NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Brunswick Steam Electric Plant Unit 1	0 5 0 0 0 3 2 5	1 OF 0 4

TITLE (4) Automatic Isolations of Units 1 and 2 Common Control Building Emergency Air Filtration Systems Due to Chlorine Leaks

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 NAMES	DOCKET NUMBER(S)
1 2	1 2	8 7	8 7	—	0 22	— 0 1	0 2	2 3	8 8	Brunswick Unit 2	0 5 0 0 0 3 2 4
											0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)					
POWER LEVEL (10)	1 0 0	20.402(b)	20.405(c)	X	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)		OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		
		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
	AREA CODE
M. J. Pastva Jr., Regulatory Compliance Specialist	9 1 9 4 5 7 - 2 3 1 6

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	
X	*	P C V	W 0 2 5	N		X	*	P C V	W 0 2 5	N	
X	*	P C V	W 0 2 5	N		X	*	**	W 0 2 5	N	

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 fifteen single-space typewritten lines) (16)

At 1959 hours on 12/12/87, 0515 hours on 12/26/87, and 2330 hours on 12/31/87, automatic isolation of the Units 1 and 2 common Control Building Emergency Air Filtration (CBEAF) System and common Control Building Heating, Ventilating, Air Conditioning (CB HVAC) System occurred due to chlorine leakage/alarm conditicns at the site Chlorination System (CS) chlorine loading area. The isolations were revealed through Control Room alarm annunciation and indication. Unit 1 was at 100% and Unit 2 was respectively at 73%, 56%, and 69%, while in a fuel depletion coast down approaching a unit refuel/maintenance outage in 1988. After each high chlorine alarm condition cleared, the CB HVAC and CBEAF Systems were returned to normal service. These events did not result in significant personnel hazard.

The 12/12/87 and 12/31/87 events respectively resulted from chlorine leakage past the flex seals of pressure regulating valves (PRVs) of the CS liquid evaporators' numbers 1 and 3 and the PRV of CS liquid evaporator number 2. In each case, the flex seals were replaced.

The 12/26/87 event resulted from chlorine leakage from an insufficiently tightened piping flange union where the CS chlorine tank car supply line is connected to the CS piping. The flange gasket was replaced and the subject flange union was properly tightened.

*EIIS System description unavailable.
**EIIS component description unavailable.

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Initial Conditions

Unit 1 was operating at 100% power. Unit 2, while in a fuel depletion coast down approaching a unit refueling/maintenance outage scheduled to begin in January 1988, was operating at the following power levels on the specified dates: December 12, 1987 (73%), December 26, 1987 (56%), and December 31, 1987 (69%). The units' common Control Building (EIIS/NA) Heating, Ventilating, Air Conditioning (CB HVAC) System (EIIS/VI) was aligned in the normal mode of operation and the units' common Control Building Emergency Air Filtration (CBEAF) System (EIIS/VI) was aligned in normal standby readiness. In addition, the chlorine storage tank car (EIIS/*/**) of the units' common Chlorination System (CS) (EIIS/*) was aligned for service to the CS.

DESCRIPTION OF EVENTS

Description of First Event

At approximately 1945 hours on December 12, 1987, the CS was removed from service in accordance with the system Operating Procedure (OP)-43.1 following a routine chlorination of the Circulating Water (CW) System (EIIS/KE).

At 1959 hours on December 12, 1987, the chlorine loading (storage) area high chlorine alarm annunciation (EIIS/*/ANN) was received, concurrent with automatic isolation of CB HVAC System and automatic isolation and starting logic lockout of the CBEAF System per design. At 2013 hours, the high chlorine alarm annunciation for the units' common Chlorination Building (EIIS/MH) was received in the Control Room.

A Radiological Waste Control (Radwaste) System (EIIS/WD) Auxiliary Operator (AO) was dispatched to the chlorine loading area and the Chlorination Building to investigate the cause of the subject chlorine alarms. The AO determined that the alarms resulted from chlorine leaks, as evidenced by an odor of chlorine within the immediate vicinity of the Chlorination Building. These findings were reported to the Control Room and by 2038 hours, the chlorine storage tank car was isolated. The chlorine alarms subsequently cleared and CB HVAC and CBEAF Systems were returned to their normal configurations.

Further troubleshooting and use of an ammonia sniffer revealed that the chlorine leaks originated from the pressure regulator valves (PRVs) (EIIS/*/PCV) of the CS numbers 1 and 3 liquid evaporators (EIIS/*/EVP), 2-CW-PRV-212 and 232. An investigation determined a higher than normal amount of chlorine had leaked from the flex seals of the valves and into their common vent line

*EIIS System code description not available.
**EIIS component description not available.

(EIIS/*/PSX). The investigation concluded that trace amounts of chlorine gas from the vent line had been detected by the chlorine detectors in the area of the Chlorination Building and the chlorine storage area, thereby resulting in the event.

Corrective Action To First Event

The flex seals of 2-CW-PRV-212 and 232, both Wallace and Tiernan, Part No. P-16903, were replaced and the valves were returned to service. The PRVs of the other CS liquid evaporators were checked for leakage from the valves' flex seals with none found. In addition, plans were then made to rebuild the flex seals in the PRVs of the remaining CS liquid evaporators by March 31, 1988.

Description of Second Event

Shortly before 0515 hours on December 26, 1987, the CS was operating with CS evaporator numbers 2, 4, and 5 in service. At 0515 hours, the chlorine loading (storage) area high chlorine alarm annunciation was received, concurrent with automatic isolation of the CB HVAC System and automatic isolation and starting logic lockout of the CBEAF System per design. Shortly thereafter, the subject chlorine alarm automatically reset and the CB HVAC and CBEAF Systems were returned to their normal configurations. An inspection of the chlorine loading area revealed a small chlorine leak at the piping flange union (EIIS/*/**) where the CS chlorine tank car liquid supply line is connected to the CS chlorine supply inlet piping. The chlorine tank car was manually isolated from the CS supply piping to terminate the leak.

Corrective Action To Second Event

Upon disassembly and inspection of the leaking pipe flange, it was noted that the flange bolts (EIIS/*/**) were insufficiently tightened. The flange gasket (EIIS/*/**) was found to have been compressed evenly around the flange tongue with some extrusion evident. The gasket had previously been installed on December 23, 1987, at which time two independent leak tests showed no evidence of chlorine leakage. The investigation concluded possible insufficient supporting of the piping downstream of the subject flange as a contributing factor to failure of the gasket.

The flange gasket, Wallace & Tiernan, Part No. T-12470, was replaced, the flange union was properly tightened, and the CS was realigned to the chlorine tank car. Maintenance personnel, including those involved with replacement of

*EIIS System code description not available.
**EIIS component description not available.

the gasket on December 23, 1987, were counseled on the importance of attention to detail and the recognition of unsatisfactory conditions during routine maintenance activities. As a result of this event, the involved procedure for replacement of the gasket, Maintenance Instruction (MI)-16-706, will be revised to provide more detailed instruction regarding tightening of these type flanges. In addition, an Engineering Work Request (EWR) has been initiated to evaluate the suitability of the current support structure for the piping immediate downstream of the subject piping flange. The anticipated date for completion of the involved procedure revision is April 30, 1988.

Description of Third Event

At 2330 hours on December 31, 1987, during removal of the CS from service, the chlorine loading area and Chlorination Building high chlorine alarm annunciations were received, concurrent with automatic isolation of the CB HVAC System and automatic isolation and starting of the CBEAF System per design. The Radwaste AO, who was removing the CS from service at the time of this event, detected an odor of chlorine within the immediate vicinity of the Chlorination Building and closed the chlorine tank car supply manual isolation valve. Troubleshooting of this problem revealed evidence of chlorine leakage at the PRV of number 2 CS liquid evaporator, 2-CW-PRV-222.

By approximately 0005 hours on January 1, 1988, the chlorine alarms cleared and the CB HVAC and CBEAF Systems were returned to their normal configuration.

An inspection showed the valve flex tube seal was leaking from the seal diaphragm tower due to failure of the seal split gland. The investigation determined that trace amounts of chlorine gas had entered the common vent line of the other CS liquid evaporators' PRVs and were detected by the chlorine detectors in the area of the Chlorination Building and the chlorine storage area, thereby resulting in the event.

Corrective Action To Third Event

2-CW-PRV-222 was replaced and the CS was returned to service.

Events Assessment

These events did not pose a significant personnel hazard and the consequences of their occurrence under other reasonable and credible circumstances would not have been more severe.

A prior similar event involving a Chlorination System leak was reported in LER 1-87-013.

CP&L
Carolina Power & Light Company

Brunswick Steam Electric Plant
P. O. Box 10429
Southport, NC 28461-0429
February 23, 1988

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BRUNSWICK STEAM ELECTRIC PLANT UNIT 1
DOCKET NO. 50-325
LICENSE NO. DPR-71
SUPPLEMENT TO LICENSEE EVENT REPORT 1-87-022

Gentlemen:

In accordance with Title 10 to the Code of Federal Regulations, the enclosed Supplemental Licensee Event Report is submitted. The original report fulfilled the requirement for a written report within thirty (30) days of a reportable occurrence and was submitted in accordance with the format set forth in NUREG-1022, September 1983.

Very truly yours,

C. R. Dietz, General Manager
Brunswick Steam Electric Plant

MJP/mcg

Enclosure

cc: Dr. J. N. Grace
Mr. E. D. Sylvester
BSEP NRC Resident Office

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