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NS-NRC-88-3375

September 30, 1988

Director of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D.C. 20555

ATTENTION: Mr. Marvin W. Hodges, Chief
Reactor Systems Branch
Division of Engineering and System Technology

SUBJECT: Response to NRC Questions (Addendum 1 to WCAP-11236) on Westinghouse Topical Report, WCAP-11236 (Proprietary) "BISON-A One Dimensional Dynamic Analysis Code for Boiling Water Reactors", and Associated Modifications to WCAP-11236

REFERENCE: Letter from W. M. Hodges of NRC to W. J. Johnson dated 5/31/88

Dear Mr. Hodges:

Enclosed are:

1. Three (3) copies of the Westinghouse response to the NRC questions (Addendum 1 to WCAP-11236) on the Topical Report WCAP-11236 (proprietary)

2. Three (3) copies of Errata Sheets for Volume 1 (Theory and Models) of WCAP-11236 (proprietary)

3. Three (3) copies of Revision 1 of Volume 2 (Qualification) of WCAP-11236 (proprietary)

4. One (1) copy of an Application for Withholding Proprietary Information from Public Disclosure (non-proprietary)

The enclosures include errata sheets for Volume 1 of WCAP-11236 and Revision 1 of WCAP-11236. These modifications represent clarifications and corrections discussed with the NRC in the course of review. Responses to the questions thus refer to the revised Topical Report.

This information is submitted for your review and approval as part of the ongoing NRC review of Westinghouse generic BWR topicals. It is being submitted by Westinghouse, and the NRC authorization to use such information is being sought on behalf of ABB-ATOM under a subcontract to ABB-ATOM. It is the intention of ABB-ATOM and Westinghouse to continue to proceed along these lines until ABB-ATOM has received NRC approval for their Quality Assurance Plan, at which time Westinghouse will transfer NRC approvals and licenses to ABB-ATOM.

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ABB-ATOM has designed and built 11 BWR's in Sweden and Finland, and supplies much of their fuel in addition to BWR and PWR fuel for other European reactors. BISON is the major reactor dynamics code in the non-LOCA area used in the design and safety analysis of these plants. Further, BISON has been reviewed by nuclear regulatory authorities in Sweden, Finland, Germany, and Switzerland.

WCAP-11236 contains a complete description of the BISON code and a description of BISON qualification analyses compared with transient tests in U.S. and European reactors and with standard calculations, to make possible independent evaluation of the code.

Based on the information submitted, Westinghouse concludes that the BISON code as described in WCAP-11236 is acceptable for analysis of BWR non-LOCA transients.

- The BISON code is applicable for all BWR/2's through BWR/6's, as well as those European reactors for which it has been applied, including external-pump and internal-pump designs and jet-pump and non-jet-pump designs.

- The BISON code is applicable for analysis of limiting plant transients considered for reload licensing and for other transients, including

  - Feedwater controller failure, maximum demand;
  - Generator load rejection without bypass;
  - Turbine trip without bypass;
  - Turbine trip with bypass;
  - Pressure regulator failure, closed;
  - MSIV closure without position scram ;
  - Recirculation flow controller failure, decreasing flow;
  - Recirculation flow controller failure, increasing flow;

- The BISON code is applicable to transients in which the flow through parallel recirculation loops or pumps behaves differently, with the qualification that core flow must be justified for such cases.

- The BISON code with its SLAVE channel model is applicable for calculation of CPR if coupled with an approved CPR correlation;

- The methodology described for deriving reactor neutronics parameters used as input to the BISON code by collapsing from a three-dimensional model is appropriate for the final licensing analyses of limiting transients. Other methods described in WCAP-11236 may also be used for scoping and sensitivity studies and for non-limiting transients.

- The sensitivity studies discussed herein support the conclusion that the selection of correlations and options recommended for licensing analyses and input parameters provide a reasonable and

adequate representation of a BWR. The correlations recommended for licensing analysis are identified in the enclosed response to question 5, and the recommended options are listed in section 3.5 of Volume 2 of WCAP-11236 (Revsion 1).

- As an integral part of the Westinghouse BWR licensing methodology, a cycle-specific evaluation will be performed of the non-LOCA transients determined to be limiting for each reload application.

This submittal contains Westinghouse proprietary information of trade secrets, commercial, or financial information which we consider privileged or confidential pursuant to 10CFR9.5(4). Therefore, it is requested that the Westinghouse proprietary information attached hereto be handled on a confidential basis and be withheld from public disclosure.

This material is for your internal use only and may be used only for the purpose for which it is submitted. It should not be otherwise used, disclosed, duplicated or disseminated, in whole or in part, to any other person or organization outside the Office of Nuclear Reactor Regulation without the prior written approval of Westinghouse. Correspondence with respect to the Application for Withholding should reference AW-88-104 and should be addressed to R. A. Wiesemann, Manager of Regulatory and Legislative Affairs, Westinghouse Electric Corporation, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

Very truly yours,

W. J. Johnson, Manager
Nuclear Safety Department

WJJ/p
Enclosures