



Indian Point Energy Center
450 Broadway, GSB
P.O. Box 249
Buchanan, N.Y. 10511-0249
Tel (914) 254-6700

Lawrence Coyle
Site Vice President

NL-15-087

August 14, 2015

U.S. Nuclear Regulatory Commission
Document Control Desk
11545 Rockville Pike, TWFN-2 F1
Rockville, MD 20852-2738

SUBJECT: Licensee Event Report # 2015-005-00, "Automatic Reactor Trip Due to a Turbine-Generator Trip Caused by the Trip of 345kV Main Generator Output Breaker 3 due to a Failure of South Ring Bus 345kV Breaker 5"
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) 2015-005-00. The attached LER identifies an event where the reactor automatically tripped, which is reportable under 10 CFR 50.73(a)(2)(iv)(A). As a result of the reactor trip, the Auxiliary Feedwater System was actuated, which is also reportable under 10 CFR 50.73(a)(2)(iv)(A). This condition was recorded in the Entergy Corrective Action Program as Condition Report CR-IP3-2015-03487.

There are no new commitments identified in this letter. Should you have any questions regarding this submittal, please contact Mr. Robert Walpole, Manager, Regulatory Assurance at (914) 254-6710.

Sincerely,


LC/cbr

cc: Mr. Daniel H. Dorman, Regional Administrator, NRC Region I
NRC Resident Inspector's Office, Indian Point Energy Center
Ms. Bridget Frymire, New York State Public Service Commission

IE22
NRR

LICENSEE EVENT REPORT (LER)

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 Records and FOIA/Privacy Service 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: INDIAN POINT 3

2. DOCKET NUMBER
05000-2863. PAGE
1 OF 4

4. TITLE: Automatic Reactor Trip Due to a Turbine-Generator Trip Caused by the Trip of 345kV Main Generator Output Breaker 3 due to a Failure of South Ring Bus 345kV Breaker 5

| 5. EVENT DATE | | | 6. LER NUMBER | | | 7. REPORT DATE | | | 8. OTHER FACILITIES INVOLVED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REV. NO. | MONTH | DAY | YEAR | FACILITY NAME | DOCKET NUMBER | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 15 | 2015 | 2015 | 005 - 00 | | 8 | 14 | 2015 | FACILITY NAME | DOCKET NUMBER 05000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. OPERATING MODE 1 | | | 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10. POWER LEVEL 100% | | | <table border="0"><tr><td><input type="checkbox"/> 20.2201(b)</td><td><input type="checkbox"/> 20.2203(a)(3)(i)</td><td><input type="checkbox"/> 50.73(a)(2)(i)(C)</td><td><input type="checkbox"/> 50.73(a)(2)(vii)</td></tr><tr><td><input type="checkbox"/> 20.2201(d)</td><td><input type="checkbox"/> 20.2203(a)(3)(ii)</td><td><input type="checkbox"/> 50.73(a)(2)(ii)(A)</td><td><input type="checkbox"/> 50.73(a)(2)(viii)(A)</td></tr><tr><td><input type="checkbox"/> 20.2203(a)(1)</td><td><input type="checkbox"/> 20.2203(a)(4)</td><td><input type="checkbox"/> 50.73(a)(2)(ii)(B)</td><td><input type="checkbox"/> 50.73(a)(2)(viii)(B)</td></tr><tr><td><input type="checkbox"/> 20.2203(a)(2)(i)</td><td><input type="checkbox"/> 50.36(c)(1)(i)(A)</td><td><input type="checkbox"/> 50.73(a)(2)(iii)</td><td><input type="checkbox"/> 50.73(a)(2)(ix)(A)</td></tr><tr><td><input type="checkbox"/> 20.2203(a)(2)(ii)</td><td><input type="checkbox"/> 50.36(c)(1)(ii)(A)</td><td><input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)</td><td><input type="checkbox"/> 50.73(a)(2)(x)</td></tr><tr><td><input type="checkbox"/> 20.2203(a)(2)(iii)</td><td><input type="checkbox"/> 50.36(c)(2)</td><td><input type="checkbox"/> 50.73(a)(2)(v)(A)</td><td><input type="checkbox"/> 73.71(a)(4)</td></tr><tr><td><input type="checkbox"/> 20.2203(a)(2)(iv)</td><td><input type="checkbox"/> 50.46(a)(3)(ii)</td><td><input type="checkbox"/> 50.73(a)(2)(v)(B)</td><td><input type="checkbox"/> 73.71(a)(5)</td></tr><tr><td><input type="checkbox"/> 20.2203(a)(2)(v)</td><td><input type="checkbox"/> 50.73(a)(2)(i)(A)</td><td><input type="checkbox"/> 50.73(a)(2)(v)(C)</td><td><input type="checkbox"/> OTHER</td></tr><tr><td><input type="checkbox"/> 20.2203(a)(2)(vi)</td><td><input type="checkbox"/> 50.73(a)(2)(i)(B)</td><td><input type="checkbox"/> 50.73(a)(2)(v)(D)</td><td></td></tr></table> | | | | | | | | <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) | <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 checked="" 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 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) | |
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| Specify in Abstract below or in NRC Form 366A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

12. LICENSEE CONTACT FOR THIS LER

NAME
Richard Machado, Engineering Systems-ElectricalTELEPHONE NUMBER (Include Area Code)
(914) 254-7784

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 |
|-------|--------|-----------|--------------|--------------------|-------|--------|-----------|--------------|--------------------|
| X | FK | BKR | I004 | Y | | | | | |

14. SUPPLEMENTAL REPORT EXPECTED

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

15. EXPECTED SUBMISSION DATE

| MONTH | DAY | YEAR |
|-------|-----|------|
| 10 | 31 | 2015 |

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

On June 15, 2015, an automatic reactor trip (RT) occurred due to a Main Turbine-Generator trip as a result of a direct generator trip from the Buchanan switchyard. All control rods fully inserted and all required safety systems functioned properly. The plant was stabilized in hot standby with decay heat being removed by the condenser. There was no radiation release. The emergency diesel generators did not start as offsite power remained available. The auxiliary feedwater system actuated as expected due to steam generator low level from shrink effect. Prior to the RT, Con Edison requested that Main Generator Output breaker 1 be opened to support removing 345kV feeder W97 from service for removal of a Mylar balloon on a 345kV conductor at the Millwood substation. After breaker 1 was opened, Main Generator Output breaker 3 opened initiating a direct generator trip signal due to a fault in South Ring Bus breaker 5. Direct cause of the RT was failure of 345kV breaker 5 which activated protective relays that opened the remaining Main Generator Output breaker 3 which initiated a trip sequence that resulted in a RT. No apparent cause has been determined. Con Edison owns breaker 5 and is performing an investigation and evaluation and will provide a report to Entergy. Corrective actions include replacement of breaker 5 and any necessary actions identified from the completion of the cause evaluation. The event had no effect on public health and safety.

LICENSEE EVENT REPORT (LER)

| FACILITY NAME (1) | DOCKET (2) | LER NUMBER (6) | | | PAGE (3) |
|---------------------|------------|----------------|----------------------|--------------------|----------|
| Indian Point Unit 3 | 05000-286 | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | 2 OF 4 |
| | | 2015 | - 005 | - 00 | |

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 June 15, 2015, while at 100 percent reactor power, an automatic reactor trip (RT) {JC} occurred at 19:20 hours, due to a Main Turbine {TA} Main Generator {TB} trip as a result of a direct generator trip from the Buchanan switchyard. All control rods {AA} fully inserted and all required safety systems functioned properly. The plant was stabilized in hot standby with decay heat being removed by the condenser {SG}. There was no radiation release. The emergency diesel generators {EK} did not start as offsite power remained available. The auxiliary feedwater system {BA} actuated as expected due to steam generator {AB} low level from shrink effect. An investigation into the cause of the event and a post transient evaluation was initiated. The event was recorded in the Indian Point corrective action program (CAP) as Condition Report CR-IP3-2015-03487.

Prior to the RT Control Room operators were informed by the Con Edison District Operator (DO) at 11:43 hours, of an issue on 345 kV feeder W97 {FK}. At 16:15 hours, the Con Edison DO reported the issue with feeder W97 which also affected feeder W93 requiring both feeders to be de-energized. The outage for the scheduled work was expected to last approximately one hour and was designated a Category 2 emergency (Equipment is in danger of failure but does not pose an immediate hazard to people or other equipment) in accordance with IP-SMM-OP-104 (Offsite Power and Continuous Monitoring and Notification). The issue concerned a Mylar balloon on the top conductor of feeder W97 just outside of the Millwood 345 kV substation. To support the Con Edison request for removing feeder W97 from service, the Unit 3 Main Generator Output breaker {BKR} (345kV Breaker 1) had to be opened. On June 15, 2015, at 19:16 hours, 345kV Breaker 1 was opened in accordance with 3-SOP-EL-017 (Operation of 345kV Breakers #1 and #3). Shortly after opening 345kV Breaker 1, South Ring Bus {FK} 345kV Breaker 5 failed causing Main Generator Output Breaker 3 to auto open and the automatic trip of feeders Y88, W98 and W96. In accordance with design, opening of 345kV Breakers 1 and 3 will trip the 86 Primary and 86 Backup lockout relays and initiate a turbine trip which will cause a RT. The following relays were tripped: 1) 345kV Line BU Ground Fault Detected (W96), 2) 345kV Line Backup Phase Fault Detected (A, C), 3) 345kV Line Phase Fault Detected (A, C), 4) 345kV Line Primary Ground Fault Detected.

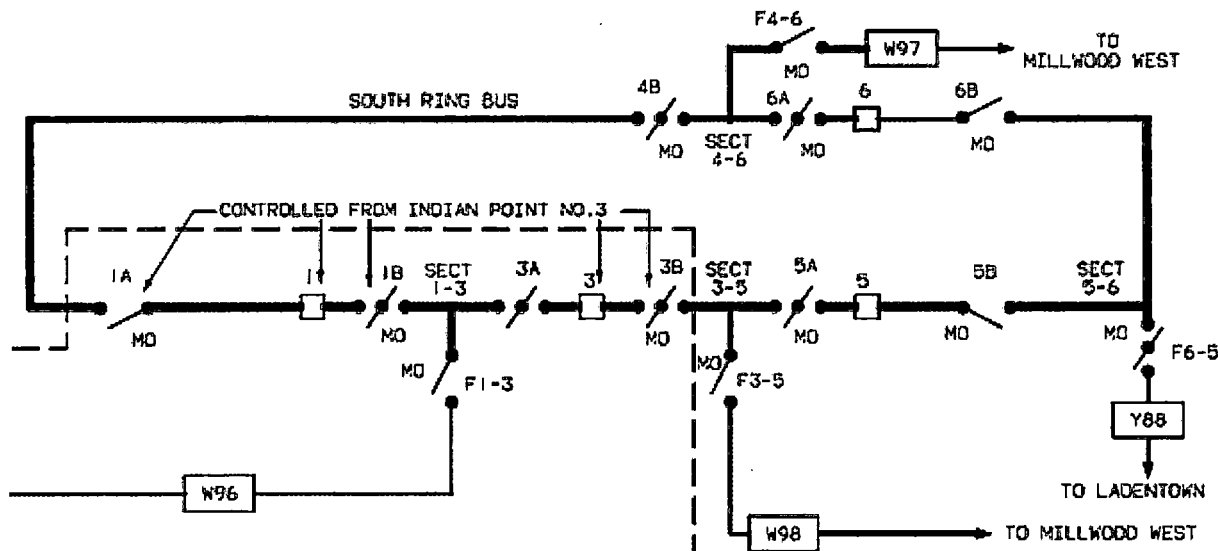
The Unit 3 High Voltage Electrical Distribution System consists of the following subsystems: 1) 22kV system, 2) 345kV system, and 3) 138kV and 13.8kV system. The Unit 3 Main Generator supplies electrical power at 22kV through isolated phase bus to the two Main Transformers (MT). The MTs increase the voltage of the generator output to 345kV which is transmitted to the Buchanan Substation South Ring Bus via feeder W96. The Buchanan Substation contains two 345kV Ring Buses (North and South) and a 138kV bus. The South Ring Bus is normally supplied by Unit 3 and the North Ring Bus by Unit 2. The South Ring Bus is connected to the Millwood West Substation via two feeders, W97 and W98 and to the Ladentown Substation via feeder Y88. The South Ring Bus consists of four 345kV breakers, numbered 1, 3, 5 and 6. The 345kV breaker #5 was a Power Circuit Breaker, Type 345GA 25-30, SN 41-39006-2044, manufactured by ITE Imperial Corporation {I004} in 1971 and installed in 1973. This breaker is owned by Con Edison.

An extent of condition investigation determined that the Indian Point Energy Center (IPEC) does not own any 345kV circuit breakers manufactured by ITE. Prior to replacement in 2003, Main Generator Output Breakers 1 and 3 were ITE circuit breakers.

LICENSEE EVENT REPORT (LER)

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Figure of South Ring Bus at Buchanan 345kV Substation



As a result of two successive in-service failures of breaker 3, both breaker 1 and 3 were replaced with HVB Model SF6 circuit breakers. Con Edison has also replaced breaker 6 leaving no other same style 345kV breakers in the Buchanan switchyard. 138kV breakers are considered similar in that they are high power circuit breakers. 138kV breaker BT5-6 is manufactured by ITE. Based on the results of Preventive Maintenance (PM)s performed on BT5-6, it was determined the probability of an in-service failure was medium. 138kV breaker BT5-6 is scheduled for replacement in the 2019 refueling outage. The PMs performed and their periodicities are consistent with ENN-EP-G-004 (Switchyard and Large Power Transformer Preventive Maintenance Guidelines). A review of the PM results did not show any negative or degrading trend.

The Cause of Event

The apparent cause has not been determined. Con Edison who owns breaker 5 will perform a detailed failure analysis with assistance from the breaker manufacturer and determine the root cause and provide a report to Entergy. The direct cause of the RT was an internal fault to ground of the 345 kV Breaker 5 Phase C. An initial internal inspection of breaker 5 revealed extensive damage to Phase C. The trip of breaker 5 activated protective relays that opened breaker 3 which caused a direct generator trip resulting in a turbine trip and RT.

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| Indian Point Unit 3 | 05000-286 | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | 4 OF 4 |
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NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

Corrective Actions

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

- A detailed inspection and failure analysis of 345kV breaker 5 is being performed by Con Edison to identify the specific failure mechanism and root cause. The Con Edison report will be provided to Entergy and the Entergy Apparent Cause Evaluation will be updated.
- 345kV Breaker 5 will be replaced by Con Edison.
- This LER will be revised as necessary based on the results of the Con Edison report after breaker inspection and evaluation.

Event Analysis

The event is reportable under 10CFR50.73(a)(2)(iv)(A). The licensee shall report any event or condition that resulted in manual or automatic actuation of any of the systems listed under 10CFR50.73(a)(2)(iv)(B). Systems to which the requirements of 10CFR50.73(a)(2)(iv)(A) apply for this event include the Reactor Protection System (RPS) including RT and AFWS actuation. This event meets the reporting criteria because an automatic RT was initiated at 19:20 hours, on June 15, 2015, and the AFWS actuated as a result of the RT. On June 15, 2015, at 20:15 hours, a notification was made in accordance with 10 CFR 50.72: a 4-hour non-emergency notification for an actuation of the reactor protection system {JC} while critical under 10 CFR 50.72(b)(2)(iv)(B), and an 8-hour notification under 10CFR50.72(b)(3)(iv)(A) for a valid actuation of the AFW System (Event Log #51156).

As all primary safety systems functioned properly there was no safety system functional failure reportable under 10CFR50.73(a)(2)(v).

Past Similar Events

A review was performed of previous Licensee Event Reports (LERs) in the past three years reporting a RT as a result of a high voltage breaker failure. No LERs were identified.

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 the event was an uncomplicated reactor trip with no other transients or accidents. Required primary safety systems performed as designed when the RT was initiated. The AFWS actuation was an expected reaction as a result of low SG water level due to SG void fraction (shrink), which occurs after a RT and main steam back pressure as a result of the rapid reduction of steam flow due to turbine control valve closure.

There were no significant potential safety consequences of this event. The RPS is designed to actuate a RT for any anticipated combination of plant conditions. This event was bounded by the analyzed event described in FSAR Section 14.1.8 (Loss of External Electrical Load). All components in the RCS were designed to withstand the effects of cyclic loads due to reactor system temperature and pressure changes. For this event, rod control was in automatic and all rods inserted upon initiation of a RT. The AFWS actuated and provided required FW flow to the SGs. RCS pressure remained below the set point for pressurizer PORV or code safety valve operation and above the set point for automatic safety injection actuation. Following the RT, the plant was stabilized in hot standby.