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AUG 31 1988

U.S. Nuclear Regulatory Commission
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Gentlemen:

In the Matter of) Docket Nos. 50-327
Tennessee Valley Authority) 50-328

SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2 - REACTOR COOLANT SYSTEM (RCS) POSTTRIP COOLDOWN AND SHUTDOWN MARGIN (SDM)

As requested by letter from Suzanne Black dated August 19, 1988, enclosed is our submittal on the above subject. Included in the submittal, enclosure 1, is a description of the subject phenomenon, its probable cause, the effect on SDM, and the immediate corrective actions that have been implemented for operation of SQN units 1 and 2. The submittal also contains a discussion of the long-term corrective actions that are presently under investigation.

Summary statements of the commitment contained in this submittal are provided in enclosure 2.

If you have any questions concerning this submittal, please telephone M. A. Cooper at (615) 870-6549.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

R. Gridley, Manager
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cc: See page 2

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U.S. Nuclear Regulatory Commission

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Description of Problem

On June 14, 1988, TVA identified an issue associated with cooldowns following a reactor trip. Both units 1 and 2 are affected. Following a reactor trip, the current plant configuration results in a reactor coolant system (RCS) cooldown below the design no-load temperature of 547 degrees Fahrenheit (F). Operational history indicates that the RCS will generally cool down to approximately 520 degrees F following a reactor trip from full power. The safety issue associated with this cooldown is in the area of shutdown margin (SDM). The design core SDM assumes that, on a reactor trip, the RCS stabilizes at 547 degrees F and, as a result, does not consider the input of positive reactivity because of a subsequent posttrip cooldown. Therefore, conditions could exist that would result in a failure to maintain the 1,600-percent mille (pcm) technical specification (TS) SDM requirement if, under certain core conditions, a cooldown of the magnitude experienced in the past occurs.

Corrective Actions For Continued Operation

When this issue was identified, the following immediate corrective actions were taken to ensure continued operation of unit 2 within design basis assumptions for the remainder of cycle 3 and to provide resolution to support restart of unit 1:

1. Westinghouse Electric Corporation was contacted to determine the maximum allowable cooldown for which the TS 1,600-pcm SDM requirement would be maintained. The Westinghouse analysis provided the minimum cooldown temperature as a function of burnup under various pretrip conditions.

2. SQN Emergency Instruction ES-0.1, "Reactor Trip Response," was revised to require the operations crew to initiate a manual RCS boration if average RCS temperature drops below the minimum allowable temperature supplied by Westinghouse. The intent of this boration is to ensure that actions are taken consistent with TS requirements to mitigate the potential loss of SDM as a result of the posttrip cooldown.

The immediate corrective actions ensure that the operator takes manual action in the event of a posttrip cooldown to maintain validity of Final Safety Analysis Report (FSAR) assumptions concerning SDM for a steam line break design basis event. This action resolves the immediate safety issue. The corrective actions constitute a compensatory measure and have been evaluated in accordance with Administrative Instruction 49, "Control and Tracking of Compensatory Measures." The long-term corrective actions will resolve this compensatory measure.

Long-Term Corrective Actions To Mitigate Posttrip Cooldowns

TVA believes the posttrip cooldown to be the result of the combination of an excessive mass loss from the steam generators via the steam dump system and miscellaneous secondary-side steam leaks. The RCS overcooling is further compounded by the refilling of the steam generators with water from the condensate storage tank, which is typically 70 degrees F, via the auxiliary

feedwater (AFW) system. The SQN AFW system is designed with an automatic steam generator level control system. AFW to each steam generator is controlled to automatically maintain no-load steam generator levels. On a reactor trip, two 100-percent-capacity, motor-driven AFW pumps and one 200-percent-capacity, turbine-driven AFW pump start and deliver full flow until steam generator levels are returned to 33-percent narrow range level.

TVA is presently investigating options to reduce the mass loss from the steam generators. This reduction in mass loss following a reactor trip would have a twofold effect. First, the initial RCS cooldown from at-power conditions would be slowed and its magnitude reduced. Secondly, because less mass would be removed from the steam generators, the amount of AFW that would be required to regain steam generator level would be reduced, thereby further limiting the RCS cooldown.

To reduce the mass loss from the steam generator following a reactor trip, TVA is investigating various methods of optimizing steam dump operation. These methods are currently being analyzed by Westinghouse to determine their feasibility and effect on RCS cooldown.

The Westinghouse analyses will also include a study of the sensitivity of the RCS cooldown to AFW flow rate. The Westinghouse study will also provide a basis for determining if the current automatic AFW level control system should be defeated by taking manual control following reactor trips. TVA believes that automatic operation of the AFW level control system is desirable and is first pursuing corrective action to prevent the posttrip cooldown without having to take manual control of the system.

Following a thorough review of the Westinghouse analysis, TVA will determine which plant modifications and/or procedure revisions will best serve to mitigate the posttrip cooldown. Any required plant modifications and/or procedure revisions will be initiated and implemented in an expedient and controlled manner.

To further limit mass loss from the steam generators, TVA is providing the appropriate management attention to ensure that steam leaks, which could contribute to the RCS cooldown, are adequately controlled by the existing maintenance program. Sources of steam leaks identified during unit 2 operation are being evaluated for applicability to unit 1.

Conclusion

TVA is presently investigating several different options to resolve the posttrip cooldown being experienced at SQN. Following completion of the review of these options, TVA will determine appropriate long-term resolution. TVA will provide NRC with a status of our investigation results and plan for resolution implementation by October 14, 1988.

In the interim, continued operation of unit 2 or restart of unit 1 will not result in any safety concerns as a result of the cooldown because of procedural controls presently in place that require manual boration of the RCS in the event of an excessive posttrip cooldown. This boration requirement will ensure that actions are taken consistent with TS requirements to mitigate the potential loss of SDM because of posttrip cooldowns.

Enclosure 2

List of Commitments

1. TVA is presently investigating several different options to resolve the posttrip cooldown being experienced at SQN. Following completion of the review of these options, TVA will determine appropriate long-term resolution. TVA will provide NRC with a status of our investigation results and plan for resolution implementation by October 14, 1988.