Nuclear

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January 13, 1983
4410-83-L-0015

TMI Program Office
Attn: Mr. Lake Barrett, Deputy Director
U. S. Nuclear Regulatory Commission
c/o Three Mile Island Nuclear Station
Middletown, PA 17057

Dear Sir:

Three Mile Island Nuclear Station, Unit 2 (TMI-2)
Operating License No. DPR-73
Docket No. 50-320
Reactor Building Air Cooler Units

This letter is to inform you of GPUNC's intent to shut off the containment air coolers for an indefinite period of time. The air coolers are being shut down for the purpose of decontamination and, depending on dose rates, maintenance. The air coolers have not been maintained since late 1978; therefore, the likelihood of failure is considered to be high. A controlled shutdown is considered preferable to a mechanical failure.

Shutdown of the air coolers has been evaluated for effects on plant safety in the following areas and shutdown is considered acceptable as described below:

The Reactor Building Air Cooling Units (RBACUs) are not specifically addressed in the Recovery Technical Specifications. There are three specifications, however, that could have implications for the shutdown of the RBACUs. They are as follows:

1. Specification 3.6.1.4 requires that reactor building atmospheric pressure be maintained between 0 psig and a minimum pressure (negative) determined by a combination of reactor building air temperature and BWST temperature. The RBACUs are one means of meeting the specification by maintaining building air temperature less than outside air temperature. However, the present and simplest means of pressure control in the

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building is by operation of one of the two trains of the containment purge system. One purge train will operate nearly continuously for the foreseeable future, and thus RBACUs will not be required for pressure control. The availability of a backup purge train provides pressure control capability in the event of a purge system failure or shutdown required for equipment maintenance.

2. Specification 3.6.1.5 requires that the average reactor building air temperature not exceed 130°F. The RBACUs can be used for temperature control, but, with the present reactor coolant system and auxiliary equipment heat loads in the reactor building, they should not be needed. Analyses have been performed that show that operation of a single purge train, operating at up to 25,000 CFM, is sufficient to keep reactor building temperatures below the 130°F limit. Since both trains of the purge can be operated at up to 50,000 CFM, there is a substantial margin between the temperature limit and the maximum expected building temperature. No recovery operations in the building have been identified that would generate sufficient heat to impact this evaluation.

   A possible concern in using the purge for maintaining temperatures in the reactor building is that of low temperatures, namely the 50°F limit associated with boron solubility. This concern can be alleviated by using the purge heaters. Steady state sensitivity studies were performed for various ambient conditions and purge system flow rates and these analyses determined that single purge train operation is sufficient to maintain the reactor building temperature above 50°F. Redundancy, and additional capacity, is provided by the second purge train.

   A second forthcoming activity is the opening of all airlock doors during containment entries. Door opening requires a reduced purge system flowrate which limits both the cooling and heating capability during entries. If temperature limits are approached, the doors may be secured and the purge system flowrates increased.

3. Specification 3.3.3.8 requires that reactor building smoke detectors be operable at all times. These smoke detectors are located in the RBACU's discharge ductwork and the system airflow provides the motive force for air sampling. Since turning off the RBACU's will render these detectors inoperable, additional smoke detectors will be temporarily installed in the reactor building. These detectors will comply with appropriate NFPA codes and will provide adequate coverage for long term shutdown of the RBACU's, as well as meet Technical Specification 3.3.3.8. Prior to installation of the alternate smoke detectors, it is intended to test the restart capabilities of the RBACUs via SOP by testing one cooler at a time. If a minimum of two units can be restarted, it is planned to shut down some, or all, of the air coolers during the day, establish a fire watch per the Tech. Spec. action statement if necessary, and perform decon on the coolers. At the end of the day, at least one of the RBACUs will be restarted in order to make the smoke detectors operable. This mode of operation will continue until the alternate smoke detectors are installed. At this point, the RBACU's will be shut down indefinitely. If the RBACU's will be shut down for more than one year, the alternate system will be reevaluated for permanent installation.

The design flow of the RBACUs, with four units operating, is 165,000 CFM. Using the design value, the RBACUs circulate about 5 containment volumes per hour. Since they only recirculate the air, they do not affect the gross concentration of airborne contamination in the building in any favorable way, and, in fact, may be increasing airborne activity from sources internal to the air coolers and/or by increasing air currents which entrain surface activity. They do provide some mixing to more evenly distribute the contaminants, but with exception of the south quadrant of elevation 347'-6", the mixing does not occur in areas where high worker activity will take place. Reduction of gross airborne contamination levels is accomplished by the purge system, which exchanges clean outdoor air for the contaminated containment air. Operation of the purge system with the RBACUs stopped will result in an air flow pattern from elevations 305'-0" and 347'-6" into the "B" D-Ring. Depending on the setup of the purge system and whether one or both trains are operated, the system will exchange 0.5 to 1.5 containment volumes per hour.

Since the RBACUs provide little useful local mixing for workers, and have no effect whatsoever on gross contamination levels, their operation is not essential from the viewpoint of worker doses.

The RBACUs provide inadequate local mixing for control of hydrogen at the vent points from the reactor cooling system. This was resolved during the Quick Look program by using a blower to provide high volume dilution of the hydrogen as it was vented. This method will continue to be used if hydrogen release rates from the RCS warrant it. The containment purge system is adequate to maintain the gross hydrogen concentration in the building well below the combustible limit.

Since the RBACUs are inadequate for local hydrogen control, and have no effect on gross hydrogen concentration, their use is not essential for combustible gas control.

The RBACUs, by forcing air up and out of the D-rings, contradict the air flow pattern recommended for gross decontamination of the RB. With only the purge system in operation, air flow will be into the "B" D-ring while the "A" ring will be nearly stagnant. This will assist in minimizing recontamination due to air flow patterns in the direction of higher towards lower contamination levels. Thus, stopping the RBACUs is desirable for decontamination operations.

Based on the evaluations above, the following may be concluded that:

- The RBACUs are not required for maintaining containment pressure or temperature within Technical Specification limits, and therefore may be stopped without presenting undue risk to the public health and safety.

- The RBACUs are not essential for worker dose reduction or for maintaining low combustible gas concentration and, therefore, may be stopped without presenting undue risk to the public health and safety.

- Shutdown of the RBACUs is desirable for decontamination operations.

GPUNC therefore proposes to shut off the RBACUs for decontamination and maintenance.

If you have any questions or desire further information please contact Mr. J. E. Larson of my staff.

Sincerely,

B. K. Kanga
Director, TMI-2

BKK/RBS/sle

Attachment

cc: Dr. B. J. Snyder, Program Director - TMI Program Office