50-498

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

November 6, 1998

Mr. William T. Cottle
President and Chief Executive Officer
STP Nuclear Operating Company
South Texas Project Electric
Generating Station
P. O. Box 289
Wadsworth, TX 77483

SUBJECT: GENERIC LETTER (GL) 97-01, "DEGRADATION OF CONTROL ROD DRIVE MECHANISM NOZZLE AND OTHER VESSEL CLOSURE HEAD PENETRATIONS," RESPONSES FOR SOUTH TEXAS PROJECT, UNITS 1 AND 2 (STP) AND THE WESTINGHOUSE OWNERS GROUP INTEGRATED PROGRAM FOR ASSESSMENT OF WESTINGHOUSE DESIGNED VESSEL HEAD PENETRATION NOZZLES (TAC NOS. M98598 AND M98599)

Dear Mr. Cottle:

On April 1, 1997, the staff issued Generic Letter (GL) 97-01, "Degradation of Control Rod Drive Mechanism Nozzle and Other Vessel Closure Head Penetrations," to the industry requesting in part that addressees provide a description of the plans to inspect the vessel head penetration (VHP) nozzles at their respective pressurized water reactor (PWR) designed plants. With respect to the issuance of the GL, the staff required the addressees to submit an initial response within 30 days of issuance informing the staff of the intent to comply with requested information and a follow-up response within 120 days of issuance containing the technical details to the staff's information requests. In the discussion section of the GL, the staff stated that "individual licensees may wish to determine their inspection activities based on an integrated industry inspection program. . .," and indicated that it did not object to individual PWR licensees basing their inspection activities on an integrated industry inspection program.

As a result, the Westinghouse Owners Group (WOG) determined that it was appropriate for its members to develop a cooperative integrated inspection program in response to GL 97-01. The WOG program is documented in two Topical Reports issued by the Westinghouse Electric Corporation (WEC), WCAP-14901, Revision 0, "Background and Methodology for Evaluation of Reactor Vessel Closure Head Penetration Integrity for the Westinghouse Owners Group," and WCAP-14902, Revision 0, "Background Material for Response to NRC Generic Letter 97-01: Reactor Vessel Closure Head Penetration Integrity for the Westinghouse Owners Group."

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The WOG submitted the integrated programs described in WCAP-14901, Revision 0, and WCAP-14902, Revision 0, to the staff on July 25, 1997. The staff has reviewed your responses to GL 97-01, dated May 1 and July 29, 1997, and determined by your responses that you were a member of the WOG and a participant in the WOG integrated program that was developed to address degradation in Westinghouse designed VHP nozzles, and the staff's requests in GL 97-01. However, the staff could not determine after reviewing your responses

which of the two Westinghouse Generic Topical Submittals, WCAP-14901, Revision 0, or WCAP-14902, Revision 0, is being endorsed for the assessment of the VHP nozzles at your plants.

The staff requires further information to complete its review of your responses as they relate to the WOG's integrated program for assessing VHP nozzles at WOG member plants. The enclosure to this letter forwards staff's inquiries in the form of a request for additional information (RAI). It should be noted that similar staff requests have been issued to other WOG member utilities. As was the staff's position before, the staff encourages you to address these inquiries in integrated fashion with the WOG and the Nuclear Energy Institute (NEI); however, the staff also requests that you identify any deviations from the WOG's integrated program that may be specific to your facilities. The staff appreciates the efforts expended with respect to this matter.

This request was discussed with Ms. Kathleen Work of your staff on November 3, 1998, and a mutually agreeable target date of a response to the RAI within 120 days was established. The staff appreciates the efforts expended with respect to this matter.

Sincerely,

ORIGINAL SIGNED BY:

Thomas W. Alexion, Project Manager
Project Directorate PD IV-1
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Enclosure: Request for Additional Information

Docket Nos. 50-498 and 50-499

cc w/encl: See next page

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which of the two Westinghouse Generic Topical Submittals, WCAP-14901, Revision 0, or WCAP-14902, Revision 0, is being endorsed for the assessment of the VHP nozzles at your plants.

The staff requires further information to complete its review of your responses as they relate to the WOG's integrated program for assessing VHP nozzles at WOG member plants. The enclosure to this letter forwards staff's inquiries in the form of a request for additional information (RAI). It should be noted that similar staff requests have been issued to other WOG member utilities. As was the staff's position before, the staff encourages you to address these inquiries in integrated fashion with the WOG and the Nuclear Energy Institute (NEI); however, the staff also requests that you identify any deviations from the WOG's integrated program that may be specific to your facilities. The staff appreciates the efforts expended with respect to this matter.

This request was discussed with Ms. Kathleen Work of your staff on November 3, 1998, and a mutually agreeable target date of a response to the RAI within 120 days was established. The staff appreciates the efforts expended with respect to this matter.

Sincerely,

Thomas W. Alexion

Thomas W. Alexion, Project Manager
Project Directorate PD IV-1
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Enclosure: Request for Additional Information

Docket Nos. 50-498 and 50-499

cc w/encl: See next page

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Request for Additional Information Regarding Utilities Participating

in the Westinghouse Owners Group (WOG) Response to Generic Letter (GL) 97-01

Applicability of the WOG Integrated Program
for Assessing Vessel Head Penetration (VHP) Nozzles
in Westinghouse Designed Nuclear Plants
to the Plant-specific Responses to GL 97-01 for Participating
Member Utilities and Plants in the WOG

On April 1, 1997, the staff issued Generic Letter (GL) 97-01, "Degradation of Control Rod Drive Mechanism Nozzle and Other Vessel Closure Head Penetrations," to the industry requesting in part that addressees provide a description of the plans to inspect the vessel head penetration (VHP) nozzles at their respective pressurized water reactor (PWR) designed plants. With respect to the issuance of the GL, the staff required the addressees to submit an initial response within 30 days of issuance informing the staff of the intent to comply with requested information and a follow-up response within 120 days of issuance containing the technical details to the staff's information requests. In the discussion section of the GL, the staff stated that "individual licensees may wish to determine their inspection activities based on an integrated industry inspection program. . .," and indicated that it did not object to individual PWR licensees basing their inspection activities on an integrated industry inspection program.

As a result, the WOG determined that it was appropriate for its members to develop a cooperative integrated inspection program in response to GL 97-01. The WOG program is documented in two Topical Reports issued by the Westinghouse Electric Corporation (WEC), WCAP-14901, Revision 0, "Background and Methodology for Evaluation of Reactor Vessel Closure Head Penetration Integrity for the Westinghouse Owners Group," and WCAP-14902, Revision 0, "Background Material for Response to NRC Generic Letter 97-01: Reactor Vessel Closure Head Penetration Integrity for the Westinghouse Owners Group."

The technical content provided in WCAP-14902, Revision 0, is basically the same as that provided in WCAP-14901, Revision 0. The difference with regard to the reports is that WOG member plants subscribing to the content of WCAP-14901 have opted to rank the susceptibility of their VHP nozzles according to a probabilistic Weibull analysis method that was developed by WEC. In contrast, the WOG member plants subscribing to the content of WCAP-14902, Revision 0, have opted to rank the VHP nozzles for their facilities according to a probabilistic methodology that was developed by another vendor of choice. The staff has determined by letters May 1 and July 29, 1997, that you were a member of the WOG and a participant in the WOG integrated program that was developed to address degradation in Westinghouse designed VHP nozzles, and the staff's requests in GL 97-01. However, the staff could not determine after reviewing your responses which of the two Westinghouse Generic Topical Submittals, WCAP-14901, Revision 0, or WCAP-14902, Revision 0, is being endorsed for the assessment of the VHP nozzles at your plants.

ENCLOSURE

The staff requires further information to complete its review of your responses as they relate to the WOG's integrated program for assessing VHP nozzles at WOG member plants. The staff requests the following information with respect to the content of your responses to GL 97-01, dated May 1 and July 29, 1997, and to the WOG's integrated program for assessing VHP nozzles at WOG member plants:

1. Indicate which Westinghouse Topical Report, WCAP-14901, Revision 0, or WCAP-14902, Revision 0, is being endorsed for the assessment of VHP nozzles at your plants, and which crack initiation and growth susceptibility model is being used for the assessment of the VHP nozzles at your plants.

2. Provide the following information if Topical Report WCAP-14901 Revision 0, is being endorsed for the VHP nozzles at your plants; otherwise skip to Information Request 3.

   a. In WCAP-14901, Revision 0, WEC did not provide any conclusions as to what the probabilistic failure model would lead the WOG to conclude with respect to the assessment of primary water stress corrosion cracking (PWSCC) in WEC-designed vessel head penetrations. With respect to the probabilistic susceptibility model (e.g., probabilistic failure model) provided in WCAP-14901:

      (1) Provide the susceptibility rankings compiled for the WOG member plants for which WCAP-14901 is applicable. In regard to other WOG member plants to which WCAP-14901 is applicable, include the basis for establishing the ranking of your plants relative to the others.

      (2) Describe how the probabilistic failure model in WCAP-14901 for assessing postulated flaws in vessel head penetration nozzles was bench-marked, and provided a list and discussion of the standards the model was bench-marked against.

      (3) Provide additional information regarding how the probabilistic failure models in WCAP-14901 will be refined to allow the input of plant-specific inspection data into the model's analysis methodology.

      (4) Describe how the variability in product forms, material specifications, and heat treatments used to fabricate each control rod drive mechanism (CRDM) penetration nozzle at the WOG member utilities are addressed in the probabilistic crack initiation and growth models described or referenced in Topical Report No. WCAP-14901.

   b. Table 1-2 in WCAP-14901 provides a summary of the key tasks in WEC's VHP nozzle assessment program. The table indicates that the tasks for (1) Evaluation of PWSCC Mitigation Methods, (2) Crack Growth Data and Testing, and (3) Crack Initiation Characterization Studies have not been completed and are still in progress. In light of the fact that the probabilistic susceptibility models appear to be dependent in part on PWSCC crack initiation and growth estimates, provide your best estimate when these tasks will be completed by WEC, and

describe how these activities relate to and will be used to update the probabilistic susceptibility assessment of VHP nozzles at your plants.

c. In the NEI letters of January 29, 1998 (Ref. 1), and April 1, 1998 (Ref. 2), NEI indicated that inspection plans have been developed for the VHP nozzles at the Farley, Unit 2 plant in the year 2002, and the Diablo Canyon, Unit 2 plant in the year 2001, respectively. The staff has noted that although you have endorsed the probabilistic susceptibility model described in WCAP-14901, Revision 0, other WOG member licensees have endorsed a probabilistic susceptibility model developed by an alternate vendor of choice. The WOG's proposal to inspect the VHP nozzles at the Farley, Unit 2 and Diablo Canyon, Unit 2 plants appears to be based on a composite assessment of the VHP nozzles at all WOG member plants. Verify that such a composite ranking assessment has been applied to the evaluation of VHP nozzles at your plants. If composite rankings of the VHP nozzles at WOG member plants have been obtained from the composite results of the two models, justify why application of the probabilistic susceptibility model described in WCAP-14901, Revision 0, would yield the same comparable relative rankings of the VHP nozzles for your plants as would application of the alternate probabilistic susceptibility model used by the WOG member plants not subscribing to WCAP-14901, Revision 0. Comment on the susceptibility rankings of the VHP nozzles at your plants relative to the susceptibility rankings of the VHP nozzles at the Farley, Unit 2 and Diablo Canyon, Unit 2 plants.

3. Provide the following information on how Topical Report WCAP-14902, Revision 0, is being endorsed for the VHP nozzles at your plants.

a. WEC and the WOG did not provide a description of the crack initiation and growth susceptibility model used for the assessment of WEC VHP nozzles in plants endorsing WCAP-14902, Revision 0. Provide a description of the crack initiation and growth susceptibility model used for assessment of the VHP nozzles at your plants.

b. In WCAP-14902, Revision 0, WEC did not provide any conclusions as to what the probabilistic failure model would lead the WOG to conclude with respect to the assessment of PWSCC in WEC-designed VHP nozzles. With respect to the probabilistic susceptibility model (e.g., probabilistic failure model) referenced in WCAP-14902:

(1) Provide the susceptibility ranking of your plants as compiled from the crack initiation and growth analysis of the VHP nozzles for your plants to that compiled for the other WOG member plants for which WCAP-14902, Revision 0, is applicable.

(2) Describe how the probabilistic failure (crack initiation and growth) model in used for the assessment of the VHP nozzles at your plants was bench-marked, and provide a list and discussion of the standards the model was bench-marked against.

(3) Provide additional information regarding how the probabilistic failure (crack initiation and growth) models for the assessment of VHP nozzles at your plants will be refined to allow the input of plant-specific inspection data into the model's analysis methodology.

(4) Describe how the variability in product forms, material specifications, and heat treatments used to fabricate each CRDM penetration nozzle at the WOG member utilities are addressed in the probabilistic crack initiation and growth models described or referenced in Topical Report No. WCAP-14902, Revision 0.

c. Table 1-2 in WCAP-14902, Revision 0, provides a summary of the key tasks in WEC's VHP nozzle assessment program. The tables indicate that the Tasks for (1) Evaluation of PWSCC Mitigation Methods, (2) Crack Growth Data and Testing, and (3) Crack Initiation Characterization Studies have not been completed and are still in progress. In light of the fact that the probabilistic susceptibility models appear to be dependent in part on PWSCC crack initiation and growth estimates, provide your best estimate when these tasks will be completed by WEC, and describe how these activities relate to and will be used to update the probabilistic susceptibility assessment of VHP nozzles at your plants.

d. In the NEI letters of January 29, 1998 (Ref. 1), and April 1, 1998 (Ref. 2), NEI indicated that inspection plans have been developed for the VHP nozzles at the Farley, Unit 2 plant in the year 2002, and the Diablo Canyon, Unit 2 plant in the year 2001, respectively. The staff has noted that although you have decided to apply an alternate probabilistic susceptibility model to the assessment of the VHP nozzles at your plants, other WOG member licensees, including the Southern Nuclear Operating Company and the Pacific Gas and Electric Company, the respective licensees for the Farley units and the Diablo Canyon units, have selected to apply the susceptibility model described in WCAP-14901, Revision 0, to the assessment of VHP nozzles at their plants. The WOG's proposal to inspect VHP at Farley, Unit 2 and Diablo Canyon, Unit 2 appears to be based on an composite assessment of the VHP nozzles at all WOG member plants. Verify that such a composite ranking assessment has been applied to the evaluation of VHP nozzles at your plants. If composite rankings of the VHP nozzles at WOG member plants have been obtained from the composite results of the two models, justify why application of the alternate probabilistic susceptibility model being for the assessment of VHP nozzles at your plants would yield the same comparable relative rankings as would application of the probabilistic susceptibility model used by the WOG member plants subscribing to the contents of WCAP-14901, Revision 0. Comment on the susceptibility rankings of the VHP nozzles at your plants relative to the susceptibility rankings of the VHP nozzles at the Farley, Unit 2 and Diablo Canyon, Unit 2 plants.

REFERENCES

1. January 19, 1998 - Letter from David J. Modeen, Director of Engineering, Nuclear Generation Division, Nuclear Energy Institute, to Mr. G.C. Lainas, Acting Director, Division of Engineering, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission (Untitled).

2. April 1, 1995 - Letter from David J. Modeen, Director of Engineering, Nuclear Generation Division, Nuclear Energy Institute, to Mr. G.C. Lainas, Acting Director, Division of Engineering, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, "SUBJECT: Generic Letter 97-01, 'Degradation of Control Rod Drive Mechanism Nozzle and Other Vessel Head Penetrations.' "