



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

March 11, 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: REQUEST FOR ADDITIONAL INFORMATION (RAI) REGARDING THE SIMPLIFIED  
BOILING WATER REACTOR (SBWR) DESIGN (Q950.44-Q950.48)

The staff has determined that it needs additional information to support its review activities related to the SBWR design certification. Some additional information on the single tube condensation experiments performed by the University of California at Berkeley is needed (Q950.44-Q950.48).<sup>\*</sup> So that we may maintain progress on our review efforts in this area, we would appreciate a written response to the enclosed questions within 45 days of the date of this letter.

You have previously requested that portions of the information submitted in the August 1992, application for design certification of the SBWR plant, as supplemented in February 1993, be exempt from mandatory public disclosure. The staff has not completed its review of your request in accordance with the requirements of 10 CFR 2.790; therefore, that portion of the submitted information is being withheld from public disclosure pending the staff's final determination. The staff concludes that this RAI does not contain those portions of the information for which you are seeking exemption. However, the staff will withhold this letter from public disclosure for 30 calendar days from the date of this letter to allow GE the opportunity to verify the staff's conclusions. If, after that time, you do not request that all or portions of the information in the enclosure be withheld from public disclosure in accordance with 10 CFR 2.790, this letter will be placed in the NRC's Public Document Room.

---

<sup>\*</sup>The numbers in parentheses designate the tracking numbers assigned to the questions.

NRC FILE CENTER COPY

9404140213 940311  
PDR ADOCK 05200004  
A PDR

*FOI*  
11

This RAI affects nine or fewer respondents, and therefore is not subject to review by the Office of Management and Budget under P.L. 96-511.

If you have any questions regarding this matter, please contact me at (301) 504-1178 or Mr. Frederick Hasselberg at (301) 504-1141.

Sincerely,

~~Original Signature~~

Melinda Malloy, Project Manager  
Standardization Project Directorate  
Associate Directorate for Advanced Reactors  
and License Renewal  
Office of Nuclear Reactor Regulation

Enclosure:  
RAI on the  
SBWR Design

cc w/enclosure:  
See next page

Distribution (w/enclosure):

*Central File	PDST R/F	MMalloy
*PDR	SNinh	RHasselberg
DCrutchfield/WTravers	RBorchardt	JNWilson
PShea	WRussell/FMiraglia, 12G18	
ATHadani, 12G18	TKing, NLS007	LShotkin, NLN353
TLee, NLN353	JHan, NLN353	Fodar, NLN353
MVirgilio/RJones, 8E2	DMcPherson, 8E2	WHodges/BDLiaw, 7D26
RBarrett, 8H2	RElliott, 8H2	JMonninger, 8H2
MSnodderly, 8H2	TCollins, 8E23	CCarpenter, 8E23
LPhillips, 8E23	GThomas, 8E23	ALevin, 8E23
EKendrick, 8E23	RCaruso, 8E1	GBagchi, 7H15
DTerao, 7H15	SHou, 7H15	SAlI, 7H15
SLee, 7H15	FEltawila, NLN344	YChen, NLN344
CTinkler, NLN344	ANotafrancesco, NLN344	MFinkelstein, 15B18
WDean, 17G21	GSuh (2), 12E4	JMoore, 15B18
ACRS (11)		

OFC	LA:PDST	PM:PDST	PM:PDST	SCSB	SG:PDST
NAME	PShea <i>pw</i>	MMalloy:sg	FHasselberg <i>FW</i>	RBarrett <i>RB</i>	JNWilson <i>JNW</i>
DATE	03/9/94	03/9/94	03/10/94	03/11/94	03/11/94

\*To be held for 30 days

Mr. Patrick W. Marriott  
GE Nuclear Energy

Docket No. 52-004

cc: Mr. Laurence S. Gifford  
GE Nuclear Energy  
12300 Twinbrook Parkway  
Suite 315  
Rockville, Maryland 20852

Director, Criteria & Standards Division  
Office of Radiation Programs  
U.S. Environmental Protection Agency  
401 M Street, S.W.  
Washington, D.C. 20460

Mr. Sterling Franks  
U.S. Department of Energy  
NE-42  
Washington, D.C. 20585

Mr. John E. Leatherman, Manager  
SBWR Design Certification  
GE Nuclear Energy  
175 Curtner Avenue, MC-781  
San Jose, California 95125

Mr. Steven A. Hucik  
GE Nuclear Energy  
175 Curtner Avenue, MC-780  
San Jose, California 95125

Mr. Frank A. Ross  
Program Manager, ALWR  
Office of LWR Safety & Technology  
U.S. Department of Energy  
NE-42  
19901 Germantown Road  
Germantown, Maryland 20874

Mr. Victor G. Snell, Director  
Safety and Licensing  
AECL Technologies  
9210 Corporate Boulevard  
Suite 410  
Rockville, Maryland 20850

Mr. Richard W. Burke, Sr., Manager  
BWR Design Certification  
Electric Power Research Institute  
3412 Hillview Avenue  
Palo Alto, California 94304-1395

REQUEST FOR ADDITIONAL INFORMATION (RAI) ON THE  
SIMPLIFIED BOILING WATER REACTOR (SBWR) DESIGN

Single Tube Condensation Tests

- 950.44 The materials describing the experimental hardware used in the condensation experiments conducted at the University of California at Berkeley (UCB) need to have sufficient detail to enable the staff to construct a RELAP5/MOD3 model for the SBWR plant. To supplement the information in GE Nuclear Energy (GE) Report NEDC-32301, "Single Tube Condensation Test Program," Revision 0, December 1993, provide the following additional information regarding the experimental hardware used in the condensation experiments:
- a. Overall flow diagrams showing every component in the system. The diagrams should show the relationships between each component and the dimensions of each component. All pipe sizes should be described (i.e., schedule, material, lengths, locations of reducers or expanders, valve locations and types, roughness of materials, use of insulation, etc.).
  - b. Description of the test section (condenser). The description should include all relevant dimensions, materials, material roughness, properties (i.e., thermal conductivities, heat capacities, emissivities, etc.).
  - c. Equipment capacities and characteristics. This information should include valve characteristics ( $C_v$ ), orifice geometries and calibrations, check valve properties (i.e., loss properties), systems characterization data used to obtain system loss coefficients, heat transfer characteristics, and environmental heat losses.
- 950.45 The materials regarding the experimental hardware used in the condensation experiments conducted at UCB need to describe all relevant instrumentation. To supplement the information in GE Report NEDC-32301, "Single Tube Condensation Test Program," Revision 0, December 1993, provide the following additional information regarding the instrumentation used in the condensation experiments:
- a. Instrumentation list that includes all instrumentation used to record the experimental data. The location of each piece of instrumentation should be described to the extent that the location of each sensor with respect to the facility hardware is clearly shown.

Enclosure

- b. Instrumentation ranges, uncertainties, and calibration technique. The range of each instrument, the uncertainty of each instrument, and a description of how each instrument was calibrated should be provided. If the instrumentation was changed for different phases of the experiment or the instrument was reranged in some fashion, that information should also be provided. Also provide a description the pre-test and post-test instrumentation checks.
- c. Methodology for calculating instrumentation uncertainty. Fully describe the experimental techniques used to define the uncertainty of each piece of instrumentation.
- d. Data qualification log. The log should include the experimentalist's observations during the experiments regarding instrumentation, including unusual behavior exhibited. In addition, the log should describe the methodology used to qualify the data following the test and summarize the results of applying the methodology to the measured data.
- e. Instrumentation nomenclature. The labeling and descriptive information used to identify each instrumentation channel should be provided so that observations regarding various instrumentation channels during the experiments can be clearly identified.

950.46

To supplement the information in GE Report NEDC-32301. "Single Tube Condensation Test Program," Revision 0, December 1993, provide the following additional information regarding the data from the condensation experiments conducted at UCB:

- a. All data in engineering units, particularly the data used to derive calculated parameters utilized in the derivation of any correlations, or confirmation of existing correlations resulting from these data. All calculated parameters should also be provided, e.g., tank inventory levels based on measured differential pressures and local heat fluxes based on measured conditions. The data should include, as a minimum:
  - (1) condenser tube wall temperature distributions
  - (2) local vapor saturation temperatures (or wet-bulb and dry-bulb temperatures)
  - (3) noncondensable mass fractions
  - (4) flow rates
  - (5) pressures
  - (6) temperatures

- b. Test procedures, including procedures describing the early preparations for the experiment. The procedures should include information such as: the length of time the facility is allowed to heatup prior to recording data; a description of the method used to purge unwanted noncondensibles, the method used to deaerate the working fluid, and the method of injecting the desired noncondensibles; etc.
- c. Initial conditions and boundary conditions should be described, as well as the methodology used to define the initial and boundary conditions. The methodology should describe the relationships between the test being performed and the ultimate objective(s) of the experiments.

950.47 To supplement the information in GE Report NEDC-32301, "Single Tube Condensation Test Program," Revision 0, December 1993, regarding the condensation experiments conducted at UCB, provide a description of:

- a. The methodology developed to derive either a new correlation or to provide additional support for an existing correlation.
- b. The experimentalist's planned use for the correlation, including the range of applicability and the correlation's uncertainty.

950.48 Provide copies of the following references (listed on pages 6-1 and 6-2 of GE Report NEDC-32301, "Single Tube Condensation Test Program," Rev. 0, December 1993):

- a. J. S. Z. Kuhn, V. E. Schrock, P. F. Peterson, report in preparation.
- b. V. E. Schrock, et al., *Final Report of the UCB Study of Condensation Phenomenon in the Presence of Noncondensables*, report in preparation.
- c. E. Vial and V. E. Schrock, *A Correlation Based on the Combined UCB and MIT Data Sets for Condensation Inside Tubes with Noncondensable Gas*, UCB-NE-4193, April 1993.