INL USQ PROCESS
POTENTIAL INADEQUACY IN THE SAFETY ANALYSIS (PISA) FORM
(DO NOT USE FOR PROPOSED CHANGES)

Facility or Activity: Advanced Test Reactor

USQ Process No.: RTC-USQ-2006-630

Subject: TSR Surveillance Requirement 4.2.1.2.9 Inadequately Implemented

Describe the New Information/Discovery:

TSR Surveillance Requirement 4.2.1.2.9 requires the firewater pump startup parameter SETPOINTS and RESPONSE time to be verified annually. This verifies the requirement in TSR Table 3.2.1.2-2 that the setpoint is ≥ 55 psig and the response time is ≤ 120 sec.

DOP 8.3.3, "RTC Annual Firewater Pump Setpoints," is identified as the procedure which provides the instructions for performing the surveillance requirement. The time this procedure measures is the time from the start pressure trip to the start of cranking of the firewater pump. This is not the appropriate response time measurement. It should measure the time from the start pressure trip to the time the firewater pump is running.

Identify the applicable safety basis document(s) (e. g., DSA, SAR, BIO, TSRs, etc.):

SAR-153, Advanced Test Reactor Upgraded Final Safety Analysis Report
TSR-186, Technical Safety Requirements for the Advanced Test Reactor

I. PISA ASSESSMENT

a. Is there a potential inadequacy in the analytical methodology and/or tools used in the safety basis?
☐ Yes ☒ No

b. Is there a potential discrepancy between the safety basis assumptions, provisions, or conditions, in the accident analysis and the facility operation or parameters?
☒ Yes ☐ No

c. Is the actual physical condition of the facility different than as described in the safety basis (discrepant as-found condition)?
☐ Yes ☒ No

d. Has an actual or postulated operational event or incident revealed a potential inadequacy in the safety basis?
☐ Yes ☒ No

e. Is this an activity or condition not analyzed in the existing safety basis?
☐ Yes ☒ No

Provide an explanation of the assessment result:

The analysis, which provides the basis for TSR-186 Section 3.2.1.2, assumes the pump will start ≤ 120 sec. ater the start pressure trip is reached. This time is currently not measured by the surveillance procedure.

G. L. Sharp USQ Evaluator Print/Type Name	USQ Evaluator Signature	9/14/06 Date
M. B. McDonough Nuclear Facility Manager Print/Type Name	Nuclear Facility Manager Signature	9/14/06 Date

If the answer to ALL of the assessment questions above is No, file the completed form. Do not complete Section II, III, or IV.
If the answer to any one of the assessment questions is Yes, there is a potentially inadequate safety analysis (PISA):

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- Nuclear Facility Manager document actions (Section II), including interim operating restrictions, taken to place or maintain the facility in a safe condition.
- Nuclear Facility Manager execute reporting process per MCP-190 or AWP-3.1, for PISA.
- USQ evaluator proceed to Section III.

II. DOCUMENT ACTIONS TAKEN TO PLACE OR MAINTAIN FACILITY IN A SAFE CONDITION AND PROVIDE THE BASIS FOR THE SELECTION OF ANY INTERIM CONTROLS

No immediate action to place or maintain the facility in a safe condition is required.

Response time testing of the firewater pumps start function is performed at regular intervals using DOP-8.3.3. The pumps are also started weekly to meet fire protection requirements. The surveillance test measures the time from the start pressure trip to the start of cranking of the pump. Although the surveillance test does not formally measure and document the time for the pump to start and run, the approximate time of the pumps to start and run is observed to be well within the allowed 120-second total actuation and start time requirement. The time for a firewater pump to start and run is on the order of 10 seconds. The total time for the pump start actuation, the start delay timer (≤ 25 seconds), and the time for any firewater pump to start and run is on the order of 60 seconds (or less) compared to the total allowed time of 120 seconds.

In order to eliminate the response time testing discrepancy, the surveillance procedure will be modified to measure the total pump response time from the start pressure trip to the time the firewater pump is running. The procedure revision will be completed by 5 OCT 2006.

G. L. Sharp Safety Analyst Print/Type Name	Safety Analyst Signature	9/14/06 Date
M. B. McDonough Nuclear Facility Manager Print/Type Name	Nuclear Facility Manager Signature	9/14/06 Date

Is independent technical review required? Yes ☐ No ☑

Nuclear Facility Manager
Signature or Initials: 9/14/06

Independent Reviewer Print/Type Name	Independent Reviewer Signature	Date

III. DETERMINATION

Identify applicable section(s) of the safety basis document(s) (e.g., DSA, SAR, BIO, TSRs, etc.).

TSR-186 Section 3.2.1.2
SAR-153 Section 15.11.10
SAR-153 addendum EDF-5614

IIIa: POTENTIAL FOR AN INCREASE IN PROBABILITY OR CONSEQUENCE OF AN ACCIDENT OR MALFUNCTION EVALUATED IN THE SAFETY BASIS

1. Could the PISA increase probability of occurrence of an accident previously evaluated in the safety basis?
Yes ☐ No ☒
Explain:

The auto-start function of firewater pumps 688-M-1, 688-M-2, and 633-1 is relied on to mitigate certain accident sequences in the ATR safety basis. The auto-start function is not an accident initiator and does not contribute to the probability of occurrence of any credible accident.

2. Could the PISA increase the consequences of an accident previously evaluated in the safety basis?
Yes ☒ No ☐
Explain:

The auto-start function of firewater pumps 688-M-1, 688-M-2, and 633-1 is relied on to mitigate certain accident sequences in the ATR safety basis. The time for a pump to receive its start signal until the pump is running and providing flow is modeled. Failure to perform an adequate surveillance test could lead to an unidentified increase in the time from the start pressure trip to the time a firewater pump is running and providing flow. Therefore, the pump performance could degrade and, thereby, result in an increase in the consequences of some safety basis analyses.

3. Could the PISA increase the probability of occurrence of a malfunction of equipment important to safety previously evaluated in the safety basis? Yes ☒ No ☐
Explain:

The auto-start function of firewater pumps 688-M-1, 688-M-2, and 633-1 is relied on to mitigate certain accident sequences in the ATR safety basis. The time for a pump to receive its start signal until the pump is running and providing flow is specifically modeled. Failure to perform an adequate surveillance test could lead to an unidentified increase in the time from the start pressure trip to the time a firewater pump is running and providing flow and, thereby, result in the pump response being outside of its assumed performance. Therefore, the inadequate surveillance could increase the probability of occurrence of a malfunction of equipment.

4. Could the PISA increase the consequences of a malfunction of equipment important to safety previously evaluated in the safety basis? Yes ☐ No ☒
Explain:

The auto-start function of firewater pumps 688-M-1, 688-M-2, and 633-1 is relied on to mitigate certain accident sequences in the ATR safety basis. Failure of a firewater pump to start and run is considered as a postulated single failure in the accident analyses; 2 of 3 pumps must start and run for success. This bounds any postulated degraded performance or failure of a single firewater pump to perform its intended safety function. Multiple pump failures due to the inadequate start time surveillance is not a credible condition. The maximum allowed time in the safety basis for each firewater pump to start and run is 120 seconds, compared to the typical performance of 60 seconds (including start timer delays of up to 25 seconds). Significant degradation in the start time of a pump would have to occur in order for pump performance to drift outside the assumed condition. This condition would also have to occur simultaneously in multiple pumps. Significant degradation in the start performance of multiple firewater pumps would be readily detectable. Therefore, failure to properly implement the firewater pump response time test does not result in an increase in the consequences of a malfunction of equipment.

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IIIb: POTENTIAL FOR CREATION OF AN UNANALYZED ACCIDENT OR MALFUNCTION OF A DIFFERENT TYPE

5. Could the PISA create the possibility of an accident of a different type than previously evaluated in the safety basis? Yes ☐ No ☒

   Explain:

   The auto-start function of firewater pumps 688-M-1, 688-M-2, and 633-1 is relied on to mitigate certain accident sequences in the ATR safety basis. The auto-start function is not an accident initiator nor does it contribute to the occurrence of any accident. The surveillance and response time of the firewater pump auto-start function do not create the possibility of an accident of a different type.

6. Could the PISA create the possibility of a malfunction of equipment important to safety of a different type than previously evaluated in the safety basis? Yes ☐ No ☒

   Explain:

   The auto-start function of firewater pumps 688-M-1, 688-M-2, and 633-1 is relied on to mitigate certain accident sequences in the ATR safety basis. Failure of a firewater pump to start and run is considered as a postulated failure in the accident analyses, this includes any postulated failure resulting in a firewater pump to fail to run. Therefore, failure to properly implement the pump start time surveillance does not result in a malfunction equipment important to safety of a different type than previously evaluated.

IIIc: POTENTIAL FOR REDUCTION IN A MARGIN OF SAFETY

7. Could the PISA reduce a margin of safety as defined in the safety basis? Yes ☒ No ☐

   Explain:

   The auto-start function of firewater pumps 688-M-1, 688-M-2, and 633-1 is relied on to mitigate certain accident sequences in the ATR safety basis. The time for a pump to receive its start signal until the pump is running and providing flow is modeled. Failure to perform and adequate surveillance test could lead to an unidentified increase in the time from the start pressure trip to the time a firewater pump is running and providing flow and, thereby, could reduce the margin of safety determined by the accident analyses.

IIId: USQ DETERMINATION CONCLUSION

8. Based on the responses to questions 1 – 7 above, does the PISA constitute an Unreviewed Safety Question?
   Yes ☒ No ☐

   Explain:

   The auto-start function of firewater pumps 688-M-1, 688-M-2, and 633-1 is relied on to mitigate certain accident sequences in the ATR safety basis. The time for a pump to receive its start signal until the pump is running and providing flow is specifically modeled. Failure to perform an adequate surveillance test could lead to an unidentified increase in the time from the start pressure trip to the time a firewater pump is running and providing flow and, thereby, result in the pump response being outside of its assumed performance. This condition could result in an increase in the consequences of some previously analyzed accidents, an increase in the probability of failure of equipment important to safety, and a reduction in the margin of safety.

NOTE: If USQ determination result is positive, additional notification for ORPS is required per MCP-190 or AWP-3.1.

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IV. APPROVAL/CONCURRENCE SIGNATURES

APPROVAL:

G. L. Sharp USQ Evaluator Print/Type Name	USQ Evaluator Signature	9/25/06 Date
M. B. McDonough Nuclear Facility Manager Print/Type Name	Nuclear Facility Manager Signature	9/25/06 Date

CONCURRENCE:

A. P. Hoskins Independent Review Committee Chair Print/Type Name	Independent Review Committee Chair Signature	9-25-06 Date