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March 6, 1984

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

Subject: FIN A2311 Task I Exxon PTSPWR2 Review

Dear Mr. Guttmann:

We have completed the review of the Exxon report, "Steam Tube Rupture Incident at Prairie Island Unit 1 -- PTSPWR2 versus Data, Preliminary Benchmark Analysis" (December 1983), which Exxon submitted as the first benchmark case in its package of code qualification material for the Chapter 15 transient analysis code PTSPWR2. Please find enclosed a set of first round questions on the report for Exxon. In addition, as requested, we have enclosed another copy of the first round questions, sent on September 30, 1983, on the PTSPWR2 code models as described in the draft of XN-74-5(P), Revision 2, "Description of the Exxon Nuclear Plant Transient Simulation Model for Pressurized Water Reactors (PTS-PWR)," (received by ANL June, 1983). Note that there was another set of questions sent to you on November 22, 1983 which reviewed the code model modifications for Combustion plants and the final version of XN-74-5(P) Revision 2 which was received by ANL in October, 1983. We are enclosing another copy of that set of questions. A separate letter and list of questions are being prepared on our review of the reissue of the Exxon methodology report, XN-74-5(P) Rev. 2, Supp. 2, for PTSPWR2. This completes our first round evaluation of all Exxon material received by ANL to date.

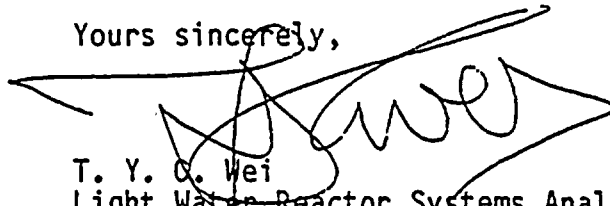
As noted in our letter of September 30, 1983 to you, Exxon had not met its milestone of September 1 in submitting the qualification material, the methodology report or the description of code modifications for CE plants as agreed upon at the June 16 ANL meeting. As of yet, Exxon still has not submitted the entire qualification material package. While it was agreed upon during the teleconference call of November 7, 1983 between NRR, Exxon, D.C. Cooke and ANL that the generic review of PTSPWR2 will continue as Exxon continues to submit qualification material to complete the package, ANL feels that it should be appropriate to discuss replacing December 31, 1983 with a new milestone date. If Exxon submits all the necessary material and responses by the middle of May, the middle of July would be an appropriate date for the TER.

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March 6, 1984

If you or your colleagues have any questions, please contact us.

Yours sincerely,



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



Paul B. Abramson, Manager
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Enclosures

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First Round Questions:
Exxon Prairie Island Unit 1 SGTR Incident Benchmark Analysis

§1.0

1. Provide a comparison against data for the remainder of transient for the period including the trip and for 200 seconds beyond the trip for which data is available. This is a benchmark calculation and not a licensing submittal. The reactor trip portion will test out the PTSPWR2 models under real plant circumstances for which Exxon is planning to use the code. The 10% load reduction phase for which Exxon submitted results is a very mild transient.
2. Provide a list of initial conditions comparing data with code values.
3.
 - a) Where is time = 0 of the computation in the sequences of events?
 - b) Submit a table of the event sequence comparing data with the code predictions.

§3.0

4. "The general assumption of symmetry between loops was made to simplify current calculations." What does this statement mean in terms of specific modelling items? List the differences in modelling which an asymmetric simulation would require.
5. Explain the choice for initial steam flow/feedwater flow given the differences in plant nominal operating conditions data.

§3.1

6. Justify the equation used for the leak rate which is described as a "Henry-Fauske based model."

§3.3

7. Explain the rationale for the pressurizer heat loss assumption.

§3.4

8. Justify the ramp rates used for load demand, steam demand and feedwater enthalpy.

§4.0

9. It is not clear how the power reduction is being effected. Is negative reactivity actually being fed back into the point kinetics equation or is the power basically input by the controller as a function of time? Clarify.
10. In Fig. 3.4 it appears that the calculated T_{ave} is rising while the measured T_{ave} appears to be decreasing at $\sim t = 220$ seconds. Explain this divergence.
11. a) "The steam flow demand is essentially input into PTSPWR2 for this analysis." Clarify.
b) Exxon believes that the steam flow data needs to be shifted in time. How would this be consistent with the pressurizer plateau data shown in Figs. 3.7 and 3.8?
c) Show the comparisons for the unshifted case.
12. a) Which loop are these temperature comparisons for?
b) Loops are typically instrumented with more than one thermocouple. If other data exists provide a comparison.
13. What is the effect of the discrepancy in the transient feedwater flow?
14. Exxon claims that the flow data is poor; that the temperature data is inconsistent; and that the ramp data is unavailable. What value then is this benchmark analysis?