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JUL 18 2003

10 CFR 50.73

U.S. Nuclear Regulatory Commission
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Washington, D. C. 20555

Gentlemen:

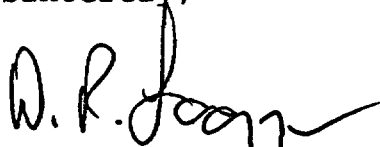
In the Matter of) Docket No. 50-390
Tennessee Valley Authority)

**WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 - DOCKET NO. 50-390 -
FACILITY OPERATING LICENSE NPF-90 - LICENSEE EVENT REPORT
(LER) 50-390/2003-002**

This submittal provides Licensee Event Report 390/2003-002. This LER addresses an event that occurred on May 21-22, 2003, which resulted in one channel of Reactor Protection System being inoperable for a period of time longer than allowed by the plant Technical Specifications. This event is being reported under 10 CFR 50.73(a)(2)(i)(B).

There are no regulatory commitments in this submittal. If you have any questions about this change, please contact P. L. Pace at (423) 365-1824.

Sincerely,



W. R. Lagergren

Enclosure

cc: See page 2

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cc (Enclosure):

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NRC FORM 366 (7-2001)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004 <small>Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NE08-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.</small>			
LICENSEE EVENT REPORT (LER) <small>(See reverse for required number of digits/characters for each block)</small>							
1. FACILITY NAME Watts Bar Nuclear Plant			2. DOCKET NUMBER 05000 - 390		3. PAGE 1 OF 7		
4. TITLE Failure in Power Distribution Panel in Reactor Protection Panel 1-R-9							
5. EVENT DATE			6. LER NUMBER		7. REPORT DATE		
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO		
05	21	2003	2003	002	00		
9. OPERATING MODE 1			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)				
10. POWER LEVEL 100			20.2201(b)		20.2203(a)(3)(ii)		
			20.2201(d)		20.2203(a)(4)		
			20.2203(a)(1)		50.36(c)(1)(i)(A)		
			20.2203(a)(2)(i)		50.36(c)(1)(ii)(A)		
			20.2203(a)(2)(ii)		50.36(c)(2)		
			20.2203(a)(2)(iii)		50.46(a)(3)(ii)		
			20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)		
			20.2203(a)(2)(v)		50.73(a)(2)(i)(B)		
			20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		
			20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)		
8. OTHER FACILITIES INVOLVED			FACILITY NAME DOCKET NUMBER 05000				
FACILITY NAME DOCKET NUMBER 05000			OTHER <small>Specify in Abstract below or in NRC Form 366A</small>				
12. LICENSEE CONTACT FOR THIS LER							
NAME Rickey Stockton, Licensing Engineer			TELEPHONE NUMBER (Include Area Code) (423) 365-1818				
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT							
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX			
B	JC	PL	WEST	N			
14. SUPPLEMENTAL REPORT EXPECTED							
15. EXPECTED SUBMISSION DATE			MONTH	DAY	YEAR		
YES (If yes, complete EXPECTED SUBMISSION DATE)			X NO				
16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)							
<p>On May 21, 2003, WBN Unit 1 was operating at 100 percent reactor power. At approximately 2153 EDT, the WBN operators were alerted to potential instrument channel III trouble when control room alarms were received. This equipment provides channel III process instrumentation of the engineered safety features actuation subsystem portion of the Reactor Protection System. The operators were able to clear the alarms and plant continued operation. However, throughout the early morning of May 22, 2003, alarms indicating the same trouble continued. Maintenance personnel performed troubleshooting and identified that a faulty power distribution panel located within Reactor Protection Set Channel III, Panel 1-R-9 was the source of the problem. The faulty power distribution panel was replaced and Panel 1-R-9 was returned to service.</p> <p>Throughout this event, the operators did not identify Panel 1-R-9 as inoperable since after clearing the alarms, plant parameters were within range (with an exception of entry into LCO 3.4.1 "RCS Pressure, Temperature, and Flow DNB Limits due to reactor coolant pressure less than 2214 for a short period) and plant operation continued. However, it was concluded after the event that the panel should have been declared inoperable and Technical Specifications actions completed within the 6 hour time requirements. This event is being reported under 10 CFR 50.73 (a)(2)(i)(B) as operation prohibited plant technical specifications.</p> <p>The cause for this event was that there was no specific guidance to assist the operators in diagnosing a panel malfunction of the sort that would also affect operability of the Reactor Protection System panel. Corrective actions include the development of an Abnormal Operating Procedure to address panel malfunctions. Additionally, the initial maintenance troubleshooting activities identified the problem to be in the data link handler portion of the rack which would not affect operability.</p>							

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I. PLANT CONDITION(S)

On May 21, 2003, at approximately 2153 Eastern Daylight Savings Time (EDT), WBN Unit 1 was operating at 100 percent reactor power. The Reactor Coolant System (RCS) (Energy Industry Identification System (EIIIS) Code AB) pressure was approximately 2235 psig and RCS Tavg was approximately 587 degrees F.

II. DESCRIPTION OF EVENT

A. Event

At approximately 2153 EDT on May 21, 2003, the WBN operators were alerted to potential instrument channel III trouble when a number of alarms (EIIIS Code ALM) were received in the main control room. Indications observed by the operators were RCS Loops 1, 2, 3, and 4 flow low and pressurizer level low, pressurizer pressure low, pressurizer pressure low SI, pressurizer level high, Refueling Water Storage Tank (RWST) Level Lo & Lo-Lo which were associated with Instrument Panel 1-R-9. Additionally, letdown was determined to be isolated. The operators entered procedure, AOI-20, "Malfunction of Pressurizer Level Control System." The operators responded by dispatching an auxiliary unit operator and a senior reactor operator to the auxiliary instrument room, where they were met by maintenance personnel who had also responded due to their monitoring of the operators radio frequency. Upon observing that letdown had isolated, the operators isolated charging by closing valves (EIIIS Code FCV) 1-FCV-62-90 and 1-FCV-62-91 in accordance with 92C of Annunciator Response Instruction (ARI)-88-94, "Reactor Coolant System." The operator then, in accordance with AOI-20, reestablished charging and letdown.

At 2203, when it was observed that RCS pressure had decreased below the 2214 psig value, the operators entered Technical Specification 3.4.1, "RCS Pressure, Temperature, and Flow DNB Limits." At 2210, control board indications appeared to be normal. The alarms had been cleared except for "Protection Set III channel failure." At 2218, LCO 3.4.1 was exited since RCS pressure was now observed to be greater than 2214 psig.

At 2220, procedure AOI-20 was exited since plant conditions had become stable. At 2244, a priority work order, was initiated to address the equipment problem. At 0106 on May 22, 2003, another burst of alarms were received as before. However, normal plant parameters remained stable. At 0307, maintenance personnel were able to begin troubleshooting which indicated that trouble appeared to be with 1 of 2 data link handler cards located in 1-R-9 panel. Previous experience of problems with these cards had shown that this type problem did not affect racks' functionality. It was determined that the work order was to be planned to replace the cards and to reset the local trouble lights on the following day shift. At this point, the operators had no evidence that any process indications had failed. Based on the information that the failure was in data link handler, the operators concluded that no operability issues existed.

At 0514, another burst of alarms were again received. The operators cleared the alarms as before. Plant parameters again appeared normal.

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At 0701, another burst of alarms were received. Plant was still stable, no controlling channels were affected. Again, at 0708, another burst of alarms as before was received. With these alarms and with the continued repetitive nature of these alarms taken into consideration, the operators declared Panel 1-R-9 as inoperable and entered the following Limiting Condition for Operation (LCOs):

LCO No.	Condition/Description	Action and Completion Time
3.3.1	N (RCS Lo Flow) W (OT delta T & low press) X (Pressurizer Level Hi)	N.1 Place channel in Trip within 6 hours W.1 Place channel in Trip within 6 hours X.1 Place channel in Trip within 6 hours
3.3.2	D (Lo Pressurizer Press) L (one P-11 Interlock Inoperable)	D.1 Place channel in Trip within 6 hours L.1 Verify interlock is in required state for exiting conditions within 1 hour.
3.3.3	A (Wide Range Pressure and pressurizer recirculation, train A, fails open)	A.1 Restore within 30 days
3.6.6	A (Containment Spray recirculation, train A fails open)	A.1 Restore with 72 hours

At 0730, the operators completed action L.1, of LCO 3.3.2 by verifying that P-11, "Pressurizer Interlock," was in its required state. Between 0730 and 1000, three additional bursts of alarms as before were received. At 0934, plant maintenance determined, through troubleshooting, that the problem was in 1-R-9 power distribution panel (EIS Code PL) and not the data link handler boards. At 1000, Panel 1-R-9 was downpowered for replacement of power distribution panel within panel 1-R-9. The operators verified that the loops and instruments for this panel were in their proper condition as required by technical specifications. At 1040, Plant Maintenance completed the required replacements. At 1223, the post maintenance test was completed satisfactorily. The operators then exited the technical specifications discussed and listed above. Panel 1-R-9 was then returned to service.

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B. Inoperable Structures, Components, or Systems that Contributed to the Event:

There were no inoperable systems that contributed to this event.

C. Dates and Approximate Times of Major Occurrences:

Time	Event
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05/21/03

21:53	Received burst of alarms for Protection Set III trouble. These indications were associated with Instrument Panel 1-R-9. Entered AOI-20.
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21:53	Dispatched an AUO and a SRO to auxiliary instrument room, maintenance personnel monitoring frequency 1 radio overheard dispatches responded to the auxiliary instrument room.
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21:54	Due to letdown isolating, isolated charging by closing 1-FCV-62-90, and -91 per ARI-92C.
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21:59	Per AOI-20, selected away from 1-LT-68-320, pressurizer controlling level change, reestablished charging, and letdown.
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22:03	Entered 3.4.1 DNB limits action A restore in 2 hours due to RCS pressure being <2214 during channel III problems with letdown isolating and heaters off. No loss of safety function exists for the entry into LCO 3.4.1, "DNB."
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22:10	Control board indications appear to be normal, all alarms except for Protection Set III channel failure have cleared for pressurizer controlling level channel now selected for 1-LT-68-339.
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22:18	Exited LCO 3.4.1 RCS pressure >2214.
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22:20	Held crew brief on AOI-20 entry. Plant conditions are stable exiting AOI-20.
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22:44	Priority 2 Work Order 03-10878-000 written to repair 1-R-9 alarms. The following alarms in 1-R-9 are channel set failure and LPS communication failure.
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05/22/03

01:06	Received another burst of alarms they were same alarms on Channel III as before.
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01:09	Alarms came in again and cleared several times finally cleared out except Protection Set III Channel Failure. Normal plant parameters remained stable.
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Time	Event
03:07	Held pre-job brief for 1-R-9 Channel III troubleshooting.
04:04	Troubleshooting data from 1-R-9 rack problem indicates we have trouble with 1 of 2 DLH (Data Link Handler) cards. Package will be planned to replace them and to reset the local trouble lights on day shift. Indications are that no process indication have failed.
05:14	Received Channel III burst of alarms again, clear plant parameters appear normal.
07:01	Received burst of alarms related to the 1-R-9 rack failure. Plant is still stable, no controlling channels were affected.
07:08	Received burst of alarms related to the 1-R-9 rack failure. Plant is still stable, no controlling channels were affected. Due to repetitive alarms associated with rack 9, the rack has been declared inoperable. Entered LCO 3.3.1 condition N (RCS Lo flow): place channel in trip within 6 hours; condition X (Pressurizer level Hi): Place channel in trip within 6 hours; condition W (OT delta T & low press): place channel in trip within 6 hours; Entered 3.3.2 condition D (Lo Pressurizer Press): place channel in trip within 6 hours; condition I (one P-11 interlock inoperable): Verify interlock is in required state for exiting conditions within 1 hr. Also entered LCO 3.3.3 action A (Wide range pressure and pressurizer level): restore within 30 days and Entered LCO 3.6.6 action A (containment spray recirculation, train A, fails open): restore within 72 hours.
07:30	Completed LCO 3.3.2 action I: verified P-11 in required state.
08:15	Received burst of alarms related to the 1-R-9 rack failure. Plant is still stable, no controlling channels were affected.
08:45	Held pre-evolution briefing with Instrument Mechanics for troubleshooting on rack 9.
09:26	Received burst of alarms related to the 1-R-9 rack failure. Plant is still stable, no controlling channels were affected
09:27	Received burst of alarms related to the 1-R-9 rack failure. Plant is still stable, no controlling channels were affected.
09:34	Instrument Mechanic reports that 1-R-9 troubleshooting determines the failure is in the power distribution panel, not the data link handler cards.

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Time	Event
05/22/03	
09:57	Completed prejob briefing on performance of IMI-99.009 to allow downpowering 1-R-9 in accordance with IMI-99.009. This downpowering action placed affected channel III bistables in trip or bypass position.
10:00	1-R-9 is downpowered. All 1-R-9 loops and instruments are in the proper condition required by technical specifications.
10:40	Instrument Mechanic reports new power distribution panel is installed and is to come to main control room for a prejob briefing for powerup and Post Maintenance Test performance.
11:00	Completed prejob briefing for powering up power distribution panel. Precautions and Technical Specifications discussed. Covered post maintenance test items and actions required if post maintenance test fails.
11:05	Entered LCO 3.0.5 to perform Post Maintenance Testing on 1-R-9.
12:23	Post Maintenance Tests completed satisfactorily following the replacement of the power supply distribution panel on rack 1-R-9. Exited LCO's 3.0.5, 3.3.1, 3.3.2, 3.3.3 and 3.6.6 associated with Work Order 03-10878-000. 1-R-9 is returned to operable status.

D. Other Systems or Secondary Functions Affected:

The loop and equipment associated with Channel III from Panel 1-R-9 was affected by this equipment failure.

E. Method of Discovery:

The equipment failure described by this LER was self revealing by the number of alarms received by the main control room.

F. Operator Actions:

See Section II.A, "Description of Event," above for operator actions during the event. However, based on information discovered during troubleshooting, the equipment that failed in 1-R-9 affected operability of the panel. Therefore, panel 1-R-9 should have been declared inoperable earlier and actions required by the Technical Specifications taken and completed for the affected channels within the 6 hour completion times. However, this did not occur and the actions were not completed within the required time frames. There, this condition is being reported under 10 CFR 50.73 (a)(2)(i)(B) as operation prohibited by Technical Specifications.

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G. Safety System Responses:

The systems and the affected channel loops responded as would be expected given the failure identified in Panel 1-R-9.

III. CAUSE OF THE EVENT

A. Immediate Cause:

The immediate cause of the event is the failure of the power distribution panels located within Panel 1-R-9.

B. Cause:

The cause for failing to recognize the potential inoperability of the Panel 1-R-9 was that there was no specific guidance to assist the operators in diagnosing Eagle 21 malfunction of the sort that would also affected operability of the Reactor Protection System (RPS) (EIS Code JC) rack. During the investigation for this event, it was found that WBN's sister plant, Sequoyah Nuclear Plant, had developed an Abnormal Operating Procedure (AOP) to address Eagle 21 malfunctions.

C. Contributing Factors

There were no contributing factors identified in this event.

IV. ANALYSIS OF THE EVENT

The purpose of the RPS is to provide automatic protection against unsafe and improper reactor operation during steady-state and transient power operations and to provide initiating signals to mitigate the consequences of faulted conditions. The RPS provides protection during all reactor modes of operation except the refueling mode. The RPS has no defined operating modes although the system's logic considers the reactor power level in determining whether a faulted condition exists or not.

The RPS provides redundant (one out of two, two out of three or two out of four) instrumentation channels for each protective function and one out of two logic train circuits. These redundant channels and trains are electrically isolated and physically separated from each other. Any single failure within a channel or train does not prevent protective system action when required. Loss of input power, the most likely mode of failure, to a channel or logic train will result in a signal calling for a trip, with the exceptions of containment spray and switchover from injection mode to recirculation mode following a safety injection. The channels for these functions are energized to trip to avoid spurious actuations.

The RPS is composed of two subsystems, the Reactor Trip subsystem (EIS Code JC) and the Engineered Safety Features Actuation Subsystem (ESFAS) (EIS Code JE). The reactor trip subsystem automatically keeps the reactor operating within a safe region by shutting down the reactor whenever the limits of the region are approached. The engineered safety features actuation subsystem uses selected plant parameters, determines whether or not predetermined safety limits are being exceeded and, if they are, combines the signals into logic matrices sensitive to combinations indicative of primary or secondary system boundary ruptures. Once the

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required logic combination is completed, the system sends actuation signals to the appropriate ESF components.

The reactor trip portion of the RPS contains circuitry consisting of two to four redundant channels which monitor various plant parameters, and logic circuitry consisting of two redundant logic trains, which shall receive inputs from the process protection and NIS channels to complete the logic necessary to automatically open the reactor trip breakers.

The ESFAS portion of the RPS consists of two discrete portions of circuitry: (1) the process instrumentation portion consisting of three to four redundant channels per parameter or variable to monitor various plant parameters such as the Reactor Coolant System and steam system pressure and temperatures and containment pressures; and (2) a logic portion consisting of two redundant logic trains which receive inputs from the process protection channels and perform the logic needed to actuate the ESF. Each train is capable of actuating the required ESF equipment. The intent is that any single failure within the ESFAS shall not prevent system action when required.

The equipment failure for this event involved Reactor Protection Set Channel III (Panel 1-R-9) which houses a portion of the Channel III process instrumentation of the Reactor Trip and ESFAS portion of the RPS. Specifically, the equipment failure involved the power distribution panel which supplies, in part, the Loop Calculation Processor (LCP), which performs the effected channel calculations. The LCP set the comparator outputs which generate the appropriate trip outputs. When the power to the LCP cycled off and on the LCP would sometimes reset during a reboot which caused anomalous indications in the main control room for a short time. However, once the panel completed its reboot sequence and the alarms cleared, plant parameter indication would again be normal and the plant continued to operate within required parameters. The remaining channels of the RPS remained unaffected by this condition.

V. ASSESSMENT OF SAFETY CONSEQUENCES

Based on the discussion in Section IV above, there was no safety significance to this event.

VI. CORRECTIVE ACTIONS

A. Immediate Corrective Actions:

Refer to Section II, "Description of Event" for discussion of the actions taken. The failed power distribution panel was replaced and the equipment associated with 1-R-9 was returned to service.

B. Corrective Actions to Prevent Recurrence:

The following actions are tracked under TVA's Corrective action program and therefore not consider to be regulatory commitments:

TVA will evaluate the SQN's AOP for applicability to WBN and, based upon this evaluation, develop a WBN procedure to address Eagle 21 malfunctions.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)**VII. ADDITIONAL INFORMATION****A. Failed Components:**

The failed component was standard Eagle-21 Power Distribution Panel II Assembly, Group I, Drawing 2005E38 series, Schematic Drawing 3D21738, Rev 2.

B. Previous LERs on Similar Events:

A search of the previous WBN LERs was performed. There has been no previous LER concerning the failure of the power distribution panels in the Reactor Protection Sets.

C. Additional Information:

None.

D. Safety System Functional Failure Consideration:

This event is not considered a safety system functional failure in accordance with NEI 99-02. The functional capability of the overall system was not jeopardized. In addition, the operators concluded that no loss of safety function existed for the entry into LCO 3.4.1 based on a lack of an active failure since there was no indication of failure of the instrument loops but on an undetermined failure within the protection set 1-R-9.

E. Loss Of Normal Heat Removal Consideration:

This event is not considered a scram with loss of normal heat removal.

VIII. COMMITMENTS

None.