



Carolina Power & Light Company  
P.O. Box 10429  
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July 7, 2000

SERIAL NO: BSEP 00-0087

10 CFR 50.73

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

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2  
DOCKET NOS. 50-325 AND 50-324  
LICENSE NOS. DPR-71 AND DPR-62  
LICENSEE EVENT REPORT 1-2000-003-00

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. Warren J. Dorman,  
Manager - Regulatory Affairs, at (910) 457-2068.

Sincerely,

C. J. Gannon  
Plant General Manager  
Brunswick Steam Electric Plant

CRE/cre

Enclosure: Licensee Event Report

IE22

Document Control Desk  
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cc:

U. S. Nuclear Regulatory Commission  
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<b>NRC FORM 366</b> (6-98)	<b>U.S. NUCLEAR REGULATORY COMMISSION</b>	<b>APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001</b>  Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the 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. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.
<b>LICENSEE EVENT REPORT (LER)</b>  (See reverse for required number of digits/characters for each block)		

<b>FACILITY NAME (1)</b> Brunswick Steam Electric Plant (BSEP), Unit No. 1	<b>DOCKET NUMBER (2)</b> 05000325	<b>PAGE (3)</b> 1 OF 4
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**TITLE (4)**  
 Control Room Emergency Ventilation System Actuation During Chlorination System Breach

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NO.	REVISION	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
06	09	2000	2000	-- 003	-- 00	07	07	2000	BSEP Unit No. 2	05000324
									FACILITY NAME	DOCKET NUMBER

<b>OPERATING MODE (9)</b>	1	<b>THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)</b>								
		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)		
<b>POWER LEVEL (10)</b>	100	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)		X 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)**

<b>NAME</b> Charles R. Elberfeld, Senior Analyst - Regulatory Affairs	<b>TELEPHONE NUMBER (Include Area Code)</b> (910) 457-2136
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

<b>SUPPLEMENTAL REPORT EXPECTED (14)</b>				<b>EXPECTED SUBMISSION DATE (15)</b>			MONTH	DAY	YEAR
<b>YES</b> (If yes, complete EXPECTED SUBMISSION DATE).	<input type="checkbox"/>	<b>NO</b>	<input checked="" type="checkbox"/>						

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

On June 9, 2000, at 1651 hours, with both units operating at rated power, the Control Room Emergency Ventilation (CREV) system actuated and aligned to the chlorine protection mode of operation. At the time of the occurrence, maintenance personnel were performing work that involved breaching the chlorination system. The cause of the occurrence is attributed to a small amount of residual chlorine gas escaping from the chlorination system when the maintenance personnel were removing piping components. Although the chlorination system had been purged with nitrogen, small amounts of residual chlorine can remain in piping crevices and trapped in corrosion products. When the system was opened, this residual chlorine, in the form of gas, escaped and was sensed by the chlorine detectors.

Due to the required sensitivity of the chlorine detection instrumentation and the nature of maintenance activities, which require a system breach, additional measures to minimize the actuation of the CREV system in the chlorine protection mode are not considered to be practical or prudent. The actuations have minimal impact on the CREV system equipment reliability, and have minimal nuclear or industrial safety significance. This event is being reported in accordance with the requirements of 10 CFR 50.73(a)(2)(iv) as a condition that resulted in the automatic actuation of an engineered safety feature.

**LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Brunswick Steam Electric Plant (BSEP), Unit No. 1	05000325	2000	003	00	2 OF 4

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

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

INTRODUCTION

On June 9, 2000, scheduled maintenance on the chlorination system [KF] was in progress. During breaching of the chlorination system, a small amount of residual chlorine gas was released to the atmosphere and was detected by the Control Room Emergency Ventilation (CREV) [VI] system chlorine isolation instrumentation located in the chlorine tank car area. At 1651 hours, the CREV system isolated in the chlorine protection mode of operation. A four-hour non-emergency notification of the engineered safety feature (ESF) actuation was made to the NRC (Event Number 37076) at approximately 2021 hours, in accordance with 10 CFR 50.72(b)(2)(ii). At the time of the event, both BSEP Unit Nos. 1 and 2 were operating at 100 percent of rated thermal power. This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv) as a condition that resulted in the actuation of an ESF.

EVENT DESCRIPTION

On June 9, 2000, scheduled maintenance on the chlorination system was in progress, which included implementation of a modification to improve the piping configuration between the chlorination system and the chlorine tank car (i.e., chlorine source). The chlorine tank car was isolated and under clearance to support the maintenance activity. The downstream piping had been purged with nitrogen to displace the residual chlorine. At 1651 hours, control room personnel received annunciators indicating a high chlorine level in the chlorine loading area, and the CREV system isolated, as designed, in the chlorine protection mode of operation. Control room operators entered the appropriate Technical Specification Limiting Conditions for Operation and Technical Requirements Manual required actions/compensatory measures for the CREV system isolation, and referenced Abnormal Operating Procedure 0AOP-34.0, "Chlorine and Toxic Gas Emergencies." Reports from the field indicated that some residual chlorine was released to atmosphere when the maintenance personnel were disconnecting a pipefitting on the transfer line from the chlorine tank car to the chlorination system. Following the CREV system actuation, chlorine detection instrumentation in the area of the maintenance activities indicated little or no detectable chlorine gas concentration levels. At 1752 hours, the chlorine isolation instrumentation was reset, and by 1814 hours, the CREV system was restored to its normal configuration.

EVENT CAUSE

The cause of this occurrence is attributed to a small amount of residual chlorine gas escaping from the chlorination system when maintenance personnel were removing the piping components. The chlorine detection instrumentation setpoints are set to isolate the CREV system at a very low threshold. This threshold allows the chlorine detection instrumentation and the CREV system to meet the response time requirement for isolating the control room in the event of a chlorine tank car rupture with wind blowing in the direction of the CREV system intake. This threshold results in the instrumentation being extremely sensitive to very small concentrations of chlorine (i.e., one part per million) near the detectors.

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

Although the chlorination system had been purged with nitrogen, residual chlorine, in very small amounts, can remain in the chlorination system piping crevices and trapped in corrosion products. When the system is opened, this residual chlorine, in the form of gas, can escape and potentially be sensed by the chlorine detectors.

**CORRECTIVE ACTIONS**

Due to the required sensitivity of the chlorine detection instrumentation and the nature of maintenance activities, which require a system breach, additional measures to minimize the actuation of the CREV system in the chlorine protection mode are not considered to be practical or prudent. The actuations have minimal impact on the CREV system equipment reliability, and have minimal nuclear or industrial safety significance. However, some procedural controls are being enhanced to better communicate the chlorination system breach activities with control room personnel. The intent of these enhancements is to identify activities with a high likelihood of causing CREV system actuations and conduct those activities as pre-planned evolutions, which are not reportable under 10 CFR 50.72 or 10 CFR 50.73.

**SAFETY ASSESSMENT**

The nuclear and industrial safety significance of this occurrence is considered minimal. The design basis chlorine release is based on a complete rupture of a chlorine tank car containing 55 tons of chlorine. The quantity of chlorine gas released in this (i.e., the June 9, 2000) event is considered insignificant with respect to the bounding analysis. Additionally, the affected safety systems functioned as designed to ensure control room habitability. Prior to the initiation of the chlorination system maintenance activity, the chlorine tank car was isolated and the chlorination system purged; minimizing the amount of residual chlorine gas which could be inadvertently released. During the occurrence, the personnel followed prescribed industrial safety practices for breaching the chlorination system. The safety of the personnel involved with the activity was not jeopardized.

**PREVIOUS SIMILAR EVENTS**

LERs 1-99-007 and 1-00-002 documented events in which the CREV system automatically isolated due to the release of residual chlorine gas from the chlorination system during maintenance activities. The LER 1-99-007 event occurred during a chlorine tank car change-out, and the procedure for performing that activity was reviewed for potential enhancement. The corrective action associated with LER 1-99-007 could not be reasonably expected to have prevented the June 9, 2000 event. The LER 1-00-002 event occurred while venting chlorination system piping after a nitrogen pressure test. The wind unexpectedly changed direction during the venting and the CREV actuation occurred before the venting could be secured. Due to the nature of the event, no corrective actions to prevent recurrence were deemed to be appropriate.

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These LERs identified that residual chlorine, chlorine detection instrumentation sensitivity, and the outdoor weather conditions contribute to the probability of extremely small concentrations of chlorine being detected and causing the ESF actuations. Both LERs considered programmatic enhancements to reduce the probability of actuations under specific conditions. The programmatic enhancements established to date have not been effective in preventing actuations or alleviating the requirement to report the actuations.

**COMMITMENTS**

No commitments have been identified in this document. Actions discussed in this submittal represent intended or planned actions by Carolina Power & Light Company. They are described for the NRC's information and are not regulatory commitments. Please notify the Manager – Regulatory Affairs at BSEP of any questions regarding this document or any associated regulatory commitments.