UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUL 25 1980

Docket No. 50-245

Mr. W. G. Counsil
Vice President, Nuclear Engineering
and Operations
Northeast Nuclear Energy Company
P.O. Box 270
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Dear Mr. Counsil:

Subject: Interim Reliability Evaluation Program (IREP) - Phase II

The concerns about the IREP program expressed at our meeting of June 12, 1980 and letters we have received since, have prompted us to share with you more of the details of the IREP program plan and the technical guidance for conduct of IREP studies. We may have left you with the impression that the methods and procedures will be made up as the studies progress. This is not the case. As the enclosures demonstrate, the broad outlines of methods and procedures are well established. What remains to be done is to fine-tune some of the instructions to the teams to assure a standardized quality product with reasonable opportunities for management oversight and redirection.

Enclosed are (1) the current draft of the IREP Procedures and Schedule Guide*, (2) the draft IREP Event Tree Guide, and (3) a draft guide for selecting component failure rates. We expect that these items will be refined and edited in the coming weeks. It is our intention to base their revision on the comments of the Probabilistic Analysis Staff and its IREP contractor, Sandia National Laboratories. We do not expect substantial alterations to the technical approach. However, we and Sandia are taking special care to select the intermediate milestones for documentation and review. We both hope to ensure high and consistent quality, but at the same time avoid the dissipation of resources on premature status reports and their evaluation. The enclosed Procedure and Schedule Guide represents what we consider the strictest approach to both procedure and schedule. We are presently considering substantial relaxation of both aspects.

*Some have taken to calling this procedural guide a cookbook. We dislike the term "cookbook" since it implies a well established recipe for something. We do not have a well established recipe for performing an interim reliability evaluation of a plant but are trying to develop one.

Many of the licensee's concerns with IREP Phase II have been enumerated in a letter from Arthur Lundvall of Baltimore Gas and Electric Company (BG&E) to NRC dated June 25, 1980. This letter, too, is enclosed for ease of reference (Enclosure 4). We think Mr. Lundvall's concerns warrant a detailed reply, not just to BG&E but the other owners of IREP II plants as well. The concerns are generic. TVA has sent us a letter expressing similar concerns. Arkansas Power and Light has conditionally agreed to proceed with the IREP program but has also expressed these concerns.

1. Schedule

We are more concerned with promptly initiating the IREP Phase II studies than we are with rushing to judgment on the results. Just as we are proceeding with deliberation on the completion of the Phase I study of Crystal River, we are fully prepared to modify the schedule on the completion of a Phase II study if that is necessary to perform an adequate job.

Our sense of urgency on the inception of the Phase II studies is based upon a perception in both RES and NRR at NRC that it is desirable to survey all operating reactors in IREP-like studies as soon as practically possible. This work is covered in the Task Action Plan (NUREG-0660) as Tasks II.C.1 and II.C.2. The Phase II IREP studies will serve, among other objectives, as a proving ground for a study scope and task description that can be followed on all plants with the resources the NRC and the industry might realistically be able to provide within the next few years. The objective is to distill the essence of risk assessment to a level that would permit a plant to be studied in less than a year by a team composed of two experienced system reliability analysts, one engineer thoroughly versed in the design and operation of the plant; and three reactor systems engineers of the background commonly found in utilities, vendors, or architect-engineer staffs. These teams are to generate a standardized and meaningful product, albeit one that is not so complete as one entailing, say, thirty man years effort per plant.

NRC plans to prepare the procedural guide (perhaps in collaboration with the industry) drawing upon the Phase II experience and NRC will request, sometime in 1981, that these studies be started on operating plants. Roger Mattson has suggested a forum for industry input on the procedural guide, to which I will turn later.

It is with this background that we feel a sense of urgency to get on with the inception of the Phase II studies. It is also responsible for the impression we gave that the "cookbook" is still developing; we intend to be working on the Phase III procedural guide throughout Phase II, drawing upon the Phase II experience.

2. Methodology

We feel that the state-of-the-art in probabilistic risk assessment is quite well-developed through many applications, refinements, and peer review. There are many shortcomings in the completeness and precision of available techniques but the time is ripe to divert some of our research resources from the advancement of the frontiers of risk assessment to the broad scale application of the well-developed portions of the discipline. Our principal problem in this context is to distill the essence of the techniques that are well known to the community of experienced practitioners into a form that can be usefully implemented by many small teams of less specialized analysts throughout the industry in a comparatively short period of time. We are targeting a plant-specific catalog of core melt accidents that is abstract enough to be fairly complete yet specific enough to be useful in risk assessment, operator training, emergency planning, and the like. The state-of-the-art in event tree analysis can support this. In addition, we are aiming for the performance of system reliability analysis and common-cause failure analysis - including operator error - of sufficient depth to give fairly good odds that the risk-dominant accident sequences will be identified. In particular, we want to screen the subject plants for susceptibility to those accidents in which common factors couple the initiating event with the degradation of the reliability of the systems expected to mitigate the event, e.g., scenarios like TMI or the NNI-bus faults at Rancho Seco and Crystal River.

The task of preparing the instructions for such studies requires input from experts in risk assessment and the experience of the Phase II studies. We welcome industry input to the Phase III instructions developed in parallel with the Phase II effort. However, it would unnecessarily delay the program to schedule the industry input to Phase II and thereby substantially delay the conduct of this phase.

3. Timing vs. Plant Alterations

It is not a problem to incorporate in IREP studies design or procedural alterations that are well-planned but not yet implemented. For example, the Crystal River Unit 3 study credited alterations to the Emergency Feedwater System that were just evolving from conceptual to detailed design as the study was in progress. For those cases in which a conceptualized change is not yet well enough elaborated for modeling in a system reliability analysis, it is feasible to perform sensitivity studies which could give useful input to detailed design or procedural implementation. Therefore, we see as many or more advantages as disadvantages in performing IREP studies while the TMI modifications are in the pipeline.

4. Licensee Participation

As you can see, the IREP Procedure and Schedule Guide provides for a number of points at which preliminary results and working papers are submitted to the plant owner as well as the NRC Research and Sandia IREP program management for review and comment. There will be ample opportunity for the owners' engineering and operations personnel to keep posted on the developing study. We welcome your suggestions for improvements in the structure of this oversight. We intend to provide periodic briefings of NRC and licensee management on the progress of the IREP reviews. At these times, if you have any basic problems with the conduct of the studies, you will have ample opportunity to voice your concerns.

We would welcome the membership on the IREP study teams of one to three engineers drawn from and supported by yourselves (the owner) or your consultants. We think it would be more valuable to you as well as to the team effort if your participants on the IREP team are drawn from your engineering or operations staffs. An individual thoroughly familiar with the design and operation of the plant would be the most useful to the study team. One who knows to whom to route technical design or operations questions would enhance the speed and accuracy of the IREP effort. Such an individual would be particularly well suited to maximize the benefit of the experience for yourselves as well. That person would be equipped to translate the engineering insights that will be implicit in the study into useful guidance for your conduct of operations, maintenance, personnel training and the evaluation of retrofit options. The experience would enhance the participant's usefulness in economic risk management, availability engineering, and in dealing with subsequent regulatory issues as well. That person need not have prior experience with risk assessment or system reliability analysis - an alert individual can learn much of that through the IREP experience. Such team members detailed to IREP from your staff will be free to keep you posted of the team's activities as you see fit even outside the framework of scheduled IREP reporting. You may also want to employ the services of a competent risk assessment engineer to help in your review of the preliminary reports and the subsequent draft report. While we would be happy to accept such a consultant as a detailee to the IREP team, we would prefer members of your own staff.

NRC is paying for these IREP studies. We and our contractors will provide working space for participants sent by the owner. Salary, travel and subsistence costs for the owner's representatives are the responsibility of the plant owner. From time to time in the IREP study there may arise technical questions about plant response which may not be answerable from existing records. These questions will be directed to the owner for response. Any costs of special

analysis by the owner or support by contractors to the owner are the responsibility of the plant owner. We do not expect to encounter a large number of such questions or any which require extensive special analysis. Our experience in the Crystal River IREP supports this expectation.

5. Regulatory Ratcheting

The controversy surrounding the Reactor Safety Study, the many reviews and criticisms of it, and the culmination of that controversy in the Lewis Committee Report is fresh in our minds. We are very conscious that careless use of probabilistic risk analysis can lead to incorrect understanding and action. At the same time we and many others are convinced that probabilistic risk analysis is a tool which can make substantial contributions to nuclear safety. Certainly, if we had all heeded the message of the Reactor Safety Study, we would have focused our attentions on transients, small breaks, and operator error years ago. Perhaps the TMI accident would have been prevented if we had.

As you know, many groups have undertaken probabilistic risk analyses now and we must address what to do with the results. It is not enough to say that the results of such an analysis should be carefully reviewed and considered. Such analyses, if carefully done, can reveal the Achilles heel of the plant and give a fair measure of how vulnerable the plant is to serious accidents. We need a consistent way to decide whether to backfit the plant to reduce either the likelihood or the consequences of the accidents which dominate the risk. Owners and the NRC need to look at the results of these analyses, considering their quality and their uncertainties, and decide what changes, if any, are warranted. In virtually every case I would expect the owner of the plant to factor the results of these analyses into the plant's procedure reviews and operator training. In many cases I would expect the analyses to identify areas where minor changes in testing, maintenance, or hardware would substantially reduce risk; and in other cases, analyses will point to design features of the plant which are not easy to change. The owner's voice should be the first heard on what changes are warranted, but I realize that many owners are concerned that NRC will press ahead with ratcheting decisions before the owner is heard. The best way to avoid this is for the owner to follow the analysis closely, evaluate the significance of findings as they develop, and take the lead in identifying what actions are appropriate.

A larger forum has been proposed for joint industry and NRC consideration of probabilistic risk analysis methods and their use in regulation. The NRC and the Institute of Electrical and Electronic Engineers (IEEE) held a joint technology transfer conference here in Washington in January of this year. The first proposal for followup action

made by the steering committee of that conference was to encourage industry and NRC consideration of probabilistic risk analysis methods and uses in a structured technical forum. This idea led to a meeting at the IEEE on May 15, 1980 where Roger Mattson of the NRC proposed NRC/industry collaboration on the procedures and policies to govern the extension of IREP to all the operating nuclear plants. A copy of the minutes of that meeting is enclosed as Enclosure 5. He suggested that this initiative be hosted by the IEEE as a neutral technical (and public) forum with unique connections to related areas of expertise. He suggested that two committees be formed. One of these would be a steering committee composed of managers to deal with issues such as objectives, schedules and resource constraints, and consideration of the form and quality of IREP results for ultimate use in regulation. The second would be a working group of experts in risk assessment to work up the scope, procedures, and assumptions for the accomplishment of IREP Phase III or the "National Reliability Evaluation Program," NREP, as Roger calls it. In addition to the host role, the IEEE would obtain periodic input to the two committees from its resources in non-nuclear industries that have extensive experience in system reliability analysis and reliability assurance.

There was another meeting on June 11, 1980. Nuclear industry representatives at the meeting were Walt Fee of Northeast Utilities, Bob Szalay of the Atomic Industrial Forum, and Ed O'Donnell of Ebasco Services who is chairman of the AIF Ad Hoc Committee on Probabilistic Safety Analysis. The AIF Ad Hoc Committee has since met and we expect to meet with them again here in Washington on August 5.

I believe that I have addressed the three recommendations with which Mr. Lundvall's letter closes but, to summarize:

a. Licensee Input on Methodology and Assumptions. There will be ample opportunity for licensee input on the way the plant is modeled: system success criteria, points of no return, accident phenomenology, and the modeling of system behavior. The teams will be under instructions to use the most realistic (but justified) data on system behavior and plant response that is readily available. They are also to weed out any identifiable conservatisms in the final analyses of those accident sequences that rise to prominence in the preliminary screening. There will also be ample opportunity for licensee review of interim reports, the draft report, and the final report.

b. Schedule. As noted above, we wish to proceed to the draft report stage to garner the experience with the use of the procedure guide which is needed to prepare for Phase III. We will not rush an

incomplete job into print in a final report. The end date may slip as necessary to achieve a quality product. At the same time I am aware, as I am sure you are, of the danger of having a poor quality draft report in existence with a correcting final report too distant.

I would like to begin work by gathering the teams in late August. Based on your comments we now propose to handle Millstone 1 and Calvert Cliffs in Washington, Arkansas 1 in Albuquerque, New Mexico, and Browns Ferry in Idaho Falls, Idaho. I hope this gives you the basis for enthusiastic participation in the IREP-II work. I propose that we meet with the four participating licensees on the afternoon of August 4 here in Bethesda if you feel that such a meeting would be of mutual benefit. Please call Robert M. Bernero, Director of the Probabilistic Analysis Staff, Office of Nuclear Regulatory Research, on (301) 492-9528 with your views.

Sincerely,

Original signed by
Darrell G. Eisenhut

Darrell G. Eisenhut, Director
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Enclosures: As Stated

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