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10 CFR 50.90

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Prairie Island Nuclear Generating Plant Units 1 and 2
Dockets 50-282 and 50-306
Renewed License Nos. DPR-42 and DPR-60

Supplement to License Amendment Request (LAR) to Revise Technical Specification (TS) 3.8.1, "AC Sources – Operating", Emergency Diesel Generator Voltage and Frequency Limits (TAC Nos. MF4259 and MF4260)

By letter dated June 9, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14160A593), Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), submitted a License Amendment Request (LAR) for the Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2. The proposed license amendment would revise the steady-state voltage and frequency in certain Surveillance Requirements in Technical Specification 3.8.1. By email dated October 28, 2014 (ML14302A819), the NRC Staff requested additional information (RAI) on the June 9, 2014 (ML14160A593) LAR submittal. The enclosure to this letter provides supplemental information in response to the NRC Staff RAI. NSPM submits this supplement in accordance with the provisions of 10 CFR 50.90.

The supplemental information provided in this letter does not impact the conclusions of the Determination of No Significant Hazards Consideration and Environmental Assessment presented in the June 9, 2014 (ML14160A593) LAR submittal.

In accordance with 10 CFR 50.91, NSPM is notifying the State of Minnesota of this LAR supplement by transmitting a copy of this letter and enclosure to the designated State Official.

If there are any questions or if additional information is needed, please contact Mr. Dale Vincent, P.E., at 651-267-1736.

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Summary of Commitments

This letter contains no new commitments and no revisions to existing commitments

I declare under penalty of perjury that the foregoing is true and correct.
Executed on DEC 17 2014

Scott Sharp
Site Operations Director, Prairie Island Nuclear Generating Plant
Northern States Power Company - Minnesota

Enclosures (1)

cc: Administrator, Region III, USNRC
Project Manager, PINGP, USNRC
Resident Inspector, PINGP, USNRC
State of Minnesota

ENCLOSURE

Supplement to License Amendment Request (LAR) to Revise Technical Specification (TS) 3.8.1, "AC Sources – Operating", Emergency Diesel Generator Voltage and Frequency Limits (TAC Nos. MF4259 and MF4260)

By letter dated June 9, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14160A593), Northern States Power Company, a Minnesota corporation (the licensee), doing business as Xcel Energy, submitted a request to the U.S. Nuclear Regulatory Commission (NRC) to amend the Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP), Operating Licenses DPR-42 and DPR-60. The License Amendment Request (LAR) proposes to revise steady state voltage and frequency limits for Technical Specification (TS) Surveillance Requirements (SRs) 3.8.1.2, 3.8.1.6, and 3.8.1.9. The changes would modify the SRs by providing surveillance enhancements to improve operation and testing of the emergency diesel generators (EDGs), and provide a more restrictive voltage and frequency band for operation when not connected in parallel with electrical power.

<u>NRC Request for Additional Information (RAI):</u>

1. The LAR stated that EDG loading calculations during a loss of offsite power with a safety injection (SI) event at PINGP were reviewed. The results of these calculations demonstrate that PINGP EDG's are sized adequately to support safeguards loads when considering a frequency increase of 0.5 Hz (60.5 Hz) from the nominal 60 Hz. The EDG steady state loading for an SI event concurrent with a loss of offsite power (LOOP) indicates that D2 (Unit 1 Train B) has the least margin at a time interval of 5 minutes to 30 minutes with a total loading of 2333.72 kilowatts (kW) compared to the D2 continuous operation rating of 2750 kW.

    a. Please confirm that the small break LOCA, large break LOCA, and main steam line break events have also been considered as part of the analysis of the EDG loading calculations mentioned above.

    b. Engineering calculation ENG-EE-021 previously submitted in support of License Amendment Nos. 189 and 178 regarding a TS change to the EDG SR 3.8.1.9, dated October 21, 2008 (ADAMS Accession Number ML082490441), evaluated the worst-case loading on the EDGs. This calculation indicated a higher loading than the 2333.72 kW discussed in this recent LAR.

    Please confirm the maximum postulated loading on the EDGs when operating at worst-case voltage and frequency.

2. The LAR states that PINGP performed a degraded voltage case study that generated numerous plant configurations per the calculation. The degraded voltage relay (DVR) setpoints and analyses are referenced in the LAR as the bounding analyses to demonstrate operability of equipment and protective relay settings. The DVR setpoint analysis considers the safety buses powered from the offsite electrical power source which generally has a higher capacity to provide the reactive power needs of plant

loads compared to the onsite electrical power systems which are exciter capability limited.

a. Please state the minimum starting voltage for large pump motors and the voltage drop at the remote safety buses associated with starting large pump motors that are a part of the EDG minimum voltage case study.

b. Please confirm that the motor acceleration time and trip relay set-points are bounded by the DVR analyses when the EDGs are supplying safety loads at the minimum voltage and frequency.

c. Please confirm that the voltage and frequency requirements, delineated in Regulatory Guide 1.9, Revision 4, "Application and Testing of Safety-Related Diesel Generators in Nuclear Power Plants," during load sequencing transients are maintained with the proposed steady state EDG frequency and voltage limits.

d. Please confirm that the degraded voltage relays do not actuate during EDG load sequencing and have to be reset in the event of a loss off offsite power when the EDG is required to supply plant loads.

3. The LAR states that DVR's monitor safeguards 4 kV bus voltage and are used in the EDG load shedding and load restoration scheme. The reset values for these DVR relays are 0.6 percent (%) above the dropout values. The actual plant setting for the DVR dropout is 95.4% of 4160 volts alternating current (VAC). Therefore, actual plant setting for the DVR reset would occur at 96.0%. However, the DVR dropout range identified in the setpoint calculation and Section 8.3.3 of the PINGP Updated Final Safety Analysis Report is 95.5 ± 0.7% (94.8% to 96.2%). With an upper limit of 96.2% as the DVR dropout value, the DVR reset value would be 96.8% (4027 VAC). Once the DVR is reset, a degraded voltage condition is not present. The proposed TS minimum voltage value of 4084 VAC will allow continued sequencing of safeguards loads onto the EDGs by providing adequate voltage to clear a degraded voltage condition.

   Please verify that the DVR's do not have to be reset during a LOOP event when the EDG is operating at the minimum voltage of 4084 VAC and is required to supply plant loads.

NSPM Response:

Question 1 Preface

There was incorrect information contained in the original LAR submittal (Agencywide Documents Access and Management System Accession No. ML14160A593). The data provided in the submittal on page 15 of 22 states, "EDG steady state loading for an SI event concurrent with a Loss of Offsite Power indicates D2 (Unit 1 Train B) to have the least margin at a time interval of 5 minutes to 30 minutes with a total loading of 2333.72 kW compared to the D2 continuous operation rating of 2750 kW." Rather, the time interval and total loading values at which D2 has the least margin are 30 minutes to 1 hour and 2335.06 kW, respectively. This correction is supported in Table 1 of Prairie Island calculation ENG-EE-021.

The incorrect information does not impact the intent of the discussion contained in the affected paragraph of the original LAR submittal (ML14160A593). It should be noted that the correct least margin total load (2335.06 kW) and time interval (30 minutes to 1 hour) values were used to form these responses instead of the incorrect values stated in Question 1.

Question 1(a)

Prairie Island calculation ENG-EE-021, Diesel Generator Steady State Loading for SI Event Concurrent with Loss of Offsite Power (LOOP) for D1, D2, D5, and D6, demonstrates the ability of the EDGs to perform their design basis function of carrying required engineering safety feature loads (safeguards) steady state loads. The analysis is performed with the station in a Loss of Coolant Accident (LOCA) coincident with a Loss of Off-Site Power (LOOP). The design basis accident (DBA) for Prairie Island is the rupture of a reactor coolant pipe large and small. ENG-EE-021 evaluates the EDGs during a Safety Injection (SI) along with a LOOP. The SI + LOOP configuration provides EDG loading which is the most bounding case, thus placing the maximum amount of load on the EDGs.

Small Break

A minor pipe break (small break) is defined as a rupture of the reactor coolant system (RCS) pressure boundary with a total cross sectional area less than 1.0 ft^2 in which the normally operating charging system flow is not sufficient to sustain pressurizer level and pressure. The charging system is capable of making up for a rupture of a 3/8" tubing or a failure of a 3/8" compression fitting while maintaining pressurizer water level and system pressure.

Ruptures of cross section up to ¾" can be accommodated by two of the three charging pumps well before the core is uncovered. However, in this case the RCS would depressurize below the Reactor Trip and Safety Injection (SI) setpoints and the SI System will mitigate the event. The SI would start the EDG and connect to the safeguards bus in the event that off-site power was not available. The loading analyzed in ENG-EE-021 bounds the EDG loading for the small break LOCA event.

Large Break

Should a major break occur, depressurization of the RCS results in a pressure decrease in the pressurizer. Reactor trip and Safety Injection signals occur when the respective pressurizer low pressure trip setpoint is reached. This scenario is the design basis accident for which ENG-EE-021 demonstrates the ability of the EDGs to perform their design function of carrying the required safeguards steady state loads.

Steam Line Break

Depending on the size and location of the break, a safety injection signal will be generated by one of the actuation signals. For large breaks inside containment, the safety injection signal is generated from either a low steam line pressure or a high containment pressure. For smaller breaks inside containment, reactor trips on the Overpower ΔT function may be generated. For breaks initiated from zero-power conditions, the primary SI signal is generated from low steam line pressure or low pressurizer pressure. For large steam line breaks outside of containment, the primary SI signal is generated from low pressurizer pressure. For small steam line breaks outside containment, the primary SI signal is generated by low steam line pressure. The core is then shut down by the boric acid injection delivered by the Safety Injection System.

The worst case response to a steam line rupture would be a SI initiation. The SI actuation would start the EDG and connect to the safeguards bus in the event that off-site power was not available. The loading analyzed in ENG-EE-021 bounds the EDG loading for the main steam line break.

Question 1(b)

Engineering calculation ENG-EE-021 that was previously submitted in support of License Amendment Nos. 189 and 178, dated October 21, 2008 was revision 3 of the calculation which was issued on 01/29/2008. Since that time the calculation has undergone several revisions; 3 major and one minor. These revisions have updated the loading contained in the analysis based on design changes that have been made to the plant. The information provided in the Prairie Island submittal was utilizing data form ENG-EE-021 Rev. 6 which was issued on 04/05/2013. ENG-EE-021 Revision 6A was issued on 10/1/2014 and is the current analysis of record. D2 is still the EDG with the

least margin and a total loading during the time interval of 30 min to 1 hour at 2335.06 kW which is below the continuous rating of 2750 kW.

Question 2(a)

Prairie Island calculation ENG-EE-183, Unit 1 Electrical Transient Analysis for a LOCA Concurrent with a LOOP, determined the terminal voltage of the 4 kV large motors for load sequencing during the DBA. The table below lists the starting terminal voltage for each 4 kV motor and the terminal voltage 3 seconds after motor start.

Bus 15 Alpha Train			
		Voltage % of 4160	
Breaker	Load	Start	Start + 3 sec
15-1	11 SI Pump	70.01	119.52
15-4	11 RHR Pump	101.53	99.68
15-9	11 CS Pump	101.54	99.67
15-5	11 CC Pump	89.88	105.52
Bus 16 Bravo Train			
		Voltage % of 4160	
Breaker	Load	Start	Start + 3 sec
16-7	12 SI Pump	70.23	104.6
16-1	12 CS Pump	101.91	99.90
16-6	12 RHR Pump	101.87	99.90
16-5	12 CC Pump	87.72	104.78
16-3	12 MD AF Pump	91.22	101.94

ENG-EE-018, Unit 2 Diesel Generator Sequence Loading for an SI Event (LOCA) Concurrent with a LOOP, is the Unit 2 analysis. This analysis is not performed in the same manner as the Unit 1 analysis in that the analysis does not provide a large motor terminal voltage. ENG-EE-018 analyzes the performance of the EDGs by sequentially loading the EDGs in 7 steps. For each sequence step the kW actual, kVA actual, SkVA (starting kVA) and the motor load for each bus and MCC is tabulated. The total transient inrush SkVA loading for each EDG is compared to the D5/D6 inrush kVA loading limits.

Each step steady state voltage is defined as the loading at the end of each sequence when the load inrush currents have dropped and loading is full load steady state current. The total steady state loading at the end of each sequence step is calculated by summing with the loads from the previous steps. The calculated steady state loads at the end of sequence step are compared to the D5/D6 steady state load limits.

The results of the analysis demonstrate that the Unit 2 EDGs are within their transient and steady state loading values, ensuring that the EDGs will provide the required power to the Safeguards loads.

During each refueling outage an Integrated Safety Injection Test is performed. This test simulates a Safety Injection concurrent with a LOOP. During this test, EDG voltage is captured during the load sequencing transient. The recent tests demonstrate that the EDGs provide adequate voltage to start the safeguards loads under a simulated LOOP/LOCA event.

Question 2(b)

As demonstrated in Prairie Island calculation ENG-EE-183, Unit 1 Electrical Transient Analysis for a LOCA Concurrent with a LOOP, the overcurrent protection relays do not trip which in turn do not cause the associated breakers to trip. The transient analysis also determined the time for each motor to accelerate to breakdown speed was less than 3 seconds for each Unit 1 4 kV motor.

Unit 2 EDGs do not have a transient analysis similar to that of the Unit 1 EDGs. ENG-EE-018, Unit 2 Diesel Generator Sequence Loading for an SI Event (LOCA) Concurrent with a LOOP, is the Unit 2 analysis. This analysis demonstrates that the EDGs are not overloaded during each load sequence step and thus ensures the EDGs will complete the load sequence and provide power to the Safeguards Buses and subsequent ESF loads.

During each refueling outage an Integrated Safety Injection Test is performed. This test simulates a Safety Injection concurrent with a LOOP. During this test, EDG voltage is captured during the load sequencing transient. The recent tests demonstrate that the EDGs provide adequate voltage to start the safeguards loads under a simulated LOOP/LOCA event at the prescribed sequence intervals. This ensures that acceleration to normal operating speed for each motor has occurred prior to the next load sequence step.

Question 2(c)

During each refueling outage an Integrated Safety Injection Test is performed. This test simulates a Safety Injection concurrent with a LOOP. During this test, EDG voltage is captured during the load sequencing transient. The recent tests demonstrate that the EDGs provide adequate voltage to start the safeguards loads under a simulated LOOP/LOCA event at the prescribed sequence intervals ensuring the requirements of Reg Guide 1.9 are met for Unit 2 EDGs and Safety Guide 9 for the Unit 1 EDGs.

Question 2(d)

During each refueling outage an Integrated Safety Injection Test is performed. This test simulates a Safety Injection concurrent with a LOOP event. Performance of this test has not resulted in actuation of the any degraded or undervoltage relays such that the load sequencing would halt and wait for voltage at the safeguards bus to recovery which would allow the load sequence to continue. A search of the corrective action program database was performed and no issues associated with actuation of DV or UV relays during an Integrated SI Test were found.

Question 3

The Technical Specification requires that the degraded voltage relays operate within -0.7% and +0.7% the trip setpoint of 95.5% nominal bus voltage. The dropout trip setpoint and reset setpoint per Surveillance Procedures SP 1216 [SP 2216], SP 1217 [SP 2217], SP 1218 [SP 2218] and SP 1219 [SP 2219] are 95.4% and 96.0% respectively. A calibration setting tolerance of +/- 0.1% is specified in Surveillance Procedures SP1216 [SP 2216], SP 1217 [SP 2217], SP 1218 [2218] and SP 1219 [SP 2219] for the relay setpoints. The relays shall be recalibrated if the "As Found" values are +/- 0.2% of the actual plant dropout and reset setpoints as discussed below.

ACTUAL RESET SETTING (Calibration) ----------		96.0% Nominal (3993.6V / 114.39V)
Calibration tolerance -----	95.9% Low Limit (3989.4V / 114.28V)	96.1% High Limit (3997.8V / 114.51V)

The Surveillance Procedures, SP 1218 [SP 2218] and SP 1219 [SP 2219] must verify that the relay dropout and reset setpoints are within the acceptable Technical Specification limits of 94.8% (lower) and 96.2% (upper) the nominal trip setpoint. For conservatism, the surveillance procedures include a +/- 0.2% calibration tolerance for the actual relay dropout and reset values. This calibration tolerance ensures that the relay dropout occurs within the Technical Specifications allowance. The relays shall be re-calibrated if the "as found" setting is not within the following setpoint values:

RESET SETPOINT (Test Acceptance)		96.0% Nominal
Acceptance Range ---	95.8% Low Limit (3985.3V / 114.16V)	96.2% High Limit (3993.6V / 114.63V)

SP performance ensures that the DV relays will not be reset during a LOOP event when the EDG is operating at the minimum voltage of 4084 VAC.