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Mr. Harold E. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Denton:

River Bend Station-Unit 1
Docket No. 50-458

Enclosed are revisions to the River Bend Station (RBS) Final Safety Analysis Report (FSAR) Section 9A.2.1 (see Attachment 1) that respond to the concerns identified in the Staff's letter of February 8, 1985. Section 9A.2 of the FSAR provides a Fire Hazards Analysis, including a Safe Shutdown Analysis, for RBS that shows for a fire in any single plant fire area, including the main control room, there exists at least one method to achieve and maintain a safe shutdown condition. This method provides isolation from the main control room outside of the main control room, for the necessary systems and components, including the support systems, to provide and maintain safe shutdown for a postulated fire in the main control room. Also, Section 9A.2.1.1, item 4 has been corrected to delete the indication that "fire in more than a single electrical division is not postulated." This completes our response to the RBS Safety Evaluation Report Outstanding Issue No. 13.

Also enclosed, as Attachment 2, are deviations from the Branch Technical Position CMEB 9.5-1 that have been identified to-date. Provided with these deviation discussions are references to the RBS FSAR where this subject is discussed. An additional deviation has been requested for the schedule of implementation of the modifications discussed in our letter of December 21, 1984 (RBG-19,754). Justification for this schedular deviation was provided with that request.

Sincerely,

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thereof provided between components which accomplish similar functions within redundant systems, for redundant components within the same system, and for the power and control wiring associated with the components.

The effects of single failures of the fire detection and protection systems were analyzed. All areas containing safety-related components are protected by primary and backup fire suppression systems. Since safety-related areas are provided with more than one detector, failure of a 1 detector to operate does not cause a loss of system function. Also, the detection system is a supervised system 11 and its failure is alarmed in both control rooms.

The fire protection systems in areas containing Seismic Category I equipment are seismically supported so that during a Seismic event, system components do not impair the 11 ability of redundant engineered safety features to safely shut down the plant or limit the release of radioactivity to the environment.

9A.2.1.1 Methodology

The methodology for safe shutdown analysis is given in Figure 9A.2-11. This section discusses specific RBS design features which are important in the analysis.

1. The safe shutdown equipment and cables include those that meet acceptable definitions for associated circuits. (See Section 7.4.1 for a 11 definition of safe shutdown methods.)

2. A transient fire is considered to be caused due to the combustibles required to be used in the plant area for the purpose of repair, maintenance, and fuel loading operations. These combustibles are neither fixed quantity nor fixed quality. These combustibles include paper, wood, rags, packing materials, lubricating oils, etc. These combustibles are under the scrutiny of administrative control. ~~Transient fires are not considered in these two cases.~~

3. Fire suppression systems are designed to assure that their rupture or inadvertent operation in a 13 fire area does not significantly impair the design capability of safety-related structures, systems, or components in accordance with GDC 3. With loss of offsite power, the effect on diesel generator operation was evaluated, and it was determined that

since the fire protection system inside the diesel generator building is seismically designed at least one train of onsite power is assured. The design provides that:

a. The fire protection piping inside the diesel generator building meets the requirements of ANSI B31.1, and the pipe supports comply with the requirements of AISC, including seismic loads.

b. Further protection against inadvertent operation is provided by the deluge valve, closed head design for systems PS 2A, 2B, and 2C in fire areas DG-1, DG-2, and DG-3. 13

Fire areas generally contain only one division of electrical equipment such as MCC and switchgear which might be involved in a fire or be inadvertently sprayed by the fire brigade, yet fire brigade usage of fire suppression fog nozzles was evaluated. The safe shutdown analysis shows that there is at least one other set of systems, equipment, and cables located outside the fire area free of fire damage, or protected by an approved method (see Legend for Table 9A.2-35), or described in fire brigade procedures to ensure safe shutdown.

4. Fire protection for the main control room is ~~, analyzed separately and is~~ described in GE Topical Report NEDO-10466A. Section 4.0 of this report describes the details. The NRC accepted this report for reference in license applications on July 13, 1978. The PGCC design separates the Division I/II/III cables with fire stops and fire seals within raceways, and provides barriers in panels in those cases where separate panels are not provided. The main control room is continuously manned and access is controlled to limit the introduction of personnel and combustibles. 13
~~Therefore, fire in more than a single electrical division is not postulated.~~

5. Spurious valve operation was analyzed separately. Redundant switchgear, load centers, and motor control centers and the control circuits are located in separate fire areas separated by fire barriers or protected using an acceptable method. A failure in the control circuitry caused by a fire

could affect at most one shutdown method except as described below in Sections 9A.2.1.2 and 9A.2.1.3.

9A.2.1.2 High Pressure/Low Pressure Interface Valves

There are five high pressure/low pressure interfaces that are each isolated by two motor-operated valves in series. The five pairs of isolation valves are as follows:

1E12*MOVF008 1E12*MOVF009	RHR/recirculation system interface and containment isolation valves for RHR shutdown cooling mode.
1E12*MOVF052A 1E12*MOVF087A	RHR/RCIC system interface isolation valves for RHR steam condensing mode
1E12*MOVF052B 1E12*MOVF087B	RHR/RCIC system interface isolation valves for RHR steam condensing mode
1E12*MOVF040 1E12*MOVF049	RHR/radwaste system interface isolation valves for RHR flushing mode
1MSS*MOVF001 1MSS*MOVF002	Main steam/reactor building equipment Drain system interface isolation valves for reactor pressure vessel hydrostatic test venting

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1. Valves 1E12*MOVF008 and 1E12*MOVF009 are in series; but in the event of a fire, hot shorts, defined as the shorting of an energized conductor onto a conductor of an independent circuit, in the control circuits will not cause spurious operation of both valves. These valves are located in two different fire areas, electrically powered and controlled from two independent divisional motor control centers, and cable runs that are also located in different fire areas or adequately separated. The pressure interface is maintained by one of the two valves during a fire.

2. Valves 1E12*MOVF040 and 1E12*MOVF049 are in series, but in the event of a fire, hot shorts, defined as the shorting of an energized conductor onto a conductor of an independent circuit, in the control circuits do not cause spurious operation of both valves. These valves are located in the same fire area; however, they are electrically powered and controlled from two independent divisional motor

control centers and cable runs that are located in different fire areas or adequately separated. A single fire cannot cause spurious operation of both valves simultaneously, and the pressure interface is maintained by one of the two valves during a fire.

3. Valves 1E12*MOVF052A and 1E12*MOVF087A are in series and in the event of a fire, hot shorts in control circuits may cause spurious opening of both valves. These valves are located in the same fire area and share the same electrical power supplies, motor control centers, and cable runs. Spurious operation of these valves during a fire may cause reactor coolant to flow to the suppression pool. However, safe shutdown of the plant is maintained. The required reactor coolant makeup is within the capability of the high pressure coolant injection systems, i.e., the reactor core isolation cooling (RCIC) system or the high pressure core spray (HPCS) system. An inadvertent opening of these valves permits reactor pressure vessel steam to flow into the RHR system loop A heat exchangers. The RHR system relief valves pass this steam flow to the suppression pool. During safe shutdown the operator can release reactor coolant steam to the suppression pool through the main steam safety relief valves and make up the reactor coolant loss with high pressure core spray and RCIC. An additional reactor coolant steam flow path and rate to the suppression pool through the RHR system that does not exceed the capability of the high pressure

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Operating procedures ensure that power is removed from at least one MOV in each path whenever reactor pressure exceeds that of the connected system's design pressure. This ensures that a loss of coolant from the reactor coolant pressure boundary does not result from a fire in any single plant fire area.

core spray and RCIC systems does not degrade plant safe shutdown. The Division 2 RHR system loop is used for shutdown.

One loop of the RHR is sufficient in this event to achieve safe shutdown of the plant. Initially, the RHR loop is placed in the suppression pool cooling mode. Later in the shutdown operation, the RHR loop is shifted to alternate shutdown cooling. This dual service of the single RHR loop can be utilized without reaching unacceptable suppression pool temperatures or otherwise degrading safe shutdown.

4. Valves 1E12*MOVF052B and 1E12*MOVF087B have the same condition as valves 1E12*MOVF052A and 1E12*MOVF087A from 3 above. The Division 1 RHR system Loop A is used for shutdown.

5. Valves 1MSS*MOVF001 and 1MSS*MOVF002 are in series and in the event of a fire, hot shorts in the electrical circuits may cause spurious operation of both valves. These valves are in the same fire area and share the same electrical power supplies, motor control centers, and cable runs. Spurious operation of these valves during a fire would cause reactor coolant to flow to the drywell; but safe shutdown of the plant is maintained. An inadvertent opening of these valves permits reactor pressure vessel steam to flow into the drywell equipment drain sump and then into the drywell atmosphere. The steam flow would then vent to the suppression pool through the drywell vents. The drywell is designed for steam flow and the required reactor coolant makeup is within the capability of the HPCS system. During safe shutdown the operator would release reactor coolant steam to the suppression pool through the main steam safety relief valves and make up the reactor coolant loss with HPCS. An additional reactor coolant flow path and rate to the suppression pool through the drywell vents that does not exceed the makeup capability of the HPCS systems does not degrade plant shutdown. These valves are not required for safe shutdown. 11

ATTACHMENT 2

1. Carpet in the main control room (9A.3.7.2)

   Although the BTP states that "there should be no carpeting in the main control room," carpeting squares and/or tiles will be installed in the main control room and meet or exceed the following requirements:

   A. ASTM E-84-70 Steiner Tunnel Test
   B. Flame Spread - 25 maximum
   C. Smoke Development - 150 maximum
   D. Fuel Contribution - 150 maximum
   E. Static Electricity - 3.5 kV

2. Fire water storage tank capacity (9.5.1.2.1, 9A.3.6.2.5)

   Although the BTP states that tanks used for the freshwater supply to the fire suppression system should have a minimum capacity of 300,000 gallons, tanks in use at RBS have a working capacity of 265,000 gallons. To compensate, these tanks are filled automatically by the shallow well makeup pump at a rate of 800 gpm when the water level falls 2 feet below the overflow level and shutoff when this overflow level is again reached. Additional makeup is provided by two 150 gpm, manually operated deep well pumps.

3. Diesel generator fuel oil day tank protection (9A.3.7.9)

   The BTP states that the day tank should be "located in a separate enclosure with a minimum fire resistance rating of 3 hours," however, at RBS the 550-gal day tank for each diesel is unenclosed complying with NFPA Standard No. 37, Stationary Combustion Engines and Gas Turbines. Separation of diesel-generators from one another by 3-hr rated fire barriers precludes affecting redundant diesels by a single fire event, while an automatic preaction water sprinkler system is available for fire suppression and the heat sensitive detection system alarms locally and in the control rooms.

4. Hose station accessibility to all buildings (9A.3.6.3.5)

   The BTP states that "interior manual hose installation should be able to reach any location...with at least one effective hose stream." At RBS the following areas do not have interior manual hose stations but suppression is available as described:

   A. The motor generator building, normal cooling tower, and makeup water intake structure are provided with detectors and portable extinguishers.

   B. The primary access point building and the standby service water pumphouse are provided with detectors, portable extinguishers, and yard hose stream.

C. The diesel generator building is provided with detectors, portable extinguishers, yard hose stream, and an automatic preaction water spray system.

D. The fire pump house is provided with portable extinguishers and yard hose stream. In addition, the diesel-driven fire pump areas are protected by an automatic sprinkler system. The remainder of the areas in the fire pump house are provided with detectors.

E. The tunnel areas are provided with detectors and automatic water spray systems. The tunnel areas can also be reached by manual hose stations located in adjoining buildings.

5. Hose station hose length to 150 feet (9.5.1.2.4, 9A.3.6.3.5)

Although the BTP states "standpipes with hose connections (should be) equipped with a maximum of 100 feet of 1-1/2-inch woven-jacket, lined fire hose." RBS has six areas with 150 feet of hose - in the control building at elevation 70'-0" (fire area C-11), elevation 116'-0" and elevation 136'-0" (outside the main control room); in the fuel building at elevation 70'-0" on the east wall; in the G tunnel at elevation 70'-0"; and in the radwaste building at elevation 70'-0". Sufficient system pressure exists such that a 30 foot hose stream is assured with the 150 foot hose length.

6. Recirculation pump lube oil collection system (9A.3.7.1.1, 9B.4.15)

The BTP states that the fire protection system design should account for the lubricating oil system of the primary coolant pumps. However, oil collection systems for the two reactor recirculation pumps at RBS are not provided because of the following reasons:

A. There is a limited amount of oil in each pump (each totals less than 54 gallons) with low and high oil level monitors and no pressurized oil lines external to the motor casing.

B. Any spills of oil, or oil-water mixtures (the RPCCW system cools each of two reservoirs in each pump,) if ignited would ignite at the point of leak and thus pan collection is not necessary. However, a 4-inch floor drain 5 feet from the pump drains to a 650 gallon sump 20 feet from the pump and eventually to the liquid radwaste system through 50 gpm sump pumps.

C. Any fire in the recirculation pump fire area would not affect other fire areas and since the pumps are widely separated a single pump fire would not affect the other pump. Regardless, the pumps and supporting equipment are not required for plant shutdown.

7. Automatic fixed fire suppression systems in drywell/containment (9A.2.2.1, 9A.3.7.1.1)

   The BTP states "because of the general inaccessibility of the primary containment during normal plant operation, (fire) protection should be provided by automatic fixed systems." At RBS, the drywell, when opened, is under stringent administrative controls and procedures minimizing equipment and personnel access; thus, a transient exposure fire is not postulated. Additionally, negligible exposed cables exists in the drywell and therefore cable fires are not postulated. Finally, the lubricating oil in the recirculation pumps is the other major drywell fire hazard and for the reasons outlined in Item 6 above fires are not credible. As for the containment, cables meet IEEE 383-1974 standards and are installed in accordance with the RBS position on Regulatory Guide 1.75. In addition, physical separation and the actual cable material combine for low fire loadings such that no fixed fire suppression is installed. However; fire detection and hose stations are provided.

8. Main control room suspended ceiling lighting fixture cables (9A.3.5.1.6)

   Although the BTP indicates that concealed spaces in suspended ceilings should be devoid of combustibles, RBS has cables for the suspended ceiling lighting fixtures concealed. The amount of lighting fixture cables is minimal and thus the combustible loading is negligible.

9. Oil-filled transformer locations (9A.3.5.1.8)

   The BTP states that buildings containing safety-related systems within 50 feet of oil-filled transformers should be "without openings and have a fire resistance ratings of at least 3 hours." However, the wall of the fuel building is located within 50 feet of an oil-filled transformer but is 3-hour fire-rated with an opening closed by a missile-protected door. A similar situation exists for the turbine building containing safety-related RPS inputs turbine trip, but not required for safe shutdown.

10. Supervision/Administrative controls of fire protection system valves (9A.3.6.3.2)

    The BTP states that "all valves in the fire water system should be electrically supervised" which is true at RBS except for underground hydrant valves and drainage and vent valves.

11. Fire-ratings of water-tight and pressure-tight doors (9.5.1.2.14)

    The BTP states that "door openings in fire barriers should be protected with equivalently rated doors...that have been tested and approved by a nationally recognized laboratory." With the exception of special doors such as pressuretight, watertight, and

missile-protected doors, the doors installed in the fire rated assemblies are UL-labeled fire doors. The manufacturers of pressuretight and watertight doors have evaluated the fire testing requirements of NFPA-252 and have provided certificates of equivalency for these doors.

12. Non-fire-rating of missile-protected doors in exterior building walls (9.5.1.2.14)

    Missile-protected doors by their nature take precedence to fire ratings. Except as noted below, missile-protected doors are located in exterior building walls for which there are negligible external fire loadings. Therefore, fire rating of these doors is not required. Missile-protected doors P95/2, P123/1, and P123/4 are located in the south wall of the auxiliary building, providing passage between the auxiliary and turbine buildings. In lieu of fire rating these three doors, a separate 3-hr fire-rated door is provided in series with each of doors P95/2, P123/1, and P123/4. In each case, the fire-rated door is located on the auxiliary building side of the missile-protected door and is provided with an automatic hold-open release device. Equipment removal plugs, as identified below, are not tested nor rated since there is negligible external fire loading an internal fire would not affect more than one plug:

    A. Control building equipment removal plug: el. 116, area C-24

    B. Diesel building equipment removal plug; el. 98, areas DG-4, 5, and 6

    C. Reactor building equipment removal hatch and plug: el. 98, area RC-6

13. RDAC power supply (9A.3.6.1.4)

    The BTP states "primary and secondary power supplies should be provided for the fire detection system and...automatic suppression system...using normal offsite power as the primary supply with a 4-hour battery supply as secondary supply." The RDAC utilizes 2-hour batteries as it secondary power supply and will be administratively reconnected to the Class 1E-480V load center, which energizes the non-Class 1E battery charge, after LOCA trip signals have been manual reset.

14. Cable tray stacks (9A.3.5.3.3)

    The BTP indicates that automatic water suppression should be utilized for cable trays outside the cable spreading room for additional fire protection (i.e. along with separation and manual firefighting protection.) However, at RBS when the highest cable tray is less than 15 feet above the floor and the cable tray stacks are 6 or less deep, or when no safety-related cables are contained in tray stacks, these trays are considered accessible for manual

firefighting using water hose stations. The analysis of fire loading of these trays, the exposure to other trays and equipment, and the effects on safe plant shutdown do not justify fixed, automatic, fire suppression systems. Smoke detectors are provided for warning of potential fires at these locations, which allows personnel to respond and take appropriate action.

15. Fire water curtain in fire areas AB-1 and AB-15 (9A.2.4.1)

Credit should be given for a water curtain which separates fire area AB-1 from AB-15 (west-east) at elevations 70'-0" and 141'-0" in the auxiliary building. The water curtain features closely spaced open-head sprinklers with water discharge initiated by tripping a deluge valve activated by cross-zoned fire detectors. Smoke propagation does not represent a hazard to redundant systems and operation of the system does not endanger safety systems on either side of the water curtain in accordance with NRC Generic Letter 83-33. The area in the vicinity of the water curtain does not contain equipment which requires the use of combustible materials for maintenance and the use of the water curtain for protection of the auxiliary building unit coolers enhances the availability of both of these redundant safe shutdown support systems. Therefore, both divisions would not be subject to damage in a single fire event.

16. Partition in fire areas C-4 and C-13 (9A.2.5.1)

In the Control Building adequate separation is provided by minimum 3-hour, fire-rated walls except for the walls separating the redundant Division I and II chillers and air-conditioning equipment rooms. Area C-4 contains the Division I and II redundant HVAC equipment on the west and east sides of the wall, respectively. The equipment ensures adequate ventilation for the respective standby switchgear rooms. As listed in Table 9A.2-8, the combustible loading consists of the air-conditioning unit's motor insulation. The loading due to cables is negligible since cables are run in conduit. Area C-13 contains the Division I and II redundant chiller equipment necessary to air-condition the main control room on the west and east sides of the wall, respectively. Combustible loading consists of cable in tray, approximately 7 ft from the wall, see Table 9A.2-8. The walls dividing these areas are 1 hour fire-resistant, with 1 1/2 hour rated doors. Automatic fixed suppression systems and fire detection are provided.