NORTHERN STATES POWER COMPANY

PRAIRIE ISLAND NUCLEAR GENERATING PLANT

REVISED FIRE PROTECTION SAFE SHUTDOWN ANALYSIS OCTOBER 22, 1979

1.0 METHOD OF ANALYSIS

This re-analysis of fire hazards for the Prairie Island Nuclear Generating Plant was performed to provide assurance that redundant systems will not be damaged to the extent that hot or cold shutdown cannot be achieved and maintained.

To this end, it was decided to consider two types of fires:

- o Design basis fire
- o Maximum credible fire

The design basis (postulated) fire is based on the Fluor-Pioneer Fire Hazards Analysis dated March 1977 and Supplement dated July 1977. The postulated fire was assumed, without Fluor-Pioneer's proposed modifications. In addition, it was assumed that entry would not be possible to conduct manual operation of valves in the event the fire rendered associated power and control circuits inoperable. This approach was taken to determine whether it represented an intolerable situation which would require physical changes to the existing plant.

Upon completion of evaluating the design basis fire, it was decided to re-examine the amount of combustibles assumed in the design basis fire of Fire Hazards Analysis of March 1977 and Supplement dated July 1977. The maximum credible fire is based on actual quantities of combustibles present which would contribute to a fire.

Four fire areas are considered critical to achieve and maintain hot shutdown; 18, 18A, 31 and 32. Of these, areas 31 and 32 were re-analyzed and a maximum credible fire established. This fire is shown to be trivial in section 2.2. A fire in areas 18 or 18A are assumed to affect shutdown ability; therefore, for the minimum safe shutdown equipment, operational methods were chosen which avoided circuitry or components in these areas. Based on this philosophy cabling necessary for operation of safe shutdown equipment, independent of areas 18 or 18A availability, was identified. The re-analysis was performed based on this identification. For certain equipment areas 18 and 18A were

unavoidable and the re-analysis identifies the effects of fires in those and summarizes needed fire protection.

A re-analysis was made of each additional fire area which has been previously identified as having either safeguards equipment located therein or safeguards cables passing through it. Cables for all equipment required for hot or cold shutdown have been traced and drawings updated. A tabulation of fire areas having an effect on cable for hot and cold shutdown equipment was also made current.

Each piece of equipment required for hot or cold shutdown was examined from a standpoint of its location within a fire area and with respect to other safeguards equipment in the same area and with the routing of the power and control cables from their source to the final operational component.

The analysis took into consideration cable runs into fire areas, the relationship to other redundant cables and the effects on operation as a result of a fire in any one area. The discussion which follows describes each piece of equipment required for hot and cold shutdown and addresses each fire area which may have an effect on the equipment. Only those fire areas where redundant cables or equipment are located will be addressed. If an area is not discussed, only one train or one piece of equipment is located within that area.

1.1 HOT SHUTDOWN EQUIPMENT

The following equipment is required to place and maintain Unit 1 in a subcritical hot shutdown condition. Unless specifically noted, Unit 2 design is identical to Unit 1. Equipment shared by both units is addressed to assure that it will be available for either unit.

1.1.1 Steam Safety Relief Valves

There are five Code design steam safety relief valves provided for each steam generator. The valves for each steam generator are located in different fire areas. (NOTE: SG #11 valves are in fire area 60 and SG #12 valves are in fire area 2.) These valves are self actuated by a rise in pressure and do not require any external assistance. A fire in either fire area would not affect the operability of these valves.

1.1.2 Diesel Generators

Two diesel generators are provided and shared by both units. Each diesel generator is located in a separate fire area which is a specially designed room to provide complete separation and independence. The fire areas where the diesel generators are located are 25 and 26. The areas having cabling for both diesels are 13, 18, 18A, 32 and 58.

a. Fire Area 13

This area is the control room and control for both diesels is located here. The control for each diesel is physically separated and any fire which could occur in this area was classified as trivial in the original analysis and would permit operation of the second diesel. In addition, control for the affected diesel can be switched to local control. A fire in this area would have no effect on operability of either diesel-generator.

b. Fire Area 18 and 18A

This area is the relay and cable room. A fire in this area could render control of the diesels from the control room inoperable. Control can be assumed locally at the diesels. To provide assurance that the diesel(s) will not trip on protection relay action, specific cables will have to be disconnected. The protection relays are located in the relay room. These cables have been identified and can affect control power, starting, running, stopping, governor speed control and field excitation. A short section of 25406-1 passes through a corner of fire area 18. The cable is in a flex armor sheath. This cable provides power from diesel generator No. 2 to the 4.16 KV bus. See section 3.0 for recommended corrective action. A fire in the relay room will not affect the overall operation of the diesels with appropriate action taken in disconnecting those cables affected by a relay room fire.

c. Fire Area 32

This area is one of two auxiliary feedwater pump rooms which also contains one of two hot shutdown panels. This area was re-analyzed

and is discussed in detail in section 3.3 of this report. DC control power cables for both diesels are routed through this area. They are physically separated and based upon the re-analysis, only a trivial fire can exist and is not of sufficient intensity to affect both cables. It is, therefore, concluded that a fire in this area will not affect the operability of either diesel generator.

d. Fire Area 58

This area is in the Auxiliary Building on the ground floor. The cables noted above, for both diesels, which would require disconnecting in the event of a relay room fire pass through this area. Only a small length of these cables for diesel generator No. 2 pass through the area and these are physically separated from diesel generator No. 1 cables by a large distance. The fire loading in this area is small and no loss of operability would occur in the event of a fire.

1.1.3 Batteries

There are two batteries, each located in a separate fire area. The loss of one battery will not affect plant operation, since the redundant battery and related DC panels and cabling would remain intact. The DC power is distributed to panels 15 and 16 which are located in the relay room. The DC power is used for breaker control, pump speed control and solenoid valve control. The loss of DC power has been analyzed in each case and it has been concluded that in every case, operation of equipment can be maintained without DC power or a means can readily be provided to supply an alternate source of DC power.

a. Fire Areas 18 and 18A

A fire in this area assumes that DC panels 15 and 16 would be rendered inoperable. These panels in turn feed panels 153 and 163, which provide power to valves CV-31325 through CV-31328, CV-31335 and CV-31336. These can be provided air by re-directing the air around the solenoid. Operation of required equipment by other means can be accomplished in the event of a fire in the relay room.

b. Fire Area 32

Cables for both trains pass through this area. This area contains one of two hot shutdown panels. The re-analysis of this area has shown that only a fire of low intensity can exist thereby not rendering any of the cables inoperable. A fire will not affect operation of DC circuits.

1.1.4 Auxiliary Feedwater Pump and Associated Valves

There are two auxiliary feedwater pumps provided, one motor driven and one steam driven. Each is located in a separate fire area. A re-analysis was made of the two fire areas (31 and 32) and discussed in section 2.2. Based upon the re-analysis, both pumps and their associated valves will be accessible and operable in the event of a fire in either area. There are two other areas where redundant associated valves have cabling routed through the same area. Steam supply isolation valves "A" and "B" both have cabling going through fire areas 59 and 60.

a. Fire Areas 59 and 60

These areas are in the Auxiliary Building and cover the mezzanine and operating levels. They are both low intensity areas and loss of any cabling would not affect operation of the motor operated valves since they are provided with handwheels.

1.1.5 Station Air Compressors

A total of five station air compressors have been provided. Three of the five are located in fire areas 31 and 32. Fire area 32 contains two of the compressors. The re-analysis has demonstrated that the maximum credible fire in either area 31 and 32 will not affect operation of any equipment in that area. Station air will be available under all postulated fire conditions. In any event, the two compressors outside areas 31 and 32 would also be available.

1.1.6 Cooling Water Pumps

One diesel-driven and one motor-driven cooling water pump are provided for each unit, with a third motor-driven pump provided to be used by

either unit. The pumps are located in fire area 41, screenhouse. The pumps are physically separated by large distance and in no instance is any cabling for pumps 11 and 12 routed in the same area.

1.1.7 Steam Generator Power Operated Relief Valves

Each Steam Generator is provided with one power operated relief valve (CV-31084, 31089). These valves are controlled from the control room and hot shutdown panel. Fire areas 18, 18A, 58, 59 and 60 contain cabling for the redundant valves. Each is described below.

a. Fire Area 18 and 18A

A fire in this area could render control of the power operated relief valves inoperable from both the control room and hot shutdown panel. Loss of any electrical signal would not prevent valves from being operated with the handwheel.

b. Fire Areas 58 and 59

These areas are the Auxiliary Building ground and mezzanine floors, respectively. Cabling for both valves passes through both areas. The cabling for Unit 2 valves passes through separate fire areas except for areas 18 and 18A. Only a fire in area 18 or 18A could affect electrical actuation of Unit 2 power operated relief valves. A fire in any other area through which cabling is routed could affect only one of the valves.

c. Fire Area 60

This area is the Auxiliary Building operating level and contains cables for both relief valves. The cables have sufficient physical separation in addition to the area having a very low intensity fire loading due to a lack of combustibles. No loss of operation would be sustained in the event of a fire in this area.

1.1.8 Boration

Boration is achieved through the charging pumps or Safety Injection pumps from the Boric Acid Tanks or the Refueling Water Storage Tanks. From the Boric Acid Tanks flow is directed to the charging pumps via the Boric Acid Transfer pumps through three different paths. Flow

is then sent to the reactor coolant either by seal injection lines or normal charging. When using Safety Injection pumps the flow path is from the Boric Acid Tank directly to the pump and into the reactor coolant via the cold legs or the vessel itself, independent of the charging paths. If the Boric Acid Tanks are not available the Refueling Water Storage Tanks can supply borated water directly to charging pumps or Safety Injection pumps.

Numerous paths have been provided to assure boric acid flow to the reactor coolant system. In the normal paths from the boric acid tank, one valve is common (CV-31328). The valve, normally open, closes on solenoid failure due to loss of the cables in the relay room. Power can be restored to the solenoid (SV-33236) by providing a temporary jumper in terminal cabinet 1134. This assures keeping CV-31328 open. Boration from the reactor water storage tank directly to the Safety Injection pumps and from the Boric Acid Tanks directly to the SI pumps is readily available in the event that CV-31328 is not available due to a fire which would affect the control circuits. The emergency and abnormal paths for boration employ motor operated valves which are equipped with handwheels to permit their being opened in the event of loss of control circuits. Equipment location is such that adequate protection by physical separation is provided to assure that loss of redundant equipment will not occur. The cables can be provided with added protection for the areas where the cable trays cross over each other in fire areas 58, 59, 73 and 74. Sufficient time is available to permit operation of other circuits, such as leak offs and manual operation of valves for proper alignment of valves in a system.

1.1.8.1 Heat Trace Circuits

Heat Trace Circuits are required for boration. There is a normal and a redundant circuit provided for each section of heat tracing. The cables are routed in conduit and will not be affected by a fire in areas 58, 59 and 60.

1.1.8.2 Location of Equipment Required for Boration

Equipment required for boration, i.e., boric acid transfer

pumps, charging pumps, safety injection pumps, residual heat removal pumps, valves and cabling are for the most part located in fire areas 58, 59, 73 and 74 for both units which are designated as very light or trivial fire intensity areas.

The larger pumps are located in separate cubicles and the equipment is physically separated throughout the areas. The cable trays for the various components are in closer proximity to each other than are the components. Table 3.1-1 lists the various crossover nodes of safeguard cables. Of the 25 crossover nodes listed in Table 3.1-1, only five nodes contain cables for redundant equipment in the same unit. This equipment is backed up by the redundant equipment from the other unit, except for charging and residual heat removal pumps. These are located in their separate cubicles or pits. In order to assure protection of cables in one tray against a possible fire in another tray where the crossover occurs, fire retardant blankets are recommended to be placed in the lower trays. The cables in these trays have been identified as cables for the equipment required for boration.

1.1.9 Steam General Level, Reactor Coolant Pressure and Temperature, Pressurizer Level Indication

Hot shutdown panels A and B provide steam generator level, main steam header pressure, pressurizer level and pressure indication that are used to monitor plant status to assure safe hot shutdown. Reactor coolant temperature required for cold shutdown is not presently indicated at the hot shutdown panels.

Cables for the indicators, upon leaving the containment, are routed through the relay room into the control room to process racks containing the signal conditioning equipment. From the process racks, cables pass through the relay room to the hot shutdown panel and to other terminal cabinets. A design basis fire in the relay room is assumed to cause the loss of all instrumentation and control which is routed through the relay room. Since the process racks at Prairie

Island are located in the control room and not in the relay room, equipment, except for cables routed through the relay room, which is used to provide remote indications is unaffected by a relay room fire.

The following equipment will remain available upon the loss of the relay room:

a. All local indicating instruments and transmitters associated with the control room instrumentation racks.

b. All 4160v, 480v, and AC and DC vital bus protective relays.

c. Circuit breaker local control for all 4160 and 480 volt switch gear.

d. Blackout and automatic sequence relaying.

Since the process racks are located in the control room rather than in the relay room, the design basis fire was then located in the control room. The original fire analysis concluded that a control room fire was trivial in nature, which means that any fire in that area can be controlled. Therefore, a relay room fire was still the basis for losing indication at the hot shutdown panels.

1.2 Cold Shutdown Equipment

The following equipment is required to bring Unit 1 to a safe cold shutdown condition within 72 hours using either onsite or offsite power sources. Some of the same equipment required for hot shutdown is also required to achieve cold shutdown. In addition, the following equipment is required.

1.2.1 Residual Heat Removal System

Two residual heat removal pumps are provided, both are located in fire area 58, in separate pits. The cabling for the two pumps is physically separated. Safeguards cabling passing through this area has been reviewed and recommended actions have been made to use a fire resistant blanket in trays having safeguards cables and passing under another safeguards tray. The valves associated with the residual heat removal pumps are provided with handwheels to permit operation in the event of loss of power to the valves. The valve which can

bypass the heat exchanger is air operated and can be jumpered in the event of loss of electrical power to the solenoid valve. A fire in any area containing heat removal equipment or cabling will not prevent operation of the system to satisfy cold shutdown conditions.

1.2.2 Component Cooling System

The component cooling pumps, heat exchangers and valves are located in fire area 58. There is physical separation between components. The valves are motor operated and provided with handwheels. Areas 18 and 18A are the other areas common to the pumps only. A fire in this area could render normal control inoperable but the pumps can be operated from the motor control center with proper jumpering. A fire in area 58 would not render the component cooling system inoperable.

1.2.3 Component Cooling Heat Exchanger Supply Valves

The supply and outlet valves for the two heat exchangers are located in separate fire areas. The supply valves are motor operated and provided with a handwheel. The outlet valves are air operated and fail open. A fire in any area will have no effect on operation of these valves.

1.2.4 Reactor Coolant Temperature, Pressurizer Level Indication

These are discussed in section 1.1.9.

1.2.5 Seal Leak-Off Isolation Valves

The seal leak-off isolation valves are located inside containment, fire area 1. These valves are closed after the reactor coolant pumps are turned off. A relay room fire would prevent closure of the valves which fail open. The valves can be closed by use of electrical jumpers at terminal cabinet 1138 and providing DC power to the solenoid or the air can be jumpered around the solenoid. A fire in area 18, 18A or 59 will not prevent operation of these valves.

2.0 ANALYSIS OF FIRE AREAS

2.1 Fire Zones 58, 59, 73 and 74

Walls, floors and ceiling in these four areas are of fire resistant

construction (3 hours). The areas are not normally occupied. Equipment required for hot or cold shutdown is located here as are control and power cables for these systems. Our reanalysis confirms the conclusion of the original analysis that the design basis fire is postulated to be a cable fire. Storage of combustibles is not permitted in this area. Since the cables are resistant to fire, the design basis fire cannot be a rapidly advancing, high heat producing type of fire.

An examination of the areas resulted in finding the area void of oil, wood and trash. Clothing is stored in a separate contained area. The conclusion being that the potential ignition source for a fire does not exist. Since the design requirement for routing of cables was a minimum of three feet separation, a thorough examination of all trays carrying safety related cables was made. The potentially vulnerable areas were only where one safety related cable tray crossed over another safety related cable tray. Table 3.1-1 lists the fire area, location of crossover nodes, affected trays and vertical clearances determined by visual inspection.

The original fire hazards analysis recommended that all open cable trays within six feet of Fire Areas 73 and 58; 74, 59 and 84 be covered to maintain adequate separation and that all open trays be sprayed with a flame retardant material.

Since the maximum credible fire, based on actual combustibles, is a light fire it is recommended that a flame retardant blanket be used instead in the open cable trays passing underneath another safety-related cable tray. The length of blanket should extend for a distance of twice the width of the upper tray on each side of the point of intersection for all nodes where the clearance is less than three feet.

2.2 Fire Areas 31 and 32

2.2.1 Summary Description

Fire areas 31 and 32 are the auxiliary feedwater pump rooms. These rooms contain both the electrical and steam driven auxiliary feedwater pumps and their discharge valves, three of five air compressors, and motor control centers for both Trains A and B. Each area has a hot shutdown panel. Each hot shutdown panel has been provided with

the equipment and indication required for achieving and maintaining hot shutdown when the control room is unavailable.

This analysis was performed to demonstrate whether safe shutdown can be readily accomplished from either shutdown panel A or B.

2.2.2 Design Basis Fire

A design basis fire, defined by the original fire hazards analysis, was assumed with one additional criteria applied. The criteria applied was that during a design basis fire, entry into the fire area would not be permitted for at least 1/2 hour since the fire hazards analysis (Figure 9-1 of the Supplement) has a fire intensity rating of less than one hour. With entry not permitted, assurance cannot be provided that equipment will function as required for achieving hot shutdown. This is based on having steam generator water inventory equivalent to 1/2 hour before action must be taken to assure continued water supply.

It was decided to re-examine the design basis fire in the original analysis. Table 6-1, of the Fluor-Pioneer analysis, sheets 31 and 32, tabulates the hazards analysis for the two areas. The design basis fire in the original analysis was the auxiliary feedwater pump lube oil cooler. In the Supplement it was a cable or pump gear box fire. In both cases, the quantities of combustibles were identical. These quantities appeared overly conservative. The original analysis noted 272 gallons of oil being available. The only oil bearing components are the lube oil cooler and air compressor gear box. A check was made of the vendor instruction manuals and of the sump capacities to verify actual oil quantities. The actual quantities of oil are 14 and 20 gallons respectively for fire zones 31 and 32. It was therefore determined that the original estimates of oil, and therefore the fire loading, were excessive.

A similar approach was taken on determining a more realistic volume of cable which could contribute to the fire.

The cable volume was determined by actual measurement of tray lengths in the two fire areas and from cable quantities in the cable tray report. A section of number 12, 7-conductor cable was cut apart and the insulation stripped and weighed. The selected cable represents the major type of cable used in those areas.

In addition, since the trays pass through the room just under the ceiling, the total area of the room was not considered in the original analysis. There is a "crawl space" through which the trays pass. This area was considered for the cable fire but not for the oil fire, since it would not be affected by an oil fire.

Revised heat loads resulting from the re-analysis are tabulated in Table 3.3-1.

Based upon these new values, a fire occurring in either fire area would be classified as a trivial fire and capable of being controlled by the installed wet pipe system, fire extinguishers or by the use of hose stations located outside the area. These values invalidate the design basis fire analysis noted above. Further, it is concluded that a fire of such intensity, in either of these areas, which would prevent entry of personnel to perform manual operations of valves, if required, and to maintain hot shutdown capability from either area is not credible or possible. Therefore, no modifications are recommended to these fire zones, except for previous commitments made to replace the existing grating over the pipe trench with a solid plate and to provide a concrete fire barrier in the pipe trench at the boundary between the two areas.

3.0 SUMMARY AND RECOMMENDATIONS

In summary, our analysis concludes the following:

1. There is no basis for as severe a fire load in either auxiliary feedwater room, fire areas 31 and 32, as noted in the original analysis.
2. A fire in either area 31 or 32 would be of such low intensity that existing fire fighting equipment is sufficient to contain the fire.

3. Entry into fire areas 31 and 32 will be possible to perform manual functions which may be necessary to accomplish hot shutdown.

4. No physical design changes, either mechanical or electrical, are justified for fire areas 31 and 32.

5. Installation of the concrete barrier and pipe trench cover in fire areas 31 and 32 are not objectionable and provide an added degree of fire safety.

6. There is no justification for the use of any flame retardant material in the cable trays passing through the auxiliary feedwater rooms.

7. The relay room was considered lost, thereby requiring separate indication of steam generator level, main steam pressure, pressurizer level and pressure, and reactor coolant temperature at the hot shutdown panels.

8. Open trays should be covered with flame retardant material at specified tray crossover points. See Table 3.1.1.

9. Cable 25406-1 passes through one corner of fire area 18 and is protected by a flex armor sheath. Additional fire protection will be provided for this short section of cable to assure it remains intact in the event of a fire in this area.

Table 3.1-1 Physical Separation of Redundant Equipment

Fire Area	Dwg Number	Node	Location	Affected Trays	Vertical Clearance
59	NF-40113-1T Unit - Aux. Bldg. Mezz. Flr.	1	G.4/5.1	1AM-LA2 1AM-LB27 1AM-TB18	LA2 to LB27 - 1½' to TB18 - 2'
		2	H.4/5.1	1AM-T55 1AM-TW1 1AM-LA2 1AM-TA11	T55 to LA2 - 3'+ to TA11 - 2'+ TW1 to LA2 - 3'+ to TA11 - 3'+
		3	H.8/5.1	1AM-TX1 1AM-TA4 1AM-TA12	TX1 to TA12 - 2½' to TA4 - 3'+
		4	H.1/5.8	1AM-LB5 1AM-LB15 1AM-TB4 1AM-TA10	LB5 to TA10 - 3'+ LB15 to TA10 - 3'+ TB4 to TA10 - 2½'
		5	H.3/5.8	1AM-LB5 1AM-LB15 1AM-TB4 1AM-T55 1AM-TW1	TW1 to LB5 - 3'+ to LB15 - 3'+ to TB4 - 3'+ T55 to LB5 - 3'+ to LB15 - 3'+ to TB4 - 2½'
		6	H.1/5.8	1AM-LB19 1AM-LB6 1AM-TB5 1AM-TX1	TX1 to LB19 - 3' to LB6 - 2' to TB5 - 1'
		7	G.4/6.6	1AM-LB2 1AM-TB2 1AM-T27	T27 to LB2 - 1' to TB2 - 2'

Table 3.1-1 (Continued)

Fire Area	Dwg Number	Node	Location	Affected Trays	Vertical Clearance
		8	G.8/6.6	1AM-T27 1AM-TA9	2'
		9	H.2/6.6	1AM-T27 1AM-T55	3'+
		10	H.3/6.6	1AM-TW1 1AM-T27	3'+
		11	H.6/6.6	1AM-T28 1AM-T27	3'+
58	NF-40112-1T1-B	1	G.6/7.1	1AR-TA10 1AG-LA30 1AG-TA27 1AG-LB6 1AG-TB5	TB5 to TA10 - 3'+ to LA30 - 2½' to TA27 - 1' LB6 to TA10 - 3'+ to LA30 - 2½' to TA27 - 1'
		2	J.3/9.4	1AG-LA27 1AG-LB15 1AG-TB14	LA27 to LB15 - 3'+ to TB14 - 3'+
		3	G.7/10.1	2AG-TB2 2AG-LB2 2AG-LA4	LA4 to TB2 - 2' to LB2 - 2'
73	NF-40475M Unit 2 - Aux. Bldg. Grnd. Flr.	1	G.5/11.0	2AG-LB8 2AG-TB8 2AG-LA19 2AG-TA17	2AG-LB to LA19 - 3' TB8 to TA17 - 3'
		2	G.6/11.9	2AG-TA11 2AG-LA13 2AG-LB29	LB29 to TA11 - 1' to LA13 - 2'

Table 3.1-1 (Continued)

Fire Area	Dwg Number	Node	Location	Affected Trays	Vertical Clearance
74	NF-40476J	1	H.1/12.1	2AM-TA9 2AM-LB5	3'+
		2	H.3/12.1	2AM-LB6 2AM-T55	3'+
		3	H.3/12.1	2AM-TX1 2AM-LB6	3'+
		4	H.8/12.1	2AM-LB6 2AM-TW1	3'
		5	H.8/12.1	2AM-TB14 2AM-TW1	3'
		6	J.7/11.3	2AM-TB10 2AM-T45 2AM-TR1	TB10 to T45 - ½' to TR1 - ½'
		7	H.8/12.9	2AM-LA2 2AM-TA11 2AM-TW1	TW1 to LA2 - 3'+ to TA11 - 2'
		8	H.4/12.9	2AM-LA2 2AM-TA11 2AM-TX1	TX1 to LA2 - 3'+ to TA11 - 3'+
		9	H.4/12.9	2AM-LA2 2AM-TA11 2AM-T55	T55 to LA2 - 3' to TA11 - 2'

Table 3.3-1

	ORIGINAL VALUES		REVISED VALUES	
	Area 31	Area 32	Area 31	Area 32
Amount of cables (lbs)	2217	3563	788	1412
Amount of oil (gal)	272	272	14	20
Surface Area (sq ft) (oil)			1183	1183
Surface Area (sq ft) (cable)			2366	2366
Surface Area (sq ft) (total)	1183	1183	1775**	1775**
Ht of Combustion (cable avg)(Btu/lb)	8836	8836	8836	8836
Ht of Combustion (oil) (Btu/gal)	152,000	152,000	152,000	152,000
Total Fire Load (oil) (Btu/sq ft)			1799	2570
Total Fire Load (cable) (Btu/sq ft)			2943	5273
*Total Fire Load (Btu/sq ft)	47,350	57,470	4742	7843
Weighted Total Fire Load*			5122	8742

* Total oil and cable Btu value divided by $\frac{\text{cable area + oil area}}{2}$ **

CALCULATION SHEET

Fire Area 31

Oil

Total capacity = 14 gal

Heat of Combustion = 152,000 Btu/gal

Area = 1183 sq ft

Cable

Total weight = 788 lbs

Heat of Combustion = 8836 Btu/lb

Area = 2366 sq ft

Oil

152,000 Btu/gal x 14 gal = 2,128,000 Btu

2,128,000 Btu/1183 sq ft = 1,799 Btu/sq ft

Cable

788 lb x 8836 Btu/lb = 6,962,768 Btu

6,962,768 Btu/2366 sq ft = 2943 Btu/sq ft

Total Fire Load is 1799 Btu/sq ft + 2943 Btu/sq ft = 4742 Btu/sq ft

1206 155

CALCULATION SHEET

Fire Area 32

Oil

Total capacity = 20 gal

Heat of Combustion = 152,000 Btu/gal

Area = 1183 sq ft

Cable

Total weight = 1412 lbs

Heat of Combustion = 8836 Btu/lb

Area = 2366 sq ft

Oil

152,000 Btu/gal x 20 gal = 3,040,000 Btu

3,040,000 Btu/1183 sq ft = 2570 Btu/sq ft

Cable

1412 lbs x 8836 Btu/lb = 12, 476,432 Btu

12,476,432 Btu/2366 sq ft = 5273 Btu/sq ft

Total Fire Load is 2570 + 5273 = 7843 Btu/sq ft

1206 156

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 1&2 SYSTEM ____

COMPONENT	FIRE AREA 1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
DC AND EMER. AC																																													
MCC 1A1 TO MCC 1AC1																				X	X																										
MCC 1A2 TO MCC 1AC2																				X		X																									
MCC 2A1 TO MCC 2AC1																			X				X																							
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125 V D.C. PANELS																																													
PNL. 11 TO PNL. 15								X												X	X																								
PNL. 12 TO PNL. 16								X			X									X		X																							
PNL. 21 TO PNL. 25									X										X				X																						
(CONT)																																													

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 1&2 SYSTEM ____

COMPONENT	FIRE AREA 1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
125V. D.C. PANELS (CONT)																																													
PNL. 22 TO PNL. 26									X				X						X					X																					
PNL. 15 TO PNL. 151								X																					X															
PNL. 15 TO PNL. 152								X																					X															
PNL. 15 TO PNL. 153	X							X																					X															
PNL. 16 TO PNL. 161								X																					X															
PNL. 16 TO PNL. 163	X							X																					X															
PNL. 25 TO PNL. 251									X																													X						
PNL. 25 TO PNL. 252									X																													X						
PNL. 25 TO PNL. 253									X																										X			X						
PNL. 26 TO PNL. 261									X																													X						
PNL. 26 TO PNL. 263									X																										X			X						
125V D.C. TO 480V																																													
PNL. 11 TO BUS 110																				X	X							X	X													X			
PNL. 12 TO BUS 120		X									X									X		X							X															
PNL. 21 TO BUS 210																			X				X														X	X						
PNL. 22 TO BUS 220						X							X						X					X														X						

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 1&2 SYSTEM ____ SHEET 3 OF 21

FIRE AREA

COMPONENT	1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
POWER SUPPLY																																													
BUS 15																X				X								X															X			
BUS 16											X		X																																	
BUS 25													X				X											X	X																	
BUS 26																			X	X																							X	X		
BUS 110																				X								X	X													X		X		
BUS 120			X								X																		X															
BUS 210																			X																	X	X				X		X	
BUS 220						X							X																									X							
MCC 1A1																				X								X	X													X			
" 1K1																												X	X													X			
" 1L1																													X													X			
" 1LA1																													X	X															
MCC 1A2			X								X									X								X																
" 1K2			X																									X	X																
" 1L2			X																										X																
" 1LA2																													X	X															
MCC 2A1																			X																	X	X						X	
" 2K1																																				X	X						X	
" 2L1																																												X	
" 2LA1																																						X	X						
MCC 2A2						X							X						X																			X							
" 2K2						X																															X	X							
" 2L2						X																																X							
" 2LA2																																						X	X						

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 1&2 SYSTEM EG

COMPONENT	FIRE AREA 1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
D1 EMERGENCY GENERATOR																																													
CONTROL					X			X								X				X	X						X																		
START / RUN					X			X								X											X																		
FUEL TRANSFER								X								X																													
STOP					X			X	X							X											X																		
GOV. SPEED CONTROL					X			X								X											X																		
FIELD EXCITATION					X			X								X											X																		
D2 EMERGENCY GENERATOR																																													
CONTROL					X			X			X						X			X		X					X	X																	
START/RUN					X			X									X										X	X																	
FUEL TRANSFER																	X																												
STOP					X			X	X								X										X	X																	
GOV. SPEED CONTROL					X			X									X										X	X																	
FIELD EXCITATION					X			X									X										X	X																	

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 1 SYSTEM AF

COMPONENT	FIRE AREA 1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
AUXILIARY FEEDWATER																																													
11 TURB. DRIVEN AFP																				X																										
MN. STEAM SUPPLY VLV 32264								X											X	X								X																		
STEAM SUPPLY ISOL. "A" 32016																													X	X																
STEAM SUPPLY ISOL. "B" 32017																													X	X																
CONDENSATE SUPPLY VLV. 32933																				X																										
DISCHARGE TO 11 S/G 32238																			X	X																										
DISCHARGE TO 12 S/G 32239																			X	X																										
AUX. FEED TO 11 S/G 32242																													X	X																
AUX. FEED TO 12 S/G 32243																													X	X																
21 MOTOR DRIVEN AFP									X										X	X			X																					X		
CONDENSATE SUPPLY VLV. 32336																			X	X																										
DISCHARGE TO 21 S/G 32383																			X																										
DISCHARGE TO 22 S/G 32384																			X																										

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 2 SYSTEM AF

COMPONENT	FIRE AREA 1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
AUXILIARY FEEDWATER																																													
12 MOTOR DRIVEN AFP								X			X								X	X		X																							
CONDENSATE SUPPLY VLV. 32335																			X	X																									
DISCHARGE TO 11 S/G 32381																				X																									
DISCHARGE TO 12 S/G 32382																				X																									
22 TURB. DRIVEN AFP																			X																									
MN. STEAM SUPPLY VLV. 32265									X				X						X	X																									
STEAM SUPPLY ISOL. "A" 32019																																					X	X							
STEAM SUPPLY ISOL. "B" 32020																																					X	X							
CONDENSATE SUPPLY VLV. 32345																			X																									
DISCHARGE TO 21 S/G 32246																			X	X																									
DISCHARGE TO 22 S/G 32247																			X	X																									
AUX. FEED TO 21 S/G 32248																																					X	X							
AUX. FEED TO 22 S/G 32249																																					X	X							

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 1&2 SYSTEM SA

COMPONENT	FIRE AREA 1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
STATION AIR																																													
121 AIR COMPRESSOR																				X																							X		
122 AIR COMPRESSOR											X									X																									
123 AIR COMPRESSOR																			X																								X		
124 AIR COMPRESSOR																									X									X											
125 AIR COMPRESSOR																										X								X											

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 1&2 SYSTEM COOLING WATER

COMPONENT	FIRE AREA 1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	26A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
COOLING WATER																																													
12 DIESEL CLP																											X																		
22 DIESEL CLP																											X																		
11 MOTOR CLP												X			X										X		X																		
121 MOTOR CLP												X			X										X		X																		
21 MOTOR CLP														X	X											X	X																		
11 COMP CLG HX																												X																		
COOLING SUPPLY VLV. 32145																												X																		
COOLING OUTLET VLV. 31381																												X																		
12 COMP. CLG. HX																																				X									
COOLING SUPPLY VLV. 32146																																				X									
COOLING OUTLET VLV. 31411																																				X									
21 COMP. CLG. HX.																											X																		
COOLING SUPPLY VLV. 32160																											X																		
COOLING OUTLET VLV. 31383																											X																		
22 COMP. CLG HX																																				X									
COOLING SUPPLY VLV. 32161																																				X									
COOLING OUTLET VLV. 31384																																				X									
11 AUX. FEED/COOLING SUPPLY 32025																				X																									
12 AUX. FEED/COOLING SUPPLY 32027																			X	X																									
21 AUX. FEED/COOLING SUPPLY 32026																			X	X																									
22 AUX. FEED/COOLING SUPPLY 32030																			X																										

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 1&2 SYSTEM CC

COMPONENT	FIRE AREA 1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
COMPONENT COOLING																																														
11 CC PMP								X												X	X						X															X		
12 CC PMP								X			X											X					X										X								
11 CC HX OUTLET VLV. 32120																											X																		
12 CC HX OUTLET VLV. 32121																											X																		
11/12 CC LOOP ISOL. "A" 32266																											X																		
11/12 CC LOOP ISOL. "B" 32267																											X																		
21 CC PMP									X										X				X				X										X					X		
22 CC PMP									X				X											X														X							
21 CC HX OUTLET VLV. 32122																																					X								
22 CC HX OUTLET VLV. 32123																																					X								
21/22 CC ISOL. "A" 32268																																					X								
21/22 CC ISOL. "B" 32269																																					X								

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 1 SYSTEM [illegible] SHEET 10 OF 21

FIRE AREA

COMPONENT	1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
VOLUME CONTROL																																													
EMERGENCY BORATION (FROM BAST)																																													
VALVES 32086																													X																
31199																													X																
RWST TO CHG. PUMP SUCTION																																													
32060																												X																	
11 CHG. PUMP								X												X								X																	
12 CHG. PUMP								X											X	X								X																	
13 CHG PUMP								X												X								X																	
CHG. FLOW, VALVES 31198																													X																
31328	X																												X																
SEAL LEAKOFF ISOL VALVES 31335	X							X																					X																
31336	X							X																					X																
11 B.A. XFER PMP.					X			X											X	X								X	X																
12 B.A. XFER PMP.					X			X	X				X						X	X								X	X																

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FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 1 SYSTEM VC-HT

COMPONENT	FIRE AREA 1	2	K	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
HEAT TRACING																																													
POWER SUPPLY A																													X																
POWER SUPPLY B																													X																
#11 BAST TO EMERG. BORATION																																													
ET-19 (11 BA XFER PMP)																													X																
ET-20 (12 BA XFER PMP)																													X																
ET-23 (11 BA FILTER)																													X																
ET-28 (11 BA FILTER BYPASS)																													X		X														
#121 BAST TO EMERG. BORATION																																													
ET-25 (121 BAST TO XFER. INLET)																													X																
ET-20 (12 BA XFER PMP)																													X																
ET-19 (11 BA XFER PMP)																													X																
ET-23 (11 BA FILTER)																													X																
ET-27 (11 BA FILTER BYPASS)																													X		X														
ET-30A (11 BA FILTER TO 11 BA BLENDER																													X																
ET-30B (BA PATH)																													X																
ET-40 (11 BA BLENDER BYPASS)																													X																
BASTS TO SI PUMPS																																												
ET-3C, (11 BAST)																												X	X		X														
ET-3B, (121 BAST)																													X		X														

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 1 SYSTEM XC-HJ

COMPONENT	FIRE AREA 1	2	10	11	13	16	17	18	18a	19	20	21	22	23	24	25	26	28a	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
BAST TO SI PMPS (CON'T)																																													
ET-38																												X	X		X														
ET-101 (SI SUCTION HEADER)																													X		X														
ET-1 (SI SUCTION PIPING)																												X	X																

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 2 SYSTEM VC

COMPONENT	FIRE AREA 1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
VOLUME CONTROL																																														
EMERGENCY BORATION FROM BAST																																													
VALVES 32189																																					X								
31212																																					X								
RWST TO CH SUCTION																																													
7062																																				X									
21 CHG. PMP.									X										X	X																X								
22 CHG. PMP.									X										X																	X								
23 CHG. PMP.									X										X	X																X								
CHG. FLOW VALVES 31211																																						X							
31420																																		X				X							
SEAL LEAKOFF ISOL.																																													
VALVES 31426									X																									X				X							
31427									X																									X				X							
21 BA. XFER. PMP.									X										X																		X	X						
22 BA. XFER. PMP.									X											X																	X	X						

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 2 SYSTEM VC-HT

COMPONENT	FIRE AREA 1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
VOLUME CONTROL HEAT TRACING																																													
21 BAST TO EMERG. BORATION																																													
ET-21 (21 BA XFER PMP)																												X																	
ET-22 (22 BA XFER PMP)																												X																	
ET-24 (21 BA FILTER)																												X																	
ET-26 (XFER TO 21 RECIR)																												X																	
ET-31A (21 BA FILTER BYPASS)																												X																	
121 BAST TO EMERG. BORATION																																													
ET-21 (21 BA XFER PMP																												X																	
ET-22 (22 BA XFER PMP																												X																	
ET-24 (21 BA FILTER)																												X																	
ET-27 (21 BA FILTER BYPASS)																														X															
ET-31A (21 BA FILTER BYPASS																												X																	
ET-31 (BA PATH)																												X																	
ET-43 (21 BA BLENDER BYPASS																												X										X							
BASTS TO SI PMPS																																													
ET-3A (21 BAST DISCH. HEADER)																											X	X		X															
ET-3B (121 BAST DISCH. HEADER)																														X							X								
ET-2 (SI PMP SUCT. HEADER)																											X	X									X								
ET-102 (SI SUCTION HEADER)																													X	X															

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 1&2 SYSTEM MS

COMPONENT	FIRE AREA 1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
11 S/G MN. STEAM SAFETY RLF. TO ATMOS. VALVE 31084								X	X										X								X	X	X				X			X								
12 S/G MN. STEAM SAFETY RLF. TO ATMOS VALVE 31089		X						X												X							X	X	X			X												
21 S/G MN. STEAM SAFETY RLF. TO ATMOS. VALVE 31102		X						X	X										X								X	X					X			X		X	X				
22 S/G MN. STEAM SAFETY RLF. TO ATMOS. VALVE 31107								X	X											X													X				X	X	X				

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 1&2 SYSTEM SM

COMPONENT	FIRE AREA 1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
HOT SAMPLE VALVES																																													
CV-31300	X							X																					X																
CV-31301								X																					X																
CV-31307								X	X																				X						X			X							
CV-31308								X	X																				X									X							

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 1&2 SYSTEM SI

COMPONENT	FIRE AREA 1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
11 SI PMP								X												X	X							X														X		
11 SI PMP SUCTION VALVE 32162																												X																	
12 SI PMP								X			X											X					X	X																
12 SI PMP SUCTION VALVE 32163																												X																	
RWST SUPPLY VLV. "A" 32079																												X																	
" " " "B" 32080																												X																	
BAST SUPPLY VLV. "A" 32081																												X																	
" " " "B" 32082																												X																	
21 SI PMP									X										X				X													X					X			
21 SI PMP SUCTION 32190																																				X									
22 SI PMP									X				X											X												X	X							
22 SI PMP SUCTION 32191																																				X									
RWST SUPPLY VLV. "A" 32182																																				X									
" " " "B" 32183																																				X									
BAST SUPPLY VLV. "A" 32184																																				X									
" " " "B" 32185																																				X									
11 ACCUMULATOR ISOL. 32071	X																																												
12 " " " 32072	X																																												
21 " " " 32174																																			X										
22 " " " 32175																																			X										

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 1 SYSTEM –

COMPONENT	FIRE AREA 1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
UNIT 1 MONITORING																																													
PRESSURIZER PRESSURE																																													
1P-429	X				X			X																				X																
1P-430	X				X			X																				X																
1P-431	X				X			X																				X																
1P-449	X				X			X											X	X								X				X												
RC LOOP																																													
1P-419	X				X			X																				X																
1P-420	X				X			X																				X																
S/G LEVEL																																													
1L-460	X				X			X			X								X	X								X	X														X		
1L-461	X				X			X																				X																
1L-462	X				X			X																				X																
1L-463	X				X			X																				X																
1L-470	X				X			X			X								X	X								X	X														X		
1L-471	X				X			X																				X																
1L-472	X				X			X																				X																
1L-473																																													
RC TEMP WIDE RANGE RTD'S																																													
1T-450A	X				X			X																				X																
1T-451A	X				X			X																				X																
1T-450B	X				X			X																				X																
1T-451B	X				X			X																				X																
PRESSURIZER TEMP																																													
1T-421	X				X			X																				X																
1T-424	X				X			X																				X																

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 2 SYSTEM –

COMPONENT	FIRE AREA 1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
UNIT 2 MONITORING																																														
RC PRESSURE																																														
PRESSURIZER PRESSURE																																														
2P-429					X				X																									X			X								
2P-430					X				X																									X			X								
2P-431					X				X																									X			X								
2P-449					X			X	X										X	X												X		X			X								
RC LOOP																																														
2P-419					X				X																									X			X								
2P-420					X				X																									X			X								
S/G LEVEL																																														
2L-460					X			X	X										X	X												X		X			X		X						
2L-461					X				X																									X			X								
2L-462					X				X																									X			X								
2L-463					X				X																									X			X								
2L-470					X			X	X										X	X												X		X			X		X						
2L-471					X				X																									X			X								
2L-472					X				X																									X			X								
2L-473					X				X																									X			X								
RC TEMP WIDE RANGE RTD'S																																														
2T-450A					X				X																									X			X								
2T-451A					X				X																									X			X								
2T-450E					X				X																									X			X								
2T-451B					X				X																									X			X								
PRESSURIZER TEMP																																														
2T-421					X				X																									X			X								
2T-424					X				X																									X			X								

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 1 SYSTEM RHR

COMPONENT	FIRE AREA 1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
11 RHR PMP																				X								X																X		
12 RHR PMP											X																	X	X																
LOOP A SUCTION																																														
VALVES 32164	X																																												
32165	X																																												
LOOP B SUCTION																																													
VALVES 32230	X																																												
32231	X																																												
LOOP B INJECTION																																													
VALVE 32066	X																																												
RHR CONTROL																																													
HX BYPASS 31237																												X																	
11 HX FLOW 31235																												X																	
12 HX FLOW 31236																												X																	

FIRE AREAS WITH SAFE SHUTDOWN COMPONENTS OR CABLE

UNIT NO. 1&2 SYSTEM 2RHR 1&2 Hx Level

COMPONENT	FIRE AREA 1	2	10	11	13	16	17	18	18A	19	20	21	22	23	24	25	26	28A	31	32	33	34	35	36	37	38	41	58	59	60	61	68	69	70	71	72	73	74	75	76	79	80	81	82	84
21 RHR PMP																			X																		X								
22 RHR PMP.													X																								X	X							
LOOP A SUCTION																																													
VALVES 32192																																			X										
32193																																			X										
LOOP B SUCTION																																													
VALVES 32232																																			X										
32233																																			X										
LOOP B INJECTION																																													
VALVE 32169																																			X										
RHR FLOW CONTROL																																													
HX BYPASS 31240																																					X								
21 HX FLOW 31238																																					X								
22 HX FLOW 31239																																					X								
UNIT ONE PRZ LIQUID LEVEL																																													
1L-426	X				X																								X																
1L-427	X				X																								X																
1L-428	X				X																								X																
1L-433	X				X																								X																
UNIT TWO PRZ LIQUID LEVEL																																													
2L-426					X																																								
2L-427					X																																								
2L-428					X																																								
2L-433					X																																								