123 Main Street
White Plains, New York 10
914 681 6200

**New York Power Authority**

J. Phillip Bayne
Executive Vice President
Nuclear Generation

July 16, 1984
IPN-84-23

Director of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing

Subject: Indian Point 3 Nuclear Power Plant (IP-3)
Docket No. 50-286
Adequacy of Station Electric Distribution System Voltages

References:

1) Letter from S. A. Varga to L. W. Sinclair dated February 19, 1982 entitled: "Adequacy of Station Electric Distribution System Voltages," and Associated Safety Evaluation Report (SER).

2) Letter from J. P. Bayne to S. A. Varga dated March 24, 1982 (IPN-82-27) entitled: "Adequacy of Station Electric Distribution System Voltages."

3) Letter dated August 8, 1979 from W. Gammill to Power Reactor Licensees ("Adequacy of Station Electric Distribution Systems Voltages").

4) Letter from J. P. Bayne to S. A. Varga dated April 30, 1984 (IPN-84-16) entitled: "Degraded Grid Voltage (DGV) Protection for Class 1E Power Systems."

Dear Sir:

The purpose of this letter is to advise you of the status of the ongoing activities associated with the subject item. The NRC's SER (Reference 1) concluded that the offsite power system and onsite distribution system for IP-3 will be capable of providing acceptable voltages at the terminals of Class 1E equipment for the worst case station electric load and grid voltages provided satisfactory results are obtained from: 1) voltage analyses verification testing, and 2) 480-volt motor starter voltage verification analyses for transient voltage conditions. Per Reference 2, the Authority indicated the results of these tests and analyses would be submitted 90 days after completion of the final test. Due to the steam and electric generator repair outages, these tests were only recently completed.

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The testing efforts conducted by the Authority consisted of two phases. The first phase involved the measurement of motor terminal and motor starting voltages for the worst case safety related load feeders as identified by the original computer analyses. In addition, sample testing of 480-volt motor starters was performed to assess pick-up and drop-out voltage characteristics. This phase of work was performed while the plant was shutdown. The second phase involved measurement of bus voltages, load flows and safety related motor control center (MCC) voltages with the plant at power.

Upon collection and tabulation of these test measurements, the correlation aspects of the verification tests were initiated. As part of the work associated with the verification tests and correlation studies, it was deemed appropriate to update the original computer model to more accurately reflect the plant configuration as it currently exists. The testing effort included means to facilitate this updating. As such, the updated model rather than the original model developed in the late 1970's was used as the basis for the correlation effort.

Attachment A presents the results of the Phase I and Phase II Correlation Studies and demonstrates the validity of the revised computer model.

The Authority is currently in the process of verifying the proper operation of 480 volt safety related equipment including the 480-volt motor starters during transient voltage conditions in accordance with the second concern contained in Reference 1 as cited above. It is expected that these results will be provided to the NRC staff by late August of this year. Along with these results, the Authority will also provide all necessary revisions to the responses previously provided to the NRC's Reference 3 letter. These revisions will reflect updated results generated by the revised computer model discussed above.

Information obtained from the transient voltage analyses currently in progress will be utilized to resolve the concerns stated in the Authority's Reference 4 letter. As indicated in this letter, the Authority had anticipated that revised technical specifications (T/S's) based on the modification option selected for the degraded grid voltage (DGV) protection system would be provided to your staff by August 16, 1984. The Authority intends, however, to present a "complete" package of information in the interest of closing this as well as the other issues discussed above. As such, the degraded grid voltage information together with the information discussed above will be transmitted by late August of this year.

Should you have any questions, please contact Mr. P. Kokolakis of my staff.

Very truly yours,

J. P. Bayne
Executive Vice President
Nuclear Generation

cc: Resident Inspector's Office
Indian Point Unit 3
U. S. Nuclear Regulatory Commission
P. O. Box 66
Buchanan, New York 10511

ATTACHMENT A

## 1.0 PHASE I Correlation Studies

1.1 Percent error between computed and measured motor terminal voltages:

| | | Voltage Measured (volts) | Voltage Calculated (volts) | Percent Error |
|---|---|---|---|---|
| 1.1.1 | SWP 32 | 469.3 | 476.9 | +1.6 |
| 1.1.2 | MOV 746 | 462.5 | 463.5 | +0.2 |
| 1.1.3 | MOV 899A | 466.9 | 474.0 | +1.5 |

1.2 Percent error between computer modeled and measured motor starting voltages:

| | | Voltage Measured (volts) | Voltage Calculated (volts) | Percent Error |
|---|---|---|---|---|
| 1.2.1 | SWP 32 | 392.0 | 390.9 | -0.3 |
| 1.2.2 | MOV 746 | 398.5 | 399.0 | +0.1 |
| 1.2.3 | MOV 899A | 394.0 | 396.0 | +0.5 |

## 2.0 PHASE II Correlation Studies

Percent error between computer modeled and measured 480v bus voltages:

2.1 Unit Auxiliary Transformer feeding 6.9 KV Buses 1, 2, 3, and 4:

| | | Voltage Measured (volts) | Voltage Calculated (volts) | Percent Error |
|---|---|---|---|---|
| 2.1.1 | Bus 2A | 460.8 | 461.2 | +0.1 |
| 2.1.2 | Bus 3A | 464.4 | 462.3 | -0.5 |

2.2 Station Auxiliary Transfromer feeding 6.9KV Buses 1, 2, 3, 4, 5, and 6:

| | Voltage Measured (volts) | Voltage Calculated (volts) | Percent Error |
|---|---|---|---|
| 2.2.1 Bus 2A | 456.0 | 464.3 | +1.8 |
| 2.2.2 Bus 3A | 457.2 | 464.8 | +1.7 |
| 2.2.3 Bus 5A | 448.8 | 458.3 | +2.1 |
| 2.2.4 Bus 6A | 452.8 | 458.2 | +1.2 |
| 2.2.5 MCC 36A | 439.2 | 458.3 | +4.3 * |
| 2.2.6 MCC 36B | 442.8 | 458.3 | +3.5 * |

* Errors indicated are due to accuracy problems associated with the MCC strip chart recorder. The measured voltage at each MCC should have coincided with the measured voltage at each MCC's respective 480-volt bus, since there were no loads on either MCC.