

OAK RIDGE NATIONAL LABORATORY

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Mr. Melvin Silberberg, Head
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Dear Mel:

The draft of Volume I of NUREG-0956 includes some valuable new work by BCL and SNLA on LWR accident source term estimation methods. In particular, the work on the thermal-hydraulic and fission product transport considerations in the primary coolant system and the updated core-concrete interaction model represent substantial improvements over previous available procedures. However, there are some potentially important source term issues which the draft does not address.

Among the technical issues which deserve to be treated more completely are the following:

1. The variations among nuclear plants, e.g., the variations existing among large containment PWRs, need to be taken into account. As was noted at the recent review meeting for the subject draft, the impacts of differences in both plant design and operator procedures upon the probabilities of various accident sequences can be important. But possibly just as significant, and not mentioned, are the large potential differences in source term magnitudes for any specific sequence caused by some plant-to-plant variations. Many of these effects could be estimated by application and/or adaptation of currently available procedures to a variety of conditions, e.g., different core sizes and compositions, various containment sizes, and a range of concrete compositions.
2. The effects of high pressure in the primary coolant system upon the release rates from the core materials should be considered. It seems inconsistent to worry about some of the other effects of high pressure while ignoring that effect. The basic effect should be treatable by consideration of appropriate processes in certain metal and chemical production industries.
3. The model sensitivities and other sources of uncertainty in the estimated source terms need to be consistently and thoroughly addressed. Lack of such consideration in the subject report hampers interpretation and evaluation of the results.

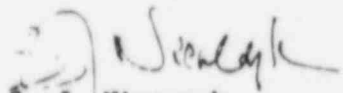
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In addition to the technical issues, there are some other issues which are important. If the goal of the subject report is to produce source terms which can be factored into regulation, then the perspective in which the source terms will be used needs to be clearly stated for the reviewer for at least the following reasons:

1. Source terms appropriate for realistic or real-time purposes and source terms appropriate for probabilistic risk assessments can frequently be expected to be somewhat different. Whereas a best estimate in a mechanistic framework is indicated for realistic purposes, e.g., the decision on whether or not to evacuate during an accident, a source term involving much less detailed analysis but more emphasis on balance and consideration of the rest of the accident spectrum may often be adequate for risk assessment purposes.
2. By definition, any source term depends in part upon the population-at-risk, e.g., the public or the equipment inside the containment. Inasmuch as even "best estimate" source terms for risk assessments typically have some biases with respect to the public incorporated into them, it should be noted that models and assumptions which result in best estimates of source terms for the public do not necessarily result in best estimates of source terms for other populations-at-risk.
3. As was noted previously, accident source terms are plant-dependent. Regulations, however, have not taken these differences into account but probably should.

To a large extent, the foregoing problems in the area of LWR accident source term estimation are long-standing ones and cannot be solved overnight. However, the potential impact of the "0772" follow-on effort on regulation seems to require that at least the effects of plant-to-plant variations and an assessment of the uncertainties be addressed by that effort.

Yours truly,



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