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

Dear Sir:

Three Mile Island Nuclear Station, Unit 2 (TMI-2)
Operating License No. DPR-73
Docket No. 50-320
Temporary Once Through Steam Generator (OTSG) Layup
Recirculation System

Your letter, NRC/TMI-81-036, transmitted comments on the Design Criteria for the Temporary Once Through Steam Generator (OTSG) Layup Recirculation System. Attached is our response to these comments. If you have any additional concerns with the subject design criteria, please contact Mr. J. E. Larson of my staff so that these concerns can be addressed expeditiously.

Sincerely,

J J Barton

J. J. Barton
Acting Director, TMI-2

JJB:JJB:djb

Attachment

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

U.S. NUCLEAR REGULATORY COMMISSION
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OPEN ITEMS ON DESIGN CRITERIA FOR TEMPORARY OTSG LAYUP RECIRCULATION SYSTEM

1. Comment

10 CFR 50 Appendix A, General Design Criteria for closed system isolation (GDC-57) requires that piping which penetrates primary reactor containment and is neither part of the reactor coolant pressure boundary nor connected directly to the containment atmosphere shall have at least one containment isolation valve which shall be either automatic, locked closed or capable of remote manual operation. State how your current system design meets this requirement and/or the intent of GDC-57.

Response

To meet the requirements of 10CFR50, Appendix A (GDC-57), the system isolation valves (first valve outside containment) will be maintained locked closed while the system is not in operation.

2&3 Comment

10 CFR 50.55a, Codes and Standards, and Reg Guide 1.26 establish criteria for Quality Group Classifications and Standards for Water, Steam and Radioactive Waste Containing Components of Nuclear Power Plants. These criteria require ASME III, Seismic I, Class 2 up to and including the first isolation valve for PWR steam and feedwater systems extending from and including the secondary side of steam generators up to and including the outermost containment isolation valves. Provide justification for not designing the system to meet these requirements.

Although the reactor is shut down, RCS pressure is approximately 100 psig and no apparent primary to secondary leakage exists, we are concerned with primary system integrity on the "B" OTSG based on the events of March 29, 1979. A description of the system overpressure protection and basis for no installed relief protection must be addressed. Since the potential for primary to secondary leakage exists, it is our position that adequate safety protection must be provided considering the worst case RCS overpressure transient.

Response

It is recognized that the proposed first isolation valve does not meet the seismic criteria defined in Reg. Guide 1.29, nor does it meet Reg. Guide 1.26, but the 600 pound ASA valve specified is as good for this particular application. This valve is a B16-5-600# ASA Class cast steel gate valve. This is a common, widely used component whose leak tightness capability we believe to be acceptable and whose isolation capability is acceptable.

When the system which the valve isolates is not in operation, the valve will be closed thus effecting boundary isolation.

Our rationale for not requiring a code valve is that the OTSG Layup Recirculation System is a temporary system and prior to returning to power operation, the system will be dismantled. General Design Criteria #57 is intended to ensure that the containment boundary is not compromised for release of radioactive material to outside containment. The 600# valve, which has a cold pressure rating of 1480#, is, in our opinion, as good as is required, in no way degrades the seismic containment boundary.

There are no over-pressurization mechanisms within the RCS or the secondary system which could create a transient that would challenge the pressure rating of this valve. The maximum heat generation in the core is approximately 47 kw, as of 2/1/82. This power will continue to decrease such that by 1982 year end the power will be approximately 29 kw. The potential for criticality was addressed in the NRC safety evaluation in support of a GPU request for exemption from certain requirements of Appendix J to 10 CFR Part 50 which concluded that the accident need not be designed against in reference to containment integrity based on Paragraph 4.1 of the PEIS which states that "the most probable (although very unlikely) cause of recriticality was found to be boron dilution, which would be a slow enough process that any approach to criticality can be detected and remedied". Other pressurization events such as inadvertent actuation of the high pressure injection pumps, inadvertent actuation of the low pressure injection pumps, or inadvertent energization of the pressurizer heaters are prevented due to the fact that those electrical components are racked out and under administrative control to ensure that they cannot be placed into operation.

Finally, it must be recognized that the system is temporary and by the time this system is in operation the RCS may be depressurized and vented to atmosphere. When that is the case, the maximum hydrostatic head that can be placed on this system will be the absolute pressure in the steam generator, plus the elevation head to the pump. The design of the system is 150# and the system will not be operated at greater than 100#. The 1480# cold rating, therefore, provides us the boundary confidence which we believe to be necessary.

As an added precaution mechanical flanges are being provided on the low pressure side of the isolation valves which will be blanked per emergency procedural requirements at the outset of such a transient. The piping between the valves and the flanges will be designed to ANSI B31.1 600# line specification, however as "temporary" piping it will not be seismically qualified. Such an excursion would develop rather slowly, due to plant conditions, therefore the flanges will enable disconnection of the low pressure portion of the temporary system such that relief protection will not be required. Also, installation of the blanks provide a second mechanical isolation point (outside of the subject valves) for containment purposes.

For the above reasons, the component which we intend to use, is acceptable based on the rationale that 1) the system is a temporary system, 2) the system can be isolated if necessary, 3) the system will be operated at significantly below the design temperatures and pressures of the component allowables, and 4) the system will be removed before taking TMI-2 back to power operation.

4. Comment

Based on previous discussions with your staff we understand that the Technical Evaluation Report will address the impact of the proposed recirculation system on the core/core cooling and visa versa. We believe, however, these findings are necessary to bound the range of conditions and controls necessary in developing acceptable design criteria for this OTSG wet layup system. If not already completed, we suggest the timely review of these effects to insure no significant parametric changes are necessary.

Response

The effects of the OTSG Recirculation System on core cooling have been reviewed and it was determined that no adverse effects will occur. The most visible impact would be possible inducement of a burp in the Reactor Coolant System due to feeding a generator at approximately 100 gpm of water at 65°F. It was recognized that the hot legs are 50°F warmer than that and the OTSG shell is 20°F-30°F warmer than that. Hence, feeding of the Main Steam and Feed Water lines would create a differential density and could result in a burp, which is not detrimental.

5. Comment

Provide your basis for not including isolation valves for either pumps.

Response

There are upstream and downstream isolation valves at 5 and 25 piping feet, respectively, from the system pump. This is considered to be adequate. The temporary Sandpiper pump which will only be used during the "B" OTSG clean-up phase will be equipped with isolation valves.