



GE Nuclear Energy

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August 28, 1995

MFN 166-95
Docket STN 52-004

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington DC 20555

Attention: Theodore E. Quay, Director
Standardization Project Directorate

Subject: **SBWR - Test and Analysis Program Description,
NEDC-32391P, Revision C (Proprietary)**

- Reference:
1. MFN 136-95, J. E. Quinn (GE) to T. E. Quay (NRC), *SBWR - Response to Request for Additional Information (RAI) Regarding the Simplified Boiling Water Reactor (SBWR) Design (Q900.102 - Q900.181)*, dated 6/29/95, July 28, 1995.
 2. MFN 018-95, J. E. Quinn (GE) to R. W. Borchardt (NRC), *Approach to Achieve Closure of Items Related to the GE SBWR TAPD*, February 14, 1995.
 3. Memorandum to John T. Larkins (ACRS from Dennis M. (NRC), *Draft Safety Evaluation Report (SER) on the Adequacy of the Technical Approach to the Testing and Analysis Program (TAP) for the Simplified Boiling Water Reactor (SBWR) Design*, November 25, 1994.
 4. ACRS Thermal Hydraulic Phenomena Subcommittee Meetings, December 15 and 16, 1994, and January 10, 1995.
 5. NRC/GE TAPD DSER Meeting January 9, 1995.
 6. 417th ACRS Meeting January 12, 1995.

This letter transmits Revision C of the *SBWR Test and Analysis Program Description (TAPD)* report, NEDC-32391P, for your review. This report provides a comprehensive, integrated plan that addresses the testing and analysis elements needed for analysis of SBWR performance. In particular, this revision of the document describes the resolution of testing related issues identified in References 1 and 2. GE-NE requests NRC concurrence that the planned tests satisfactorily address the concerns in References 1 and 3 through 6, and moreover provide an adequate basis for TRACG qualification.

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Revision C replaces Revision B in total. The changes from Revision B to Revision C are identified by sidebars in the left-hand margins of the affected pages. Please dispose of all copies of Revision B in a manner appropriate for the destruction of proprietary materials, or return them to GE Nuclear Energy, Attention: J. E. Leatherman, M/C 781.

Reference 2 identifies the process and approach being utilized to achieve closure on the issues raised in Reference 3, NRC TAPD Draft Safety Evaluation Report (DSER), and References 4 through 6, meetings with the NRC and ACRS. This letter provides an update (see attached table) to References 1 and 2 with respect to the resolution status of each TAPD related action item from the responses to RAIs 900.102-181 and the GE-NRC-ACRS meetings held in December 1994 and January 1995. The table includes the affected (changed) report locations.

Revision C also includes changes related to updated or newer information, editorial corrections and improvements, and additional information provided for completeness.

Please note that NEDC-32391P contains information of the type which GE maintains in confidence and withholds from public disclosure. They have been handled and classified as proprietary to GE as indicated in the attached affidavit. We hereby request that this information be withheld from public disclosure in accordance with the provisions of 10CFR2.790. Revision C to NEDC-32391P provides sidebars in the right-hand margins to distinguish those parts of the document which are deemed Proprietary to the General Electric Company. A non-proprietary version of the subject report will be supplied under a separate cover letter.

If you have any questions regarding this report, please contact John Leatherman of our staff on (408) 925-2023.

Sincerely,



James E. Quinn,
Projects Manager

Attachment: *Status of TAPD, Rev. C + Scaling Report Commitments and RAIs*

Enclosure: *SBWR Test and Analysis Program Description (TAPD),
NEDC-32391P, Revision C*

cc: P. A. Boehnert (NRC/ACRS) - [7 paper copies w/ att & w/encl., plus E-Mail w/ att]
I. Catton (ACRS) - [1 paper copy w/ att & w/encl., plus E-Mail w/ att]
S. Q. Ninh (NRC) - [21 paper copies w/ att & w/encl., plus E-Mail w/ att]
J. H. Wilson (NRC) - [1 paper copy w/ att & w/encl., plus E-Mail w/ att]

Status of TAPD, Rev. C Scaling Report Commitments and RAIs

Scheduled Date	ID or RAI No.	Source or Date Received	Comments or Action	Where Documented
4/1/96	4	12/94 & 1/95 meetings	Develop chimney technical basis. Develop supporting data for void fraction in large diameter pipes and capability of TRACG to analyze flow distribution in parallel channels. Document in Qual. report.	TRACG Qualification LTR NEDE-32177P Rev.1
8/31/95	17	12/94 & 1/95 meetings	In TAPD Rev. C, consideration of medium and low phenomena - Include medium ranked phenomena in assessment matrix; low ranked phenomena only in checks for existence of models in TRACG.	TAPD-C Tables 2.3-1 through 2.3-5; 4.1-1a through 4.1-5b; 5.1-1a through 5.5-2b.
8/31/95	19	12/94 & 1/95 meetings	In TAPD Rev. C, clarify interaction studies discussed in Sections 4.2 and Appendix C of TAPD to address specific questions in DSER.	TAPD-C Sec. 4.2 & C.3
8/31/95	20	12/94 & 1/95 meetings	In TAPD Rev. C, include vessel/containment interactions as specific highly ranked phenomena in PIRT.	TAPD-C Table 2.3-2; Section 2.3-1
8/31/95	21	12/94 & 1/95 meetings	In TAPD Rev. C, discuss PCCS purge/vent process from phenomenological point of view.	TAPD-C Section A.3.1.1.4
8/31/95	22	12/94 & 1/95 meetings	In TAPD Rev. C, separate out SRV air clearing loads as an item in PIRT for containment.	TAPD-C Table 2.3-2; Section 2.3.1
8/31/95	24	12/94 & 1/95 meetings	In TAPD Rev. C, include discussion of PAR interactions. Add description of performance characteristics and flow patterns induced by PARs.	TAPD-C Sections 4.1 & 4.2.4
8/31/95	25	12/94 & 1/95 meetings	In TAPD Rev. C, expand discussion of PIRT tables. Add new Appendix D which will include a brief discussion of each parameter and the basis for its ranking.	Requested information is in new TAPD Supplement 1
8/31/95	26	12/94 & 1/95 meetings	In TAPD Rev. C, address phases of the transient in Section 3. Add column to Table 3.2-1 to indicate for what transient the phenomena are ranked and for what phase. Clarify discussion on SBWR unique features and phenomena.	TAPD-C Section 3.2, Table 3.2-1
8/31/95	38	12/94 & 1/95 meetings	In TAPD Rev. C, document use of GIST data. Role of GIST data in validation of TRACG.	TAPD Rev. C Section 7.0; Appendix A.3.1.4.2
8/31/95	46	12/94 & 1/95 meetings	In TAPD Rev. C, define PANDA tests M5, M7, M9. Define test conditions for PANDA tests based on TRACG results and engineering judgment.	TAPD-C Section A.3.1.3.3; Table A.3-10b
8/31/95	32	12/94 & 1/95 meetings	In TAPD Rev. C, justify test initial conditions and range. Compare the range of parameters in the test to those expected in SBWR. Develop basis for how the test is picked up "on the fly"; i.e. how rate of change of parameters is treated.	TAPD-C Section A.3.1.7.4

Status of TAPD, Rev. C Scaling Report Commitments and RAIs

Scheduled Date	ID or RAI No.	Source or Date Received	Comments or Action	Where Documented
8/31/95	23a	12/94 & 1/95 meetings	In TAPD Rev. C, add ATWS scenario in Section 2.2.3 and expand Table 2.3-4. For stability, expand Table 2.3-5 PIRT format.	TAPD-C Sec. 2.2.3.1, Tab. 2.3-4, Tab. 2.3-5, Fig. 2.2-6
8/31/95	900.102	Partial & MFN 136-95	The use of the term "reactor water level" will be clarified throughout the TAPD report in Revision C.	TAPD-C throughout
8/31/95	900.104	Partial & MFN 136-95	GE agrees and will make the change in TAPD Revision C.	TAPD-C Sec. 2.3.1
8/31/95	900.105	Partial & MFN 136-95	GE agrees and will make the change in TAPD Revision C.	TAPD-C Table 2.3-3
8/31/95	900.106	Partial & MFN 136-95	This typographical error will be corrected in revision C to correctly reflect "water carryover and steam carry under."	TAPD-C Table 3.2-1
8/31/95	900.107	Partial & MFN 136-95	Table 3.2-1 to be updated in TAPD-C	TAPD-C Tab. 3.2-1
8/31/95	900.108	Partial & MFN 136-95	GE will use the early GIRAFFE test as "SUPPORTING INFORMATION", and indicate this consistently in Sections 3 and 5 of TAPD, Rev. C.	TAPD-C Sections 3 and 5
8/31/95	900.109	Partial & MFN 136-95	Section 3.3.9 will be modified in TAPD, Rev. C to emphasize that the planned test program will obtain data to qualify TRACG.	TAPD-C Section 3.3.9
8/31/95	900.113	Partial & MFN 136-95	The apparent inconsistency in Section 6 will be corrected in TAPD, Revision C.	TAPD-C Page 6-1
8/31/95	900.114	Partial & MFN 136-95	GE will use MPa (megapascals) in TAPD, Revision C Appendix A.	TAPD-C throughout
8/31/95	900.115	Partial & MFN 136-95	c. IC Operation with Non-condensable Gases - The text in Section A.3.1.2.4 (Justification of Test Conditions) will be expanded to note that non-condensable gases are directly injected into the test unit inlet line and do not originate in the vessel.	TAPD-C Section A.3.1.2.4
8/31/95	900.116	Partial & MFN 136-95	The text in TAPD will be revised to reflect the change in the IC test procedure.	TAPD-C Section 3.1.2.4
8/31/95	900.117	Partial & MFN 136-95	The cycles shown in Figure A.3-23 apply to the "component demonstration" tests for the IC. The text and tables for both the "transient" and "component demonstration" tests will be revised to provide a more comprehensive summary of the test procedures.	TAPD-C Sections A.3.1.2.1 & A.3.1.2.3; Tables A.3-5b, c & d, and A.3-28

Status of TAPD, Rev. C Scaling Report Commitments and RAIs

Scheduled Date	ID or RAI No.	Source or Date Received	Comments or Action	Where Documented
8/31/95	900.120	Partial & MFN 136-95	The requested information will be included in App. A of TAPD, Rev. C.	TAPD-C Section A.3.1.7.4+E7
8/31/95	900.121	Partial & MFN 136-95	TAPD - Comparisons with CRIEPI data will be made in App. A for "steady circulation flow, period of oscillations and flow amplitude in the instability regions, power-temperature stability map".	TAPD-C Sec. A.3.1.8.2
9/15/95	900.123	Partial & MFN 136-95	The scaling material App. B of the TAPD will be moved to the scaling report. This question will be partially addressed in the revised scaling report. The remainder of the response is re-scheduled for 9/95.	Scaling Report (Ref. 32 of TAPD-C)
9/15/95	900.124	Partial & MFN 136-95	This question will be partially addressed in the revised scaling report (NEDC-32288 Scaling of the SBWR Related Tests, Revision 1). The remainder of the response is re-scheduled for 9/95.	Scaling Report (Ref. 32 of TAPD-C)
8/31/95	900.125	Partial & MFN 136-95	The use of GIST data will be defined in Revision C of the TAPD. The response to the question on the impact of the IC unit will be re-scheduled to 9/95.	TAPD-C Section A.3.1.4.2; & Scaling Report
9/15/95	900.126	Partial & MFN 136-95	This question will be addressed in the revised scaling report.	Scaling Report (Ref. 32 of TAPD-C)
9/15/95	900.127	Partial & MFN 136-95	This question will be addressed in the revised scaling report.	Scaling Report (Ref. 32 of TAPD-C)
9/15/95	900.128	Partial & MFN 136-95	This question will be addressed in the revised scaling report.	Scaling Report (Ref. 32 of TAPD-C)
8/31/95	900.130	Partial & MFN 136-95	Several cases with varying numbers of available IC heat exchangers and no CRDs have been evaluated and will be included in App. C of TAPD, Revision C.	TAPD-C Sec. C.1 & C.3, Tab. C.3-1
8/31/95	900.133	Partial & MFN 136-95	The second paragraph of Section 2.2.1.3 will be reviewed and clarified in TAPD, Revision C.	TAPD-C Section 2.2.1.3
8/31/95	900.136	Partial & MFN 136-95	Figure 2.2-5 will be redrafted in TAPD-C to be consistent with Figure C.4-3.	TAPD-C Figure 2.2-5
8/31/95	900.137	Partial & MFN 136-95	For TAPD Revision C, subsection 2.3.1 will be updated to clarify the discussion on TRACG modeling of the noncondensable distribution.	TAPD-C Section 2.3.1
8/31/95	900.138	Partial & MFN 136-95	A discussion of Item DW2 will be provided in TAPD, Rev. C.	New TAPD Supplement 1 Sec. S1.2
8/31/95	900.139	Partial & MFN 136-95	WW2 will be clarified in TAPD, Rev.C.	New TAPD Supplement 1 Table S1-1

Status of TAPD, Rev. C Scaling Report Commitments and RAIs

Scheduled Date	ID or RAI No.	Source or Date Received	Comments or Action	Where Documented
8/31/95	900.140a 2	Partial & MFN 136-95	a2. The typographical error on the spelling of PCCS will be corrected in TAPD-Revision C.	TAPD-C Table 3.2-1
8/31/95	900.143d	Partial & MFN 136-95	Table 3.3-1 will be updated and the reference to GIRAFFE test data as a Technology Basis as well as confirming PANDA data will be deleted.	TAPD-C Table 3.3-1
9/15/95	900.143g	Partial & MFN 136-95	Item 69: Relevant scaling results will be included in the updated Scaling Report.	Scaling Report (Ref. 32 of TAPD-C)
8/31/95	900.144	Partial & MFN 136-95	GE will provide additional discussion in Section A3.1.6.4 of TAPD on the basis for a hydrogen concentration.	TAPD-C Section A.3.1.6.4
8/31/95	900.149	Partial & MFN 136-95	The apparent discrepancy in Table 5.3-2 will be clarified in TAPD, Rev. C.	TAPD-C Table 5.3-2a & Table 5.5-2a
8/31/95	900.150	Partial & MFN 136-95	Measurements will be elaborated in Table 5.5-2 of TAPD, Rev. C.	TAPD-C - For a breakdown by individual test, see Table 5.3-2a. For measurements, see Table A.3-13. For PSTF data, see References 22, 38 & 46.
8/31/95	900.156	Partial & MFN 136-95	In Revision C, the first sentence in the final paragraph of TAPD Section A.3.1.5.1 will be revised.	TAPD-C Sec. A.3.1.5.1
8/31/95	900.160	Partial & MFN 136-95	In Table A.3-3, page A-51, PANTHERS/PCCS test 78 (air and helium) should be included as a TRACG qualification point.	TAPD-C Table A.3-3
9/15/95	900.163	Partial & MFN 136-95	This question will be addressed in the revised scaling report.	Scaling Report (Ref. 32 of TAPD-C)
9/15/95	900.165	Partial & MFN 136-95	This question will be partially addressed in the revised scaling report. The remainder of the response is re-scheduled for 9/95.	Scaling Report (Ref. 32 of TAPD-C)
9/15/95	900.166	Partial & MFN 136-95	This question will be addressed in the revised scaling report.	Scaling Report (Ref. 32 of TAPD-C)
9/15/95	900.167	Partial & MFN 136-95	This question will be partially addressed in the revised scaling report. The remainder of the response is re-scheduled for 9/95.	Scaling Report (Ref. 32 of TAPD-C)
8/31/95	900.170	Partial & MFN 136-95	We agree that "component structural performance" is a better description and will make that change in A.3.1.2.1 of TAPD-C.	TAPD-C Section A.3.1.2.1

Status of TAPD, Rev. C Scaling Report Commitments and RAIs

Scheduled Date	ID or RAI No.	Source or Date Received	Comments or Action	Where Documented
8/31/95	900.171	Partial & MFN 136-95	The text in Section A.3.1.1.4 will be revised to include discussion of the condensate return flow from the PCC.	TAPD-C Section A.3.1.1.4
8/31/95	900.172	Partial & MFN 136-95	For clarification, Table 4.2-1 is updated with a footnote on the operation of RWCU System.	TAPD-C Tab. 4.2-1
8/31/95	900.174	Partial & MFN 136-95	GE will correct the far right hand box in Figure 1.4-3 to say "IETS" and also define the acronyms in the text.	TAPD-C Figure 1.4-3; Section 1.4
8/31/95	900.175	Partial & MFN 136-95	GE will update Table 1.2-2 to clarify the SBWR Feature description, and change ADS Valves to SRVs in the table.	TAPD-C Tab. 1.2-2
8/31/95	900.180	Partial & MFN 136-95	The test objective and other text will be improved in TAPD, Rev. C to more closely reflect the process that will be used to confirm the mechanical design of the IC heat exchanger.	TAPD-C Section A.3.2.2.2

General Electric Company

AFFIDAVIT

I, **George B. Stramback**, being duly sworn, depose and state as follows:

- (1) I am Project Manager, Licensing Services, General Electric Company ("GE") and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.
- (2) GE is an owner of the information sought to be withheld. The information sought to be withheld is contained in the GE report, NEDC-32391P, *SBWR Test and Analysis Program Description*, Revision C, Class 3 (GE Proprietary Information), dated August 1995. The proprietary information is delineated by bars in the right-hand margin adjacent to the specific material.
- (3) In making this application for withholding of proprietary information of which it is an owner, GE relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), 2.790(a)(4), and 2.790(d)(1) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information", and some portions also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).
- (4) Some examples of categories of information which fit into the definition of proprietary information are:
 - a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by General Electric's competitors without license from General Electric constitutes a competitive economic advantage over other companies;

- b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;
- c. Information which reveals cost or price information, production capacities, budget levels, or commercial strategies of General Electric, its customers, or its suppliers;
- d. Information which reveals aspects of past, present, or future General Electric customer-funded development plans and programs, of potential commercial value to General Electric;
- e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in both paragraphs (4)a, (4)b and (4)d, above.

- (5) The information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GE, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GE, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.
- (6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within GE is limited on a "need to know" basis.
- (7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GE are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

- (8) The information identified in paragraph (2), above, is classified as proprietary because it contains details of the method of development and supporting data and analyses relative to the TRACG computer program. This program is intended for use as the licensing-basis code for evaluating BWR response to transients without scram. This code has been under development by GE for over ten years, at a total cost in excess of three million dollars.

The information identified in paragraph (2), above, also is classified as proprietary because it contains details of the SBWR tests and supporting data and analyses. This test program has been under development by GE and its associates for more than seven years at a total cost of tens of millions of dollars.

- (9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GE's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GE's comprehensive BWR technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, and NRC review costs comprise a substantial investment of time and money by GE and its associates.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GE's competitive advantage will be lost if its competitors are able to use the results of the GE experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GE would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GE of the opportunity to exercise its competitive advantage to seek an adequate return on the large investment in developing these very valuable analytical tools.

STATE OF CALIFORNIA

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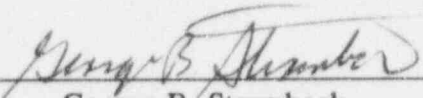
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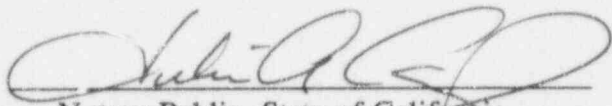
George B. Stramback, being duly sworn, deposes and says:

That he has read the foregoing affidavit and the matters stated therein are true and correct to the best of his knowledge,

Executed at San Jose, California, this 24th day of August, 1995


George B. Stramback
General Electric Company

Subscribed and sworn before me this 24th day of August, 1995


Notary Public, State of California

