

## 7.9 PHYSICAL SEPARATION AND ELECTRICAL ISOLATION

### 7.9.1 Physical Separation

The separation criteria for Salem Generating Station Units 1 and 2 protection systems and equipment is based on IEEE Standard 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations." The plant design predated Regulatory Guide 1.75, "Physical Independence of Electric Systems," therefore, strict compliance has not been required. Salem Station does not conform to Regulatory Guide 1.75 in the following areas:

#### 1. Section 4.5 - Associated Circuits

From Regulatory Guide 1.75:

Associated circuits should comply with one of the following:

- a. they should be uniquely identified as such and should remain with or be separated the same as those Class IE circuits with which they are associated; they should be subject to all requirements placed on Class IE circuits such as cable derating, environmental qualifications, flame retardance, splicing restrictions, and raceway fill, unless it can be demonstrated that the absence of such requirements could not significantly reduce the availability of the Class IE circuits, or
- b. they should be in accordance with 4.5a from the Class IE equipment to and including an isolation device. Beyond the isolation device, a circuit is not subject to the requirements of this document provided it does not again become associated with a Class IE system, or

- c. they should be analyzed or tested to demonstrate that Class IE circuits are not degraded below an acceptable level.

PSE&G's position:

Non-safety related cables received a designation of E, F, G, or H for the following:

- a. All cables passing through the containment penetrations.
- b. All cables confined to (originating and terminating within) the control room, auxiliary equipment room (elev. 122), and relay room.
- c. All non-safety related cables fed from safety related power sources.

This is the equivalent of associated circuits. Non-safety related cables (associated circuits) may be routed in trays containing safety related cables as follows:

E with B  
F with C  
G with D  
H with A

Cables may not cross safety related channels. When non-safety related cables leave vital trays, they may run together, provided they do not re-enter a safety related channel or violate an established practice.

2. Section 5.1.2 - Identification

From Regulatory Guide 1.75:

Exposed Class IE raceways should be marked in a distinct permanent manner at intervals not to exceed 15 feet and at points of entry to and exit from enclosed areas. Class IE raceways should be marked prior to the installation of their cables.

PSE&G's position:

One side of each tray shall be marked every thirty (30) feet, and on both sides at penetrations of walls, floors, etc.

3. Section 5.1.3 - Cable Spreading Area and Main Control Room

From Regulatory Guide 1.75:

The cable spreading area(s) is the space(s) adjacent to the control room where instrumentation and control cables converge prior to entering the control termination, or instrument panels. Where feasible, redundant cable spreading areas should be utilized.

Power supply feeders to instrument and control room distribution panels should be installed in enclosed raceways that qualify as barriers. The minimum separation distance between redundant Class IE cable trays...should be one foot between trays separated horizontally and three feet between trays separated vertically.

PSE&G's position:

Salem Station does not have redundant cable spreading areas. The minimum separation distance at Salem Station is twelve (12) inches between trays separated horizontally and eighteen (18) inches between trays separated vertically.

4. Section 5.1.4 - General Plant Areas

From Regulatory Guide 1.75:

In plant areas from which potential hazards such as missiles, external fires, and pipe whip are excluded the minimum separation distance between redundant cable trays should be...three feet between trays separated horizontally and five feet between trays separated vertically.

PSE&G's position:

The same separation criteria as in 3 above is applied throughout Salem Station Units 1 and 2.

5. Section 5.5 - Containment Electrical Penetrations

From Regulatory Guide 1.75:

Redundant Class IE containment electrical penetrations should be physically separated in accordance with the requirements of Section 4.0. Compliance with 4.0 will generally require that redundant penetrations be widely dispersed around the circumference of the containment. The minimum physical separation for redundant penetrations should meet the requirements for cables and raceways given in Section 4.5

PSE&G's position:

There are no physically separated containment penetrations.

#### 7.9.2 Electrical Isolation

Electrical isolation for Class IE power circuits is directed by IEEE Standard 308-1971. Electrical isolation for Class IE instrumentation and control circuits is directed by IEEE Standard 279-1971. The requirement for isolation devices is that no credible failure at the output of an isolation device shall prevent the associated protection system channel from meeting the minimum performance requirement specified by the design basis.