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

Facility or Activity: RTC, TRA-670-Advanced Test Reactor

USQ Process No.: RTC-USQ-2006-578

Subject: SAR-153, Chapter 15.15 "Reflector Aging" did not analyze the seismic LOCA for early and late margins

Describe the New Information/Discovery:
SAR-153, Chapter 15.15 "Reflector Aging" did not analyze the seismic LOCA for early and late margins.
EDF TRA-ATR-927 analyzed the bounding accidents for reflector aging, in the analysis a piece of beryllium breaks off the reflector block and causes a partial flow blockage of flow channel 20, this EDF establishes a lobe power limit of 48 MW in order to maintain margins for CHF and FI. The low flow event was the only event in the reflector aging analysis in which the margins were less than those in the full power analysis. In the seismic LOCA all AC power (diesel & commercial) is assumed to be lost, this results in a LOCA and a low flow event. This event has not been analyzed for reflector aging. There is a potential that the margins may be lower than reported in SAR-153.

Identify the applicable safety basis document(s) (e. g., DSA, SAR, BIO, TSRs, etc.):
SAR-153, chapter 15.15
EDF TRA-ATR-927-ATR UFSAR - Chapter 15 - Plate 19 Flow Blockage Analysis For The ATR Safety Analysis Upgrade

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 seismic LOCA combined with reflector aging has not been analyzed. And therefore the answer to question e is yes.

VERYL KIRKPATRICK		8/21/06
USQ Evaluator Print/Type Name	USQ Evaluator Signature	Date
MARTIN B. McDONOUGH		8/21/06
Nuclear Facility Manager Print/Type Name	Nuclear Facility Manager Signature	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.

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USQ Process No.:

Subject: SAR-153, Chapter 15.15 "Reflector Aging" did not analyze the seismic LOCA for early and late margins

- 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

Until the seismic LOCA with an aged reflector in evaluated, reactor operation is not allowed when <2σ from Beryllium cracking, or if cracks in the Beryllium are observed.

Steve Wagner	S Wagner	8/22/06
Safety Analyst Print/Type Name	Safety Analyst Signature	Date
MARTIN B. McDONOUGH	Martin B. McDonough	8/22/06
Nuclear Facility Manager Print/Type Name	Nuclear Facility Manager Signature	Date

Is independent technical review required? Yes ☐ No ☐

Nuclear Facility Manager Signature or Initials

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.).

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:

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

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USQ Process No.:

Subject: SAR-153, Chapter 15.15 "Reflector Aging" did not analyze the seismic LOCA for early and late margins

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:

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

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:

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:

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:

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POTENTIAL INADEQUACY IN THE SAFETY ANALYSIS (PISA) FORM
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USQ Process No.:

Subject: SAR-153, Chapter 15.15 "Reflector Aging" did not analyze the seismic LOCA for early and late margins

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:

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:

USQ Evaluator Print/Type Name	USQ Evaluator Signature	Date
Nuclear Facility Manager Print/Type Name	Nuclear Facility Manager Signature	Date

CONCURRENCE:

Independent Review Committee Chair Print/Type Name	Independent Review Committee Chair Signature	Date

INL USQ PROCESS
POTENTIAL INADEQUACY IN THE SAFETY ANALYSIS (PISA) FORM
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Subject: SAR-153, Chapter 15.15 "Reflector Aging" did not analyze the seismic LOCA for early and late margins

Describe the New Information/Discovery:
SAR-153, Chapter 15.15 "Reflector Aging" did not analyze the seismic LOCA for early and late margins.
EDF TRA-ATR-927 analyzed the bounding accidents for reflector aging, in the analysis a piece of beryllium breaks off the reflector block and causes a partial flow blockage of flow channel 20, this EDF establishes a lobe power limit of 48 MW in order to maintain margins for CHF and FI. The low flow event was the only event in the reflector aging analysis in which the margins were less than those in the full power analysis. In the seismic LOCA all AC power (diesel & commercial) is assumed to be lost, this results in a LOCA and a low flow event. This event has not been analyzed for reflector aging. There is a potential that the margins may be lower than reported in SAR-153.

Identify the applicable safety basis document(s) (e. g., DSA, SAR, BIO, TSRs, etc.):
SAR-153, chapter 15.15
EDF TRA-ATR-927-ATR UFSAR - Chapter 15 - Plate 19 Flow Blockage Analysis For The ATR Safety Analysis Upgrade

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 seismic LOCA combined with reflector aging has not been analyzed. And therefore the answer to question e is yes.

USQ Evaluator Print/Type Name	USQ Evaluator Signature	Date
Nuclear Facility Manager Print/Type Name	Nuclear Facility Manager Signature	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.

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POTENTIAL INADEQUACY IN THE SAFETY ANALYSIS (PISA) FORM
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USQ Process No.: RTC-USQ-2006-578

Subject: SAR-153, Chapter 15.15 "Reflector Aging" did not analyze the seismic LOCA for early and late margins

- 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

Until the seismic LOCA with an aged reflector in evaluated, reactor operation is not allowed when <2σ from Beryllium cracking, or if cracks in the Beryllium are observed.

Safety Analyst Print/Type Name	Safety Analyst Signature	Date
Nuclear Facility Manager Print/Type Name	Nuclear Facility Manager Signature	Date

Is independent technical review required? Yes ☐ No ☐

Nuclear Facility Manager Signature or Initials

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.).
SAR 153 Section 15.15

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:
   This event was not evaluated in SAR-153. While several other events were considered concurrent with flow blockage occurring in Channel 20, a Channel 20 flow blockage occurring with a seismic LOCA was not evaluated. Therefore, this PISA does not increase the probability of occurrence of an accident previously evaluated in the safety basis.
2. Could the PISA increase the consequences of an accident previously evaluated in the safety basis?
   Yes ☐ No ☒
   Explain:
   This event was not evaluated in SAR-153. While several other events were considered concurrent with flow blockage occurring in Channel 20, a Channel 20 flow blockage occurring with a seismic LOCA was not evaluated. Therefore, this PISA does not increase the consequences of an accident previously evaluated in the safety basis.

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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:
   This event was not evaluated in SAR-153. Therefore, this PISA does not increase the probability of occurrence of a malfunction of equipment important to safety previously evaluated in the safety basis.

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

   Explain:
   This event was not evaluated in SAR-153 in conjunction with a seismic LOCA. Therefore, this PISA does not increase the consequences of a malfunction of equipment important to safety previously evaluated in the safety basis.

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:
   While several other events were considered concurrent with flow blockage occurring in Channel 20, a Channel 20 flow blockage occurring with a seismic LOCA was not evaluated. Therefore, this PISA does create the possibility of an accident of a different type than previously evaluated in the safety.

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:
   While several other events were considered concurrent with flow blockage in Channel 20, a Channel 20 flow blockage occurring with a seismic LOCA was not evaluated. Therefore, this PISA does create the possibility of a malfunction of equipment important to safety of a different type than previously evaluated in the safety Both the reflector and the fuel elements are considered safety related in Appendix A of Chapter 3 of SAR-153.

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 evaluation of the seismic LOCA in SAR-153 resulted in some of the lowest documented margins in the safety basis. If flow were reduced even more as a result of flow blockage, it would be expected that the safety margins would be further reduced. Therefore, this PISA could reduce a margin of safety as defined in the safety basis.

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Subject: SAR-153, Chapter 15.15 "Reflector Aging" did not analyze the seismic LOCA for early and late margins

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:
Part IIIa shows that there is no potential for an increase in probability or consequence of an accident evaluated in the safety basis. Part IIIb shows that there is a potential for the creation of an unanalyzed accident or malfunction of a different type, and Part IIIc shows that there is a reduction in the margin of safety established in the safety basis. Therefore, this PISA finding does constitute a USQ.

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:

Steve Wagoner	Steve Wagoner	8/24/06
USQ Evaluator Print/Type Name	USQ Evaluator Signature	Date
MARTIN B. McDONOUGH	Martin B. McDonough	8/24/06
Nuclear Facility Manager Print/Type Name	Nuclear Facility Manager Signature	Date

CONCURRENCE:

Alan P. Hoskins	Alan P. Hoskins	8-24-06
Independent Review Committee Chair Print/Type Name	Independent Review Committee Chair Signature	Date