

Indian Point 3  
Nuclear Power Plant  
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John H. Garrity  
Resident Manager

December 4, 1993  
IPN-93-156

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

Subject: Indian Point Unit 3 Nuclear Power Plant  
Docket No. 50-286  
License No. DPR-64  
Reply to Notice of Violation of 10CFR50, Appendix B, Criterion III, Design  
Control (50-286/93-18-01)

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Dear Sir:

The Authority agrees with the subject violation contained in the NRC Region I Inspection Report 50-286/93-18. The enclosed Attachment I is the Authority's reply to the violation. A summary of the commitments made in this letter is in Attachment II.

The Authority recognizes the similarity of this event to the design control event described in the Escalated Enforcement Item 93-22-08, which will be discussed at the Enforcement Conference on December 10, 1993.

Very truly yours,

A handwritten signature in black ink, appearing to read 'JH Garrity', written over a horizontal line.

John H. Garrity  
Resident Manager  
Indian Point Unit 3 Nuclear Power Plant

JHG/RF/DJC

Attachments

cc: see next page

100003  
9312140155 931204  
PDR ADOCK 05000286  
Q PDR

A handwritten signature in black ink, appearing to read 'JED', written vertically along the right margin.

Docket No. 50-286  
IPN-93-156

cc: Mr. Thomas T. Martin  
Regional Administrator  
U.S. Nuclear Regulatory Commission  
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475 Allendale Road  
King of Prussia, Pennsylvania 19406-1415

Mr. Jacques P. Durr, Chief  
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U.S. Nuclear Regulatory Commission  
Resident Inspectors' Office  
Indian Point 3 Nuclear Power Plant

**Violation - Violation of Part 50 of Title 10 Appendix B, Criterion III, Design Control**

Part 50 of Title 10 of the *Code of Federal Regulations*, Appendix B, Criterion III, Design Control, requires that measures shall be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems and components.

New York Power Authority's Design Specification E-677126, Revision 0, regarding Instrumentation and Control Equipment and System Design, paragraph 5.1.3, Electric Power, established a limit for harmonic distortion of 5% on the 118 Vac regulated buses.

Contrary to the above, measures were not established for review for suitability of application of the safety-related instruments when attached to their respective 118 Vac regulated buses, in that, prior to August 13, 1993, the harmonic distortion exceeded 5% on three of the four 118 Vac regulated buses. This is a Severity Level IV Violation (Supplement I)

**Response to Violation**

NYPA agrees with this violation.

**Reason for Violation**

The cause of this event was personnel error in that engineering did not specify a test for Total Harmonic Distortion (THD) after the inverter was installed because it was not recognized that the factory specified test that verified the inverter to design specifications was not sufficient to address the synergistic effect that instrument switching power supplies have on the Elgar type inverter. This amplified reaction was not present for the original inverters that were of a ferro-resonant design.

Engineering reviewed the design process that was used in 1985 to install the new Elgar inverters. This review indicated that at that time the design control procedures did not provide a mechanism to assist the design engineer in determining the design criteria and ensure the design organization specifies testing to verify unique design requirements.

Engineering performed an initial review of the THD affects which induced a bias on the instrument loops due to magnetic transfer distortions. The review included the Reactor Protection System (RPS) and Engineered Safety Features Actuation System (ESFAS) instrumentation. Engineering determined that the function of two circuits was potentially diminished because the bias would produce a non-conservative shift in the instrument loop accuracy when the inverters transferred power source. The two circuits are High Steam Flow Safety Injection and Overpressure Protection. Engineering is performing calculations to determine these circuits' actual instrument loop drifts with the bias experienced during plant operations. Based on these preliminary calculations, the actual drifts with the bias were within the design analysis. These two circuits are not required while the plant is shut down, and these concerns will be resolved before startup.

**Corrective Actions Taken or Will Be Taken To Correct the High THD and Affect**

1. Engineering identified instrumentation required for the plant mode of operation (cold shutdown) that can be affected by the instrument buses on backup power. The operators have been informed via an Operations Department night order that these instruments may exhibit a shift upon an instrument bus being on the backup power supply. Status: Complete
2. Technical Services will complete calculations for determining the actual instrument loop drift with the bias experienced during plant operations for the two circuits High Steam Flow Safety Injection and Overpressure Protection that were potentially diminished because the bias produced a non-conservative shift. Status: Based on these preliminary calculations the actual drift with the bias was within design analysis for the circuits. These two circuits are not required while the plant is shut down, and these calculations will be completed by December 31, 1993.
3. The Authority will complete the evaluation to determine the extent of the instrument bus power/inverter THD affect on instrumentation, and will modify the instrument power bus/inverter design, and instrumentation if necessary, to ensure the design is within design basis specifications. Revised specifications will be completed by January 20, 1994. Any plant modifications will be completed by February 14, 1994. Status: Testing and the evaluation are in progress. In addition, a Westinghouse Suresine line conditioner unit was tested and demonstrated that it would effectively reduce THD on an instrument bus.
4. Instrumentation and Control Department (I&C) will develop and implement a periodic monitoring program for THD on the instrument buses. Status: In progress. Engineering is evaluating the location and test equipment to implement this monitoring program. I&C will develop the actual program after engineering is complete. This corrective action will be completed by February 14, 1994.
5. Engineering will revise the Electrical Engineering Standard, EES-6, that controls engineering design changes on bus loading to provide an additional level of assurance that THD effects are considered during modifications. Status: Nuclear Engineering Design Department, the electrical group, is evaluating all further modifications to the instrument buses with regard to their affect on THD. Revision to the engineering standard will be completed by March 1, 1994.

**Corrective Action To Preclude Recurrence**

The Authority believes that the probability of recurrence of this type of design control event has been significantly reduced by the implementation of the Modification Control Manual (MCM) and the Design Control Manual (DCM). The MCM and DCM were implemented subsequent to the design controls used at the time these inverters were installed. These manuals' procedures are more prescriptive in defining testing and design criteria development, which should reduce the risk of not detecting another unexpected modification effect. Specifically, MCM-10, "Preparation of Engineering Requirements for the Installation of Modifications" - Revision 0 of 1/22/90, and MCM-11, "Preparation of Modification Test Requirements" - Revision 0 of 1/11/90, require the design organization to identify and specify testing to ensure that unique design requirements are verified. In addition, DCM-13 "Conduct of Engineering" - Revision 2 of 12/3/92, provides specific check lists that assist the design engineer in the determination of design criteria.

**Date When Full Compliance Will Be Achieved**

The Authority believes we are in full compliance with Part 50 of Title 10 of the *Code of Federal Regulations*, Appendix B, Criterion III, Design Control. The MCM and DCM described above established the measures and provide the controls required for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems and components.

Attachment II  
Reply to Notice of Violation 50-286/93-18-01

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Number	Commitment	Due
IPN-93-156-01	Technical Services will complete calculations for determining the actual instrument loop drift with the bias experienced during plant operations for the two circuits High Steam Flow Safety Injection and Overpressure Protection that were potentially diminished because the bias produced a non-conservative shift.	December 31, 1993
IPN-93-156-02	The Authority will complete the evaluation to determine the extent of the instrument bus power/inverter THD affect on instrumentation, and will modify the instrument power bus/inverter design, and instrumentation if necessary, to ensure the design is within design basis specifications.	February 14, 1994
IPN-93-156-03	Instrumentation and Control Department will develop and implement a periodic monitoring program for THD on the instrument buses.	February 14, 1994
IPN-93-156-04	Engineering will revise the Electrical Engineering Standard, EES-6, that controls engineering design changes on bus loading to provide an additional level of assurance that THD effects are considered during modifications.	March 1, 1994