8005140699

# DUKE POWER COMPANY

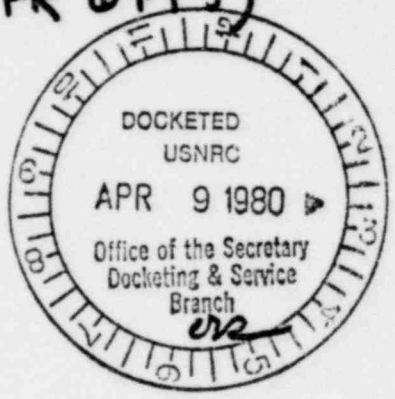
POWER BUILDING
422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28201

A. C. THIES
SENIOR VICE PRESIDENT
PRODUCTION AND TRANSMISSION

March 29, 1980

P. O. Box 2178

DOCKET NUMBER
PROPOSED RULE PR-50 (23)
(45 FR 6793)




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

Attention: Docketing and Service Branch

Subject: U.S. Nuclear Regulatory Commission
10 CFR Part 50 - Advance Notice of
Proposed Rulemaking
Nuclear Plant Reliability Data System
(NPRDS) - Required Participation

Reference: Federal Register Volume 45, No. 21, Wednesday, January 30, 1980, Page 6793

Mr. Secretary:

Duke Power Company is well familiar with the NPRDS program. We have participated in NPRDS since the pilot project, have representation on ANSI N 18-20, have used NPRDS data in our analysis and have the NPRDS program resident on our in-house computer for our own use. Being familiar with and a supporter of NPRDS, Duke Power Company cannot support mandatory participation of utilities in NPRDS under the auspicies of the NRC because the attendant problems are too great. Our specific comments are set forth in answers to the specific questions asked in the referenced Federal Register Notice.

Very truly yours,

A. C. Thies

A. C. Thies

ACT/amr

Acknowledged by card. 4-9-80

Responses

Questions Posed by Advanced Rulemaking
on Making NPRDS Mandatory

Question 1: How should NPRDS effort be apportioned between improving plant availability and improving plant safety? Where should the emphasis be?

Response: The NPRDS program was developed to provide the nuclear power industry with long term failure statistics on safety related systems and components. Safety is and should be the only concern of the NPRDS program.

The expansion of scope based strictly on availability considerations should be avoided, particularly if NPRDS participation becomes mandatory. The economics of operating a unit, and by inference unit availability, is beyond the scope of the Commission's charter. Such an expansion would extend the Commission's influence into areas where it has no authority.

There are also technical problems associated with the merging of a safety oriented data base with an availability oriented one. The source of the problems is the difference in the basic philosophies on which the data bases are built. From these differences evolve somewhat different data needs and criteria. While these difficulties can be overcome, the inclusion of availability oriented information at this point in time would detract from the current efforts to upgrade the existing system. It is recognized, however, that some data which are useful for availability calculations are included in the present data base. The use of this data, where applicable, should be encouraged at all levels of the industry.

It should be pointed out that both the National Electric Reliability Council (NERC) and the Electric Power Research Institute (EPRI) have programs underway which will collect and distribute availability data. These programs are being coordinated and talks have begun to dovetail NPRDS data with these programs. The coordinated development of complementary data programs appears to be a much better solution to the collection of both safety-related and availability data.

Question 2: How should NPRDS data be used by the industry, the public, and the NRC to achieve this emphasis? What other uses, if any, should be made of NPRDS data?

Response: The data which is in the current NPRDS program can be, and is being, used for a wide variety of applications. Some applications, such as the development of a statistical data base to support probabilistic analyses, are useful to the industry, the public, and the NRC. A probabilistic analysis can be used in a variety of ways: to estimate risk to the general public or some segment of the public, to identify design weaknesses, to evaluate competitive designs, or as one of the bases for a problem diagnosis system.

Other uses are beneficial to the industry and the NRC. Among these are identification of failure syndromes, optimization of test and surveillance intervals, prediction of failure trends, and vendor product improvement. Still other uses, such as vendor selection and optimization of spare parts

inventories, primarily benefit the industry. This list of applications is certainly not all inclusive: limits on the applications of the data are largely due to the ingenuity of the users.

Question 3: How should data be gathered and analyzed to facilitate recommended uses?

Response: No significant changes in data collection are warranted. As indicated in the response to the previous question, the data in the present system is meeting the needs of a wide variety of applications. The ANSI N18-20 subcommittee, which provides NPRDS with technical guidance, makes periodic adjustments to the system when necessary.

The newly established Institute of Nuclear Power Operations (INPO) and Nuclear Safety Analysis Center (NSAC), both nuclear utility sponsored organizations, have such analyses as a specific part of their activities. INPO will utilize NPRDS and other applicable data sources in studies and analyses related to operations, maintenance, training and human factors. NSAC will utilize NPRDS and other applicable data sources in studies and analyses related to equipment design and reliability.

Question 4: Who should alert appropriate persons concerning problems uncovered from analysis of NPRDS data? Who should initiate design, maintenance, or operating improvements?

Response: Alerts on significant events that need quick action will seldom, if ever, come from a data base analysis. The more likely items such as weakness in design, relative performance of vendors' equipment, need for changes in test or surveillance schedules, etc., are longer term and should not be classified as alerts. At any rate, if the identified problem results from analyses by organizations such as NRC, INPO, EPRI, NSAC, or an NSSS vendor, that organization should take the lead in notifying the utilities, A/E's, etc.

Suspected generic problems identified by organizations such as utility, manufacturer, consultant, etc., should be referred to the more broadly based industry organization such as INPO and NSAC for review of the generic implications and need for an "alert".

NSAC and INPO have put in place a Significant Event Evaluation and Information Network (SEEIN) to disseminate the results of a comprehensive analysis of all sources of operational data, including the NPRDS. This network links plant operators, designers and vendors, and it ties into the in-house analyses of the utilities' on-sight review teams.

Whenever any of the concurrent, overlapping analyses of operational data suggest a generic problem, this network provides a mechanism for alerting all participants who might be affected by the problem. That network also contains feedback loops for monitoring the subsequent design, maintenance, or operating changes and tracking the problem to its resolution.

Safety-related problems uncovered by this network will be reported to the NRC by the appropriate vendor or plant operator under 10 CFR 21.

Question 5: What systematic analysis is conducted currently by licensees? To what extent and for what purpose should each licensee, the NRC, and the public analyze the data?

Response: A requirement already exists that each licensee review operating experience at plants of similar design (TMI-2 Lessons Learned Task Force Report NUREG 0578). NPRDS through routine detailed output reports and the Special Report Writer capability (now being tested in a pilot program) can assist the utilities in this function by making historical engineering and failure data readily available. The program can serve as a useful tool in operational experience evaluation. But to require each licensee to analyze the data would be needlessly duplicative, and in fact, would be counter-productive; it would inhibit utilities from performing the non-routine, specialized types of analyses pertinent to particular situations and immediate needs. This data analysis can be more effectively accomplished with an attendant feedback mechanism by utility sponsored organizations such as INPO and NSAC and by the NRC.

We, in Duke, have used reliability data to investigate the relative performance of competing electrical design configurations, to investigate the economic feasibility of a spare, main step-up transformer for the 230 KV system, and to try to identify possible weaknesses in our electrical designs. We are considering the use of event tree/fault tree analyses coupled with control room alarms and indications in developing a problem diagnosis tool to be used by operations for trouble shooting. We would rely heavily on reliability data for this project.

Some of the possible applications of NPRDS data were listed in response to Question 2. Other than periodic analyses by NSAC and INPO, analyses should be performed as the need dictates. Care should be used in requiring analyses by licensees to assure that the analyses are contributing to the safety of plants and are not just a calculational exercise.

Question 6: If NPRDS reporting is made mandatory, what form of NPRDS management (i.e. industry, NRC, or joint industry/NRC) will best lead to full responsive reporting and meaningful analysis?

Response: Management should remain as it is now-joint industry/NRC management. The management structure will actually have relatively little influence on reporting and analysis: only demonstrated usefulness will impact these items significantly. Besides, "meaningful" analyses are being performed using current NPRDS data. "Fully responsive reporting", which appears to be a synonym for 100% participation, is not necessary for NPRDS data to be applied in a meaningful and useful manner.

Question 7: To what extent, if any, should the NRC manage NPRDS reporting and data analysis?

Response: The NRC should remain an active participant in the ANSI N18.20 subcommittee and user of NPRDS data. Nothing beyond this is warranted. The bulk of the effort in establishing and operating the NPRDS program has come from and is coming from the industry. The industry has designed the program

to meet its needs. NRC management of NPRDS would have the effect of altering the program to meet the needs of the NRC first and industry second. This can be seen by proposed changes already submitted to ANSI N18-20. These proposed changes would add considerably to burden of reporting data while offering minimal benefits to the industry. Such change in a program supported primarily by industry funds appear inordinate. Further, management of the NPRDS by NRC would inherently force the system into the regulatory arena with all the attendant loss of flexibility and complications of legal and political impacts.

Question 8:

If NPRDS reporting is made mandatory, how should the NRC inspect and enforce mandatory licensee participation? Should licensees be subject to enforcement penalties for noncompliance with NPRDS requirements?

Response:

A requirement that all utilitites participate in NPRDS does not necessitate a separate inspection and enforcement function at the utility level by the NRC. The degree and accuracy of reporting is readily available for review by the N18-20 Subcommittee (which has NRC representation) and the NRC staff through reports prepared by the NPRDS contractor. The tacit assumption contained in this question, the NRC must inspect and enforce if participation is to be made mandatory, clearly demonstrates previously expressed concerns.

The NRC has sufficient regulation (through Technical Specifications and 10 CFR 21 requirements) to ensure that nuclear safety concerns are properly reported. NPRDS is a long term statistical data base developed by the industry, and it is inappropriate to suggest or consider enforcement penalties.

Question 9:

What improvements should be made to the NPRDS Manual or other guiding vehicle to enhance uniformity of reportable scope, completeness, and accuracy of reporting, and usability of the data?

Response:

Uniformity of reporting can best be accomplished by demonstrating to those doing the work that the data is useful and is being used to prove the safety, performance, and reliability of their plant. The primary problem with reportable scope has been the lack of an appropriate guide which can be referenced in the procedures manual. This problem was recognized from the outset and it was hoped that appropriate standards would be forthcoming in the next few years. The Unique Identification of Plant Equipment (UNID) now being developed by an industry committee for approval as an IEEE Standard should provide more of the detailed guidance and instruction to ensure more consistent reporting.

In 1978, the ANSI N18-20 Subcommittee established a Task Force to review, clarify, define, and recommend rules and procedures to the ANSI N18-20 Subcommittee in the following areas:

1. Improved quality of data
2. Standardized reportable scope and failure reporting
3. Increased usage of data

4. Improved rules for reporting and maintaining the data base
5. Expanded scope of audits of data
6. Implementation of computer terminal access for special reports
7. Other areas as directed by the ANSI N18-20 Subcommittee

Progress is being made in each of these areas as mentioned in response to some of the other questions, as as this work is completed, it will be incorporated in the Reporting Procedures Manual for NPRDS. The analyses which will be performed by NSAC, INPO, and the NRC will contribute to the demonstration of usefulness and will accelerate added uses within the utilities, A/E's and Manufacturers.

Question 10:

Any data-gathering system needs feedback to maintain and upgrade system capability in the face of changing events, methodological advances and other factors. Feedback is particularly necessary to modify data-gathering activity upon which the whole analytical system rests. What feedback features, if any, should be addressed by rulemaking?

Response:

The current NPRDS program has a good feedback mechanism. There have been a number of changes to the NPRDS procedures manual and reporting forms since the system went into operation in July 1974, all as a result of feedback to the ANSI N18-20 Subcommittee. With the expected usage of the data base by NSAC, NRC, and INPO, there will be additional valuable feedback. We see no need for this subject to be addressed further.

Question 11:

Should the NPRDS and LER systems be restructured to avoid overlapping data-gathering requirements or should present systems formats be retained?

Response:

LER's are designed for rapid reporting of significant events. both equipment related and non-equipment related. NPRDS is designed for long term reliability of systems and components. Although data may overlap, the functions are independent. Restructuring should be limited to satisfying the intent of the LER system and should not be tied to NPRDS.

Question 12:

In the event you recommend eliminating duplication between LER and NPRDS reporting, how would you restructure each system's reporting requirements? Comment specifically on the idea expressed in summary Paragraph 8 of limiting LER reporting to items of major safety significance. Should such restructuring be done simultaneously with making NPRDS reporting mandatory or should ongoing NPRDS and LER upgrading efforts continue separately?

Response:

We do not recommend eliminating duplication between LER and NPRDS reporting.

Question 13:

Do you agree with the summary Paragraph 2 estimate of a minimum of 3500 components as an appropriate scope? Assuming a reportable scope of 3500 components, how many NPRDS failure reports should be expected per month per operating plant?

Response:

Reportable scope for any plant can only be determined by a detailed evaluation of the plant's design. To try to establish and impose some average number is absurd. A reportable scope of 3500 components should only be used as a ballpark figure.

The same is true for the number of failure reports during a month's period. Setting a benchmark number does not recognize legitimate variations in operating experience, either from plant to plant or between different months at the same plant.

Question 14:

Should the scope of systems and components presently summarized by the NPRDS Manual be expanded or contracted and, if so, what areas?

Response:

Some change in the scope of reporting to NPRDS is expected as a result of the ANSI N18-20 Subcommittee efforts. TMI-2-related investigations have indicated the need to look carefully at various currently non-reportable components in proximity to the primary system or ECCS. This is being considered in the studies now underway.

The resulting change in the NPRDS scope is expected to be fairly minor; however, since the existing data collecting systems adequately cover those systems and components outside the scope of NPRDS.

Question 15:

Does the cost of preparing and submitting failure reports differ between the LER and the NPRDS systems? What do you estimate these costs to be?

Response:

The cost of NPRDS Form 4 reports and LER reports are about equal. Duke estimates the cost to be in the range of $100 to $200 each.

Question 16:

Are the per-plant figures of $75,000 to $200,000 for one time development of NPRDS engineering data and $50,000 for annual NPRDS reporting considered valid or are these figures understated or overstated?

Response:

The $75,000 to $200.000 range for pedigree reports is reasonable. The $75,000 number is, however, a minimum number. The average expenditure is

probably between $150,000 and $175,000. Pedigreeing can be called a one-time development in theory only. Since its start in 1974, the scope of the NPRDS program has been expanded a number of times. In addition to these expansions, the newly instituted audits of failure reports usually generate questions about pedigree information which must be resolved.

Estimates of $50,000 per unit are reasonable for multi-unit stations, but are low for single unit stations.

Question 17:

What alternatives to mandatory reporting would provide the data necessary for complete and accurate reliability analyses and at what level of assurance?

Response:

It is a fundamental flaw to assume that for a data base to be useful, it must represent 100% of the potential data base. While this is probably true for a regulatory data base upon which enforcement actions are based, it very definitely is not true for a long term statistical data base such as NPRDS.

The ANSI N18-20 Subcommittee fully supports the concept of 100% enthusiastic reporting by the utilities, but not at the expense of involving this long term reliability data base in the regulatory process with attendant legal, political, inspection, enforcement, etc. activities.

The key to improved data quality and complete reporting is to make the enterprise worthwhile to the utilities. Two possible ways of making "fully responsive" reporting worthwhile are for the Commission to offer incentives to utilities using NPRDS data to make real improvements in plant safety and to tie participation in NPRDS to the ability to participate in the insurance pool offered. [redacted]. These measures taken separately or, preferably, together should bring about significant improvements in data quality and the level of reporting.

The offering of incentives has the most promise and it brings about a double benefit. It should improve data quality, but most importantly, it should also bring about an increase in the overall level of safety for the plants. Such incentives as relaxation of test and surveillance intervals, relaxed limiting conditions for operation, or relief from strict adherence to the single failure criterion when they can be rigorously supported by data from NPRDS are a rational use of the data base which will encourage data usage and improvements in data quality. The FAA and the airline industry have successfully used this type of system for years. It would be well worth the effort to investigate this application.

The cost of replacement power when a nuclear unit is off line is astronomical. Insurance pools are being established to help offset the loss of revenue in the case of outages associated with plant mishaps. If responsible participation in NPRDS were one of the criteria for membership in an insurance pool, the incentive for participation would be greatly increased.

Question 18:

Do the benefits to the utility and the public of improved availability and the increased safety factor warrant the cost of NPRDS or is there a less costly way to realize equivalent benefits in regulatory action?

Response:

It should be emphasized, again, that NPRDS should deal with safety issues only. The nuclear power industry is beginning to more fully appreciate probabilistic analyses. This trend will continue to grow, and the demand for more and better data will grow along with it. One of the prime factors affecting the use of reliability data is the availability of reliability engineers. As more utilities and other industry members have added reliability engineers to their staffs, the usage of data has increased. This is also a growing trend.

Past history has shown that governmental bodies are usually more ineffective and inefficient then private industry. It is doubtful that any regulatory action would be more cost effective.

In addition, the utilities have demonstrated that they perceive the need for improved power plant information systems through their voluntary support of availability related systems such as GADS and EPRI's National Data Base development effort. This has all been accomplished without regulatory intervention.

Question 19:

How should NPRDS be funded? Should industry fund fully or should the NRC contribute funds to support the industry system?

Response:

Funding should come primarily from the utilities, but as major user of data, the NRC should also contribute as it has in the past. Incidentally, there is a fallacy being espoused by some members of NRC staff-that the NRC pays 40% of the cost of NPRDS. This is inaccurate. The NRC does supply about 40% of the NPRDS contractor's budget, but with 60 plants contributing $50,000 per year through failure reporting, the NRC's portion of the overall cost drops to about 5-10% per year. This ignores the cost of pedigreeing: if one or two plants are pedigreed each year, the NRC's contribution drops to 2-3% of the overall cost. Having a minor contributor control the NPRDS program hardly seems appropriate.

Question 20:

Should the six early-design plants, excluded when the NPRDS commenced, continue to be excluded or should all plants be required to operate?

Response:

The design of the six early plants were unique and are not an adequate indicator of current, much less future, designs. Any significant events occurring in them should be adequately reported through the LER system. Their inclusion into the NPRDS data base in not warranted.

Question 21:

Certain operator errors must now be reported within the scope of the LER system. Furthermore, NPRDS reports sometimes include corresponding human error information. To what extent, if any, should an improved NPRDS collect man-machine interface data and perform reliability analyses which consider human factors?

Response:

NPRDS reporting of human factor information should not go far beyond what is the current practice. Some clarification of reporting codes is warranted, but beyond that nothing should be done.

The technical basis for human reliability is radically different from that required of equipment reliability. The sources and types of variation are increased by orders of magnitude. There is not even a consensus among human factors experts about what should be reported. For the NPRDS program, which tends to standardize practice, to enter this field as it is just starting to develop would be a mistake.