidance for the requirements of the interior standpipe and hose systems. The system configuration meets the intent of NFPA No. 14. Specific differences are set forth below:<br><br>a. Paragraph 412 - Location of hose outlets<br><br>b. Paragraph 413 - Valves provided at the main riser<br><br>c. Paragraph 442 - Pressure reducer at standpipe outlets<br><br>d. Paragraph 721 - Inspection of standpipe systems<br><br>e. Paragraph 724 - Inspection of hoses | 1. Revise the FSAR to clarify the status of compliance with NFPA No. 14 and previously approved deviations.<br><br>2. Based on WNP-2 status of compliance with NFPA No. 14 following are recommended:<br><br>a. Recommend the evaluation of the following paragraphs for feasibility and applicability: 413, 442.<br><br>b. Evaluate paragraph 721 against procedure PPM 7.4.7.6.4.1 and paragraph 724 against PPM's listed in NFPA comparison and Technical Specification 4.7.6.4.B.<br><br>c. Paragraph 412 is not in accordance with the Code and justify its equivalency based on engineering analysis and documentation. | The existing design provides an equivalent level of protection. |

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|-------------------|--|---------------------------|--|---|--|---------|
| 2.199             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.1 and 9.5.1.2.1, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Subsection F.2.4.e and the fire hazards analysis for each fire area, Amendment No. 37; it does not address alternative hose stations provision for instances when the fire hazard could block access to a single hose station serving that area. | Not needed                | Contract Documents 215 and 217. Flow Diagram Fire Protection System Drawing No. H-515. Plant Procedure Manuals: 7.4.7.6.1.1.4, 7.4.7.6.4, 7.4.7.6.4b, 1.3.35, 7.4.7.6.4.1. | In compliance with Plant commitments, Technical Specifications 3/4.7.6, 4.7.6.2.a. as approved by NRC SSER 3. | Update the FSAR to reflect plant commitments.                          |         |

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|-------------------|---|---------------------------|--|---------------------------------------|--|--|
| 2.200             | DNA - see Remarks   |                           |  |                                       |  | Not applicable for plants for which construction permits were issued prior to July 1, 1976. The guide lines of Appendix A to BTP APCS 9.5-1 do not specify standpipe and hose systems in areas containing equipment required for plant shutdown in the event of a safe shutdown earthquake to be analyzed for SSE loading to ensure system pressure integrity. WNP-2 construction permit was issued in 1973. |
| 2.201             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E3(e), Amendment No. 24. | Not needed                | Contract Documents 215 and 217. Flow Diagram Fire Protection System Drawing No. H-515. Technical Specifications 3/4.7.6, 4.7.6.2a. | In compliance with Plant Commitments. | No change  |  |

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|-------------------|--|---|--|---------------------------------------|--|--|
| 2.202             | Yes, in compliance as described in PPM 10.29.19              | Yes, see Plant Technical Specification 3/4.7.6. | PPM 10.29.19                                 | In compliance with plant commitments. | No change, mention in the FSAR.  | WNP-2 Code in effect is NFPA 196(1972).  |
| 2.203             | DNA - see Remarks  |   |  |                                       |  | There are no flammable liquids included in the plant. See Supply System response to NRC Position E3(f) in Amendment No. 19 dated October 1981 NRC prior to fuel load date of 12/23/83. Foam or AFFF are not used at WNP-2. |
| 2.204             | DNA - see Remarks  |   |  |                                       |  | 50 ft. of 1-1/2 inch hose is not utilized at WNP-2.  |

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|-------------------|--|---------------------------|--|--|--|-----------------|
| 2.205             | Refer to Item 2.198.   | Refer to Item 2.198.      | Refer to Item 2.198.   | For discussion of NFPA No. 14 status and hose stations spacing refer to Item 2.198. Standpipe and hose systems at WNP-2 are intended to be used for Class III service. | Same as for Item 2.198.  | See Item 2.198. |
| 2.206             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1.1, Amendment No. 36. | Not needed                | Contract Documents 215 and 217. Flow Diagram Fire Protection System Drawing No. M-515. | WNP-2 uses standpipes in excess of this guideline. For details refer to Item 2.198.  | No design change, refer to Item 2.198.                                 |                 |

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|-------------------|---|---|---|---|--|--|
| 2.165             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.3, Amendment No. 30. Fire condition, sensed by a detector, energizes as zone light on the main panel in the Control Room. Only detection systems actuating suppression systems have local control panel with these features and local alarm is sounded. | Yes. See FSAR Subsection 9.5.1.2.3, Amendment No. 30 filed with NRC prior to fuel load. | Contract Documents 217, 218 and 02.<br>Electrical Wiring Diagram EWD-62E Sheets 000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 036A, 039, 040, 041, 042 and 053.<br><br>Drawing Nos. E502, E503 Sheet 6, E504, E508.<br><br>Design Drawing 02-217-0084 Sheets 1-72. | In compliance with plant commitments and meets the intent of this criteria. | No changes, however, revise the FSAR to clarify plant commitments.   | 1. NFPA 72A, 72D or 72E do not have this requirement.<br><br>2. A newly added local control panel in RB E1.606 has these features for detection. |
| 2.166             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.2.1.3 and 9.5.1.2.1.4, Amendment No. 30 and 34; with the exception that it does not address that manual fire alarm stations are used to actuate water flow to the spray nozzles.   | Not needed  | Contract Documents 217 and 218.<br>Electrical Wiring Diagram EWD-62E Sheets 000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 036A, 039, 040, 041, 042 and 053.<br><br>Drawing Nos. E502, E503 Sheet 6, E504, E508.<br><br>Design Drawing 02-217-0084 Sheets 1-72.     | In compliance with plant commitments.                                       | Revise FSAR Section 9.5.1.2.1.4 to indicate that manual fire alarm stations are utilized to actuate water flow to the spray nozzles. |  |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program  | Remarks   |
|-------------------|---|---------------------------|---|---|---|---|
| 2.167             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.1.6 and 9.5.1.2.1, Amendment No. 36 and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E2(a), Amendment No. 37. | Not needed                | Flow Diagram Fire Protection System Drawings M-515, M-573 and M-861. Drawings M-741 series and associated Isometric Drawings, Drawing M-932 (DCP 83-0047-0G), Drawing 5749 (DCP 83-0047-0H), Drawing EWD-62E Sheets 27-32 and 53. Drawing 10M-SS2-PE-86-1421. Contract Documents 206, 214, 215, 217, 223, 224 and 231. PPH's Vol. 7 (Surveillance) and Vol. 10 (Administration). PHR's 02-86-0395 and 02-84-1071. Hydrostatic Test Report Documents. ANI letter to D. Evans (WPPS) dated 4/26/82. | <p>NFPA 24 was extensively used as guidance for the underground yard main loop design and installation. The underground yard main system including hydrants and accessories meet the intent of NFPA 24.</p> <p>Specific differences are set forth in the Paragraphs below:</p> <p><u>NFPA-24</u></p> <ul style="list-style-type: none"> <li>a. 15 - Framed plans of complete system</li> <li>b. 3601 - Labels for control valves</li> <li>c. 5201 - Location of hose houses for hydrants</li> <li>d. 5501 - Identification of hose houses</li> <li>e. 5601 - Hose house accessories</li> <li>f. 5801 - Approved nozzles</li> <li>g. 5901 - Hydrant use other than fire protection purposes</li> <li>h. 6101 - Hoses for hydrants</li> </ul> | <p>Update the FSAR to Clarify the Plant status of compliance with NFPA 24 by detailing the extent of guidance used from NFPA 24 for the underground yard main loop. These clarifications should include engineering evaluation and backup documentation.</p> <ul style="list-style-type: none"> <li>1. Mark hose houses per paragraph 5501</li> <li>2. Revise procedures for hydrants to be used solely for Fire Protection purposes per Paragraph 5901</li> <li>3. Provide depth of cover to be in accordance per Paragraph 9101</li> <li>4. Recommend the evaluation of the following paragraphs for feasibility and applicability: 3601, 5201, 5601, 5801, 9301, 9302, 9303, 9601, 9605, 9606, 9901 and 9902</li> <li>5. List of the following items as not in accordance with the code and justify their equivalency, for Paragraphs 15, 6101, 8101, 8301, 9801, 9802, 9803.</li> </ul> | <ul style="list-style-type: none"> <li>1. The existing design provides an equivalent level of protection.</li> <li>2. Based on its review the NRC found the water supply system to meet the guidelines of BTP CMER Section C.6.b. This includes the underground yard loop.</li> </ul> |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|---|---------------------------|---|---------------------------------------|--|---------|
| 2.163             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.3, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E1(c), Amendment No. 19. | Not needed                | Contract Documents 217, 218 and 02.<br>Electrical Wiring Diagram EWD-62E<br>Sheets 000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 036A, 039, 040, 041, 042 and 053.<br>Drawing Nos. E502, E503<br>Sheet 6, E504, E508<br><br>Design Drawing 02-217-0084<br>Sheets 1-72. | In compliance with plant commitments. | No change.   |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken   | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program  | Remarks |
|-------------------|--|---|---|---|---|---------|
| 2.164             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.3, Amendment No. 30; with the exception that, in addition to the primary power supply from the plant's generating system, which is backed up by an offsite power supply, a secondary source is available from the emergency diesel generator with backup capabilities from DC storage batteries with a capacity of two hours; and capability for manual connection to the Class 1E Emergency Power Bus within 4 hours of loss of off-site power and follow the applicable guidelines in Regulatory Guides 1.6.1.32 and 1.75. | Yes. See FSAR Section 9.5.1.2.3 Amendment No. 30 filed with NRC prior to fuel load. | Contract Documents 217, 218 and 02; Electrical Wiring Diagram EWD-62E Sheets 000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 036A, 039, 040, 041, 042, and 053;<br><br>Drawing Nos. E502, E503 Sheet 6, E504, E508.<br><br>Design Drawing 02-217-0004 Sheets 1-72. | In compliance with Plant Commitments. NFPA-720 was used as a guidance for the Protective Signalling System at WNP-2. The WNP-2 power supply sources meet the intent of NFPA-720.<br><br>The differences are explained in the code evaluation with Paragraph 2220 Power Supplies (main Control Room).<br><br>The system configuration also meets the intent of BTP CHEB 9.5-1. | Revise the FSAR to clarify the previously approved Plant Commitments. The noted paragraphs are included in the formal deviations taken.<br><br>This clarification should include appropriate Engineering Analyses and backup documentation. |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WHP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WHP-2 Commitment To Compliance With Fire Protection Criteria | Formal Deviation(s) Taken | WHP-2 Fire Protection Program Implementation | WHP-2 Fire Protection Program Status | Recommended Option(s) For Improvement Of WHP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|

|                   |  |  |  |  |  |  |
|-------------------|--|--|--|--|--|--|
| 2.167<br>(Cont'd) |  |  |  | <ul style="list-style-type: none"> <li>i. 8101 and 8301 - Coating and Lining of pipe</li> <li>j. 9101 - Depth of cover</li> <li>k. 9301, 9302 and 9303 - Protection against damage</li> <li>l. 9601 - Anchors</li> <li>m. 9605 and 9606 - Thrust Blocks</li> <li>n. 801, 9802 and 9803 - Flushing of underground mains</li> <li>o. 9901 and 9902 - Testing of underground mains</li> </ul> |  |  |
|-------------------|--|--|--|--|--|--|

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken   | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program  | Remarks |
|-------------------|--|---|---|--------------------------------------|---|---------|
| 2,168             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.2.1 and 9.5.1.2.1.1, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E2(A), Amendment No. 24; and Section F.4, Compliance with Appendix R, Item 1.6, Amendment No. 24; with the exception that it does not address the purpose of post indicator valves to isolate portions of the main for maintenance or repair without shutting off the supply to primary and back-up fire suppression systems serving areas that contain or expose safety-related equipment. | Yes, as noted in noted FSAR subsection F.3.2 Position E2(A), Amendment No. 24, and Section F.4, Item 1.6, Amendment No. 24. | Flow Diagram Fire Protection System Drawings M-515, M-573, M-741 series and Isometric Drawings, Contract Documents 206, 215, 217 and 224. | Meets the intent of this criteria.   | <p>Revise the FSAR to clarify the Plant approach and commitments.</p> <p>Install a 12 inch post indicator valve in the 12 inch cast iron fire main line No. 12" FP (4)-1 located on the east end opposite valve No. FP-V-17P, south of intersecting line No. 12 FP (8)-1.</p> |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks |
|-------------------|---|--|---|---|--|---------|
| 2.162             | <p>Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.3, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E1(b), Amendment No. 37.</p> <p>All signals to the Control Room are distinctively divided into zones which designate the building, floor and cause of alarm. Supervising signals and alarms from sprinkler system actuation and pull boxes from all buildings except the warehouses shall sound in the Control Room and are automatically sent to offsite fire departments.</p> <p>Provision or lack of local audible alarms transmitted by the fire detection system, sounding in the fire area where a fire is detected is not discussed.</p> | <p>Yes. See Supply System FSAR Section 9.5.1, Subsection 9.5.1.2.3 Amendment No. 30 and response to Subsection F.3.2 Position E1(b) in Amendment No. 19 dated October 1981 filed with NRC prior to fuel load date of 12/23/83.</p> | <p>Contract Documents 217,218 and 02. Electrical Wiring Diagram EWD-62E Sheets 000, 001, 002, 003, 004, 005, 006 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 036A, 039, 040, 041, 042 and 053.</p> <p>Drawing Nos. E502, E503 Sheet 6, E504, E508.</p> <p>Design Drawing 02-217-0004 Sheets 1-72.</p> | <p>Meets the intent of the guidelines. Fire alarms are received in the Control Room. The Control Room operator gives oral instructions over the public address loud-speakers.</p> | <p>No change in Plant Design, due to the deviation taken prior to 12/23/83. Update FSAR to reflect Plant Commitments. Evaluate the need or feasibility of providing local audible alarms which sound in the area where a fire may be sensed.</p> |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks                                      |
|-------------------|---|--|--|--|--|--|
| 2.16)             | Yes, in general compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.3, Amendment No. 30; and Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Amendment No. 19; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Positions E1(a,b), Amendment No. 19, and E1(c,d), Amendment No. 19; and Section F.4, Compliance with Appendix R, Item F.4.2.f, Amendment No. 24. | Yes. Refer to: NRC letter dated 4/13/83, D Kubick to R Ferguson, Subject - Fire Protection Site Audit WNP-2; Supply System letter G02-83-0597, dated 7/1/83, G D Bouchey to A Schwencer, Subject - Response to Fire Protection Site Audit Concerns; Supply System letter G02-83-0981, dated 10/28/83, G C Sorensen to A Schwencer, Subject - Response to Fire Protection Site Audit Concerns; and WNP-2 SSER 4 paragraph 9.5.1.6(1). | Contract Documents 217 and 218. Electrical Wiring Diagram EWD-62E Sheets 000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 036A, 039, 040, 041, 042 and 053.<br><br>Drawing Nos. E602, E603 Sheet 0, E604, E608.<br><br>Design Drawing 02-217-0004 Sheets 1-72. | In compliance with plant commitments, NFPA-72E was used as guidance in selection and installation of Fire Detectors at WNP-2. The system configuration meets the intent of NFPA-72E. Differences are as noted below:<br><br>a) Paragraph 2-5.1.2 - Drawing Review by Authority having Jurisdiction<br><br>b) Paragraph 2-5.1.3 - Drawing Review by Authority having Jurisdiction<br><br>c) Paragraph 2-6.5 - Detector Location (4-4.6)<br><br>d) Paragraph 4-1.2 - Detector Location (4-4.6)<br><br>e) Paragraph 4-3.1 - Detector Location<br><br>f) Paragraph 4-4.5.2 - Detector Location<br><br>j) Paragraph 4-4.6 - Detector Location (Deep Pockets)<br><br>Smoke detectors location was approved by the Authority having Jurisdiction. | Revise the FSAR to clarify the previously approved commitments to NFPA-72E. The noted code paragraphs are included in the approved deviation. This clarification should include appropriate Engineering Analyses and backup documentation. Evaluate Paragraphs 4-3.1 and 4-4.6 for feasibility and applicability to WNP-2.<br><br>Refer to Section 5.0 "Fire Detection System Walkdown Report" of this report for specific recommended improvements. | Pulsed line heat detectors are not utilized. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|--|--|---------|
| 2.160<br>(Cont'd) |  |                           |  | t. 3445 - Water Temperature supervision<br>u. 3446 - Fire pump supervisory instruments<br>v. 3511 - Distinctive smoke alarm signals<br>w. 3541 - Smoke alarm signals<br>x. 3542 - Smoke alarm signals<br>y. 3544 - Supervision of detection circuits |  |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|---|--|---------|
| 2.160 (Cont'd)    | <p>vising Station (Control Room) are not automatically recorded. WNP-2 employs a pre-alarm detection system which sounds an alarm signal in the control room only. The Control Room operator manually sounds a building-wide alarm over the public address system. An alarm also can be sent to off-site fire departments.</p> |                           |  | <p>g. 1241 - Daily reports</p> <p>h. 1261(c) - Disposition of the cause of alarm signal</p> <p>i. 2021 - Document submitted prior to approval</p> <p>j. 2110 - National Electric Code NFPA No. 70</p> <p>k. 2212 - Equipment approval</p> <p>l. 2221 - Power Supply</p> <p>m. 2222 - Primary Power Supply</p> <p>n. 2223 (a-f) - Secondary Power Supply</p> <p>o. 2224 - Separate power supply for trouble signals.</p> <p>p. 2231 - Additional power supply</p> <p>q. 2243 - Overcurrent protective devices.</p> <p>r. 2251 - Rectifier Power Supply</p> <p>s. 3444(b) - Water level</p> |  |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken   | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks  |
|-------------------|---|---|--|---|--|--|
| 2.160             | <p>Yes, meets the guidelines as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.2.3 and 9.5.1.3, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.2 Fire Hazards Analysis, Amendment No. 37; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Positions E1(a,b), Amendment No. 37, and E1(c,d), Amendment No. 19; and Section F.4, Compliance with Appendix R, Item F.4.2f, Amendment No. 37; and the Technical Memorandum No. 1227, Rev 3, Amendment No. 33.</p> <p>The fire detection system complies with Class B systems, as defined in NFPA 72D, with the following exceptions: detection circuits that actuate fire suppression systems in safety-related areas are Class A. All signals coming into the Central Super-</p> | <p>Yes. See Supply System response to NRC Position E1(a) in Amendment No. 19 dated October 1981 filed with NRC prior to fuel load date of 12/23/83.</p> | <p>Contract Documents 217, 218 and 02.</p> <p>Electrical Wiring Diagram EWD-62E Sheets 000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 036A, 039, 040, 041, 042 and 053.</p> <p>Drawing Nos. E502, E503 Sheet 6, E504, E508.</p> <p>Design Drawing No. 02-217-0084 Sheets 1-72.</p> | <p>In compliance with plant commitments. Fire detection systems used to actuate automatic fire suppression systems in safety related areas are Class A as defined by NFPA-72D, Paragraphs 1111, 3541 and 3542.</p> <p>All other fire detection systems are Class B.</p> <p>NFPA-72D was used as guidance at WNP-2 for Proprietary Protective Signaling Systems.</p> <p>The systems configuration meets the intent of NFPA-72D. Specific differences are set forth in the Paragraphs below:</p> <ol style="list-style-type: none"> <li>1211 - Recorder does not automatically record signals</li> <li>1212 - Recording devices not provided</li> <li>1221 - Access to Control Room by authorized people</li> <li>1222 - Control Room staffing</li> <li>1223 - Control Room operator's function</li> <li>1234 - Drain list</li> </ol> | <p>No change to Plant Design due to deviation taken prior to 12/23/83, and approved by the NRC.</p> <p>Revise the FSAR to clarify the previously approved commitments to NFPA-22D. The listed code paragraphs are included in the approved deviations noted in FSAR Appendix F, Technical Memorandum No. 1227, Revision No. 3, Amendment No. 33 and SER 4, Section 9.5.1.6 pages 9-5 and 9-6. This clarification should include engineering analysis and backup documentation.</p> | <p>This criteria item changed from the original criteria of Appendix A to BTP APCSB 9.5-1, where the requirements for Class A system were not spelled out. Therefore, WNP-2 included this feature, at the NRC request, only for actuation of automatic fire suppression systems in areas where safety related systems are present.</p> |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No: | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken   | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks   |
|-------------------|--|---|--|--|--|---|
| 2-159             | Yes, in general compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.1.5 and 9.5.1.2.3, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Amendment No. 37; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Positions E1(a,b), Amendment No. 37, and E1(c,d) Amendment No. 19; and Section F.4, Compliance with Appendix R, Item F.4.2f, Amendment No. 37; and the Technical Memorandum No. 1227 Rev 3, Amendment No. 33. | Yes. Several areas were not provided with smoke detectors. By letter dated July 1, 1983, WNP-2 provided verification that the ventilation system is designed to facilitate movement of smoke toward the detectors thus eliminating the NRC Staff concern about smoke stratification and detector response. NRC found this acceptable and granted a deviation. Refer to NRC SSER 4, pages 9-5 and 9-6. | Contract Documents 217 and 218. Electrical Wiring Diagram EWD-62E Sheets 000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 036A, 039, 040, 041, 042 and 053. Drawing Nos. E502, E503 Sheet 6, E504, E508.<br><br>Design Drawing 02-217-0084 Sheets 1-72.<br><br>DCP 02-85-0088, 0A.<br>PPH's Vol. 7 (Surveillance) and Vol. 10 (Maintenance). | Complies with Plant Commitments. Meets the intent of the criteria. Existing deviations were evaluated and found acceptable by the NRC. | Revise the FSAR to reflect the WNP-2 previously approved commitments.  | The existing design provides an equivalent level of protection. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|---------------------------------------|--|---------|
| 2.156             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position D5(b), Amendment No. 37. | Not needed                | PPH 1.3.36                                   | In compliance with Plant Commitments. | No design change. Update FSAR.   |         |
| 2.157             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position D5(c), Amendment No. 19. | Not needed                | Contract Document 228.                       | In compliance with Plant Commitments. | No design change. Update FSAR.   |         |
| 2.158             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position D5(d), Amendment No. 19. | Not needed                | Contract Document 228.                       | In compliance with Plant commitments. | No design change. Update FSAR.   |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken   | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program  | Remarks   |
|-------------------|--|---|--|---------------------------------------|---|---|
| 2.155             | <p>Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position DS(a), Amendment No. 19; with the exception that most fixed emergency lighting consist of self-contained lighting units with 2-25W, 6V, sealed beam lights and a 20 A-H battery supply, provided in critical areas. The batteries will last 2-3 hours. In addition, emergency lighting connected to the A.C. emergency buses which are supplied by the diesel generators is installed. This lighting will last indefinitely, therefore, the plant is essentially in compliance.</p> <p>Fixed emergency lighting in the Main Control Room, Remote Shutdown Room, and interconnecting access corridor consists of 8-hour battery units in accordance with the requirements of 10CFR50, Appendix R. See 2.156.J.</p> | Yes. See Supply System response to NRC position DS(a) Amendment No. 19 dated October 1981 filed with NRC prior to fuel load date of 12/23/83. | Contract Documents 218 and 228.              | In compliance with Plant commitments. | No change due to deviation taken prior to 12/23/83. Revise the FSAR to clarify the Plant commitments and acceptable deviations. | A DCP is being worked to provide Emergency Lighting in the Alternate Shutdown Room as part of the revised Shutdown Procedure. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|---------------------------------------|--|---------|
| 2.154             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Positions D.5.a, D.5.c and D.5.d Amendment No. 19 and D.5.b, Amendment No. 36; and Section F.4, Compliance with Appendix R, Item F.4.2, Amendment No. 19. | Not needed                | Contract Documents 218 and 228.              | In compliance with Plant Commitments. | No design change. Revise the FSAR to clarify Plant Commitments.        |         |

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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation              | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks   |
|-------------------|--|---------------------------|---|---------------------------------------|--|---|
| 2.152             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Areas: RC-IV, RC-VI, RC-VII, RC-VIII and RC-XI Amendment No. 34.  | Not needed                | Air Handling Specification Contract No. 67.               | In compliance with Plant Commitments  | No design change. Clarify the FSAR to reflect Plant Commitments.       | Locate or re-create the Combustible Load Calculations for these fire areas. |
| 2.153             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Areas: RC-IV, RC-VI, RC-VII, RC-VIII and RC-XI, Amendment No. 34. | Not needed                | Air Flow Diagram Drawing Nos. M-548, M-545, M-549, M-551. | In compliance with Plant commitments. | No design change. Clarify the FSAR to reflect Plant commitments.       | Refer to Item 2.152.  |

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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation                                       | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program     | Remarks  |
|-------------------|--|---------------------------|--|---------------------------------------|--|--|
| 2.150             | Yes, in compliance as described in FSAR Section 6.5.1, Engineered Safety Features Filtration Systems; and Section 9.5.1, Fire Protection System, Subsection 9.5.1.1.2, Amendment No. 36.<br><br>Redundant fans are provided for each standby gas treatment system to remove decay heat which is an acceptable substitute for air bleed system. | Not needed                | Air Flow Diagram Drawing No. H-544.  | In compliance with Plant Commitments. | No design change, however, update the FSAR.                                |  |
| 2.151             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.1.2, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazard Analysis, Fire area: RC-XI, RC-XII and R-1, Elevation 572'-0", Amendment No. 34.   | Not needed                | Air Cleaning Specification Contract No. 18.<br>Air Flow Diagram Drawing No. H-544. | In compliance with Plant Commitments. | No design change. Update and revise the FSAR to reflect Plant Commitments. | Locate or re-create the Combustible Load Calculations for these areas. |

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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken   | WNP-2 Fire Protection Program Implementation                     | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program                       | Remarks   |
|-------------------|---|---|--|---------------------------------------|--|---|
| 2.147             | Deviation as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APESB 9.4-1, Subsection F.3.2, Compliance Evaluation, Position D4(f), Amendment No. 19. No smoke control system is installed. | Yes, See Supply System response to NRC Position D4(f) in Amendment No. 19, dated October 1981 filed with NRC prior to fuel load date of 12/23/83. | Not implemented, due to deviation taken and approval by the NRC. | In compliance with Plant Commitments. | No design change, however, update and clarify the FSAR to clearly reflect Plant Commitments. |   |
| 2.148             | DNA - see Remarks   |   |  |                                       |  | Total Flooding Halon System is not used at WNP-2. |
| 2.149             | Yes, in compliance as described in FSAR Section 9.4, Heating Ventilating and Air Conditioning, Amendment No. 9; and Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.4, Amendment No. 3E.  | Not needed  | Air Cleaning Specification Contract No. 18.                      | In compliance with Plant Commitments. | No design change   |   |

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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken   | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program                          | Remarks |
|-------------------|--|---|---|---------------------------------------|---|---------|
| 2.144             | Deviation as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position D4(c), Amendment No. 19.          | Yes. See Supply System response to NRC Position D4(c) in Amendment No. 19 filed with NRC prior to fuel load date of 12/23/83. | Implemented to the extent possible and practical.   | In compliance with Plant Commitments. | No change, due to deviation taken prior to 12/23/83, however, describe and clarify in the FSAR. |         |
| 2.145             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position D4(d), Amendment No. 19. | Not needed  | Air Cleaning Specification Contract No. 18. Fire Protection System Flow Diagram Drawing No. M-515.                  | In compliance with Plant Commitments. | No design change, however update the FSAR to clarify the Plant Commitments.                     |         |
| 2.146             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position D4(e), Amendment No. 19. | Not needed  | Air Flow Diagram Drawing No. M-548. Physical Layout Drawings M-788, -805, -809, -810, -820, -823, -825, -826, -828. | In compliance with Plant Commitments. | No change.  |         |

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| Criteria Item No: | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken   | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks  |
|-------------------|--|---|---|---|--|--|
| 2-142 and 2-143   | Yes. In compliance as described in FSAR Section 9.4.1, Fire Protection System, Subsections 9.5.1.1.1) 9.5.1.1.2, 9.5.1.1.3, 9.5.1.1.3.10-B, 9.5.1.1.5 and 9.5.1.2.4, Amendment No. 36; and Appendix F Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, each Fire Hazards Analysis (FHA) area, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position D4(a), Amendment No. 19. Separate rate smoke and heat vents are not provided in the areas where potential exists for heavy smoke conditions as called for in NFPA Standard 204 referenced in the criteria. | Yes. See Supply System response to NRC Position D4(a) in Amendment No. 19, dated October 1981 filed with NRC prior to fuel load date of 12/23/83. | Air Flow Diagram Drawing No. M-549 and Design Drawings M-188, M-805, M-809, M-810, M-820, M-823, M-824, M-828, M-828 Contracts: 216, 67, 18, CVI 216-001658 | 1. In compliance with Plant Commitments. NFPA 90A was extensively used as guideline in the design of WNP-2 ventilation system.<br><br>2. Plant Technical Specifications cover the monitoring of radioactive smoke and gasses. | 1. No design change due to deviation taken prior to 12/23/83. Revise and update the FSAR to reflect the Plant Commitments and previously approved deviations.<br><br>2. Delete the commitment to compliance with NFPA 204. See Remark 1.<br><br>3. Evaluate WNP-2 compliance with NFPA 91 and 101. See Remark 2. | 1. NFPA-204 guidance for smoke control address was not for this plant. The smoke control objectives of NFPA-204 are fulfilled through the adoption of the relevant guidelines of NFPA 90A and BTP CMB 9.5-1, Item C.b.f.<br><br>2. NFPA 91 and NFPA 101 were not part of the scope of this report. |

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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program  | Remarks   |
|-------------------|---|---------------------------|--|---|---|---|
| 2.207             | DNA - See Remarks.  |                           |  |   |   | Standpipes greater than 3 inches in size are utilized at WNP-2.                                   |
| 2.208             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1.7, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E4, Amendment No. 37. Does not address disarmament of automatic Halon extinguishing systems nor administrative controls as described in BTP CHED Position C.2.c. | Not needed                | Contract Document 02. Drawings EWD 62E Sheets 1-10. Plant Procedures: Administrative - Volume 1, Surveillance - Volume 7, and Alarm Response - Volume 4, as required. Maintenance Volume 10.29.15. Specification MIL-M-12218B. PPM 1.3.35. | In compliance with Plant commitments. The Halon systems for the Main Control Room PGCC Control Cabinets meet the requirements of NFPA 12A.<br><br>For inspection and maintenance of these systems the guidance of NFPA 12A was used extensively. Specific differences are set forth below.<br><br>a. Paragraph 1715 - Check weight of refillable containers.<br><br>b. Paragraph 1717 - weight and pressure recorded on tag.<br><br>PPM 1.3.35 describes the administrative controls to be present when impairment of Halon System is required. | Update the FSAR to clarify the compliance, previously approved commitments and explain that WNP-2 means of addressing Paragraphs 1715 and 1717 criteria represents a practical approach to specific plant conditions. | The Halon systems for the Main Guardhouse and Building 85 did not constitute part of this review. |

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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation                               | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|--|--|--|--|--|---------|
| 2.209             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation Position E4, Amendment No. 37; with the exception that halon cylinder fill verification is performed every six months in lieu of 3 months or quarterly. | Yes. See Supply System response to NRC Position E4 in Amendment No. 19 dated October 1981, filed with NRC prior to fuel load date of 12/23/83. | Plant Procedures Surveillance Volume No. 7. PPM Volume 4 (Alarm Response). | In compliance with Plant Commitments, NFPA-12A, Paragraph 1710 which requires inspection and testing at least annually, and meets the intent of Maintenance and Testing of the guidelines and NFPA 12A requirements. Specific differences are set forth below:<br><br>a. Paragraph 1715 - check weight of refillable containers.<br><br>b. Paragraph 1717 - weight and pressure recorded on tag.<br><br>Weighing of 60 agent containers is impractical. Liquid level is measured. This is an equivalent method of measurement. | Same as for Item 2.208.  |         |

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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status                          | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks   |
|-------------------|--|---------------------------|--|---|--|---|
| 2.210             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1.7, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position E4, Amendment No. 37. | Not needed                | Contract Document 02.<br>Drawings EWD 62E Sheets 1-10.<br>Plant Procedure Manuals:<br>Volume 1 (Administrative)<br>Volume 4 (Alarm Response)<br>Volume 7 (Surveillance).<br>PPM 10-29-15 and Maintenance Vol. 10, Paragraph 10.29.15.<br>Specification MIL-M-12218B. | In compliance with Plant Commitments.<br>This was done by GE. | Same as Item 2.208.  |   |
| 2.211 and 2.212   | See Remarks  |                           |  |   |  | CO <sub>2</sub> suppression systems are not installed in areas containing safety-related equipment. Therefore, an evaluation was not performed. Not part of the scope of this Report. |

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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks  |
|-------------------|---|---------------------------|--|--|--|--|
| 2.213             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.1.1, 9.5.1.1.5, 9.5.1.2.1.8, 9.5.1.3 and Table 9.5-5, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis - each fire area, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation Position E6, Amendment No. 19. | Not needed                | Contract No. 217 PPM 2.8.9.                  | <p>In compliance with Plant Commitments. Approved by the NRC Staff in the original SER. A walkdown indicates that the intent of NFPA 10 for provision and installation of portable extinguishers appears to have been met. Also selection of dry chemical extinguishers appears to be in accordance with NFPA 10. (See Remarks) Specific differences are set forth below:</p> <p><u>NFPA 10</u></p> <p>Paragraph 1-4.8 - Installation of extinguishers above 5'-0" from floor</p> <p>Paragraph 1-4.9 - Operation of extinguisher</p> <p>Paragraph 1-4.12 - Instruction manual</p> <p>Paragraph 2-1 - Selection of extinguishers</p> <p>Paragraphs 2-2.1, 2-2.1.1 and 2-2.1.3 - Selection of extinguishers per hazards</p> <p>Paragraphs 3-1.1, 3-1.2, 3-1.2.1, 3-1.2.2, 3-1.2.3, 3-1.2.4 and 3-1.3 - Distribution of Extinguishers</p> | <p>Revise and consolidate the FSAR to clarify the degree of commitment and compliance with NFPA 10. Based on differences found in comparison of WNP-2 against NFPA 10 Code Guidelines the following are recommended:</p> <ol style="list-style-type: none"> <li>1) Verify installation height of portable extinguishers against Paragraph 1-4.8.</li> <li>2) Obtain instruction manuals of fire extinguishers used at WNP-2 as required by Paragraph 1-4.12.</li> <li>3) Explain how selection of extinguishers for specific hazards meets the intent of Paragraphs 2-1, 2-2.1, 2-2.1.1 and 2-2.1.3, and ANSI approval of their selection.</li> <li>4) Evaluate for feasibility and applicability the following paragraphs: 1-4.9, 3-1.1, 3-1.2, 3-1.2.1, 3-1.2.2, 3-1.2.3, 3-1.2.4, 3-1.3, 3-2.1, 3-2.2, 3-2.3, 3-2.4, 3-2.5, and 3-6.</li> </ol> | WNP-2 did not commit to do inspection, maintenance and testing of portable extinguishers in accordance with NFPA 10, and therefore Chapters 4 and 5 do not apply and were not evaluated. |

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| Criteria Item No.   | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program                            | Remarks   |
|---------------------|---|---------------------------|---|---------------------------------------|---|---|
| 2.214 through 2.216 | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.1.1.3.1 and 9.5.1.2.5 Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Areas: R-I through R-XV, R-XVIII through R-XIX and R-XXI, Amendment No. 37; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position F1(a), Amendment No. 24. | Not needed                | Fire Protection Program; FSAR Section 9.5.1 and Appendix F, including the Fire Hazards Analysis (FHA), as applicable. | In compliance with Plant Commitments. | No change, however, revise and consolidate the FSAR and FHA to clearly reflect plant commitments. | During normal operation WNP-2 Primary Containment is inerted.<br><br>Locate or re-create the combustible load calculations for these fire areas.  |
| 2.217 through 2.223 | DNA - See Remarks Clarification: For Criteria Item 2.221, GDC 56 applies only to Primary Containment, therefore, the entire Criteria pertains only to Primary Containment. See Remarks.   |                           |   |                                       |   | Primary containment is inerted during normal operation as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position F1(a), Amendment No. 24. |

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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status                          | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program                            | Remarks  |
|-------------------|---|---------------------------|--|---|---|--|
| 2.224             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.1.1.3.1 and 9.5.1.2.6, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Areas: R-I through R-XV, R-VXIII through R-XIX and R-XXI, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Positions FI(a) and FI(b), Amendment No. 24. | Not needed                | Fire Protection Program; FSAR Section 9.5.1 and Appendix F, including the Fire Hazards Analysis (FHA) as applicable. | In compliance with Plant Commitments. Refer to 2.133 - 2.141. | No change, however, revise and consolidate the FSAR and FIA to clearly reflect Plant Commitments. | Approved by the NRC in the SER. Refer to Item 2.214. |

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|-------------------|---|---------------------------|--|---------------------------------------|--|-------------------------|
| 2.225             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.1.1.3.1 and 9.5.1.2.5, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Areas: R-I through R-XV, R-VXIII through R-XIX and R-XXI, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2; Compliance Evaluation; Position F1(b), Amendment No. 37. | Not needed                | Same as for Item 2.214 and Plant Procedure Manual (PPM) 1.3.35 | In compliance with Plant Commitments. | Same as for Item 2.214   | Same as for Item 2.224. |

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|-------------------|---|---------------------------|---|--|--|-------------------------|
| 2,226             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.1.1.3.1 and 9.5.1.2.5, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Areas; R-I through R-XV, R-VIII through R-XIX and R-XXI, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation; Position FI(b); Amendment No. 37. | Not needed                | Same as for Item 2.225. No written documentation available. | Verbal confirmation by WNP-2 engineers | Same as for Item 2.214. Also a plant procedure should be initiated to designate location and assure maintenance of self-contained breathing apparatus. | Same as for Item 2.224. |

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|-------------------|---|--|---|---|---|---|
| 2.227             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsections 9.5.1.1.2, 9.5.1.1.3, 9.5.1.2.1.7, and Table 9.5-5, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Area RC-X, Amendment No. 37; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Positions D4 and F2, Amendment No. 19, and D3(j) and E4, Amendment No. 37; with the exception that peripheral areas of the Control Room proper are separated by partitions that are not fire rated. | Yes. By letter of 7/1/83, WNP-2 committed to install an automatic sprinkler system in these peripheral areas. NRC SSER-4 pages 9-7 and 9-8 finds this acceptable.<br><br>Original SER page 9-35. | FSAR Section 9.5.1 and Appendix F. FHA: RC-X for further details refer to criteria items: 2.142, 2.160, 2.166, 2.193, 2.208, 2.213. | 1. In compliance with Plant Commitments.<br><br>2. Barriers that define the room were not evaluated for implementation as they are not part of the scope of this report. See Remarks. Peripheral rooms are of non-combustible construction, but without fire resistance rating. This was approved by NRC in the SER and SSER's. No smoke dampers are provided. Carbon dioxide flooding is not used for the Control Room. Halon is used only for PGCC system protection.<br><br>For status of compliance with specific fire protection provisions for the control room refer to items:<br><br>2.142, 2.160, 2.193, 2.208, 2.213. | 1. No design change due to deviations taken prior to 12/23/83.<br><br>2. However, revise, update and clarify the FSAR to clearly describe the Plant commitments and approved deviations, including fire door dampers and frames, etc. | Building design features are not part of the scope of this report.<br><br>Locate or re-create the Combustible Load Calculations for this fire area. |

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| Criteria Item No.   | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks              |
|---------------------|--|--|---|---|--|----------------------|
| 2.228 through 2.230 | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.1.8 and Table 9.5-5, Amendment No. 30; and Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Area RC-X, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCS8 9.5-1, Subsection F.3.2, Compliance Evaluation, Position F2, Amendment No. 37. | Yes, Technical Specifications 3/4.7.6 and 4.7.6.4b. ANI Approval, Property File No. M-219 (1979).<br><br>Original SER page 9-36, SSER 4. | Same as Item 2.227.   | In compliance with Plant Commitments. For details refer to criteria items 2.160, 2.166, 2.193, 2.198, 2.208, 2.213. | No design change. Clarify the FSAR and FHA.                            | Refer to Item 2.227. |
| 2.231               | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Area RC-X, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCS8 9.5-1, Subsection F.3.2, Compliance Evaluation, Position F2, Amendment No. 37.  | Not needed   | FSAR Appendix F Section F.2 and F.3. For further details refer to criteria items: 2.159, 2.160 and 2.161. | In compliance with Plant Commitments. For further details refer to items 2.159, 2.160 and 2.161.                    | No design change, however, clarify the FSAR and FHA.                   | Refer to Item 2.227. |

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 FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria<br>Item No. | WNP-2 Commitment<br>To Compliance With<br>Fire Protection<br>Criteria | Formal<br>Deviation(s)<br>Taken | WNP-2 Fire<br>Protection Program<br>Implementation | WNP-2 Fire<br>Protection<br>Program<br>Status | Recommended<br>Option(s) For<br>Improvement Of<br>WNP-2 Fire<br>Protection Program | Remarks |
|----------------------|---|---------------------------------|--|---|--|---------|
|----------------------|---|---------------------------------|--|---|--|---------|

2.241 DHA - see Remarks

Foam or AFFF are  
 not used at WNP  
 in safety re-  
 lated areas.

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program  | Remarks  |
|-------------------|---|--|--|---|---|--|
| 2.242             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F-2, Fire Hazards Analysis, Fire Area RC-11 A.B.C and RC-111, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCSB 9.6-1, Subsection F.3.2, Compliance Evaluation, Position F3(a), Amendment No. 19; with the exceptions that there are some tray crossover and support obstructions which hamper but do not preclude access, one hose station is installed immediately outside the room and line detectors are not provided. | Yes. See Supply System response to NRC position F3(a) in Amendment No. 19, dated October 1981 filed with NRC prior to fuel load date of 12/23/83.<br><br>Not required by BTP APCSB. SER. | Architectural Drawings Series "A": Civil Drawings Series "S", Piping Drawing N-515, PPM 2.B.9.<br>Contract Documents 215, 217 and 218, Electrical Wiring Diagram EWP-62E Sheets 000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 032A, 039, 040, 041, 042 and 053.<br>Drawings E502, E503 Sheet 6, E504, E508.<br><br>Design Drawing 02-217-0084 Sheets 1-72.<br><br>Supply System Letter G02-83-184 (3/4/83).<br>Lesson Plan 80 - FPI-0600-L.<br>PPM's Vol. 1 (Administrative), Vol. 2 (F. P. Sys. Operations), Vol. 4 (Alarm Response), Vol. 7 (Surveillance), Vol. 10 (Maintenance), Vol. 13 (Emergency).<br><br>PED's 217-E-0249 217-B-0247 and 0250.<br><br>Instruction Manuals 02-999-00 and 02-217-03.<br><br>AWI approval, Property File No. W-219 (1979). | In compliance with Plant Commitments. Original aisle design was in accordance with this criteria, presently meets the intent. Structural supports of cable trays are interfering. This was approved by the NRC.<br><br>Continuous line detectors are not used. Committed before 1983. For further details refer to Criteria Items: 2.160, 2.161, 2.198 and 2.213. | No design change, update, consolidate and clarify the FSAR & FHA based on previously approved commitments and deviations.<br><br>For further details refer to Criteria Items 2.160, 2.161, 2.198 and 2.213. | WNP-2 did not commit to have line detectors, and therefore it is considered to be an acceptable deviation. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
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FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program                                  | Remarks   |
|-------------------|--|--|---|--|---|---|
| 2.243             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis Fire Areas RC-II A,B,C and RC-11, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position D1(i)c, Amendment No. 24. | Yes. See Supply System response to HRC position D1(i) in Amendment No. 19 dated October 1981 filed with HRC prior to fuel load date of 12/23/83. | WNP-2 FHA. General Arrangement Drawings Series "H". Civil Drawings Series "S". Plumbing Drawings. | In compliance with Plant commitments. Drains were not provided in the cable spreading room. Flooding is accounted for until doors are opened. Gaseous suppression systems are not installed in the cable spreading room. | Revise the FSAR and FHA to update and clarify the Plant commitments and previously approved deviations. | NFPA-92 M does not apply to WNP-2, as it was not used in the plant design. Flooding was a consideration in the FHA.<br><br>Gas extinguishing systems are not installed in the cable spreading room. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
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FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks  |
|-------------------|--|--|---|--|--|--|
| 2.244             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Areas RC-II, A,B,C and RC-III, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Positions D3(b) and D3(c), Amendment No.37; with the exception that separate spreading rooms are not provided for each redundant division. However, the cable spreading room is designed to provide divisional separation. | Yes, by letter of October 12, 1981 from WNP-2 to HRC. WNP-2 committed to comply with Section IIIG of Appendix R, SSER 3. Technical Specifications. | Contract Document 210A. Architectural Drawings Series "A", Civil Drawings Series "5",<br><br>PPH's 1.3.19, 1.3.35, 7.4.7.7.2.1, 7.4.7.7.2.4.<br><br>PED 210A-CS-0370. FHA, as applicable. | In compliance with Plant Commitments. WNP-2 is one-reactor unit and has one cable spreading room. Building design features and safe shutdown analysis were not evaluated. See Remarks. | No change. Clarify the FSAR and FHA, to reflect the Plant commitments. | The building design features and Safe Shutdown Analysis in case of fire were excluded from the scope of this report. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken   | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program                  | Remarks |
|-------------------|---|---|--|--|---|---------|
| 2.245             | <p>Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Areas RC-III A,B,C Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position D4(a), Amendment No. 19. Gas extinguishing systems are not used in cable spreading room.</p> <p>Separate manually actuated smoke venting that is operable from outside the room is not provided for the cable spreading room.</p> | <p>Yes. See Supply System response to NRC position D4(a) and Fire Hazards Analysis RC-III, A,B,C in Amendment No. 19, dated October 1981, filed with NRC prior to fuel load date of 12/23/83.</p> | <p>Air Flow Diagram Drawing No. M-549.</p>   | <p>In compliance with Plant Commitments. Portable manually actuated smoke removal is provided.</p> | <p>Revise the FSAR to include smoke removal capability stated in FHA RC-III, A,B,C.</p> |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|

2.246 DHA - see Remarks

There are no computers performing safety-related functions at WNP-2.

Non safety-related computers are located in buildings separate from the Control Room Complex.

TDAS computer and PPIC computer are located at the Data Center in Richland, WA.

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WPP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WPP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken  | WPP-2 Fire Protection Program Implementation  | WPP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WPP-2 Fire Protection Program  | Remarks   |
|-------------------|--|--|---|---|---|---|
| 2.247             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Areas RC-VIII and RC-XIV, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation Position F5, Amendment No. 19. Automatic fire detectors do not alarm locally. | Yes. See Supply System response to NRC position F5 in Amendment No. 19 dated October 1981, filed with NRC prior to fuel load date of 12/23/83.<br><br>SSER 3 9.5.1.6 page 9-3 lists deviation from C.6.C of BTP CHEB 9.5-1 for Switchgear Room #1. Technical Specifications. | Fire Hazards Analysis. Architectural Drawings Series "A". Civil Drawings Series "S". Contract Documents 210A, 215 and 217. Electrical Wiring Diagram EWD-62E Sheets 000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 036A, 039, 040, 041, 042 and 053. Drawings E502, E503 Sheet 6, E504, E508. Design Drawing 02-217-0084 Sheets 1-72.<br><br>PPH's Vol. 1 (Administrative) Vol. 2 (Fire Protection System Operation) Vol. 4 (Alarm Response) Vol. 7 (Surveillance) Vol. 10 (Maintenance) Vol. 13 (Emergency)<br><br>PED's 217-E-0249, 217-B-0247 and -0250, 210A-CS-0370.<br><br>Instruction Manuals 02-999-000 and 02-217-03.<br><br>ANI approval, Property File No. N-219 (1979).<br><br>Supply System Letter G02-83-184 (3/4/83). Lesson Plan 80-FPT-0600-L. | In compliance with Plant Commitments. Fire barriers of 3-hour rating or equivalent are provided. Less than 3-hour ratings are acceptable based on the combustible loading and defense-in-depth concept.<br><br>The redundant Switchgear Room is separated by rated fire barriers. (see Remarks). Automatic detection is provided, without local alarm, as previously approved. (See Criteria Item 2.160).<br><br>For further details refer to Items: 2.160, 2.161, 2.198 and 2.213. | No design change, however, revise and update the FSAR and the FIA to reflect the Plant Commitments, previously approved deviations and describe the equivalent level of protection provided.<br><br>For further details refer to Items: 2.160, 2.161, 2.198 and 2.213, as applicable. | 1. Locate or re-create combustible load calculations for the Switchgear Rooms.<br><br>2. Building design features are excluded from the scope of this review. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks                                |
|-------------------|--|--|--|--|--|--|
| 2.24B             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Areas RC-VIII and RC-VIX; Amendment No. 39. Smoke would be removed through the operation of the smoke exhaust system with portable ducting. | Yes, per Fire Hazards Analysis Fire Area RC-VIII Switchgear Room No. 2 and Fire Area RC-XIV, Switchgear Room No. 1, Amendment No. 34.<br><br>See Supply System response to NRC position D4(a) in Amendment No. 10, dated October 1981, filed with NRC prior to fuel load date of 12/23/83. | Air Flow Diagram Drawing No. M-549.          | In compliance with Plant Commitments. Flooding was described in the FHA. HFPA 92M did not constitute part WNP-2 design. Manual portable smoke venting was accepted by the NRC. | No design change due to deviations taken prior to 12/23/83, however, clarify and change the FHA and FSAR to reflect the Plant Commitments, and previously approved deviations. | HFPA-92M was not part of WNP-2 design. |

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FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program  | Remarks   |
|-------------------|---|--|---|--|---|---|
| 2.249             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, as applicable, Amendment No. 36; and Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position F6, Amendment No. 19; with the exception that automatic fire detectors do not alarm locally. | Yes. See Supply System response to NRC position F6 in Amendment No. 19, dated October 1981, filed with NRC prior to fuel load date of 12/23/83.<br><br>Plant Technical Specifications. | Architectural Drawings Series "A". Civil Drawings Series "S". Mechanical Drawing M-515. PPM 2.8.9. Contract Documents 210A, 215, 217 and 218. Electrical Wiring Diagram EWD-62E Sheets 000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 036A, 039, 040, 041, 042 and 053. Drawings E502, E503 Sheet 6, E504, E508.<br><br>Design Drawing 02-217-0084 Sheets 1-72.<br><br>PPM's Vol. 1 (Administrative)<br>Vol. 2 (F. P. Sys. Operation)<br>Vol. 4 (Alarm Response)<br>Vol. 7 (Surveillance)<br>Vol. 10 (Maintenance)<br>Vol. 13 (Emergency).<br><br>PED's 217-E-0249, 210A-CS-0370, 217-B-0249 and -0250. | In compliance with Plant Commitments.<br><br>The 3-hour fire resistance rating was not a criteria requirement for WNP-2. Refer to FSAR Appendix F, Section F.3, Position F.6. Detection and portable means for fire protection are provided. Local alarms are sounded through paging system from the Control Room. This was previously approved by the NRC. (see Item 2.160).<br><br>For further details refer to Items: 2.159, 2.160, 2.161, 2.198 and 2.213. | No design change, however, revise, update, clarify the FSAR and FHA to clearly describe the previously approved Plant Commitments.<br><br>For further details refer to Items: 2.159, 2.160, 2.161, 2.198 and 2.213. | At WNP-2 direction only separation of these areas from other safety related areas and fire hazards were evaluated at this time. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks  |
|-------------------|---|--|--|---|--|--|
| 2.250             | Yes, in compliance as described in FSAR Appendix F, Fire Protection System, Subsections 9.5.1.2.2 and 9.5.1.2.4, Amendment No. 36, and Table 9.5-4, Amendment No. 38, and Protection Evaluation Section F.2, Fire Hazards Analysis, Fire Areas RC-V and RC-VI, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance, Evaluation Position F7, Amendment No. 37; with the following exceptions: ventilation penetrations are protected by - 1-1/2 hour fire rated dampers, Battery Room #1 east and west wall have a two hour rating. | Yes. See Supplement System Response to NRC Position F7 in Amendment No. 19, dated October, 1981 filed with NRC prior to fuel load date of 12/23/83 and original SER 9.5.1.5(1) page 9-29 and FIA Item 1.a., Fire Areas RC-V and RC-VI, Amendment No. 19. | Fire Hazards Analysis: Civil Drawings Series "5", General Arrangement Drawings Series "M", Mechanical Drawings M-913, PPH 2.8.9, Contract Documents 210A, Contract Documents 210A, Contract Documents 210A, 215 and 217.<br><br>Architectural Drawings A-506, A-507, A-550, A-553, A-554 and A-555.<br><br>PPH's Vol. 1 (Administrative) Vol. 2 (F.P. System Operation) Vol. 7 (Surveillance).<br><br>PED's 217-B-0247 and -0250, 210A-CS-0370.<br><br>SER Supplement 3 (May 1983).<br><br>ANL approval, Property File No. N-219 (1979). | In compliance with Plant Commitments. The Battery rooms have less than minimum 3-hr. fire resistance rated barriers enclosing them.<br><br>Fire Dampers rating of 1 1/2 hr. was approved by the NRC in the original SER, however the 2-hr. rating of the interdivisional wall was not mentioned. This configuration is technically acceptable based on the fire loading for the rooms and defense-in-depth provided in fire protection. Automatic fire detection alarms in the Control Room not locally. This was approved for the entire Plant. Refer to item 2.162. | Update, revise and consolidate the FIA and the WNP-2 Commitments in the FSAR, to reflect the Plant Commitments and previously approved deviations. Clarify to the NRC the 2-hr. fire resistance rating wall and provide technical justification to its acceptability, based on engineering analysis. Evaluate the Plant Commitment and NRC's understanding in the original SER, of the battery room ventilation systems compliance with NFPA 69. Change the Response to NRC Position F7 to be consistent with the fire resistance rating of the battery room boundaries, as listed in the FIA for fire areas RC-V and RC-VI. | 1. Comparison of NFPA-69 with WNP-2 design was not part of the scope of this review. BTP CNEB 9.5-1 does not mention NFPA 69 in its guidelines for Battery Rooms.<br><br>2. Building design features were not evaluated as they were excluded from the scope of this review. |

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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|---|--|---------|
| 2.213<br>(Cont'd) |  |                           |  | Paragraphs 5-5.3.1, 5-5.3.2<br>Testing equipment for non-compressed gas types<br><br>Paragraph 5-6.2 - Testing procedures for non-compressed gas types<br><br>Paragraph 5-6.3 - Testing procedures for hose assemblies<br><br>Paragraph 5-6.4.2 - Recording of tests for non-compressed types<br><br>Paragraph 5-6.4.3 - Hose assembly hydrostatic test recording |  |         |

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 FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria<br>Item No. | WNP-2 Commitment<br>To Compliance With<br>Fire Protection<br>Criteria | Formal<br>Deviation(s)<br>Taken | WNP-2 Fire<br>Protection Program<br>Implementation | WNP-2 Fire<br>Protection<br>Program<br>Status | Recommended<br>Option(s) For<br>Improvement Of<br>WNP-2 Fire<br>Protection Program | Remarks |
|----------------------|---|---------------------------------|--|---|--|---------|
|----------------------|---|---------------------------------|--|---|--|---------|

Item Nos. See Remarks.  
 2,271  
 through  
 2,349

Not evaluated,  
 excluded from the  
 scope of this  
 report.

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|--|--|---------|
| 2.213<br>(Cont'd) |  |                           |  | <p>Paragraphs 3-2.1, 3-2.2, 3-2.3, 3-2.4, 3-2.5 - Extinguisher size and placement for Class A Hazards.</p> <p>Paragraph 3-6 - Extinguisher size and placement for Class A Hazards</p> <p>Following paragraphs do not apply to WNP-2 (See Remarks):</p> <p>Paragraphs 4-1.2 - Inspection</p> <p>Paragraph 4-1.4 - Maintenance and recharging of extinguishers</p> <p>Paragraph 4-3.2.3 - Operating instructions on extinguisher label</p> <p>Paragraph 4-3.3 - Corrective actions for extinguishers</p> <p>Paragraph 4-4.1 - Maintenance</p> <p>Paragraph 4-4.1.1 - Hydrostatic test</p> <p>Paragraph 4-4.1.2 - Spare extinguishers</p> <p>Paragraph 4-4.2 - Maintenance Procedures</p> |  |         |

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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks                                |
|-------------------|---|---------------------------|---|---------------------------------------|--|--|
| 2.234             | DNA - See Remarks   | Not needed                | Air Flow Diagram Drawing No. M-549.   | In compliance with Plant Commitments. | No design change, however either clarify the FSAR section 9.5.1 or cross-reference to Ventilation Section for further details. | Portable smoke extraction is utilized. |
| 2.235             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.2.2 Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Area RC-X, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position F2, Amendment No. 37. | Not needed                | Contract document 217. Electrical Wiring Diagram EWD-62E Sheets. 000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 036A, 039, 040, 041, 042 and 053. Drawings E502, E503 Sheet. 6, E504, E508.<br><br>Design Drawing 02-217-0084 Sheets. 1-72. | In compliance with Plant Commitments. | No design change, update the FSAR to reflect this.   | Refer to Item 2.227.                   |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation                         | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks                           |
|-------------------|--|---------------------------|--|---------------------------------------|--|-----------------------------------|
| 2.232             | Yes, in Compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Area RC-X, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation Position F2, Amendment No. 37.   | Not needed                | MUREG No. 0737   | In compliance with Plant Commitments. | No design change, clarify the FSAR and FIA for fire area RC-X.         | Refer to Item 2.227.              |
| 2.233             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position F2, Amendment No. 37; with the exception that the Control Room ventilation intake is provided with smoke detection capability to automatically alarm locally and isolate the Control Room Ventilation System in lieu of manually isolating the ventilation system. | Not needed                | HVAC Flow Diagram Drawing No. M-548. Contract Documents 216 and 218. | In compliance with Plant Commitments. | No design change, however revise the FSAR.                             | Cross-reference HVAC Section 9.4. |

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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken   | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks   |
|-------------------|---|---|--|--|--|---|
| 2.238             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Table 9.5-6, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Areas RC-II A,B,C, and RC-III, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation Position F 3(a), Amendment No. 37. Cable spreading room is protected by a closed head directional water spray preaction system. | Yes. See Supply System response to NRC position F3(a) in Amendment No. 19, dated October, 1981 filled with NRC prior to fuel load date of 12/23/83. | Contract Documents 02, 215, 217 and 218. Electrical Wiring Diagram EWD-62E Sheets 000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 036A, 039, 040, 041, 042 and 053. Drawings E502, E503 Sheet 6, E504, E508. Drawings M-610 and M-615.<br><br>PPM's Vol. 1 (Administrative). Vol. 2 (F.P. System Operation) Vol. 4 (Alarm Response) Vol. 7 (Surveillance) Vol. 10 Maintenance) Vol. 13 (Emergency).<br><br>PED 217-E-0249.<br>DCP 02-85-0088-0A.<br><br>Design Drawings Sheets 1 & 2 Drawing 02-217-0084 Sheets 1-72. Instruction Manuals 02-999-000 and 02-217-03. | In compliance with Plant commitments. Closed head directional water sprays are used. Open head spray systems are not used at WNP-2.<br><br>For further details refer to Items: 2.160, 2.161, 2.193 - NFPA 15 only. | No design change. Update, consolidate and clarify the FSAR and the FIA. For further details refer to Items: 2.160, 2.161, and 2.193 - NFPA 15. | Locate or re-create the Combustible Load Calculations for these fire areas. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program  | Remarks              |
|-------------------|---|---------------------------|---|--|---|----------------------|
| 2.236             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Area RC-X, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position F2, Amendment No. 37. | Not needed                | HVAC Flow Diagram Drawing No. M-548. Contract Documents 02, 216 and 218.<br><br>Electrical Drawing END-62E, Sheets 1-10.<br><br>PPM's Vol. 1 (Administrative)<br>Vol. 4 (Alarm Response)<br>Vol. 7 (Surveillance).<br><br>PPM 10-29-15, Specification MIL-M-12218B. | In compliance with Plant Commitments. For further details refer to Criteria Item No. 2.208.                                    | No design change. Revise and update the FSAR to reflect Plant conditions. For further details refer to Items 2.208. | Refer to Item 2.227. |
| 2.237             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, F.A. RC-X, Amendment No. 37. Does not specifically address.   | Not needed                | Fire Protection Program FSAR Section 9.5.1 and Appendix F, including the FHA.   | Appears to be in accordance with Plant Commitments, as there is no mention of a carpet being present in the Main Control Room. | No change   | Refer to Item 2.227. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|

2.240 DHA - see Remarks

Foam is not used in Cable Spreading Rooms at WNP-2.

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WHP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WHP-2 Commitment To Compliance With Fire Protection Criteria | Formal Deviation(s) Taken | WHP-2 Fire Protection Program Implementation | WHP-2 Fire Protection Program Status | Recommended Option(s) For Improvement Of WHP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|

2.239 DNA - see Remarks

Open head deluge and open directional spray systems are not used at WHP-2.

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WPP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No.   | WPP-2 Commitment To Compliance With Fire Protection Criteria | Formal Deviation(s) Taken | WPP-2 Fire Protection Program Implementation | WPP-2 Fire Protection Program Status | Recommended Option(s) For Improvement Of WPP-2 Fire Protection Program | Remarks   |
|---------------------|--|---------------------------|--|--------------------------------------|--|---|
| 2.252 through 2.257 | Not reviewed. See Remarks.                                   |                           |  |                                      |  | These guidelines are not part of the scope of this (review) report. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks  |
|-------------------|---|---------------------------|--|--|--|--|
| 2.251             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.1.3.3, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, as applicable, and Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position FB, Amendment No. 37. | Not needed                | The WNP-2 Fire Protection Program, which is the FSAR and FHA. Civil Drawings Series "S". | In compliance with Plant commitments.<br><br>SER Supplement 3.<br><br>Building Design features in presentation were not evaluated at this time, per Supply System direction. | No change.   | Only the provision of barriers separating the Turbine Building from adjacent structures containing safety-related equipment was reviewed at this time. Detail Design of the barrier, nor implementation were not part of the scope of this review. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks  |
|-------------------|---|--|---|---|--|--|
| 2.259             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Table 9.5-5, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.2, Fire Areas DG-1 through DG-X, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APESB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position F9, Amendment No. 19; and Position D1(1)c, Amendment No. 24; with the exception that automatic fire detection circuits do not alarm locally, through the alarm and signaling system. | Yes. See Supply System response to NRC position F9 in Amendment No. 19, dated October 1981 filed with NRC prior to fuel load date of 12/23/83. | Mechanical Drawing No. M-515. PPH 2.8.9. Air Flow Diagram Drawing No. M-549. Contract Documents 02, 210A, 215 and 217, Electrical Wiring Diagram EWD-62E Sheets 000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 036A, 039, 040, 041, 042 and 053; Drawings E502, E503 Sheet 6, E504, E508.<br><br>Design Drawing 02-217-0084 Sheets 1-72.<br><br>PPH's Vol. 1 (Administrative) Vol. 2 (F. P. System Operation) Vol. 4 (Alarm Response) Vol. 7 (Surveillance) Vol. 10 (Maintenance) Vol. 13 (Emergency).<br><br>PED's 217-E-0249, 217-B-0247 and -0250, 210A-CS-0370.<br><br>Technical Specification 4.7.6.2.<br><br>Instruction Manuals 02-999-00, 02-217-03.<br><br>ANI approval, Property File No. W-219 (1979). | In compliance with Plant commitments. Local alarming of automatic detection systems was addressed in Item 2.160.<br><br>Flooding is expected, and acceptable, as described in every fire hazards analysis. Local means of drainage the fire suppression system is provided.<br><br>For further details refer to Items 2.160, 2.162, 2.193 - NFPA 15 only, 2.198, 2.213. | Revise the FSAR to reflect Plant commitments and previously approved deviations, verify commitments are described same way throughout.<br><br>For further details refer to Items 2.160, 2.162, 2-193 - NFPA 15, 2.198 and 2.213. | Fire Area DG-X does not have any safety related equipment. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken   | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks  |
|-------------------|--|---|--|---------------------------------------|--|--|
| 2.258             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.1.3, Amendment No. 30, 9.5.1.1.3.5, Amendment No. 36, Tables 9.5-4, Amendment No. 30, 9.5-5, Amendment No. 36 and 9.5-6, Amendment No. 36; and Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Areas DG-I through DG-X, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position F9, Amendment No. 37. | Yes, fire dampers installed non-listed frames. Supply System letter dated September 29, 1983 and approved by the HRC in SSER 4 pages and 9-5. | Architectural Drawings Series "A". Civil Drawings Series "S". Contract Document 210A. PPM 1.3.19, 1.3.35, 7.4.7.7.2.1 and 7.4.7.7.2.4. | In compliance with Plant Commitments. | Revise the FSAR to reflect the Plant previously approved commitments.  | Locate or re-create the combustible loadings for these fire areas. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken   | WNP-2 Fire Protection Program Implementation                       | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program  | Remarks |
|-------------------|---|---|--|--|---|---------|
| 2.261 and 2.262   | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCS 9.5-1, Subsection F.3.2, Compliance Evaluation, Position F10, Amendment No. 19; with the exception that diesel fuel tanks with a capacity greater than 1,100 gallons are located inside buildings containing safety-related equipment. (See Item 2.260) | Yes. See Supply System response to NRC position F10 in Amendment No. 19, dated October 1981 filed with NRC prior to fuel load date of 12/23/83.<br><br>Original SER 9.5.1.7(6) page 9-37. | General Arrangement Drawings Series "H". Also refer to Item 2.260. | In compliance with Plant commitments. Main diesel fuel oil storage tanks are buried in the yard. The day tanks are 3,000 gal, for details refer to Item 2.260. NFPA 30 was extensively used as guidance. For specific differences refer to Item 2.130. | No design change, however, revise, consolidate and update the FSAR and FIAA to reflect the Plant commitments and previously approved deviations. For further details refer to Item 2.130. |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program                   | Remarks                           |
|-------------------|--|--|---|---------------------------------------|--|-----------------------------------|
| 2.260             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Areas DG-VII, DG-VIII and DG-IX; Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position F9, Amendment No. 19. The day tank capacities are 3,000 gallons. | Yes. See Supply System response to NRC position 9 in Amendment No. 19, dated October 1981 filed with NRC prior to fuel load date of 12/23/83.<br><br>Original SER 9.5.1.8, page 9-38.<br><br>Technical Specifications. | Contract Document 210A. Architectural Drawings Series "A". General Arrangement Drawings Series "H". Civil Drawings Series "S".<br><br>PPM's 1.3.19, 1.3.35, 7.4.7.7.2.1 and 7.4.7.7.2.4.<br><br>PED 210A-CS-0370. | In compliance with Plant commitments. | Revise the FSAR and FHA to reflect Plant commitments and previously approved deviations. | WNP-2 implemented option 2.260(1) |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|
|-------------------|--|---------------------------|--|--------------------------------------|--|---------|

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

2.263  
(Cont'd)

LISTING "C"

| <u>Safety Related Pump</u> | <u>Description</u>          | <u>Location</u>                  | <u>Detection</u> | <u>Sprinklers</u> | <u>Floor Drains</u> | <u>3 Hr Barriers</u> | <u>Hose Station and Extinguishers</u>  |
|----------------------------|-----------------------------|----------------------------------|------------------|-------------------|---------------------|----------------------|--|
| RHR                        | Residual Heat Removal Pumps | Reactor Building                 | Yes              | No                | Yes                 | Yes                  | Hose Station and Portable Extinguisher |
| RHR                        | Residual Heat Removal Pumps | Standby Service Water Pump house | Yes              | No                | No                  | Yes                  | Yard Hydrant                           |

\*TBR - to be removed.

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program   | Remarks  |
|-------------------|--|--|---|--|--|--|
| 2.263             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, fire areas, as applicable, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position F11, Amendment No. 19; with the exception that fire detection has a local visual alarm and not a local audible alarm. | Yes. See Supply System response to NRC position F11 in Amendment No. 19 dated October 1981 filed with NRC prior to fuel load date of 12/23/83.<br><br>Technical Specification 4.7.6.2. | Contract Documents 02, 210A, 215 and 217. Architectural Drawings Series "A". Civil Drawings Series "S".<br><br>Mechanical Drawings M-510 and M-515. PPM 2.8.9.<br><br>Electrical Wiring Diagram EWD-62E Sheets 000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 036A, 039, 040, 041, 042, and 053. Drawings E502, E503 Sheet 6, E504, E508.<br><br>Design Drawing 02-217-0084 Sheets 1-72.<br><br>PPM's Vo. 1 (Administrative) Vol. 2 (F. P. System Operation) Vol. 4 (Alarm Response) Vol. 7 (Surveillance) Vol. 10 (Maintenance) Vol. 13 (Emergency).<br><br>PED's 217-E-0249, 217-B-U247 and -0250, and 210A-CS-0370.<br><br>Instruction Manual 02-999-00 and 02-217-03. | In compliance with Plant commitments.<br><br>ANI approval, Property Fire No. H-219 (1979).<br><br>The RHR pumps located in the RB are enclosed within 3-hr rated fire barriers. The pumps located in the Standby Service Water Pump-house have approximate 100 ft by 100 ft separation without inter combustibles. Detection is provided, automatic suppression is not provided. For non-provision of local alarm approval refer to Item 2.160. Loss of any of the above listed pumps will not adversely impact the Plant safe shutdown, as demonstrated by the fire hazards analysis in case of fire.<br><br>The NRC found this acceptable and approved the arrangement in the original SER page 9-37.<br><br>For further details refer to Items: 2.160, 2.162, 2.198, 2.213. | No design change. Update, revise, consolidated the FSAR and FHA to reflect the Plant commitments and approved deviations, based on description of equivalent protection.<br><br>For further details refer to Items 2.160, 2.162, 2.198, 2.213. | 1. See attached listing "C" of safety related pumps and related fire protection systems. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WPP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WPP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken  | WPP-2 Fire Protection Program Implementation | WPP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WPP-2 Fire Protection Program  | Remarks  |
|-------------------|--|--|--|--|---|--|
| 2.265             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position D4(a), Amendment No. 37; with the exception that manual control of the ventilation system is not provided. | Yes. See Supply System response to NRC position D4(a) in Amendment No. 19, dated October, 1981 filed with NRC prior to fuel load date of 12/23/83. | Air Flow Diagram Drawing No. M-549,          | In compliance with Plant commitments. Manual portable means for smoke removal is provided and accepted by the NRC. | Update the FSAR and FHA by cross-referencing the HVAC section and mention the portable means of smoke removal as an acceptable alternative. | Ventilation system not specifically addressed in Supply System response to NRC position F11, however described in Section 9.5.4. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
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| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program                      | Remarks   |
|-------------------|--|--|--|--|---|---|
| 2.264             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, Fire Area: Circulating Water Pump House, Item 5.d, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position DI(i)c, Amendment No. 24. | Yes. See Supply System response to HRC position DI(i) in Amendment No. 19 dated October 1981 filed with HRC prior to fuel load date of 12/23/83. fuel load date of 12/23/83. Approved by the original SER. | See Item 2.263.                              | In compliance with Plant commitments. Equipment is located on pedestal and flooding could potentially occur, however, portable pumping units would be available to remove water. | Revise the FSAR and FHA to reflect the Plant commitment and previously approved deviations. | Refer to Item 2.263 "C" of safety related pumps and related fire protection systems |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WHP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WHP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WHP-2 Fire Protection Program Implementation                     | WHP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WHP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|--|--|---------|
| 2,267             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position F12, Amendment No. 24. | Not needed                | Architectural Drawings Series "A".<br>Civil Drawings Series "S". | Yes, in compliance in accordance with Mr. R Talbert - Supply System Nuclear Engineering. | No change, update the FSAR to reflect this status.                     |         |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken   | WNP-2 Fire Protection Program Implementation  | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program  | Remarks   |
|-------------------|---|---|---|--|---|---|
| 2.266             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, as applicable, Amendment 37; and Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position F.12, Amendment No. 24; with the exception that automatic fire detection does not alarm locally. | Yes. See Supply System response to NRC position F12 in Amendment No. 24, dated May 1982 filed with NRC prior to fuel load date of 12/23/83.<br><br>Found acceptable by the NRC in the original SER. | Mechanical Drawing No. M-515. PPH 2.8.9. Contract Documents 215, 217 and 218. Electrical Wiring Diagram EWD-62E Sheets 000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 036A, 039, 040, 041, 042 and 053. Drawings E502, E503 Sheet 6, E504, E508.<br><br>Design Drawing 02-217-0084 Sheets 1-72.<br><br>Supply System Letter G02-83-184 (3/4/83).<br><br>PPH's Vol. 1 (Administrative)<br>Vol. 2 (F.P. System Operation)<br>Vol. 4 (Alarm Response)<br>Vol. 7 (Surveillance)<br>Vol. 10 (Maintenance)<br>Vol. 13 (Emergency).<br><br>PED's 217-E-0249, 217-B-0247 and -0250.<br><br>Instruction Manuals 02-999-00 and 02-217-03. | In compliance with Plant commitment. Suppression is provided as required by the FHA. Ventilation controls are provided. For further details refer to Items: 2.160, 2.162, 2.193 - as applicable, 2.198, 2.213. | Revise, update and consolidate the FSAR and FHA to reflect the Plant commitments and previously approved deviations. For details refer to Items 2.160, 2.162, 2.193 - as applicable, 2.198 and 2.213. | Building design features were not evaluated, as they were excluded from the scope of this review. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WHP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WHP-2 Commitment To Compliance With Fire Protection Criteria  | Formal Deviation(s) Taken | WHP-2 Fire Protection Program Implementation  | WHP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WHP-2 Fire Protection Program | Remarks   |
|-------------------|---|---------------------------|---|---|--|---|
| 2.269             | Yes, in compliance as described in FSAR Section 9.5.1, Fire Protection System, Subsection 9.5.1.1.3.2, Amendment No. 30; and Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, as applicable, Amendment No. 37; and Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Positions F14 and F15, Amendment No. 37. | Not needed                | FHA, as applicable.<br>Architectural Drawings Series "A". Civil Drawings Series "S". Mechanical Drawing No. M-515. PPM 2.8.9.<br><br>PED's 217-E-0249, 217-B-0247 and -0250, 210A-CS-0370.<br><br>ANI approval, Property File No. H-219 (1979). | In compliance with Plant Commitments. Looked at commitments to have fire barriers only.<br>See Remarks. | No design change. Further evaluation of these areas.                   | Building design was not part of the scope of this review. |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken  | WNP-2 Fire Protection Program Implementation   | WNP-2 Fire Protection Program Status   | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program  | Remarks |
|-------------------|--|--|--|--|---|---------|
| 2.268             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.2, Fire Hazards Analysis, as applicable, Amendment 37; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position F13, Amendment No. 19; with the exception that automatic fire detectors do not alarm locally. | Yes. See Supply System response to NRC position F13 in Amendment No. 19, dated October 1981 filed with NRC prior to fuel load date of 12/23/83. Found acceptable by the NRC in the original SER. | Mechanical Drawing No. M-515. PPH 2.8.9. Contract Documents 215, 217 and 218. Electrical Wiring Diagram EWD-62E Sheets 000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 027, 028, 029, 030, 031, 032, 036A, 039, 040, 041, 042 and 053. Drawings E502, E503 Sheet 6, E504, E508.<br><br>Design Drawing 02-217-0084 Sheets 1-72.<br><br>Supply System Letter G02-83-184 (3/4/83).<br><br>Lesson Plan 80-FPT-0600-L<br><br>PED's 217-E-0249, 217-B-0247 and -0250.<br><br>Instruction Manuals 02-999-00 and 02-217-03. | In compliance with Plant commitments.<br><br>Local alarm from automatic detection is not provided as explained in Item 2.160 and found acceptable by the NRC. For further details refer to Items: 2.160, 2.162, 2.198 and 2.213. | Revise, update and consolidate the FSAR and FHA to reflect the Plant commitments and previously approved deviations. For further details refer to Items: 2.160, 2.162, 2.198 and 2.213. |         |



WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION  
FUNCTIONAL, LICENSING AND DESIGN REQUIREMENTS/COMPLIANCE

| Criteria Item No. | WNP-2 Commitment To Compliance With Fire Protection Criteria   | Formal Deviation(s) Taken | WNP-2 Fire Protection Program Implementation                   | WNP-2 Fire Protection Program Status  | Recommended Option(s) For Improvement Of WNP-2 Fire Protection Program | Remarks |
|-------------------|--|---------------------------|--|---------------------------------------|--|---------|
| 2.270             | Yes, in compliance as described in FSAR Appendix F, Fire Protection Evaluation; Section F.3, Compliance with Branch Technical Position APCSB 9.5-1, Subsection F.3.2, Compliance Evaluation, Position F16, Amendment No. 37. | Not needed                | Plot Plan, Civil Drawings Series "S". Fire Protection Program. | In compliance with Plant commitments. | No design change, however update and revise the FSAR.                  |         |

audit performed in an expeditious manner.

The Ebasco Fire Protection Engineering reviewed the QA findings and concurs with them. There is a comment we suggest to be added to the FSAR and FPQA program: "The Design and Construction QA Program is described in..... and was approved by the NRC Staff.....However, for components of the Fire Protection Program designed, specified, procured, manufactured, fabricated, or installed prior to the institution of the Fire Protection Quality Assurance program (Date), sufficient control was exercised and followed to the extent practical, and the activities performed evaluated during subsequent audit, surveillance and design review.

The FP Engineers reviewed the FPQA Audit Report performed on September 8-12, 1986, and the Response to QA Audit 86-376 dated November 19, 1986.

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION

4.0

QUALITY ASSURANCE INDEPENDENT ASSESSMENT

In accordance with the description of Task 3.3 as outlined in the Supply System Letter No. G02-86-0883 from G. C. Sorensen to J. B. Martin - NRC dated September 16, 1986, the Supply System requested Ebasco to assign a QA Engineer to review the WNP-2 Fire Protection QA program against licensing commitments. Ebasco Fire Protection Engineers were requested to review the Ebasco QA Engineer report and the WNP-2 FPQA Audit performed on September 8-12, 1986, and provide additional independent assessment of the existing fire protection program and its adequacy.

The QA Engineer reviewed the WNP-2 QA commitments as described in the FSAR Section 9.5.1 and Appendix F Amendment 37 against the NRC Criteria listed in Section 2.0 Items 2.86 through 2.96 of this Report. Section 3.0 Items 2.86 through 2.96 of this Report reflects the status of compliance with NRC Criteria, FPQA implementation and compliance. We offer the following comments:

1. Ebasco received no documentation about the FPQA program prior to May 1980, except of verbal discussions that Burns and Roe was responsible for it prior to the above-listed date.
2. Ebasco received no written documentation as to the date when the FPQA was established at WNP-2. The first time a commitment to the NRC was made in WNP-2 FSAR Appendix F, Amendment 19, issued in October 1981.
3. The WNP-2 FPQA program implementation cannot be assessed without an audit to establish compliance. This audit may be performed by either Supply System, or Ebasco. Please advise us if the Supply System wishes Ebasco to perform the audit, because there is a list of prerequisites Ebasco needs in order to have the

| <u>Building/Elevation</u> | <u>Drawing Number</u> | <u>Rev.</u> | <u>Date</u> |
|---------------------------|-----------------------|-------------|-------------|
| f. R&CB/501'-507'         | 02-217-00-84 Sh. 38   | B           | 8/24/84     |
| g. R&CB/525'              | 02-217-00-84 Sh. 39   | H           | 12/14/82    |
| h. RB/422'-3" and 441'-0" | 02-217-00-84 Sh. 45   | D           | 10/10/85    |
| i. RB/471' & 501'         | 02-217-00-84 Sh. 46   | C           | 7/07/82     |
| j. RB/606'-10.5" & 522'   | 02-217-00-84 Sh. 47   | E           | 8/24/84     |
| k. RB/548' & 572'         | 02-217-00-84 Sh. 48   | D           | 8/24/84     |

### 3. FINDINGS AND RECOMMENDATIONS

#### a. Drawing Compliance

The drawings show as-built conditions with a high degree of accuracy.

The following deviations were found:

1. Drawing No. 02-217-00-84 Sh. 31: detector 39-10 is shown incorrectly as a flame detector instead of a photoelectric detector.
2. Drawing No. 02-217-00-84 Sh. 38: the wall shown on the drawing between detectors 26-9 and 26-8 has been removed.
3. Drawing No. 02-217-00-84 Sh. 48: an existing beam is not shown near detector 18-4.

It is recommended that the drawings be changed accordingly to reflect actual plant conditions.

#### b. NFPA Code Compliance

Relocation of the devices listed is recommended to comply with NFPA codes. Refer to Attachment A for details on the areas of noncompliance listed below:

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION

5.0

FIRE DETECTION SYSTEM WALKDOWN REPORT

A walkdown was performed in November 1986 by Ebasco Services accompanied by Supply System personnel. The walkdown covered only safety-related areas of WNP-2. They included areas in the Reactor Building (RB), Diesel-Generator (DG) Building, Rad-Waste and Control Building (R&CB), and the Service Water Pumphouses were included. The walkdown was done to check only for strict compliance with NFPA codes.

1. PURPOSE OF WALKDOWN

The purpose of the walkdown was to perform a visual check for:

- a. Drawing compliance
- b. NFPA-72A, -72D and -72E code compliance
- c. Potential delay of the response time of detectors based on their location or obstructions
- d. Additional detectors required for minimum coverage per NFPA Code
- e. Any other potential problems

2. AREAS COVERED

The following areas were reviewed and inspected:

| <u>Building/Elevation</u>        | <u>Drawing Number</u> | <u>Rev.</u> | <u>Date</u> |
|----------------------------------|-----------------------|-------------|-------------|
| a. Service Water Pumphouse/Grade | 02-217-00-84 Sh. 6    | F           | 8/24/84     |
| b. DG/441' & 445'                | 02-217-00-84 Sh. 31   | F           | 7/01/82     |
| c. R&CB/437'                     | 02-217-00-84 Sh. 35   | G           | 7/01/82     |
| d. R&CB/467'                     | 02-217-00-84 Sh. 36   | F           | 9/05/86     |
| e. R&CB/487'                     | 02-217-00-84 Sh. 37   | H           | 7/01/82     |

c. Detectors with Potentially Delayed Response Times

Detectors listed to be in noncompliance with Paragraph 4-4.1 of NFPA-72E quoted above have potentially delayed response times due to the presence of obstructions such as HVAC ducts, cable trays, etc. Detectors installed above HVAC ducts should be relocated to clear the duct where there is adequate clearance for smoke travel. Detectors installed above cable tray stacks have potentially delayed response times for fires in trays below the top one. These detectors should be moved to the outside edge of the stacks.

d. Additional Detectors

Additional smoke detectors are recommended to be installed to provide minimum coverage for compliance with NFPA 72E in several of the areas investigated, as follows:

| <u>Building</u> | <u>Elevation</u> | <u>No. of Detectors</u> |
|-----------------|------------------|-------------------------|
| R&CB            | 437'             | 2                       |
| R&CB            | 467'             | 2                       |
| R&CB            | 487'             | 2                       |
| RB              | 442'             | 1                       |
| RB              | 471'             | 4                       |
| RB              | 522'             | 1                       |
| RB              | 548'             | 2                       |
| RB              | 572'             | 1                       |

Proposed locations for additional smoke detectors are shown on the accompanying prints. All additional smoke detectors should be installed in compliance with NFPA-72E.

e. Other Potential Areas of Concern

The areas of concern discussed below should be investigated, however they currently meet NFPA code. Three areas have been identified as sources for potential concern:

| <u>Building/Elevation</u> | <u>Device Type</u> | <u>Device No.</u> | <u>Recommendation</u> |
|---------------------------|--------------------|-------------------|-----------------------|
| DG/455'                   | Detector           | 38-1              | Relocate              |
| DG/455'                   | Detector           | 38-2              | Relocate              |
| DG/455'                   | Detector           | 38-3              | Relocate              |
| R&CB/437'                 | Detector           | 66-7              | Relocate              |
| R&CB/437'                 | Detector           | 66-7A             | Relocate              |
| R&CB/437'                 | Detector           | 66-7B             | Relocate              |
| R&CB/437'                 | Detector           | 66-7C             | Relocate              |
| R&CB/467'                 | Detector           | 23-12             | Relocate              |
| R&CB/467'                 | Detector           | 23-13             | Relocate              |
| R&CB/467'                 | Detector           | 23-14             | Relocate              |
| R&CB/487'                 | Detector           | 65-29             | Relocate              |
| R&CB/487'                 | Detector           | 65-30             | Relocate              |
| R&CB/501'                 | Detector           | 27-4              | Relocate              |
| R&CB/525'                 | Detector           | 66-15             | Relocate              |
| RB/471'                   | Detector           | 14-10             | Relocate              |
| RB/471'                   | Detector           | 14-22             | Relocate              |
| RB/471'                   | Detector           | 14-24             | Relocate              |
| RB/471'                   | Detector           | 14-28             | Relocate              |
| RB/503'                   | Detector           | 15-15             | Relocate              |
| RB/522'                   | Detector           | 16-6              | Relocate              |
| RB/522'                   | Detector           | 16-9              | Relocate              |
| RB/572'                   | Detector           | 18-18             | Relocate              |
| RB/572'                   | Detector           | 18-21             | Relocate              |
| RB/572'                   | Detector           | 18-22             | Relocate              |
| RB/572'                   | Detector           | 18-25             | Relocate              |
| RB/572'                   | Detector           | 18-27             | Relocate              |
| RB/572'                   | Detector           | 18-30             | Relocate              |

Details for recommendations to correct the above-listed areas of noncompliance are provided in Attachment A.

ATTACHMENT A

DETAILED FINDINGS BY AREA

a. Drawing No. 02-217-00-84 Sh. 6, Service Water Pumphouse/Grade:

1. Smoke detectors and Manual Alarm Stations are installed as shown on the drawing.

Recommendation: No changes to existing system.

b. Drawing No. 02-217-00-84 Sh. 31, Diesel-Generator/441' & 455':

1. Manual Discharge Stations throughout the areas are not labeled to indicate precisely what system is being discharged/actuated.

Recommendation: Labels should be modified or added to indicate which system will be actuated by each manual station and the corresponding area affected.

2. Manual Pull Station 40-6 is not located in the path of egress and could easily be missed. It is located around the corner from the door and two vertical conduits are between it and the corner.

Recommendation: Relocate the Pull Station near the door.

3. A wide air duct passes immediately below detectors 38-1, 38-2, and 38-3 with very little clearance. This could present an obstruction to the air carrying particles of incomplete combustion.

Recommendation: Relocate the detectors to alternating edges of the duct.

1. The signs near manual discharge stations do not identify the fire suppression system intended to be discharged or the areas affected by the discharge. It is recommended that the signs be modified to indicate precisely which system will be actuated and which area will be affected, through their use.
2. Another source of potential concerns may be the occurrence of stratification of smoke in high-ceilinged areas. Detectors are spaced closely throughout the safety-related areas, due to the deep beams, which, can compensate for the ceiling height.
3. Fires in lower trays of cable tray stacks may be difficult to detect in their early stages due to lack of air flow. It is recommended that detectors be relocated above the outside edge of the stack. A detector should be considered at an intermediate level to provide better protection.

6. Manual Pull Station 20-3 is located behind a normally open door and is not readily available or visible. The door leads to the stairwell and elevator and is the normal exit route.

Recommendation: Relocate the station to the room side of the door.

7. Areas investigated for compliance with NFPA-72E (refer to the drawing)

Area 1. Pocket near column 12.5 and N.1. Cable trays, large pipe, and air duct go through the area and there is electrical equipment below.

Recommendation: Install a smoke detector between pipes and the duct.

Area 2. Access hatch at column 13.6 and N.9. Other detectors are present in the area.

Recommendation: No detector is required.

Area 3. Pocket at column 12.5 and Q.1. Piping, duct, and cable trays cross through this area. There is a partial wall through the center of this area.

Recommendation: Install a smoke detector above the short wall and between the duct and cable trays.

d. Drawing No. 02-217-00-84 Sh. 36, H&CB/467':

1. Detector 22-3 is installed above a cable tray. Air flow may be obstructed by cable tray. Visual inspection indicated the detector may be against the beam.

c. Drawing No. 02-217-00-84 Sh. 35, R&CB/437':

1. Smoke detectors 66-7, 66-7A, 66-7B, and 66-7C are located above a wide HVAC duct with very little clearance. The duct creates an obstruction in the air flow to provide intelligence for these detectors.

Recommendation: Relocate the smoke detectors to alternating edges of the duct.

2. Smoke detectors 66-21 through 66-27 are located above a duct. Visual observation indicated adequate clearance for air flow.

Recommendation: No changes to existing system.

3. Smoke detectors 20-15 through 20-19 are located above two 2-foot-diameter pipes with little clearance. Visual observation indicates inadequate space for early warning operation.

Recommendation: Relocate the detectors between the pipes and the duct.

4. Detectors 20-11 through 20-14 were inaccessible due to a high-radiation area. Design drawings show smoke detectors to be between two rows of cable tray that are three or four trays deep. There is approximately three feet of clearance above the trays.

Recommendation: Inspect the area when conditions allow it.

5. Inaccessible scaffolding located at ceiling level obscured the view of detector 20-22.

Recommendation: Reinspect the area when conditions allow it.

Area 1. Electrical room between columns 15.1 and 13.9 and columns H.3 and K.1. Electrical equipment is present in the room.

Recommendation: Install a smoke detector in this room.

Area 2. Pocket at column 12.2 and K.1. There is an air duct in the area and no combustibles below.

Recommendation: A detector is not recommended.

Area 3. Pocket in Rad-Waste Control Room near column 13.9 and N.1. There is electrical control equipment in this area.

Recommendation: Install a smoke detector in this area.

e. Drawing No. 02-217-00-84 Sh. 37, R5CB/487'

1. Cable Spreading Room. The following detectors are installed near obstructions: 65-7, 65-9, 65-12, 65-14, 65-15, 65-18, 65-19, 65-20, 65-24, 65-26, 65-29, 65-30, 65-33, 65-34, 65-36, and 65-37. Visual inspection indicates that there is adequate clearance around all detectors, except 65-29 and 65-30.

Recommendation: Relocate detectors 65-29 and 65-30 to clear the obstruction.

2. Detectors 66-9 through 66-12 are installed on beams under the grated floor. Signs indicate only that detectors are under the floor. Based on a visual inspection by Supply System Personnel, the detector locations were verified and adequate clearances seen.

Recommendation: The signs should be changed to show the detector number and precise location.

Recommendation: Relocate the detector between the cable tray and the duct.

2. Detector 22-2 is installed above HVAC duct (approx. 3 feet wide) with little clearance to the ceiling.

Recommendation: Relocate the detector to clear the edge of the duct.

3. Detector 22-1 is installed adjacent to a beam.

Recommendation: Move the detector into the pocket on the other side of the beam. See Area 1 below.

4. A wide HVAC duct (approx. 4 feet wide) is obstructing detectors 23-12, 23-13, and 23-14.

Recommendation: Relocate the detectors to clear the duct, placing them on alternate sides of the duct.

5. HVAC Duct and cable tray obstruct detector 22-9. Visual inspection indicated moving the detector is not feasible.

Recommendation: No change to existing system.

6. Cable trays are installed below detector 23-8 with about three feet of clearance. Visual inspection indicated there is adequate clearance.

Recommendation: No changes to existing system.

7. Areas without detection investigated for compliance with NFPA 72E (refer to the drawing):

Recommendation: Move the Station near the door.

2. Detectors 28-1, 28-3, 28-6, 28-8, 28-24, 28-25, 28-26 and 28-28 are installed above a wide HVAC duct (approx. 3 feet wide) with approximately one to two feet of clearance. Visual inspection indicates clearance is adequate.

Recommendation: No change to the existing system.

3. There is very little clearance for detector 66-15. Visual inspection indicated the clearance to be adequate.

Recommendation: No change to the existing system.

4. Areas investigated for compliance with NFPA 72E (refer to the drawing):

Area 1. Pocket at column 10 and between K.1 and L.9. No combustibles are in the area, only an air duct.

Recommendation: No detector recommended.

Area 2. Pocket at column 10 and between K.1 and H.3. Two cable trays pass through this area on an exit path.

Recommendation: Install a smoke detector.

- h. Drawing No. 02-217-00-84 Sh. 45, Reactor Building/422'-3" and 441'-0":

1. Most of the building on this elevation was inaccessible due to high radiation and could not be inspected.

Recommendation: Investigate this area when the conditions allow.

3. Detectors 24-4 and 24-5 are installed above cable trays. Neither detector is visible from the floor. Visual inspection of the area indicated there is adequate clearances.

Recommendation: No changes to the existing system.

4. Detector 24-33 is installed above an HVAC duct. Visual inspection indicates adequate clearance between the top of duct and the detector.

Recommendation: No changes to the existing system.

5. Areas investigated for compliance with NFPA-72A (refer to drawing):

Area 1. Radiation equipment storage area near column 15.1 and K.1.

Recommendation: Install a smoke detector.

Area 2. Office area near column 12.5 and N.1.

Recommendation: Install a smoke detector.

- f. Drawing No. 02-217-00-84 Sh. 38, R&CB/501'-507':

1. A girder is obstructing detector 27-4.

Recommendation: Relocate the detector on either side of the beam for accessibility.

- g. Drawing No. 02-217-00-84 Sh. 39, R&CB/525':

1. Manual Pull Station 28-31 is installed across the room from the path of egress and is located behind two rows of conduits.

Area 1. Pocket at column 8.3 and between H.3 and K. This is a very small area with an air duct, girders, and no combustibles.

Recommendation: A detector is not recommended.

Area 2. Pocket between columns 8.3 and 9.4 and columns K and M. Duct and a large crane are in the area.

Recommendation: Install a smoke detector.

Area 3. Pocket between columns 3.4 and 4 and between column M and N.8. Duct and a large crane in the area.

Recommendation: Install a smoke detector.

Area 4. Pocket at column 4 and M. Cable tray, piping, and girders are in this area.

Recommendation: Install a smoke detector.

Area 5. Pocket at column 4 and between column K and M. Duct and a large crane are in the area.

j. Drawing No. 02-217-00-84 Sh. 47, Reactor Building/606'-10.5" and 522'.

1. Detectors 16-6 and 16-9 are above an air duct.

Recommendation: Move each detector to the edge of the duct.

2. Detector 16-33 is installed in the corner of two beams.

Recommendation: Move detector six inches or more from both beams.

2. Area investigated for compliance with NFPA-72E (refer to the drawing):

Area 1. Pocket between columns 5 and 6 and at N.8.

Combustibles are present in the area.

Recommendation: Install a smoke detector.

1. Drawing No. 02-217-00-84 Sh. 46, Reactor Building/471' and 503':

1. Detector 14-24 is blocked by a HVAC duct.

Recommendation: Move the detector to either side of the duct.

2. Detector 14-28 is blocked by a cable tray. The detector cannot be seen. Visual inspection indicated that moving the detector is not feasible.

Recommendation: No change to the existing system.

3. Detectors 14-10, and 15-15 are each installed above a stack of six cable trays with six inches of clearance from the top tray. There is a possible problem with detecting fires on lower trays.

Recommendation: Move each detector to the outside edge of the cable trays.

4. Detector 14-22 is blocked by air duct.

Recommendation: Move the detector to either edge of the duct.

5. Area investigated for compliance with NFPA-72E (refer to the drawing):

Recommendation: Investigate these areas when conditions allow.

2. Detectors 18-18, 18-21, 18-22, 18-25, 18-27, and 18-30 are installed above air ducts.

Recommendation: Move detectors to the edge of the duct.

3. Areas investigated for compliance with NFPA 72E (refer to drawing):

Area 1. Equipment room at column 5 and M. HVAC duct and conduits pass through this area.

Recommendation: Install a smoke detector.

Area 2. Pocket at column 7.1 and N. Conduit and possible transient combustibles are present in this area.

Recommendation: Install a smoke detector.

Area 3. Pocket at column 8.3 and K. Transient combustibles could be present in this area.

Recommendation: Install a smoke detector.

3. Detectors at El. 606'-10.5" have been removed and the system on this elevation is being redesigned. Refer to Design Change Packet DCP 02-85-00-88-0A.

Recommendation: Design and install in accordance with NFPA-72E.

4. Areas investigated for compliance with NFPA 72E (refer to drawing):

Area 1. Pocket at column 4 and K. This is a very small area.

Recommendation: A detector is not required.

Area 2. Pocket at column 4 and M. This is a very small area.

Recommendation: A detector is not required.

Area 3. Pocket between column 6 and 8.3 and column M and N.8. Cable trays are below the area.

Recommendation: Install a smoke detector at the outside edge of cable trays.

Area 4. Pocket between column 6 and 8.3 and on column M. Electrical controls are in this location. A detector was previously located here so that conduit and a junction box are already in this area.

Recommendation: Replace the removed smoke detector.

k. Drawing No. 02-217-00-84 Sh. 48, Reactor Building/548' and 572':

1. Two areas for review were in high-radiation zones and could not be inspected.

6.2 Plant Procedures Manuals (PPMs) (Cont'd)

| <u>PPM No.</u> | <u>Rev No.</u> | <u>Title</u>   |
|----------------|----------------|--|
| 1.3.19         | 8              | Housekeeping   |
| 1.3.29         | 7              | Locked Valve Checklist   |
| 1.3.35         | 1              | Fire Protection Program Controls                                     |
| 1.3.36         | 1              | Fire Protection Program Training                                     |
| 1.3.36.3E      | 1              | Fire Protection Program Training                                     |
| 1.9.1          | 4              | Plant Safety Program   |
| 1.10.1         | 7              | Reportable Events and Occurrences Required by<br>Regulatory Agencies |
| 2.8.7          | 4              | Fire Protection System   |
| 2.8.9          | 4              | Monthly Fire Extinguisher Inspection                                 |
| 4.12.4.1       |                |  |
| 7.4.3.7.9.3.3  | 2              | Ionization Detector Channel Function Test<br>Zone 14                 |
| 7.4.3.7.9.3.4  | 2              | Ionization Detector Channel Function Test<br>Zone 14                 |
| 7.4.3.7.9.13   | 2              | Ionization Detector Channel Function Test<br>Zone 65                 |
| 7.4.3.7.9.14   | 2              | Ionization Detector Channel Function Test<br>Zone 66                 |
| 7.4.3.7.9.23   | 2              | Thermal Detector Channel Function Test Zone 79                       |
| 7.4.3.7.9.24   | 2              | Thermal Detector Channel Function Test Zone 80                       |
| 7.4.3.7.9.25   | 2              | Thermal Detector Channel Function Test Zone 81                       |
| 7.4.3.7.9.26   | 2              | Thermal Detector Channel Function Test Zone 82                       |
| 7.4.3.7.9.27   | 2              | Thermal Detector Channel Function Test Zone 83                       |
| 7.4.3.7.9.28   | 2              | Thermal Detector Channel Function Test Zone 84                       |
| 7.4.3.7.9.29   | 2              | Heat Detector Water Spray WMA-FU-54A-CFT                             |
| 7.4.3.7.9.30   | 3              | Heat Detector Water Spray WMA-FU-54B-CPT                             |

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
WNP-2 FIRE PROTECTION PROGRAM RE-EVALUATION

6.0

LIST OF WNP-2 IMPLEMENTING DOCUMENTS

6.1 Contract Documents

| <u>Contract Document No.</u> | <u>Contract Description</u>      | <u>Specification No.</u> | <u>Date (Looked at)</u> |
|------------------------------|----------------------------------|--------------------------|-------------------------|
| 02                           | Nuclear Steam Supply             | None                     | 11/14/86                |
| 18                           | Standby Gas Filters              | None                     | 11/19/86                |
| 24                           | Shop Fabricated Tanks            | None                     | 11/18/86                |
| 29                           | Fire Pumps and Drivers           | None                     | 11/12/86                |
| 53                           | Diesel Generators                | None                     | 11/18/86                |
| 67                           | Air Handling Units               | None                     | 11/19/86                |
| 206                          | General Construction             | None                     | 11/12/86                |
| 210A                         | Architectural Construction       | None                     | 11/14/86                |
| 214                          | Turbine Generator Installation,  | None                     | 11/14/86                |
| 215                          | Mechanical Equipment             | None                     | 11/14/86                |
| 216                          | HVAC and Plumbing Installation   | None                     | 11/19/86                |
| 217                          | Fire Protection System           | None                     | 11/14/86                |
| 217A                         | Fire Protection System           | None                     | 11/14/86                |
| 218                          | Electrical Installation Contract | None                     | 11/14/86                |
| 223                          | Cooling Towers and Accessories   | None                     | 11/14/86                |
| 224                          | Temporary Facilities             | 158,3A,15B,15H           | 11/14/86                |

6.2 Plant Procedures Manuals (PPMs)

| <u>PPM No.</u> | <u>Rev No.</u> | <u>Title</u>                    |
|----------------|----------------|---------------------------------|
| 1.3.8          | 7              | Equipment Clearance and Tagging |
| 1.3.10         | 4              | Fire Protection Program         |
| 1.3.10.5A      | 4              | Fire Protection Program         |
| 1.3.10.5A1     | 4              | Fire Protection Program         |
| 1.3.10.5F1     | 4              | Fire Protection Program         |

## 6.2 Plant Procedures Manuals (PPMs) (Cont'd)

| <u>PPM No.</u> | <u>Rev No.</u> | <u>Title</u>                           |
|----------------|----------------|--|
| 10.29.29       | 2              | Fire Protection Sprinkler System Flush |
| 13.2.1         | 3              | Fires/Explosions                       |
| 13.10.11       | 3              | Plant Emergency Team Duties            |
| 13.10.12       | 3              | Reentry Team Duties                    |
| 13.10.13       | 3              | Recovery Team Duties                   |

## 6.3 Architectural Drawings

| <u>Dwg No.</u> | <u>Rev No.</u> | <u>Title</u> |
|----------------|----------------|--------------|
| A-506          | 36             |              |
| A-506-A        | 5              |              |
| A-507-1        | 26             |              |
| A-507-2        | 1              |              |
| A-508          | 19             |              |
| A-508-A        | 4              |              |
| A-520          | 6              |              |
| A-521          | 14             |              |
| A-550          | 8              |              |
| A-553          | 19             |              |
| A-554          | 22             |              |
| A-555          | 18             |              |

## 6.4 Electrical Drawings

| <u>Dwg No.</u> | <u>Rev No.</u> | <u>Title</u>                       |
|----------------|----------------|------------------------------------|
| E-502 Sh 1     | 21             | Main one line diagram              |
| E-502 Sh 3     | 15             | Main one line diagram              |
| E-502 Sh 6     | 46             | Auxiliary one line diagram         |
| E-503 Sh 10    | 21             | 480V Motor Control Center one line |

6.2 Plant Procedures Manuals (PPMs) (Cont'd)

| <u>PPM No.</u>  | <u>Rev No.</u> | <u>Title</u>   |
|-----------------|----------------|--|
| 7.4.3.7.9.31    | 5              | Heat Detector Water Spray for REA-FU-2A-CFT  |
| 7.4.3.7.9.32    | 5              | Heat Detector Water Spray for REA-FU-2B-CFT  |
| 7.4.3.7.9.33    | 2              | Heat Detector Water Spray for SGT-FU-1A-CFT  |
| 7.4.3.7.9.34    | 2              | Heat Detector Water Spray for SGT-FU-1B-CFT  |
| 7.4.7.6.1.1.2   | 3              | Monthly Fire Pump FP-P-2A Operability Test   |
| 7.4.7.6.1.1.2.3 | 3              | Monthly Fire Pump FP-P-2A Operability Test   |
| 7.4.7.6.1.1.3   | 3              | Monthly Fire Pump FP-P-2B Operability Test   |
| 7.4.7.6.1.1.4   | 5              | Monthly Fire System Valve Alignment  |
| 7.4.7.6.1.1.6   | 2              | Fire System Flow Path Valve Exercise   |
| 7.4.7.6.1.2.1   | 2              | Monthly Operability Test of Diesel Fire Pump FP-P-1  |
| 7.4.7.6.1.2.2   | 3              | Diesel Fire Pump Fuel Test   |
| 7.4.7.6.1.3.1   | 4              | Weekly Fire Pump Battery Testing   |
| 7.4.7.6.2.2     | 2              | Annual Fire Protection Testable Valve Operability  |
| 7.4.7.6.2.3     | 0              | Sprinkler System Functional Test and Inspection  |
| 7.4.7.6.4.1     | 5              | Plant Fire Hose Station Operability Demonstration  |
| 7.4.7.7.2.1     | 3              | Fire Door Operability  |
| 7.4.7.7.2.4     | 6              | Unlocked Fire Door Operability   |
| 10.2.5          | 4              | Rotating Equipment Coupling Alignment  |
| 10.29.10        | 2              | Function Check Deluge System and Pre-Action Systems  |
| 10.29.15        | 3              | Removal/Installation of 26/44 lb Spherical and 30 lb Cylindrical PGCC Halon Bottles and Agent Quantity/Fill Verification |
| 10.29.17        | 1              | Wet Pipe - Flow and Tamper Switches - CFT  |



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Electrical Drawings (Cont'd)

| <u>Dwg No.</u>    | <u>Rev No.</u> | <u>Title</u>                          |
|-------------------|----------------|---------------------------------------|
| E-504 Sh 6        | 30             | Vital one line diagram                |
| E-504             | 30             | Vital one line diagram                |
| E-508 Sh 1        | 52             | AC Power Panel Schedules              |
| E-515 Sh 2        | 2              | 480V Switchgear Breaker Settings List |
| 02-217-0084 Sh 1  | EE             | Electrical Design Drawing             |
| 02-217-0084 Sh 2  | P              | Electrical Design Drawing             |
| 02-217-0084 Sh 3  | D              | Electrical Design Drawing             |
| 02-217-0084 Sh 4  | G              | Electrical Design Drawing             |
| 02-217-0084 Sh 5  | G              | Electrical Design Drawing             |
| 02-217-0084 Sh 6  | F              | Electrical Design Drawing             |
| 02-217-0084 Sh 7  | H              | Electrical Design Drawing             |
| 02-217-0084 Sh 8  | M              | Electrical Design Drawing             |
| 02-217-0084 Sh 9  | C              | Electrical Design Drawing             |
| 02-217-0084 Sh 10 | H              | Electrical Design Drawing             |
| 02-217-0084 Sh 11 | F              | Electrical Design Drawing             |
| 02-217-0084 Sh 12 | L              | Electrical Design Drawing             |
| 02-217-0084 Sh 13 | J              | Electrical Design Drawing             |
| 02-217-0084 Sh 14 | F              | Electrical Design Drawing             |
| 02-217-0084 Sh 15 | G              | Electrical Design Drawing             |
| 02-217-0084 Sh 16 | C              | Electrical Design Drawing             |
| 02-217-0084 Sh 17 | E              | Electrical Design Drawing             |
| 02-217-0084 Sh 18 | G              | Electrical Design Drawing             |
| 02-217-0084 Sh 19 | D              | Electrical Design Drawing             |
| 02-217-0084 Sh 20 | J              | Electrical Design Drawing             |
| 02-217-0084 Sh 21 | C              | Electrical Design Drawing             |
| 02-217-0084 Sh 22 | B              | Electrical Design Drawing             |

6.4 Electrical Drawings (Cont'd)

| <u>Dwg. No.</u>    | <u>Rev No.</u> | <u>Title</u>              |
|--------------------|----------------|---------------------------|
| 02-2117-0084 Sh 23 | G              | Electrical Design Drawing |
| 02-2117-0084 Sh 24 | G              | Electrical Design Drawing |
| 02-2117-0084 Sh 25 | E              | Electrical Design Drawing |
| 02-2117-0084 Sh 26 | D              | Electrical Design Drawing |
| 02-2117-0084 Sh 27 | C              | Electrical Design Drawing |
| 02-2117-0084 Sh 28 | D              | Electrical Design Drawing |
| 02-2117-0084 Sh 29 | G              | Electrical Design Drawing |
| 02-2117-0084 Sh 30 | H              | Electrical Design Drawing |
| 02-2117-0084 Sh 31 | F              | Electrical Design Drawing |
| 02-2117-0084 Sh 32 | B              | Electrical Design Drawing |
| 02-2117-0084 Sh 33 | C              | Electrical Design Drawing |
| 02-2117-0084 Sh 34 | D              | Electrical Design Drawing |
| 02-2117-0084 Sh 35 | G              | Electrical Design Drawing |
| 02-2117-0084 Sh 36 | F              | Electrical Design Drawing |
| 02-2117-0084 Sh 37 | H              | Electrical Design Drawing |
| 02-2117-0084 Sh 38 | B              | Electrical Design Drawing |
| 02-2117-0084 Sh 39 | H              | Electrical Design Drawing |
| 02-2117-0084 Sh 40 | G              | Electrical Design Drawing |
| 02-2117-0084 Sh 41 | F              | Electrical Design Drawing |
| 02-2117-0084 Sh 42 | E              | Electrical Design Drawing |
| 02-2117-0084 Sh 43 | E              | Electrical Design Drawing |
| 02-2117-0084 Sh 44 | B              | Electrical Design Drawing |
| 02-2117-0084 Sh 45 | D              | Electrical Design Drawing |
| 02-2117-0084 Sh 46 | C              | Electrical Design Drawing |
| 02-2117-0084 Sh 47 | E              | Electrical Design Drawing |
| 02-2117-0084 Sh 48 | D              | Electrical Design Drawing |

6.4 Electrical Drawings (Cont'd)

| <u>Dwg No.</u>    | <u>Rev No.</u> | <u>Title</u>                                 |
|-------------------|----------------|--|
| 02-217-0084 Sh 49 | C              | Electrical Design Drawing                    |
| 02-217-0084 Sh 50 | C              | Electrical Design Drawing                    |
| 02-217-0084 Sh 51 | F              | Electrical Design Drawing                    |
| 02-217-0084 Sh 52 | E              | Electrical Design Drawing                    |
| 02-217-0084 Sh 53 | F              | Electrical Design Drawing                    |
| 02-217-0084 Sh 54 | I              | Electrical Design Drawing                    |
| 02-217-0084 Sh 55 | I              | Electrical Design Drawing                    |
| 02-217-0084 Sh 56 | Q              | Electrical Design Drawing                    |
| 02-217-0084 Sh 57 | N              | Electrical Design Drawing                    |
| 02-217-0084 Sh 58 | I              | Electrical Design Drawing                    |
| 02-217-0084 Sh 59 | H              | Electrical Design Drawing                    |
| 02-217-0084 Sh 60 | K              | Electrical Design Drawing                    |
| 02-217-0084 Sh 61 | M              | Electrical Design Drawing                    |
| 02-217-0084 Sh 62 | B              | Electrical Design Drawing                    |
| 02-217-0084 Sh 63 | E              | Electrical Design Drawing                    |
| 02-217-0084 Sh 64 | C              | Electrical Design Drawing                    |
| 02-217-0084 Sh 65 | D              | Electrical Design Drawing                    |
| 02-217-0084 Sh 66 | C              | Electrical Design Drawing                    |
| 02-217-0084 Sh 67 | B              | Electrical Design Drawing                    |
| 02-217-0084 Sh 68 | C              | Electrical Design Drawing                    |
| 02-217-0084 Sh 69 | A              | Electrical Design Drawing                    |
| 02-217-0084 Sh 70 | A              | Electrical Design Drawing                    |
| 02-217-0084 Sh 71 | A              | Electrical Design Drawing                    |
| 02-217-0084 Sh 72 | B              | Electrical Design Drawing                    |
| EWD-62E Sh 000    | 3              | F.P. - System 62 - Electrical Wiring Diagram |

#### 6.4 Electrical Drawings (Cont'd)

| <u>Dwg No.</u>  | <u>Rev No.</u> | <u>Title</u>                                 |
|-----------------|----------------|--|
| EWD-62E Sh 001  | 3              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 002  | 2              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 003  | 2              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 004  | 2              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 005  | 2              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 006  | 2              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 007  | 2              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 008  | 2              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 009  | 2              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 010  | 2              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 027  | 2              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 028  | 2              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 029  | 2              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 030  | 2              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 031  | 2              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 032  | 2              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 036A | 2              | F.P. - System 62 - Electrical Wiring Diagram |

#### 6.4 Electrical Drawings (Cont'd)

| <u>Dwg No.</u> | <u>Rev No.</u> | <u>Title</u>                                 |
|----------------|----------------|--|
| EWD-62E Sh 039 | 1              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 040 | 0              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 041 | 0              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 042 | 0              | F.P. - System 62 - Electrical Wiring Diagram |
| EWD-62E Sh 053 | 0              | F.P. - System 62 - Electrical Wiring Diagram |

#### 6.5 Mechanical Drawings

| <u>Dwg No.</u> | <u>Rev No.</u> | <u>Title</u>                 |
|----------------|----------------|------------------------------|
| M-510          | 61             |                              |
| M-512 Sh 1     | 2              |                              |
| M-512 Sh 3     | 3              |                              |
| M-512 Sh 4     | 0              |                              |
| M-515          | 51             | Fire Protection Flow Diagram |
| M-515 Sh 1     | 2              | Fire Protection Flow Diagram |
| M-545          | 53             | Flow Diagram                 |
| M-549          | 32             | Flow Diagram                 |
| M-551          | 30             | Flow Diagram                 |
| M-573          | 22             | Fire Protection Flow Diagram |
| M-587          | 26             | General Arrangement          |
| M-741          | 24             |                              |
| M-788          | 21             |                              |
| M-805          | 18             |                              |
| M-809          | 32             |                              |
| M-810          | 40             |                              |

6.5 Mechanical Drawings (Cont'd)

| <u>Dwg No.</u> | <u>Rev No.</u> | <u>Title</u> |
|----------------|----------------|--------------|
| M-820          | 25             |              |
| M-823          | 21             |              |
| M-825          | 28             |              |
| M-826          | 29             |              |
| M-828          | 6              |              |
| M-848          | 41             |              |
| M-859          | 10             |              |
| M-892          |                |              |

6.6 Diesel Fuel Oil Drawings

| <u>Dwg No.</u> | <u>Rev No.</u> | <u>Title</u> |
|----------------|----------------|--------------|
| DO-442-1.11    | 8              |              |
| DO-446-1.8     | 9              |              |
| DO-447-1.8     | 9              |              |
| DO-448-1       | 1              |              |

6.7 Civil Drawings

| <u>Dwg No.</u> | <u>Rev No.</u> | <u>Title</u> |
|----------------|----------------|--------------|
| C-508          | 6              |              |
| C-896          | 0              |              |

6.8 Structural Drawings

| <u>Dwg No.</u> | <u>Rev No.</u> | <u>Title</u> |
|----------------|----------------|--------------|
| S-857          | 27             |              |
| S-858          | 16             |              |

6.9 Plumbing Drawings

| <u>Dwg No.</u> | <u>Rev No.</u> | <u>Title</u> |
|----------------|----------------|--------------|
| P-541          | 27             | Flow Diagram |
| P-542          | 8              | Flow Diagram |

6.10 Pipe Isometric Drawings: CVI 02-215-00-14362

CVI 02-215-00-14363

CVI 02-215-00-2750

CVI 02-29-00, 37

6.10 Pipe Isometric Drawings: (Cont'd)

CVI 02-216-001658, R1

CVI 02-216-06, 9, R0

CVI 02-216-06, 10, R0

CVI 02-216-06, 10, R8

CVI 02-224-00, 2

6.11 Maintenance Procedures: Volume 4

Volume 7

Volume 10

6.12 FSAR Technical Specifications: 3/4.7, b

3.7.6.1

4.7.6.2.a

4.7.6.2.c.2

4.7.6.2.c.3

4.7.6.2.d.3

6.13 Project Engineering Directives (PEDs): 0249-7/83

210A-CS-0370

E-217

E-249

- 6.14 Project Modification Requests (PMRs): 02-84-1071-0  
02-84-1071-1  
02-84-1623  
02-84-1623
- 6.15 Design Change Packages (DCPs): 02-84-1623.OA  
01-85-0088.OA  
84-1071-06-006
- 6.16 Instruction Manuals: CP-30  
CP-31
- 6.17 Calculations: 2.03.09  
2.06.08  
2.12.00  
9.32.00  
E/I-02-85-07
- 6.18 Miscellaneous Documents
- Property File N-219 1979
  - FP-P-110 Performance Curve for Aurora Pump No. 82-65340
  - Automatic Detection Equipment 02-217-00-84 Sheets 1-72
  - 51573 Transmittal No. 2 B&R File No. 5-1973
  - System 62 Acceptance Test Report
  - P P Program 1.3.10
  - P P Improvement 1.10.1
  - Stewart Stevenson Drawing 21307 Sheets 1 and 2 Rev 1
  - Surveillance Procedure Vol. 7
  - BTQMB 9.5.11 Item C.5.F
  - Emergency Plan Implementing Procedure (EPIP) - 13.2.1
  - Emergency Plan Implementing Procedure (EPIP) - 13.14.4

ASSESSMENT OF FIRE PROTECTION  
PROGRAM RESPONSIBILITIES AND ADMINISTRATION

December, 1986

  
G.D. Bouchey Director,  
Support Services

  
C.M. Powers, WNP-2  
Plant Manager



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ASSESSMENT OF FIRE PROTECTION  
PROGRAM RESPONSIBILITIES AND ADMINISTRATION

I. INTRODUCTION

In the 1985 Systematic Assessment of Licensee Performance (SALP) Report (issued in July 1986), U.S. Nuclear Regulatory Commission (NRC) noted that "In general the fire protection program appears to lack effective commitment and coordination among various aspects of the program..." They recommended that management consider..." assigning to a member of plant management staff the responsibility for providing overall coordination of the program..." In subsequent discussions with the NRC-Region V Staff, they indicated their major concerns relate to strengthening the role of the registered Fire Protection Engineer and the concept of establishing a WNP-2 Fire Marshall was suggested. These positions would assure that fire protection issues are adequately considered in the course of plant engineering, operations, maintenance, and modification implementation (including resolution of issues at the proper level of management, if necessary).

Based on NRC comments in their SALP evaluation and commitments made during recent NRC inspections the Supply System has undertaken a major reevaluation of the WNP-2 Fire Protection Programs (Reference 1). One task in this reevaluation involves reassessment of our Fire Protection Program, definition of responsibilities, role of the Industrial Safety and Fire Protection (IS&FP) and Plant staff, and administrative/work control processes to assure their adequacy. Examples of areas that will be reexamined and improved by this task include the role of the registered fire protection engineer, fire protection staff review of welding/burning permits, fire protection review of design modifications, maintenance work requests, LERs, etc.

This report summarizes the results of the reevaluation task in two (2) sections. The first deals with organization and roles; the second with administrative processes to ensure adequate implementation. A final section identifies an action plan for implementation of future milestones.

## II. WNP-2 FIRE PROTECTION PROGRAM ORGANIZATIONAL RESPONSIBILITIES AND ROLES

### A. Organization Structure

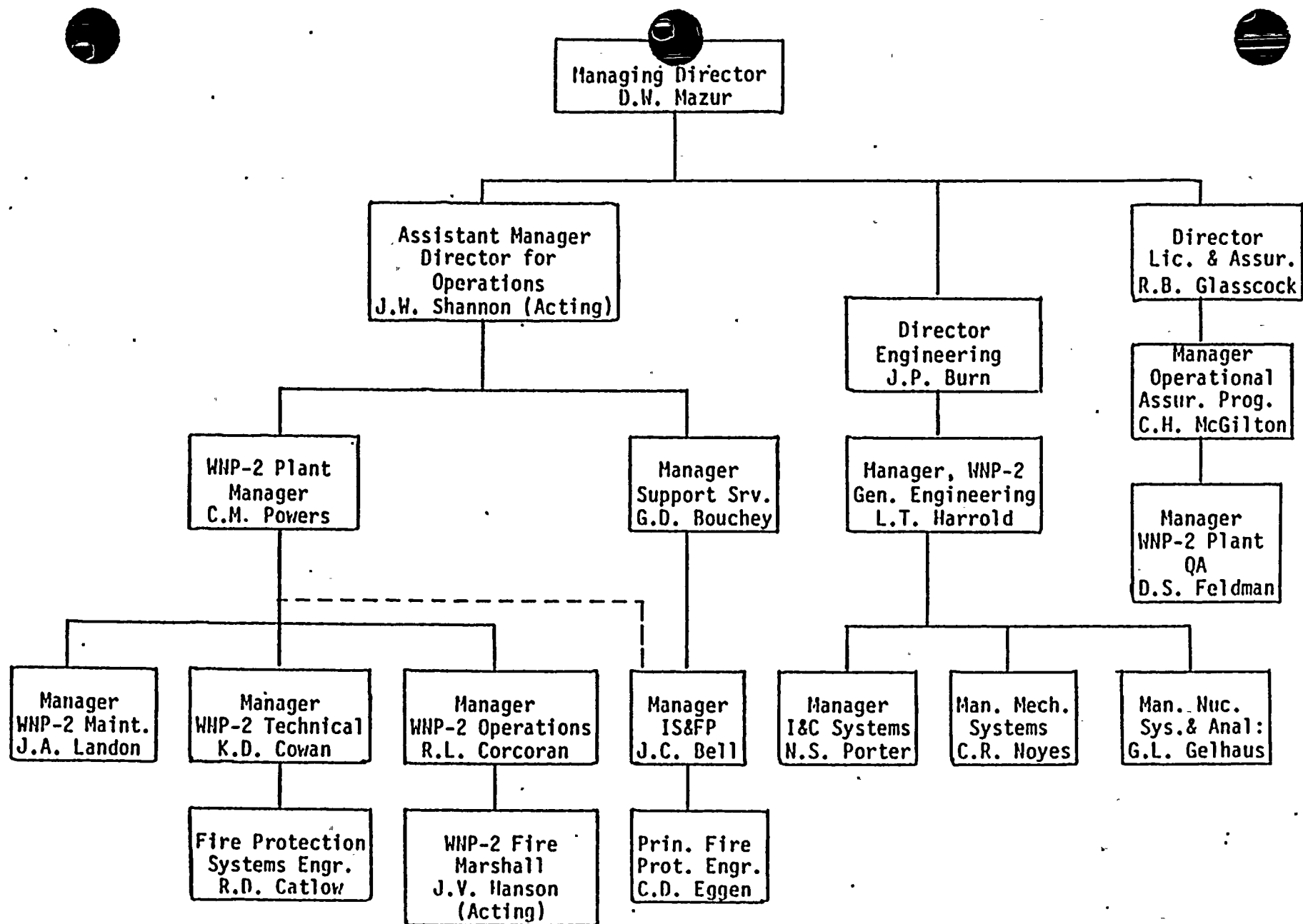
The Plant Manager is the line manager responsible for the adequacy of fire protection of WNP-2. In this role, he is responsible for the proper implementation of the WNP-2 Fire Protection Program, including conformance with the applicable Federal and State regulations and corporate requirements. The Program is controlled primarily through two positions, (1) a registered Fire Protection Engineer (reporting to the IS&FP Manager) and (2) a WNP-2 Fire Marshall (reporting to the WNP-2 Operations Manager).

The Supply System's organization associated with the Fire Protection Program is shown in Figure 1. This organizational arrangement is fully consistent with NRC regulations and guidance (References 2 and 3). The role of key positions within this organization in the WNP-2 Fire Protection Program are summarized below.

Assistant Managing Director for Operations [J.W. (Jack) Shannon (acting)]: Senior management official responsible for safe and efficient operation of Supply System nuclear power facilities.

WNP-2 Plant Manager [C.M. (Chris) Powers]: Overall line manager responsible for the implementation and effectiveness of the WNP-2 Fire Protection Program. Reports to the Assistant Managing Director for Operations.

Manager, Support Services [G.D. (Don) Bouchey]: Assigned the overall corporate responsibility for fire protection program formulation and for assessment of adequacy of fire protection at Supply System facilities including WNP-2. Reports to the Assistant Managing Director for Operation.



Supply System Organizational Element Associated with Fire Protection  
Figure 1



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Industrial Safety and Fire Protection Manager [J.C. (Joe) Bell]: Responsible for development of corporate fire protection policies/programs for all Supply System operating plants and construction projects. Responsible for formulation and assessment of the effectiveness of the WNP-2 Fire Protection Program, in support of the WNP-2 Plant Manager. Reports to the Manager, Supports Services, which provides an independent management chain for policy matters or resolution of issues.

Principal Fire Protection Engineer [C.D. (Dale) Eggen]: Overall responsibility for ensuring the technical adequacy of all elements of the Fire Protection Program. Encumbent is required to be a Registered Fire Protection Engineer and Member Grade in S.F.P.E. Reports to the IS&FP Manager. Areas of responsibility and functions are summarized below:

o Safe Shutdown

- o Reviews of the safe shutdown method against the Final Safety Analysis Report (FSAR) commitments;
- o Reviews the fire barrier required for the safe shutdown system used; and
- o Performs the Plant's fire hazards analysis and reviews the safe shutdown methods and analysis for compliance with regulatory requirement and technical adequacy.

o Physical Protection

- o Reviews the fire protection systems related to design, FSAR commitments, NRC or ANI letters, etc. to ensure system/program adequacy;
- o Reviews new fire protection related work, including PMRs, DCPs, SCNs, and the FSAR (Volume 16, Section 9.5.1 and Appendix "F");
- o Reviews NCR and LER corrective actions related to fire protection; and
- o Reviews emergency lighting for safe egress, vision at shutdown panels, and adequate maintenance.

o Administrative Control

- o Reviews fire protection procedures to assure commitments are met;
- o Investigates all fires/explosions to determine the root cause, to recommend changes, to prevent recurrence, and to ensure an investigation history file is maintained;
- o Reviews fire brigade training to assure compliance with procedures and regulations;
- o Periodically tracks fire protection system surveillances and preventive maintenance to assure program adequacy and proper implementation;
- o Reviews QA audits and audit responses related to fire protection; and
- o Performs periodic plant tours and reports results to the WNP-2 Plant Manager and Manager IS&FP.

o Others

- o Make recommendations to management to correct any weaknesses identified and help to implement the changes; and
- o Provides technical support to Plant and Engineering organizations, as required, to assist with identification of cost effective solutions to problems and with preparation of system designs.

Plant Fire Marshall [J.V. (John) Hanson (Acting)]: Responsible for adequate implementation of the Fire Protection Program requirements by the Plant Staff/support groups. Serves as the principal point of contact for the Program's concerns and is responsible for ensuring proper reviews by the IS&FP Fire Protection Engineering Staff as described above.

Reports to the WNP-2 Operations Manager. The WNP-2 Fire Marshall is delegated the authority necessary to accomplish his responsibilities including authority to stop Plant work if necessary until conformance with fire protection programs is achieved. Areas of responsibilities and functions are summarized below:

o Safe Shutdown

- o Ensures adequate implementation of commitments within the Plant.

o Physical Protection

- o Coordinates Plant activities, which may impact barriers, detection, and suppression systems, to ensure proper implementation of program requirements;
- o Reviews and ensures adequate implementation of new work;
- o Reviews NCRs/LERs and assures adequate corrective actions are implemented; and
- o Reviews special fire protection requirements for MWRs.

o Administrative Control

- o Coordinates implementation of fire protection administrative requirements by Plant organizations;
- o Reviews and assures implementation of fire protection related Plant procedures;
- o Serves as a point of contact for all fire protection inspections;
- o Coordinates system surveillances/preventative maintenance programs to ensure proper and timely implementation; and
- o Implements fire barrier and penetration programs.

o Other

- o Participates in the investigation of all fires/explosions to determine the root cause and to prevent recurrence.

Generation Engineering Manager [L.T. Harrold]: Provides for design and discipline support of fire protection systems. Performs safe shutdown analysis and engineering associated with electrical separation. Responsible for adequacy of design, design documentation, and design control process implementation, including obtaining appropriate fire protection reviews. Reports to Director of Engineering.

WNP-2 Operations Manager [R.L. (Roger) Corcoran]: Responsible for implementation of numerous Program elements including system operation, performance of certain fire system surveillances, fire brigade staffing and member qualification, recording of proper response to fire alarms, notification of Plant Fire Marshall of all fires and system impairments, approval of fire system impairments, and approval of Program's permits. Responsible to provide management support for the WNP-2 Fire Marshall. Reports to the WNP-2 Plant Manager.

WNP-2 Maintenance Manager [J.A. (Jim) Landon]: Responsible for timely, preventative and corrective maintenance of fire protection systems and surveillances of fire detection systems. Reports to the WNP-2 Plant Manager.

WNP-2 Technical Manager [K.D. (Kirk) Cowan]: Provides a Fire Protection System Engineer, implements fire protection system performance trending and modifications, and administers the fire barrier penetration surveillance program. Reports to the WNP-2 Plant Manager.

Director Licensing and Quality Assurance [R.B. (Bob) Glasscock]: Provides independent quality surveillance and audit programs in conformance with regulatory requirements and corporate policies. Reports directly to the Managing Director.

WNP-2 Plant QA Manager [D.S. (Dom) Feldman]: Responsible for on-site QA functions at WNP-2 including QA/QC programs associated with the fire protection program.

## B. Interface Analysis

As part of the review of the WNP-2 fire protection program functional roles within the Supply System a review of the major organizational interfaces was performed. The results of the review were utilized to formulate the organization improvements described in this report. Figure 2 is a sketch of the major programmatic interfaces involved in the WNP-2 fire protection program implementation. It is included here because we believe it helps to understand how effective program coordination will be accomplished. It should be emphasized that Figure 2 is not an organizational chart nor should it be interpreted to prohibit or discourage communication or interfaces not specifically shown in the diagram.

As shown in Figure 2 the Principal Fire Protection Engineer interfaces with all program elements (including the WNP-2 Fire Marshall, Engineering and Training) in a coordinating, technical advisory and assessment role. The WNP-2 Fire Marshall has the key role in on-site implementation of the program and provides the principal interface with all WNP-2 Plant organizations on fire protection matters.



### III. FIRE PROTECTION PROGRAM ADMINISTRATION

An overall review of the Fire Protection Program administration was conducted to assess its adequacy. Areas that were evaluated include design process, system modifications, licensing/FSAR maintenance, incident reporting/investigation, records, quality assurance, procedures/procedure review, staffing levels/qualifications, performance assessment, surveillance/maintenance, training/training records, welding/cutting, control of combustibles, and fire system impairment procedures. As a result of the review, the following improvement initiatives have been identified and are being implemented.

1. Broader review is needed by a Registered Fire Protection Engineer of significant fire protection program documentation. Specifically, the following improvement to the current administrative review process is being or has been implemented:
  - o All facilities and Plant modification packages (DCPs) are now being reviewed and signed off by the Principal Fire Protection Engineer for fire protection impacts. The Engineering design control procedures has been changed to reflect this process modification.
  - o The fire protection review of procedures needs to be improved. A list of plant procedures will be identified that require mandatory fire protection reviews. The procedure coordinator for these procedures will ensure a fire protection review is performed of all modifications to these procedures. IS&FP will review plant procedure changes for impact on fire protection. Comments will be tracked by IS&FP to assure appropriate resolution.
  - o Open fire protection issues should be tracked to completion by the Fire Protection Engineer who ensures timely action. Results should be periodically reported to Senior Management.

2. All MWRs should receive an improved fire protection review by the implementing organizations. PPM 1.3.7, Maintenance Work Requests and associate fire protection plant procedures (PPMs 1.3.10 and 1.3.35) will be revised to require appropriate fire protection review. The review will be documented at least in checklist form.
3. The fire protection system surveillances and preventative maintenance activities will be overviewed by the WNP-2 Fire Marshall to assure full compliance with regulatory commitment and applicable codes.

#### IV. FUTURE ACTIONS

The following milestones and responsible individuals are established to implement the actions described in Section II and III above:

- |  |         |                              |
|--|---------|------------------------------|
| 1. Draft revision to NOS 39 Policy   | 1/15/87 | G.D. Bouchey                 |
| Issue revised NOS  | 1/31/87 |                              |
| 2. Implement Organization Changes<br>(i.e. create Fire Marshall position)  | 1/1/87  | C.M. Powers                  |
| 3. Meet with involved staff to clarify roles   | 1/15/87 | G.D. Bouchey/<br>C.M. Powers |
| 4. Revise plant procedure as described in<br>Section III.  | 3/3/87  | J.V. Hanson/<br>J.C. Bell    |
| 5. Conduct management review to assess<br>adequacy of actions/status. Implement<br>mid-course corrections if necessary | 6/87    | G.D. Bouchey/<br>C.M. Powers |

## References

1. Letter, G.C. Sorensen, Supply System to J.B. Martin, NRC Region V, "Fire Protection Program Reevaluation", dated September 16, 1986.
2. 10CFR50, Appendix R, Fire Protection Program for Nuclear Power Facilities.
3. NRC Supplementary Guidance, "Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance", June 14, 1977.



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FIRE PROTECTION PROGRAM ASSESSMENT

JANUARY 1987

BY: J. V. HANSON



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FIRE PROTECTION PROGRAM ASSESSMENT  
JANUARY 1987

Background

This report is an assessment of the WNP-2 Plant conformance to the Plant Fire Protection Program. The Plant Fire Protection Program is defined in the following procedures:

| <u>PPM</u> | <u>REV</u> |                                  |
|------------|------------|----------------------------------|
| 1.3.10     | 4-C        | Fire Protection Program          |
| 1.3.19     | 8-C        | Housekeeping                     |
| 1.3.35     | 1-C        | Fire Protection Program Controls |
| 1.3.36     | 1-C        | Fire Protection Program Training |






These procedures identify the individuals responsible for certain actions to make the fire protection and other related programs a success.

Methodology

Each procedure was reviewed in detail to determine how well organizations and personnel are implementing the requirements. Each action was judged on the basis of interviews with personnel involved, evaluation of previous QA concerns and corrective actions being implemented, and evaluation of recent procedure revisions. The assessment is a subjective view of the WNP-2 Fire Protection Procedures and their implementation.

The following legend explains the symbols used to assess the performance to the procedure requirement and their meanings.

LEGEND

-  PERFORMANCE ACCEPTABLE.
-  PERFORMANCE ACCEPTABLE IN MOST AREAS; IMPROVING  
NEEDS IMPROVEMENT IN ISOLATED CASES.
-  PERFORMANCE GENERALLY NOT PER EXPECTATIONS. IMPROVEMENT  
NEEDED IN MOST AREAS.
-  PERFORMANCE DETERIORATING. REQUIREMENTS NOT FOLLOWED.
-  NO ATTEMPT TO FOLLOW PROCEDURE.

## Conclusions









The WNP-2 Fire Protection Program Procedures are adequate. The four procedures require minor revisions to clarify responsibilities, update information, correct wording and incorporate changes to implement corrective actions from Quality Assurance audits.

The procedure compliance by Plant organizations needs improvement in some areas. Corrective action in the form of procedure revisions, additional training and implementation of new programs will strengthen the Plant's overall Fire Protection Program. These corrective actions will be implemented before April 1, 1987. An assessment of the effectiveness of some of the changes will not be possible to observe until the Spring Refueling Outage.

| Responsibility | Requirement   | Assessment of Performance | Assessment                                 | Comment/Resolution/Remarks  |
|----------------|---|---------------------------|--|---|
| Plant Manager  | Establish fire brigade and supply training.   | ↑                         | Trained fire brigade exists                | Need management attention or response to identified concerns.   |
|                | Drills and practice sessions for fire brigade.  | ↑                         | Fire brigade is trained and drilled        |   |
|                | Fire hazard/safety surveys and/or inspections are conducted and documented. Procedures prepared.  | ↗                         | D. Egan prepares monthly inspection report |   |
|                | Coordinating fire drills and evaluating.  | ↑                         |  | Signs are not posted. Revise procedure or post signs.   |
|                | Posting areas to store fire retardant lumber.   | ↗                         | Areas are identified in PPM 1.3.35         |   |
|                | Assure maintenance and operations maintains the fire equipment and performs PMs and surveillance procedures.  | ↗                         | Needs closer scrutiny                      | Develop matrix of NFPA * NRC requirements identify responsibility.  |
|                | All control valves larger than 1-1/2" in the fire protection system are locked in the wide open position with non-breakable Shackle locks and chains. | →                         | Most valves are sealed                     | Management decision to lock all 2" and larger valves controlling water to sprinkler systems and standpipes. Revise procedure. |

**PROCEDURE****1.3.10**

| <b>Responsibility</b>                           | <b>Requirement</b>  | <b>Assessment<br/>of<br/>Performance</b> | <b>Assessment</b>  | <b>Comment/Resolution/Remarks</b>  |
|---|---|--|--|--|
| <b>Plant<br/>Technical<br/>Manager</b>          | Preliminary review of design changes for possible impact on Plant fire protection provisions. | ↑  |  | Need to improve on timeliness of completing review.  |
|   | Assuring special inspections and audits are conducted as required by Tech. Specs.             | ↑  |  |  |
| <b>Plant<br/>Operations<br/>Manager</b>         | Fire brigade members Equipment Operators maintain their qualifications.                       | ↗  |  | Improved - previous problems with member not maintaining qualifications. Scheduled for training. Shift Support Supervisor should have ready access to PQS. |
| <b>Health/Physics<br/>Chemistry<br/>Manager</b> | Fire brigade members H.P. Technicians maintain their qualifications.                          | ↗  |  | Same as above. Shift Supervisor should have ready access to PQS.   |
| <b>Generation<br/>Engineering<br/>Manager</b>   | Prepare design packages.  | ↑  | Packages prepared on priority set by Plant Technical Manager |  |
|   | Incorporates design changes for fire protection into the FSAR.                                | ↑  |  |  |
|   | Assures design changes are reviewed by IS&FP Fire Protection Engineer.                        | ↑  | All design changes are reviewed by IS&FP                     |  |








| Responsibility                                   | Requirement  | Assessment of Performance   | Assessment                  | Comment/Resolution/Remarks   |
|--|--|---|-----------------------------|--|
| Manager of Industrial Safety and Fire Protection | Recommend equipment for fire protection use.   |    |                             | Smoke evaluation - equipment. Need to develop review of P.R. for Safety and Fire Protection.                                     |
|  | Drills and training with local fire departments.   |    |                             |  |
|  | Recommendations for maintaining fire protection equipment.   |    |                             |  |
|  | Provide technical assistance in preparing instructions and procedures.   |    | Pre fire plans need update. | IS&FP needs to incorporate changes to pre-fire plans. Designated by Plant Manager to take lead.                                  |
|  | Aid Plant Manager in coordinating fire drills and evaluating.  |    |                             |  |
|  | Technical assistance in locating fire related signs.   |  | Signs properly located.     |  |
|  | Audit and follow-up on "Transient Combustibles Permit" and "Cutting, Welding-Grinding Permit" which are overdue. |  |                             | IS&FP have provided followup action. Review responsibility and revise procedure. Assign to responsible Plant Department Manager. |
|  | Monthly fire prevention inspection of the Plant. Results to Plant Manager.                                       |  |                             |  |







**PROCEDURE****1.3.10**

| Responsibility                                   | Requirement  | Assessment of Performance | Assessment                                 | Comment/Resolution/Remarks  |
|--|--|---------------------------|--|---|
| Manager of Industrial Safety and Fire Protection | Review MWRs resulting from surveillance testing.   | →                         | Not reviewing MWRs                         | Review of MWRs generated as a result of surveillance testing is Plant staff responsibility-Fire Marshall. Revise procedure.   |
|  | Review technical aspects of fire brigade and fire watch training.  | ↑                         |  |   |
|  | Investigate fire explosion or malfunctioning fire protection equipment. Prepare report.  | →                         | Investigations are not being done properly | Lack of cooperation between IS&FP and Plant Operations has hampered performing through investigations. Repair and reinforce communication channels. Revise procedure to reflect agreements. |
|  | Review MWRs on a random basis to determine if adequate preplanning for impairments, hazards work etc. have been included by the DSG. | ↑                         |  |   |
| Shift Manager                                    | Stopping work that does not meet fire protection requirements.   | ↑                         |  | Preplanning is done at the work supervisor level. DSG does not know the scope of work to adequately identify fire hazards. Revise procedure.  |
|  | Receives notification of planned system impairments.   | ↑                         |  |   |
|  | Assures redundant fire protection components or systems are not impaired prior to approving an impairment.                           | ↑                         |  |   |

| Responsibility           | Requirement  | Assessment of Performance | Assessment  | Comment/Resolution/Remarks   |
|--------------------------|--|---------------------------|---|--|
| Shift Manager            | Reviews fire protection system impairments against Tech. Spec. requirements. Directs Shift Support Supervisor to notify the NRC.             | ↑                         |   | Delete Shift Support Supervisor notifying NRC. Shift Manager to notify NRC. Revise procedure.  |
|                          | Initiates surveillance action requirements applicable to fire system impairments.  | ↑                         |   |  |
|                          | Notification of IS&FP of all fires, explosions on related incidents and unplanned fire protection impairments.                               | →                         | Have not notified or communicated with IS&FP on fires |  |
|                          | Notify the Shift Support Supervisor of any impairment to the fire protection system due to surveillance testing or maintenance.              | ↑                         |   |  |
| Shift Support Supervisor | Act as fire brigade leader and assures all others on fire brigade are qualified.   | ↑                         |   | Recent change to procedure appears to be a successful change. Need to clarify role of Shift Support Supervisor when he is in the control room license maintenance. |
|                          | Initiates a fire protection system checklist for an unplanned impairment and maintaining in a notebook until returned to operable condition. | ↑                         |   |  |

PROCEDURE1.3.10

| Responsibility           | Requirement  | Assessment of Performance  | Assessment   | Comment/Resolution/Remarks  |
|--------------------------|--|--|--|---|
| Shift Support Supervisor | Reports fire protection system impairments to NRC,   |   | Change responsibility to Shift Manager                       | Not done, Shift Manager's responsibility. Needs procedure revision.   |
|                          | Notifies ANI for all fire protection system impairments or malfunctions and when they are restored.  | <br> | Notifies ANI, but does not notify IS&FP                      | Need to be timely. Plant Operations Manager and IS&FP Manager to agree on notification requirements.  |
|                          | Completing fire protection system impairment checklist when system is restored to operable.  |   | Impairment checklist is not consistently being sent to Files | Files do not have a complete list of completed checklists. Plant Operations Manager action to correct deficiency.   |
|                          | Maintain a notebook for active "cutting-welding-grinding" and "transient combustible" permits. Those that are close to time limit and have exceeded time limit are sent to IS&FP for follow up action. |    | Permits exceeding time limit                                 | Should be maintaining a log. Should be reported to Plant Maintenance Manager for action. IS&FP should audit. Establish log. Revise procedure to have Plant Maintenance Manager take action. |
|                          | Performing fire hazard analysis when required.   |   | Inappropriate use of words                                   | His review should be to determine that the permit is within the frame work of the FSAR fire hazard analysis. Revise procedure. Work supervisor reviews.                                     |
|                          | Approving "cutting-welding-grinding" and "transient combustibles" permits.   |   |  |   |

| Responsibility  | Requirement  | Assessment of Performance   | Assessment | Comment/Resolution/Remarks                                |
|-----------------|--|---|------------|---|
| Work Supervisor | Completing and implementing requirements of cutting-welding-grinding permits.  |    |            |   |
|                 | Assuring personnel performing work under their control follow cutting-welding-grinding permits and/or transient combustible permits.                               |    |            |   |
|                 | Assures that the cutting-welding-grinding permit is attached to the MWR and/or procedure.  |    |            |   |
|                 | Stopping any work that does not meet Fire Protection Program requirements.   |   |            | Supervision needs to follow closely to ensure compliance. |
|                 | Assuring "Transient Combustible Permits" and Fire Protection System impairment checklist are closed out and returned to radwaste control room and attached to MWR. |  |            |   |
|                 | Coordinating planned impairments with the Shift Manager prior to system impairment.  |  |            |   |

Look closely at the process. Train personnel. Review close out process.









PROCEDURE1.3.10

| Responsibility  | Requirement   | Assessment of Performance | Assessment                                 | Comment/Resolution/Remarks   |
|-----------------|---|---------------------------|--|--|
| Work Supervisor | Notifying the Shift Manager or designee as soon as system returned to normal.   | ↑                         |  | Corrective action has been implemented by Plant Maintenance Manager.                 |
|                 | Establish a group of trained fire watch personnel.  | ↑                         |  |  |
|                 | Assure that fire extinguishers checked out of the tool crib have been returned at end of job, 5 days, or Friday p.m., whichever comes sooner. | ↗                         | Identified as a concern on recent QA audit |  |
| Workmen         | Maintain copy of cutting-welding-grinding permit at work location.  | ↗                         |  | Make sure workers follow through on closing out permits. Reinforce through training. |
|                 | Following requirements/precautions on permit. Lead or foreman sign off permit at the start of period or shift.                                | ↑                         |  |  |
|                 | Coordinating a planned impairment with his supervisor prior to impairment of system.  | ↑                         |  |  |
|                 | Obtaining approval of Shift Manager prior to impairing a fire system.   | ↑                         |  |  |

| Responsibility    | Requirement  | Assessment of Performance | Assessment                | Comment/Resolution/Remarks                           |
|-------------------|--|---------------------------|---------------------------|--|
| Workmen           | Following specific requirements of the permits that are required by this procedure.                      | ↑                         |                           | New program being implemented needs to be monitored. |
|                   | Notifying the Shift Manager when a fire protection system is returned to service.                        | ↑                         |                           |  |
|                   | Cleaning up the worksite at job completion or end of shift.  | ↗                         | Needs continued attention |  |
|                   | Returning any fire extinguishers to the tool crib.   | ↑                         |                           |  |
| Any Individual    | Reporting to the control room any activity which may affect fire protection control.                     | ↑                         |                           |  |
| Fire Watch Person | In case of fire related to work task, notify Shift Manager/control room and take action to control fire. | ↑                         |                           |  |
|                   | Stop work when activities deviate from permit approved requirements. Report to work supervisor.          | ↑                         |                           |  |









PROCEDURE1.3.10

| Responsibility        | Requirement   | Assessment<br>of<br>Performance | Assessment | Comment/Resolution/Remarks                 |
|-----------------------|---|---------------------------------|------------|--|
| Fire Watch<br>Person  | Remain in the area to perform fire watch duties.  | ↑                               |            | Monitor fire extinguisher control program. |
|                       | Revisit area or make arrangements for others if required by permit.   | ↑                               |            |  |
|                       | Returning fire extinguishers used in fire watch to the tool crib.   | ↑                               |            |  |
| Tool Crib<br>Operator | Issuing fire extinguishers only that have current monthly inspection. Coordinate inspection to have adequate number in reserve. | ↑                               |            |  |







| Responsibility           | Requirement   | Assessment of Performance   | Assessment   | Comment/Resolution/Remarks  |
|--------------------------|---|---|--|---|
| Plant Operations Manager | Cleanliness of operating equipment and control panels.  |    |  | Plant Operations Manager needs to define expectations.                          |
| Instrument Maintenance   | Cleanliness of instrument racks and installed instruments.  |    |  | Provide labels at racks and periodic inspection program.                        |
| Electrical Maintenance   | Cleanliness of electrical switch gear.  |    |  | Have a PM program.  |
| Each Plant Employee      | Wipe up oil spills. Pick up rags, papers, and foreign material.   |    |  | Improvement needed. Expect Area Coordinator to identify areas needing cleanup.  |
|                          | At the end of the job, return tools and equipment. At the end of day, neatly organize tools out of the way. |   | Problem occurs during outages                                  | Program is defined. Need to evaluate performance during outages.                |
|                          | After inspecting, close all inspection and access doors.  |  |  |   |
|                          | Remove combustible shipping material to designated storage or waste storage.                                |  | Too much combustible shipping material taken into the building | Need to minimize radwaste input/need to identify storage areas.                 |
|                          | At the end of the job remove or arrange to remove scaffolding, shielding, special fixtures, etc.            |  |  | Work supervisor package review for closeout. Improvement needed during outages. |






**PROCEDURE****1.3.19**

| <b>Responsibility</b>                | <b>Requirement</b>  | <b>Assessment<br/>of<br/>Performance</b> | <b>Assessment</b> | <b>Comment/Resolution/Remarks</b>  |
|--------------------------------------|---|--|-------------------|--|
| <b>Plant<br/>Operations</b>          | Inspect and clean all control panels, escutcheons and engravings.                                       | ↑  |                   |  |
|                                      | Properly securing gas bottles against substantial members with rope or chain tie off at top and bottom. | ↗  |                   | Designs are being developed for providing racks as the need is identified. Design and installation of the racks must compete against higher priority work. |
|                                      | Gas bottles not secured to safety related equipment or supports.  | ↗  |                   | Must watch during Floor Coordinator rounds. Take corrective action when identified.  |
|                                      | Housekeeping problems are reported to the Floor Coordinators for action.                                | ↗  |                   | Need to improve method to document problems.   |
| <b>Assistant<br/>Plant Manager</b>   | Maintains a list of (Area) Floor Coordinators.  | ↑  |                   |  |
| <b>(Area) Floor<br/>Coordinators</b> | Inspect their assigned areas periodically to ensure compliance with the house-keeping procedure.        | ↑  |                   |  |
| <b>Anyone</b>                        | Identify housekeeping concerns to (Area) Floor Coordinator for action on house-keeping report forms.    | ↗  |                   | Need to provide a usable form.   |

| Responsibility      | Requirement  | Assessment of Performance   | Assessment     | Comment/Resolution/Remarks  |
|---------------------|--|---|----------------|---|
| Department Managers | Inspect monthly those areas assigned to their personnel. Prepare report to Assistant Plant Manager describing age and backlog of housekeeping. |    |                | Evaluate their performance.   |
| All Employees       | Work area kept free of tripping hazards and sharp projections on floors.   |    |                |   |
|                     | Loose overhead items are secured or stored at ground level.  |    |                | Need to improve performance in the dry well.  |
|                     | Spills of oil, water, and chemicals are immediately cleaned up.  |    |                | Get surface cleaning - not a detailed cleaning.   |
|                     | Provide temporary protection where handrails are removed. Restore as soon as possible.   |  |                |   |
|                     | Storage area kept free of an accumulation of materials.  |  |                | 437' Elevation of RW a problem - need to define more storage areas.   |
|                     | Control vegetation and keep grounds neat and clean.  |  | Minimum effort | Grounds are kept clean, debris picked up. Could control vegetation better. Apply herbicide before it seeds or grows to maturity. Need to enclose dumpsters. |
|                     | Covers to switchgear, cabinets and panels are in place.  |  |                | A few missing covers.   |







PROCEDURE1.3.19

| Responsibility | Requirement   | Assessment<br>of<br>Performance   | Assessment                     | Comment/Resolution/Remarks  |
|----------------|---|---|--------------------------------|---|
| All Employees  | Introduction of combustible materials into the Plant shall be minimized.  |    |                                | Fix as part of radwaste minimization.   |
|                | Flammable liquid combustibles, such as lubricants, cleaners, paint, etc. shall be handled in containers and closed when not used.       |    |                                |   |
|                | Wastes shall not be burned on site. An exception is burning waste oil for fire brigade training.  |    | Burning other material on site | Burn tumbleweeds blown against the industrial perimeter fence. Stop burning weeds or deviate procedure. |
|                | All combustibles shall be kept out of the new fuel storage rack areas on 606' Reactor Building when it is being used to store new fuel. |    |                                | Have not stored new fuel in new fuel storage rack. Not anticipated to store fuel there in the future.   |
|                | Work done on critical equipment shall provide for measures to prevent contamination with foreign material.                              |  |                                | New PPM 1.3.42 should help monitor during the outage.   |
|                | Chemicals used for Plant Maintenance and Plant Operations tasks shall be approved for use per PPM 1.13.2, Chemical Permits.             |  |                                | Very few chemicals in use without stickers.   |








| Responsibility | Requirement   | Assessment<br>of<br>Performance   | Assessment   | Comment/Resolution/Remarks                                    |
|----------------|---|---|--|---|
| All Employees  | Employees shall assure work spaces are kept free of radiological contamination to the extent practical. Personnel working in an area are responsible for returning it to a clean uncontaminated state.                  |    |  | Work spaces get a general cleanup but not a good cleanup.     |
|                | All waste materials generated in controlled areas shall be treated as contaminants. Such materials shall be surveyed by H/P and disposed as directed by H/P. Materials shall be unpacked before taking into such zones. |    | Too much combustible packing material in radiation zones | Plant needs to improve on taking packing material into zones. |
|                | All grinding, blasting, welding shall be contained to prevent spread of airborne contamination.   |  |  |   |
|                | Care taken to limit the areas of surface contamination - use plastic covers.  |  |  |   |
|                | H/P personnel provides assistance to determine level of contamination and recommend decontamination.  |  |  |   |


PROCEDURE1.3.19

| Responsibility | Requirement  | Assessment<br>of<br>Performance | Assessment | Comment/Resolution/Remarks   |
|----------------|--|---------------------------------|------------|--|
| All Employees  | Only the quantities of paints, lubricants, solvents, degreasers, and chemicals needed for the job shall be removed from storage.                       | ↑                               |            | Such as basement of Service Building and Reactor Building crane.                                   |
|                | Drips and leaks of lubricants and chemicals shall receive attention as soon as reported.   | ↗                               |            |  |
|                | Containers of products, (oil, paint, solvents) shall be kept tightly closed to prevent introduction of foreign material and reduce the risk of spills. | ↑                               |            |  |
|                | All water hoses should be shut off when not in use.  | ↑                               |            |  |
|                | All pump seal leakage or valve leakage should be minimized or repaired as quickly as possible.   | ↗                               |            | Work is completed that can be accomplished during the time and manpower limits of a forced outage. |
|                | Floor shall be swept or wet vacuumed. All detected system and equipment leaks should be repaired expeditiously.  | ↑                               |            |  |











| Responsibility | Requirement   | Assessment<br>of<br>Performance   | Assessment | Comment/Resolution/Remarks  |
|----------------|---|---|------------|---|
| All Employees  | Outside door should remain closed except for entry. Where possible provide isolation area.  |    |            | 441 West Turbine Building Door and 437 Radwaste Rollup Door need to be opened only when needed. |
|                | All outside doors should have weather stripping to limit dirt input to liquid Radwaste system.  |    |            |   |
|                | Packing cases, shipping, containers, wood, should not be taken into radiologically controlled areas.  |    |            | Radwaste Minimization Program implementation.   |
|                | Tools and special equipment used in radiologically controlled areas should be predetermined and precaution taken to minimize contamination. |   |            |   |
|                | Hand tools routinely used in contaminated area are to be stored in special hot tool storage cabinets, boards, or boxes.                     |  |            | Develop Hot Shop.   |
|                | Rope barriers shall not be installed or attached to tubing, flexconduit, electrical wires or instrument racks.                              |  |            |   |








**PROCEDURE****1.3.19**

| <b>Responsibility</b> | <b>Requirement</b>   | <b>Assessment<br/>of<br/>Performance</b>  | <b>Assessment</b> | <b>Comment/Resolution/Remarks</b>                      |
|-----------------------|--|---|-------------------|--|
| <b>All Employees</b>  | Scaffolding should not be erected too close to critical racks or components.   |    |                   |  |
|                       | Scaffolding should not be erected to change traffic flow to expose instruments, racks, MCC panels, etc. from bumping damage. |    |                   |  |
|                       | Temporary power cords shall not violate divisional power criterion.  |    |                   |  |
|                       | Gas bottles should be stored in properly designed bottle racks. Temporary storage per PPM 1.3.19.4A.2.g.                     |    |                   | There are designs being developed for providing racks. |
|                       | Plastic bag color coding is used to maintain an effective radioactive contamination control program.                         |  |                   | Bag sorting will minimize radwaste input.              |
|                       | Brown plastic bags - clean trash.  |  |                   |  |
|                       | Green plastic bags - contain radiologically clean equipment and material.  |  |                   | Bag sorter will eliminate concern.                     |

| Responsibility | Requirement  | Assessment<br>of<br>Performance   | Assessment | Comment/Resolution/Remarks        |
|----------------|--|---|------------|-----------------------------------|
| All Employees  | Yellow plastic bags -<br>contain contaminated,<br>potentially contaminated<br>or radioactive equipment<br>or material. |  |            | Have some clean material in them. |


**PROCEDURE****1.3.35**

| <b>Responsibility</b>            | <b>Requirement</b>   | <b>Assessment of Performance</b>  | <b>Assessment</b>                   | <b>Comment/Resolution/Remarks</b>  |
|----------------------------------|--|---|-------------------------------------|--|
| <b>Responsible Material User</b> | <b>Control of flammable or combustible materials</b>   |   |                                     |  |
|                                  | o Flammable liquids  |    | <b>Applies to Plant Maintenance</b> | <b>Individuals do not follow housekeeping requirements on cleanup of their work both in process and end of job. Supervision and foreman to enforce procedures with workmen. Need to watch closely during outage.</b> |
|                                  | o Combustible liquids  |    |                                     |  |
|                                  | o Flammable gases  |    |                                     |  |
|                                  | o Aerosol containers   |    |                                     |  |
|                                  | o Combustible materials in vital areas   |    |                                     |  |
|                                  | o Combustible materials in remainder of Plant  |    |                                     | <b>H.P. needs to police housekeeping due to their activities. Cease storage of yellow bagged material all over Plant for extended times.</b>   |
| <b>Shift Support Supervisor</b>  | <b>Transient combustible permit procedure.</b>   |    |                                     | <b>Welding shop needs to close out permits consistently.</b>   |
| <b>Plant Maintenance</b>         | <b>Cleanup of flammable and combustible waste, scrap, etc. resulting from work activity.</b>             |  |                                     | <b>Workmen do not always consider cleanup part of work package. Reinforce workmen that it is their responsibility to cleanup their work - "National Park Policy".</b>  |
|                                  | <b>All temp wood used in the Plant shall be treated with a U.L. listed pressure impregnated process.</b> |  |                                     | <b>Reactor Building - good. Non-pressure treated wood used in Turbine Building - laydown cribbing.</b>   |
|                                  | <b>Ladders greater than 9' shall be fiberglass. Less than 9' may be wood.</b>                            |  |                                     |  |

| Responsibility                         | Requirement   | Assessment of Performance   | Assessment  | Comment/Resolution/Remarks  |
|--|---|---|---|---|
| Plant Maintenance                      | Application of the cutting, welding, grinding permit and time restrictions.                     |    | Time restrictions are not followed and Plant Operations allows times in excess of procedure | Plant Operations and Maintenance are not implementing procedure. Train Shift Support Supervisor and Plant Maintenance to follow procedures. |
|  | Work authorized and reviewed by work supervisor.  |    |   | In-process review not done by Supply System supervision. Bechtel also needs to improve.   |
|  | Approval of work implementation of work requirements closeout.                                  |    |   | Supervision is done from the office or desk.  |
|  | Implementation of general requirements of the cut-weld-grind permits.                           |   |   |   |
|  | Fire watch implementation for cut-weld-grind permits.   |  |   |   |
|  | Fire protection system impairment checklist procedure.  |  |   |   |
| Plant Maintenance/<br>Plant Operations | Application of the fire protection system impairment checklist procedure and time restrictions. |  |   |   |

**PROCEDURE****1.3.35**

| <b>Responsibility</b>                          | <b>Requirement</b>  | <b>Assessment of Performance</b> | <b>Assessment</b> | <b>Comment/Resolution/Remarks</b>   |
|--|---|----------------------------------|-------------------|---|
| <b>Plant Maintenance/<br/>Plant Operations</b> | Work authorization and review by work supervisor.   | ↑                                |                   | Need to train and educate Plant personnel in fire barrier awareness.  |
|  | Approval of work implementation of work requirements.   | ↑                                |                   |   |
|  | Special requirements for breaching or compromising a fire barrier.  | ↗                                |                   |   |
|  | Application of Technical Specification, ANI, NFPA and Supply System requirements on fire barrier penetrations.                            | ↑                                |                   |   |
|  | Inspection testing and checking of fire control equipment per PPMs, Tech. Specs., and ANI requirements                                    | ↑                                |                   |   |
|  | Visual inspection monthly of fire extinguishers maintenance per NFPA 10.  | ↑                                |                   |   |
|  | Weekly Plant inspections for control of flammable and combustible materials. Report to Plant Manager/ Assistant Plant Manager for action. | ↓                                | Not being done    | Procedure does not identify responsibility for inspection. Need to revise procedure to require periodic inspection by the Floor Coordinators. |

| Responsibility                                 | Requirement  | Assessment<br>of<br>Performance   | Assessment | Comment/Resolution/Remarks  |
|--|--|---|------------|---|
| Industrial<br>Safety and<br>Fire<br>Protection | Upon receipt of an overdue permit, logs and follows up to close out. Notes disposition and corrective action in the log. |  |            | Logs being kept and in order. Need to redefine responsibilities to Plant Maintenance Manager. |

PROCEDURE1.3.36

| <u>Responsibility</u> | <u>Requirement</u>   | <u>Assessment<br/>of<br/>Performance</u> | <u>Assessment</u> | <u>Comment/Resolution/Remarks</u>  |
|-----------------------|--|--|-------------------|--|
| Fire Brigade          | Five (5) members on site at all times. Leader and two (2) others shall be plan knowledgeable. Shall not include minimum shift crew required to safety shut down the Plant. | ↑  |                   |  |
|                       | Consist of Shift Support Supervisor (Leader), Health Physics/Chem. Tech (1), and Equipment Operators (3)   | ↑  |                   |  |
|                       | Initial physical examination and an annual reexamination for continued fitness.  | →  |                   | No physical examination until 1986. Reevaluate examination requirements. |
|                       | Drills will be conducted (4) times a year per shift. Members must participate in the required number of drills.  | ↗  |                   | Have a few deficiencies at end of the year.                              |
|                       | Offsite fire department will participate in one (1) per year.  | ↑  |                   |  |
|                       | Drill shall be in the Plant to allow team practice.  | ↑  |                   |  |

| Responsibility | Requirement   | Assessment of Performance | Assessment | Comment/Resolution/Remarks                |
|----------------|---|---------------------------|------------|---|
| Fire Brigade   | Unannounced drills shall be four (4) weeks or greater apart.  | ↑                         |            | No experience with unsatisfactory drills. |
|                | 30 days minimum between drills for each shift.  | ↑                         |            |   |
|                | Preplan drills, critique and remedy deficiencies.   | ↑                         |            |   |
|                | Unsatisfactory drill performance followed by repeat drill within 30 days.   | ↑                         |            |   |
|                | Every three (3) years, have an unannounced drill critiqued by independent, qualified individual available for NRC review. | ↑                         | In 1985    |   |
|                | Disqualification, requalification and makeup drills.  | ↑                         |            |   |
|                | Practice sessions held once every year.   | ↑                         |            |   |
|                | Makeups on practice sessions within 90 days.  | ↑                         |            |   |
|                | Disqualification, requalification and makeup practice sessions.   | ↑                         |            |   |

PROCEDURE











1.3.36

| Responsibility | Assessment  | Assessment | Remarks |
|----------------|---|------------|---------|
|                |   |            |         |
| Fire Brigade   | Initial classroom instruction includes:   |            |         |
|                | o Review of the Emergency Plan  | ↑          |         |
|                | o Train with local fire departments understand responsibilities                             | ↑          |         |
|                | o Local fire department be provided special nuclear hazards training                        | ↑          |         |
|                | o Proper use of emergency equipment   | ↑          |         |
|                | o Methods for fighting fires  | ↑          |         |
|                | o Direction and coordination of activities (fire brigade leaders)                           | ↑          |         |
|                | o Qualified instructors   | ↑          |         |
|                | o Instruction to be provided to all fire brigade members                                    | ↑          |         |
|                | Periodic classroom instruction will be part of each drill and practice session and include: |            |         |
|                | o Review of strategies and procedures   | ↑          |         |

Portable ventilation equipment use needs improvement.

| Responsibility | Requirement  | Assessment of Performance | Assessment                | Comment/Resolution/Remarks                  |
|----------------|--|---------------------------|---------------------------|---|
| Fire Brigade   | Periodic Classroom Instruction (Cont.):  |                           |                           |   |
|                | o Review of Plant Modifications and changes to fire fighting procedures  | ↗                         | Prefire plans out of date | Update prefire plans. IS&FP to lead update. |
|                | o Periodic refresher training sessions to repeat classroom instruction over two (2) year period  | ↑                         |                           |   |
|                | o Identification and location of fire hazards and types of fires   | ↑                         |                           |   |
|                | o Toxic and corrosive effects expected   | ↑                         |                           |   |
|                | o Location of fire fighting equipment layout, access and egress routes   | ↑                         |                           |   |
|                | o Proper use of available fire fighting equipment and method for each type of fire   | ↑                         |                           |   |
|                | Regular planned meetings at least every three (3) months for all fire brigade members with an agenda of required reading. If not done, member is disqualified until completing meeting requirements. | ↑                         |                           |   |

PROCEDURE1.3.36

| Responsibility | Requirement   | Assessment<br>of<br>Performance   | Assessment  | Comment/Resolution/Remarks  |
|----------------|---|---|---|---|
| Fire Brigade   | All training documented on a training attendance record original forwarded to Training Development and Evaluation Department,   |    |   | Assigning disqualified and nonqualified personnel to fire brigade. Need to execute program. |
|                | Disqualified member is excluded from brigade duties until requalified.  |    |   |   |
|                | Fire fighting procedures or instructions shall be developed to cover the following areas: <ul style="list-style-type: none"><li>o Discovery of fire</li><li>o Action of control room operator</li><li>o Selection and responsibilities of fire brigade members</li><li>o Coordination of offsite fire department activities</li><li>o Actions of security guards for fires</li><li>o Responsibilities of other Plant personnel</li><li>o Preplanned strategies for fighting fires</li></ul> | <br><br><br><br><br><br> | <br>Prefire plans are out of d | Update prefire plans. IS&FP to lead update.   |

| Responsibility          | Requirement  | Assessment<br>of<br>Performance | Assessment | Comment/Resolution/Remarks |
|-------------------------|--|---------------------------------|------------|----------------------------|
| Fire Brigade            | Instructions and preplanned strategies shall be evaluated during drills and practice sessions. | ↑                               |            |                            |
| Fire Watch<br>Personnel | Selected from Plant Maintenance and Contractors staff.   | ↑                               |            |                            |
|                         | Completed fire watch training course.  | ↑                               |            |                            |
|                         | Personnel must understand responsibilities as noted in PPMs 1.3.35 and 1.3.10                  | ↑                               |            |                            |
|                         | Retrain every two years.   | ↑                               |            |                            |



WASHINGTON PUBLIC POWER SUPPLY SYSTEM

AN EVALUATION OF THE ADEQUACY OF THE DESIGN AND CONSTRUCTION  
ACTIVITIES FOR THE FIRE PROTECTION PROGRAM DURING THE  
CONSTRUCTION PHASE OF WNP-2

FEBRUARY 1987

REPORT NO. WPPSS-ENT-108

*L.T. Harrold 2/25/87*  
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## EXECUTIVE SUMMARY

**D** This report provides an evaluation by Supply System Engineering of the adequacy during the construction phase of design and construction activities associated with the Fire Protection Program at WNP-2. The report contains a review of the results of previous design and construction verification efforts, fire protection LERs and NCRs, NRC findings and open items, Quality Assurance Audits, and the inter-organizational task force evaluations of the Fire Protection Program initiated in mid-1986. This data base was used to:

- o Assess the adequacy of the construction phase implementation of the Fire Protection Program including design requirements,
- o Identify and assess generic implications, and
- o Determine whether additional physical quality reverification is recommended.

While the WNP-2 Fire Protection Program addresses all activities contributing to fire protection at the plant, this report is concerned only with the physical plant features that are part of the Fire Protection Program. Physical plant features include the fire suppression system (pumps, piping, hydrants, valves, tanks, sprinklers, hangers, controls, etc.), the fire detection system, fire barriers (fire walls, doors, dampers, seals, etc.), safe shutdown cable protection (THERMO-LAG and 3M materials, and electrical separation), and emergency lighting.

**D** From the evaluation described in this report the following conclusions are made:

- o Individual and program deficiencies have been properly identified and have been or are being properly evaluated and resolved.
- o With the exception of identified deficiencies, the design and construction of fire protection physical plant features during the construction phase were adequate.
- o No further investigation of the design and construction activities of the physical features of the Fire Protection Program is required, except for the resolution of the open deficiencies identified in this report.
- o Identified deficiencies are unique to the Fire Protection Program and are not applicable to other systems, with the exception of the generic issue relating to cable derating.
- o There are no identified deficiencies (including those still in process of investigation or correction) that constitute a reduction in safety with continued operations of the plant.
- o Engineering believes that a thorough and complete evaluation of the WNP-2 Fire Protection Program has been performed.



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## I. INTRODUCTION AND SCOPE

### A. Introduction

The fire protection issue has been a continuing effort from the conception of the WNP-2 project. WNP-2 received its construction permit in March of 1973. The Brown's Ferry fire occurred in March of 1975. From that point forward there have been a number of criteria changes that have been identified with respect to fire protection design in nuclear power plants.

At the start of construction (1972) at WNP-2, the Fire Protection Program was considered to be fire pumps, fire main suppression system, detection systems and structural fire barriers. Also included was the administrative control for these systems and fire prevention activities. Following the 1975 Brown's Ferry fire, additional items were put into the Fire Protection Program. They include such things as "safe shutdown" systems, electrical separation, and fire separation of electrical divisions.

Recognizing that WNP-2 was not licensed for operation until 1983, there was a fair amount of design and construction that had been accomplished prior to the time that additional guidance relative to fire protection was issued to the industry. As a result of that, the plant was not designed with full cable separation and all other fire protection criteria satisfied. Much of the work that has been done has been by nature of a backfit. Throughout this period WNP-2 has concentrated on meeting the intent of the industry with respect to fire protection design.

In areas where there was not sufficient spacing to meet separation criteria, materials such as THERMO-LAG were installed to provide fire barriers. At the time those contracts were started, there was minimum guidance available on what should be done and how materials should be applied. WNP-2 was on the leading edge of the technology. There were only two other plants that were involved in the application of THERMO-LAG at that time. They also were presented with the same concerns that have been identified at WNP-2.

WNP-2 was identifying new design and construction methodology as construction progressed. This review identifies deficiencies that were missed in those construction days. Additional fire protection guidance has continued to be issued by the NRC up to and including the issuance in 1986 of Generic Letter 86-10.

An historical review indicates that the fire protection regulations and guidance were not a model of clarity. It is apparent that the entire industry, including the regulators, were learning as the Fire Protection Program was developed. WNP-2 has attempted to stay current with these developments in design and construction activities. Because WNP-2 was one of the early plants involved in implementation of additional guidance on fire protection, there was no precedent that could be exactly followed.

Initially, the quality control of the fire protection system was in conformance with the NFPA codes effective at that time. While some of the Fire Protection Program was Quality Class I, the vast majority was Quality Class II, although some of the Quality Class II work was Seismic Category I because of its proximity to other Quality Class I Systems. Quality Class I systems were routinely audited in accordance with 10CFR50, Appendix B. Quality Class II work, however, was not routinely audited until the issuance of Appendix A of Branch Technical Position APCS 9.5-11 in August 1976. Consequently, design and construction of much of the Fire Protection Program was not audited as completely as safety related systems.

## B. Scope

In August 1986, the Supply System established a program plan to reevaluate the WNP-2 Fire Protection Program and on September 16, 1986, submitted the program plan to the NRC. This report provides the evaluation of the adequacy of design and construction activities during the construction phase described in Task 3.3 of that program plan (Reference 1).

The evaluation was accomplished by reviewing documentation associated with the following:

- o Construction phase design and construction verification efforts.
- o Deficiencies identified by Quality Assurance organizations, the NRC Findings, Nonconformance Reports (NCRs), and Licensee Event Reports (LERs) along with associated corrective actions.
- o Internal reviews occurring subsequent to construction completion.

These reviews consisted of the following:

- o The data base (NCRs, LERs, etc.) was collected.
- o The data base was reviewed for any fire protection related items.
- o The identified documents relative to fire protection were reviewed to establish scope and nature of the deficiency. This included specific assessments of safety significance, cause as related to construction or design, and generic implications.
- o The corrective actions were reviewed to insure that they correctly resolved the deficiencies. For those deficiencies that were design related, the design requirements were reviewed to insure the appropriateness of the corrective action. (Section 3.1 of Reference 1 provides a comprehensive comparison of the WNP-2 Fire Protection Program with the design requirements, i.e., NFPA and FSAR.) For deficiencies with corrective actions not yet complete, the planned and scheduled corrective actions were evaluated and the adequacy of interim corrective/remedial/mitigation measures were evaluated.

Recognizing the WNP-2 Fire Protection Program addresses all activities contributing to fire protection at the plant, this report is concerned only with the physical plant features that are part of the Fire Protection Program. Physical features include the fire suppression system (pumps, piping, hydrants, valves, tanks, sprinklers, hangers, controls, etc.), safe shutdown cable protection (THERMO-LAG and 3M materials, and electrical separation), and emergency lighting. None of the Fire Protection Program's physical features were intentionally placed outside the scope of these reviews, but only those portions having specific identified deficiencies are addressed.

The following limitations have been applied to the scope of this evaluation:

- o The focus of this evaluation is on the construction phase implementation of the Fire Protection Program. Where necessary, specific reviews have been extended into the operational phase of WNP-2 to identify deficiencies associated with construction phase activities. Operational phase activities have been evaluated elsewhere in the Fire Protection Program Reevaluation Plan described in Reference 1.
- o This evaluation activity did not involve a major physical quality reverification effort since the need for such an effort was not identified by this review.
- o This review does not include a specific evaluation of design compliance with code requirements, BTP 9.5-1 or other FSAR commitments as that evaluation is being performed by the independent fire protection consultant under Task 3.1 of the Fire Protection Program Reevaluation (Reference 1).

## SUMMARY AND CONCLUSIONS

In 1980, WNP-2 safety-related construction work was suspended because of a breakdown in management control and work quality. Substantial changes in Supply System Management and construction contractors followed. In the interim period until restart of safety-related construction in July 1981, comprehensive reviews of documentation under which construction was performed were completed. Included were construction contract specifications, deficiency documents, construction and Quality Assurance procedures, training and qualification procedures and procedures covering various phases of work planning and control. The principal purpose of the reviews of specifications and procedures was to assure compliance with codes, standards and FSAR requirements to provide internal consistency and adequacy of Quality throughout the construction contractors. Under this program, construction was restarted in July, 1981 on a controlled contract-by-contract basis.

In 1980, the Supply System committed to reinspect safety-related work completed prior to the 1980 shutdown. This comprehensive and manpower intensive program was completed over a three year time frame. The program was called the Quality Verification Program and was established to verify the adequacy of safety-related work completed prior to the shutdown.

In 1981, Bechtel Power Corporation, an experienced construction management organization, was selected to manage the completion of WNP-2 construction. In addition, Bechtel assembled a special engineering management team which compiled a list of 320 potential engineering problems drawn from Bechtel and industry experience. Each problem was assessed to determine if Burns and Roe had recognized and adequately resolved the problem.

In 1982, the Design Reverification Program was established to evaluate the adequacy of WNP-2 design and to ensure that FSAR and NRC requirements had been implemented into design documents. This reverification consisted of two safety systems and one non-safety system and was extended into generic and interactive issues to assure that the program provided an adequate assessment of design.

In 1982, the Supply System contracted with Technical Audit Associates (TAA) to independently review and evaluate these programs and to audit their effectiveness. TAA concluded that:

- o The overall program was a comprehensive and integrated set of activities capable of providing confidence that WNP-2 had been designed and constructed to meet regulatory and FSAR commitments.
- o Quality enhancements which were developed during work suspension and improved work control practices implemented in the restart program were effective and adequate.
- o FSAR commitments and regulatory requirements have been effectively carried forward into design documents.

- o The Design Reverification Program including interactive studies and the depth of the reviews provides adequate confirmation that WNP-2 design is adequate.
- o Weakness in the design process used to confirm original design assumptions had been adequately addressed with adequate corrective actions implemented to correct those weaknesses throughout design.
- o The overall design process was conservative and produced a safe plant conforming to FSAR and Regulatory requirements.

As discussed in Section III.A of this report, the reinspection of work completed prior to 1980 provided only a limited review of the physical features associated with the Fire Protection Program and the Design Reverification Program only reviewed, as a separate study, the fire protection interaction with RHR-loop B equipment required to bring the plant to shutdown. However, since the Burns and Roe process for both safety and non-safety related design was essentially the same, the results of the Design Reverification Program provide high confidence that the design of the fire protection physical features was adequate, including design provisions for emerging regulatory criteria. Similarly, the quality and work control improvements that were put in place prior to restart in 1981, and the heightened management awareness to quality following restart, provide confidence that the fire protection physical features were properly constructed.

In Section III.B of this report, deficiency documents associated with fire protection are evaluated as an element of the overall assessment of the construction phase Fire Protection Program. Of the seventy documented NRC findings associated with fire protection, twenty were considered design or construction related. These address concerns in the areas of safe shutdown, cable protection, fire barriers, and emergency lighting. Seven remaining open items have been thoroughly discussed with NRR and NRC Region V and are currently in the resolution process. These NRC concerns have arisen primarily due to the complexities of backfitting additional fire protection requirements into a plant which was substantially completed and the lack of clarity of the governing criteria. Hence, to a large extent, the Fire Protection Program at WNP-2 evolved as a unique program not under standards or requirements common to either safety or non-safety related systems. The open items are addressed further in Section III.C of this report.

The corrective actions associated with identified deficiency documents have been reviewed and found to be acceptable. Corrective action plans for open items are considered satisfactory and the interim remedial actions currently in place pending final resolution are considered adequate. This review has also determined that the construction and operational phase NCR programs have been effective in resolving identified deficiencies.

One generic deficiency has been identified that is applicable to fire protection. WNP-2 cable sizing calculations did not reflect THERMO-LAG ampacity derating. All calculational discrepancies have been resolved and field modifications were not required.

Since the NRC team inspection of the WNP-2 Fire Protection Program in March 1986, the Supply System has been conducting an in-depth review of program adequacy. Initial efforts were concentrated on the THERMO-LAG issues eventually evolving into an inter-organizational review of the total program. The objective is to provide a forum for identifying all individual and organizational concerns; identify and collect all known problems; define and implement corrective actions and track resolution to closure. This program has been effective in probing all aspects of the Fire Protection Program and the identification of areas to be evaluated. The internal reviews are discussed in Section III.C.

The most significant of the internal review open items in terms of potential impact on the plant relate to the THERMO-LAG tests which are scheduled for 1987. These tests are intended to validate installation methods, minor material substitutions which were not included in the original tested configuration, and untested interfaces between tested barrier materials. The test programs are designed to test potential solutions should less than optimum test results be obtained.

The Supply System initiated a program in June 1984 to re-perform the WNP-2 safe-shutdown analysis to verify that the commitment to meet the intent of the technical requirements of Appendix R was included in the Burns and Roe design. This analysis was completed in March 1986 but is not yet in final calculational form. An additional high-impedance fault analysis required by NRC Generic Letter 86-10 was initiated in April 1986 and is now complete. These evaluations plus the ampacity derating calculational discrepancy corrections have involved over 22,000 man-hours of engineering effort. Errors found in the course of the re-analysis have been reported and field changes are substantially complete.

The remainder of the internal review topics discussed in Section III.C are well on their way to closure. Most of these have been reviewed by the NRC with sufficient dialog to provide a sufficient technical basis for closure.

It is the overall conclusion of this report that the construction phase implementation of the Fire Protection Program was adequate, with the exception of the errors which occurred during the THERMO-LAG installation and the errors which were identified in the original safe shutdown analysis performed by Burns and Roe. The THERMO-LAG problems have been substantially corrected pending additional testing for specific configurations, and the safe-shutdown reanalysis has been completed with discrepancies substantially corrected in the field. The errors which were discovered with the THERMO-LAG installation and the safe-shutdown analysis are considered to result from the lack of industry knowledge of the THERMO-LAG product and the lack of clarity within the industry of the BTP 9.5-1 criteria. Clarification of the requirements have been provided as late as 1986 with the issuance of Generic Letter 86-10.

The design requirements during the construction phase implementation of the Fire Protection Program were considered adequate with the exception of the design error associated with the calculation for the amount of

THERMO-LAG required for seismic steel and the omission of structural support steel in the original fire test specification for the THERMO-LAG barrier. These errors have subsequently been corrected in the field for the three hour barriers. The calculational error in omitting derating of power cables in THERMO-LAG raceways has been corrected with no hardware impact as the original calculation was conservative. As an additional verification of the adequacy of the design requirements, an independent consultant is evaluating the design for compliance with the NFPA code and the FSAR.

All identified deficiencies have not yet been closed. In these cases the interim corrective/remedial/mitigation measures have been evaluated and the intended safety function is satisfied by the interim measures. These interim measures provide adequate assurance of public safety and compliance with WNP-2 Technical Specifications. The final or total corrective actions planned for incomplete items have been reviewed and have been determined to be adequate. Completion of these corrective actions is being pursued as a high priority. Each of the physical plant features of the WNP-2 Fire Protection Program is being adequately addressed to provide assurance of design and construction in accordance with required codes, standards, and commitments.

## III. DETAILED DISCUSSION OF REVIEWS

### A. Previous Design and Construction Verification Efforts

#### 1. Background

The objective of this task was to identify and assess the adequacy of construction phase design and construction verification efforts directed at the Fire Protection Program. There were two verification efforts employed during the construction phase, as follows:

- a. Quality Verification Program (QVP) that evaluated the completed construction activities and was conducted from August 1980 through September 1983.
- b. Design Reverification Program (DRP) that evaluated the design process and was conducted from October 1982 through September 1983.

The QVP and DRP concentrated on safety related systems and those portions of the fire protection components that directly interfaced with the safety related systems. Therefore, the QVP and DRP provided limited evaluation of the total Fire Protection Program.

#### 2. Description of Review and Results

##### a. Verification Efforts -- Quality Verification Programs

On June 17, 1980, the NRC issued a 10CFR50.54(f) Notice of Violation to the Supply System (Reference 2). Several specific deficiencies were cited in illustration of a common problem: Ineffective control by Supply System and Burns and Roe, Inc. (BRI) of the activities of contractors without NRC reviewed Quality Assurance programs.

In response to the NRC Notice of Violation, the Supply System developed and implemented a plan for the detailed reverification of completed safety significant work intended to provide adequate assurance that construction activities both complete and incomplete would conform to required standards, regulations, and commitments (Reference 3). This is referred to as the Quality Verification Program (QVP).

The QVP was accomplished utilizing a random sampling of the completed work which was categorized Quality Class I or Quality Class II/Seismic Category I. Since much of the Fire Protection Program's physical features were Quality Class II and Seismic Category II it was outside the scope of the QVP.

Completed work was reviewed on a system basis and alternatively on a contract basis. The physical features of the Fire Protection Program that were addressed by the QVP included portions of the fire suppression system, fire detection system and fire barriers that directly interfaced with safety related systems. No significant deficiency relative to the construction of the Fire Protection Program's physical features was identified. All identified QVP deficiencies were properly resolved.

b. Verification Efforts -- Design Reverification Program

The DRP was established to reverify that WNP-2 was designed to meet the regulatory requirements committed to in the WNP-2 FSAR. To accomplish this the WNP-2 design requirements for safety systems were reviewed to ensure that they were complete and correctly reflected in the detailed design documents used during construction. The conclusions of the DRP were based on the in-depth review of two Quality Class I systems (HPCS and RHR) and one Quality Class II system (RFW). In addition, five studies were conducted to evaluate the interactions between the reactor system and other systems. Of those five studies one addressed fire protection interaction with the RHR (Residual Heat Removal) system.

The only relevant portion of the DRP was a limited study covering the interface of the fire protection system with RHR Loop B. This study concentrated on establishing that RHR Loop B was adequately protected from fire and provided assurance that the dedicated path was available for shutdown. This study addressed design considerations relevant to the Fire Protection Program's physical features as they interacted with the RHR system.

The single DRP finding affecting the fire protection system was that cable sizing calculations did not include thermal derating. Since Burns and Roe advised that thermal derating was in process, it was not identified by the DRP as a deficiency. It has subsequently been determined that Burns and Roe failed to implement this commitment. (See Section III.C.3 for a detailed discussion of this ampacity derating issue).

c. Conclusions

The QVP concluded that completed work was satisfactory; however, it did not provide a comprehensive review of the construction of the fire protection system because this system was generally out of QVP scope.

The DRP concluded that the design of Quality Class I and II systems, components and structures was satisfactory.

The same process was used for design of the fire protection system. However, the DRP did not provide a comprehensive review of the fire protection system design because this was generally out of the DRP scope.

Both of these efforts (QVP and DRP) were independently verified by the Technical Audit Associates, Inc. (Reference 4)

## **8. Fire Protection Program Identified Deficiencies**

### **1. Background**

Fire Protection Program deficiencies have been identified and documented by Quality Assurance Findings, NRC Inspection Findings, NCRs, and LERs. The objective of the review of these documents was to determine if actions were correct and to determine the possible generic design and construction implications of the deficiencies.

### **2. Description of Review and Results**

#### **a. Quality Assurance Findings**

The Fire Protection Program's physical features were designed Quality Class II and III. The Quality Assurance Program requirement of 10CFR50, Appendix B, routinely audited design and construction activities related to Quality Class II applications. However, Fire Protection Programs for Quality Class II applications were not routinely audited until Appendix A of Branch Technical Position APCS 9.5-1 was implemented as defined in Amendment 19 of the FSAR. Since August 1983, the entire Fire Protection Program has been addressed in the Supply System's annual fire protection audits.

Quality Assurance audits of construction contractors performing Quality Class III work were not required. However, when Branch Technical Position APCS 9.5-1 was implemented, QA audits of Quality Class II Fire Protection activities were instituted and performed for the Supply System by the systems completion contractor, Bechtel Power Corporation (BPC). Two such audits of the fire protection contractor (Sentry Automatic Sprinkler) and a subcontractor (Lord Electric) were performed and subsequently closed in the third quarter of 1981 and first quarter of 1982, respectively. Additionally, Brand performed Quality Class I work on fire barrier penetration seals and THERMO-LAG applications and was also audited by BPC.

These aforementioned audits addressed the full range of activities for which the contractors were responsible. No significant design or construction deficiencies were noted. In the operational phase, the Supply System performs an

annual audit (References 5 through 8) of the Fire Protection Program as required by WNP-2 Technical Specification 6.5.2.8.h using the guidance provided in NRC Generic Letter 82-21. Two deficiencies are further discussed in Section III.C.6.f of this report. Post construction reviews have indicated an oversight in this area discussed in the conclusion of this section, III.B.3.

b. NRC Findings

NRC Inspection Reports provided another means for identifying problems, weaknesses, or potential problems related to the Fire Protection Program. In this portion of the task, NRC findings related to Fire Protection were reviewed to identify design or construction related deficiencies and to evaluate the adequacy of the corrective actions.

All NRC inspection reports for WNP-2 were reviewed through December 1986. Seventy NRC findings pertaining to fire protection were identified and are listed in Section IV. Twenty of these findings are considered to have a root cause related to design and/or construction. These findings address concerns in the areas of safe shutdown cable protection, fire barriers, and emergency lighting.

Of the 14 open NRC findings as of December, 1986, 7 are associated with housekeeping, training, blocked fire doors, etc. The remaining 7 are associated with design and construction. Specifically they are safe-shutdown methodology, THERMO-LAG installation, RHR Hi-Low interface, control room fire procedure, and emergency lighting. A detailed discussion of these items is presented in Section III-C of this report.

c. NCRs

The NCR program identifies nonconformances to specified standards and then provides the administrative vehicle for tracking them through the resolution process. This process includes an evaluation of the scope and safety-significance of the nonconformance and a course of corrective action that addresses the specific nonconforming condition, applicability to other items or areas, and actions to prevent recurrence.

In order to identify applicable NCRs, the computerized NCR index was examined. Those NCRs having a description that could possibly be associated with fire protection were then identified. The NCRs reviewed are listed in Section V of this report. These NCRs were reviewed to determine that the NCR process appropriately resolved identified deficiencies. Fire protection related NCRs issued during WNP-2 operation resulting in LERs are addressed in the next subsection of this report.

A total of 136 construction phase NCRs were identified and reviewed. The time period covered by these NCRs was from July 30, 1975 to October 18, 1983. The deficiencies documented on these NCRs were caused by personnel error, procedural noncompliance, or defective equipment/material. Two generic deficiencies applicable to fire protection were identified by trending. One addressed improper installation of concrete inserts and the other addressed improper installation of anchor bolts. Correct review, disposition and implementation was confirmed for all reviewed NCRs.

A total of 62 Fire Protection Program operational phase NCRs have a design or construction related cause. They address deficiencies in the areas of safe shutdown cable protection, fire barriers, fire detection, fire suppression, and emergency lighting. These issues are discussed in Section III.C of this report.

d. LERs

Those conditions or events that violated the terms of the WNP-2 Operating License are documented and reported to the NRC via LERs. LERs were not required to be written during construction phase activities. Thirty-eight fire protection related LERs written after 1983 were reviewed. A brief description of these along with the associated cause and corrective actions, are listed in Section VI of this report.

Those LERs having a root cause related to design or construction deficiencies in the Fire Protection Program are in the fire suppression system, fire barriers, and in the safe shutdown cable protection. A discussion of the design related issues identified by these LERs is discussed in Section III.C of this report.

3. Conclusions

Many of the same or similar design related Fire Protection Program deficiencies have been identified by QA organizations, NRC inspections, NCRs, and LERs. All valid deficiencies are also associated with an NCR. This includes an evaluation of the cause, safety significance and applicability to other items (i.e. generic implications).

It is the conclusion of this review that the construction and operational phase NCR program has been effective in resolving identified deficiencies. However, internal reviews conducted by the Supply System in 1986 have identified problems with THERMO-LAG fire barrier installation which were not identified by NRC inspection reports or QA audits and inspections during construction. Specifically these are the unauthorized use of

the annulus pumping method of THERMO-LAG application for conduit protection; incomplete installation of seals in conduits entering the protected raceways; and general adherence to protection of 9 inches of all thermal conducting materials entering the barrier. Even though these oversights could reflect a weakness in the program based upon today's knowledge of the product and its application, the overall cause is complex in nature. The THERMO-LAG installation was state-of-the-art in 1982 when work began and WNP-2 was one of the first plants to install the material. Installation was complex because of the interferences and the multitude of heat conducting members penetrating the envelope. In addition, the THERMO-LAG material was installed under the technical direction of two THERMO-LAG vendor employees who provided help during the construction phase. Engineering concludes that these THERMO-LAG problems, when viewed from the total design and construction perspective of physical plant fire protection features, are unique and as such do not reflect negatively on the integrity of the overall installation.

It is also concluded that only one generic issue has been identified and that is the cable ampacity derating issue. This is further discussed in Section III.C.3.

Furthermore, it is concluded that the current open issues and associated remedial actions are in compliance with the WNP-2 Technical Specifications and are not of a generic design nature.

#### C. Post Construction Internal Reviews

Following construction, the Supply System identified several fire protection improvements that were considered necessary and were subsequently implemented. Three notable examples are:

- o A larger storage tank was constructed to provide adequate and reliable water volume for the fire suppression system.
- o The site potable water system and fire protection system have been completely separated to increase the reliability of the fire suppression system.
- o Additional plant storage areas have been created with the installation of automatic sprinklers on the 487', and 467' elevations of the radwaste building. This will allow materials to be stored away from safety related areas and increase the overall safety of the plant.

In early 1984, the Supply System had difficulty in updating the FSAR using Burns and Roe's safe-shutdown analysis and has subsequently performed a complete reanalysis. The results of this reanalysis is discussed in Section III.C.4 of this report.

In March of 1986, the NRC performed an on-site inspection of the Fire Protection Program. During this inspection an NRC concern surfaced over the amount of THERMO-LAG applied to seismic steel penetrating the three-hour fire barrier associated with safe shutdown cables. This resulted in an engineering review of the design calculations, installation specifications, THERMO-LAG vendor's requirements and the fire barrier test program to determine the correct amount of THERMO-LAG required on seismic bracing for the three hour barrier. Separately, the NRC Office of Investigation initiated an investigation into the subject of seismic steel protection at WNP-2. As a result of a commitment made to the NRC in the April 1986 Enforcement Conference, the Quality Assurance organization performed an evaluation of the design control process as it applied to fire protection during the construction phase. This evaluation consisted of a detailed review of 20 fire protection system Project Engineer Directives (PEDs). It was concluded that the design control process for fire protection was satisfactory (with the exception of the THERMO-LAG issues) (Reference 9).

As a result of Supply System reviews of the 3 hour THERMO-LAG barrier, and in view of the number of NRC questions and concerns regarding other aspects of the program, an inter-organizational task force was established in August 1986 to identify all known fire protection concerns and potential problems, including the NRC's, and track progress to completion. Represented in the task group are Licensing, Technical Staff, Quality Assurance, Engineering, Fire Protection and Bechtel. This group meets bi-weekly to add new issues as they are raised and to provide needed direction to satisfy the issues as they are followed to completion. No new issues have been added since November 3, 1986. While a total of 47 issues have been raised, 29 of them were completed by December 15, 1986, and work continues on the remainder on a priority basis. These issues have been grouped into the following six general categories and are discussed separately:

- o Provision of a one or three hour fire protection barrier for cables (18 issues).
- o Design and construction of fire lines (3 issues).
- o Cable derating/tray overfill (3 issues).
- o Safe shutdown and other NRC concerns (6 issues).
- o Programmatic concerns (7 issues).
- o Miscellaneous hardware items (fire doors, smoke detectors, penetration seals, etc.) (10 issues).

1. Provision of a one or three hour fire protection barrier for cables (18 issues)

a. Background

Safe shutdown dedicated cables are protected either by separation (20 feet with no intervening combustibles), a fire rated wall, or by application of fire barrier material with or without a sprinkler system. The fire barrier material THERMO-LAG was used exclusively during the construction period while 3M material use was added post construction. A one-hour barrier is used where a sprinkler system is available and conversely a 3 hour barrier is used without sprinklers. When fire barrier material is used, the supporting structural elements and heat flowpaths, as well as the cables themselves, are required to be protected.

When the THERMO-LAG was being applied during the construction period it was a new product and there was some confusion as to the details of application and amount required to provide a safe envelope for the cables. This was a problem particularly with the protection of structural steel and the multitude of interferences with the fire barrier envelope in the field. In 1986 several concerns were raised as to the adequacy of these fire protection measures, as follows:

- (1) Use of an untested application procedure for applying THERMO-LAG to conduits. (5 issues)
- (2) Failure to provide a full 18" of heat flowpath protection for three hour fire barriers on dedicated cable envelopes. (3 issues)
- (3) Use of untested materials within the protected envelope. (2 issues)
- (4) Seals for conduits entering the envelope may not be complete. (2 issues)
- (5) Untested interface between tested barrier materials. (1 issue)
- (6) Requirements for component supporting structural steel protection. (2 issues)
- (7) One hour fire barrier in cable spreading room. (3 issues)

b. Description of Review

(1) Use of untested application procedure of THERMO-LAG to conduits (5 issues)

The construction files and procedures were researched for justification to use the untested annulus pumping method with negative results. The vendor was queried about this method with negative results.

No engineering direction or justification can be found for use of this untested method of THERMO-LAG installation.

A series of fire tests is being conducted in 1987 to verify the adequacy of the installation method. If not adequate, appropriate corrective actions will be taken. Any corrective actions are scheduled for completion June 30, 1988.

In the meantime all areas with THERMO-LAG applied in this manner are on firewatch in accordance with NNP-2 Technical Specification 3.7.7. Since these areas are on firewatch, Engineering does not feel there is any safety concern. Additionally, a trained fire brigade is available, all areas are provided with fire detectors, and hose stations and fire extinguishers are in the area if fires are detected. Therefore, this condition does not present a safety concern with continued operation of the plant.

(2) Failure to provide a full 18" of heat flowpath protection for three hour fire barriers for dedicated cable envelope (3 issues)

During an inspection in March 1986, the NRC questioned the installation of 9" of THERMO-LAG on seismic steel penetrating the three hour fire barriers when they had observed 18" at another plant. In response to this issue a report was submitted to the NRC in May 1986 (Reference 9). In preparation for this report, vendor data and architect/engineer calculations were reviewed to determine the basis for the use of 9" of THERMO-LAG on secondary steel members. By calculation it can be shown that 9" of THERMO-LAG is adequate for structural steel protection. However, the only test data that could be found indicates that 18" is adequate to protect the cables within the envelope (to maintain cable temperatures less than 325° F). Tests have not been conducted to confirm the adequacy of 9" of THERMO-LAG on secondary steel. The evaluation of the basis for 9" THERMO-LAG is discussed in reference 9.

The conclusion reached in the report to the NRC was that a judgemental error was made, influenced by the level of industry experience and status of nuclear plant Fire Protection Programs in place at the time of implementation. Furthermore, this judgement has been evaluated to be a unique design error.

All dedicated cables within the three hour barrier have since been provided with 18" of heat flow path protection. Prior to and during this work, a fire watch of the affected areas was provided. This work is now complete. Therefore, there is no safety concern with continued operation of the plant.

(3) Use of untested materials within the protected envelope (2 issues)

Construction files were reviewed and meetings were held with the THERMO-LAG vendor concerning the use of untested materials such as Kao-Wool and hardware cloth in the THERMO-LAG envelope. Project design changes issued during construction have been reviewed to determine whether there was any authorization for use of non-tested materials. Recognizing materials may have been tested separately, there is no evidence that materials in combination have been tested. No adequate justification for the use of these materials has been identified.

A fire test will be conducted to affirm that the untested materials are acceptable. If they are not appropriate corrective actions will be taken. The fire test is scheduled to be completed in 1987 and any corrective action, if needed, will be completed by June 30, 1988.

Pending results of this fire test, these areas are all on firewatch in accordance with WNP-2 Technical Specification 3.7.7. Additionally, a trained fire brigade is available, all areas are provided with fire detectors, and hose stations and fire extinguishers are available if fires are detected. Engineering concludes there is no safety concern with continued operation of the plant.

(4) Seals for conduits entering the envelopes may not be complete (2 issues)

As part of the review and field inspections, the seals in conduits entering cable trays were checked. As a related issue, continuous, non-dedicated conduits supported from structural members within the protected envelope have not been sealed when these conduits are continuous through the envelope.

In the field inspection, some seals were found to be missing or incomplete and these nonconformances were documented. These missing or incomplete seals were then properly sealed and remained on the fire watch until the work was completed. For those nondedicated conduits that are continuous and pass through the envelope, information was received on January 16, 1987, from the THERMO-LAG vendor that the design used in the plant provided adequate protection for the dedicated cable envelope. No additional sealing was necessary. Therefore, this issue is considered closed.

(5) Untested interface between tested barrier materials  
(1 issue)

In 1986, 3M fire barrier material was used as an alternate to THERMO-LAG, but no approved fire test of an interface between these two materials has been conducted. An interface test is scheduled and those effected areas are on fire watch pending successful completion of this test by March 31, 1987.

Since these areas are on firewatch and the actual fire loading in the buildings is much less than the design fire conditions, Engineering concludes there is no safety concern with continued plant operation.

(6) Requirements for structural steel protection  
(2 issues)

During Supply System field inspections a question arose concerning the amount of THERMO-LAG protection required for embedded steel strip plates which support hangers for dedicated cable trays. A calculation was performed which showed that 9" of THERMO-LAG protection was adequate. In all cases, 18 inches of heat flow path have been protected and 9" of protection has now been provided on all embedded steel plates in the three hour fire barrier areas. Engineering concludes this problem is resolved.

(7) One hour fire barrier in cable spreading room  
(3 issues)

One hour fire barriers were originally to be installed in the cable spreading room in the 20 foot exclusion area for all cables. This was subsequently modified during construction by a design change which used THERMO-LAG to provide a 20 foot non-combustible area. As a result, not all supports for dedicated cables received THERMO-LAG protection necessary for the heat flow path.

Available test results show that 18" of heat flow path protection is adequate. An engineering analysis indicates that 9" of protection is adequate in combination with sprinklers. This calculation is currently being reviewed by the THERMO-LAG vendor. Additional THERMO-LAG is to be added to provide the additional protection required.

These areas are on firewatch and Engineering concludes this condition does not present a safety concern with continued operation of the plant.

## 2. Design and Construction of Fire Lines (3 issues)

### a. Background

Commitments for WNP-2 include NFPA 13-75 (Sprinkler System), 20-74 (Fire Pumps), and 24-73 (Private Fire Mains). During the construction period fire mains were installed in accordance with standard design practice in effect before the Brown's Ferry fire. Subsequent review did not result in any changes to the basic fire main layout. In a recent inspection an NRC representative questioned the location of a fire main under the diesel generator building.

### b. Buried Fire Mains (2 issues)

As a result of the NRC concern, a complete evaluation of all fire protection piping buried under plant structures was completed, including obtaining an opinion from NFPA Code regarding the WNP-2 design. Specific to the buried piping underneath the diesel generator building, this evaluation resulted in the following conclusions:

- (1) The design does not violate the intent of NFPA 24-73.
- (2) The design of the building is adequate in case of leakage.
- (3) Calculations show that the main will not be damaged by building settlement.
- (4) The main has already survived significant water overpressure variations without damage and has been hydrotested twice in 1986.
- (5) The main may not survive safe shutdown earthquake motions as presently constructed but its failure would not degrade plant structures.
- (6) The other safety related buildings were also evaluated. The addition of 5 isolation valves is being considered to enhance the plant's ability to maintain the fire protection system.

- (7) Other segments of the fire mains were also hydro-tested in 1986.

If a break were to occur, it would happen under the hallway which separates the diesel generator building from the reactor building and be caused by the differential building movements during an earthquake (an event that does not have to be considered concurrently with a fire). The pipe is rigidly attached at the reactor building and using worst case assumptions, is considered captured by the mud mat under the diesel generator building even though the drawings show the bottom of the mud mat at the top of the pipe. Therefore the pipe can only break between the two buildings. A break in this line would not degrade the diesel generator building foundation to the extent that the diesel generators would become inoperative. The postulated break would not prevent safe shutdown of the plant. Considering the hallway slab, which is free to lift, and the penetration into the Reactor Building, a break would cause flooding in the hallway and some water would reach the Reactor Building sumps but the line would be isolated.

Based upon the above conclusions, the current design of the fire main under the diesel generator building and lines under other safety-related buildings is not considered a safety problem.

c. Transformer Yard Deluge System (1 issue)

The Deluge System in the Transformer Yard would not automatically drain after testing and potentially could freeze. As a temporary correction, the drain valve was changed to be locked open and a drain hole was drilled in the screwed cap down stream at the drain valve. The permanent fix will be to add one (1) open head to automatically drain the system. This task is scheduled to be completed by January 1988.

An acceptable temporary correction has been implemented. Engineering concludes there is no safety concern with continued operation of the plant.

3. Cable Derating/Tray Overfill (3 issues)

a. Background

As a result of the NRC Audit performed in March 1986, NRC concerns were expressed about cable derating analysis for cables with THERMO-LAG protection and cable tray overfill. Specifically, it appeared that WNP-2 power cables routed in THERMO-LAG protected raceways were not additionally derated for the THERMO-LAG envelope; that some power cable raceways shown in the WNP-2 cable schedule are indicated

as greater than 40% filled which could result in additional derating required; and that bottom cables laying on sharp edges of trays could fail due to cable weight.

b. Description of Review

(1) Cable Derating (1 issue)

Power cables routed in THERMO-LAG protected raceways require a 9.4% additional ampacity derating for those in conduits and 17.7% for those in trays. The existing WNP-2 cable sizing calculations do not reflect THERMO-LAG ampacity derating. A complete review of power cables routed in THERMO-LAG protected raceways has been completed to assure that these cables are adequately sized to accommodate the additional required derating.

Approximately 2,000 Class 1E and associated power cables have been reviewed to verify the adequacy of the original cable sizing calculations. Of those, 28 cables were shown to be calculationaly undersized. A review of each identified cable was performed to physically verify actual running currents. These were compared with calculated values. All calculational discrepancies have been resolved. No field modifications are required.

Therefore, Engineering concludes there is no safety concern with continued operation of the plant.

(2) Cable Tray Overfill Review (2 issues)

The WNP-2 cable tray loading criteria requires that no more than 40% of power tray cross sectional area be filled with cables and no more than 50% for control and signal trays.

Concerns by the NRC in a recent exit briefing that WNP-2 trays appeared to be more than 40 to 50 percent filled were evaluated by a review of the then existing WNP-2 tray loading schedules. Investigations, however, revealed that overfill conditions did not actually exist in the field. Due to methods of node assignment and cross sectional area assignment, the trays only appeared to be overfilled. Therefore, no unsafe conditions exist in the plant.

Each of the indicated overfilled nodes (approximately 50 out of 2000 Class 1E) was reviewed against actual conditions. The majority of apparent overfill conditions were eliminated by revising the stated cross sectional tray areas to actual. The remaining conditions were justified on an individual basis.

Since no overfill conditions actually exist and tray rollouts are smooth edged, failure of bottom cables from weight is not a concern.

4. Safe Shutdown and Other NRC Concerns (6 issues)

a. Safe Shutdown Analysis (2 issues)

(1) Background

In June 1984, following completion of the Appendix R safe shutdown analysis by Burns and Roe, the Supply System assumed responsibility for the preparation of the WNP-2 FSAR Appendix F update.

It was determined that the existing analysis format did not lend itself to the FSAR update format requested by the NRC. Additionally, the Burns and Roe analysis was not arranged in a manner that allowed easy verification of compliance to the various requirements of Appendix R and appeared to contain inconsistencies.

As a result, the Supply System initiated a program to verify the commitment to meet the intent of the technical requirements of Appendix R and to provide an analysis in an acceptable format. As the Supply System analysis progressed, some discrepancies were found, reported to the NRC in LER 84-031 as required, and corrected. Additionally, during this time the NRC issued clarifying Generic Letters 85-01 and 86-10 resulting in additional analysis. The last of these analyses is scheduled to be completed in March 1987.

(2) Description of the Review

A complete reanalysis of Appendix R safe shutdown was performed between June 1984 and March 1986 involving approximately 11,000 manhours of engineering time. An additional high impedance fault analysis required by Generic Letter 86-10 and cable derating review began in April 1986 involving an additional 11,000 engineering manhours.

(3) Results/Status

The analyses, although complete, are not yet in their final calculational form. The reanalysis uncovered several design discrepancies which were reported by revisions to LER-84-031. Resulting field modifications are in progress and are substantially complete. Fire watches exist for all areas where fixes are not yet complete. No unsafe conditions exist in the plant.

b. Other NRC Concerns (4 issues)

(1) Safe Shutdown NRC Concerns (3 issues)

On October 20, 1986, the Supply System received NRC concerns regarding safe shutdown. The response was submitted on December 1, 1986 (Reference 10).

Of the ten questions, three were considered to be of sufficient safety significance to warrant further information via phone. The three questions concerned the control room evacuation procedure 4.12.1.1, power removal from RHR-V-8 and V-9, and location of fire detectors. These were discussed with the NRC on December 18, 1986.

With regard to Procedure 4.12.1.1, the following commitments were made:

- (a) Deviate the procedure to (1) correct typos indicating which Automatic Depressurization System (ADS) valves are used, and (2) clarify that six ADS valves are relied on in control room evacuation due to fire (step 12 page 2 appeared confusing to the staff). This action was completed by December 22, 1986.
- (b) Deviate the procedure by December 26, 1986 to clearly indicate actions taken for evacuation of the control room due to fire. Confusion seems to exist in that the procedure is for evacuation under any circumstance and the staff could not readily discern what portions of the procedure are expected to be completed for fire. Attachment D to the procedure was modified to meet this commitment by December 22, 1986.
- (c) Inform the NRC by January 2, 1987 which of three options will be selected: new procedure, appendix to existing procedure, or high lighted (asterisked) portions indicating control room fire evacuation actions. Subsequently the NRC has been notified that a separate procedure for control room evacuation due to fire will be completed by February 1987. In the interim the procedure deviation assures evacuation and requisite actions can be accomplished within the required time.

The NRC has since reviewed this procedure and participated in a drill in January 1987, to ensure that 6 ADS valves could be actuated within the 10 minute

boundary determined by analysis. The drill showed the valves could be actuated in 5 1/2 minutes. With this resolution, Engineering concludes there are no safety concerns with continued operation of the plant.

Considering the suggestion to remove power from RHR-V-8 and V-9, it appears that the NRC staff management was not fully aware of the Supply System's position: RHR-V-8, V-9 are used as the preferred safe shutdown cooling path post-LOCA and, therefore, removal of that path is more significant to safety than the proposed fire scenario in which opening both valves due to a fire is a credible occurrence. The staff committed to revisit their position. This concern is still open. To date the safety concern of this item is in question. At the present time Engineering concludes this is no safety concern with continued operation.

With respect to the location of fire detectors, it was recognized that the License condition is based on Amendment 33 to the FSAR which in turn provides no exceptions to compliance with NFPA 72E. There are detectors mounted in the plant that appear to not be in compliance with NFPA 72E. An independent fire protection consultant to the Supply System is performing a detailed evaluation of detector location compliance with NFPA Code and the results will be presented in another part of the Fire Protection Reevaluation Report. The Supply System will evaluate the extent of conformance, and the necessity for conformance to the code when the consultant's report is received. However, in the interim, the commitment to document the nonconformance on an NCR for evaluation as to reportability and posting of a fire watch was made. The NRC staff did acknowledge that this issue was not a significant safety issue.

(2) Hi-to-Low RHR System Interface. RHR-V-8 Power Removal (1 issue)

This issue was briefly discussed in the previous section. Removal of power from RHR V-8 during normal plant operation results in loss of the normal shutdown cooling and vessel water level reduction post-accident. This is contrary to the requirements of the Emergency Procedure Guidelines. The NRC is reviewing the regulation conflict and will provide their assessment in the near future.

5. Programmatic Issues (7 issues)

Programmatic issues are addressed in another section of the Reevaluation Plan (Ref. 1). These are all administrative controls such as fire reporting, alarm response and organizational matters.

6. Miscellaneous Hardware Items (10 issues)

a. Background

During construction there was a lack of sensitivity to minor details that might affect the overall Fire Protection Program. With the intensive reevaluation undertaken in the current review these miscellaneous items were identified and steps taken to correct them. They consist of such items as small modifications to fire doors, loss of some details on penetration seals, emergency lighting and architectural design changes in the control room.

b. Penetration Sealing (3 issues)

In 1986 a field verification of the fire seals addressed by the WNP-2 Technical Specification was conducted (all were inspected except for less than 5% that were inaccessible), and the Plant Seal Tracking System (PSTS), a computer program containing all penetration data, is being updated to reflect the as-built information. The certified vendor information (CVI) file is also being corrected to reflect this as-built information. Penetrations that were found to be improperly sealed during the field verification were documented on non-conformance reports. Required corrective action is complete on all identified non-conforming seals. The 5% that was not accessible will be inspected during the refueling outage in April 1987 and any corrections required will be completed by June 30, 1987.

A firewatch was established in these areas once it was determined that these seals could not be checked due to obstructions. There is no reason to believe that these seals have been improperly installed, or degraded. Thus the firewatch gives an added confidence level that barriers will not be breached by a fire. Engineering concludes there is no safety concern with continued operation of the plant.

The fire penetration seals were installed as a Quality Class I system. The installation contractors installation procedure contained a step to assure that if overfill of cable was noted, a change of detail was made. When overfill was noted, SF-60 seal material was installed. This SF-60 material has been tested successfully in overfilled

penetration seals. The change of material is noted in PSTS and has been field verified. The work on the original seals has been checked and found to be acceptable.

Therefore, the adequacy of overfilled penetration is in agreement with original requirements and is considered closed with no safety impact on the Plant.

c. Architectural Changes to the Control Room (1 issue)

Changes to the Shift Manager's office in the control room were made without an approved design change. As a result of the fire protection review, installation of additional combustible materials was stopped. An NCR was prepared to document this problem and appropriate corrective actions were taken to provide a correct design for the desired changes and to prevent recurrence of the departure from plant procedures. This area is continuously occupied and fire suppression equipment is available. Engineering concludes there is no safety concern with continued operation of the plant.

d. Emergency Lighting (3 issues)

(1) Background

During the March 1986 NRC Audit, the NRC reviewer identified that the 8-hour battery powered emergency lighting existing in diesel generator room 1B did not provide sufficient illumination to all panel controls.

(2) Description of Review

A complete lighting review was conducted to assure that adequate emergency lighting exists throughout the facility for access and control areas necessary for shutdown operations which must be made during a fire event.

(3) Results/Status

The review identified the following areas which required additional emergency lighting:

1. Main Control Room.
2. Remote shutdown Room.
3. Alternate Remote Shutdown Room.
4. SM-8 Switchgear Room.
5. Diesel Generator Room 1B.

Diesel backed 8 hour battery pack emergency lighting exists in all areas where operator post-fire actions are required. However, some areas are lacking in sufficient illumination. In the interim, until modifications can be completed, other portable lighting is available to supplement existing lighting. Therefore, no unsafe conditions exist in the plant.

All modifications are scheduled to be completed by the end of the second refueling outage in June 1987 (Reference 10).

e. Fire Detection Instrumentation (2 issues)

During the 1986 NRC Appendix "R" audit, deficiencies with the WNP-2 fire detection system installation were noted. The WNP-2 commitment stated the installation was per NFPA 72E-74 requirements. A consultant was commissioned to review the WNP-2 fire detector installation against NFPA requirements. That effort is not covered in this report but will be covered elsewhere in the Fire Protection Re-evaluation report.

f. Fire Door Modifications (1 issue)

Fire doors in the plant have had signs installed that violate the UL fire rating of the door. The plant staff completed walkdowns that identified all doors with violations. Work orders were then issued to repair/restore the fire doors to UL listed configuration. A memorandum was issued that identifies the proper repair procedure and sign limitations and cautions employees to contact a knowledgeable person before repairing or modifying fire doors. All work is complete and the fire doors are in compliance with the UL label requirements. Therefore, this condition does not present any safety concern with continued operation of the plant.

#### IV. LISTING OF REVIEWED NRC FINDINGS

| <u>Reference</u> | <u>Finding ID</u> | <u>Closed by<br/>NRC Report</u> | <u>Description of Findings</u>   |
|------------------|-------------------|---------------------------------|--|
| 20               | 78-10-05          | 79-04                           | Cable separation problem. Cannot be further evaluated until cable installation and fire barriers are in place.   |
| 21               | 79-04-07          | 82-28                           | Cable separation problem. Criteria being applied to separation of Class 1 circuits at termination locations.   |
| 22               | 80-07-01          | 82-28                           | Separation criteria for Class 1E, non-Class 1E, and associated circuits.   |
| 23               | 80-19-02          | 82-08                           | Separation of electrical cables from instrument tubing on redundant systems is not being considered.   |
| 24               | 81-17-02          | 81-25                           | Failure to revise PMI 4-9 pertaining to Fire Protection.   |
| 24               | 81-17-05          | 82-28                           | Lack of clear cable separation criteria for electrical contractor.   |
| 25               | 82-12-01          | 82-15                           | Responsibility for performing inspections of the fire protection system requires clarification. Resolve conflicting instruction between Bechtel QC manual and Bechtel Engineering. |
| 26               | 82-21-01          | 83-18                           | Failure of electrical contractor to assure quality with respect to electrical separation.  |
| 26               | 82-21-04          | 83-18                           | Electrical separation of Class 1E and non-Class 1E.  |
| 26               | 82-21-05          | 83-18                           | Safety Division 1, 2, and 3 are in physical contact with each other in the control room.   |
| 27               | 83-38-14          | 85-37                           | Electrical raceway separation.   |
| 28               | 83-39-01          | 83-50,<br>85-31                 | Fire Brigade members wearing full beards.  |

| <u>Reference</u> | <u>Finding ID</u> | <u>Closed by<br/>NRC Report</u> | <u>Description of Findings</u>  |
|------------------|-------------------|---------------------------------|---|
| 28               | 83-39-02          | 83-50                           | Fire Brigade Training-Review SCBA Training  |
| 28               | 83-39-03          | 85-31                           | Cutting and Welding Permit System.  |
| 28               | 83-39-04          | 83-50,<br>85-31                 | Fire Watch Program.   |
| 28               | 83-39-05          | 85-31                           | Installation of fire barrier penetration seals and dampers in process. Re-examine at future inspection. |
| 28               | 83-39-06          | 85-05                           | Fire Doors. Small fire door in the wall of the MCC rooms not UL approved.                               |
| 28               | 83-39-07          | 85-30                           | Fire Doors. Doors not self-closing due to ventilation system imbalance.                                 |
| 28               | 83-39-08          | 83-50                           | Emergency Lighting.   |
| 28               | 83-39-09          | 85-31                           | Fire Protection Systems - Pressure and gauge OK but valve supervision incomplete.                       |
| 28               | 83-39-10          | 85-31                           | Fire Protection Systems - Match up identification systems.  |
| 28               | 83-39-11          | 85-05                           | Fire Protection Systems - Halon system incomplete.  |
| 28               | 83-39-12          | 85-29                           | Fire Protection Systems - Fire pump tests to meet NFPA standards.                                       |
| 28               | 83-39-13          | 85-05                           | Fire Extinguisher Program.  |
| 28               | 83-39-14          | 85-05                           | Fire Fighting Equipment - Distribution of equipment.  |
| 28               | 83-39-15          | 85-05                           | Fire Fighting Equipment - Hose station and hydrant houses.  |
| 28               | 83-39-16          | 85-05                           | Pre-Fire Plans.   |
| 28               | 83-39-17          | 83-50                           | Technical Specification Surveillance Procedure.   |

| <u>Reference</u> | <u>Finding ID</u> | <u>Closed by<br/>NRC Report</u> | <u>Description of Findings</u>  |
|------------------|-------------------|---------------------------------|---|
| 28               | 83-39-18          | 85-05                           | Power Generation Control Complex (PGCC) Floor.  |
| 28               | 83-39-20          | 86-13                           | Safe Shutdown Capability.   |
| 28               | 83-39-21          | 86-13                           | Fire Protection Evaluation will be rereviewed following completion of current changes.                      |
| 29               | 83-50-01          | 85-05                           | Fire doors had extra holes drilled in them.   |
| 29               | 83-50-02          | 86-13                           | Emergency lighting test results and PM program not inspected.   |
| 29               | 83-50-03          | 85-05                           | Additional hose station installation was incomplete.  |
| 29               | 83-50-04          | 84-06                           | Safe shutdown capability not per Appendix R, Section III.G. Request exemption for the two conditions cited. |
| 30               | 84-09-02          | 85-38                           | Fire Suppression System design control of hangers.  |
| 31               | 84-24-01          | 84-34                           | General fire protection/safety to be included in plant training for personnel access.                       |
| 32               | 84-29-01          | 85-31                           | Housekeeping--cleanliness and Fire Safety (change PPM 1.3.19).  |
| 32               | 84-29-02          | 85-31                           | Fire protection for welding, grinding, and cutting activities (change PPM 1.3.10).                          |
| 33               | 85-05-01          | Open                            | No procedure for annual functional test of air dampers.   |
| 33               | 85-05-02          | Open                            | Additional staffing of fire protection engineer.  |
| 33               | 85-05-03          | Open                            | Fire Brigade Training.  |
| 33               | 85-05-04          | 85-31                           | Control of transient combustibles.  |
| 33               | 85-05-05          | 86-01                           | Housekeeping in DG rooms--absorbant pads.   |

| <u>Reference</u> | <u>Finding ID</u> | <u>Closed by<br/>NRC Report</u> | <u>Description of Findings</u>   |
|------------------|-------------------|---------------------------------|--|
| 33               | 85-05-06          | 85-31                           | Housekeeping--aerosol cans.  |
| 33               | 85-05-07          | 85-31                           | Housekeeping--nitrogen gas bottles.  |
| 33               | 85-05-08          | 85-31                           | Fire brigade locker labeling.  |
| 34               | 85-22-01          | 85-31                           | Evaluate desirability of placing "Controlled Copies" of PPM's at remote S/D panels.                      |
| 34               | 85-22-02          | 85-31,<br>86-01                 | Evaluate desirability of placing "Controlled Copy" of PPM's in smoking area of Reactor Building.         |
| 34               | 85-22-03          | 85-31                           | Control of combustibles.   |
| 35               | 85-30-04          | 85-37                           | Bechtel inspectors did not understand working document.  |
| 36               | 85-31-01          | 85-36                           | Use of plastic sign holders on fire doors.   |
| 37               | 86-05-01          | Open                            | Safe Shutdown methodology in case of fire has not been approved. Documentation discrepancy.              |
| 37               | 86-05-02          | Open                            | Cable trays not thermolagged enough to provide safe shutdown train separation.                           |
| 37               | 86-05-03          | 86-22                           | Appropriate QA/QC measures have not been applied to fire protection.                                     |
| 37               | 86-05-04          | Open                            | Separation of High/Low voltage circuit cables. Being evaluated by NRR for potential safety significance. |
| 37               | 86-05-05          | 86-13                           | Organization of design documents implementing procedures.  |
| 37               | 86-05-06          | Open                            | NRR is currently evaluating WNP-2 analysis for control room fire and cable spreading room fire.          |
| 37               | 86-05-07          | Open                            | DG Room emergency lighting.  |
| 37               | 86-05-08          | 86-13                           | Emergency lighting drawings.   |
| 37               | 86-05-09          | 86-13                           | Door rating proof.   |

| <u>Reference</u> | <u>Finding ID</u> | <u>Closed by<br/>NRC Report</u> | <u>Description of Findings</u>  |
|------------------|-------------------|---------------------------------|---|
| 37               | 86-05-10          | Open                            | Define continuous alarm response.   |
| 37               | 86-05-11          | 86-13                           | Two errors in a first draft of the DG spurious signal analysis were identified. |
| 37               | 86-05-12          | 86-13                           | Spurious signal to RHR valve initiating LOCA.                                   |
| 38               | 86-06-01          | 86-34                           | Nitrogen air cylinders improperly stored.                                       |
| 39               | 86-22-01          | Open                            | Plant housekeeping control of flammable liquids.                                |
| 39               | 86-22-02          | Open                            | Plant housekeeping control of combustibles and fire doors.                      |
| 40               | 86-31-IIA         | Open                            | Fire Protection Housekeeping.   |
| 40               | 86-31-IIC         | Open                            | Reactor Building fire door open.  |
| 41               | 86-16             | Open                            | THERMO-LAG installation.  |

## V. LISTING OF REVIEWED NCRs

The following NCRs were reviewed to determine the adequacy of the NCR program as it relates to fire protection:

### A. Construction Phase

#### Burns and Roe, Inc. NCRs

00700, 00737, 02439, 02732, 02746, 02823, 02838, 02924, 03396, 03544, 03545, 03556, 03740, 03852, 03875 through 03882, 04030, 04270, 04671, 04948, 04964, 05593, 05716, 05748, 05783, 08009, 08800 through 08824, 09025 through 09097, 09931, and 09933 (132 separate NCRs).

#### Bechtel Power Corporation NCRs

20072, 20077, 21656, and 22181 (Four separate NCRs).

The time period covered by these NCRs was from July 30, 1975 to October 18, 1983.

These NCRs were initiated by the following site contractors:

| <u>Contractor</u>          | <u>Contract No.</u> | <u>Scope of Work</u> |
|----------------------------|---------------------|----------------------|
| Bovee Crail, Geri/WBG      | 2808-215            | General Mechanical   |
| Waldinger Corporation      | 2808-216            | HVAC                 |
| Sentry Automatic Sprinkler | 2808-217            | Sprinkler Systems    |
| Fischback Lord             | 2808-218            | Electrical           |
| Johnson Control, Inc.      | 2808-220            | Instrumentation      |
| Bechtel Power Corporation  | 2808-250            | System Completion    |

The topics addressed by these NCRs were:

- |                                |                               |
|--------------------------------|-------------------------------|
| o Welder Qualification Records | o Weld Records                |
| o Concrete Inserts             | o Unistrut                    |
| o Inspection Checklists        | o Documentation Discrepancies |
| o Torque Wrench Calibration    | o Anchor Bolts                |
| o Pipe Supports                | o Spalled Concrete            |

B. Operational Phase

1. Fire Barriers

Fire Barrier Penetration Seal Deficiencies

250-22296, 283-0183, 284-0011, 284-0154, 284-0328, 284-0770,  
285-0068, 285-0288, 285-0289, 285-0301, 285-0231, 286-0026,  
286-0052, 286-0200, 286-0276, 286-0280

Fire Door Deficiencies

284-0094, 284-0224, 284-0227, 284-0553, 284-0588, 284-0589,  
284-0725, 285-0432, 286-0065, 286-0415

Fire Damper Deficiencies

283-0176, 285-0045

2. Safe Shutdown Cable Protection

284-0311, 284-0740, 285-0268, 285-0133, 285-0347, 285-0474,  
285-0477, 285-0486

3. Fire Suppression

284-0383, 284-0502, 284-0378, 285-0059, 285-0266, 283-0204,  
284-0001, 284-0349, 284-0423, 284-0617

4. Fire Detection

283-0177, 284-0071, 284-0705, 285-0060, 285-0087, 285-0480,  
284-0809, 285-0005, 285-0232, 285-0484, 285-0485, 286-0070

5. Emergency Lighting

284-0613, 284-0759, 285-0059, 285-0533

# **VI. LIST OF REVIEWED LERS**

| <b>LER AND<br/>DATE ISSUED</b> | <b>DESCRIPTION</b>   | <b>1) CAUSE</b><br><b>2) CORRECTIVE ACTION(S)</b>   |
|--------------------------------|--|---|
| 83-002 1-20-84                 | FP-TK-100 Water inventory was less than the required 280,000 gallons   | 1) Equipment. Air binding of supply pump<br>2) Corrected through procedural changes to prevent recurrence.                                    |
| 83-003 1-20-84                 | Fire dampers did not conform to UL requirements  | 1) Procedure.<br>2) Modified existing dampers and scheduled replacements.   |
| 83-004 1-20-84                 | Loss of fire detection instrumentation on Reactor Building 606' El.  | 1) Equipment. Instrument was shorted out due to condensation.<br>2) Power supply replaced and source of condensation corrected.               |
| 83-005 1-20-84                 | Fire rated seals were removed to perform construction work for plant mod.  | 1) Personnel error. Work document did not specify appropriate measures.<br>2) Added to fire watch and replaced seal when const. completed.    |
| 83-006 1-20-84                 | Fire rated door had a hole burned into it causing a loss of fire boundary integrity.   | 1) Personnel error.<br>2) Added to fire watch and scheduled door replacement.   |
| 83-007 1-20-84                 | Fire hydrant froze in cold weather.  | 1) Personnel error. Craftsman inadvertently blocked drainage port of hydrant.<br>2) Repair hydrant and used alternate hydrant during interim. |
| 83-008 1-20-84                 | Fire damper did not function correctly causing a loss of fire boundary integrity.  | 1) Equipment. Guillotine style damper was stuck open.<br>2) Added to fire watch and scheduled for repair.                                     |
| 83-009 1-20-84                 | Fire damper stuck open causing a loss of fire boundary integrity.  | 1) Equipment. Link holding damper open had fused.<br>2) Added to fire watch and scheduled for repair.   |
| 84-026 4-18-84                 | A pressure surge resulting from the start of fire pumps caused inadvertent and momentary activation of other portions of the system. | 1) Design. Caused by pressure surge.<br>2) A design change to minimize pressure surge was initiated.  |
| 84-031 5-10-84                 | Ten cables required for plant safe-shutdown identified as not THERMO-LAGGED.   | 1) Design.<br>2) Cables were THERMO-LAGGED.   |

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| LER AND<br>DATE ISSUED | DESCRIPTION  | 1) CAUSE<br>2) CORRECTIVE ACTION(S)   |
|------------------------|--|---|
| 84-047 6-15-84         | Penetration fire protection seals were not installed in biological shield wall.  | 1) Design.<br>2) Assigned fire watch until penetrations are sealed.   |
| 84-061 7-6-84          | A floor drain on 522' El. of Reactor Building is open to another fire zone on 501' El.   | 1) Design.<br>2) Assigned firewatch until fire barrier established.   |
| 84-061-01 7-26-84      | Two additional drains penetrating fire zones were identified.  | 1) Design.<br>2) Assigned firewatch until fire barrier established.   |
| 84-086 9-6-84          | Failure to conduct fire tour.  | 1) Personnel error.<br>2) Fire tour was promptly re-established.  |
| 84-096 9-27-84         | A deluge system was activated due to a steam leak. The pressure surge caused by the pump tripped two preaction systems. Cooling water to the DG firepump was inadvertently isolated. | 1) Equipment and personnel. Steam leak and inadvertent cooling water isolation.<br>2) Fixed steam leak and locked open valve. |
| 84-031-01<br>11-29-84  | Another cable required for plant safe shutdown was identified as not THERMO-LAGGED.  | 1) Design.<br>2) Added to fire watch until circuit repaired.  |
| 84-122 12-20-84        | Inadvertent termination of fire door supervisory alarm circuit.  | 1) Personnel error.<br>2) Assigned fire watch until circuit repaired.   |
| 84-031-02<br>12-20-84  | Four more safety related cables were identified as unprotected.  | 1) Design.<br>2) Added to fire watch until THERMO-LAGGED.   |
| 84-031-03<br>1-17-85   | The emergency stop switch for the Division 2 emergency diesel generator was not isolated from the main control room.   | 1) Design.<br>2) Added to firewatch until circuit isolation established.  |
| 84-047-01<br>1-25-85   | Same as LER 84-047   | 1) No change.<br>2) Corrective actions completed.   |
| 05-004-01<br>2-28-85   | Technical Specification surveillance on fire pump batteries exceeded maximum allowed time period.  | 1) Personnel error.<br>2) Performed surveillance and changed scheduling practice.   |
| 85-015 4-16-85         | The fire detection instrument for RHR valve room was inadvertently removed.  | 1) Personnel error.<br>2) Added to fire watch and upgrade procedures and personnel.   |

LER AND  
DATE ISSUED

DESCRIPTION

1) CAUSE  
2) CORRECTIVE ACTION(S)

|                      |  |  |
|----------------------|--|--|
| 85-023 4-16-85       | Appendix R electrical separation deficiency identified.  | 1) Design.<br>2) Add to fire watch and upgrade procedures and personnel and correct specific deficiencies. |
| 85-028 5-16-85       | Unsealed floor penetration identified.   | 1) Procedure.<br>2) Add to fire watch until seal installed, inspect other floor penetration seals.         |
| 85-023-1 7-11-85     | Same as LER 85-023   | 1) No change.<br>2) Corrective actions updated.  |
| 84-031-04<br>7-11-85 | Circuits for Div. 2 Eng. Service Water cooling valves without control isolation.                 | 1) Procedure.<br>2) Add to fire watch until transfer switch installed.                                     |
| 85-043 7-22-85       | Result of 18% Technical Specification surveillance on fire barriers identified four deficiencies | 1) Procedure.<br>2) Add to fire watch until sealed, performed 100% inspection.                             |
| 85-046 7-29-85       | Reactor scrammed due to fire on FH-D-1B.   | 1) Equipment.<br>2) Fire extinguished, pump failure analyzed and repaired.                                 |
| 85-050 8-19-85       | The solenoid valve controlling flow to the sprinkler header would not open.                      | 1) Equipment.<br>2) Added room to fire watch until valve repaired.   |
| 85-054 8-30-85       | Fire tour not completed per Technical Specifications.  | 1) Personnel error.<br>2) Resumed fire tour and counseled personnel.                                       |
| 85-023-02<br>9-9-85  | Items identified by LERA 85-023-01 as being placed on fire watch were not placed on fire watch.  | 1) Personnel error.<br>2) Added to fire watch and counseled personnel.                                     |
| 84-031-05<br>9-19-85 | Three cables listed in LER 84-031-04 as having work completed--did not have work completed.      | 1) Personnel error.<br>2) Added to firewatch and upgraded affected instructions/procedures.                |
| 85-057 11-8-85       | A fire damper was found to be not installed.   | 1) Procedure.<br>2) Added to fire watch until damper installed.  |

| <u>LER AND<br/>DATE ISSUED</u> | <u>DESCRIPTION</u>  | <u>1) CAUSE<br/>2) CORRECTIVE ACTION(S)</u>   |
|--------------------------------|---|---|
| 84-031-06<br>3-3-86            | Additional items identified as requiring electrical separation.                               | 1) Design.<br>2) Added to fire watch until electrical separation complete.                            |
| 86-028 9-18-86                 | Flooding analysis for all areas containing safety related equipment identified as incomplete. | 1) Design.<br>2) Isolate flooding sources, add affected rooms to fire watch and analyze for flooding. |
| 86-028-01<br>10-3-86           | Same LER 86-028   | 1) Same<br>2) Updates corrective actions.   |
| 86-033 10-13-86                | Incorrect sizing of underground cables (SW-P-1A and 1B)                                       | 1) Design.<br>2) Preliminary analysis performed, an indepth analysis to follow.                       |
| 86-033-01<br>10-22-86          | Cable derating for additional cables was not properly taken into account.                     | 1) Design.<br>2) Perform an indepth analysis of problem.  |

## VII. REFERENCES\*

1. 602-86-0883, G.C. Sorensen (SS) to J.B. Martin (NRC) Region V, dated September 16, 1986, "Fire Protection Program Reevaluation".
2. Docket No. 50-397, EA-80-20; V. Stello, Jr. (NRC Director of Inspection and Enforcement) to N.O. Strand (Supply System Managing Director), dated June 17, 1980, "10CFR50.54(f) Notice of Violation".
3. 602-83-153, N.O. Strand (Supply System Managing Director) to V. Stello, Jr. (NRC Office of I&E).
4. TAA Report 1126-F1, dated 9/83, Approved by HE Sheets (Technical Audit Associates), "An Independent Evaluation of the Plant Verification Program at WNP-2".
5. CA-JRZ-83-85, TJ Houchins (Supply System Audit Manager) to JD Martin (WNP-2 Plant Manager), dated August 8, 1983, "Corporate Licensing and Assurance Audit 83-261."
6. CA-TJH-84-114, TJ Houchins (Supply System Audit Manager) to JD Martin (WNP-2 Plant Manager), dated September 11, 1984, "Corporate Licensing and Assurance Audit 84-305."
7. CA-DAK-85-086, TJ Houchins (Supply System Audit Manager) to CM Powers (WNP-2 Plant Manager), dated September 16, 1985, "Corporate Licensing and Assurance Audit 85-344".
8. CA-DAK-86-119, TJ Houchins (Supply System Audit Manager) to CM Powers (WNP-2 Plant Manager), dated October 6, 1986, "Corporate Licensing and Assurance Audit 86-376".
9. 602-86-418, GC Sorensen (Supply System Manager of Regulatory Programs) to JB Martin (NRC) dated 5/9/86, "NRC Inspection 86-05 Enforcement Conference, April 15, 1986".
10. 602-86-1049, GC Sorensen (Supply System manager of Regulatory Program) to EG Adensam (NRC), dated 12/1/86, "WNP-2 Response to Request for Additional Information".
11. WNP-2 Project Management Instruction Manual.
12. Letter, F.J. Barta (Brand, Corporate QA Manager) to W. Tretheway (Brand Site QA Manager), dated December 29, 1981, "Brand Corporate QA Audit of Brand Site QA Program".

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\*A total list of references reviewed in preparation of this report is presented. However, only directly relating documents are specifically noted in the text of this report.

13. Letter, F.J. Barta (Brand, Corporate QA Manager) to W. Tretheway (Brand Site QA Manager), dated January 31, 1983, "Brand Corporate QA Audit of Brand Site QA Program".
14. BECBI-006-81-0016, S. Pohtos (Bechtel Construction Manager) to M.S. Stevenson (Brand), dated November 30, 1981, "Report of Bechtel QA Audit 16.1.1 of Brand".
15. BIBEC-006-82-009, W.G. Tretheway (Brand, QA Manager) to S. Pohtos (Bechtel Construction Manager), dated January 26, 1982, "Response and Request for Closure of Bechtel Audit 16.1.1".
16. BECBI-006-82-0009, S. Pohtos (Bechtel Construction Manager) to M.S. Stevenson (Brand), dated February 8, 1982, "Closure of Audit 16.1.1".
17. BECBI-006-83-0090, J. F. Newgen (Bechtel Construction Manager) to M.S. Stevenson (Brand), dated June 3, 1983, "Report of Bechtel Audit 18.1.1 of Brand".
18. BIBEC-006-83-0110, W.G. Tretheway (Brand QA Manager) to J.F. Newgen (Bechtel Construction Manager), dated June 8, 1983, "Response to Bechtel Audit 18.1.1 of Brand".
19. BECBI-006-83-0134, J. F. Newgen (Bechtel Construction Manager) to M.S. Stevenson (Brand), dated July 8, 1983, "Closure of Bechtel Audit 18.1.1 of Brand".
20. NRC Inspection Report No. 78-10, "October 24-27, 1978 Inspection".
21. NRC Inspection Report No. 79-04, "Feb. 27 - March 16, 1979 Inspection".
22. NRC Inspection Report No. 80-07, "May 27-30, 1980 Inspection".
23. NRC Inspection Report No. 80-19, "Nov. 4-7, 1980 Inspection".
24. NRC Inspection Report No. 81-17, Letter dated October 23, 1981, "August 31 to September 4, 1981 Inspection".
25. NRC Inspection Report No. 82-12, Letter dated July 1, 1982, "May 1982 Inspection".
26. NRC Inspection Report No. 82-21, "Aug. 9 - Sept. 3, 1982 Inspection".
27. NRC Inspection Report No. 83-38, Letter dated 8/30/83, "Aug. 1-15, 1983 Inspection".
28. NRC Inspection Report No. 83-39, Letter dated August 29, 1983, "August 8-12, 1983 Inspection".
29. NRC Inspection Report No. 83-50, Letter dated December 14, 1983, "October 17-21, 1983 Inspection".

30. NRC Inspection Report No. 84-09, Letter dated June 13, 1984, "April 1-30, 1984 Inspection".
31. NRC Inspection Report No. 84-24, Letter dated September 21, 1984, "August 20-24, 1984 Inspection".
32. NRC Inspection Report No. 84-29, Letter dated November 2, 1984, "September 10-14, October 1-5, 1984 Inspections".
33. NRC Inspection Report No. 85-05, Letter dated March 19, 1985, "February 4-8, 1985 Inspection".
34. NRC Inspection Report No. 85-22, Letter dated August 7, 1985, "June 10-28, 1985 Inspection".
35. NRC Inspection Report No. 85-30, Letter dated September 20, 1985, "August 3-31, 1985 Inspection".
36. NRC Inspection Report No. 85-31, Letter dated November 26, 1985, "October 7 - November 6, 1985 Inspection".
37. NRC Inspection Report No. 86-05, Letter dated April 4, 1986, "March 3-24, 1986 Inspection".
38. NRC Inspection Report No. 86-06, Letter dated April 7, 1986, "February 3 - March 14, 1986 Inspection".
39. NRC Inspection Report No. 86-22, Letter dated 8/4/86, "June 10-13, 1986 Inspection".
40. NRC Inspection Report No. 86-31, Letter dated September 18, 1986, "August 28, 1986 Inspection".
41. NRC Inspection Report No. 86-16, Letter dated June 18, 1985, "May 6-10, 1985 Inspection".
42. SS2-PE-86-1462, L.T. Harrold (Generation Engineering) to G.D. Bouchey (Support Services), dated November 14, 1986, "Generation Engineering's Fire Protection Program Evaluation".
43. 10CFR50.55 Deficiency Log, Listing of Deficiencies Considered for Reportability under 10CFR50.55.
44. WNP-2 FSAR Section 9.5.1 Amendment 36 and Appendix F Amendment 37, Fire Protection System.
5. Contract 29 awarded to Johnston Pumps for Fire Pumps and Drives.
6. Contract 206 (Section 15C) awarded to Bovee and Crail for Installation of Fire Protection Piping.
- Contract 215 (Section 15B) awarded to WBG for providing and installing piping systems.

48. Contract 215 (Section 15S) subcontracted to Brand for providing and installing fire barriers.
49. Contract 217 awarded to Sentry for furnishing and installing fire protection systems.
50. WNP2MCL-F-80-0113, D.E. Dobson (Supply System Deputy Project Manager, Construction) to All Contractors, dated July 17, 1980, "Stop Work Order No. 009 for Quality Class I Work".
51. WNP2MCL-F-80-0114, D.E. Dobson (Supply Sytem Deputy Project Manager, Construction) to All Contractors, dated July 23, 1980, "Clarification of Stop Work Order No. 009--Includes Quality Class II Seismic Category I".
52. Contract 250 awarded to Bechtel Power Corporate for completing unfinished system construction.
53. Report, M.N. Leach (Bechtel Reverification Group Lead Engineer) and J.B. Gatewood (Bechtel QA Manager), dated July 29, 1982 "Reverification Report for Fire Protection and Deluge System (62)".
54. BECWNP2-82-0826, S. Pohtos (Bechtel Construction Manager) to H.A. Crisp (SS), dated July 26, 1982, "Miscellaneous Fire Protection Systems (62.6) Reverification".
55. WNP2SAS-217-F-81-0128, G.I. Wells (Deputy Project Manager, Construction) to B. Doupey (Sentry), dated May 15, 1981, "Release from Stop Work Order NO. 009".
56. RCSW-81-644, T.D. Smith (RCSW Senior Engineer) to W.R. Wingfield (RCSW Team Leader), dated August 6, 1981, "Subcontractor Review of IR's, NCRs, and Open QAFR's Applicable to Brand".
57. RCSW Reverification Package for Contract 215.
58. RCSW Reverification Package for Contract 217.
59. NRC Inspection Report No. 83-55, Letter dated January 5, 1984, "November 14-18, 1983 Inspection".
60. Contract 206 Reverification Report Bovee and Crail, dated August 29, 1983. Signed and stamped by M.N. Leach (Bechtel Reverification), J.B. Gatewood (Bechtel QA Manager), R.L. Knawa (QVP Manager), R.T. Johnson (Project QA Manager).
61. QVP Overview Report, Approved by CS Carlisle (WNP-2 Program Director), dated 9/21/83.
62. WNP-2 Design Reverification Program Report, Approved by GD Bouchey (Supply System Technical Specialist), dated 9/83.
63. IOM, DS Feldman (WNP-2 QA Manager) to CM Powers (WNP-2 Plant Manager), dated 12/13/85, "Electrical Separation Issues Summary Report".