NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Peach Bottom Atomic Power Station Units 2 & 3	0 5 0 0 0 2 7 7	1 OF 0 5

TITLE (4)
Unit 2 Reactor Scram resulting from a generator lockout condition & subsequent turbine trip Failure of the 2A Reactor Feedpump turbine to trip on demand during recovery activities.

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)
										0 5 0 0 0
1 1	0 9	9 7	9 7	0 0 9	0 0	1 2	0 9	9 7	Peach Bottom	0 5 0 0 0 2 7 8

OPERATING MODE (9): 1

POWER LEVEL (10): 1 0 0

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

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)	X 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)
George Lengyel	7 1 7 4 5 6 - 7 0 1 4

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)

On November 9, 1997, with unit 2 at 100 percent power, a generator lockout and subsequent turbine trip occurred that resulted in a reactor scram. The generator lockout resulted from problems caused during activities that swapped the 2AD003 battery charger from charger #1 to charger #2 when an equipment operator failed to appropriately follow procedure. No safety consequences occurred as a result of the scram and all safety systems were available. Corrective actions for the personnel error/procedure non-compliance were taken by the Senior Manager of Operations and reinforced with operations shift personnel. Additionally, during post-scram recovery activities, the 2A reactor feedpump turbine (RFPT) failed to trip on demand from the control room and at the local trip station. The condition that prevented the 2A RFPT to trip is believed to have existed during power operations prior to the scram and is therefore a condition prohibited by Technical Specifications (TS) 3.3.2.2, "Feedwater and Main Turbine High Water Level Trip Instrumentation". Corrective actions for the RFPT included repair, reinstallation and testing of the trip device, and an on-going analysis of failure mechanism, maintenance practices and the preventive maintenance program to prevent recurrence.

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Requirements of the Report

This LER is being submitted pursuant to 10CFR50.73 (a)(2)(iv) due to an Engineered Safety Feature (ESF) actuation and 10 CFR 50.73 (a)(2)(i)(B) due to a condition prohibited by Technical Specifications.

Unit Conditions at Time of Discovery

Unit 2 was in the "RUN" mode at 100 percent of thermal reactor (EIIS:EA) power. Unit 3 was in the "RUN" mode with power increasing from 80 percent following the unit 3 eleventh refueling outage. There were no systems, structures or components that were inoperable that contributed to the event. At the time the 2A RFPT failed to trip, unit 2 was at zero percent power with the mode switch in "SHUTDOWN".

Description of the Event

On November 9, 1997, with unit 2 at 100 percent power, operations personnel swapped the A reactor protection system (RPS) (EIIS:JC) to the alternate power source and received the 2A battery trouble charger alarm. An equipment operator (EO) (non-licensed) was dispatched to investigate the alarm. The EO reported that a fan failure light on the 2AD003 battery charger (EIIS:BYC) was lit, although the fans inside the charger appeared to operate properly. The EO's attempts to reset the fan failure alarm were unsuccessful and per the alarm response card, the EO was directed to place the 2AD003 standby battery charger in service in accordance with SO 57B.1.A-2, "125/250 Volt Station Battery Charger Startup".

During performance of the SO, the EO did not wait the prescribed period of time for charger output voltage to ramp up to the normal operating voltage level prior to closing the DC output breaker (EIIS:BKR). When the EO closed the output breaker, the voltage was still below the normal 125 VDC level and a momentary loss of power was sensed by the generator protection relay panel and the generator field and auxiliary panel (EIIS:PL). When the DC power interruption occurred, two relays (EIIS:RLY) were aligned to the 125 VDC bus and when the charger voltage recovered to the normal 125 VDC level, both relays picked up starting a relay race. This relay race picked up a normally open contact on the generator lockout relay and when the lockout relay operated, a transfer trip signal was sent to trip the generator, resulting in a reactor scram on November 9, 1997 at approximately 1525 hours.

During the transient and reactor scram, all safety systems functioned as designed. A group II, III primary containment isolation system (PCIS) isolation occurred as expected and all systems functioned as designed.

Corrective Actions

After the scram occurred, the appropriate PCIS and RPS scram logics were reset and the affected systems were rest to the appropriate configuration.

The equipment operator was counseled on the correct use of level I procedures by the Senior Manager of Operations. In addition, information regarding this event was disseminated to operations shift personnel including reinforcement of the expectation for use of procedures, including level I in accordance with A-C-79, Procedure Adherence and Use.

The RFPT trip device was repaired, reinstalled and tested to prove operability. A root cause evaluation is on-going to determine the cause of the damaged parts and to determine appropriate changes to maintenance practices or programs including testing.

The generic implications of a similar failure on the other five RFPTs has been evaluated and determined to be unlikely. A review of past equipment performance indicates the other turbine trip devices have been very reliable. The other unit 2 RFPTs were successfully tripped after the reactor scram on November 9, 1997. The unit 3 RFPTs were successfully tripped during the recent forced outage on November 28, 1997. This provides reasonable assurance that a similar deficient condition does not exist on these RFPTs.

Previous Similar Events

There were no previous events identified where swapping battery chargers resulted in a reactor scram. The 2A RFPT failure-to-trip event is a repeat failure and is being evaluated accordingly.

During the scram recovery phase the 2A RFPT (EIIS:TRB) failed to trip from the control room and at the local trip station. The 2A RFPT was successfully tripped following manual agitation of the mechanical trip device. Also, during scram recovery, other equipment problems were noted that required additional operator actions. These problems and additional operator actions were discussed in a post-scram debrief and evaluated in the licensee's corrective action process.

Cause of the Event

The cause of the reactor scram was a turbine trip resulting from a generator lockout signal. The generator lockout signal resulted from relay actuation (generator lockout relay) following momentary loss and recovery of power on the 125 VDC system from swapping the 2AD003 battery charger from charger #1 to charger #2.

The swapping of battery chargers is a task that has been performed in the past and as recently as the previous day (November 8, 1997) without incident. During the battery swapping activity on November 9, the EO read the steps of the SO and then placed the procedure aside. A caution statement in the procedure indicates that the operator must wait 15 to 20 seconds for the charger to ramp up in voltage before closing the DC output switch to prevent blowing fuses. Although the EO performed the procedure steps in the required order from memory, the EO failed to wait the prescribed 15 to 20 seconds for voltage to ramp up. By closing the DC output switch early, the EO set up a logic sequence that resulted in the turbine trip and reactor scram.

The SO procedure in use at the time was a level I procedure and required to be in hand and followed step by step during task performance. By placing the procedure aside, the EO relied on memory to perform the five steps involved with swapping the battery chargers rather than referring to each step as performed.

The cause of the 2A RFPT failure-to-trip was determined to be intermittent binding of the manual trip rod spring cup against the trip device housing caused by deformation of the cup. Inspections also revealed a bent manual trip rod and slight misalignment between the trip lever and trip rod connection points. The 2A RFPT failure-to-trip is similar to a previous occurrence where the same RFPT failed to trip on April 1, 1997. In that previous event, mechanical agitation of the trip mechanism by personnel was also required to trip the turbine.

Investigation of the April event revealed dirt and oil film buildup in the trip dump valve (EIIS:V). This condition was noted to be consistent with a failure mode described by the

equipment manufacturer and other industry operating experience. At that point, station staff and management believed the apparent cause had been determined and the equipment was reassembled and tested prior to returning to service. Exercise of the equipment and post-maintenance testing indicated that the trip function was restored and operable. When the turbine failed to trip in November, the trip mechanism was fully disassembled to determine the reason for failure.

Although the root cause evaluation is still in progress, preliminary information indicates that the spring cup deformation has existed in the trip device for some time and was most likely the cause of the April failure-to-trip event. It appears that the trip device displayed an intermittent failure tendency that at some point in time between April and the November event could have prevented the RFPT from tripping during power operations. According to TS 3.3.2.2, the failure of the high water level trip function at operations greater than 25 percent power requires a two hour action to restore the trip function, or a four action to reduce unit power below 25 percent. This condition would have prevented the RFPT from tripping via the manual trip lever or from a signal to the trip dump valve. The RFPT would have tripped on an overspeed condition.

Analysis of Event

No actual safety consequences occurred as a result of this event. During the transient and reactor scram all systems performed as designed. However, during the scram recovery phase, other equipment problems were noted that required additional operator actions. These problems and additional operator actions were discussed in a post-scram debrief and evaluated in the plant's corrective action program. Battery charger voltages were noted to recover to normal following the event.

The rapid shutdown of all RFPTs following a scram is part of normal scram recovery actions to prevent overfeeding of the reactor vessel and possible main steam line flooding. During power operations, the high water level trip is designed to prevent cladding damage due to injection of colder feedwater. Since the 2A RFPT failed to trip on demand after the scram, no safety consequences occurred. However, the failure of an RFPT to trip at plant operation greater than 25 percent power is a condition prohibited by TS. Had the RFPT failed to trip on demand from the control room at plant operation greater than 25 percent power, operator action would have been taken to trip the RFPT locally. Had the RFPT failed to trip locally, the operator would have mechanically agitated the trip device to successfully trip the turbine.