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May 7, 1982

Mr. Spottswood Burwell
U. S. Nuclear Regulatory Commission
Licensing Project Manager
Office of Nuclear Reactor Regulation
Washington, D.C. 20555

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION
ALTERNATE SHUTDOWN

REF: (1) NUREG-0797, SUPPLEMENT 2

Dear Mr. Burwell:

The purpose of this letter is to submit a description of the CPSES Alternate Shutdown capability in case of a fire in the Control Room or Cable Spreading Room. The description attached to this letter is sufficient to allow closure of Outstanding Issue (8) (a) of reference (1), when considered in conjunction with the previous Power Systems Branch, Instrumentation and Control Systems Branch, and Chemical Engineering Branch reviews and site visits.

There are 5 attachments to this letter. They are:

A - A marked up copy of CPSES/FSAR Section 7.4 that reflects CPSES Alternate Shutdown;

B - A marked up copy of selected pages for CPSES/FSAR Section 9.5 that reflects CPSES Alternate Shutdown;

C - An advanced copy of CPSES/FSAR Section 7.4 as revised;

D - An advanced copy of the selected pages for CPSES/FSAR Section 9.5 as revised; and,

E - A copy of the CPSES Alternate Shutdown Study dated April 1982.

This documentation is provided for your information and, of course, the FSAR revisions will be reflected in the next amendment to the CPSES/FSAR.

Sincerely,

H. C. Schmidt

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Attachments

ATTACHMENT A

FSAR SECTION 7.4

MARKED UP

7.4 SYSTEMS REQUIRED FOR SAFE SHUTDOWN

The systems required for safe shutdown are controlled and monitored by instrumentation channels associated with those systems in both the Nuclear Steam Supply System (NSSS) and balance of plant (BOP) systems. These systems are normally aligned to serve a variety of operational functions, including startup and shutdown, as well as protective functions. There are no uniquely identified safe shutdown systems per se. However, prescribed procedures for securing and maintaining the plant in a safe condition can be instituted by appropriate alignment of selected systems. 2 Q032.22

Two kinds of shutdown conditions are addressed in this section: hot standby and cold shutdown. Hot standby is a stable condition of the reactor achieved shortly after a programmed or emergency shutdown of the plant and is the safe shutdown design basis for CPSES. Cold shutdown is a stable condition of the plant achieved after the residual heat removal process has brought the primary coolant temperature below 200°F. In either case, the reactivity control systems maintain a subcritical condition of the core. The plant technical specifications explicity define both hot standby and cold shutdown conditions.

The instrumentation and control functions required to be aligned for maintaining safe shutdown of the reactor that are discussed in this section are the minimum number under nonaccident conditions. These functions permit the necessary operations that will:

1. Prevent the reactor from achieving criticality in violation of the technical specifications.

2. Provide an adequate heat sink so that design and safety limits are not exceeded.

The designation of systems that can be used for safe shutdown depends

on identifying those systems which provide the following capabilities:

1. Reactivity control - reactor trip and boration

2. Decay heat removal - auxiliary feedwater (AFW) supply and residual heat removal (RHR) [The RHRS is required to achieve and maintain cold shutdown.]

7.4.1 DESCRIPTION

In the event of a unit shutdown, the unit will be brought to and maintained at a safe shutdown condition from the main Control Room or the Hot Shutdown Panel (see Section 7.4.1.3).

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The portions of the Reactor Trip System required to achieve the shutdown condition are described in Section 7.2. The minimum systems, support systems, component controls, and monitoring indicators required under nonaccident conditions to maintain hot standby are tabulated and discussed in Section 7.4.1.1 and those required to maintain cold shutdown are tabulated and discussed in Section 7.4.1.2. Shutdown from outside the Control Room is discussed in Section 7.4.1.3.

7.4.1.1 Hot Standby

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The following systems, support systems, and monitoring indicators are required for hot standby:

1. Essential Systems

   a. Auxiliary Feedwater System (AFS)

   b. Atmospheric steam relief valves

   c. Chemical and Volume Control System (CVCS), boron addition portion.

2. Support Systems

   a. Station Service Water System (Sections 9.2.1 and 7.3.1.1.4) | 9 Q032.22

   b. Component Cooling Water System (Sections 9.2.2 and 7.3.1.1.4)

   c. Onsite power system (Sections 8.3 and 7.3.1.1.4), including diesel generators (Section 9.5)

   d. Control Room ventilation system (Sections 9.4.1 and 7.3.1.1.4) | 11

   e. ESF Ventilation System (Sections 9.4.5 and 7.3.1.1.4)

   f. Safety Chilled Water System (Sections 9.4F and 7.3.1.1.4)

3. Monitoring Indicators

   a. Steam Generators (SG's)

      1) Water level for each SG

      2) Pressure for each SG

   b. Reactor Coolant System

      1) Pressurizer water level

      2) Pressurizer pressure

   c. Condensate storage tank level | 9 Q032.22

7.4.1.1.1 Auxiliary Feedwater System

At hot standby, decay heat is removed by supplying auxiliary feedwater to the steam generators. Heat is dumped to the condenser (if offsite power is available) or to the atmosphere via the atmospheric steam relief valves.

For a description of the Auxiliary Feedwater System refer to Section 10.4.9.

For a description of the Auxiliary Feedwater System control refer to Section 7.3.1.1.4, Item 5. A discussion of instrumentation requirements is found in Section 10.4.9.5.

The system flow diagram is shown on Figure 10.4-11.

The system failure mode analysis is contained in Table 10.4-9 and the pertinent illustration is Figure 10.4-12.

7.4.1.1.2 Atmospheric Steam Relief Valves

For normal plant cooldown, the Steam Dump System, described in Section 10.4.4, is used to control the cooldown rate by directing steam from the steam generators to the condenser. The power-operated atmospheric steam relief valves enable heat removal from the steam generators to the atmosphere when the condenser is not in service. These valves, described in Section 10.3.2.2, will allow gradual cooldown of the RCS to the point where the RHRS can be employed to continue plant cooldown (less than 425 psig and 350°F).

The main steam system is protected against overpressurization by the ASME B&PV Code-certified safety valves described in Section 10.3.2.1. In the event of loss of the Steam Dump System and loss of the power-operated atmospheric steam relief valves, the safety valves will

be used to dump steam to the atmosphere, thereby maintaining the plant at hot standby.

1. Initiating Circuits

A pressure transmitter and controller is provided for each atmospheric steam relief valve. Steam pressure developed in the SG is limited by the controller set point selected. Either automatic or manual control can be selected on the controller located in the Control Room.

These valves are also equipped with handwheels to enable local manual operation on loss of air. For operation outside the Control Room, access to the valve's control circuitry in a local panel is provided and manual operation of each valve is accomplished with a local controller at the Hot Shutdown Panel. 32
The initiation device for the safety valve is an intrinsic part of the valve.

2. Logic

See instrumentation and control diagrams (ICD's) listed under "Main Stream Reheat and Steam Dump System" in Tables 1.7-1 and 1.7-2 for atmospheric steam relief valve control.

The safety valves are spring-loaded valves that open on reaching the pressure set point.

3. Bypass

There are no electrical bypasses on safety valves nor on atmospheric steam relief valves.

The atmospheric steam relief valves have manually operated

isolation valves upstream of the relief valves for relief valve maintenance. Administrative procedures will assure the proper position of these isolation valves.

4. Interlocks

There are none.

5. Redundancy

The safety valves are redundant (backup) to the atmospheric steam relief valves.

6. Diversity

The normally power-operated atmospheric steam relief valves can also be operated diversely and manually via the valve handwheel.

The safety and relief valves are of diverse design.

7. Actuated Devices

None, other than the valves themselves.

8. Supporting Systems

The following supporting systems are required for operation of the power-operated atmospheric steam relief valves.

a) Class 1E electric power (see Section 8.3)

b) Compressed Air System (see Section 9.3.1 and Figure 9.3-1)

9. Design Basis Information

a) See Table 10.3-2 for the design basis of the main steam safety valves.

b) See Table 10.3-3 for the design basis of the power-operated atmospheric steam relief valves.

10. Electric Schematic Drawings

See Table 1.7-1 for Unit 1 and common and Table 1.7-2 for Unit 2 schematics (electrical) associated with "Main Steam Reheat & Steam Dump System."

11. Portions of System Not Required for Safety

The power-operated atmospheric steam relief valves and pressure transmitter output indication displayed on the control board are not required for safety.

7.4.1.1.3 Chemical and Volume Control System, Boron Addition Portion

The functions of the CVCS discussed in Section 9.3.4 are those associated with normal operation. Safe and economical operation design parameters (see Table 9.3-6) dictate the design of the CVCS for normal operation. For the safety evaluation of the overall CVCS operation refer to Section 9.3.4.1.3 and Table 9.3-9 for the failure modes and effects analysis (FMEA). If safe shutdown operation alone is to be considered, then the primary functions of the CVCS are that it provide a means, along with the proper operator action, to maintain adequate shutdown margin by sufficiently borating the core and to maintain pressurizer level. These functions are those required to maintain adequate Reactor Coolant System (RCS) inventory. The instrumentation, control and electrical features associated with maintaining adequate RCS inventory are those applied to the following groups of equipment:

1. Boric acid transfer pumps
2. Centrifugal charging pumps
3. Letdown orifice isolation valves

Further considerations, as would apply t one unit, are as follows:

1. Initiating Circuits

Initiation is by automatic or manual commands. For discussion of automatic commands of the CVCS proper, refer to Sections 9.3.4 and 9.3.4.1.2.3, and for a discussion of the pressurizer water level control portion, see Section 7.7. Maintenance of hot standby and cold shutdown is discussed in 9.3.4.1.2.6. Manual control may be taken either in the Control Room or outside the Control Room at the Hot Shutdown Panel. For the instrumentation application, refer to Section 9.3.4.1.5.

2. Logic

32 | At the ~~Hot Shutdown panel~~ Shutdown Transfer Panel (Train A) and Hot Shutdown Panel (Train B), operator action may transfer control of the boric acid transfer pumps, centrifugal charging pumps and letdown orifice isolation valves from the Control Room to the Hot Shutdown panel. At this location, start-stop operation of the pumps and open-close operation of the valves in question can be undertaken. If the redundant normal suction paths to centrifugal charging pumps that establish boration are not available, normally closed motor operated valve I-8104 (refer to Figure 9.3-10, sheet 3) can be opened either remotely in the Control Room or by handwheel at the local station.

3. Bypasses

32 | Control from the Control Room of the above groups of equipment is manually bypassed, when control is taken over at the Hot Shutdown at the Shutdown Transfer Panel (Train A) and at the Hot Shutdown Panel (Train B).

Panel.

4. Interlocks

With control of those above groups of equipment at the Hot Shutdown Panel, there are no interlocks imposed on their operation.

5. Redundancy

There are two centrifugal charging pumps, two boric acid transfer pumps, and three letdown orifice isolation valves.

6. Diversity

No diversity is provided for the boric acid transfer pumps. In addition to the centrifugal charging pumps, there is a positive displacement charging pump. There are other valves in the letdown line, which, in addition to letdown orifice isolation valves, can also be used to isolate the letdown line.

7. Actuated Devices

The motor control centers for the centrifugal charging pumps and boric acid transfer pumps and the solenoid valves for the letdown orifice isolation valves are the actuation devices of the CVCS required for safe shutdown.

8. Supporting Systems

The centrifugal charging pumps, the boric acid transfer pumps, and the letdown orifice isolation valve solenoid valves are powered from Class 1E buses. Additionally, the Safety Chilled Water System supplies chilled water to the charging pump fan coil

unit (see Section 9.4F) and the Station Service Water System supplies cooling water to the centrifugal charging pump lube oil coolers (see Section 9.2.1).

9. Design Basis Information

The CVCS is not specifically designed to be a protection system. Section 3, "Design Bases," of IEEE Standard 279 does not specifically apply to non-protection systems such as the CVCS. Portions of the CVCS, which are shared with the Safety Injection System, come under IEEE Standard 279 design bases as discussed in Section 7.3.

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10. Drawings

For the CVCS flow diagram, refer to Figure 9.3-10. Also refer to the flow diagrams in Section 6.3 for shared functions of the Safety Injection System, as well as the electrical drawing list in Section 1.7.

11. Portion of System Not Required for Safety

Refer to item 9 above.

7.4.1.2 Cold Shutdown

Cold shutdown is achieved following hot standby and includes passing through hot shutdown. Four key functions are required to achieve and maintain cold shutdown. They are circulation of the reactor coolant, removal of residual heat, boration, and depressurization. The required means for performing these functions are described below.

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1. Circulation of the reactor coolant is provided first by natural circulation that is effected by the reactor core providing the

heat source and the steam generators the heat sink, and then by the residual heat removal pumps.

2. Removal of residual heat is accomplished first via the Auxiliary Feedwater System and then via the residual heat removal heat exchanger. Hot standby is maintained by releasing steam via the safety grade steam generator safety valves. Cooldown to 350°F is accomplished by releasing steam via operation of the steam generator power-operated relief valves. Then cooldown to cold shutdown conditions is achieved with the Residual Heat Removal System. A sufficient seismic Category I supply of deaerated auxiliary feedwater to permit four hours operation at hot standby followed by cooldown to Residual Heat Removal System initiation conditions is provided by the condensate storage tank. 11 Q212.3 Q032.6

A backup seismic Category I source for the Auxiliary Feedwater System is the Station Service Water System. This system provides an assured long-term supply of auxiliary feedwater. 11 Q032.66

3. Boration is accomplished using portions of the Chemical and Volume Control System. Boric acid from the boric acid tanks is supplied to the suction of the centrifugal charging pumps by the boric acid transfer pumps. The centrifugal charging pumps inject the boric acid into the reactor coolant system via the safety injection flow paths or the normal charging and reactor coolant pump seal injection flow paths. Makeup in excess of that needed for boration can be provided from the refueling water storage tank. 9 Q212.32

4. Depressurization is accomplished using portions of the Chemical and Volume Control System. Either boric acid from the boric acid tanks or refueling water from the refueling water storage tank is used as desired for depressurization with the flow path being via the centrifugal charging pumps and auxiliary spray valve to the

pressurizer.

In addition to the systems required for hot standby delineated in Section 7.4.1.1, the following systems, support systems, and monitoring indicators are required to achieve and maintain cold shutdown.

1. Essential Systems

   a. Residual Heat Removal System (RHRS)

   b. Pressurizer pressure control during RCS depressurization

2. Support Systems - No additional support systems required other than those listed in Section 7.4.1.1, Number 2.

3. Monitoring Indicators

   a. RCS wide range temperature

   b. Boric acid tank level (per boric acid tank)

Additionally, the safety injection signal trip circuit must be defeated and the accumulator isolation valves closed during the later stages of plant cooldown.

7.4.1.2.1 Residual Heat Removal System (RHRS)

The Residual Heat Removal System is designed to remove residual heat from the core and reduce the temperature of the Reactor Coolant System (RCS) during plant cooldown to cold shutdown conditions. The system is permitted to be manually initiated when the reactor coolant temperature and pressure are reduced to 350°F and 400 psig or below. A detailed discussion of the RHRS is provided in Section 5.4.7. RHRS operation for reactor cooldown is discussed in Section 5.4.7.2.3. Manual actions

required of the operator, both inside and outside Control Room, are discussed in Section 5.4.7.2.7. Further considerations are as follows.

1. Initiating Circuits

Manual control of the RHRS is from the Control Room. For operator actions outside the Control Room, refer to Section 5.4.7.2.7.

2. Logic

For the logic diagram for control of the RHRS inlet isolation valves, see Figure 7.6-2.

3. Bypasses

There are no automatic operational bypasses in the RHRS. Isolation of the RHRS cannot be manually bypassed unless permissive conditions have been automatically met as described in Section 7.6.2.

4. Interlocks

For discussion of the RHRS inlet isolation valves interlocks, refer to Section 7.6. Section 5.4.7.2.7 discusses application of the single failure criteria.

5. Redundancy

Two independant residual heat removal pumps are provided, either of which can provide the necessary heat removal capacity for the RCS for the safe shutdown condition. Each RHR pump is powered from a separate Class 1E bus.

6. Diversity

For opening permissives and for automatic closing of the RHR inlet isolation valves, diverse RCS pressure transmitters, made by different manufacturers, are used. There is no other diversity in the RHRS control.

7. Actuated Devices

Electrical control equipment for the RHRS pumps, the inlet isolation valves, the mini-flow control, and the RHRS heat exchanger are the principal actuated devices.

8. Supporting Systems

The RHRS is powered from Class 1E buses. The RHRS heat exchangers and pumps are cooled with component cooling water (see Section 9.2.2).

9. Design Basis Information

The RHRS is not specifically designed as a protection system. Section 3, "Design Basis," of IEEE Standard 279 does not specifically apply to non-protection systems like the RHRS. Portions of the Safety Injection System which are shared with the RHRS came under IEEE Standard 279 design basis as discussed in Section 7.3.

10. Drawings

For the RHRS flow diagram, refer to Figures 5.4-6 and 5.4-7. For the RHRS inlet isolation valve interlocks, refer to Figure 7.6-2. Refer to the Section 1.7 list for applicable electrical drawings.

11. Portion of System Not Required for Safety

Refer to item 9 above.

7.4.1.2.2 Pressurizer Pressure Control

Pressurizer heater control is provided to maintain the RCS at (of the pressurizer fluid) operating pressure following a reactor trip to prevent excessive cooling and subsequent depressurization of the system. Normal operation is automatic via the proportional and backup heaters, as described in Section 7.7. If, for any reason, the normal pressure-regulating system is not available, the operator will control either of two back-up heater groups in the pressurizer by manual ON-OFF control switches. Air-operated valve 1-8145 in the auxiliary spray flow path, with manual control in the Control Room, provides spray for depressurizing when normal pressurizer spray control is not available. Means for depressurizing the RCS are also available from the pressurizer power-operated relief valves, with manual control in the Control Room, as well as from the normal pressurizer pressure spray control, which is active when the pressurizer pressure control system is operating. This pressurizer pressure control system, which also automatically controls the pressurizer heaters, as described in Section 7.7, is non-safety related. The pressurizer safety valves, which prevent the RCS from exceeding its design pressure, are safety-related but are self-activated and do not require instrumentation, control, and electrical circuitry for operation. 3:

1. Initiating Circuits

In normal automatic operation, the pressurizer pressure control system is controlled by pressurizer pressure transmitters. In addition, the backup heater groups are provided with direct manual control for initation by the operator. 32

AMENDMENT 32
~~OCTOBER 2, 1981~~

2. Logic

See Figures 7.2-1 (sheets 11 and 12) and 7.7-4.

3. Bypass

The control circuit provides no bypass of the manual backup heater control function other than maintenance provisions.

4. Interlocks

All pressurizer heater groups are connected with a low-level switch to cut off power to the heaters on pressurizer low-low water level, thereby preventing heater damage. This interlock is ~~not used when bypassed at the Hot Shutdown Panel for~~ manual control of the pressurizer backup heaters is transferred to the ~~Hot~~ Shutdown Panel. 32

5. Redundancy

Two backup heater groups are provided, either of which can provide the necessary energy input to the ~~primary system~~ (pressurizer fluid to develop the requisite pressure) for the safe shutdown condition. Either of two power-operated relief valves will perform the depressurization function. 32

6. Diversity

No diversity of control or power supply is provided between the backup heater groups. Diversity of depressurization is provided by power-operated relief valves, safety valves, spray valves, and auxiliary spray valves.

7. Actuated Devices

The electrical control equipment for the pressurizer backup

heater groups, power-operated relief valves, safety valves, spray valves, and auxiliary spray valves are the actuated devices.

8. Supporting Systems

Provisions have been included to feed the pressurizer backup heaters from independent Class 1E power supplies. The pressurizer power-operated relief valves and the pressurizer auxiliary spray valve utilize air from the Instrument Air System and control power from Class 1E DC buses.

9. Design Basis Information

Section 3, "Design Basis," of IEEE Standard 279 does not apply because the pressurizer pressure control system, except for the safety valves, is not specifically designed to be a safety system. The design basis is derived from operational objectives. The safety valves are self actuated. 32

10. Drawings

For piping and instrumentation flow diagrams for the pressurizer pressure control system, refer to Sections 5.4.10 and 9.8.4.1. Figure 7.2-1, sheets 11 and 12, illustrate the logic.

11. Portions of System Not Required for Safety

Refer to item 9 above.

7.4.1.3 Shutdown From Outside the Control Room

A common control room is provided ~~and~~ that contains all controls and instrumentation necessary for the operation of Units 1 and 2 reactor, turbine-generator, and auxiliary and emergency systems under normal or 32

accident conditions. Sufficient radiation shielding, containment integrity, missile protection and habitability provisions are provided to permit access, exit, and continued occupancy of the control room for the duration of accident conditions such that aggregate radiation exposure to personnel would be below that specified by 10CFR50, Appendix A, General Design Criterion 19.

(save for the required Control Room fire considerations)

32 Considering the detailed station design provisions to ensure continuous control room access, it is unlikely that the necessity could arise for evacuation of the Control Room. Nevertheless, provisions have been made to maintain the reactor in a safe hot standby condition if access to the control room is lost (e.g. Control Room fire). Hot standby is maintained as described in Section 7.4.1.3.2. Furthermore, cold shutdown can be achieved from outside the Control Room through the use of suitable procedures as described in Section 7.4.1.3.3.

7.4.1.3.1 Design Criteria

In designing for safe reactor shutdown in the event of Control Room evacuation, the following design criteria are applied.

except, of course, for a fire that destroys either the Control Room or the Cable Spreading Room.

32 1. Access back into the Control Room will generally be achieved prior to the initiation of cold shutdown; however, the capability for bringing the reactor to cold shutdown conditions exists outside the Control Room through the use of suitable procedures and secondary controls as described in Section 7.4.1.3.3.

(Except for a Control Room or Cable Spreading Room fire;

2. Control room evacuation is initiated for an undefined cause; (for example, control environment not habitable) and the event which causes Control Room evacuation does not degrade Control Room equipment.

3. Design basis accidents are not assumed to occur simultaneously with control room evacuation. However, loss of offsite power has

Insert A

4. For four specific plant fires, shutdown capability is provided as follows:

Fire Location	Loss	Shutdown From
Cable Spreading Room (CSR)	Both Trains	Hot Shutdown Panel using Train A and Shutdown Transfer Panel Transfer.
Control Room (CR)	Both Trains	Hot Shutdown Panel Using Train A and Shutdown Transfer Panel Transfer.
Hot Shutdown Panel (HSP)	Train B	Control Room using Train A
Shutdown Transfer Panel (STP)	Train A	Control Room using Train B

For any other postulated plant fire, shutdown is accomplished from the Control Room utilizing either surviving train.

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been considered.

5 8. (Except for a fire in the Control Room or Cable Spreading Room,) ~~Loss~~ loss of safety system redundancy does not occur as a result of the event requiring control room evacuation, and all equipment in the control room and all automatic controls continue to function.

6 8. The Hot Shutdown Panel (HSP) (and the Shutdown Transfer Panel (STP),) including essential ~~controls~~ equipment mounted on (it, is) them, are designed to withstand an SSE with no loss of essential functions. The essential local control stations are also designed to withstand an SSE with no loss of essential functions. ~~13~~ 32

7 8. The Hot Shutdown Panel is normally untended and is surrounded by ~~of the walk-in a type with locked access doors.~~ a locked enclosure. Opening the ~~access~~ enclosure door will initiate an alarm in the Control Room. The Shutdown Transfer Panel is also normally untended and access to it is restricted via normally locked doors. Opening the enclosure doors will initiate an alarm in the Control Room.

8 8. The Hot Shutdown Panel, located in the switchgear area of the Safeguards Building, at elevation 831'-6", and the Shutdown Transfer Panel, located one floor below at elevation 810'-6", are easily accessible to Control Room operators through controlled access areas.

9 8. Electrical separation for the Hot Shutdown Panel and the Shutdown Transfer Panel follows the same criteria as corresponding Control Room equipment. Loss of control or indication for one train for any reason will not affect its redundant counterpart. ~~11~~ 32 Q032.36 Q040.23 Q040.64

10 8. Controls on the Hot Shutdown Panel are provided with a ~~selector~~ transfer switch (at the Shutdown Transfer Panel for Train A and Hot Shutdown Panel for Train B) that transfers control of ~~switchgear~~ equipment from the Control Room to the Hot Shutdown Panel. Placing this local ~~selector~~ transfer switch in the local position will electrically isolate ~~the main control board controls~~ all Control Room and Cable Spreading Room Equipment from the rest of the circuitry, will provide audible and visible indication in the Control Room and will turn off ~~position~~ status lights on the main control board. ~~11~~ 32 Q032.25 Q032.23 Q032.66

11 ~~10~~. Each control circuit consists of cables that 1) connect the transfer switches to control switches in the Control Room, 2) 11 Q040.64

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been considered.

5 8. (Except for a fire in the Control Room or Cable Spreading Room, loss of safety system redundancy does not occur as a result of the event requiring control room evacuation and all equipment in the control room and all automatic controls continue to function.

6 8. The Hot Shutdown Panel (HSP) and the Shutdown Transfer Panel (STP), including essential ~~controls~~ equipment mounted on ~~it~~ them, is designed to withstand an SSE with no loss of essential functions. The essential local control stations are also designed to withstand an SSE with no loss of essential functions. ~~13~~ 32

7 8. The Hot Shutdown Panel is normally untended and is surrounded by ~~of the walk-in a type with locked access doors.~~ a locked enclosure. Opening the ~~access~~ enclosure door will initiate an alarm in the Control Room. The Shutdown Transfer Panel is also normally untended and access to it is restricted via normally locked doors. Opening the enclosure doors will initiate an alarm in the Control Room.

8 8. The Hot Shutdown Panel, located in the switchgear area of the Safeguards Building, at elevation 831'-6", and the Shutdown Transfer Panel, located one floor below at elevation 810'-6", ~~is~~ are easily accessible to Control Room operators through controlled access areas.

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10 8. Controls on the Hot Shutdown Panel are provided with a ~~selector~~ transfer switch (at the Shutdown Transfer Panel for Train A and Hot Shutdown Panel for Train B) that transfers control of ~~switchgear~~ equipment from the Control Room to the Hot Shutdown Panel. Placing this local ~~selector~~ transfer switch in the local position will electrically isolate the main control board controls from the rest of the circuitry, will provide audible and visible indication in the Control Room and will turn off ~~position~~ status lights on the main control board. ~~11~~ 32 Q032.25 Q032.23 Q032.66

11 8. Each control circuit consists of cables that 1) connect the transfer switches to control switches in the Control Room, 2) 11 Q040.64

connect the transfer switches to the HSP-mounted control switches, 3) connect the transfer switches to the pertinent motor control center. Each of these cables are inherently separated from their redundant counterpart. In addition, the cables from the HSP to the Control Room and the motor control centers are external to the HSP for almost all of their run. Loss of a control circuit does not mean loss of function since control circuits are available at the HSP for each of the redundant systems.

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~~11.~~ To prevent a single event (e.g., short-circuit) from affecting both the Control Room controls and the HSP controls, control-circuit fuses are either located in equipment accessible in such an event (e.g., 6.9 KV and 480V switchgear) or separate fuses, located in separate fire zones, are provided for both the Control Room control circuit and the HSP control circuit.

The controls and monitoring indicators provided on the Hot Shutdown Panel and required for hot standby are listed in Table 7.4-1. Instrumentation and controls provided on the Hot Shutdown Panel for operating convenience or cold shutdown are listed in Table 7.4-2. Instrumentation and controls required for cold shutdown are marked with the letter (c) in ~~both~~ Tables 7.4-1, 7.4-2 and 7.4-3. Switches provided on the Shutdown Transfer Panel are listed in Table 7.4-3.

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Those marked with the letter (f) are added for Alternate Shutdown for a fire in the Control Room or Cable Spreading Room.

7.4.1.3.2 Hot Standby From Outside The Control Room

Should the Control Room become uninhabitable, the reactor will be manually tripped, the neutron level and control rod position will be verified before evacuation takes place. Also, the reactor can be tripped locally at the reactor trip switchgear which is in close proximity to the Hot Shutdown Panel.

13 Sufficient controls are provided outside the Control Room on a Seismic Category I Hot Shutdown Panel (See Tables 7.4-1 and 7.4-2) and other

Insert B

1. Transfer control from the Control Room to the Hot Shutdown Panel, as required, using the transfer switches at the Shutdown Transfer Panel for Train A and the transfer switches at the Hot Shutdown Panel for Train B.

locations to:

- Achieve prompt hot standby of the reactor
- Maintain the unit in a safe condition during hot standby.

7.4.1.3.3 Cold Shutdown From Outside the Control Room

Cold shutdown can be achieved from outside the Control Room through the use of suitable procedures and by virtue of local control of the systems listed in Section 7.4.1.2. The design bases for the achievement and maintenance of cold shutdown are as listed in Section 7.4.1.3.1. Instrumentation and controls on the Hot Shutdown Panel, marked with the letter (c) on Tables 7.4-1 and 7.4-2, are utilized to attain cold shutdown outside the Control Room. In addition, certain local manipulations of controls and initiating devices, as described below, are required.

4 For cold shutdown from outside the Control Room due to a Control Room or Cable Spreading Room fire, see Section 7.4.1.3.4.

The basic procedure to established cold shutdown from the hot standby condition, for reasons other than fire in the Control Room or Cable spreading Room and assuming the Control Room is uninhabitable, is as follows. 32

Insert B

2 1. Borate to the cold shutdown boron concentration using boric acid transfer pumps and charging pumps. Q212.84

Location: Hot Shutdown Panel.

Available Indications: Reactor Coolant System (RCS) boron concentration determined by sampling. 9 Q212.84

3 2. Cooldown the RCS by use of the steam generator power-operated atmospheric relief valves.

AMENDMENT 32
DECEMBER 15, 1988

Location: Hot Shutdown Panel and local patch panel or manual handwheel operation.

Available Indications: RCS temperature, pressurizer pressure and level, steam generator level, auxiliary feedwater flow and condensate storage tank level.

4 e. Depressurize the RCS by throttling the pressurizer spray valve while maintaining pressurizer level.

Location: Hot Shutdown Panel and local patch panel

Available Indications: pressurizer pressure and level, charging and letdown flow.

9 Q212.84

5 f. At 1900 psig in the RCS, block the low pressurizer pressure safety injection (SI) and the low steamline pressure SI signals.

Location: Cable spreading room

Available Indications: Pressurizer pressure indication on the Hot Shutdown Panel.

6 g. At 1000 psig in the RCS, close the accumulator discharge isolation valves and rack out the safety injection pump and containment spray pump breakers.

Location: Switchgear and motor control centers.

32 Available Indications: Pressurizer pressure indication ~~in~~ on the ~~Hot Shutdown primary sample room~~ Panel.

7 h. At 350°F and 425 psig in the RCS, align the RCS for cooldown with

Insert C

7.4.1.3.4 Alternate Shutdown System

The Hot Shutdown Panel had been designed to enable control to a hot standby condition if, for unspecified but non-catastrophic reasons, the Control Room (CR) had to be evacuated. The circuits required for shutdown on the Hot Shutdown Panel have been redesigned to comply with the CPSES fire protection requirements. The present design enables control via Train A equipment even if a complete loss of the Control Room or Cable Spreading Room is postulated due to fire. Thus the Hot Shutdown Panel, Shutdown Transfer Panel and specific portions of the plant systems noted in this section function as the Alternate Shutdown System for CPSES for a fire in the Control Room or Cable Spreading Room. 32

The Hot Shutdown Panel and Shutdown Transfer Panel are each located in different fire zones which are, in turn, different from the fire zones associated with the Cable Spreading Room and Control Room.

Since the postulated complete loss of either the Cable Spreading Room or the Control Room would also cause the loss of both Train A and Train B shutdown control and associated monitoring, alternate shutdown capability was provided to survive this highly improbable catastrophe by:

1. Relocating Train A transfer circuits from the Hot Shutdown Panel to the Shutdown Transfer Panel,

2. Providing redundant Train A shutdown control circuits independent of the Control Room and Cable Spreading Room, and

cont

Insert C cont

3. Providing monitoring circuits for Train A shutdown systems which are independent of the Control Room and Cable Spreading Room equipment and cabling.

If the postulated fire occurs in the Control Room or Cable Spreading Room, the transfer of Train A will take place at the Shutdown Transfer Panel and the control of the required Train A shutdown equipment is established at the Hot Shutdown Panel. For this scenario, Train A has be chosen for alternate shutdown control with the requisite Train B and non-safety related indications independent of the Control Room and Cable Spreading Room.

The shutdown procedures are basically the same as described in Sections 7.4.1.3.2 and 7.4.1.3.3. For cold shutdown, however, steps 5 and 6 of Section 7.4.1.3.3 are carried out immediately. 32

To summarize, loss of either the Control Room or Cable Spreading Room will require Train A transfer from the Shutdown Transfer Panel and Train A control at the Hot Shutdown Panel. Loss of the Hot Shutdown Panel will require Train A control in the Control Room. Loss of the Shutdown Transfer Panel will require Train B control in the Control Room.

the Residual Heat Removal System. 9

Location: Switchgear and Hot Shutdown Panel. Q212.84

Available Indications: RCS pressure indication and ~~in the primary sample room,~~ RCS temperature indication on the Hot Shutdown Panel. 32

Insert C →

7.4.2 ANALYSIS

Hot standby is a stable plant condition that is automatically reached following a reactor trip from power. Additionally, the plant design features permit the achievement of cold shutdown as described in Section 7.4.1.2. In the unlikely event that access to the Control Room is restricted, the plant can be safely kept at hot standby by the use of the monitoring indicators and controls listed in Section 7.4.1.3 until the Control Room can be reentered. Furthermore, cold shutdown conditions can be achieved from outside the Control Room through the use of suitable procedures as described in Sections 7.4.1.3.3 and 7.4.1.3.4, and by virtue of local control of the equipment listed in Section 7.4.1.2, in conjunction with the instrumentation and controls provided on the Hot Shutdown Panel and the Shutdown Transfer Panel (Tables 7.4-1, ~~and~~ 7.4-2[2] and 7.4-3). 37

The discussions below demonstrate conformance to applicable General Design Criteria (GDC), Regulatory Guides, and IEEE Standard 279-1971. See also Table 7.1-2 for criteria applicable to all systems, Section 7.3, and other sections as referred to in the text. 11 Q032.14 Q032.67

7.4.2.1 General Analysis

1. Conformance to NRC General Design Criteria

a. GDC 19

The Hot Shutdown Panel and essential local control stations, discussed in Section 7.4.1.3, provide adequate controls and indications at locations outside the Control Room to maintain the reactor and the reactor coolant system in the safe shutdown condition and to ensure decay heat removal in the event the Control Room must be evacuated.

b. GDC 34

Essential controls are provided outside the control room on the Hot Shutdown Panel to ensure adequate decay heat removal from the Reactor Coolant System in the event the main Control Room must be evacuated.

2. Conformance to NRC Regulatory Guides

a. RG 1.29

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The Hot Shutdown Panel, (Shutdown Transfer Panel,) and essential local control stations are designed to withstand the effects of a Safe Shutdown Earthquake (SSE) without loss of function or physical damage. The Hot Shutdown Panel, (Shutdown Transfer Panel,) and essential local control stations are classified as Seismic Category I components.

b. RG 1.75

25

Proper separation in accordance with Regulatory Guide 1.75 and IEEE Standard 384 is maintained within the Hot Shutdown Panel for Train A, Train B and non-Class 1E equipment and wiring.

3. Conformance to IEEE Standard 279-1971

and Shutdown Transfer Panel

The Hot Shutdown Panel, including essential controls and indications, and the essential local control stations are designed to conform to applicable portions of IEEE Standard 279-1971. The control circuits at the Hot Shutdown Panel and essential local control stations are designed such that a single failure will not prevent proper protective action (maintaining safe hot standby) when required. This is accomplished by providing independent Class 1E power for the fully redundant controls for the systems required for safe shutdown.

32

AMENDMENT 32
~~AUGUST 7, 1981~~

To prevent interaction between the redundant systems, the control channels are wired independently and separated with no electrical connections between redundant control systems. Nonessential control circuits and nonessential monitor circuits are electrically isolated from essential controls and indications to prevent jeopardizing the reliability of the systems required for safe shutdown.

7.4.2.2 Analysis for Shutdown From Outside the Control Room

The discussion found in Section 7.4.2.1 is applicable. The additional guides, criteria, and standards listed in Table 7.1-1 apply only to the essential instrumentation and controls required for safe shutdown from outside the control room.

Also see the criteria applicability matrix, Table 7.1-2, for further information.

7.4.2.3 Consideration of Selected Plant Contingencies

7.4.2.3.1 Loss of Instrument Air Systems

Since electric-powered instrumentation is supplied from the Class 1E Power System, loss of the Instrument Air System will not degrade instrumentation required for safe shutdown. An analysis of the effect of loss of plant instrument air is provided in Section 9.3.1 and Table 9.3-3.

7.4.2.3.2 Loss of Cooling Water to Vital Equipment

Cooling water for safety-related systems is supplied by the Safety Chilled Water System (Section 9.4F), the Component Cooling Water System (Section 9.2.2), and the Station Service Water System (Section 9.2.1). Each of these systems is redundant; therefore the loss of any one cooling loop or instrumentation associated with that loop will not degrade the safety-related equipment serviced by the system. Also see the analyses presented in Sections 9.4F, 9.2.1 and 9.2.2 and Tables 9.2-1 and 9.2-5.

7.4.2.3.3 Plant Load Rejection, Turbine Trip, and Loss of Offsite Power

In the event of loss of offsite power associated with plant load rejection or turbine trip, power for safe shutdown is provided by the onsite Class 1E power systems. The description of the power systems is presented in Section 8.3. The standby diesel generators will provide power for the operation of safety-related equipment. The station batteries will provide DC power for the operation of control and instrumentation required to actuate and control essential components.

CPSES/FSAR
TABLE 7.4-1
(SHEET 1 of 4)

INSTRUMENTATION AND CONTROL
LOCATED ON HOT SHUTDOWN PANEL

Identification	Function
LI-501A	(C) Steam generator 1 - level
LI-502	(C) Steam generator 2 - level
LI-503A	(C) Steam generator 3 - level
LI-504A	(C) Steam generator 4 - level
PI-514B	Steam generator 1 - pressure
PI-524B	Steam generator 2 - pressure
PI-534B	Steam generator 3 - pressure
PI-544B	Steam generator 4 - pressure
LI-459B	(C) Pressurizer - level
LI-460B	(C) Pressurizer - level
PI-455B	(C) Pressurizer - pressure
LI-2478B	(C) Condensate storage tank - level
LI-2479B	(C) Condensate storage tank - level
HS-2450C	(C) Motor-driven AFW pump 01 - local control
HS-2450B	(C) Motor-driven AFW pump 01 - local/remote 132
HS-2451C	(C) Motor-driven AFW pump 02 - local control
HS-2451B	(C) Motor-driven AFW pump 02 - local/remote
1/1-APCH1L	(C) Charging pump 1 - control
43/1-APCH1L	(C) Charging pump 1 - local/remote 132
1/1-APCH2L	(C) Charging pump 2 - control
43/1-APCH2L	(C) Charging pump 2 - local/remote
1/1-APBA1L	(C) Boric acid transfer pump 1 - control
43/1-APBA1L	(C) Boric acid transfer pump 1 - local/remote 132
1/1-APBA2L	(C) Boric acid transfer pump 2 - control

(C) - Required for Cold Shutdown

AMENDMENT 32

CPSES/FSAR
TABLE 7.4-1
(SHEET 2 of 4)

INSTRUMENTATION AND CONTROL
LOCATED ON HOT SHUTDOWN PANEL

Identification	Function	
43/1-APBA2L	(C) Boric acid transfer pump 2 - local/remote	
HS-4250C	(C) SSW pump 01 - local/control	
HS-4250B	(C) SSW pump 01 - local/remote	132
HS-4251C	(C) SSW pump 2 - local control	
HS-4251B	(C) SSW pump 2 - local/remote	
HS-4518C	(C) CCW pump 01 - local control	
HS-4518B	(C) CCW pump 01 - local/remote	132
HS-4519C	(C) CCW pump 2 - local control	
HS-4519B	(C) CCW pump 2 - local/remote	
43/1-456FT	(F) Pressurizer PORV remote local	
1/1-456FL	(F) Pressurizer PORV local control	
1-HS-2456FT	(F) Motor-driven AFWP-1/recirculation valve local control	
1-HS-4286FL	(F) SSW pump-1 discharge valve local control	
1-HS-4393FL	(F) Diesel generator-A service water control valve local control	
1-HS-4699FL	(F) CCW to Reactor Coolant pump coolers isolation valve local control	32
1-HS-4701FL	(F) RCP motor air and lube oil coolers CCW return header isolation valve	
1-HS-4514FL	(F) CCW heat exchanger to non-safety loop-1 control valve local control	
1-HS-4524FL	(F) Non-safety loop return to CCW header isolation valve local control	

(C) - Required for Cold Shutdown
(F) - Added for Fire Protection - Alternate Shutdown

AMENDMENT 32

CPSES/FSAR
TABLE 7.4-1
(SHEET 3 of 4)

INSTRUMENTATION AND CONTROL
LOCATED ON HOT SHUTDOWN PANEL

Identification	Function
1-HS-4526FL	(F) CCW to non-safety loop isolation valve local control
1/1-8106FL	(F) Charging pumps to Reactor Coolant System isolation valve local control
1/1-8801AF	(F) Charging pumps to Reactor Coolant System SIS isolation valve local control
43/1-8153FT	(F) Reactor Coolant System excess letdown valve remote local
1/1-8153FL	(F) Reactor Coolant System excess letdown valve local control
1/1-8110FL	(F) Charging pump miniflow isolation valve local control
1/1-APRHIL	(F) RHR pump-1 local control
1/1-8701AF	(F) RHR loop-1 inlet isolation valve local control
1/1-8701BF	(F) RHR Loop-2 inlet isolation valve local control
1-HS-2333FL	(F) Main Steam loop-1 isolation and bypass valves local control
1-HS-2334FL	(F) Main Steam loop-2 isolation and bypass valves local control
1-HS-2335FL	(F) Main Steam loop-3 isolation and bypass valves local control
1-HS-2336FL	(F) Main Steam loop-4 isolation and bypass valves local control

32

(F) - Added for Fire Protection - Alternate Shutdown

AMENDMENT 32

CPSES/FSAR
TABLE 7.4-1
(SHEET 4 of 4)

INSTRUMENTATION AND CONTROL
LOCATED ON HOT SHUTDOWN PANEL

Identification	Function
1/1-455AFL	(F) Pressurizer power relief valve local control
1-HS-6700FL	(F) Chilled water recirculation pump 5 local control
CS/BT-1EA1L	(F) Tie breaker 8T-1EA1 local control
CS/T1EB1L	(F) Bus 1EA1 transfer T1EB1 feeder breaker local control
CS/1EB1-1L	(F) Incoming breaker 1EB1-1 local control
CS/T1EB3L	(F) Bus 1EA1 transfer T1EB3 feeder breaker local control
CS/1EB3-1L	(F) Incoming breaker 1EB3-1 local control
CS/BT-1EB13L	(F) Tie breaker BT-1EB13 local control

32

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*Hand/Auto station with built-in transfer device to block control room signal and initiate control room local override alarm

SSW - Station Service Water System
CCW - Component Cooling Water System
AFW - Auxiliary Feedwater System

(F) - Added for Fire Protection - Alternate Shutdown

CPSES/FSAR
TABLE 7.4-2
(SHEET 1 OF 6)

OTHER INSTRUMENTATION AND CONTROLS
LOCATED ON HOT SHUTDOWN PANEL

Identification	Function	
FK-121A	(C) Pressurizer Level Control Valve - Valve Control (Charging Flow Control)	
1/1-8149AL	(C) Letdown valve 8149A - control	
43/1-8149AL	(C) Letdown valve 8149A - local/remote	1 32
1/1-8149BL	(C) Letdown valve 8149B - control	
43/1-8149BL	(C) Letdown valve 8149B - local/remote	1 32
1/1-8149CL	(C) Letdown valve 8149C - control	
43/1-8149CL	(C) Letdown valve 8149C - local/remote	1 32
SK-2452B*	Turbine-driven AFW pump - speed control	
SI-2452B	Turbine-driven AFW pump - speed indication	
HS-2452C	Turbine-driven AFW pump - local control	
HS-2452B	Turbine-driven AFW pump - local/remote	1 32
HS-2452E	Turbine-driven AFW pump - local control	
HS-2452D	Turbine-driven AFW pump - local/remote	
FK-2459B*	Turbine-driven AFW pump to steam generator 1-valve control	
FK-2453C*	(C) Motor-driven AFW pump 01 to steam generator 1-valve control	
FK-2460B*	Turbine-driven AFW pump to steam generator 2-valve control	
FK-2453D*	(C) Motor-driven AFW pump 01 to steam generator 1-valve control	
FK-2461B*	Turbine-driven AFW pump to steam generator 3-valve control	
FK-2454C*	(C) Motor-driven AFW pump 02 to steam generator 3-valve control	
FK-2462B*	Turbine-driven AFW pump to steam generator 4-valve control	
FK-2454D*	(C) Motor-driven AFW pump 02 to steam generator 4-	

(C) Required for Cold Shutdown

AMENDMENT 32

CPSES/FSAR
TABLE 7.4-2
(SHEET 2 OF 6)

OTHER INSTRUMENTATION AND CONTROLS
LOCATED ON HOT SHUTDOWN PANEL

Identification		Function
		valve control
1/1-PCPR1L		Pressurizer heater backup - Group A control
43/1-PCPR1L		Pressurizer heater backup - Group A local/remote e 132
1/1-PCPR2L		Pressurizer heater backup - Group B control
43/1-PCPR2L		Pressurizer heater backup - Group B local/remote
RCS	(C)	Reactor Coolant System Wide-Range Temperature
NI-31F		NIS Source-Range Indication
NI-32F		NIS Source-Range Indication
FI-121B	(C)	Charging Pump to CVCS Charging and RCP Seals - Flow
FI-183B		Boric Acid Filter Recovery Line - Flow
FI-132B	(C)	Letdown - flow
1/1-8104L		Emergency boration valve - control
43/1-8104L		Emergency boration valve transfer - local/remote
1/1-TCV-129L		Letdown divert valve TCV-129 - control
43/1-TCV-129L		Letdown divert valve TCV-129 - local/remote e 132
HS-5405C		Containment recirculation fan 01 - control
HS-5405B		Containment recirculation fan 01 - local/remote e 132
HS-5409B		Containment recirculation fan 02 - control
HS-5409C		Containment recirculation fan 02 - local/remote
HS-5413C		Containment recirculation fan 03 - control
HS-5413B		Containment recirculation fan 03 - local/remote e 132
HS-5417C		Containment recirculation fan 04 - control
HS-5417B		Containment recirculation fan 04 - local/remote
FI-2463D	(C)	AFW to steam generator 1 - flow
FI-2463B	(C)	AFW to steam generator 1 - flow

(C) Required for Cold Shutdown

CPSES/FSAR
TABLE 7.4-2
(SHEET 3 OF 6)

OTHER INSTRUMENTATION AND CONTROLS
LOCATED ON HOT SHUTDOWN PANEL

Identification	Function
FI-2464D	(C) AFW to steam generator 2 - flow
FI-2464B	(C) AFW to steam generator 2 - flow
FI-2465D	(C) AFW to steam generator 3 - flow
FI-2465B	(C) AFW to steam generator 3 - flow
FI-2466D	(C) AFW to steam generator 4 - flow
FI-2466B	(C) AFW to steam generator 4 - flow
PI-2477B	Turbine-driven AFW pump - suction pressure
PI-2455B	Turbine-driven AFW pump - discharge pressure
PI-2475B	Motor-driven AFW pump 01 - suction pressure
PI-2453B	Motor-driven AFW pump 01 - discharge pressure
PI-2476B	Motor-driven AFW pump 02 - suction pressure
PI-2454B	Motor-driven AFW pump 02 - discharge pressure
FI-4258B	(C) SSW train A - flow
FI-4259B	(C) SSW train B - flow
PI-4252B	SSW pump 01 - discharge pressure
PI-4253B	SSW pump 2 - discharge pressure
V-1EA1-L	6900-V bus 1EA1 - voltage
F-1EA1-L	6900-V bus 1EA1 - frequency
A-1EA1-1L	6900-V bus 1EA1, preferred offsite source - amperes
A-1EG1-L	6900-V bus 1EA1, onsite source - amperes
A-1EA1-2L	6900-V bus 1EA1, alternate offsite source - amperes

(C) Required for Cold Shutdown

CPSES/FSAR
TABLE 7.4-2
(SHEET 4 OF 6)

OTHER INSTRUMENTATION AND CONTROLS
LOCATED ON HOT SHUTDOWN PANEL

Identification	Function
CS-1EA1-1L	6900-V bus 1EA1, preferred offsite source breaker-control switch
CS-1EG1-L	6900-V bus 1EA1, onsite source breaker - control switch
CS-1EA1-2L	6900-V bus 1EA1, alternate offsite source breaker - control switch
V-1EA2-L	6900-V bus 1EA2 - voltage
F-1EA2-L	6900-V bus 1EA2 - frequency
A-1EA2-2L	6900-V bus 1EA2, alternate offsite source - amperes
A-1EG2-L	6900-V bus 1EA2, onsite source - amperes
A-1EA2-1L 43-1EA1-1 43-1EG1 43-1EA1-2	6900-V bus 1EA2, preferred offsite source - amperes 6900-V bus 1EA1 preferred offsite source brker - selector switch 6900-V bus 1EA1 onsite source breaker - selector switch 6900-V bus 1EA1 alternate offsite source brker - selector switch
CS-1EA2-2L	6900-V bus 1EA2, alternate offsite source breaker - selector switch
CS-1EG2-L	6900-V bus 1EA2, onsite source breaker - control switch
CS-1EA2-1L	6900-V Bus 1EA2, preferred offsite source breaker - control switch
43-1EA2-2	6900-V bus 1EA2, alternate offsite source breaker - selectcr switch
43-1EG2	6900-V bus 1EA2, onsite source breaker - selector switch
43-1EA2-1	6900-V bus 1EA2, preferred offsite source breaker - selector switch

132

CPSES/FSAR
TABLE 7.4-2
(SHEET 5 OF 6)

OTHER INSTRUMENTATION AND CONTROLS
LOCATED ON HOT SHUTDOWN PANEL

Identification	Function
1-ZL-2476B	Motor-driven AFWP-2 suction pressure status light
1-ZL-2454C	Motor-driven AFWP-2 discharge to SG-3 control valve
1-ZL-2454D	Motor-driven AFWP-2 discharge to SG-4 control valve
1-ZL-2459B	Turbine-driven AFWP discharge to SG-1 control valve
1-ZL-2460B	Turbine-driven AFWP discharge to SG-2 control valve
1-ZL-2453C	Motor-driven AFWP-1 discharge to SG-1 control valve
1-ZL-2475B	Motor-driven AFWP-1 suction pressure status light
1-ZL-2453D	Motor-driven AFWP-1 discharge to SG-2 control valve
1-ZL-2461B	Turbine-driven AFWP discharge to SG-3 control valve
1-ZL-2462B	Turbine-driven AFWP discharge to SG-4 control valve
ZL-455 CF	(F) Pressurizer spray valve
ZL-455 BF	(F) Pressurizer spray valve
ZL-PCPX 1F	(F) RCP-1 running
ZL-PCPX 2F	(F) RCP-2 running
ZL-PCPX 3F	(F) RCP-3 running
ZL-PCPX 4F	(F) RCP-4 running

32

(F) Added for Fire Protection - Alternate Shutdown

AMENDMENT 32

CPSES/FSAR
TABLE 7.4-2
(SHEET 6 OF 6)

OTHER INSTRUMENTATION AND CONTROLS
LOCATED ON HOT SHUTDOWN PANEL

Identification	Function
TR-413F/423F	(F) Reactor Coolant System loop-1 & 2 wide range temperature
TR-433F/443F	(F) Reactor Coolant System loop-3 & 4 wide range temperature
HS-5180F	(F) Steam generator blowdown drains
MLB-63	(F) Train B shutdown valves
HC-2325	(F) SG-1 PORV
HC-2326	(F) SG-2 PORV
HC-2327	(F) SG-3 PORV
HC-2328	(F) SG-4 PORV
HC-455C	(F) Pressurizer spray valve
HC-606	(F) RHR discharge control valve
HC-618	(F) RHR minimum flow valve

32

* Hand/Auto station with built-in transfer device to block control room signal and initiate control room local override alarm

SSW - Station Service Water System

CCW - Component Cooling Water System

AFW - Auxiliary Feedwater System

(F) - Added for Fire Protection - Alternate Shutdown

CPSES/FSAR
TABLE 7.4-3
(SHEET 1 of 4)

TRANSFER SWITCHES LOCATED ON SHUTDOWN TRANSFER PANEL (STP)

Identification		Function
HS-2450B	(C)	Motor-driven AFWP-1 remote local
HS-2453AF	(F)	Motor-driven AFWP-1 to SG-1 control valve remote local
HS-2453BF	(F)	Motor-driven AFWP-1 to SG-2 control valve remote local
HS-2456FT	(F)	Motor-driven AFWP-1 recirculation valve remote local
43/1-121-FT	(F)	Pressurizer level control valve remote local
HS-4250B	(C)	SSW pump-1 remote local
HS-4286FT	(F)	SSW pump-1 discharge valve remote local
HS-4393FT	(F)	Diesel generator-A service water control valve remote local
HS-4699FT	(F)	CCW to Reactor Coolant pump coolers isolation valve remote local
HS-4701FT	(F)	RCP motor air and lube oil coolers CCW return header isolation valve remote local
HS-4518B	(C)	CCW pump-1 remote local
HS-4514FT	(F)	CCW heat exchanger to non-safety loop-1 control valve remote local
HS-4524FT	(F)	Non-safety loop return to CCW header isolation valve remote local
HS-4526FT	(F)	CCW to non-safety loop isolation valve remote local
HS-5405B		Containment recirculation fan 01 remote local

32

(F) Added for Fire Protection - Alternate Shutdown

AMENDMENT 32

CPSES/FSAR
TABLE 7.4-3
(SHEET 2 of 4)

TRANSFER SWITCHES LOCATED ON SHUTDOWN TRANSFER PANEL (STP)

Identification		Function
43/1-APCH1L	(C)	Centrifugal charging pump-1 remote local
43/1-APBA1L	(C)	Boric acid transfer pump-1 remote local
HS-5413B		Containment recirculation fan 03 remote local
43/1-8106FT	(F)	Charging pumps to Reactor Coolant System isolation valve remote local
43/1-8801AF	(F)	Charging pumps to Reactor Coolant System SIS isolation valve remote local
43/1-8149AL	(C)	CVCS letdown orifice isolation valve remote local
43/1-8149BL	(C)	CVCS letdown orifice isolation valve remote local
43/1-8149CL	(C)	CVCS letdown orifice isolation valve remote local
43/1-8110FT	(F)	Charging pump miniflow isolation valve remote local
43/1-APRH1F	(F)	RHR pump-1 remote local
43/1-8701AF	(F)	RHR loop 1 inlet isolation valve remote local
43/1-8701BF	(F)	RHR loop 2 inlet isolation valve remote local
HS-2452B		Turbine-driven AFWP steam supply header#1 valve remote local
43/1-TCV-129 L		Letdown to demineralizer or volume control tank remote local
HS-2333FT	(F)	Main Steam loop 1 isolation and bypass valves remote local

(F) Added for Fire Protection - Alternate Shutdown

32

AMENDMENT 32

TRANSFER SWITCHES LOCATED ON SHUTDOWN TRANSFER PANEL (STP)

Identification		Function
HS-2334FT	(F)	Main Steam loop 2 isolation and bypass valves remote local
HS-2335FT	(F)	Main Steam loop 3 isolation and bypass valves remote local
HS-2336FT	(F)	Main Steam loop 4 isolation and bypass valves remote local
43/1-455AFT	(F)	Pressurizer power relief valve remote local
43/1-PCPR1L		Pressurizer heater backup group-A remote local
HS-XT	(F)	Water chiller control remote local
HS-6700FT	(F)	Chilled water recirculation pump-5 remote local
43/1EA1-1		Incoming breaker 1EA1-1 remote local
43/1EA1-2		Incoming breaker 1EA1-2 remote local
43/1EG1		Diesel generator breaker 1EG1 remote local
43/BT-1EA1	(F)	Tie breaker BT-1EA1 remote local
43/T1EB1	(F)	Bus 1EA1 transfer T1EB1 feeder breaker remote local

32

(F) Added for Fire Protection - Alternate Shutdown

CPSES/FSAR
TABLE 7.4-3
(SHEET 4 of 4)

TRANSFER SWITCHES LOCATED ON SHUTDOWN TRANSFER PANEL (STP)

Identification		Function
43/1EB1-1	(F)	Incoming breaker 1EB1-1 remote local
43/T1EB3	(F)	Bus 1EA1 transfer 1EB3 feeder breaker remote local
43/1EB3-1	(F)	Incoming breaker 1EB3-1 remote local
43/BT-1EB13	(F)	Tie breaker BT-1EB13 remote local

32

* Hand/Auto station with built-in transfer device to block control room signal and initiate control room local override alarm

SSW - Station Service Water System

CCW - Component Cooling Water System

AFW - Auxiliary Feedwater System

(F) Added for Fire Protection - Alternate Shutdown

AMENDMENT 32

ATTACHMENT B

FSAR SECTION 9.5

(SELECTED PAGES)

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not labeled as a fire-rated door because of the wicket.

Since the fire barrier rating is greater than the postulated fire duration, and since the area is a controlled occupational access area, there will not be an unacceptable radiation release to the environment or other areas of the plant due to a fire.

9. Fire Area 9

The safety-related essential systems and components located in Fire Area 9 are:

a. Safety-related cables, Train A

b. Safety-related cables, Train B

c. 6.9-kV and 480-V switchgear, Train A

d. Motor control center, Train A

e. Fan coil units, Train A

f. Electrical penetration assemblies, Train A

32 | g. Shutdown Transfer Panel, Train A

Fire Area 9, shown on Figure 9.5-2, is located on elevation 810 ft 6 in. of the Safeguards Building Unit 1. The only mechanical components in this area are two HVAC fan coil units located in a one-foot-thick reinforced concrete enclosure. The enclosure is not rated because the only combustible materials in the area are the cables serving the fan coil units.

As shown on Figure 9.5-38, the combustible loading for this area is classified a medium hazard which limits the maximum fire duration to less than 90 minutes, assuming all combustible

material (electrical cable jacket and insulation material) in the area burns. This assumption is conservative, because the cable is self-extinguishing, fire retardant, and nonpropagating in accordance with the requirements of IEEE 383-1974.

Fire detectors are provided in this area to enable rapid fire detection. Figure 9.5-38 defines the number and type of fire detectors in this area.

Where required by section 9.5.1.2.3.9, Train B essential safety-related cabling ~~in this area~~ is protected by a one-hour rated fire barrier. In addition, where required by Section 9.5.1.2.3.8, directional sprinklers are installed in areas where there is a high density of safety related cable trays a pre-action

A portion of this fire area is protected by an automatic wet-pipe sprinkler system, designed to provide general area coverage. The locations ~~protected area~~ and ~~the~~ water spray density ~~is~~ are described ~~in~~ on Figures 9.5-2 and 9.5-38. The detectors used to activate these sprinklers have been class "A" wired.

~~Automatic sprinklers, designed to apply water directly on cable tray, are also installed where there is a high density of safety related cable trays, as described in section 9.5.1.2.3.8. Figure 9.5-2 shows the locations of these sprinklers.~~

32

Hose stations and portable extinguishers are provided as a backup to the sprinkler systems.

~~Shields are provided for electrical equipment where discharge of a sprinkler system could damage essential safety-related electrical equipment.~~

32

A fire in this area will effect only Train A electrical equipment and cabling. The plant can be safely shutdown using the redundant safety train equipment.

The rated fire barriers which physically separate Fire Area 9 from adjacent areas are constructed of poured, reinforced concrete walls and floor with approved doors, fire dampers, and penetration seals of equivalent rating. As stated in Subsection 9.5.1.3.1, Item 8, door S-29c is designed and constructed to UL requirements, but is not labeled as a fire door because of a manway wicket in the door. The wicket is designed and constructed to the same requirements as door S-29c. The location of the door with respect to the combustible material in the area does not present a potential hazard to the adjacent area. Stairwell S-5, located in the corner of Fire Area 9, is enclosed in a two-hour rated fire barrier. See section 9.5.1.5.3.3 for further description.

Since the fire barrier rating is greater than the postulated fire duration, and since the area is a controlled occupational access area, there will not be an unacceptable radiation release to the environment or other areas of the plant due to a fire.

10. Fire Area 10

The safety-related essential systems and components located in Fire Area 10 are:

a. Diesel generator, Train A

b. Diesel generator, instrumentation and control equipment and cables, Train A

c. Diesel generator, Jacket water and lube oil coolers, Train A

d. Diesel generator, Air receivers, air dryers, air intake filters, compressors and after coolers, Train A

The rated fire barriers which physically separate Fire Area 15 from adjacent fire areas are constructed of poured, reinforced concrete walls and floors with approved fire doors, fire dampers, and penetration seals of equivalent rating.

Since the fire barrier rating is greater than the postulated fire duration, and since the area is a controlled occupational access area, there will not be an unacceptable radiation release to the environment or other areas of the plant due to a fire.

18. Fire Area 16

The safety-related essential systems and components located in Fire Area 16 are:

a. Hot shutdown panel, Trains A and B (See Section 7.4.1.3.4 for description)

b. Safety-related cables, Train A and B

Fire Area 16, shown on Figure 9.5-3, is located on elevation 831 ft 6 in. of the Safeguards Building Unit 1. Fire Area 16 also contains non-safety related electrical equipment, penetrations and cables as well as the equipment listed above.

The cables routed in this area are predominantly control and instrumentation. They are self-extinguishing, fire retardant, and nonpropagating in accordance with the requirements of IEEE 383-1974.

The hot shutdown panel is a walk-in type metal enclosure provided with entrance doors. The cables supplying the train A portion of the hot shutdown panel enter the panel via conduits from the area below (fire area 9) and the cables supplying the train B portion of the hot shutdown panel enter the panel via conduits from this

area (area 16). Thus, train A and B cable entries are physically separated from each other. e 32

As shown on Figure 9.5-38, the combustible loading for this area is classified a medium hazard, which limits the maximum fire duration to less than 60 minutes, assuming all combustible material (electrical cable jacket and insulation material) in the area burns. This assumption is conservative, because the cable is self-extinguishing, fire retardant, and nonpropagating in accordance with the requirements of IEEE 383-1974.

Class "A" wired

Fire detectors are provided in this area to enable rapid fire detection and to actuate the suppression system. Figure 9.5-38 defines the number and type of fire detectors in this area.

Where required by section 9.5.1.2.3.9, one train of essential safety-related cabling is protected by a one-hour rated fire barrier. 32

A portion of this fire area is protected by ~~an automatic wet-pipe~~ a pre-action sprinkler system designed to provide general area coverage. Figure 9.5-3 and 9.5-38 describe the protected area and the water spray density of the sprinkler system.

Hose stations and portable extinguishers are also provided as a backup to the sprinkler system.

Shields are provided for electrical equipment where discharge of a sprinkler system could damage safety-related essential electrical equipment. e 32

An alternate shutdown system is provided which ensures that at least one train of essential safety-related equipment will be operational following a fire in this area. e

In the event of a fire in this fire area, shutdown is achieved from the Control Room. See Section 7.4.1.3.4.

The rated physical barriers which physically separate Fire Area 16 from adjoining areas of the plant are constructed of poured, reinforced concrete with doors, fire dampers, and penetration seals of an equivalent rating. Stairwell S-5, located in the corner of Fire Area 16, is enclosed in a two-hour rated barrier, as described in section 9.5.1.5.3. This stairwell serves as a means of and access for Fire Area 16.

Since the fire barrier rating is greater than the postulated fire duration, and since the area is a controlled occupational access area, there will not be an unacceptable radiation release to the environment or other areas of the plant due to a fire.

19. Fire Area 144

The safety-related essential systems and components located in Fire Area 144 are:

a. Safety-related piping and cables, Train A

b. Safety-related piping and cables, Train B

Fire area 144, shown on Figure 9.5-3 is located on elevation 831 ft. 6 in. of the Safeguards Building, Unit 1. This area is a piping penetration area for non-radioactive piping.

As shown on figure 9.5-38, the combustible loading for Fire Area 144 is classified a light hazard which limits the maximum fire duration to less than 30 minutes, assuming all combustible material (electrical cable jackets and insulation) in the area burns. This assumption is conservative, because the cable is self-extinguishing, fire retardant, and nonpropagating in accordance with the requirements of IEEE 383-1974.

830 ft 0 in. There are no combustible materials in the area.

As shown on Figure 9.5-39, the combustible loading for this area is classified a low hazard. A fire in this area does not affect the safe shutdown of the plant.

The rated fire barriers which physically separate Fire Area 62 from adjacent plant areas are constructed of poured, reinforced concrete walls rated at two hours with approved fire doors and dampers of equivalent rating. Where the stairwell connects with a medium hazard area, three-hour rated fire doors are provided to maintain the integrity of the adjacent area fire barrier. The stairwell rating is in accordance with NFPA and OSHA requirements for stairwell enclosures.

21. Fire Area 63

The safety-related essential equipment and components located in this fire area are:

a. Safety-related cables, Unit 2, Trains A and B.

b. Termination cabinents and distribution panelboards, Unit 2, Trains A and B.

Fire Area 63, shown on Figure 9.5-14, is located at elevation 807 ft 0 in. of the Electrical and Control Building. This fire area is the Unit 2 Cable Spreading Room. There is no mechanical equipment located in this area. In addition to the cables listed above, there are non-safety-related cables extending through this area. All cables in this area are self-extinguishing, fire retardant, and nonpropagating, in accordance with the requirements of IEEE 383-1974.

As shown on Figure 9.5-39, the combustible loading for this area is classified a high hazard. The method of assigning a fire duration to a fire in this area is inappropriate as a fire involving IEEE 383-1974 qualified cables would propagate very slowly, if at all.

~~The plant can be safely shutdown~~ in the event a ~~design basis~~ fire occurs in this fire area, alternate shutdown systems and procedures are provided to ensure safe shutdown independent of the Cable Spreading Room. See Section 7.4.1.3.4 for a description of these systems. 32

Fire detectors are provided throughout this area to enable rapid fire detection, and to actuate the primary fire suppression system. Figure 9.5-39 defines the number and type of fire detectors in this area.

This fire area is provided with a total-flooding-automatically actuated Halon system. Section 9.5.1.4.2.2 describes the design of the Halon fire suppression systems.

As a backup to the Halon system, the fire area is protected by an automatic wet-pipe sprinkler system, designed to provide general area coverage. Figure 9.5-39 defines the sprinkler system design density. In addition, hose stations and portable extinguishers are provided for extinguishment of small fires. A minimum height of seven feet is maintained between the bottom of the lowest tray and the floor of the area to facilitate manual fire fighting.

Shields are provided for electrical equipment where discharge of a sprinkler system could damage essential safety-related electrical equipment.

The three-hour rated fire barriers which physically separate Fire Area 63 from the adjacent plant areas are constructed of poured,

reinforced concrete with approved fire doors, dampers, and penetration seals of equivalent rating. The fire dampers are equipped with automatic Halon override to ensure closure upon actuation of the fixed Halon system.

A fire in this area will not result in a radiation release because there are no radioactive materials in the area. The area is considered an uncontrolled, unrestricted access area.

22. Fire Area 64

The safety-related essential equipment and components located in this fire area are:

a. Safety-related cables, Unit 1, Trains A and B

b. Termination cabinents and distribution panelboards, Unit 1, Trains A and B.

Shown on Figure 9.5-14, Fire Area 64 is located at elevation 807 ft 0 in. of the Electrical and Control Building. This fire area is the Unit 1 Cable Spreading Room. There is no mechanical equipment located in this area. In addition to the cables listed above, there are non-safety-related cables extending through this area. All cables in this area are self-extinguishing, fire retardant and nonpropagating, in accordance with the requirements of IEEE 383-1974.

As shown on Figure 9.5-39, the combustible loading for this area is classified a high hazard. The method of assigning a fire duration to a fire in this area is inappropriate, as a fire involving IEEE 383-1974 qualified cable would propagate very slowly, if at all.

~~The plant can be safely shutdown~~ in the event a ~~design basis~~ fire occurs in this fire area, ~~A~~lternate ~~S~~hutdown ~~S~~ystems and ~~P~~rocedures are provided to ensure safe shutdown independent of the Cable Spreading Room. See Section 7.4.1.3.4 for a description of these systems. 32

Fire detectors are provided throughout this area to enable rapid fire detection, and to actuate the primary Fire Suppression System. Figure 9.5-39 defines the number and type of fire detectors in this area.

This fire area is provided with a total-flooding-automatically-actuated Halon sytem. Section 9.5.1.4.2.2 described the design of the Halon fire suppression systems.

As a backup to the Halon system, the fire area is protected by an automatic wet-pipe sprinkler system, designed to provide general area coverage. Figure 9.5-39 defines the sprinkler system design density. In addition, hose stations and portable extinguishers are provided in this area for extinguishment of small fires. A minimum height of seven feet is maintained between the bottom of the lowest tray and the floor of the area to facilitate manual fire fighting.

Shields are provided for electrical equipment where discharge of a sprinkler system could damage essential safety-related electrical equipment.

The three-hour rated fire barriers which physcially separate Fire Area 64 from the adjacent plant areas are constructed of poured, reinforced concrete with approved fire doors, dampers, and penetration seals of equivalent rating. The fire dampers are equipped with automatic Halon overrides to ensure closure upon actuation of the fixed Halon system.

A fire in this area will not result in a radiation release because there are no radioactive materials in the area. The area is considered an uncontrolled, unrestricted access area.

23. Fire Area 65

Fire Area 65 is the Control Room complex. This area encompasses the main control consoles, the auxiliary relay panels, the production supervisors area, the locker room and lavatory, the kitchen area, and the observation area. Shown on Figures 9.5-15, 9.5-18 and 9.5-19, the control room complex on elevations 830 ft 0 in. and 840 ft 6 in. and is common to both units. Three-hour fire rated physical separation is maintained between this area and adjacent plant areas.

As shown on Figure 9.5-39, the combustible loading for Fire Area 65 is classified a light hazard which limits the maximum fire duration to less than 30 minutes.

Fire detectors are provided at the following locations in this fire area to enable rapid fire detection:

a. Inside each main control console

b. Below the false ceiling in the main console area.

c. Below the false ceiling in the auxiliary relay panel area.

d. Above the false ceiling wherever cabling is routed.

e. In the locker room, kitchen, and production supervisors office.

f. In the control room observation area.

g. In the ventilation supply and return ductwork.

Hose stations and portable extinguishers are provided in this fire area for fire extinguishment. Figures 9.5-15 and 9.5-39 defines the type and location of the fire extinguishing equipment in the control room.

The production supervisor's office, the kitchen area, and the locker room and lavatory are separated from the main control console area by concrete walls containing windows. Rated fire barriers are not required at these locations because of the low amount of combustible material present. A fire outside of Fire Area 65 will not affect the habitability of the control room.

~~The plant is capable of being safely shutdown~~ in the event that a ~~design basis~~ fire occurs in this fire area, Alternate ~~S~~hutdown systems and procedures are provided to ensure safe shutdown independant of the Control Room. See section 7.4.1.3.4 for a description of these systems. 32

The rated fire barriers which separate this area from other areas of the plant are constructed of poured, reinforced concrete or gypsum dry walls with approved fire doors, fire dampers, and penetration seals of equivalent rating.

A fire in this area will not result in a radiation release because there are no radioactive materials in this area. The area is considered an uncontrolled, unrestricted access area.

24. Fire Area 66

There are no safety-related systems and components located in Fire Area 66. This area contains the Unit 2 computer room. Shown on Figure 9.5-15, it is located at elevation 830 ft 0 in. of the Electrical and Control Building.

The rated fire barriers which physically separate Fire Area 83 from adjacent areas are constructed of poured, reinforced concrete walls and floors with approved doors, fire dampers, and penetration seals of equivalent rating. The barrier between Fire Areas 83 and 84 includes a manually operated rollup steel door (Door S-29c) with a manway wicket. This door is constructed in accordance with UL requirements for rollup steel doors, but it is not labeled as a fire rated door because of the wicket. See Section 9.5.1.5.3.3 for further description.

Since the area fire barrier rating is greater than the postulated fire duration, and since the area is a controlled occupational access area, there will not be an unacceptable radiation release to the environment or other areas of the plant due to a fire.

9. Fire Area 84

The safety-related components located in Fire Area 84 are:

a. Safety-related cables, Train A

b. Safety-related cables, Train B

c. 6.9-kV and 480-V switchgear, Train A

d. Motor control center, Train A

e. Emergency fan coil units, Train A

f. Electrical penetration assemblies, Train A

32 | g. Shutdown Transfer Panel, Train A

Fire Area 84, shown on Figure 9.5-8, is located on elevation 810 ft 6 in. of the Safeguards Building Unit 2. The only mechanical components in this area are two HVAC emergency fan coil units

located in a one-foot-thick reinforced concrete enclosure. The enclosure is not rated because the only combustible materials in the area are the cables serving the fan coil units.

As shown on Figure 9.5-40, the combustible loading for this area is classified as a medium hazard which limits the maximum fire duration to less than 90 minutes, assuming all combustible material (electrical cable jacket and insulation material) in the area burns. The assumption is conservative, because the cable is self-extinguishing, fire-retardant, and nonpropagating in accordance with the requirements of IEEE 383-1974.

Fire detectors are provided to enable rapid fire detection. Figure 9.5-40 defines the number and type of fire detectors in this area.

Where required by Section 9.5.1.2.3.9, safety-related Train B cabling in this area is protected by a one-hour rated fire barrier.

A portion of this fire area is protected by ~~an automatic wet pipe~~ a pre-action sprinkler system, designed to provide general area coverage. Automatic sprinklers designed to apply water directly on cable trays are also installed where there is a high density of safety-related cable trays, as described in Section 9.5.1.2.3.8. The detectors used to actuate these sprinklers have been Class "A" wired.

Hose stations and portable extinguishers are provided as a backup to the fixed sprinkler systems.

Shields are provided over electrical equipment where discharge of a sprinkler system could damage safety-electrical equipment.

Based on the above considerations, a fire in this area will affect only the Train A safety-related cables in the area. The

redundant safety train equipment is available to safely shutdown the plant.

The rated fire barriers which physically separate Fire Area 84 from adjacent areas are constructed of poured, reinforced concrete walls and floor with approved doors, fire dampers, and penetration seals of equivalent rating. As stated in Subsection 9.5.1.3.1, Item 8 Door S-29c is designed and constructed to UL requirements but is not labeled as a fire door because of the wicket. The location of the door with respect to the combustible material in the area does not present a potential hazard to the adjacent area. Stairwell S-5, located in the corner of Fire Area 84, is enclosed in a two-hour rated fire barrier. See Section 9.5.1.5.3.3 for further description.

Since the fire barrier rating is greater than the postulated fire duration, and since the area is a controlled, occupational access area, there will not be an unacceptable radiation release to the environment or other areas of the plant due to a fire.

10. Fire Area 85

The safety-related components located in Fire Area 85 are:

a. Diesel generator, Train A

b. Diesel generator instrumentation and control equipment and cables, Train A

c. Diesel generator jacket water and lube oil coolers, Train A

d. Diesel generator air receivers, air dryers, air intake filters, compressors and after coolers, Train A

Since the fire barrier rating is greater than the postulated fire duration, and since the area is a controlled occupational access area, there will not be an unacceptable radiation release to the environment or other areas of the plant due to a fire.

18. Fire Area 91

The safety-related components located in Fire Area 91 are:

321

a. Hot shutdown panel, Trains A and B (See Section 7.4.1.3.4 for description)

b. Safety-related cables, Train A and B

Fire Area 91, shown on Figure 9.5-9, is located on elevation 831 ft 6 in. of the Safeguards Building Unit 2. Fire Area 91, contains non-safety-related electrical equipment and cables as well as the equipment listed above.

The hot shutdown panel is a walk-in type metal enclosure provided with entrance doors. The cables supplying the train A portion of the hot shutdown panel enter the panel via conduits from the area below (Fire Area 84) and the cables supplying the train B portion of the hot shutdown panel enter the panel via conduits from this area (Area 91). Thus, train A and B cable entries are physically separated from each other.

As shown on Figure 9.5-40, the combustible loading for this area is classified as a medium hazard which limits the maximum fire duration to less than 60 minutes, assuming all combustible material (electrical cable jacket and insulation material) in the area burns. This assumption is conservative, because the cable is self-extinguishing, fire-retardant, and nonpropagating in accordance with the requirements of IEEE 383-1974.

Class "A" wired

and to actuate the supression system

Fire detectors are provided to enable rapid fire detection. Figure 9.5-40 defines the number and type of fire detectors in this area.

Where required by Section 9.5.1.2.3.9, one train of safety-related cabling in this area is protected by a one-hour rated fire barrier.

A portion of this fire area is protected by ~~an automatic wet-pipe~~ a pre-action sprinkler system designed to provide general area coverage. Figure 9.5-6 and 9.5-40 describe the protected area and the water spray density of the sprinkler system. Hose stations and portable extinguishers are also provided as a backup to the fixed sprinkler system.

Shields are provided over electrical equipment where discharge of a sprinkler system could damage safety-related electrical equipment.

An alternate shutdown system is provided which ensures that at least one train of safety-related essential equipment will be operational following a fire in this area.

The rated fire barriers which physically separate Fire Area 91 from adjoining areas of the plant are constructed of poured, reinforced concrete with doors, fire dampers, and penetration seals of an equivalent rating. Stairwell S-5, located in the corner of Fire Area 91, is enclosed in a two-hour fire rated barrier, as described in Section 9.5.1.5.3. This stairwell serves as a means of access for Fire Area 91.

Since the fire barrier rating is greater than the postulated fire duration, and since the area is a controlled ocupational access area, there will not be an unacceptable radiation release to the environment or other areas of the plant due to a fire.

In the event of a fire in this fire area, shutdown is achieved from the Control Room. See Section 7.4.1.3.4.

ATTACHMENT C

FSAR SECTION 7.4

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7.4 SYSTEMS REQUIRED FOR SAFE SHUTDOWN

The systems required for safe shutdown are controlled and monitored by instrumentation channels associated with those systems in both the Nuclear Steam Supply System (NSSS) and balance of plant (BOP) systems. These systems are normally aligned to serve a variety of operational functions, including startup and shutdown, as well as protective functions. There are no uniquely identified safe shutdown systems per se. However, prescribed procedures for securing and maintaining the plant in a safe condition can be instituted by appropriate alignment of selected systems. 2 Q032.22

Two kinds of shutdown conditions are addressed in this section: hot standby and cold shutdown. Hot standby is a stable condition of the reactor achieved shortly after a programmed or emergency shutdown of the plant and is the safe shutdown design basis for CPSES. Cold shutdown is a stable condition of the plant achieved after the residual heat removal process has brought the primary coolant temperature below 200°F. In either case, the reactivity control systems maintain a subcritical condition of the core. The plant technical specifications explicity define both hot standby and cold shutdown conditions.

The instrumentation and control functions required to be aligned for maintaining safe shutdown of the reactor that are discussed in this section are the minimum number under nonaccident conditions. These functions permit the necessary operations that will:

1. Prevent the reactor from achieving criticality in violation of the technical specifications.

2. Provide an adequate heat sink so that design and safety limits are not exceeded.

The designation of systems that can be used for safe shutdown depends

on identifying those systems which provide the following capabilities:

1. Reactivity control - reactor trip and boration

2. Decay heat removal - auxiliary feedwater (AFW) supply and residual heat removal (RHR) [The RHRS is required to achieve and maintain cold shutdown.]

7.4.1 DESCRIPTION

In the event of a unit shutdown, the unit will be brought to and maintained at a safe shutdown condition from the main Control Room or the Hot Shutdown Panel (see Section 7.4.1.3).

11 Q032.22 The portions of the Reactor Trip System required to achieve the shutdown condition are described in Section 7.2. The minimum systems, support systems, component controls, and monitoring indicators required under nonaccident conditions to maintain hot standby are tabulated and discussed in Section 7.4.1.1 and those required to maintain cold shutdown are tabulated and discussed in Section 7.4.1.2. Shutdown from outside the Control Room is discussed in Section 7.4.1.3.

7.4.1.1 Hot Standby

11 Q032.23 Q032.51 Q032.56 The following systems, support systems, and monitoring indicators are required for hot standby:

1. Essential Systems

   a. Auxiliary Feedwater System (AFS)

   b. Atmospheric steam relief valves

c. Chemical and Volume Control System (CVCS), boron addition portion.

2. Support Systems

a. Station Service Water System (Sections 9.2.1 and 7.3.1.1.4) | 9 Q032.22

b. Component Cooling Water System (Sections 9.2.2 and 7.3.1.1.4)

c. Onsite power system (Sections 8.3 and 7.3.1.1.4), including diesel generators (Section 9.5)

d. Control Room ventilation system (Sections 9.4.1 and 7.3.1.1.4) | 11

e. ESF Ventilation System (Sections 9.4.5 and 7.3.1.1.4)

f. Safety Chilled Water System (Sections 9.4F and 7.3.1.1.4)

3. Monitoring Indicators

a. Steam Generators (SG's)

1) Water level for each SG

2) Pressure for each SG

b. Reactor Coolant System

1) Pressurizer water level

2) Pressurizer pressure | 9 Q032.22

c. Condensate storage tank level

7.4.1.1.1 Auxiliary Feedwater System

At hot standby, decay heat is removed by supplying auxiliary feedwater to the steam generators. Heat is dumped to the condenser (if offsite power is available) or to the atmosphere via the atmospheric steam relief valves.

For a description of the Auxiliary Feedwater System refer to Section 10.4.9.

For a description of the Auxiliary Feedwater System control refer to Section 7.3.1.1.4, Item 5. A discussion of instrumentation requirements is found in Section 10.4.9.5.

The system flow diagram is shown on Figure 10.4-11.

The system failure mode analysis is contained in Table 10.4-9 and the pertinent illustration is Figure 10.4-12.

7.4.1.1.2 Atmospheric Steam Relief Valves

For normal plant cooldown, the Steam Dump System, described in Section 10.4.4, is used to control the cooldown rate by directing steam from the steam generators to the condenser. The power-operated atmospheric steam relief valves enable heat removal from the steam generators to the atmosphere when the condenser is not in service. These valves, described in Section 10.3.2.2, will allow gradual cooldown of the RCS to the point where the RHRS can be employed to continue plant cooldown (less than 425 psig and 350°F).

The main steam system is protected against overpressurization by the ASME B&PV Code-certified safety valves described in Section 10.3.2.1. In the event of loss of the Steam Dump System and loss of the power-operated atmospheric steam relief valves, the safety valves will

be used to dump steam to the atmosphere, thereby maintaining the plant at hot standby.

1. Initiating Circuits

A pressure transmitter and controller is provided for each atmospheric steam relief valve. Steam pressure developed in the SG is limited by the controller set point selected. Either automatic or manual control can be selected on the controller located in the Control Room.

These valves are also equipped with handwheels to enable local manual operation on loss of air. For operation outside the Control Room, access to the valve's control circuitry in a local panel is provided and manual operation of each valve is accomplished with a local controller at the Hot Shutdown Panel. 32

The initiation device for the safety valve is an intrinsic part of the valve.

2. Logic

See instrumentation and control diagrams (ICD's) listed under "Main Stream Reheat and Steam Dump System" in Tables 1.7-1 and 1.7-2 for atmospheric steam relief valve control.

The safety valves are spring-loaded valves that open on reaching the pressure set point.

3. Bypass

There are no electrical bypasses on safety valves nor on atmospheric steam relief valves.

The atmospheric steam relief valves have manually operated isolation valves upstream of the relief valves for relief valve maintenance. Administrative procedures will assure the proper position of these isolation valves.

4. Interlocks

There are none.

5. Redundancy

The safety valves are redundant (backup) to the atmospheric steam relief valves.

6. Diversity

The normally power-operated atmospheric steam relief valves can also be operated diversely and manually via the valve handwheel.

The safety and relief valves are of diverse design.

7. Actuated Devices

None, other than the valves themselves.

8. Supporting Systems

The following supporting systems are required for operation of the power-operated atmospheric steam relief valves.

a) Class 1E electric power (see Section 8.3)

b) Compressed Air System (see Section 9.3.1 and Figure 9.3-1)

9. Design Basis Information

a) See Table 10.3-2 for the design basis of the main steam safety valves.

b) See Table 10.3-3 for the design basis of the power-operated atmospheric steam relief valves.

10. Electric Schematic Drawings

See Table 1.7-1 for Unit 1 and common and Table 1.7-2 for Unit 2 schematics (electrical) associated with "Main Steam Reheat & Steam Dump System."

11. Portions of System Not Required for Safety

The power-operated atmospheric steam relief valves and pressure transmitter output indication displayed on the control board are not required for safety.

7.4.1.1.3 Chemical and Volume Control System, Boron Addition Portion

The functions of the CVCS discussed in Section 9.3.4 are those associated with normal operation. Safe and economical operation design parameters (see Table 9.3-6) dictate the design of the CVCS for normal operation. For the safety evaluation of the overall CVCS operation refer to Section 9.3.4.1.3 and Table 9.3-9 for the failure modes and effects analysis (FMEA). If safe shutdown operation alone is to be considered, then the primary functions of the CVCS are that it provide a means, along with the proper operator action, to maintain adequate shutdown margin by sufficiently borating the core and to maintain pressurizer level. These functions are those required to maintain adequate Reactor Coolant System (RCS) inventory. The instrumentation, control and electrical features associated with maintaining adequate RCS inventory are those applied to the following groups of equipment:

1. Boric acid transfer pumps
2. Centrifugal charging pumps
3. Letdown orifice isolation valves

Further considerations, as would apply to one unit, are as follows:

1. Initiating Circuits

Initiation is by automatic or manual commands. For discussion of automatic commands of the CVCS proper, refer to Sections 9.3.4 and 9.3.4.1.2.3, and for a discussion of the pressurizer water level control portion, see Section 7.7. Maintenance of hot standby and cold shutdown is discussed in 9.3.4.1.2.6. Manual control may be taken either in the Control Room or outside the Control Room at the Hot Shutdown Panel. For the instrumentation application, refer to Section 9.3.4.1.5.

2. Logic

32 | At the Shutdown Transfer Panel (Train A) and Hot Shutdown Panel (Train B), operator action may transfer control of the boric acid transfer pumps, centrifugal charging pumps and letdown orifice isolation valves from the Control Room to the Hot Shutdown panel. At this location, start-stop operation of the pumps and open-close operation of the valves in question can be undertaken. If the redundant normal suction paths to centrifugal charging pumps that establish boration are not available, normally closed motor operated valve I-8104 (refer to Figure 9.3-10, sheet 3) can be opened either remotely in the Control Room or by handwheel at the local station.

3. Bypasses

Control from the Control Room of the above groups of equipment is manually bypassed at the Shutdown Transfer Panel (Train A) and at the Hot Shutdown Panel (Train B) when control is taken over at the Hot Shutdown Panel. 32

4. Interlocks

With control of those above groups of equipment at the Hot Shutdown Panel, there are no interlocks imposed on their operation.

5. Redundancy

There are two centrifugal charging pumps, two boric acid transfer pumps, and three letdown orifice isolation valves.

6. Diversity

No diversity is provided for the boric acid transfer pumps. In addition to the centrifugal charging pumps, there is a positive displacement charging pump. There are other valves in the letdown line, which, in addition to letdown orifice isolation valves, can also be used to isolate the letdown line.

7. Actuated Devices

The motor control centers for the centrifugal charging pumps and boric acid transfer pumps and the solenoid valves for the letdown orifice isolation valves are the actuation devices of the CVCS required for safe shutdown.

8. Supporting Systems

The centrifugal charging pumps, the boric acid transfer pumps, and the letdown orifice isolation valve solenoid valves are powered from Class 1E buses. Additionally, the Safety Chilled Water System supplies chilled water to the charging pump fan coil unit (see Section 9.4F) and the Station Service Water System supplies cooling water to the centrifugal charging pump lube oil coolers (see Section 9.2.1).

9. Design Basis Information

The CVCS is not specifically designed to be a protection system. Section 3, "Design Bases," of IEEE Standard 279 does not specifically apply to non-protection systems such as the CVCS. Portions of the CVCS, which are shared with the Safety Injection System, come under IEEE Standard 279 design bases as discussed in Section 7.3.

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10. Drawings

For the CVCS flow diagram, refer to Figure 9.3-10. Also refer to the flow diagrams in Section 6.3 for shared functions of the Safety Injection System, as well as the electrical drawing list in Section 1.7.

11. Portion of System Not Required for Safety

Refer to item 9 above.

7.4.1.2 Cold Shutdown

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Cold shutdown is achieved following hot standby and includes passing through hot shutdown. Four key functions are required to achieve and

maintain cold shutdown. They are circulation of the reactor coolant, removal of residual heat, boration, and depressurization. The required means for performing these functions are described below. 9 Q212.2

1. Circulation of the reactor coolant is provided first by natural circulation that is effected by the reactor core providing the heat source and the steam generators the heat sink, and then by the residual heat removal pumps.

2. Removal of residual heat is accomplished first via the Auxiliary Feedwater System and then via the residual heat removal heat exchanger. Hot standby is maintained by releasing steam via the safety grade steam generator safety valves. Cooldown to 350°F is accomplished by releasing steam via operation of the steam generator power-operated relief valves. Then cooldown to cold shutdown conditions is achieved with the Residual Heat Removal System. A sufficient seismic Category I supply of deaerated auxiliary feedwater to permit four hours operation at hot standby followed by cooldown to Residual Heat Removal System initiation conditions is provided by the condensate storage tank. 11 Q212.32 Q032.66

   A backup seismic Category I source for the Auxiliary Feedwater System is the Station Service Water System. This system provides an assured long-term supply of auxiliary feedwater. 11 Q032.6

3. Boration is accomplished using portions of the Chemical and Volume Control System. Boric acid from the boric acid tanks is supplied to the suction of the centrifugal charging pumps by the boric acid transfer pumps. The centrifugal charging pumps inject the boric acid into the reactor coolant system via the safety injection flow paths or the normal charging and reactor coolant pump seal injection flow paths. Makeup in excess of that needed for boration can be provided from the refueling water storage tank. 9 Q212.3

4. Depressurization is accomplished using portions of the Chemical and Volume Control System. Either boric acid from the boric acid tanks or refueling water from the refueling water storage tank is used as desired for depressurization with the flow path being via the centrifugal charging pumps and auxiliary spray valve to the pressurizer.

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In addition to the systems required for hot standby delineated in Section 7.4.1.1, the following systems, support systems, and monitoring indicators are required to achieve and maintain cold shutdown.

1. Essential Systems

   a. Residual Heat Removal System (RHRS)

   b. Pressurizer pressure control during RCS depressurization

2. Support Systems - No additional support systems required other than those listed in Section 7.4.1.1, Number 2.

3. Monitoring Indicators

   a. RCS wide range temperature

   b. Boric acid tank level (per boric acid tank)

Additionally, the safety injection signal trip circuit must be defeated and the accumulator isolation valves closed during the later stages of plant cooldown.

7.4.1.2.1 Residual Heat Removal System (RHRS)

The Residual Heat Removal System is designed to remove residual heat from the core and reduce the temperature of the Reactor Coolant System

(RCS) during plant cooldown to cold shutdown conditions. The system is permitted to be manually initiated when the reactor coolant temperature and pressure are reduced to 350°F and 400 psig or below. A detailed discussion of the RHRS is provided in Section 5.4.7. RHRS operation for reactor cooldown is discussed in Section 5.4.7.2.3. Manual actions required of the operator, both inside and outside Control Room, are discussed in Section 5.4.7.2.7. Further considerations are as follows.

1. Initiating Circuits

   Manual control of the RHRS is from the Control Room. For operator actions outside the Control Room, refer to Section 5.4.7.2.7.

2. Logic

   For the logic diagram for control of the RHRS inlet isolation valves, see Figure 7.6-2.

3. Bypasses

   There are no automatic operational bypasses in the RHRS. Isolation of the RHRS cannot be manually bypassed unless permissive conditions have been automatically met as described in Section 7.6.2.

4. Interlocks

   For discussion of the RHRS inlet isolation valves interlocks, refer to Section 7.6. Section 5.4.7.2.7 discusses application of the single failure criteria.

5. Redundancy

Two independant residual heat removal pumps are provided, either of which can provide the necessary heat removal capacity for the RCS for the safe shutdown condition. Each RHR pump is powered from a separate Class 1E bus.

6. Diversity

For opening permissives and for automatic closing of the RHR inlet isolation valves, diverse RCS pressure transmitters, made by different manufacturers, are used. There is no other diversity in the RHRS control.

7. Actuated Devices

Electrical control equipment for the RHRS pumps, the inlet isolation valves, the mini-flow control, and the RHRS heat exchanger are the principal actuated devices.

8. Supporting Systems

The RHRS is powered from Class 1E buses. The RHRS heat exchangers and pumps are cooled with component cooling water (see Section 9.2.2).

9. Design Basis Information

The RHRS is not specifically designed as a protection system. Section 3, "Design Basis," of IEEE Standard 279 does not specifically apply to non-protection systems like the RHRS. Portions of the Safety Injection System which are shared with the RHRS came under IEEE Standard 279 design basis as discussed in Section 7.3.

10. Drawings

For the RHRS flow diagram, refer to Figures 5.4-6 and 5.4-7. For the RHRS inlet isolation valve interlocks, refer to Figure 7.6-2. Refer to the Section 1.7 list for applicable electrical drawings.

11. Portion of System Not Required for Safety

Refer to item 9 above.

7.4.1.2.2 Pressurizer Pressure Control

Pressurizer heater control is provided to maintain the RCS at operating pressure following a reactor trip to prevent excessive cooling of the pressurizer fluid and subsequent depressurization of the system. Normal operation is automatic via the proportional and backup heaters, as described in Section 7.7. If, for any reason, the normal pressure-regulating system is not available, the operator will control either of two back-up heater groups in the pressurizer by manual ON-OFF control switches. Air operated valve 1-8145 in the auxiliary spray flow path, with manual control in the Control Room, provides spray for depressurizing when normal pressurizer spray control is not available. Means for depressurizing the RCS are also available from the pressurizer power-operated relief valves, with manual control in the Control Room, as well as from the normal pressurizer pressure spray control, which is active when the pressurizer pressure control system is operating. This pressurizer pressure control system, which also automatically controls the pressurizer heaters, as described in Section 7.7, is non-safety related. The pressurizer safety valves, which prevent the RCS from exceeding its design pressure, are safety-related but are self-activated and do not require instrumentation, control, and electrical circuitry for operation. 32

1. Initiating Circuits

In normal automatic operation, the pressurizer pressure control system is controlled by pressurizer pressure transmitters. In addition, the backup heater groups are provided with direct manual control by the operator.

2. Logic

See Figures 7.2-1 (sheets 11 and 12) and 7.7-4.

3. Bypass

The control circuit provides no bypass of the manual backup heater control function other than maintenance provisions.

4. Interlocks

All pressurizer heater groups are connected with a low-level switch to cut off power to the heaters on pressurizer low-low water level, thereby preventing heater damage. This interlock is not used when manual control of the pressurizer backup heaters is transferred to the Hot Shutdown Panel. 32

5. Redundancy

Two backup heater groups are provided, either of which can provide the necessary energy input to the pressurizer fluid to develop the requisite pressure for the safe shutdown condition. Either of two power-operated relief valves will perform the depressurization function. 32

6. Diversity

No diversity of control or power supply is provided between the backup heater groups. Diversity of depressurization is provided by power-operated relief valves, safety valves, spray valves, and auxiliary spray valves.

7. Actuated Devices

The electrical control equipment for the pressurizer backup heater groups, power-operated relief valves, safety valves, spray valves, and auxiliary spray valves are the actuated devices.

8. Supporting Systems

Provisions have been included to feed the pressurizer backup heaters from independent Class 1E power supplies. The pressurizer power-operated relief valves and the pressurizer auxiliary spray valve utilize air from the Instrument Air System and control power from Class 1E DC buses.

9. Design Basis Information

Section 3, "Design Basis," of IEEE Standard 279 does not apply because the pressurizer pressure control system, except for the safety valves, is not designed as a safety system. The design basis is derived from operational objectives. The safety valves are self actuated. | 32

10. Drawings

For piping and instrumentation flow diagrams for the pressurizer pressure control system, refer to Sections 5.4.10 and 9.8.4.1. Figure 7.2-1, sheets 11 and 12, illustrate the logic.

11. Portions of System Not Required for Safety

Refer to item 9 above.

7.4.1.3 Shutdown From Outside the Control Room

A common Control Room is provided that contains all controls and instrumentation necessary for the operation of Units 1 and 2 reactor, turbine-generator, and auxiliary and emergency systems under normal or accident conditions. Sufficient radiation shielding, containment integrity, missile protection and habitability provisions are provided to permit access, exit, and continued occupancy of the control room for the duration of accident conditions such that aggregate radiation exposure to personnel would be below that specified by 10CFR50, Appendix A, General Design Criterion 19.

Considering the detailed station design provisions to ensure continuous Control Room access, it is unlikely (save for the required Control Room fire considerations) that the necessity could arise for evacuation of the Control Room. Nevertheless, provisions have been made to maintain the reactor in a safe hot standby condition if access to the Control Room is lost (e.g., Control Room fire). Hot standby is maintained as described in Section 7.4.1.3.2. Furthermore, cold shutdown can be achieved from outside the Control Room through the use of suitable procedures as described in Section 7.4.1.3.3. 32

7.4.1.3.1 Design Criteria

In designing for safe reactor shutdown in the event of Control Room evacuation, the following design criteria are applied.

1. Access back into the Control Room will generally be achieved prior to the initiation of cold shutdown except, of course, for a fire that destroys either the Control Room or the Cable Spreading 32

Room. The capability for bringing the reactor to cold shutdown conditions exists outside the Control Room through the use of suitable procedures and secondary controls as described in Section 7.4.1.3.3..

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2. Except for a Control Room or Cable Spreading Room fire, Control Room evacuation is initiated for an undefined cause (for example, control environment not habitable) and the event which causes Control Room evacuation does not degrade Control Room equipment.

3. Design basis accidents are not assumed to occur simultaneously with control room evacuation. However, loss of offsite power has been considered.

4. For four specific plant fires, shutdown capability is provided as follows:

Fire Location	Loss	Shutdown From
Cable Spreading Room (CSR)	Both Trains	Hot Shutdown Panel using Train A and Shutdown Transfer Panel transfer.
Control Room (CR)	Both Trains	Hot Shutdown Panel using Train A and Shutdown Transfer Panel transfer.
Hot Shutdown Panel (HSP)	Train B	Control Room using Train A
Shutdown Transfer Panel (STP)	Train A	Control Room using Train B

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For any other postulated plant fire, shutdown is accomplished from the Control Room utilizing either surviving train.

5. Except for a fire in the Control Room or Cable Spreading Room, loss of safety system redundancy does not occur as a result of the event requiring control room evacuation and all equipment in the control room and all automatic controls continue to function.

6. The Hot Shutdown Panel (HSP) and the Shutdown Transfer Panel (STP) including essential equipment mounted on them, are designed to withstand an SSE with no loss of essential functions. The essential local control stations are also designed to withstand an SSE with no loss of essential functions.

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7. The Hot Shutdown Panel is normally untended and is surrounded by a locked enclosure. Opening the enclosure doors will initiate an alarm in the Control Room. The Shutdown Transfer Panel is also normally untended and access to it is restricted via normally locked doors. Opening the enclosure doors will initiate an alarm in the Control Room.

8. The Hot Shutdown Panel, located in the switchgear area of the Safeguards Building, at elevation 831'-6", and the Shutdown Transfer Panel, located one floor below at elevation 810'-6", are easily accessible to Control Room operators through controlled access areas.

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Q040.23
Q040.64

9. Electrical separation for the Hot Shutdown Panel and the Shutdown Transfer Panel follows the same criteria as corresponding Control Room equipment. Loss of control or indication for one train for any reason will not affect its redundant counterpart.

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Q032.23
Q032.66

10. Controls on the Hot Shutdown Panel are provided with a transfer switch (at the Shutdown Transfer Panel for Train A and Hot

Shutdown Panel for Train B) that transfers control of equipment from the Control Room to the Hot Shutdown Panel. Placing this local transfer switch in the local position will electrically isolate all Control Room and Cable Spreading Room equipment from the rest of the circuitry, will provide audible and visible indication in the Control Room and will turn off status lights on the main control board. 32 Q032.25 Q032.23 Q032.66

11. Each control circuit consists of cables that 1) connect the transfer switches to control switches in the Control Room, 2) connect the transfer switches to the HSP-mounted control switches, 3) connect the transfer switches to the pertinent motor control center. Each of these cables are inherently separated from their redundant counterpart. In addition, the cables from the HSP to the Control Room and the motor control centers are external to the HSP for almost all of their run. Loss of a control circuit does not mean loss of function since control circuits are available at the HSP for each of the redundant systems. 11 Q040.64

12. To prevent a single event (e.g., short-circuit) from affecting both the Control Room controls and the HSP controls, control-circuit fuses are either located in equipment accessible in such an event (e.g., 6.9 KV and 480V switchgear) or separate fuses, located in separate fire zones, are provided for both the Control Room control circuit and the HSP control circuit.

The controls and monitoring indicators provided on the Hot Shutdown Panel and required for hot standby are listed in Table 7.4-1. Instrumentation and controls provided on the Hot Shutdown Panel for operating convenience or cold shutdown are listed in Table 7.4-2. Switches provided on the Shutdown Transfer Panel are listed in Table 7.4-3. Instrumentation and controls required for cold shutdown are marked with the letter (c) in Tables 7.4-1, 7.4-2 and 7.4-3. Those 32

32 marked with the letter (f) are added for Alternate Shutdown for a fire in the Control Room or Cable Spreading Room.

7.4.1.3.2 Hot Standby From Outside The Control Room

Should the Control Room become uninhabitable, the reactor will be manually tripped, the neutron level and control rod position will be verified before evacuation takes place. Also, the reactor can be tripped locally at the reactor trip switchgear which is in close proximity to the Hot Shutdown Panel.

13 Sufficient controls are provided outside the Control Room on a Seismic Category I Hot Shutdown Panel (See Tables 7.4-1 and 7.4-2) and other locations to:

- Achieve prompt hot standby of the reactor
- Maintain the unit in a safe condition during hot standby.

7.4.1.3.3 Cold Shutdown From Outside the Control Room

Cold shutdown can be achieved from outside the Control Room through the use of suitable procedures and by virtue of local control of the systems listed in Section 7.4.1.2. The design bases for the achievement and maintenance of cold shutdown are as listed in Section 7.4.1.3.1. Instrumentation and controls on the Hot Shutdown Panel, marked with the letter (c) on Tables 7.4-1 and 7.4-2, are utilized to attain cold shutdown outside the Control Room. In addition, certain local manipulations of controls and initiating devices, as described below, are required.

32 Q212.84 For cold shutdown from outside the Control Room due to a Control Room or Cable Spreading Room fire, see Section 7.4.1.3.4. The basic

procedure to established cold shutdown from the hot standby condition, for reasons other than fire in the Control Room or Cable Spreading Room and assuming the Control Room is uninhabitable, is as follows.

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1. Transfer control from the Control Room to the Hot Shutdown Panel, as required, using the transfer switches at the Shutdown Transfer Panel for Train A and the transfer switches at the Hot Shutdown Panel for Train B. Q212.84

2. Borate to the cold shutdown boron concentration using boric acid transfer pumps and charging pumps.

   Location: Hot Shutdown Panel.

   Available Indications: Reactor Coolant System (RCS) boron concentration determined by sampling.

3. Cooldown the RCS by use of the steam generator power-operated atmospheric relief valves. 9

   Location: Hot Shutdown Panel and local patch panel or manual handwheel operation. Q212.84

   Available Indications: RCS temperature, pressurizer pressure and level, steam generator level, auxiliary feedwater flow and condensate storage tank level.

4. Depressurize the RCS by throttling the pressurizer spray valve while maintaining pressurizer level.

   Location: Hot Shutdown Panel and local patch panel

Available Indications: pressurizer pressure and level, charging and letdown flow.

5. At 1900 psig in the RCS, block the low pressurizer pressure safety injection (SI) and the low steamline pressure SI signals.

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Location: Cable spreading room

Q212.84

Available Indications: Pressurizer pressure indication on the Hot Shutdown Panel.

6. At 1000 psig in the RCS, close the accumlator discharge isolation valves and rack out the safety injection pump and containment spray pump breakers.

Location: Switchgear and motor control centers.

Available Indications: Pressurizer pressure indication on the Hot Shutdown Panel.

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7. At 350^{o}F and 425 psig in the RCS, align the RCS for cooldown with the Residual Heat Removal System.

Q212.84

Location: Switchgear and Hot Shutdown Panel.

Available Indications: RCS pressure indication and RCS temperature indication on the Hot Shutdown Panel.

7.4.1.3.4 Alternate Shutdown System

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The Hot Shutdown Panel had been designed to enable control to a hot standby condition if, for unspecified but non-catastrophic reasons, the Control Room (CR) had to be evacuated. The circuits required for

shutdown on the Hot Shutdown Panel have been redesigned to comply with the CPSES fire protection requirements. The present design enables control via Train A equipment even if a complete loss of the Control Room or Cable Spreading Room is postulated due to fire. Thus, the Hot Shutdown Panel, Shutdown Transfer Panel and specific portions of the plant systems noted in this section function as the Alternate Shutdown System for CPSES for a fire in the Control Room or Cable Spreading Room.

The Hot Shutdown Panel and Shutdown Transfer Panel are each located in different fire zones which are, in turn, different from the fire zones associated with the Cable Spreading Room and Control Room.

Since the postulated complete loss of either the Cable Spreading Room or the Control Room would also cause the loss of both Train A and Train B shutdown control and associated monitoring, alternate shutdown capability was provided to survive this highly improbable catastrophe by: 32

1. Relocating Train A transfer circuits from the Hot Shutdown Panel to the Shutdown Transfer Panel,

2. Providing redundant Train A shutdown control circuits independent of the Control Room and Cable Spreading Room, and

3. Providing monitoring circuits for Train A shutdown systems which are independent of the Control Room and Cable Spreading Room equipment and cabling.

If the postulated fire occurs in the Control Room or Cable Spreading Room, the transfer of Train A will take place at the Shutdown Transfer Panel and the control of the required Train A shutdown equipment is established at the Hot Shutdown Panel. For this scenario, Train A has been chosen for alternate shutdown control with the requisite Train B and non-safety related indications independent of the Control Room and Cable Spreading Room.

The shutdown procedures are basically the same as described in Section 7.4.1.3.2 and 7.4.1.3.3. For cold shutdown, however, step 6 of Section 7.4.1.3.3 is carried out immediately.

32 To summarize, loss of either the Control Room or Cable Spreading Room will require Train A transfer from the Shutdown Transfer Panel and Train A control at the Hot Shutdown Panel. Loss of the Hot Shutdown Panel will require Train A control in the Control Room. Loss of the Shutdown Transfer Panel will require Train B control in the Control Room.

7.4.2 ANALYSIS

Hot standby is a stable plant condition that is automatically reached following a reactor trip from power. Additionally, the plant design features permit the achievement of cold shutdown as described in Section 7.4.1.2. In the unlikely event that access to the Control Room is restricted, the plant can be safely kept at hot standby by the use of the monitoring indicators and controls listed in Section 7.4.1.3 until the Control Room can be reentered. Furthermore, cold shutdown conditions can be achieved from outside the Control Room through the use of suitable procedures as described in Sections 7.4.1.3.3 and 7.4.1.3.4 and by virtue of local control of the equipment listed in Section 7.4.1.2, in conjunction with the instrumentation and controls
32 provided on the Hot Shutdown Panel and the Shutdown Transfer Panel (Tables 7.4-1, 7.4-2 and 7.4-3).

11 The discussions below demonstrate conformance to applicable General
Q032.14 Design Criteria (GDC), Regulatory Guides, and IEEE Standard 279-1971.
Q032.67 See also Table 7.1-2 for criteria applicable to all systems, Section 7.3, and other sections as referred to in the text.

7.4.2.1 General Analysis

1. Conformance to NRC General Design Criteria

a. GDC 19

The Hot Shutdown Panel and essential local control stations, discussed in Section 7.4.1.3, provide adequate controls and indications at locations outside the Control Room to maintain the reactor and the reactor coolant system in the safe shutdown condition and to ensure decay heat removal in the event the Control Room must be evacuated.

b. GDC 34

Essential controls are provided outside the control room on the Hot Shutdown Panel to ensure adequate decay heat removal from the Reactor Coolant System in the event the main Control Room must be evacuated.

2. Conformance to NRC Regulatory Guides

a. RG 1.29

The Hot Shutdown Panel, Shutdown Transfer Panel, and essential local control stations are designed to withstand the effects of a Safe Shutdown Earthquake (SSE) without loss of function or physical damage. The Hot Shutdown Panel, Shutdown Transfer Panel, and essential local control stations are classified as Seismic Category I components. 32

b. RG 1.75

25 Proper separation in accordance with Regulatory Guide 1.75 and IEEE Standard 384 is maintained within the Hot Shutdown Panel for Train A, Train B and non-Class 1E equipment and wiring.

3. Conformance to IEEE Standard 279-1971

32 The Hot Shutdown Panel and Shutdown Transfer Panel, including essential controls and indications, and the essential local control stations are designed to conform to applicable portions of IEEE Standard 279-1971. The control circuits at the Hot Shutdown Panel and essential local control stations are designed such that a single failure will not prevent proper protective action (maintaining safe hot standby) when required. This is accomplished by providing independent Class 1E power for the fully redundant controls for the systems required for safe shutdown.

To prevent interaction between the redundant systems, the control channels are wired independently and separated with no electrical connections between redundant control systems. Nonessential control circuits and nonessential monitor circuits are electrically isolated from essential controls and indications to prevent jeopardizing the reliability of the systems required for safe shutdown.

7.4.2.2 Analysis for Shutdown From Outside the Control Room

The discussion found in Section 7.4.2.1 is applicable. The additional guides, criteria, and standards listed in Table 7.1-1 apply only to the essential instrumentation and controls required for safe shutdown from outside the control room.

Also see the criteria applicability matrix, Table 7.1-2, for further information.

7.4.2.3 Consideration of Selected Plant Contingencies

7.4.2.3.1 Loss of Instrument Air Systems

Since electric-powered instrumentation is supplied from the Class 1E Power System, loss of the Instrument Air System will not degrade instrumentation required for safe shutdown. An analysis of the effect of loss of plant instrument air is provided in Section 9.3.1 and Table 9.3-3.

7.4.2.3.2 Loss of Cooling Water to Vital Equipment

Cooling water for safety-related systems is supplied by the Safety Chilled Water System (Section 9.4F), the Component Cooling Water System (Section 9.2.2), and the Station Service Water System (Section 9.2.1). Each of these systems is redundant; therefore the loss of any one cooling loop or instrumentation associated with that loop will not degrade the safety-related equipment serviced by the system. Also see the analyses presented in Sections 9.4F, 9.2.1 and 9.2.2 and Tables 9.2-1 and 9.2-5.

7.4.2.3.3 Plant Load Rejection, Turbine Trip, and Loss of Offsite Power

In the event of loss of offsite power associated with plant load rejection or turbine trip, power for safe shutdown is provided by the onsite Class 1E power systems. The description of the power systems is presented in Section 8.3. The standby diesel generators will provide power for the operation of safety-related equipment. The station batteries will provide DC power for the operation of control and instrumentation required to actuate and control essential components.

CPSES/FSAR
TABLE 7.4-1
(SHEET 1 of 4)

INSTRUMENTATION AND CONTROL
LOCATED ON HOT SHUTDOWN PANEL

Identification		Function
LI-501A	(C)	Steam generator 1 - level
LI-502A	(C)	Steam generator 2 - level
LI-503A	(C)	Steam generator 3 - level
LI-504A	(C)	Steam generator 4 - level
PI-514B		Steam generator 1 - pressure
PI-524B		Steam generator 2 - pressure
PI-534B		Steam generator 3 - pressure
PI-544B		Steam generator 4 - pressure
LI-459B	(C)	Pressurizer - level
LI-460B	(C)	Pressurizer - level
PI-455B	(C)	Pressurizer - pressure
LI-2478B	(C)	Condensate storage tank - level
LI-2479B	(C)	Condensate storage tank - level
HS-2450C	(C)	Motor-driven AFW pump 01 - local control
HS-2451C	(C)	Motor-driven AFW pump 02 - local control
HS-2451B	(C)	Motor-driven AFW pump 02 - local/remote
1/1-APCH1L	(C)	Charging pump 1 - control
1/1-APCH2L	(C)	Charging pump 2 - control
43/1-APCH2L	(C)	Charging pump 2 - local/remote
1/1-APBA1L	(C)	Boric acid transfer pump 1 - control
1/1-APBA2L	(C)	Boric acid transfer pump 2 - control

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(C) - Required for Cold Shutdown

CPSES/FSAR
TABLE 7.4-1
(SHEET 2 of 4)

INSTRUMENTATION AND CONTROL
LOCATED ON HOT SHUTDOWN PANEL

Identification		Function	
43/1-APBA2L	(C)	Boric acid transfer pump 2 - local/remote	
HS-4250C	(C)	SSW pump 01 - local/control	32
HS-4251C	(C)	SSW pump 2 - local control	
HS-4251B	(C)	SSW pump 2 - local/remote	
HS-4518C	(C)	CCW pump 01 - local control	32
HS-4519C	(C)	CCW pump 2 - local control	
HS-4519B	(C)	CCW pump 2 - local/remote	
43/1-456FT	(F)	Pressurizer PORV remote local	
1/1-456FL	(F)	Pressurizer PORV local control	
1-HS-2456FT	(F)	Motor-driven AFWP-1/recirculation valve local control	
1-HS-4286FL	(F)	SSW pump-1 discharge valve local control	
1-HS-4393FL	(F)	Diesel generator-A service water control valve local control	32
1-HS-4699FL	(F)	CCW to Reactor Coolant pump coolers isolation valve local control	
1-HS-4701FL	(F)	RCP motor air and lube oil coolers CCW return header isolation valve	
1-HS-4514FL	(F)	CCW heat exchanger to non-safety loop-1 control valve local control	
1-HS-4524FL	(F)	Non-safety loop return to CCW header isolation valve local control	

(C) - Required for Cold Shutdown
(F) - Added for Fire Protection - Alternate Shutdown

CPSES/FSAR
TABLE 7.4-1
(SHEET 3 of 4)

INSTRUMENTATION AND CONTROL
LOCATED ON HOT SHUTDOWN PANEL

Identification	Function
1-HS-4526FL	(F) CCW to non-safety loop isolation valve local control
1/1-8106FL	(F) Charging pumps to Reactor Coolant System isolation valve local control
1/1-8801AF	(F) Charging pumps to Reactor Coolant System SIS isolation valve local control
43/1-8153FT	(F) Reactor Coolant System excess letdown valve remote local
1/1-8153FL	(F) Reactor Coolant System excess letdown valve local control
1/1-8110FL	(F) Charging pump miniflow isolation valve local control 32
1/1-APRH1F	(F) RHR pump-1 local control
1/1-8701AF	(F) RHR loop-1 inlet isolation valve local control
1/1-8701BF	(F) RHR Loop-2 inlet isolation valve local control
1-HS-2333FL	(F) Main Steam loop-1 isolation and bypass valves local control
1-HS-2334FL	(F) Main Steam loop-2 isolation and bypass valves local control
1-HS-2335FL	(F) Main Steam loop-3 isolation and bypass valves local control
1-HS-2336FL	(F) Main Steam loop-4 isolation and bypass valves local control

(F) - Added for Fire Protection - Alternate Shutdown

CPSES/FSAR
TABLE 7.4-1
(SHEET 4 of 4)

INSTRUMENTATION AND CONTROL
LOCATED ON HOT SHUTDOWN PANEL

Identification	Function
1/1-455AFL	(F) Pressurizer power relief valve local control
1-HS-6700FL	(F) Chilled water recirculation pump 5 local control
CS/BT-1EA1L	(F) Tie breaker BT-1EA1 local control
CS/T1EB1L	(F) Bus 1EA1 transfer T1EB1 feeder breaker local control
CS/1EB1-1L	(F) Incoming breaker 1EB1-1 local control
CS/T1EB3L	(F) Bus 1EA1 transfer T1EB3 feeder breaker local control
CS/1EB3-1L	(F) Incoming breaker 1EB3-1 local control
CS/BT-1EB13L	(F) Tie breaker BT-1EB13 local control

32

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*Hand/Auto station with built-in transfer device to block control room signal and initiate control room local override alarm

SSW - Station Service Water System
CCW - Component Cooling Water System
AFW - Auxiliary Feedwater System

(F) - Added for Fire Protection - Alternate Shutdown

CPSES/FSAR
TABLE 7.4-2
(SHEET 1 OF 6)

OTHER INSTRUMENTATION AND CONTROLS
LOCATED ON HOT SHUTDOWN PANEL

Identification		Function	
FK-121A	(C)	Pressurizer Level Control Valve - Valve Control (Charging Flow Control)	
1/1-8149AL	(C)	Letdown valve 8149A - control	32
1/1-8149BL	(C)	Letdown valve 8149B - control	32
1/1-8149CL	(C)	Letdown valve 8149C - control	32
SK-2452B*		Turbine-driven AFW pump - speed control	
SI-2452B		Turbine-driven AFW pump - speed indication	
HS-2452C		Turbine-driven AFW pump - local control	
HS-2452E		Turbine-driven AFW pump - local control	
HS-2452D		Turbine-driven AFW pump - local/remote	
FK-2459B*		Turbine-driven AFW pump to steam generator 1-valve control	
FK-2453C*	(C)	Motor-driven AFW pump 01 to steam generator 1-valve control	
FK-2460B*		Turbine-driven AFW pump to steam generator 2-valve control	
FK-2453D*	(C)	Motor-driven AFW pump 01 to steam generator 1-valve control	
FK-2461B*		Turbine-driven AFW pump to steam generator 3-valve control	
FK-2454C*	(C)	Motor-driven AFW pump 02 to steam generator 3-valve control	
FK-2462B*		Turbine-driven AFW pump to steam generator 4-valve control	
FK-2454D*	(C)	Motor-driven AFW pump 02 to steam generator 4-	

(C) Required for Cold Shutdown

CPSES/FSAR
TABLE 7.4-2
(SHEET 2 OF 6)

OTHER INSTRUMENTATION AND CONTROLS
LOCATED ON HOT SHUTDOWN PANEL

Identification	Function	
	valve control	
1/1-PCPR1L	Pressurizer heater backup - Group A control	32
1/1-PCPR2L	Pressurizer heater backup - Group B control	
43/1-PCPR2L	Pressurizer heater backup - Group B local/remote	
RCS	(C) Reactor Coolant System Wide-Range Temperature	
NI-31F	NIS Source-Range Indication	
NI-32F	NIS Source-Range Indication	
FI-121B	(C) Charging Pump to CVCS Charging and RCP Seals - Flow	
FI-183B	Boric Acid Filter Recovery Line - Flow	
FI-132B	(C) Letdown - flow	
1/1-8104L	Emergency boration valve - control	
43/1-8104L	Emergency boration valve transfer - local/remote	
1/1-TCV-129L	Letdown divert valve TCV-129 - control	32
HS-5405C	Containment recirculation fan 01 - control	32
HS-5409B	Containment recirculation fan 02 - control	
HS-5409C	Containment recirculation fan 02 - local/remote	
HS-5413C	Containment recirculation fan 03 - control	32
HS-5417C	Containment recirculation fan 04 - control	
HS-5417B	Containment recirculation fan 04 - local/remote	
FI-2463D	(C) AFW to steam generator 1 - flow	
FI-2463B	(C) AFW to steam generator 1 - flow	

(C) Required for Cold Shutdown

CPSES/FSAR
TABLE 7.4-2
(SHEET 3 OF 6)

OTHER INSTRUMENTATION AND CONTROLS
LOCATED ON HOT SHUTDOWN PANEL

Identification	Function
FI-2464D	(C) AFW to steam generator 2 - flow
FI-2464B	(C) AFW to steam generator 2 - flow
FI-2465D	(C) AFW to steam generator 3 - flow
FI-2465B	(C) AFW to steam generator 3 - flow
FI-2466D	(C) AFW to steam generator 4 - flow
FI-2466B	(C) AFW to steam generator 4 - flow
PI-2477B	Turbine-driven AFW pump - suction pressure
PI-2455B	Turbine-driven AFW pump - discharge pressure
PI-2475B	Motor-driven AFW pump 01 - suction pressure
PI-2453B	Motor-driven AFW pump 01 - discharge pressure
PI-2476B	Motor-driven AFW pump 02 - suction pressure
PI-2454B	Motor-driven AFW pump 02 - discharge pressure
FI-4258B	(C) SSW ~~train A~~ pump 1 - flow
FI-4259B	(C) SSW ~~train B~~ pump 2 - flow
PI-4252B	SSW pump 01 - discharge pressure
PI-4253B	SSW pump 2 - discharge pressure
V-1EA1-L	6900-V bus 1EA1 - voltage
F-1EA1-L	6900-V bus 1EA1 - frequency
A-1EA1-1L	6900-V bus 1EA1, preferred offsite source - amperes
A-1EG1-L	6900-V bus 1EA1, onsite source - amperes
A-1EA1-2L	6900-V bus 1EA1, alternate offsite source - amperes

(C) Required for Cold Shutdown

CPSES/FSAR
TABLE 7.4-2
(SHEET 4 OF 6)

OTHER INSTRUMENTATION AND CONTROLS
LOCATED ON HOT SHUTDOWN PANEL

Identification	Function
CS-1EA1-1L	6900-V bus 1EA1, preferred offsite source breaker-control switch
CS-1EG1-L	6900-V bus 1EA1, onsite source breaker - control switch
CS-1EA1-2L	6900-V bus 1EA1, alternate offsite source breaker - control switch
V-1EA2-L	6900-V bus 1EA2 - voltage
F-1EA2-L	6900-V bus 1EA2 - frequency
A-1EA2-2L	6900-V bus 1EA2, alternate offsite source - amperes
A-1EG2-L	6900-V bus 1EA2, onsite source - amperes
A-1EA2-1L	6900-V bus 1EA2, preferred offsite source - amperes
CS-1EA2-2L	6900-V bus 1EA2, alternate offsite source breaker - selector switch
CS-1EG2-L	6900-V bus 1EA2, onsite source breaker - control switch
CS-1EA2-1L	6900-V Bus 1EA2, preferred offsite source breaker - control switch
43-1EA2-2	6900-V bus 1EA2, alternate offsite source breaker - selector switch
43-1EG2	6900-V bus 1EA2, onsite source breaker - selector switch
43-1EA2-1	6900-V bus 1EA2, preferred offsite source breaker - selector switch

32

CPSES/FSAR
TABLE 7.4-2
(SHEET 5 OF 6)

OTHER INSTRUMENTATION AND CONTROLS
LOCATED ON HOT SHUTDOWN PANEL

Identification	Function
1-ZL-2476B	Motor-driven AFWP-2 suction pressure status light
1-ZL-2454C	Motor-driven AFWP-2 discharge to SG-3 control valve
1-ZL-2454D	Motor-driven AFWP-2 discharge to SG-4 control valve
1-ZL-2459B	Turbine-driven AFWP discharge to SG-1 control valve
1-ZL-2460B	Turbine-driven AFWP discharge to SG-2 control valve
1-ZL-2453C	Motor-driven AFWP-1 discharge to SG-1 control valve
1-ZL-2475B	Motor-driven AFWP-1 suction pressure status light
1-ZL-2453D	Motor-driven AFWP-1 discharge to SG-2 control valve
1-ZL-2461B	Turbine-driven AFWP discharge to SG-3 control valve
1-ZL-2462B	Turbine-driven AFWP discharge to SG-4 control valve
ZL-455 CF	(F) Pressurizer spray valve
ZL-455 BF	(F) Pressurizer spray valve
ZL-PCPX 1F	(F) RCP-1 running
ZL-PCPX 2F	(F) RCP-2 running
ZL-PCPX 3F	(F) RCP-3 running
ZL-PCPX 4F	(F) RCP-4 running

(F) Added for Fire Protection - Alternate Shutdown

32

OTHER INSTRUMENTATION AND CONTROLS
LOCATED ON HOT SHUTDOWN PANEL

Identification	Function
TR-413F/423F	(F) Reactor Coolant System loop-1 & 2 wide range temperature
TR-433F/443F	(F) Reactor Coolant System loop-3 & 4 wide range temperature
HS-5180F	(F) Steam generator blowdown drains
MLB-63	(F) Train B shutdown valves
HC-2325	(F) SG-1 PORV
HC-2326	(F) SG-2 PORV
HC-2327	(F) SG-3 PORV
HC-2328	(F) SG-4 PORV
HC-455C	(F) Pressurizer spray valve
HC-606	(F) RHR discharge control valve
HC-618	(F) RHR minimum flow valve

32

* Hand/Auto station with built-in transfer device to block control room signal and initiate control room local override alarm

SSW - Station Service Water System

CCW - Component Cooling Water System

AFW - Auxiliary Feedwater System

(F) - Added for Fire Protection - Alternate Shutdown

CPSES/FSAR
TABLE 7.4-3
(SHEET 1 of 4)

TRANSFER SWITCHES LOCATED ON SHUTDOWN TRANSFER PANEL (STP)

Identification		Function
HS-2450B	(C)	Motor-driven AFWP-1 remote local
HS-2453AF	(F)	Motor-driven AFWP-1 to SG-1 control valve remote local
HS-2453BF	(F)	Motor-driven AFWP-1 to SG-2 control valve remote local
HS-2456FT	(F)	Motor-driven AFWP-1 recirculation valve remote local
43/1-121-FT	(F)	Pressurizer level control valve remote local
HS-4250B	(C)	SSW pump-1 remote local
HS-4286FT	(F)	SSW pump-1 discharge valve remote local
HS-4393FT	(F)	Diesel generator-A service water control valve remote local
HS-4699FT	(F)	CCW to Reactor Coolant pump coolers isolation valve remote local
HS-4701FT	(F)	RCP motor air and lube oil coolers CCW return header isolation valve remote local
HS-4518B	(C)	CCW pump-1 remote local
HS-4514FT	(F)	CCW heat exchanger to non-safety loop-1 control valve remote local
HS-4524FT	(F)	Non-safety loop return to CCW header isolation valve remote local
HS-4526FT	(F)	CCW to non-safety loop isolation valve remote local
HS-5405B		Containment recirculation fan 01 remote local

(F) Added for Fire Protection - Alternate Shutdown

32

CPSES/FSAR
TABLE 7.4-3
(SHEET 2 of 4)

TRANSFER SWITCHES LOCATED ON SHUTDOWN TRANSFER PANEL (STP)

Identification		Function
43/1-APCH1L	(C)	Centrifugal charging pump-1 remote local
43/1-APBA1L	(C)	Boric acid transfer pump-1 remote local
HS-5413B		Containment recirculation fan 03 remote local
43/1-8106FT	(F)	Charging pumps to Reactor Coolant System isolation valve remote local
43/1-8801AF	(F)	Charging pumps to Reactor Coolant System SIS isolation valve remote local
43/1-8149AL	(C)	CVCS letdown orifice isolation valve remote local
43/1-8149BL	(C)	CVCS letdown orifice isolation valve remote local
43/1-8149CL	(C)	CVCS letdown orifice isolation valve remote local
43/1-8110FT	(F)	Charging pump miniflow isolation valve remote local
43/1-APRH1F	(F)	RHR pump-1 remote local
43/1-8701AF	(F)	RHR loop 1 inlet isolation valve remote local
43/1-8701BF	(F)	RHR loop 2 inlet isolation valve remote local
HS-2452B		Turbine-driven AFWP steam supply header#1 valve remote local
43/1-TCV-129L		Letdown to demineralizer or volume control tank remote local
HS-2333FT	(F)	Main Steam loop 1 isolation and bypass valves remote local

(F) Added for Fire Protection - Alternate Shutdown

32

CPSES/FSAR
TABLE 7.4-3
(SHEET 3 of 4)

TRANSFER SWITCHES LOCATED ON SHUTDOWN TRANSFER PANEL (STP)

Identification		Function
HS-2334FT	(F)	Main Steam loop 2 isolation and bypass valves remote local
HS-2335FT	(F)	Main Steam loop 3 isolation and bypass valves remote local
HS-2336FT	(F)	Main Steam loop 4 isolation and bypass valves remote local
43/1-455AFT	(F)	Pressurizer power relief valve remote local
43/1-PCPR1L		Pressurizer heater backup group-A remote local
HS-XT	(F)	Water chiller control remote local
HS-6700FT	(F)	Chilled water recirculation pump-5 remote local
43/1EA1-1		Incoming breaker 1EA1-1 remote local
43/1EA1-2		Incoming breaker 1EA1-2 remote local
43/1EG1		Diesel generator breaker 1EG1 remote local
43/BT-1EA1	(F)	Tie breaker BT-1EA1 remote local
43/T1EB1	(F)	Bus 1EA1 transfer T1EB1 feeder breaker remote local

32

(F) Added for Fire Protection - Alternate Shutdown

CPSES/FSAR
TABLE 7.4-3
(SHEET 4 of 4)

TRANSFER SWITCHES LOCATED ON SHUTDOWN TRANSFER PANEL (STP)

Identification	Function
43/1EB1-1	(F) Incoming breaker 1EB1-1 remote local
43/T1EB3	(F) Bus 1EA1 transfer 1EB3 feeder breaker remote local
43/1EB3-1	(F) Incoming breaker 1EB3-1 remote local
43/BT-1EB13	(F) Tie breaker BT-1EB13 remote local

32

* Hand/Auto station with built-in transfer device to block control room signal and initiate control room local override alarm

SSW - Station Service Water System

CCW - Component Cooling Water System

AFW - Auxiliary Feedwater System

(F) Added for Fire Protection - Alternate Shutdown

ATTACHMENT D

FSAR SECTION 9.5

(SELECTED PAGES)

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not labeled as a fire-rated door because of the wicket.

Since the fire barrier rating is greater than the postulated fire duration, and since the area is a controlled occupational access area, there will not be an unacceptable radiation release to the environment or other areas of the plant due to a fire.

9. Fire Area 9

The safety-related essential systems and components located in Fire Area 9 are:

a. Safety-related cables, Train A

b. Safety-related cables, Train B

c. 6.9-kV and 480-V switchgear, Train A

d. Motor control center, Train A

e. Fan coil units, Train A

f. Electrical penetration assemblies, Train A

g. Shutdown Transfer Panel, Train A

32

Fire Area 9, shown on Figure 9.5-2, is located on elevation 810 ft 6 in. of the Safeguards Building Unit 1. The only mechanical components in this area are two HVAC fan coil units located in a one-foot-thick reinforced concrete enclosure. The enclosure is not rated because the only combustible materials in the area are the cables serving the fan coil units.

As shown on Figure 9.5-38, the combustible loading for this area is classified a medium hazard which limits the maximum fire duration to less than 90 minutes, assuming all combustible material (electrical cable jacket and insulation material) in the area burns. This assumption is conservative, because the cable is self-extinguishing, fire retardant, and nonpropagating in accordance with the requirements of IEEE 383-1974.

Fire detectors are provided in this area to enable rapid fire detection. Figure 9.5-38 defines the number and type of fire detectors.

A portion of this fire area is protected by a pre-action sprinkler system, designed to provide general area coverage. In addition, where required by section 9.5.1.2.3.8, directional sprinklers are installed in areas where there is a high density of safety related cable trays. The locations and water spray densities are described in Figures 9.5-2 and 9.5-38. The detectors used to actuate these sprinklers have been class "A" wired. 32

Where required by section 9.5.1.2.3.9, Train B essential safety-related cabling is protected by a one-hour rated fire barrier.

Hose stations and portable extinguishers are provided as a backup to the sprinkler systems.

A fire in this area will effect only Train A electrical equipment and cabling. The plant can be safely shutdown using the redundant safety train equipment.

The rated fire barriers which physically separate Fire Area 9 from adjacent areas are constructed of poured, reinforced concrete walls and floor with approved doors, fire dampers, and penetration seals of equivalent rating. As stated in Subsection 9.5.1.3.1, Item 8, door S-29c is designed and constructed to UL requirements, but is not labeled as a fire door because of a manway wicket in the door. The wicket is designed and constructed to the same requirements as door S-29c. The location of the door with respect to the combustible material in the area does not present a potential hazard to the adjacent area. Stairwell S-5, located in the corner of Fire Area 9, is enclosed in a two-hour rated fire barrier. See section 9.5.1.5.3.3 for further description.

Since the fire barrier rating is greater than the postulated fire duration, and since the area is a controlled occupational access area, there will not be an unacceptable radiation release to the environment or other areas of the plant due to a fire.

10. Fire Area 10

The safety-related essential systems and components located in Fire Area 10 are:

a. Diesel generator, Train A

b. Diesel generator, instrumentation and control equipment and cables, Train A

c. Diesel generator, Jacket water and lube oil coolers, Train A

d. Diesel generator, Air receivers, air dryers, air intake filters, compressors and after coolers, Train A

The rated fire barriers which physically separate Fire Area 15 from adjacent fire areas are constructed of poured, reinforced concrete walls and floors with approved fire doors, fire dampers, and penetration seals of equivalent rating.

Since the fire barrier rating is greater than the postulated fire duration, and since the area is a controlled occupational access area, there will not be an unacceptable radiation release to the environment or other areas of the plant due to a fire.

18. Fire Area 16

The safety-related essential systems and components located in Fire Area 16 are:

a. Hot shutdown panel, Trains A and B
(See section 7.4.1.3.4 for description)

32

b. Safety-related cables, Train A and B

Fire Area 16, shown on Figure 9.5-3, is located on elevation 831 ft 6 in. of the Safeguards Building Unit 1. Fire Area 16 also contains non-safety related electrical equipment, penetrations and cables as well as the equipment listed above.

The cables routed in this area are predominantly control and instrumentation. They are self-extinguishing, fire retardant, and nonpropagating in accordance with the requirements of IEEE 383-1974.

32

As shown on Figure 9.5-38, the combustible loading for this area is classified a medium hazard, which limits the maximum fire duration to less than 60 minutes, assuming all combustible material (electrical cable jacket and insulation material) in the

area burns. This assumption is conservative, because the cable is self-extinguishing, fire retardant, and nonpropagating in accordance with the requirements of IEEE 383-1974.

Class "A" wired fire detectors are provided in this area to enable rapid fire detection and to actuate the suppression system. Figure 9.5-38 defines the number and type of fire detectors in this area.

A portion of this fire area is protected by a pre-action sprinkler system designed to provide general area coverage. Figure 9.5-3 and 9.5-38 describe the protected area and the water spray density of the sprinkler system. 32

Where required by Section 9.5.1.2.3.9, one train of essential safety-related cabling is protected by a one-hour rated fire barrier.

Hose stations and portable extinguishers are also provided as a backup to the sprinkler system.

In the event of a fire in this area, shutdown is achieved from the control room. See Section 7.4.1.3.4. 32

The rated physical barriers which physically separate Fire Area 16 from adjoining areas of the plant are constructed of poured, reinforced concrete with doors, fire dampers, and penetration seals of an equivalent rating. Stairwell S-5, located in the corner of Fire Area 16, is enclosed in a two-hour rated barrier, as described in section 9.5.1.5.3. This stairwell serves as a means of and access for Fire Area 16.

Since the fire barrier rating is greater than the postulated fire duration, and since the area is a controlled occupational access area, there will not be an unacceptable radiation release to the environment or other areas of the plant due to a fire.

19. Fire Area 144

The safety-related essential systems and components located in Fire Area 144 are:

a. Safety-related piping and cables, Train A

b. Safety-related piping and cables, Train B

Fire area 144, shown on Figure 9.5-3 is located on elevation 831 ft. 6 in. of the Safeguards Building, Unit 1. This area is a piping penetration area for non-radioactive piping.

As shown on figure 9.5-38, the combustible loading for Fire Area 144 is classified a light hazard which limits the maximum fire duration to less than 30 minutes, assuming all combustible material (electrical cable jackets and insulation) in the area burns. This assumption is conservative, because the cable is self-extinguishing, fire retardant, and nonpropagating in accordance with the requirements of IEEE 383-1974.

830 ft 0 in. There are no combustible materials in the area.

As shown on Figure 9.5-39, the combustible loading for this area is classified a low hazard. A fire in this area does not affect the safe shutdown of the plant.

The rated fire barriers which physically separate Fire Area 62 from adjacent plant areas are constructed of poured, reinforced concrete walls rated at two hours with approved fire doors and dampers of equivalent rating. Where the stairwell connects with a medium hazard area, three-hour rated fire doors are provided to maintain the integrity of the adjacent area fire barrier. The stairwell rating is in accordance with NFPA and OSHA requirements for stairwell enclosures.

21. Fire Area 63

The safety-related essential equipment and components located in this fire area are:

a. Safety-related cables, Unit 2, Trains A and B.

b. Termination cabinents and distribution panelboards, Unit 2, Trains A and B.

Fire Area 63, shown on Figure 9.5-14, is located at elevation 807 ft 0 in. of the Electrical and Control Building. This fire area is the Unit 2 Cable Spreading Room. There is no mechanical equipment located in this area. In addition to the cables listed above, there are non-safety-related cables extending through this area. All cables in this area are self-extinguishing, fire retardant, and nonpropagating, in accordance with the requirements of IEEE 383-1974.

As shown on Figure 9.5-39, the combustible loading for this area is classified a high hazard. The method of assigning a fire duration to a fire in this area is inappropriate as a fire involving IEEE 383-1974 qualified cables would propagate very slowly, if at all.

In the event a fire occurs in this fire area, alternate shutdown systems and procedures are provided to ensure safe shutdown independent of the Cable Spreading Room. See section 7.4.1.3.4 for a description of these systems. 32

Fire detectors are provided throughout this area to enable rapid fire detection, and to actuate the primary fire suppression system. Figure 9.5-39 defines the number and type of fire detectors in this area.

This fire area is provided with a total-flooding-automatically actuated Halon system. Section 9.5.1.4.2.2 describes the design of the Halon fire suppression systems.

As a backup to the Halon system, the fire area is protected by an automatic wet-pipe sprinkler system, designed to provide general area coverage. Figure 9.5-39 defines the sprinkler system design density. In addition, hose stations and portable extinguishers are provided for extinguishment of small fires. A minimum height of seven feet is maintained between the bottom of the lowest tray and the floor of the area to faciliate manual fire fighting.

Shields are provided for electrical equipment where discharge of a sprinkler system could damage essential safety-related electrical equipment.

The three-hour rated fire barriers which physically separate Fire Area 63 from the adjacent plant areas are constructed of poured,

reinforced concrete with approved fire doors, dampers, and penetration seals of equivalent rating. The fire dampers are equipped with automatic Halon override to ensure closure upon actuation of the fixed Halon system.

A fire in this area will not result in a radiation release because there are no radioactive materials in the area. The area is considered an uncontrolled, unrestricted access area.

22. Fire Area 64

The safety-related essential equipment and components located in this fire area are:

a. Safety-related cables, Unit 1, Trains A and B

b. Termination cabinents and distribution panelboards, Unit 1, Trains A and B.

Shown on Figure 9.5-14, Fire Area 64 is located at elevation 807 ft 0 in. of the Electrical and Control Building. This fire area is the Unit 1 Cable Spreading Room. There is no mechanical equipment located in this area. In addition to the cables listed above, there are non-safety-related cables extending through this area. All cables in this area are self-extinguishing, fire retardant and nonpropagating, in accordance with the requirements of IEEE 383-1974.

As shown on Figure 9.5-39, the combustible loading for this area is classified a high hazard. The method of assigning a fire duration to a fire in this area is inappropriate, as a fire involving IEEE 383-1974 qualified cable would propagate very slowly, if at all.

In the event a fire occurs in this fire area, alternate shutdown systems and procedures are provided to ensure safe shutdown independent of the Cable Spreading Room. See section 7.4.1.3.4 for a description of these systems. 32

Fire detectors are provided throughout this area to enable rapid fire detection, and to actuate the primary Fire Suppression System. Figure 9.5-39 defines the number and type of fire detectors in this area.

This fire area is provided with a total-flooding-automatically-actuated Halon sytem. Section 9.5.1.4.2.2 described the design of the Halon fire suppression systems.

As a backup to the Halon system, the fire area is protected by an automatic wet-pipe sprinkler system, designed to provide general area coverage. Figure 9.5-39 defines the sprinkler system design density. In addition, hose stations and portable extinguishers are provided in this area for extinguishment of small fires. A minimum height of seven feet is maintained between the bottom of the lowest tray and the floor of the area to faciliate manual fire fighting.

Shields are provided for electrical equipment where discharge of a sprinkler system could damage essential safety-related electrical equipment.

The three-hour rated fire barriers which physcially separate Fire Area 64 from the adjacent plant areas are constructed of poured, reinforced concrete with approved fire doors, dampers, and penetration seals of equivalent rating. The fire dampers are equipped with automatic Halon overrides to ensure closure upon actuation of the fixed Halon system.

A fire in this area will not result in a radiation release because there are no radioactive materials in the area. The area is considered an uncontrolled, unrestricted access area.

23. Fire Area 65

Fire Area 65 is the Control Room complex. This area encompasses the main control consoles, the auxiliary relay panels, the production supervisors area, the locker room and lavatory, the kitchen area, and the observation area. Shown on Figures 9.5-15, 9.5-18 and 9.5-19, the control room complex on elevations 830 ft 0 in. and 840 ft 6 in. and is common to both units. Three-hour fire rated physical separation is maintained between this area and adjacent plant areas.

As shown on Figure 9.5-39, the combustible loading for Fire Area 65 is classified a light hazard which limits the maximum fire duration to less than 30 minutes.

Fire detectors are provided at the following locations in this fire area to enable rapid fire detection:

a. Inside each main control console

b. Below the false ceiling in the main console area.

c. Below the false ceiling in the auxiliary relay panel area.

d. Above the false ceiling wherever cabling is routed.

e. In the locker room, kitchen, and production supervisors office.

f. In the control room observation area.

g. In the ventilation supply and return ductwork.

Hose stations and portable extinguishers are provided in this fire area for fire extinguishment. Figures 9.5-15 and 9.5-39 defines the type and location of the fire extinguishing equipment in the control room.

The production supervisor's office, the kitchen area, and the locker room and lavatory are separated from the main control console area by concrete walls containing windows. Rated fire barriers are not required at these locations because of the low amount of combustible material present. A fire outside of Fire Area 65 will not affect the habitability of the control room.

In the event that a fire occurs in this fire area, alternate shutdown systems and procedures are provided to ensure safe shutdown independant of the Control Room. See section 7.4.1.3.4 for a description of these systems. 32

The rated fire barriers which separate this area from other areas of the plant are constructed of poured, reinforced concrete or gypsum dry walls with approved fire doors, fire dampers, and penetration seals of equivalent rating.

A fire in this area will not result in a radiation release because there are no radioactive materials in this area. The area is considered an uncontrolled, unrestricted access area.

24. Fire Area 66

There are no safety-related systems and components located in Fire Area 66. This area contains the Unit 2 computer room. Shown on Figure 9.5-15, it is located at elevation 830 ft 0 in. of the Electrical and Control Building.

The rated fire barriers which physically separate Fire Area 83 from adjacent areas are constructed of poured, reinforced concrete walls and floors with approved doors, fire dampers, and penetration seals of equivalent rating. The barrier between Fire Areas 83 and 84 includes a manually operated rollup steel door (Door S-29c) with a manway wicket. This door is constructed in accordance with UL requirements for rollup steel doors, but it is not labeled as a fire rated door because of the wicket. See Section 9.5.1.5.3.3 for further description.

Since the area fire barrier rating is greater than the postulated fire duration, and since the area is a controlled occupational access area, there will not be an unacceptable radiation release to the environment or other areas of the plant due to a fire.

9. Fire Area 84

The safety-related components located in Fire Area 84 are:

a. Safety-related cables, Train A

b. Safety-related cables, Train B

c. 6.9-kV and 480-V switchgear, Train A

d. Motor control center, Train A

e. Emergency fan coil units, Train A

f. Electrical penetration assemblies, Train A

32 | g. Shutdown Transfer Panel, Train A

Fire Area 84, shown on Figure 9.5-8, is located on elevation 810 ft 6 in. of the Safeguards Building Unit 2. The only mechanical components in this area are two HVAC emergency fan coil units located in a one-foot-thick reinforced concrete enclosure. The enclosure is not rated because the only combustible materials in the area are the cables serving the fan coil units.

As shown on Figure 9.5-40, the combustible loading for this area is classified as a medium hazard which limits the maximum fire duration to less than 90 minutes, assuming all combustible material (electrical cable jacket and insulation material) in the area burns. The assumption is conservative, because the cable is self-extinguishing, fire-retardant, and nonpropagating in accordance with the requirements of IEEE 383-1974.

Fire detectors are provided to enable rapid fire detection. Figure 9.5-40 defines the number and type of fire detectors in this area.

A portion of this fire area is protected by a pre-action sprinkler system, designed to provide general area coverage. Automatic sprinklers designed to apply water directly on cable trays are also installed where there is a high density of safety-related cable trays, as described in Section 9.5.1.2.3.8. The detectors used to actuate these sprinklers have been Class "A" wired. 32

Where required by Section 9.5.1.2.3.9, safety-related Train B cabling in this area is protected by a one-hour rated fire barrier.

Hose stations and portable extinguishers are provided as a backup to the fixed sprinkler systems. 32

Based on the above considerations, a fire in this area will affect only the Train A safety-related cables in the area. The redundant safety train equipment is available to safely shutdown the plant.

The rated fire barriers which physically separate Fire Area 84 from adjacent areas are constructed of poured, reinforced concrete walls and floor with approved doors, fire dampers, and penetration seals of equivalent rating. As stated in Subsection 9.5.1.3.1, Item 8 Door S-29c is designed and constructed to UL requirements but is not labeled as a fire door because of the wicket. The location of the door with respect to the combustible material in the area does not present a potential hazard to the adjacent area. Stairwell S-5, located in the corner of Fire Area 84, is enclosed in a two-hour rated fire barrier. See Section 9.5.1.5.3.3 for further description.

Since the fire barrier rating is greater than the postulated fire duration, and since the area is a controlled, occupational access area, there will not be an unacceptable radiation release to the environment or other areas of the plant due to a fire.

10. Fire Area 85

The safety-related components located in Fire Area 85 are:

a. Diesel generator, Train A

b. Diesel generator instrumentation and control equipment and cables, Train A

c. Diesel generator jacket water and lube oil coolers, Train A

d. Diesel generator air receivers, air dryers, air intake filters, compressors and after coolers, Train A

Since the fire barrier rating is greater than the postulated fire duration, and since the area is a controlled occupational access area, there will not be an unacceptable radiation release to the environment or other areas of the plant due to a fire.

18. Fire Area 91

The safety-related components located in Fire Area 91 are:

32 a. Hot shutdown panel, Trains A and B
(See Section 7.4.1.3.4 for description)

b. Safety-related cables, Train A and B

Fire Area 91, shown on Figure 9.5-9, is located on elevation 831 ft 6 in. of the Safeguards Building Unit 2. Fire Area 91, contains non-safety-related electrical equipment and cables as well as the equipment listed above.

32

As shown on Figure 9.5-40, the combustible loading for this area is classified as a medium hazard which limits the maximum fire duration to less than 60 minutes, assuming all combustible material (electrical cable jacket and insulation material) in the area burns. This assumption is conservative, because the cable is self-extinguishing, fire-retardant, and nonpropagating in accordance with the requirements of IEEE 383-1974.

32 Class "A" wired fire detectors are provided to enable rapid fire detection and to actuate the suppression system. Figure 9.5-40 defines the number and type of fire detectors in this area.

A portion of this fire area is protected by a pre-action sprinkler system designed to provide general area coverage. Figure 9.5-6 and 9.5-40 describe the protected area and the water spray density of the sprinkler system. 32

Hose stations and portable extinguishers are also provided as a backup to the fixed sprinkler system.

In the event of a fire in this area, shutdown is achieved from the control room. See Section 7.4.1.3.4. 32

The rated fire barriers which physically separate Fire Area 91 from adjoining areas of the plant are constructed of poured, reinforced concrete with doors, fire dampers, and penetration seals of an equivalent rating. Stairwell S-5, located in the corner of Fire Area 91, is enclosed in a two-hour fire rated barrier, as described in Section 9.5.1.5.3. This stairwell serves as a means of access for Fire Area 91.

Since the fire barrier rating is greater than the postulated fire duration, and since the area is a controlled ocupational access area, there will not be an unacceptable radiation release to the environment or other areas of the plant due to a fire.

19. Fire Area 147

The safety-related components located in Fire Area 147 are:

a. Safety-related piping and cables, Train A

b. Safety-related piping and cables, Train B

Fire Area 147, shown in Figure 9.5-9 is located on elevation 831 ft. 6 in. of the Unit 2 Safeguards Building. This area contains piping penetrations for non-radioactive piping.

As shown in Figure 9.5-40, the combustible loading for Fire Area 147 is classified as a light hazard which limits the maximum fire duration to less than 30 minutes, assuming all combustible material (electrical cable jacket and insulation) in the area burns. This assumption is conservative, because the cable is self-extinguishing, fire retardant, and nonpropagating, in accordance with the requirements of IEEE 383-1974.

Fire detectors are provided to enable rapid fire detection. Figure 9.5-40 defines the number and type of fire detectors in this area.

Where required by Section 9.5.1.2.3.9, one train of safety-related cabling in this area is protected by a one-hour rated fire barrier.

This fire area is protected by an automatic wet-pipe sprinkler system designed to provide general area coverage.

Hose stations and portable extinguishers are located in the adjacent fire area as a backup to the fixed sprinkler system.

ATTACHMENT E

ALTERNATE

SHUTDOWN

STUDY