POWER AUTHORITY OF THE STATE OF NEW YORK

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June 12, 1981
IPN-81-41

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
Docket No. 50-286
Adequacy of Station Electric Distribution System Voltages

Dear Sir:

In response to your letter dated February 2, 1981 and as a result of subsequent discussions with the NRC staff, the Authority provides herewith, in Attachment I, the additional information requested in your letter.

Very truly yours,

G. M. Wilverding

for J. P. Bayne
Senior Vice President
Nuclear Generation

cc: Mr. T. Rebelowski
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ATTACHMENT I

ADEQUACY OF STATION ELECTRIC DISTRIBUTION SYSTEM VOLTAGES

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

REFERENCES:

a. NRC generic letter to all Power Reactor Licensees, "Adequacy of Station Electric Distribution System Voltages," dated August 8, 1979.

b. PASNY letter, Paul J. Early, to S. Varga, Operating Reactors Branch No. 1, NRC, Docket No. 50-286, May 30, 1980.

QUESTION

1. The response to Question 1a in your submittal of May 30, 1980[b] identifies the normal operating range of the voltages at the Buchanan Substation for the 345 kV, 138 kV, and the 13.8 kV systems as 347 kV to 358 kV, 136 kV to 142 kV, and 13.7 kV to 14.1 kV, respectively. Guideline 6[a] requested that the minimum expected value of the grid voltage be selected based on the least of three conditions. Which of these conditions applies to the minimum voltage identified in your submittal?

RESPONSE

Our response to question 1a addresses the nominal voltage ranges on the Con Edison grid system. The minimum expected voltages were determined in accordance with Guideline 6c[a]. Steps are taken by the Con Edison System Operator to maintain acceptable voltage levels should they fall outside these ranges.

QUESTION

2. Assuming the 13.8 kV source is supplying buses 5 and 6 (the 138 kV source is out of service), what would be the effect on the 13.8 kV source and loads considering a unit trip and a fast transfer of the four 6.9 kV buses 1, 2, 3, and 4 to the 13.8 kV source? Specifically, this assumes the 13.8 kV supply would sustain a voltage transient. What is the minimum and transient voltage, the transient duration, and the final voltage? Is the fast transfer of the four 6.9 kV buses and loads prevented by interlocking or Limiting Conditions of Operation noted in the Technical Specifications? Please clarify.

RESPONSE

The energizing of buses 5 and 6 from the 13.8/6.9 kV GT Substation is covered in Standard Operating Procedure No. SOP-EL-5, Operation of On-Site Power. This procedure requires that if power is supplied to buses 5 and 6 from 13.8/6.9 kV GT Substation and if 6.9 kV buses 1, 2, 3 and 4 are energized from the Unit Auxiliary Transformers, the operator is to place the Station Auxiliary Transformer Breakers, UT1-ST5, UT2-ST5, UT3-ST6, and UT4-ST6 in the tripped pull out position. In the event of a unit trip, this operator action will prevent trip transfer of buses 1, 2, 3 and 4 from creating an overload condition on the 13.8/6.9 kV GT Substation.

Based on the Operator action contained in the above referenced procedure, the situation contained in this question could not occur.

QUESTION

3. With all possible class 1E loads supplied from the 13.8 kV system, what would be the transient effect on the distribution system due to the start of a large non-1E load? (Refer to Guideline 6[a]).

RESPONSE

The 13.8 kV offsite supply is designed to accomplish the following:

a. To be capable to supply minimum safeguard loads.

b. To be capable to supply buses 5 and 6 during normal plant operations.

The largest non-1E load to be started under these conditions on these buses would be the 900 HP Circulating Water Pumps. The starting of one of these pumps would cause voltages to drop several percent for approximately two (2) seconds, during which time voltages at all equipment would remain above minimum levels required.

QUESTION

4. Regarding maximum grid voltage conditions, your response to Question 1c[b] states that, "voltage would have a negligible effect on equipment life and will not cause equipment damage." Does this statement consider a sustained overvoltage (or undervoltage) on motor control circuit components (control power transformers, starter coils, fuses, etc.) battery chargers, and other systems operated from the class 1E 480 V supply at voltages below 480 V? 480 V motor starters usually operate between 90% and 110%, and it appears from Table 2 that the starters on MCC 36A would be required to operate at less than 90%. Please clarify.

RESPONSE

The motor control centers and the battery chargers are rated at 480 volts. The nominal operating voltage range for this equipment is 480 volts $\pm$ 10%. The overvoltage of 2.9% of nominal identified in response 1c[b] is well within the $\pm$ 10% nominal voltage range for this equipment and will not affect equipment life.

The 480 volt motor starters will pick-up at 408 volts (.85 per unit) and will operate when already closed down to 288 volts (.6 per unit). The calculated value of 432 volts (.899 per unit) for MCC 36A in Table 2[b] provides adequate margin for safe operation.

QUESTION

5. a. When do you expect to supply test results per your response to Question 5?

   b. On which "480 V buses" will you obtain current and voltage measurement?

   c. Your response to question 5 refers to MCC 26A and 26B. Shouldn't this be 36A and 36B?

   d. What is the expected load on all buses that will be used to obtain measured values? If loading is less than 30%, your results should document instrumentation accuracy and demonstrate that each bus is sufficiently loaded to obtain accurate readings.

RESPONSE

a-b. The Authority has scheduled the testing of the bus loads prior to and during our up-coming refueling outage. The current and voltage measurements of the 480 volt buses, 2A, 3A, 5A and 6A will be done on a sample basis. After the test result calculations have been performed for the measurements taken, these values will be compared with, the computer values to ensure the accuracy of the computer values. All the test results will be forwarded upon completion.

c. The previous response to question 5 incorrectly referred to MCC 26A and 26B. These should have been 36A and 36B.

d. Expected auxiliary plant load during bus voltage measurement will be the normal full power load (estimated 37 megawatts). It is the intent to obtain all measurements, including motor starting and running currents, during normal plant operation.

However, motors which can not be safely operated during normal plant operation will be operated on a sample basis during the upcoming refueling outage. At this time, bus voltages will be higher than during normal operation, and measurements will be corrected to compensate for this voltage difference.

QUESTION

6. Refer to the attached drawings SK-6868-1 for IP3 and SK-6591-1 for IP2. Explain the operation of the 20 MVA transformers circled on these drawings. It appears that one of the transformers may be able to supply all loads to Indian Point 2 and 3. If operation of one transformer to both units is not prevented by interlocking or Limiting Conditions of Operation, please provide an analysis for this condition.

RESPONSE

The two 20 MVA transformers circled on the referenced drawings serve to provide the respective alternate sources of offsite power at Indian Point No. 3 and Indian Point No. 2. Under normal conditions, the Authority's 13.8/6.9 kV 20 MVA autotransformer is energized via 13.8 kV feeder 13W93 up to the normally open 6.9 kV tie breakers GT35 and GT36. The 6.9 kV tie breaker 52 GT/BT is normally open in the racked out position. At Indian Point No. 2, their 13.8/6.9 kV 20 MVA autotransformer is normally energized via 13.8 kV feeder 13W92 up to the normally open 6.9 kV tie breakers GT25 and GT26.

In the event of the loss of the Indian Point No. 3 preferred primary 138 kV offsite supply, the Indian Point No. 3, 13.8 kV supply is manually switched to supply 6.9 kV buses 5 and 6. This supply is capable of supplying the normal load on buses 5 and 6 and is capable of supplying all 480 volt safeguard and safe shutdown loads, but is not capable of supplying full plant load. A similar procedure is followed at Indian Point No. 2 for loss of its 138 kV primary preferred offsite source.

In the event of the loss of the 138 kV offsite supplies to both Indian Point Nos. 2 and 3 coincident with the outage of one of the 20 MVA autotransformers, the normal loads on buses 5 and 6 and the 480 volt safeguard and safe shutdown loads at both Indian Point Nos. 2 and 3 could be supplied from one 20 MVA 13.8/6.9 kV autotransformer by closing 6.9 kV tie breaker 52GT/BT. This mode of operation, due to the loss of the 138 kV offsite power supply, represents a limiting condition of operation. Caution would be taken to keep the loads below the ampere rating of the equipment and to maintain adequate voltage levels.