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June 10, 1994

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

SUBJECT: River Bend Station - Unit 1
Docket No. 50-458
License No. NPF-47
Licensee Event Report 50-458/94-009

File Nos. G9.5, G9.25.1.3

RBG-40647

Gentlemen:

In accordance with 10CFR50.73, enclosed is a Licensee Event Report.

Very truly yours,

James J. Fisicaro

James J. Fisicaro
Director - Nuclear Safety

JJF/jcm
enclosure

JE22

cc: U.S. Nuclear Regulatory Commission
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NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
RIVER BEND STATION	05000458	1 OF 6

TITLE (4) Piping Error During Construction Results in Incorrect Measurement of RCS Leakage

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER 05000
05	13	94	94	-- 009 --	00	06	10	94	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	5
POWER LEVEL (10)	0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.402(b)		20.405(c)	50.73(a)(2)(iv)	73.71(b)
	20.405(a)(1)(i)		50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
	20.405(a)(1)(ii)		50.36(c)(2)	50.73(a)(2)(vii)	OTHER
	20.405(a)(1)(iii)	X	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iv)		50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
	20.405(a)(1)(v)		50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
T. W. Gates, Supervisor - Licensing	(504) 381-4866

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On May 13, 1994, with the plant in Operational Condition 5 (refueling), Engineering's extensive investigation of problems with the drywell air cooler condensate flow transmitter led to the discovery that the condensate leakage from the drywell air coolers was incorrectly being counted as identified leakage rather than unidentified leakage because of a drain system piping discrepancy. As a result, the drywell floor sump drain flow monitoring system, 1DER-KC174, has been inoperable since initial plant start-up. This condition constitutes operation prohibited by RBS Technical Specification 3.4.3.1.b.

Based on the information available, the cause of this error is indeterminate. However, there are two causal factors which contributed to this condition not being detected earlier: 1) inadequate pre-operational testing of the reactor containment floor and equipment drain system within the drywell prior to initial plant start-up, and 2) inadequate acceptance criteria in the periodic preventative maintenance task for the inlet piping to the equipment and floor drain sumps.

Since other leak detection systems were available to indicate any significant reactor coolant pressure boundary leakage, there was no impact on the safe operation of the plant or the health and safety of the public as a result of this condition.

REPORTED CONDITION

On May 13, 1994, with the plant in Operational Condition 5 (refueling), it was discovered that the condensate leakage from the drywell air coolers was being routed to the reactor building equipment drain sump, 1DER-TK1 (*TK*), rather than to the reactor plant floor drain sump, 1DFR-TK1 (*TK*). As a result, leakage from the drywell air coolers has been counted as identified leakage rather than unidentified leakage by the drywell floor sump drain flow monitoring system, 1DER-KC174. The inability of the leak detection system to properly classify leakage as identified or unidentified prevented compliance with RBS Technical Specification 3/4.4.3, "Reactor Coolant System Leakage," which requires that the drywell and pedestal floor sump drain flow monitoring system be operable in Modes 1 through 3. This condition has existed since initial plant start-up. Therefore, this condition is reportable as operation prohibited by Technical Specifications in accordance with 10CFR50.73.

INVESTIGATION

During the fifth refueling outage, Engineering personnel were conducting tests to determine if the drywell air cooler condensate flow transmitter, 1E31-FTN021, (*FT*) was functioning properly. Because of initial installation problems which affected its performance and reliability, the drywell air cooler condensate flow transmitter has been inoperable since plant start-up. The most recent effort to correct these problems was completed shortly after refueling outage (RF) 4. During fuel cycle 5, the flow rate output indicated by the drywell air cooler condensate flow transmitter was consistently higher than the recorded total unidentified leakage rate provided by the drywell floor drain sump monitoring system. The drywell floor sump drain flow monitoring system, which monitors all unidentified leakage, should always indicate more leakage than that shown on the drywell air cooler condensate flow transmitter. A complete investigation including a review of system drawings and testing of the system was performed to determine the exact cause of the discrepancy.

As a result of this testing, it was determined that the drywell air cooler condensate flow transmitter has been providing an accurate indication of condensate flow (unidentified leakage) from the drywell air coolers since it was repaired shortly after RF-4. Further investigation revealed that the unidentified leakage from the drywell air coolers has been counted as identified leakage via the reactor building equipment drain sump rather than unidentified leakage via the reactor plant floor drain sump due to a piping error. Drywell floor drain hub DNH-1105 (*DRN*) does not connect to the reactor plant floor drain sump as shown on plant drawings (FSK-23-6Q and EB-10A). Instead, the drywell floor drain hub is connected to the reactor building equipment drain sump.

ROOT CAUSE

The piping error described in this report was made during construction. The cause of this error cannot be determined from the information available. However, there are two causal factors which contributed to this condition not being detected earlier.

The first causal factor is inadequate pre-operational testing of the reactor containment floor and equipment drain system and the drywell cooling system within the drywell prior to initial plant start-up. Based on a review of the Hydrostatic & Flushing Preoperational Acceptance Test Procedure for the reactor containment floor drains (1-FP-609-5), the test did not verify that the individual drain hubs and floor drains were connected to the correct sump. The flushing test only required that water be injected into the individual hubs and drains; it did not require verification that the flushing water was draining into the correct sump.

The Type A System Turnover Request for the drywell cooling system (1-PT-404) and the associated Master Scope Diagrams (MS-32-9AL and 23-6Q) were also reviewed to determine if this system turnover package verified which sump the condensate entered or if there were any exceptions noted at the time of turnover. This review revealed that the boundary for this system ended at the funnel (drain hub) for drain piping and that the test did not verify the final destination of the drain water past the drain hub.

The second causal factor is inadequate acceptance criteria in preventative maintenance (PM) task 2227 which is performed during each refueling outage to verify that there is no blockage of the inlet piping to the equipment and floor drain sumps. The acceptance criteria for this PM task requires that the technician verify that the water being injected into the inlet piping for the sump being tested actually enters the sump by visual inspection after opening the manway on the respective sump or by watching the associated sump level indicator (*IL*) rise. This acceptance criteria is inadequate because controls cannot be placed on the other influent water supplies into these sumps during the test period. Other sources of water entering the sump may mask the water being used to perform the test or be mistaken for the water being used for the test. Water is continuously entering these tanks, and it is possible for the technicians performing the test to mistake water from other sources for the water being used for the test.

The installation error noted in this report occurred during the initial concrete pour for the reactor building (*NG*). Although this report involves only one installation error associated with one reactor plant floor drain system hub located in the drywell, testing associated with the investigation of this condition was expanded to include both the reactor plant floor drain system and reactor building equipment drain system in the drywell as well as in containment. The expanded test was conducted to determine if there were any generic installation or inspection practices used by the original Architect Engineer (AE) at RBS which needed to be addressed. Based on the tests performed, no other errors were found in the floor and

equipment drain systems. Therefore, the condition described appears to be an isolated occurrence in the reactor containment floor and equipment drain system and the drywell cooling system that does not represent a problematic issue or generic deficiency in the AE's installation and inspection programs. No similar events have been reported.

CORRECTIVE ACTIONS

The installed configuration of the floor and equipment drains in the containment and drywell were verified via testing and were found to be installed in accordance with existing design documents, with the exception of drywell floor drain hub DNH-1105.

The remaining corrective actions for the reported condition and findings discussed in the root cause determination are summarized below.

1) Modification request (MR) 94-0060 rerouted the drywell air cooler drain line from drywell floor drain hub DNH-1105 to floor drain DNF-1103 and identified DNH-1105 as an equipment drain hub.

2) Prior to its next performance, PM task 2227 will be revised to require that the leakage rate into the sump be monitored via the ERIS computer (*CPU*) rather than by visual examination of the sump or denoting level changes on the sump level indicator. This will provide a more accurate means of verifying drain system operability.

SAFETY ASSESSMENT

The purpose of monitoring for unidentified leakage is to detect significant reactor coolant pressure boundary (RCPB) degradation in an effort to minimize the potential for gross boundary failure. Should a crack in a RCPB pipe occur, the purpose of the unidentified leakage detection system is to provide an alarm to the plant operators when the leak rate exceeds a predetermined value, usually a value less than 5 gallons per minute (GPM). The alarm warns the plant operators that a leak has developed and plant shutdown may be required to determine the source of the leakage.

The drywell floor sump drain flow monitoring system is used as one of the primary methods for detecting RCPB unidentified leakage. The other primary unidentified leak detection method is from airborne particulate radioactivity monitoring via radiation monitor 1RMS*RE112. The particulate channel of this radiation monitor continuously samples the drywell atmosphere to detect an increase in radioactive particulate. An increase in particulate radioactivity above normal conditions indicates that there is a

potential release of reactor coolant from the RCPB. This radiation monitor provides an alarm in the main control room with the alert setpoint at a level equivalent to an unidentified leakage rate of 1 GPM above normal operating conditions and the high setpoint at a level equivalent to an unidentified leakage rate of 5 GPM.

In addition to the above primary leakage detection methods, two alternate methods are used: 1) monitoring of condensate flow from the drywell air coolers via the drywell air cooler condensate flow transmitter, and 2) monitoring of airborne gaseous radioactivity via radiation monitor 1RMS*RE112. One of the alternate methods and the two primary methods must be operable to satisfy minimum RBS Technical Specification operability requirements.

Each of the above referenced leakage detection systems are required to be tested by RBS Technical Specification 4.4.3.1. These tests include a channel functional test every 31 days and a channel calibration every 18 months for the particulate and gas channels of radiation monitor 1RMS*RE112, the drywell air cooler condensate flow transmitter, and the sump drain flow monitoring system. Additionally, a channel check every 12 hours is required for the particulate and gas channels of radiation monitor 1RMS*RE112, and a flow test of the drywell floor drain sump inlet piping is required every 18 months. Each of these tests have been conducted as required except the channel functional test for the drywell air cooler condensate flow transmitter which was considered inoperable (tracking LCO 92-0276).

If a leak had developed from a piping system within the RCPB, the plant operators would have been made aware of the condition by the operable leak detection methods. The alarms associated with the gaseous and particulate channels of radiation monitor 1RMS*RE112 would have provided early warning of a leak and the identified and unidentified leakage rate channels of the drywell floor sump drain flow monitoring system could have been consulted to help evaluate the condition. Therefore, there was no impact on the safe operation of the plant or the health and safety of the public as a result of this condition.

Efforts were made to evaluate historical unidentified leakage to determine if the RBS Technical Specification limit of 5.0 GPM had been exceeded. Once the drywell air cooler condensate flow transmitter was placed into operation shortly after RF-4, Engineering routinely monitored the leakage rate shown on 1E31-FIM03 (the flow indicator for the drywell air cooler condensate flow transmitter). Based on Engineering's extensive evaluation, the worst case maximum unidentified leakage rate for Cycle 5 was 3.59 GPM, well below the Technical Specification limit of 5.0 GPM. However, the only sources of leakage rate data available for Cycles 1 through 4 are; 1) Current Total Unidentified Leakage Rate, 2) 24 hour Average Leakage Rate, 3) Drywell Gaseous Radiation Level, and 4) Drywell Particulate Radiation Level. Thus, a determination for Cycles 1 through 4 cannot be made with any reasonable degree of accuracy based on the information available.

The plant was shut down prior to exceeding the Technical Specification limit on two separate occasions when the leak detection monitor indicated abnormally high unidentified leakage. A conservative administrative limit for unidentified leakage of approximately 4.0 GPM is used to avoid the possibility of operation outside of the Technical Specification limit.

NOTE: Energy Industry Identification System Codes are identified in the text as (*XX*).