Entergy

Entergy Nuclear Generation Co.
Pilgrim Nuclear Power Station
600 Rocky Hill Road
Plymouth, MA 02360

Mike Bellamy
Site Vice President

March 5, 2002

US Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

SUBJECT: Entergy Nuclear Generation Company
Pilgrim Nuclear Power Station
Docket No. 50-293
License No. DPR-35

Pilgrim Response to NRC Request for Additional Information Related to the Proposed License Amendment 3/4.7.B.1.a.2, Standby Gas Treatment (SBGT) Heater Requirement

LETTER NUMBER: 2.02.015

REFERENCE: ENGC Letter to NRC, Proposed License Amendment Change to the Technical Specifications (TS) 3/4.7.B.1.a.2, Standby Gas Treatment (SBGT) Heater Requirement, dated August 22, 2001

Dear Sir or Madam:

By the referenced letter, Entergy Nuclear Generation Company (ENGC) proposed to amend Pilgrim Operating License No. DPR-35 in accordance with 10 CFR 50.90. The proposed amendment relates to changes to Technical Specification, 3/4.7.B.1.a.2, Standby Gas Treatment (SBGT) Heater Requirement. The attachment to this letter provides the Pilgrim response to the NRC request for additional information.

Should you have any questions regarding this letter, please contact Walter Lobo at (508) 830-7940.

Thomas Trepanier

Commonwealth of Massachusetts)
Country of Plymouth)

Then personally appeared before me, Thomas Trepanier, who being duly sworn, did state that he is acting Site Vice President of Pilgrim Nuclear Power Station and that he is duly authorized to execute and file the submittal contained herein in the name and on behalf of Entergy Nuclear Generation Company and that the statements are true to the best of his knowledge and belief.

My commission expires: September 20, 2002 Peter M Kahler
DATE NOTARY PUBLIC

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Attachment: 1. Pilgrim Response to NRC Request for Additional Information

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ATTACHMENT 1

REQUEST FOR ADDITIONAL INFORMATION
PILGRIM NUCLEAR POWER STATION
PROPOSED LICENSE AMENDMENT
CHANGE TO THE TECHNICAL SPECIFICATIONS 3/4.7.B.1.a.2
STANDBY GAS TREATMENT (SBGT) HEATER REQUIREMENT

1. NRC REQUEST

The first paragraph on page 4 of ATTACHMENT A, of the August 22, 2001, submittal states that "the effects (e.g., increased electrical load and heat load on components and charcoal) of the larger heaters have been evaluated and found not to adversely impact other equipment."

With regard to that statement, please provide a detailed discussion as to why the increased electrical load of the larger heaters will not adversely impact other equipment during a design basis accident. In your response, please consider the increased loading on supply breakers, cable sizing, motor control center loading and diesel generator loading. Please provide sufficient data to support the conclusion.

2. PILGRIM RESPONSE

Pilgrim has installed increased heater capacity using 10 CFR 50.59 provisions to meet the 70% relative humidity (RH) design requirements for the charcoal beds in the Standby Gas Treatment System (SGTS) and is requesting NRC approval for a more restrictive Technical Specification surveillance. The 10 CFR 50.59 review considered the impact of increased heater capacity on supply breakers, cable sizing, 480V motor control center loading and diesel generator loading and has concluded that increased heater capacity along with component replacements does not adversely impact other equipment. The result of this evaluation is described below. The modification has increased the rated heater capacity to approximately 30.2 kW at 480V AC with a capacity of approximately 23.4 kW at degraded voltage conditions.

To ensure that the increased heater capacity did not adversely impact the equipment, the scope of the modification included component replacements to accommodate the higher capacity of the heater and/or to provide new components that have appropriate Environmental Qualification (EQ) documentation for the updated temperature conditions. The heater capacity modification included replacement of the existing 30A, 3-pole circuit breakers with 50A breakers for each SGTS unit. The four contactors for the four banks of heaters in each unit and the 480/120V AC-control transformer for each SGTS unit were also replaced. In addition, some of the wiring in contactor panels was replaced and new cables were installed from these panels to the bank of heaters. This entire scope of the modification was evaluated and found to not adversely impact other equipment.

3. Analysis of Effect on Functions:

A. Temperature

The maximum SGTS unit and room temperatures were determined using assumptions that maximize these temperatures by including the maximum electric heater output and a conservatively derived effect from potential radioactive decay heat loading on the charcoal. The SGTS unit and room temperatures are highest when only one SGTS train is operating after the other train has accumulated the maximum quantity of Post Loss of Coolant Accident (LOCA) halogens and has the total charcoal decay heat loading on its charcoal beds but then becomes inactive (fan is shutdown).

The above conditions can occur if the SGTS "A" train were operated for the first 200 hours (8.3 days) after LOCA to adsorb the maximum halogen loading and then the system is swapped over to the "B" train. In this configuration, the "A" train charcoal is cooled only by the 500 CFM bypass air supplied by the active "B" train. The total heat loss to the SGTS room is maximized because the unit surface temperatures in the inactive "A" train are maximized due to the charcoal decay heat load and the low bypass air flow rate.

The highest temperatures in the SGTS units and room occur for cases where the total SGTS air flow rate is minimized at 3600 CFM, the electric heater output is maximized at 30.2 kW total, and there is 13.4 kW of energy generated by the radioactive decay of halogens on the charcoal in the inactive train. At these conditions, the SGTS unit air stream temperatures are highest for each of the calculated locations downstream of the electric heaters, downstream of the inactive charcoal bed (bypass air only), and for the mixed total exhaust air stream. At peak charcoal decay heat loading 200 hours after the LOCA, the SGTS unit air stream temperature downstream of the electric heaters entering the charcoal beds is 148°F; downstream of the inactive charcoal bed is 199°F (bypass air only); the mixed exhaust is 155°F (active plus bypass); and the SGTS room temperature is 140°F.

The SGTS room was previously defined as a mild temperature environment not to exceed 130°F. Accordingly, new electrical support components were installed and the EQ profile was updated to 140°F to meet the design basis requirement to demonstrate that all affected components have been evaluated for the new conditions. The existing control transformers and contactors for the inlet heaters were replaced with appropriate EQ profile. EQ data was also updated for new wiring installed. All other existing components requiring an EQ evaluation in their EQ Design Record Files were updated for the new temperature conditions.

Special consideration was given to the qualification status of the motor-operated Standby Gas Fan Outlet Dampers. For the emergency mode of operation, the outlet dampers are in the Full Open position and remain in that position, i.e., the damper is effectively a static component and the motor-operator has no required active function in the emergency mode. Therefore, the EQ Design Record File for this component does not require addressing the active operation of the motor-operator during the worst case Design Basis Accident temperatures.

The maximum SGTS unit air stream temperature entering the charcoal beds downstream of the electric heaters operating at 30.2 kW capacity is 148°F with a total flow of 3600 CFM (4000 CFM -10%). The over-temperature cutoff switch has a setpoint of 200°F. The highest temperature within or exiting the inactive charcoal bed was determined to be bounded by a maximum potential value of 244°F so that the air stream through the HEPA filters will be below the design basis value of 260°F.

Using a conservative heat transfer calculation for the decay heat load on the charcoal, it was determined that the charcoal temperature is bounded by a maximum potential value of 253°F. It is therefore concluded that the charcoal will be below the design basis value of 330°F under all conditions and iodine desorption is prevented.

B. Electrical Lead

The increased heater capacity impacted the emergency diesel generator (EDG) loads. The increased EDG loads were evaluated, determined to be within the EDG ratings, and included in the EDG loading profile. The affected electrical calculations for ampacity and degraded voltage were updated to include the higher kW heaters. The undercurrent relay trip setpoint detecting SGTS inlet heater failures was updated. Design basis analysis for the SGTS airflow, temperature, humidity, charcoal temperature, and SGTS room temperatures were updated. The updated design basis calculation uses a maximum SGTS flow rate of 4400 CFM (4000 CFM +10%), which is the highest potential flow rate for the SGTS system in actual operation.

The impact of increased heater capacity on 480-volt motor control centers was evaluated and the 480/120V AC-control transformer for each SGTS unit was replaced to accommodate the additional electrical loading.

C. Summary

Based upon the above described scope of the modification, analysis of impact, and updating of applicable calculations and EQ profile, Pilgrim has concluded that the effects (e.g., increased electrical load and heat load on components and charcoal) of the larger heaters have been evaluated and found not to adversely impact other equipment.