Dominion®

Dominion Nuclear Connecticut, Inc.
Millstone Power Station
Rope Ferry Road, Waterford, CT 06385

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

JUL 30 2013

Serial No. 13-438
NSSL/MLC R0
Docket No. 50-336
License No. DPR-65

DOMINION NUCLEAR CONNECTICUT, INC. MILLSTONE POWER STATION UNIT 2 RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING LICENSE AMENDMENT REQUEST FOR CHANGES TO TECHNICAL SPECIFICATION 3/4.7.11, "ULTIMATE HEAT SINK"

By letter dated May 3, 2013, Dominion Nuclear Connecticut, Inc. (DNC) submitted a license amendment request (LAR) for Millstone Power Station Unit 2 (MPS2). The proposed amendment would modify Technical Specification (TS) 3/4.7.11, "Ultimate Heat Sink," to increase the current ultimate heat sink (UHS) water temperature limit from 75°F to 80°F and change the TS Action to state, "With the ultimate heat sink water temperature greater than 80°F, be in HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours."

In a letter dated June 26, 2013, the Nuclear Regulatory Commission (NRC) provided DNC an opportunity to supplement the LAR identified above. Supplemental information was provided to the NRC in a letter dated June 27, 2013. In a letter dated July 18, 2013, the NRC transmitted a request for additional information (RAI) related to the LAR. DNC responded to the RAI in a letter dated July 19, 2013. In an e-mail dated July 23, 2013, the NRC transmitted a second RAI to DNC. Attachment 1 to this letter contains DNC's response. Additionally, in a clarification call with the NRC on July 23, 2013, DNC agreed to provide supplemental information to DNC's response to RAI-1 from letter dated July 19, 2013. This information is also included in Attachment 1.

If you have any questions or require additional information, please contact Wanda Craft at (804) 273-4687.

Sincerely,

Scace

S. E. Scace
Site Vice President – Millstone Power Station

STATE OF CONNECTICUT)
)
COUNTY OF NEW LONDON)

The foregoing document was acknowledged before me, in and for the County and State aforesaid, today by S. E. Scace, who is Site Vice President of Millstone Power Station. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of that Company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 30 day of July, 2013.

My Commission Expires: 3/31/16.

Notary Public

WM. E. BROWN
NOTARY PUBLIC
MY COMMISSION EXPIRES MAR. 31, 2016

A001
NRR

Commitments made in this letter:

None

Attachments:

1. Response to Request for Additional Information Regarding License Amendment Request for Changes to Technical Specifications 3/4.7.11, "Ultimate Heat Sink"
2. Proto-Power Calculation 98-119, Rev. B
3. Excerpt from DNC Calculation 94-DES-1111-M2, Revision 00.
4. Excerpt from DNC Calculation 94-DES-1111-M2, Revision 00, Change 1.

cc: U.S. Nuclear Regulatory Commission
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Attachment 1

Response to Request for Additional Information Regarding License Amendment Request for Changes to Technical Specifications 3/4.7.11, “Ultimate Heat Sink”

Dominion Nuclear Connecticut, Inc.
Millstone Power Station Unit 2

Response to Request for Additional Information Regarding License Amendment Request for Changes to Technical Specifications 3/4.7.11, "Ultimate Heat Sink"

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EMERGENCY DIESEL GENERATOR RAI

Background

The licensee has provided a response to RAI-3 of NRC letter dated July 18, 2013 in a letter dated July 19, 2013. RAI 3 was submitted regarding design operational limits of the emergency diesel generators (EDG).

Issues

A) Each EDG is cooled by 3 heat exchangers in series on the Service Water (SW) side. The licensee has stated that the first cooler in series, i.e. the intercooler (X-83A or B) for each EDG, is the controlling component, meaning that if the cooling requirements of the intercooler is met then the cooling requirements of other heat exchangers, i.e. the lube oil cooler and the jacket water cooler, are met.

B) The vendor data sheet for the intercooler specifies greater heat exchange requirements and SW flow requirements than what the licensee has stated in their response to RAI-3. For an EDG load of 2750 KW and seawater (SW) temperature of 75°F the differences are stated in the table below:

	Vendor Data Sheet	***RAI 3 Response***
Intercooler heat load at 2750KW	*2,769,000 BTU/HR*	*2,067,000 BTU/HR*
Seawater flow rate	*700 GPM*	*507 GPM*

RAI-1

1) *Please explain fully in detail and prove the statement that the intercooler (X-83A or B) for each EDG is the controlling component, meaning that if the cooling requirements of the intercooler is met then the cooling requirements of other heat exchangers, i.e. the lube oil cooler and the jacket water cooler, are met.*

DNC Response to RAI-1

Calculation 98-119, Revision B (provided in Attachment 2) provides the thermal performance analysis results for the MPS2 EDG heat exchangers. The basis for DNC's statement specifying that the EDG intercooler heat exchanger is the limiting heat exchanger is provided on Page 35 of Calculation 98-119. The calculation was performed by first determining the required service water flow rate to the first heat exchanger (i.e., the intercooler) and then determining the resulting service water outlet temperature from that heat exchanger. That outlet temperature was then used as the inlet temperature for the next heat exchanger (i.e., lube oil cooler) since they are arranged in series. If acceptable results for the lube oil cooler were obtained, then the process was repeated for the third heat exchanger (i.e., jacket water cooler). Note that the increase in UHS temperature from 75°F to 80°F requires an increase in service water flow to the EDGs. This increased flow partially compensates for the increase in inlet temperature which mitigates the effect on the downstream heat exchanger(s). The 5°F increase in UHS temperature and the required increase in service water flow, results in an intercooler heat exchanger outlet temperature rise of 3.3°F. The increased service water flow that is now required for 80°F UHS temperature was available as margin between the required and delivered flow rates for the EDG heat exchangers.

RAI-2

2) *Explain and justify the differences in vendor requirements and the response to RAI 3, as listed in the table above.*

DNC Response to RAI-2

Flow Rate
As shown in Calculation 12-328, "Equivalent Thermal Performance of the Unit 2 EDG Heat Exchangers for UHS Temperature Increase" (see Pages 2 and 3 of Attachment 9 of DNC letter dated July 19, 2013), the 507 gpm value was used in calculations to support a UHS temperature of 77°F, rather than 75°F. The 507 gpm flow rate was used in DNC Calculation 94-DES-1111-M2, Revision 00, Change 1 (see Attachment 4). For a UHS temperature of 80°F, a flow rate of 637 gpm is required.

Heat Load
DNC Calculation 94-DES-1111-M2, Revision 00 (also known as Proto-Power Calculation 94-053) (excerpt provided in Attachment 3) shows that the heat load in the vendor data

sheet is based on a 3250 KW, 30 minute rating, at 118% of design load. The calculation also provides a graph of EDG air cooler (or intercooler) heat load versus EDG loading. At the design loading condition of 2750 KW, the air cooler heat load is $2.067\text{x}10^6$ Btu/hr. Change 1 to this calculation (Attachment 4) slightly revised the heat load downward, however, Calculation 12-328 (provided as Attachment 9 in DNC Letter dated July 19, 2013) conservatively used the $2.067\text{x}10^6$ Btu/hr heat load . Note that the MPS2 FSAR states that the continuous load rating of the MPS2 EDGs is 2750 KW and there are no scenarios where that load is exceeded.

Supplemental Information for Response to RAI-1 (from DNC Letter Dated July 19, 2013)

The containment loss of coolant accident (LOCA) and main steam line break (MSLB) analyses modeled the reactor building closed cooling water (RBCCW) system and its interface with containment (via the containment air recirculation (CAR) fans in the injection mode and the CAR fans and shutdown cooling (SDC) heat exchangers in the sump recirculation mode). The RBCCW spent fuel pool (SFP) heat load was included in these analyses. For simplicity, other heat loads on the RBCCW system were included in the analyses as a single heat load. These analyses were performed under two different assumed conditions: 1) to minimize heat transfer (for determining worst case containment conditions) and, 2) to maximize heat transfer (for determining highest RBCCW temperature). The latter condition, for which a RBCCW temperature profile was developed, was then used as input to subsequent calculations which evaluated the impact of the higher RBCCW temperature on critical components.

A summary of the results are as follows:

Engineered Safety Features (ESF) Room Coolers

The analysis for the ESF room coolers used the RBCCW temperature profile, as well as heat loads in the room (running equipment, hot piping, etc.), to determine a room temperature profile which was then used as input to evaluate equipment environmental qualification (EEQ) components in those rooms. The results of the analysis concluded that with an increase in UHS temperature to 80°F, the ESF room equipment remains within its EEQ design limits.

SFP Cooling

For SFP cooling, RBCCW flow is isolated at the start of the LOCA. RBCCW flow is then restored four hours post LOCA. The RBCCW temperature profile is then used to determine the SFP temperature profile. The SFP temperature is assumed to be at its maximum allowed temperature of 150°F at the start of the accident and to heat up due to loss of cooling for four hours. Based on these considerations, the maximum SFP temperature is analytically determined to remain below the allowable temperature of 200°F.

Pumps with RBCCW Cooled Seals

The seals for the high pressure safety injection (HPSI) and low pressure safety injection (LPSI) pumps were previously evaluated based on an assumed RBCCW supply temperature of 147°F and a pumped fluid temperature of 300°F. This evaluation determined a resultant HPSI and LPSI pump seal temperature of 192°F and 232°F, respectively. For an increase in UHS temperature to 80°F, the maximum RBCCW supply temperature was increased to 149°F. This change increases the average temperature of the RBCCW through any heat exchanger by 2°F. Conservatively assuming 300°F for the pumped fluid (actual maximum calculated temperature is 234°F), increasing the RBCCW cooling water temperature to 149°F will result in an expected HPSI and LPSI seal outlet temperature of 194°F and 234°F, respectively. These temperatures are within the 250°F acceptance criteria for acceptable seal performance.

The containment spray (CS) pump seals were previously evaluated at an RBCCW temperature of 147°F. Using vendor supplied information, it was concluded that, at an RBCCW temperature of 149°F, the CS pump seal temperature would be 225°F, which is within the design maximum seal temperature of 300°F.