

Indian Point 3
Nuclear Power Plant
P.O. Box 215
Buchanan, New York 10511
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September 11, 1990
IP3-90-060

Docket No. 50-286
License No. DPR-64

Document Control Desk
Mail Station PI-137
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sir:

The attached Licensee Event Report LER 90-005-00 is hereby submitted in accordance with the requirements of 10CFR50.73. This event is of the type defined in the requirements per 10CFR50.73(a)(2)(ii).

Very truly yours,

A handwritten signature in cursive script, appearing to read 'J. Russell', written over the typed name.

Joseph Russell
Resident Manager
Indian Point Three Nuclear Power Plant

ED/rj
Attachment

cc: Mr. Thomas T. Martin
Regional Administrator
Region 1
U.S. Nuclear Regulatory Commission
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King of Prussia, Pennsylvania 19406

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LICENSEE EVENT REPORT (LER)

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| FACILITY NAME (1) Indian Point Unit 3 | DOCKET NUMBER (2) 0 5 0 0 0 2 8 6 | PAGE (3) 1 OF 0 7 |
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TITLE (4) Plant Shutdown and Unusual Event Due to Emergency Diesel Generator Operability Concerns Following Modification

| EVENT DATE (5) | | | LER NUMBER (6) | | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | | |
|----------------|-----|------|----------------|-------------------|-----------------|-----------------|-----|------|-------------------------------|--|------------------|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | MONTH | DAY | YEAR | FACILITY NAMES | | DOCKET NUMBER(S) |
| 0 8 | 0 9 | 0 9 | 0 9 | 0 0 5 | 0 0 | 0 9 | 1 1 | 9 0 | | | 0 5 0 0 0 |

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)

| | | | | |
|---------------------------|-------------------|-------------------|----------------------|--|
| OPERATING MODE (9) N | 20.402(b) | 20.405(c) | 50.73(a)(2)(iv) | 73.71(b) |
| POWER LEVEL (10) 1 0 0 | 20.405(a)(1)(i) | 50.36(c)(1) | 50.73(a)(2)(v) | 73.71(c) |
| | 20.405(a)(1)(ii) | 50.36(c)(2) | 50.73(a)(2)(vii) | OTHER (Specify in Abstract below and in Text, NRC Form 366A) |
| | 20.405(a)(1)(iii) | 50.73(a)(2)(i) | 50.73(a)(2)(viii)(A) | |
| | 20.405(a)(1)(iv) | X 50.73(a)(2)(ii) | 50.73(a)(2)(viii)(B) | |
| | 20.405(a)(1)(v) | 50.73(a)(2)(iii) | 50.73(a)(2)(ix) | |

LICENSEE CONTACT FOR THIS LER (12)

| | |
|---|------------------------------------|
| NAME Edward Diamond, Senior Plant Engineer | TELEPHONE NUMBER |
| | AREA CODE: 9 1 4 7 3 6 8 0 4 5 |

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

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPRDS | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPRDS |
|-------|--------|-----------|--------------|---------------------|-------|--------|-----------|--------------|---------------------|
| X | E K | D G A | 1 5 2 | Y | | | | | |

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

| | | |
|-------|-----|------|
| MONTH | DAY | YEAR |
| | | |

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On August 9, 1990, with the reactor at 100 percent power, one emergency diesel generator was out of service and the operability of a second emergency diesel generator became suspect. The limiting condition for operation action statement of Technical Specifications for two inoperable emergency diesel generators was entered. A plant shutdown was started and an unusual event declared. The Authority has identified the root causes as poor maintenance practices and documentation insufficient. All three emergency diesel generators were restored or confirmed to be operable within the same day. The plant shutdown continued to the hot shutdown condition. The unusual event was terminated at 2035 hours on August 9, 1990. The reactor was brought critical at 2020 hours on August 10, 1990 and full power operations reached on August 12, 1990 at 1200 hours.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

DESCRIPTION OF THE EVENT

On August 9, 1990 the reactor was brought to the hot shutdown condition from 100 percent power. This action was taken in response to a loss of confidence by the plant staff in the operability of 32 emergency diesel generator (EDG) (EG) (A152) (ALCO Model No. 251E16MS) with 33 EDG out of service for installation of a modification. This occurred at 1100 hours on August 9, 1990. Technical Specification 3.7 requires two of three EDG's to be operable at all times the reactor is above the cold shutdown condition. Operators started shutting the plant down and declared an unusual event.

Hot shutdown was reached at 1540 on August 9, 1990; the unusual event was ended at 2035 when 32 EDG tested satisfactory.

INVESTIGATION OF THE EVENT

On August 3, 1990 31 EDG was modified to permit operation at a higher service water temperature limit. When operators were doing preoperational checks on 31 EDG, prior to post maintenance testing, the local control panel alarm lamp test failed. Instrumentation and Controls (I&C) Department personnel investigated and found nothing wrong except that the control power fuses were blown. With no other evidence the I&C personnel decided that the fuses had blown due to fatigue.

The fuses were replaced. 31 EDG was satisfactorily tested utilizing a full functional test, declared operable, and returned to service at 2045 on August 3, 1990.

On August 7, 1990 the modification was installed on 32 EDG. The same set of circumstances occurred prior to post maintenance testing: lamp test failed, plant personnel investigated, found nothing wrong except that control power fuses were blown. Again, this was attributed to fuse fatigue.

The fuses were replaced, 32 EDG was satisfactorily tested utilizing a full functional test, declared operable, and returned to service at 2100 on August 7, 1990.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

At 0502 on August 9, 1990, 31 and 32 EDG were tested for operability and returned to standby as required while 33 EDG was out of service for the modification installation. At 0515 the "32 EDG Auto Start Defeated" annunciator window alarmed in the control room. Personnel found that the control power fuses for 32 EDG were blown. The fuses were replaced and a work request was initiated for I&C to investigate.

Incoming day shift personnel recognized that a problem existed and ran 32 EDG at 0710 to reverify its operability and commenced restoration efforts on 33 EDG. At 0716 facility personnel notified NRC of the problem via "hotline" telephone.

I&C personnel investigating the 32 EDG control power problem noticed that relays associated with generator field flashing were energized. This is not normal for the shutdown condition. Clamp-on ammeter readings revealed that the control circuit was drawing roughly 17.5 amperes. Normal, shutdown current should be roughly 2 amperes; the fuses are rated at 15 amperes.

During the restoration of 33 EDG its control power fuses were found to be blown. With the sequence of events involving blown control power fuses and, although 32 EDG had been satisfactorily retested earlier, the operability of 32 EDG was indeterminate at this point. 33 EDG had not yet been returned to service, so at 1100 hours on August 9, 1990 operators started a plant shutdown as required by Technical Specifications LCO's 3.7.A.5 and 3.7.B.1. The facility declared an unusual event as required when a plant shutdown is required by Technical Specifications.

33 EDG was quickly restored to service. 33 EDG was satisfactorily tested utilizing a full functional test, declared operable and returned to service at 1340 hours on August 9, 1990.

The field "flashing" relays for the EDG's are actuated by a jacket water pressure switch. The EDG control scheme uses jacket water pressure as indication that the engine is up to speed since the jacket water pump is driven by the EDG crankshaft. The pressure switch actuates at roughly 8 psig and resets at roughly 1.5 psig lower.

Based on the preceding information, plant technical and engineering staff developed the following scenario:

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

Part of the modification to the EDG's was to replace a thermostatically controlled valve in each EDG's jacket water cooling system. The maintenance mechanics had to drain down the jacket water cooling system before working on the valve. They refilled the jacket water system with a portable pump when the work was completed. The portable pump was capable of pressurizing the jacket water system above the actuating pressure of the associated pressure switches.

The actuation of the pressure switches energized the field "flash" relays. Normally, the field "flash" relays would be deenergized by a voltage feedback signal from the generator voltage regulator. However, since the engine was not running, the field "flash" relays did not deenergize. This resulted in a continuous draw of 17.5 amps on the control circuit. Since this is above the 15 amp rating of the fuses but below the fuse capability curve, this condition would cause the fuse to blow, but not immediately. This was verified by a test reenactment at roughly 1430 on August 9, 1990.

The jacket water pressure switches do not have an adjustable reset pressure. The switches are calibrated for actuating pressure (8 psig ± 2 psig). Settings at the low end of the acceptable actuating pressure range may result in a reset pressure that is below the static head of the jacket water system, which is what occurred on 32 EDG. The jacket water pressure switch on 32 EDG was set to actuate at six psig. After 32 EDG was run for its operability test at 0502 hours on August 9, 1990 the jacket water pressure did not decay below the jacket water pressure switch reset pressure. As a result, the generator field "flash" relays remained energized when the 32 EDG engine was shut down. This, in turn, caused the second set of control power fuses for 32 EDG to blow at 0515.

The plant shutdown was continued to the hot shutdown condition, which was reached at 1540. The unusual event was terminated at 2035, when 32 EDG was satisfactorily retested. An engineering evaluation and visual inspection judged that the extended field "flash" did not damage the generators or exciters.

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TEXT (If more space is required, use additional NRC Form 368A's) (17)

CAUSE OF THE EVENT

The cause of the event was the interaction that occurred between the installation of the mechanical, thermostatically controlled valve in the EDG's jacket water systems and the excitation system.

The following root causes have been identified as contributing to this event:

1. Poor maintenance practice - poor practices were employed refilling the EDG jacket water system.
2. Documentation insufficient - plant design documentation does not provide analysis or justification for the jacket water pressure switch set and reset pressures.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

CORRECTIVE ACTIONS

- 1) An engineering evaluation and visual inspection judged that the extended field "flash" did not damage the generators or exciters.
- 2) The control fuses were replaced in each EDG control cabinet.
- 3) All EDG's were tested with a full function surveillance test before returning the plant to service.
- 4) All EDG's were satisfactorily tested before we terminated the unusual event.
- 5) A temporary procedure change to surveillance procedure 3PT-V16, Diesel Generator Functional Test, has been issued to verify that the jacket water pressure switch is reset at the test's conclusion.
- 6) The Maintenance Department will insure that the poor work practices regarding draining and filling the jacket water systems are not repeated by developing a written procedure to address this aspect of the job.
- 7) Analysis and reevaluation of the EDG jacket water pressure switch setpoints will be resolved before the end of the refueling outage.

ANALYSIS OF THE EVENT

This event is reportable under 10CFR50.73(a)(2)(i)(B). The plant was conservatively judged to be in a condition prohibited by the plant's Technical Specifications. 33 EDG was inoperable, held-off for maintenance, from 0525 on August 8, 1990 until 1340 on August 9, 1990. During this time period, plant management lost confidence in the operability of 32 EDG starting at 1100 hours on August 9, 1990. A second EDG, 33, was restored to operable status at 1340 hours on August 9, 1990. Thus, the facility operated at power for a total of 2 hours, 40 minutes with two potentially inoperable EDG's. This is contrary to Technical Specification 3.7.B.1, which allows one EDG to be inoperable for 72 hours when the plant is above cold shutdown. In retrospect, 32 EDG was capable of being operated throughout this time frame.

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During the time of questionable EDG operability, the situation was further mitigated by virtue of:

- 1) Offsite power was continuously available from 138KV and 13.8KV feeders.
- 2) The "Appendix R" diesel generator was available as an additional onsite power source. The "Appendix R" diesel generator was not affected by the ultimate heat sink modification as its cooling system is independent of the service water system.

SECURING FROM THE EVENT

The plant declared all three EDG's operable at 2035 on August 9, 1990 and terminated the unusual event. The plant shutdown to the hot shutdown condition was completed at 1540 on August 9, 1990.

Operators took the reactor to the critical condition at 2020 on August 10, 1990, synchronized the main generator to the grid at 0455 on August 11, 1990, and reached full power at 1200 on August 12, 1990.

Pursuant to 10CFR50.72(b)(ii)(B), the Authority made a one hour event notification to NRC at 0716 on August 9, 1990 after we determined that a 30 minute period with two inoperable EDG's occurred between 0515 and 0545 that day.

Pursuant to 10CFR50.72(b)(i)(A) and 10CFR50.72(a)(i), the Authority made a one hour event notification to NRC at 1100 hours on August 9, 1990 for the initiation of a plant shutdown required by Technical Specifications and the declaration of an unusual event when the operability of 32 EDG was determined questionable with 33 EDG out of service. No similar events or LER's have occurred or been reported to date.