Telephone 617 366-9011
TWX
710-390-0739

YANKEE ATOMIC ELECTRIC COMPANY

20 Turnpike Road Westborough, Massachusetts 01581

WYR 80-64

June 9, 1980
B.4.1.1

United States Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region I
631 Park Avenue
King of Prussia, PA 19406

Atention: Mr. Boyce H. Grier, Director

References: (a) License No. DPR-3 (Docket No. 50-29)
(b) USNRC Letter to YAEC dated May 9, 1980
I&E Bulletin No. 80-12
(c) YAEC Letter to USNRC dated October 30, 1979
Reportable Occurrence, 50-29/79-23/03L "480 Volt
Busses De-energized"

Dear Sir:

Subject: Response to I&E Bulletin No. 80-12 "Decay Heat Removal Operability"

The following information is being provided in response to I&E Bulletin No. 80-12. The responses addresses in sequence the concerns raised in the bulletin.

1. The circumstances and sequence of events at the Davis-Besse facility as described in reference (b) attachment, have been reviewed for applicability to the Yankee Rowe facility.

2. The shutdown cooling system at Yankee Rowe has significant design differences than those described for the Davis-Besse plant in reference (b). The Yankee Rowe shutdown cooling system has no capability for automatic alignment of the pump suction from its normal main coolant loop 4 suction. All alignments of the shutdown cooling system are manually initiated, therefore realignment and subsequent loss of suction to the pump from an instrument logic actuation cannot occur.

   All Decay Heat Removal (DHR) degradation events experienced at Yankee Rowe have been of a minor nature. The last such event occurred on September 30, 1979. At that time the 480 volt 5-2 bus, which supplies power to the shutdown cooling pump motor, was de-energized for installation of fire protection foam. The

loss of power to the shutdown cooling pump was anticipated as part of the preparation for this maintenance work. The shutdown cooling pump's redundant pump, the low pressure surge tank cooling pump, was aligned, in advance, in anticipation of this occurrance. The bus was de-energized for personnel safety and could have been re-energized quickly if events required such action. The de-energized bus event was reported in reference (c).

3. The shutdown cooling system is placed in service after the main coolant temperature has been reduced to approximately 330°F and the pressure to less than 300 psig. The shutdown cooling system then reduces the main coolant temperature to 140°F or less and operates continuously to maintain this temperature as long as required by maintenance or refueling operations.

The shutdown cooling system consists of a heat exchanger, circulating pump, piping, valves, and instruments arranged in a low pressure auxiliary loop parallel with the main coolant loops. The shutdown cooling pump takes suction from the hot leg of the main coolant piping on the reactor side of the loop stop valves and recirculates main coolant water throught the tube side of the shutdown cooler and back into the cold leg of the main coolant piping, also on the reactor side of the loop stop valves. The main coolant is contained in a closed system and reactor decay heat load is transferred through the shutdown cooler to the component cooling system which in turn is cooled by river water. This arrangement of providing the intermediate cooling medium of the component cooling system was selected in order to assure that any possible leakage of radioactive main coolant would not enter the river water.

Complete backup of the Shutdown Cooling System is provided by the low pressure surge tank pump and heat exchanger which are identical units connected in parallel. By employing double valving in the inlet and outlet lines to the main coolant piping, any required maintenance can be accomplished on the shutdown cooling system components.

The shutdown cooling pump receives power from the 480 volt 5-2 bus. The low pressure surge tank cooling pump receives its power from the 480 volt 6-3 bus. These busses are fed from separate offsite power sources. The separation of these power supplies was part of the basis for the NRC Systematic Evaluation Program safe shutdown review.

Other diverse means available for decay heat removal include the steam generator(s) used in conjunction with the main condenser, the steam generator(s) used in conjunction with the atmospheric dump or the feed and bleed system.

Overall reliability of the shutdown cooling system from many years of experience is considered excellent.

4. Plant procedures were analyzed for adequacy of safeguarding against loss of redundancy and diversity of DHR capability. Except where noted in sections 6 and 7 below, plant procedures and associated technical specifications sections adequately address safeguarding against loss of redundancy and diversity of the DHR capability.

5. Plant procedures were analyzed for adequacy of responding to DHR loss events. Plant procedure(s) address the following events;

   a) Shutdown cooling pump loss of electrical supply; or electrical or mechanical failure

   b) Loss of alternate shutdown cooling capability

   c) Shutdown cooling system heat exchanger failure

   d) Loss of component cooling supply to the shutdown cooling system heat exchanger

   e) Shutdown cooling system main header rupture that can be isolated from the main coolant system

   The procedure(s) specifies alternate means of decay heat removal for each case event listed above. The procedure(s) as a whole sufficiently addresses any compounding of the events by degradation of the decay heat removal capacity.

6. a) Administrative controls will be implemented to assure that redundant or diverse DHR methods are available during required modes of plant operation. These administrative controls will be implemented as soon as practicable but no later than 45 days after the date of this letter.

   b) Administrative controls will be implemented requiring an alternate means of decay heat removal or expediting the restoration of the lost train or method for those cases where single failure or other actions can result in only one decay heat removal train available. These administrative controls will be implemented as soon as practicable but no later than 45 days after the date of this letter.

7. a) Procedural changes will be initiated as a result of this review to limit maintenance activities to assure redundancy or diversity and integrity of the decay heat removal capacity, during removal and installation of the reactor head. As a result of the review of reference (b), it was noted that when the water inventory in the main coolant system is low (below the main coolant flanges) loss of decay heat removal capacity can be serious.

The loss of decay heat removal capability would also be serious during the early stages of plant cooldown when decay heat is the greatest. Procedural changes will be initiated to add additional precautions to limit maintenance activities to assure sufficient decay heat removal capacity.

b) The plant cooldown procedure states in part that, "While in Modes 2-5 at least two main coolant loops shall be cut in to the reactor vessel (pumps may be off) or the shutdown cooling system shall be in operation." per technical specification 3.4.1.1.b.

In addition, the routine shutdown procedure(s) states in part that the shutdown cooling and low pressure surge tank systems are in the appropriate operating states as defined by their respective operating procedures. These procedures in conjunction with plant operating staff experience provide assurances against decay heat removal degradation. However, due to the concerns addressed in reference (b) additional safeguards in the form of added precautions in the appropriate procedures, as described above, will be added to assure adequacy of safeguarding against loss of redundancy and diversity of decay heat removal capability.

We trust you will find this information satisfactory. However, if you have any questions, please contact us.

Very truly yours,

YANKEE ATOMIC ELECTRIC COMPANY

D. E. Vandenburg
Senior Vice President

DEV/dln

COMMONWEALTH OF MASSACHUSETTS)
)ss
COUNTY OF WORCESTER )

Then personally appeared before me, D. E. Vandenburgh, who, being duly sworn, did state that he is a Senior Vice President of Yankee Atomic Electric Company, that he is duly authorized to execute and file the foregoing request in the name and on the behalf of Yankee Atomic Electric Company, and that the statements therein are true to the best of his knowledge and belief.

A. R. Soucy Notary Public
My Commission Expires Sept. 7, 1984