

MAY 01 2002



LR-N02-0142

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

**Request for Exemption From 10 CFR 50, Appendix R, for Fire Areas
1(2)-FA-AB-64B, 1(2)-FA-AB-84C, and 1(2)-FA-AB-84B
Salem Generating Station, Units 1 and 2
Docket Nos. 50-272 and 50-311
Facility Operating License No. DPR-70 and DPR-75**

Ladies and Gentlemen:

In accordance with the provisions of 10 CFR 50.12(a), PSEG Nuclear, LLC (PSEG) requests three exemptions from the requirements of 10 CFR 50, Appendix R, as they apply to Salem Generating Station Fire Areas 1(2)-FA-AB-64B, 1(2)-FA-AB-84C, and 1(2)-FA-AB-84B. The exemption requests are provided as Attachments 1 through 3.

The exemption requests are submitted as the result of the re-analysis of post-fire safe shutdown capability and proposed plant modifications in response to resolution of Electrical Raceway Fire Barrier System (ERFBS) issues at Salem. Each of the identified plant fire areas has a current exemption from Appendix R requirements. Based upon the revised safe shutdown analysis and proposed plant modifications, the current exemptions for these areas will be replaced with these proposed exemptions when approved by the NRC.

The fire areas and the specific exemption requests are summarized as follows:

<u>Fire Area</u>	<u>Description</u>	<u>Request</u>
1(2)-FA-AB-64B	Reactor Plant Auxiliary Bldg. – Elev. 64'	From the fixed suppression requirement of Section III.G.3 of Appendix R and from the loss of offsite power requirement of Section III.L.3 of Appendix R
1(2)-FA-AB-84C	11 (21) CCW Pump and Heat Exchanger Area – Elev. 84'	From the fixed suppression requirement of Section III.G.3 of Appendix R

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MAY 01 2002

<u>Fire Area</u>	<u>Description</u>	<u>Request</u>
1(2)-FA-AB-84B	Reactor Plant Auxiliary Equipment Area – Elev. 84'	From the loss of offsite power requirement of Section III.L.3 of Appendix R and the use of separation in an alternate shutdown area

The compliance strategies for these areas and therefore the exemption requests rely on the completion of plant modifications, safe shutdown procedure revisions, and administrative controls revisions for both safe shutdown equipment and combustible material controls.

The plant modifications associated with these exemptions are the installation of the Chemical & Volume Control System (CVCS) cross-tie, relocation of the local/remote switch for the A-channel Service Water pumps from the Hot Shutdown Panel to another fire area and installation of 8-hour emergency lights for local actions. These modifications will be completed prior to the restart from Salem Unit 1 Refueling Outage 15 (1R15) in the Fall of 2002.

The proposed exemptions for fire areas 1(2)-FA-AB-64B and 1(2)-FA-AB-84B refer to Exemption #1 approved by the NRC in the Safety Evaluation Report issued on July 20, 1989. Exemption #1 discusses the acceptability of some HVAC duct configurations where the fire damper could not be installed in the plane of the fire boundary wall. Specifically the exemption asked for approval of installing the fire damper in the HVAC duct downstream of the fire boundary and wrapping the HVAC duct with FS-195 from the fire damper to the boundary wall (essentially extending the fire boundary out to the fire damper). As reported in LER 311/98-014-00 dated October 1, 1998, the FS-195 fire barrier material was determined to not meet the one-hour rating specified in the exemption. As a result, compensatory measures were put in place in accordance with the fire protection program for all of the affected fire dampers. An evaluation is being performed to determine if the fire barriers can be either eliminated, or the duct assembly presently installed is acceptable for the hazards, or the duct assembly needs to be upgraded or replaced as committed in the LER. Completion of the evaluation and any upgrades to the HVAC duct wrap configurations are being tracked by PSEG Nuclear's Corrective Action Program.

Should you have any questions regarding this request, please contact Brian Thomas at (856) 339-2022.

Sincerely,


Mark B. Bezilla
Vice President - Technical Support

Attachments (4)

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I declare under penalty of perjury that the foregoing is true and correct.

Executed on **MAY 01 2002**



M. B. Bezilla
Vice President –
Technical Support

**Attachment 1
LR-N02-0142**

**Request for Exemption from
10 CFR 50, Appendix R, Sections III.G.3 and III.L.3
Fire Area 1(2)-FA-AB-64B
Reactor Plant Auxiliary Building – Elevation 64'**

**PSEG Nuclear LLC
Salem Generating Station, Units 1 and 2
Docket Nos. 50-272 and 50-311**

**Exemption Request – Fire Area 1(2)-FA-AB-64B
Reactor Plant Auxiliary Building – Elevation 64'**

Exemption Requested

In accordance with the requirements of 10 CFR 50.12 (a), PSEG Nuclear, LLC (PSEG) requests an exemption from the requirements of 10 CFR 50, Appendix R, Section III.G.3 to the extent that a fixed suppression system is not installed for an area where alternative shutdown capability is provided. Specifically, Fire Area 1(2)-FA-AB-64B, Reactor Plant Auxiliary Building – Elevation 64', is not provided with a fixed suppression system.

In addition, an exemption from the requirements of 10 CFR 50 Appendix R, Section III.L.3 to the extent that alternative shutdown capability must accommodate conditions where offsite power is not available for 72 hours. Specifically, Fire Area 1(2)-FA-AB-64B, Reactor Plant Auxiliary Building – Elevation 64', relies upon offsite power for alternative shutdown capability.

Discussion

The Reactor Plant Auxiliary Equipment Area (Elevation 64') of the Auxiliary Building, contains waste gas compressors, waste gas tanks, storage tank recirculation pumps, laundry pump (Unit 1), chemical drain tank pump (Unit 1), and holdup tanks and pumps. See Figures 1 and 2.

Fire Protection Features and Systems

The fire area consists of many concrete rooms. Each room contains either a single component or groups of similar components. The floor, ceiling, and walls in this area are constructed of reinforced concrete, designated as fire area boundaries. An approved exemption request (Exemption #1 - July 20, 1989) specifically identified the following features as adequate for the hazard:

- Ventilation duct penetrations (with and without dampers), and
- 1-1/2 hour rated fire doors, and
- Steel hatches

Some of the ventilation duct fire dampers are mounted external to the fire barrier with fire wrap protecting the section of duct between the barrier and the dampers. These damper configurations are being evaluated in accordance with the guidance of Generic Letter 86-10 as being adequate for the fire hazards (see discussion in cover letter).

The in-situ combustibles in this area consist of lubricating oil in pumps and motors, paper, plastic in electrical cabinets, cable insulation and FS-195. The area contains limited ignition sources and paths for fire propagation.

A partial fire detection system is installed in the area with the exception of the Holdup Tank Rooms, No. 1 Pump Waste Monitor Hold-Up Tank Pump Room, the

**Exemption Request – Fire Area 1(2)-FA-AB-64B
Reactor Plant Auxiliary Building – Elevation 64'**

Waste Evaporator Feed Pump Room, and the unused space formerly designated as the Gas Analyzer Area. These rooms are separated from the remainder of the area by concrete walls. The concrete walls have open doorways for access to the tanks. The detectors are located near the major hazards in the area. The detection system has been evaluated, in accordance with the guidance of Generic Letter 86-10, as adequate for the hazards in the area. In addition, the staff previously concluded in their July 20, 1989 Safety Evaluation (Exemption #10) that the summary analyses contained in the exemption requests were sufficient to satisfy the Generic Letter 86-10 partial detection evaluation guidelines.

Manual fire alarm stations are provided in the area. Detectors and manual fire alarm stations alarm in the Control Room.

Manual fire suppression capability is provided in the form of portable fire extinguishers and manual hose stations.

Given the in-situ combustibles and the fire protection features provided, it is unlikely that a fire of significant magnitude or duration would develop within the area. The lack of a suppression system in this area was previously approved in the July 20, 1989 NRC Safety Evaluation (Exemption #10).

Safe Shutdown Capability

Cabling associated with the following safe shutdown functions and systems is in the area:

<u>Functions</u>	<u>Potentially Affected Systems</u>
Reactor Coolant Inventory Control and Reactivity Control	Chemical and Volume Control System
Decay Heat Removal	Auxiliary Feedwater System Residual Heat Removal System
Process Monitoring	Auxiliary Feedwater System Chemical and Volume Control Main Feedwater System Main Steam System Reactor Coolant System
Mechanical Support	Chilled Water System Component Cooling Water System Control Air System Service Water System
Electrical Support	Electrical Distribution System

**Exemption Request – Fire Area 1(2)-FA-AB-64B
Reactor Plant Auxiliary Building – Elevation 64'**

Functions

HVAC

Potentially Affected Systems

Auxiliary Building Ventilation System
Containment Building Ventilation System
Control Area Ventilation System
Service Water Ventilation System
Switchgear and Penetration Area Ventilation System

In the unlikely event of a fire damaging safe shutdown cables within the area prior to control and extinguishment of the fire by the on-site fire department, the ability to achieve and maintain hot standby for this area consists of the following:

- Use of alternative shutdown capability, independent of the fire area, in the form of the Chemical and Volume Control System (CVCS) cross-tie from the unaffected unit for seal injection, boration, and inventory control (modification discussed in Attachment 4).
- Use of off-site power. A fire in this area has the potential to result in a loss of the emergency diesel generators to the 4160V vital buses. However, offsite power to the 4160V vital buses has been evaluated and is not affected by a fire in this area and therefore, will remain available to provide power to safe shutdown components. The use of offsite power, in lieu of on-site emergency diesel generators, is considered an acceptable alternative to the requirements of Section III.L.3 of 10 CFR 50 Appendix R.

Manual operator actions relied upon to achieve hot standby and cold shutdown are limited and are practical, reasonable and achievable under the expected environmental conditions. Summaries of the major actions associated with the shutdown are:

- Positive Control of the affected unit's CVCS flowpath.
- Aligning the Service Water system from the unaffected unit.
- Aligning the Control Area and Switchgear & Penetration Area HVAC systems.
- Aligning the Residual Heat Removal (RHR) system.
- Aligning the Component Cooling Water (CCW) system.

The actions can be accomplished prior to the plant reaching an unrecoverable condition. Operator action locations and the associated pathways, for actions that must occur within the first 8 hours, are being provided with 8-hour battery backed emergency lighting. Operator staffing level is sufficient to accomplish the actions required. Plant procedures will address the potential operator actions. Operations staff will be trained, as necessary, on the use of these procedures.

The ability to achieve and maintain cold shutdown for this area includes repairs to restore power to Component Cooling Water system components.

**Exemption Request – Fire Area 1(2)-FA-AB-64B
Reactor Plant Auxiliary Building – Elevation 64'**

Repairs relied upon to ensure cold shutdown capabilities are practical, reasonable and achievable. Repair procedures govern the performance of the repairs. Materials needed to implement the repairs are dedicated for use and are stored onsite. These repairs can be performed and cold shutdown can be achieved within 72 hours of a fire event.

Evaluation

An exemption from:

1. The requirements of Sections III.G.3 of 10 CFR 50 Appendix R to provide a fixed suppression system in an area provided with alternative shutdown capability, and
2. The requirements of Section III.L.3 of 10 CFR 50 Appendix R that alternative shutdown capability accommodate post fire conditions where offsite power is not available for 72 hours

is based on the following:

- The area has low combustible loading and limited ignition sources.
- The area is provided with a detection system that is adequate for the fire hazards within the area. The detection system would alert operators to summon the on-site plant fire department to rapidly extinguish the fire.
- Alternative shutdown capability, independent of the fire area, is provided to ensure post-fire safe shutdown.
- Offsite power remains available for a fire in this area.

Conclusion

It is, therefore, PSEG's position that a level of protection equivalent to Sections III.G.3 and III.L.3 of Appendix R to 10 CFR 50 will be provided following the proposed alternative shutdown modifications. The installation of a fixed suppression system would not significantly enhance the level of fire protection for safe shutdown capability. The use of offsite power, in lieu of on-site emergency diesel generators, is considered an acceptable alternative.

The requested exemptions from Sections III.G.3 and III.L.3 of Appendix R to 10 CFR 50 has been reviewed and determined not to be in conflict with other legal requirements, does not present an undue risk to the public health and safety, and is consistent with the common defense and security. The exemption request, therefore, conforms to the requirements of 10 CFR 50.12(a)(1). In addition, "special circumstances" exist for the requested exemption in that application of the regulation in this particular circumstance is not necessary to achieve the underlying purpose of Appendix R to 10 CFR 50. The exemption requested demonstrates that an equivalent level of fire protection safety will be provided through alternate means.

**Exemption Request – Fire Area 1(2)-FA-AB-64B
Reactor Plant Auxiliary Building – Elevation 64'**

The alternate means consist of a combination of use of offsite power, a detection system, low combustible loading, and alternative shutdown capability.

**Attachment 2
LR-N02-0142**

**Request for Exemption from
10 CFR 50, Appendix R, Section III.G.3
Fire Area 1(2)-FA-AB-84C
CCW 11 (21) Pump and Heat Exchanger Area
Elevation 84'**

**PSEG Nuclear LLC
Salem Generating Station, Units 1 and 2
Docket Nos. 50-272 and 50-311**

**Exemption Request – Fire Area 1(2)-FA-AB-84C
Component Cooling Water 11 (21) Pump and Heat Exchanger Area
Elevation 84'**

Exemption Requested

In accordance with the requirements of 10 CFR 50.12 (a), PSEG Nuclear, LLC (PSEG) requests an exemption from the requirements of 10 CFR 50, Appendix R, Section III.G.3 to the extent that a fixed suppression system is not installed for an area where alternative shutdown capability is provided. Specifically, Fire Area 1(2)-FA-AB-84C, Component Cooling Water 11 (21) Pump and Heat Exchanger Area – Elevation 84', is not provided with a fixed suppression system.

Discussion

The Component Cooling Water Pump Area (Elevation 84') of the Auxiliary Building, contains the 11(21) Component Cooling Water (CCW) Pump and Heat Exchanger. See Figures 3 and 4.

Fire Protection Features and Systems

The floor, ceiling, and walls in this area are constructed of reinforced concrete, designated as fire barriers and have been evaluated, in accordance with the guidance in Generic Letter 86-10, as adequate for the fire hazard. An approved exemption request (Exemption # 1 - July 20, 1989) specifically identified the following features as adequate for the hazard:

- Ventilation duct penetrations sealed to the thickness of the barrier with ventilation ducts that do not contain fire dampers, and
- 1-1/2 hour rated fire doors.

The in-situ combustibles in this area consist of lubricating oil in the CCW pump and motor, cable insulation, and FS-195 wrap. The area contains limited ignition sources and paths for propagation.

An area wide detection system is installed in the area. The detection system has been evaluated as adequate for the hazards. Detectors alarm in the Control Room.

Manual fire alarm stations are provided in the corridor outside the area. The manual fire alarm stations alarm in the Control Room.

Manual fire suppression capability is provided in the form of portable fire extinguishers and manual hose stations located in the corridor outside the area.

Given the in-situ combustibles and the fire protection features provided, it is unlikely that a fire of significant magnitude or duration would develop within the area.

**Exemption Request – Fire Area 1(2)-FA-AB-84C
Component Cooling Water 11 (21) Pump and Heat Exchanger Area
Elevation 84'**

Safe Shutdown Capability

Cabling/equipment associated with the following safe shutdown functions and systems is in the area:

<u>Functions</u>	<u>Potentially Affected Systems</u>
Reactor Coolant Inventory Control and Reactivity Control	Chemical and Volume Control System
Decay Heat Removal	Auxiliary Feedwater System Main Steam System Residual Heat Removal System
Process Monitoring	Main Feedwater System Main Steam System Reactor Coolant System
Mechanical Support	Component Cooling Water System Service Water System
Electrical Support	Electrical Distribution System
HVAC	Auxiliary Building Ventilation System Containment Building Ventilation System Service Water Ventilation System Switchgear & Penetration Area Ventilation System

In the unlikely event of a fire damaging safe shutdown cables within the area prior to control and extinguishment of the fire by the on-site fire department, the ability to achieve and maintain hot standby for this area consists of the following:

- Use of alternative shutdown capability, independent of the fire area, in the form of the Chemical and Volume Control System (CVCS) cross-tie from the unaffected unit for seal injection, boration, and inventory control (modification discussed in Attachment 4).

Other than the CVCS cross-tie, hot standby will be achieved using normal shutdown systems.

Manual operator actions relied upon to achieve hot standby and cold shutdown are limited and are practical, reasonable and achievable under the expected environmental conditions. Summaries of the major actions associated with the shutdown are:

- Positive Control of the affected unit's CVCS flow path.

**Exemption Request – Fire Area 1(2)-FA-AB-84C
Component Cooling Water 11 (21) Pump and Heat Exchanger Area
Elevation 84'**

- Aligning the Switchgear & Penetration Area HVAC systems.
- Aligning the Component Cooling Water (CCW) system.

The actions can be accomplished prior to the plant reaching an unrecoverable condition. Operator action locations and the associated pathways, for actions that must occur within the first 8 hours, are being provided with 8-hour battery backed emergency lighting. Operator staffing level is sufficient to accomplish the actions required. Plant procedures will address the potential operator actions. Operations staff will be trained, as necessary, on the use of these procedures.

Evaluation

An exemption from:

1. The requirements of Sections III.G.3 of 10 CFR 50 Appendix R to provide a fixed suppression system in an area provided with alternative shutdown capability

is based on the following:

- The area has low combustible loading and limited ignition sources.
- The area is provided with a detection system that is adequate for the fire hazards within the area. The detection system would alert operators to summon the plant fire department to rapidly extinguish the fire.
- Alternative shutdown capability, independent of the fire area, is provided to ensure post-fire safe shutdown.

Conclusion

It is, therefore, PSEG's position that a level of protection equivalent to Section III.G.3 of Appendix R to 10 CFR 50 will be provided following the proposed alternative shutdown modifications. The installation of a fixed suppression system would not significantly enhance the level of fire protection for safe shutdown capability.

The requested exemption from Section III.G.3 of Appendix R to 10 CFR 50 has been reviewed and determined not to be in conflict with other legal requirements, does not present an undue risk to the public health and safety, and is consistent with the common defense and security. The exemption request, therefore, conforms to the requirements of 10 CFR 50.12(a)(1). In addition, "special circumstances" exist for the requested exemption in that application of the regulation in this particular circumstance is not necessary to achieve the underlying purpose of Appendix R to 10 CFR 50. The exemption requested demonstrates that an equivalent level of fire protection safety will be provided through alternate means. The alternate means consist of a combination of a detection system, low combustible loading, and alternative shutdown capability.

**Attachment 3
LR-N02-0142**

**Request for Exemption from
10 CFR 50, Appendix R, Section III.L.3
Fire Area 1(2)-FA-AB-84B
Reactor Plant Auxiliary Building – Elevation 84'**

**PSEG Nuclear LLC
Salem Generating Station, Units 1 and 2
Docket Nos. 50-272 and 50-311**

**Exemption Request – Fire Area 1(2)-FA-AB-84B
Reactor Plant Auxiliary Equipment Area – Elevation 84'**

Exemption Requested

In accordance with the requirements of 10 CFR 50.12 (a), PSEG Nuclear, LLC (PSEG) requests an exemption from the requirements of 10 CFR 50, Appendix R, Section III.L.3 to the extent that alternative shutdown capability must accommodate post fire conditions where offsite power is not available for 72 hours. Specifically, Fire Area 1(2)-FA-AB-84B, Reactor Plant Auxiliary Equipment Area - Elevation 84', relies upon offsite power for alternative shutdown capability.

Discussion

The Reactor Plant Auxiliary Equipment Area (Elevation 84') of the Auxiliary Building, contains pumps, heat exchangers, tanks and control centers for the chemical and volume control, component cooling, safety injection, containment spray, auxiliary feedwater, waste disposal, and spent fuel pool cooling systems. See Figure 3 and 4.

Fire Protection Features and Systems

The floor, ceiling, and walls in this area are constructed of reinforced concrete, designated as fire area boundaries. The fire area consists of many concrete rooms. Each room contains either a single component or groups of similar components. An approved exemption request (Exemption #1 - July 20, 1989) specifically identified the following features as adequate for the hazard:

- Ventilation duct penetrations (with 1-1/2 hour dampers), and
- 1-1/2 hour rated fire doors, and
- Steel hatches

Some of the ventilation duct fire dampers are mounted external to the fire barrier with fire wrap protecting the section of duct between the barrier and the dampers. These dampers are being evaluated in accordance with the guidance of Generic Letter 86-10 as being adequate for the fire hazards (see discussion in cover letter).

The in-situ combustibles in this area consist of lubricating oil in pumps and motors, flammable liquids stored in cabinets, cable insulation, and FS-195. The area contains limited ignition sources and paths for fire propagation.

Partial area detection is provided in the ceiling in the Safety Injection and Component Cooling Water pump areas, Charging and Containment Spray Areas, Spent Fuel Pool Heat exchanger areas as well as various corridors. Detectors are located within the vicinity of major hazards. The fire detection system has been evaluated in accordance with Generic Letter 86-10 and is considered adequate for the fire hazards in the area. In addition, the staff concluded in their

**Exemption Request – Fire Area 1(2)-FA-AB-84B
Reactor Plant Auxiliary Equipment Area – Elevation 84'**

July 20, 1989 Safety Evaluation that the summary analyses contained in the exemption requests were sufficient to satisfy the Generic Letter 86-10 partial detection evaluation guidelines.

Fire suppression is provided for the Auxiliary Feedwater pumps by automatically actuated redundant pre-action sprinkler systems. Fire suppression is provided for the charging pump area by a wet pipe sprinkler system. The fire suppression systems have been evaluated in accordance with Generic Letter 86-10 and are considered adequate for the fire hazards in the area. In addition, the staff concluded in their July 20, 1989 Safety Evaluation that the summary analyses contained in the exemption requests were sufficient to satisfy the Generic Letter 86-10 partial suppression evaluation guidelines.

Manual fire alarm stations are provided in the area. Detectors and manual fire alarm stations alarm in the Control Room.

Manual fire suppression capability is provided in the form of portable fire extinguishers and manual hose stations.

Given the in-situ combustibles and the fire protection features provided, it is unlikely that a fire of significant magnitude or duration would develop within the area.

Safe Shutdown Capability

Cabling associated with the following safe shutdown functions and systems is in the area:

<u>Functions</u>	<u>Potentially Affected Systems</u>
Reactor Coolant Inventory Control and Reactivity Control	Chemical and Volume Control System
Decay Heat Removal	Auxiliary Feedwater System Main Feedwater System Main Steam System Residual Heat Removal System Safety Injection Isolation
Process Monitoring	Reactor Coolant System Main Steam System Auxiliary Feedwater System Main Feedwater System Chemical and Volume Control

**Exemption Request – Fire Area 1(2)-FA-AB-84B
Reactor Plant Auxiliary Equipment Area – Elevation 84'**

<u>Functions</u>	<u>Potentially Affected Systems</u>
Mechanical Support	Component Cooling Water System Chilled Water System
Mechanical Support	Control Air System Service Water System
Electrical Support	Electrical Distribution System
HVAC	Auxiliary Building Ventilation System Containment Building Ventilation System Control Area Ventilation System Service Water Ventilation System Switchgear and Penetration Area Ventilation System

In the unlikely event of a fire damaging safe shutdown cables within the area prior to control and extinguishment of the fire by the on-site fire department, alternative shutdown capability, independent of the fire area, will be provided as described below with the exception of the service water system.

The ability to achieve and maintain hot standby for this area consists of the following:

- Use of alternative shutdown capability, independent of the fire area, in the form of the Chemical and Volume Control System (CVCS) cross-tie from the unaffected unit for seal injection, boration, and inventory control (modification discussed in Attachment 4).
- Use of off-site power. A fire in this area has the potential to result in a loss of the emergency diesel generators to the 4160V vital buses. However, offsite power to the 4160V vital buses has been evaluated and is not affected by a fire in this area and therefore, will remain available to provide power to safe shutdown components. The use of offsite power, in lieu of on-site emergency diesel generators, is considered an acceptable alternative to the requirements of Section III.L.3 of 10 CFR 50 Appendix R.
- Use of the Main Feedwater System for decay heat removal
- Use of the Service Water system as described below.

Other than the CVCS cross-ties, hot standby will be achieved using normal shutdown systems.

The Service Water system cabling for all six Service Water pumps is routed through this area (see Figure 5). Service Water is required to bring the plant to hot standby and cold shutdown. To ensure the availability of the Service Water for hot standby, an evaluation has been performed that demonstrates that at least two Service Pumps would remain available due to a distance separation of over 75 horizontal feet with intervening combustible loads. This distance

**Exemption Request – Fire Area 1(2)-FA-AB-84B
Reactor Plant Auxiliary Equipment Area – Elevation 84'**

separation ensures that either the A-channel Service Water pumps or the B and C-channel Service Water pumps would remain available as discussed below:

- The B-channel and C-channel Service Water pumps would remain available due to a fire in the vicinity of the A-channel Service Water cables.
- The A-channel Service Water pumps would remain available due to a fire in the vicinity of the B and/or C-channel service water cables.

The basis of the acceptability of the separation evaluation is as follows:

- With the use of offsite power, each 4 KV bus has the capability to power the two Service Water pumps associated that bus.
- Detection is provided in the area of the A, B, and C-channel Service Water cabling.
- Partial suppression is provided over the major hazards.
- Manual fire suppression capabilities exist.
- Based on the combustible loading in the vicinity of the A-channel Service Water cables, sufficient time exists to allow manual fire suppression activities to control and suppress the fire prior to the fire propagating and damaging the redundant B and/or C-channel Service Water pump cables.
- Based on the combustible loading in the vicinity of the B and C-channel Service Water cables, the partial suppression, sufficient time exists to allow manual fire suppression activities to control and suppress the fire prior to the fire propagating and damaging the redundant A-channel Service Water cables.

To support the above separation evaluation, a review of spurious actuations was conducted to assess the affect on the Service Water function. Based on this review a modification is being performed to the Hot Shutdown Panel to relocate the remote/manual selector switches for the A-channel Service Water pumps. These switches will be relocated out of the Hot Shutdown Panel into another fire area to eliminate any spurious actuations from affecting the ability to use the A-channel Service Water pumps.

Manual operator actions, relied upon to ensure hot standby and cold shutdown capability, are limited and are practical, reasonable and achievable under the expected environmental conditions. Summaries of the major actions associated with the shutdown are:

- Positive Control of the affected Unit's CVCS flow path.
- Aligning the Component Cooling Water (CCW) system.
- Aligning the Control Area and Switchgear & Penetration Area HVAC systems.
- Aligning the Residual Heat Removal (RHR) system.

**Exemption Request – Fire Area 1(2)-FA-AB-84B
Reactor Plant Auxiliary Equipment Area – Elevation 84'**

The actions can be accomplished prior to the plant reaching an unrecoverable condition. Operator action locations and the associated pathways are being provided with 8-hour battery backed emergency lighting. Operator staffing level is sufficient to accomplish the actions required. Plant procedures will address the potential operator actions. Operations staff will be trained, as necessary, on the use of these procedures.

Evaluation

An exemption from:

1. The requirements of Section III.L.3 of 10 CFR 50 Appendix R that alternative shutdown capability accommodate post fire conditions where offsite power is not available for 72 hours

is based on the following.

- Offsite power remains available for a fire in this area.
- The area has low combustible loading and limited ignition sources.
- The area is provided with detection and suppression systems that are adequate for the fire hazards within the area. The staff concluded in their July 20, 1989 Safety Evaluation that the summary analyses contained in the exemption requests were sufficient to satisfy the Generic Letter 86-10 partial suppression evaluation guidelines. The detection system would alert operators to summon the on-site plant fire department to rapidly extinguish the fire.
- Alternative shutdown capability, independent of the fire area, is provided to ensure post-fire safe shutdown.
- Service Water capability is ensured by adequate separation, detection and manual fire suppression activities.

Conclusion

It is, therefore, PSEG's position that a level of protection equivalent to III.L.3 of Appendix R to 10 CFR 50 will be provided following the proposed alternative shutdown modifications.

The requested exemption from Section of III.L.3 of Appendix R to 10 CFR 50 has been reviewed and determined not to be in conflict with other legal requirements, does not present an undue risk to the public health and safety, and is consistent with the common defense and security. The exemption request, therefore, conforms to the requirements of 10 CFR 50.12(a)(1). In addition, "special circumstances" exist for the requested exemption in that application of the regulation in this particular circumstance is not necessary to achieve the underlying purpose of Appendix R to 10 CFR 50. The exemption requested demonstrates that an equivalent level of fire protection safety will be provided

**Exemption Request – Fire Area 1(2)-FA-AB-84B
Reactor Plant Auxiliary Equipment Area – Elevation 84'**

through alternate means. The alternate means consist of a combination of an adequate detection system, suppression system, low combustibile loading, and alternative shutdown capability.

**Attachment 4
LR-N02-0142**

**Salem Unit 1 and 2 Chemical and
Volume Control System (CVCS) Cross-Tie Modification**

**PSEG Nuclear LLC
Salem Generating Station, Units 1 and 2
Docket Nos. 50-272 and 50-311**

Salem Unit 1 and 2 Chemical and Volume Control System (CVCS) Cross-Tie Modification

As discussed with the NRC in the public meetings held on April 5, 2001 and September 6, 2001, PSEG Nuclear informed the NRC that an alternative approach is being taken to replacing fire wrap in certain areas of the plant. A determination was made that the overall plant safety could be improved, if charging capability could be provided independent of the fire area in which the fire occurred. To achieve this goal for certain fire areas, ensuring charging capability independent of the fire area was pursued by cross tying the charging systems between Salem Unit 1 and Unit 2 as described below.

The Salem Chemical and Volume Control System (CVCS) design includes three charging pumps. Two centrifugal pumps and one positive displacement (PD) pump. The two (2) Charging/Safety Injection (C/SI) pumps are centrifugal pumps that can be used for normal operation and for Emergency Core Cooling System (ECCS) safety injection function (accident mitigation). The single PD pump is a lower flow, positive displacement pump that is not credited for accident mitigation. Except for the pressure boundary, the PD pump is not safety related. The PD pump was originally credited for normal power operation for Reactor Coolant System (RCS) make-up, RCP seal injection, and boration for Safe Shutdown (SSD). The PD pump is powered from a safety related bus with emergency diesel back-up power. Currently the PD pump in each unit has been isolated from service due to concerns with ECCS leakage outside the containment following a loss of coolant accident.

An inter-unit cross-tie of the CVCS is being installed to permit restoration of the PD pump's design capabilities to provide charging system safe shutdown functions (see Figure 6). Essentially this proposal establishes a "swap" of PD pumps between the Salem units. The pumps remain isolated from the ECCS recirculation flow path of the unit they reside in but are available to provide reactivity control, RCP seal injection, and RCS make-up for normal cool down to the other unit for Safe Shutdown (SSD) evolutions. The change allows the PD pump to serve as one of the charging pumps available to support safe shutdown activities of the opposite unit by providing a source of high pressure borated water that is available following the loss of the fire affected units' charging pumps.

The following are the functional changes being implemented in the modification:

- The 13 PD pump will be a SSD, charging pump for Unit 2. When the 13 PD pump is used, Unit 1 is referred to as the "operating" unit and Unit 2 will be referred to as the "SSD" unit.
- The 23 PD pump will be a SSD, charging pump for Unit 1. When the 23 PD pump is used, Unit 2 is referred to as the "operating" unit and Unit 1 will be referred to as the "SSD" unit.
- The cross-ties cannot be used to restore the PD pump for power operation of either the associated unit or the opposite unit. The PDP boundary valves must remain isolated.

Salem Unit 1 and 2 Chemical and Volume Control System (CVCS) Cross-Tie Modification

- The sources of water for the PD pump will initially be the operating unit's Refueling Water Storage Tank (RWST) and then after manual alignments are made, the SSD unit's Boric Acid Storage Tanks will be used.
- When relying on the Boric Acid Transfer pump, the PD pump will be operated at the Boric Acid Transfer pump flow. However, the RWST suction will not be shut to ensure PD pump suction is not inadvertently lost if the BAT pump fails.
- When a unit is in modes 1-4, its C/SI pumps are not aligned to the cross-tie. The PD pump boundary valves maintain isolation that prevents the C/SI pumps from being aligned to the cross-tie during modes 1-4.
- When a unit is in mode 5, 6 or defueled, one of its C/SI pumps may be substituted for the PD pump if the PD pump is unavailable. This requires the appropriate suction valve to be open.
- The modification includes a test line to allow the PD pump to be periodically tested with the unit at power.

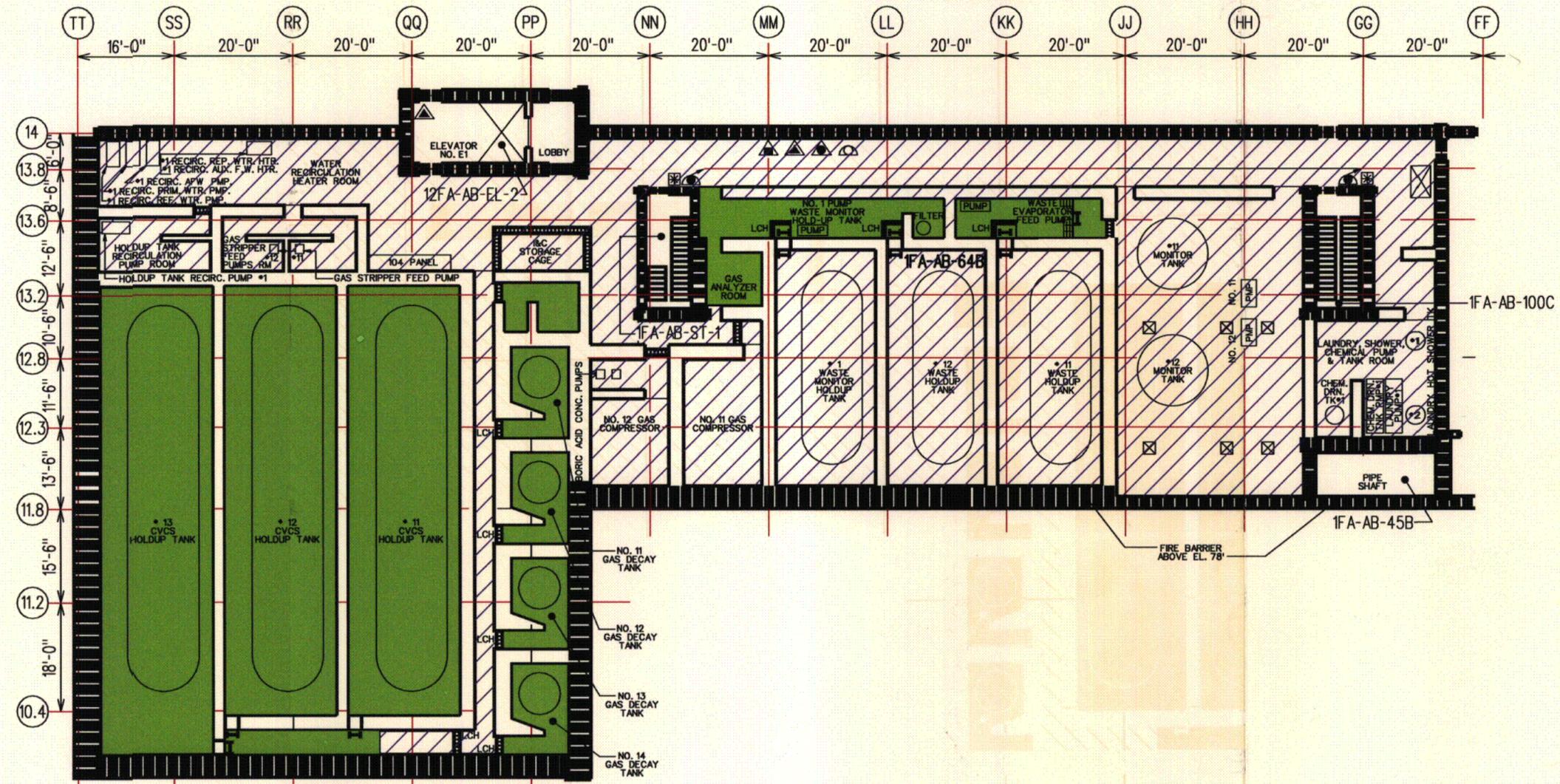
Administrative controls to address component failure/unavailability will be addressed through the revision or creation of procedures to ensure the availability of the cross-tie equipment in all modes of operation. These procedure changes will address how long the equipment can remain out of service and the required compensatory measures to establish in accordance with the Fire Protection Program. The procedure changes will be issued prior to the cross-tie implementation which will be completed prior to the restart from the Salem Unit 1 Refueling Outage 15 (1R15).

Figure 6, depicts the CVCS Cross-connect in its normal alignment.

Figure 1

LR-N02-0142

**Fire Area 1-FA-AB-64B
Reactor Plant Auxiliary Building
Elevation 64'**



LEGEND:

- | | | | |
|-----|---------------------------------------|---|-------------------------------|
| ☒ | MANUAL ALARM STATIONS | ■ | NO DETECTION |
| ⊗ | HATCH FLOOR LEVEL | ▨ | COVERAGE (DETECTION) |
| ⊗ | HATCH CEILING LEVEL | | NOTE: THERE IS NO SUPPRESSION |
| — — | LADDER | | |
| 🔥 | HOSE STATION CHARGED STANDPIPE | | |
| ⊘ | WIRE GATE | | |
| ⌂ | LOCKED DOOR | ⌂ | SECURITY |
| | | ⌂ | HEALTH PHYSICS |
| ▲ | PORTABLE DRY CHEM. EXTINGUISHER | | |
| ▲ | PORTABLE WATER EXTINGUISHER | | |
| ▲ | PORTABLE CO ₂ EXTINGUISHER | | |
| 🌀 | SPARE HOSE REEL | | |
| ▬▬▬ | FIRE AREA BOUNDARY | | |

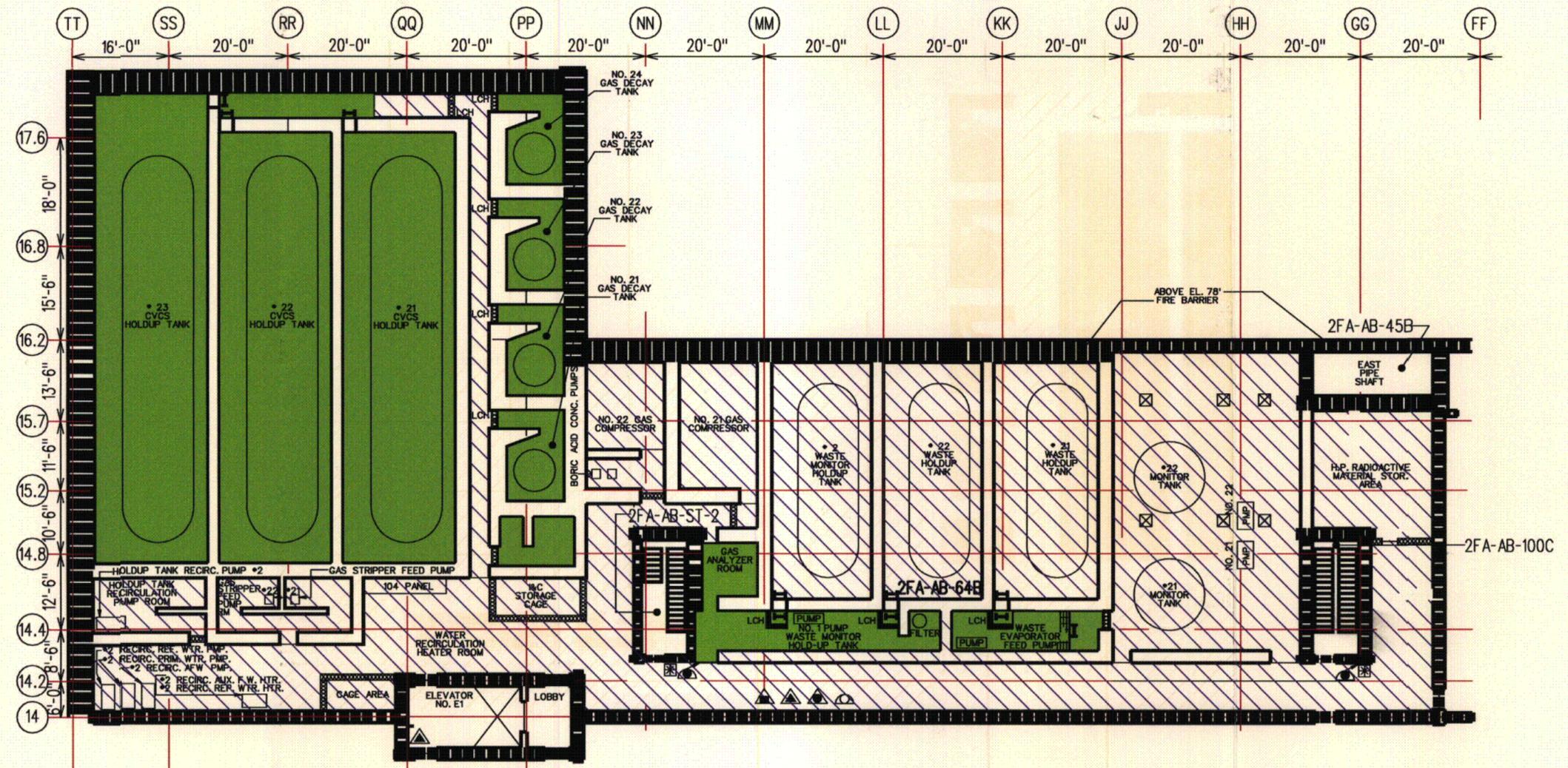
FIGURE 1
FIRE AREA 1FA-AB-64B

C01

Figure 2

LR-N02-0142

**Fire Area 2-FA-AB-64B
Reactor Plant Auxiliary Building
Elevation 64'**



LEGEND:

- ☒ MANUAL ALARM STATIONS
- ⊠ HATCH FLOOR LEVEL
- ⊞ HATCH CEILING LEVEL
- ┆ LADDER
- 🚒 HOSE STATION CHARGED STANDPIPE
- ⚡ WIRE GATE
- ┆ L.C. LOCKED DOOR
- ┆ S SECURITY
- ┆ H HEALTH PHYSICS
- 🔥 PORTABLE DRY CHEM. EXTINGUISHER
- 💧 PORTABLE WATER EXTINGUISHER
- 🔥 PORTABLE CO₂ EXTINGUISHER
- 🌀 SPARE HOSE REEL
- ▬ FIRE AREA BOUNDARY

- NO DETECTION
- ▨ COVERAGE (DETECTION)

NOTE: THERE IS NO SUPPRESSION

FIGURE 2
FIRE AREA 2FA-AB-64B

COZ

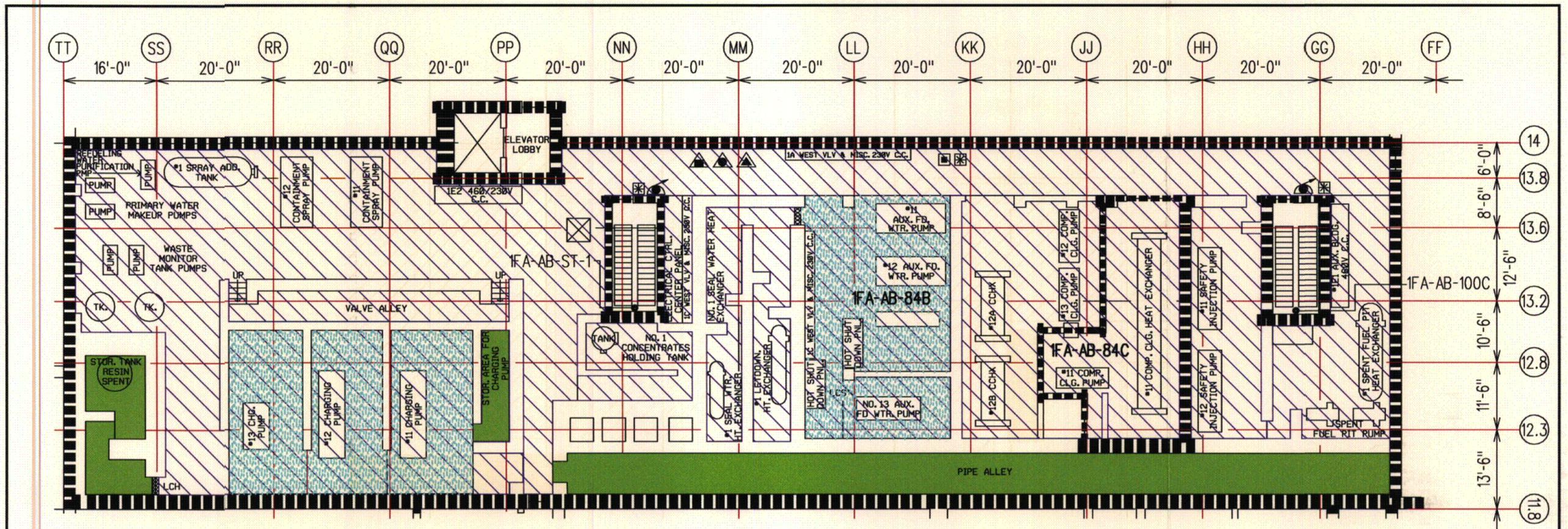
Figure 3

LR-N02-0142

**Fire Area 1-FA-AB-84C
11 CCW Pump and Heat Exchanger Area
Elevation 84'**

and

**Fire Area 1-FA-AB-84B
Reactor Plant Auxiliary Building
Elevation 84'**



LEGEND:

- | | | | |
|------|---------------------------------------|----|----------------------|
| ⊠ | MANUAL ALARM STATIONS | ■ | NO DETECTION |
| ⊞ | HATCH FLOOR LEVEL | ▨ | SPRINKLER COVERAGE |
| ⊞ | HATCH CEILING LEVEL | ▩ | COVERAGE (DETECTION) |
| ┆ | LADDER | | |
| ⦿ | HOSE STATION CHARGED STANDPIPE | | |
| ⌋ | WIRE GATE | | |
| ■ | AFW ACTUATION STATION | | |
| ⌋ | LOCKED DOOR | S= | SECURITY |
| L.C. | | H= | HEALTH PHYSICS |
| ▲ | PORTABLE DRY CHEM. EXTINGUISHER | | |
| ▲ | PORTABLE WATER EXTINGUISHER | | |
| ▲ | PORTABLE CO ₂ EXTINGUISHER | | |
| ⦿ | SPARE HOSE REEL | | |
| ▬▬▬ | FIRE AREA BOUNDARY | | |

FIGURE 3
FIRE AREA 1FA-AB-84B AND 1FA-AB-84C

C03

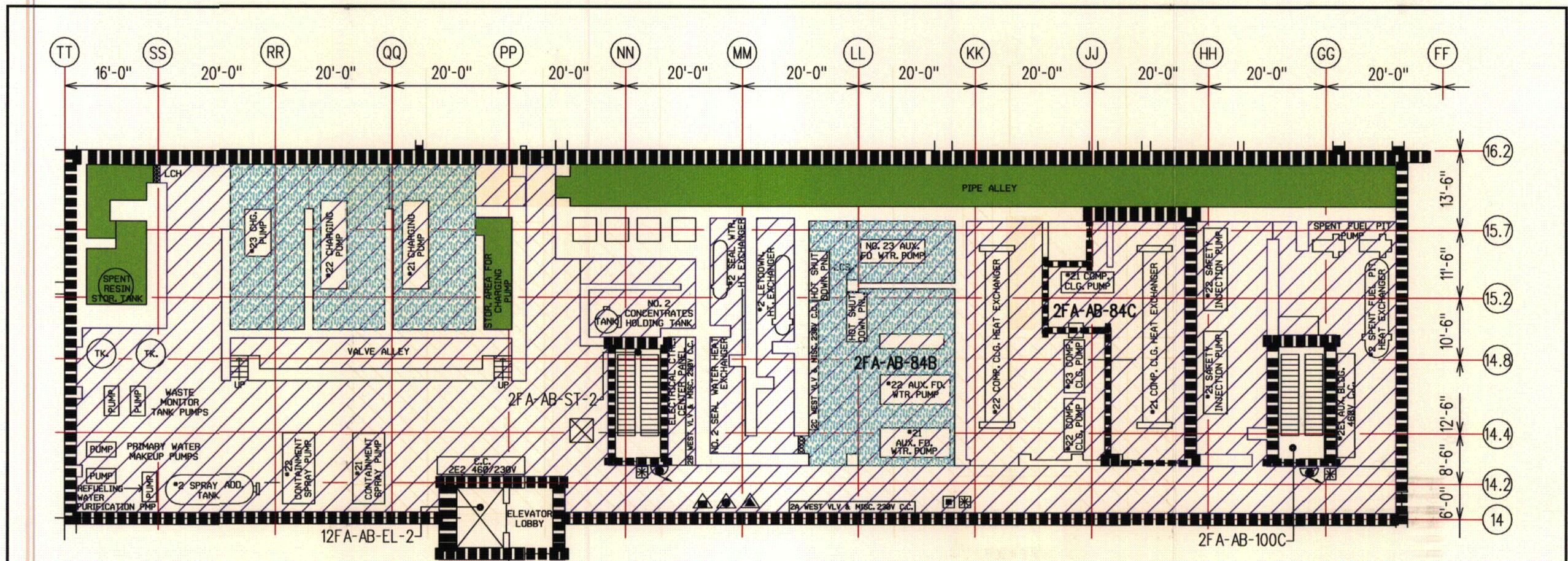
Figure 4

LR-N02-0142

**Fire Area 2-FA-AB-84C
21 CCW Pump and Heat Exchanger Area
Elevation 84'**

and

**Fire Area 2-FA-AB-84B
Reactor Plant Auxiliary Building
Elevation 84'**



LEGEND:

- | | | | |
|--|---------------------------------------|--|----------------------|
| | MANUAL ALARM STATIONS | | NO DETECTION |
| | HATCH FLOOR LEVEL | | SPRINKLER COVERAGE |
| | HATCH CEILING LEVEL | | COVERAGE (DETECTION) |
| | LADDER | | |
| | HOSE STATION CHARGED STANDPIPE | | |
| | WIRE GATE | | |
| | AFW ACTUATION STATION | | |
| | LOCKED DOOR | | SECURITY |
| | | | HEALTH PHYSICS |
| | PORTABLE DRY CHEM. EXTINGUISHER | | |
| | PORTABLE WATER EXTINGUISHER | | |
| | PORTABLE CO ₂ EXTINGUISHER | | |
| | SPARE HOSE REEL | | |
| | FIRE AREA BOUNDARY | | |

FIGURE 4
FIRE AREA 2FA-AB-84B AND 2FA-AB-84C

CO4

Figure 5

LR-N02-0142

**Reactor Plant Auxiliary Building
Elevation 84'
Service Water Cable Separation**

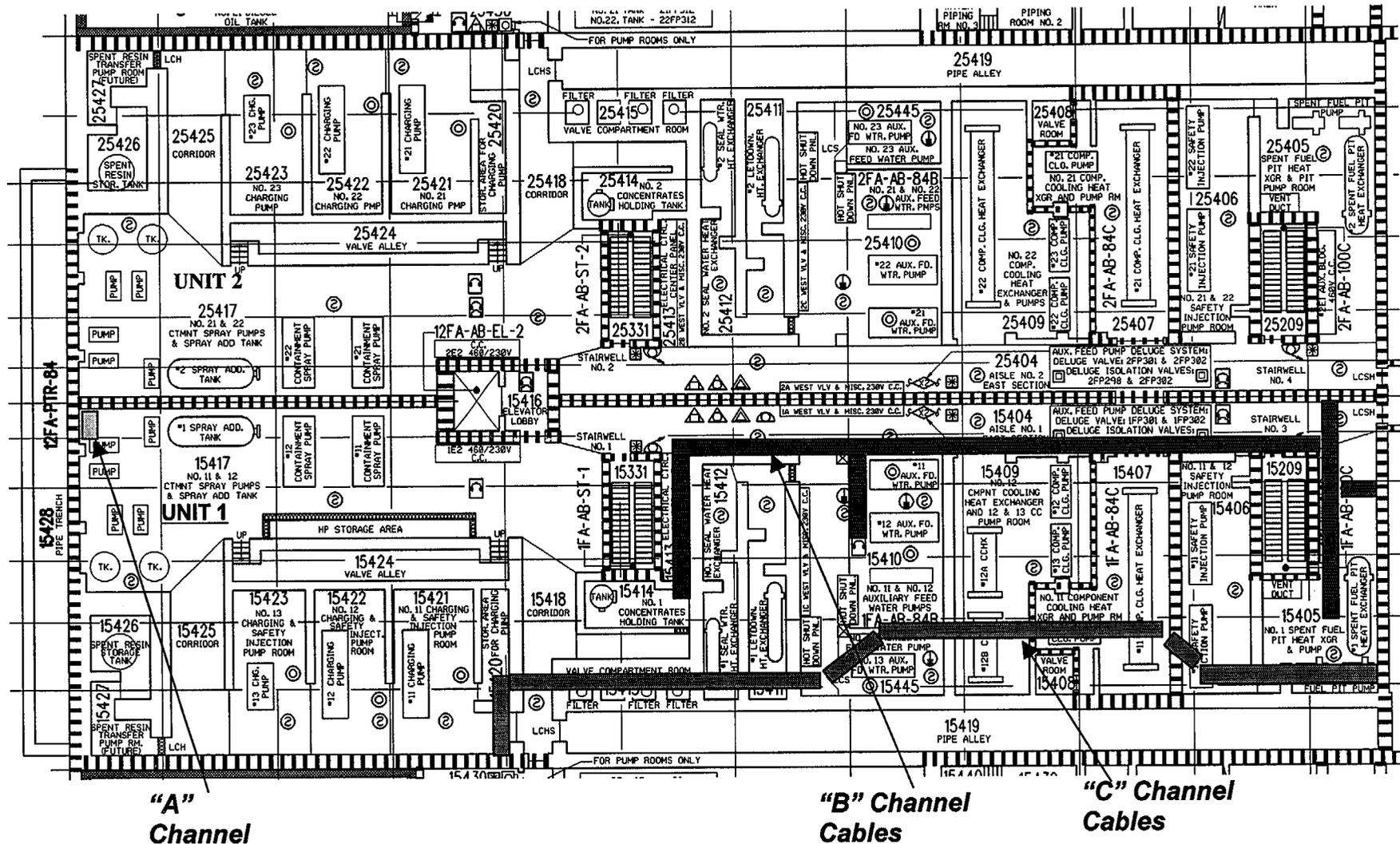


Figure 5. Locations of Service Water Cables (shown for Unit 1 only Unit 2 Similar).

Figure 6

LR-N02-0142

**Chemical and Volume Control
Cross Tie**

