



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 167 AND 171 TO

FACILITY OPERATING LICENSE NOS. DPR-24 AND DPR-27

WISCONSIN ELECTRIC POWER COMPANY

POINT BEACH NUCLEAR PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-266 AND 50-301

1.0 INTRODUCTION

By letter dated April 27, 1995, as supplemented November 29, 1995, the Wisconsin Electric Power Company, the licensee, submitted a request for revision to the Point Beach Nuclear Plant (PBNP), Units 1 and 2, Technical Specifications (TSs). The requested amendments would revise TS Table 15.3.5-1, "Engineered Safety Features Initiation Instrument Setting Limits," and TS Table 15.3.5-3, "Engineered Safety Features." Setting limits would be modified and references would be changed. The bases for TS Section 15.3.5, "Instrumentation System," would also be changed to be consistent with the TS changes. The November 29, 1995, submittal provided supplemental information that did not change the initial proposed no significant hazards consideration determination.

At PBNP, degraded voltage relays are installed on each of the 4.16kV safeguard buses (Unit 1 A05, Unit 1 A06, Unit 2 A05, and Unit 2 A06). The purpose of these relays is to detect lower than acceptable voltage levels for continuous operation of engineered safety features (ESF) equipment supplied from these buses. These relays generate the signal to disconnect the safety-related buses from the preferred off-site source. This causes an undervoltage condition on the safety-related buses which actuates the 4.16kV and 480V loss of voltage protection functions, causing the emergency diesel generators (EDGs) to start and provide power to the safety-related buses.

The proposed changes consist of changing the time delays for the 4.16kV degraded voltage, 4.16kV loss of voltage and 480V loss of voltage protection functions. PBNP is also proposing to make editorial changes to the 4.16kV and 480V loss of voltage protection functions. These editorial changes will change incorrect bus references. Additionally, PBNP is proposing an editorial change that will add a footnote.

2.0 EVALUATION

2.1 Proposed Changes to the Degraded Voltage Protection System

PBNP has completed electrical system modifications to establish appropriate 4.16kV degraded voltage protection and ensure reliability of the preferred power supply to the safeguards buses. These modifications included replacement of the 4.16kV degraded voltage protection relays and raising the low voltage station auxiliary transformer tap settings approximately 2 percent. As a result of these electrical system modifications, PBNP is proposing to modify the degraded voltage protection logic to include a shorter time delay if the degraded voltage condition occurs coincident with a safety injection (SI) signal.

The licensee has performed an analysis and evaluation incorporating the recent modifications, and has determined that a TS relay setting of ≥ 3937 volts for the 4.16kV degraded voltage protection is adequate to maintain the required safeguard bus voltages. Additionally, the licensee stated that a change will be made to TS Table 15.3.1, Specification 9, which will remove the $\pm 1/2$ percent tolerance associated with the degraded voltage setting limit and change the time delay so that it will vary depending on the presence of a SI signal. The licensee has determined that the degraded voltage setting limit of ≥ 3937 volts with the time delay limits of < 6.47 seconds (with an SI signal) and < 54 seconds (without an SI signal) provides the appropriate protection for the ESF equipment during a degraded voltage condition.

The NRC staff raised a concern regarding the use of a " \geq " symbol for the degraded voltage setpoints. The staff wanted some assurance that PBNP used reasonable relay settings for the degraded voltage relay in spite of the apparent lack of an upper limit. This concern was established earlier in NRC Information Notice (IN) 95-37, "Inadequate Offsite Power Systems Voltages During Design Basis Events." The IN, in part, states, "If these setpoints are allowed to drift in the upward direction, this trend could also lead to the increased potential for separation from offsite power during design basis events." The licensee stated that although the proposed TS relay settings do not include an upper limit, the normal practice is to set the relays as close as practicable to the TS setting limits. Additionally, the licensee will add the following statement to the basis for TS 15.3.5:

"The 4.16kV degraded voltage setting limit is provided as greater-than-or-equal-to a value with no upper limit. The 4.16kV degraded voltage protection feature is designed to actuate when at least two of the three associated relays operate for the duration of the time delay. The 4.16kV degraded voltage relays are normally set as close as possible to the TS setting limit to minimize, to the extent practicable, the possibility of unnecessary actuation of this protection feature."

The licensee stated that the modification of the degraded voltage protection functions at PBNP involved the evaluation of the following three degraded voltage scenarios:

(1) Degraded Voltage Coincident With a SI Signal

With the coincidence of the SI signal, the degraded voltage function would actuate in < 6.47 seconds. The actuation of the degraded voltage protection function would cause the normal supply breaker for the 4.16kV safeguards buses to open, thus ending the degraded voltage condition. Power restoration would be initiated by actuation of the loss of voltage protection function on each of the affected safeguards buses. The 4.16kV and 480V loss of voltage protection functions cause shedding of the 480V ESF and some non-ESF loads. The emergency diesel generators (EDGs) receive a start signal and the EDG output breakers close to power the safeguard buses. The subsequent sequencing of ESF loads will occur as described in the PBNP FSAR.

(2) Degraded Voltage Without a SI Signal

In this situation, it is expected that the only safeguards equipment that would be operating are the station battery chargers, service water pumps, and containment cooling fans. The maximum time delay setting limit for degraded voltage actuation without a coincidence SI is < 54 seconds. With no signals causing any ESF loads to sequence automatically, it is expected that no ESF loads would be started during the degraded voltage condition. The ESF loads that are already operating can operate for at least one minute at terminal voltages of 75 percent. The voltage supplied to the PBNP 345kV switching station from the offsite power transmission system will not be reduced such that the lowest ESF load terminal voltage is < 75 percent for one minute, without the rapid decrease of voltage to levels that would actuate the loss of voltage protection function. Therefore, the ESF loads that are running would remain operable. The ESF loads that are not running would also remain operable because they would not be started during the period of degraded voltage.

(3) Degraded Voltage With a Delayed SI Signal

The ESF equipment that is operating during the degraded voltage condition prior to the SI would be expected to remain operable as described in the scenario above. After the SI occurs, the sequencing and operability of ESF equipment would be as described in the PBNP FSAR.

The staff agrees that the above changes are necessary because the evaluation and analyses conducted to incorporate the recent modifications to the electrical system include a more accurate determination of voltages during steady-state and transient conditions. The electrical system analyses demonstrate that the proposed changes to the degraded voltage settings will result in maintaining operability of required ESF equipment. Additionally, the changes to the time delay are necessary because the voltage dependence portion of the time delay is no longer needed (because recent modifications installed solid-state relays that have a time delay that is independent of voltage). Finally, the licensee has addressed NRC concerns related to the use of the " \geq " symbol for the relay setpoints by placing a statement in the basis which will clarify the setting of the degraded voltage relay setpoints.

2.2 Proposed Changes to the Loss of Voltage Protection Function

(1) 4.16KV Loss of Voltage Protection Function

The PBNP staff stated that the proposed changes to the 4.16kV loss of voltage function will change the setting limit and time delay for this protection function. The setting limit is being changed to remove the " \pm " tolerance and to add a ">" designation. This setting limit is not being raised or lowered, only clarified to show that the setting limit requirement is a minimum value for this protection function. The time delay for the 4.16kV loss of voltage protection function is being changed to a more limiting range. Previously, the TS time delay for this function was required to be ≤ 1 second ± 10 percent. The proposed changes will now establish 0.7 second as a lower limit for the time delay as well as include an upper limit of ≤ 1 second. This is based on an evaluation of the coordination of this protection function with the 480V loss of voltage load shedding function. Proper coordination is maintained by preventing the 4.16kV function from occurring faster than the 480V function. This prevents the EDG from reenergizing a safeguards bus prior to the actuation of the 480V load shedding function, which will allow the ESF loads to be sequenced. Additionally, the proposed upper limit of the time delay of 1.0 second is less than the current requirement of ≤ 1 second ± 10 percent.

The licensee is also proposing an editorial change to Table 15.3.5-3 for the 4.16kV loss of voltage function. The "***" footnote reference is being added for the 2-out-of-3, 4.16KV loss of voltage protection function. This footnote provides the appropriate instructions for a situation where one channel of the 4.16kV loss of voltage protection logic is inoperable.

(2) 480V Loss of Voltage Protection Function

To reflect the recent modifications made to the PBNP electrical system, the maximum time delay for this protection function is being reduced to 0.5 second to maintain proper coordination between the 4.16kV and 480V loss of voltage functions. This prevents the 4.16kV function from occurring faster than the 480V function. PBNP has determined that the 0.5 second maximum time delay provides a sufficient margin to allow the 480V load shedding to occur before the 4.16kV loss of voltage protection function actuates. Additionally, the voltage range for the time delay function is no longer necessary because a previous modification installed solid state relays that have a time delay that is independent of voltage.

PBNP has also proposed editorial changes to the 480V loss of voltage protection system that would correct the bus references. TS Table 15.3.5-1, Specification 10.b, will be changed from the bus references of A05 and A06 to B03 and B04. The A05 and A06 bus references are incorrect for this protection function because these buses are 4.16kV. The appropriate bus references for this protection function should be B03 and B04.

The staff agrees that the above changes should be made to the time delays for the 4.16kV and 480V loss of voltage protection functions to ensure proper coordination. The licensee has determined that the proposed time delays

provide sufficient margin to allow the 480 volt load shedding function to occur before the 4.16kV loss of voltage protection function actuates. Additionally, the voltage range for the time delay function is no longer necessary because previous modifications installed solid-state relays that have a time delay that is independent of voltage.

The editorial changes made to the 4.16kV and 480V loss of voltage protection function add the correct bus references for the 480V loss of voltage protection system and add a footnote that provides the appropriate instructions for a condition where one channel of the 4.16kV loss of voltage protection logic is inoperable.

3.0 SUMMARY

The proposed changes to the 4.16kV degraded voltage, 4.16kV loss of voltage, and 480V loss of voltage relay setpoints and associated time delays are necessary to reflect recent modifications to the PBNP electrical system. The changes are based on an electrical system analysis and evaluation that have more accurately determined voltage levels during steady-state and transient conditions. The staff has determined that the above changes are necessary and appropriate to assure proper operation of the ESF equipment. Therefore, the changes are acceptable.

The editorial changes to the TSs for the 4.16kV and 480V loss of voltage protection system are necessary to correct the bus references. Additionally, a footnote is necessary to add the appropriate instruction for a condition where one channel of the 4.16kV loss of voltage protection logic is inoperable. The staff has determined that the editorial changes are necessary to clarify the TSs and are therefore acceptable.

The November 29, 1995, submittal proposed changes to the bases for TS 15.3.5 to address concerns about degraded voltage protection relay setpoints (as stated in NRC Information Notice 95-37, "Inadequate Offsite Power System Voltages During Design-Basis Events," dated September 7, 1995). The staff agrees with the licensee that this addition is consistent with the TSs, and is appropriate.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Wisconsin State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

These amendments change a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluent that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously published a proposed finding that these amendments

involve no significant hazards consideration and there has been no public comment on such findings (60 FR 27346). Accordingly, these amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR §51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of these amendments.

6.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: M. Pratt

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