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SCHWENCER,A. Licensing Branch 2

SUBJECT: Submits written responses to questions discussed at 831128 meeting re final design assessment rept,Table on potential finding rept for RHR piping & supports encl.

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December 7, 1983
G02-83-1125

Docket No. 50-397

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Schwencer:

Subject: NUCLEAR PROJECT NO. 2
WNP-2 DESIGN REVERIFICATION PROGRAM
RESPONSE TO STAFF QUESTIONS

Reference: Letter from G. C. Sorensen to H. R. Denton, dated September 27, 1983, subject, "WNP-2 Design Reverification Program"

A meeting between the NRC staff and Supply System personnel was held on Tuesday, November 28, 1983, to discuss the Final Design Assessment Report prepared for WNP-2 (reference). During the meeting, D. Jang and R. Li of the NRC staff, presented several questions which were addressed by the Supply System. As requested by R. Auluck, the written responses to these questions are provided for your information.

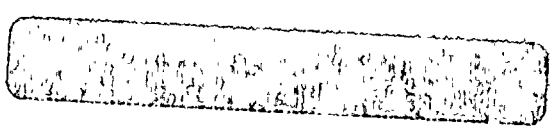
Structural Branch Questions

Question 1

What is the basis used in the selection of structural members which were examined to determine if loads applied to these members were adequately considered in the design process? Also provide a detailed discussion to justify that the audit results from the limited selected samples are sufficiently representative of the entire plant to be used in judging the overall adequacy of WNP-2 Category I structural design.

Response

Technical Audit Associates' Finding No. 5 recommended that the Supply System make a spot check of a selected heavily loaded wall to determine



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if the original structural design is still adequate in view of the additional loads from piping supports and restraints that may have been added. They recommended, based on their plant walkdown, that review of the main steam tunnel north wall would be an appropriate example. After completing the review of the main steam tunnel wall, the Supply System concluded that the design adequately included impact from whipping pipes, but this sample was not representative from a hung load standpoint. A field walkdown was then conducted to identify a wall in the reactor building that would represent a worst case for evaluation. A wall at elevation 471 ft., which supports a large number of pipe supports and cable trays, was then selected and evaluated.

The two walls evaluated would not represent a statistically valid review sample. The primary purpose for performing this review was to determine if the AE design methodology and processes were adequate. However, field walkdown was utilized to identify worst case walls for review. The review concluded that the design of these walls, utilizing the AE methodology and process, is adequate.

Question 2

It was determined that for the main steam tunnel north wall, the use of a cracked versus uncracked wall section for the computation of dynamic deflection did not affect the final acceptability of the structure. Describe the procedures and assumptions adopted for both the cracked and uncracked section analyses, also provide the design margins with respect to the code allowables obtained from the analyses.

Response

The procedures and assumptions used to determine the ductility ratio are described in FSAR Section 3.6.1.6.3.2 with the maximum allowable values provided in Table 3.6-1. Using the procedure described in the FSAR, the calculated ductility ratio, μ, was 6.6. The allowable value per FSAR Table 3.6-1 is 10.

Question 3

Referring to Section 3.5.4.1 of Reference 2, (WNP-2 Final Assessment Report), the imposed pipe whip restraint design loads are comprised of equivalent static loads due to high energy pipe break, jet impingement loads, and missile impact loads due to the postulated break. Provide a discussion as to how these loads are considered in the design of adjacent structures. If the method used to assess the combined effects of these loads is different from that given in the SRP Section 3.8.4, provide a discussion of the basis for deviating from the SRP load combination procedures.

Response

Imposed pipe whip restraint design loads were included as stated in FSAR Section 3.8.4 and Tables 3.8-15 and 3.8-16. This method corresponds to that provided in SRP 3.8.4. Reference 2 (WNP-2 Final Assessment Report) Section 3.5.6.1 describes the reviews performed for the two walls reviewed. This review included consideration for the equivalent static, jet impingement and missile impact loads.

Mechanical Engineering Branch Questions

Question 1

Provide a summary of the results of the RHR System Piping and Support Review discussing the Potential Finding Reports and the status of their resolution.

Response

The RHR Addendum to the Final Assessment Report will be issued by December 31, 1983. This report will discuss the results of the RHR piping and support reviews. A summary of the results, potential finding reports (PFRs) and their status follows.

Six PFRs, all classified as observations, were issued. Three were design related and three construction related. The generic and specific deficiencies identified during the review of the HPCS piping and support calculations did not exist in the RHR calculations. All areas of design and construction reviewed are acceptable. A summary of the issued PFRs is provided on the attached table. Since all of the PFRs were classified as observations, specific corrective action plans were not required to track implementation of resolutions. The status of each resolution is provided for information.

Question 2

Clarify the description and provide the status of the corrective action plan described for PFR-PB-3.

Response

This finding is described on Page 3.5-14 of our Final Assessment Report and relates to the use of an incorrect higher than allowable shear stress for structural attachment fillet welds in determining pipe movement following a postulated break. The analysis concluded that the

specific pipe would have limited movement following the postulated break where, in fact, use of correct allowable shear stress would result in less limited movement. Upon review of the related calculations, as committed to in the corrective action plan, only two cases were affected by this error. These cases are: one postulated break in HPCS piping and one postulated break in LPCS piping. The postulated HPCS break was examined in the design reverification activities. In all other postulated break analysis, no credit was taken for limited pipe movement. For the two specific cases, a preliminary re-analysis shows that pipe movement following postulated break is, in fact, limited due to other features and that there is no additional equipment impacted. The preliminary re-analysis is expected to be finalized by December 16, 1983.

Question 3

Describe the actions that have occurred relative to PFR-RHR-25 since your Final Assessment Report was issued.

Response

As discussed on Page 3.3-27 of our Final Assessment Report, this finding relates to a failure by the AE to update all aspects of the RHR heat exchanger lower support anchor bolt calculations as a result of revised loading conditions transmitted by project letter, GEBR-2-81-189. The only revised loading condition not evaluated was that of a vertical load in the upward direction that would put the anchor bolt in tension. Neither the anchor bolt washer plate nor the concrete beam which supports the heat exchanger were reassessed for this load change. The conclusions presented in our report were that vertical loads in the upward direction do not actually exist because neither containment hydrodynamic loads nor seismic loads were significant. On a preliminary basis, the equipment supplier, General Electric, concurred with this conclusion. Upon further evaluation, as part of Project's evaluation of the information transfer process, it became apparent that significant loads in the vertical upward direction were possible depending on the loads that the piping system applied to the heat exchanger nozzles and depending on the flexibility of the heat exchanger nozzles. In order to avoid potential last minute construction impact, the Supply System has taken the following contingency action. The anchor bolt washer was modified to be at least as strong in the vertical upward direction as the supporting concrete beam. This strengthening will accommodate an approximate increase of a factor of 5 over the original upward design load.

General Electric has performed a coupled analysis of the piping and heat exchanger to determine the actual loads to the structure. The preliminary results indicate that the maximum up load is within the modified washer plate design and the maximum support structure design.

General

Question

Does the transmittal of design information between General Electric and Burns and Roe, Incorporated via project letters (see PFR-RHR-25) comply with the requirements of the GE Quality Assurance Program?

Response

General Electric has confirmed that transmittal of New Load Interface Requirements to the Supply System and Burns and Roe via project letters is within the provisions set forth in their quality assurance program.

If you have any questions concerning the above information, please contact me on (509) 372-5238.

Very truly yours,

GC Sorensen

G. C. Sorensen, Manager
Regulatory Programs

GCS:DLW:ch

Attachment: Table 1, RHR Piping and Supports - Potential Finding Reports

cc: Mr. R. Auluck - NRC
Mr. W. S. Chin - BPA
Mr. A. D. Toth - NRC Resident Inspector

Table 1

RHR Piping and Supports - Potential Finding Reports

Description	Status
PFR-RHR-32 was issued to document an error in the calculation of the maximum vertical load on RHR-436. Analysis showed that the support design was conservative and adequate for the increased load.	The subject hanger has been redesigned based on the as-built stress calculation. The revised hanger calculation corrected the error and no new deficiencies were identified.
PFR-RHR-36 reported that seismic accelerations on valves RHR-V-14B and RHR-V-104 were not calculated utilizing the correct valve stem orientation. These two valves are oriented such that their operators lie in the horizontal plane, as opposed to the vertical plane, like the other valves in this system. The accelerations were calculated and reported to the Supply System Equipment Qualification Group as if the operators were in the vertical plane.	This anomaly is understood by the Supply System EQ group. B&R tabulates the accelerations in the Global 'X', 'Y', 'Z' system and the EQ group transforms the accelerations into the correct local orientation for use in seismic qualifications. Qualification is performed in accordance with procedure TDP 3.32 and the data sheet for transformation of coordinate systems.
PFR-RHR-40 was issued as a result of checking the section properties used for determination of shear and bending stresses in an M4X13 beam for RHR-902N. The analyst had mistakenly used section moduli from a W4X13 beam. Correction of the error will cause member stresses to increase slightly. (Less than 2000 psi).	BRI has corrected the calculation error. This type of error was not noted in any other hanger calculations reviewed and therefore was not considered to have generic implications.
PFR-RHR-37 was issued to document a potential interference between small bore pipe RHR-2289-1 and pipe support RHR-2289-11. This PFR was noted during the as-built walkdown of the piping.	Analysis shows that for this small bore line, the thermal movement will eliminate any interference. Project Engineering was notified of the potential generic consideration. The generic consideration will be addressed when conducting Power Ascension Test 8.2.17, Piping Systems Expansion and Vibration Tests. These tests will be performed to meet the requirements of ASME Section XI, Winter 1978 Addendum and NRC letter GI2-81-62. High energy small bore piping with a safety significance is included in the inspections.

RHR Piping and Supports - Potential Finding Reports

PFR-RHR-38 was issued to document an error in an overall dimension shown on the as-built drawing for hanger RHR-915N.	Project Engineering was requested to correct the error on the as-built drawing. This error has been corrected.
PFR-RHR-39 was issued to document an incorrect deletion of material from the as-built drawing for hanger RHR-184.	Project Engineering was requested to correct the as-built drawing error. This error has been corrected.