EPRI

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Dear Novak:

SUBJECT: JUNE 26 & 27, 1980 MEETING OF ADVANCED CODE REVIEW
GROUP MEETING

In general, I felt that this meeting was of limited value for
both NRC and the group. This is because, (1) considerable
time was taken looking for a "simple" criterion to judge
overall code performance, which was more "management" than
technically oriented, and (2) the TRAC data comparisons were
overshadowed by the code's inability to conserve mass.

With regard to this second point, the only conclusion I can
reach is that any good results are probably "fortuitous" if
the code doubles the total mass during a calculation. This
is unacceptable and must be corrected immediately. I would
also strongly suggest that all conserved quantities be double-
checked, especially total energy. As I have previously pointed
out, (please see previous letters dated 9/12/79 and 1/30/80) a
steady state solution which holds for prolonged periods of time
is a good way to guarantee that the conversation laws are in
fact being correctly applied. As BNL pointed out, TRAC is
incapable of this in numerous cases; the true steady state is
an absolutely essential starting point for operational
transient analysis and to a large degree for small break analysis.
This steady state capability should be made a top priority
development item.

With respect to the search for a "figure of merit" for code
assessment, I think I made my points at the meeting, however,
I will repeat them here.

1) I do not think simple "figure of merit" criteria exist which
could be satisfactory in generic terms for code evaluation.

2) The use of a "DOX" type of criterion would simply add
confusion to an already complicated subject and have
limited, if any, useful effect.

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(3) Comparison of only integral quantities (such as $MBRK = \int W_{Br} dt$) have limited use because all time history effects are lost. (However this is a physically meaningful quantity and far more sensible than DOX).

(4) If a temperature integral quantity is mandatory, I suggest that $\int k \, dT$, i.e., the stored energy be considered. I feel that some physically meaningful quantity is to be preferred over a purely arbitrary measurement.

As for the selection and discussions of experiments, the presentation only went part way. The experimental facilities and tests were described but no link was made as to WHY these experiments should be calculated and WHAT good results would demonstrate with respect to code qualification. This is difficult to do and I suggest that you review Volume IV of the RETRAN Computer Code Manual EPRI CCM-5 to see what EPRI did in this area.

The approach should be to basically identify each model and show what degree of confidence can be established by each test analyzed. Again I feel that LASL has skipped these simple tests in favor of the more complicated system effect analyses. I feel that system effect analysis also have an important role in code qualification but by themselves are not sufficient. With respect to the presentation of the hot pin temperature and a single flow measurement when in fact multiple measurements at the same point were available. At the minimum, the data scatter should have been indicated.

I feel that the BNL presentation was good, especially pointing out discrepancies in the code. These are essential for an intelligent review of any code.

With respect to the RELAP-5 development activity, I would like to see more hard data comparisons. However, from the limited material presented, the program looks promising. I feel the association with LOFT had a very positive influence on this activity and I hope it continues. I was especially pleased to see the more reasonable computer time associated with RELAP-5. I would like to point out that the 20 hours of CDC CYBER 176 time used by INEL for the TRAC analysis of a PWR would cost about $100,000 at commercial rates. This will limit the code usefullness to only limited analyses at present.
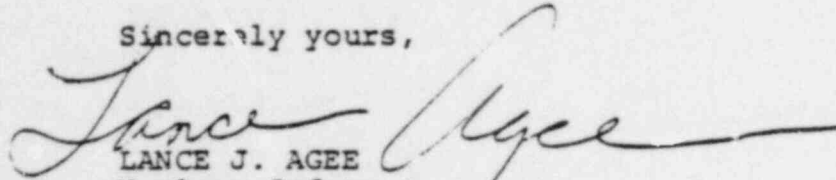
In closing, I would like to say I enjoyed your presentation on flow regimes and well-posed equations. I hope that LASL will study your slides with care. I will send you some EPRI reports

(which discuss stratified flow) by S. Banerjee when they come back from the printers (about 2 weeks). They are similar to your work but carry some of the concepts further.

If I can be of further assistance, please contact me.

Sincerely yours,

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LJA:ns

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