CP&L

Carolina Power & Light Company
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OCT 18 1996

SERIAL: BSEP 96-0393
10 CFR 50.73

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

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NO. 50-325 AND 50-324/LICENSE NO. DPR-71 and DPR-62
LICENSEE EVENT REPORT 1-96-012

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. Mark 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

IE22

cc: Mr. S. D. Ebneter, 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

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

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.

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Brunswick Steam Electric Plant, Unit 1	05000325	1 OF 4

TITLE (4)

5 Of 8 Chlorine Detectors 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
09	19	96	96	-- 12 --	00	10	21	96	BSEP Unit 2	05000324
									FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	1
POWER LEVEL (10)	94

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

	20.2201(b)		20.2203(a)(2)(v)	X	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)
	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 or in NRC Form 366A
	20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Steve Tabor, Sr. Analyst, Regulatory Affairs	(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

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 September 19, 1996, with Units 1 and 2 operating at maximum power, during performance of the quarterly calibration test of the chlorine detection system one of the four chlorine sensors installed at the Service Water System intake structure and the four chlorine sensors installed at the Control Building HVAC intake plenum failed to alarm within response time requirements. These sensors provide for chlorine gas leak detection and the chlorine isolation logic for the Unit 1 and Unit 2 Control Room ventilation systems. Quarterly testing had been based on evaluation of data from 1995 which had incorrectly concluded that quarterly calibration would be sufficient to ensure system operability. The 1995 test results did not provide sufficient data or experience to predict the amount of degradation that could occur over a 6 month operational period.

The failed sensors were replaced and tested to verify proper operation. Additional corrective actions include quarterly replacement and calibration of the eight chlorine detectors. The safety significance of this event is minimal. During the worst case accident with complete failure of the Control Room ventilation isolation system, based on calculation the maximum chlorine concentration in the Control Room is less than 10.5 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, three of the four sensors located at the Service Water Intake structure were determined to be adequate for ensuring that the system's safety function remained available.

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.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
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TEXT *(If more space is required, use additional copies of NRC Form 366A)* (17)

TITLE

5 Of 8 Chlorine Detectors Inoperable

INITIAL CONDITIONS

On September 19, 1996, Units 1 and 2 were operating at 94% and 100% power respectively. 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 September 19, 1996, during performance of the quarterly calibration test of the chlorine detection system, one of the four chlorine sensors installed at the Service Water System intake structure and the four chlorine sensors installed at the CBHVAC intake plenum failed to alarm within response time requirements. Operations was notified of the failed surveillance requirements and the five failed 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, which installed detector wind shields, 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 test established a calibration check on each trip channel on a staggered basis to ensure operability of the system should any two detectors fail the calibration. This test plan was conducted from May through October 1995. Based upon test results, engineering determined that newly installed detectors would perform adequately during the period between quarterly calibration. A preventive maintenance route was established to perform calibration checks on the detectors quarterly. The decision was made to trend the quarterly test data for detector degradation and based on detector performance direct detector replacement.

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

The test scheduled for January of 1996 was not performed due to an inappropriate extension of the calibration test frequency. This test would have provided the first opportunity to verify operation at a 6 month detector service life. When the detectors were finally tested in April 1996, three of the four CBHVAC detectors and three of the four detectors at the Service Water System intake structure failed. This event is documented in LER 1-96-05. All eight detectors were replaced, calibrated, and the quarterly PM schedule was reestablished. In addition, the Service Water Intake sensors were included in the chlorine sensor quarterly test program.

The first quarterly test was performed in June of 1996. The response time of the eight detectors was found well within the required 5 second requirement. Engineering determined that the sensors did not require replacement due to increased sensitivity of the detectors during this testing. During the subsequent quarterly test conducted on September 19, 1996, the four CBHVAC and one of the four service water building sensors failed the calibration check.

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.

CAUSE OF EVENT

The chlorine detector test plan was not sufficient to ensure the operability of the chlorine detection system. The initial test plan conducted from May through October of 1995 was established on a staggered basis to ensure the operability of at least one subsystem of the chlorine detection system at any given time. Evaluation of the test results from the staggered testing concluded that the detectors could perform adequately and reliably for at least 96 days.

In October of 1995, engineering discontinued the staggered testing and established quarterly testing. In addition, the calibration plan conducted after October of 1995 was inappropriately changed to allow the detectors to be left in service for greater than 96 days based on the quarterly calibration checks. Engineering did not have sufficient data or experience with the detectors to support predicting the amount of degradation that could occur during a second three month period of operation.

CORRECTIVE ACTIONS

The five failed detectors were immediately replaced and satisfactorily tested. In addition, on October 3, 1996, the remaining three detectors were replaced and satisfactorily tested.

A quarterly detector replacement program has been established.

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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, based on calculation the maximum chlorine concentration in the Control Room is less than 10.5 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, three of the four sensors at the Service Water intake structure were adequate for ensuring that the system's safety function remained available.

The five sensor failures were detected and replaced during the routine surveillance and were not challenged by an actual chlorine event. Testing determined that although the five sensors would not have actuated within the required 5 seconds, four of the five sensors would have responded, providing isolation capability during the type of 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

Previous similar events involving the failure of multiple chlorine detectors were reported in LER 1-95-02 and 1-96-05.

EIIS COMPONENT IDENTIFICATION

System/Component	EIIS Code
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
NONE	