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)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Dresden Nuclear Power Station, Unit 3	05000249	1 OF 5

TITLE (4)
SBLC was Inoperable from Suction Line Low Temperature Due to a Wiring Discrepancy in the Heat Trace Controller Circuit

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
10	28	97	97	-- 011 --	00	11	25	97	None	
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N
POWER LEVEL (10)	099

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

	20.2201(b)		20.2203(a)(3)(i)	50.73(a)(2)(iii)	73.71(b)
	20.2203(a)(1)		20.2203(a)(3)(ii)	50.73(a)(2)(iv)	73.71(c)
	20.2203(a)(2)(i)		20.2203(a)(4)	50.73(a)(2)(v)	OTHER
	20.2203(a)(2)(ii)		50.36(c)(1)	50.73(a)(2)(vii)	(Specify in Abstract below and in Text, NRC Form 366A)
	20.2203(a)(2)(iii)		50.36(c)(2)	50.73(a)(2)(viii)(A)	
	20.2203(a)(2)(iv)	X	50.73(a)(2)(i)	50.73(a)(2)(viii)(B)	
	20.2203(a)(2)(v)		50.73(a)(2)(ii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Scott Mathis Ext. 2171	(815) 942-2920

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 October 28, 1997, with Unit 3 in mode 1, the Standby Liquid Control (SBLC) suction temperature fell below Technical Specification 4.4.A.1.c. minimum temperature limit of 83 degrees F and the SBLC system was declared inoperable. The heat trace controller was adjusted and temperature raised in the suction line to greater than 83 degrees F. An investigation revealed that a wiring discrepancy existed in the heat trace controller circuit. Two of the three heat trace circuits were crossed and wired to the wrong leg of heat tracing resulting in the heat trace controller from one section of pipe controlling another section. During the troubleshooting phase of this problem, the SBLC low suction temperature condition recurred on October 31, 1997 and the SBLC system was subsequently declared inoperable. System repairs were made to correct the cause of the suction piping low temperature heating problem. The primary cause of this event was determined to be improper wiring of the heat trace control circuitry due to indeterminate conditions. Contributing causes include: (1) Inadequate Post Maintenance Testing of heat tracing; and (2) A failure to implement setpoint changes to SBLC suction temperature switches in a timely manner following the change to upgraded Technical Specifications (TSUP). Corrective actions include establishing better Post Maintenance Testing instructions when work is performed on heat trace circuits, and completing the setpoint changes for SBLC suction line temperature switches for both Units. The safety significance of the event was determined to be minimal.

PLANT AND SYSTEM IDENTIFICATION:

General Electric - boiling water reactor - 2527 MWt rated core thermal power.

Energy Industry Identification System (EIIS) codes are identified in the text as [XX]and are obtained from IEEE Standard 805-1984, IEEE Recommended Practice for System Identification in Nuclear Power Plants and Related Facilities.

EVENT IDENTIFICATION:

SBLC was Inoperable from Suction Line Low Temperature Due to a Wiring Discrepancy in the Heat Trace Controller Circuit.

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 3 Event Date: October 28, 1997 Event Time: 1501

Reactor Mode: 1 Mode Name: Run Power Level: 99%

Reactor Coolant System Pressure: 1000 psig

B. DESCRIPTION OF EVENT:

This event is reportable pursuant to 10CFR50.73(a)(2)(i)(B) any operation or condition prohibited by the plant's Technical Specifications.

On October 27, 1997, at 0609, an alarm was received in the Main Control Room for low temperature on Unit 3 Standby Liquid Control (SBLC) [BR] piping. The alarm setpoint is 78 degrees F, and has three separate input signals, two are for A and B SBLC pump suction line temperature and a third is for main SBLC storage tank temperature. An Equipment Attendant (EA) (Non-Licensed Operator) was dispatched to check local conditions to verify the alarm. Local indication for SBLC suction piping temperature, TI 3-1160, indicated the temperature to be 90 degrees F. This local indication for temperature was in close proximity to the temperature switch which caused the alarm in the control room. Based on this conflict between the Control Room alarm and local indication, a work package was created for the Instrument Maintenance Department (IMD) to troubleshoot temperature switches 3-1165, 3-1149 (for the suction line) and 3-1155 (main SBLC tank) which input into the Control Room alarm circuit.

On October 28, IMD determined that switch 3-1165 had tripped which initiated the Control Room alarm, IMD found no problems with the calibration of the SBLC temperature switch 3-1165. The 3-1165 temperature switch is located on the SBLC pump suction piping common to both pumps. At approximately 1430, the IMD technician took surface readings on the system piping with a pyrometer and found the temperature to be approximately 80 degrees F. Technical Specification 4.4.A.1.c demonstrates heat tracing operability by the ability to maintain temperature greater than 83 degrees F, which is required for SBLC to be considered operable.

At 1530 on October 28, an Operations Supervisor (OS) (Licensed Senior Reactor Operator) verified with a pyrometer that the surface temperature on the suction piping to the SBLC pumps was 80 degrees F. The indicated local temperature, from TI 3-1160, was still reading 90 degrees F at this time. The SBLC system was declared inoperable. The sensor for the local SBLC suction temperature indication, TE 3-1161, is closer to the SBLC tank than temperature switch TS 3-1165, which causes a Control Room alarm on low suction temperature. Ambient temperatures are slightly higher closer to the SBLC tank due to heat losses from the tank.

IMD and a Component Engineer began to troubleshoot the three heat trace circuits. Two of the three heat trace circuits were found not energized. Their controllers were adjusted, both heat trace circuits energized and suction line temperature was raised to 84 degrees F.

IMD continued to monitor the system temperature locally. At 1700 on October 28, a SBLC High Temp alarm was received in the Control Room. This alarm came from TS 3-1149, the opposing suction temperature switch. Once the alarm cleared at 1800, IMD continued troubleshooting of the heat trace circuits. Another slight adjustment was made to the heat trace thermostat and TS 3-1149 was calibrated. No problem was found with TS 3-1149. The LCO was exited at 1820. DOS 1100-01, SBLC System Pump Test, was performed as a conservative measure to verify no precipitation of chemical in the suction piping had occurred.

Operations began once per shift monitoring of the SBLC piping temperatures at 2033 on October 28, using a surface pyrometer. Temperature was maintained above the required TS limit of 83 degrees F.

On October 29, IMD and a Component Engineer continued troubleshooting of heat trace circuits. No Control Room alarms were received during this time. The heat trace circuitry was controlling temperature.

On October 30, IMD and a Component Engineer discovered a wiring discrepancy between the plant and the wiring diagram. Two of the three heat trace circuits had their controller circuits crossed. There are three loops of heat tracing. By design, System A controls A SBLC pump piping, system B controls B SBLC pump piping, and system C controls both pumps common piping include relief valve lines and test lines. System C heat trace runs in the same proximity as system A, and overlaps by about 6 inches. With the wiring discrepancy, system B sensor controlled system C heat trace and system C sensor controlled system B heat trace. When system B temperature was lower than the heat trace setpoint, it energized system C heat trace. System B was not receiving heat, and system C stayed energized causing the relief and test line piping to become warm. This problem was even more compounded when the sensing point for system A was near the heat trace line for system C and was already warm. This caused the A system to not to become energized.

At 0930, on October 31, another low temperature condition was identified during in-plant operator rounds for the same section of piping. The control room had not yet received the low temperature alarm. Indicated temperature using the pyrometer was approximately 80 degrees F. The SBLC system was again declared inoperable and the Technical Specification LCO entered. IMD personnel were dispatched to adjust the heat trace controllers to activate heating for the affected piping. The temperature in the suction line was raised to greater than 83 degrees F at 1148. The LCO was not exited until 1220, October 31, when the previously identified wiring discrepancy was corrected and verified by proper operation of the system. Monitoring of the controller performance indicated that the controller was functioning properly. IMD continued to adjust/balance the heat trace controllers to assure continued performance. In addition, Operations increased the frequency of temperature monitoring from once per shift to every 4 hours. An Operability Evaluation was completed to verify operability of the SBLC pumps.

C. CAUSE OF EVENT:

The primary cause of this event was the improper wiring of the heat trace control circuitry (NRC Cause Code X). Review of previous maintenance packages ranging in date from 1988 to present 1997 that had the potential to reverse the heat tracing circuitry did not reveal when the wiring error may have occurred. Therefore, the cause of this discrepancy is deemed indeterminate. Two of the three heat trace circuits were crossed and wired to the wrong leg of heat tracing. This affected the ability to adequately keep the suction line greater than 83 degrees F.

Contributing causes identified were:

1. Inadequate work performed during maintenance packages for SBLC heat tracing (NRC cause code D) due to a lack of specific work instructions. This may have caused improper leads to be landed or heat tracing to become crossed.

2. Inadequate Post Maintenance Testing (PMT) of previous work performed on the SBLC heat tracing (NRC cause code D) due to a lack of specific PMT instructions. This may have allowed a pre-existing condition to exist for a period of time following maintenance. With two of the three heat trace circuits crossed and wired to the wrong leg of heat tracing, recent PMTs only verified the energized circuits by amperage on the circuit. This failed to properly identify which leg of heat tracing was energized.

3. Not implementing the setpoint changes for the suction line temperature switches soon after TSUP went into effect (NRC Cause Code E). Prior to Technical Specification Upgrade implementation, the limit on SBLC suction temperature was based on boron concentration per Figure 3.4.2. Presently, it is a fixed 83 degrees F. These setpoint changes were deferred as a business decision as it was assumed normal operator rounds would adequately monitor the SBLC suction temperature. These setpoints were originally scheduled to be changed as part of the business decision by November 17, 1997.

D. SAFETY ANALYSIS:

SBLC is designed as an alternate system to shutdown the reactor in the unlikely event that there are control rod drives which fail to scram when required. TS figure 3.4...-1, explains SBLC temperature versus concentration requirement. Currently the sodium pentaborate solution is at a 16% concentration, from which a minimum temperature of 76 degrees F is required to prevent precipitation of the boron from the solution. Heat trace is applied to the SBLC suction piping to ensure temperatures of the sodium pentaborate solution are high enough to preclude this precipitation. Since suction temperatures were identified at 80 degrees F and the SBLC basis allow a 10 degree margin, we retained reasonable assurance that SBLC remained in an operable condition and capable of performing its intended function. For this reason, the nuclear safety significance was determined to be minimal.

E. CORRECTIVE ACTIONS:

1. The wiring discrepancy identified on Unit 3 with the heat trace controller circuits was corrected to match plant prints. (Complete)

2. Unit 2 SBLC heat trace controllers circuits were verified to be wired correctly per the plant prints. (Complete)

3. Raised setpoints for SBLC low suction temperature switches for unit 3 per setpoint change 03-97-55. (Complete)

4. Raised setpoints for SBLC low suction temperature switches for unit 2 per setpoint change 02-97-54. (Complete)

5. Establish better work instructions to be used by work planners on systems requiring work on heat trace circuits. (2491809701102)

6. Establish better Post Maintenance Testing instructions by work analysts to better define which circuit is energized when heat trace circuits are tested following maintenance. (2491809701101)

F. PREVIOUS OCCURRENCES:

LER/Docket Number	Title
None	

G. COMPONENT FAILURE DATA:

None