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April 30, 1984
IPN-84-16

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 (IP-3) Nuclear Power Plant
Docket No. 50-286
Degraded Grid Voltage (DGV) Protection
for Class 1E Power Systems

- References:
- 1) Letter from S. A. Varga to L. W. Sinclair dated September 29, 1982 entitled "Degraded Grid Protection for Class 1E Power Systems" and associated Safety Evaluation Report (SER).
 - 2) Letter from J. P. Bayne to S. A. Varga (IPN-83-12) dated February 10, 1983 entitled "Additional Information Regarding Degraded Grid Protection for Class 1E Power Systems".
 - 3) Letter from J. P. Bayne to S. A. Varga (IPN-82-32) dated April 13, 1982 entitled "Proposed Changes to the Technical Specifications Related to the Indian Point 3 Station Electrical Distribution System."
 - 4) Letter from J. P. Bayne to S. A. Varga (IPN-82-27) dated March 24, 1982 entitled "Adequacy of Station Electric Distribution System Voltages."

Dear Sir:

This letter provides additional information with respect to the current status of the DGV protection system at IP-3 and is a result of recent conversations that the Authority has had with members of your staff. The information provided in Attachment A to this letter supplements and in some cases supercedes the information previously provided in the Authority's response (Reference 2) to the four conclusions cited in the NRC's SER (Reference 1) on the IP-3 DGV protection system.

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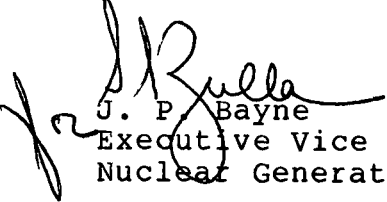
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The Authority will submit appropriate revisions to the technical specifications previously submitted in Reference 3 governing the IP-3 DGV and loss of voltage protection systems upon NRC staff acceptance of the resolutions provided in Attachment A and upon Authority selection of one of the two resolution options pertaining to the DGV relay actuation time delay as discussed in Attachment A. This latter effort is contingent upon completion of the Authority's evaluation of the data obtained from the verification tests of system voltages and transient analyses of motors as these evaluations will provide quantitative assessments of voltage degradations and associated time durations for various plant operating conditions.

Due to the recent steam generator and electric generator repair outages, the system voltage test data were only recently obtained since the plant was required to be at power to collect certain of this data. As such, the subsequent evaluation efforts will be completed by July 16, 1984 in accordance with Reference 4 at which time the results of the verification tests of system voltages and transient analyses of motors will be submitted to the NRC. It is thus anticipated that the Authority will select one of the two resolution options pertaining to the DGV relay actuation time delay for implementation and will forward all appropriate technical specification revisions governing the IP-3 DGV and loss of voltage protection systems by August 16, 1984.

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
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Attachment A to IPN-84-16
Degraded Grid Protection for Class 1E
Power Systems

NEW YORK POWER AUTHORITY
INDIAN POINT 3 NUCLEAR POWER PLANT
DOCKET NO. 50-286

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 has re-evaluated this SER conclusion. As a result, it is apparent that the limiting safety related load is that of certain motor-operated valves (MOV's) rather than the MCC contactors. Information contained in Consolidated Edison's August 29, 1977 submittal for IP-3 (W. J. Cahill, Jr. to R. W. Reid) indicates that all MOV's are designed to operate down to 414 volts. Thus, the Authority construes 414 volts to be the limiting voltage value based on the information available to date. The Authority therefore proposes to increase the voltage sensing setpoint to ≥ 414 volts.

As indicated in the cover letter to this Attachment, the Authority is in the process of evaluating the data obtained from the recently completed verification tests of systems voltages and transient analyses of motors. Should these evaluations impact the voltage sensing value for the DGV protection system proposed above, this value will be modified accordingly. It should be noted, however, that any modification to the proposed value would raise rather than lower the voltage sensing setpoint.

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

The Authority's original response to this SER conclusion as stated in Reference 2 was indicative of our position that the proposed "fail-safe" one-out-of-two logic was more desirable than the NRC's recommended two-out-of-two logic. Discussions with members of your staff have indicated that the Authority's proposed one-out-of-two logic is acceptable provided monthly testing of the loss of voltage relays be imposed. As will be discussed in our response to the fourth SER conclusion, the Authority will conform to the NRC's monthly testing recommendation.

3. The proposed delay of ≤ 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 acknowledges that a time delay of ≤ 210 seconds exceeds the time delay assumed in the accident analysis for delivering cooling to the core under accident conditions. However, too short a time delay could inadvertently and unintentionally actuate the DGV relays due to the temporary voltage degradation on the 480 volt bus that results from a large motor start (e.g., a reactor coolant pump (RCP) motor) as well as the transfer of loads from the main generator to offsite power following a unit trip. The former concern has been evidenced by the event that occurred at Point Beach (Reference: SER for Amendment No. 58 to Point Beach Unit 1 and Amendment No. 62 to Point Beach Unit 2 dated January 6, 1982) as well as RCP motor start tests conducted at IP-3 which confirmed a significant temporary 480 volt bus voltage degradation as a result of these RCP motor starts.

As indicated in the cover letter to this Attachment, the collection of data for the verification tests of system voltages has only recently been completed due to the unanticipated steam generator and electric generator repair outages. The data obtained are currently being

evaluated. These evaluations should provide the needed information with respect to the concerns cited above to justify the selection of the time delay associated with DGV relay actuation.

A number of alternative options with respect to resolution of this particular SER conclusion are being investigated. Descriptions of the two options most favored by the Authority to date are as follows:

First Option:

- o For a DGV condition with no coincident safety injection (SI) demand, credit would be taken for an existing alarm in the IP-3 control room that annunciates when 480 volt bus voltage degrades to 92.7% of nominal (~445 volts) and the subsequent operator action required by Alarm Response Procedure ARP-5, Revision 5 ("Panel SBF-2 Safeguards"). In addition, automatic DGV protection would be available as a back-up. The time delay associated with the voltage sensing value of the DGV relays would be ≤ 40 seconds. Such a limit would be imposed to preclude impacting of normal plant operations (e.g., the voltage degradation on the 480 volt bus that typifies RCP motor start). Further, if voltage conditions continued to deteriorate to $\leq 46\%$ of nominal volt bus voltage, additional back-up would be provided by the automatic loss of voltage protection system.

For a DGV condition with a coincident SI demand, credit would be taken for the automatic DGV protection system. The time delay associated with the voltage sensing value of the DGV relays would be ≤ 10 seconds. This would require a bypass of the DGV relay time delay under SI conditions and would satisfy the concern regarding FSAR accident analysis assumptions.

Second Option:

- o The time delay associated with the voltage sensing value of the DGV relays would be ≤ 10 seconds which would satisfy the concern regarding FSAR accident analysis assumptions. This option would provide for a temporary bypass of DGV protection during RCP or if necessary other large motor starts. DGV protection would be restored upon completion of the motor starts. This would preclude

the DGV relays from being actuated as a result of momentary voltage degradations due to large motor starts.

The former option has been discussed with members of your staff and with monthly testing of the alarm has met with favorable reception. The Authority will initiate discussions with members of your staff on the latter option upon receipt and review of the information provided in this letter.

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.

As indicated in the current response to the second SER conclusion, the Authority will conform to the NRC's monthly testing recommendation for the loss of voltage relays. It should be noted that such conformance will require a significant modification of the existing loss of voltage circuitry. In addition, the Authority will also conform to the NRC's monthly testing recommendation for the DGV relays. A less significant modification will be required for the existing DGV circuitry to facilitate such monthly testing. Further, the Authority will conform to the NRC's monthly testing recommendation for the alarm should the first resolution option be decided to be implemented.