123 Main Street
White Plains, New York
914 681.6240

Corbin A. McNeill
Senior Vice President
Nuclear Generation

January 15, 1985
IPN-85-03

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
Additional Information Regarding Degraded
Grid Protection for Class 1E Power Systems

References:

1) Letter from S.A. Varga to J.P. Bayne dated November 26, 1984 regarding additional information on degraded grid voltage protection monthly surveillance tests.

2) 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."

3) Letter from J.P. Bayne to S.A. Varga dated August 31, 1984 (IPN-84-35) entitled: "Degraded Grid Voltage (DGV) Protection for Class 1E Power Systems and Related Proposed Changes to the Technical Specifications."

Dear Sir:

Attachment A to this letter provides the information requested in Reference 1 regarding the potential for and consequences of an inadvertent isolation of a 480v bus during monthly surveillance testing of the 480-volt loss of voltage (LOV) relays.

The proposed testing features for the LOV relays have been designed so as to minimize the potential for inadvertent trips. While the design has not yet been finalized, the design philosophy being adopted can be summarized as follows: (1) independence of the redundant protection relays during the test mode on a bus-specific basis; (2) a simplified testing scheme; (3) a definitive identification of the LOV circuitry to be tested and the balance of LOV circuitry not able to be tested because of its logic actuation function; (4) incorporation of positive action features to

A015
1/1

insure circuit security and restoration; and (5) inability of the LOV circuitry under test to trip the logic input control relay thereby preventing a trip of the bus feeder breaker and load shedding by the LOV circuitry under test.

While the proposed monthly surveillance of the LOV circuitry is considered acceptable, it is recognized that less frequent testing can further minimize the potential for challenges to safety equipment as well as reduce degradation of safety related components. Specifically, the work of the NRC Staff Task Group which studied the issue of Technical Specification surveillance requirements is cited. Their recommendations, published in NUREG 1024, Technical Specifications - Enhancing the Safety Impact, included the need to review the basis for surveillance requirements and their effects on safety related components. The findings of the Task Group are especially applicable in this instance. Recommendations 2 and 4 of the Task Group suggest that surveillance requirements be reviewed to assure that important safety equipment is not degraded as a result of testing, that such tests are conducted in a safe manner and in the appropriate operational mode, and that such tests do not consume plant personnel time unnecessarily.

The Authority had originally proposed to test the 480-volt LOV relays on a refueling basis. More frequent testing (particularly with the plant at power) was not desirable since the existing LOV circuitry was not capable of accomodating at power testing and since the potential for inadvertent bus trips would be increased. This position was consistent with evidence that excessive testing can lead to unnecessary equipment challenges which reduce plant availability and more frequent testing of certain equipment is of questionable usefulness. This is especially true in light of the excellent operating history that has typified the LOV relays.

The previously proposed surveillance interval was not consistent with that of the NRC Staff and, after several discussions, the Authority agreed to implement monthly testing. It was noted in Reference 2 that significant modification of the existing LOV circuitry would be required to allow for such monthly testing without impacting plant reliability. The monthly testing features resulting from these modifications were briefly outlined in Reference 3. A more in-depth description of the monthly testing features is provided in the attachment.

The Authority concludes that the design of the LOV circuitry test features in addition to the test procedures to be developed will minimize any potential for inadvertant isolation of a 480v bus during monthly surveillance.

Should you or your staff have any questions regarding this matter, please contact Mr. P. Kokolakis of my staff.

Very truly yours,

Corbin A. McNeill, Jr.
Senior Vice President
Nuclear Generation

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

Attachment A to IPN-85-03

Additional Information Regarding Degraded
Grid Protection for Class 1E Power Systems

This attachment provides the information requested in Reference 1 regarding the monthly testing of the 480-volt loss of voltage (LOV) relays and the potential for and consequences of inadvertant isolation of a 480v bus.

As indicated in the cover letter, the proposed testing features for the LOV relays have been designed so as to minimize the potential for inadvertent trips. While the design has not yet been finalized, the design philosophy being adopted can be summarized as follows: (1) independence of the redundant protection relays during the test mode on a bus-specific basis; (2) a simplified testing scheme; (3) a definitive identification of the LOV circuitry to be tested and the balance of LOV circuitry not able to be tested because of its logic actuation function; (4) incorporation of positive action features to insure circuit security and restoration; and (5) inability of the LOV circuitry under test to trip the logic input control relay thereby preventing a trip of the bus feeder breaker and load shedding by the LOV circuitry under test.

During the monthly tests of the 480-volt LOV protection circuitry, each 480-volt bus will be tested individually. For the three 480-volt buses not in the test mode, full LOV protection will be available. For the one 480-volt bus in the test mode, advantage

will be taken of the one-out-of-two LOV actuation logic. Since only one channel will be tested at a time on the particular bus being tested, the LOV protection for that bus will revert to a one-out-of-one logic during the test mode via the channel not being tested.

The proposed test scheme for the LOV circuitry extends from the initial LOV sensing relays (Westinghouse type CV-7 inverse time relays) to the control relays that input to the actuation logic. The control relays themselves will not be actuated; however, the integrity of their coils will be verified by energization of a light circuit. It is anticipated that the test scheme will utilize a three-position maintained key-operated switch. The center position of this switch will be the key input and key removal position and will correspond to the normal (i.e., non-test) condition. The positions directly to the left and right of center will correspond to the test mode for each of the two LOV relay sensors associated with the particular bus LOV protection being tested.

The key-operated switch incorporates security and restoration features by requiring positive action to initiate and terminate testing. Use of the switch also precludes the possibility of testing more than one LOV relay at a time. Placement of the switch in other than its center position (i.e., placement of the switch in one of the two possible test conditions) will annunciate an alarm in the central control room (CCR) and will prevent operation of the

associated logic input control relay from the particular channel being tested. As indicated above, however, the channel not in the test mode will remain operable to provide for one-out-of-one LOV protection on the particular 480-volt bus undergoing the test.

In addition to the three-position maintained key-operated switch testing feature and its associated CCR alarm, other features are planned to minimize the potential for inadvertent 480-volt bus trips. These features include positive indication at the 480-volt switchgear for the particular LOV channel being tested in addition to positive indication in the CCR of operation of an LOV or degraded grid voltage (DGV) relay. These positive indications will consist of light circuits which will be energized or de-energized as appropriate. Current plans provide for eight individual light circuits installed at the 480-volt switchgear corresponding to each of the LOV protection channels. Whenever a particular channel is placed in the test mode, the light circuit corresponding to that channel will be energized thus minimizing the possibility of not properly identifying the channel which is in the test mode. In addition, it is currently planned to install a series light circuit to monitor both LOV and DGV protection channels in the CCR. Should this circuit be de-energized, the CCR would be alerted to the operation of either the LOV or DGV relays.

These positive indications will further insure restoration of LOV protection upon termination of the monthly tests.

The Authority is confident that the proposed testing design features described above in addition to the testing procedures that will be developed for monthly testing of the LOV protection circuitry will serve to minimize the potential for inadvertent 480-volt bus trips during such tests. In fact, the testing design features have been developed as a result of this very concern, which is not unique to the NRC staff. Nevertheless, the Authority assessed the consequences of an inadvertent 480-volt bus trip and the resultant automatic operations that would transpire by evaluating the impact of an inadvertant bus trip under certain plant operating conditions. The results of this investigation indicate that the loss of a single 480-volt bus from the preferred source of offsite power, while potentially disruptive to equipment powered from the bus, should not cause a reactor trip within the time-frame that the event would be recognized and subsequent rectifying action taken. This is especially true in light of the fact that the CCR will have been alerted that the LOV protection circuitry was being tested.