Entergy

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Fred Dacimo
Site Vice President
Administration

February 28, 2007
Indian Point Unit No. 2
Docket No. 50-247
NL-07-013

Document Control Desk
U.S. Nuclear Regulatory Commission
Mail Stop O-P1-17
Washington, DC 20555-0001

Subject: Licensee Event Report # 2007-001-00, "Technical Specification Prohibited Condition Due to Exceeding the Allowed Completion Time for an Inoperable Residual Heat Removal Pump Due to an Electrical Supply Breaker Failure"

Dear Sir:

Pursuant to 10 CFR 50.73(a)(1), Entergy Nuclear Operations Inc. (ENO) hereby provides Licensee Event Report (LER) 2007-001-00. The enclosed LER identifies an event where the plant was operated in a condition prohibited by Technical Specifications, which is reportable under 10 CFR 50.73(a)(2)(i)(B). This condition has been recorded in the Entergy Corrective Action Program as Condition Report CR-IP2-2007-00013.

There are no commitments contained in this letter. Should you or your staff have any questions regarding this matter, please contact Mr. Patric W. Conroy, Manager, Licensing, Indian Point Energy Center at (914) 734-6668.

Sincerely,

for

Fred R. Dacimo
Site Vice President
Indian Point Energy Center

IE22

Attachment: LER-2007-001-00

cc:

Mr. Samuel J. Collins
Regional Administrator – Region I
U.S. Nuclear Regulatory Commission

U.S. Nuclear Regulatory Commission
Resident Inspector's Office
Resident Inspector Indian Point Unit 2

Mr. Paul Eddy
State of New York Public Service Commission

INPO Record Center

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

LICENSEE EVENT REPORT (LER)

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-I0202, (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:	2. DOCKET NUMBER	3. PAGE
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4. TITLE: Technical Specification Prohibited Condition Due to Exceeding the Allowed Completion Time for an Inoperable Residual Heat Removal Pump Due to an Electrical Supply Breaker Failure

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
1	2	2007	2007	- 001 -	00	02	28	2007	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)*
Louis Lubrano, Component Engineer	(914) 271-7201

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	ED	BKR	W120	Y					

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

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

On January 2, 2007, during quarterly surveillance testing of the 21 Residual Heat Removal pump (RHRP), there was a failure of the pump to start on demand. Investigation into the cause of the condition identified that the pump electrical supply breaker control power fuse had blown due to a breaker malfunction. The supply breaker was a DB-50, 480 volt AC breaker. The apparent cause of the breaker failure to close was a mispositioned inertia latch. The lack of inertia latch reset caused the breaker closing coil to remain energized following breaker closure initiation until the control fuses actuated. The inertia latch is designed to reset following a breaker trip to allow for future breaker closures. The binding inertia latch was not resetting as required resulting in the failure of the breaker to close. A contributing cause was the presence of a residue found on the inertia latch and pivot pin mating surfaces. Corrective actions included breaker cleaning, re-lubrication, testing and return to service. Subsequently, the 21 RHRP breaker was replaced with a refurbished breaker. An examination of the breaker residue material will be performed by the breaker manufacturer and a report provided. Engineering will review the report and any necessary corrective actions will be performed. Although Engineering believes the breaker had freedom of movement, the breaker maintenance and modification procedures were enhanced to assure freedom of movement of the inertia latch. An inspection of the remaining DB-50 breakers except closed breakers was performed. All inspected breakers were found to be in working order. 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 brackets { }

DESCRIPTION OF EVENT

On January 2, 2007, at approximately 9:57 hours, while at 100% steady state reactor power, the 21 Residual Heat Removal (RHR) {BP} pump {P} was declared inoperable as a result of failing to start during performance of quarterly surveillance 2-PT-Q028A,"Residual Heat Removal Pump." Technical Specification (TS) 3.5.2 Limiting Condition for Operation (LCO), Condition A was entered for one or more trains of Emergency Core Cooling Systems (ECCS) inoperable. The surveillance was stopped and the Operations Shift Manager was notified. Control Room (CR) operators secured the 21 RHR pump and initiated an investigation of the problem. The event was recorded in the IPEC corrective action program (CAP) as CR-IP2-2007-00013.

During performance of surveillance 2-PT-Q28A, the Red indicating light {IL}, which will illuminate upon closure of the supply breaker {BKR}, did not illuminate as expected. The Green indicating light, which implies that control power is available to close the supply breaker, extinguished approximately 15 seconds after the attempt to close the breaker. Surveillance 2-PT-Q028 is performed to demonstrate operability of the 21 RHR pump in accordance with the TS. As part of the surveillance, the 21 RHR pump supply breaker is cycled to start the pump. The 21 RHR pump supply breaker (BRKR2012-004/24Y9688X-2) {BKR} is a type DB-50, 480 volt AC breaker {ED} manufactured by Westinghouse {W120}. The breaker was isolated and troubleshooting performed by Component Engineering and Maintenance. An inspection of the breaker by Westinghouse was also performed. Upon inspection of the breaker by Component Engineering, the inertia latch was found not in its reset position. The inertia latch is designed to prevent a breaker re-closure due to contact bounce following a breaker trip. The as-found condition showed the inertia latch remained toggled and did not reset following the last breaker trip operation. With the inertia latch not reset, the breaker is restricted by the inertia latch from closing. An attempt to close the breaker with the inertia latch out of position will result in the closing coil {CL} not de-energizing. Under this condition the closing coil will continue to draw current until the protective fuses {FU} open. Upon initial inspection, the inertia latch was found to be binding and not operating smoothly when cycled. All required clearances and gaps were as required. Upon removal of the inertia latch, inspection revealed that the latch would not easily slide off the pivot pin. Once the latch was removed, residue was observed on the pivot pin and latch bushing. The inertia latch bushing and pivot pin were cleaned, lubricated and re-installed. At approximately 1:09 PM the 21 RHR breaker was reconnected to the 480 volt bus and the RHR pump started per surveillance test 2-PT-Q028. At approximately 2:20 PM the 21 RHR pump was restored to operable and the TS LCO condition was then exited. Subsequently, the 21 RHR pump breaker was replaced with a refurbished breaker on January 11, 2007.

An extent of condition inspection was performed for safety related DB-50, 480 volt AC breakers. The reactor trip breakers do not apply since their safety function is to trip open and this event only affected breaker closure. Breakers in the open position (21) were inspected and found to have their inertia latches properly reset to allow breaker closure. Breakers in the closed position have their inertia latches toggled upon breaker opening and therefore can not be inspected for latch reset while in the closed position. Eleven (11) breakers were racked out from their connected position to allow for a close inspection of the inertia latches and all were found in good working condition. Additionally, 12 spare DB-50 breakers were inspected and the inertia latches were found in proper working order.

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

In 2000, installation of a new inertia latch design was implemented whose design features a new added weight design coupled with a spring force to ensure that the inertia latch resets. This event is considered an isolated event since there has been no record of failures and the new design has had an excellent performance record including no industry events of this type.

CAUSE OF EVENT

The direct cause for the failure of the 21 RHR pump to start was failure of the 21 RHR pump supply breaker to close. The apparent cause for the failure of the breaker to close was determined to be a mispositioned breaker inertia latch. The inertia latch is designed to reset following a breaker trip to allow for future breaker closures. Failure of the latch to reset prevented the breaker to close on demand. A contributing cause for the mispositioned inertia latch was the presence of a residue found on the inertia latch and pivot pin mating surfaces. Westinghouse inspected the breaker and performed a close examination of the breaker and inertia latch to determine the cause of the residue. Westinghouse found imbedded material in the bushing of the inertia latch and noted that the inside of the inertia latch bushing should be a smooth honed finish, free of any plating, gouges, or pitting. The imbedded material found on the surface of the bushing created a rough and uneven surface which may have caused the breaker failure. Westinghouse did not determine the source or type of the imbedded material. Westinghouse will perform an in-depth investigation of the failed inertia latch foreign material. Engineering believes the breaker itself had freedom of movement but the breaker Preventive Maintenance (PM) procedure (2-BRK-022-ELC) and the breaker Modification procedure (2-BRK-015-ELC) were enhanced to emphasize the importance of assuring freedom of movement and smooth operation of the inertia latch.

CORRECTIVE ACTIONS

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

- Initially the 21 RHR 480 volt supply breaker inertia latch bushing and pivot pin were cleaned, lubricated, re-installed, satisfactorily tested, returned to service and the TS LCO exited. Subsequently, the breaker was replaced with a refurbished breaker on January 11, 2007.
- An extent of condition inspection was performed on 21 open DB-50 breakers and found to have their inertia latches properly reset. Additionally, 12 spare breakers were inspected and the inertia latches were found in proper working order. Inspections were also performed on 11 installed breakers. The 11 breakers were racked out, cycled and their inertia latch manipulated. The 11 breakers were found to have their inertia latch in proper working order.
- A work order was prepared for Westinghouse to perform an examination of the embedded material and provide a report. Engineering review of the Westinghouse report and identification of any necessary additional enhancements or changes is scheduled for completion on April 30, 2007.

EVENT ANALYSIS

The event is reportable under 10CFR50.73(a)(2)(i)(B). The licensee shall report any operation or condition which was prohibited by the plant TS. This event meets the reporting criteria because the 21 RHR pump failed to close on demand during surveillance testing and its inertia latch would have prevented it from closing since the last time it was tested on October 9, 2006. The time in which the condition existed was determined to exceed the 72 hours allowed completion time for TS 3.5.2 and the required actions were not performed.

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

During the time the 21 RHR breaker was inoperable, the 22 RHR pump was operable and available to perform the safety function. A review of support systems for the 22 RHR pump identified that the 23 Emergency Diesel Generator (EDG), which provides emergency power for the 22 RHR pump, had been declared inoperable on October 29, 2006, as a result of EDG service water cooling water piping repairs. During that time, offsite power remained available and would have supplied normal power for the 22 RHR pump. At no time during the failed 21 RHR breaker condition was the RHR system unable to perform its safety function. In accordance with reporting guidance in NUREG-1022, an additional random single failure need not be assumed in that system during the condition. Therefore, there was no safety system functional failure of the RHR system reportable under 10 CFR 50.73(a)(2)(v). Review of the condition for reporting under 10 CFR 50.73(a)(2)(ix),"Any event or condition that as a result of a single cause could have prevented the fulfillment of a safety function for two or more trains or channels in different systems," determined the event is not reportable under this criterion. Although other DB-50 breakers could have the condition and be in other safety trains that were not inspected, engineering judged that this failure was an isolated case and that the breakers, which now have new latches, have an excellent performance record and no record of failure. Engineering judgment, as allowed by the guidelines of NUREG-1022, concluded that there is reasonable expectation that the safety functions of potentially affected systems could be fulfilled.

PAST SIMILAR EVENTS

A review was performed of Licensee Event Reports (LERs) for the past three years for any events that involved DB-50 breaker failures that resulted in exceeding TS allowed completion times. No LERs were identified that reported breaker failures.

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 were no events during the time the 21 RHR pump was inoperable due to its failed breaker condition. In addition, the redundant 22 RHR pump was available to perform the safety function.

There were no significant potential safety consequences of this event under reasonable and credible alternative conditions. The condition identified on January 2, 2007, would have prevented the 21 RHR breaker from closing since the last time it was successfully tested on October 9, 2006 (exposure time of 86 days). A risk assessment was performed for this condition with the following results: The Core Damage Frequency (CDF) was determined to be 1.812E-5 per year. Given a baseline CDF of 1.787E-5 per year, the condition represents an incremental CDF (ICDF) of 2.50E-7 per year. The Incremental Core Damage Probability (ICDP) based on the exposure time of 86 days (86 days/365 days per year) was determined to be 5.89E-8. The ICDP determined for this event is below the value considered risk significant.