FPL

10 CFR § 50.73
L-2005-196
September 19, 2005

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

Re: Turkey Point Unit 4
Docket No. 50-251
Reportable Event: 2005-004-00
Date of Event: July 20, 2005
Foreign Material Causes Inoperability of One Emergency Containment Cooler

The attached Licensee Event Report 50-251/2005-004-00 is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(ii)(B).

If there are any questions, please call Mr. Walter Parker at (305) 246-6632.

Very truly yours,

Terry Jones

Terry O. Jones
Vice President
Turkey Point Nuclear Plant

Attachment

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

IE22

NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory 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 and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@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 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.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Turkey Point Unit 4	05000251	1 OF 5

4. TITLE

Foreign Material Causes Inoperability of One Emergency Containment Cooler

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER 05000
07	20	2005	2005	- 004 -	00	09	19	2005	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE: 1

10. POWER LEVEL: 100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☒ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Paul F. Czaya – Licensing Engineer	305-246-7150

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

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

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

On July 20, 2005, Unit 4 4C Emergency Containment Cooler (ECC) fan failed to start during a scheduled monthly surveillance test. The 4C ECC fan tripped due to thermal overload during two start attempts. Inspection during a subsequent containment entry revealed a rubber shoe cover with evidence of having been lodged between the fan stationary vanes and rotating blades. The rubber shoe cover was removed and further inspection and test operation showed no resulting damage. Three ECCs are provided in each reactor containment building to remove decay heat during a maximum hypothetical accident. The most likely cause of the rubber shoe cover entering the 4C ECC outlet ductwork is human error during the recent refueling outage which concluded on June 13, 2005. It is postulated that an individual failed to pay adequate attention when ascending or descending erected scaffolding above the 4C ECC and to report the loss of the rubber shoe cover. The containment closeout inspection procedure will be revised to require inspection inside such components as the ECCs that have outlet areas with a potential for foreign material intrusion. In addition, enhancements to procedure 0-ADM-730, Foreign Material Exclusion Controls, will be evaluated. Since no actual event occurred which relied on the ECCs to perform their safety function and the remaining two ECCs were operable, the health and safety of the public and plant personnel were not affected.

DESCRIPTION OF THE EVENT

The Unit 4 4C Emergency Containment Cooler (ECC) [BK] failed its monthly surveillance test on July 20, 2005. As a result, the 4C ECC was declared inoperable and Unit 4 entered Technical Specification 3.6.2.2, Action a, requiring repair within 72 hours.

The 4C ECC fan [BK, FAN] tripped due to thermal overload during two surveillance test start attempts. During troubleshooting, three additional instrumented start attempts were made with the third attempt showing normal start and run indications. Inspection during a subsequent containment entry revealed a rubber shoe cover with evidence of having been lodged between the fan stationary vanes and rotating blades. The rubber shoe cover was removed and further inspection found no resulting damage. Upon completion of the inspection, the 4C ECC fan was started with no evidence of damage, vibration or unusual noise.

This event was determined to be reportable in accordance with 10 CFR 50.73(a)(2)(ii)(B).

At the time of the failure of the 4C ECC fan to start, Unit 4 was operating in Mode 1 at 100% power.

BACKGROUND

The Emergency Containment Cooling System consists of three fan cooling units each consisting of a motor [MO], fan, bare tube cooling coil [CCL], instrumentation and controls. The units are located above the refueling floor inside containment [NH] between the containment wall and the secondary compartment shield walls. The location of the cooling units provides individual isolation and prevents recirculation between units.

Following a loss-of-coolant accident, the safety injection signal will automatically energize motor circuits to start the dedicated Train B and C ECC fans. The third swing ECC fan (Train A) is only capable of being manually started, which can be initiated in accordance with emergency operating procedures to ensure that two ECC units are available post-accident. Analysis allows manual start of the 4A ECC within 24 hours of the initiation of the event if 4B or 4C ECC does not automatically start, as designed. The ECC units are not normally in service during reactor operation.

During emergency operation the air-steam mixture is forced upward through the coil and discharged into the upper regions of containment. The fan is mounted above the coil. Condensate will drain via the floor drain [DRN] system to the containment sump.

To preclude foreign material intrusion, foreign material exclusion (FME) covers were used during the recent refueling outage. FME covers were installed over the ECCs during the majority of the outage. However, the FME covers were removed near the end of the outage for required surveillance activities providing a window of opportunity for foreign material intrusion. It is likely that the rubber shoe cover entered the 4C

ECC between the time the FME cover was removed and the final containment closeout inspection was completed.

CAUSE OF THE EVENT

The most likely cause of the rubber shoe cover entering the 4C ECC outlet ductwork is human error during the recent refueling outage which concluded on June 13, 2005. It is postulated that an individual failed to pay adequate attention when ascending or descending erected scaffolding above the 4C ECC and to report the loss of the rubber shoe cover. There is no direct evidence as to who lost the rubber shoe cover or when the loss occurred.

ANALYSIS OF THE EVENT

Investigation identified that the FME covers were removed near the end of the outage in support of required safeguards testing. As a result, any of the activities occurring above the 4C ECC could have resulted in an individual losing a rubber shoe cover. No record or account of a missing rubber shoe cover was found. Two surveillance tests of the Unit 4 ECCs were completed satisfactorily on June 1, 2005 (Mode 5 while exiting from the outage) and June 20, 2005 (Mode 1, 100% power). These tests indicate that the rubber shoe cover was likely resting atop the fan motor and fell into the 4C ECC stationary vanes and rotating fan blade assembly sometime after the last surveillance test on June 20, 2005.

To ensure proper identification of foreign material intrusion points and increase FME effectiveness, possible foreign material intrusion points should have been identified in pre-job tailboards prior to any work in the area. The FME Area classification and boundary should have been clearly defined and expressed to all individuals working in the area. The FME Area classification was not clearly defined for the jobs being performed. Clear guidelines/expectations of planning, individual accountability, proactive peer checking practices and identifying foreign material intrusion points would have been the primary barrier to prevent the foreign material intrusion event directly above the 4C ECC outlet opening.

Containment closeout procedures were reviewed to determine why the procedures were not effective barriers. The current containment closeout procedure 0-SMM-051.3, Containment Closeout Inspection, is focused mainly on potential FME hazards relative to the containment recirculation sump screen area. Four sections of the procedure pertain to tie-down details for scaffold material storage, drum storage, and general tie-down instructions in the area of the ECCs. However, none of these sections specified inspection of the inside of the open vents of the ECCs. The purpose of the containment closeout procedure is to ensure a proper closeout inspection of containment prior to establishing containment integrity.

Visual inspections of affected areas within containment when containment integrity is established are required following each containment entry. Visual inspections are performed in accordance with 0-ADM-009, Containment Entries When Containment Integrity Is Established. This procedure provides instructions, steps and data necessary to ensure that no loose debris or foreign materials are present in containment which

could be transported to the containment recirculation sumps and cause restriction of the residual heat removal pump [BP, P] suctions during LOCA conditions. Reviews found no procedural guidelines or plant documents that require inspection directly into the ECC outlets or other components/system openings.

The FME program procedure 0-ADM-730 was reviewed to determine why it was not effective in preventing the intrusion of foreign material into the 4C ECC outlet area. The purpose of the FME program is to outline the requirements for maintaining the cleanliness of open systems and components by preventing the uncontrolled introduction of foreign materials, such as grease, oil, maintenance residue, dirt, debris, tools, etc. This procedure also establishes guidelines, work practices, the use of barrier devices, inspection requirements, and recovery from loss of integrity relevant to the control of foreign materials.

In general, any component/system that has an opening that allows for foreign material intrusion can potentially be impacted if:

- Methods to accurately track and trend FME physical barrier usage do not exist.
- FME physical barriers are not strategically placed or effectively designed or used.
- Appropriate actions are not taken when foreign material intrusion events occur.
- FME Area evaluation criteria are inadequate.
- There is inconsistent FME awareness amongst plant personnel.

Reportability

A review of the reporting requirements of 10 CFR 50.72 and 10 CFR 50.73 and NRC guidance provided in NUREG-1022, Revision 2, Event Reporting Guidelines 10 CFR 50.72 and 10 CFR 50.73, was performed for the subject condition. As a result of this review, the condition is reportable as described below.

Technical Specification (TS) Limiting Condition for Operation 3.6.2.2 states that three ECC units shall be operable in Modes 1, 2, 3, and 4. During monthly surveillance on July 20, 2005, 4C ECC fan tripped twice on thermal overload. The 4C ECC was declared inoperable and Unit 4 entered a 72 hour shutdown action (TS 3.6.2.2, Action a).

ECCs are normally in standby. TS Surveillance Requirement 4.6.2.2.a requires each ECC to be demonstrated operable at least once per 31 days by starting each cooler unit from the control room [NA]. Operability could not be demonstrated at the time of the surveillance. During the time the rubber shoe cover was lodged in the fan blades, the fan could not perform its safety related design function. The 4C ECC would not have been able to start.

The previous surveillance test was conducted successfully on June 20, 2005. The shoe cover could have fallen onto the stationary blades from atop the fan motor at any time between June 20 and July 20, 2005. Since the shoe cover could have fallen soon after the previous surveillance, the condition preventing the start of the 4C ECC would have been existent for greater than 72 hours. Therefore, TS 3.6.2.2, Action a was exceeded. This is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by the TSs.

ANALYSIS OF SAFETY SIGNIFICANCE

One ECC and one train of containment spray are required for short-term accident mitigation. To ensure long-term containment post-accident conditions can be reduced to within applicable electrical equipment qualification bases, two ECCs and one train of containment spray are required. Two of the three ECCs (4B and 4C) start on a safety injection signal. The third unit (4A) can be manually started following a maximum hypothetical accident. Analysis allows manual start of the 4A ECC within 24 hours of the initiation of the event if 4B or 4C ECC does not automatically start, as designed.

With the inability of the 4C ECC to start with the rubber shoe cover wedged between the rotating blades and stationary vanes, two operable ECCs remained to accomplish the safety function. In addition, if the 4C ECC unit was needed and did not initially start, it might have started after a number of start attempts as it did during troubleshooting.

Since two operable ECCs were available to perform the safety function, the health and safety of the public and plant personnel were not affected.

CORRECTIVE ACTIONS

1. Procedure 0-SMM-051.3, Containment Closeout Inspection, will be revised to require inspection inside such components as the ECCs that have outlet areas that have a potential for foreign material intrusion. The procedural change will specifically identify components that may be prone to non-obvious foreign material intrusion events.

2. Enhancements to procedure 0-ADM-730, Foreign Material Exclusion Controls, will be evaluated.

ADDITIONAL INFORMATION

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

FAILED COMPONENTS IDENTIFIED: None

SIMILAR EVENTS: None