



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 21, 1999

MEMORANDUM TO: File

FROM: William O. Long, Senior Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

SUBJECT: BROWNS FERRY, RISK INFORMED INSERVICE INSPECTION, AUDIT
OF LICENSEE DOCUMENTS AND ANALYSES SUPPORTING
REQUEST FOR RELIEF (TAC NO. MA5355)

On December 1-2, 1999, NRR personnel (Bill Long, Syed Ali, Steve Dinsmore, Ted Sullivan) and NRR contractor personnel [Dan Henry (INEEL) and Fred Simonen (PNL)] visited the Browns Ferry facility. The purpose of the visit was to audit the licensee's calculations supporting its April 23, 1999 ASME Code relief request relating to risk-informed inservice inspection (RI-ISI) for Browns Ferry Unit 3. This audit was initiated following receipt of a licensee response to a Request for Additional Information and a meeting which did not provide the staff with a clear understanding of the licensee's methodology for calculating the safety significance of various piping segments.

The licensee's proposed RI-ISI program is presented by the licensee as using a methodology based on the NRC-approved Westinghouse Owners Group methodology, described in WCAP-14572-A, "Westinghouse Owners Group Application of Risk-Informed Methods to Piping Inservice Inspection Topical Report" with licensee-identified differences. The staff's review strategy has been to determine whether there are additional differences between the WCAP-14572 methodology and the Browns Ferry methodology, and evaluate the effects of those differences. The audit was focused on these efforts.

The audit findings are presented below.

- The Browns Ferry calculations for segment ranking, change in risk, and weld selection were done using either the consequences with operator action, or consequences without operator action, whichever the expert panel felt was the most applicable case. The Westinghouse methodology requires that both cases (with and without operator action) be analyzed and the worst case assumed unless specific justification is provided. The licensee agreed to analyze both cases.
- In some segments, a failure may not be immediately apparent and an unrelated initiating event may occur between the time a segment fails and the failure is discovered. A fault exposure time correction factor is applied to reduce the unrelated initiating event frequencies to account for the limited time this condition exists. The licensee inappropriately applied this time correction factor to the

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scenario where the operator discovers the failure and trips the plant. If the operator discovered the failure, the plant trip is a direct consequence of the failure and no correction factor is warranted. The licensee is revising the calculations.

- The licensee's method stated that segments were defined as lengths of pipe with the same failure consequence. Some segments, however, contained normally closed isolation valves within a segment. The consequence of failures upstream or downstream of the valve during normal operation would have different local and plant level consequences. The licensee stated that, for these segments, the segment part with the highest pipe failure related CDF or LERF was used to represent the segment in all calculations.
- It was not initially clear whether high pressure systems that are normally on standby at low pressure, had been walked down for analysis of dynamic effects of line breaks. The staff was told that such walkdowns have been performed and are considered.
- It was found that the WinPraise analyses do not reflect the effects of certain intergranular stress corrosion cracking repairs and weld improvements which were performed years after initial plant operation. The licensee is reanalyzing with those piping elements removed from consideration, since they will continue to receive inspections under current requirements.

These issues were addressed at the exit discussion held December 2, 1999, at 4:00 PM. The licensee plans to revise the submittal. The staff advised the licensee that it intends to promptly review new information as received in order to support the licensee's implementation schedule as much as feasible. A list of audit participants is attached. A list of documents made available to the audit team by the licensee is also attached.

The staff also advised TVA that it would be briefing NRC management about the results of the audit. In particular, the staff would discuss that fact that essentially no weld examinations other than those of augmented programs would be performed. It was pointed out that this issue was identified early in the review and there may be a need for further discussion on this subject.

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**ENTRANCE MEETING
DECEMBER 1, 1999
RISK INFORMED INSERVICE INSPECTION
(RI-ISI)**

NAME	ORGANIZATION	TELEPHONE
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Volume 1

SPP 9.7 , CORROSION CONTROL PROGRAM

LERF BASIS (RELATIONSHIP TO CDF)

EXPERT PANEL MEETING MINUTES

0-TI-346 , MAINTENANCE RULE PERFORMANCE INDICATOR MONITORING ,
TRENDING , AND REPORTING - 10CFR50.65

FSAR 4.12 , INSERVICE INSPECTION AND TESTING

3-SI-4.6.G , INSERVICE INSPECTION PROGRAM , UNIT 3

3-SI-4.6.G , INSERVICE INSPECTION PROGRAM , UNIT 3 (PROPOSED)

Volume 2

0-TI-376 , ASME SECTION XI CONTAINMENT INSERVICE INSPECTION
PROGRAM UNITS 2 AND 3

3-SI-4.6.G APPENDIX A : ANALYSIS FOR RISK INFORMED INSERVICE
INSPECTION FOR BROWNS FERRY NUCLEAR PLANT UNIT 3

ENGINEERING REPORT , RISK INFORMED INSERVICE INSPECTION
PROGRAM SENSITIVITY STUDIES

ENGINEERING REPORT , CHANGE IN RISK EVALUATION

Volume 3

BROWNS FERRY PSA PEER REVIEW CERTIFICATION

Volume 4

BFN PIPING FAILURE HISTORY EVALUATION (TROI)

Volume 5

PIPE RUPTURE EVALUATION FOR INSIDE AND OUTSIDE PRIMARY
CONTAINMENTS UNITS 2 AND 3 , REVISION 4

PIPE RUPTURE EVALUATION FOR BFNP UNIT 3 RESTART , REVISION 3

Volume 6

WCAP -14572 , TOPICAL REPORT

Volume 7

WinPRAISE

Volume 8 (3 BOOKS)

WinPRAISE METHODOLGY CALCULATION

ENGINEERING REPORT : WinPraise FAILURE PROBABILITIES