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November 22, 1983

Mr. Jack Guttman
Reactor Systems Branch
Division of Systems Integration
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Review of PTSPWR2 Under Task I.A of FIN A2311

Dear Mr. Guttman:

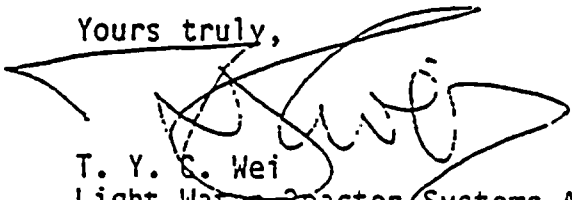
Enclosed are first round questions on the Exxon plant transient code PTSPWR2 based on our review of the following Exxon reports:


1. XN-74-5 (P) Rev. 2 Supp. 1 draft, "PTSPWR2 Modifications for St. Lucie Unit 1," W. T. Nutt, et al. (received September 1983).
2. XN-NF-74-5 (P) Rev. 2, "Description of the Exxon Plant Transient Simulation Model for Pressurized Water Reactors (PTS-PWR)," D. M. Turner, et al. (received October 1983).

Exxon has informed us that document (1) describes the generic modifications to the code models necessary for the analysis of Combustion Engineering plants. Document (2) was previously reviewed in draft form and a list of first round questions on that draft was sent to NRC on September 30, 1983. The enclosed list of questions focus only on modifications to the draft contained in the final version of the report.

If further clarification is required please contact us.

Yours truly,


T. Y. C. Wei
Light Water Reactor Systems Analysis
Reactor Analysis and Safety Division


P. B. Abramson, Manager
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Mr. Jack Guttman

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November 22, 1983

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Enclosure

Distribution:

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RAS Files: 8M627, A15

PTSPWR2 XN-NF-74-5(P) Rev. 2: First Round Questions on
Modifications to the Draft Report

The applicant is requested to verify that the errors identified as typographical errors are indeed typographical errors and were not carried further into the program statements.

Section 2.3.4

- 1) If the boron transport model uses the equations of the thermal model, eqs. (2-31) - (2-37), (2-32) and (2-35), what variable is used in place of temperature?
- 2) Since boron injection is assumed by the model to take place in the reactor vessel lower plenum, what is done about injection in the legs?

Section 2.4

- 3) Is wall heat not modelled in the pressurizer?

PTSPWR2 XN-74-5 (P) Rev. 2, Suppl. 1:
First Round Questions on Code Modifications for CE Plants

The applicant is requested to verify that the errors identified as typographical errors are indeed typographical errors and were not carried further into the program statements.

Section 2.0

- 1) How is the pump energy included in the hydraulic flow model?
- 2) Provide details of the model for the
 - (a) motor torque
 - (b) friction torque
 - (c) windage torque.
- 3)
 - (a) List the parameters adjusted in the modelling of a pump coastdown.
 - (b) List the data used to adjust the above parameters.
 - (c) Justify the use of SEMISCALE pump data for CE pumps.
- 4)
 - (a) What torque is adjusted to stop shaft rotation?
 - (b) Justify the above approach.

Section 3.0

- 5) Present the derivation for eq. (3.5) and show how it is consistent with eq. (2-26e) in the main report.
- 6) Define $V_{sg,j}$.
- 7) Justify the functional form used in eq. (3.8).
- 8) Provide a figure showing the elevation differences used.
- 9) Give a reference for the pump head curve shown in Fig. 3.2.

- 10) Define δ_j and λ_j used in eq. (3.14).

Section 4.0

- 11) How is the hot leg to cold leg delta-T redefined?

Section 5.0

- 12) Provide the modified MacBeth correlation used for pressures below 1450 psia and the database for the modification.

Section 7.0

- 13) Provide references for eq. (7.2) - (7.4) and Fig. 7.3 which describe various trips.

Section 8.0

- 14) Explain how eq. (8.2) used in the initialization of the pressurizer is consistent with eqs. (2-45) - (2-46) of the new pressurizer model described in the main report.

Section 9.0

- 15) There is an implication that the original code model does not conserve energy in the steam dome during depressurization. Clarify.
- 16) (a) Reconcile eq. (5.2) of the main report with eq. (9.1) for the break flow.
- (b) What are the units used in eq. (9.2) for the break flow?
- (c) Provide the value of the quality used for the Moody flow factor of Fig. 9.1 and justify the choice.
- (d) Why is dome pressure and not steam line pressure used to calculate steam line break flow?

- 17) (a) Reconcile eq. (9.4) with eq. (3.30) for the steam dome in the main report.
- (b) Provide a figure, which should correspond to Fig. 3.2 in the main report, to illustrate eq. (9.5).
- (c) Correct the typographical error for the left side of eq. (9.8) (last line of page).
- (d) Explain why the steam generator model of the main report requires the modifications of the supplement to calculate the mass in the dome.

18) Provide equations for the boron transport model.