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DOCKET NUMBER
PROPOSED RULE PR-50 (7)
(45 FR 6793)

March 26, 1980
PLL:05:CRF:80

Secretary of the Commission
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Docketing and Service Branch

Dear Sir:

General Atomic Company wishes to submit the following comments on the Advance Notice of Proposed Rulemaking that appeared in the Federal Register, 45, No. 21, January 30, 1980, pp 6793-6795.

General Atomic has been engaged in probabilistic risk analysis and its application to nuclear power systems for about seven years and in these activities has made extensive use of data sources of the type described in the Notice. Therefore, the comments given below represent the result of considerations of some of these issues for a long period of time.

GENERAL

The whole issue of making NPRDS mandatory seems to have come about because of the accident at TMI-2. We believe that the basic problem involved here is defined by the following question:

> What needs to be done to prevent accidents as serious as (or worse than) the one at TMI-2 from occurring in the future?

We believe that this problem of preventing accidents can be solved if the following four-step program is properly implemented:

1. Collect data.

2. Analyze/evaluate the data.

3. Identify changes needed to prevent serious accidents.

4. Implement the changes.

All of these steps are in operation now, but the TMI-2 accident still occurred. The question is: where is there a deficiency? In the Advance Notice, NRC seems to express their belief that data collection is deficient. Opposing views are also expressed--like GAO's belief that making NPRDS mandatory could not be justified because, among other reasons, only limited safety benefits would be expected.

Acknowledged by card. 4-1-80, CRA

We are not opposed to making NPRDS mandatory as a part of the overall solution to the basic problem. However, the mandatory NPRDS would not be enough, in and of itself, to solve that problem. We believe that the emphasis should be placed on steps 2 and 3 listed above: namely, analyze and evaluate the raw data, and use the resulting information and insights to identify the changes needed to prevent serious accidents from occurring. A properly designed data collection and retrieval system can be a valuable asset to completing those two steps successfully.

We recommend that some form of central data collection and evaluation institute be formed. (It might be similar to the Central Reliability Data Organization (CREDO) that has been formed for fast reactors.) Such an institute should be chartered with the total management and operating responsibility for the first three steps listed above--namely.

1. Collect data and maintain a file of raw data.

2. Analyze/evaluate the raw data.

3. Flag significant events for NRC to consider in identifying changes needed to prevent serious accidents.

4. Provide for access to data banks at all levels above by computerized linkages to other, external organizations; e.g., vendors, architect-engineers, and utilities.

The institute should not be an integral par of the NRC organization, but the board of directors should have representatives from NRC, DOE, the utilities, and industry.

We believe that the weakness in the accident analyses performed thus far is that they focus on what actually did occur. That is, very little is done to explore what could have happened under somewhat different circumstances. Thus, even though the basic ingredients for a variety of serious accidents may already have been observed and recorded many times, analysts have no basis for recognizing the potential for such serious accidents to occur. An organized analysis approach is clearly needed to fill this analysis gap. We recommend that this analysis approach be developed along such lines as the following:

a. For each individually observed event sequence, postulate other related event sequences that could have occurred for varying hardware states and varying plant responses,* with particular emphasis on common mode failures.

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*The postulated accident sequences may vary substantially from one plant to another because plant designs and operating characteristics can vary from plant to plant. For example, postulating a Browns Ferry-type of fire at a PWR could have yielded a different accident scenario than that observed at the Browns Ferry BWR.

b. Estimate occurrence frequencies for all postulated event sequences.

c. Estimate consequences for all postulated event sequences.

d. Use a risk plot (a plot of frequency versus consequence) to identify the relatively high-frequency, high-consequence event sequences for further study/evaluation as potentially serious accidents. Flag all such event sequences and promptly notify NRC, the utilities, and industry of their potential seriousness.

This analysis approach clearly requires that reliability and availability type data be developed from the raw data for equipment, operators and maintenance personnel, and various plant operations and procedures involved in the running of a plant. Such reliability/availability data is directly needed to support task "b" above. As a bonus, such data should be considered to be THE STANDARD and used as the basis for all reliability and availability calculations performed by NRC, DOE, the utilities, and industry. Such a data base should, therefore, encompass the scope and supersede all existing LWR data bases.

Once the data analysis approach has been developed in detail, it should then be possible to determine exactly what raw data is needed to support the analyses and what form of storage/retrieval of the raw data would best facilitate performing those analyses. We believe that the data reporting system must be consistent across the industry. Furthermore, the best interests of all concerned parties would best be served by evaluating all of the numerous, independent data systems in the light of the analysis needs of all parties. We recommend deleting from those various data systems all portions that would be duplicated by the data system adopted for the institute. Furthermore, it should be noted that the data system for the institute could be the same as or markedly different from NPRDS. We expect that the data reporting system and the institute's data system will have to provide better visibility of such operational dependencies as common cause, common mode, and propagating failures, as well as other unusual conditions. Such capabilities are not provided in any other existing data system.

SPECIFIC RESPONSES TO SUMMARY OF FEATURES

In view of our foregoing comments, it seems quite possible that the data system needed for the institute could be quite different from NPRDS. Therefore, we refer to that data system below as the Institute Data System (IDS), rather than the NPRDS, simply to underscore such a possibility.

1. We believe that safety and availability should be emphasized equally and can indeed be both served by the same data system. There would be no nuclear power in this country if it weren't safe. Poor availability would also eliminate nuclear power for economic reasons.

2. NRC, the utilities, and industry could use IDS essentially as outlined in our General Philosophy to support safety objectives. A similar approach could be developed for plant availability.

3. This question cannot be answered until the data analysis/evaluation approach has been developed and defined in detail. However, we strongly recommend that both data reporting and evaluation give explicit and high visibility to common mode failures.

4. The institute should promptly alert appropriate personnel in NRC, the utilities, and industry of each hypothesized event sequence found that could potentially be a serious accident. The utilities and industry should initiate any necessary design/procedural changes to prevent the accident from occurring.

5. This is addressed by the General Philosophy and (briefly) in our response to question 1.

6. This is addressed by the General Philosophy.

7. This is addressed by the General Philosophy.

8. Perhaps the most effective way to assure proper participation in a mandatory IDS program is to offer rewards/incentives on an industry-wide basis. This will tend to get the utilities working together and policing themselves for their common good and wellbeing. An incentive for proper participation might be a streamlined licensing process. This would be attractive because of reduced costs to the utilities (and, incidentally, to their customers).

9. Same as response to question 3.

10. The only need is a provision for changing IDS. The decision to make any such change should reside in the board of directors of the institute. Any such change should be made effective a reasonable time after the decision is made. In no instance should such a change be made to be retroactive. In order to be able to respond to retroactive changes, each utility would have to maintain extensive in-house records of "everything that ever happened", and it would be very difficult to control/enforce/organize in-house record keeping uniformly for all utilities.

11. LER is an example of one of the systems (mentioned generically in the General Philosophy) that should be changed to avoid duplicating IDS.

12. The idea of limiting LER's to items of major safety significance seems reasonable. The LER's might be incorporated as a basis for reporting an observed accident sequence and the associated hypothesized event sequences that represent potentially serious accidents.

13-16. The utilities are better qualified to respond to these questions.

17. We believe that most of the necessary data is already available. We believe that the primary difficulty has been that the data has not been properly analyzed. A secondary contributor is that the data is probably not organized in a manner needed to effectively support the type of analysis approach recommended in the General Philosophy.

18. A cost benefit study is needed before answering this question.

19. IDS should be jointly funded by industry and NRC.

20. All plants should be included, to the extent possible from already existing records. The early plant information supplies data needed for estimating the so-called "infant mortality" portions of learning curves.

21. Same as response to question 3.

We would be pleased to discuss these comments with your staff if you so desire.

Very truly yours,

Colin R. Fisher, Director
Licensing Division

CRF:jr