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SEP 3 0 2002

L-2002-186
10 CFR § 50.73

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

Re: Turkey Point Unit 3
Docket No. 50-250
Reportable Event: 2002-002-00
Date of Event: August 2, 2002
Operation with One Component Cooling Water Pump in Excess of Technical Specification Allowable Limits

The attached Licensee Event Report 250/2002-002-00 is being submitted pursuant to the requirements of 10 CFR § 50.73(a)(2)(i)(B).

If there are any questions, please call Stavroula Mihalakea at (305) 246-6454.

Very truly yours,

John P. McElwain
Vice President
Turkey Point Nuclear Plant

SM

Attachment

cc: Regional Administrator, USNRC, Region II
Senior Resident Inspector, USNRC, Turkey Point Nuclear Plant

IE22

NRC FORM 366 (7-2001) U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004
LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)	Estimated burden per response to comply with this mandatory information collection request 50 hours Reported lessons learned are incorporated into the licensing process and fed back to industry Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U S Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503 If a means used to impose 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

1. FACILITY NAME	2. DOCKET NUMBER	3 PAGE
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4. TITLE
Operation with One Component Cooling Water Pump in Excess of Technical Specification Limit

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8 OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
08	02	2002	2002 -	02 -	00	10	01	02	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE	1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)							
10. POWER LEVEL	100		20.2201(b)		20 2203(a)(3)(ii)		50 73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)
			20 2201(d)		20 2203(a)(4)		50 73(a)(2)(iii)		50.73(a)(2)(x)
			20 2203(a)(1)		50.36(c)(1)(i)(A)		50 73(a)(2)(iv)(A)		73 71(a)(4)
			20 2203(a)(2)(i)		50.36(c)(1)(ii)(A)		50 73(a)(2)(v)(A)		73 71(a)(5)
			20 2203(a)(2)(ii)		50.36(c)(2)		50.73(a)(2)(v)(B)		OTHER Specify in Abstract below or in NRC Form 366A
			20 2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)		
			20 2203(a)(2)(iv)		50.73(a)(2)(i)(A)		50.73(a)(2)(v)(D)		
			20 2203(a)(2)(v)	x	50.73(a)(2)(i)(B)		50.73(a)(2)(vii)		
			20 2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(viii)(A)		
			20 2203(a)(3)(i)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)		

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Stavroula Mihalakea – Licensing Engineer	(305) 246-6454

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
D	EA	52	G080	N					

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	x	NO				

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

On 8/02/02, Turkey Point Unit 3 was operating at 100% power. At 8:28, the 3A Component Cooling Water (CCW) pump [CC:P] was declared out of service to allow Electrical Maintenance to replace its 4.16 kV [EA:52] breaker with a refurbished breaker. Operations entered Technical Specifications (TS) 3.7.2, Action b., which allows operation for 72 hours with one CCW pump operable or two CCW pumps operable but not from independent power supplies. After breaker replacement, Operations started the 3A CCW pump, declared it operable at 12:45 and exited the TS action statement. On 8/04/02, the 3A CCW pump was stopped as part of periodic Inservice testing. On 8/06/02 at 3:25, Operations attempted to start the 3A CCW pump, but the refurbished breaker failed to close due to an improper breaker/cubicle interface setup and the vibrational shock of the first breaker closing action. As such, there was no operable 3A train CCW pump available from 8/02/02 at 8:28 until 8/06/02 at 12:43 (i.e., 100 hours and 15 minutes), when the 3C CCW swing pump was aligned to the 3A train. The Unit 3 CCW system did not comply with TS 3.7.2, Action b., and is reported herein under 10CFR50.73 (a)(2)(i)(B). The cause for this event was lack of specific procedural guidance in breaker/cubicle interface. Corrective actions include revising procedures/work instructions to add detailed checks of the breaker/cubicle interfaces and training Maintenance and Operations personnel.

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

Event Description and Sequence of Occurrences

On August 2, 2002, Turkey Point Unit 3 was operating at 100% reactor power. Electrical Maintenance was scheduled to install a refurbished 4.16 kV breaker [EA: 52] into position 3AA12 for the 3A Component Cooling Water (CCW) pump [CC: P], swapping it with the existing breaker, which was scheduled for vendor refurbishment. At 8:28, Operations declared the 3A CCW pump out of service and entered Technical Specifications (TS) 3.7.2, Action b. which allows plant operation for 72 hours with only one CCW pump operable or with two CCW pumps operable but not from independent power supplies. Electrical Maintenance installed a recently refurbished General Electric (GE) Magne-Blast breaker [EA: 52]. After installation, Operations started the 3A CCW pump successfully and at 12:45 declared it operable and exited TS 3.7.2, Action b.

The CCW system design is such that the 3A CCW pump is normally powered from the 3A 4.16 kV Bus, the 3B CCW pump is normally powered from the 3B 4.16 kV Bus, and the 3C CCW pump is normally powered from the 3D 4.16 kV Bus, which is a "swing" bus between the 3A and 3B 4.16 kV Buses, normally aligned to the 3B 4.16 kV bus. Each pump is 100% redundant, with only one pump required to support normal, off-normal and accident conditions. Therefore, in this case, with the 3A CCW pump declared inoperable for breaker maintenance, the 3B CCW pump was operating and the 3C CCW pump was available from the same 3B 4.16 kV bus.

On August 4, 2002 the 3A CCW pump was stopped as part of periodic Inservice testing. On August 6, 2002, at 3:25, Operations attempted to restart the 3A CCW pump, but it failed to start. The refurbished breaker for the 3A CCW pump did not close during this second attempted start after having been installed. The 3A CCW pump was subsequently declared inoperable and Operations entered TS 3.7.2, Action b., and realigned the 3D 4.16 kV Bus (from which the 3C CCW pump is powered) from the 3B 4.16 kV Bus to the 3A 4.16 kV Bus. At 12:43, Operations racked down the 3A CCW pump breaker, at which time the 3C CCW pump configuration supported TS requirements. This action is explained as follows. The 3A CCW pump is powered from the 3A 4.16 kV Bus. The 3B CCW pump is powered from the 3B 4.16 kV Bus. The breaker control logic for the 3C CCW pump motor depends on the source of power to the 3D 4.16 kV Bus. If the 3A or 3B CCW pump is inoperable, its breaker must be open and racked down and the 3D 4.16 kV Bus aligned to the associated Bus in order for the 3C CCW pump to be declared operable. This ensures that the 3C CCW pump sees the same Bus stripping and load sequencing signals as the inoperable pump it replaces. The 3C CCW pump became available from an independent power source (3A train) only when Operations aligned the 3D Bus to the 3A Bus (3A train), and the 3A CCW pump breaker 3AA12 was racked down. The 3B CCW pump remained operable during the event. The plant conditions were stable, and there were no safety systems actuated throughout the duration of this event.

The specific functional failure was a failure of the 3A train 4.16 kV system to provide power to a safeguards load (3A CCW pump) during normal and accident conditions. There was no operable CCW pump supplied by the 3A train from August 2, 2002 at 8:28 until August 6, 2002 at 12:43, i.e., for 100 hours and 15 minutes. Therefore, the Unit 3 CCW system did not comply with TS 3.7.2, Action b. Accordingly, this event is reported herein under 10CFR50.73(a)(2)(i)(B), due to operation with a condition prohibited by plant TSs.

Event Analysis

The failure of the 3A CCW pump to start on demand was due to the failure of the 3AA12, 4.16 kV breaker to close on demand. Troubleshooting was performed on August 6, 2002, at the 3AA12 cubicle in the 'as found' condition with the breaker racked in. It was found that the 52/IS [EA: 52,29] switch contacts 3-4 on the breaker were not made up (not closed), as expected in the fully racked up position. The 52/IS switch contacts 3-4 are part of the Positive Interlock System and are in the breaker closing circuit. These contacts are used as interlock and are required to be closed to allow an electrical signal to close the breaker. Therefore, the breaker could not be closed electrically.

On a typical GE Magne-Blast breaker, the Positive Interlock system prevents the breaker from being closed either mechanically or electrically, when the breaker is not in the fully racked up or racked down position. This is accomplished by a cam plate that acts on the Positive Interlock Roller (PIR) during the racking evolution. When the breaker is fully racked up with a correct breaker/cubicle interface, the PIR is positioned in the center in the upper V-notch of the operating cam plate and there is no interaction between them.

The incorrect breaker/cubicle interface of the 3AA12-breaker installation resulted in the PIR being in contact with the V-notch, such that the cam plate was interacting with the PIR without moving the mechanism to the actuated position. During the closing evolution, in addition to closing the main contacts, mechanical energy is transferred from the closing springs to the opening (tripping) spring and a ratcheting motion/vibration occurs on the breaker structure when the charging motor recharges the closing springs. The shock that occurs during the first closing evolution and the associated mechanical forces applied to the breaker may 're-align' the breaker to cubicle interface to a small degree. It was this shock that caused the 3AA12 cam plate to move the PIR enough to open the 52/IS contacts. Experience has shown that marginal clearance (parts touching with no air gap) of the PIR to the cam plate may not allow a refurbished breaker to close on the second attempt due to the slight shock of the first breaker closure realigning the breaker/cubicle interface.

The cause of the event is attributed to a failure to correct a marginal breaker/cubicle interface, which prevented the breaker from closing on demand after the first closure. The 3AA12 cubicle elevator upper limit switch was set slightly too high. When the refurbished breaker was racked up, the PIR interacted with the upper side of the V-notch in the operator cam plate. This resulted in the cam plate applying pressure on the PIR but not enough to affect its alignment. Upon the shock associated with the first breaker closure, the cam plate caused sufficient movement of the PIR lever to cause the 52/IS (3-4) contacts to change state (from closed to open). Once the 52/IS contacts (3-4) opened, the breaker could not be 're-closed'.

The original breaker was compared to the refurbished breaker, which failed to operate. It was determined that the original breaker had less play in the shaft and the switches required more travel to operate. The original breaker would therefore be less sensitive to pressure being applied to the PIR by the cam plate as a result of the breaker resting too high in the cubicle. The original breaker was re-installed in the 3AA12 position, as an immediate corrective action, and the cubicle interfaces were reworked. The breaker cubicle interface checks ensured that there was acceptable engagement and the PIR roller was verified to be free to rotate, not touching the cam plate.

The Design Basis requires that: 1) these switchgear shall be capable of providing power to safeguards loads during normal operation, a loss of off site power, a safety injection signal, or a loss of offsite power concurrent with a safety injection signal, and, 2) these switchgear shall be capable, following a loss of offsite power, of being powered by an emergency diesel generator following load shedding from the bus. This requires that a closed breaker have the capability to be tripped open (stripped from the bus) in response to a Loss of Offsite Power (LOOP). The degraded 3AA12 breaker/cubicle interface only affected the electrically operated closing capabilities of the 3AA12 breaker and subsequent spring charging after opening. The concern identified has no effect on the ability of a closed breaker to open (trip). The Updated Final Safety Analysis Report (UFSAR) describes the associated switchgear and breakers along with their functions. The Technical Specifications provide the required equipment for plant operation and appropriate required actions, should the equipment not be operable. There is reasonable assurance that all other required breakers have demonstrated their operability in past breaker operations. Therefore, the safety functions of the remaining plant breakers as described in the UFSAR are not affected.

Root Cause and Contributing factors

The Root Cause Analysis identified the lack of specific procedural guidance as the prime reason why this event occurred. The Maintenance work instruction did not provide sufficient direction to ensure proper breaker to cubicle interfaces. Specifically, it did not have quantitative detail to ensure that the PIR should be free from touching the cam plate. The following have been determined as contributing factors:

- Failure to incorporate Vendor technical information and Service Advisory Letter (SAL) information into plant procedures.
- Corrective Actions from the previous event discussed below were ineffective in preventing recurrence, in that sufficient dimensional detail was not provided in the Maintenance work descriptions for quantitative dimensional set up of the breaker/cubicles interface.
- Inadequate Post Maintenance Testing (PMT) for determining operability for more than two (2) breaker cycles for each specific 4.16kV breaker.
- Lack of specific Operations training and procedures to perform adequate visual observation of key breaker/cubicle interface points.

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Repeat Events

A review has indicated that a similar event associated with breaker 3AB09 (3B Load Center feeder breaker) occurred at Turkey Point in March of 2000. In both cases, the events involved the installation of refurbished breakers. The 3AB09 breaker closed one time and failed to close a second time during subsequent safeguards testing. Corrective actions included a qualitative check of the PIR position in the work description. This corrective action was not sufficiently detailed to be effective.

Generic Implications

Due to the nature of this event, the original degraded 3AA12 cubicle interface cannot be assumed to be an isolated event. The concerns raised in the root cause evaluation are applicable to A and B 4.16 kV Busses on both Turkey Point Units 3 and 4. This concern is not applicable to the C or D busses on either Unit, as those busses are of a different manufacturer and do not have the same breaker/cubicle interface design. There is reasonable assurance that the breakers that have been closed multiple times (at a minimum three times) will continue to operate correctly, even if the cubicle interfaces are degraded as experienced in 3AA12 cubicle (i.e. previous closing action has not adversely affected the 52/IS contacts).

The current data base for the 3A, 3B, 4A, 4B bus 4.16 kV GE Magne-Blast breaker refurbishment has been reviewed. All breakers that are required to close during a Design Basis Event were reviewed to ensure that the installed breaker had been closed at least three times. This potentially degraded breaker interface only affects electrically operated closing capabilities of the breaker and subsequent spring charging after opening. The concern identified has no effect on the ability of a closed breaker to open (trip). Therefore there is no current generic operability concern associated with this event.

Corrective Actions

1. The original breaker was re-installed and the 3AA12 breaker/cubicle interfaces were reworked. The critical interface characteristics: upper elevator limit switch adjustment, breaker positioning, and PIR position were verified to be acceptable. Post Maintenance Testing (PMT) verified closure of the breaker three times with the breaker in the fully racked up position. This breaker is considered to be operable.

2. A training brief has been issued to Electrical Maintenance and to Operations personnel to ensure awareness of this event and corresponding procedural changes.

3. Operations has revised the procedure for racking up or down a General Electric breaker to include the visual inspections of the specific breaker/cubicle interfaces, specifically including verification that there is an air gap between the PIR and the cam plate and that the PIR is free to rotate.

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4. The standard work description for installing a refurbished breaker in the Turkey Point Unit 3 and 4, A or B 4.16 kV Busses has been extensively revised to provide specific details and checks of critical dimensions (specifically checking that the PIR has an air gap between it and the cam plate).

5. Maintenance procedures will be revised to incorporate vendor manual and Service Advisory Letter recommendations with respect to critical dimensional requirements for setting up proper breaker to cubicle interfaces.

6. A training requirement will be developed on the subject of breaker-to-cubicle interface checks in the form of Job Performance Measure (JPM) for Electrical Maintenance personnel.

Additional Information

EIIS Codes are shown in the format [EIIS SYSTEM: IEEE component function identifier, second component function identifier (if appropriate)].