

Top Nozzle Screw Fracture Update

Meeting With USNRC

February 28, 2000

- Introduction
- TN Screw Status Update
- Conditional Acceptance Option
- WOG Perspective

D. Rowland

D. Rowland

J. Galembush

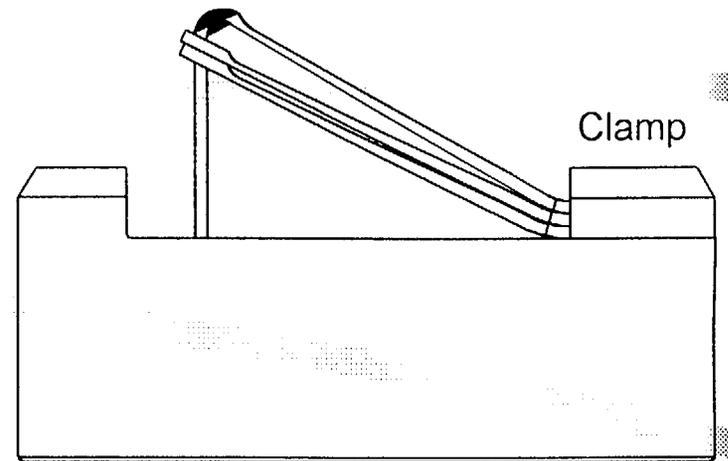
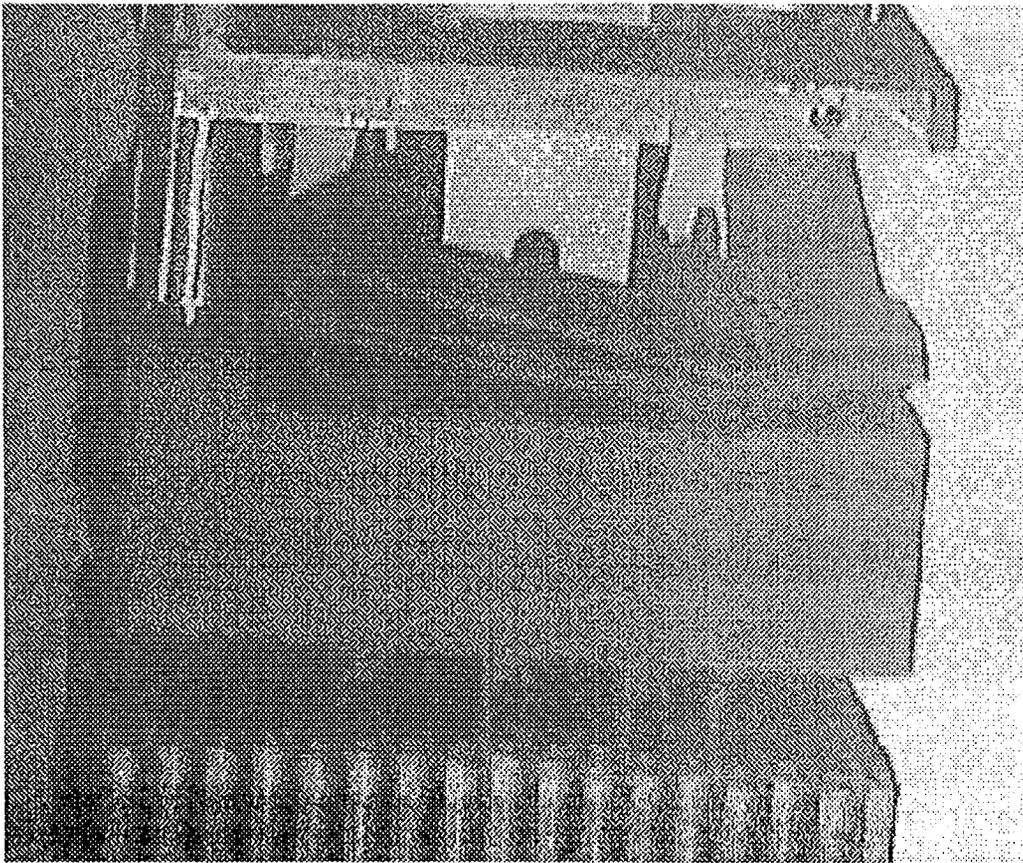
S. Ferguson

Top Nozzle Screw Fracture Update Introduction

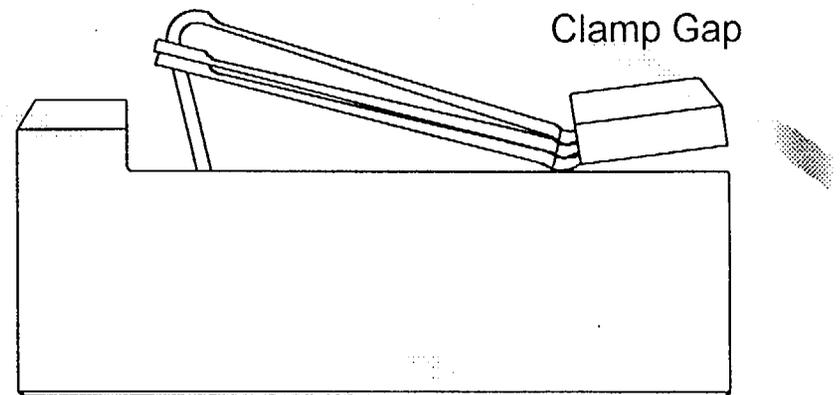
Purpose:

- Follow-up to Dec 1999 update meeting on screw fractures.
- Closeout root cause analysis.
- Update on margin enhancements.
- Update on Spring 2000 outage preparation.
- Describe conditional acceptance option.

Description

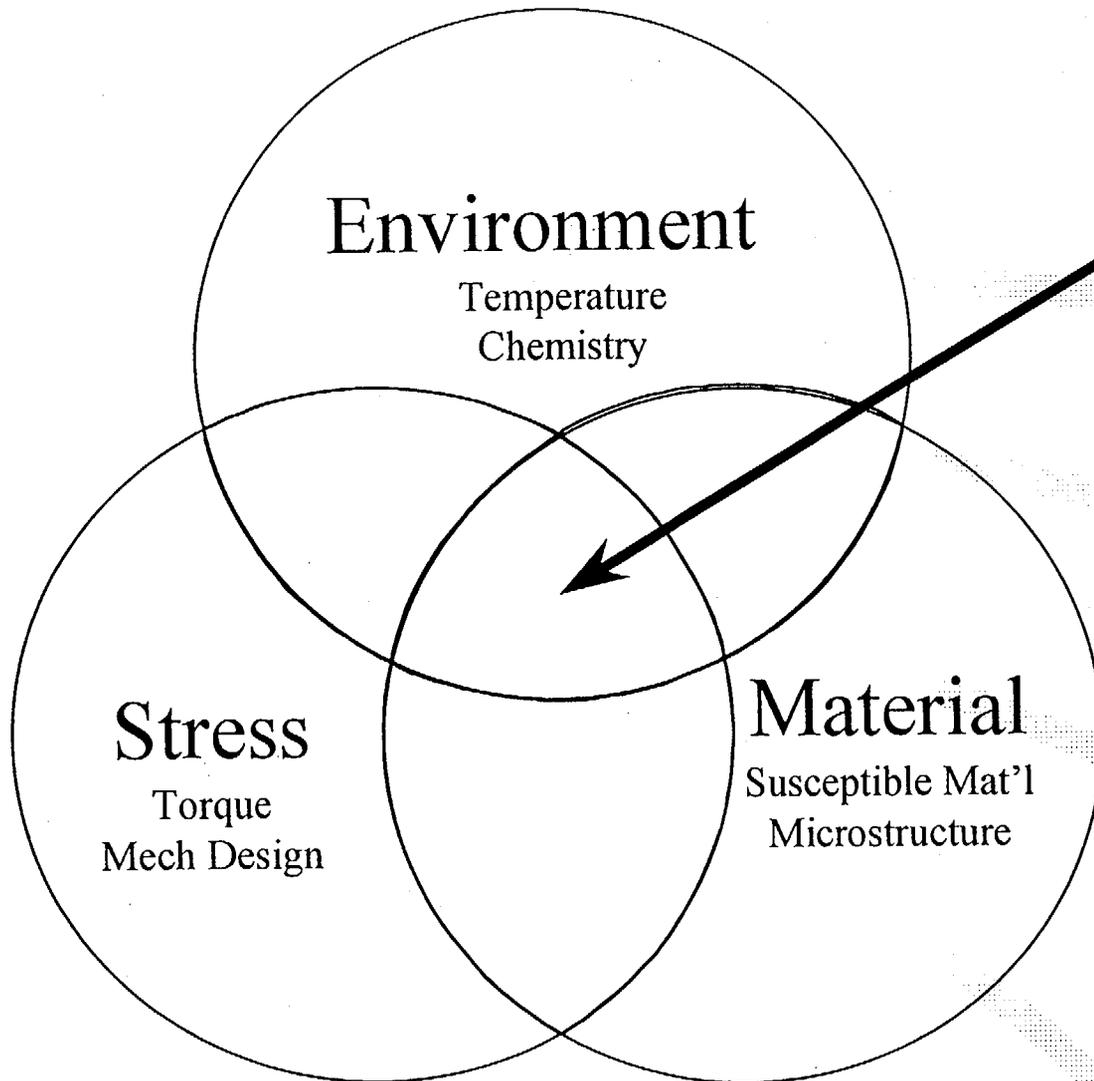


Normal Condition

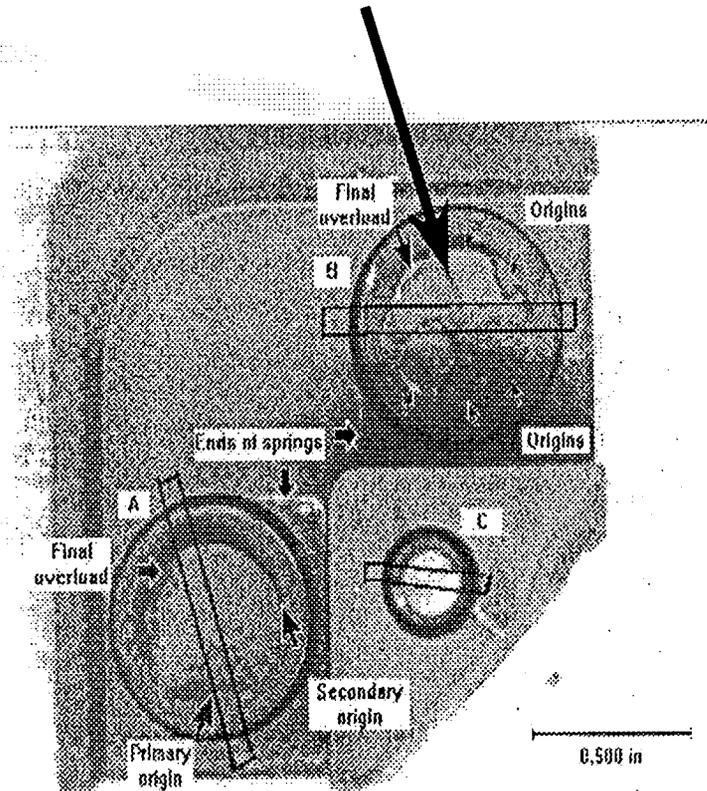


Abnormal Condition 3

Fracture Mechanism: Primary Water Stress Corrosion Cracking



PWSCC requires combination of three conditions



Root Cause Investigation

a, c



2/28/00

5

7/15/99

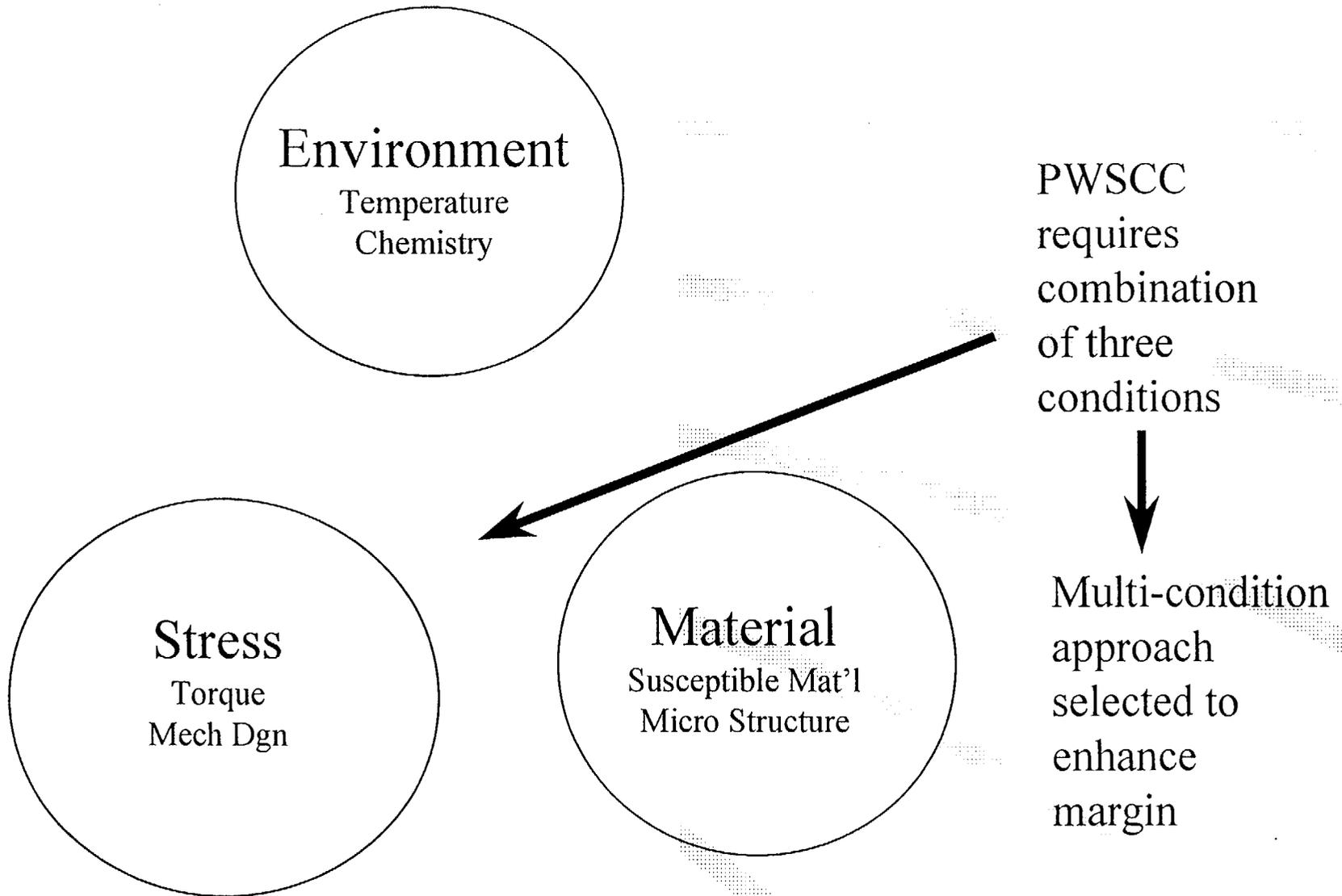
Fall Inspection Results

- Repair activities have not affected critical path.
- Approximately 1200 fuel assemblies were inspected during the fall [] a, b, c.
- New spring screw inspection technique provided greater discrimination of fractures compared to visual exams.
- Key Fall inspection observations:
 - Fractures identified in fuel built prior to window
 - Fractures observed in a 14x14 region
 - No fractures detected in susceptible region at a 17x17 plant
 - No fractures observed in 1X fuel [] a, b, c
 - No fractures observed in 1X, 2X, or 3X fuel at a 14 foot design plant [] a, c

Root Cause Results

- Material [] a, b, c identified as the key root cause:
 - [] a, b, c
 - [] a, b, c
- Variations in alloy 600 heat performance expected (and observed)
- Root Cause Report issued as WCAP-15356 (Proprietary), Dec. 1999.

Margin Enhancements Implemented



Top Nozzle Joint Margin Enhancement Strategy



Safety Assessment: Low Safety Significance

- All parts remain captured on top nozzle
- FA remains engaged in alignment pins
 - Inspections of internals and assemblies show no unusual wear conditions
- RCCA movement unaffected
- Handling tools assessed
 - latching problems reported on 3 fuel assemblies
- Accident conditions acceptable
- Nuclear Safety Advisory Letter (NSAL-99-004, May 1999) documents low safety significance

Alloy 600 Heat Performance



Spring 2000 Outage Examinations Will Provide Key Information on Heat Performance



Top Nozzle Screw Fractures: Actions

- Outage Plans:
 - Anticipate screw fractures in [] a, c.
 - Identify plant-by plant contingency plans in advance:
 - Repair.
 - Core redesign w/ acceptable replacement fuel.
 - Conditional acceptance.
 - Review and apply, as needed, available W documents on inspection, operation, & safety.
- New Fuel Deliveries:
 - [] a, c.
 - [] a, c.

Top Nozzle Holddown Spring Screw Fractures Summary

- Root cause investigated & identified
- Corrective actions implemented
- Additional margin being pursued
- Options identified to minimize impact & manage the issue on older fuel

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F/A Top Nozzle Holddown Spring Screw Fracture Safety Assessment Review

- Westinghouse 10 CFR Part 21 Evaluation
 - Completed on June 21, 1999.
 - No Substantial Safety Hazard.
 - Nuclear Safety Advisory Letter (NSAL) Published on May 11, 1999.
- Nuclear Safety Advisory Letter 99-004
 - Formal Licensee Notification of the Issue.
 - No Substantial Safety Hazard Determination.
 - Safety Assessment / JCO Provided.
 - NSAL 99-004 Remains Applicable Today.

Fuel Reinsertion Licensing Option

- Two Options Previously Available for F/A's With Fractured Screws:
 - Discharge from the core.
 - Repair and reuse.
- With WOG support, Westinghouse developed another option for further flexibility:
 - Permits conditional acceptance of assemblies with fractured screws, provided design and safety criteria are met.
 - Expected to be applied on a plant specific basis depending on the situation.
 - WOG participated in review of safety evaluation.
 - Available for Spring 2000 outage plants.

Key Design & Safety Criteria to Support Fuel Reinsertion Option

- Visual inspection of []^{a, b, c}.
 - No clamp gaps []^{a, b, c} permitted for re-inserted assemblies.
 - Ensures all parts are secured to the top nozzle.
 - Ensures no operation or handling concerns.
 - Conservatively bounds field observations and test results.
- A loose parts assessment will be performed as part of the safety evaluation to ensure that the specific nozzle design has been evaluated.
- Plant specific assessments are required to address potential effects on reactor internals holddown spring, Seismic, & LOCA forces.
- Licensee tracks non-conforming condition in its internal deficiency tracking system as per Generic Letter 91-18, Revision 1.

F/A Top Nozzle Holddown Spring Screw Fracture Acceptance Option Safety Evaluation

- Westinghouse Generic Safety Evaluation
 - Meets 10 CFR 50.59 Criteria.
 - Uses Westinghouse Integrated Safety Evaluation (ISE) Process.
 - Primary Focus of the ISE is in the Following Areas:
 - › Potential for Loose Parts
 - › RCCA Insertion
 - › Reactor Internals & Fuel Assembly Holddown Forces
 - › Fuel Handling Accident

F/A Top Nozzle Holddown Spring Screw Fracture Re-Use Option Safety Evaluation

- Plant Specific Safety Evaluation
 - Performed by Westinghouse on an “As-Requested” Basis.
 - Meets 10 CFR 50.59 Criteria.
 - Uses Plant Specific Design Parameters.
 - Uses the Generic Safety Evaluation as a Blueprint.

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WOG Perspective

- Initial Potential Issue (PI) Core Team contact - 4/99.
- Fuel Working Group (FWG) included for technical support.
- PI Core Team/FWG reviewed NSAL 99-004 - 5/99.
- FWG was directly involved in the Root Cause Evaluation.
- Westinghouse requested WOG review of Safety Evaluation for use of fuel assemblies with fractured screws.

WOG Perspective

- PI Core Team chairman formed task team for SECL review.
- Utilities included:
 - FP&L, UNICOM, Virginia Power, WCNOG
 - WEP, NEU, PSE&G
- Task team participation included:
 - Review/comment on SECL drafts
 - Review/comment on Operations Flow Chart

WOG Perspective

- WOG views conditional acceptance of fuel assemblies with fractured spring screws as an acceptable option.
- WOG is providing consistent guidance for utility implementation of this option.

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- Update on Spring 2000 outage preparation.
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