

AUG 20 2004

LR-N04-0371



U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION (RAI) REGARDING
REQUEST FOR AUTHORIZATION TO USE A RISK-INFORMED INSERVICE
INSPECTION ALTERNATIVE TO THE ASME BOILER AND PRESSURE VESSEL
CODE SECTION XI REQUIREMENTS FOR CLASS 1 AND 2 PIPING
HOPE CREEK GENERATING STATION
DOCKET NO. 50-354**

Reference: LR-N04-0366, Response To Request For Additional Information Regarding
Request For Authorization To Use A Risk-Informed Inservice Inspection
Alternative To The ASME Boiler And Pressure Vessel Code Section XI
Requirements For Class 1 And 2 Piping, dated August 17, 2004

In the referenced letter PSEG indicated that the response to Question 5 could not be
included due to expansion of scope. PSEG committed to respond by August 27, 2004.
Attachment 1 contains PSEG's response to the question 5 of the August 5, 2004
Request for Additional Information (RAI).

If you have any questions or require additional information, please contact Mr. Michael
Mosier at (856) 339-5434.

Sincerely,


Michael Brothers
Vice President – Site Operations

Attachment

A047

C: Regional Administrator – NRC Region I
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Mr. D. Collins, Project Manager – Hope Creek
U.S. Nuclear Regulatory Commission
Mail Stop 08C2
Washington, DC 20555-0001

USNRC Senior Resident Inspector – Hope Creek (X24)

Mr. K. Tosch, Manager IV
Bureau of Nuclear Engineering
PO Box 415
Trenton, New Jersey 08625

Attachment 1

Response to NRC Request For Additional Information

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**HOPE CREEK GENERATING STATION
FACILITY OPERATING LICENSE NO. NFP-57
DOCKET NO. 50-354
REQUEST FOR ADDITIONAL INFORMATION**

NRC Question 5:

As explained in paragraph 4 of Section 3.5, and reiterated in the notes to Table 3.5 of the March 1, 2004 submittal, you have included 6 non-Category A Intergranular Stress Corrosion Cracking (IGSCC)-susceptible welds in the scope of the RI-ISI program. This was done even though you indicated that the IGSCC inspection program was to be unaffected by the RI-ISI program and welds only susceptible to IGSCC are excluded from the RI-ISI program scope such that IGSCC susceptibility was no longer considered in the risk-ranking of a piping segment. Therefore, the scope of piping segments left for consideration under the RI-ISI program include only IGSCC welds susceptible to multiple degradation mechanisms.

Section 3.6.4 of EPRI TR-112657 provides two alternatives for selecting weld locations. The alternatives are also discussed in ASME Code Cases N-560 and N-578, but the staff has only endorsed the alternatives as described in the EPRI Topical Report and has not endorsed the Code Cases. The selection alternatives discussed in Section 3.6.4.1 and 3.6.4.2 correspond to discussions in ASME Code Case N-560 and N578 respectively. In Section 3.6.4.1 of the TR, there are explicit provisions for crediting an augmented inspection program examination as an RI-ISI examination, provided that the location is a high-risk location (Risk Categories 1, 2, or 3), and that no more than half of the total RI-ISI examinations may be "borrowed" from these programs. Section 3.6.5.1 expands on this discussion by noting that the locations of these "borrowed" examinations must be identical to those called out in the augmented inspection program, and not one that is within the scope of the program, but not identified for inspection. Section 3.6.4.2 of the TR requires that the augmented inspection program remain completely as is. The "number, location, and frequency" would remain the same. These programs are not subsumed into the EPRI RI-ISI program (with the exception of Category A IGSCC welds). The section further states that elements determined to have degradation mechanisms, other than those in the Flow Accelerated Corrosion (FAC) and IGSCC inspection programs are to be included in the RI-ISI program. The number and locations are to be selected according to the RI-ISI program. There is no provision in this section, which allows augmented inspections to be credited toward the total number of RI-ISI examinations.

Section 3.6.5.2 of the TR, which discusses the attributes of a Code Case N-578 examination, only reiterates the provisions for welds that are under the jurisdiction of an augmented inspection program. No additional information is given. For welds not under one of these programs, this section provides additional guidance for selection of locations. Again, there is no provision given for crediting these augmented inspection program examinations toward the RI-ISI examination count.

In the first alternative, augmented program elements are fully included in the RI-ISI program but augmented inspections may be credited to satisfy the required number of inspection locations. In the second alternative, augmented program elements (and degradation mechanism) are excluded from the RI-ISI program although discontinued Section XI inspections must still be reflected in the change in risk estimates. There are no provisions in EPRI TR-112657 for mixing the alternatives by excluding the augmented inspection program elements and degradation mechanism but crediting the inspections.

Section 3.5 of your submittal, and the notes to Table 3.5, appear to indicate that you have excluded all augmented program elements from the RI-ISI program but have credited some of the inspections in the RI-ISI program, in essence, mixing the alternatives.

- a) Explain how your submittal is in accordance with the approved methodology or justify why any deviation yields a RI-ISI program with an equivalent level of safety as one developed using the approved methodology.
- b) Describe, in detail, how the IGSCC (category B through G) program's welds and weld inspections were incorporated into the RI-ISI program. Specifically, indicate the number of welds in the IGSCC program and the number of weld inspections in the program. How were the number of welds available for inspection in the RI-ISI program (i.e., the RI-ISI program population) increased when the welds inspected in the IGSCC augmented program welds were credited as inspections in the RI-ISI program? If the RI-ISI population was not increased by the total number of welds within the IGSCC inspection program, provide a justification for this.
- c) From your submittal and the supplemental information you provided, the staff understands that four IGSCC (category B through G) program inspections at weld locations exposed to multiple degradation mechanisms are credited as RI-ISI program inspections. In addition, the staff understands that there are a total of 13 weld locations that are exposed to IGSCC and at least one other degradation mechanism.

- d) Confirm or clarify this understanding. Do any of these 13 welds, other than the four that are exposed to multiple degradation mechanisms and undergo IGSCC program inspections which are credited to the RI-ISI program, also receive IGSCC program inspections? If so, explain why the above four inspections were credited to the RI-ISI program, but not any of the other inspections. How many of the 13 welds with IGSCC and at least one other damage mechanism were added to the overall population of RI-ISI welds when the above four IGSCC weld inspections were credited in the RI-ISI program?
- d) Confirm that all of the inspections from the augmented inspection programs credited in the RI-ISI program (we understand this to be a total of four) are capable of detecting the additional degradation mechanisms identified at each of the applicable weld locations.
- e) From your submittal and the supplemental information you provided, the staff understands that two IGSCC (category B through G) program inspections at weld locations exposed only to the IGSCC degradation mechanism are credited as RI-ISI program inspections. In addition, the staff understands that there are a total of 7 weld locations that are exposed only to the IGSCC degradation mechanism. Confirm or clarify this understanding. Do any of these 7 welds other than the two that are exposed only to the IGSCC degradation mechanism and undergo IGSCC program inspections, which are credited to the RI-ISI program, also receive IGSCC program inspections? If so, explain why the above two inspections were credited to the RI-ISI program, but not any of the other inspections. How many of the 7 welds exposed only to the IGSCC degradation mechanism were added to the overall population of RI-ISI welds when the above two IGSCC weld inspections were credited in the RI-ISI program?
- f) When a weld location from an augmented inspection program is included in the RI-ISI program, the degradation mechanism addressed by the augmented program is assumed to be controlled by that program. That is, the RI-ISI program assumes that the mechanism does not exist because of its control under the augmented program. For welds where IGSCC is the only degradation mechanism, their inclusion in the RI-ISI program would result in them being considered as having no degradation mechanism at all. What welds, if any, would not be inspected in the RI-ISI program as a result of the two borrowed welds discussed in question 5.d? Would any of these preempted weld location inspections subject to degradation mechanisms other than IGSCC, and if so, what is the increase in risk due to their replacement?

PSEG Response to Question 5:

- a) Based upon lessons learned from the first few follow-on plant applications, the guidance in EPRI TR-112657 that explains and defines these requirements could be clearer. The table and accompanying discussion provided below defines the relationship between an IGSCC Program and RI-ISI Program per the requirements of EPRI TR-112657. The HCGS submittal is in conformance with these requirements and the approved EPRI RI-ISI methodology.

IGSCC Program and RI-ISI Program Relationship

IGSCC Program Category	In Scope of RI-ISI Program	Subsumed by RI-ISI Program	EPRI TR-112657 Requirements
A	YES	YES	These locations are considered resistant to IGSCC and are assigned a low failure potential provided no other damage mechanisms are present. IGSCC is not assigned as a damage mechanism for RI-ISI purposes nor for Generic Letter 88-01 (or BWRVIP75) purposes.
B – G	YES	NO	The plant augmented inspection program mandated by Generic Letter 88-01 (or BWRVIP-075) maintains management responsibility and IGSCC is assigned as a damage mechanism in the RI-ISI Program.

As indicated above, the requirements pertaining to Category A locations are very clear-cut. That is, IGSCC is not assigned as a damage mechanism and the RI-ISI Program subsumes the examination of these weld locations.

It is important to note that similar to Category A locations, non-Category A locations are also included in the scope of the RI-ISI Program. Regardless of the category assignment, all IGSCC Program weld locations remain in the RI-ISI Program population. This includes IGSCC Program locations selected for RI-ISI Program purposes, as well as those locations that are not.

For non-Category A locations, IGSCC is assigned as a damage mechanism in the RI-ISI Program, and the plant's Generic Letter 88-01 (or BWRVIP-075) Program maintains control for the management of this mechanism. If other damage mechanisms are also identified in the RI-ISI damage mechanism

assessment, such as for Risk Category 2 (2) locations, examination techniques and volumes appropriate to detect the other mechanisms will be implemented, independent of the examination performed per the plant's Generic Letter 88-01 (or BWRVIP-075) Program.

For Risk Category 4 (2) locations, where IGSCC is the only damage mechanism identified, examinations performed per the plant's augmented inspection program may be credited towards satisfying the RI-ISI Program selection requirements. That is, double credit will be taken for one exam (i.e., IGSCC Program credit and RI-ISI Program credit). This is consistent with the Fitzpatrick RI-ISI Program submittal (ADAMS ML0037410481) which was the first BWR application approved using the EPRI RI-ISI methodology that had a substantial number of non Category A IGSCC welds. This is also consistent with how these augmented IGSCC Program exams have historically been credited by traditional Section XI ISI Programs.

- b) There are twenty non-Category A locations in the HCGS augmented inspection program for IGSCC. Of these twenty non-Category A locations, nineteen are Category C and one is Category E. All twenty of these locations have been incorporated into the RI-ISI Program, and are included in the population total as reflected in the table below, irrespective of whether or not they have been selected for RI-ISI purposes.

Per BWRVIP-75 requirements, five of the nineteen Category C locations (25% sampling required) require inspection, as well as the only Category E location (25% sampling required). These six IGSCC inspection locations have also been selected for RI-ISI purposes as indicated below. In those cases below where other damage mechanisms have been identified, examination techniques and volumes appropriate to detect the other mechanisms will also be implemented to satisfy the RI-ISI Program requirements. For those cases below where no other damage mechanisms have been identified, the performance of the IGSCC Program examination will satisfy the RI-ISI Program requirement.

Non-Category A IGSCC Locations

System	Risk Category	DMs	Weld Count	Selections	Comments
RPV	2 (2)	TT, (IGSCC)	C - 1	1	This piping weld has been selected for examination per the plant's augmented inspection program for IGSCC (Category C) and for RI-ISI purposes due to the presence of TT.
	2 (2)	CC, (IGSCC)	C - 11 E - 1 Total - 12	3	These three piping welds have been selected for examination per the plant's augmented inspection program for IGSCC (two Category C and one Category E) and for RI-ISI purposes due to the presence of CC.
	4 (2)	None (IGSCC)	C - 6	1	This piping weld has been selected for examination per the plant's augmented inspection program for IGSCC (Category C) and is being credited for RI-ISI purposes.
BC	4 (2)	None (IGSCC)	C - 1	1	This piping weld has been selected for examination per the plant's augmented inspection program for IGSCC (Category C) and is being credited for RI-ISI purposes.

c) As addressed in the response to question 5(b) above, there are a total of thirteen non-Category A locations that are also susceptible to other damage mechanisms in addition to IGSCC. All thirteen of these locations are in the RI-ISI Program population. The IGSCC Program selected four of these locations for examination. These same four locations were also selected for RI-ISI Program purposes. To satisfy the RI-ISI Program requirements, examination techniques and volumes appropriate to detect the other damage mechanisms identified will also be implemented. None of the nine remaining locations were selected for examination by the IGSCC Program.

- d) As addressed above, examination techniques and volumes appropriate to detect the other damage mechanisms identified at the applicable locations will also be implemented, independent of the examination performed per the plant augmented inspection program for IGSCC.
- e) As addressed in the response to question 5(b) above, there are a total of seven non-Category A locations that are susceptible only to IGSCC. All seven of these locations are in the RI-ISI Program population. The IGSCC Program selected two of these locations for examination. These same two locations were also selected for RI-ISI Program purposes. In such cases where no other damage mechanisms have been identified, the performance of the IGSCC Program examination will satisfy the RI-ISI Program requirement. None of the five remaining locations were selected for examination by the IGSCC Program.
- f) As addressed in the response to question 5(e) above, there are a total of seven non-Category A locations that are susceptible only to IGSCC. The welds are designated as Risk Category 4 (2) locations per the RI-ISI process. The table provided below is an excerpt from the table presented in the response to question 5(b) above.

Per the RI-ISI process, element selections are required on a system, risk category and damage mechanism combination basis. As a result, the required selections must come from the groupings presented below.

Risk Category 4 (2) Locations

System	Risk Category	DMs	Weld Count	Required Selections	Comments
RPV	4 (2)	None (IGSCC)	6	1	This piping weld has been selected for examination per the plant's augmented inspection program for IGSCC (Category C) and is being credited for RI-ISI purposes.
BC	4 (2)	None (IGSCC)	1	1	This piping weld has been selected for examination per the plant's augmented inspection program for IGSCC (Category C) and is being credited for RI-ISI purposes.

In the two cases presented above, the performance of the IGSCC Program examination will satisfy the RI-ISI Program requirement. These seven non-

Category A locations comprise the entire RI-ISI Program population for these specific system, risk category and damage mechanism groupings. Per the RI-ISI process, the required selections have to come from these groupings.

From a worker radiation exposure standpoint, it would not be practical to arbitrarily select two locations for RI-ISI purposes other than those already selected by the IGSCC Program. Consequently, double credit is being taken for one exam (i.e., IGSCC Program credit and RI-ISI Program credit) to meet the requirement.