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L-PI-12-047
10 CFR 50.90

U S Nuclear Regulatory Commission
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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 Add Diesel Fuel Oil License Bases and Revise Technical Specifications (TS) 3.7.8, "Cooling Water (CL) System" and 3.8.3, "Diesel Fuel Oil" (TAC Nos. ME6849 AND ME6850)

By letter dated August 11, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML112240140), Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), requested NRC review and approval of additional diesel fuel oil (DFO) license bases and amendments to TS 3.7.8, "Cooling Water (CL) System" and 3.8.3, "Diesel Fuel Oil" for the Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2. NSPM supplemented this LAR by letter dated February 21, 2012 (ADAMS Accession No. ML12054A057). By letter dated May 23, 2012, ADAMS Accession No. ML12142A156, NRC Staff requested additional information (RAI) to support review of the LAR dated August 11, 2011 (ML112240140) as supplemented February 21, 2012. The enclosure to this letter provides responses to the NRC Staff RAIs. NSPM submits this supplement in accordance with the provisions of 10 CFR 50.90.

The supplemental information provided in this letter and enclosure does not impact the conclusions of the Determination of No Significant Hazards Consideration or Environmental Assessment presented in the August 11, 2011 (ADAMS Accession No. ML112240140) submittal as supplemented February 21, 2012 (ADAMS Accession No. ML12054A057).

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 651-388-1121.

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 JUL 0 9 2012

James E. Molden
Site Vice President, 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

Response to Requests for Additional Information (RAIs) for License Amendment Request (LAR) to Add Diesel Fuel Oil License Bases and Revise Technical Specifications (TS) 3.7.8, "Cooling Water (CL) System" and 3.8.3, "Diesel Fuel Oil" (TAC Nos. ME6849 and ME6850)

This enclosure provides responses from Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), to Nuclear Regulatory Commission (NRC) RAIs provided by letter dated May 23, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12142A156) regarding the LAR requesting NRC review and approval of additional diesel fuel oil (DFO) license bases and amendments to TS 3.7.8, "Cooling Water (CL) System" and TS 3.8.3, "Diesel Fuel Oil" for the Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2, submitted by letter dated August 11, 2011 (ML112240140) as supplemented February 21, 2012 (ML12054A057).

NRC RAI EEEB-7

In its February 21, 2012, letter, the licensee's response to RAI EEEB-1a delineates the flow paths that are available from each of the storage tanks to the day tank of each diesel engine. Technical Specification (TS) surveillance requirement (SR) 3.8.1.5 requires verification of capability of the fuel oil transfer system to transfer fuel oil from the storage tank to the day tank. Validate that current plant procedures verify operability of each of the paths delineated in the NSPM response to comply with TS requirements.

NSPM Response to RAI EEEB-7:

SR 3.8.1.5 is focused on the ability of the Unit 1 and 2 fuel oil system, which supports operation of the safety-related Emergency Diesel Generators (EDGs), to transfer fuel oil from the storage tanks to the day tanks. As stated in the TS Bases for this SR, "This Surveillance demonstrates that each required fuel oil transfer pump operates and transfers fuel oil from its associated storage tank to its associated day tank." The SR 3.8.1.5 31 day frequency is aligned with the surveillance test that is also performed every 31 days to satisfy requirements for the Diesel Fuel Oil Testing Program per TS 5.5.11. Steps are located in the monthly sampling surveillance procedures to operate each transfer pump and verify that a level change is seen at the associated day tank. The appropriate steps and checks are marked with an asterisk (*) to denote that they are acceptance criteria to meet a TS requirement. The control switch is verified to be placed in the "auto" position after the performance of the test for each transfer pump. The procedures for monthly sampling for Unit 1 and 2 EDGs also satisfy the requirements for SR 3.8.1.4.

NRC RAI EEEB-8

The licensee's response to RAI EEEB-4a states that Section 8.4 of the PINGP Updated Safety Analysis Report (USAR) defines the design-basis worst case accident from the emergency diesel generator (EDG) loading perspective as a large-break loss-of-coolant accident (LBLOCA) concurrent with a loss of offsite power (LOOP). NSPM further states that the basis for EDG load reduction within the first hour of EDG operation during this event is associated with the draindown of the refueling water storage tank (RWST) and the subsequent transfer to the recirculation mode.
The NRC staff notes that the LOOP/LBLOCA event may result in the 'most severe' short term loading of the EDG and may be used to determine the kilowatt rating of the EDG. However, it may not be the most conservative loading from a fuel oil consumption perspective, when some pumps may operate for longer durations depending on the type of break or event. USAR Table 14.7-4 (Unit 2) provides the time durations for RWST low level alarm actuation for various break sizes. According to this Table, the RWST low level is not reached for a 1.5 inch break size and it takes approximately 5467 seconds to reach the low level alarm point following a 2 inch break.
Validate that the calculation of record for fuel oil consumption evaluated events related to different size breaks for LOCA and steam line breaks inside containment for a bounding case.

NSPM Response to RAI EEEB-8:

The calculation of record for fuel oil consumption does not evaluate events related to difference size breaks for LOCA and steam line breaks inside containment for a bounding case. The PINGP design basis for fuel oil storage has included specific reference to the LBLOCA EDG loading Table 8.4-1 in the USAR since the initial licensing of the plant.

As previously discussed in the NSPM response to NRC RAI EEEB-3 in letter L-PI-12-007, there is no combination of a worst case design basis accident coincident with an external flood in the current PINGP design basis for fuel oil storage requirements.

When the new design basis for fuel oil storage as requested in this LAR is implemented, a worst case fuel consumption design basis accident EDG loading case will be created in the EDG loading calculation that will include loads required during a LBLOCA and/or a SBLOCA. Significant loading differences for SBLOCA will include the operation of pressurizer heaters and the duration of injection will be extended to the maximum time allowed for transfer to recirculation phase to prevent boron precipitation. The maximum allowed time per the time critical operator action to prevent boron precipitation is 7.5 hours as described in plant operator instructions. The fuel oil storage calculations will use this loading case as design input to determine fuel storage requirements.

NRC RAI EEEB-9

The licensee's response to RAI EPTB -1a and -1b states that fuel oil consumption rates were determined based on manufacturer's testing and pre-operational testing records. The test records provide the consumption rates (in units of pounds / [brake horsepower * hours] for the Unit 1 EDGs or (in units of grams / [kilowatt * hours]) for the Unit 2 EDGs at various loading conditions. Provide details on the power factor values that were used in the testing program and how the EDG fuel oil consumption calculations accounted for the reactive power required by accident-mitigating equipment.

NSPM Response to RAI EEEB-9:

Test records indicate that the fuel consumption rate testing was likely done at unity power factor. Increases in reactive power have no direct impact on fuel oil consumption. There are however, indirect impacts (secondary effects) that result from increased reactive power. The indirect impacts include:

1. Additional power consumed by the excitation system.

2. Additional power consumed via resistive losses in the generator, cabling and distribution system transformers due to the higher current flow.

The PINGP fuel oil storage calculations use the PINGP EDG loading calculation (ENG-EE-021) as design input for EDG load which includes estimated cable and transformer losses in the EDG load. Generator excitation system losses are not expressly included in the EDG loading since they are normally accounted for in the generator efficiency when a parasitic excitation system is used. As a result, including excitation system losses in the output loading would amount to "double dipping" with respect to required brake horse power (BHP) and fuel consumption.

Nevertheless, the excitation system power requirements (losses) at 100% loading and rated (0.8) power factor are bounded by conservatisms in the estimated losses in ENG-EE-021 as follows using Unit 1 Train A EDG D1 as an example:

- ENG-EE-021 used a conservative value of 2% of 480V load for transformer losses and determined the losses to be 20.25 kW. The PINGP Electrical Transient Analysis Program (ETAP) model in the degraded voltage calculation (ENG-EE-171) for the same plant alignment with the exception that the system is fed from offsite sources shows a worst case transformer loss value of < 0.8% of the total 480 V load. Using 1% for conservatism, the expected Train A transformer losses would be approximately 10.1 kW.

- ENG-EE-021 used a conservative value of 3% for cable losses and determined the losses to be 66.12 kW. The PINGP ETAP model in ENG-EE-171 for the same plant alignment with the exception that the system is fed from offsite sources shows a worst case cable and motor overload relay (MOLR) heater loss value of < 1.1%. Using 1.5% for conservatism, the expected Train A cable and MOLR heater losses would be approximately 33.1 kW.

- ENG-EE-021 uses 20.25 + 66.12 = 86.37 kW as the combined losses in Train A for cables and transformers. The ETAP results in ENG-EE-171 indicate that the combined losses are approximately 10.1 + 33.1 = 43.2 kW. This shows that the estimate in ENG-EE-021 is conservative (over estimates) by approximately 86.4 - 43.2 = 43.2 kW.

- The exciter test documentation indicates that the exciter draws less than 17 kW at 100% load and 0.8 power factor. The 43.2 kW of conservatism in the ENG-EE-021 estimated losses is more than twice the losses in the exciter test report for the condition when the EDG is loaded to 100% at a power factor of 0.8. Therefore, the power consumed by the excitation system is bounded by the conservatisms in the losses calculated in the EDG loading calculation.

Examination of the estimated losses in ENG-EE-021 versus the losses calculated in ENG-EE-171 by ETAP shows a similar amount of conservatism (more than twice the losses shown in the exciter test report).

Note that the cable and transformer losses in ENG-EE-171 are calculated at the degraded voltage analytical limit value, which is lower than the EDG's output voltage. Since the loading on the safety buses during the postulated events is predominantly motor (constant kVA) loads, the currents will be slightly higher at the lower voltage. As a result, the cable and transformer losses determined by ETAP in ENG-EE-171 will be slightly higher (conservative) relative to the losses when the system is fed from the EDG.

The EDG loading values from ENG-EE-021 are divided by generator efficiency to arrive at required BHP used in the fuel consumption rate calculation, which accounts for resistive losses in the generator.

Therefore, the EDG loading and EDG fuel oil consumption calculations have accounted for the reactive power required by accident-mitigating equipment.