June 22, 2006

Mr. Gordon Bischoff, Manager
PWR Owners Group Program Management Office
Westinghouse Electric Company
P.O. Box 355
Pittsburgh, PA 15230-0355

SUBJECT: CORRECTIONS TO THE FINAL SAFETY EVALUATION FOR PRESSURIZED WATER REACTOR (PWR) OWNERS GROUP TOPICAL REPORT WCAP-14572, REVISION 1-NP-A, SUPPLEMENT 2, "WESTINGHOUSE OWNERS GROUP APPLICATION OF RISK-INFORMED METHODS TO PIPING INSERVICE INSPECTION TOPICAL REPORT CLARIFICATIONS" (TAC NO. MC3979)

Dear Mr. Bischoff:

By letter dated August 10, 2004, and its supplement dated June 22, 2005, the Westinghouse Owners Group (WOG), now known as the Pressurized Water Reactor Owners Group (PWR Owners Group), submitted Topical Report (TR) WCAP-14572, Revision 1-NP-A, Supplement 2, "Westinghouse Owners Group Application of Risk-Informed Methods to Piping Inservice Inspection Topical Report Clarifications," (WCAP-14572, Sup. 2) to the U.S. Nuclear Regulatory Commission (NRC) staff for review and approval. By letter dated February 6, 2006, an NRC draft safety evaluation (SE) regarding our approval of WCAP-14572, Sup. 2, was provided to the PWR Owners Group for review and comments. The PWR Owners Group commented on the draft SE in a teleconference between the PWR Owners Group and the NRC staff on February 23, 2006, and submitted the comments by letter dated March 3, 2006. The NRC staff agreed with the PWR Owners Group comments and modifications as discussed with the PWR Owners Group and issued the final SE on May 1, 2006.

Subsequently, the PWR Owners Group informed the NRC staff via an e-mail dated May 24, 2006, that they had incorrectly marked-up the draft SE when they submitted their comments in the letter dated March 3, 2006. In that e-mail, the PWR Owners Group provided the corrected

mark-up of their comments on the draft SE. Accordingly, the final SE has been corrected and is enclosed with this letter. The NRC staff's disposition of PWR Owners Group's corrected comments are also discussed in the attachment to the corrected final SE.

If you have any questions, please contact Mr. Girija Shukla at 301-415-8439.

Sincerely,

/RA/
Juan D. Peralta, Acting Chief
Special Projects Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Project No. 694

Enclosure: Corrected Final Safety Evaluation

cc w/encl:
Mr. James A. Gresham, Manager
Regulatory Compliance and Plant Licensing
Westinghouse Electric Company
P.O. Box 355
Pittsburgh, PA 15230-0355

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CORRECTED FINAL SAFETY EVALUATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

TOPICAL REPORT WCAP-14572, REVISION 1-NP-A, SUPPLEMENT 2, "WESTINGHOUSE OWNERS GROUP APPLICATION OF RISK-INFORMED METHODS TO PIPING INSERVICE INSPECTION TOPICAL REPORT CLARIFICATIONS"

PRESSURIZED WATER REACTOR (PWR) OWNERS GROUP

PROJECT NO. 694

1.0 INTRODUCTION AND BACKGROUND

By letter dated August 10, 2004, the Westinghouse Owners Group (WOG) now known as the Pressurized Water Reactor Owners Group (PWR Owners Group) submitted Topical Report (TR) WCAP-14572, Revision 1-NP-A, Supplement 2, "Westinghouse Owners Group Application of Risk-Informed Methods to Piping Inservice Inspection Topical Report Clarifications," (WCAP-14572, Sup. 2) to the U.S. Nuclear Regulatory Commission (NRC) staff for review and approval (Reference 1). Further clarifying information and revised pages to WCAP-14572, Sup. 2, were provided in a supplemental letter dated June 22, 2005 (Reference 2).

WCAP-14572, Sup. 2, was submitted as a supplement to Topical Report WCAP-14572, Revision 1-NP-A, "Westinghouse Owners Group Application of Risk-Informed Methods to Piping Inservice Inspection," (Reference 3), which was reviewed and approved by the NRC staff on December 15, 1998. WCAP-14572, Revision 1-NP-A (original, or approved WCAP-14572) provides guidance on selecting and categorizing piping components as high safety significant (HSS) or low safety significant (LSS) groups in order to develop a risk-informed inservice inspection (RI-ISI) program as an alternative to the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code* (Code) Section XI, inservice inspection (ISI) requirements for piping. RI-ISI programs focus inspections of piping at HSS locations and locations where failure mechanisms (i.e., degradation mechanisms) are likely to be present. The goal of the RI-ISI program is to provide an ongoing substantive assessment of piping conditions.

The WOG submitted WCAP-14572, Sup. 2, to propose a modified method to calculate the failure probability of some pipe segments and to further clarify two topics described in the approved WCAP-14572. WCAP-14572, Sup. 2, addresses the following three topics:

- A methodology for evaluating a segment that includes piping with different diameters (i.e., a multiple pipe diameter (MPD) segment) as an alternative to the previously approved methodology presented in the approved WCAP-14572.

- The expert panel decision process for moving a segment that, based on the quantitative results, would normally be HSS into the LSS segment category.

- The requirements for examination based on the postulated failure modes and configuration of each piping structural element revised to the requirements presented in the WOG supplemental letter dated June 22, 2005.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(g) specifies that ISI of nuclear power plant components shall be performed in accordance with the requirements of the ASME Code, Section XI, except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). The regulation 10 CFR 50.55a(a)(3) states, in part, that proposed alternatives to the requirements of paragraph (g) may be used when authorized by the Director of the Office of Nuclear Reactor Regulation. The applicant shall demonstrate that: (i) The proposed alternatives would provide an acceptable level of quality and safety, or (ii) Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

In its December 15, 1998, safety evaluation (SE), the NRC staff concluded that the RI-ISI program described in the original WCAP-14572 provides an acceptable level of quality and safety pursuant to 10 CFR 50.55a for the proposed alternative to the piping ISI requirements with regard to the number of inspections, locations of inspections, and methods of inspections.

The NRC staff reviewed WCAP-14572, Sup. 2, with respect to the guidance contained in Regulatory Guide (RG) 1.178, “An Approach for Plant-Specific Risk-Informed Decision Making: Inservice Inspection of Piping” (Reference 4) and Standard Review Plan (SRP) Chapter 3.9.8, “Standard Review Plan for the Review of Risk-Informed Inservice Inspection of Piping” (Reference 5). These documents describe an acceptable methodology, acceptance guidelines, and a review process for proposed plant-specific, risk-informed changes to ISI of piping programs. Further guidance is provided in RG 1.174, “An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis” (Reference 6) and in SRP Chapter 19, Rev. 1, “Use of Probabilistic Risk Assessment in Plant-Specific, Risk-Informed Decisionmaking: General Guidance” (Reference 7), which contains general guidance for using probabilistic risk assessments (PRAs) in risk-informed decisionmaking. WCAP-14572, Sup. 2, was also evaluated for its contribution to the goal of the approved WCAP-14572, to provide a substantive ongoing assessment of the piping condition by focusing inspections of piping at HSS locations and locations where failure mechanisms are likely to be present.

3.0 TECHNICAL EVALUATION

WCAP-14572, Sup. 2, proposes a new method of evaluating MPD segments as an alternative to the previously approved methodology presented in the approved WCAP-14572. The approved WCAP-14572, permits MPD segments, but does not provide any guidance specific to evaluating these types of segments. In the proposed method, a failure probability is estimated for each part of the segment with a different diameter, and the highest failure probability is used to represent the segment. WCAP-14572, Sup. 2, recognizes that use of the new method could result in fewer inspections compared to using the approved method.

WCAP-14572, Sup. 2, also proposes guidelines that the expert panel may use for moving a segment, that the quantitative results indicate should be in the HSS category, into the LSS category. The approved WCAP-14572 states that piping segments that have been determined by quantitative methods to be HSS should not be classified as LSS by the expert panel without sufficient justification that is documented as part of the program. WCAP-14572, Sup. 2, proposes guidance on what justification and documentation is necessary for the expert panel to change the classification of piping segments from HSS to LSS.

Additionally, WCAP-14572, Sup. 2, revises Table 4.1-1 in the approved WCAP-14572. Table 4.1-1 provides the requirements for the examination of piping structural elements selected for inspection. The purpose for the revision to Table 4.1-1 is to incorporate acquired knowledge and to reflect changes in the examination methods used in the industry since the issuance of the approved WCAP-14572.

3.1 Evaluating Multiple Pipe Diameter Segments

The approved WCAP-14572 methodology is based on dividing the piping systems up into piping segments. Piping segments are primarily defined as lengths of piping where the consequence of failure is the same for a pressure boundary failure anywhere within the segment. One of the three other criteria that may be used to define a segment is pipe size, but the methodology does not prohibit including piping with different diameters within one segment. WCAP-14572, Sup. 2, proposes a specific method to evaluate these MPD segments that differs from the method approved in the original WCAP-14572, for all pipe segments.

3.1.1 Approved Method

The approved WCAP-14572 describes a method for evaluating piping segments by defining piping segments, calculating the failure probability of each segment, and selecting which welds to inspect. The approved methodology assigns all significant degradation mechanisms present in the segment to a single weld, imposes the most severe operating characteristics and environment on that weld, and estimates the failure probability of that weld. This estimate is used to characterize the failure probability of the entire segment. For some configurations of piping and degradation mechanisms, the estimated failure probability may be excessively conservative when the worst-case properties are combined at a single weld. Consequently, if the resulting failure probability is excessively conservative, the segment should be subdivided until a reasonable failure probability can be obtained. Excessively conservative estimates may occur in any piping segment, but are expected to occur more frequently in MPD segments because pipe size is a major factor contributing to the failure probability.

The number and location of inspections in the final RI-ISI program are strongly dependent on the failure probability estimates. A high failure probability results in the segment being designated as HSS unless the consequences of the segment rupture are benign compared to other segments. Segments that are not classified as HSS are classified as LSS and no inspections are required in LSS segments. Once the population of HSS segments has been identified, an element selection process and a change-in-risk evaluation determine which, and how many, elements to inspect.

The approved WCAP-14572 describes a structural element selection process. Each segment is placed in the Structural Element Selection Matrix. HSS segments with a high failure

importance are placed in Region 1 of the matrix and HSS segments with a low failure importance are placed in Region 2 of the matrix. Segments placed in Region 1 are further divided into Regions 1A and 1B. Region 1A contains the welds in an HSS segment that are affected by an active degradation mechanism. Region 1B contains the remaining welds in the HSS segment (i.e., those that are affected by no, or by only postulated, degradation mechanisms).

All welds in Region 1A are selected for inspection. A minimum of one weld is selected for inspection in the remaining welds in Region 1B. A minimum of one weld is also selected for inspection from each segment placed in Region 2. For the butt welds in Region 1B and Region 2, a statistical analysis is used to determine if more than one inspection is needed. Experience from RI-ISI submittals indicates that, almost always, no additional inspections are required to satisfy the statistical analysis guidelines.

In the final step in the development of an RI-ISI program, the change-in-risk associated with replacing the existing ASME program with the RI-ISI program is estimated. The change-in-risk calculation uses the failure probabilities without ISI to represent segments that do not have any inspections and uses the failure probabilities with ISI to represent segments that have one or more inspections. In the change-in-risk evaluation, the number of inspections in each segment does not have an impact on the failure probability used to represent a segment. Segments that included one or more ASME inspections, but will not include any RI-ISI inspections, will contribute an increase in risk to the total change. Segments that included ASME inspections and will include RI-ISI inspections are risk neutral. Segments that did not include ASME inspection exams, but will include one or more RI-ISI inspections, will contribute a reduction in risk to the total change. The approved WCAP-14572 guidelines state that if properly implemented, the RI-ISI program should always result in a risk-neutral to risk-reduction situation compared to the ASME program. If this guideline is not satisfied, inspections should be added.

3.1.2 Proposed Method

In WCAP-14572, Sup. 2, the WOG proposes an alternate method for estimating the failure probability of MPD segments and proposes an additional guideline for the element selection criteria. The change-in-risk calculation and risk-neutral guidelines are not changed.

The proposed method for estimating the failure probability involves temporarily separating a MPD segment into sub-segments based on the different pipe diameters. All the degradation mechanisms and operating characteristics in each sub-segment are applied to one weld of that sub-segment and the failure probability estimated for each sub-segment. The highest failure probability from all the temporary sub-segments is used as the failure probability for the MPD segment. Otherwise, the MPD segment is maintained as a single segment during the remaining evaluations.

In WCAP-14572, Sup. 2, the WOG also proposes an additional element selection criterion. The proposed guidance requires that one or more inspections be conducted that addresses each postulated degradation mechanism in each HSS segment.

3.1.3 Evaluation

The proposed method will retain some MPD segments that would otherwise require subdivision using the approved method. Therefore, the proposed methodology results in the same, or fewer segments than using the approved method. Thus, there could be fewer but larger HSS segments and fewer but larger LSS segments. The difference in the number of segments is only important insofar as it affects the number and location of inspections in the final RI-ISI program. Fewer HSS segments could result in selecting fewer locations for inspection because the element selection process is not influenced by the size of the segment. Fewer LSS segments could result in selecting fewer locations because the change-in-risk estimate is based on the number of segments and not by the number of welds in each segment.

WCAP-14572, Sup. 2, describes eight different piping configurations that were evaluated to investigate the potential differences in the number of RI-ISI program inspections based on the element selection process that is applied to HSS segments. A piping configuration is characterized by type of weld (socket or butt welds), distribution of degradation mechanisms between the different pipe sizes and weld types, and whether the degradation mechanisms are active or postulated. One configuration was identified that could result in the proposed methodology requiring fewer inspections than the approved methodology. This configuration is characterized by the presence of different postulated degradation mechanisms in different pipe sizes of a segment that has at least some butt welds in more than one pipe size.

The approved methodology would require that all the postulated degradation mechanisms be combined in the smallest pipe size and this might result in an overly conservative failure probability requiring that the segment be subdivided. If the results were overly conservative and the segment must be subdivided, two or more of the new segments would contain postulated degradation mechanisms. The sub-segment with the highest failure probability (and therefore the failure probability selected for the entire MPD segment) would become a new HSS segment because its failure probability and consequence would remain the same. The classification of the remaining new segments (previously sub-segments) will depend on their individual failure probabilities and one or more of the new segments could be HSS. Each of these new HSS segments would require a minimum of one inspection for a total of at least two inspections as compared to the one inspection required for the entire MPD segment with the proposed methodology.

The difference in the number of HSS segments between application of the approved versus the proposed method is highly dependent on the configuration and further generic investigation of this difference would be inconclusive. In Reference 2, the WOG proposed including an additional element selection guideline as part of the proposed methodology. This guideline directs the licensee to conduct one or more examinations that address each postulated degradation mechanism when an HSS segment is modeled with multiple postulated degradation mechanisms. The configuration identified in WCAP-14572, Sup. 2, as the most likely to result in fewer inspections using the proposed method includes, by definition, different postulated degradation mechanisms. Application of the new guideline will reduce the likelihood that the proposed method will result in fewer locations being selected in these MPD segments. The new guideline also improves the element selection process compared to the approved method by ensuring that, in general, inspections are targeted toward the full population of degradation mechanisms.

After completing the element selection process on the HSS segments, the approved

WCAP-14572 compares the RI-ISI program and the ASME Section XI program by calculating the change-in-risk from implementation of the RI-ISI program. The change-in-risk calculations depend on the number of segments, not the number of inspections. WCAP-14572, Sup. 2, demonstrates that there may be a smaller estimated increase in risk when the proposed methodology is used instead of the approved method. The approved WCAP-14572 guidelines suggest inspections be added until at least a risk-neutral change is estimated. A smaller estimated risk increase would more often meet the change-in-risk guidelines without adding locations and, therefore, the final RI-ISI program would have the same or fewer inspections when using the proposed method instead of the approved method.

Table 2.2-4 of Reference 2 describes 11 basic configurations that were evaluated to investigate the potential differences in the number of RI-ISI inspections based on the change-in-risk calculation. The configurations are characterized by the presence or absence of ASME inspections in different sized piping and the presence or absence of RI-ISI inspections in the same piping after replacing the ASME program with the RI-ISI program. Reference 2 identified 2 of the 11 configurations for which subdividing an MPD segment into 2 or more new segments would increase the change-in-risk estimate. Both configurations result in additional LSS segments if the MPD segment needs to be subdivided using the approved method. Increasing the number of LSS segments will likely increase the estimated change-in-risk because there are more segments in which inspections could be discontinued and, therefore, contribute to the estimated increase in risk.

WCAP-14572, Sup. 2, stated that the impact of these two possible configurations is minimal for three reasons. First, MPD segments usually do not contain ASME Section XI exams on more than one size. Therefore, splitting up MPD segments will create few new LSS segments that contribute to the change-in-risk. Second, LSS segments have a low risk-significance and, therefore, those few new segments that were inspected under ASME and contribute to the risk increase will have a minimal impact on the change-in-risk estimate. Third, there is conservatism built into the change-in-risk calculation. In an MPD segment with an ASME Section XI inspection, it is possible that the ASME Section XI inspection is not at the location with the highest failure probability although the highest failure probability is used in the change-in-risk estimate. Thus, the ASME Section XI inspection may not address the majority of the risk associated with the segment, whereas the RI-ISI program focuses inspections on locations where failure mechanisms are likely to be present. The NRC staff accepts that few of the new segments would be expected to have had ASME inspections and the risk contribution from the few segments that had ASME inspections will be minimal. Therefore, the NRC staff finds that the impact of applying the proposed, instead of the approved, method on the change-in-risk will not be significant.

As described in the SE approving the original WCAP-14572, the goal of the RI-ISI program is to maintain an ongoing assessment of the piping condition. A major improvement in the RI-ISI program compared to the ASME program is that the RI-ISI inspections are targeted toward elements where the condition of the piping is believed most at risk of degradation (i.e., locations where degradation mechanisms are, or are potentially, present). The proposed method includes the new guideline that, in any given HSS segment, one or more inspections are performed that address each of the different postulated degradation mechanisms.
This guideline further improves the RI-ISI program's coverage of degradation mechanisms and, thereby, improves the assurance that the piping conditions are appropriately assessed. The

NRC staff believes that this improved assurance will result in a more comprehensive RI-ISI program, even though there might be a slight reduction in the number of locations inspected.

3.2 Expert Panel Categorization of Segments as LSS that are Quantitatively HSS

The approved WCAP-14572 permits the expert panel to classify piping segments as LSS that have been determined by quantitative methods to be HSS, but requires sufficient justification that is documented as part of the program. WCAP-14572, Sup. 2, provides guidance clarifying "sufficient justification" for crediting operator actions, which is the most common reason used by the expert panels to reclassify the safety significance of segments.

The approved WCAP-14572 recommends that pipe segments with risk reduction worth (RRW) greater than 1.005 should be categorized as HSS while the segments with RRW values between 1.001 and 1.004 should be identified for additional consideration by the expert panel. The consequences of some segments' failure can be mitigated by an operator action. Operator action refers to those actions taken to isolate or mitigate the consequences of piping failure. Each such segment has two RRW values calculated, one "with operator action" and one "without operator action." The highest RRW value is nominally assigned to the segment for classification.

The most common scenario where the expert panel reclassifies an HSS segment as LSS is one where the expert panel finds that the "without operator action" results represent an overly conservative or unrealistic scenario. In some cases, the core damage frequency (CDF) and large early release frequency (LERF) RRW "without operator action" results are greater than 1.005 while the CDF and LERF RRW "with operator action" are less than 1.005 or even less than 1.001. The approved WCAP-14572 would initially classify the segment as HSS based on the quantitative results.

WCAP-14572, Sup. 2, provides the following guidance clarifying the conditions that should exist before an expert panel has an opportunity to judge that the likelihood of the operators failing to take the appropriate mitigating actions is unrealistic.

- The operator actions are proceduralized.
- Indications are available to alert the operators to take the appropriate action.
- There is time available for the operator to diagnose and take the action that results in a success path (i.e., isolating or mitigating the piping failure) prior to the action becoming ineffective to mitigate the piping failure consequences.
- The equipment associated with taking the action must be available.

If the expert panel determines that the above conditions exist, and decides it is appropriate to categorize a segment as LSS that is quantitatively HSS, WCAP-14572, Sup. 2, further states that the following elements of the justification will be documented:

- identification of the procedure that the operators are using,

- identification of the instrumentation that would alert the operators to take the appropriate actions,

- the estimated time that the operators have to respond to the event, and

- if the operator action is modeled in the plant PRA, the results of the importance analysis for a pipe segment after applying human error probabilities (HEPs) developed for operator actions in the internal events PRA for actions that can be used as surrogates for the RI-ISI operator action.

Determining whether the above conditions are satisfied requires the same information as that required by the *ASME Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications*, ASME RA-S-2002, to support fully defining an operator response that will be used in a PRA analysis (Index No. HR-F2). As discussed in RG 1.200, the NRC staff has determined that PRA analyses that comply with the ASME standard are considered adequate to support risk-informed regulatory application (with some exceptions though there are no exceptions to HR-F2). The approved WCAP-14572 guidance for RI-ISI program development permits the licensee to directly judge whether the likelihood of the operators failing to perform the action is unrealistic and does not require using a human reliability analysis methodology to estimate a HEP. The option to use applicable, previously quantified HEPs relies on a more rigorous analysis and, therefore, is also acceptable. The NRC staff finds that the additional guidance provided in WCAP-14572, Sup. 2, is acceptable because the clarification is consistent with acceptable information requirements for evaluating HEPs, and the use of this information to directly judge whether the likelihood of the operators failing to perform the action is consistent with RI-ISI program development as applied in the approved WCAP-14572.

3.3 Examination Requirements by Degradation Mechanism for Elements Selected for Inspection for the Risk-Informed Inservice Inspection Program

WCAP-14572, Sup. 2, proposes to replace Table 4.1-1 in the approved WCAP-14572, with the revised table included in Section 4 of WCAP-14572, Sup. 2. The purpose of the revision to the table is to incorporate acquired knowledge and reflect more appropriate inspections for specific degradation mechanisms. A summary of the changes to Table 4.1-1 is discussed below.

Column Examination Requirements/Fig. No. removes the references to figures in IWC of the Code. This change maintains a consistent requirement for all risk-informed inspections regardless of pipe class.

A change to Item No. R1.12 removes the figure references to branch nozzles and to piping 4-inch nominal pipe size and larger. This change reflects the experience of observing high cycle fatigue damage in small bore piping (both socket and butt welds).

Item No. R1.13 modifies the term for the degradation mechanism from "Elements Subject to Corrosive, Erosive, or Cavitation Wastage" to "Elements Subject to Erosion Cavitation."

For Item No. R1.15, "Elements Subject to Primary Water Stress Corrosion Cracking (PWSCC)," WCAP-14572, Sup. 2, proposes to change the examination method from a

VT-2 visual examination to a volumetric examination. The corresponding acceptance standard is also proposed to change to the acceptance standards in IWB-3514.

In Item No. R1.17, "or Pitting" has been added to include that microbiologically-influenced corrosion may form pitting. The pitting locations may become sites for crack initiation. In addition, the examination requirement column for this item added Figure Nos. IWB-2500-8(a) and IWB-2500-8(b) to include inspections for small bore piping applications.

WCAP-14572, Sup. 2, proposes to add two new item numbers to the table. The first is Item No. R1.19, "Elements Subject to External Chloride Stress Corrosion Cracking (ECSCC)." Item No. R1.19 proposes a surface examination using the acceptance criteria in IWB-3514. The second new item number is R1.20, "Elements not Subject to a Degradation Mechanisms." These elements will receive a volumetric examination using the acceptance criteria in IWB-3514. These items are not expected to have any degradation. Therefore, these inspections will account for uncertainty and unknown conditions in the subject segment.

These changes represent new insights and reflect the inspection method most likely to detect the expected degradation mechanism. In cases where there is no expected degradation mechanism, the elements will be inspected using a volumetric examination. Should any unexpected degradation be occurring in the HSS elements selected for inspection, a volumetric examination should be capable of detecting any patterns of degradation. Therefore, the NRC staff finds that the proposed replacement of Table 4.1-1 in the previously approved WCAP-14572, with Table 4.1.1 in WCAP-14572, Supplement 2, is acceptable.

4.0 CONCLUSIONS AND CONDITIONS

The NRC staff concludes that the proposed RI-ISI program as described in the approved WCAP-14572, and WCAP-14572, Sup. 2, as clarified and revised by the June 22, 2005, supplemental letter, will provide an acceptable level of quality and safety with regard to the number of inspections, locations of inspections, and methods of inspections. WCAP-14572, Sup. 2, clarifies and describes proposed modifications to the previously approved WCAP-14572. Based on its evaluation of WCAP-14572, Sup. 2, the NRC staff has reached the following conclusions:

The NRC staff finds that the methodology proposed in WCAP-14572, Sup. 2, to calculate the failure probability of MPD segments and to select elements for inspection is an acceptable alternative to the method approved in the original WCAP-14572. The alternative method to calculate the failure probability may result in slightly fewer inspections than the original method, but the expanded element selection process will increase the number of inspections targeted toward all the different postulated degradation mechanisms in segments with relatively high consequences. WCAP-14572, Sup. 2, applies the new selection criteria to all segments, not only MPD segments. Increasing the number of inspections targeted toward all the postulated degradation mechanisms supports the NRC staff’s expectations that the RI-ISI program provides reasonable assurance that the program will provide a substantive ongoing assessment of the piping condition.

Most of the decisions that the expert panel makes about reclassifying an HSS segment to an LSS segment are based on the expert panel's conclusion that the likelihood that the operators fail to perform a task is very low. The NRC staff finds that the guidelines presented in WCAP-14572, Sup. 2, on the information that an expert panel needs (and must document) to support the judgement that an HEP is very low are consistent with the acceptable guidelines for evaluating HEPs and, therefore, are acceptable.

Table 4.1-1 in WCAP-14572, Sup. 2, provides the requirements for inspection of HSS piping structural elements. The table updates the requirements in Table 4.1-1 in WCAP-14572, by incorporating acquired knowledge since the approval of the TR and reflects the examination method most likely to detect the expected degradation mechanism. The NRC staff finds that the replacement of Table 4.1-1 in the previously approved WCAP-14572, with Table 4.1-1 in WCAP-14572, Sup. 2, is acceptable.

According to the methodology in the approved WCAP-14572, licensees will identify those aspects of plant licensing bases that may be affected by the proposed change, including the final safety analysis report, technical specifications, and licensing conditions. In addition, licensees will identify all changes to commitments that may be affected, as well as the particular piping systems, segments, and welds that are affected by the changes in the augmented programs. Specific revisions to the inspection scope, schedules, locations, and techniques will also be identified, as will plant systems that rely on the affected piping.

Licensees who have not implemented the approved methodology described in the original WCAP-14572, need to submit relief requests to implement the approved methodology described in WCAP-14572, and as modified by WCAP-14572, Sup. 2. Licensees who have already implemented RI-ISI programs based on the original WCAP-14572, may not need to submit relief requests to incorporate the modifications in WCAP-14572, Sup. 2, and may make changes to their ISI programs in accordance with the provisions of 10 CFR 50.59, if its evaluation criteria are met. As applied to methodologies in the FSAR, prior NRC approval is not required if the change involves the use of a method approved by the NRC for the intended application. However, deviations from the NRC's approved methodology described in the original WCAP-14572, or as modified by WCAP-14572, Sup. 2, need to be identified and submitted to the NRC staff for prior review and approval.

5.0 REFERENCES

5. Letter from F. P. Schiffley, II (Chairman, Westinghouse Owners Group) to Chief Financial Officer, U.S. Nuclear Regulatory Commission, Transmittal of Supplement 2 to WCAP-14572, Revision 1-NP-A, (Non-Proprietary) "Westinghouse Owners Group Application of Risk-Informed Methods to Piping Inservice Inspection Topical Report Clarifications." (PA-MSC-0076), August 10, 2004.

6. Letter from D. F. Pilmer (Vice-Chairman, Westinghouse Owners Group) to U.S. Nuclear Regulatory Commission, Responses to the NRC Request for Additional Information Regarding the Review of WCAP-14572, Revision 1-NP-A Supplement 2, (Non-Proprietary), "Westinghouse Owners Group Application of Risk-Informed Methods to Piping Inservice Inspection Topical Report Clarifications" (PA-MSC-0076), June 22, 2005.

7. WCAP-14572, Revision 1-NP-A, “Westinghouse Owners Group Application of Risk-Informed Methods to Piping Inservice Inspection Topical Report,” February 1999.

8. NRC Regulatory Guide 1.178, “An Approach for Plant-Specific Risk-Informed Decision Making for Inservice Inspection of Piping,” September 1998.

9. Standard Review Plan Chapter 3.9.8, “Standard Review Plan for the Review of Risk-Informed Inservice Inspection of Piping,” NUREG-0800, September 2003.

10. NRC Regulatory Guide 1.174, “An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis,” July 1998.

11. Standard Review Plan Chapter 19, Rev. 1, "Use of Probabilistic Risk Assessment in Plant-Specific, Risk-Informed Decisionmaking: General Guidance,” NUREG-0800, November 2002.

Attachment: Resolution of Comments

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Andrea Keim

Date: June 22, 2006

RESOLUTION OF PRESSURIZED WATER REACTOR OWNERS GROUP COMMENTS ON FINAL SAFETY EVALUATION FOR TOPICAL REPORT WCAP-14572, REVISION 1-NP-A, SUPPLEMENT 2, "WESTINGHOUSE OWNERS GROUP APPLICATION OF RISK-INFORMED METHODS TO PIPING INSERVICE INSPECTION TOPICAL REPORT CLARIFICATIONS"

By letter dated March 3, 2006, the Pressurized Water Reactor (PWR) Owners Group commented on the draft SE. These comments were discussed in a teleconference between the PWR Owners Group and the NRC staff on February 23, 2006. The NRC staff agreed with the PWR Owners Group comments and modifications as discussed with the PWR Owners Group and issued the final SE on May 1, 2006.

Subsequently, the PWR Owners Group informed the NRC staff via an e-mail dated May 24, 2006, that they incorrectly marked-up the draft SE when they submitted their comments in the letter dated March 3, 2006. In that e-mail, the PWR Owners Group also provided the corrected mark-up of their comments on the draft SE. The NRC staff's disposition of PWR Owners Group's corrected comments is discussed below:

No.	Final SE Reference	Corrected Mark-up of Final SE Text	Corrected Final SE Text	NRC Staff Resolution
1.	Page No. 7	~~If the operator action is modeled in the plant PRA,~~ The equipment associated with taking the action must be available.	The equipment associated with taking the action must be available.	Adopted
2.	Page No. 7	large early release frequency (LERF) RRW "without operator action" results **are** ~~is~~ greater than	large early release frequency (LERF) RRW "without operator action" results are greater than	Adopted
2.	Page No. 8	**if the operator action is modeled in the plant PRA,** the results of the importance analysis for a pipe segment after applying human error probabilities (HEPs) developed for operator actions in the internal events PRA for actions that can be used as surrogates for the RI-ISI operator action.	if the operator action is modeled in the plant PRA, the results of the importance analysis for a pipe segment after applying human error probabilities (HEPs) developed for operator actions in the internal events PRA for actions that can be used as surrogates for the RI-ISI operator action.	Adopted