



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

April 7, 1994

Docket No. 52-004

Mr. Patrick W. Marriott, Manager
Advanced Plant Technologies
GE Nuclear Energy
175 Curtner Avenue
San Jose, California 95125

Dear Mr. Marriott:

SUBJECT: QUALITY OF SIMPLIFIED BOILING WATER REACTOR (SBWR) APPLICATION

The purpose of this letter is to inform you of the Nuclear Regulatory Commission (NRC) staff's concerns with regard to the quality of the SBWR standard safety analysis report (SSAR), your responses to staff requests for additional information (RAIs), particularly responses to Round 0 questions, some of which are nonresponsive or incomplete, and other GE Nuclear Energy (GE) submittals supporting this application. Examples are detailed in the enclosure. Many staff reviewers have found that the technical quality of the current version of the SBWR SSAR is not consistent with a timely and efficient review. As our early experience with the advanced boiling water reactor (ABWR) review has shown, this will result in the need to generate a large number of extra clarifying RAIs and to conduct numerous additional interactions with GE.

These issues are of great concern to us because they indicate that GE has not implemented lessons learned from the ABWR review and SSAR development process. Also, they would appear to call into question GE's internal quality assurance (QA) prior to submittals to the Commission and even understanding regarding compliance with certain regulatory requirements.

Both GE and NRC have limited resources for design certification. It is inefficient and unnecessary to spend a significant amount of time on clarifying questions or repeating questions asked during the ABWR design review which should have already been addressed in the SBWR SSAR. We do not intend to QA each GE submittal to assure compliance with basic requirements and commitments. To preclude further problems and regain review efficiency, GE should: (1) perform a comprehensive review of the staff's questions raised in the ABWR review and address those issues applicable to the SBWR in a near-term SSAR amendment, (2) provide an interim SSAR amendment which updates those SBWR systems to the most current ABWR design status where the systems are common to both reactors, (3) submit complete information and adequate responses to address the staff's questions, and (4) implement a program to assure that future submittals are correct and internally consistent and which includes instructing GE's staff on the importance of high quality submittals.

Neither of us wish to lose review momentum caused by redoing what has already been completed and resolved work. In a letter dated May 29, 1992, we advised GE of quality problems with the ABWR application. The problem with the ABWR

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submittals resulted in resources, in excess of those budgeted, being expended on the ABWR review and schedule delays that need not be repeated on the SBWR. The NRC has not allocated that level of effort for the SBWR review. Therefore, if GE does not improve the quality of the submittals, we will reassess the review of the SBWR design certification application and, perhaps, redirect staff resources to other project reviews until GE implements effective corrective actions.

Sincerely,

(Original signed by)

Dennis M. Crutchfield, Associate Director
for Advanced Reactors and License Renewal
Office of Nuclear Reactor Regulation

Enclosure:
Quality Comments on
SBWR Documents

cc w/enclosure:
See next page

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NAME: PShea	SNinh/tz	MMalloy	JNWilson	RBorchardt	DCrutchfield
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Mr. Patrick W. Marriott
GE Nuclear Energy

Docket No. 52-004

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QUALITY COMMENTS ON SBWR DOCUMENTS

- (1) In SSAR Section 5.2.2, "Overpressure Protection," GE claims that the peak reactor vessel pressure is independent of valve capacity and is only a function of the valve set point. This is a significant deviation from the current industry-accepted standard analysis, but there is no explanation to support GE's claim.
- (2) In SSAR Section 4.6, "Control Rod Drive System," for both SBWR and ABWR, the scram discharge volume is diverted to the reactor vessel instead of discharging to the scram discharge piping. In the ABWR review, the staff raised the issue of the adequacy of the scram accumulator pressure to accomplish a scram. The SBWR SSAR does not address this issue. We have raised the issue again in the SBWR RAI (not yet issued to GE for response) for proper resolution.
- (3) In SSAR Section 5.2.2, "Overpressure Protection," for the various parts of Figure 5.2-5, the x-coordinate values are not identified and parts of the figures are not readable (see the attached figures).
- (4) In RAI PEPB.0, the staff concluded that, in general, GE's application for FDA and SBWR design certification regarding emergency preparedness requirements contained sufficient information to establish that emergency preparedness requirements have been factored into the design bases of the SBWR, with the exception of SSAR Section 1.8, (Summary of COL Licensee Information). In response, GE included SSAR Section 1.8 in the February 28, 1993, SSAR submittal, but there are no emergency preparedness items listed for a COL applicant. However, in Section 13.3, (Emergency Planning), there are COL action items identified.

The staff determined that GE's response to this RAI was incomplete and generated a new RAI PEPB 810.1 (not yet issued to GE for response) which states that Section 1.8, should be made consistent with the requirements for emergency planning in Section 13.3, "Emergency Planning," of the SSAR. Additionally, since the COL applicant will have to provide emergency plans in accordance with 10 CFR 50.33(g) and 52.79(d), this task also needs to be included in SSAR Section 1.8.

- (5) RAI 950.17 requested complete piping diagrams and a detailed description of the reactor pressure vessel for the GIRAFFE test facility. GE responded in MFN 006-94 dated January 18, 1994, that Toshiba prefers to make as-built drawings for the GIRAFFE facility available for viewing at the facility (as opposed to providing them to GE for transmittal to NRC). GE is responsible for obtaining all pertinent information the staff requests in the course of the review. The indicated response was nonresponsive.
- (6) Various GE documents under review by NRC contain information that will likely be used as a basis for the staff's safety findings on the SBWR review but contain disclosures or legal notices. These disclaimers or legal notices indicate that GE does not make any representation or

Enclosure

warranty (express or implied) nor assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of the information in the documents. Some examples of documents containing such disclaimers/notices include the SSAR, NEDC-32301 (test report on the single tube condensation test program for the SBWR), NEDC-32215P (GIRAFFE test program report), NEDE-32177P (TRAGG qualification report), NEDE-32176P (TRAGG model description), and NEDE-32178 (application of TRAGG model to SBWR safety analyses). Such disclaimers/notices are inappropriate in the documents provided to the staff for its safety review of the SBWR design.

- (7) In MFN 189-93 dated November 5, 1993, GE indicated that the units of measure to be used in all documents related to the SBWR design would be SI units followed in parentheses by the corresponding U.S. customary units, for all significant dimensions and other parameters. This letter stated several exceptions to this practice: (1) for detailed calculations, only important results and conclusions would be provided in dual units; (2) for prescribed analyses (e.g., ASME Code) or computer codes defined in the secondary system of units, the secondary system would be used throughout, with the important results and conclusions shown with the primary systems of units in parentheses following the secondary system units; and (3) for documents generated in a third system of units, the primary and secondary units will also be shown for the important results and conclusions.

The staff's review of primarily the SSAR showed that GE has not implemented its commitments with regard to displaying dual units. A sample review of NEDC-32215P (GIRAFFE test program report) also shows that this commitments is not being followed.

- (8) Although it has not completed its review of numerous GE requests for withholding of information submitted on the SBWR docket claimed to be proprietary, the staff cannot make certain GE-to-NRC correspondence available for inspection and copying in the NRC Public Document Room (per 10 CFR 2.790) since GE has submitted proprietary versions for which the proprietary and non-proprietary portions are not easily separable. Examples of such documents are NEDC-32301 (test report on the single tube condensation test program for the SBWR), NEDC-32215P (GIRAFFE test program report), NEDE-32177P (TRAGG qualification report), NEDE-32176P (TRAGG model description), and NEDE-32178P (application of TRAGG model to SBWR safety analyses).

10 CFR 2.790(b)(1)(ii) requires that the information sought to be withheld by a requester be incorporated, as far as possible, into a separate paper. While the proprietary versions of the example reports that have been submitted fulfill this requirement, in practice the staff expects that non-proprietary version of each report also be provided. GE should provide a non-proprietary version of each proprietary report already submitted. In the future, GE should ensure the proprietary and non-proprietary versions are submitted within a reasonable period of time of each other, if not submitted simultaneously.

- (9) 10 CFR 2.790(b)(1)(ii) requires that the affidavit accompanying a request for withholding from public disclosure a whole document or part of a document be executed by the owner of the information even though the information is submitted by another person. In the case of GE's submittal of report NEDC-32215P, "GIRAFFE Passive Heat Removal Testing Program," (MFN 134-93 dated October 19, 1993), for example, the pages are stamped to indicate that the document contains GE proprietary information and Toshiba proprietary information. It is not clear that GE owns the information that is proposed for withholding and whether the affidavit accompanying this submittal, which has been executed by GE, meet the requirements of 10 CFR 2.790.
- (10) During the week of March 14, 1994, the staff requested GE to provide an approximately one-day technical session in April 1994, on the overall SBWR design to facilitate the staff's RAI development process. GE indicated that it could not support the staff's request in the time frame indicated since it was concentrating on its response to a March 7, 1994, letter from the staff addressing staff's concerns on the testing program for the SBWR. Furthermore, a GE SBWR design certification program representative stated that GE did not believe the staff needed the technical session to complete the RAIs.

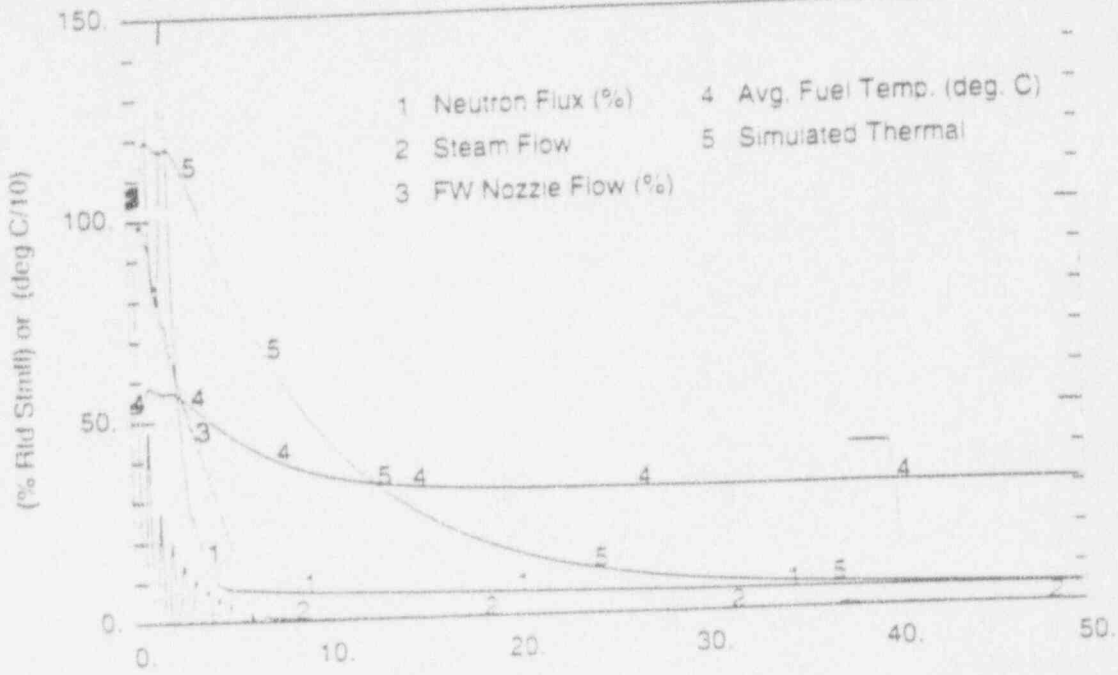
The staff has issued nearly 700 RAIs on the SBWR review; however, the staff estimates that these RAIs represent only one-third of the staff's initial review. A large portion of the review still remains. GE's last technical session for the staff on the SBWR was conducted in September 1992. The majority of the reviewers and contractors presently assigned to the SBWR review are not familiar with the design and, consequently, a near-term technical session would be in the interest of promoting efficiency of the review and eliminating the need for GE to hold a number of such sessions for smaller groups of reviewers.

- (11) In a letter dated October 8, 1993 (MFN No. 164-93), GE Nuclear Energy (GE) responded to the staff's request for additional information (RAI) Q900.1 regarding fuel performance testing. Contrary to the position stated in Q900.1 that the staff considers the ATLAS tests to be part of the testing program for SBWR design certification, GE's response asserts that this testing is not part of the certification testing program. The staff has prepared another RAI (not yet transmitted) in which the staff reaffirms that it considers the ATLAS tests to be part of the testing program required by 10 CFR 50.47(b)(2) for SBWR design certification and requires GE to revise its documentation on the SBWR testing program to include the ATLAS tests.

The remainder of GE's response to RAI Q900.1 was nonresponsive. Instead of describing, as requested, the planned testing and analysis program, including test specifications, test matrices, planned analyses, and verification that ATLAS can adequately represent SBWR thermal-hydraulic conditions, the response describes how critical power calculations have been "validated" by comparing the output of the COBRA-G code to the GEXLO2 model. No evidence is presented in the response to permit the staff to determine if the code and the model are applicable over the

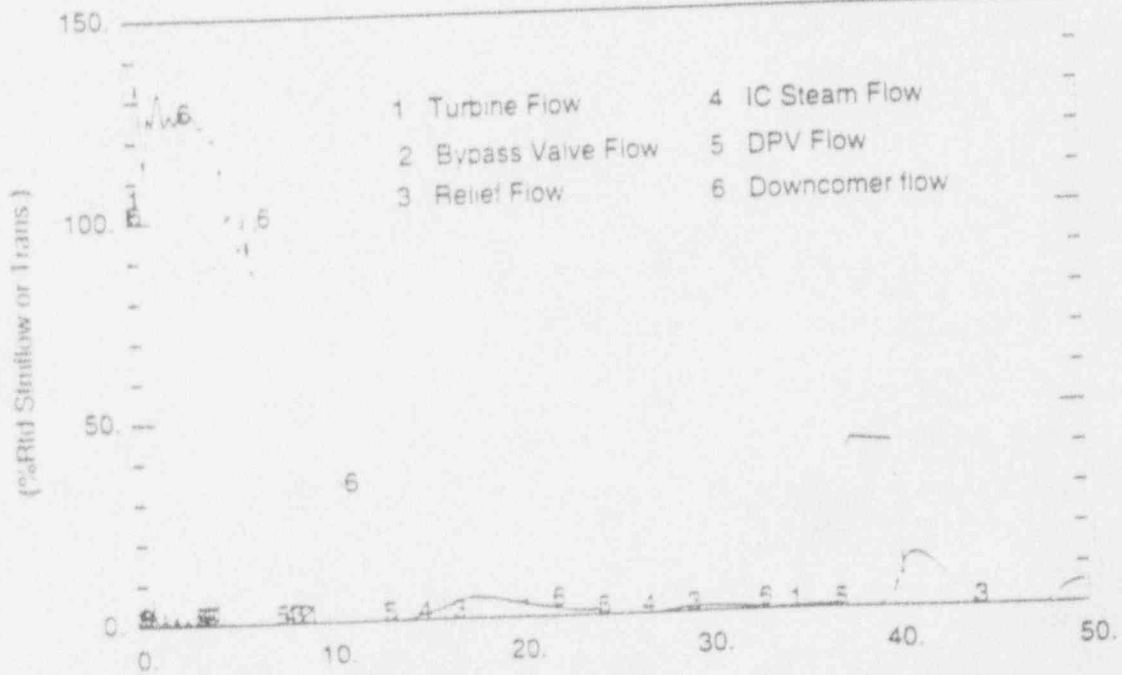
range of geometric (e.g., fuel length, pitch, diameter, spacer configuration) and thermal-hydraulic (e.g., mass flow rate, power profile) parameters representative of the SBWR fuel design. Showing points on a figure with no legend or details to allow determination of relevant supporting information, as was done on the three graphs accompanying the GE response, is relatively useless. The fact that GEXLO2 and COBRA-G "agree" on the prediction of SBWR critical power could merely mean that both are biased by the same factors. The staff has prepared another RAI (not yet transmitted) in which the staff renews its request for the information originally requested by RAI Q900.1.

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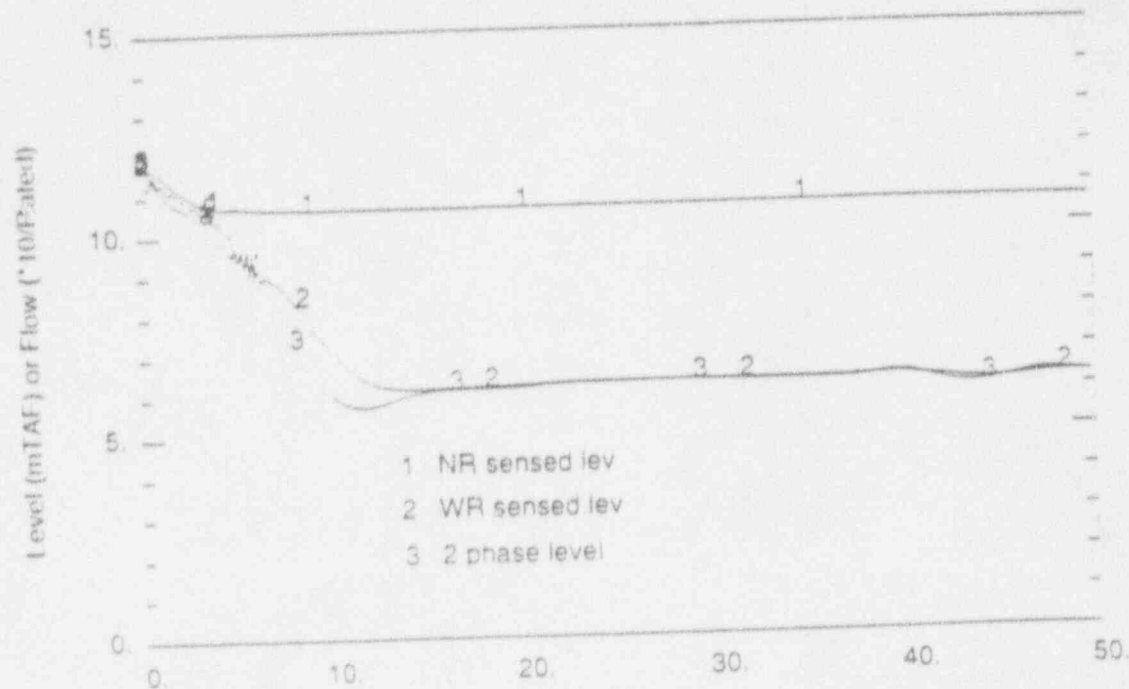


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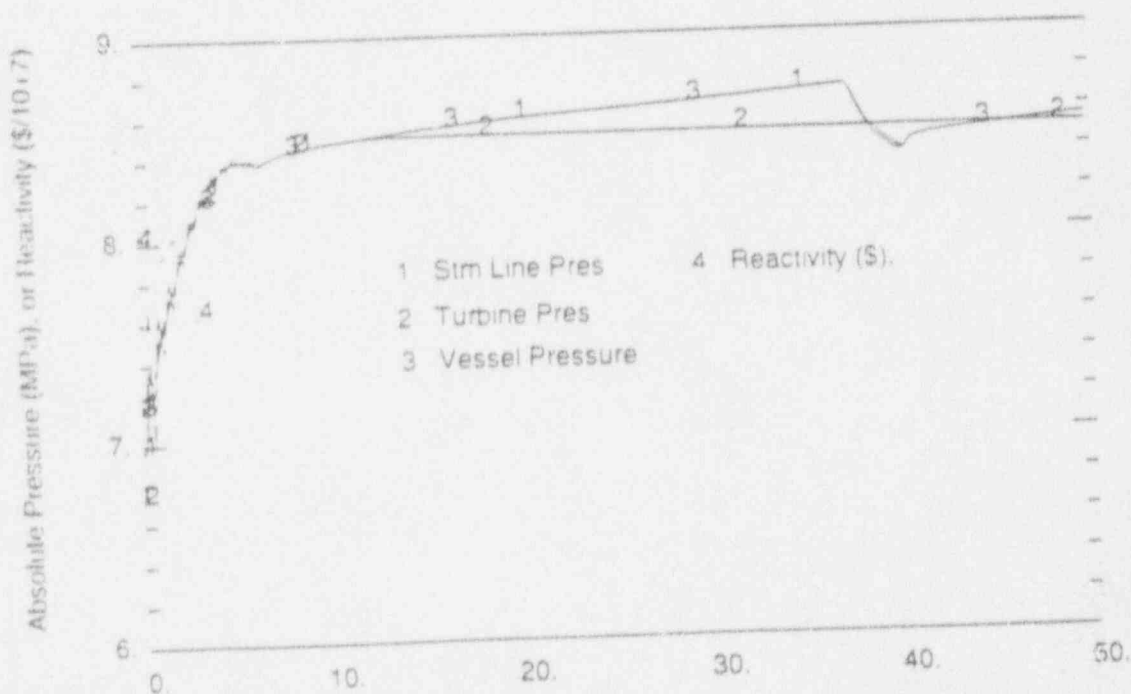
Figure 5.2-4 Load Rejection with Bypass Failure — Pressure Scram

SBWR



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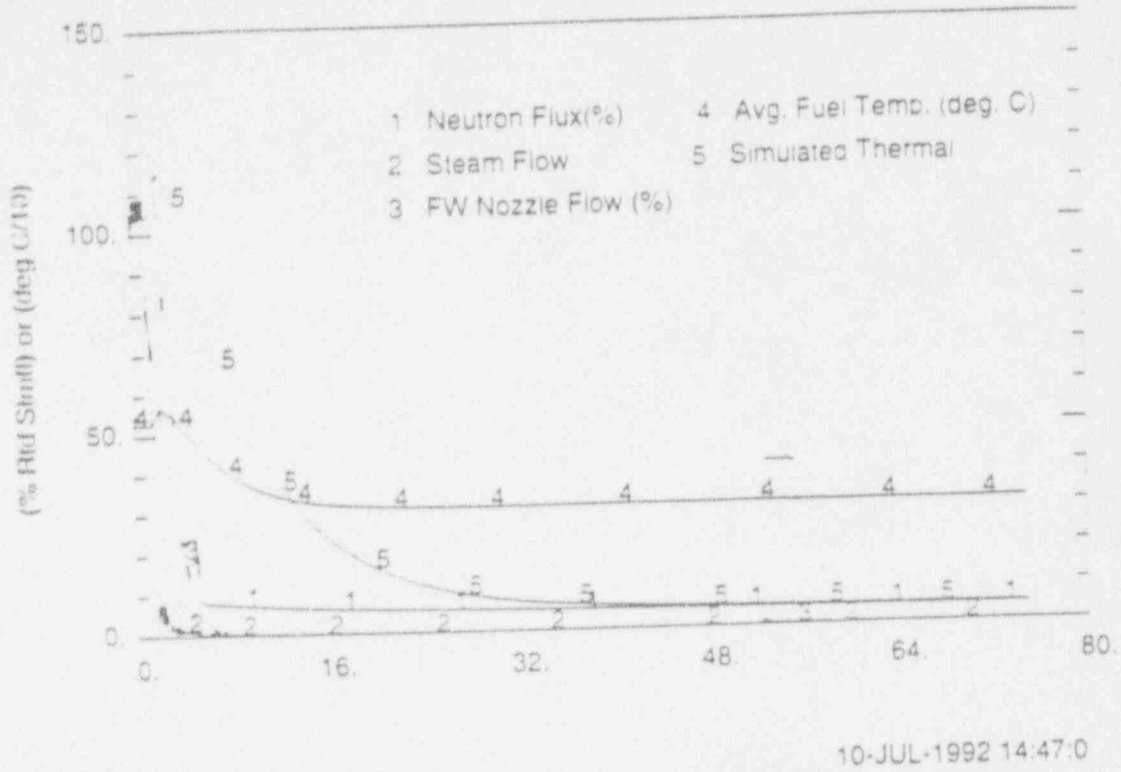
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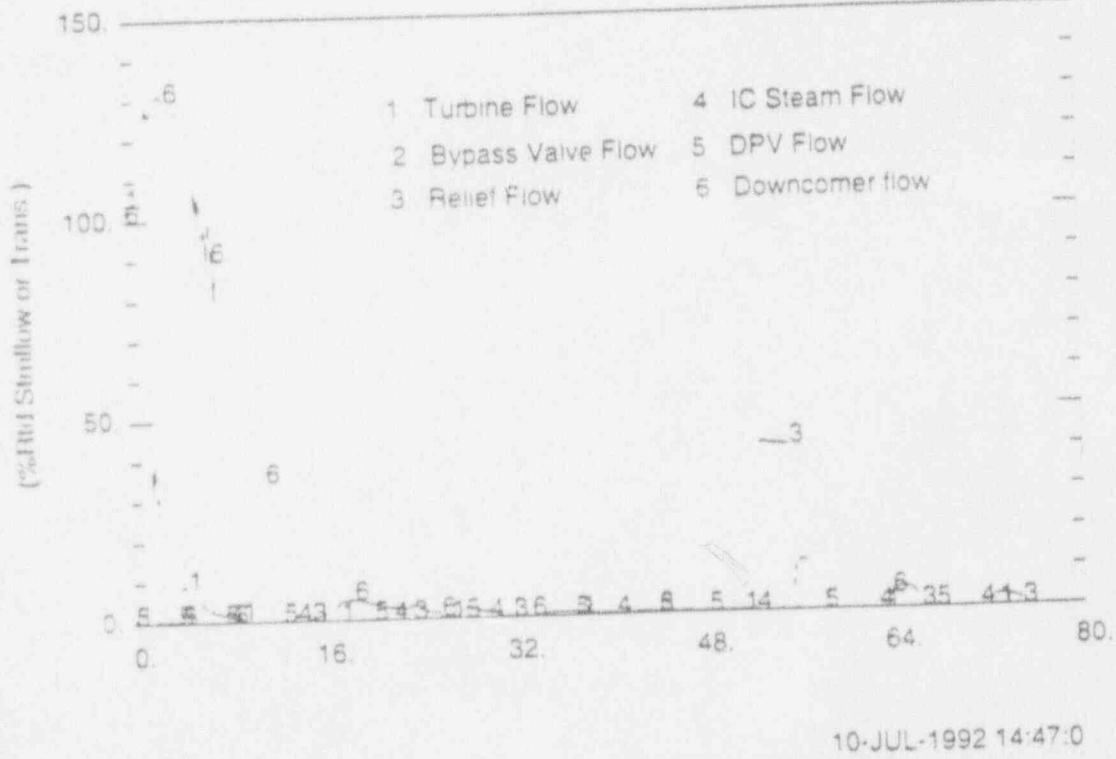
Figure 5.2-5 Load Rejection with Bypass Failure — Pressure Scram (Continued)

Integrity of Reactor Coolant Pressure Boundary

SBWR



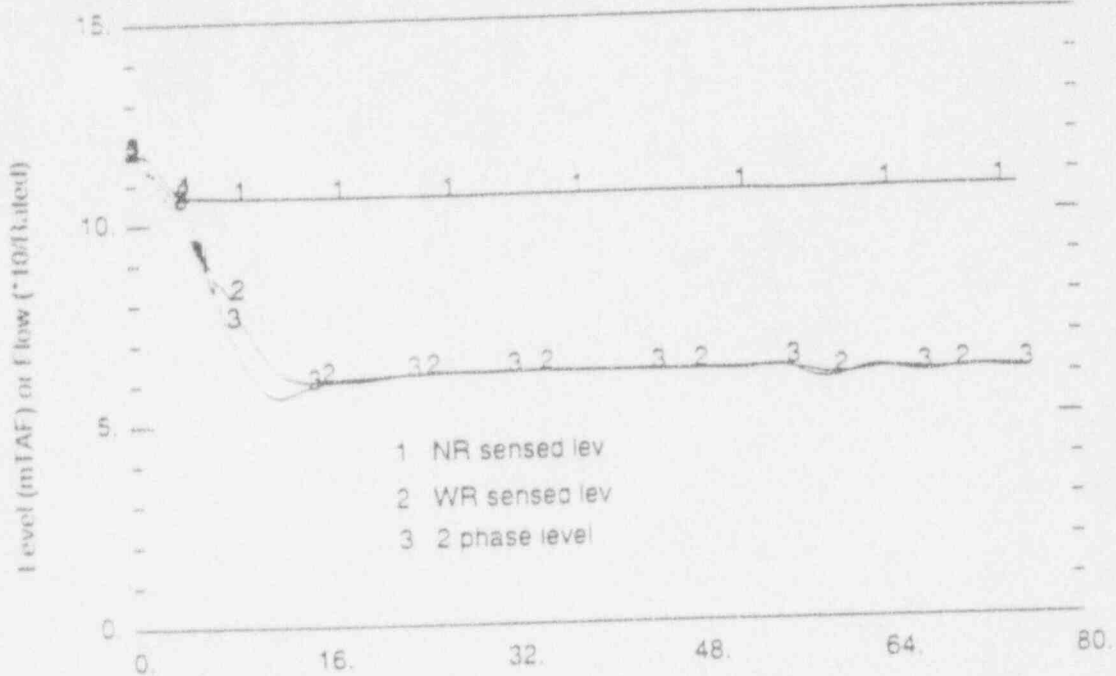
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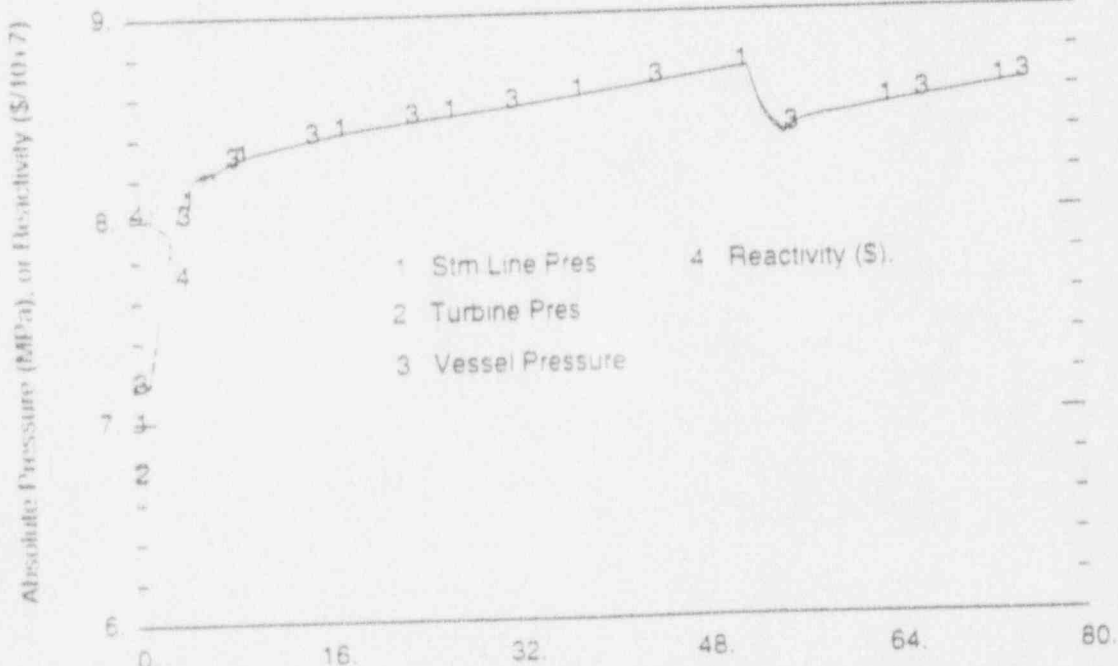
Figure 5.2-5 MSIV Closure — Flux Scram

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Figure 5.2-5 MSIV Closure — Flux Scram (Continued)