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NL-09-077

October 29, 2009

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

Subject: Licensee Event Report # 2008-006-01, "Automatic Actuation of an Emergency Diesel Generator and Two Auxiliary Feedwater Pumps During Surveillance Testing due to Inadvertent De-Energization of the Normal Supply Breaker to 480 Volt Safeguards Bus 6A"
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 revised Licensee Event Report (LER) 2008-006-01. The attached LER identifies an event where there was an automatic actuation of an emergency diesel generator and two auxiliary feedwater pumps, systems listed in 10 CFR 50.73(a)(2)(iv)(B), which is reportable under 10 CFR 50.73(a)(2)(iv)(A) . This condition was recorded in the Entergy Corrective Action Program as Condition Report CR-IP3-2008-02519. The revised LER incorporates changes as a result of an evaluation of troubleshooting and testing performed during the Unit 3 refueling outage.

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. Samuel J Collins, Regional Administrator, NRC Region I
NRC Resident Inspector's Office, Indian Point 3
Mr. Paul Eddy, New York State Public Service Commission
INPO Record Center

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NRR

NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES: 8/31/2010

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: Automatic Actuation of an Emergency Diesel Generator and Two Auxiliary Feedwater Pumps During Surveillance Testing due to Inadvertent De-Energization of the Normal Supply Breaker to 480 Volt Safeguards Bus 6A

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
10	09	2008	2008	- 006 -	01	10	29	2009	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)*
Vincent Andreozzi, System Engineering Supervisor Electrical/Instrumentation & Control	(914) 734-6816

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	RLY	A109	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 October 9, 2008, Instrumentation & Control (I&C) Technicians were performing surveillance testing, when the normal power supply breaker for 480 Volt AC safeguards bus 6A inadvertently opened, causing the bus to de-energize. In accordance with design, loads on bus 6A were stripped and then sequentially re-loaded back onto the bus. The bus undervoltage control circuitry caused an automatic actuation of emergency diesel generator (EDG) 32 which started and re-energized the bus, actuation of motor driven auxiliary feedwater pump (AFWP) 33 and steam driven AFWP 32. All systems performed as designed. AFW was injected into the steam generators (SG) that resulted in a 1-2% change in SG level, an approximate 0.1% increase in reactor power and no control rod movement. The initial root cause analysis (RCA) did not identify a cause but determined the breaker trip was caused by energizing its shut trip coil. The most probable cause was an intermittent fault in the digital volt meter (DVM) used for the test. Subsequent analysis by an independent vendor determined the DVM operated properly in all functions and ranges and calibration results were within specifications and no anormalies were noted. Troubleshooting and testing for a similar event on January 9, 2009, did not identify a cause. A revised RCA failed to identify a specific cause but identified a probable cause as a meter lead short between terminals of degraded grid time delay relay (62-1/6A). Corrective actions included revision of the surveillance test to require the use of different test meter leads and brief of personnel on potential of test leads causing a short circuit. 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 October 9, 2008, while at 100% steady state reactor power, Instrumentation and Control (I&C) Technicians were performing monthly surveillance test 3-PT-M62C, "480 Volt AC Degraded Grid/Undervoltage Functional Testing Bus 6A," when at approximately 12:54 hours, the normal power supply breaker {BRK} for 480 Volt AC safeguards bus 6A {ED} inadvertently opened causing the bus to de-energize. The bus undervoltage control circuitry {JE} caused an automatic actuation of emergency diesel generator (EDG) 32 {EK} which started and re-energized the bus {BU}, actuation of motor driven auxiliary feedwater (AFW) pump (AFWP) 33 and steam driven AFWP 32 {BA}. In accordance with design the loads on bus 6A were stripped and then the assigned loads were sequentially re-loaded back onto the bus. All systems performed as designed. AFW was injected into the steam generators (SG) {AB} that resulted in a 1-2% change in SG level, and an approximate 0.1% increase in reactor power. There was no control rod movement. The event was recorded in the Indian Point Corrective Action Program (CAP) as CR-IP3-2008-02519.

The onsite AC power distribution system is composed of 480 Volt AC buses 5A, 6A, 2A and 3A which is divided into three safeguards power trains. The three safeguards power trains are train 5A (Bus 5A and EDG-33), Train 6A (Bus 6A and EDG-32), and Train 2A/3A (Bus 2A and 3A and EDG-31). The 480 Volt AC safeguards buses receive power from 6.9 kV bus sections through their respective Station Service Transformer {FK} or from three onsite EDGs. The 480 Volt safeguard buses are designed with protection against undervoltage (UV) and degraded grid voltage (DGV) using relays that sense UV or DGV conditions. Non-Safety Injection (SI) Blackout relays will send start signals to bus sequencing timers for essential loads that include the motor driven AFWPs and the turbine driven AFWP. The bus undervoltage relays will initiate the opening of the power feeds from the SST and 480 Volt AC tie breaker for a DGV condition after DGV relays are timed out on a particular bus. Each of two voltage sensing relays has its own associated timing relay to provide a time delay to insure proper coordination with plant electrical transients. Actuation of the DGV relays will trip the bus supply breaker removing power to the buses which will actuate the UV relays. When the feeder breaker trips, the bus UV relays will initiate bus stripping, actuate EDG start, and provide signals that will begin load sequencing to reload the bus.

On October 9, 2008, at approximately 9:10 hours, three qualified I&C Technicians initiated TS required monthly functional testing of the three 480 Volt safeguards buses in accordance with surveillance test procedure 3-PT-M62A,B,C using a Fluke 189 digital volt meter. The technicians started with bus 2A/3A which was satisfactorily completed at 10:00 hours, then started testing bus 5A at 1012 hours which was satisfactorily completed at 10:38 hours. After a lunch break, at approximately 12:35 hours, using the same Fluke digital volt meter used in the previous tests, the three I&C technicians started testing bus 6A in accordance with surveillance procedure 3-PT-M62C to test the 480 Volt AC undervoltage/degraded grid protection system for Bus 6A. The test is performed to demonstrate that the 480 Volt AC undervoltage/degraded grid protection system functions properly. The 480 Volt AC bus 6A undervoltage/degraded grid protection functions are tested locally at switchgear {SWGR} in the 480 Volt Switchgear Room on the 15 foot elevation of the Control Building {NA}.

Performance of the test requires technicians to connect a digital volt meter to read volts DC in order to verify that the contacts for the DGV Agastat (62-1/6A) were energized and ready for actuation. At approximately 12:54 hours, as the probes of the Fluke 189 meter were connected to the terminal points, the technicians noticed that the digital volt meter display was cycling unexpectedly as if it were attempting to find the correct scale. Within a second or two, the technicians heard the normal bus 6A supply breaker open. The technicians did not hear either UV Agastat actuate. The technicians were unable to obtain the voltage reading required by the test procedure. After realizing the bus 6A supply breaker had tripped, the technician holding the meter probes on the terminals left them in place and asked for a peer check. A peer check confirmed the probes were on the correct terminals. The technicians also verified that the digital meter was on the correct scale (VDC). The technicians did not notice any sparking when the connection was made to the terminals and there were no burn marks on the probes that would have suggested a short internal to the meter. The technicians reported to the Control Room and their supervisor. The test instrument used for the test is a digital volt meter model 189 manufactured by Fluke {F137}. The DGV relay (62-1/6A) is a time delay relay {62} Series E7000, part number E7014PD004, manufactured by Agastat {A109}.

Cause of Event

The initial root cause analysis (RCA) did not identify a cause but determined the breaker trip was caused by energizing its shut trip coil of the normal supply breaker for 480 volt safeguards bus 6A. The most probable cause was concluded to be an intermittent fault in the digital volt meter (DVM) (Fluke 189) used to verify that the contacts in the DGV Agastat relay (62-1/6A) were energized and ready for actuation. Subsequent analysis by an independent vendor determined the DVM operated properly in all functions and ranges and calibration results were within specifications and no anormalies were noted. The root cause analysis considered human error, plant equipment malfunction or designed actuation, and test equipment fault. Human error and malfunction of installed equipment or designed actuation was evaluated and determined not to be the cause. A subsequent re-analysis for a similar event on January 9, 2009, that was performing the same test could not identify a cause. A monitoring plan was developed to collect circuit parameters in the 52/6A trip circuitry during testing. Monitoring was performed in regularly scheduled tests with additional monitoring and testing performed in the spring 2009 refueling outage. Despite rigorous investigation, the root cause is indeterminate. The probable cause was determined to be a meter lead short from terminal 4 to terminal 2 of DGV time delay relay 62-1/6A. A meter lead short from relay 62-1/6A terminal 4 to terminal 2 would not have resulted in an arc as determined in a failure analysis of the relay and leads. An evaluation of organizational and programmatic weaknesses identified inadequate work practices during performance of test 3-PT-M62C where the test leads used had the potential for shorting the terminals of Agastat time delay relays. The potential for causing a short with a meter lead exists anytime an exposed meter lead is long enough to short between terminals.

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

Corrective Actions

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

- Test procedures 3-PT-M62A,B,C were revised so that the voltage check of the degraded grid voltage Agastat are not taken across contacts.
- An independent vendor performed an analysis of the Fluke 189 digital volt meter used during the test. The vendor analysis determined the DVM operated properly in all functions and ranges and calibration results were within specifications and no anormalies were noted.
- Degraded Grid time delay relay 62-1/6A was replaced and satisfactorily testing in accordance with 3-PT-M62C. The relay and the DVM leads used during the test were sent to an independent vendor for performance of a failure analysis. The results of the independent vendor analysis concluded neither the meter leads or relay 62-1/6A were faulty.
- Degraded Grid Voltage Protection Tests (3-PT-M62A, 3-PT-M62B, and 3-PT-M62C) were revised to specify the use of test leads that do not have the potential to create a short circuit between terminals of the Agastat time delay relays.
- Maintenance and Operations personnel were briefed on the possibility of meter lead probes causing a short circuit during meter reading activities and that pre-job briefs should include this precaution. The brief included the expectation that during an activity that identifies that terminals could be shorted by standard meter lead probs, different leads should be used.
- Insulated test leads by Pomona were purchased to help reduce the possibility of a short circuit.

Event Analysis

The event is reportable under 10CFR50.73(a)(2)(iv)(A). The licensee shall report any event or condition that resulted in the manual or automatic actuation of any system listed in 10CFR50.73(a)(2)(iv)(B). The systems to which the requirements of 10CFR50.73(a)(2)(iv)(A) apply include; (#6) PWR auxiliary or emergency feedwater system, and (#8) Emergency AC electrical power systems including emergency diesel generators (EDG).

This event meets the reporting criteria because the 32 EDG actuated to start and the 32 and 33 AFWP actuated to start when the UV control circuit on 480 Volt AC Bus 6A actuated. On October 9, 2008, the normal power supply to safeguards bus 6A was inadvertently de-energized and in accordance with design the 32 EDG, AFWP-32 and 33 automatically started at approximately 12:54 hours. At 12:58 hours, the 33 AFWP was secured and at 13:19 hours the 32 AFWP was secured. At 14:35 hours, 480 Volt AC Bus 6A was returned to its normal power supply and the condition for Technical Specification 3.8.1 was exited. At 14:41 hours, the 32 EDG was secured and returned to its normal standby condition. All required safety systems performed as designed. As a result of the event, there were no safety systems that were not capable of performing their 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 reportable under 10 CFR 50.73(a)(2)(v).

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Past Similar Events

A review was performed of Licensee Event Reports (LERs) for the past three years for any events reporting inadvertent Engineered Safety Feature actuation during testing. The review identified three LERs: LER-2005-003, LER-2008-003, and LER-2008-004. LER-2005-003 reported an inadvertent actuation of AFWPs 31 and 33 on May 16, 2005, during Reactor Protection Logic Functional testing. The cause of the event was human error due to inadequate work practices where the technician performing the test failed to adhere to the procedure. LER-2008-003 reported the actuation of an EDG due to the inadvertent action of the UV sensing circuit on bus 5A. The cause of the inadvertent actuation was procedure use and adherence. LER-2008-004 reported inadvertent actuation of AFWPs 31 and 33 during Reactor Protection Logic Channel Functional testing caused by incorrect jumper connection due to personnel error. The events reported in LER-2005-003, LER-2008-003, and LER-2008-004 do have a similar cause to this event because those events were determined to be caused by human performance errors although for this event there was insufficient objective evidence that a meter lead short did occur therefore, a Human Performance error could not be concluded as the cause of the event.

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 accidents or transients requiring the EDGs. Required power from both offsite sources and onsite emergency power were available and the actuation circuitry and EDG performed in accordance with design and minimum safeguards power was available to power safety loads. There was no significant core reactivity change as there was no automatic movement of the control rods, reactor power increased approximate 0.1%, and there was a 1-2% change in SG level. The changes were well within the actuation limits of the reactor protection system.