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NOV 12 2002

U.S. Nuclear Regulatory Commission  
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10 CFR 50.73

Gentlemen:

**TENNESSEE VALLEY AUTHORITY - WATTS BAR NUCLEAR PLANT (WBN)  
UNIT 1 - DOCKET NO. 50-390 - FACILITY OPERATING LICENSE NPF-90 -  
LICENSEE EVENT REPORT (LER) 50-390/2002-004**

This submittal provides Licensee Event Report 2002-002. This LER addresses an event where one of the two offsite power feeds was lost for a brief period. The interruption of the offsite supply resulted in the actuation of engineered safety feature equipment and due to this, the event is being reported under 10 CFR 50.73(a)(2)(iv)(A)

There are no regulatory commitments in this submittal. Should there be questions regarding this event, please call P. L. Pace at (423) 365-1824.

Sincerely,

  
W. R. Lagergren

Enclosure  
cc (Enclosure):

JE22

U.S. Nuclear Regulatory Commission

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cc (Enclosure):

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# LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME <b>Watts Bar Nuclear Plant (WBN) UNIT 1</b>	2. DOCKET NUMBER <b>05000 - 390</b>	PAGE (3) <b>1 OF 7</b>
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4 TITLE  
**Partial Loss of Offsite Power**

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
09	21	2002	2002	-- 004	-- 00	11	08	2002	NA	05000
									FACILITY NAME	DOCKET NUMBER
									NA	05000

9. OPERATING MODE	1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check one or more)								
10. POWER LEVEL	100	<input type="checkbox"/>	20 2201(b)	<input type="checkbox"/>	20.2203(a)(3)(ii)	<input type="checkbox"/>	50.73(a)(2)(ii)(B)	<input type="checkbox"/>	50.73(a)(2)(ix)(A)	
		<input type="checkbox"/>	20 2201(d)	<input type="checkbox"/>	20.2203(a)(4)	<input type="checkbox"/>	50.73(a)(2)(iii)	<input type="checkbox"/>	50.73(a)(2)(x)	
		<input checked="" type="checkbox"/>	20 2203(a)(1)	<input type="checkbox"/>	50 36(c)(1)(i)(A)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)(A)	<input type="checkbox"/>	73 71(a)(4)	
		<input type="checkbox"/>	20.2203(a)(2)(i)	<input type="checkbox"/>	50.36(c)(1)(ii)(A)	<input type="checkbox"/>	50.73(a)(2)(v)(A)	<input type="checkbox"/>	73.71(a)(5)	
		<input type="checkbox"/>	20.2203(a)(2)(ii)	<input type="checkbox"/>	50.36(c)(2)	<input type="checkbox"/>	50.73(a)(2)(v)(B)	<input type="checkbox"/>	OTHER	
		<input type="checkbox"/>	20.2203(a)(2)(iii)	<input type="checkbox"/>	50.46(a)(3)(ii)	<input type="checkbox"/>	50.73(a)(2)(v)(C)	<input type="checkbox"/>	Specify in Abstract below or in NRC Form 366A	
		<input type="checkbox"/>	20 2203(a)(2)(iv)	<input type="checkbox"/>	50.73(a)(2)(i)(A)	<input type="checkbox"/>	50 73(a)(2)(v)(D)			
		<input type="checkbox"/>	20 2203(a)(2)(v)	<input type="checkbox"/>	50 73(a)(2)(i)(B)	<input type="checkbox"/>	50 73(a)(2)(vii)			
		<input type="checkbox"/>	20 2203(a)(2)(vi)	<input type="checkbox"/>	50 73(a)(2)(i)(C)	<input type="checkbox"/>	50 73(a)(2)(viii)(A)			
<input type="checkbox"/>	20 2203(a)(3)(i)	<input type="checkbox"/>	50.73(a)(2)(ii)(A)	<input type="checkbox"/>	50 73(a)(2)(viii)(B)					

12. LICENSEE CONTACT FOR THIS LER

NAME <b>Jerry Bushnell, Licensing Engineer</b>	TELEPHONE NUMBER (Include Area Code) <b>(423) 365-8048</b>
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

YES (If yes, complete EXPECTED SUBMISSION DATE)2	<input checked="" type="checkbox"/>	NO	<input type="checkbox"/>	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR

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

While operating at 100% power on September 21, 2002, Watts Bar Unit 1 experienced a momentary loss of the 161 kV offsite power feed to Common Station Service Transformer (CSST) D. WBN's two offsite power supplies are fed from a remote switchyard located at the Watts Bar hydroelectric plant. The affected offsite power source through CSST D is the primary power source for 6900V Shutdown Boards 1B-B and 2B-B. The partial loss of offsite power was caused by the inadvertent manual operation of a breaker at the hydroelectric plant switchyard. The opening of the breaker occurred at 11:00:20 (EDT) and the breaker was reset to provide offsite power at 11:00:34 (EDT). Due to this event, and the loss of the primary feed to the shutdown boards, a valid engineered safety function (ESF) actuation occurred which started all four of the standby diesel generators (DGs), along with, as designed, the 1B-B Motor Driven Auxiliary Feedwater (AFW) Pump and the Turbine Driven AFW Pump. The DGs provided power to the affected Shutdown Boards and other required blackout loads during the event.

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		YEAR	SEQUENTIAL NUMBER	REVISION	
Watts Bar Nuclear Plant (WBN) Unit 1	05000390				2 OF 7
		2002 --	004	-- 00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

**I. PLANT CONDITION(S)**

At the time of event, Watts Bar Unit 1 was in Mode 1 at 100 percent reactor power.

**II. DESCRIPTION OF EVENT**

**A. Event:**

While operating at 100% power on September 21, 2002, Watts Bar Unit 1 experienced a momentary loss of the 161kV offsite power feed to Common Station Service Transformer (CSST) D (Energy Industry Identification System (EIIIS) Code XFMR). WBN's two offsite power supplies are fed from a remote switchyard located at the Watts Bar hydroelectric plant approximately 1.5 miles from WBN on the same reservation. The affected offsite power source through CSST D is the primary power sources for 6900V Shutdown Boards 1B-B and 2B-B. The partial loss of offsite power was caused by the inadvertent manual operation of a breaker (Breaker 934) at the hydroelectric plant switchyard by a hydro plant operator. The opening of the breaker occurred at 11:00:20 (EDT) and the breaker was reset to provide offsite power at 11:00:34 (EDT). Due to this event, and the loss of the primary feed to the shutdown boards, a valid engineered safety function (ESF) actuation occurred which started all four of the standby diesel generators (DGs) (EIIIS Code EK/DG), along with, as designed, the 1B-B Motor Driven Auxiliary Feedwater (AFW) Pump (EIIIS Code BA/P) and the Turbine Driven AFW Pump (EIIIS Code BA/TRB). The DGs provided power to the affected Shutdown Boards and other required blackout loads during the event.

The event was documented in the TVA corrective action program as problem evaluation report (PER) 02-013430-000.

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

There were no Inoperable Structures, Components, or Systems that Contributed to the Event.

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**C. Dates and Approximate Times of Major Occurrences:**

September 21, 2002

11:00:20 EDT	The 161 kV offsite power feed to CSST D was momentarily lost.
11:00:34 EDT	The breaker at the hydro switchyard was reset to provide offsite power to CSST D.
11:01 EDT	Entered LCO 3.8.9 due to the loss of the offsite power feed to CSST D and the shedding of various plant components/systems.
11:44 EDT	The hydro switchyard components affected by the manipulation of the breaker are restored to their normal configuration.
15:10 EDT	Power was restored to the components/systems affected by the partial loss of offsite power and LCO 3.8.9 was exited.

**D. Other Systems or Secondary Functions Affected:**

The WBN onsite standby ac power system (diesel generators) is a safety-related system which is designed to supply power for ac-powered electrical devices essential to safety. The primary impact this event had on plant systems occurred when various non-essential components (loads) were shed as a result of the diesel generators supplying power to 6900V Shutdown Boards 1B-B and 2B-B. The shedding of the loads occurred as designed with one exception. Breaker 1-BKR-62-228/1 supplies power to a heater for the Boric Acid Tank and failed to open as part of the load shedding process. After identification, the breaker was configured open by the Operations staff until repairs were made. This problem was documented in the TVA corrective action program as problem evaluation report (PER) 02-013470-000.

**E. Method of Discovery:**

The plant responded as designed to the partial loss of the offsite power supply.

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**F. Operator Actions:**

Abnormal Operating Instruction (AOI) 35, "Loss of Offsite Power," directs the response to events like the one experienced on September 21, 2002. The operations staff properly followed the controls defined in Section 3.2, "Operator Actions (Loss Of One 161 KV Power Supply) to respond to the power interruption.

**G. Safety System Responses:**

As designed, the 1B-B Motor Driven Auxiliary Feedwater (AFW) Pump and the Turbine Driven AFW Pump started along with the four emergency diesel generators (DGs). DGs 1B-B and 2B-B connected and supplied power to 6.9 kV Shutdown Boards 1B-B and 2B-B. Once this occurred and voltage returned to the shutdown buses, the automatic load sequence logic connected the essential loads in the proper sequence. In addition, the load shed logic removed (tripped) the non-essential loads to assure that the loading on each of the DGs was within the ratings of the generator.

One non-essential component (load) was not removed from the 1B-B DG. This was due to the breaker feeding the Boric Acid Tank heater failing to open. This heater is rated at 22.5 kW and because it remained energized, the load to DG 1B-B was increased by 22.5 kW. A review of the maximum steady state loading composite summary for the 1B-BDG found sufficient margin was available to support all required loads with the ratings of the generator not being exceeded.

**III. CAUSE OF THE EVENT**

**A. Immediate Cause:**

The cause of the momentary partial loss of offsite power is discussed below in Part B, "Root Cause."

**B. Root Cause:**

The momentary partial loss of offsite power was caused by the inadvertent manual operation of a breaker (Breaker 934) at the hydroelectric plant.

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**C. Contributing Factor:**

Contributing to the cause of this event are the following three issues:

1. On September 16, 2002, Breaker 968 was removed from service for a scheduled internal inspection. Dispatcher switching was performed as written to accomplish this task. However, the switching instructions for removing Breaker 968 from service set up the Bus 2-2 relaying scheme incorrectly. The resulting current imbalance was not detected until the hydro Operator placed generator Number 3 online on September 21, 2002. The current imbalance resulted in the operation of the differential relays on Bus 2-2 and a subsequent disagreement alarm in the hydro plant control room.
2. The red (breaker closed/energized) indicator light for Breaker 934 was not working. This resulted in all three lights associated with the breaker not being lit during the time the disagreement alarm was sounding. At this time, the hydro plant operator assumed the disagreement light for Breaker 934 was burned out and he also thought that the disagreement lights had been cleared, but the audible alarm continued in the Control Room. Based on this, the hydro plant Operator opened Breaker 934.
3. Prior to opening Breaker 934, the hydro plant Operator did not take the required time to ensure that the bus feeding WBN was deenergized. Once Breaker 934 was opened the operator reviewed the available indicators and realized that he had interrupted the 161 kV power feed to WBN. He responded by quickly closing Breaker 934. Had he reviewed other available indicators first, it would have been evident that Breaker 934 was closed and was not the cause of the disagreement alarm.

**IV. ASSESSMENT OF SAFETY CONSEQUENCES**

The interruption in one of the 161 kV offsite power feeds from the hydro plant switchyard was very brief. Therefore, the response of WBN to the momentary partial loss of 161 kV power is the primary safety consideration. As indicated previously, the plant systems/components responded as designed to the partial loss of 161 kV power. The one exception was the failure to open of the breaker feeding the Boric Acid Tank heater. This heater is rated at 22.5 kW and because it remained energized, the load to

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diesel generator 1B-B was increased by 22.5 kW. A review of the maximum steady state loading composite summary for the 1B-B diesel generator identified sufficient margin was available to support all required loads with the ratings of the generator not being exceeded. Considering this, the impact of the event was minimal.

**V. CORRECTIVE ACTIONS**

**A. Immediate Corrective Actions:**

1. Refresher training was provided to six hydro plant Operators in the areas of:
  - a. The significance of the loss of either of the WBN offsite power feeds.
  - b. The need to verify that both the disagreement white light and the control panel meters indicate that a breaker has tripped.
  - c. The expectation of the performance of a control board lamp walk down at the end of each shift was reinforced.
2. Tape was installed on the control boards to outline the controls for the WBN offsite power breakers as a reminder to the operators that the manipulation of a breaker inside the tape could affect WBN.

**Note:**

The Watts Bar hydro plant experienced a fire on September 27, 2002. The fire damaged the electrical controls in the plant and resulted in the loss of both offsite 161 kV power feeds to WBN. The impact of the fire on WBN is being addressed in TVA's corrective action program as PER 02-013616. The fire event resulted in the declaration of a Notification of Unusual Event (NOUE) and will be reported under 10 CFR 50.73 as LER 2002-05.

**B. Corrective Actions to Prevent Recurrence:**

None

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**VI. ADDITIONAL INFORMATION**

**A. Failed Components:**

There were no failed components involved in this LER.

**B. Previous LERs on Similar Events:**

There have been no previous LERs for WBN that were caused by a loss of offsite power.

**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.

**E. Loss Of Normal Heat Removal Consideration:**

Because the event did not involve a reactor trip, it is not considered a scram with loss of normal heat removal in accordance with NEI 99-02.

**VII. COMMITMENTS**

None.