



L-2016-134  
10 CFR § 50.73  
June 30, 2016

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D. C. 20555-0001

Re: Turkey Point Unit 4  
Docket No. 50-251  
Reportable Event: 2016-001-00  
Date of Event: May 3, 2016  
Technical Specification Action Not Taken for Unrecognized Inoperable Reactor  
Protection Instrument Channel

The attached Licensee Event Report 05000251/2016-001-00 is submitted pursuant to 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by the Technical Specifications, and 10 CFR 50.73(a)(2)(v)(A) as a condition that could have prevented the fulfillment of a specified safety function.

If there are any questions, please call Mr. Mitchell Guth at 305-246-6698.

Sincerely,

A handwritten signature in black ink, appearing to read 'T. Summers', with a long horizontal line extending to the right.

Thomas Summers  
Vice President  
Turkey Point Nuclear Plant

Attachment

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

IE22  
NRR



**LICENSEE EVENT REPORT (LER)**

(See Page 2 for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@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 4

**2. DOCKET NUMBER**

05000251

**3. PAGE**

1 OF 5

**4. TITLE**

Technical Specification Action Not Taken for Unrecognized Inoperable Reactor Protection Instrument Channel

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
5	3	2016	2016	- 001	- 00	6	30	2016		05000
										05000

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)			
1	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
10. POWER LEVEL  100% RTP	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(i)
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(ii)
	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> OTHER	Specify in Abstract below or in NRC Form 366A	

**12. LICENSEE CONTACT FOR THIS LER**

LICENSEE CONTACT	TELEPHONE NUMBER (Include Area Code)
Paul F. Czaya	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

<b>14. SUPPLEMENTAL REPORT EXPECTED</b> <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	<b>15. EXPECTED SUBMISSION DATE</b>	MONTH	DAY	YEAR

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

On May 3, 2016 Engineering personnel identified the potential past inoperability of Reactor Protection System Overtemperature Delta T and Overpressure Delta T Channel III. Corrected coefficients were input to a Loop C resistance temperature detector (RTD) and resulted in a significant change to the setpoint. Evaluation confirmed that the Channel III setpoint had exceeded the Technical Specification (TS) allowable value and was inoperable for approximately five days. Because the inoperable condition was not recognized at the time, the TS required actions were not taken. During the five-day period, an additional channel was inoperable and not tripped during test/adjustment activities for a cumulative period of approximately four hours. This resulted in a loss of the specified safety function during the four-hour period. The root cause is the absence of a controlled engineering document describing the derivation of RTD coefficient data. Corrective actions: 1) Revise the RTD replacement procedure to require validation of the correct methodology for deriving RTD coefficients, and 2) Establish a controlled calculation that contains the basis and methodology for deriving RTD coefficients.

NRC FORM 366A  
(11-2015)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104

EXPIRES: 10/31/2018



## LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Turkey Point Unit 4	05000-251	2016	- 001	- 00

### NARRATIVE

#### DESCRIPTION OF THE EVENT

On May 3, 2016 with Unit 4 in Mode 1 at approximately 100% rated thermal power, Engineering personnel identified the potential past inoperability of Reactor Protection System Overtemperature Delta T (OTDT) and Overpressure Delta T (OPDT) Channel III [JC, CHA]. Corrected coefficients were entered into the Eagle 21 Process Protection Upgrade System for a spare Loop C resistance temperature detector (RTD) [AB, TE] that resulted in a significant change to the setpoint. The correct coefficients were input by instrumentation and control (I&C) personnel on May 2, 2016. Evaluation confirmed that the Channel III setpoint had exceeded the Technical Specification (TS) allowable value as specified in TS 2.2.1, Table 2.2-1, Functional Units (FU) 5 and 6, and was inoperable when required for approximately five days. Incorrect Eagle 21 RTD coefficients were entered for the spare RTD on April 20, 2016 during the Unit 4 refueling/maintenance outage. Unit 4 entered Mode 2 and the mode of applicability of TS 3.3.1, Table 3.3-1 for FU 5 and 6 on April 27, 2016 at approximately 2020 hours. Because the inoperable condition was not recognized at the time, TS Required Action to place the channel in the tripped condition within six hours was not taken. This is a condition prohibited by the TSs and reportable in accordance with 10 CFR 50.73(a)(2)(i)(B).

In addition, during the five day period that OTDT and OPDT Channel III was inoperable another of the three channels was inoperable at times during test/adjustment activities for a cumulative period of approximately four hours. With two channels inoperable, the specified safety function was not met because two operable or operating channels are required to achieve the safety function. This aspect is reportable in accordance with 10 CFR 50.73(a)(2)(v)(A) because of the impact on the reactor trip function to shut down the reactor.

#### CAUSES OF THE EVENT

The root cause is the absence of a controlled engineering document describing the derivation of RTD coefficient data.

A contributing cause is not implementing the temporary design change process when the Eagle 21 Redundant Sensor Algorithm (RSA) value was temporarily increased from 4 degrees F to 12 degrees F for the reactor startup.

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### NARRATIVE

#### ANALYSIS OF THE EVENT

RCS hot leg temperature ( $T_{hot}$ ) is measured by three RTDs located 120 degrees circumferentially around the RCS pipe in each of the three loops and these indications are averaged. The  $T_{hot}$  average is used to determine RCS Delta T and the RCS  $T_{avg}$ . The RCS  $T_{avg}$  and Delta T calculated values are used in the reactor trip system instrumentation safety functions associated with OTDT and OPDT. The  $T_{avg}$  calculated value is also used in the Engineered Safety Features (ESF) Actuation System associated with Safety Injection, Steam Line Isolation and ESF interlocks. An evaluation concluded that there was no adverse impact on ESF functions.

The OTDT and OPDT reactor trip function consists of three independent channels with one channel in each of the three RCS Loops. Actuation of a trip signal in two of the three channels is required to trip the reactor. The two-out-of-three trip logic prevents a reactor trip from the spurious actuation of a trip signal from one channel while providing redundancy to accommodate the failure of one channel to generate the required trip signal.

During startup and power ascension from the refueling outage, Engineering personnel noted that the indication from the spare Channel III RTD deviated from the other two RTDs by up to 8 degrees F. Engineering personnel realized that incorrect coefficients had been entered into Eagle 21 for the spare RTD. RTD cross-calibrations are performed when RCS temperature reaches 250, 350, 450 and 547 degrees F. The cross-calibrations at 250 and 350 degrees F were satisfactory.

When the RTD cross-calibration failed at 450 degrees F on April 25, 2016, it was concluded that it was due to the incorrect coefficients for the spare RTD. It was also assumed that this  $T_{hot}$  input would be removed by the Eagle 21 RSA feature. The RCS hot leg RTDs for a particular channel are averaged and the output is compared to the average of the cold leg RTDs for the respective RCS loop. The signals from the RTDs are checked to see if they deviate from each other by more than a preset amount (DELTAH). The RSA takes the signal furthest from the average and removes it from the calculation before it is used for Delta T. It was assumed that the DELTAH value was set at 4 degrees F as is normal for steady state power operation, but the setting was not verified. I&C personnel had adjusted the DELTAH value to 12 degrees F during the plant startup via work order instructions. The Eagle 21 RSA did not remove the input from the spare RTD. The change to DELTAH for startup is a temporary configuration change that was not performed in compliance with the temporary configuration change process.

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### NARRATIVE

The correct coefficients for the spare RTD were entered into the Eagle 21 system for Loop C Channel III on May 2, 2016 returning the channel to operable status.

During the approximate five day period of OTDT/OPDT Channel III inoperability, the single failure criterion was not met. During two periods when more than one channel was inoperable (approximate four hours cumulative), the specified safety function was lost.

### ANALYSIS OF SAFETY SIGNIFICANCE

During the period that OTDT and OPDT Channel III was inoperable, OTDT and OPDT Channels I and II were operable except for periods when testing of the channels occurred. During the testing periods each channel was placed in the tripped condition except during a few hour period when the channels were being returned to service in accordance with TS 3.0.6. During this short period, the TS safety function provided by OTDT and OPDT reactor trips was not available because two of the three channels were inoperable and the reactor trip logic requires two OTDT or OPDT signals. A bounding risk assessment concluded that for the approximate four hour period that the specified safety function was not available, the core damage probability was well below the NRC acceptance criteria for minimal risk impact. As a result, the safety significance of the event is considered low.

### CORRECTIVE ACTIONS

Corrective action is in accordance with condition report AR 2129632 and includes:

1. Revise the RCS RTD replacement procedure to require validation of the correct methodology for deriving RCS RTD coefficients.
2. Establish a controlled calculation that contains the basis and methodology for deriving RCS RTD coefficients.
3. Update the work order process to ensure any changes to the Eagle 21 RSA complies with the temporary configuration change process.

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**NARRATIVE**

**ADDITIONAL INFORMATION**

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

FAILED COMPONENTS IDENTIFIED: None.

PREVIOUS SIMILAR EVENTS: None.