September 4, 2007

Mr. Keith J. Polson
Vice President Nine Mile Point
Nine Mile Point Nuclear Station, LLC
P. O. Box 63
Lycoming, NY 13093

SUBJECT: NINE MILE POINT NUCLEAR STATION, UNIT NO. 2 - ISSUANCE OF AMENDMENT RE: TECHNICAL SPECIFICATION 3.7.1 REGARDING ULTIMATE HEAT SINK TEMPERATURE LIMITS (TAC NO. MD4031)

Dear Mr. Polson:

The Commission has issued the enclosed Amendment No.119 to Renewed Facility Operating License No. NPF-69 for Nine Mile Point Nuclear Station, Unit No. 2. The amendment consists of changes to Technical Specification (TS) 3.7.1, "Service Water (SW) System and Ultimate Heat Sink (UHS)," in response to your application transmitted by letter dated January 4, 2007, as supplemented by letters dated April 27, 2007, May 22, 2007, and July 23, 2007.

The amendment changes TS 3.7.1 as follows: (1) revises the existing Limiting Condition for Operation statement to require four operable SW pumps to be in operation when SW subsystem supply header water temperature is ≤82 °F, and adds a requirement that five operable SW pumps be in operation when SW subsystem supply header water temperature is > 82 °F and ≤84 °F; (2) deletes Condition G and its associated Required Actions and Completion Times; (3) revises Surveillance Requirement 3.7.1.3 to increase the maximum allowed SW subsystem supply header water temperatures from 82 °F to 84 °F, and modifies the requirements for increasing the surveillance frequency as the temperature approaches the limit.

A copy of the related Safety Evaluation is enclosed. A Notice of Issuance will be included in the Commission's next regular biweekly *Federal Register* notice.

Sincerely,

/RA/

Marshall J. David, Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-410

Enclosures:
1. Amendment No. 119 to NPF-69
2. Safety Evaluation

cc w/encls: See next page

September 4, 2007

Mr. Keith J. Polson
Vice President Nine Mile Point
Nine Mile Point Nuclear Station, LLC
P.O. Box 63
Lycoming, NY 13093

SUBJECT: NINE MILE POINT NUCLEAR STATION, UNIT NO. 1 - ISSUANCE OF AMENDMENT RE: TECHNICAL SPECIFICATION 3.7.1 REGARDING ULTIMATE HEAT SINK TEMPERATURE LIMITS (TAC NO. MD4031)

Dear Mr. Polson:

The Commission has issued the enclosed Amendment No. 119 to Renewed Facility Operating License No. NPF-69 for Nine Mile Point Nuclear Station, Unit No. 2. The amendment consists of changes to Technical Specification (TS) 3.7.1, "Service Water (SW) System and Ultimate Heat Sink (UHS)," in response to your application transmitted by letter dated January 4, 2007, as supplemented by letters dated April 27, 2007, May 22, 2007, and July 23, 2007.

The amendment changes TS 3.7.1 as follows: (1) revises the existing Limiting Condition for Operation statement to require four operable SW pumps to be in operation when SW subsystem supply header water temperature is ≤82 °F, and adds a requirement that five operable SW pumps be in operation when SW subsystem supply header water temperature is > 82 °F and ≤84 °F; (2) deletes Condition G and its associated Required Actions and Completion Times; (3) revises Surveillance Requirement 3.7.1.3 to increase the maximum allowed SW subsystem supply header water temperatures from 82 °F to 84 °F, and modifies the requirements for increasing the surveillance frequency as the temperature approaches the limit.

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NRR-058

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NINE MILE POINT NUCLEAR STATION, LLC

DOCKET NO. 50-410

NINE MILE POINT NUCLEAR STATION, UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 119
Renewed License No. NPF-69

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Nine Mile Point Nuclear Station, LLC (the licensee) dated January 4, 2007, as supplemented by letters dated April 27, 2007, May 22, 2007, and July 23, 2007, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-69 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, as revised through Amendment No. 119 are hereby incorporated into this license. Nine Mile Point Nuclear Station, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 90 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Mark G. Kowal, Chief
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the License and Technical Specifications

Date of Issuance: September 4, 2007

ATTACHMENT TO LICENSE AMENDMENT NO. 119

RENEWED FACILITY OPERATING LICENSE NO. NPF-69

DOCKET NO. 50-410

Replace the following page of the Renewed Facility Operating License with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove Page	Insert Page
4	4

Replace the following pages of Appendix A, Technical Specifications, with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages	Insert Pages
3.7.1-1	3.7.1-1
3.7.1-2	3.7.1-2
3.7.1-3	3.7.1-3

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 119 TO RENEWED FACILITY

OPERATING LICENSE NO. NPF-69

NINE MILE POINT NUCLEAR STATION, LLC

NINE MILE POINT NUCLEAR STATION, UNIT NO. 2

DOCKET NO. 50-410

1.0 INTRODUCTION

By letter dated January 4, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML070170453), as supplemented by letters dated April 27, 2007 (ADAMS Accession No. ML071280517), May 22, 2007 (ADAMS Accession No. ML071500063), and July 23, 2007 (ADAMS Accession No. ML072130020), Nine Mile Point Nuclear Station, LLC, (NMPNS, the licensee) requested an amendment to Renewed Facility Operating License No. NPF-69 for Nine Mile Point Nuclear Station, Unit No. 2 (NMP2). Specifically, the licensee proposed to revise Technical Specification (TS) 3.7.1, "Service Water (SW) System and Ultimate Heat Sink (UHS)," as follows:

- Revise the existing Limiting Condition for Operation (LCO) statement to require four operable SW pumps to be in operation when SW subsystem supply header water temperature is ≤82 °F, and add a requirement that five operable SW pumps be in operation when SW subsystem supply header water temperature is > 82 °F and ≤84 °F.

- Delete Condition G and its associated Required Actions and Completion Times.

- Revise Surveillance Requirement 3.7.1.3 to increase the maximum allowed SW subsystem supply header water temperatures from 82 °F to 84 °F, and modify the requirements for increasing the surveillance frequency as the temperature approaches the limit.

The NMP2 SW system is a once-through system that supplies water from Lake Ontario, which serves as the UHS, to various essential and non-essential components, during normal plant operation, shutdown conditions, and following accidents and transients. The current TS requirements allow operation with the SW subsystem supply header water temperature between 82 °F and 84 °F, provided that the average temperature over the previous 24-hour period is ≤82 °F and a fifth SW pump is placed in service. The proposed TS changes would eliminate the temperature averaging requirement and establish 84 °F as the design limit for the UHS water temperature (as measured at the SW subsystem supply headers).

During the summer of 2005, a sustained period of unusually hot weather caused Lake Ontario water temperatures and, therefore, SW subsystem supply header temperatures to approach the

current TS 3.7.1, Condition G, entry condition value of >82 °F, which requires temperature averaging over the previous 24-hour period per Required Action G.1. Had the SW subsystem supply header temperature exceeded 82 °F as an average value, initiation of a plant shutdown would have been required and hot shutdown achieved within 12 hours and cold shutdown within 36 hours. Therefore, past history has established the impetus for the proposed TS changes.

The supplemental letters dated April 27, 2007, May 22, 2007, and July 23, 2007, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the Nuclear Regulatory Commission (NRC) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on March 13, 2007 (72 FR 11390).

2.0 REGULATORY EVALUATION

The NRC staff evaluated the licensee's request utilizing the following General Design Criteria (GDC) from Title 10 of the *Code of Federal Regulations*, Part 50 (10 CFR Part 50), Appendix A:

- GDC 16, "Containment design," as it relates to the containment and associated systems establishing an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment and assuring that the containment design conditions important to safety are not exceeded for as long as the postulated accident conditions require.

- GDC 38, "Containment heat removal," as it relates to the containment heat removal system safety function to reduce rapidly, consistent with the functioning of other associated systems, the containment pressure and temperature following any loss-of-coolant accident (LOCA) and to maintain them at acceptably low levels.

- GDC 44, "Cooling water," as it relates to providing a system to transfer heat from structures, systems, and components important to safety to a UHS. The system safety function shall be to transfer the combined heat load of these structures, systems, and components under normal operating and accident conditions.

- GDC 50, "Containment design basis," as it relates to the containment heat removal system which shall be designed so that the containment structure and its internal compartments can accommodate, without exceeding the design leakage rate and with sufficient margin, the calculated pressure and temperature conditions resulting from any LOCA.

The NRC staff also used the following sections of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," for the evaluation:

- 6.2.1, "Containment Functional Design"

- 6.2.1.1.C, "Pressure-Suppression Type BWR [Boiling-Water Reactor] Containments"

- 6.2.2, "Containment Heat Removal Systems"

- 6.2.3, "Secondary Containment Functional Design"

3.0 TECHNICAL EVALUATION

3.1 Impact on Components and Systems Served by the SW System

The SW system is designed with suitable redundancy to provide a reliable source of cooling water for the removal of heat from the following components:

Safety-related components:

- Residual heat removal (RHR) heat exchangers
- RHR pump seal coolers
- Emergency diesel generators (EDGs)
- Control building area coolers and chillers
- Hydrogen recombiners
- Safety-related area coolers
- Spent fuel pool heat exchangers

Non-safety-related components:

- Main condenser steam jet air ejector system pre-coolers and air removal vacuum pump seal coolers
- Reactor building closed loop cooling (RBCLC) system heat exchangers
- Reactor building normal supply air cooler
- Turbine building closed loop cooling (TBCLC) system heat exchangers
- Turbine building ventilation

3.1.1 SW System

The available net positive suction head (NPSH) for the SW pumps operating at design flow (10,000 gallons per minute), minimum intake bay level (233.1 feet), and 100 °F lake water temperature is 34.5 feet, which exceeds the required NPSH by approximately 10 feet. Therefore, SW pump operability is not adversely impacted by a UHS temperature of 84 °F.

SW piping was evaluated by the licensee for a UHS water temperature of 84 °F. The results showed that the piping continues to meet the design-basis allowable stress requirements for piping and the allowable loads for equipment nozzles, and that pipe supports continue to meet the design-basis requirements. The effect of the 2 °F UHS temperature increase on pipe displacements, spring load settings, and header displacements will be minimal and will not affect the design-basis limits. Therefore, operation with a UHS temperature of 84 °F will have no significant effect on SW piping, nozzles, and supports.

3.1.2 RHR Heat Exchangers and RHR Pump Seal Coolers

The RHR heat exchangers are cooled by the SW system. The licensee stated that an increase in the UHS water temperature from 82 °F to 84 °F would result in a small reduction in the heat removal capacity of the RHR heat exchangers. The NRC staff's review of the impact on heat removal capacity of the RHR heat exchangers is addressed in Section 3.2.1.

The RHR pump seal coolers are designed for a maximum cooling water temperature of 105 °F to ensure adequate protection for the pump seals. The increase of UHS water temperature to 84 °F would have no impact on the reliability of RHR pump seal coolers.

3.1.3 Division 1, 2, and 3 EDGs

The EDGs receive an auto-start signal on a LOCA, loss of offsite power (LOOP), or LOCA/LOOP. With offsite power maintained (i.e., LOCA without a LOOP), the EDGs run unloaded until manually secured. The licensee has evaluated the jacket water cooling systems for the post-LOCA loading condition (generator loaded to no more than 100 percent) and at the test condition (110 percent of generator output), assuming design fouling factors with 10 percent tube plugging for the Division 1 and 2 EDGs, and approximately 8 percent tube plugging (26 tubes) for the Division 3 (high pressure core spray) EDG. The jacket water heat exchanger tube plugging limits are managed via the corrective action program whenever a tube requires plugging. For these conditions, the Division 1 and 2 EDG jacket water high outlet temperature alarm setpoint would not be reached with the UHS water temperature as high as 100 °F, and the jacket water high outlet temperature trip setpoint is 15 °F above the alarm setpoint. The Division 3 EDG jacket water high outlet temperature alarm setpoint would not be reached with the UHS water temperature as high as 89 °F, and the jacket water high outlet temperature trip setpoint is 8 °F above the alarm setpoint. Therefore, there is adequate margin to ensure operability of the EDGs at a UHS water temperature of 84 °F.

Each of the three EDG rooms is cooled by a once-through ventilation system that does not utilize the UHS for cooling. The cooling medium is outside air. Therefore, the EDG rooms are not affected by the UHS water temperature increase. Each of the three EDG control rooms is cooled by a local unit cooler served by the SW system. These local unit coolers are designed to maintain the EDG control room area temperature at or below 104 °F. The performance requirement for the local unit coolers is currently based on a UHS water temperature of 84 °F. Therefore, the increased UHS temperature would have insignificant impact in these rooms.

3.1.4 Control Building Area Chillers and Coolers

<u>Control Building Chillers</u>

The control building chiller condensers are cooled by the SW system. These chillers were evaluated for operation at a UHS water temperature of 84 °F. The licensee's evaluation concluded that operation with a UHS temperature of 84 °F would require four SW pumps in operation to ensure that the post-accident control building chiller flow requirement is met. Placing a fifth SW pump in operation, together with pre-planned actions to manage SW system flow rate and heat loads, ensures that sufficient SW flow to the control building chillers is available to meet accident analysis assumptions when the UHS temperature is > 82 °F and ≤84 °F, assuming a single failure of either one operating SW pump or one operating chiller and no concurrent LOOP (i.e., non-essential loads do not automatically isolate). Operation of a fifth SW pump when the UHS water temperature exceeds 82 °F is currently a required action associated with TS 3.7.1, Condition G, which allows a temperature averaging approach and a maximum temperature not to exceed 84 °F. The proposed changes to TS 3.7.1 would remove Condition G and add LCO b.2, which requires the fifth SW pump to be in operation when water temperature of one or two SW subsystem supply headers is > 82 °F and ≤84 °F, since the design will now be based on continuous operation at a UHS temperature of 84 °F. Furthermore, the licensee stated that the

minimum required SW flow rate to the chillers will be verified in accordance with the SW system operating procedure prior to the UHS temperature exceeding 82 °F. If there is insufficient flow rate to the chillers, the applicable control building chillers will be declared inoperable and actions will be taken in accordance with TS 3.7.3, "Control Room Envelope Air Conditioning (AC) System."

In a supplemental letter dated July 23, 2007, the licensee confirmed that no hardware changes are required for the proposed change and that the established design change process will be used to identify and incorporate the plant documentation and procedure changes necessary to implement the proposed changes to TS 3.7.1 within the 90-day implementation period requested in the January 4, 2007, submittal.

In the July 23, 2007, supplemental letter, the licensee also elaborated on information provided in Section 4.1.1.3 of the January 4, 2007, submittal. In the supplemental letter, the licensee stated that certain pre-planned actions to manage SW system flows and heat loads are already incorporated into the SW system operating procedure. These include: (1) adjusting SW flows to the heat exchangers in the RBCLC and TBCLC systems; (2) opening the valves in the SW lines that bypass the temperature control valves located downstream of each chiller; and (3) increasing chilled water outlet temperature to 50 °F. Additional actions are under consideration, such as adjusting cooling tower make-up flows. All of these actions are within NMP2's design and license bases. The licensee stated that better SW system flow management, including managing the flows to the RBCLC and TBCLC heat exchangers (non-essential loads) to within design flow rates, is required to sustain required flows to the control building chillers. The operating procedures for the SW, RBCLC, and TBCLC systems will be modified to provide more specific guidance such that SW system flows are maintained consistent with system design requirements. As noted previously, operating a fifth SW pump when the UHS temperature exceeds 82 °F (required by both the current TS and the proposed TS) provides additional flow capacity to the system. A procedural requirement to periodically monitor the SW flow rate to the control building chillers when elevated UHS temperatures are being experienced will also be added. The licensee concluded that the existing pre-planned actions together with the procedure modifications described above establish a pre-accident SW system operational configuration that assures that the control building chillers will operate as designed and that control building design basis temperatures will be met for all operating and postulated accident conditions at a UHS temperature of 84 °F, assuming a single failure of either one operating SW pump or one operating chiller and no concurrent LOOP. No post-accident operator actions are required to assure adequate SW flow to the control building chillers.

The NRC staff found the licensee's evaluation and plans acceptable.

Control Building General Area Unit Coolers

The local unit coolers in the standby switchgear, battery, and chiller rooms of the control building are designed to maintain the area temperature at or below 104 °F. Performance testing of these unit coolers is periodically performed to verify their required capacity based on a UHS water temperature of 84 °F. Therefore, operation with a UHS temperature of 84 °F has insignificant impact on performance of the equipment in these control building area rooms.

3.1.5 Hydrogen Recombiners

The hydrogen recombiners utilize the SW system to cool the recombiner exhaust gas stream by means of a water spray aftercooler, to protect the concrete surrounding the penetration through which the exhaust gases pass to re-enter the primary containment. The recombiner aftercooler sizing is based on a 180 °F cooling water supply header temperature. Therefore, raising the UHS water temperature limit to 84 °F (well below the 180 °F temperature) does not compromise the integrity of the concrete surrounding the penetration.

3.1.6 Safety-Related Area Coolers

Emergency Core Cooling System (ECCS) Equipment Rooms Heating Ventilation and Air Conditioning (HVAC)

The RHR pump rooms and the low-pressure core spray pump room each have two unit coolers that are served by the SW system. Both coolers are normally operable. For normal plant operation (e.g., RHR operating in shutdown cooling mode), operation of both unit coolers will maintain the room design temperature at 120 °F. For accident conditions and for a 10 CFR Part 50, Appendix R fire event, operation of a single room unit cooler is sufficient to maintain the room within the design temperature of 135 °F.

The RHR heat exchanger rooms each have one unit cooler. Operation of the unit cooler maintains the room within the design temperature of 120 °F for normal operation and 135 °F for accident conditions.

The high-pressure core spray pump room has two unit coolers that are cooled by the SW system. Both unit coolers are normally required to be operable. For accident conditions, operation of a single unit cooler can maintain the room within its design temperature of 135 °F.

The licensee stated in the January 4, 2007, submittal that all the unit coolers for the HVAC in the ECCS equipment rooms are periodically tested to verify their required capacity based on a UHS water temperature of 84 °F. The NRC staff found that the proposed TS change would have no adverse impact on the coolers in these rooms.

Electric Tunnels and Control Building Basement Cooling

Unit coolers are provided in these areas that are cooled by the SW system. The equipment in the electrical tunnels that is required to operate following an accident is designed to operate with ambient temperature of ≤137 °F which can be maintained without a unit cooler in operation. The licensee stated in the January 4, 2007, submittal that operation of the area unit coolers with the SW temperature of 84 °F in the control building basement will maintain the post accident area temperature within the equipment operability limit. Therefore, operation with the UHS at 84 °F has insignificant impact in these areas.

Motor Control Center (MCC) Room and Standby Gas Treatment System (SGTS) Room Unit Coolers

Each MCC room has two coolers and each SGTS room has one unit cooler that are cooled by the SW system. They are designed to maintained a design temperature of 104 °F for these rooms during normal operation and post-accident conditions. The licensee stated in the January 4, 2007, submittal that performance testing of the MCC and SGTS room unit coolers is periodically performed to verify their required capacity based on a UHS water temperature of

84 °F. Therefore, operation with a UHS temperature of 84 °F has insignificant impact on these rooms.

Reactor Building General Area Unit Coolers

There are several safety-related unit coolers in reactor building general areas that are cooled by the SW system. The general area design temperatures are 104 °F for normal operation and 135 °F for accident conditions. The licensee stated in the January 4, 2007, submittal that performance testing of these unit coolers is periodically performed to verify their required capacity based on a UHS water temperature of 84 °F. Therefore, operation with a UHS temperature of 84 °F has insignificant impact on performance of the equipment in these areas.

Reactor Core Isolation Cooling (RCIC) Room Unit Coolers

The SW system supplies cooling water to each of the two RCIC room unit coolers. Both unit coolers are normally operable. The licensee stated in the January 4, 2007, submittal that operation of a single unit cooler is sufficient to maintain the room design temperature of 120 °F. Performance testing of the RCIC room unit coolers is based on a UHS water temperature of 84 °F. Therefore, operation with a UHS temperature of 84 °F has insignificant impact on RCIC equipment performance.

SW Pump Bay Unit Coolers

The two unit coolers in each of the two SW pump bays are cooled by SW. Normally, each pump bay has two SW pumps running with one unit cooler in service. When three SW pumps are running, both unit coolers are needed during elevated UHS temperature conditions. These unit coolers function to maintain the SW pump bays below the area design temperature of 104 °F. The licensee stated in the January 4, 2007, submittal that performance testing of these unit coolers is periodically performed to verify their required capacity based on a UHS water temperature of 84 °F. Therefore, operation with a UHS temperature of 84 °F will not adversely impact performance of the equipment in the SW pump bays since area temperatures will be maintained within the design limit.

3.1.7 Spent Fuel Pool Cooling System

As discussed in Section 3.1.9, the spent fuel pool cooling heat exchangers are normally cooled by the RBCLC system and may alternatively be cooled directly by the SW system.

The limiting decay heat load for the spent fuel pool cooling system during normal plant operation occurs when there is an emergency full core offload. The licensee's analysis shows that, for operation with a UHS water temperature of 84 °F, the spent fuel pool temperature would be approximately 132 °F, which is below the 150 °F design limit for an emergency full core offload. Therefore, operation with a UHS temperature of 84 °F is acceptable for the spent fuel pool heat exchangers.

The maximum heat load that the spent fuel pool would be subjected to post-LOCA was determined based on discharge of a normal batch of fuel bundles during a 20-day refueling outage, with the remainder of the spent fuel pool full of spent fuel bundles from previous similar refueling discharges. With a UHS water temperature of 84 °F, the heat removal capability of

the spent fuel pool heat exchangers is such that the peak spent fuel pool temperature would be approximately 116 °F, which is below the 125 °F operation limit. Therefore, operation with a UHS temperature of 84 °F is acceptable for the spent fuel pool heat exchangers.

3.1.8 Condenser Air Removal System

The main condenser steam jet-air ejectors (SJAEs) are normally in service to maintain main condenser vacuum during plant operation. The pre-coolers cool the non-condensible gases and condense vapor removed from the main condenser. The licensee stated that the 2 °F increase of UHS water temperature will cause a small decrease in the efficiency of the SJAEs that will have an insignificant impact on main condenser vacuum. The condenser air removal vacuum pumps are typically in service during plant startup to establish main condenser vacuum. The licensee stated that, as indicated in plant data for operation with a UHS water temperature of 84 °F, the vacuum pump seal return water temperature will be approximately 104 °F, which is 21 °F below the high temperature alarm setpoint. Therefore, the change has an insignificant impact on the performance of the condenser air removal system.

3.1.9 RBCLC System

The RBCLC system is a non-safety-related system that provides cooling water to reactor auxiliary system equipment and accessories during normal plant operation. The three RBCLC system heat exchangers are cooled by the SW system. Two heat exchangers are normally in service with the remaining one in standby. The licensee stated in the January 4, 2007, submittal that operation with a UHS temperature of 84 °F will not adversely impact the performance of equipment cooled by the RBCLC system. However, the licensee did not explain how operability of the equipment within the drywell that is cooled by RBCLC system will be affected by the elevated UHS temperature. In a letter dated March 29, 2007 (ADAMS Accession No. ML070850046), the NRC staff issued a request for additional information (RAI). RAI-4 requested the licensee to provide information on the impact of increased UHS temperature on the RBCLC system inside the drywell and explain if the cooling water system that is cooled by the UHS at increased temperature will maintain equipment operability inside the drywell.

In response to RAI-4, which referred to NMP2 Updated Safety Analysis Report (USAR) Section 9.2.2, the licensee stated that RBCLC system temperature is controlled by bypassing part of the component cooling water flow around the RBCLC heat exchangers. A temperature control valve is provided to regulate flow through the heat exchangers to maintain the desired temperature. In accordance with the system operating procedure, a normal RBCLC supply temperature of 86 °F is maintained, which is 9 °F below the design supply temperature of 95 °F. Normally, two of the three RBCLC heat exchangers are in service. The third (standby) RBCLC heat exchanger is placed in service when the UHS temperature is greater than 72 °F. In the event of increasing RBCLC supply temperature, heat loads on the RBCLC system would be reduced in accordance with the system operating procedure. For example, the spent fuel pool cooling heat exchangers could be cooled directly by the SW system instead of the RBCLC system. With three RBCLC heat exchangers in service and the system heat loads managed in accordance with the system operating procedure, the RBCLC supply temperature can be maintained less than its design limit of 95 °F when the UHS temperature is 84 °F. Since the RBCLC supply water temperature can be maintained at or below its design value of 95 °F for all anticipated conditions, there will be no impact on the performance capabilities of the equipment serviced by the RBCLC system,

including equipment inside the drywell. The NRC staff found the licensee's rationale acceptable.

RAI-5 requested the licensee to provide information on how the instrument air compressors would be affected by the proposed 2 °F increase in UHS temperature to 84 °F. In response to RAI-5, the licensee stated that the three non-safety-related instrument air compressors are cooled by the RBCLC system. Normally only one compressor is running to support plant operation, a second compressor serves as a lag unit, and the third compressor is a backup. The RBCLC system can support operation of all three air compressors with the RBCLC supply temperature being no higher than its design temperature of 95 °F. Since the RBCLC supply water temperature can be maintained at or below its design value of 95 °F for all anticipated conditions, there will be no impact on the performance capabilities of the air compressors when the UHS temperature is 84 °F. The NRC staff found the licensee's rationale acceptable.

3.1.10 Reactor Building Normal Supply Air Cooler

The non-safety-related reactor building supply air system has no accident mitigation function and is isolated during accident conditions. The normal supply air cooler uses SW to cool the normal outside supply air to the reactor building during normal plant operation to ensure habitability of the areas served and optimum performance of equipment. The licensee stated that the normal supply air temperature increase due to a 2 °F increase in the UHS water temperature will have a negligible affect on reactor building area equipment. This conclusion was based on the small supply air temperature increase (approximately 1 °F) resulting from a 2 °F increase in the UHS temperature, the large heat capacity of the reactor building, and diurnal outside air temperature variation. In addition, the licensee's review of operating data indicated that the reactor building area temperatures will not exceed the design maximum temperatures for operation with a UHS temperature of 84 °F. Therefore, operation with a UHS temperature of 84 °F will not adversely impact performance of equipment in reactor building areas since area temperatures will be maintained within design limits.

3.1.11 TBCLC System

The TBCLC system is a non-safety-related system that has no accident mitigation function. It provides cooling water to components in the turbine and radwaste buildings. The three TBCLC heat exchangers are cooled by the SW system. Two heat exchangers are normally in service with the remaining one in standby. The standby heat exchanger is used during the summer season when UHS water temperature is elevated. TBCLC system operating configuration and heat loads are managed in accordance with existing operating procedures to maintain TBCLC temperature within design values. Therefore, operation with a UHS temperature of 84 °F will not adversely impact performance of equipment cooled by the TBCLC system.

3.1.12 Turbine Building Ventilation

There are a number of turbine building unit coolers served by the SW system that remove heat from various areas of the building. In addition, chillers that are cooled by SW provide chilled water to cool ventilation supply air for the turbine building. The licensee stated that, as a result of the 2 °F increase in UHS water temperature, turbine building area temperatures could increase by approximately 2 °F, but that this small increase will not have a significant impact on the operability of equipment located in the turbine building.

The main steam tunnel area of the turbine building contains leakage detection temperature sensors that close the main steam isolation valves (MSIVs) when the area temperature reaches the setpoint. The licensee's evaluation of the existing margins between operating temperatures and the instrument setpoints indicated that there is sufficient margin to accommodate a UHS temperature of 84 °F without reaching the high area temperature MSIV closure setpoint during normal plant operation. In addition, the main steam line tunnel lead enclosure high temperature MSIV closure setpoint can be adjusted upward as ambient temperature increases, in accordance with Footnote (b) to TS Table 3.3.6.1-1, Primary Containment Isolation Instrumentation.

3.1.13 Fire Protection Water System

The available NPSH for the fire protection water pumps at a UHS water temperature of 100 °F exceeds the required NPSH by approximately 1 foot. Since available NPSH will be greater than 1 foot for operation at a UHS temperature of 84 °F, fire protection water pump operability is not adversely impacted by the proposed change.

The diesel-driven fire water pump uses lake water for jacket water cooling. The jacket water heat exchanger is sized for cooling water temperatures up to 90 °F. Therefore, there is no adverse impact on pump cooling resulting from operation at a UHS temperature of 84 °F.

The electric fire pump room is cooled by a local area cooler which uses lake water as the cooling medium. The licensee evaluated equipment in this room for operation in the higher ambient temperature resulting from the 2 °F increase in UHS water temperature, and determined that all equipment and components in this room needed for fire protection will function at the elevated temperature. Therefore, the fire protection function is unaffected by an increase in the UHS temperature to 84 °F.

3.2 Accident Analyses

NMP2 is a BWR-5 with a Mark II containment. As described in USAR Section 9.2.1.2, lake water enters through an intake structure, flows through the trash racks and traveling water screens, and enters the intake bay to the SW system. The primary containment spray, as described in USAR Section 6.2.2, is a part of the RHR system and is capable of quickly reducing primary containment pressure following a design-basis LOCA and maintaining the pressure below the containment design pressure. The RHR system pumps take suction from the suppression pool, pass the water through the RHR heat exchangers where it is cooled by SW, and then directs the water to the drywell and suppression chamber spray headers. After removing heat from the containment spray water, the SW is returned to the lake through a discharge tunnel.

3.2.1 Primary Containment Response

Impact on LOCA Analysis Initial Conditions

In response to RAI-7, the licensee evaluated the effect of higher SW temperature on the initial drywell temperature of 135 °F, which is used as input for the LOCA analyses. The licensee

stated, by reference to information in the response to RAI-4 (see Section 3.1.9 for more detail), that the RBCLC supply water temperature can be maintained at or below its design value of 95 °F for all anticipated conditions, therefore, there will be no impact on the performance capabilities of the drywell coolers; they will be capable of maintaining the drywell temperature less than 135 °F when UHS (i.e., SW subsystem supply header) temperature is 84 °F. The NRC staff considers the licensee's evaluation acceptable because RBCLC heat exchangers will operate to supply water at a temperature below 95 °F, which is a 9 °F margin compared to the normal RBCLC supply temperature of 86 °F, and, if necessary, the licensee would maintain the RBCLC water supply temperature below 95 °F by reducing RBCLC heat exchanger heat loads in accordance with the system operating procedure.

The licensee evaluated the effect of the increased SW temperature on the initial suppression pool temperature of 90 °F, which is used as input for the LOCA analyses. The RHR system in its pool cooling mode is used to maintain the suppression pool within its TS limit of 90 °F. In response to RAI-6, the licensee showed that the RHR heat exchangers, assuming a 3 percent tube plugging, the design fouling factor, and a SW subsystem supply header temperature of 84 °F, could cool the suppression pool from 110 °F to 90 °F in less than 24 hours and, therefore, the TS 3.6.2.1 requirement would be met. The NRC staff agrees with the licensee's evaluation.

Impact on Post-LOCA Peak Primary Containment Pressure

The licensee referred to USAR Sections 6.2.1.1.3 and 6.2.1.1.5, which state that SW is not immediately relied upon for post-accident recovery and primary containment heat removal and is not an input to the primary containment peak pressure evaluation. The suppression pool provides the immediate post-accident pressure suppression function following a LOCA. Per USAR Sections 6.2.1.1.3 and 6.2.1.1.5, peak drywell pressure and suppression chamber pressure are reached within a few minutes from the initiation of a large-break LOCA. The RHR system in its primary containment spray mode or suppression pool cooling mode, in which the SW is used for heat removal, is not assumed to be initiated by the operator until at least 10 minutes from the onset of the LOCA. Therefore, an increase in the SW temperature from 82 °F to 84 °F will not affect the peak drywell and suppression chamber pressure.

Impact on Post-LOCA Peak Drywell Temperature

The licensee stated that the limiting post-LOCA short term peak drywell temperature is established by the main steam line break accident and occurs within 1 minute after the start of the event. The RHR system in its drywell spray mode, in which SW is used for heat removal, is not assumed to be initiated by the operator until at least 10 minutes after the onset of the LOCA. Therefore, an increase in the SW temperature from 82 °F to 84 °F will not affect the short term peak drywell temperature. The NRC staff agrees with the licensee's evaluation.

The licensee stated that the limiting post-LOCA long term peak drywell temperature is established by a small steam line break. In response to RAI-1, the licensee provided the calculated 30-day post-LOCA drywell temperature profile using a SW temperature of 84 °F, 3 percent RHR heat exchanger tube plugging and the design fouling factor consistent with NMP2 power uprate analysis. The licensee showed that this temperature profile is very close to the similar temperature profile using the present SW temperature of 82 °F, a 5 percent RHR heat exchanger tube plugging and design fouling factor. As discussed in more detail

below, the licensee also showed that the composite environmental qualification (EQ) temperature profile that is used to establish EQ of safety-related equipment envelopes the post-LOCA long term drywell temperature profile. The NRC staff finds the licensee's analyses acceptable.

Impact on Post-LOCA Peak Suppression Pool Temperature

The RHR system in its pool cooling mode is used for post-LOCA suppression pool cooling. Per USAR Table 6.2-4, the power uprate post-LOCA peak suppression pool temperature is 207.9 °F, about 4 °F below its design limit of 212 °F, calculated with a SW subsystem supply header temperature of 82 °F and 5 percent RHR heat exchanger tubes plugged, and design fouling factor. In a license amendment request dated August 22, 2003, which was approved by the NRC as License Amendment No. 113 on May 7, 2004 (ADAMS Accession No. ML041170236), the licensee reduced the RHR heat exchanger plugged tubes area margin by lowering the tube plugged limit from 5 percent to 3 percent. The licensee stated that the RHR heat exchanger tube plugging is controlled administratively in a maintenance procedure. In response to RAI-2, the licensee demonstrated that the RHR heat exchanger heat removal capability with a 3 percent tube plugged and 84 °F SW subsystem supply header temperature is essentially the same as the heat removal capability with 5 percent tube plugged and 82 °F SW subsystem supply header temperature with the design fouling factor. Therefore, the RHR heat exchanger with 3 percent tubes plugged and 84 °F SW subsystem supply header temperature is adequate to maintain the post-LOCA peak suppression pool temperature below its design limit. The NRC staff agrees with the licensee's assessment.

Impact on Post-LOCA Suppression Chamber Gas Temperature

The licensee stated that, in the post-LOCA long term condition, the gas above the suppression pool reaches thermodynamic equilibrium with the suppression pool. Therefore, it essentially stays close to the post-LOCA suppression pool temperature discussed above. The NRC staff agrees with the licensee's assessment because the suppression chamber gas temperature stays below its design limit of 212 °F.

Impact on Suppression Pool Temperature due to Anticipated Transients Without Scram (ATWS)

As discussed above, the initial suppression pool temperature for accident analyses is not affected by an increase in SW temperature to 84 °F. In response to RAI-8, the licensee stated that the ATWS suppression pool heatup analysis was performed by the General Electric Company utilizing computer code STEMP04. NRC has previously accepted applications that used this computer code. The analysis was performed using a SW temperature of 84 °F. The highest calculated peak suppression pool temperature was 155 °F which is well below the ATWS limit of 190 °F. The NRC staff accepts the licensee's evaluation.

Impact on Suppression Pool Temperature due to an MSIV Closure Event

In a supplemental letter dated May 22, 2007, the licensee stated that the suppression pool temperature resulting from an MSIV closure event at 102 percent power in conjunction with a LOOP, as described in USAR Section 6A.10.2, was evaluated. In this evaluation, the licensee determined that, with a SW temperature of 84 °F, RHR heat exchanger design fouling factor,

and 3 percent tubes plugged, the peak suppression pool temperature remains below its design limit of 212 °F. The NRC staff agrees with the evaluation because the licensee demonstrated in response to RAI-2 that the RHR heat exchanger with its revised parameters, (i.e., SW subsystem supply header temperature of 84 °F, 3 percent tubes plugged, and design fouling factor) has approximately the same heat removal capacity as it would have with a SW subsystem supply header temperature of 82 °F, 5 percent tubes plugged, and design fouling factor. The latter analysis was previously reviewed and approved by the NRC staff.

Impact on Equipment in the Drywell

The drywell area coolers are served by the RBCLC system, which is cooled by the SW system. The licensee stated in the January 4, 2007, submittal that operation with a UHS temperature of 84 °F may result in a slight increase in drywell area temperature, but the existing drywell temperature limit of 150 °F specified in TS 3.6.1.5 would not be affected by the proposed TS change. The peak drywell temperature conditions are established by the steam line break accident and occur in the early part of the transient when the UHS is not immediately relied upon to provide post-LOCA primary containment heat removal. In Section 4.2.1.3 of the January 4, 2007, submittal, the licensee stated that the long-term post-LOCA drywell temperature profile would be several degrees higher because of the impact of higher UHS temperature on RHR heat exchanger heat removal capability, but that this would not adversely impact the post-LOCA performance of equipment located in the drywell. However, the licensee did not address whether the several degree temperature increase in the drywell would affect its EQ temperature previously approved. In RAI-1, the NRC staff asked the licensee to provide information on the post-LOCA temperature profile and EQ temperature profile and on the safety margin between the two temperature profiles, and to explain what actions would be taken to maintain drywell temperature within a limit that would ensure the validity of the EQ temperature previously approved.

In response to RAI-1, the licensee provided a figure showing the composite EQ temperature profile that is used to establish qualification of electrical equipment important to safety in the drywell; the figure covered the first 30 days post-LOCA. Also plotted on the figure were the calculated 30-day post-LOCA containment temperature responses assuming UHS temperature of 82 °F and 84 °F. Beyond 30 days, the licensee stated that the EQ temperature profile remains constant at 150°F, whereas the calculated post-LOCA temperatures for the 82 °F and 84 °F cases continue to decrease with ongoing containment heat removal via the RHR heat exchangers. The composite EQ drywell temperature profile remains bounding post-LOCA, even for the 2 °F increase in UHS temperature, and the margin between the composite EQ drywell temperature profile and the qualification test profile for the equipment remain unchanged. Therefore, the licensee stated that no actions are required to ensure the validity of the EQ temperature previously approved. The NRC staff found the licensee's rationale acceptable.

3.2.2 RHR Heat Exchanger Performance

There was no information in the January 4, 2007, submittal regarding which computer code was used to analyze thermal and hydraulic performance of the RHR heat exchangers or whether it was updated. In RAI-2, the NRC staff requested the licensee to provide information on the computer code used for the analysis and on the accuracy of the analysis compared with other recognized calculation methods.

In response to RAI-2, the licensee stated that a computer code was not used to analyze the thermal and hydraulic performance of the RHR heat exchangers for the proposed 2 °F increase in UHS temperature to 84 °F. Since the heat exchanger flow rates have not changed from the existing analysis, the hydraulic performance will not be impacted. The heat exchanger thermal performance is calculated using the effectiveness method, which requires heat exchanger data including the overall heat transfer coefficient, design-basis fouling, and flow rates. Testing of the RHR heat exchanger is performed consistent with the heat transfer methods specified in Electric Power Research Institute TR-107397, "Service Water Heat Exchanger Testing Guidelines." Collected heat exchanger test data is extrapolated to design conditions using the PROTO-HX program, Shell and Tube Heat Exchangers Module (Version 4.00). The heat exchanger testing performed in 2004 for the "B" RHR heat exchanger determined that the projected heat duty, when extrapolated to design conditions and considering test uncertainties, was 44.68 MBtu/hr. Likewise, testing of the "A" RHR heat exchanger in 2007 yielded a projected heat duty of 45.7 MBtu/hr. The required heat removal capacity at design condition is 33.08 MBtu/hr. Thus, the as-tested RHR heat exchanger performance is significantly better than the design performance assumed in the plant safety analysis. The NRC staff's review found the licensee's justification acceptable.

In Section 4.2.1.4 of the January 4, 2007, submittal, the licensee stated that post-LOCA suppression pool cooling is provided by the RHR system, which is cooled by the SW system. The calculated peak post-LOCA suppression pool water temperature for power uprated conditions is approximately 4 °F below the 212 °F design limit based on a UHS temperature of 82 °F and assuming 5 percent of the RHR heat exchanger tubes are plugged. However, the licensee did not address whether the pool temperature design limit would be exceeded when the UHS heat exchanger temperature reaches 84 °F. In RAI-3, the NRC staff requested the licensee to justify that the peak suppression pool temperature design limit would not be exceeded for a LOCA with the UHS temperature continuously at 84 °F and to validate it with a computer analysis.

In response to RAI-3, the licensee stated that the present RHR heat exchanger tube plugging limit is 3 percent. The 3 percent limit was established in conjunction with the evaluation performed by the licensee in support of License Amendment No. 113, which was issued by NRC letter dated May 7, 2004, as noted above. Additionally, as demonstrated in the response to RAI-2, the RHR heat exchanger removal capacity with 3 percent tube plugging and 84 °F SW subsystem supply header temperature is essentially the same as the heat removal capability with 5 percent tube plugging and 82 °F SW subsystem supply header temperature. Thus, the 4 °F margin between the peak calculated post-LOCA suppression pool temperature and the 212 °F design limit, together with limiting the allowable RHR heat exchanger tube plugging to 3 percent, is adequate to accommodate the proposed 2 °F increase in UHS temperature to 84 °F. The NRC staff's review found the licensee's response acceptable.

3.2.3 Secondary Containment Response

As described in the USAR, the secondary containment consists of the reactor building and auxiliary bay structures and it completely surrounds the primary containment. It is maintained at a negative pressure of at least 0.25 inch water gage relative to the outside atmosphere. The licensee stated that the limiting post-LOCA conditions for maintaining the negative pressure occur in winter. The NRC staff agrees with the licensee because the greater density difference

between the outside air and inside air during winter creates a higher differential pressure resulting in a higher air in-leakage compared to the summer conditions. Therefore, operation with a UHS temperature of 84 °F, which occurs during summer, does not have the limiting impact on maintaining post-LOCA vacuum conditions inside the secondary containment.

3.2.4 Conclusions from the Technical Evaluation

The NRC staff has reviewed the licensee's submittals for the proposed increase in SW subsystem supply temperature limit from 82 °F to 84 °F. The NRC staff has determined that the proposed change meets the requirements of 10 CFR Part 50, Appendix A, as follows:

- GDC 16 because the licensee provided acceptable data and analyses to demonstrate that the containment and associated systems would continue to provide an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment and because the primary containment design conditions important to safety are not exceeded following postulated design-basis LOCA, ATWS, and MSIV closure events.

- GDC 38 because the RHR system heat exchangers would remove primary containment heat and maintain its pressure and temperature below their design limits following a design-basis LOCA event.

- GDC 44 because SW system cooling can be provided at the proposed subsystem supply header temperature of 84 °F for normal and post-accident heat removal requirements to ensure adequate heat removal for proper equipment operation, and because the licensee has demonstrated acceptable heat removal capability at the higher SW subsystem supply header temperature limit at accident conditions.

- GDC 50 because the licensee provided acceptable data and analyses to demonstrate that the primary containment heat removal system will continue to ensure that the primary containment structure and its internal compartments can accommodate without exceeding the design leakage rate and with sufficient margin, the calculated pressure and temperature conditions resulting from the design-basis LOCA.

By meeting the requirements above, the proposed change also meets the applicable guidance of Standard Review Plans 6.2.1, 6.2.1.1.C, and 6.2.2.

The NRC staff also determined that the proposed change does not adversely impact on the capability of maintaining post-LOCA vacuum in the secondary containment in compliance with the guidance of Standard Review Plans 6.2.3.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes

surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (72 FR 11390). Accordingly, the amendment meets 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 the amendment.

6.0 CONCLUSION

The NRC 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 the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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