UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323

Report Nos.: 50-321/86-38 and 50-366/86-38

Licensee: Georgia Power Company
P. O. Box 4545
Atlanta, GA 30302

Docket Nos.: 50-321 and 50-366 License Nos.: DPR-57 and NPF-5

Facility Name: Hatch 1 and 2

Inspection Conducted: December 16-19, 1986

Inspectors: W. H. Miller, Jr. — 2-2-87 Date Signed

P. M. Madden — 2-2-87 Date Signed

M. D. Hunt — 2-2-87 Date Signed

J. Menning — 2-2-87 Date Signed

R. H. Bernhard — 2-2-87 Date Signed

Approved by: T. E. Conlon, Section Chief — 2-2-87 Date Signed
Plant Systems Section
Division of Reactor Safety

SUMMARY

Scope: This special, announced inspection was conducted in the areas of fire protection and the licensee's actions regarding the implementation of the requirements of 10 CFR Appendix R, Sections III.G, III.J. and III.L.

Results: No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*J. T. Beckham, Jr., Vice President - Plant Hatch
H. C. Nix, General Manager - Plant Hatch
*P. E. Fornel, Project General Manager - Appendix R
*S. C. Hart, Jr., Project Engineering Manager
*J. L. Wilkes, Special Project Manager
C. Doutt, Implementation Engineer
*K. A. Fry, Senior Nuclear Engineer (Detection System Project Supervisor)
*J. D. Heidt, Licensing Engineer
*C. Hicks, Implementation Coordinator
*D. E. McAfee, Senior Plant Engineer (Fire Protection)
W. McDonald, Implementation Coordinator
D. Midlik, Lead Implementation Supervisor

Other licensee employees contacted included engineers, technicians, operators, mechanics, security force members, and office personnel.

Other Organizations

Southern Company Services

*J. Blackburn, Analysis Engineer
*R. Bunt, Unit 1 Analysis Supervisor
*P. D. Grissom, Licensing Engineer
*G. D. McGaha, AIE Engineering Supervisor
*J. G. Sterchi, Fire Protection Engineer
*R. V. Walker, Fire Protection Engineer
E. C. Leanard, Electrical Engineer

Bechtel

*G. M. Cooper, Analysis Engineer (Electrical)
*D. E. Dismukes, Mechanical Group Supervisor
*D. P. Jenner, Electrical Engineer

Hayes Tool & Engineering

*W. R. Klein, Implementation Supervisor

NRC Resident Inspectors

*P. Holmes-Ray
*G. Nejfelt

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on December 19, 1986, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee. The following new item was identified during this inspection:

Inspector Followup Item (321/86-38-01 and 366/86-38-01), Licensee to Develop Procedures to Control the Change-out and Replacement of Safe Shutdown Appendix R - Fuses - paragraph 5.b(1).

The licensee (J. T.Beckham, Jr.) committed in the exit interview to initiate the corrective action on this item.

The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection.

3. Licensee Action on Previous Enforcement Matters

(Closed) Unresolved Item (366/82-10-03) Requirements for Fire Barrier Between Unit 2 HPCI and RHR Pump Rooms. NRC memorandum for T. A. Ippolito from W. V. Johnston of August 17, 1982 indicated that this wall was not required to have a 3-hour fire rating. This inspection verified that the HPCI pump and RHR system Pump B are in the same fire area. This item is closed.

4. Unresolved Items

Unresolved items were not identified during the inspection.

5. Compliance with 10 CFR 50, Appendix R, Section III.G and III.L

An inspection was conducted to determine if the fire protection features provided for structures, systems and components important to safe shutdown at Hatch Units 1 and 2 were in compliance with 10 CFR 50, Appendix R, Sections III.G. and III.L. The scope of this inspection determined if the fire protection features provided for reactivity control, reactor coolant makeup function, reactor heat removal function, process monitoring function and safe shutdown system support function were capable of limiting potential fire damage so that one train or safe shutdown pathway of systems essential to achieving and maintaining hot and cold shutdown from either the Control Room or Emergency Control Stations are free from fire damage.

a. Safe Shutdown Capabilities

The licensee performed an analysis to determine the shutdown pathways utilizing the minimum required equipment to bring Hatch Nuclear Plant Units 1 and 2 to cold shutdown for a design basis fire. The major systems and equipment required, were defined by general electric and further refined in the licensee's Safe Shutdown Appendix R analyses. The licensee's analyses assumed the minimum performance requirements, as defined in 10 CFR 50, Appendix R for any specific fire area to be:

- The Reactor shall be able to achieve and maintain subcritical conditions.

- The Reactor shall be able to achieve and maintain cold shutdown conditions within 72 hours after the initiating event.

- There shall be no fuel clad damage experienced during the shutdown.

- Reactor pressure shall be maintained within design limits.

- Containment pressure shall be maintained within design limits.

- The shutdown systems shall be capable of achieving their functions independent of the availability of normal off-site power.

- All systems and components not affected by the fire are assumed to be available and function normally.

The licensee's analysis assumed the reactor to be operating at 100% power when a fire occurs in a fire area. The fire condition is accompanied by a reactor scram, closure of the main steam isolation valves (MSIVs) and a loss of off site power. The licensee's analysis assumes that only those systems equipped with emergency power are used to achieve and maintain cold shutdown. Therefore, isolation of the reactor results in reactor pressurization, reactor inventory loss and suppression pool heatup. Thus the reactor vessel, fuel clad and containment integrity are threatened as isolation occurs.

For fires which occur in plant areas outside the Control Room/Cable Spreading Room Complex, the licensee after a reactor scram has the option of achieving and maintaining cold shutdown conditions utilizing either shutdown pathway 1 or 2 equipment. For fires which occur within the control room/cable spreading room complex, pathway 3 equipment, which is controlled from the remote shutdown panel, is utilized. Pathways 1, 2, and 3 equipment required for safe shutdown is capable of performing the following functions:

- Prevention of excessive reactor Pressurization.
- Providing adequate reactor makeup inventory.
- Capable of Depressurizing the reactor.
- Removal of decay heat from the reactor.

Pathway 1 shutdown which is controlled from the control room utilizes reactor core isolation cooling (RCIC) and the safety/relief valves (S/RVs) to provide reactor protection via inventory makeup, decay heat removal and depressurization. The licensee utilizes one S/RV to control reactor vessel pressure and RCIC for inventory makeup. Reactor depressurization to below 135 psig occurs approximately 4 hours into the event which at the time low pressure core injection (LPCI) will be available. Therefore, prior to placing the plant in the shutdown cooling mode of operation LPCI will be available to makeup any reactor inventory loss.

The following systems, utilizing primarily Division 1 equipment, are required for pathway 1 shutdown:

- Residual Heat Removal System (RHR)
- Residual Heat Removal Service Water System (RHRSW)
- RCIC
- S/RVs
- Plant Service Water (PSW)
- Reactor Vessel Level and Pressure
- Suppression Chamber Temperature
- Suppression Chamber Level
- Reactor Recirculation
- Drywell Air
- Diesel Generator and Support Equipment
- MSIVs

The primary electrical loads for Unit 1 will be supplied by diesel generators 1A and 1B and for Unit 2 the electrical loads will be supplied by Diesel Generator 2A.

Pathway 2 shutdown which is also controlled from the control room utilizes High Pressure Core Injection (HPCI) and S/RVs to provide reactor protection via inventory makeup, decay heat removal and depressurization. The licensee utilizes one S/RV to control reactor vessel pressure and HPCI for inventory makeup and control. Reactor depressurization to below 265 psig occurs approximately 4 hours into the event which at that time low pressure core spray (LPCS) will be available. Therefore, prior to placing the plant in the alternate shutdown cooling mode of operation, LPCS will be available to makeup any reactor inventory loss.

The following systems utilizing primarily Division 2 equipment are required for pathway 2 shutdown:

- RHR
- RHRSW
- HPCI
- S/RV
- PSW
- Reactor Vessel Level and Pressure
- Suppression Chamber Temperature
- Suppression Chamber Level
- LPCS
- Drywell Air
- Diesel Generator And Support Equipment
- MSIVs

The primary electrical loads for Unit 1 will be supplied using diesel generators 1B and 1C and for Unit 2 the electrical loads will be supplied by Diesel Generator 2C.

Pathway 3 is used to shutdown both units in the event of a fire in the main control room, the cable spreading room and the computer room. This shutdown pathway utilizes RCIC and two S/RVs on Unit 1 and three S/RVs on Unit 2 to provide reactor protection via inventory makeup, decay heat removal and depressurization.

The following systems are utilized for a Pathway 3 shutdown:

- RHR
- RHRSW
- RCIC
- S/RVs
- PSW
- Reactor Vessel Level and Pressure
- Suppression Chamber Temperature
- Suppression Chamber Level
- Reactor Recirculation

- Drywell Air
- Diesel Generator and Support Equipment
- MSIVs
- Condensate Storage Tank Level
- Control Rod Drive
- Primary Containment Cooling.

In order to ensure safe shutdown capabilities, where cables or equipment of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside the primary containment, 10 CFR 50, Appendix R, Section III.G.2 requires that one train of hot shutdown systems be maintained free of fire damage by providing fire protection features which meet the requirements of either III.G.2.a, III.G.2.b., or III.G.2.c.

On the basis of the above Appendix R criteria, the inspectors made an inspection of cabling and components associated with the Residual Heat Removal System, Residual Heat Removal Service Water System, High Pressure Core Injection, Reactor Core Isolation Cooling System, Safety Relief Valves, Low Pressure Core Spray System, Low Pressure Core Injection Systems and Onsite Power Distribution System.

(1) Fire Protection for Safe Shutdown Systems/Components.

An inspection was made to determine if redundant cabling for the Units 1 and 2 safe shutdown system, required to achieve and maintain hot and cold shutdown conditions have been provided with adequate separation or protected in accordance with Appendix R, Section III.G.2.

Included in the review was an evaluation of the acceptability of the barrier or enclosure construction configuration as a fire rated barrier as used in the plant. Also, the review verified the adequacy of the installed penetration sealing systems, and fire dampers/fire doors with respect to installation completeness, physical condition, and fire test documentation.

The following cabling and components associated with safe shutdown pathway 1 and 2 systems were reviewed for compliance with 10 CFR 50, Appendix R, Section III.G. 2:

(a) Unit 1 - Fire Protection pathway 1 and 2 safe shutdown systems.

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
R24-S012-ES4-M71 Power - Core Spray Inlet Valve - Path 2	1205	Path 1	2
R25-S001-ES7-M24 Control Power - Core Spray Inlet Valve - Path 2	0014	Path 2	9
R25-S001-ES7-M22 Control Power - Core Spray Inlet Valve - Path 2	1020 1104	Path 1 Path 1	2 2
R24-S012-ES8-C71A Control - Core Spray Inlet Valve - Path 2	1205 1104	Path 1 Path 1	2 2
R24-S012-ES8-C71C Control - Core Spray Inlet Valve - Path 2	1205 1104	Path 1 Path 1	2 2
R24-S012-ES4-M69 Power - Core Spray Outboard Valve - Path 2	1205	Path 1	2
R25-S001-ES7-M24 Control Power - Core Spray Outboard Valve - Path 2	0014	Path 2	9
R25-S002-ES8-M22 Control Power - Core Spray Outboard Valve - Path 2	1020 1104	Path 1 Path 1	2 2

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
R24-S012-ES8-C69 Control - Core Spray Outboard Valve - Path 2	1205	Path 1	2
R24-S012-ES8-C69A Control - Core Spray Outboard Valve - Path 2	1205 1104	Path 1 Path 1	2 2
R24-S012-ES8-69B Control - Core Spray Outboard Valve - Path 2	1205 1104	Path 1 Path 1	2 2
R24-S011-ES3-M42 Power - RHR LPCI Discharge Valve - Path 1	1203 *1205	Path 2 Path 1	2 8
R24-S011-ES3-M42A Power - RHR LPCI Discharge Valve - Path 1	1203	Path 2	2
R24-S018-ES3-M34A Power - RHR LPCI Discharge Valve - Path 1	1203 *1205	Path 2 Path 1	2 8
H11-P627-ES8-C007 Control - RHR LPCI Discharge Valve - Path 1	1104	Path 1	9
H11-P627-ES8-C008 Control - RHR LPCI Discharge Valve - Path 1	1104 1205	Path 1 Path 1	9 9
R24-S018-ES7-C34 Control - RHR LPCI Discharge Valve - Path 1	1203	Path 2	2

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
R24-S018-ES7-C34A	1703	Path 2	2
Control - RHR LPCI	*1205	Path 1	8
Discharge Valve - Path 1			
R24-S018-ES7-C34D	1203	Path 2	2
Control - RHR LPCI	*1205	Path 1	8
Discharge Valve - Path 1			
R24-S018-ES3-M25	1203	Path 2	2
Power - RHR LPCI	*1205	Path 1	8
Discharge Valve - Path 1			
R25-S004-ES7-M35	1015	Path 2	2
Control Power - RHR	0040	Path 2	2
LPCI Discharge Valve - Path 1	0014	Path 2	2
H11-P602-ES7-C070	*1104	Path 1	3,4,5
Control - RHR LPCI	1203	Path 2	2
Discharge Valve - Path 1	*1205	Path 1	8
H11-P602-ES7-C073	*1104	Path 1	3,4,5
Control - RHR LPCI	1203	Path 2	2
Discharge Valve - Path 1	*1205	Path 1	8
H11-P617-ES7-C052	1203	Path 2	
Control - RHR LPCI	*1205	Path 1	8
Discharge Valve - Path 1			
H11-P618-ES8-C001	1104	Path 1	9
Control - RHR LPCI	1403	Path 1	9
Discharge Valve - Path 1	1205	Path 1	9
H11-P622-ES7-C039	*1104	Path 1	3,4,5
Control - RHR LPCI	1203	Path 2	2
Discharge Valve - Path 1	*1205	Path 1	8

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
H11-P622-ES7-C041	*1104	Path 1	3,4,5
Control - RHR LPCI	1203	Path 2	2
Discharge Valve - Path 1	*1205	Path 1	8
H11-P627-ES8-C007	1104	Path 1	9
Control - RHR LPCI	1205	Path 1	9
Discharge Valve - Path 1			
R24-S018-ES7-C25	1203	Path 2	
Control - RHR LPCI	*1205	Path 1	8
Discharge Valve - Path 1			
R24-S018-ES7-C25A	1203	Path 2	2
Control - RHR LPCI	*1205	Path 1	8
Discharge Valve - Path 1			
R24-S018-ES7-C25D	1203	Path 2	2
Control - RHR LPCI	*1205	Path 1	8
Discharge Valve - Path 1			
R24-S011-ES2-M57	1203	Path 2	2
Power - RHR Heat Exchanger "A" Bypass Valve - Path 1			
R24-S011-ES7-C57	1203	Path 2	2
Control - RHR Heat Exchanger "A" Bypass Valve - Path 1			
R24-S011-ES7-C57A	1203	Path 2	2
Control - RHR Heat Exchanger "A" Bypass Valve - Path 1			
R24-S012-ES4-M26	1205	Path 1	2
Power - RHR LPCI Dischange Valve - Path 2			

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
R24-S012-ES4-M26A Power - RHR LPCI Discharge Valve - Path 2	1205	Path 1	2
R24-S018-ES4-M04A Power - RHR LPCI Discharge Valve - Path 2	1205	Path 1	2
H11-P626-ES7-C006 Control - RHR LPCI Discharge Valve - Path 2	1203	Path 2	9
H11-P627-ES8-C007 Control - RHR LPCI Discharge Valve - Path 2	1104	Path 1	1
H11-P627-ES8-C008 Control - RHR LPCI Discharge Valve - Path 2	1104 1205	Path 1 Path 1	2 2
R24-S018-ES8-C04 Control - RHR LPCI Discharge Valve - Path 2	*1203 1205	Path 2 Path 1	8 2
R24-S018-ES8-C04A Control - RHR LPCI Discharge Valve - Path 2	1205 1104	Path 1 Path 1	2 2
R24-S018-ES8-C04D Control - RHR LPCI Discharge Valve - Path 2	1205 1104	Path 1 Path 1	2 2
R24-S012-ES4-M51 Power - Suppression Pool Spray Valve - Path 2	1205	Path 1	2

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
H11-P618-ES8-C004 Control - Suppression Pool Spray Valve - Path 2	1104 1205	Path 1 Path 1	2 2
R24-S012-ES8-C51 Control - Suppression Pool Spray Valve - Path 2	1205	Path 1	2
R24-S012-ES8-C51A Control - Suppression Pool Spray Valve - Path 2	1205 1104	Path 1 Path 1	2 2
R24-S012-ES8-C51C,D,&E Control - Suppression Pool Spray Valve - Path 2	1205	Path 1	2
R24-S012-ES4-M53 Power - RHR Inlet To Suppression Pool Valve - Path 2	1205	Path 1	2
H11-P618-ES8-C004 Control - RHR Inlet To Suppression Pool Valve - Path 2	1104 1205	Path 1 Path 1	2 2
R24-S012-ES8-C53 Control - RHR Inlet to Suppression Pool Valve - Path 2	1205 1203	Path 1 Path 2	2 8
R24-S012-ES8-C53A Control - RHR Inlet To Suppression Pool Valve - Path 2	1104 1205	Path 1 Path 1	2 2
R24-S012-ES8-C53C,D,&E Control - RHR Inlet To Suppression Pool Valve - Path 2	1205	Path 1	2

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
R24-S012-ES4-M40 Power - Containment Spray Discharge Valve - Path 2	1205	Path 1	2
H11-P618-ES8-C004 Contral - Containment Spray Discharge Valve - Path 2	1104 1205	Path 1 Path 1	2 2
R24-S012-ES8-C40 Control - Containment Spray Discharge Valve - Path 2	1205 *1203	Path 1 Path 2	2 8
R24-S012-ES8-C40A Control - Containment Spray Discharge Valve - Path 2	1205 1104	Path 1 Path 1	2 2
R24-S011-ES3-M88 Power - Containment Spray Dischange Valve - Path 1	1203	Path 2	2
H11-P617-ES7-C005 Control - Containment Spray Discharge Valve - Path 1	1203	Path 2	2
R24-S011-ES7-C88 & A Control - Containment Spray Discharge Valve - Path 1	1203	Path 2	2
R24-S011-ES3-M51 Power - RHR Inlet To Suppression Pool Valve - Path 1	1203	Path 2	2
H11-P617-ES7-C005 Control - RHR Inlet To Suppression Pool Valve - Path 1	1203 1205	Path 2 Path 1	2 9

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
R24-S011-ES7-C51 Control - RHR Inlet To Suppression Pool Valve - Path 1	1203	Path 2	2
P24-S011-ES7-C51 Control - RHR Inlet To Suppression Pool Valve - Path 1	1203 1104	Path 2 Path 2	2 2
R22-S007-ES2-M02 Power - RHR Service Water Pump ID - Path 2	1404	Path 1	2
H11-P618-ES8-C009 Control - RHR Service Water Pump ID - Path 2	1104 1205	Path 1 Path 1	2 2
H11-P618-ES8-C010 Control - RHR Pump 1D - Path 2	1104 1205	Path 1 Path 1	2 2
R22-S007-ES8-C02B,G,&H Control - RHR Service Water Pump ID - Path 2	1104	Path 1	2
R24-S011-ES3-M19 Power - RHR Pump 2A Suchation Valve - Path 1	1203	Path 2	2
H11-P601-ES7-C109 Control - RHR Pump 2A Suction Valve - Path 1	1203	Path 2	2
R24-S011-ES7-C19 Control - RHR Pump 2A Suction Valve - Path 1	1203	Path 2	2

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
R24-S011-ES7-C19A Control - RHR Pump 2A Suction Valve - Path 1	1203	Path 2	2
R22-S006-ES1-M05 Power - RHR Pump 2D - Path 2	1205 *1203	Path 1 Path 2	2 8
H11-P617-ES7-C036 Control - RHR Pump 2D - Path 2	*1203	Path 2	8
H11-P617-ES7-C036A Control - RHR Pump 2D - Path 2	1205 *1203	Path 1 Path 2	2 8
H11-P617-ES7-C037 Control - RHR Pump 2D - Path 2	*1203	Path 2	8
H11-P617-ES7-C037A Control - RHR Pump 2D - Path 2	1205 *1203	Path 1 Path 2	2 8
H11-P617-ES7-C071 & Co72 Control - RHR Pump 2D - Path 2	1408 1412 0014	Path 2 Path 2 Path 2	9 9 9
R22-S006-ES7-C05 Control - RHR Pump 2D - Path 2	*1412 *0014	Path 2 Path 2	6 3,4,5
R22-S006-ES7-C05J Control RHR Pump 2D - Path 2	*1203 1205	Path 2 Path 1	8 2
R24-S012-ES4-M57 Power - RHR Heat Exchanger "B" Bypass Valve - Path 2	1205	Path 1	2

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
R24-S012-ES8-C57A	1205	Path 1	2
Control - RHR Heat Exchanger "B" Bypass Valve - Path 2	1104	Path 1	2
R24-5012 ES8-C57C, D&E	1205	Path 1	2
Control - RHR Heat Exchanger "B" Bypass Valve - Path 2			
R22-S005-ES1-M05	1412	Path 2	2
Power - RHR system Pump 2A - Path 1	1203	Path 2	2
R22-S005-ES7-C05	*1104	Path 1	3,4,5
Control - RHR System	1412	Path 2	2
Pump 2A - Path 1	0014	Path 2	2
R22-S005-ES7-C05B & M	1412	Path 2	2
Control RHR System Pump 2A - Path 1			
R22-S006-ES1-M02	1408	Path 2	2
Power - RHR Service Water Pump 1C - Path 1			
R22-S006-ES1-M02A	0501	Path 1 & 2	8
Power - RHR Service Water Pump 1C - Path 1			
R22-S006-ES7-C02	1408	Path 2	2
Control - RHR	1412	Path 2	2
Servic Water Pump 1C - Path 1			
R22-S006-ES7-C02B	1408	Path 2	2
Control - RHR Service Water Pump 1C - Path 1			
R22-S006-ES7-C02F	1408	Path 2	2
Control - RHR	1412	Path 2	2
Service Water Pump 1C - Path 1			

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
R22-S007-ES2-M01 Power - RHR Service Water Pump 1B - Path 2	1404	Path 1	2
R22-S007-ES2-M01A Power - RHR Service Water Pump 1B - Path 2	0501	Path 1 & 2	8
R22-S007-ES8-C01 Control - RHR Service Water Pump 1B - Path 2	1404 *0014	Path 1 Path 2	2 3,4,5
R22-S007-ES8-C01B, G&H Control - RHR Service Water Pump 1B - Path 2	1404	Path 1	2
R22-S007-ES2-M06 Power - Core Spray Pump - Path 2	1205 1404	Path 1 Path 1	2 2
H11-P626-ES7-C001 Control - Core Spray Pump - Path 2	1203 1205	Path 2 Path 1	9 2
H11-P626-Es7-C002 Control - Core Spray Pump - Path 2	1205 1203	Path 1 Path 2	2 9
H11-P627-ES8-C026 Control - Core Spray Pump - Path 2	*0014 1402 1404	Path 2 Path 1 Path 1	3,4,5 2 2
H11-P627-ES8-C027 Control - Core Spray Pump - Path 2	*0014 1402 1404	Path 2 Path 1 Path 1	3,4,5 2 2
R22-S007-ES8-C06 Control - Core Spray Pump - Path 2	1404 *0014	Path 1 Path 2	2 3,4,5

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
R22-S007-ES8-C06B, H&J Control - Core Spray Pump - Path 2	1404	Path 1	2
R22-S007-ES8-C06K Control - Core Spray Pump - Path 2	*0014	Path 2	3,4,5
R24-S012-ES4-M67 Power - Suppression Chamber Suction Valve - Path 2	1205	Path 1	2
R24-S012-ES8-C67 Control - Suppression Chamber Suction Valve - Path 2	1205	Path 1	2
R24-5012-ES8-C67A Control Suppression Chamber Suction Valve - Path 2	1205 1104	Path 1 Path 1	2 2
R24-S011-ES3-M75A & B Power - HPCI Steam Support Inboard Isolation Valve - Path 2	1205	Path 1	2
R24-S011-ES7-C75N & D Control - HPCI Steam Supply Inboard Isolation Valve - Path 2	*1203 1205	Path 2 Path 1	8 2
R24-S022-ES6-M05 & A Power - HPCI Steam Supply Outboard Isolation Valve - Path 2	1205	Path 1	2
R24-S022-ES8-C05 Control - HPCI Steam Supply Outboard Isolation Valve - Path 2	1205 *1203	Path 1 Path 2	2 8

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
R24-S022-ES8-C05A Control - HPCI Steam Supply Outboard Isolation Valve - Path 2	1205 1104	Path 1 Path 1	2 2
R24-S022-ES6-M11, A & G Power - HPCI Pump Outboard Discharge Valve - Path 2	1205	Path 1	2
R24-S022-ES8-C11 Control - HPCI Pump Outboard Discharge Valve - Path 2	1205	Path 1	2
R24-S022-ES8-C11A Control - HPCI Pump Outboard Discharge Valve - Path 2	1205	Path 1	2
R24-S022-ES8-C11C Control - HPCI Pump Outboard Discharge Valve - Path 2	1205	Path 1	2
R24-S022-ES6-M07C, D & E Power - HPCI Pump Inboard Discharge Valve - Path 2	1205	Path 1	2
R24-S022-ES8-C07A Control - HPCI Pump Inboard Discharge Valve - Path 2	1205 1104	Path 1 Path	2 2
R24-S022-ES8-C07D Control - HPCI Pump Inboard Discharge Valve - Path 2	1205 *1203	Path 1 Path 2	2 8
R24-S022-ES8-C07E Control - HPCI Pump Inboard Discharge Valve - Path 2	1205	Path 1	2

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
R25-S001-ES7-M24 Power - HPCI Pump - Path 2	0014	Path 2	9
R25-S002-ES8-M06 Power - HPCI Pump - Path 2	1020 1104	Path 1 Path 1	2 2
R25-S002-ES8-M10 Power - HPCI Pump - Path 2	1020	Path 1	2
R25-S002-ES8-M22 Power - HPCI Pump - Path 2	1020 1104	Path 1 Path 1	2 2
R25-S002-ES8-M25 Power - HPCI Pump - Path 2	1020 1104	Path 1 Path 1	2 2
R25-S064-ES7-M22 Power - HPCI Pump - Path 2	1015 0014 0040	Path 2 Path 2 Path 2	9 9 9
R25-S065-ES8-M04 Power - HPCI Pump - Path 2	1013 *0014	Path 1 Path 2	2 3,4,5
R25-S065-ES8-M21 Power - HPCI Pump - Path 2	1013 *0014	Path 1 Path 2	2 3,4,5
R25-S065-ES8-M35 Power - HPCI Pump - Path 2	1013 *0014	Path 1 Path 2	2 3,4,5
R24-S022-ES8-M15 Power - HPCI Pump Suction From Suppression Pool Valve - Path 1	1205	Path 1	2
R24-S022-ES8-C15 Control - HPCI Pump Suction from Suppression Pool Valve - Path 2	1205	Path 1	2

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
R24-5022-ES8-C15A Control - HPCI Pump Suction from Suppression Pool Valve - Path 2	1205 1104	Path 1 Path 1	2
R24-5022-ES6-M16 Power - HPCI Pump Suction from Suppression Pool Valve - Path 2	1205	Path 1	2
R24-5022-ES8-C16 Control - HPCI Pump Suction from Suppression Pool Valve - Path 2	1205	Path 1	2
R24-5022-ES8-C16A Control - HPCI Pump Suction from Suppression Pool Valve - Path 2	1205 1104	Path 1 Path 1	2 2
R25-5002-ES8-M10 Power - Suppression Pool Suction Isolation Valve - Path 2	1020 1104	Path 1 Path 1	2 2
H11-P601-ES8-C039 Control - Suppression Pool Suction Isolation Valve - Path 2	1104 1205	Path 1 Path 1	2 2
R24-5022-ES6-M06 & A Power - HPCI Suction Valve from CST - Path 2	1205	Path 1	2
R24-5022-ES8-C06 Control - HPCI Suction Valve from CST - Path 2	1205	Path 1	2
R24-5022-ES6-C06A Control - HPCI Suction Valve from CST - Path 2	1205 1104	Path 1 Path 1	2 2
R24-5018-ES4-M16 Power - RCIC Steam Inboard Isolation Valve - Path 1	1203	Path 2	2

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
R24-5018-ES8-C16 & A Control - RCIC Steam Inboard Isolation Vale - Path 1	1203 *1205	Path 2 Path 1	2 8
R24-5018-ES8-C16C Control - RCIC Steam Inboard Isolation Valve - Path 1	1203	Path 2	2
R24-5021A-ES7-M01 Power - RCIC Steam Outboard Isolation Valve - Path 1	1203	Path 2	2
R24-5021A-ES7-C01 Control - RCIC Steam Outboard Isolation Valve - Path 1	1203	Path 2	2
R24-5021A-ES7-C02 Control - RCIC Steam Outboard Isolation Valve - Path 1	*1104 1203	Path 1 Path 2	3,4,5 2
R24-5021A-ES7-C05, C06, & C07 Control - RCIC Steam Outboard Isolation Valve - Path 1	1203	Path 2	2
R24-5021-ES5-M09 Power - RCIC Outboard Discharge Valve - Path 1	1203	Path 2	2
R24-5021-ES5-C09 & C09A Control - RCIC Outboard Discharge Valve - Path 1	1203 *1104	Path 2 Path 1	2 3,4,5
R24-5021A-ES5-M02 Power - RCIC Pump Inboard Discharge Valve - Path 1	1203	Path 2	2
R24-5021A-ES7-C08 Control - RCIC Pump Inboard Discharge Valve - Path 1	1203 *1205	Path 2 Path 1	2 8

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
R24-5021A-ES7-C09 Control - RCIC Pump Inboard Discharge Valve - Path 1	1203 *1104	Path 2 Path 1	2 3,4,5
R24-5021A-ES7-C11, C12, & C13 Control - RCIC Pump Inboard Discharge Valve - Path 1	1203	Path 2	2
R24-5021-ES5-M21 Power - RCIC Turbine - Path 1	1203	Path 2	2
R24-5021-ES7-C21 Control - RCIC Turbine - Path 1	1203	Path 2	2
R24-5021-ES7-C21A Control - RCIC Turbine - Path 1	1203 *1104	Path 2 Path 1	2 3,4,5
R24-5021-ES7-C21B, C21C, C21D & C21E Control - RCIC Turbine - Path 1	1203	Path 2	2
R24-5021-ES5-M17 Power - RCIC Pump Suction Valve from Suppression Pool - Path 1	1203	Path 2	2
R24-5021-ES7-C17 Control - RCIC Pump Suction Valve from Suppression Pool - Path 1	1203	Path 2	2
R24-5021-ES7-C17A Control - RCIC Pump Section Valve from Suppression Pool - Path 1	1203 *1104	Path 2 Path 1	2 3,4,5

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
R25-5001-ES7-M14 Power - Suppression Pool Suction Valve - Path 1	0014	Path 2	2
H11-P602-ES7-C033 Control - Suppression Pool Suction Valve - Path 1	*1104 1203 *1205	Path 1 Path 2 Path 1	3,4,5 2 8
R24-5021-ES5-M12 Power - RCIC Pump Suction Valve from Suppression Pool - Path 1	1203	Path 2	2
R24-5021-ES7-C12 & C12A Control - RCIC Pump Suction Valve from Suppression Pool - Path 1	1203	Path 2	2
R24-5021-ES5-M03 Power - RCIC Pump Suction Valve from Condensate Storage Tank - Path 1	1203	Path 2	2
R24-5021-ES7-C03 Control - RCIC Pump Suction Valve from Condensate Storage Tank - Path 1	1203	Path 2	2
R24-5021-ES7-C03A Control - RCIC Pump Suction Valve from Condensate Storage Tank - Path 1	1203 *1104	Path 2 Path 1	2 3,4,5
R25-5064-ES7-M19 Power - Plant Service Water Inlet Valve - Path 1	1015 0014 0040	Path 2 Path 2 Path 2	2 2 2
R22-5005-ES7-C05K Control - Plant Service Water Inlet Valve - Path 1	0014 1412	Path 2 Path 2	2 2

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
R22-5005-ES7-C05I, C05J, & C05L Control - Plant Service Water Inlet Valve - Path 1	1203 1412	Path 2 Path 2	2 2
R25-5065-ES8-M15 Power - Plant Service Water Inlet Valve - Path 2	1013 *0014	Path 1 Path 2	2 3,4,5
R22-5006-ES8-C07L Control - Plant Service Water Inlet Valve - Path 2	1104 1205	Path 1 Path 1	2 2
R22-5006-ES8-C07M Control - Plant Service Water Inlet Valve - Path 2	1205	Path 1	2
R22-5006-ES8-C05I Control - Plant Service Water Inlet Valve - Path 2	1205	Path 1	2
R24-5025-ES7-M50 Power - Service Water Isolation Valve to Diesel Generators - Path 1	1412 1601	Path 2 Path 2	2 2
R24-5025-ES7-C50 Control - Service Water Isolation Valve to Diesel Generators - Path 1	1412	Path 2	2
R24-5027-ES8-M50 Power - Service Water Isolation Valve to Diesel Generators - Path 2	1404 1602	Path 1 Path 1	2 2
R24-5027-ES8-C50 Control - Service Water Isolation Valve to Diesel Generators - Path 2	1404	Path 1	2

NOTES: 1) Cables identified with "*" intrude into a fire area that contains cables of the redundant shutdown path.

2) Cables for redundant shutdown path are located in a separate fire area.

3) Area contains fire detection system.

4) Area contains automatic fire suppression system.

5) Cable enclosed within a 1 hour fire rated barrier.

6) Cable enclosed within a 3 hour fire rated barrier.

7) Operator actions required for plant shutdown.

8) Exemption submitted.

9) Analyzed not to affect safe shutdown capability.

(b) Unit 2 - Fire Protection for Pathway 1 and 2 Safe Shutdown Systems

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
ABE701M01 & ABE701M02	0001	1 or 2	2,9
Power - Division I	0040	1 or 2	2,9
ECCS Cabinet 2H11-P925	2004	1 or 2	2,9
Path 1 and 2	2016	1 or 2	2,9
	2018	1 or 2	2,9
ABE703M01 &	0001	1 or 2	2,9
ABE703M02	0040	1 or 2	2,9
Power - Division I	2004	1 or 2	2,9
ECCS Cabinet 2H11-P925	2616	1 or 2	2,9
Path 1 and 2	2018	1 or 2	2,9
ABE802M01 &	2104	1 or 2	2,9
ABE802M02	2014	1 or 2	2,9
Power - Division II	2020	1 or 2	2,9
ECCS Cabinet 2H11-P926			
Path 1 and 2			
ABE911C01 &	2203F	1 or 2	7,9
ABE915C04	2203K	1 or 2	7,9
Control - Pressure	2205S	1 or 2	7,9
Transmitters 2B21-N120C	2203K	1 or 2	7,9
& 2B21-N122C			
Path 1			

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
EAE183M02	0501	1 or 2	8
Power - RHR Service Water Pump "A"			
Path 1			
EAE187M01	2203	2	2
Power - RHR	Duct	2	2
Pump "A"	2494	2	2
Path 1			
EAE888C07			
Control - RHR Pump "B"	*0014K	2	3,4,5
Path 2	2409	1	2
EAE318M01			
Power - RHR Pump "A"	2203B	2	2
Torus Suction Valve	2203A	2	2
Path 1	2203F	2	2
EAE718C01	*2104	1	3,4,5
Power - RHR Pump "A"	2203F	2	2
Torus Suction Valve			
Path 1			
EAE718C02	2203B	2	2
Power - RHR Pump "A"	2203A	2	2
Torus Suction Valve	2203F	2	2
Path 1			
EAE718C03	2203B	2	2
Power - RHR Pump "A"	2203A	2	2
Torus Suction Valve	2203F	2	2
Path 1	*2104	1	3,4,5
EAE444M01	2205B	1	2
Control - RHR Pump "B"	2205A	1	2
Torus Suction Valve	2205F	1	2
Path 2			
EAE844C05	*2203F	2	3,4,5
Control - RHR Pump "B"	2205F	1	2
Torus Suction Valve	2205C	1	2
Path 2	2205A	1	2

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
EAE844M02	*2203F	2	3,4,5
Power - RHR Pump "B"	2205N	1	2
Torus Suction Valve	2205F	1	2
Path 2			
EAE720C02	2203B	2	2
Control - RHR Pump "A"	2203A	2	2
SDC Suction Valve	2203F	2	2
Path 1			
EAE720C04	2203B	2	2
Control - RHR Pump "A"	2203A	2	2
SDC Suction Valve	2203F	2	2
Path 1	*2104	1	3,4,5
AAE823C04	2203F	1 or 2	7,9
Control - RHR SDC	2205N	1 or 2	7,9
Suction Isolation Valve	2205F	1 or 2	7,9
Path 1	225E	1 or 2	7,9
AAE317M01	2203F	1	7
Power - RHR SCD			
Suction Isolation Valve			
Path 1			
EAE334M01	2203F	2	2
Power - RHR LPCI	*223E	1 or 2	8
Injection Valve			
Path 1			
EAE734C05	223E	1 or 2	8
Control - RHR LPCI	2203F	2	2
Injection Valve			
Path 1			
EBE701M01	2004	2	2
Power - RHR LPCI	2016	2	2
Outboard Valve	0014K	2	2
Path 1	*2014	1	3,4,5
	2016	2	2
ABE915C04	2203F	2	2
Control - RHR LPCI	2203K	2	2
Outboard Valve	2205S	2	2
Path 1	2203K	2	2

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
EAE861C05	2205F	1	2
Control - RHR	225E	1 or 2	8
LPCI Outboard Valve	2205N	1	2
Path 2			
EAE461M01	2205F	1	2
Power - RHR LPCI	225E	1 or 2	8
Outboard Valve	2205N	1	2
Path 2			
EAE721C01	2203F	2	2
Control - RHR SDC Suction Valve			
Path 1			
EAE721C04	2203B	2	2
Control - RHR SDC	2203A	2	2
Suction Valve	2203F	2	2
Path 1	*2104	1	3,4,5
EAE727C02	*2104	1	3,4,5
Control - RHR Test	2203F	2	2
Line Valve			
Path 1			
EAE853C02	*2203F	2	3,4,5
Control - RHR Containment	2205N	1	2
Spray Valve	2104	1	2
Path 2			
EAE853M02	*2203F	2	3,4,5
Power - RHR Containment	2205N	1	2
Spray Valve	2205F	1	2
Path 2			
EAE732C02	*2104	1	3,4,5
Control - RHR Heat	2203F	2	2
Exchanger "A" Bypass Shell Side Valve			
Path 1			
EAE856C04	*2203F	2	3,4,5
Control - RHR Heat	2205N	1	2
Exchanger "B" Bypass	2205F	1	2
Shell Side Valve			
Path 2			

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
EAE338M01	2203B	2	2
Power - RHR Heat	2203A	2	2
Exchanger "A" Service	2203F	2	2
Water Flow Control Valve			
Path 1			
EAE738C01	*2104	1	3,4,5
Control - RHR Heat	2203F	2	2
Exchanger "A" Service			
Water Flow Control Valve			
Path 1			
EAE865C02			
Control - RHR Heat	2104	1	2
Exchanger "B" Service	2205F	1	2
Water Flow Control Valve			
Path 2			
EAE807M01	*014G	2	3,4,5
Power - RHR Heat	2014	1	2
Exchanger "B" Service	2017	1	2
Water Flow Control Valve			
Path 2			
EDE821C03	2205Z	1	2
Control - HPCI Pump	2205A	1	2
Suction Valve	2205F	1	2
from Torus			
Path 1			
EDE622M02	2205Z	1	2
Power - HPCI Pump	2205A	1	2
Suction Valve	2205F	1	2
from Torus			
Path 2			
EDE613M02	2205Z	1	2
Power - HPCI Turbine	2205A	1	2
Stop Valve	2205F	1	2
Path 2			
EDE815C02	2205Z	1	2
Control - HPCI Pump	2205A	1	2
Suction Valve	2205F	1	2
from CST			
Path 2			

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
EDE616M05 &	2205A	1	2
EDE616M06	*225W	1 or 2	8
Power - HPCI Pump Injection Valve Path 2	2205F	1	2
EEE918C26	2203C	2	2
Control - RCIC Turbine	2203F	2	2
and Turbine Trip and	*2104	1	3,4,5
Governing Valves	0014K	2	2
Path 1	2016	2	
	2018	2	
EEE703C05	2203C	2	2
Control - RCIC Turbine	2203A	2	2
and Turbine Trip and	2203F	2	2
Governing Valves	*2104	1	3,4,5
Path 1			
EEE708C02	2203F	2	2
Control - RCIC Pump Suction Valve from CST Path 1			
EEE708M02	2203F	2	2
Power - RCIC Pump Suction Valve from CST Path 1			
EEE710C03	2203A	2	2
Control - RCIC Pump	*223W	1 or 2	8
Injection Valve	2203	2	2
Path 1			
EEE510M01	2203A	2	2
Power - RCIC Pump	*223W	1 or 2	8
Injection Valve	2203C	2	2
Path 1	2203F	2	2
EEE714C03			
Control - RCIC Pump Suction Valve from Suppression Pool Path 1	2203F	2	2

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
EEE711C01	2203F	2	2
Control - RCIC Pump Suction Valve from Suppression Pool			
Path 1			
EBE221M01	2205B	1	2
Power - Core Spray	2409	1	2
Pump "B"			
Path 2			
EBE802M01	*0014G	2	3,4,5
Power - Core Spray	2014	1	2
Injection Valve	2017	1	2
Path 2			
ABE018C05	2104	1	2
Control - Core Spray	2205F	1	2
Injection Valve	2205I	1	2
Path 2			
EBE415M01	2205B	1	2
Power - Core Spray Pump	2205F	1	2
Min. Flow Bypass Valve			
Path 2			
PUE135M02	0501	1 or	8
Power - Division I Service	2404	2	
Water Pump "A"			
Path 1			
PUE735C06			
Control - Division I	0014K	2	2
Service Water Pump "A"			
Path 1			
PUE305C02			
Control - Turbine Bldg.	2602	1 or 2	7,9
Div. II			
Header Isolation Valve	2409	1 or 2	7,9
Path 2			

Cable No. Function Shutdown Path	Fire Area Cable Routes	Assured Shutdown Pathway	Appendix R Fire Protection Features
PUE805M01	2602	1 or 2	7,9
Power - Turbine Bldg.	2409	1 or 2	7,9
Division II			
Header Isolation Valve			
Path 2			
RSE725C01	2404	2	2
Control - Diesel	2403	2	2
Diesel Generator 2A	2401	2	2
Div. I Fuel Oil			
Transfer Pump			
Path 1			
RUE835M01	2409	1	2
Power - Diesel	2609	1	2
Generator 2C			
Div. II Fuel Oil			
Transfer Pump			
Path 2			

NOTES: Notes for Unit 1, paragraph Section 5.a.(1)(a), are also applicable to Unit 2.

Based on the review of the licensee's safe shutdown analysis, the routing of the above sample Units 1 and 2 safe shutdown cables, and the available plant fire protection features for protection of safe shutdown capabilities, it appears that sufficient protection is available to maintain one shutdown pathway free from fire damage. Thus, the plant is in compliance with 10 CFR 50, Appendix R Section III.G.

b. Associated Circuits of Concern

The separation and protection requirements to 10 CFR 50, Appendix R, apply not only to safe shutdown circuits but also to associated circuits that could prevent operation or cause maloperation of safe shutdown systems and equipment. The identification of these associated circuits of concern was performed for Hatch Nuclear Plant (HNP) Units 1 and 2 in accordance with NRC Generic Letter 81-12 and subsequent NRC clarification. Associated circuits of concern are defined as those circuits that have a physical separation less than that required by Section III.G.2 of Appendix R, and have one of the following:

- A common power source (common bus) where the shutdown equipment and the power source is not electrically protected from the circuit of concern by coordinated breakers, fuses, or similar devices; or

- A connection to circuits of equipment whose spurious operation (spurious signal) would adversely affect the shutdown capability; or

- A common enclosure with the shutdown cables, and

  Type (1) are not electrically protected by circuit breakers, fuses of similar devices, or

  Type (2) will allow propagation of the fire into the enclosure.

(1) Associated Circuits by Common Power Supply (Common Bus)

Circuits and cables associated by common power supply are simply nonsafe shutdown cables whose fire-induced failure will cause the loss of a power source (bus, distribution panel, or MCC) that is necessary to support safe shutdown. This problem could exist for power, control or instrumentation circuits. The problem of associated circuits of concern by common power supply is resolved by ensuring adequate electrical coordination between the safe shutdown power source supply breaker and the component feeder breakers or fuses.

For the audit of this concern at HNP Units 1 and 2 sample selections of the electrical equipment which supply/control the power to various pieces of electrically powered equipment which must function in shutdown pathways 1 and 2 were examined. Where equipment is common to two of the three shutdown pathways, the fuse/breaker coordination was examined to provide assurance that power would be available if required. Due to the similarity of Units 1 and 2, various components were selected from each unit. Review of the breaker coordination curves, developed for the component which should it fault could cause the greatest challenge to the supply breaker for that particular power supply board, were reviewed. Discussions with knowledgeable licensee representatives were held to insure adequate understanding on the part of the NRC inspector relating to various actions and adjustments required to meet the coordination criteria.

The licensee's analysis determined that several breakers in the 600V switchgear (SWGR) did not exhibit the coordination requirements in certain instances of current/time conditions when plotted on a coordination curve. This condition was corrected by two methods:

(a) The over current trip devices (electro-mechanical) were replaced with solid state devices that could be adjusted to meet the time/current requirements of the downstream loads. The solid state devices were used mainly on the 600V ac buses 1C, 2C, 1D, and 2D where the feed was to a 600V motor control center (MCC).

(b) Where molded case circuit breakers had been used in certain distribution panels, it was determined that no adjustments could be made on these breakers that would meet coordination of the upstream feeder breakers. In this case, the molded case circuit breakers were replaced with molded case switches and fuses that have the required characteristics. The fuses that provide the required characteristics will be installed in series with each molded case switch. Design changes to power circuits from the 600V ac motor control centers which supply power to essential distribution panels have been implemented for Units 1 and 2. There are approximately 280 circuits which will require modification. These circuits have been identified on Design Change Requests (DCR) 239, 233 and 232.

During the review, it was noted that the fuses to be added have special characteristics. These characteristics are required to meet the circuit coordination requirements. It was noted that there did not appear to be any program in place to insure that these fuses would be replaced with the same type should replacement be required. It is important to control these fuses in that two fuses with the same amperage rating could have different type elements which determine the length of time needed to open on overcurrent. Therefore, type for type fuse replacement is required to meet the design intent of the circuit protection scheme. The licensee committed to initiate procedures for fuse control during installation and maintenance.

This item is identified as Inspector Followup Item (321/86-38-01 and 366/86-38-01), Licensee to Develop Procedures to Control the Change-out and Replacement of Safe Shutdown/Appendix R Fuses.

The examination of the breaker/fuse coordination was performed during this inspection for the power distribution boards and equipment identified below:

RHR Pumps 1A and 1B (2A and 2B)
RHR Service Water Pumps 1A and 1B (2A and 2B)
Plant Service Water Pump 1B
Core Spray Pump 1B
4160V Bus 1E (2E)

4160V Bus 1F (2F)
4160V Bus 1G (2G)
600 Volt Load Centers 1C and 1D
600 Volt Motor Control Centers R24-5011, R24-5012, R24-5018A, R24-5018B
DC load centers 1A and 1B

NOTE: Unit 2 equipment shown in parentheses.

(2) Associated Circuits Causing Spurious Operation (Spurious Signals)

Circuits associated because of spurious operation are those that can, by fire-induced failures cause safe shutdown equipment or nonsafe shutdown equipment to maloperate in a way that defeats the function of safe shutdown systems or equipment. Examples include the uncontrolled opening or closing of valves, or of circuit breakers, due to fire-induced damage to nonsafe shutdown instrument and control circuits that affect the control circuit interlocks of the safe shutdown components.

The analysis of spurious operations considered equipment (safe shutdown and nonsafe shutdown) that could affect safe shutdown of the plant. The potential effects of associated circuits of concern were considered in the spurious operations analysis.

The licensee advised the inspectors that their review of the effect of spurious signals revealed that the shutdown pathways 1 and 2 are separated such that the safe shutdown capability would not be adversely affected by any one spurious actuation in any one plant area. To preclude any possibility of spurious operation at a high-low interface valve, the circuits (cables and conduits) were wrapped. In addition, the inspectors noted several areas where the cable trays had been wrapped to provide a conservative approach. It was noted that in each case the heavy steel support for the cable trays had been wrapped to provide protection to the supports from local area fires.

The licensee further advised that the shutdown paths required personnel actions, if required, such that a spurious action of a component could be halted by removal of its power source.

(3) Associated Circuits by Common Enclosure

The common enclosure concern is found when redundant trains are routed together with a nonsafety circuit which crosses from one raceway or enclosure to another, and the nonsafety circuit is not electrically protected or fire can destroy both redundant trains due to inadequate fire protection.

The licensee advised that the removal of power from equipment to prevent spurious signal operations also supports part of the protection provided for the common enclosure concern. The power interruption is accomplished either by breakers, fuses, or opening supply breakers. Power and control cables are sized and rated for 600 volts, in which case a fault should trip the protective device prior to jacket overheating or self-ignition. A study was made by the licensee to assure that faults along any length of a cable would activate the trip device prior to self-ignition.

Additionally, cable wrapping was installed in any area that presented a challenge to the concept of common enclosure separation.

c. Alternative Shutdown Capabilities

The inspectors reviewed operating personnel training, shift staffing and the licensee's use of plant procedures, as these activities relate to alternative shutdown capabilities. These areas were reviewed to determine if the requirements of Appendix R, Section III.L. were met.

(1) Personnel Training and Shift Staffing

The inspectors reviewed the licensee's program for conducting training specifically on the procedures used for safe shutdown and alternative shutdown in case of fire. It was noted that classroom training was given to licensed and non-licensed operators during the third quarter of 1986. The inspectors reviewed training lesson plans, attendance records, and held discussions with shift operating personnel to verify that the above training was properly implemented.

The licensee's normal shift staffing was reviewed to verify that sufficient personnel were available to operate equipment and systems described in the procedures for remote shutdown. The shift personnel provided for such procedures are separate from the operating personnel assigned to the fire brigade. Adequate shift staffing was further demonstrated during a walk-through drill of the procedures for remote shutdown which began in the control room followed by manning the remote shutdown panels and other stations in the plant.

(2) Procedures

The inspectors reviewed the licensee's plant procedures to verify that Appendix R, Section III.L., requirements as given below have been incorporated into applicable procedures.

- Achieve and maintain subcritical reactivity conditions in the reactor

- Provide decay heat removal capabilities
- Maintain reactor coolant inventory
- Achieve and maintain hot shutdown conditions
- Achieve and maintain cold shutdown conditions
- Provide direct readings of process variables necessary to control the above conditions.

The following procedures were reviewed:

Procedure Number for Unit 1(2)	Rev.	Title
34AB-FPX-053-1S (2S)	0	Fire Procedure
31EO-EOP-001-1S (2S)	0	Flow Chart Emergency Operating Procedure (EOP) for Shutdown From Inside Control Room
31EO-EOP-002-1S (2S)	0	Flow Chart (EOP) for Shutdown From Outside Control Room

The abnormal operating procedure for fire is used for a scram or when in hot or cold shutdown to provide the operator with required manual actions for each fire zone. This procedure also informs the operator of what protected equipment provides the redundancy required by Appendix R for each fire zone. The flow chart EOPs are used following any scram and provide guidance to the operator from a condition of full system availability to the minimum shutdown capability. One flow chart EOP provides for shutdown from inside the control room, and another provides for shutdown from outside the control room. In order to address the requirements of Appendix R, the flow chart EOPs are supplemented with required manual actions that were developed from the Appendix R analysis. The flow chart EOPs are also supplemented by End Path Manuals that contain instructions for proceeding to cold shutdown.

(3) Walk-Through of Procedures for Remote Shutdown

The inspectors conducted a walk-through of the flow chart EOP for shutdown outside the control room, 31EO-EOP-002-1S, Rev. 0. The scenario for this exercise involved a fire in the cable spreading room requiring subsequent evacuation of the control room, and loss

of offsite power when the reactor was manually scrammed. This walk-through was conducted with the minimum required shift manning as delineated in Table 6.2.2-1 of the Technical Specifications. The purpose of the walk-through was to verify that:

- Communications between various stations are adequate and operable
- Identification plates installed on valves and instrumentation agree with that called for in the procedure steps
- Lighting at shutdown stations and along operator paths to shutdown stations is adequate
- Equipment and valves to be operated can be reached and are not obstructed
- Sound power phone headsets are available and procedures to be used are available and contain the latest revision
- Steps of procedures are clear and can be accomplished
- Instrumentation identified in IEN 84-09 is available to monitor system process variables

Although the walk-through demonstrated all of the above, the inspectors identified several instances where procedures could be improved. These improvements were discussed with the licensee and related procedure change requests were initiated during this inspection. The inspectors indicated that the revised procedures would be reviewed during a subsequent NRC inspection.

No violations or deviations were identified.

6. Compliance with 10 CFR 50, Appendix R, Section III.J., Emergency Lighting

Section III.J. requires emergency lighting units with at least 8-hour battery power supply to be provided in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto.

A total of approximately 463 battery powered emergency lighting units have been provided in plant areas needed for operation of shutdown equipment and components and in the access and egress routes to these areas. These units are rated by the manufacturer to provide in excess of 8 hours illumination. The installation and arrangement of a random sample of the installed lighting units were reviewed by the inspectors and found to meet Appendix R, Section III.J.

All lighting units are inspected monthly to verify operability, and to check battery supply and position of lamp heads. Each unit is also operated annually for 8-hours to verify that the units will operate for the required time. These tests and inspections are conducted using surveillance procedure 42SV-FPX-003-OS, Emergency Lighting Surveillance. This procedure was reviewed by the inspectors and found to include all of the required inspection and test requirements.

Within the areas examined, no violations or deviations were identified.

7. Inspector Followup Items

(Closed) Inspector Followup Item 321/85-28-01 and 366/85-28-01, Review of Appendix R Fire Barrier Upgrade Program. The inspectors performed a walk-down of various diesel generator and auxiliary building fire barrier wall assemblies required to meet the requirements of 10 CFR 50, Appendix R, Section III.G.2 and verified that the sampled fire barrier assemblies were fully functional. Therefore, this item is closed.