June 12, 2001

MEMORANDUM TO: William Beckner, Acting Chief
Generic Issues, Environmental, Financial
and Rulemaking Branch
Division of Regulatory Improvements Programs, NRR

FROM: Joseph L. Birmingham, Project Manager/**RA/**
Generic Issues, Environmental, Financial
and Rulemaking Branch
Division of Regulatory Improvements Programs, NRR

SUBJECT: SUMMARY OF MAY 22, 2001 MEETING WITH NUCLEAR ENERGY INSTITUTE (NEI), ELECTRICAL POWER RESEARCH INSTITUTE (EPRI), AND WESTINGHOUSE OWNERS GROUP (WOG), ON RISK-INFORMED IN-SERVICE INSPECTION (RI-ISI)

On May 22, 2001, staff of the Nuclear Regulatory Commission (NRC) met with representatives of NEI, EPRI, WOG and industry at NRC headquarters in Rockville, Maryland. The purpose of the meeting was to discuss licensing strategies for risk-informing ISI for high-energy line-break (HELB) break exclusion requirements (BER), minimum 10% sample size for ASME Class 1 piping examinations, RI-ISI program update philosophy, communication of changes to program to NRC, and plans for future meetings. Attachment 1 is a list of meeting attendees, Attachment 2 is the slides presented by NEI, and Attachment 3 identifies information the staff suggested be added to the WOG RI-ISI Template.

Ted Sullivan, NRC, began the meeting with opening remarks and a review of the agenda. Biff Bradley, NEI, briefly discussed the history of risk-informing ISI requirements and stated that RI-ISI has been one of the most successful applications of risk-informed technology. Regarding HELB/BER issues the NEI presentation stated:

- Augmented ISI is permitted to provide assurance of protection in instances where the installation of restraints or shields is not practical

- Augmented ISI for HELB requirements is set forth in Standard Review Plan (SRP) sections 3.6.1, 3.6.2 and plant specific commitments

- Individual plant requirements for augmented inspection vary greatly:
    - No requirements
    - Small number of examinations
    - Meet or exceed SRP guidance

NEI stated that augmented inspection requirements generally comply with Section XI of the applicable edition of the American Society of Mechanical Engineers (ASME). However, frequency of inspections can be increased over that required by Section XI such that some plants inspect these locations three times during each 10-year inspection interval. The number of locations associated with the augmented inspection programs can reach as many as 500

depending on plant-specific requirements. A survey of WOG members showed that the number of defects found under these programs is small and are mostly the result of flow-accelerated corrosion (FAC) which is addressed under separate programs for erosion/corrosion. Other issues discussed by NEI are in Attachment 2 to this memorandum.

The NRC staff discussed technical issues related to RI-ISI with NEI and industry including the need to satisfy single-failure criteria, types of volumetric inspections, changes in safety margins or defense-in-depth concepts, and the need to perform consequence analysis as part of the calculations for change in risk. The staff also discussed the applicability of Regulatory Guide 1.174, "An Approach for using Probabilistic Risk Assessment in Risk-Informed Decisions On Plant-Specific Changes to the Licensing Basis." NEI indicated that the technical issues would be discussed with the staff and, as needed, addressed in approved revisions of topical reports submitted by the EPRI and the WOG.

NEI then discussed licensing strategies for implementation of RI-ISI methodology for HELB piping. NEI noted that high energy programs are typically defined in Final Safety Analysis Reports (FSARs) and not included in plant technical specifications. Therefore, for most plants, RI-ISI methodology could be implemented under 10 CFR 50.59 with appropriate reference to the staff approved revision of the EPRI or WOG topical report. Notification to the NRC would be through periodic update of the FSAR per 50.71(e). The staff discussed this approach with NEI, particularly the possible need for rulemaking or for exemptions to General Design Requirement 4 (GDC-4). NEI did not think rulemaking or exemptions to GDC-4 would be needed and agreed to discuss these further with the staff. The staff and NEI discussed whether a section discussing how the methodology continues to meet GDC-4 and also how 50.59 is applicable for implementation should be included in the methodology. In general, a summary section with this information was considered useful. The staff noted that the Office of General Counsel (OGC) would need to be involved and NEI suggested that OGC be involved early for efficiency reasons. NEI and the staff discussed how a demonstration plant could show the feasibility of a generic approach and agreed that a demonstration plant was desirable.

NEI and NRC discussed a 10-percent minimum sample size for ASME Class 1 butt welds under the RI-ISI programs. The topic of sampling size had been discussed with the staff somewhat during review of the EPRI and WOG topical reports. The staff noted that the 10-percent minimum sample size was used by the reviewers to establish a reasonable assurance of defense-in-depth and adequate safety margin in lieu of more detailed reviews. The staff stated that the approved methodologies should provide that assurance and, therefore, more detail is needed in the WOG template submittals to confirm the approved methodology was followed. The staff further stated that the RI-ISI submittals based on the EPRI methodology had evolved over the course of several submittals to include details that are not included in the template submittals. The staff provided a list of examples of additional items (Attachment 3) that should be included in the submittals based on the WOG methodology. WOG representatives indicated that a telephone discussion will be arranged with the staff to discuss these and any additional items that need to be included in the WOG RI-ISI submittals.

As a result of the meeting, the following action items were identified:

- NEI will provide an updated RI-ISI submittal schedule by mid-June

- WOG will provide schedule of interaction with the staff on a BER example plant (Beaver Valley) which will determine the schedule for the review and approval of the WOG Topical Report Addendum

- EPRI agreed to provide a schedule for the review and approval of the EPRI Topical Report Addendum on BER/HELB

- The staff needs to interact further on the implication of GDC-4 on BER/HELB piping

- The staff will discuss the feasibility of application of 10 CFR 50.59 for the change to utilize the risk-informed methodology for the BER piping with OGC

- NEI agreed to develop wording that defined how the changes in BER/HELB ISI still meet GDC-4 and how 50.59 criteria are met

- Staff and WOG will discuss the additional items for the WOG template in an upcoming telephone call

- WOG and EPRI will work on wording for a summary at the end of the template to discuss the results of the RI-ISI program

- NEI, WOG and EPRI will meet at the end of June to discuss the RI-ISI program update process philosophy. The staff will also work on the definition of what constitutes a significant change in the RI-ISI program requiring resubmittal. A telephone discussion will the be arranged with the staff on this issue by end of June or early July, 2001

The group agreed to have the next meeting on RI-ISI in early to mid-October 2001. The meeting was then adjourned.

Project No. 689
Attachments: As stated
cc w/atts: See list

The group agreed to have the next meeting on RI-ISI in early to mid-October 2001. The meeting was then adjourned.

Project No. 689
Attachments: As stated
cc w/atts: See list

Distribution: Mtg. Summary w/ NEI on RI-ISI May 22, 2001
PUBLIC
ACRS
OGC

EMail
SCollins/JJohnson
BSheron
WBorchardt
DMatthews/FGillespie
WBeckner
EMcKenna
JBirmingham
WBateman
ESullivan
SAli
KManoly
SDinsmore
DTerao
SHou
GKelly
GImbro
YLi
SHou
PWen
LLund
PBoehnert, ACRS
MTschiltz, EDO
AHsia, RES

G:\RGEB\JLB\Msum-new\Msum NEI RI ISI 5-22-01.WPD

OFFICE	RGEB	SC:EMEB	SC:EMCB	SC:RGEB
NAME	JBirmingham:	KManoly	ESullivan	SWest
DATE	06/12/2001	06/12/2001	06/12/2001	06/12/2001

OFFICIAL RECORD COPY

cc: Mr. Ralph Beedle
Senior Vice President
and Chief Nuclear Officer
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Mr. Alex Marion, Director
Programs
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Mr. David Modeen, Director
Engineering
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Mr. Anthony Pietrangelo, Director
Licensing
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Mr. Jim Davis, Director
Operations
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Ms. Lynnette Hendricks, Manager
Licensing
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

Mr. Jim Riley
Nuclear Energy Institute
Suite 400
1776 I Street, NW
Washington, DC 20006-3708

List of Attendees For RI ISI Meeting May 22, 2001

NAME	ORGANIZATION
Biff Bradley	Nuclear Energy Institute
Kenneth Balkey	Westinghouse
Nancy Closky	Westinghouse
Dennis Weakland	FENOC/WOG
Patrick O'Regan	EPRI
Frank Ammirato	EPRI
Mark Pyne	Duke Power
Alex McNeill	Dominion
Ray West	Dominion
John Dosa	Niagara Mohawk
EiLynn McClain	Niagara Mohawk
Robin Graybeal	Proto-Power Corp.
Richard Fougerousse	Inservice Engineering
Nancy Chapman	SERCH Licensing/Bechtel
Deann Raleigh	LIS, Scientech
Ted Sullivan	NRR/DE/EMCB
Syed Ali	NRR/DE/EMCB
Shou-nien Hou	NRR/DE/EMCB
Louise Lund	NRR/DE/EMCB
David Terao	NRR/DE/EMEB
Yueh-Li C. Renee	NRR/DE/EMEB
Gene Imbro	NRR/DE/EMEB
Stephen Dinsmore	NRR/DSSA/SPSB
Glenn Kelly	NRR/DSSA/SPSB
Joseph Birmingham	NRR/DRIP/RGEB
Eileen McKenna	NRR/DRIP/RGEB
Jack Donahew	NRR/PDIV-2

ADDITIONAL INFORMATION FOR WOG RI-ISI TEMPLATE

1) A version of the following table is included in the current template. Please expand the table (usually Table 3.4-1) to include the following information. It is not expected that additional analyses be performed to provide the following summarizing information - entries of “0" or “N/A” should be used where appropriate.

a) Degradation Mechanism/ Combination	b) Failure Probability range at 40 years with no ISI			c)Susceptible systems	d) Number of segments characterized
	leak	disabling leak	break		

a) Degradation Mechanism/Combination: Segment failure probabilities are characterized in the WCAP method by imposing all degradation mechanism in a segment (even if they occur at different welds) and the worst case operating conditions at the segment on a “representative” weld, and using the resulting failure probability for the segment. Please identify each degradation mechanism and each unique combination of degradation mechanisms identified. The table in the current template submittals is not clear about which specific degradation mechanisms or combination of mechanisms are included in the leak estimates provided.

b) Failure Probability range at 40 years with no ISI: For each degradation mechanism and unique combination of degradation mechanisms, please provide the range of estimates developed for each of the three failure sizes as applicable. The table in the current template submittals provided the range of leak estimates only.

c) Susceptible systems: Please identify the systems susceptible to each degradation mechanism and unique combination of degradation mechanisms. The table in the current template submittals includes this information for the identified degradation mechanisms.

d) Number of Segments Characterized: Please identify the total number of segments for which the identified degradation mechanism and unique combinations of degradation mechanisms were used.

2) Each segment has four RRWs calculated, a CDF with and without operator action, and a LERF with and without operator action. Please add the following Table.

System	Number of segments with any RRW >1.005	Number of segments with any RRW between 1.005 and 1.001	Number of segments with any RRW between 1.005 and 1.001 placed in HSS	Number of segments with all RRW < 1.001 selected for inspection	Total number of segments selected for inspection

3) Please add the following table

System	Number of segments modeled with one break size	Number of segments modeled with two break sizes	Number of segments modeled with three break sizes	Number of segments modeled as initiating events (Equation 3-1)	Number of segments modeled as mitigating failures (Equation 3-4)	Number of segments modeled as initiating events and support system failure (Equation 3-9)	Number of segments with a change in risk estimated due to change in inspection program

4) Please add the statement that the sensitivity study to address uncertainty as described on page 125 was performed, and identify how many segments' RRW increased from below 1.001 to greater than or equal to 1.005. If the sensitivity study was not performed, provide a description and justification of any deviation.

5) Please add the statement that the change in risk calculations were performed according to all the guidelines provided on page 213 of the WCAP or provide a description and justification of any deviation.

6) Please add the statement that all four criteria for accepting the results discussed on page 214 and 215 in the WCAP were applied. If “reevaluation” was needed, please summarize the results of the reevaluation. If all four criteria were not used, please provide a description and justification of any deviation.

7) Briefly describe the qualifications, experience, and training of the users of the SRRA code on the capabilities and limitations of the code.

8) Please provide the following information regarding the treatment of augmented programs during the RI-ISI program development.

a) Treatment of augmented program inspections during categorization is described on page 80 in the WCAP. Please add the statement that the effects of ISI of existing augmented programs are included in your calculations used to categorize the segments or provide a description and justification of any deviation.

b) When the SRRA code is used for calculating failure probabilities for IGSCC of BWR plant piping, please describe if the results were compared with plant or industry failure data as applicable.

c) When the SRRA code is used for calculating failure probabilities for FAC, please describe if calculations were coordinated with the existing plant program since the code requires input that can be obtained from the knowledge gained from ongoing monitoring and evaluations of wall thinning rates.

9) Please confirm that SRRA code was only used to calculate failure probabilities for the failure modes, materials, degradation mechanisms, input variables and uncertainties it was programmed to consider as discussed in the WCAP Supplement 1, page 15. For example, SRRA code should only be applied to standard piping geometry (circular piping geometry with uniform wall thickness). If the code was applied to any non-standard geometry, please describe how the SRRA inputs were developed.

10) Please describe any sensitivity studies performed to support the use of the SRRA code.

11) Please provide the total number of Class 1 butt welds and socket welds, the percentage of Class 1 butt welds selected for volumetric inspection, and the percentage of Class 1 socket welds selected for inspection in the RI-ISI program.