NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3160-0104
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 5

TITLE (4) SBGT Inoperability While Sipping Irradiated Fuel due to Inlet Valves not Being in the Full Open Position

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 4	8 8	8 8	0 3 2	0 1	0 4	2 8	8 9	BSEP Unit 2	0 5 0 0 0 3 2 4
										0 5 0 0 0

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
5	0 1 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	X 50.73(a)(2)(vii)	X OTHER (Specify in Abstract below and in Text, NRC Form 366A) 10CFR21
		20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	X 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
Tony Harris, Regulatory Compliance Specialist	9 1 9 4 5 7 - 2 0 3 8

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 fifteen single-space typewritten lines) (16)

Unit 1 was in a scheduled refuel outage. On 12/14/88, the Unit 1 SBGT A and B train maintenance inlet valves were identified by the resident NRC inspector as being only 5-10% open. This condition had existed since 12/11/88, during which time irradiated fuel in the spent fuel pool had been moved for the purpose of fuel sipping, a condition that required SBGT to be operable.

Event investigation revealed that the root cause of this event was a design deficiency in the valve indication logic at the RTGB and at the SBGTs which allowed one of the two valves for which the logic light controls to be in the intermediate position and the light to show the valves' position as open. Another design condition that compounded the consequences of the event was that Unit 1 SBGT maintenance isolation valves do not receive an auto open signal upon auto initiation of the SBGT, which differs from the Unit 2 design. Also contributing significantly to the event was a series of personnel errors that failed several barriers which were in place to prevent these valves from being left in the closed or partially open position.

The safety significance of this event was compounded by the failure of the Reactor Building isolation dampers during this same time period (see LER 1-88-034). An assessment of anticipated releases from a fuel bundle drop accident during sipping activities revealed that anticipated releases would be within the accident guideline values of 10CFR100.

This event has been determined to be reportable per 10CFR21.

IE22

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

Event

SBGT inoperability while sipping irradiated fuel due to inlet valves not being in the full open position.

Initial Conditions

Unit 1 was in day 34 of a scheduled 70 day refuel outage. Cancellation of clearance 1-1890, which closed the inlet valves for the Standby Gas Treatment System (EIIS/BH) Trains A and B and limiting condition of operation (LCO) A1-88-2211 for secondary containment (EIIS/JM), was completed on 12/11/88 at 1351. These valves had been closed to allow scheduled testing on the SBGT ventilation ducting (EIIS/BH/DUCT). Irradiated fuel sipping began on 12/11/88 at 1535 and was completed on 12/14/88 at 1000 per the refuel floor HP logbook.

Event Description

On 12/14/88 at 1058, Unit 1 SBGTs A and B maintenance inlet valves (EIIS/BH/ISV) 1C-BFV-RB and 1G-BFV-RB were identified by the resident NRC inspector as being only 5-10% open. This was confirmed by the Unit 1 Reactor Building Auxiliary Operator. The Shift Foreman was notified, and the valves were then opened using the local switches at the SBGTs. The valves operated as expected. LCOs A1-88-2261 and A1-88-2262 were initiated to determine the reason for the valves being closed. On 12/15/88 at 0126 LCOs A1-88-2261 and A1-88-2262 were cancelled by completing PT-15.6 for SBGT operability and OP-10, SBGT standby lineup section.

Event Investigation

The initial focus of the event investigation was determining why these valves were in the partial open configuration. On 12/5/88 at 0125 clearance 1-1890 was approved to be hung for the performance of Periodic Test (PT)-15.1.3, SBGT System Helium Leak Detection Test. Clearance 1-1890 was then added to existing LCO A1-88-2211 on secondary containment inoperability in order to concurrently track SBGT inoperability. The SBGTs and secondary containment were not required during this time period due to plant conditions. The PT lineup sheet requires that the inlet valves to the SBGT be closed, while the discharge valves remain open for performance of the test. Upon satisfactory completion of this PT, clearance 1-1890 was approved for cancellation at 0230 on 12/11/88 while performing the restoration lineup for PT-15.1.3. Due to independent verification requirements associated with the restoration lineup, 2 Auxiliary Operators were instructed to remove the clearance. The duty Control Operator (CO) gave no special instructions to the AOs performing the clearance removal.

Inlet valves 1C-BFV-RB and 1G-BFV-RB were manually taken off their seats (the valves had been manually torqued shut) and left throttled by the AOs per the requirements of the restoration lineup sheet for PT-15.1.3. There were no

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

other responsibilities or cautions detailed on the lineup restoration sheet. While removing clearance 1-1890, one of the AOs explained to the other AO verifying the restoration that the AOs were to release the hand torque on the inlet valves and the CO would open the inlet valves from the Control Room. The AOs completed pulling the clearance and returned to the Control Room. Before the AOs returned to the Control Room, the CO opened the SBGT Reactor Building suction valve 1D-BFV-RO. The CO did not open the 1C and 1G inlet valves in the Control Room because he knew from training that these valves must be opened locally using the SBGT switches. There was no further communication between the AOs and the CO verifying that these valves were open. The AOs verified position indication for the inlet valves at the RTGB. The CO verified valve positions for 1B-BFV-RB, 1C-BFV-RB, 1E-BFV-RB, and 1G-BFV-RB at the RTGB. Clearance 1-1890 and PT-15.1.3 restoration lineup paperwork were signed off satisfactorily. Based upon the extent of the work activities on the SBGT System, as well as the control provided by the clearance and PT-15.1.3 restoration lineup, the outage Senior Reactor Operator (SRO) and the COs for the unit decided that a standby lineup would not be required. Secondary containment LCO A1-88-2211 was cancelled on 12/11/88 at 1351. At this time, it was believed by the Operations staff that the SBGT valve lineup was correct. The inlet valves to both trains, however, were only 5% to 10% open. Irradiated fuel sipping was conducted in the Unit 1 spent fuel pool from 12/11/88 at 1535 until 12/14/88 at 1000. This activity requires that both SBGTs and secondary containment be operable per technical specifications.

A review of the position indication logic for the Unit 1 SBGT A and B suction and discharge valves showed that the indication for the inlet and outlet maintenance isolation valves for each train have a common indicator at the local SBGT panel and in the Control Room on the RTGB. The indication is such that if one valve limit switch is open (setpoint is > 96% open) and the other valve is intermediate (setpoint is > 4% open) the indication is open. Actual indication for each valve must be determined by either local valve position indication or at the motor control center (MCC) for each valve. There is a caution statement in the standby lineup section of OP-10 referencing this design condition. The lineup restoration sheet of PT-15.1.3 gives no indication of this condition nor does it reference performing lineup verification per OP-10.

It is noted that the Unit 1 SBGT system logic differs from the Unit 2 logic. The Unit 2 SBGT maintenance isolation valves receive an auto open signal on an auto initiation signal, and the Unit 1 valves do not. Because of this lack of an auto open signal, the SBGT System would not have operated upon receipt of an auto start signal. This unit logic difference is covered in the License Training Program.

Event Cause

The root cause of this event was a design deficiency in the valve indication logic at the reactor/turbine generation board (RTGB) and at the SBGTs. The logic was part of the original design package for the maintenance isolation valves supplied by United Engineers and Constructors (UE&C). The lack of an auto open signal to the SBGT maintenance isolation valves upon receipt of an auto initiation signal is a design condition that compounded the consequences of the event. Also contributing significantly to the event was personnel error in that several barriers in place to prevent these valves from being left in the closed or partially open position failed.

The significant personnel errors leading to the barrier failures contributing to this event are:

1. Lack of communication between the CO and the AOs performing the restoration lineup as to which of the individuals would perform the opening of the inlet isolation valves.

2. Failure of the Control Operator to question how the valves had been opened.

3. Failure of Operations personnel for 3 days to identify the intermediate indications existing at the valves' MCC compartments.

Additionally, the procedure lineup restoration for PT-15.1.3 was inadequate in that it did not provide either a caution statement about the isolation valve logic or refer the operator to performing a standby lineup per the guidance of OP-10 for the restoration of the system. The procedure was also deficient in that it was not clear as to which operator (AO or CO) was responsible to open the inlet valves once the AO had removed the hand torque from the valves.

Corrective Actions

Plant modifications have been completed which provide an accurate indication on the RTGB and the local control panel for the inlet and outlet valves. That modification provides for an open (red) indication when both valves are open, a closed (green) indication when both valves are closed and no indication when either valve is in the intermediate position. As a result of these modifications, procedural changes to Periodic Test (PT)-15.1.3, Standby Gas Treatment System Helium Leak Detection Test, on the suction piping of the SBGT System, are not considered necessary.

To assist operations and plant personnel in identifying potential problems of this nature, SBGT breaker compartments as well as other selected site load breakers have been labeled to reflect the normal expected position of that compartment. With these labels, it is easier to identify a component being out of its expected position at the MCC.

The plant General Manager conducted a briefing for each of the Operations shifts concerning this violation. Each briefing lasted 30 to 45 minutes and typically included the Shift Operating Supervisor, the Shift Foremen, the Senior Control Operators, Control Operators, the Auxiliary Operators and other shift support personnel. The briefing included discussions on: 1) a review of this event, 2) that plant performance is directly dependent on plant personnel, 3) the need to take the time to do the job right, 4) plant professionalism and self discipline to high personal standards, 5) the need to always question indications/activities in the field which do not appear correct, and 6) properly communicating and operating by doing what you say-saying what to do. In addition, a training session was provided during the first quarter of real-time training on the proper methodology of conducting plant tours.

A review of the RTGB for other indications which may not be reflective of the actual condition/position was performed by Operations personnel. Correction of those indications has been assigned to the engineering section. Until those corrections are completed, a periodic independent local verification has been established to assure positive control is maintained by the Operations staff. The Technical Support Unit is reviewing the list of indications on the RTGB developed by Operations. The schedule for corrective actions is expected to be completed by June 1, 1989. In addition, the fuel sipping procedure will be revised to require verification of SBGT operation prior to the next use of that procedure. This is expected to be the Unit 2 refueling outage scheduled for September 9, 1989.

The Training Department has included this event in its lesson plan for secondary containment.

Event Assessment

The only credible event relative to the activities being performed at the time of the SBGT inoperability (fuel sipping) would have been a fuel bundle drop accident in the spent fuel pool. CP&L performed an assessment of this accident. The assessment assumed a release of radioactivity to the environment based on SBGT inoperability and the failure of the secondary containment isolation dampers to close (see related LER 1-88-034). The assessment concluded that the whole body dose at the site boundary from such a release would be 0.3 millirem, and the Site Boundary Thyroid Dose would be 1776 millirem. These exposures are within the guideline values of 10CFR100.

Because of the administrative controls in place, this problem would have been identified prior to refueling of the reactor, and thus there would be no other reasonable and credible alternative conditions requiring assessment.

CP&L
Carolina Power & Light Company

Brunswick Steam Electric Plant
P. O. Box 10429
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April 28, 1989

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

BRUNSWICK STEAM ELECTRIC PLANT UNIT 1
DOCKET NO. 50-325
LICENSE NO. DPR-71
SUPPLEMENT TO LICENSEE EVENT REPORT 1-88-032

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,

J. L. Harness, General Manager
Brunswick Steam Electric Plant

TH/ah

Enclosure

cc: Mr. S. D. Ebneter
Mr. E. G. Tourigny
BSEP NRC Resident Office

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