APPENDIX

U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-458/85-27   Construction Permit: CPPR-145

Docket: 50-458   Category: A2

Licensee: Gulf States Utilities (GSU)
P. O. Box 2951
Beaumont, Texas 77704

Facility Name: River Bend Station (RBS)

Inspection At: River Bend Station, St. Francisville, Louisiana

Inspection Conducted: April 1-4, 1985

Inspectors: R. P. Mullikin   6/3/85
R. P. Mullikin, Reactor Inspector,   Date
Project Section A, Reactor Project Branch 2

for R. P. Mullikin   6/3/85
J. F. Stang, NRR   Date

Other
Accompanying
Personnel: A. N. Fresco, Brookhaven National Laboratory (BNL)
E. MacDougall, BNL

Approved: E. H. Johnson   6/3/85
FOR J. P. Jaudon, Chief, Project Section A,   Date
Reactor Project Branch 1

Inspection Summary

Inspection Conducted April 1-4, 1985 (Report 50-458/85-27)

Areas Inspected: Special announced inspection of the implementation of the fire protection program and compliance with the requirements of 10 CFR Part 50, Appendix R (safe shutdown) per FSAR commitments and SER evaluation. The inspection involved 124 inspector-hours onsite by two NRC inspectors and two consultants.

Results: Within the two areas inspected, no violations or deviations were identified.

DETAILS

1. Persons Contacted

Principal Licensee Employees

*W. J. Cahill, Jr., Senior Vice President, River Bend Nuclear Group
*P. F. Tomlinson, Operations Quality Assurance (QA) Director
*T. F. Crouse, QA Manager
*K. E. Suhrke, Manager, Project, Planning and Coordination
*P. D. Graham, Assistant Plant Manager, Services
*G. V. King, Plant Services Supervisor
*G. A. Patrissi, Fire Protection QA Engineer
*J. E. Spivey, QA Engineer
*D. R. Gipson, Assistant Plant Manager
*R. B. Stafford, Director, Quality Services
*J. E. Derryberry, Fire Protection Procedures
*D. G. Looney, Nuclear Control Operator
*D. A. Linville, Senior Loss Prevention Engineer
*D. R. McCarter, Director, Loss Prevention
*D. L. Sharp, Senior Mechanical Engineer
*E. R. Grant, Supervisor, Nuclear Licensing
*R. D. Ruby, Systems Engineer, Fire Protection
*D. M. Reynerson, Executive Staff
*B. Chustz, Area Coordinator
P. Barker, Nuclear Control Operator
D. Adams, Nuclear Control Operator

Stone and Webster (S&W)

*A. J. Mascena, Fire Protection Engineering
*J. M. Pasquarello, Fire Protection Engineering
*B. E. Ellis, Startup and Test Department
*J. A. Kirkebo, Senior Project Engineer
*W. I. Clifford, Vice President
*B. R. Hall, Assistant Superintendent, Field Quality Control
*D. E. Hoeppner, Assistant Superintendent, Engineering
*W. G. Culp, Manager, Electrical Division
*J. R. Lalik, Senior Construction Supervisor
*J. H. Gelston, Principal Electrical Engineer
*L. L. Dietrich, Lead Licensing Engineer
*G. E. Hirst, Mechanical Engineer
*S. D. Shah, Fire Protection Engineer
T. Hanigan, Controls and Instrumentation Engineer

*Denotes those attending the exit interview.

The inspection team also contacted other site personnel including operations, licensing, quality assurance, and construction personnel.

2. List of Documents Reviewed

The following procedures, documents and drawings were reviewed:

a. Procedures

Title	Number	Revision
Fire Fighting Procedures	FPP-0010	1
Guidelines for Preparation of Pre-Fire Strategies	FPP-0020	0
Permanent Storage of Combustibles	FPP-0030	0
Control of Transient Combustibles	FPP-0040	0
Handling of Flammable Liquids and Gases	FPP-0050	0
Hot Work Permit	FPP-0060	1
Duties of Fire Watch	FPP-0070	0
Fire Protection Training and Drills	FPP-0080	1
Fire Fighting Equipment, Inventory Inspection and Maintenance	FPP-0090	1
Fire Protection System Impairment	FPP-0100	0
Station Fire Protection Program	ADM-0009	1
Shutdown from Outside the Main Control Room	AOP-0031	0

b. Documents

- Stone and Webster Engineering Corporation, "Fire Analysis Criteria and Evaluation Method Including Results and Conclusions for 10 CFR 50 Appendix R Fire Hazards Analysis - River Bend Station - Unit 1 Gulf States Utilities Company-West Feliciana Parish, Louisiana," Criterion 12210-240.201, Rev. 2, March 20, 1985.

- GE Specification A62-4-50, Document No. 22A7193, Rev. 0, September 30, 1980 (FW40), "Mechanical Equipment Separation for Engineered Safety Feature (SS)."

- Letter to NRC from GSU enclosing Amendment No. 11 to Fire Protection Program Evaluation Report, November 29, 1983.

c. Engineering Piping and Instrumentation Diagrams (P&IDs)

Title	Drawing Number	Revision
System 051 - Nuclear Boiler Instrumentation	PID-25-1A	0
System 051 - Nuclear Boiler Instrumentation	PID-25-1B	0
System 109 - Main Steam	PID-3-1A	0
System 109 - Main Steam	PID-3-1B	0
System 609 - Drains Floor & Equipment	PID-32-5B	0
System 206 - MSIV Positive Leakage Control	PID-27-20A	0
System 206 - MSIV Positive Leakage Control	PID-27-20B	0
System 209 - Reactor Core Isolation Cooling	PID-27-6A	0
System 203 - High Pressure Core Spray System	PID-27-4A	0
System 204 - Residual Heat Removal System-LPCI	PID-27-7A	0
System 204 - Residual Heat Removal System-LPCI	PID-27-7B	0
System 204 - Residual Heat Removal System-LPCI	PID-27-7C	0
System 118 - Service Water - Normal	PID-9-10A	0
System 118 - Service Water - Normal	PID-9-10B	0
System 118 - Service Water - Normal	PID-9-10C	0
System 118 - Service Water - Normal	PID-9-10D	0
System 309 - Diesel Generator	PID-8-9A	0
System 309 - Diesel Generator	PID-8-9B	0
System 309 - Diesel Generator	PID-8-9C	0

d. General Arrangement Drawings

Title	Drawing Number	Revision
Plant Plan View - El. 65'-0", 67'-6", and 70'-0"	FSAR Fig. 9A.2-1	Amend. 11
Plant Plan View - El. 95'-0", 106'-0", and 123'-0"	FSAR Fig. 9A.2-2	Amend. 11
Plant Plan View - El. 123'-6", 136'-0", 141'-0" and 148'-0"	FSAR Fig. 9A.2-3	Amend. 11
Plant Plan View - El. 113'-0" through 199'-0"	FSAR Fig. 9A.2-4	Amend. 11
Plant Elevation View, Sheets 1 and 2	FSAR Fig. 9A.2-5	Amend. 11

e. Electrical Drawings

Drawing Number	Revision
12210-ESK-5SWP04	16
12210-ESK-6SWP09	9
12210-ESK-11ICS05	3
12210-ESK-11ICS10	6
12210-ESK-11ICS09	3
12210-EE-1B	9
12210-EE-1C	9
12210-EE-1K	11
12210-EE-1L	10
12210-EE-1M	3
12210-EE-1AA	6
12210-EE-1AB	6
12210-EE-1SA	2
12210-EE-1TC	2
12210-EE-1WB	2
12210-EE-1ZC	1
12210-EE-1ZD	2
12210-EE-1ZG	5
12210-EE-1ZH	5
12210-EE-1ZJ	7

3. Emergency Lighting System

The NRC inspector examined the emergency lighting system required for safe shutdown. Section 9.5.3.1 of the River Bend Station FSAR requires that DC emergency lighting be provided in all areas of the plant needed for the operation of safe shutdown equipment and in the areas required for access/egress between areas. This lighting is to be provided by 8-hour-rated battery packs except in the main control room and the remote shutdown panel rooms. Special provisions for the main control room and the remote shutdown panel rooms include an emergency Class 1E source of power.

The operator actions required per Abnormal Operating Procedure No. AOP-0031, "Shutdown From Outside the Main Control Room" were walked down by the NRC inspector. This is the preliminary procedure for abandoning the main control room due to a fire which could make operator actions in this room impossible. The emergency lighting was inspected against whether an operator, unfamiliar with the exact location of safe shutdown equipment, could perform the required function without delay.

The NRC inspector was shown two Stone and Webster's (S&W) engineering and design coordination reports (E&DCRs) concerning the addition or relocation of 8-hour battery packs in various areas of the plant. These changes were considered during the walkdown.

There was only one area noted where any additional modification to existing or planned emergency lighting needed to be made. This was to the battery pack supplying lighting to the main turbine. This was noted to the licensee and a verbal commitment was made by the licensee to relocate these lights.

The NRC inspector found the emergency lights inspected to be aimed correctly in order to provide full benefit of the available illumination. However, the sealed beam lamps can easily become misaligned due to construction activities, and a procedure is required to survey this activity. This procedure has not been written as yet.

Also reviewed was the manufacturer's data for the emergency lights. The Cloride, Inc., time-discharge curve showed that full capacity can be supplied for greater than 8 hours. In addition, the battery packs were inspected for the inclusion of a test switch and a charge indicator.

The completion of the E&DCRS (C-27593 and P-22314A), the relocation of emergency lighting in the turbine building, and the issuance of an emergency lighting procedure is considered an open item. (458/8527-01)

4. <u>Post-Fire Safe Shutdown Capability</u>

a. <u>Systems Required for Safe Shutdown</u>

The River Bend Station is a GE Boiling Water Reactor (BWR) designated BWR-6 with a Mark III containment, and the following goals must be met to achieve post-fire safe shutdown:

(1) Reactivity control capable of achieving and maintaining cold shutdown reactivity conditions (reactor coolant temperature less than or equal to 200°F).

(2) Reactor coolant makeup capable of maintaining water level above the core at all times during shutdown conditions.

(3) Process monitoring capable of providing direct readings to perform and control the above functions.

(4) Supporting functions capable of providing process cooling, lubrication, etc., necessary to permit operation of equipment used for safe shutdown functions.

In accomplishing the goals outlined above, the equipment and systems used to achieve and maintain hot shutdown conditions should be free of fire damage and capable of maintaining such conditions for 72 hours using onsite emergency power. The equipment and systems

used to achieve and maintain cold shutdown conditions should be either free of fire damage or the damage to these systems should be limited such that repairs can be made and cold shutdown conditions achieved within 72 hours, using onsite emergency power only. The two conditions of reactor shutdown are defined as follows:

(1) Hot Shutdown - The reactor mode switch is in shutdown and the reactor coolant temperature is greater than 200°F.

(2) Cold Shutdown - The reactor mode switch is in shutdown and the reactor coolant temperature is less than 200°F.

There are two redundant methods of plant shutdown selected by the licensee in their Fire Protection Evaluation Report (FPER). These methods are designated Methods 1 and 2 and are described in Section 7.4 of the FSAR, and accompanying Figure 7.3-3. Although redundant, they are not equivalent, i.e., they do not use identical equipment. The two methods are described in detail below.

(1) Method 1 - This method utilizes only Division I components and essentially involves the use of the reactor core isolation cooling (RCIC) system with the turbine-driven pump exhausting to the suppression pool. Some of the power operated safety relief valves are required to control reactor pressure vessel (RPV) pressure and also to depressurize the RPV in order to enter into the cold shutdown phase. During hot shutdown, the suppression pool cooling mode (SPCM) of the residual heat removal system (RHRS) is activated using the Division I RHR pump A and heat exchanger A. Cold shutdown is achieved by also using the same RHRS components in the shutdown cooling mode of RHR.

Under some circumstances, the high pressure core spray (HPCS) system, which is designed as Division III, is used instead of the RCIC system. The remaining components required to achieve cold shutdown are all the Division I components necessary to achieve cold shutdown using the RCIC system.

It should be noted that the Division I and Division II emergency diesel generators were manufactured by Transamerica Delaval and are similar to those which have been the subject of an industry task force resulting from problems discovered at the Shoreham Nuclear Power Station. Two pumps, A and C, are currently powered by the Division I diesel while B and D are powered by the Division II diesel. In the new design, pump C will be powered by the Division III diesel, which is dedicated to the HPCS system. This change results in Division III being totally separate from Divisions I and II.

(2) Method 2 - This method involves the manual actuation of the Division II safety relief valves, either automatic depressurization system (ADS) designated or non-ADS designated, to depressurize the RPV down to about 250 psia to allow RPV makeup by means of the low pressure coolant injection (LPCI), RHR pump C, (Division II) during the hot shutdown phase. The Division II RHR pump B and heat exchanger B are used for suppression pool cooling and also to achieve cold shutdown.

The original version of the Safety Evaluation Report (SER) for the River Bend Station, dated May 1984, stated that the safe shutdown capability for compliance with Appendix R requirements was still under review by the NRC staff. Final approval had not yet been issued during the time of this inspection. The licensee did produce a document to justify the use of Method 2. While Method 1 has routinely been approved, Method 2 was the subject of an internal NRC memorandum which stated that ". . . For some cases this will result in a short-term uncovering of the upper portion of the core during depressurization." The memo then discussed the fact that Appendix R, Section III.L states that ". . . During the post-fire shutdown, the reactor coolant system process variable shall be maintained within those predicted for a loss of normal AC power. . .", and ". . . The reactor coolant makeup function shall be capable of maintaining the reactor coolant level above the top of the core for BWRs. . . ." It concluded by stating that because the analyses provided by GE indicated that the time that the core will be uncovered will be short enough and the amount of fuel uncovered small enough that the use of ADS and LPCI is an approved and accepted means of achieving and maintaining safe shutdown conditions, and does comply with certain provisions of Section III.L of Appendix R regarding fission product boundary integrity and that the NRC staff intends to grant exemptions to the referenced sections of Appendix R, Section III.L.

Although NRC staff approval has not yet been formally issued, this inspection was performed assuming that approval will be granted. This is a significant matter, because Method 2 is the relied upon method for about 60 percent of the fire areas/zones in the plant. Pending formal NRC approval of Method 2, this will be considered an open item. (458/8527-02)

The systems listed below are grouped under the headings of the goals identified in 10 CFR 50, Appendix R as requirements for BWR safe shutdown, for both hot standby and cold shutdown.

(1) Reactivity Control

Methods 1 and 2 - The only system required is the control rod drive system and the associated scram circuits. Upon loss of power, the rods will be driven in automatically and, in case of

fire damage to the logic circuitry, the system will fail in the safe position (rods driven in). A manual scram of the reactor is accomplished in the main control room (MCR) by either arming and depressing the Division I, II, III, and IV scram pushbuttons or setting the reactor mode switch to shutdown. If either of these actions cannot be performed in the MCR prior to evacuation, the reactor can be tripped by deenergizing the circuit breakers at the reactor protection system (RPS) distribution panel in the control building at elevation 115'.

(2) Reactor Coolant Makeup

Method 1 - This is the preferred method for shutdown, both inside and outside of the MCR, and relies upon the use of the RCIC (Division I) system. The initial source is the condensate storage tank which has a minimum reserve of 125,000 gallons. The RCIC system or HPCS system are used to maintain RPV level over the full core until the RPV pressure reaches 110 psig, at which point the Division I RHRS is actuated. There are three designated safety relief valves, one of which is assigned to the ADS, which are utilized to depressurize to reach the 110 psig RPV pressure, if necessary, to achieve cold shutdown. These valves discharge to the suppression pool which is cooled by RHR pump A in the suppression pool cooling mode when the pool temperature reaches its upper limit.

Method 2 - In this method, the designated safety relief valves are utilized to rapidly (within a few minutes) depressurize the RPV to the point at which the Division II RHR pump C, operating in the LPCI mode, can inject makeup flow. RHR pump B, also on Division II, is utilized in the suppression pool cooling mode to maintain the proper pool temperature.

(3) Reactor Pressure Control and Decay Heat Removal

Method 1 - In order to provide initial cooling and RPV pressure control after reactor scram and to maintain hot shutdown conditions, the RCIC or HPCS systems may be utilized in conjunction with the safety relief valves and the RHRS in the suppression pool cooling mode. The Division I RHR pump A is utilized in either case in the suppression pool cooling mode and ultimately in the shutdown cooling mode to achieve cold shutdown. The SSWS is used to cool the RHR heat exchanger to reject heat to the ultimate heat sink (UHS), which is the SSWS cooling tower.

Method 2 - Pressure control and decay heat removal are achieved by discharging steam from the RPV directly to the suppression pool by manual actuation of the designated safety relief valves. The Division II RHR pump B is used first for suppression pool cooling and then in the shutdown cooling mode in the same manner as the Division I RHRS described by Method 1 to reject heat to the UHS.

(4) Process Monitoring

The following process variable are required to be monitored for safe shutdown:

- Reactor Pressure
- Reactor Level
- Suppression Pool Temperature
- Suppression Pool Level
- RCIC or HPCS Flow (Method 1 only)
- RHR/LPCI Pump C Flow (Method 2 only)
- RHRS Flow

(5) Support Systems

The support systems required for safe shutdown are listed on FSAR Figure 7.4-3, Amendment 11, January 1984, as follows:

CMS - Containment Monitoring System
LSV - Penetration Valve Leakage Control Systems
HVN - Ventilation Chilled Water System
HVK - Control Building Chilled Water System
RPCCW - Reactor Plant Component Cooling Water System
HVR - Reactor Plant Ventilation System
HVF - Fuel Building Ventilation System
HVP - Diesel Generator Ventilation System
EGA - Diesel Generator Air Start System
EGS - Emergency Diesel Generators (Divisions I and II)
EGF - Emergency Diesel Fuel System

In addition, during the inspection, the licensee indicated that E22- Division III diesel generator for the HPCS System will be added to the list.

Some of the systems above are listed only because it is preferable or required to operate a valve for isolation of non essential loads during a LOCA, which is not a required assumption for Appendix R analyses. Others are listed to indicate spent fuel pool cooling requirements.

(6) Cold Shutdown

Cold Shutdown is achieved by placing either the Division I or Division II trains of the RHRS into the shutdown cooling mode for Methods 1 or 2, respectively. If a fire prevents operation of the RHR/recirculation system interface and inboard containment isolation valve IE12*MOVF009, located in the drywell, the valve can be operated by jumpering the leads at its motor control center, or as a last resort, an operator could be sent into the drywell to manually operate the valve. If jumpering does not succeed, the next preferred method is to jumper 1LSV*C3A, the positive valve leakage control system air compressor, to provide additional air supply to operate the designated safety relief valves. This allows continued dumping of steam or water to the suppression pool from the RPV with the RHR pumps continuing to cool the pool using the RHR heat exchangers. This is the alternate shutdown cooling mode of RHR.

Since, at this point, the jumpering is performed to allow entry into the cold shutdown phase, it is an acceptable repair within the Appendix R requirements.

b. Areas Where Alternative Safe Shutdown is Not Required

All areas of this plant will meet the requirements of III.G.2 of Appendix R, and, therefore, do not require alternative safe shutdown capability except for the control room. Four areas were selected to determine compliance with III.G.2 and are discussed below.

(a) Auxiliary Building Pipe and Electrical Tunnel, Elev. 70'-0", Fire Area AB-7

This area contains equipment, instrumentation, and cables for both shutdown Methods 1 and 2. The Division II safe shutdown circuits are run in conduit and will be wrapped with a 3-hour-rated barrier to ensure that Method 2 will be available for safe shutdown. The wrapping had not been completed by the time of the inspection.

(b) Auxiliary Building RHR Pump B and Heat Exchangers Room, Elev. 70'-0", Fire Area AB-3

This area contains major Division II RHRS components such as RHR pump B, RHR heat exchangers B and D, RHR loop B valves, and Division II electrical cables and instrumentation.

The only Division I cable supplies power to a redundant RHR sample isolation valve that is not required for safe shutdown. The flow path is isolated by a normally closed manual valve at the sample panel.

Since Method 1 remains available for safe shutdown, and no wrapping is required, no unacceptable conditions were identified.

(c) Auxiliary Building RHR Pump A and Heat Exchangers Room, Elev. 70'-0", Fire Area AB-5

This area contains major Division I RHRS components such as RHR pump A, RHR heat exchangers A and C, RHR loop A valves and Division I electrical cables and instrumentation.

The Division II cables that pass through this area serve a motor operated isolation valve in RHR loop B and a minimum flow bypass valve in RHR loop C. Since a fire could adversely affect Method 1 systems and RHR loop C, reliance is placed upon use of the Division III HPCS system plus Method 2 components.

Since there are no valve or instrumentation requiring protection, no unacceptable conditions were identified.

(d) Auxiliary Building - RCIC and RHR Pump C Room, Elev. 70', Fire Area AB-4

This area contains major Division I components such as the RCIC pump and turbine, RCIC system valves, RHR pump C and a loop C valve, as well as Divisions I and II electrical cables and instrumentation, and Division II equipment.

Since equipment and cables for both Methods 1 and 2 are located in this area but the Division I equipment and cables are associated with the RCIC system, safe shutdown could still be achieved using Method 1 systems in conjunction with the Division III HPCS system.

No unacceptable conditions were identified for this area.

(e) Reactor Building - Main Steam Tunnel Outside Containment (Upstream of Jet Impingement Wall) Elev. 95'-9", Fire Area RC-2, Zone Z-2

Although the Fire Hazards Analysis (FHA) states that this area contains equipment, instrumentation, and/or cables for shutdown Method 1 only, and that shutdown can be achieved using Method 2, a physical inspection did reveal some Division II unprotected conduits and a junction box.

Subsequent analysis by the applicant indicated that these conduits supply power to two normally open outboard containment isolation valves for the turbine plant miscellaneous drains system, valves 1B21*MOVF019 and 1B21*MOVF085. Since these valves need to be actuated only following a containment isolation signal, they are not required under the assumptions of an Appendix R post-fire safe shutdown scenario.

Therefore, no unacceptable conditions were identified for this area.

Completion of all fire barrier wrapping required for III.G.2 is considered an open item. (458/8527-03)

5. Procedures/Alternate Safe Shutdown

The licensee has stated that the only fire area that requires alternative safe shutdown is the main control room (MCR) (area C-25).

a. Procedures

(1) AOP-0031 "Shutdown from Outside the Main Control Room"

The procedure reviewed and walked through was the one applicable in case of a fire which necessitates use of the Division I remote shutdown panel. The applicant stated that only a fire in the MCR required use of this panel. This was confirmed by review of the appropriate electrical drawings.

This procedure is an unsigned Revision 0 and can only be considered preliminary pending incorporation of the diesel generator modifications discussed in paragraph 4 previously. The procedure is adequately detailed, however, with respect to the existing design, except that provisions for local verification or operation of valves which have spuriously actuated has not been incorporated.

The scope of the review was to ascertain that shutdown can be attained in a safe and orderly manner, to determine the level of difficulty involved in operating equipment, and to verify that there is no dependence on repairs to achieve hot shutdown.

Prior to the walk through of this procedure, both general and specific comments on the organization, wording and prioritization of the actions to reduce the probability of human errors and confusion were made, which the operators willingly agreed to incorporate into the official issuance.

The procedure will have to be revised also to reflect the jumpering actions to achieve cold shutdown as previously discussed in paragraph 4 of this report.

The walk through revealed that the actions required could be performed in a reasonable amount of time and in a safe and orderly manner.

The incorporation in Procedure AOP-0031 of the above listed changes is considered an open item. (458/8527-04)

(2) Use of Method 2 (Depressurization by Safety Relief Valves and LPCI Mode of RHRS)

From the information given in the FHA, it can be determined that Method 2 is relied upon as the surviving safe shutdown method for some 60 percent of the fire areas for which shutdown can be accomplished from the MCR.

The licensee indicated that no direct procedure for this exists. Rather, entry into Method 2 is begun from a document described as a prefire strategy. The document provided contains a handwritten Section 9.0 "Evaluation of Fire and Shutdown Capability," which states:

> "Fire Area C-22 contains instrumentation and/or cables for Shutdown Method 1. In the event of a fire in this area, plant shutdown would be achieved using Shutdown Method 2."

However, the licensee stated that emphasis is actually placed on using shutdown Method 1 because it is the preferred method. Method 2 would only be implemented after the operator has exhausted all other preferred methods by following the sequence in the abnormal operating procedures.

There are two concerns which need to be addressed. The first is that the prefire strategies are only preliminary and as provided indicate that the operator should directly implement Method 2, contrary to the licensee's stated intentions.

Secondly, in implementing Method 1, the operators should be clearly instructed that due to fire damage, spurious instrumentation readings and valve operations may have occurred, or may be occurring, and specific actions should be identified to deal with this situation, such as local position verification or operation of motor operated valves, or alternative instrumentation readings.

The above stated changes to the prefire strategies are considered an open item. (458/8527-05)

b. Remote Shutdown Capabilities

In case of a major fire in the main control room, the plant will be shut down using the Division I remote shutdown panel. With the isolation now provided and proposed, and with revisions to Procedure AOP-0031 noted in paragraph 4 above, this item is considered satisfactory.

6. Protection For Associated Circuits

The River Bend Station was inspected for compliance with the following associated circuit provisions of 10 CFR 50.48, Appendix R:

- Common bus concern
- Spurious signals concern
- Common enclosure concern

a. Common Bus Concern

The common bus associated circuit concern is found in circuits, either nonsafety-related or safety-related, where there is a common power source with shutdown equipment, and the power source is not electrically protected from the circuit of concern.

In order to inspect for this concern at River Bend, a sample selection of circuits was checked. The following are examples of the components that were fed from or controlled by circuits that were reviewed during the inspection:

- SWP A, B and D, including D.G. feed
- 480V MOV's - several
- 480V small motors - several
- 120V DC circuits

For all of the samples of fuses, circuit breakers and relays reviewed, the coordination was satisfactory. River Bend has a requirement for reevaluating protective relay settings. This is an ongoing program with reevaluation intervals not exceeding 3 years.

b. Spurious Signal Concern

The spurious signal associated circuit concern is composed of two items:

- The false motor, control, and instrument readings such as occurred at the 1975 Brown's Ferry fire. These could be caused by fire initiated grounds, shorts or open circuits.

° Spurious operations of safety related or non-safety related components that would adversely affect shutdown capability (e.g., RHR/RES isolation valves).

The following areas were examined:

(1) Current Transformer Secondaries

The routing of diesel generators I and II (D.G.I and D.G.II) were checked to verify Section III.G.2 separation. This was done to assure that a single fire would not disable D.G.1 and D.G.II by causing an open circuit on the current transformers feeding the differential relays. This was satisfactory.

(2) High-Low Pressure Interfaces

Five high-low pressure interfaces were identified in FSAR Appendix 9.A.2.1.2. This analysis was reviewed and found to be satisfactory.

(3) Isolation of Other Fire Instigated Spurious Signals

The remote shutdown panel that has been provided for shutdown Method I was found to be adequately protected from a control room fire by redundant electrical isolation.

Many diesel generator shutdown circuits could be lost by a control room fire, but the licensee has recognized this and has prepared eleven engineering and design coordination reports (E&DCRs) to provide the necessary isolation. These were reviewed and found to be satisfactory. The completion of the work necessary to isolate the diesel generators from the main control room is considered an open item. (458/8527-06)

Revision 2 of the fire hazards analysis (FHA) does not show a complete analysis for spurious signals that could affect valve operations for any III.G.2 area fire. The licensee has agreed to revise the FHA accordingly. Furthermore, in any III.G.2 area, either Division I or Division II is fire wrapped. The licensee has not performed a spurious signal analysis for those circuits that are not wrapped. The above spurious signal concerns are considered an open item pending resolution by the licensee. (458/8527-07)

c. The Common Enclosure Concern

The common enclosure associated circuit concern is found when redundant circuits are routed together in a raceway or enclosure and are not electrically protected, or fire can destroy both circuits due to inadequate fire protection means.

At the River Bend plant the concern was answered satisfactorily when a sample of circuits selected were all found to be electrically protected. In addition, the applicant stated that nonsafety-related circuits are not routed from one redundant train to another. During the physical plant review no exceptions to this statement were found.

7. Communications Systems

There are three modes of communications available:

a. Page-Party/Public Address System

This consists of six channels, one for page and five for party communications. The components are all solid state and the equipment is placed in areas throughout the plant which may be occupied by personnel during normal, abnormal, startup or shutdown conditions.

This system was not utilized during the safe shutdown procedure walk through.

b. Sound-Powered Phones

This system is also installed throughout the plant. It was not utilized during the procedure walk through and no headsets were in evidence.

c. Portable Radios

This system consists of hand-held portable radios. The repeaters are located at a microwave tower in an isolated area of the plant. Portable radios were used during the procedures walk through. However, they were ineffective even to communicate to adjacent areas within 30 to 40 feet of each other.

It is the licensee's position that since Appendix R does not require the postulation of a single active failure in addition to the fire, the communications system is not required to implement the safe shutdown procedure and that each operator is trained to carry out the functions assigned to him/her.

While the NRC inspection team did not identify any aspects of the procedure which absolutely required communications assuming no single active failure, the procedure is currently preliminary and must be revised to incorporate changes required to load service water pump C onto the Division III diesel generator and also for isolation of the diesels, as previously discussed. The revised design may require communications.

Additionally, the proper attention to spuriously actuated valves and instrumentation may require communications. The resolution of possible communications requirements because of changes required from this inspection is considered an open item. (458/8527-08)

8. Fire Protection, Detection, Suppression

a. Safe Shutdown

The NRC inspector observed numerous fire door assemblies which were not labeled or listed by a nationally recognized testing laboratory as required by Section III.G.2 of Appendix R (BTP CMEB 9.5-1, Section C.5.a). The licensee verbally committed to have each fire door assembly labeled, listed or tested in accordance with National Fire Protection Association (NFPA) 252. In addition, it was noted that all fire penetration seals between safe shutdown areas were not complete.

The inspector also observed curbs not installed to prevent water drainage from flowing between the Division I and Division II switchgear rooms. The licensee verbally committed to install curbs to prevent the flow of water between the switchgear rooms.

The resolution of the fire door assembly ratings, completion of all safe shutdown penetration seals, and the installation of curbs between switchgear rooms is considered an open item. (458/8527-09)

b. Fire Detection Systems

To comply with Section C.6.a of BTP CMEB 9.5-1, the fire alarm system should be designed and installed in accordance with NFPA 72D. Information was unavailable during the inspection to verify that the fire alarm system had been designed and installed in accordance with NFPA 72D. A prototype of the River Bend Station fire alarm system is currently being tested by Underwriters Laboratory (UL) for compliance with UL 864 and NFPA 72D. The licensee has verbally committed to make any modifications recommended by UL. This is considered acceptable. The resolution of this concern by the licensee is considered an open item. (458/8527-10)

c. Automatic Suppression Systems

The NRC inspector observed that butterfly valves were installed in the suction lines to the fire pumps. The use of butterfly valves in fire pump suction lines is not in accordance with NFPA 20. The licensee has verbally committed to remove all butterfly valves installed in the fire pumps suction lines and replace them with approved valves.

The NRC inspector also observed sprinkler heads whose spray patterns were obstructed by cable trays, conduits and grating in the cable chases and diesel generator rooms. The licensee has verbally agreed to install additional sprinkler heads below the obstructions in accordance with NFPA 13.

The replacement of the fire pumps suction butterfly valves and the installation of additional sprinklers are considered an open item. (458/8527-11)

9. Fire Protection/Prevention Program

The NRC inspectors reviewed the licensee's fire protection program procedures. It was found that several station operating procedures, fire protection program procedures, and prefire strategies were not complete. The data to be added were minor in nature except for changes discussed previously in this report. In addition, the fire protection program preoperational tests had not been completed.

The completion and issuance of all fire protection station operating procedures, fire protection program procedures, and prefire strategies, and the completion of all fire protection preoperational tests are considered an open item. (458/8527-12)

10. Exit Interview

An exit interview was conducted on April 4, 1985, with the personnel denoted in paragraph 1 of this report. The NRC senior resident inspectors for operations and construction also attended this meeting. At this meeting, the scope of the inspection and the findings were summarized.