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-2006-629

Subject: ATR Reactor Shutdown System Mode Selector Switches Surveillance Requirement Discrepancy

Describe the New Information/Discovery:

The Advanced Test Reactor (ATR) Technical Safety Requirements (TSR-186) require that the LOCA PCP Shutoff System be operable during power operation and following power operation until the fuel cooling time is met or ≤ 1 primary coolant pump is operating (see TSR 3.2.3.3). Operability of the LOCA PCP Shutoff System requires that the Reactor Shutdown System (RSS) mode selector switches be in the pressurized operation position. Surveillance Requirement (SR) 4.2.3.3.5 requires verification of the RSS mode selector switches position "if the PCS has been at atmospheric pressure, prior to entering Applicability." The previously text in quotes establishes the frequency for performing this surveillance.

The Bases section for SR 4.2.3.3.5 discusses that the frequency determined by "if the PCS has been at atmospheric pressure, prior to entering Applicability" is in part supported by LCO 3.2.3.2. However, the supporting surveillance requirement associated with LCO 3.2.3.2, to verify the RSS mode selector switch position (SR 4.2.3.2.5), was removed with implementation of TSR-186 Revision 3B in December 2001. As a result, the Bases section for SR 4.2.3.3.5 refers to a supporting surveillance requirement that no longer exists. Therefore, the existing SR 4.2.3.3.5 frequency may not ensure that the switch is in the proper position prior to entering the applicable reactor operating mode and facility procedures may not ensure the required position of the switches prior to entering applicability.

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 Bases for the SR 4.2.3.3.5 frequency refers to a supporting requirement in the TSR that was deleted with implementation of TSR-186 Revision 3B (see LCO 3.2.3.2, SR 4.2.3.2.5). The SR frequency may be insufficient to ensure operability and facility procedures may not adequately control the position of the switches. This represents a potential discrepancy between the safety basis assumptions and conditions assumed in the accident analyses and facility configuration during operation.

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Subject: ATR Reactor Shutdown System Mode Selector Switches Surveillance Requirement Discrepancy

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	9/25/06 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):

- 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.

The reactor operator pre-startup checklist (DOP-7.1.4) performs verification of the RSS mode selector switches prior to entering applicability for LCO 3.2.3.3 (power operation). This meets the requirements of SR 4.2.3.3.5 for normal startup conditions. A single, and very unlikely, scenario was identified where the reactor could exit and re-enter applicability for LCO 3.2.3.3, without going through the pre-startup checklist. Following shutdown from 2 PCP operation operators are permitted to switch between one of the operating PCPs and a non-operating PCP. The transition is made by shutting down one operating PCP (exiting applicability of LCO 3.2.3.3), then starting a PCP (re-entering the applicability). Although there is no reason for the mode selector switches to be moved during this evolution, facility procedures do not prevent such and no re-verification of the position of the switches is required by facility procedures. However, the mode switches are located in a locked room and are not easily accessible. Therefore, manipulation of the switches during the postulated brief exit and re-entry into LCO 3.2.3.3 applicability is not a significant concern.

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 3.2.3.3 (SR 4.2.3.3.5);
SAR-153 Section 6.10, Section 15.6, and 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 LOCA PCP Shutoff System is an engineered safety feature (ESF) that provides mitigation in response to certain postulated accident conditions. However, failure of the LOCA PCP Shutoff System to perform its intended safety function is not an initiator for any postulated accidents. Therefore, there is no increase in the probability of occurrence of any accident.

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

Explain:

The LOCA PCP Shutoff System is an ESF that provides mitigation in response to certain postulated accident conditions. The accident analysis considers a partial failure of this ESF by analyzing continued operation of a single PCP. Should the RSS mode selector switches be in the incorrect position during pressurized operation, although very unlikely, the LOCA PCP Shutoff System would be defeated, resulting in all operating PCPs to continue to run which is not bounded by the 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 LOCA PCP Shutoff System is an ESF that provides mitigation in response to certain postulated accident conditions. The accident analysis considers a partial failure of this ESF by analyzing continued operation of a single PCP. Should the RSS mode selector switches be in the incorrect position during pressurized operation, although very unlikely, the LOCA PCP Shutoff System would be defeated. Hence, there is a potential increase in 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 LOCA PCP Shutoff System is an ESF that provides mitigation in response to certain postulated accident conditions. The accident analysis considers a partial failure of this ESF by analyzing continued operation of a single PCP. Should the RSS mode selector switches be in the incorrect position during pressurized operation, although very unlikely, the LOCA PCP Shutoff System would be defeated, resulting is all operating PCPs to continue to run. This postulated failure mode is not bounded by the safety basis analyses.

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:

This LOCA PCP Shutoff System is an ESF that provides mitigation in response to certain postulated accident conditions. However, failure of the LOCA PCP Shutoff System to perform its intended safety function is not an initiator for any postulated accidents. Therefore, there is no potential to create an accident of a different type.

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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 LOCA PCP Shutoff System is an ESF that provides mitigation in response to certain postulated accident conditions. The accident analysis considers a partial failure of this ESF by analyzing continued operation of a single PCP. Should the RSS mode selector switches be in the incorrect position during pressurized operation, although very unlikely, the LOCA PCP Shutoff System would be defeated, resulting is all operating PCPs to continue to run. This postulated failure mode is not addressed in the safety basis analyses.

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 LOCA PCP Shutoff System is an ESF that provides mitigation in response to certain postulated accident conditions. The accident analysis considers a partial failure of this ESF by analyzing continued operation of a single PCP. Should the RSS mode selector switches be in the incorrect position during pressurized operation, although very unlikely, the LOCA PCP Shutoff System would be defeated, resulting in all operating PCPs to continue to run which is not bounded by the safety basis 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 LOCA PCP Shutoff System is an ESF that provides mitigation in response to certain postulated accident conditions. The accident analysis considers a partial failure of this ESF by analyzing continued operation of a single PCP. Should the RSS mode selector switches be in the incorrect position during pressurized operation, although very unlikely, the LOCA PCP Shutoff System would be defeated, resulting in all operating PCPs to continue to run. 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, the postulated failure, and the corresponding postulated consequences, 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.

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