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FACIL:50-261 H.B. Robinson Plant, Unit 2, Carolina Power & Light C 05000261
AUTH.NAME AUTHOR AFFILIATION
BAUR,D.H. Carolina Power & Light Co.
FLANAGAN,W.J. Carolina Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 93-005-00:on 930602,temperature violation of boric acid storage tank occurred due to biased calibration of equipment.Planned appropriate calibration,adjustment/ replacement of equipment.W/930702 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 7
TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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EXTERNAL:	EG&G BRYCE,J.H	2	2	L ST LOBBY WARD	1	1
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United States Nuclear Regulatory Commission
Attn: Document Control Desk
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H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
LICENSEE EVENT REPORT NO. 93-005-00

Gentlemen:

The enclosed Licensee Event Report (LER), is submitted in accordance with 10CFR50.73 and NUREG 1022 including Supplements No. 1 and 2.

Very truly yours,

W. J. Flanagan, Jr.
Acting Plant General Manager
Robinson Nuclear Plant

DHB:1st

Enclosure

cc: Mr. S. D. Ebneter
Mr. W. T. Orders
INPO

IE22 1/1

Enclosure to Serial: RNP/93-1539

NRC FORM 366 (5-92) — U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

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.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2	05000 261	1 OF 6

TITLE (4)
Apparent Temperature Violation of the Boric Acid Storage Tank

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
06	02	93	93	-- 005 --	00				FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)	100		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)	X	OTHER
			20.405(a)(1)(iii)		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)
David H. Baur - Regulatory Compliance	(803) 383-1296

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)

This is a voluntary LER.

At approximately 1840 hours on June 2, 1993, with the H. B. Robinson Unit No. 2[1] operating at 100 percent power, an Operability Determination concluded, based on indicated temperatures recorded on a Heat Trace Recorder, that the Boric Acid Storage Tanks (BASTs) had been inoperable due to a portion of the tank volume being below the Technical Specification requirement of 145 degrees F. Testing and investigation determined that the calibration of the recorder was erroneously biased by an ambient temperature compensation made to the millivolt signals injected by the Biddle Versa Cal Calibrator. When the 10 degree correction, resulting from eliminating the erroneous bias is applied to the recorder temperatures originally documented on June 2, 1993, then it is apparent that a Technical Specification violation did not occur. Corrective actions taken and planned include appropriate calibration, adjustment/replacement of equipment.

[1]H. B. Robinson Unit No. 2 is a Pressurized Water Reactor in commercial operation since March, 1971.

NRC FORM 366A (5-92) U.S. NUCLEAR REGULATORY COMMISSION

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

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL	REVISION	
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2	05000-261	93	-- 005 --	00	2 OF 6

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

I. DESCRIPTION OF EVENT

At approximately 1840 hours on June 2, 1993, with the H. B. Robinson Unit No. 2 operating at 100 percent power, an Operability Determination concluded, based on indicated temperatures recorded on the Heat Trace Recorder, that the Boric Acid Storage Tanks (BASTs) had been inoperable due to a portion of the tank volume being below the Technical Specification requirement of 145 degrees F.

Information Known on June 2, 1993

During the performance of the routine BAST recirculations on May 31, 1993, several Heat Trace Circuits associated with the recirculation flow paths were observed to alarm during the initial phase of the recirculation. The Operations Shift forwarded an electronic note to management and the System Engineer for the Heat Trace System, expressing concern over system operability but did not state that the recorded temperatures dropped below 145 degrees F. May 31, 1993, was a holiday and the note was not seen until June 1, 1993. Also on June 1, 1993, the NRC Resident became aware that the Heat Trace Recorder temperatures had fallen below 145 degrees F and discussed this information with the Manager - Electrical Systems. The Manager -Electrical Systems, in turn, discussed the issue with the System Engineer for the Heat Trace System and later with the Manager - Operations. Since all indications pointed to having boric acid below 145 degrees F, an Operability Determination was initiated because the indicated out-of-specification temperatures were located in the piping and not the BASTs. The tanks were recirculated and the temperatures on Heat Trace Recorder No. 1 indicated below 145 degrees F for at least one point in the recirculation flow path of each tank. These temperatures rose above 145 degrees F within twenty-five (25) minutes and stabilized between 150 and 160 degrees F after approximately thirty (30) minutes of recirculation. The indicated temperatures for the BASTs remained relatively constant during the recirculation at 163 degrees F ± 1 degree. A second recirculation was performed five (5) hours later and the Heat Trace Circuits remained above 145 degrees F. Following the second BAST recirculation, the Heat Trace Recorder indicated that the BAST was within specifications and could be maintained within specifications using more frequent recirculations.

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LICENSEE EVENT REPORT (LER)

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H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2	05000-261	93	-- 005 --	00	3 OF 6

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

Information obtained from testing

Boric Acid Storage Tank

Testing began to determine optimum recirculation times to prevent the indicated temperatures from falling below the 145 degree F limit, and after a few tests, the decision was made to control the tanks' temperature between 170 and 175 degrees F to allow decreasing the frequency of recirculations. The recirculation time for the "A" BAST was decreased to once per eight (8) hours while the "B" Tank was decreased to once per twelve (12) hours. This ensured that the "A" Tank would be maintained above 145 degrees F to satisfy Technical Specifications so that the "B" Tank could be used for testing. During the testing, analysis of the data indicated that the "B" Tank did not appear to be at the temperature the tank temperature controller, TI-109, indicated. The controller calibration was checked using a Jofra immersion type temperature calibrator and the as-found response was well within requirements. Subsequent testing using thermocouples, RTDs, and surface pyrometers provided additional evidence that the temperature controller in the "B" Tank was actually indicating approximately seven (7) degrees F high. Continued trouble-shooting, using a hot bath and repeating the calibration using the Jofra calibrator, confirmed that the controller indicated appropriately seven (7) degrees F high at 175 degrees F and three (3) degrees low at 100 degrees F. Calibration efforts are in progress, but due to the age of the component, replacement may be required. Further testing, using a seven (7) degree F correction applied to the controller output, did not resolve the difference in the temperature measurements between the controller and the Heat Trace Recorder.

Heat Trace Recorder

Since the Heat Trace Circuits are for temperature maintenance in static systems, the indication on the various circuits should have approached the temperature of the fluid in the lines after a few minutes of flow. This was not occurring. To determine why the Heat Trace Recorder temperature was not approaching the corrected tank temperature, the Heat Trace Temperature Recorder was calibrated. The calibration indicated the recorder was well within specifications. A thermocouple was then connected to a spare point on the recorder and placed in a temperature calibrator. The results indicated the recorder was reading approximately ten (10) degrees low. Investigation determined that the calibration of the recorder was biased by an ambient temperature compensation made to the millivolt signals injected by the Biddle Versa Cal Calibrator. Upon using the temperature mode of the calibrator, the Heat Trace Recorder readings increased ten (10) degrees F. When this increase is applied to the recorder temperatures originally documented on June 2, 1993, then it is apparent that a Technical Specification violation did not occur.

NRC FORM 366A (5-92) U.S. NUCLEAR REGULATORY COMMISSION

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LICENSEE EVENT REPORT (LER)

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		YEAR	SEQUENTIAL	REVISION	
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2	05000-261	93	-- 005 --	00	4 OF 6

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

Additional information concerning the Boric Acid Storage Tank

Westinghouse was contacted concerning the issue of BAST stratification. The Westinghouse design process took into consideration thermal stratification and potential cold spots in the establishment of the 145 degree F requirement for the BASTs. This was the minimum temperature required to ensure that the 12.5 percent Boric Acid solution maintained in the BAST would not precipitate out. The solubility curve for 12.5 percent Boric Acid solution indicates 137 Degrees F to be the precipitation temperature. Per Westinghouse, with the BAST controller indicating 145 degrees F, there could be cold spots less than 137 degrees F in the tank. However, these cold spots would not prevent flow and would go back into solution at the start of a pump. Measurements taken to date indicate a maximum difference of approximately twelve (12) degrees F between the location where the controller measures temperature and the bottom of the BAST. The temperatures measured to determine stratification are being obtained by surface probes on the "B" Tank, a process that inherently reads lower temperatures than the fluid inside the tank, which adds a small conservatism of 1 or 2 degrees F to this assessment. This confirms that with an indicated BAST temperature of 145 degrees F, there may be some cold spots less than 137 degrees F as taken into account in the Westinghouse design analysis. The alarm setpoint of 155 degrees F provides additional conservatism to ensure significant precipitation does not occur.

II. CAUSE OF EVENT

As stated above, it was determined that the Heat Trace Recorder, that was calibrated using the Biddle Versa Cal Calibrator, was reading approximately ten (10) degrees low. Investigation determined that the calibration of equipment was biased by an internal ambient temperature compensation made to the millivolt signals and injected by the Biddle Versa Cal Calibrator. When using the temperature mode of the Biddle Versa Cal Calibrator, the Heat Trace Recorder readings increased ten (10) degrees F. Additionally, recognizing the error induced by the Biddle Versa Cal Calibrator was further aggravated by the seven (7) degree F error in the BAST temperature controller.

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H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2	05000-261	93	-- 005 --	00	5 OF 6

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

III. ANALYSIS OF EVENT

This is a voluntary LER. The reportable condition that was originally identified did not exist.

When this event was first evaluated on June 1 and 2, 1993, based on the assumption that the installed temperature indicators were correct, it was concluded that a Technical Specification violation had occurred and that a LER was required pursuant to 10CFR50.73(a)(2)(i)(B), operation or condition prohibited by Technical Specifications. However, based on the testing, investigating, and evaluations that followed, it has been concluded and documented, that a conservative error in the Heat Trace Recorder indicated temperatures caused the apparent violation.

IV. CORRECTIVE ACTIONS

The calibration data sheet for Heat Trace Recorders required the Biddle Versa Cal Calibrator to be used in the millivolt mode. These data sheets have been revised to require the equipment to be used in the temperature mode. This action will preclude recurrence of the error.

An investigation was conducted to determine what other equipment had been calibrated using the Biddle Versa Cal Calibrator. This investigation revealed that five (5) additional instruments were calibrated using the millivolt input with the Biddle Versa Cal Serial No. 99943. These five (5) instruments have been reviewed for potential impact to proper operation of Robinson Unit No. 2. Three (3) of the instruments are Non-Q and have no automatic features or alarms associated with them, nor do they have any direct plant operational impact. The remaining two (2) instruments are thermocouples which measure "A" and "B" Emergency Diesel Generator cylinder exhaust temperatures. These thermocouples are for information and have no operational requirement. However, to prevent recurrence, the Calibration Data Sheets for the remaining instruments will also be revised to require the Biddle Versa Cal Calibrator to be used in the temperature mode in lieu of the millivolt mode. These actions will be complete by the end of Refueling Outage 15, presently scheduled to end on November 4, 1993.

If possible, the BAST controller will be calibrated and adjusted to reduce the error to an acceptable value. If the calibration efforts fail, the controller will be replaced. Replacement, if required, will be completed by January 15, 1994.

NRC FORM 366A (5-92) U.S. NUCLEAR REGULATORY COMMISSION

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LICENSEE EVENT REPORT (LER)

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H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2	05000-261	93	-- 005 --	00	6 OF 6

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

V. ADDITIONAL INFORMATION

1. Failed Component Identification

   None

2. Previous Similar Events

   None

Form No.: NG-5020
10/90

Attachment 2
to NGGM 304-01

OUTGOING NRC CORRESPONDENCE INPUT VERIFICATION

JUL 1991 REV 3

FACTS #: _____
LETTER #: _____

DOCUMENT IDENTIFICATION: _____

INPUT VERIFICATION: For items 1-5 below, attachments to, or notes on the reverse of this page, are acceptable to ensure completeness.

THE ACCURACY OF THE ATTACHED INPUT WAS VERIFIED BY ONE OR MORE OF THE FOLLOWING METHOD(S) [SEE NOTE 1]:

		PACKAGE PREPARER (NOTE 1)
1.	PERSONAL KNOWLEDGE OF SUBJECT/PROJECT	_____
2.	INPUT OBTAINED FROM OTHERS (LIST SOURCES.)	
	Name A. McCauley Organization T.S.	_____
	Name D. Turner Organization T.S.	_____
3.	REVIEW OF PLANT TECHNICAL DOCUMENTS (LIST DOCUMENTS) _____	
	_____	_____
4.	VERIFIED BY FIELD OBSERVATIONS (DISCUSS EXTENT) _____	
	_____	_____
5.	OTHER (DESCRIBE): _____	
	_____	
	_____	_____

COMMITMENT ID FORM (NG-5021) _____ Attached _____ No Commitments
FSAR CHANGE FORM (NG-5024) _____ Attached _____ No FSAR Changes (NOTE 2)

RESPONSE MANAGER (See NOTE 1)	DATE
_____	_____

NOTE 1: Each individual, by his signature, attests that to the best of his knowledge and based on personal knowledge, reports from cognizant individuals, or reference to appropriate documentation that the input provided is accurate and free from material false statement.

NOTE 2: 10CFR50.71(e) requires that the FSAR(s) be revised "to contain all the changes necessary to reflect information and analyses submitted to the Commission."

Form No: NG-5021
10/90

Attachment 3
to NGGM 304-01

OUTGOING NRC CORRESPONDENCE
COMMITMENT ID FORM
(Alternate Form May Be Used.)

JUL 1991 REV 3

FACTS #: _____
LETTER #: _____

DEPARTMENT: _____

No.	Commitment Description	Due Date	Remarks (Note 1)
	REVISE REMAINING CALC DATA SHEETS TO REQUIRE VERSA CALC TO BE USED IN TEMP. MODE		

PREPARER: _____ DATE: _____

NOTE 1: Include information such as what commitment is contingent upon, why commitment is being made, or other information to assist Senior Management in the decision and sign-out approval process.