



Carolina Power & Light Company  
P.O. Box 10429  
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MAY 09 1996

SERIAL: BSEP 96-0188  
10 CFR 50.73

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

BRUNSWICK STEAM ELECTRIC PLANT UNITS 1 AND 2  
DOCKET NOS. 50-325/50-324 AND LICENSE NOS. DPR-71/DPR-62  
LICENSEE EVENT REPORT 1-96-05

Gentlemen:

In accordance with the Code of Federal Regulations, Title 10, Part 50.73, Carolina Power & Light Company submits the enclosed Licensee Event Report. This report fulfills the requirement for a written report within thirty (30) days of a reportable occurrence.

Please refer any questions regarding this submittal to Mr. M. A. Turkal at (910) 457-3066.

Sincerely,

W. Levis, Director-Site Operations  
Brunswick Nuclear Plant

SFT/sft

Enclosures

1. Licensee Event Report
2. Summary of Commitments

cc: Mr. S. D. Ebnetter, Regional Administrator, Region II  
Mr. D. C. Trimble, NRR Project Manager - Brunswick Units 1 and 2  
Mr. C. A. Patterson, Brunswick NRC Senior Resident Inspector  
The Honorable H. Wells, Chairman - North Carolina Utilities Commission

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## LICENSEE EVENT REPORT (LER)

(See reverse for required number of  
digits/characters for each block)ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION  
COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO  
THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING  
BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33),  
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)

Brunswick Steam Electric Plant, Unit 1

DOCKET NUMBER (2)

05000325

PAGE (3)

1 OF 4

TITLE (4)

Six of Eight Chlorine Sensors Used For Control Building Isolation Logic Were Found Inoperable

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
04	10	96	96	-- 05	-- 00	05	09	96	BSEP - Unit 2	05000324
									FACILITY NAME	DOCKET NUMBER
										05000
OPERATING MODE (9)		04	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
			20.2201(b)			20.2203(a)(2)(v)			<input checked="" type="checkbox"/> 50.73(a)(2)(i)	50.73(a)(2)(viii)
			20.2203(a)(1)			20.2203(a)(3)(i)			50.73(a)(2)(ii)	50.73(a)(2)(x)
POWER LEVEL (10)		100	20.2203(a)(2)(i)			20.2203(a)(3)(ii)			50.73(a)(2)(iii)	73.71
			20.2203(a)(2)(ii)			20.2203(a)(4)			50.73(a)(2)(iv)	OTHER
			20.2203(a)(2)(iii)			50.36(c)(1)			50.73(a)(2)(v)	Specify in Abstract below
			20.2203(a)(2)(iv)			50.36(c)(2)			50.73(a)(2)(vii)	or in NRC Form 366A

## LICENSEE CONTACT FOR THIS LER (12)

NAME

Steve Tabor, Regulatory Affairs

TELEPHONE NUMBER (Include Area Code)

(910) 457-2178

## 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
B	VI	DET	R369	Y					

## SUPPLEMENTAL REPORT EXPECTED (14)

YES  
(If yes, complete EXPECTED SUBMISSION DATE).

X NO

EXPECTED  
SUBMISSION  
DATE (15)

MONTH DAY YEAR

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

On April 10, 1996, with Units 1 and 2 operating at 100% power, during performance of the annual Chlorine Detection System Channel Calibration surveillance three of the four chlorine sensors installed at the Service Water System intake structure were found inoperable. Additionally, on April 11, 1996, during completion of the annual surveillance, three of the four chlorine sensors installed at the Control Building HVAC intake plenum were found inoperable. These sensors provide for chlorine gas leak detection and the chlorine isolation logic for the Unit 1 and Unit 2 Control Room ventilation systems. Investigation into the cause of this event determined that the sensors failed to meet response time requirements due to decreasing sensor sensitivity. An improperly implemented accelerated test plan and failure to recognize the significance of the need to adjust the sensitivity of all chlorine sensors on a more frequent than annual basis contributed to the test failure.

The failed sensors were replaced by April 11, 1996. Additional corrective actions include expansion of the test program to include the Service Water Intake structure chlorine detectors and review of the cause of this event with Engineering personnel.

This event is being reported in accordance with the requirements of 10 CFR 50.73 (a)(2)(i) in that the failure of the chlorine detectors constitutes a condition prohibited by the plant's Technical Specifications.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Brunswick Steam Electric Plant, Unit 1	05000325	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		96	-- 05 --	00	

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

TITLE

Six of Eight Chlorine Sensors Used For Control Building Isolation Logic Were Found Inoperable

INITIAL CONDITIONS

On April 10, 1996, both Units were operating at 100% power and a 55 ton railway chlorine tank car was on site to support the Circulating/Service Water intake structures routine chlorination requirements.

EVENT NARRATIVE

Eight chlorine sensors, four in the Control Building HVAC (CBHVAC) system intake plenum and four at the Service Water System intake structure provide chlorine leak detection and chlorine isolation logic for the Unit 1 and Unit 2 control room ventilation systems. On April 10 and 11, 1996, during performance of the annual Chlorine Detection System channel calibration surveillance, three of the four sensors in both locations were discovered outside the required response time of five seconds. Operations was notified of the failed surveillance requirements, and as required by the surveillance the eight system sensors were replaced and tested successfully.

Previously, on March 23, 1995, five of the eight chlorine sensors were discovered inoperable in their as-found condition during performance of the annual calibration surveillance procedure. This event is documented in LER 1-95-02. The root cause investigation of the March 23, 1995 condition determined that the four sensors in the CBHVAC system intake plenum failed to meet response time requirements due to dirt impingement on the sensor probes. The other failed detector was one of four installed at the Service Water Intake structure. These sensors are not subject to the air flow conditions seen by the CBHVAC intake plenum sensors. The failure of this detector resulted from calibration drift and was considered to be an isolated incident. No long term corrective action was prescribed for the sensors installed at the Service Water Intake structure.

As a result of the March 23, 1995 condition, a design change was implemented to protect the CBHVAC system intake plenum sensors from high velocity air flow. In addition, an accelerated test program was initiated to determine optimum detector life. The results of this testing determined that the sensors would be acceptable for a minimum of 3 months. In September of 1995, a decision was made to perform quarterly calibration testing of the CBHVAC system chlorine sensors.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Brunswick Steam Electric Plant, Unit 1	05000325	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 4
		96	-- 05 --	00	

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

The first scheduled quarterly calibration test was performed in October of 1995 for the CBHVAC system intake plenum chlorine sensors. The test procedure provided for the October test did not include sensor sensitivity adjustment instructions. The test results indicated that although sensor performance was within required tolerances, generally the sensor response times were increasing and the sensitivity of the sensors was decreasing. Based on the test results, the decision was made to include sensor sensitivity adjustment instructions in the next scheduled quarterly sensor test (January of 1996). The January test could not be performed as scheduled due to the unavailability of the test gas needed to perform the test and an extension request was submitted to allow deferral of the January test performance until the next scheduled test date. The extension request was approved and consequently, the next test was not performed until April 10 and 11, 1996.

This event is being reported in accordance with the requirements of 10 CFR 50.73 (a)(2)(i) in that the failure of the chlorine detectors constitutes a condition prohibited by the plant's Technical Specifications.

#### EVENT CAUSE

The six chlorine sensors failed to meet response time requirements due to decreased sensor sensitivity. The quarterly test program was established to assess the performance and maintain the reliability of the CBHVAC system intake plenum chlorine detectors. Personnel performance resulted in a failure to implement the quarterly test plan as designed. Inadequate pre-planning of the test activity resulted in the unavailability of the test gas and Engineering inappropriately approved the chlorine sensor test extension request. Consequently, the CBHVAC system intake plenum chlorine sensors were allowed to degrade to a condition that did not meet the sensor response time requirements.

When the quarterly test program was established, the Service Water intake structure sensors were not included in the plan based on past performance and due to the fact that these sensors are not installed in an environment as harsh as the CBHVAC system intake plenum. The significance of chlorine sensor sensitivity adjustment on a more frequent basis than annually was not recognized until the recent failures occurred.

#### CORRECTIVE ACTIONS

The eight chlorine sensors were replaced and tested satisfactorily by April 11, 1996.

Administrative action has been initiated to address the performance of the personnel responsible for the implementation of the chlorine sensor test program.

The Service Water intake structure chlorine sensors will be included in the chlorine sensor quarterly test program.

Engineers will review the root cause investigation for this event.

An assessment of the preventive maintenance extension request process will be performed and a corrective action plan developed as needed.



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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Brunswick Steam Electric Plant, Unit 1	05000325	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 4
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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

SAFETY ASSESSMENT

The safety significance of this event is minimal. During the worst case accident with complete failure of the Control Room ventilation isolation system, the maximum chlorine concentration in the Control Room should be no more than 10 ppm. The toxicity limit is 15 ppm for two minutes without physical incapacitation (i.e., severe coughing, eye burn, or severe skin irritation). At the time of the event, although three of the four sensors at the Service Water intake structure did not respond within 5 seconds, the sensors were determined to be adequate for ensuring that the system's safety function remained available.

The six sensor failures were detected and replaced during the routine surveillance and were not challenged by an actual chlorine event. Testing determined that the six sensors, while not in tolerance, would have responded, providing isolation capability during the type of catastrophic chlorine event that could threaten Control Room habitability.

Operator action required by the abnormal operating procedure for chlorine emergencies (AOP-34.0), upon the detection of an odor of chlorine in the control room, includes the direction for control room personnel to don emergency air breathing equipment.

PREVIOUS SIMILAR EVENTS

A previous similar event involving the failure of multiple chlorine detectors was reported in LER 1-95-02. The chlorine detector failures which were reported in that LER resulted primarily from dirt impingement on the sensors. This problem was corrected as a result of the corrective actions implemented in accordance with the LER. The recent failures resulted from not adjusting the sensor sensitivity on a more frequent basis and an improperly implemented chlorine sensor test program.

EIIS COMPONENT IDENTIFICATIONSystem/ComponentEIIS

Control Building Control Complex Environmental Control System

VI

Enclosure  
List of Regulatory Commitments

The following table identifies those actions committed to by Carolina Power & Light Company in this document. Any other actions discussed in the submittal represent intended or planned actions by Carolina Power & Light Company. They are described to the NRC for the NRC's information and are not regulatory commitments. Please notify the Manager-Regulatory Affairs at the Brunswick Nuclear Plant of any questions regarding this document or any associated regulatory commitments.

Commitment	Committed date or outage
Engineers will review the root cause investigation for this event.	6/14/96
The Service Water intake structure chlorine sensors will be included in the chlorine sensor quarterly test program.	6/21/96
An assessment of the preventive maintenance extension request process will be performed and a corrective action plan developed as needed.	12/15/96