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J. E. Pollock  
Site Vice President

NL-10-108

October 27, 2010

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Mail Stop O-P1-17  
Washington, D.C. 20555-0001

SUBJECT: Licensee Event Report # 2010-006-00, "Safety System Functional Failure  
Due to Inoperable Reactor Coolant Loop 21 and 22 Hot Leg Wide Range  
Temperature Indicators Credited for Remote Shutdown per Technical  
Specification 3.3.4"  
Indian Point Unit No. 2  
Docket No. 50-247  
DPR-26

Dear Sir or Madam:

Pursuant to 10 CFR 50.73(a)(1), Entergy Nuclear Operations Inc. (ENO) hereby provides Licensee Event Report (LER) 2010-006-00. The attached LER identifies an event which is reportable as a safety system functional failure under 10 CFR 50.73(a)(2)(v). This condition was recorded in the Entergy Corrective Action Program as Condition Report CR-IP2-2010-05446.

There are no new commitments identified in this letter. Should you have any questions regarding this submittal, please contact Mr. Robert Walpole, Manager, Licensing at (914) 734-6710.

Sincerely,

A handwritten signature in black ink, appearing to read "J. E. Pollock", followed by the text "for J. P.".

JEP/cbr

cc: Mr. William Dean, Regional Administrator, NRC Region I  
NRC Resident Inspector's Office, Indian Point 3  
Mr. Paul Eddy, New York State Public Service Commission  
LEREvents@inpo.org

JE22  
NRK

## 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](mailto: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: INDIAN POINT 2

2. DOCKET NUMBER

05000-247

3. PAGE

1 OF 4

4. TITLE: Safety System Functional Failure Due to Inoperable Reactor Coolant Loop 21 and 22 Wide Range Hot Leg Temperature Indicators Credited for Remote Shutdown per Technical Specification 3.3.4

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
9	1	2010	2010	006	00	10	30	2010	FACILITY NAME	DOCKET NUMBER
										05000
									FACILITY NAME	DOCKET NUMBER
										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)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
10. POWER LEVEL	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<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)(C)	<input type="checkbox"/> OTHER
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

## 12. LICENSEE CONTACT FOR THIS LER

NAME

Michael Dries, System Engineer

TELEPHONE NUMBER (Include Area Code)

(914) 271-7172

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

## 14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO

## 15. EXPECTED SUBMISSION DATE

MONTH DAY YEAR

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

On September 1, 2010, during performance of 2-PT-Q017C (Alternate Safe Shutdown Supply Verification to 23 CCP), the Reactor Coolant System (RCS) Wide Range Hot Leg Temperature Instruments TI-5139 (Loop 21) and TI-5141 (Loop 22) test readings were found out of specification. Technical Specification Basis 3.3.4 (Remote Shutdown), Table 3.3.4-1, Function 3.b Decay Heat Removal via Steam Generators, RCS Hot Leg (HL) Temperature requires one operable function. The RCS HL Temperature is also credited in Technical Requirements Manual (TRM) 3.3.D (Appendix R Alternate Safe Shutdown Instrumentation). After verification of proper performance of the test, Operations concluded the function for RCS HL Temperature was inoperable and entered TS 3.3.4 Action Statement A.1. The apparent cause was indeterminate. A Failure Modes and Effect Analysis identified two possible causes: PC-1) A test process failure. The test has had historical problems with the test sequence where the instruments are powered prior to start of the 23 CCP and starting currents impacted instrument readout. Also the instruments and circuit is required to warm up and stabilize after establishing power. To mitigate these effects the test was revised. PC-2) Component failure. A complete failure of the R/I converter (TM) could cause the condition but a successful re-test and calibration ruled out a complete failure. Corrective actions include re-performing test 2-PT-Q017C with engineering review, and evaluating re-test results and identifying any additional actions. The event had no effect on public health and safety.

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

Note: The Energy Industry Identification System Codes are identified within the brackets {}.

DESCRIPTION OF EVENT

On September 1, 2010, while at 100% steady state reactor power, Operations performed quarterly test 2-PT-Q017C (Alternate Safe Shutdown Supply Verification to 23 CCP). Test 2-PT-Q017C verifies: 1) the Component Cooling Water (CCW) {CC} pump is capable of being operated from the alternate AC power supply, 2) Channel checks for Alternate Safe Shutdown Instrumentation: Temperature Indicator TI-5139 Reactor Coolant System (RCS) Loop 21 Hot Leg (HL) Wide Range (WR) Temperature, TI-5140 RCS Loop 21 Cold Leg (CL) WR Temperature, TI-5141 RCS Loop 22 HL WR Temperature, TI-5142 RCS Loop 22 CL WR Temperature. In accordance with the procedure, the Alternate Source Range Monitor Disconnect switch (EDH 7) was closed and channel checks performed for RCS WR HL and CL Temperature Instruments. RCS Loop 21 and Loop 22 CL WR Temperature instruments TI-5140 and TI-5142 tested satisfactorily. RCS Loop 21 and 22 HL WR Temperature instruments TI-5139 and TI-5141 did not meet test specifications. RCS Loop 21 HL temperature instrument TI-5139 indicated failed high and RCS Loop 22 HL temperature instrument TI-5141 indicated failed low. The As-Found test readings failed to meet the procedure acceptance criteria. The Control Room was notified and an assessment was performed that concluded the test results were valid.

Technical Specification (TS) Basis 3.3.4 (Remote Shutdown), Table 3.3.4-1, Function 3.b (Decay Heat Removal via Steam Generators), RCS HL Temperature requires one operable function. The RCS HL Temperature is also credited in Technical Requirements Manual (TRM) 3.3.D (Appendix R Alternate Safe Shutdown Instrumentation). Operations concluded the function for RCS HL Temperature was inoperable and entered TS 3.3.4 Action Statement A.1 and SAO-703 (Fire Protection Impairment Criteria and Surveillance) at 16:00 hours. The event was recorded in the Indian Point Energy Center corrective action program (CAP) as condition report CR-IP2-2010-05446. TS 3.3.4 required action A.1 is to restore the required function to operable within 30 days. SAO-703 required action 9.a.1 is to establish an hourly fire watch tour for areas related to the impacted equipment within one hour, and required action 9.a.2 is to restore the impaired instruments or power distribution and control components to functional status within 72 hours. Work Orders were issued to troubleshoot and repair. On September 2, 2010, troubleshooting was being conducted to support issue resolution. However, no system anomaly was detected and test 2-PT-Q17C was re-performed. The test results were satisfactory with no issues and TS 3.3.4 and SAO-703 actions exited at 16:13 hours.

An historical review of the surveillances and calibrations was performed. The review went back to July 23, 2007 and identified two tests that resulted in unsatisfactory results. One test on October 30, 2008, identified TI-5139 (RCS Loop 21 HL WR Temperature) oscillating. The cause was determined to be a degraded R/I Converter [Temperature Modifier(TM)]. The second unsatisfactory test was on July 9, 2009, when TI-5139 pegged high and was replaced.

The extent of condition review determined the only other instruments that could have been affected are the cold leg temperature indications. However, these instruments passed their surveillance tests and subsequent calibrations.

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## Cause of Event

The apparent cause was indeterminate. A Failure Modes and Effect Analysis (FMEA) identified two possible causes: PC-1) A test process failure, PC-2) Component failure. PC-1: Test 2-PT-Q017C has had historical problems regarding the test sequence when the Alternate Safe Shutdown (ASSD) panel was powered prior to the start of the 23 Component Cooling Water Pump (CCP). The 23 CCP starting current had instances of impacting instrument readouts. To mitigate this effect the surveillance test was revised. Another impact discovered was the need to wait a period of time for the instrument to warm up and stabilize after establishing power. A 15 minute waiting restriction was added to the last test revision in March 2009. Operations confirmed that this waiting requirement was met. A possible cause is the waiting time for instrument warm-up remains too short and additional time will provide better performance.

PC-2: A review of the instrument loop shows the majority of components are common with respect to the power supply such that any failure would have resulted in all four of the TIs failing not just two. The common components are Transfer Switch EDF9, Fuse box EWA19, disconnect Switch EDH7, and SOLA Transformer EBB8. The remaining components are unique to each instrument and consist of an R/I converter (TM) and Temperature Indication (TI). A degraded TM would be expected to cause the TI readout to shift, but not go to zero or peg to a maximum value and remain. A complete failure of the TM could cause the TI to peg high or low, but the successful test the next day ruled out a complete TM failure. Calibration of the instruments is performed on two year frequency in accordance with procedure 2-PC-2Y1. The last calibration was performed on September 17, 2010, subsequent to the quarterly test and all TMs and TIs were found to be satisfactory with the exception of some minor drift on TM-5141 (RCS Loop 22 HL WR Temperature). TI-5141 was unaffected by the as-found drift. The only remaining possible cause is that the TIs became stuck when power was first applied.

## Corrective Actions

The following corrective actions will be performed under the Corrective Action Program (CAP) to address the causes of this event.

- Re-perform test 2-PT-Q017C with engineering review.
- Evaluate re-test results and identify any additional actions.

## Event Analysis

The event is reportable under 10CFR50.73(a)(2)(v)(A), "Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to: (A) shutdown the reactor and maintain it in a safe shutdown condition." On September 1, 2010, at 16:00 hours, operations declared the RCS WR HL Temperature Instruments TI-5139 (Loop 21) and TI-5141 (Loop 22) inoperable based on test readings found out of specification. TS Basis 3.3.4 (Remote Shutdown), Table 3.3.4-1, Function 3.b Decay Heat Removal via Steam Generators, RCS HL (HL) Temperature requires one operable function. The RCS HL Temperature is also credited in Technical Requirements Manual (TRM) 3.3.D (Appendix R Alternate Safe Shutdown Instrumentation). TS 3.3.4 Action Statement A.1 was entered for inoperable Wide Range Hot Leg Temperature Instruments TI-5139 (Loop 21) and TI-5141 (Loop 22). The RCS HL indication in the remote shutdown panel is limited to the two instruments referenced in the TS 3.3.4 Basis and there are no redundant instruments to perform the function remote from the control room. The condition was considered a SSFF under 10CFR50.72(b)(3)(v) and an 8-hour non-emergency notification was provided to the NRC (EN#46222) at 16:53 hours.

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

## Past Similar Events

A review was performed of the past three years of Licensee Event Reports (LERs) for events that reported a loss of remote shutdown instruments for Indian Point Unit 2. Two LERs were identified: LER-2009-003 and LER-2009-004. LER-2009-003 reported a SSFF for an inoperable 21 Pressurizer Backup Heater that is credited in TS 3.3.4. LER-2009-004 reported a SSFF for an inoperable 23 Charging Pump that is credited in TS 3.3.4. These LERs were SSFFs as a result of failed components (breaker and internal pump valve) and not remote shutdown instruments.

## Safety Significance

This event had no effect on the health and safety of the public. There were no actual safety consequences for the event because there was no shutdown requiring the use of the remote shutdown panel. There was no significant potential safety consequences of this event because in accordance with NUREG-0800, Section 7.4, shutdown remote from the CR is not an event analyzed in the USFAR for accident analysis (Chapter 14). Specific scenarios are not specified on which the adequacy of shutdown capability remote from the CR is evaluated. A recognized type of event that could force the evacuation of the CR and the need to shut down remote from the CR is smoke from a fire. Fire damage limits as they impact safe shutdown do not require consideration of an additional random single failure in the capability to safely shut down. Therefore, application of single failure to remote shutdown is applicable only to other events that could cause the CR to become uninhabitable. These events would not result in consequential damage or unavailability of systems required for safe shutdown.