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REISSUED LETTER
Original letter
dated: 12/15/93

December 23, 1993

Document Control Desk
U.S. NUCLEAR REGULATORY COMMISSION
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Washington, DC 20555

Gentlemen:

DOCKETS 50-266 AND 50-301
DEGRADED GRID VOLTAGE RELAY SETTING LIMITS
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

This is a revision to our letter dated December 15, 1993, which contained two errors on page 3. We are reissuing the letter in its entirety, to maintain completeness. The corrections are indicated by strikeout of the incorrect information and the addition of the correct information. Margin bars are located next to the lines that contain the corrections. We are sorry for any inconvenience this may have caused.

On January 7, 1993, Wisconsin Electric (WE) completed an analysis of ABB Impell Calculation 0870-150-007, Revision 0. The analysis indicated that the existing settings for the Point Beach Nuclear Plant degraded grid voltage relays could be too low to adequately protect all safety-related equipment from operating at voltages below proven capability. Technical Specification Table 15.3.5-1, Item 9, "Degraded Voltage (4.16 kV)", contained a required setting of ≥3875 volts ±2%. The analysis indicated that operation at voltages just above the minimum required by this technical specification requirement could result in operation of equipment at lower than required voltages. Therefore, all 4160 volt degraded grid voltage protection channels were declared inoperable at 1515 CST on January 7, 1993, invoking the shut down requirements of Technical Specification 15.3.0, "Limiting Conditions for Operation."

A Nuclear Reactor Regulation Temporary Waiver of Compliance was requested and granted to allow time to determine new setting limits, calibrate the relays, submit a Technical Specification Change Request, and receive a license amendment for the setting limit change. New setting limits were determined and relay setting changes were completed January 15, 1993. A Technical Specification Change Request was submitted to the Nuclear Regulatory Commission by letter dated January 19, 1993, and amendments were issued on

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March 26, 1993. Licensee Event Report 93-001-00 submitted on February 16, 1993, provides additional information concerning this issue.

The current Technical Specification degraded grid voltage relay setting limit is 3959 ± 1/2% as determined in WE Calculation N-93-002, Revision 0. However, this setting did not include the quantification of the errors in the potential transformers, the degraded grid voltage relays, and the voltmeters used to calibrate the relays. The accuracy of these devices had not been determined at that time. The 3959 ± 1/2% setting limit was used because it was our judgement that the calculation was conservative due to the assumptions used to quantify the electrical loads during the worst case postulated conditions which were the basis for the calculation.

It was our judgement that refining the calculation by using actual measured loads would result in a lower minimum allowable voltage on the 4160 volt safeguards busses, thus providing sufficient margin between the relay settings and the minimum required voltage to accommodate the relay and transformer accuracy tolerances. Technical Specification Change Request 161, submitted to the NRC on January 19, 1993, noted this and stated that field measurements and verifications would be performed during 1993 to verify and refine the existing calculation inputs, assumptions, and results. These measurements were to include quantifying actual relay calibration and potential transformer tolerances. Our commitment to perform these measurements and verifications was also identified in the NRC Safety Evaluation for Technical Specification Amendments 137 and 141 for Units 1 and 2 respectively, issued by the NRC on March 26, 1993.

Prior to initiating these measurements, we decided to review other options which would demonstrate the acceptability of the new Technical Specification setting limits and account for the inaccuracies of the relay circuits. Additional information was obtained from the manufacturers and from past studies which contain test data on some of the larger safeguards loads. After review of this information, it was determined that the inputs and assumptions in Calculation N-93-002, Revision 0, were not overly conservative as they applied to major loads and impedances of system components.

With regard to the major loads, it was our judgement that additional field measurements would not yield significantly different results from those obtained from manufacturers and previous tests. With regard to the relay circuits, information from the manufacturers of the existing relays and potential transformers showed that the accuracy of these devices was relatively high. Therefore, based on the conclusion that field measurements would not yield significantly different load inputs and the relatively high accuracy of the relay circuits, appropriate degraded grid voltage relay setting limits can be determined without additional field measurements.

Inputs from Calculation N-91-016, "PBNP Diesel Generator Loading Calculation," were used to refine the loading inputs in Revision 0 of Calculation N-93-002 to generate Revision 1. These inputs consisted of data from pump brake horsepower curves and previous field measurements for the majority of the large safeguards loads. Also, administrative controls are in effect which will limit the maximum load on the limiting 4160 volt safeguards bus (1A-05). These controls will assure that the terminal voltage for the limiting load (Containment Recirculation Fan 1W-1B1) will not fall below the 90% of rated voltage requirement. The remaining loads, including the non-safety related motors, were kept at the conservative values utilized in the initial calculation.

WE Calculation N-93-002, Revision ~~1~~ 2, base on the above input modifications, indicates that the minimum sustained bus voltage required for proper operation of safeguards equipment on the Unit 1 4160 volt Train A safeguards bus (1-A05) is ~~3941~~ 3931 volts. The other 4160 volt safeguards busses (1-A06, 2-A05, and 2-A06) have slightly lower minimum voltage requirements. Therefore, 3931 volts will be used as the basis for the degraded voltage relay setting limit for all 4160 volt safeguards busses to maintain consistent settings for the degraded grid voltage relays.

An additional calculation (N-93-098, Revision 1) was prepared to quantify the maximum error associated with the operation of the degraded grid voltage relay circuits. The guidance provided in ANSI/ISA-S67.04-1988 was utilized for combining the errors associated with each component of the relay circuit and the relay calibration process.

The Technical Specification degraded voltage relay setting limit hould be $\geq$3944 volts to properly allow for PT and voltmeter errors as determined by Calculation N-93-098, Revision 1. The proposed degraded voltage relay setting limit of $\geq$3944 volts is 5 volts higher than the current tolerance would allow (3959 - 1/2% · 3959 ≈ 3939 volts). We have verified that the current relay settings in the plant are $\geq$3944 volts. Therefore, this proposed setting limit is currently being met. We propose to change this Technical Specification setting limit to $\geq$3944 volts. This format for the setpoint, consistent with the presentation of other setting and safety limits in the Technical Specifications, is more appropriate than the current format of 3959 volts $\pm$ 1/2%.

The new higher degraded voltage setting limit of $\geq$3944 volts is substantially higher than the previous setting of 3875 volts $\pm$2% and therefore much closer to the normal operating voltage of the 4 kV system. This has raised our concern about the existing ITE 27D degraded grid voltage relays and the voltmeters used to calibrate the relays. There is an increased possibility that the degraded grid voltage relays will not reset after short-term voltage dips because the ITE 27D relays have a wide deadband between the dropout setting of the relay and the voltage required to pick the relay up again. Therefore, we have decided to replace the ITE 27D relays with ASEA Brown Boveri (ABB) 27N relays which

have an adjustable pickup setting. This allows the setting of a much smaller deadband than the ITE 27D relay. The new ABB 27N degraded grid undervoltage relays will be installed in early 1994 in conjunction with the planned annual diesel generator outages. We expect to replace all the degraded grid undervoltage relays by March 31, 1994.

The voltmeters used previously to calibrate the degraded grid relays were rated by the manufacturer as having a ±0.5% accuracy. The last annual calibration tests of these voltmeters showed all to be within a ±0.09% accuracy range, which is within the 0.1% accuracy range used in Calculation N-93-098, Revision 1. Future calibrations of the degraded grid voltage relays will be performed with meters that have a manufacturer's rated accuracy of ±0.1% accuracy to ensure that the 0.1% voltmeter accuracy is maintained.

In summary, the following additional actions are planned:

1) Replace the existing ITE 27D degraded grid voltage relays on each of the four 4160 volt safeguard busses with the more accurate ABB 27N undervoltage relays. This will be completed during the annual diesel generator outages in the first quarter of 1994.

2) Revise the calibration procedures for the degraded grid voltage relays to assure the use of calibration equipment with accuracies as assumed in Wisconsin Electric Calculation N-93-098, Revision 1. This will be done prior to the installation of the new ABB 27N relays in the first quarter of 1994.

3) Revise Technical Specification Table 15.3.5-1, Item 9, to change the setting limit from 3959 volts ±1/2% to ≥3944 volts. This change will be submitted by March 1994.

Please feel free to contact us if you have any questions.

Sincerely,

for
Bob Link
Vice President
Nuclear Power

CAC/jg

cc: NRC Regional Administrator, Region III
NRC Resident Inspector