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MEMORANDUM FOR: Dennis M. Crutchfield, Assistant Director for Safety Assessment
Division of Licensing

FROM: R. Wayne Houston, Assistant Director for Reactor Safety
Division of Systems Integration

SUBJECT: RIVER BEND - ICSB REVIEW OF TECHNICAL SPECIFICATIONS

Plant Name:	River Bend
Docket No.:	50-458
Licensing Status:	OL
Responsible Branch:	LB #2
Project Manager:	S. Stern
Review Branch:	ICSB
Review Status:	Complete

As requested by memorandum dated April 19, 1985 (D. Crutchfield, DL to R. W. Houston, DSI, et al), the Instrumentation and Control Systems Branch (ICSB) has reviewed the proposed River Bend Technical Specifications that are within ICSB's scope. A list of the Technical Specification areas reviewed is provided in Enclosure 1. Please note that radiation, seismic, meteorological, loose parts, effluent monitoring and fire protection instrumentation are not within ICSB's area of responsibility, and have not been included as part of this review. Comments which we believe should be considered during preparation of the final River Bend Technical Specifications are provided in Enclosure 2.

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Enclosures:
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ENCLOSURE 1

RIVER BEND TECHNICAL SPECIFICATIONS
REVIEWED BY ICSB

1.0	Definitions
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ENCLOSURE 2

ICSB COMMENTS REGARDING
PROPOSED RIVER BEND TECHNICAL SPECIFICATIONS

1. Page 1.5; Definition of OPERABLE-OPERABILITY

The definition of OPERABLE-OPERABILITY states that for a system, train, or component to be operable, all necessary attendant auxiliary/support systems required for the system, train, or component to perform its safety function must also be operable (i.e., capable of performing their related support functions). Examples of auxiliary/support systems given in the definition of OPERABLE are instrumentation, controls, electrical power, cooling or seal water, and lubrication. The intent of this definition is to enforce the concept that if an essential auxiliary/support system is inoperable, then the safety system itself is also considered to be inoperable. This would place the plant into a limiting condition for operation (LCO) where action must be taken to restore the safety system to an operable status within an allotted time, or otherwise to bring the reactor to a safe condition where the safety system is no longer needed.

Earlier versions of the BWR Standard Technical Specifications (STS), e.g., Revision 3 issued in the Fall of 1980, contained a similar definition of OPERABLE-OPERABILITY with the exception that the associated emergency (i.e., safety related) electrical power source was also required to be operable. It is our understanding that the definition was changed (i.e., the requirement for emergency power source availability deleted), as requested by the nuclear industry, to prevent the loss/unavailability of a train of emergency power from placing the plant into multiple LCOs (i.e., a LCO for the power system itself, and an additional LCO for each safety system that receives emergency power from the degraded power system). The LCOs concerning the emergency onsite electrical power system (Section 3/4.8 of the TS) are considered sufficient to ensure that the power system (i.e., the essential auxiliary/support system) is returned to an operable status within a reasonable time, or that reactor operation is restricted to a safe level.

The onsite/emergency electrical power system differs from other essential auxiliary/support systems in that the other systems typically are not governed by their own Technical Specification LCOs (e.g., an ECCS pump lubricating oil system does not have its own LCO but is governed by the operability requirement for the pump). The change to the STS to delete the requirement for emergency power source availability from the definition of OPERABILITY was a "bookkeeping" change which significantly reduced the effort required from licensees in keeping track of individual LCOs. However, by deleting the requirement for emergency power, the situation now exists where a safety related system is considered operable by the TS even though it is not capable of performing its safety function using its safety related power source. With one train of the onsite emergency power system inoperable, the plant no longer satisfies its licensing basis (i.e., the ability to accomplish reactor shutdown and the mitigation of accident consequences using safety related equipment given a loss of offsite power and a single active failure). Section 3/4.8 (Electrical Power Systems - Bases) of the TS states the following:

> The operability of the A.C. and D.C. power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety related equipment required for

(1) the safe shutdown of the facility and (2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design Criteria 17 of Appendix "A" to 10 CFR 50.

The point being made is that in accordance with the Commission's regulations (e.g, IEEE Standard 279-1971 and GDC 21) and the licensing design basis for the plant, a train of safety related equipment is considered to be inoperable if its associated emergency power source is inoperable. The fact that this equipment is not considered inoperable by the STS has caused confusion during recent OL reviews. We believe that the current TS operability requirements for safety related equipment, including the onsite emergency electrical power system, and the associated LCOs are adequate. However, we believe that the TS definition of OPERABILITY should be changed to be consistent with the Commission's regulations used as the basis for acceptance of nuclear power plant designs. We suggest that a footnote be added to the TS definition of OPERABILITY which indicates that safety related (emergency) power is also required for the associated system/train/component to be operable, but that only the LCO associated with the electrical power system (Section 3/4.8) applies to the situation where an emergency power source is unavailable (i.e., additional LCOs associated with individual safety systems need not apply). This would prevent confusion/misunderstanding on behalf of applicants/licensees believing that the staff considers safety related equipment to be operable even if emergency power is not available. It is suggested that this change also be considered for the BWR STS.

In modes 4 and 5 (cold shutdown and refueling) only one train of emergency power is required to be operable (see page 3/4 8-10 of the TS). Typically, the operability requirements for safety related equipment are relaxed in modes 4 and 5. For example, in modes 1, 2, & 3, all four ECCS low pressure injection systems (LPCS and LPCI A, B, & C) and the high pressure injection system (HPCS) are required to be operable. In modes 4&5, only two of these 5 ECCS injection systems are required to be operable. The operability requirement for this situation (see page 3/4 5-6 of the TS) should be revised to indicate that the associated emergency power sources for the two ECCS injection systems operable in modes 4 and 5 are also required to be operable. This would prevent the situation where one train of emergency power is unavailable (e.g., an inoperable diesel generator), and the safety related injection system(s) in the opposite train are removed from service, leaving insufficient operable safety related systems in modes 4&5. This type of wording is similar to that used in the Westinghouse STS to ensure that for modes where only one safety related system and emergency power train are required to be operable, that the operable system receives its power from the operable emergency power source. We recommend that the River Bend TS and the BWR STS be revised similar to the Westinghouse STS concerning operability requirements for safety related equipment in modes 4&5.

2. Page B 2-6; Intermediate Range Monitor, Neutron Flux-High

The description of the 8 IRMs should be changed to indicate that there are 2 IRM channels associated with each of the 4 reactor protection system (RPS) trip channels, instead of 4 IRMs in each of the reactor trip systems.

3. Page B 2-9; Reactor Mode Switch Shutdown Position

This section should be changed to read: "The reactor mode switch Shutdown position provides additional manual reactor trip capability." The reactor mode switch Shutdown position is not redundant to the RPS automatic protective instrumentation channels as stated.

4. Page B 2-9; Manual Scram

This section should be changed to read: "The manual scram pushbutton switches provide a diverse means for initiating a reactor shutdown (scram) to the automatic protective instrumentation channels and provides manual reactor trip capability." Manual scram is not a redundant channel to the automatic instrumentation channels.

5. Page 3/4 1-13; Control Rod Position Indication

It may be appropriate to require the control rod position indication system to be operable in modes 3 and 4 (hot and cold shutdown), even though the rods should be inserted into the core (placing the reactor mode switch in the shutdown position initiates a reactor scram). The reason for this is that BWRs do not have much (if anything) in terms of safety related indications of reactor shutdown. The control rod position indication system portion of the rod control and information system (RCIS) is powered from a non-Class 1E uninterruptible power supply (these sources have been known to occasionally be interrupted; i.e., power lost). The neutron monitoring system (NMS) instrumentation, although designed as safety related, receives power (via electrical protection assemblies, EPAs) from the non-Class 1E RPS motor-generator (MG) sets. The EPAs, designed to protect RPS components from degraded power conditions, will disconnect the RPS buses from the MG sets if an overvoltage, undervoltage, or underfrequency condition is sensed, resulting in the loss of NMS instrumentation and reactor scram. The scram pilot valve solenoid group status lights are a non-Class 1E indirect indication of reactor shutdown. It is realized that it is not practical for the rod position indication system to continually be operable in modes 3 and 4 (e.g., when system maintenance is required). However, since the rod position indication system provides the only direct indication of rod position, we believe that this system should be required to be operable in modes 3 and 4 (with adequate provisions to allow for maintenance activities, etc.), and that rod position should be periodically verified. We suggest that the Reactor Systems Branch (RSB) and Core Performance Branch be asked to determine whether such a change to the TS is appropriate.

6. Page 3/4 1-17; Rod Pattern Control System

A definition of a "DISARMED CONTROL ROD" should be added to the Definition section of the TS (e.g., A control rod is considered disarmed when it is fully inserted and the associated directional control valves are rendered inoperable, either electrically by removing power to the solenoids, or hydraulically by closing the drive water and exhaust water isolation valves). The applicant should indicate whether electrically disarming a control rod involves lifting leads or the installation of jumpers, and discuss the administrative controls associated with disarming a control rod and returning a disarmed control rod to service.

7. Page 3/4 1-19; Standby Liquid Control System

The surveillance requirements for the SLCS are written such that the system level manual actuation switches are never tested during the life of the plant. A surveillance requirement for these switches should be provided.

8. Page 3/4 3-12; Main Steam Line Isolation - Condenser Vacuum Low

The main steam line isolation function on low condenser vacuum is required to be operable in modes 1, 2, & 3, but may be bypassed in modes 2&3 if all turbine stop valves (TSVs) are closed (see note **). It is our understanding that the low condenser vacuum isolation function is provided to prevent the possible release of radiation from the nuclear system process barrier in the event of an accident, and that the radiological consequences of certain accidents (e.g., rod drop accident) in the startup mode are significant. With the low condenser vacuum isolation function bypassed, the TSVs and turbine bypass valves (TBVs), which are designed to close automatically on low condenser vacuum, would be relied on to provide isolation. However, the staff does not give credit for either the TSVs or TBVs as isolation valves. The TSVs do not fully satisfy the requirements for isolation valves, and the TBVs and control circuitry are not safety related. In addition, the TBVs provide only a single isolation barrier which does not satisfy the single failure criteria, unlike the redundant (inboard and outboard) MSIVs.

It should either be demonstrated that the low condenser vacuum isolation function is not required in modes 2 and 3 and the TS revised accordingly, or note ** should be deleted. Perhaps it can be shown that inadvertent use of the condenser via the TBVs or TSVs and the release of radioactive materials to the turbine building environment is not a safety concern when in modes 2 or 3, or that sufficient diverse isolation signals will remain functional (e.g., main steam line high radiation) to provide adequate protection.

9. Table 3.3.2-1; Isolation Actuation Instrumentation

For items 1d (Primary Containment Isolation - Manual Initiation) and 2i (Main Steam Line Isolation - Manual Initiation), the minimum operable channels per trip system should be 2; not 2/group. For item 5n (Reactor Core Isolation Cooling System - Manual Initiation), the minimum operable channels per trip system should be 1; not 1/valve. It should also be verified that the minimum operable channels per trip system are correct for items 3d (Secondary Containment Isolation - Manual Initiation), 4i (Reactor Water Cleanup System Isolation - Manual Initiation), and 6g (RHR System Isolation - Manual Initiation).

10. Table 3.3.2-2; Isolation Actuation Instrumentation Setpoints

The trip setpoint for item 1a (Reactor Vessel Water Level - Low Low Level 2) should be ≥45.5 inches; not ≤454.5 inches.

11. Table 3.3.3-1; Emergency Core Cooling System Actuation Instrumentation
The column "Minimum Operable Channels Per Trip Function" should be changed to "Minimum Operable Channels," and the number of operable channels changed from 2 to 4 for items A.1a and B.1a (Reactor Vessel Water Level - Low Low Low, Level 1), and items A.1b and B.1b (Drywell Pressure-High). Action statements 30 through 36 should be revised to delete the words "per trip function," and footnote (e) should be deleted. Action statement 34 for items C.1a and C.1b should be changed to action statement 30.

12. Tables 3.3.3-1, 3.3.3-2, and 4.3.3.1-1; Automatic Depressurization System
These tables should be revised to include operability, setpoint, and surveillance requirements, as appropriate, for the ADS drywell high pressure bypass timers and the ADS manual inhibit switches. The bypass timers and inhibit switches were added to the River Bend ADS design for resolution of TMI Action Plan Item II.K.3.18.

13. Page 3/4 3-44; ATWS Recirculation Pump Trip System Instrumentation
The ATWS RPT instrumentation consists of two separate actuation logic systems, one logic system for each recirculation pump. Each logic system is comprised of 2 reactor vessel low water level (level 2) instrument channels and 2 reactor vessel high pressure instrument channels arranged in a 1-out-of-4 energize-to-actuate logic. The TS allow one channel per trip system to be inoperable for up to 14 days; much longer than typically allowed for instrument channels performing safety functions. However, given the more

reliable 1-out-of-4 actuation logic, we believe that the 14 day interval is justified if an additional action statement is provided which requires prompt action if a second instrument channel in either trip system becomes inoperable (e.g., be in at least STARTUP within the next 8 hours). This will ensure that at least one instrument channel for each trip parameter (level and pressure) is operable in each ATWS RPT system. The minimum operable channels per trip system in Table 3.3.4.1-1 should be changed from 1 to 2 for items 1 (Reactor Vessel Water Level - Low Low, Level 2) and 2 (Reactor Vessel Pressure - High).

14. <u>Table 3.3.6-1; Control Rod Block Instrumentation</u>

The staff is currently pursuing with the Perry applicant whether 3 or all 4 source range monitor (SRM) instrument channels should be required to be operable in mode 2 for rod block functions 3 a, b, c, & d. The outcome of the Perry TS review should be applied to the River Bend TS.

15. <u>Table 3.3.7.5-1; Accident Monitoring Instrumentation</u>

The accident monitoring instrumentation should be required to be operable in mode 3 (hot shutdown).

16. <u>Table 4.3.7.5-1; Accident Monitoring Instrumentation Surveillance Requirements</u>

The accident monitoring instrumentation surveillance requirements should also be applicable in mode 3.

17. Page 3/4 3-85; Source Range Monitors

All 4 SRM channels may be required to be operable (see item #14 above). It may be appropriate to require all 4 SRMs to be operable in modes 3 and 4 since the SRMs provide a diverse indication of reactor shutdown to control rod position indication (see item #5 above). This would not cause an additional burden on the applicant; the associated action statement only requires verification that the control rods are fully inserted, and that the mode switch be locked in the shutdown position.

18. Page 3/4 4-7; Safety/Relief Valves Low-Low Set Function

The 14 day interval for which the low-low set (LLS) function is allowed to be inoperable for a LLS safety/relief valve (SRV) appears to be excessively long. If the inoperable LLS SRV is one of the two valves with lower reopening setpoints, the LLS function would no longer satisfy the single failure criteria. A 72 hour interval would be more appropriate.