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February 10, 1983
IPN-83-12

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 Unit 3
Docket No. 50-286
Additional Information Regarding Degraded
Grid Protection for Class 1E Power Systems

Dear Sir:

Attachment A to this letter provides the Authority's responses to the four conclusions cited in the Safety Evaluation Report (SER) for "Degraded Grid Voltage Protection for the Class 1E System" as transmitted in your September 29, 1982 letter. The Authority trusts that these responses will provide sufficient resolution of the subject items.

Should you or your staff have any further questions regarding this matter, 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 3
U.S. Nuclear Regulatory Commission
P.O. Box 66
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1. The proposed setpoint for the degraded voltage relays of ≥ 398 volts is too low to assure the pickup of the 480 volt Class 1E motor control center (MCC) contactors.

The Authority's proposed degraded grid voltage setpoint of ≥ 398 volts corresponds to the previously identified limiting value. The Authority maintains that the 398 volt setpoint should not be construed as being too low. The pickup voltage value of 408 volts for the 480 volt MCC contactors discussed in the NRC's September 29, 1982 SER corresponds to a pickup rating of 85% of 480 volts which was previously provided in submittals dated August 29, 1977 and June 12, 1981. This value, as clarified by the August 29, 1977 submittal, was derived from manufacturer's literature. The Authority has included testing of motor starters for pickup and drop-out characteristics as part of the testing program for verification of the results of data submitted. Preliminary test data for the starters tested indicate that the pickup value supplied by the vendors for the starters is conservative. The test data obtained are still being evaluated. However, the Authority realizes that an increase in the degraded grid voltage relays setpoint will not have an adverse impact on the electrical system and therefore proposes to increase the setpoint to ≥ 408 volts.

2. The loss of voltage relays which have a one-out-of-two logic could subject the Class 1E busses to spurious trips from a single failure.

The Authority does not concur with this conclusion. The Authority agrees that a single failure causing the spurious operation of one relay could lead to an undesirable separation of one 480 volt bus from the preferred source of offsite power. However, the Authority maintains that a single failure in the NRC's proposed two-out-of-two logic has the capability of preventing the 480 volt bus from shedding load, tieing the standby diesel generator onto the bus, and sequencing safeguard loads onto the bus. The Authority also maintains that it is preferable to assure that the standby onsite power source be available to re-energize the bus rather than to prevent the spurious loss of one 480 volt bus which, in most cases, will not affect the unit. The Authority will continue to conform to the "fail-safe" concept and will retain the present logic configuration.

3. The proposed delay of $\leq$ 210 seconds for the degraded voltage relays could expose equipment to severe degraded voltage and may prevent equipment from starting under accident conditions and could lead to equipment damage. The proposed time delay exceeds the time delay assumed in the accident analysis for delivering cooling to the core under accident conditions.

The Authority does not concur with this item. As stated in the NRC's SER of September 29, 1982, there is a concern that under accident conditions safety equipment could be exposed to voltages as low 46% of nominal for 210 seconds. The Authority maintains that this will not be the case. The Authority has previously stated that for voltages of 81% of nominal or less, a third level of undervoltage relaying (on the 6.9 Kv busses) exists that will experience this low voltage condition and operate after a time delay to trip their respective busses. The time delay is set at 30 seconds and the undervoltage relay is a Westinghouse CV-7 relay with an inverse time characteristic which means that the greater the voltage drop the faster the relay will operate to isolate the 6.9 Kv bus from its source. The corresponding loss of voltage relays would then operate once the decaying voltage on the 480 volt busses reaches their setpoint to activate the backup power supply logic.

As indicated in the NRC's September 29, 1982 SER, the Commission believes an acceptable design approach for the degraded voltage relays would be to bypass the proposed $\leq$ 210 second time delay under accident conditions. The Authority has evaluated the Indian Point Unit 3 degraded grid protection as

is currently installed and has determined that bypassing the time delay will result in significant plant modifications. In order for the Authority to address this approach, it would be necessary to introduce a new coincident logic (degraded voltage and accident condition) into the 480 volt bus supply breaker trip logic or the Authority could obtain equivalent protection by utilizing the existing 81% relays (described above) and a coincident accident logic to trip the 6.9 Kv supply breaker to the 480 volt bus. Both options involve intricate wiring and new relay installations in safety-related circuits, all to address a concern that within a short timeframe a coincident accident condition would occur. A simple bypass of the degraded voltage condition timer will effectively change the logic circuitry such that on an undervoltage condition (0-46%) or accident condition (SI) the logic would automatically forsake the preferred power source (i.e., offsite power) since the accident condition logic by itself does not discriminate as to voltage conditions. The Authority does not consider bypassing the time delay for the degraded voltage relays as a desirable alternative design approach.

The Authority is currently in the process of implementing a test program to verify the results of previous studies regarding degraded grid system voltage scenarios. In addition, the Authority is currently contemplating the modification of tap changer operation to reduce the time required for full span operation.

The Authority requires time to complete and evaluate the results of these two activities to derive an adequate basis for the proposed degraded grid protection at Indian Point Unit 3 and provide assurance for precluding voltage conditions from reaching the extremes cited in the NRC's SER. It should also be noted that the August 29, 1977 submittal indicated that the safety related motors (as listed in the submittal) are capable of starting and/or are able to continue to run for voltages as low as 80% of nominal bus voltage which is below the proposed degraded voltage setpoint and the 6.9 Kv system loss of voltage setpoint.

4. The channel functional surveillance test periodicity for the loss of voltage and degraded voltage relays exceeds the "at least once per 31 days" required by the June 3, 1977 letter.

The Authority has determined that the loss of voltage relays cannot be tested without initiating a spurious trip of the associated bus. The present configuration of the circuitry is such that it is not possible to isolate these relays for performance of a channel functional surveillance test. These relays are checked and tested during each refueling outage and, to date, have an excellent operating record in that no failures have been observed. As a result, the Authority does not believe an increase in the testing frequency of these relays to be warranted, and proposes to continue the current testing frequency.

The recently installed degraded voltage relays at Indian Point Unit 3 are of a different design than the loss of voltage relays in that testability of the new relays has been designed into the circuitry. The Authority maintains, however, that testing relays while at power increases the possibility of spurious trips and does not believe an increase in the testing frequency to be warranted. The Authority therefore intends to maintain the proposed refueling frequency. However, since there is a lack of operating history associated with these new relays, the Authority proposes to increase the channel functional surveillance test frequency to a quarterly basis and will perform this test on an interim basis only if Indian Point Unit 3 is not at power and only until a sufficient operating history has been established to support the refueling test frequency.