



FPL

JUN 3 0 2005

10 CFR § 50.73
L-2005-134

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

Re: Turkey Point Unit 3
Docket No. 50-250
Reportable Event: 2004-007-01
Date of Event: December 28, 2004
Revised LER 2004-007 for Manual Reactor Trip Due to Generator Exciter Turbine
Cooling Water Leak

The attached Licensee Event Report 250/2004-007-01 is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(iv)(A) and 10 CFR 50.73(a)(2)(iv)(B)(6) to provide notification of the subject event. This LER submission contains supplemental information and supersedes the prior submission dated February 25, 2005 (Florida Power and Light letter L-2005-049). Changes are indicated with a revision bar.

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

Very truly yours,

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

LICENSEE EVENT REPORT (LER)

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.

1. FACILITY NAME Turkey Point Unit 3	2. DOCKET NUMBER 05000250	3. PAGE 1 OF 5
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4. TITLE
Manual Reactor Trip Due to Main Generator Exciter Turbine Cooling Water Leak

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
12	28	2004	2004	- 007 -	01	06	30	2005	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 70	☐ 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 Stavroula Mihalakea – Licensing Engineer	TELEPHONE NUMBER (Include Area Code) 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
B	TL	EXC							

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 December 28, 2004 at 22:46 Turkey Point Unit 3 reactor was manually tripped from 70% power following a fast load reduction from 100%. The load reduction was initiated when it was recognized that the Turbine Plant Cooling Water (TPCW) leakage exceeded the makeup capability to the TPCW surge tank. The reactor trip was initiated following the discovery of water in the Turkey Point Unit 3 Main Generator exciter housing. The apparent cause of the exciter TPCW air cooler leak was found to be a failed gasket at the joint between the cooler channel head and the air cooler assembly. The root cause of the cooler failure is determined to be poor workmanship on the part of the refurbishment vendor along with inadequate technical guidance to the supplier for the repairs. Immediate corrective actions included the identification and repair of the TPCW leak source and drying of electrical components. Although parts of the 3B 4160 Volt safety related switchgear enclosure at the lower elevation were wetted due to water intrusion through the conduit penetrations in the overhead, the bus remained energized throughout the event. All plant parameters remained within the design envelope for this type of transient. All plant safety systems functioned as designed and there were no adverse effects on the operating crew's ability to safely shutdown the reactor and stabilize the plant. The health and safety of the public was not challenged nor adversely affected by this event.

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

DESCRIPTION OF THE EVENT

On December 28, 2004, Turkey Point Unit 3 was operating at 100% power. At 22:17, the operating crew received a Turbine Plant Cooling Water (TPCW) [KB] Annunciator I 5/5, "TPCW Surge Tank Hi/Lo level," alerting them to a low level in the TPCW surge tank [KB:SPP:TK]. At 22:20, Annunciator E8/3 "Generator Field Brush Contact Fail/Ground" was actuated. The crew entered the Off-Normal Operating Procedure 3-ONOP-008 "TPCW Malfunction" and established makeup to the TPCW surge tank. The TPCW surge tank level continued to decrease, indicating that the leakage was beyond the automatic makeup capability. While the operating crew was investigating the source of the TPCW leak, they estimated that approximately 90 gpm makeup water was being supplied to the TPCW system to maintain the surge tank level. The control room dispatched the Field Supervisor to investigate the leak. At 22:35, the operating crew entered the 0-ONOP-100, "Fast Load Reduction," to perform a reduction in load. The Field Supervisor reported a major water leak had occurred within the Unit 3 Main Generator exciter housing. At 22:46, the Turkey Point Unit 3 reactor was manually tripped from 70% power. At 22:50, the Field Supervisor isolated the TPCW water supply to the Unit 3 Main Generator exciter air cooler piping [TL:EXC:CLR]. Residual water from the exciter housing entered through conduit floor seals onto 3B 4160 Volt (3B 4kV) safety related switchgear enclosure [EB], located directly beneath the exciter housing. Engineering performed a walkdown on 12/29/04 at approximately 0145 hours to investigate, evaluate and address issues related to the water intrusion into 3B 4kV switchgear room. Subsequently, it was concluded that the 3B 4kV switchgear remained operable throughout the event and did not experience any AC grounds.

With the manual reactor trip, the operating crew entered 3-EOP-E-0, "Reactor Trip or Safety Injection", and verified that the reactor and turbine were tripped and safety injection was not required. All control rods inserted fully. Auxiliary Feedwater actuated automatically as expected and operated normally following the reactor trip. The operation of Turkey Point Unit 4 was unaffected by this event.

BACKGROUND

The exciter assembly is cooled by a closed air system and water cooled heat exchanger. The heat exchanger is a shell and tube type with spiral fins around tubes. There are four coolers (A-D) on the top of the exciter assembly components. Cooling water is supplied by the TPCW system to the exciter air coolers and makes multiple passes as it flows through the tubes of the heat exchanger. The air within the exciter is a closed system with a fan forcing air circulation through the coolers inside the exciter housing.

ANALYSIS OF THE EVENT

Subsequent to the reactor trip, the TPCW piping inside the exciter was inspected. Inspections of the inlet and exciter air cooler reversing chambers revealed evidence of a failed gasket on the top south air cooler (Cooler C) reversing chamber. Detailed inspections of the C Cooler found a notable gap between the sealing surface of the reversing chamber and the cooler tube sheet. The force applied on the rubber gasket led to the extrusion of the gasket material resulting in the TPCW leak.

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All Unit 3 exciter air cooler inlet and reversing chamber gaskets were replaced with suitable gaskets. Unit 4 exciter air coolers were not examined for similar deficiencies at the time of the event due to restricted access during operation. These were examined during the Unit 4 refueling outage in spring of 2005 and similar gasket deficiencies were found and corrected.

The electrical components in the exciter housing were inspected and there was no visual evidence of damage by arcing. A visual examination of the exciter skid was conducted. The inspection revealed standing water in the bottom of the exciter housing. There was evidence of a flow path for water from the gaps in the penetration seals around conduit penetrating the bottom of the exciter housing. This was the apparent leak path for water to enter the Unit 3B 4kV switchgear room.

Water from the exciter housing was forced past sealed conduits into the 3B 4kV switchgear room. Although, the conduits are sealed with fire/moisture barriers, these conduits are located in the positive pressure section of the exciter. There are zones of positive and negative pressure inside the exciter housing caused by forced air circulation. The positive pressure allowed some quantity of water to pass through the conduit seals and drip down onto the 3B 4kV switchgear enclosure. The existing seals [SEAL] in the exciter minimized the water intrusion. Some shrinkage of the seals was noted due to age degradation. The conduits penetrate into the ceiling of the 3B 4kV switchgear room above breaker cubicles 3AB13, 14, and 15. Most of the water was accumulated in the walkway areas. Some water was visible on the top of the enclosure between breakers 3AB08 through 3AB16 and in some associated relay cases.

Operations conservatively secured the following operating loads that were associated with breakers 3AB08 through 3AB16: 3B Component Cooling Water Pump [CC:P], the 3B Intake Cooling Water Pump [BS:P], the 3B Turbine Cooling Water Pump [KB:P], and the 3B1 Circulating Water Pump. Additionally, the 3B Residual Heat Removal (RHR) Pump [BP:P] was declared out of service due to the RHR pump motor overload and pump trip alarm that were received as a result of water in associated alarm relays mounted within the front part of the switchgear enclosure.

Investigation determined that there were no AC grounds or shorts caused by the water other than the annunciator alarms. The 3B RHR pump was not in operation at the time of the event and its motor supply breaker remained open throughout the event. Based on the inspection results of the cubicle and breaker followed by the successful start and stop of the 3B RHR pump, it was determined that the 3B RHR pump was not adversely affected by the water from the exciter TPCW water leak. The 3B RHR pump was subsequently placed back in service.

The 3B 4kV switchgear remained energized throughout the event. Testing and evaluation of the alarms received for the 3B 4kV switchgear determined that it was only the alarm contacts and relays that were affected by the water and causes of the alarm indications did not prevent the 3B 4kV switchgear from performing its design safety functions. The switchgear room was dried within the first few hours following the event. The annunciators cleared following the isolation of the TPCW leak and the drying of the switchgear alarm relays.

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CAUSE OF THE EVENT

The root cause of the Unit 3 exciter cooler failure was determined to be poor workmanship on the part of the refurbishment vendor along with inadequate technical guidance to the supplier prior to performing repairs.

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.

10CFR50.73(a)(2)(iv)(A) states that the licensee shall report any event or condition that resulted in a manual or automatic actuation of any of the systems listed in 10CFR50.73(a)(2)(iv)(B). This event is reportable in accordance with 10 CFR 50.73(a)(iv)(B)(1), actuation of the Reactor Protection System (RPS) since Unit 3 was manually tripped in response to TPCW air cooler leak in the exciter housing. The event is also reportable in accordance with 10 CFR 50.73 (a)(2)(iv)(A), due to AFW system actuation (10 CFR 50.73(a)(2)(iv)(B)(6)). In addition, in accordance with 10CFR 50.72(b)(2)(iv)(B), a report was made to the NRC for the manual reactor trip and 10CFR 50.72(b)(3)(iv)(A) for valid AFW system actuation on December 28, 2004, at 23:51 hours, recorded as event number: 41298.

ANALYSIS OF SAFETY SIGNIFICANCE

For this manual reactor trip, the initial conditions were well within the assumed conditions for the postulated Loss of External Electrical Load event analyzed in the Updated Final Safety Analysis Report (UFSAR). The plant was operating at 70% power with automatic Reactor Coolant System (RCS) [AB] pressure control. A 70% loss of load resulted when the turbine was tripped by the manual reactor trip. The nuclear power, pressurizer pressure, pressurizer water volume, RCS average temperature, RCS inlet temperature, and the steam generator pressure trends for this trip compared conservatively to the trends provided in the UFSAR. All plant parameters remained within the design envelope for this type of transient. There were no safety systems out of service prior to the event. There were no Risk Significant components out of service prior to the event. All plant systems functioned as designed and there were no adverse effects on the operating crew's ability to safely shutdown the reactor and stabilize the plant. The UFSAR minimum and maximum values were not exceeded during this event. No unexplained aspects of this transient were noted when compared to the UFSAR. The integrity of the core was maintained by the reactor protection system and the health and safety of the public was not compromised.

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CORRECTIVE ACTIONS

1. The affected Unit 3 Main Generator exciter equipment was disassembled, dried out, reassembled and successfully tested. The conduit seals in the Unit 3 Main Generator exciter housing were repaired.
2. The Unit 4 Main Generator exciter air cooler gaskets were inspected during the Unit 4 spring 2005 Refueling outage and replaced with the correct gaskets.
3. The conduit seals in the Unit 4 Main Generator exciter housing were inspected and repaired.
4. The "Repair/Warranty by Vendor" technique sheet was revised to require vendors to provide a repair plan for FPL approval prior to performing any repairs on the equipment.
5. A process will be developed and implemented to administratively control critical repaired items, which ensures that vendors perform the correct scope of work and validates the quality of repairs prior to placing repaired items in service.

ADDITIONAL INFORMATION

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

SIMILAR EVENTS

A data base search for the past 3 years found no similar events.