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Kewaunee / Point Beach Nuclear
Operated by Nuclear Management Company, LLC

10 CFR 50.36

December 17, 2001

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Ladies/Gentlemen:

DOCKETS 50-266 AND 50-301
TECHNICAL SPECIFICATION BASES B3.8.1 REVISION
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

Nuclear Management Company, LLC (NMC), licensee for the Point Beach Nuclear Plant (PBNP) Units 1 and 2, hereby submits a revision to the following Bases for Technical Specifications (TS): B 3.8.1, "AC Sources – Operating". A description of the changes is provided in Attachment I.

These changes have been screened for evaluation pursuant to the requirements of 10 CFR 50.59 in accordance with approved PBNP procedures and were determined to be acceptable.

Attachment II provides clean copies of the affected Technical Specification Bases pages indicating the changes.

Sincerely,

A. J. Cayia
Plant Manager

JG/kmd

Attachments: I - Description and Assessment
II - Revised Technical Specification Bases Pages

cc: NRC Regional Administrator
NRC Resident Inspector
NRC Project Manager
PSCW

A 801

DESCRIPTION AND ASSESSMENT OF CHANGES

TECHNICAL SPECIFICATION BASES B3.8.1 REVISION

POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

1.0 INTRODUCTION

Nuclear Management Company, LLC (NMC), licensee for the Point Beach Nuclear Plant (PBNP) Units 1 and 2, hereby submits a revision to the following Bases for Technical Specifications (TS): B 3.8.1, "AC Sources – Operating".

2.0 DESCRIPTION AND ANALYSIS

This change affects the Surveillance Requirements (SR) section of Bases B 3.8.1. The maximum allowable safety related bus voltage limit, for short duration, non-continuous motor operation, was revised from 110% of nominal to 115% of nominal motor nameplate voltage. The performance and periodicity of the SR specified in TS SR 3.8.1.1 are not affected by this change. The change only affects the upper limit of the acceptance criteria for satisfying this SR.

Previously, Bases B 3.8.1, "AC Sources – Operating", stated that 4160 volt bus voltage should be maintained low enough to remain below 110% of the ratings of the supplied motors. This limit was based on ANSI C50.41-77, for continuous operation, which stated that motors shall operate satisfactorily at rated load with up to a 10% variation in supply voltage. The Bases did not discuss the effects of operating above the voltage limit for short periods of time.

The revised Bases provide for a maximum limit of 115% of the motor nominal rating. The revised limit accounts for established limits on the 345 kV electrical distribution grid system voltage, voltage drop between buses and supplied motors, normal operating voltage for the 4160 and 480 volt buses, the effects of short term overvoltage on motor operation, and meter accuracy.

The 345 kV electrical distribution grid system voltage maximum limit is 362 kV. This voltage limit is normally only approached during conditions of very light loading on the grid. At this voltage level and at minimum electrical loading on the grid, the highest voltage at any safety related 4160 volt bus would be approximately 4497 volts. At any 480 volt bus, the highest voltage would be about 511 volts. Based on the typically observed 20 volt drop between the bus and any 480 volt motors, terminal voltage for these motors should always be less than 110% of rated voltage.

The only safety related motors on the 4160 volt buses are the safety injection pump motors. During normal plant operation, these motors are only used intermittently for operational testing and filling operations. Under accident conditions, 4160 volt bus voltages are expected to drop to less than 110% of rated motor voltage due to increased loading.

ANSI C50.41-1977 requires motors to be capable of operating continuously at ±10% of nominal voltage. Operation for short periods at up to 15% above nominal voltage will not cause catastrophic motor damage nor will it significantly reduce motor life. Motor operation at higher than rated voltage is similar to operation at higher than rated ambient temperature or under short term overload conditions. The type of long term degradation that could be caused by such operating conditions would be identified during normal preventative maintenance and testing of these motors.

The design functions of the safety related 4160 and 480 volt buses and supplied loads are not being affected by this change. This change does not affect power distribution system operation, configuration, or settings. Allowing intermittent, short duration operation of motors at up to 115% of nominal motor voltage ratings will not have more than a marginal effect upon the reliability of the motors or upon the qualified motor life. Setting an upper limit of 115% also provides sufficient margin to the 125% limit for motor protective device settings specified in the National Electrical Code.

REVISED TECHNICAL SPECIFICATION BASES PAGES

(incorporating proposed changes)

SURVEILLANCE REQUIREMENTS

The AC sources are designed to permit inspection and testing of all important areas and features, especially those that have a standby function, in accordance with the Point Beach Design Criteria (Ref. 1). Periodic component tests are supplemented by extensive functional tests during refueling outages (under simulated accident conditions).

Where various SRs discussed herein specify voltage and frequency limitations, the following is applicable. The minimum continuous rating for safety-related electrical motors is 90% of nominal motor voltage as recommended by ANSI C50.41-1977 and NEMA MG-1. Additionally, the safety-related motors have a one-minute rating of 75% of nominal motor voltage as recommended by ANSI C50.41-1977. Therefore, under a worst case (maximum) loading condition, safeguards bus voltages must be maintained high enough to prevent the terminal voltage at any 4160 or 480 V motor from falling below 3600 / 414 V continuous (90% of nominal) or 3000 / 345 V for one minute (75% of normal). Additionally, motor control center continuous and instantaneous voltages must be maintained above 400 V and 308 V, respectively, to ensure that 480 V Motor Control Center contactors are able to close and do not drop out. These voltages are below the minimum continuous and instantaneous 480 V motor voltage requirements.

The maximum allowable safety related system voltages must be low enough to ensure all connected equipment will operate properly at minimum plant design loading conditions. Minimum plant loading conditions at maximum grid limits (362 kV) will result in maximum voltage at the 4160 and 480 safety related buses. Motors are the most sensitive plant loads to high voltage. The maximum continuous operating design rating for safety related motors is 110% of nominal nameplate voltage as recommended by ANSI C50.41-1977. Therefore, under a worst case (minimum) design loading condition, electrical system voltages should be maintained low enough such that voltages at motor terminals remain below 110% of the motor nominal rating for continuous operation. It is permissible to operate motors above 110% for short duration, non-continuous operation when actual plant load conditions are higher than continuous operating conditions without causing damage or significantly reducing qualified motor life as stated in ANSI C84.1-1989. Continuous operation is defined as 24 hours per day per the NEC (National Electric Code). The maximum system voltage operating limits including instrument error should be maintained below 115% of nominal to ensure proper operation of all protective devices. This 115% limit is below the minimum 125% motor protective device setting limit from the NEC and is below the 119% limit listed in NUREG-1431 Rev. 2.

SURVEILLANCE REQUIREMENTS (continued)

The safeguards distribution system frequency must be maintained within the limits allowed by connected equipment; below the setting of overcurrent relays; and above the setting of underfrequency relays. Electrical motors are sensitive to variations in operating frequency.

Equipment Technical Manuals for various 4160 V and 480 V motors have indicated motor terminal frequency must be maintained between 57 - 63 Hz, which is consistent with industry motor standards. The 57 - 63 Hz rating is also consistent with the allowable frequency ranges for other frequency sensitive non-motor loads (i.e., 480 V battery chargers). Although 63 Hz is the upper limit for motor operation to prevent motor damage, motors may not be capable of operating at 63 Hz due to circuit breaker settings. Since motor current increases with frequency, the possibility exists that circuit breakers supplying 480 V motors may trip on overcurrent if the 4160 V System is operated at elevated frequencies. Calculations performed verify that all safety related 480 V motors will not trip on overcurrent assuming their terminal frequency does not exceed 62.4 Hz. Therefore, to ensure that connected safety-related loads do not trip on overcurrent, 4160 V System frequency must not exceed 62.4 Hz.

SR 3.8.1.1

This SR ensures proper circuit continuity for the offsite AC electrical power supply to the onsite distribution network and availability of offsite AC electrical power. The breaker alignment verifies that each breaker is in its correct position to ensure that distribution buses and loads are connected to their preferred power source. The 7 day Frequency is adequate since breaker position is not likely to change without the operator being aware of it and because its status is displayed in the control room.

SR 3.8.1.2

This SR helps to ensure the availability of the standby electrical power supply to mitigate DBAs and transients and to maintain the unit in a safe shutdown condition.

To minimize the wear on moving parts that do not get lubricated when the engine is not running, SR 3.8.1.2 is modified by a Note to indicate that all standby emergency power source starts for this surveillance may be preceded by an engine prelube and followed by a warmup period prior to loading.

For the purposes of SR 3.8.1.2 testing, the standby emergency power sources are started from standby conditions. Standby conditions for a standby emergency power source mean that the diesel engine coolant and oil are being continuously circulated and temperature is being maintained consistent with manufacturer recommendations.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.2 requires that, at a 31 day Frequency, the standby emergency power source starts from standby conditions and achieves required voltage and frequency.

The 31 day Frequency for SR 3.8.1.2 is consistent with Regulatory Guide 1.9 (Ref. 4). This Frequency provides adequate assurance of standby emergency power source OPERABILITY, while minimizing degradation resulting from testing.

SR 3.8.1.3

This Surveillance verifies that the standby emergency power sources are capable of synchronizing with the offsite electrical system and accepting loads $\geq$ 2500 kW and $\leq$ 2850 kW. A minimum run time of 60 minutes is required to stabilize engine temperatures, while minimizing the time that the standby emergency power source is connected to the offsite source.

Although no power factor requirements are established by this SR, the standby emergency power source is normally operated at a power factor between 0.8 lagging and 1.0. The 0.8 value is the design rating of the machine, while the 1.0 is an operational limitation to ensure circulating currents are minimized. The load band is provided to avoid routine overloading of the standby emergency power source. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain standby emergency power source OPERABILITY.

The 31 day Frequency for this Surveillance is consistent with Regulatory Guide 1.9 (Ref. 4).

This SR is modified by three Notes. Note 1 indicates that diesel engine runs for this Surveillance may include gradual loading, so that mechanical stress and wear on the diesel engine are minimized. Note 2 states that momentary transients, because of changing bus loads, do not invalidate this test. Similarly, momentary power factor transients above the limit do not invalidate the test. Note 3 stipulates a prerequisite requirement for performance of this SR. A successful standby emergency power source start must precede this test to credit satisfactory performance.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.4

This Surveillance demonstrates that each required fuel oil transfer pump system operates and transfers fuel oil from its associated storage tank to its associated day tank and engine mounted sump as applicable. This is required to support continuous operation of standby power sources. This Surveillance provides assurance that the fuel oil transfer system is OPERABLE, the fuel oil piping system is intact, the fuel delivery piping is not obstructed, and the controls and control systems for automatic fuel transfer systems are OPERABLE.

The design of fuel transfer systems is such that pumps and valves operate automatically to maintain an adequate volume of fuel oil in the day and engine mounted sump tanks during or following standby emergency source testing.

The 31 day Frequency is adequate to assure that the fuel oil transfer system is OPERABLE, since low level alarms are provided.

SR 3.8.1.5

In the event of a DBA coincident with a loss of offsite power, the standby emergency power sources are required to supply the necessary power to ESF systems so that the fuel, RCS, and containment design limits are not exceeded.

This Surveillance demonstrates the standby emergency power source operation, during a loss of offsite power actuation test signal in conjunction with an ESF actuation signal.

This test verifies all actions encountered from the loss of offsite power, including shedding of the nonessential loads and energization of the emergency buses and respective loads from the standby emergency power source. It further demonstrates the capability of the standby emergency power source to automatically achieve the required voltage and frequency within analysis limits.

The standby emergency power source autostart time of 10 seconds is derived from requirements of the accident analysis to respond to a design basis large break LOCA. The Surveillance should be continued for a minimum of 5 minutes in order to demonstrate that all starting transients have decayed and stability is achieved.

SURVEILLANCE REQUIREMENTS (continued)

The requirement to verify the connection and power supply of permanent and autoconnected loads is intended to satisfactorily show the relationship of these loads to the standby emergency power source loading logic. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, Emergency Core Cooling Systems (ECCS) injection valves are not desired to be stroked open, or high pressure injection systems are not capable of being operated at full flow, or residual heat removal (RHR) systems performing a decay heat removal function are not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the standby emergency power source systems to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 4), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with standard fuel cycle lengths.

For the purpose of this testing, the standby emergency power sources must be started from standby conditions. That is, with the engine oil continuously circulated and engine temperature maintained consistent with manufacturer recommendations for standby emergency power sources.

This SR is modified by a note. The reason for the Note is that the performance of the Surveillance would remove a required offsite source from service, perturb the electrical distribution system and challenge safety systems.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.6

As required by Regulatory Guide 1.9 (Ref. 4), this Surveillance ensures that the manual synchronization and load transfer from the standby emergency power source to the offsite source can be made and the standby emergency power source can be returned to ready to load status when offsite power is restored. It also ensures that the autostart logic is reset to allow the standby emergency power source to reload if a subsequent loss of offsite power occurs. The standby emergency power source is considered to be in ready to load status when the standby emergency power source is at rated speed and voltage, the output breaker is open and can receive an autoclose signal on bus undervoltage, and the load sequence timers are reset.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 4), and takes into consideration unit conditions required to perform the Surveillance.

REFERENCES

1. FSAR. Section 1.3.

2. FSAR. Chapter 8.

3. FSAR. Chapter 14.

4. Regulatory Guide 1.9, Rev. 3, July 1993.

5. Regulatory Guide 1.93, Rev. 0, December 1974.

6. Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," July 2, 1984.

Table B 3.8.1-1 (page 1 of 2)
Conditions for AC Sources Component Inoperabilities

Inoperable Equipment	Condition(s)
Inoperable standby emergency power source to 1A05/1B03, 1A06/1B04, 2A05/2B03, or 2A06/2B04. OR Inoperable standby emergency power sources to 1A05/1B03 and 2A05/2B03. OR Inoperable standby emergency power sources to 1A06/1B04 and 2A06/2B04.	Condition E
Inoperable standby emergency power source to A05/B03 and A06/B04 on the same unit. OR Inoperable standby emergency power to 1A05/1B03 and 2A06/2B04.	Condition E AND Condition G
One or more de-energized 4.16 kV safeguards buses (1A05/2A05/1A06/2A06). OR One or more 4.16 kV safeguards buses (1A05/2A05/1A06/2A06) with inoperable standby emergency power source(s) and inoperable offsite power source(s).	Condition D AND Condition E AND Condition F OR Condition G
Inoperable offsite power source to the associated unit's A05 and A06. OR Inoperable offsite power to 1A05 and 2A06.	Condition C AND Condition D
Inoperable offsite power source to 1A05, 1A06, 2A05, or 2A06. OR Inoperable offsite sources to 1A05 and 2A05. OR Inoperable offsite sources to 1A06 and 2A06.	Condition D

Table B 3.8.1-1 (page 2 of 2)
Conditions for AC Sources Component Inoperabilities

Inoperable Equipment	Condition(s)
X04 transformer de-energized.	Condition B AND Condition C AND Condition D
Associated unit's X03 transformer de-energized.	Condition A -------NOTE------- Enter appropriate Conditions for a de-energized X04 if auto bus transfer is incomplete. ----------