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To: Collins, NRR

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RES

AUTHOR:	Bob Leyse
AFFILIATION:	ID
ADDRESSEE:	Nils Diaz
SUBJECT:	Modeling of crud by INEEL
ACTION:	Appropriate
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LETTER DATE:	07/18/2003
ACKNOWLEDGED	No
SPECIAL HANDLING:	
NOTES:	
FILE LOCATION:	Adams
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From:	<Bobleyse@aol.com>
To:	<gwj@inel.gov>
Date:	Fri, Jul 18, 2003 1:24 PM
Subject:	Modeling of crud by INEEL

Dear Mr. Johnsen:

Your letter of June 17, 2003, REVIEW OF PAPER ABSTRACT, included an
attachment that covered the reasons for rejection of my abstract. In the first
paragraph of the attachment your reviewers assert, "However, INEEL successfully
applied an earlier version of SCDAP/RELAP-CDc ... to model crud on steam generator
tubes (see ... INEEL/EXT-98-00286, Rev.1)."

I have that report and I find that INEEL did not model crud on steam
generator tubes. INEEL modeled sludge on top of the tube sheet. On page 34 I read,
"Refined nodalization included the addition of a 12 inch sludge layer :.. ."
Apparently the remaining part of the steam generator was modeled with clean
tubes. Now that is certainly not a demonstration that INEEL has ever
successfully modeled crud on steam generator tubes.

Indeed, INEEL did not even accurately model the 12 inch sludge layer on the
tube sheet! Referring to text on pages 34 and 35, and Table 13 on page 99, it
is apparent that INEEL used the thermal properties of the metals copper, iron,
zinc, nickel and manganese in determining the thermal properties of the steam
generator sludge. Now, there is no way that those elements will exist as
pure metals in the steam generator environment. Those metals, if present, will
be present as oxides and possibly other compounds depending on the steam
generator chemistry procedures. INEEL should accordingly correct the report
INEEL/EXT-98-00286, Rev.1. And INEEL should retract the reviewers assertion that, "
... INEEL successfully applied an earlier version of SCDAP/RELAP-CDc ... to
model crud on steam generator tubes (see ... INEEL/EXT-98-00286, Rev.1)."

For your convenience, the attached file, Johnsen, is your June 17, 2003,
letter and the attachment.

Robert H. Leyse

CC: <chairman@nrc.gov>, <pettinam@id.doe.gov>, <rra@inel.gov>,
<rritter@boisestate.edu>

June 17, 2003   CCN 43147

Mr. Robert H. Leyse, CEO
Inz, Inc.
Box 2850
Sun Valley, ID 83353

REVIEW OF PAPER ABSTRACT

Dear Mr. Leyse:

Thank you for submitting your paper abstract, entitled "Deficiencies in Calculations of Core Damage Progression in SCDAP/RELAP5-3D," for the 2003 International RELAP5 Users Seminar. We have reviewed your abstract and find that it is unacceptable without significant revision for the reasons cited in the attachment.

If you choose to revise the abstract, please resubmit it to me by July 15th.

Sincerely,

Gary W. Johnsen
RELAP5-3D© Program Manager

Attachment

cc: C. Noble, DOE-ID, MS 1235

Attachment

REVIEW OF ABSTRACT "DEFICIENCIES IN CALCULATIONS OF CORE DAMAGE PROGRESSION IN SCDAP/RELAP5-3D"

First, the author is incorrect about the capabilities of SCDAP/RELAP5-3D$^©$. A proficient user can model the phenomena described in this abstract with SCDAP/RELAP5-3D$^©$, although we are not aware of any user who has modeled crud on fuel elements with SCDAP/RELAP5-3D$^©$. However, INEEL successfully applied an earlier version of SCDAP/RELAP5-3D$^©$ (SCDAP/RELAP5 MOD 3.1) to model crud on steam generator tubes (see "SCDAP/RELAP5 Evaluation of the Potential for Steam Generator Tube Rupture as a Result of Severe Accidents in Operating Pressurized Water Reactors," INEEL/EXT-98-00286, Rev. 1). The fact is, that a layer of material on the outside of a fuel rod can be modeled, and the user can specify its thickness and thermal properties.

Second, the author should state what other severe accident analysis codes, such as MELCOR and MAAP, have been applied to consider fuel crud buildup and report results from these analyses. We suspect that none of the other codes have been applied to consider this effect (because it has not been demonstrated conclusively that this effect should be considered). If no severe accident analysis codes have been applied to consider this phenomenon, then the author should revise the emphasis of this abstract (because SCDAP/RELAP5-3D$^©$ can be used to consider this effect, it is simply that users have not chosen to consider this phenomena).

Third, the abstract requires more technical substance. For example, a possible revision could emphasize that fouling is important, cite data to validate the importance of this fouling in accident analysis (and results from the NRC rulemaking, if available), and provide some estimate of the importance of this fouling (preferably with a SCDAP/RELAP5-3D$^©$ analysis because this is a user's meeting, although other severe accident analysis code calculations are acceptable). Such a revised paper would be a noteworthy contribution to the upcoming meeting. Note that the current abstract only cites data that demonstrates the potential existence of this crud (not its impact).