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Site Vice President

NL-11-019

March 10, 2011

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

SUBJECT: Licensee Event Report # 2011-001-00, "Technical Specification Prohibited Condition Caused by an Inoperable 32 Containment Spray Pump Due to High Contact Resistance in the Supply Breaker Closing Circuit"
Indian Point Unit No. 3
Docket No. 50-286
DPR-64

Dear Sir or Madam:

Pursuant to 10 CFR 50.73(a)(1), Entergy Nuclear Operations Inc. (ENO) hereby provides Licensee Event Report (LER) 2011-001-00. The attached LER identifies an event where there was a Technical Specification (TS) prohibited condition for failure to perform TS required actions within the required completion time for an inoperable Containment Spray Pump during past operation, which is reportable under 10 CFR 50.73(a)(2)(i)(B). This condition was recorded in the Entergy Corrective Action Program as Condition Report CR-IP3-2010-03523.

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,

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
NRR

NRC FORM 366 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES: 10/31/2013

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.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME:	2. DOCKET NUMBER	3. PAGE
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4. TITLE: Technical Specification Prohibited Condition Caused by an Inoperable 32 Containment Spray Pump Due to High Contact Resistance in the Supply Breaker Closing Circuit

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
1	19	2011	2011-	001 -	00	3	10	2011		05000
									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) 734-6681

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	BE	BKR	W120	Y					

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 November 12, 2010, during performance of the quarterly functional test of the 32 Containment Spray Pump (CSP) the supply breaker failed to close. The breaker was fully charged and there were no abnormal indications. A second attempt to close the breaker failed and the breaker was racked out and visually inspected with no anomalies identified with the breaker or cubicle. A test of the close circuit was satisfactory and the breaker and cubicle secondary contacts were cleaned and inspected. With the breaker in the test position it operated successfully, but when racked into the connect position it failed to close. The trip circuit was verified to operate. The breaker problem was isolated to the close circuit. With the breaker racked in and charged, the fuses were removed and the control switch was positioned to close while measuring continuity across the closing circuit. With the breaker in the test position all indications were as required. With the breaker in the connect position, an open circuit was measured. Measurements and contact alignment inspections were performed with no problems identified. The breaker was replaced with a spare breaker and the quarterly test successfully performed. The direct cause was the breaker closing circuit was not reset to allow breaker closure. The apparent cause was a malfunction in the breaker closing circuit resulting in an open circuit. Engineering's review of a vendor equipment failure evaluation (EFE) concluded the breaker failed to close due to a high contact resistance of the motor cutoff switch. Corrective actions include breaker replacement and revision of the Preventive Maintenance procedure to include resistance testing of the motor cutoff switch contacts. The event had no significant 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 November 12, 2010, at approximately 14:52 hours, while at 100% steady state reactor power, Technical Specification (TS) 3.6.6 (Containment Spray System and Containment Fan Cooler System) Condition A was entered for one containment spray train inoperable as a result of isolation of the 32 containment spray header for testing in accordance with quarterly performance test 3-PT-Q117B (32 Containment Spray Pump Functional Test). During performance of 3-PT-Q117B, the 32 Containment Spray Pump (CSP) {BE} 480 volt supply breaker {BKR} (52/CS2) failed to close and start the pump. The breaker indicated it was fully charged and there were no other abnormal indications. At approximately 15:57 hours, Operations racked the breaker out and back in and a second attempt to close the breaker failed. At 17:35 hours, the 32 CSP switch was placed in Trip-Pull-Out (TPO) for maintenance activities. The condition was recorded in the Indian Point Energy Center (IPEC) Corrective Action Program (CAP) as Condition Report CR-IP3-2010-03523.

A trouble shooting plan was developed in accordance with EN-MA-125 (Troubleshooting Control of Maintenance Activities). On November 13, 2010, at approximately 4:11 hours, the 32 CSP breaker was racked to test and cycled twice with no anomalies noted. The breaker was racked out and visually inspected with no anomalies identified with the breaker or cubicle. The breaker was removed and the close circuit was tested for continuity. The close circuit was continuous with acceptable low resistance and operated electrically in the test position. A voltage measurement of the secondary contacts measured an acceptable voltage when the Control Room switch was positioned to close. Based on troubleshooting results, the problem was initially believed to be with the cubicle and breaker secondary contact surfaces. The breaker and cubicle secondary contacts were cleaned and inspected. The breaker was placed in the test position and operated successfully, but when the breaker was racked in the connect position it failed to close. The trip circuit was verified to operate with no issues. The breaker problem was then isolated to the close circuit. With the breaker racked in and charged, the fuses were removed and the control switch was positioned to close while measuring continuity across the closing circuit. With the breaker in the test position all indications were as required. With the breaker in the connect position, an open circuit was measured. Measurements and contact alignment inspections were performed with no problems identified. The breaker was reinserted and the continuity check was successful. The fuses were installed and the breaker closed to operate the pump as required. After securing the 32 CSP, a continuity test was performed to ensure that cycling did not affect the close circuit. The test failed verifying the problem still existed. On November 13, 2010, at 14:15 hours, a decision was made to replace the breaker (52/CS2) with a spare breaker that had preventive maintenance (PM) previously performed. A continuity check was satisfactorily performed and the quarterly test successfully performed. The 32 CSP was returned to service and TS 3.6.6 Condition A was exited at 16:10 hours on November 13, 2010. The 32 CSP breaker (BRKR3050-010) is a 480 volt supply breaker (52/CS2) manufactured by Westinghouse {W120) Model DS-416. The breaker motor cutoff switch, part number PN567F430G06, is part of the breaker closing circuit and acts as a permissive for breaker closure.

An extent of condition review determined the condition is limited to DS breakers at unit 3. The condition does not impact unit 2 which does not have DS breakers. The equivalent unit 2 breakers do not have motors and use a different method for breaker closure. A sample of 9 DS breakers of a total population of 59 were selected for inspection and testing. The breaker inspection verified the breaker springs were charged and no anomalies were identified. All 9 sample breakers tested satisfactorily.

Cause of Event

The direct cause for the breaker failure to close was the breaker closing circuit was not reset to allow breaker closure. The apparent cause was a malfunction in the breaker closing circuit resulting in an open circuit. An Equipment Failure Evaluation (EFE) was performed by the original equipment manufacturer (OEM) (Westinghouse). The OEM testing could not reproduce the actual event. The high contact resistance in the closing circuit which was measured while the breaker was installed at IPEC could not be recreated by the OEM. The OEM disassembled the breaker and inspected all components. All breaker components were satisfactory except the motor cutoff switch. The switch was found to behave erratically when manually operated and tested out of the breaker. Resistance measurements of the contacts were initially acceptable in the normal and engaged state, but when the switch was shaken or jarred in simulating a closing/opening sequence, the resistance would rise to above acceptable levels. An inspection of the contacts showed significant oxidation. Engineering review of the EFE concluded the motor cutoff switch was degraded and the failure of the breaker to close was the result of high contact resistance in the breaker closing circuit. A past operability evaluation concluded the circuit malfunction likely developed following the last breaker operation prior to the event.

Corrective Actions

The following corrective actions have been or will be performed under Entergy's Corrective Action Program to address the cause and prevent recurrence:

- Installed a spare breaker for the 32 CSP and satisfactorily performed continuity checks and the quarterly functional test.
- PM procedure 3-BKR-004-ELC will be enhanced to require performance of resistance checks and repeatability testing.
- Surveillance testing during the 2011 spring refueling outage will cycle all safeguards breakers. Twelve breakers will be replaced/cycled to meet PM requirements.

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's TS. On November 12, 2010, during a quarterly surveillance test, the 32 CSP supply breaker failed to close and start the 32 CSP. TS 3.6.6 Condition A had been entered for one containment spray train inoperable due to testing. The 32 CSP was determined to be inoperable and replaced with a spare breaker. At the time of discovery (November 12, 2010), in accordance with reporting guidelines of NUREG-1022, the discrepancy is assumed to occur at the time of discovery unless there is firm evidence based on review of relevant information such as equipment history and the cause of the failure, to indicate the discrepancy existed previously. At the time the cause of the failure was not determined. The 32 CSP breaker was shipped to the OEM for an EFE. The EFE was completed and the results transmitted to IPEC by letter dated January 17, 2011. An engineering review of the EFE concluded on January 19, 2011 that the breaker was likely inoperable since its last PM and surveillance test on August 18, 2010. TS 3.6.6 has an allowed outage time of 72 hours for one containment spray train inoperable. This event meets the reporting criteria because the required TS actions were not performed and the required completion times not met. During the period of inoperability of the 32 CSP (assumed as of August 18 through November 12, 2010) redundant containment spray system (CSS) and fan cooler system (FCS) components were out of service (OOS) as well as EDGs supporting redundant components. Specifically on September 14 and 15, 2010, October 5 through 6, 2010, and November 4, 2010, the 33 EDG was OOS and TS 3.8.1 entered. The 33 EDG supports the 31 CSP, and the 31 and 33 FCUs.

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The required action of TS 3.8.1 Condition B.2 is to declare inoperable the required features supported by the inoperable EDG when it's required redundant feature is inoperable 4 hours from discovery of Condition B (one EDG inoperable). Because it was unknown that the 32 CSP was inoperable, the required 4 hour TS 3.8.1 action was not taken. The failure to implement the action of TS 3.8.1 Condition B.2 is also a TS prohibited condition. In addition, TS 3.6.6 (CSS and FCS) Condition F (two containment spray trains inoperable or any combination of three or more trains inoperable) requires immediate entry into TS 3.0.3 which was not taken since it was unknown the 32 CSP was inoperable and is a TS prohibited condition. The inoperability of the 33 EDG required the 31 CSP to be considered inoperable because it's redundant 32 CSP was inoperable but the other supported components (31 FCU and 33 FCU) were considered operable as the redundant FCUs (32, 34, 35 FCUs) were operable during the 33 EDG outage. Therefore, there was no safety system functional failure reportable under 10CFR50.73(a)(2)(v) as the minimum required safeguards components were available to perform the function during the time the 32 CSP was inoperable (at least one CSP and three Fan Cooler Unit (FCUs) or five FCUs were available). In accordance with reporting guidance in NUREG-1022, an additional random single failure need not be assumed in that system during the condition.

Past Similar Events

A review was performed of the past three years of Licensee Event Reports (LERs) for events that involved a TS violation due to a breaker failure to close. LER-2008-001 reported a failure to start of the 31 Safety Injection Pump (SIP) on January 27, 2008 as a result of the failure of the breaker to close. The failure to close was due to a failure of the breaker spring charging motor closing springs to fully charge. The cause of the closing springs not to fully charge was a failure of the breaker motor brush assembly to remain intact during operation. The cause of the retaining screw becoming dislodged could not be determined. A contributing cause was a lack of a requirement to inspect the motor brush retaining screws and brush assembly. The CAs of the event reported in LER-2008-001 would not have prevented this event as the causes were different.

Safety Significance

This event had no significant effect on the health and safety of the public. There were no actual safety consequences for the event because there were no accidents or transients requiring the Containment Spray System (CSS) or the Containment Fan Cooler System. With one containment spray train inoperable, the remaining operable containment spray and containment fan cooler trains are adequate to perform the containment cooling function. During the inoperability of the 32 CSP (assumed as of August 18, 2010 through November 13, 2010), the following redundant Containment Spray pump and Containment FCUs were unavailable: 1) 31 CSP was unavailable on October 17 and October 25, 2010, 2) the 31 FCU was unavailable on October 26, 2010, and 3) the 33 FCU was unavailable on October 1, 2010 and on October 7, 2010.

The Containment Spray System and Containment Fan Cooler System are Engineered Safety Feature (ESF) systems designed to ensure that the heat removal capability required during the post accident period can be attained. The Containment Spray System and the Containment Fan Cooler System provide redundant methods to limit and maintain post accident conditions to less than the containment design values. The configuration with one containment spray train and two fan cooler trains is the configuration available following the loss of any safeguards power train (e.g., diesel failure). Accident analysis assumptions regarding containment air cooling and iodine removal are met by one containment spray train and any two fan cooler trains (i.e., at least three fan cooler units) or two CS trains or three FCU trains.

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The Containment Fan Cooler System consisting of five 20 percent capacity FCUs and the Containment Spray System consisting of two 50% trains are divided into trains based on the safeguards power train which supports them. Containment Spray Train 31 is associated with Safeguards Power Train 5A which is supported by DG 33. Containment Spray Train 32 is associated with Safeguards Power Train 6A which is supported by DG 32. Fan Cooler Train 5A consists of FCU 31 and FCU 33 (CSP 31); Fan Cooler Train 2A/3A consists of FCU 32 and FCU 34; and Fan Cooler Train 6A consists of FCU 35 (CSP 32). Five FCUs or two CS trains or three FCUs and one CSP are adequate to meet minimum safeguards function. During the period of the inoperable 32 CSP, there was minimum safeguards capability available.

An assessment was performed to determine the impact of the condition on Core Damage Frequency (CDF) and Large Early Release Frequency (LERF). The assessment considered the case of both CSS headers out of service. The assessment concluded there is no significant impact on CDF or LERF.