



RULEMAKING ISSUE (Notation Vote)

May 19, 1995

SECY-95-129

FOR: The Commissioners

FROM: James. M. Taylor
Executive Director for Operations

SUBJECT: PROPOSED RULEMAKING FOR REPORTING EQUIPMENT RELIABILITY DATA

PURPOSE:

To obtain Commission approval for the publication of a Federal Register notice of proposed rulemaking.

BACKGROUND:

In August 1994, the staff presented the Commission with a proposed probabilistic risk assessment (PRA) policy statement (SECY-94-219). The Commission provided its approval in a memorandum dated September 13, 1994. The proposed policy was published for comment on December 8, 1994 (59 FR 63389) (Attachment 1). Among other things, the proposed policy statement indicates that NRC will expand the use of PRA technology in all regulatory matters to the extent supported by the state-of-the-art in terms of PRA methods and data. It also indicates that this implies the staff must significantly enhance the collection of human and equipment reliability data. In a memorandum dated March 24, 1995, I provided, for your information, the staff's rulemaking plan for this proposed rulemaking.

On April 26, 1995, the staff briefed the Commission on the proposed rule, as described in SECY-95-099. In a staff requirements memorandum dated May 4, 1995, the Commission requested that the staff revise the proposed package to provide additional justification regarding the need for the rule (Attachment 2). The Commission also expressed the view that the comment period on the proposed rule should not close before there is opportunity for public comment on the draft regulatory guide. This revised package responds to the Commission's request.

Contacts:

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NOTE: TO BE MADE PUBLICLY AVAILABLE
WHEN THE FINAL SRM IS MADE
AVAILABLE

DISCUSSION:

The revised notice of proposed rulemaking is provided in Attachment 2. The proposed rule, which has not been changed, would require that licensees for commercial nuclear power reactors report to the NRC summary reliability and availability data for risk-significant systems and equipment. The proposed rule would also require licensees to maintain on site, and to make available for NRC inspection, records and documentation that provide the basis for the summary data reported to the NRC. This information would improve the NRC's ability to make risk-effective regulatory decisions consistent with the proposed policy statement. The systems and equipment for which data would be provided are a subset of the systems and equipment within the scope of the maintenance rule (10 CFR 50.65).

The proposed reporting requirements would apply to the event-mitigating systems and equipment¹ which have or could have a significant effect on risk in terms of avoiding core damage accidents or preserving containment integrity. Summary information reported to the NRC would be:

- (a) The number of demands, the number of failures to start associated with such demands, and the dates of any such failures, characterized according to the identification of the train affected, the type of demand (test, inadvertent/spurious, or actual need), and the plant mode at the time of the demand (operating or shutdown),
- (b) The number of hours of operation following each successful start, characterized according to the identification of the train affected and whether or not the operation was terminated because of equipment failure, with the dates of any such failures,
- (c) The number of hours of unavailability, characterized according to the identification of the train affected, the plant mode at the time of the unavailability (operating or shutdown), the type of unavailability (planned, unplanned, or support system unavailability), and, if due to support system unavailability, identification of the support system,
- (d) For each unavailability due to component failure(s), a failure record identifying the component(s) and providing the failure date, duration, mode, cause, and effect, and
- (e) The number of hours when two or more trains from the same or different systems were concurrently unavailable, characterized according to the identification of the trains that were unavailable.

¹ In relation to this proposed rule, the term equipment is intended to apply to an ensemble of components treated as a single entity for certain PRAs where a system or train treatment would not be appropriate.

The proposed rule is intended to be a simple, performance-based rule supplemented with a detailed regulatory guide. The guide would provide methods for selecting systems and equipment subject to the rule. The guide would also provide methods to define demands, failure, unavailability, and train boundaries for each system consistent with PRA applications and suggest formats for reporting the data to the NRC and maintaining the data on site.

As indicated in the draft statement of considerations (SOC), the proposed rule is necessary for the following reasons (Attachment 3, pages 1 and 2):

1. The proposed rule would substantially improve licensee implementation of the evaluation and goal setting activities required by the maintenance rule by providing licensees with access to industry-wide reliability and availability information for risk-significant systems and equipment within the scope of the maintenance rule. (The systems and equipment for which data would be provided are a subset of the systems and equipment within the scope of the maintenance rule.)
2. The information required to be submitted would also substantially improve the NRC's oversight of licensees' implementation of the maintenance rule.
3. The proposed rule would substantially improve the NRC's ability to make risk-effective regulatory decisions consistent with the Commission's proposed PRA policy statement.

As also indicated in the draft SOC, the NRC's maintenance rule is a performance-based rule. Accordingly, a key feature of the maintenance rule is the principle that licensees should be allowed flexibility to determine the details of their maintenance programs and to establish and modify their monitoring activities. Consistent with this idea, the maintenance rule does not include reporting requirements or indicate what specific data elements must be collected and retained in order to carry out its provisions. Similarly, NUMARC 93-01, which the NRC staff has endorsed as one acceptable way of meeting the requirements of the maintenance rule, does not call for the reporting of data or the collection and retention of specific data elements. It has now been determined that reporting of data regarding reliability and availability is necessary for the following reasons (Attachment 3, pages 5 and 6):

1. A parallel effort to develop a voluntary industry-wide safety train reliability collection system failed.
2. Although plant specific information is generally available on site, and utilities have schemes to look at licensee event reports and other generic event information, the NRC pilot inspections, associated with early efforts to prepare for maintenance rule implementation in 1996, indicate that utilities do not have a systematic and consistent way of comparing specific train reliability and availability data with similar industry-wide data.

3. In connection with the NRC's evolving PRA policy, the staff has defined the data elements needed for evaluating maintenance and has established that they are the same as needed to support a transition toward a risk-and performance-based process.
4. The staff has recently found cause for concern about how some reactor licensees handle on-line maintenance. Prudent on-line maintenance decisions depend on a full appreciation of the risk-significance of taking equipment out of service (individually or collectively) and plant-specific and generic reliability and availability data would play a significant role in improving such decision-making.
5. Use of the maintenance rule as the basis for excluding active equipment from the licensee renewal rule (10 CFR 54, May 8, 1995, 60 FR 22461) could be strengthened through a substantial improvement in maintenance rule implementation.

Both the SOC and the regulatory analysis for this proposed rule provide a discussion of the need for the information proposed to be collected and reported, including the safety significance of the information. The regulatory analysis for the proposed rule also discusses in detail the impacts of collecting the information under two alternative regulatory schemes, for the purpose of assessing the burdens imposed upon licensees by the proposed rule. The regulatory analysis and the SOC set forth the conclusion that the burden imposed by the proposed information collection is justified in view of the safety significance of the information to proper licensee implementation and NRC oversight of the maintenance rule, as well as the necessity for the information in adopting and implementing risk-based regulatory activities. These rationales would form the bases for the analyses that the NRC would be required to prepare to support this proposed rulemaking should the Paperwork Reduction Act of 1995 become effective.

As suggested in the staff requirements memorandum, the staff will not close the comment period for the proposed rule until there is an opportunity for public comment on the draft regulatory guide.

As discussed in the draft SOC, industry representatives have expressed concern that the data, if publicly available, would be subject to misuse. However, the data that would be required to be reported under this proposed rule would not appear to qualify for withholding under 10 CFR 2.790(b)(1). Commenters who believe otherwise would be requested to provide specific justification for such belief (Attachment 3, pages 9 and 10).

RESOURCES:

Staff resources to prepare, review, and conduct the rulemaking are expected to be 1.5 FTE in AEOD, 0.5 FTE in RES, and 0.25 FTE in other offices. These FTE resources are included in the FY 1995-1999 Five-Year Plan. Contract support to assist in the preparation of the regulatory guide is estimated to require \$230K, and will be reprogrammed from within existing resources.

Costs for implementing the proposed rule are discussed in the draft Regulatory Analysis provided in Attachment 4.

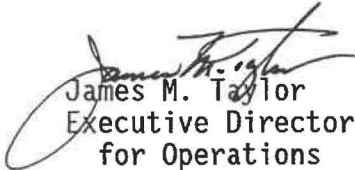
RECOMMENDATIONS:

That the Commission:

1. Approve publication of the notice of proposed rulemaking (Attachment 2).
2. Note:
 - a. The proposed rule will be published in the Federal Register for a 75-day public comment period;
 - b. I certify that this rule, if promulgated, will not have a negative economic impact on small entities because the licensees to which this rule would apply do not qualify as small entities. It is expected that the additional cost of reporting the data to NRC will be small. In the long term, the rule is expected to result in substantial cost savings to licensees with the reduced regulatory burden resulting from the move to risk-based regulation;
 - c. The Chief Counsel for Advocacy of the Small Business Administration will be informed of the certification regarding economic impact on small entities and the reasons for it as required by the Regulatory Flexibility Act;
 - d. The proposed rule contains information collection requirements that are subject to review by the Office of Management and Budget (OMB). Upon Commission affirmation, formal request for OMB review and clearance will be initiated;
 - e. A public announcement will be issued when the proposed rule is filed with the Office of the Federal Register (Attachment 5);
 - f. The appropriate Congressional committees will be informed (Attachment 6); and
 - g. Copies of the Federal Register notice of proposed rulemaking will be distributed to all operating nuclear power plant licensees. The notice will be sent to other interested parties upon request.

COORDINATION:

The Office of the General Counsel (OGC) has reviewed this proposed rulemaking and has no legal objection.


James M. Taylor
Executive Director
for Operations

Attachments:

1. Proposed policy statement
2. Staff requirements memorandum
3. Federal Register notice
4. Draft Regulatory Analysis
5. Draft press release
6. Draft Congressional letter

Commissioners' comments or consent should be provided directly to the Office of the Secretary by COB Tuesday, June 6, 1995.

Commission Staff Office comments, if any, should be submitted to the Commissioners NLT Tuesday, May 30, 1995, with an information copy to the Office of the Secretary. If the paper is of such a nature that it requires additional review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

DISTRIBUTION:

Commissioners
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Attachment 1

Use of Probabilistic Risk-Assessment Methods in
Nuclear Regulatory Activities; Proposed Policy Statement

December 8, 1994

59 FR 63389

For the Nuclear Regulatory Commission.
Frank J. Miraglia,
Acting Director, Office of Nuclear Reactor Regulation.
 [FR Doc. 94-30149 Filed 12-7-94; 8:45 am]
 BILLING CODE 7590-01-M

Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities; Proposed Policy Statement

AGENCY: Nuclear Regulatory Commission.

ACTION: Proposed policy statement.

SUMMARY: The Nuclear Regulatory Commission (NRC) is proposing a policy statement regarding the use of probabilistic risk assessment (PRA) in nuclear regulatory matters. The Commission believes that an overall policy on the use of PRA in nuclear regulatory activities should be established so that the many potential applications of PRA technology can be implemented in a consistent and predictable manner that promotes regulatory stability and efficiency and enhances safety. The proposed policy statement would improve the regulatory process through improved risk-effective safety decision-making, through more efficient use of agency resources, and through a reduction in unnecessary burdens on licensees. The use of PRA technology would be increased in all regulatory matters to the extent supported by the state-of-the-art in PRA methods and data and in a manner that complements the NRC's deterministic approach and supports the NRC's traditional defense-in-depth philosophy.

DATES: Submit comments by February 7, 1995. Comments received after this date will be considered if it is practical to do so, but the Commission is able only to ensure consideration for comments received on or before this date.

ADDRESSES: Send comments to: Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Attention: Docketing and Service Branch.

Deliver comments to: One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852, between 7:45 am and 4:15 pm Federal workdays.

Copies of comments received may be examined at: NRC Public Document Room, 2120 L Street NW. (Lower Level), Washington, DC.

FOR FURTHER INFORMATION CONTACT: Thomas G. Hiltz, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555. Telephone (301) 504-1105.

SUPPLEMENTARY INFORMATION:

- I. Background
- II. Deterministic and Probabilistic Approaches to Regulation
- III. The Commission Policy
- IV. Availability of Documents

I. Background

The NRC has generally regulated the use of nuclear material based on deterministic approaches. Deterministic approaches to regulation consider a set of challenges to safety and determine how those challenges should be defended. A probabilistic approach to regulation enhances and extends this traditional, deterministic approach, by 1) allowing consideration of a broader set of potential challenges to safety, 2) providing a logical means for prioritizing these challenges based on risk significance, and 3) allowing consideration of a broader set of resources to defend against these challenges.

Until the accident at Three Mile Island (TMI) in 1979, the Atomic Energy Commission (now the NRC), only used probabilistic criteria in certain specialized areas of licensing reviews. For example, human-made hazards (e.g., nearby hazardous materials and aircraft) and natural hazards (e.g., tornadoes, floods, and earthquakes) were typically addressed in terms of probabilistic arguments and initiating frequencies to assess site suitability. The Standard Review Plan (NUREG-0800) for licensing reactors and some of the Regulatory Guides supporting NUREG-0800 provided review and evaluation guidance with respect to these probabilistic considerations.

The TMI accident substantially changed the character of the analysis of severe accidents worldwide. It led to a substantial research program on severe accident phenomenology. In addition, both major investigations of the accident (the Kemeny and Rogovin studies) recommended that PRA techniques be used more widely to augment the traditional nonprobabilistic methods of analyzing nuclear plant safety. In 1984, the NRC completed a study (NUREG-1050) that addressed the state-of-the-art in risk analysis techniques.

In early 1991, the NRC published NUREG-1150, "Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants." In NUREG-1150, the NRC used improved PRA techniques to assess the risk associated with five nuclear power plants. This study was a significant turning point in the use of risk-based concepts in the regulatory process and enabled the Commission to greatly improve its methods for assessing containment performance after core damage and accident progression.

The methods developed for and results from these studies provided a valuable foundation in quantitative risk techniques.

PRA methods have been applied successfully in several regulatory activities and have proved to be a valuable complement to deterministic engineering approaches. This application of PRA represents an extension and enhancement of traditional regulation rather than a separate and different technology. Several recent Commission policies or regulations have been based, in part, on PRA methods and insights. These include the Backfit Rule (§ 50.109, "Backfitting"), the Policy Statement on "Safety Goals for the Operation of Nuclear Power Plants," (51 FR 30028), the Commission's "Policy Statement on Severe Reactor Accidents Regarding Future Designs and Existing Plants" (50 FR 32138), and the Commission's "Final Policy Statement on Technical Specifications Improvement for Nuclear Power Reactors" (58 FR 39132). PRA methods also were used effectively during the anticipated transient without scram (ATWS) and station blackout (SBO) rulemaking, and supported the generic issue prioritization and resolution process. Additional benefits have been found in the use of risk-based inspection guides to focus NRC inspector efforts and make more efficient use of NRC inspection resources.

Currently, the NRC is using PRA techniques to assess the safety importance of operating reactor events and is using these techniques as an integral part of the design certification review process for advanced reactor designs. In addition, the Individual Plant Examination (IPE) program and the Individual Plant Examination - External Events (IPEEE) program (an effort resulting from the implementation of the Commission's "Policy Statement on Severe Reactor Accidents Regarding Future Designs and Existing Plants") have resulted in commercial reactor licensees using risk-assessment methods to identify any vulnerabilities needing attention.

The Commission has been developing performance assessment methods for low-level and high-level waste since the mid-1970s and these activities intensified using performance assessments techniques in the late 1980s and early 1990s. This has involved the development of conceptual models and computer codes to model the disposal of waste. Because waste-disposal systems are passive, certain analysis methods used for active systems in PRA studies for power reactors had to be adapted to

provide scenario analysis for the performance assessment of the geologic repository at Yucca Mountain, Nevada. In regard to high-level waste, the NRC staff participates in a variety of international activities (e.g., the Performance Assessment Advisory Group of the Organization for Economic Cooperation and Development, Nuclear Energy Agency) to ensure that consistent performance assessment methods are used to the degree appropriate.

The Commission believes that an overall policy on the use of PRA in nuclear regulatory activities should be established so that the many potential applications of PRA methodology can be implemented in a consistent and predictable manner that promotes regulatory stability and efficiency and enhances safety. On August 18, 1994, the NRC staff proposed a PRA policy statement to the Commission in SECY-94-218, "Proposed Policy Statement on the Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities." In its Staff Requirements Memorandum of October 4, 1994, the Commission directed the staff to revise the proposed PRA policy statement and publish the proposed PRA policy statement for public comment in the Federal Register.

II. Deterministic and Probabilistic Approaches to Regulation

(A) Extension and Enhancement of Traditional Regulation

The NRC established its regulatory requirements to ensure that a facility is designed, constructed, and licensed to operate without undue risk to the health and safety of the public. These requirements are largely based on deterministic engineering criteria. Simply stated, this deterministic approach establishes requirements for engineering margin and for quality assurance in design, manufacture and construction. In addition, it assumes that adverse conditions can exist (e.g., equipment failures and human errors) and establishes a specific set of design basis events. It then requires that the licensed facility design include safety systems capable of preventing and/or mitigating the consequences of those design basis events to protect the public health and safety.

The deterministic approach contains implied elements of probability (qualitative risk considerations), from the selection of accidents to be analyzed (e.g., reactor vessel rupture is considered too improbable to be included) to the system level requirements for emergency core

cooling (e.g., safety train redundancy and protection against single failure).

In contrast to the deterministic approach, PRA addresses all credible initiating events by assessing the event frequency. Mitigating system reliability is then assessed, including the potential for common cause failures. The probabilistic treatment therefore goes beyond the single failure requirements used in the deterministic approach. The probabilistic approach to regulation is, therefore, considered an extension and enhancement of traditional regulation by considering risk in a more coherent and complete manner. A natural result of the increased use of PRA methods and techniques would be the focusing of regulations on those items most important to safety by eliminating unnecessary conservatism. Where appropriate, PRA can also be used to support additional regulatory requirements. Deterministic-based regulations have been successful in protecting the public health and safety and PRA techniques are most valuable when they serve to focus the traditional, deterministic-based, regulations and support the defense-in-depth philosophy.

Beyond its deterministic criteria, the NRC has formulated guidance, as in the safety goal policy statement, that utilizes quantitative, probabilistic risk objectives. The safety goal policy statement establishes these top-level objectives to help assure safe operation of nuclear power plants. The safety goals are intended to be generically applied by the NRC as opposed to plant-specific applications. For the purpose of implementation of the safety goals, subsidiary numerical objectives on core damage frequency and containment performance have been established. The safety goals provide guidance on where plant risk is considered to be sufficiently low such that further regulatory action is not necessary. Also, as noted above, the Commission has been using PRA in performing regulatory analysis for backfit of cost-beneficial safety improvements at operating reactors (as required by 10 CFR 50.109) for a number of years.

(B) Uncertainties and Limitations of Deterministic and Probabilistic Approaches

The treatment of uncertainties is an important issue for regulatory decisions. Uncertainties exist in any regulatory approach and these uncertainties are derived from knowledge limitations. These uncertainties and limitations existed during the development of deterministic regulations and attempts were made to accommodate these

limitations by imposing prescriptive, and what was hoped to be, conservative regulatory requirements. A probabilistic approach has exposed some of these limitations and provided an improved framework to better focus and assess their significance and assist in developing a strategy to accommodate them in the regulatory process.

Human performance is an important consideration in both deterministic and probabilistic approaches. Assessing the influence of errors of commission and organizational and management issues on human reliability is an example that illustrates where current PRA methods are not fully developed. While this lack of knowledge contributes to the uncertainty in estimated risks, the PRA framework offers a powerful tool for logically and systematically evaluating the sensitivity and importance to risk of these uncertainties. PRA techniques and models to address errors of commission and the influence of organizational factors on human reliability are currently being developed.

It is important to note that not all of the Commission's regulatory activities lend themselves to a risk analysis approach that utilizes the same PRA tools (e.g., fault tree methods). In general, fault tree methods can be more suitable for power reactor events that typically involve complex systems. Events associated with industrial and medical uses of nuclear materials generally involve simple systems, involve radiation overexposures, and result from human error, not equipment failure. Because of the characteristics of medical and industrial events, as discussed above, analysis of these events using relatively simple techniques can yield meaningful results. Power reactor events, however, generally involve complex systems and human interactions, can potentially involve more than one adverse consequence, and often result from equipment failures. Therefore, power reactor events can require greater use of more complex risk analysis techniques, such as fault tree analysis, to yield meaningful insights.

Given the dissimilarities in the nature and consequences of the use of nuclear materials in reactors, industrial situations, and medical applications, the Commission recognizes that a single approach for incorporating risk analyses into the regulatory process is not appropriate. However, PRA methods and insights will be broadly applied within the NRC to ensure that the best use is made of available techniques to foster consistency in NRC risk-based decision-making.

(C) Defense-in-Depth Philosophy

In the defense-in-depth philosophy, the Commission recognizes that complete reliance for safety cannot be placed on any single element of the design, maintenance, or operation of a nuclear power plant. Thus, the expanded use of PRA technology will continue to support the NRC's defense-in-depth philosophy by allowing quantification of the levels of protection and by helping to identify and address weaknesses or overly conservative regulatory requirements in the physical and functional barriers.

III. The Commission Policy

Although PRA methods and information have thus far been used successfully in nuclear regulatory activities, there have been concerns that PRA methods are not consistently applied throughout the agency, that sufficient agency PRA/statistics expertise is not available, and that the Commission is not deriving full benefit from the large agency and industry investment in the developed risk assessment methods. Therefore, the Commission believes that an overall policy on the use of PRA in nuclear regulatory activities should be established so that the many potential applications of PRA can be implemented in a consistent and predictable manner that promotes regulatory stability and efficiency. This policy statement sets forth the Commission's intention to encourage the use of PRA and to expand the scope of PRA applications in all nuclear regulatory matters to the extent supported by the state-of-the-art in terms of methods and data. Implementation of the proposed policy statement would improve the regulatory process in three areas: foremost, through improved risk-effective safety decision making; through more efficient use of agency resources; and through a reduction in unnecessary burdens on licensees.

Therefore, the Commission proposes the following policy statement regarding the expanded NRC use of PRA:

(1) The use of PRA technology should be increased in all regulatory matters to the extent supported by the state-of-the-art in PRA methods and data and in a manner that complements the NRC's deterministic approach and supports the NRC's traditional defense-in-depth philosophy.

(2) PRA and associated analyses (e.g., sensitivity studies, uncertainty analyses, and importance measures) should be used in regulatory matters, where practical within the bounds of the state-

of-the-art, to reduce unnecessary conservatism associated with current regulatory requirements, regulatory guides, license commitments, and staff practices. Where appropriate, PRA should be used to support additional regulatory requirements. Appropriate procedures for including PRA in the process for changing regulatory requirements should be developed and followed. It is, of course, understood that the intent of this policy is that existing rules and regulations shall be complied with unless these rules and regulations are revised.

(3) PRA evaluations in support of regulatory decisions should be as realistic as possible and appropriate supporting data should be publicly available for review.

(4) The Commission's safety goals for nuclear power plants and subsidiary numerical objectives are to be used with appropriate consideration of uncertainties in making regulatory judgments in the context of backfitting new generic requirements on nuclear power plant licensees.

Policy Implications

There are several important regulatory or resource implications that follow from the goal of increased use of PRA techniques in regulatory activities. First, the NRC staff, licensees, and Commission must be prepared to consider changes to regulations, to guidance documents, to the licensing process, and to the inspection program. Second, the NRC staff and Commission must be committed to a shift in the application of resources over a period of time based on risk findings. Third, the NRC staff must undertake a training and development program, which may include recruiting personnel with PRA experience, to provide the PRA expertise necessary to implement these goals. Additionally, the NRC staff must continue to develop PRA methods and regulatory decision-making tools and must significantly enhance the collection of equipment and human reliability data for all of the agency's risk assessment applications, including those associated with the use, transportation, and storage of nuclear materials.

This proposed policy statement affirms the Commission's view that PRA methods can be used to derive valuable insights, perspective and general conclusions as a result of an integrated and comprehensive examination of the design of nuclear facilities, facility response to initiating events, the expected interactions among facility structures, systems and components,

and between the facility and its operating staff.

IV. Availability of Documents

Copies of documents cited in this section are available for inspection and/or for reproduction for a fee in the NRC Public Document Room, 2120 L Street NW, (Lower Level), Washington, DC 20037. Copies of NUREGs cited in this document may be purchased from the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082. Copies are also available for purchase from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

In addition, copies of (1) SECY-94-218, "Proposed Policy Statement on the Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities," (2) SECY-94-219, "Proposed Agency-Wide Implementation Plan for Probabilistic Risk Assessment (PRA)," (3) the Commission's Staff Requirements Memorandum of September 13, 1994 concerning the August 30, 1994 Commission meeting on SECY-94-218 and SECY-94-219, and (4) the Commission's Staff Requirements Memorandum of October 4, 1994 on SECY-94-218 can be obtained electronically by accessing the NRC electronic bulletin board system (BBS) Tech Specs Plus. These four WordPerfect[®] 5.1 documents are located in the BBS MISC library directory under the single filename "PRAPLAN.ZIP". The BBS operates 24 hours a day and can be accessed through a toll-free number, 1-800-679-5784, at modem speeds up to 9600 baud with communication parameters set at 8 data bits, no parity, 1 stop bit, full duplex, and using ANSI terminal emulation.

Dated at Rockville, Maryland, this 1st day of December 1994.

For the Nuclear Regulatory Commission.

Gary M. Holahan,

Director, Division of Systems Safety and Analysis Office of Nuclear Reactor Regulation.

[FR Doc. 94-30147 Filed 12-7-94; 8:45 am]
BILLING CODE 7590-01-P

RAILROAD RETIREMENT BOARD

Agency Forms Submitted for OMB Review

Summary: In accordance with the Paperwork Reduction Act of 1980 (44 U.S.C. Chapter 35), the Railroad Retirement Board has submitted the following proposal(s) for the collection of information to the Office of

Attachment 1

Use of Probabilistic Risk-Assessment Methods in
Nuclear Regulatory Activities; Proposed Policy Statement

December 8, 1994

59 FR 63389

Attachment 2

Staff Requirements Memorandum

May 4, 1995



OFFICE OF THE
SECRETARY

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

Action: Jordan, AEOD
Cys: Taylor Russell
Milhoan Morrison
Thompson
Blaha

May 4, 1995

IN RESPONSE, PLEASE
REFER TO: M9504026A

MEMORANDUM TO: James M. Taylor
Executive Director for Operations

FROM: John C. Hoyle, Secretary

SUBJECT: STAFF REQUIREMENTS - BRIEFING ON PROPOSED
RULE ON SAFETY EQUIPMENT RELIABILITY DATA
(SECY-95-099), 10:00 A.M., WEDNESDAY, APRIL
26, 1995, COMMISSIONERS' CONFERENCE ROOM, ONE
WHITE FLINT NORTH, ROCKVILLE, MARYLAND (OPEN
TO PUBLIC ATTENDANCE)

The Commission¹ was briefed by the NRC staff on the proposed rule on safety equipment reliability data. The Commission requested the staff to revise the proposed rulemaking package to provide additional justification regarding the need for the rule.

~~(EEO)~~- (AEOD) (SECY Suspense: 5/17/95) 9400180

The Commission encouraged the staff to continue its efforts towards developing the regulatory guide. The Commission expressed the view that the comment period on the proposed rule should not close before there is opportunity for public comment on the draft regulatory guide.

cc: The Chairman
Commissioner Rogers
Commissioner de Planque
Commissioner Jackson
OGC
OCA
OIG
Office Directors, Regions, ACRS, ACNW, ASLBP (via E-Mail)
PDR - Advance
DCS - P1-24

¹ Commissioner Jackson had not been sworn in at the time this meeting was held and therefore did not participate in this meeting.

Attachment 3

Federal Register Notice

10 CFR PART 50

RIN 3150-AF33

Reporting Reliability and Availability Information
for Risk-significant Systems and Equipment

AGENCY: Nuclear Regulatory Commission.

ACTION: Proposed rule.

SUMMARY: The Nuclear Regulatory Commission (NRC) is proposing to amend its regulations to require that licensees for commercial nuclear power reactors report summary reliability and availability data for risk-significant systems and equipment¹ to the NRC. The proposed rule would also require licensees to maintain on site, and to make available for NRC inspection, records and documentation that provide the basis for the summary data reported to the NRC. The Commission has determined that reporting of reliability and availability information is necessary for the reasons discussed below. This proposed rule

¹ In relation to this proposed rule, the term equipment is intended to apply to an ensemble of components treated as a single entity for certain probabilistic risk assessments (PRAs) where a system or train treatment would not be appropriate.

would substantially improve licensee implementation of the evaluation and goal-setting activities required by the maintenance rule by providing licensees with access to industry-wide reliability and availability information for risk-significant systems and equipment within the scope of the maintenance rule. The systems and equipment for which data would be provided are a subset of the systems and equipment within the scope of the maintenance rule. The information required to be submitted by this proposed rule would also substantially improve the NRC's oversight of licensees' implementation of the maintenance rule. Further, this proposed rule would substantially improve the NRC's ability to make risk-effective regulatory decisions consistent with the Commission's proposed policy statement on the use of probabilistic risk assessments (PRAs).

DATES: The comment period expires on _____ (75 days following publication in the *Federal Register*). Comments received after this date will be considered if it is practical to do so, but the NRC can assure consideration only for comments received on or before this date.

ADDRESSES: Mail written comments to: U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, ATTN.: Docketing and Service Branch.

Deliver written comments to One White Flint North, 11555 Rockville Pike, Rockville, MD, between 7:30 am and 4:15 pm on Federal workdays.

Copies of the draft regulatory analysis, the supporting statement submitted to OMB, and comments received may be examined, and/or copied for a

fee, at: The NRC Public Document Room, 2120 L Street NW. (Lower Level), Washington, DC.

FOR FURTHER INFORMATION CONTACT: Dennis Allison, Office for Analysis and Evaluation of Operational Data, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Telephone (301) 415-6835.

SUPPLEMENTARY INFORMATION:

BACKGROUND

Current Requirements.

There are no existing requirements to systematically report reliability and availability information; nor is there an industry-wide database to provide such information.

The maintenance rule (10 CFR 50.65, Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, July 10, 1991; 56 FR 31306, as amended on June 23, 1993; 58 FR 33993) does not contain reporting requirements. Current reporting requirements in 10 CFR 50.72, "Immediate notification" and 10 CFR 50.73, "Licensee event report system," require the submittal of extensive descriptive information on selected system level events. The Nuclear Plant Reliability Data System, a data base that industry supports and the Institute for Nuclear Power Operations maintains, provides data on component engineering characteristics and failures. Neither of these sources includes all the data elements (i.e., number of demands on a system,

number of hours of operation, and information on maintenance unavailabilities) that are needed to determine the reliability and availability of risk-significant systems and equipment.

In recent years, plants have performed Individual Plant Evaluations (IPEs), as requested in Generic Letter 88-20 and its supplements, and submitted the results to the NRC. These submittals provide measures of risk such as core damage frequency, dominant accident sequences, and containment release category information. While system and component reliability data have been collected as part of some utility IPEs, this information is typically not included in the IPE submittals to the NRC.

NRC Maintenance Rule.

In 1991 the NRC issued the maintenance rule in final form (July 10, 1991; 56 FR 31306). In considering the maintenance rule, the Commission has determined that:

1. "...proper maintenance is essential to plant safety" (July 10, 1991; 56 FR 31306);

2. "...a regulatory framework must be put in place which provides a mechanism for evaluating the overall continuing effectiveness of licensee maintenance programs, particularly as plants continue to age" (July 10, 1991; 56 FR 31307); and

3. "...the backfitting of the requirements in the maintenance rule will provide a substantial increase in the level of protection of public health and safety beyond that currently provided by the Commission's regulations and that the costs of implementing the rule are justified in view of this increased protection" (July 10, 1991; 56 FR 31320)

The NRC's maintenance rule is a performance based rule. Accordingly, a key feature of the maintenance rule is the principle that licensees should be allowed flexibility to determine the details of their maintenance programs and to establish and modify their monitoring activities (July 10, 1991; 56 FR 31309 and 56 FR 31316). Consistent with this idea, the maintenance rule does not include reporting requirements or indicate what specific data elements must be collected and retained in order to carry out its provisions. Similarly, NUMARC 93-01, which the NRC staff has endorsed as one acceptable way of meeting the requirements of the maintenance rule, does not call for the reporting of data or the collection and retention of specific data elements. The Commission has now determined that such reporting of data regarding reliability and availability is necessary for the following reasons:

1. A parallel effort to develop a voluntary industry-wide safety train reliability collection system failed.

2. Although plant specific information is generally available on-site, and utilities have schemes to look at licensee event reports and other generic event information, the NRC pilot inspections, associated with early efforts to prepare for maintenance rule implementation in 1996, indicate that utilities

do not have a systematic and consistent way of comparing specific train reliability and availability data with similar industry-wide data.

3. In connection with the NRC's evolving PRA policy, the staff has defined the data elements needed for evaluating maintenance and has established that they are the same as needed to support a transition toward a risk- and performance-based process.

4. The staff has recently found cause for concern about how some reactor licensees handle on-line maintenance. Prudent on-line maintenance decisions depend on a full appreciation of the risk-significance of taking equipment out of service (individually or collectively) and plant-specific and generic reliability and availability data would play a significant role in improving such decision-making.

5. Use of the maintenance rule as the basis for excluding active equipment from the licensee renewal rule (10 CFR 54, May 8, 1995, 60 FR 22461) could be strengthened through a substantial improvement maintenance rule implementation.

For some systems, the maintenance rule requires licensees to establish performance or condition goals, taking into account industry-wide operating experience where practical. It also requires periodic program evaluations, including consideration of unavailability due to monitoring or preventive maintenance, taking industry-wide operating experience into account, where practical.

Licensees will need to monitor reliability and availability of risk-significant systems, particularly for the periodic program evaluations.² For most risk-significant systems, plant-specific data are too sparse to support a meaningful evaluation of system reliability and availability. With both plant-specific and industry-wide data, statistical techniques using Bayesian analysis can provide more meaningful estimates of equipment performance for comparisons with goals or to perform analysis to minimize unavailability. Industry-wide data would also provide a practical source for comparing plant-specific performance with industry operating experience. Accordingly, licensees' implementation of the evaluation and goal setting activities required by the maintenance rule would be substantially improved.

The information will also substantially improve the NRC's ability to determine whether licensees are implementing the maintenance rule, as well as provide more meaningful measures for determining whether implementation of the maintenance rule is having the intended effect, including provision of a regulatory framework "which provides a mechanism for evaluating the overall

² NUMARC 93-01, which the NRC has endorsed as describing one acceptable way of meeting the requirements of the NRC's maintenance rule, indicates in Section 12.2.4 that the adjustment for balancing of objectives needs to be done for risk-significant structures, systems, and components (SCCs). However, for other SSCs it is acceptable to measure operating SSC performance against overall plant performance criteria and standby system performance against specific performance criteria. This is reasonable in that, for systems that are not risk-significant, the expense of a rigorous balancing is not warranted.

continuing effectiveness of licensee maintenance programs, particularly as plants continue to age" (July 10, 1991; 56 FR 31307); and provision of "a substantial increase in the level of protection of public health and safety beyond that currently provided by the Commission's regulations" (July 10, 1991; 56 FR 31320).

The maintenance rule is also central to the license renewal rule. Thus, ensuring that the maintenance rule is being effectively implemented and is effective in reducing risk is important in assuring that one of the bases for the license renewal rule remains valid.

Move to Risk-Based Regulation and Requirements.

In its proposed policy statement on the use of PRAs (December 8, 1994; 59 FR 63389), the Commission indicated that the use of PRA technology should be increased in all regulatory matters to the extent supported by the state-of-the-art in terms of methods and data. The proposed policy statement further indicates that this implies the staff must significantly enhance the collection of equipment and human reliability data. Implementation of these policies would improve the regulatory process through (1) improved risk-effective safety decision making, (2) more efficient use of agency resources, and (3) reduction in unnecessary burdens on licensees.

The information collection and reporting requirements in this proposed rule represent one part of the overall move towards risk-based regulation.

Prior Efforts.

In late 1991 and through 1992, NRC participated on an INPO-established NRC/industry review group to make recommendations for changes to the Nuclear Plant Reliability Data System (NPRDS). The group's final recommendations to INPO to collect PRA-related reliability and availability data would have provided most of NRC's data needs. However, INPO took no action on these recommendations.

During 1992 and 1993, the NRC staff continued through correspondence and meetings to outline the particular data needed and to seek INPO's assistance in obtaining the data. In a December 1993 meeting with NUMARC (now the Nuclear Energy Institute (NEI)), INPO representatives suggested their Safety System Performance Indicator (SSPI) as a surrogate for reliability data. They proposed expanding the indicator to additional systems and indicated that data elements could be modified to compute actual reliability and availability data. General agreements were reached with INPO on which systems and components and what types of data elements are appropriate for maintenance effectiveness monitoring and risk-related applications.

Industry representatives expressed concern that reliability data, if publicly available, would be subject to misuse. In certain circumstances it is permissible for the NRC to withhold information from public disclosure. For example, pursuant to 10 CFR 2.790(b)(1), a licensee may propose that a document be withheld from public disclosure on the grounds that it contains trade secrets or privileged or confidential commercial or financial

information. However, the data that would be reported under this proposed rule would not appear to qualify for withholding. Reliability data used as input to risk-based regulatory decisions must be scrutable and accessible to the public. The proposed PRA policy statement indicates that appropriate supporting data for PRA analyses that support regulatory decisions should be publicly available. Similarly, the Commission's draft report on public responsiveness (March 31, 1995; 60 FR 16685) indicates that the policy of the NRC is to make information available to the public relating to its health and safety mission, consistent with its legal obligations to protect information and its deliberative and investigative processes. Commenters who believe that there is information subject to a proper 2.790(b)(1) withholding determination requested by the proposed rule should provide a specific justification for such belief.

Need for Reliability and Availability Information.

In order to move towards risk based regulation and the increased use of PRA information, the NRC staff needs scrutable, plant-specific reliability and availability information.

The framework for an overall move towards risk-based regulation involves the development of a regulatory process which includes operational procedures and decision criteria that requires credible PRA methods, models, and data. This framework would be intended to provide for predictable, consistent, and objective risk-based regulatory decision making. The data that would be reported under this rule represent one part of such a framework. In addition,

these data are needed to improve the efficiency and effectiveness of current NRC regulatory applications that employ a risk-based perspective in advance of defining the entire framework.

Some examples of how reliability and availability information would be used to improve current NRC regulatory applications that consider risk in the decision process are discussed below. One of the examples involves the need for information to support generic regulatory actions -- i.e., generic issue resolution and its associated rule making or regulatory guide revision. Another example involves the need for information to determine whether further NRC action is needed at specific plants - i.e., indicators of plant performance. Some involve a mixture of plant specific and generic elements. For example, analyzing an event at a given plant could lead to a plant-specific action such as a special inspection and/or to a generic action such as a bulletin or generic letter.

Generic issue resolution. The NRC staff currently uses risk estimates in: (1) prioritizing its work on safety issues, (2) deciding whether work to develop new requirements or staff positions to address these issues is warranted, and (3) deciding whether proposed new requirements or staff positions should be implemented. Knowing the current, updated reliability and availability of key systems on a generic and plant-specific basis would, in some cases, lead to a better understanding of the risk in these areas and, thus, to more risk-effective decisions. This should both enhance public protection and reduce unnecessary regulatory burdens.

Indicators of Plant Performance. PRA models with plant-specific reliability and availability data would be used to develop indicators of plant performance and trends in plant performance which are more closely related to risk than some of those currently in use. These indicators would enhance NRC management's ability to make risk-effective decisions with regard to identifying plants for increased or decreased regulatory attention.

Accident Sequence Precursor (ASP) and Event Analysis. Plant-specific, train-level reliability and unavailability data will be used to improve the plant-specific ASP models which the NRC staff uses to compute conditional core damage probability for determining the risk-significance of operational events. Dates of equipment failures and causal information will be used to identify common cause failures and to compute common cause failure rates for input to these models. Improving these methods will enhance the staff's ability to make risk-effective decisions about which events warrant further inspections or investigations and/or generic actions such as bulletins and generic letters.

Risk-based Inspections. Current and updated system reliability, availability and failure data in a generic and plant-specific risk-based context will be used to enhance the staff's ability to plan inspections focused on the most risk-significant plant systems, components, and operations. Generic data will be used in developing risk-based inspection guides and a framework for inspections; plant-specific data will be used to focus and optimize inspection activities at specific plants.

Aging. Equipment reliability data along with data on the equipment's age will help (1) identify equipment that is being degraded by aging, (2) define the extent and the risk-significance of aging problems, and (3) determine equipment reliability as a function of age.

Another class of examples involves the need for information to evaluate anticipated cost beneficial licensing actions, where the rationale is that risk permits reductions in previous margins of safety or less prescriptive requirements without adverse impact on overall safety. The nuclear industry has expressed interest in, and the NRC is actively pursuing, a variety of modifications to the basic regulations and guidelines that govern the operation of commercial nuclear power reactors. These modifications are characterized by allowing the individual licensees to utilize insights from plant-specific risk evaluations to reduce or remove current requirements that are found by the licensees to have low risk-significance. Current regulatory requirements under consideration for risk-based modification include those prescribing quality assurance, in-service inspection, in-service testing, surveillance testing and restrictions against on-line maintenance. It is anticipated that a significant number of additional requests will be received, relying upon risk-based arguments. These changes could adversely affect the level of safety achieved by the plants if the risk evaluations are flawed or the changes are improperly executed or the changes involved synergistic effects that are not covered by the risk models or captured by historical data. In order to properly monitor the effectiveness of licensees' programs to maintain safety while reducing regulatory burden, the NRC staff needs current, plant-specific data that can provide a direct measure of the current

level of safety achieved by each plant. Relaxation of regulatory burden then can proceed with appropriate feedback to assure that the level of safety performance is not being degraded.

Some examples of areas where reliability and availability information would provide monitoring and feedback related to reducing regulatory burdens are discussed below.

Maintenance Monitoring. As discussed above, current plant-specific data can provide a direct measure of the current level of safety achieved by each plant, which can provide feedback on the effectiveness of licensee programs, including maintenance programs. In addition, the NRC staff has expressed concern about the extent to which licensees are taking systems and equipment out of service for maintenance during plant operation. Although this practice may offer economic benefits by reducing plant downtime, it must be properly managed to assure that safety is not unduly compromised. In conjunction with hours of unavailability, the NRC staff will use the hours when any two trains from the same or different systems are concurrently unavailable to monitor how well licensees are managing the risk associated with on-line maintenance.

Risk-Based Technical Specifications. Technical Specification requirements specify surveillance intervals and allowed outage times for safety equipment for the various modes of plant operation. With plant-specific demand failure and unavailability data, proposed changes to plant-specific Technical Specifications can be more effectively accepted based on the risk-significance and performance of the plant systems/equipment. Failure

rates from actual demands will be used to verify that failure rates estimated from testing are approximately the same. Results and recommendations from the risk-based technical specifications development efforts would also be incorporated in NRC staff guidance for review of Technical Specifications modifications.

Description of Proposed Rule.

The proposed rule would require the holders of operating licenses for nuclear power reactors to report reliability and availability data for risk-significant systems and equipment. The proposed reporting requirements would apply to the event-mitigating systems and equipment which have or could have a significant effect on risk in terms of avoiding core damage accidents or preserving containment integrity. Summary information reported to the NRC would be:

(a) The number of demands, the number of failures to start associated with such demands, and the dates of any such failures, characterized according to the identification of the train affected, the type of demand (test, inadvertent/spurious, or actual need), and the plant mode at the time of the demand (operating or shutdown);

(b) The number of hours of operation following each successful start, characterized according to the identification of the train affected and whether or not the operation was terminated because of equipment failure, with the dates of any such failures;

(c) The number of hours of unavailability, characterized according to the identification of the train affected, the plant mode at the time of the unavailability (operating or shutdown), the type of unavailability (planned, unplanned, or support system unavailability), and, if due to support system unavailability, identification of the support system;

(d) For each unavailability due to component failure(s), a failure record identifying the component(s) and providing the failure date, duration, mode, cause, and effect, and;

(e) The number of hours when two or more trains from the same or different systems were concurrently unavailable, characterized according to the identification of the trains that were unavailable.

The summary information would be reported annually and compiled on the basis of calendar quarters, or on a more frequent basis at the option of each individual licensee. Records and documentation of each occurrence of a demand, failure, or unavailability that provide the basis for the summary data reported to the NRC would be required to be maintained on-site and made available for NRC inspection.

In developing these data elements, the NRC staff offices have worked together over the past three years to develop a consensus on the minimum data needed to support the maintenance rule and other risk-based applications. During this period NRC staff has also interacted extensively with the Institute of Nuclear Power Operations (INPO) and the Nuclear Energy Institute

(NEI) in an effort to define the minimum reliability and availability data needed to satisfy the needs of both NRC risk-based regulatory applications and industry (licensee) uses of PRA. At the request of industry, the NRC staff has reduced and consolidated the data requested to minimize reporting burden on industry while still meeting NRC's regulatory needs. A consensus was reached among the NRC program offices and a general agreement was obtained with INPO and NEI on the minimum data elements that would satisfy the aforementioned applications.

The number of demands and the number of successful starts are needed to determine demand reliability, i.e., the fraction of demands that result in successful starts. (The complement of this fraction is often called the probability of failure on demand). The actual number of demands and successes, as opposed to the ratio, is needed to compute confidence bounds on demand reliability. Estimating reliability is fundamental to achieving the balance described in 10 CFR 50.65(a)(3) -- e.g., a low reliability may indicate a need for more preventive maintenance.

The type of demand is needed to determine whether or not the demand reliability estimated by testing is approximately the same as the demand reliability for actual demands.

The plant mode at the time of a demand is needed to determine the demand frequency, demand reliability, and unavailability according to plant mode. These factors, as well as the risk associated with unreliability and

unavailability, can be quite different depending on whether the plant is in operation or shut down.

The hours of operation following successful starts are needed to compute the probability the equipment will function for a specified period of time. This information is needed for systems that must operate for an extended period following an accident to fulfill a risk-significant safety function. Similar to starting reliability, as discussed above, estimating the probability of continued operation is fundamental to achieving the balance described in 10 CFR 50.65 (a)(3).

The hours of unavailability are needed to determine the fraction of time that a train is not available to perform its risk-significant safety function. For some systems this can be an important or dominant contributor to the overall probability of failure to perform the system's safety function. It can be significantly affected by elective maintenance. Estimating unavailability is also fundamental to achieving the balance described in 10 CFR 50.65(a)(3).

The type of unavailability (planned or unplanned) is needed to effectively utilize these estimates. For example, a high unplanned unavailability may indicate a need for more preventive maintenance; a high planned unavailability may indicate otherwise.

The hours of unavailability due to support systems failure or unavailability are needed to eliminate double counting. For example, an ESW

train unavailability may result in other trains being unavailable as well; however, for purposes of estimating risk in a PRA study, that unavailability should not be counted more than once.

The date of each failure is needed to allow screening for potential common cause failures. Failures that occur closely together in time warrant review to see whether a common cause failure may be involved. Common cause failures may indicate a need for revised maintenance procedures, staggered testing, etc. Common cause failure rates are also needed for PRA and ASP models and are quite important in assessing system reliability and availability.

Failure cause and failure mode information are needed to support common cause failure analysis as discussed above and to associate the failure with the correct failure mode for input into PRA models.

Quarterly data are needed to conduct first order trending studies to identify areas of emerging concern with regard to overall plant and system performance. More frequent compilation is acceptable at the discretion of each licensee.

On site retention of records and documentation that provide the bases for the summary data report to the NRC for a period of several years is consistent with maintenance rule applications. For example, monitoring reliability for a few years would be necessary to determine trends in order to achieve the balance described in 10 CFR 50.65(a)(3). In addition, on-site

data are needed to provide a scrutable basis for regulatory decisions and because it is expected that, from time to time, it will be necessary for the NRC staff to review additional information in order to better understand particular subjects. For example, it is expected to be necessary to review the actual times of unavailability in order to estimate the mean repair times for key components for the purpose of updating the staff's ASP models.

New Regulatory Guide.

A new regulatory guide would be prepared to provide supplementary guidance. The guide would present an acceptable way to define the event-mitigating risk-significant systems and equipment to be addressed and it would provide risk-based definitions of failure as well as train and system boundaries consistent with PRA applications. The format in which data would be provided to the NRC and a suggested format for maintaining on-site documentation and record keeping would be included. Use of electronic data submittal, in order to reduce costs, will be considered a priority objective in developing and implementing the guide. The NRC staff will work with public and industry representatives in developing the guide. A draft guide will be published for comment before it is finalized. Public workshops are planned before and after publication of the draft guide. As experience is gained, it is expected that the regulatory guide will be revised from time to time.

Definitions. The basic definitions used in reporting under § 50.76 are discussed below; further details will be addressed in the regulatory guide. For example, the basic definition of failure is provided here; further

details, such as how to handle a case where the operators prematurely terminate system operation following a real demand, will be discussed in the regulatory guide. In particular, the regulatory guide will define risk-significant safety function(s) and failures for systems and equipment covered by this proposed rule.

Demand is an occurrence where a system or train is called upon to perform its risk-significant safety function. A demand may be manual or automatic. It may occur in response to a real need, a test, an error, an equipment malfunction or other spurious causes. For the purposes of reporting under this rule, the demands of interest are those which are actual demands or closely simulate actual demands for the train or specific equipment involved.

Failure, for the purpose of reporting under this rule, is an occurrence where a system or train fails to perform its risk-significant safety function. A failure may occur as a result of a hardware malfunction, a software malfunction, or a human error. Failures to start in response to a demand are reported under paragraph 50.65(b)(1)(i). Failures to run after a successful start are reported under paragraph 50.65(b)(1)(ii).

Unavailability is an instance where a required system or train is not in a condition to perform or is not capable of performing its risk-significant safety function. This may result from failure to start, from failure to run, or from intentional or unintentional removal of equipment from service (e.g., for maintenance or testing).

Risk-significant safety function is a safety function that has or could have a significant effect on risk in terms of avoiding core damage accidents or preserving containment integrity.

Risk-significant systems and equipment are the systems and equipment which have or could have a significant effect on risk in terms of avoiding core damage accidents or preserving containment integrity. More than one importance measure would need to be considered in determining the risk-significant systems and equipment. The reporting requirements of this rule apply to event-mitigating risk-significant systems and equipment.³

The risk-significant systems and equipment to be addressed will be determined by each licensee. The regulatory guide will describe an acceptable method for making that determination. The general approach will be to weigh various risk measures in order to determine the systems and equipment at each plant that contribute most to risk in terms of avoiding core damage accidents or preserving containment integrity.

It is expected that the rule will produce a set of basic systems that will be reported for all plants that have them. However, these basic systems

³ Note that NUMARC 93-01 defines risk-significant SSCs as those SSCs that are significant contributors to risk as determined by PRA/IPE or other methods. It is expected that the differences between definitions, if any, will be identified and addressed during the public comment process for the new regulatory guide.

are not sufficient by themselves. Additional systems and equipment to be addressed will depend on plant-specific features. Listed below is the currently proposed set of basic systems.

BASIC PWR SYSTEMS

BASIC BWR SYSTEMS

Auxiliary feedwater

Reactor core isolation cooling

High pressure safety injection

Isolation condenser, high pressure coolant injection or high pressure core spray, as appropriate

Reactor protection

Reactor protection

Low pressure safety injection

Low pressure coolant injection or core spray, as appropriate

Emergency ac power

Emergency ac power

Power operated relief valves
(as needed for feed and bleed)

Regulatory Guide 1.160.

In addition to preparation of a new regulatory guide as discussed above, Regulatory Guide 1.160, Revision 1, which endorses NUMARC 93-01, will be

revised to take exception to the general statement (in Section 13.1 of NUMARC 93-01) that documentation developed for implementation of NUMARC 93-01 (i.e., for implementation of the maintenance rule) is not required to be submitted to the NRC. The exception would simply indicate that the summary reliability and availability information required to be submitted by this proposed rule must be submitted to the NRC.

Minimizing Costs. The NRC intends that the data required to be collected and reported under this proposed rule be essentially the same as would be required for monitoring reliability and/or availability for other purposes, such as monitoring system reliability where that is the option chosen for compliance with the maintenance rule. Thus, it should be practical to gather and report the data without significant additional cost. This will be a priority goal in developing the guidance to be included in the new regulatory guide.

Sunset Provision. As experience is gained with implementing the proposed rule and utilizing the information required to be collected and reported, it is not unreasonable to expect that refinement or adjustment of the rule may be necessary or desirable. Indeed, circumstances in the future may change such that one or more of the reasons which lead the Commission to adopt the proposed information collection requirement are no longer applicable or effective. The Commission fully intends to review the rule's implementation and adjust or rescind it as necessary.

The Commission recognizes that there may be opposition to adoption of this new requirement in the absence of a requirement for such a reassessment of the rule. One way of assuring such a reassessment would be to include a "sunset provision" in the rule, whereby the rule would automatically expire after a specified period of time (e.g., five years), unless: (i) a condition specified in the rule is fulfilled, or (ii) the Commission engages in a rulemaking which extends the effectiveness of the rule.

The Commission requests public comments on whether the rule should contain such a sunset provision, and if so, the period of time after which the rule should automatically expire.

Grandfather Provision. There may be some plants for which, at the time that the proposed rule may be adopted by the Commission as a final rule, licensees have already announced plans to discontinue operation in the near future. Furthermore, licensees may determine in the future to discontinue operation at some plants. In either case, there may be less reason to require collection and reporting of the information contemplated by the proposed rule at such plants and it may be advisable to exempt such plants from the information collection and reporting requirements of the proposed rule (i.e., "grandfathering"). The Commission requests public comments on whether the rule should exempt plants that have announced (or will announce) plans to discontinue operation within a short time (e.g., two years).

Conclusion.

As discussed above in "NRC Maintenance Rule", the Commission believes that the information to be collected by this proposed rule, once it is aggregated and made publicly available, will substantially improve licensees' abilities to perform meaningful evaluations balancing increased performance due to maintenance against unavailability due to maintenance activities, as required by the maintenance rule, as well as the licensees' process for establishment of performance goals for risk-significant systems when that is required. In addition, the NRC staff's ability to ensure that the maintenance rule is being effectively implemented and is effective in reducing risk would be substantially improved. Finally, as discussed in "Need for Reliability and Availability Information", the information to be collected by the proposed rule is necessary for the development and implementation of risk-based regulatory processes. Risk-based regulatory approaches provide a means for the Commission to maintain, and in some cases improve, safety while reducing impacts on licensees as well as NRC resource expenditures, by focusing regulatory requirements and activities on the most risk-significant areas. The Commission has also prepared a regulatory analysis (see "Regulatory Analysis") which identified alternatives for collecting the information for use by both licensees and the NRC, and evaluated the costs of each viable alternative. Based upon these factors, the Commission believes that the costs of the proposed rule's information collection and reporting requirements are justified in view of the potential safety significance and projected benefits of the information in NRC regulatory activities.

Submission of Comments in Electronic Format

Commenters are encouraged to submit, in addition to the original paper copy, a copy of their comments in an electronic format on IBM PC DOS-compatible 3.5- or 5.25-inch, double-sided, diskettes. Data files should be provided in WordPerfect 5.0, or 5.1. ASCII code is also acceptable, or if formatted text is required, data files should be submitted in IBM Revisable Format Text Document Content Architecture (RFT/DCA) format.

Environmental Impact: Categorical Exclusion

The proposed rule sets forth requirements for the collection, maintenance, and reporting of risk-significant system and equipment reliability and availability data. The NRC has determined that this proposed rule is the type of action described in categorical exclusion, 10 CFR 51.22(c)(3)(ii). Therefore, neither an environmental impact statement nor an environmental assessment has been prepared for this proposed regulation.

Paperwork Reduction Act Statement

This proposed rule amends information collection requirements that are subject to the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). This rule has been submitted to the Office of Management and Budget for review and approval of the Paperwork Reduction Act requirements.

The public reporting burden for this collection of information is estimated to average 985 hours per response (i.e., per commercial nuclear power reactor per year), including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Information and Records Management Branch (T-6F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0011), Office of Management and Budget, Washington, DC 20503.

Regulatory Analysis

The Commission has prepared a draft regulatory analysis on this proposed regulation. The analysis examines the costs and benefits of the alternatives considered by the Commission. The draft analysis is available for inspection in the NRC Public Document Room, 2120 L Street NW. (Lower Level), Washington, DC. Single copies of the draft analysis may be obtained from: Dennis Allison, Office for Analysis and Evaluation of Operational Data, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Telephone (301) 415-6835.

Regulatory Flexibility Certification

In accordance with the Regulatory Flexibility Act of 1980 (5 U.S.C. 605 (B)), the Commission certifies that this rule will not, if promulgated, have a

significant economic impact on a substantial number of small entities. The proposed rule affects only the licensing and operation of nuclear power plants. The companies that own these plants do not fall within the scope of the definition of "small entities" set forth in the Regulatory Flexibility Act or the Small Business Size Standards set out in regulations issued by the Small Business Administration Act in 13 CFR Part 121.

Backfit Analysis

The proposed rule sets forth requirements for reporting and record keeping. The NRC has determined that the backfit rule, 10 CFR 50.109, does not apply to this proposed rule, and therefore, a backfit analysis is not required for this proposed rule because these amendments do not involve any provisions which would impose backfits as defined in 10 CFR 50.109(a)(1).

However, as discussed above in "Regulatory Analysis," the Commission has prepared a regulatory analysis which summarizes the purpose and intended use of the information proposed to be collected, identifies alternatives for collection and reporting of the proposed information, and identifies the impacts and benefits of the alternatives.

This regulatory analysis constitutes a disciplined process for evaluating the potential benefits and projected impacts (burdens) of information collection and reporting requirements such as the proposed rule. The Commission therefore concludes that the objective underlying the Commission's adoption of the Backfit Rule - that regulatory impacts are

assessed under established criteria in a disciplined process - is being met for this proposed rule.

List of Subjects in 10 CFR Part 50

Antitrust, Classified information, Criminal penalties, Fire protection, Intergovernmental relations, Nuclear power plants and reactors, Radiation protection, Reactor siting criteria, Reporting and record keeping requirements.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, and 5 U.S.C. 553, the NRC is proposing to adopt the following amendments to 10 CFR Part 50.

PART 50 DOMESTIC LICENSING OF PRODUCTION AND UTILIZATION FACILITIES

1. The authority citation for Part 50 continues to read as follows:

AUTHORITY: Sections 102, 103, 104, 105, 161, 182, 183, 186, 189, 68 Stat. 936, 937, 938, 948, 953, 954, 955, 956, as amended, sec. 234, 83 Stat. 1244, as amended (42 U.S.C. 2132, 2133, 2134, 2135, 2201, 2232, 2233, 2236, 2239, 2282); secs. 201, as amended, 202, 206, 88 Stat. 1242, as amended, 1244, 1246 (42 U.S. C. 5841, 5842, 5846).

Section 50.7 also issued under Pub. L. 95-601, sec. 10, 92 Stat. 2951 as amended by Pub. L. 102-486, sec. 2902, 106 Stat 3123, (42 U.S.C. 5851).

Section 50.10 also issued under secs. 101, 185, 68 Stat. 936, 955, as amended (42 U.S.C. 2131, 2235); sec. 102, Pub. L. 91-190, 83 Stat. 853 (42 U.S.C. 4332). Sections 50.13, and 50.54(dd), and 50.103 also issued under sec. 108, 68 Stat. 939, as amended (42 U.S.C. 2138). Sections 50.23, 50.35, 50.55, and 50.56 also issued under sec. 185, 68 Stat. 955 (42 U.S.C. 2235). Sections 50.33a, 50.55a and Appendix Q also issued under sec. 102, Pub. L. 91-190, 83 Stat. 853 (42 U.S.C. 4332). Sections 50.34 and 50.54 also issued under sec. 204, 88 Stat. 1245 (42 U.S.C. 5844). Sections 50.58, 50.91, and 50.92 also issued under Pub. L. 97-415, 96 Stat. 2073 (42 U.S.C. 2239). Section 50.78 also issued under sec. 122, 68 Stat. 939 (42 U.S.C. 2152). Sections 50.80 - 50.81 also issued under sec. 184, 68 Stat. 954, as amended (42 U.S.C. 2234). Appendix F also issued under sec. 187, 68 Stat. 955 (42 U.S.C. 2237).

2. Section 50.8 (b) is revised to read as follows:

§ 50.8 Information collection requirements: OMB approval.

* * * * *

(b) The approved information collection requirements contained in this part appear in §§ 50.30, 50.33, 50.33a, 50.34, 50.34a, 50.35, 50.36, 50.36a, 50.48, 50.49, 50.54, 50.55, 50.55a, 50.59, 50.60, 50.61, 50.63, 50.64, 50.65, 50.71, 50.72, 50.75, 50.76, 50.80, 50.82, 50.90, 50.91, 50.120, and Appendices A, B, E, G, H, I, J, K, M, N, O, Q, and R.

* * * * *

3. Section 50.76 is added to read as follows:

§ 50.76 Reporting reliability and availability information for risk-significant systems and equipment.

(a) Applicability. This section applies to all holders of operating licenses for commercial nuclear power plants under 10 CFR 50.21b or 50.22 and all holders of combined operating licenses for commercial nuclear power plants under 10 CFR 52.97.

(b) Requirements.

(1) Each licensee shall submit an annual report to the NRC that contains the following information, compiled on the basis of calendar quarters, or on a more frequent basis at the option of each licensee, for systems and ensembles of components in paragraph (b)(2) of this section:

(i) the number of demands, the number of failures to start associated with such demands, and the dates of such failures, characterized according to the identification of the train affected, the type of demand (test, inadvertent/spurious, or actual need), and the plant mode at the time of the demand (operating or shutdown),

(ii) the number of hours of operation following each successful start, characterized according to the identification of the train affected and whether or not the operation was terminated because of equipment failure, with the dates of any such failures,

(iii) the number of hours of unavailability, characterized according to the identification of the train affected, the plant mode at the time of the unavailability (operating or shutdown), the type of unavailability (planned, unplanned, or support system unavailability), and, if due to support system unavailability, identification of the support system,

(iv) for each unavailability due to component failure(s), a failure record identifying the component(s) and providing the failure date, duration, mode, cause, and effect, and

(v) the number of hours when two or more trains from the same or different systems were concurrently unavailable, characterized according to the identification of the trains that were unavailable.

(2) The requirements of paragraph (b)(1) of this section apply to those event-mitigation systems, and ensembles of components treated as single entities in certain probabilistic risk-assessments where a system or train treatment would not be appropriate, which have or could have a significant effect on risk in terms of avoiding core damage accidents or preserving containment integrity.

(3) Each licensee shall maintain records and documentation of each occurrence of a demand, failure, or unavailability that provide the basis for the data reported in paragraph (b)(1) of this section on site and available for NRC inspection for a period of 5 years after the date of the report specified in paragraph (b)(1) of this section.

(c) Implementation. Licensees shall begin collecting the information required by paragraph (b) of this section on January 1, 1997, and shall submit the first report required by paragraph (b)(1) of this section by January 31, 1998. Thereafter, each annual report required by paragraph (b)(1) of this section shall be submitted by January 31 of the following year.

Dated at Rockville, MD, this ____ day of _____, 1995.

For the Nuclear Regulatory Commission,

John C. Hoyle,
Secretary of the Commission

Attachment 4

DRAFT REGULATORY ANALYSIS

DRAFT

REGULATORY ANALYSIS

REPORTING RELIABILITY AND AVAILABILITY INFORMATION
FOR RISK-SIGNIFICANT SYSTEMS AND EQUIPMENT

May 17, 1995

ABSTRACT

The Nuclear Regulatory Commission (NRC) proposes to modify its reporting requirements to collect reliability and availability data from commercial nuclear power plant licensees. The NRC has determined that the reporting of such data is necessary for the following reasons. The proposed rule would substantially improve licensee implementation of the evaluation and goal setting activities required by the maintenance rule, 10 CFR 50.65. It would also substantially improve the NRC's oversight of licensees' implementation of the maintenance rule and the effectiveness of the maintenance rule. Finally, the proposed rule would substantially improve the NRC's ability to make risk-effective decisions, consistent with the NRC's safety goal and proposed PRA policies. This regulatory analysis (RA) considers alternatives that would assist the NRC in achieving these safety and regulatory goals in the most efficient manner.

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1. Introduction

This chapter provides a discussion of the issue under consideration including the statement of the problem, the objectives of the Proposed Action, and a summary of technical findings, conclusions, and recommendations. Chapter 2 presents the alternatives considered, and identifies the Preferred Alternative. Chapter 3 describes the value/cost impacts and limitations of all alternatives, and presents the technical bases for the results of the regulatory analysis. Criteria used to select the recommended action are discussed in Chapter 4. Chapter 5 presents information related to implementing the recommended action.

1.1 Statement of the Problem

Implementation of the NRC's maintenance rule (10 CFR 50.65) provides a regulatory framework for evaluating the overall continuing effectiveness of licensee maintenance programs, particularly as plants begin to age, and requires that industry-wide operating experience be taken into account to the extent practical in evaluations to assure that an appropriate balance is maintained between preventive maintenance and the availability of risk-significant structures, systems and components.

At present, there is no NRC or industry data base for consistent, industry-wide plant-specific reliability and availability data for risk-significant systems. Further, there is no program under development by nuclear power plant licensees to gather and share reliability and availability information among licensees, or even to gather such information using consistent, industry-wide definitions. The maintenance rule, which is due to become effective in July 1996, does not contain reporting requirements; thus, this condition is expected to persist.

In addition, as the Commission develops and implements policies to make greater use of risk and performance-based tools and methods, scrutable and current reliability and availability data are needed by the NRC staff to move towards risk-based regulation. This is expected to improve the regulatory process through:

- improved risk-effective decisionmaking,
- making more efficient use of agency resources, and
- reducing unnecessary regulatory burdens on licensees.

1.1.1 Nature of the Proposed Action

The NRC staff seeks rulemaking to require commercial nuclear power reactor licensees to report summaries of consistent reliability and availability data for risk-significant systems and equipment to the NRC, and to maintain supporting data at the site. This regulatory analysis evaluates alternatives for collecting such data in the most efficient manner. In a separate rulemaking, the staff proposes to amend those portions of 10 CFR 50.72, "Immediate Notification Requirements for Operating Nuclear Power Reactors," and 10 CFR 50.73, "Licensee Event Report System," which may no longer be needed in light of the new rule.

1.1.2 Background

Prior efforts to develop a program to collect and report, on a voluntary basis, the reliability data needed to support maintenance rule applications and to address risk-based decisionmaking have not been successful. NRC management has interacted extensively with the Institute of Nuclear Power Operations (INPO) and the Nuclear Energy Institute (NEI) over the past three years in attempts to develop a voluntary approach to collect reliability data and to make them available to NRC.

In late 1991 and 1992, NRC participated on an INPO-established NRC/industry review group to make recommendations for changes to the Nuclear Plant Reliability Data System (NPRDS). The group's final recommendations to INPO to collect PRA-related and reliability data would have satisfied most of NRC's data needs. However, INPO took no action on these recommendations.

During 1992 and 1993, the NRC staff continued through correspondence and meetings to outline the particular data needed and to seek INPO's assistance in obtaining the data. In a December 1993 meeting with NUMARC (now the Nuclear Energy Institute (NEI)), INPO representatives suggested their Safety System Performance Indicator (SSPI) as a surrogate for reliability data. They proposed expanding the indicator to additional systems and indicated that data elements could be modified to compute actual system reliability and availability. Although general agreements were reached with INPO on which systems and components and what types of data elements are appropriate for maintenance monitoring and risk-related applications, industry has not as yet specified the data that would be provided or made any available. Furthermore, the industry was concerned that this information, if publicly available, would be subject to misuse. The NRC staff has held that reliability data used as input to risk-based regulatory decisions should be scrutable and available to the public. For example, the proposed PRA policy statement indicates that data which serve as a basis for regulatory decisions will be made publicly available.

The role of the Proposed Action in substantially improving licensee implementation of the maintenance rule and the NRC's oversight of licensee implementation, in risk-based regulation, the efficient use of agency resources, and reducing unnecessary burdens on licensees is discussed below.

NRC Maintenance Rule. In 1991, the NRC issued the maintenance rule in final form. In considering the maintenance rule, the NRC determined that a regulatory framework must be put in place which provides a mechanism for evaluating the overall continuing effectiveness of licensee maintenance programs. A key feature of the maintenance rule is the principle that licensees should be allowed flexibility to determine the details of their maintenance programs and to establish and modify their monitoring activities. (July 10, 1991; 56 FR 31309 and 56 FR 31316). Consistent with this idea, the maintenance rule was not written to include reporting requirements or to indicate what specific data elements must be collected and retained in order to carry out its provisions. Similarly, NUMARC 93-01, which the NRC has endorsed as one acceptable way of meeting the requirements of the maintenance rule, does not indicate the need for reporting of data or collection and retention of specific data elements.

The Commission has now determined that such reporting of data regarding reliability and availability is necessary for the following reasons:

1. A parallel effort to develop a voluntary industry-wide safety train reliability collection system failed.
2. Although plant specific information is generally available on-site, and utilities have schemes to look at licensee event reports and other generic event information, the NRC pilot inspections, associated with early efforts to prepare for maintenance rule implementation in 1996, indicate that utilities do not have a systematic and consistent way of comparing specific train reliability and availability data with similar industry-wide data.
3. In connection with the NRC's evolving PRA policy, the staff has defined the data elements needed for evaluating maintenance and has established that they are the same as needed to support a transition toward a risk- and performance-based process.
4. The staff has recently found cause for concern about how some reactor licensees handle on-line maintenance. Prudent on-line maintenance decisions depend on a full appreciation of the risk-significance of taking equipment out of service (individually or collectively) and plant-specific and generic reliability and availability data would play a significant role in improving such decision-making.
5. Use of the maintenance rule as the basis for excluding active equipment from the licensee renewal rule (10 CFR 54, May 8, 1995, 60 FR 22461) could be strengthened through a substantial improvement maintenance rule implementation.

For some systems, the maintenance rule requires licensees to establish performance or condition goals, taking into account industry-wide operating experience where practical. It also requires periodic program evaluations, including consideration of unavailability due to monitoring or preventive maintenance, taking industry-wide operating experience into account, where practical.

Licensees will need to monitor reliability and availability of risk-significant systems, particularly for the periodic program evaluations.¹

For most risk-significant systems, plant-specific data are too sparse to support a meaningful evaluation of system reliability and availability. With both plant-specific and industry-wide data, statistical techniques using Bayesian analysis can provide more meaningful estimates of equipment perfor-

¹ NUMARC 93-01, which the NRC has endorsed as describing one acceptable way of meeting the requirements of the NRC's maintenance rule, indicates in Section 12.2.4 that the adjustment for balancing of objectives needs to be done for risk-significant structures, systems, and components (SCCS). However, for other SSCs it is acceptable to measure operating SSC performance against overall plant performance criteria and standby system performance against specific performance criteria. This is reasonable in that, for systems that are not risk-significant, the expense of a rigorous balancing is not warranted.

mance for comparisons with goals or to perform analysis to minimize unavailability. Industry-wide data would also provide a practical source for comparing plant-specific performance with industry operating experience. Accordingly, licensees' implementation of the evaluation and goal setting activities required by the maintenance rule would be substantially improved.

The information will also substantially improve the NRC's ability to determine whether licensees are implementing the maintenance rule, as well as provide more meaningful measures for determining whether implementation of the maintenance rule is having the intended effect, including provision of a regulatory framework "which provides a mechanism for evaluating the overall continuing effectiveness of licensee maintenance programs, particularly as plants continue to age" (July 10, 1991; 56 FR 31307); and provision of "a substantial increase in the level of protection of public health and safety beyond that currently provided by the Commission's regulations" (July 10, 1991; 56 FR 31320).

The maintenance rule is also central to the license renewal rule. Thus, ensuring that the maintenance rule is being effectively implemented and is effective in reducing risk is important in assuring that one of the bases for the license renewal rule remains valid.

PRA Policy Statement. A comprehensive study of reactor safety using PRA methods (WASH-1400) was completed in 1975 (NRC75). The accident at Three Mile Island (TMI) in 1979 substantially changed the nature of reactor safety analysis. Both major investigations of the accident (the Kemeny and Rogovin studies) (KEM79, NRC80) recommended that PRA techniques be used more widely to augment the traditional deterministic methods of analyzing nuclear plant safety. In 1990, the NRC completed a study (NUREG-1150) that used improved PRA techniques to assess the risk associated with five nuclear power plants (NRC90, NRC90A-NRC90F). The study was a significant turning point in the use of risk-based concepts in the regulatory process, and enabled the Commission to greatly improve its methods for assessing containment performance after core damage and accident progression.

On December 8, 1994 (59 FR 63389), the NRC published its proposed policy statement on the use of PRAs in nuclear regulatory activities. The Commission stated its belief that an overall policy should be established so that the many potential applications of PRA methodology can be implemented in a consistent and predictable manner that promotes regulatory stability and efficiency and enhances safety. The proposed PRA Policy Statement indicates the NRC staff should:

- expand PRA use in all regulatory activities to the extent supported by state-of-the-art in terms of methods and data,
- significantly enhance collection of equipment and human reliability data,
- make appropriate data available to the public.

PRA methods have been applied successfully in several regulatory activities and have proved to be a valuable complement to deterministic engineering approaches. This application of PRA represents an extension and enhancement of traditional deterministic regulation. Several recent Commission policies or regulations have been based in part on PRA methods and insights. These

include the Policy Statement on "Safety Goals for the Operation of Nuclear Power Plants" (51 FR 30038), the Commission's "Policy Statement on Severe Reactor Accidents Regarding Future Designs and Existing Plants" (50 FR 32138), and the Commission's "Final Policy Statement on Technical Specifications Improvement for Nuclear Power Reactors" (58 FR 39132). PRA methods were also used effectively during the anticipated transient without scram (ATWS) and station blackout (SBO) rulemakings, and supported the generic issue prioritization and resolution process (NRC83A).

NRC Safety Goals. In 1986, the NRC issued an explicit policy statement on safety philosophy and the role of safety-cost tradeoffs in the NRC's safety decisions. The NRC published its policy statement on "Safety Goals for the Operation of Nuclear Power Plants" on August 4, 1986 (51 FR 28044) (NRC86). The NRC uses its Safety Goals to gauge the adequacy of regulatory decisions regarding changes to current regulations (NRC89, NRC89A, NRC90G, NRC91).

The uses for PRA noted above currently depend upon generic data, often not verified or updated, supplemented with a limited amount of plant-specific data.

Additional Needs for Reliability and Availability Information. Besides the need for reliability data to substantially improve licensee implementation of the maintenance rule and the NRC's oversight of the maintenance rule, the NRC staff needs scrutable, plant-specific reliability and availability information in order to move towards risk based regulation and the increased use of PRA.

The framework for an overall move towards risk-based regulation will involve the development of a regulatory process which includes operational procedures and decision criteria that will require credible PRA methods, models, and data. Such a framework would be intended to provide for predictable, consistent, and objective risk-based regulatory decisionmaking. The data that would be reported under this rule represents one part of such a framework. In addition, these data are needed to improve the efficiency and effectiveness of current NRC regulatory applications that employ a risk-based perspective in advance of defining the entire framework.

Some examples of how the data would be used to improve current NRC regulatory applications that consider risk in the decision process are discussed below. One of the examples involves the need for information to support generic regulatory actions such -- i.e., generic issue resolution and its associated rulemaking or regulatory guide revision. Another example involves the need for information to determine whether further NRC action is needed at specific plants -- i.e., indicators of plant performance. Some involve a mixture of plant specific and generic elements. For example, analyzing an event at a given plant could lead to a plant-specific action such as a special inspection and/or to a generic action such as a bulletin or generic letter.

Generic Issue Resolution - The staff currently uses risk estimates in: (1) prioritizing its work on safety issues, (2) deciding whether work to develop new requirements or staff positions to address such issues is warranted, and (3) deciding whether proposed new requirements or staff positions should be implemented. Knowing the current, updated reliability and availability of key systems on a generic and plant-specific basis would, in some cases, lead to a better understanding of the risk in these areas and, thus, to more risk-

effective decisions. This should both enhance public protection and reduce unnecessary regulatory burdens.

Indicators of Plant Performance - PRA models with plant-specific reliability and availability data will be used to develop indicators of plant performance and trends in plant performance which are more closely related to risk than some of those currently in use. These indicators will then enhance NRC management's ability to make risk-effective decisions with regard to identifying plants for increased or decreased regulatory attention.

Accident Sequence Precursor (ASP) and Event Analysis - Plant-specific, train-level reliability and unavailability data will be used to improve the plant-specific ASP models which the NRC staff uses to compute conditional core damage probability for determining the risk associated with operational events. Dates of equipment failures will also be used to identify common cause failures and to compute common cause failure rates for input to these models. Improving these methods will enhance the staff's ability to make risk-effective decisions about which events warrant further inspections or investigations and/or generic actions such as bulletins and generic letters.

Risk-based Inspections - Current and updated system reliability, availability and failure data in a generic and plant-specific risk-based context will be used to enhance the staff's ability to plan inspections focused on the most risk-significant plant systems, components, and operations. Generic data will be used in developing risk-based inspection guides and a framework for inspections; plant-specific data will be used to focus and optimize inspection hours on specific equipment.

Aging - Equipment failure rate data along with data on the equipment's age will help (1) identify equipment that is being degraded by aging, (2) define the extent and the risk-significance of aging problems, and (3) determine equipment reliability and failure rates as a function of age.

Another class of examples involves the need for information to evaluate anticipated cost beneficial licensing actions, where the rationale is that risk permits reductions in previous margins of safety or less prescriptive requirements without adverse impact on overall safety. The industry has expressed interest in, and the NRC is actively pursuing, a variety of modifications to the basic regulations and guidelines that govern the operation of commercial nuclear power reactors. These modifications are characterized by allowing the individual licensees to utilize insights from plant-specific risk evaluations to reduce or remove current requirements that are found by the licensees to have low risk-significance. Current regulatory requirements under consideration for risk-based modification include those prescribing quality assurance, in-service inspection, in-service testing, surveillance testing and restrictions against on-line maintenance. It is anticipated that a significant number of additional requests will be received, based upon risk-based arguments. These changes could adversely affect the level of safety achieved by the plants if the risk evaluations are flawed or the changes are improperly executed or the changes involved synergistic effects that are not covered by the risk models or captured by historical data. In order to properly monitor the effectiveness of licensees' programs to maintain safety while reducing regulatory burden, the NRC staff needs current, plant-specific data that can provide a direct measure of the current level of safety achieved by each plant. Relaxation of regulatory burden then can proceed with appro-

prate feedback to assure that the level of safety performance is not being degraded. Without the data, progress in this direction would be significantly impeded by the need to develop costly, ad-hoc substitutes.

Some examples of areas where the data would provide monitoring and feedback related to reducing regulatory burdens are discussed below.

Maintenance Monitoring - The staff has expressed concern about the extent to which licensees are taking systems and equipment out of service for maintenance during plant operation. Although this practice can offer significant economic benefits by reducing plant downtime, it must be properly managed to avoid increasing risk, i.e, it is necessary to avoid relatively risky plant configurations. In conjunction with hours of unavailability, the NRC staff will use the hours when any two trains from the same or different systems are concurrently unavailable to monitor how well licensees are managing the risk associated with on-line maintenance.

Risk-Based Technical Specifications - Technical specifications requirements specify surveillance intervals and allowed outage times for safety equipment for the various modes of plant operation. With plant-specific demand failure and unavailability data, plant-specific technical specifications can be approved based on the risk-significance and performance of the plant systems/equipment. Actual versus surveillance/test failure rates will be used to verify that surveillance determined failures rates are consistent with failure rates during actual demands. Results and recommendations from the risk-based technical specifications development efforts would also be incorporated in staff guidance for review of technical specifications modifications.

The NRC staff offices have worked together over the past three years to develop a consensus on the minimum data needed by the NRC to support risk-based applications. During this period NRC staff has also interacted extensively with the Institute of Nuclear Power Operations (INPO) and the Nuclear Energy Institute (NEI) over the past three years in an effort to define the minimum reliability and availability data needed to satisfy the needs both NRC risk-based regulatory applications and industry (licensee) uses of PRA. A consensus was reached among the NRC program offices and a general agreement was obtained with INPO and NEI on the minimum data elements that would satisfy the aforementioned applications.

Current Data Sources and Their Deficiencies. There are no existing NRC requirements for licensees to systematically report reliability and availability information nor are licensees gathering it on a consistent basis. The Nuclear Plant Reliability Data System (NPRDS), a data base supported by industry and maintained by INPO, provides data on component engineering characteristics and failures. However, INPO has explicitly stated that the provisions of demand failure-rate data or non-failure-related causes of component unavailability are not part of NPRDS. In recent years, plants have performed individual plant examinations (IPEs) as requested in Generic Letter 88-20 and its supplements, and submitted the results to the NRC. These submittals provide measures of risk such as core damage frequency (CDF), dominant accident sequences, and release category information. However, IPE submittals do not provide sufficient information for the staff to make dependable estimates of system availability. Refer to Section 1.1.5 for additional information on current regulatory requirements.

None of the sources noted above include updated data elements that are needed to determine the current reliability and availability of risk-significant systems and equipment. Neither do the reports provided under 10 CFR 50.72 and 50.73 (discussed in Section 1.1.5).

Marginal to Safety Program. In 1984, the NRC's Annual Planning and Program Guidance (PPG) document stated that "Existing regulatory requirements that have marginal importance to safety should be eliminated." In accordance with the PPG document, the staff initiated a program to make regulatory requirements more efficient by eliminating those with marginal impact on safety. The NRC's initiative recognizes the dynamic nature of the regulatory process and that the importance and safety contribution of some existing regulatory requirements may not have been accurately predicted when adopted, or, may have diminished with time. The success of the NRC's initiative depends on the availability of methods, models and data to quantify marginal risk impacts.

Program for Regulatory Improvement. The NRC's Marginal-to-Safety Program is part of a broader NRC initiative for regulatory improvement. Through its Program for Regulatory Improvement, the staff plans to institutionalize an effort to eliminate requirements marginal to safety and to reduce regulatory burden. The NRC staff's plan, which satisfies the recent requirement for a periodic review of existing regulations in Executive Order 12866 of September 30, 1993, was approved by the Commission on August 26, 1992. The Program for Regulatory Improvement is aimed at the fundamental principle adopted by the Commission that all regulatory burdens must be justified and that its regulatory process must be efficient. In practice this supports the elimination or modification of requirements where burdens are not commensurate with their safety significance. By freeing up resources, the activities in this program should result in enhanced regulatory focus, including data gathering, in areas that are more safety significant.

The Program for Regulatory Improvement will include, whenever feasible and appropriate, the consideration of performance-oriented and risk-based approaches. In performance-oriented approaches, regulatory objectives are established without prescribing the methods or hardware necessary to accomplish the objective, and licensees are allowed the flexibility to propose cost-effective methods for implementation. Risk-based approaches use probabilistic risk analysis as the systematic framework for developing or modifying requirements.

In January 1993, the staff published (58 FR 6196) a general framework for developing performance-oriented and risk-based regulations. To increase flexibility for licensees, the detailed and prescriptive technical requirements contained in regulations could be improved and replaced with performance-based requirements and supporting regulatory guides. The regulatory guides would allow alternative approaches, although compliance with current detailed regulatory requirements would continue to be acceptable. The performance-based requirements would reward superior operating practices.

The NRC plans to use its Safety Goals and PRA tools (51 FR 28044), to the extent deemed appropriate, in the development of performance-based regulations.

Performance-Based Regulations. In adopting a performance-based regulatory approach, the NRC has adopted criteria to guide its decisionmaking (58 FR 6196). An existing NRC regulatory requirement may be modified provided that:

- The new performance-based regulation is less prescriptive and allows the licensee flexibility to adopt cost-effective methods for implementing the safety objectives of the original rule.
- The regulatory safety objectives are derived, to the extent feasible, from risk considerations and are consistent with the NRC's Safety Goals.
- Detailed technical methods for measuring or judging the acceptability of a licensee's performance relative to the regulatory safety objectives are, to the extent practical, provided in industry standards and guidance documents which are endorsed in NRC regulatory guides.
- The new regulation is optional for current licensees so that licensees can decide to remain in compliance with current regulations.
- The regulation is supported by necessary modifications to, or development of, the full body of regulatory practice including, for example, standard review plans, inspection procedures, guides, and other regulatory documents.
- The new regulation is formulated to provide incentives for innovations leading to improvements in safety through better design, construction, operating, and maintenance practices.

Sound risk- and performance-based regulation is dependent upon a compatible data base. Thus, the NRC's initiative toward risk-based rules is dependent upon, and assumes the existence of, a data base which can provide the information necessary to run PRA models and conduct risk-based safety assessments.

1.1.3 Analytical Effort

The regulatory analysis has identified alternatives to current data-gathering requirements which would meet the staff's safety objective and regulatory goals described in Section 1.2. Chapter 3 describes the value and cost impact analyses performed for these alternatives. Other considerations are noted below.

Environmental Impact: Categorical Exclusion. The Proposed Action sets forth requirements for the collection, maintenance, and reporting of risk-significant system and equipment reliability and availability data. The staff has determined that the Proposed Action is the type described in categorical exclusion, 10 CFR 51.22(c)(3)(iii). Therefore, neither an environmental impact statement nor an environmental assessment has been prepared in support of the Proposed Action.

Backfit Analysis. The Proposed Action sets forth requirements for reporting and recordkeeping. The NRC staff has determined that the Backfit Rule does not apply to information collection and reporting requirements.

Analysis Required by Statute. Paperwork Reduction Act and Regulatory Flexibility Act analyses have been conducted and the results are reported in Chapter 3.

1.1.4 Scope and Applicability

The Proposed Action for reliability and availability data gathering will apply to a select list of risk-significant systems and equipment at plants operated by holders of operating licenses for commercial nuclear power plants under 10 CFR 50.21b or 50.22 and by holders of combined operating licenses for commercial nuclear power plants under 10 CFR 52.97. The actual number of systems impacted depends on the selection criteria to be developed in an industry guidance document or in the NRC's regulatory guide. However, the number of systems is estimated between six and sixteen based on conversations with industry over the last few years.

The Proposed Action does not require licensees to gather data on human reliability at this time because of the difficulties in fully defining human errors and gathering data. However, human errors that contribute to component failures would be captured in the reports on such failures.

The Proposed Action applies to accident-mitigating systems and equipment at commercial power reactors.

The Proposed Action does not apply to other fuel cycle facilities, or byproduct, source or special nuclear materials licensees.

1.1.5 Current Regulatory Requirements

Currently, there are no rules to require systematic feedback of reliability and availability data nor are licensees gathering such information on a consistent basis or sharing such information on an industry-wide basis. However, two existing rules border on the collection of risk-based information. These are described below.

10 CFR 50.72, "Immediate Notification Requirements for Operating Nuclear Power Reactors," requires immediate or near-immediate notification of the Commission in the event of emergencies (as defined by the licensee's approved Emergency Plan), shutdowns required by or deviations from the technical specifications, any conditions resulting in or potentially resulting in seriously degraded operations, natural phenomena or external conditions that pose safety threats, conditions that result in or should have resulted in actuation of the ECCS, any conditions that result in the actuation of an engineered safety feature or could have prevented the safety function of a system, or any significant effluent releases.

10 CFR 50.73, "Licensee Event Report System," requires the submission of licensee event reports for those events requiring notification under 50.72, and in addition requires a detailed description and analysis of those events, including causation, potential safety consequences and implications, identification of manufacturers and model numbers of failed components, and planned corrective actions.

1.1.6 Achievements and Costs of the Current Rules

The data-gathering requirements in current regulations have achieved the regulatory safety goal of General Design Criterion 1 of assuring that data are available to the NRC for evaluating the safety of reactors. Current requirements meet many but not all needs of risk-based regulation. In addition, current regulatory requirements do not provide information in a form and on a frequency which can be utilized in implementing the requirements of the maintenance rule which require, where practical, consideration of industry-wide operating experience or which can be utilized in the NRC's oversight of maintenance rule implementation. The analysis in Chapter 3 provides value and impact estimates that are incremental to the baseline case, thus avoiding the need for the latter's quantification.

1.1.7 Proposed Regulatory Actions

The NRC is proposing to make data collection suitable for implementing the requirements of the maintenance rule, and more useful for risk-based regulation by increasing its currency and the efficiency of its collection and use. Systems and equipment affected are those which have or could have a significant effect on estimated core damage frequency or preserving containment integrity. Data on human reliability and from licensees other than power reactors are excluded. Specific alternatives, including the Preferred Alternative, are discussed in Chapter 2.

The NRC staff is evaluating which elements could be deleted from 10 CFR 50.72 and 50.73 that would no longer be needed in light of the Proposed Action.

1.1.8 Significance of Taking No Action

Without the reliability data rule, the benefits of the maintenance rule will be limited in the following ways. Licensees would not gain access to industry-wide reliability and availability information that is needed to substantially improve their implementation of the maintenance rule. Similarly, the NRC would not gain access to plant-specific and industry-wide reliability and availability information needed to substantially improve its ability to ensure that licensees effectively implement the maintenance rule and that the maintenance rule is effective in achieving its intended purposes. In addition, the reliability data rule is intended to help improve the efficiency of the staff and enable, in a practical way, the implementation of the Commission's proposed policies on Safety Goals and PRA. It would also support a fundamental Commission principle that all regulatory burdens must be justified and that its regulatory process must be efficient. By freeing up resources, the applications supported by this rule should result in enhanced regulatory focus on fewer areas that are more safety significant, and a reduced industry burden responding to marginal safety significant issues.

1.2 Objectives

The overall safety objective of the NRC's Proposed Action to gather reliability and availability data is:

- ▶ *to enhance the NRC's capability to effectively and efficiently evaluate the impact on reactor plant risk of (1) the implementation of the maintenance rule, (2) other NRC rules and regulations, and (3) licensee performance.*

One yardstick used to assess compliance with the effectiveness component of the safety objective is risk impact, as measured by changes in (a) core damage frequency, (b) preserving containment integrity and (c) expected radiation exposures to populations and to individuals. Another measure of effectiveness of the safety goal is public acceptance. A yardstick used to assess the efficiency component of the safety objective is, as measured by the savings in time devoted to obtaining, reducing and using required data in the regulatory decisionmaking process.

To achieve the overall objective, the rulemaking process will be guided by the following:

- ▶ *The frequency, form and substance of data collection will be standardized, and compatible with the intent of the maintenance rule and the needs of risk-based regulation, including the need to reduce uncertainty;*
- ▶ *The process will be electronic to the extent practical, and facilitate access by multiple users;*
- ▶ *The details of which safety-significant system and equipment data are to be reported will be specified in regulatory guides as an incentive to licensees to develop innovative and improved means of obtaining and reporting data;*
- ▶ *The process will support those activities that will engender public confidence in risk-based regulation;*
- ▶ *To maximize the values of the Proposed Action, it will be implemented on a schedule consistent with the NRC's maintenance rule.*

1.3 Executive Summary

The following statements present the technical findings, conclusions and recommendations, and are based on the analyses conducted in Chapter 3 and the decision rationale applied in Chapter 4.

1.3.1 Technical Findings

Promulgation of the Alternative A is estimated to result in implementation costs to the NRC and industry of \$0.7 million and \$4 million, respectively. Industry will also incur ongoing operational costs; on a per plant basis these are estimated to be about \$54 thousand and \$110 thousand per year for 80 and 30 plants, respectively. The ongoing costs to the NRC are estimated to be zero, due to offsets from other programs. The present value of these NRC and industry implementation and operational costs, assuming implementation of the rule in 1996, 20 years of ongoing operations, and a 7 percent discount rate, are about \$87 million. For Alternative B, the present value of all implementation and operational costs is about \$80 million greater than for Alternative A.

The rule is expected to yield significant benefits to both the NRC's and industry's operations. For the NRC these benefits reflect improved efficiency in reaching regulatory decisions. For industry the benefits will derive from the implementation of risk based regulations and PRA policies. For the NRC, the benefits have been quantitatively assessed only for efficiencies achieved

in evaluating licensee events, performing diagnostic evaluations, and reviewing and approving risk based technical specifications. Together, improved efficiency in these areas are estimated to yield at least \$1.1 million per year in cost savings. Given the 20-year period the rule is assumed to be in effect, this is equivalent to a present worth benefit of \$10 million.

Quantitative estimates of the benefits to industry have not been made due to the difficulties of apportioning credit between the data and the other integral components of the framework for moving to risk-based regulations. However, the magnitude of the benefits to industry can be appreciated by considering the costs of down-time and the benefits of expediting the move towards risk-based regulations. One day of down-time for a typical reactor costs about \$300 thousand, a figure dominated by the cost of replacement power. Industry's total cost for the preferred alternative will be offset if the information and insights provided by the data only avert one day of down-time per plant every 30 years. Similarly, expediting a single risk-based regulatory change can offset the total cost to industry of the rule.

1.3.2 Conclusions

The NRC concludes that its safety objective stated in Section 1.2 can be attained, while at the same time achieving a significant net savings in industry and NRC resources. The Preferred Alternative also advances NRC policies and programs, including greater use of its safety goals, application of PRA, the Regulatory Improvement Program, the Marginal-to-safety Program, and other risk- and performance-based initiatives such as focused site inspections, technical specifications, and the Accident Sequence Precursor Program.

1.3.3 Recommendations

Given these conclusions, the NRC staff recommends proceeding with rulemaking to gather data on reliability and availability for risk-significant systems and equipment. A regulatory guide should be prepared detailing the procedure for identifying risk-significant systems and equipment.

2. Alternatives

This chapter describes the alternatives considered for collecting reliability and availability data, and identifies the Preferred Alternative.

2.1 Specific Alternatives

The No-Action Alternative (Status Quo)

This alternative does not require the NRC to take any action.

It is assumed that licensees would continue reporting in accordance with current requirements. It is also assumed that, as has been the case in the past, the staff would occasionally find a need to gather extensive reliability and availability information for a specific purpose, such as was done in preparing the justification for the station blackout rule 10 CFR 50.63. When this is the case, the data collection would be difficult and expensive. Further, it is assumed that there would be progress towards risk-based regulation; however, that progress would be impeded by the lack of systematic collection of reliability and availability information.

Since consistent and comparable reliability and availability data are necessary to significantly improve licensees' implementation of the maintenance rule and the NRC's oversight of that implementation, the No-Action Alternative is ultimately not viable.

Alternative A: Collect Reliability Data by Rule

In this alternative, a new NRC rule would require utilities to report reliability and availability data periodically for a limited number of risk-significant systems and components, and in a form that would enhance its effective and efficient use in risk analysis. This requirement would enable the NRC to collect plant-specific and industry-wide reliability and availability data of the substance and form (a) to substantially improve licensee implementation of those aspects of the maintenance rule that require periodic evaluation and adjustment of maintenance programs, (b) to substantially improve NRC's oversight of the maintenance rule, (c) to support NRC's transition into risk-based regulation, (d) to automate the data collection and assessment process, thus bringing greater efficiencies to the process, (e) to implement risk-based performance indication and trending, and (f) to reduce uncertainties in some of the data and models associated with PRA.

A new reliability and availability data-gathering rule will require each licensee to submit an annual report to the NRC that contains the following information, compiled on the basis of calendar quarters, on risk-significant systems and equipment:

- The number of demands, the number of failures to start associated with such demands, and the dates of any such failures, characterized according to the identification of the train affected, the type of demand (test, inadvertent/spurious, or actual need), and the plant mode at the time of the demand (operating or shutdown),
- The number of hours of operation following each successful start, characterized according to the identification of the train affected and whether

or not the operation was terminated because of equipment failure, with the dates of any such failures,

- The number of hours of unavailability, characterized according to the identification of the train affected, the plant mode at the time of the unavailability (operating or shutdown), the type of unavailability (planned, unplanned, or support system unavailability), and, if due to support system unavailability, identification of the support system,
- For each unavailability due to component failure(s), a failure record identifying the component(s) and providing the failure date, duration, mode, cause, and effect, and
- The number of hours when two or more trains from the same or different systems were concurrently unavailable, characterized according to the identification of the trains that were unavailable.

These data will be gathered for a subset of the equipment to be monitored as part of the maintenance rule. Some additional data detail will be required, however, and a uniform method of data collection will be imposed under this alternative.

The data to be gathered under the rule will provide direct, risk-related, indicators of plant performance based on actual component reliability and failure history. Such indicators provide a measure of the effectiveness of regulatory, plant, and system performance, and eliminate the need for extensive component data analysis or interpretation.

Alternative B: Use of NRC Resources to Gather Reliability Data

The NRC has the authority under 10 CFR 50.54, Conditions of Licensees, and/or 10 CFR 50.70, Inspections, to gather reliability and availability information. In this alternative, it is assumed that the NRC would gather the information listed in Alternative A directly by inspection. The benefits of doing so would be essentially the same as Alternative A. The primary difference between Alternatives A and B is the cost and the efficiency of data collection.

Alternative C: Voluntary Submission of Reliability Data by Industry

Alternative C is identical to Alternative A without the need for rulemaking. In this alternative, it is assumed that licensees would submit the information voluntarily. The schedule, values, and impacts would be essentially the same as for Alternative A except there would be no rulemaking costs. After several years of negotiation over this issue, the NRC has not reached an agreement with industry to obtain reliability data voluntarily. Accordingly, for the purpose of this regulatory analysis, this alternative is not considered viable and no further examination is provided.

2.2 The Preferred Alternative

Alternative A is the Preferred Alternative and its incremental benefits and costs with respect to the No-Action Alternative and Alternative B are evaluated in Chapter 3.

3. Consequences

The preliminary analysis of Section 2 eliminated all but two alternatives for satisfying the requirements for reliability data collection. This section compares the consequences of Alternative A to those of the only other viable option, Alternative B. Section 3.1 provides an overview of the consequence assessment. The affected attributes are identified in Section 3.2. Alternatives A and B have very similar benefits, the small differences are discussed in Section 3.3. Selected incremental costs for Alternatives A and B, relative to the No-Action Alternative, are developed in Sections 3.4 and 3.5, respectively. In Section 3.6, the overall consequences are summarized. Sections 3.7 and 3.8 summarize the Paper Work Reduction Act and the Regulatory Flexibility Act Statements, respectively.

3.1 Overview of Consequence Assessment

3.1.1 Consequence Estimates

Consequence estimates for Alternative A and Alternative B are estimates of increments relative to the No-Action Alternative. In the final regulatory analysis, it is expected that the sources and magnitudes of uncertainties in estimates and the methods used to quantify uncertainty will be discussed. However, this draft regulatory analysis contains only a best-estimate analysis.

The groups that are expected to be affected by Alternatives A and B are the general public, Part 50 licensees and their employees, and the NRC. For each group, the attributes that characterize the consequences of each alternative were identified and differences in consequences were estimated by year for the entire time period that groups will be affected. For the purpose of this draft regulatory analysis, it was assumed that plants were not relicensed. The final regulatory analysis will, however, include separate estimates for the license renewal term.

3.1.2 Assumptions and Bases

3.1.2.1 General Assumptions

The major assumptions made and bases employed in quantifying differences in consequences associated with Alternatives A and B are:

- Costs are presented in 1995 dollars.
- Net present costs are shown as their current value assuming implementation starts in mid-1996; beyond 1996, annual submittals and other recurring activities occur for the remainder of the plant life, 110 plants with a plant life of 20 years beyond the 1996 date being assumed.
- A discount rate of 7 percent (OMB Guidelines).
- An average loaded labor rate of \$70/hr for licensee technical staff implementing the data collecting, tabulation, and reporting elements of Alternative A and \$40/hr for licensee staff responsible for storing and maintaining the records (SEA FORECAST code).

- NRC labor is costed at \$54/hr, which reflects marginal costs for NRC staff.
- Loaded rates for NRC contractors.
- All existing NRC requirements and written commitments by licensees are implemented, in particular, licensees will comply with the maintenance rule (10 CFR 50.65).
- Estimates by industry representatives vary widely as to the number of plants that are planning to collect the specific reliability and availability data once the maintenance rule is implemented. Based on the limited number of maintenance rule pilot inspections that have been performed, the NRC staff estimates that 20 to 30 plants are already collecting the data required by Alternative A, and 80 will do so once the rule becomes effective. For this analysis, the remaining 30 plants are assumed not to implement a data acquisition system to meet the rule.
- Estimates of data collection efforts are based on the following average amounts of data at each plant:
 - 4000 pages in one year of operation logs
 - 8000 pages in one year of maintenance logs
 - 1000 pages in one year of unusual occurrence report (UOR) and licensee event report (LER) logs.

In assessing consequences, probable courses of action by licensees and the NRC in applying each Alternative were established. Resources expended by these parties include labor required to collect additional data and engineering and analytical efforts needed to set up programs.

Most estimates were obtained by eliciting expert opinion. Because areas of expertise varied, a consensus opinion was elicited. The participants agreed that most of the estimates are very uncertain, and public comment should be solicited.

3.1.2.2. Assumptions Regarding Alternative A

Alternative A would require that holders of operating licenses for nuclear power reactors periodically report reliability and availability data for risk-significant systems and equipment which have or could have a significant effect on estimated core damage frequency or preserving containment integrity. Summary information reported to the NRC would comprise:

- The number of demands, the number of failures to start associated with such demands, and the dates of any such failures, characterized according to the identification of the train affected, the type of demand (test, inadvertent/spurious, or actual need), and the plant mode at the time of the demand (operating or shutdown);
- The number of hours of operation following each successful start, characterized according to the identification of the train affected and whether or not the operation was terminated because of equipment failure, with the dates of any such failures;

- The number of hours of unavailability, characterized according to the identification of the train affected, the plant mode at the time of the unavailability (operating or shutdown), the type of unavailability (planned, unplanned, or support system unavailability), and if due to support system unavailability, identification of the support system;
- For each unavailability due to component failure(s), a failure record identifying the component(s) and providing the failure date, duration, mode, cause, and effect;
- The number of hours when two or more trains from the same or different systems were concurrently unavailable, characterized according to the identification of the trains that were unavailable.

Each successful response to a demand for all or almost all of a system, train, or other equipment ensemble would be reported, but not successful demands on individual components, such as occur in valve exercise tests. The summary information would be tabulated on a quarterly basis and reported annually. Records and documentation that provide the basis for summary data reported to the NRC would be required to be maintained on-site and made available for NRC inspection. The NRC intends to issue a regulatory guide which will provide additional detail in the form of guidance on acceptable methods for implementing the rule.

This regulatory analysis assumed that the NRC would develop data base software for storage and retrieval of the data collected under the rule. This package would provide:

- user-friendly modules for data input, with validation checks;
- reports of raw data for the Public Document Room;
- automatic update of both plant-specific and generic train-level reliability estimates, using Bayesian or other appropriate methods; and
- annual reports of the updated system- and train-level reliability estimates and performance indicators based on the updated reliability estimates.

It was assumed the NRC would incur incremental costs in developing this software, in software quality assurance at Level 1 (software used in a safety-related decision), and in developing and entering prior distributions for the Bayesian analyses. The NRC does not plan to have this software offer alternative approaches to data aggregation, trend analyses, other kinds of reports, or user-friendly querying capabilities with which to extract data from the data base, although such additional features could be added. No credit was therefore taken for benefits from such additional features and no cost was attributed to them. Subsequent data base maintenance and data entry would be offset by reductions in similar activities devoted to other programs (such as the existing Performance Indicator Program) and would therefore entail no incremental cost.

It was assumed that the 75 plant-specific probabilistic risk assessment models developed for the Accident Sequence Precursor (ASP) Program would make use of the data reported under the new rule. ASP models are designed to help

estimate conditional core damage probabilities and CDF increments associated with the reactor events reported by licensees to the NRC in accordance with the requirements of 10 CFR 50.72 and 10 CFR 50.73. They are also useful in estimating the increments in CDF associated with inspection findings and changes in CDF associated with proposed changes in plant design or operational requirements. Refer to Appendix A for additional information on ASP.

The use of up-to-date, plant-specific data would significantly enhance the accuracy of the ASP models for all of their applications including estimation of the risk significance of changes in the availability of the safety systems to be reported. The NRC expects to suggest in the regulatory guide that the data should be collected consistent with the need to properly represent dependencies between trains or between functions.

3.1.2.3 Assumptions Regarding Alternative B

Under Alternative B the NRC would collect the reliability data directly from plant records. The data requirements defined in Section 3.1.2.2 under Alternative A would be the same for this alternative. Also, as for Alternative A, the data would be tabulated on a quarterly basis and reported annually. For the estimation of the consequences of Alternative B the following assumptions were utilized:

- There would not be any cost of a rulemaking (including a regulatory guide) except for costs already incurred;
- The NRC will utilize contractor support to collect the data. The NRC would incur contractor and procurement costs for the data collection effort;
- The cost of developing the data base software for storage and retrieval of the collected data will be the same as Alternative A;
- NRC headquarters program management time is the same for Alternative A;
- Records and documentation that provided the basis for the summary data would not be maintained available for inspection.

3.2. Identification of Attributes

As required by NRC regulatory analysis guidelines, those attributes that could be affected by the alternatives considered to accomplish the Proposed Action are identified in this section. Once identified, the attributes may be quantified using the techniques presented in the Reliability Analysis Technical Evaluation Handbook (NRC93A). While many of the attributes can be quantified in monetary terms, others are treated qualitatively. The following sections present a discussion of attributes affected by Alternatives A and B.

Public and Occupational Health

Although not amenable to quantitative evaluation, certain benefits of Alternatives A and B should improve safety by reducing the core damage frequency or preserving containment integrity.

NRC Implementation

Initial impacts for the NRC are assumed to include the creation of an industry-wide data base of reliability data for risk-significant equipment. It is also assumed that the NRC will incur the costs of rulemaking and costs in the first year for inspecting licensees' implementation of the rule, if Alternative A is adopted. Under Alternative B the NRC will incur costs for the procurement of contractor support and the cost of that support.

NRC Operation Costs

NRC operation will benefit from the improvements in regulatory efficiency made possible by the collected data. Under Alternative B, the NRC will incur the costs of data collection.

Industry Implementation

Under Alternative A, licensee implementation costs are incurred in identifying the risk significant systems and in setting up to collect the reliability data. In addition, provision must be made for records storage onsite such that records are available for NRC inspection.

Industry Operation

Industry operation will benefit from risk-based regulation made possible by the collected data. The fraction of benefits that can be attributable to this rule is hard to isolate, as these benefits will accrue from actions to implement risk-based regulation, as well as actions to implement data collection. For Alternative A there are the operational costs from the collection of the data, the preparation of the yearly report, and the maintenance and storage of the supporting data. For Alternative B there are lower costs in providing support during NRC data collection.

Regulatory Efficiency

Regulatory efficiency will benefit from the availability of data needed for implementation of the maintenance rule. The availability of the collected data will also be a contributing factor in achieving the benefits of risk-based regulation.

3.3 Benefits Common to Alternatives A and B

For the most part, Alternatives A and B provide the same benefits by collecting the needed reliability data. The only identified difference relates to the quality of the data: if the licensee collects the data there may, in the long run, be a better quality in the initial log entries, whereas if the NRC collects the data there may be better consistency from plant-to-plant in the way the data are summarized.

Some operational benefits that accrue to the NRC and industry from Alternatives A and B are integral with the benefits of implementing the maintenance rule and/or risk-based regulation. It is not feasible to disaggregate these benefits and attribute a specific portion of them to data collection alone. Accordingly, much of the following discussion of benefits is qualitative.

NRC Operational Benefits

Three quantifiable benefits of Alternatives A and B would reduce NRC operation costs:

- reduced cost of responding to licensee events, inspection findings, and proposed changes in design or operation;
- reduced cost for diagnostic evaluations;
- reduced cost for evaluation of requests for technical specification relief.

Licensee events. The availability of better data will also avoid unnecessary expenditures of NRC resources in situations in which the risk is insignificant. It was estimated that data to be collected would be used to evaluate at least 20 percent of licensee events, inspection findings, and proposed changes in design or operation, because at least this many would be covered by models supported by the collected data. From PRAs it has been found that approximately 70 percent of contributing events are not risk important. It was assumed that an identification of "not risk significant" would reduce NRC expenditures in this area by at least 50 percent. Therefore, the total annual NRC costs for responding to licensee events, inspection findings, and proposed changes in design or operation would be reduced by 7 percent. The present NRC effort in these areas is at least 100 full-time equivalents. Using a cost of \$54 per hour for a year of 1800 hours yielded a savings of at least \$600,000 per year.

Diagnostic evaluations. Risk-based performance indicators (PIs) will improve the process of objectively identifying plants where a diagnostic evaluation might be warranted and could help focus the effort. It was assumed that the number of diagnostic evaluations would be reduced by at least 10 percent and that the availability of better data would permit at least a 10 percent reduction in total NRC costs for each diagnostic evaluation. Now, each diagnostic evaluation requires at least four person-years of NRC and contractor effort plus travel, for a total cost of at least \$400,000. Reducing the cost by 10 percent for at least 1.5 such evaluation each year results in a savings of at least \$60,000 per year. Reducing the frequency of diagnostic evaluations by at least 10 percent would save at least an additional \$54,000 per year, bringing the total benefit to at least \$100,000 per year.

Technical specifications. For risk-based technical specifications, documented plant-specific data are needed to accurately determine failure rates and repair times for the surveillance test interval's (STI) and allowed outage time's (AOT) contributions to risk. More accurate failure and repair data are needed in these cases—while a factor of 2 uncertainty in the failure rate or repair time can translate to a factor of 2 difference in the allowed STI or AOT, for redundant components, the uncertainties multiply so that for two redundant trains, a factor of 2 translates to a factor of 4 difference in the allowed STI or AOT. The NRC has approved STI and AOT modifications previously and is preparing a program for risk-based technical specifications which will require more comprehensive plant-specific data, but that initiative is in an early stage and its effects were not considered in this analysis. Each year the NRC staff spends on the average 70,000 hours reviewing requests for technical specification relief. For this analysis, it was assumed that the

collected data would cover the evaluation needs of at least 20 percent of the requests each year. It was further assumed that Alternatives A and B would reduce the cost of the NRC for evaluating these 20 percent by at least 5 percent. Based on the average annual NRC expenditure on technical specifications review, the savings from this benefit is at least \$93,000 per year.

Additional benefits that accrue to the NRC are addressed qualitatively below, and derive primarily from the feedback of data.

General rulemaking support. The collected data could be used to support any rulemaking in which system- and train-level reliabilities are important to the value-impact analysis. The usefulness would begin with the preliminary cost-benefit analysis, where more accurate data could avoid initiation of rulemaking of only marginal net value. Early abandonment of a marginal rule would avoid both NRC costs and the industry burden in responding to the proposal. At a later stage, less uncertainty in estimating values may lead to a marginal rule being dropped, thereby avoiding an unnecessary burden on licensees. Alternatively, it may lead to a rule being adopted that might not otherwise have been justifiable, thereby improving risk-effectiveness. Finally, after a rule has been adopted, feedback of the data will permit more precise monitoring of the effectiveness of the rule, so that the regulatory action can be revisited if it has not had the intended effect.

Generic issues. The collected data may also support the identification and resolution of generic issues. The availability of the data may lead to identification of adverse industry trends, age-related or otherwise, or to currently unsuspected generic issues, resulting in risk-effective resolutions. On the other hand, use of the data for more accurate prioritization of a generic issue may reduce NRC expenditures on detailed evaluations of marginal issues and avoid an industry burden in responding to the issue. Finally, less uncertainty in estimating potential benefits of proposed resolutions makes it more likely that the resolution selected will be risk-effective.

Focused inspections. The collected data are also applicable to NRC inspections. The availability of plant-specific data will facilitate these inspections. Also, access to generic data will allow inspectors to verify that the licensee's documented assessment has taken into consideration industry-wide experience.

Maintenance. Maintenance effectiveness monitoring examines the risk effects of maintenance programs by following the downtime caused by maintenance and the benefits of detecting and correcting degradations before failures occur. The system and train reliability and availability data to be collected under Alternatives A and B will provide useful indications, at the system or train level, of maintenance effectiveness.

Industry Operational Benefits

The operational benefits to industry that accrue from Alternatives A and B are integral with the benefits of implementing the maintenance rule and/or risk-based regulation and PRA policies. Therefore, while certain benefits are quantified, no credit has been allocated to data collection alone.

Benefits that accrue to industry are discussed below, largely in a qualitative manner.

Plant availability. Risk-based configuration monitoring requires documented plant-specific data to determine the times when multiple components are down. Plant-specific and generic failure rates are needed to determine the reliabilities and availabilities of the trains which are not down in order to accurately determine the risk increase (e.g., CDF increase) due to the configuration. Risk-based configuration monitoring will facilitate on-line maintenance. In trial applications conducted by the NRC, risk-significant configurations have been identified resulting in tighter controls, while, at the same time, on-line maintenance was allowed when the risk increase was negligible. Thus, there were favorable consequences for both values and impacts. NRC is carrying out configuration monitoring at four pilot plants and is planning to extend the program. Assuming that 30 percent of shutdown time is due to maintenance and that 30 percent more on-line maintenance will be performed, a 9 percent reduction in shutdown time will result. While the extent of the availability increase would depend on the previous plant performance, it should be at least 1 percent. Assuming a benefit of at least \$300,000 per additional day of plant operation, savings of at least \$900,000 per facility-year are available. Some of this benefit will occur in any event, e.g., as a result of implementation of the maintenance rule.

Shutdown time. Earlier intervention in problems associated with system/train reliability and availability require performance data. The benefits of earlier intervention particularly by the licensees could be substantial. Assuming that at least one plant is placed on the watch list every five years because of system/train reliability and availability problems, earlier intervention might result in a reduction of at least 30 days in the outage time required to remedy the problems or, perhaps, avoid the need for an extended shutdown altogether. Some benefit in this regard would be achieved in any event, e.g., by implementation of the maintenance rule.

Technical specifications. If the NRC could approve at least 50 more requests each year than it could without the collected data, then the number of additional approvals would be at least 0.5 per facility-year. Assuming that each approval results in a reduction of licensee burden that has an average present value of at least \$100,000, this benefit would be worth at least \$50,000 per facility-year.

The other identified benefits not quantified in this analysis are described in the following paragraphs.

Marginal to safety. The collected data could be applied to eliminate system- or train-level requirements that are marginal to safety. The data would permit the NRC to be less conservative in evaluating industry rulemaking initiatives. Less uncertainty in estimating risks may lead to elimination of requirements, thereby reducing burdens on licensees. Potential rulemaking topics identified by the NRC and industry include containment leakage testing, quality assurance, fire protection, post-accident monitoring, plant security, and 10 CFR 50.54(f) information requests.

Configuration monitoring. The collected data will support risk-based configuration monitoring, and limited risk profile monitoring. Risk-based configuration monitoring has been addressed earlier. Risk profile monitoring extends risk-based configuration monitoring to include and allow trade-offs in test interval times, trends in failure rates, and maintenance contributions. Risk profile monitoring would also allow dynamic technical specifications which

depend upon the plant configuration and current performance to be implemented. Although specific data needs have not been defined, they would be the same as or derived from the data kept on site under the preferred alternative.

Quality control. In performance-based quality control, documented plant-specific data are needed to monitor the performance of equipment to ensure that reliability is acceptable and risk is controlled. With performance monitoring that is comprehensive, it covers the demands experienced in an accident and can identify deteriorating reliability performance at an early stage, the current restrictive quality control requirements can be superseded by performance-based control. NRC is presently planning a program of performance-based control which requires plant specific data. However, because it is not clear what data will be required, the use of the collected data for this application was not evaluated further. Although specific data needs have not been defined, they would be the same as or derived from the data kept on site under Alternative A.

Licensee initiatives. Other areas in which reliability data to be collected under Alternatives A and B will be useful include response to licensee risk-based initiatives, and licensee amendment reviews, including cost beneficial licensing actions (CBLAs). This area overlaps with other areas discussed above.

Technical specifications. One benefit concerning technical specification change requests was not quantified. It is expected that the availability of the collected data will bring greater consistency to NRC evaluations of a class of technical specifications change requests, enabling licensees to anticipate NRC decisions. This may result in licensees deciding not to prepare certain requests, reducing both NRC and licensee costs. It is not certain, however, that any such instances would occur.

Other potential benefits to industry are use of collected data for internal purposes and reductions in licensing burdens attributable to expedited risk-based regulation discussed under benefits to NRC operation.

Improvements in Knowledge

The public, industry and NRC will benefit from improvements in knowledge from collecting and conducting risk-based analyses. Placing the collected data in the public domain will enable citizens to improve their understanding of the source and extent of risks in commercial power reactors and to monitor the performance of the NRC in controlling those risks.

3.4 Incremental Costs for Alternative A

This section develops the costs of Alternative A as incremental amounts relative to the No-Action Alternative.

NRC Implementation Costs

The NRC would implement Alternative A by:

- completing the rulemaking;
- developing a regulatory guide for implementation of the rule;

- conducting workshops for licensees to promote understanding of Alternative A requirements and how the NRC expects it to be implemented;
- reviewing 74 submittals of lists of systems and equipment to be reported;
- preparing an industry-wide data base of reliability data for risk-significant equipment and training NRC staff on use of the data base and associated systems.

The costs for each NRC incremental activity are identified as follows:

Rulemaking. This rulemaking effort is estimated to require 3 person-years of NRC staff time prior to the rule going into effect. Included in this effort is the preparation of a regulatory guide. The regulatory guide will simplify and focus data collection and reporting efforts and facilitate the conduct of workshops. In particular, the guide should reduce the variation in licensee implementation efforts.

Workshops. The cost of each regional workshop for licensees is estimated to be about \$25,000, based on recent NRC experience in conducting public workshops on the proposed changes to 10 CFR Part 51. This estimate includes rental of facilities, preparation of transcripts, workshop materials and handouts, and contractor expenses involved in handling many of the details of such workshops. This estimate also assumes that the draft regulatory guide will be available to workshop participants, enhancing the efficiency of the workshop and reducing its costs. About two workshops for the implementation of Alternative A are expected.

Reviews. The new rule is currently scheduled to be published in final form in May 1996. The NRC expects to conduct an initial inspection of licensee programs, each review requiring 4 person-hours for review and 2 person-hours for examination of records. Based on 74 dissimilar plant designs this effort will require approximately 0.25 person-years.

Data base and training. Developing the data base and systems for storage of data and subsequent analysis, training NRC staff on the use of that data base and preparing the first annual report is estimated to require 2.0 person-years and \$35,000 for other expenses (hardware, software, travel, etc.). In addition, it is estimated that 0.25 person-years of NRC headquarters staff time will be required for program management.

NRC Operational Costs

The recurring activities that the NRC is expected to undertake in support of Alternative A are:

- receiving data reports from licensees;
- reviewing/checking data for reasonableness, internal consistency and consistency with monthly reports;
- entering data to the data base;
- training NRC Staff on the use of data base and associated system;

- preparing an annual report.

The cost for this effort is estimated to be 1 person-year and \$15,000 for other expenses (hardware, software, travel, misc.).

In addition, it is estimated that 0.1 person-years of NRC headquarters staff time will be required for program management. However, the NRC will save the cost of maintaining the current performance indicator data base, which will offset all these recurring costs.

Industry Implementation Costs

Identification of systems within the scope of the rule. A first step in a licensee's program to respond to the requirements of Alternative A is to determine which plant systems are risk-significant. This step will entail a review of all major plant systems and submittal of a list of risk-significant systems to the NRC. This work could be accomplished with an effort of about five to ten person-days per plant; a ten person-day effort translates into a discounted cost of \$6,000 per plant. It is anticipated that activities already completed or in progress for the maintenance rule would lessen the burden since these systems are within the scope of the maintenance rule. In addition, the regulatory guide also may ease the task by specifying systems for which reliability data are to be reported. It is estimated that a range of 6 to 16 systems identified as risk significant will be reported by the licensees. In this analysis, however, it is assumed that each licensee will submit a list of 11 systems for NRC review.

As discussed previously, it is assumed that 80 plants are generating the data required for the reliability data collection rule. The remaining 30 plants are planning to meet the objectives of the maintenance rule without generating the data necessary to comply with the reliability data collection rule. The initial effort required to establish a data collection program for licensees currently generating the appropriate data is estimated to be \$10,000 which includes the development of the data base software for the input and retrieval of the data. For the licensees who are not currently collecting reliability and availability data the effort to establish a program is estimated to be \$40,000. The increased cost is a result of the absence of a data collection program through the maintenance rule. For each licensee group it will be necessary to establish storage of data records onsite for NRC review. It is estimated that this results in a one-time cost of \$10,000 for each licensee. This cost includes space allocation, computer purchase, and any associated hardware.

Industry Operational Costs

The industry's costs are entailed in collecting, reporting, and storing the data. These costs are quantified in the next paragraphs.

Submittal of yearly summary report and storage and maintenance of records. Each licensee will have to tabulate reliability data by quarter for each risk-significant system for annual submittal in a summary report. It is assumed that the licensee employee assigned to this effort will search the operations, maintenance, UOR and LER logs daily. This will provide a more efficient data review and collection process. Additionally, the licensee will benefit from interfacing daily with maintenance and operations personnel and any benefit

from activities performed under the maintenance rule. It is estimated for those licensees (80) that collect reliability data under the maintenance rule that the net increase in burden will be approximately 8 person-weeks for data collection and reporting, 3 weeks for project management and 16 person weeks of support staff labor. For 80 plants over 20 years, this translates into a net present cost of approximately \$46,000,000.

These cost estimates correspond to an effort of about on-half staff year. This appears realistic considering that these licensees would already be collecting reliability and availability information for their risk-significant systems in connection with maintenance rule implementation and considering the limited number of systems involved and the limited amount of information involved. It is consistent with informal discussions with some licensee representatives.

For those licensees (30) who are not collecting reliability data under the maintenance rule the net increase in burden will be approximately 16 person-weeks for data collection, 6 weeks for project management and 32 weeks of support staff labor. For 30 plants over 10 years, this translates into a net present cost of approximately \$38,000,000.

When all licensees are considered the total net burden over 20 years is estimated to be about \$83,000,000.

The records prepared to meet Alternative A will be stored and maintained by the licensee and made available on-site for NRC inspection. These records will describe each demand, failure or unavailability of a risk significant system referred to in the annual summary report. This effort required to store and maintain records is included in the above estimates as part of the support staff labor.

3.5 Incremental Costs for Alternative B

NRC Implementation Costs

The NRC will implement Alternative B by obtaining contractor support to collect the reliability data from each nuclear power plant. The costs associated with this effort include:

- NRC contracting costs
- 1st year contractor costs

The cost of each NRC incremental activity are identified as follows:

NRC Contracting Costs. NRC contracting costs to issue the Request For Proposal and award a contract to the adequate and cost competitive contractor is estimated to require one staff-year at a cost of approximately \$100,000.

Cost of Contractor Effort (1st year costs). The successful bidding contractor will have implementation costs to begin the data collecting effort. These costs include laptop computers at a cost of \$90,000; customized software for data formatting and reporting at a cost of \$100,000; and employee training (80 people) for one day at a cost of \$35,000. This results in a first year cost of \$225,000.

NRC Operational Costs

The recurring activities under Alternative B are:

- data collection and reporting
- NRC program management
- contractor training

The cost for each recurring activity is estimated as follows:

Data collection and reporting. For this effort it is assumed that the data collection will begin after the first year of data is available. Each data collection effort will require approximately 6 person months of total effort by a team of two individuals. It is estimated that each team will visit the plant site 3 times over the course of the data collection effort. The effort is based on the following data collection assumptions:

- the contractor will review and flag pertinent data and then enter the flagged data into data base software on the laptop computers;
- each team can visit 3 sites per year;
- approximately 40 teams will be required to collect the data yearly.

The combination of labor and travel results in a yearly cost for each site of approximately \$128,000. There are also annual costs spread over all collection efforts for contractor project management (\$140,000), contractor support staff (\$14,000) and annual recurring training (\$16,000). These costs combined result in an annual net cost of \$14,500,000 over all plants to collect yearly reliability and availability data tabulated on a quarterly basis. This results in a present worth over 20 years of approximately \$160,000,000.

The increase in costs under Alternative B compared to Alternative A results from the process under which the data is collected. For Alternative A the data review and collection will be done on a daily basis and results in greater efficiency through the following:

- Mesh with the maintenance rule
- Real time (daily) review of data
- Accessibility to shift supervisor, maintenance personnel, etc. to resolve questionable data
- Site synergism
- Plant specific systems knowledge (knows reportable system train and balance of systems components)
- Learns the job by repetition frequency (daily)

Alternative B is accomplished with personnel potentially unfamiliar with the site and through a tedious review of a full year of information.

NRC Project Management. It is estimated that NRC staff management of the data collection effort will require 0.5 staff years at a cost of approximately \$56,000.

Industry Implementation Costs

There are no industry implementation costs for Alternative B.

Industry Operational Costs. To support the data collection effort it is assumed to require 0.25 staff years of licensee support during the data collection effort. This results in a recurring burden of approximately \$9,000 with a present worth of approximately \$11,000,000 for the assumed 20 year effort.

3.6 Results

Table 3-1 and Table 3-2 summarize the consequences for Alternatives A and B, respectively. Promulgation of the Alternative A is estimated to result in implementation costs to the NRC and industry of \$700,000 and \$4,000,000, respectively. Industry will also incur ongoing operational costs; on a per plant basis these are estimated to be about \$54 and \$110 thousand per year for 80 percent and 30 percent of the plants, respectively. The ongoing costs to the NRC are estimated to be zero, due to offsets from other programs. The present value of these NRC and industry implementation and operational costs, assuming implementation of the rule in 1996, 20 years of ongoing operations, and a 7 percent discount rate, are about \$87 million. For Alternative B, the present value of all implementation and operational costs is about \$80 million greater than for Alternative A.

The rule is expected to yield significant benefits to both the NRC's and industry's operations. For the NRC these benefits reflect improved efficiency in reaching regulatory decisions. For industry the benefits will derive from the implementation of risk based regulations and PRA policies. For the NRC, the benefits have been quantitatively assessed only for efficiencies achieved in evaluating licensee events, performing diagnostic evaluations, and reviewing and approving risk based technical specifications. Together, improved efficiency in these areas are estimated to yield at least \$1.1 million per year in cost savings. Given the 20-year period the rule is assumed to be in effect, this is equivalent to a present worth benefit of \$10 million.

Quantitative estimates of the benefits to industry have not been made due to the difficulties of apportioning credit between the data and the other integral components of the maintenance rule implementation and the framework for moving to risk-based regulations. However, the magnitude of the benefits to industry can be appreciated by considering the costs of down-time and the benefits of expediting the move towards risk-based regulations. One day of down-time for a typical reactor costs about \$300 thousand, a figure dominated by the cost of replacement power. Industry's total cost for the proposed rule will be offset if the information and insights provided by the data only avert one day of down-time per plant every 30 years. Similarly, expediting a single risk-based regulatory change can offset the total cost to industry of the rule.

Table 3-1. Summary of Consequences of Alternative A

<p><u>NRC Implementation:</u> Complete rulemaking, develop regulatory guide, conduct workshops, develop data base and review implementation.</p>	<p>Increased costs with a present worth of about \$0.7 million.</p>
<p><u>NRC Operation:</u> Handling data, training staff and preparing annual reports. Event reviews, diagnostic evaluations and technical specification amendments. Rulemaking support, generic issues, focused inspections and maintenance monitoring.</p>	<p>These costs would be offset by reductions in other programs such as performance indicators. Decreased costs of about \$0.8 million per year with a present worth of \$8.5 million. Significant cost decreases are expected due to improved efficiency.</p>
<p><u>Industry Implementation:</u> Develop systems list and develop data base.</p>	<p>Increased costs of about \$26 thousand per plant for licensees that are collecting reliability data under the maintenance rule. Increased costs of about \$56 thousand per plant for licensees that are not collecting reliability data under the maintenance rule. The combined present worth for all licensees is about \$4 million.</p>
<p><u>Industry Operation:</u> Submittal of annual report and storage and maintenance of records. Plant availability improvement is expected as a result of improved implementation of the maintenance rule as well as risk based regulation. Technical specification changes. Improvements in the rate of approvals is expected. Plant shutdowns, marginal to safety program, configuration monitoring, quality control, licensee initiatives, technical specification change review consistency.</p>	<p>Increased costs of \$36 and \$73 thousand per plant per year for 80 plants and 30 plants, respectively, with a present worth of about \$83 million. A 1% improvement would reduce costs by \$0.9 million per plant per year for a total present worth of \$750 million. However, it is not feasible to allocate a specific portion of the improvement to implementation of the maintenance rule and data collection alone. An improvement of 0.5 changes per year per plant would yield about \$50 thousand per plant per year for a total of present worth of \$43 million. However, it is not feasible to allocate a specific portion of the improvement to data collection alone. Significant cost decreases are expected a result of improved efficiency in these areas.</p>

Table 3-2. Summary of Consequences of Alternative B

<u>NRC Implementation:</u>	
Obtain contractor support through a Request for Proposal.	Increased costs with a present worth of about \$0.1 million.
Contractor computer and software costs.	Increased costs with a present worth of about \$0.2 million.
<u>NRC Operation:</u>	
Annual contractor support to collect reliability data from 110 reactor sites.	Increased cost of about \$14.5 million/yr with a present worth of approximately \$160 million.
Handling data, training staff and preparing annual reports.	These costs would be offset by reductions in other programs such as performance indicators.
Event reviews, diagnostic evaluations and technical specification amendments.	Decreased costs of about \$0.8 million per year with a present worth of \$8.5 million.
Rulemaking support, generic issues, focused inspections and maintenance monitoring.	Significant cost decreases are expected due to improved efficiency.
<u>Industry Implementation:</u>	
No incremental implementation costs.	
<u>Industry Operation:</u>	
Provide licensee support to contractors collecting data.	Increased costs of \$9 thousand per plant per year with a present worth of approximately \$11 million.
Plant availability improvement is expected as a result of improved implementation of the maintenance rule as well as risk-based regulation.	A 1% improvement would reduce costs by about \$0.9 million per plant per year for a total present worth of \$750 million. However, it is not feasible to allocate a specific portion of the improvement to implementation of the maintenance rule and data collection alone.
Technical specification changes. Improvements in the rate of approvals is expected.	An improvement of 0.5 changes per year per plant would yield \$50 thousand per plant per year for a total of present worth of \$43 million. However, it is not feasible to allocate a specific portion of the improvement to data collection alone.
Plant shutdowns, marginal to safety program, configuration monitoring, quality control, licensee initiatives, technical specification change review consistency.	Significant cost decreases are expected a result of improved efficiency in these areas.

3.7 Regulatory Flexibility Act Statement

In accordance with the Regulatory Flexibility Act of 1980, (5 U.S.C. 605(B)), the Commission certifies that this rule will not, if promulgated, have a significant economic impact on small entities. The Preferred Alternative affects only the licensing and operation of nuclear power plants. The companies that own these plants are not "small entities" as defined in the Regulatory Flexibility Act of the Small Business Size Standards set out in regulations issued by the Small Business Administration Act in 13 CFR Part 121.

3.8 Paper Work Reduction Act Statement

Alternative A amends information collection requirements that are subject to the Paper Work Reduction Act of 1980 (44 U.S.C. 3501 et seq). This rule has been submitted to the Office of Management and Budget for review and approval of the Paper Work Reduction Act requirements. The rule will be part to 10 CFR 50 (10 CFR 50.76) and sets forth requirements for the collection, maintenance, and reporting of risk-significant system and equipment reliability and availability data.

Justification

Need for consistent, industry-wide reliability and availability information. The maintenance rule requires that licensees conduct evaluations of performance and condition monitoring and associated goals on a periodic basis, taking into account, where practical, industry-wide operating experience. Alternative A will provide a source of consistent and comparable reliability data needed for implementation of the maintenance rule.

Need for Scrutable, Plant-specific Reliability and Availability Data. To move towards risk-based regulation and the increased use of PRA information, the NRC staff needs scrutable, plant-specific reliability and availability data compiled for risk-significant systems and equipment. For example, the staff currently uses risk estimates in prioritizing its work on safety issues, deciding whether work to develop new requirements or staff positions to address such issues is warranted and deciding whether proposed new requirements or staff positions should be implemented. Knowing the reliability and availability of key systems would, in some cases, lead to more risk-effective decisions in these areas. This should both enhance public protection and reduce unnecessary regulatory burdens.

Reliability and availability data for risk-significant systems would have other benefits as well. The increased knowledge would help the NRC staff in the evaluation of, among others, plant-specific licensing actions, development of risk-based technical specifications, risk-based inspection planning, Safety Goal implementation, accident sequence precursor analyses, and aging analyses.

Section 50.76 (b) requires that a holder of an operating permit for commercial nuclear power plant submit an annual report to the NRC that contains the following information, compiled on the basis of calendar quarters, for systems and equipment in (b)(2) of 50.76:

-
- The number of demands and failures associated with those demands;
 - The number of hours of operation following each demand for systems required to continue operation to fulfill a safety function;
 - The number of hours a system or train is unavailable;
 - The number of hours when two or more trains were concurrently unavailable;
 - For each unavailability due to component failure(s), a failure record for the component(s) providing failure cause, failure mode, and other relevant information required to link the failure to the correct cause and mode for reliability analyses.

The Alternative A requirements shall apply to those systems and equipment whose failure or unavailability would have a significant effect on estimated core damage frequency or preserving containment integrity. Also, each licensee shall maintain records and documentation, on-site and available for NRC inspection, of each occurrence of a demand, failure, or unavailability that provide the basis for the data reported.

Description of Information Collection

Number and Type of Respondents. The information collection requirement applies annually to 110 commercial reactor power plants.

Estimate of Burden

It is estimated that about 500 additional staff hours will be needed in the first year for a licensee to comply with the information collection requirement. The average incremental annual burden per licensee is estimated to be about 985 staff hours.

The magnitude of the burden is acceptable because the net benefit has a potential for being large (i.e., greater than \$100,000,000) assuming implementation of Alternative A in conjunction with the implementation of risk-based regulation and the PRA policies.

Estimate of Cost to the Federal Government

The estimated incremental cost of NRC efforts for reliability data collection is 3.4 staff years, at a rate of \$115 per hour, for a total of approximately \$700,000. For this rule it is concluded that there will not be any incremental recurring activities. These costs will be totally offset by reduced operating costs. The support of the Performance Indicator Data base is assumed to transfer to this activity with no additional cost.

4. Decision Rationale

The recommendation to promulgate a new rule to collect reliability and availability data from utilities is based on the rule's ability (1) to satisfy the safety objective and goals established for this rulemaking, including substantial improvements in licensee implementation of and NRC's oversight of the maintenance rule, (2) to avoid unnecessary future expenditures of substantial resources, and (3) to achieve the NRC's administrative goal of leaving details of regulatory implementation to guidance.

4.1 Preferred Alternative

Based upon the qualitative and quantitative analyses performed, the Preferred Alternative is Alternative A, "Collect Reliability Data by Rule."

The Preferred Alternative represents the staff's position subject to any improvements or clarifications identified through the public comment period. The analysis and rationale leading to this recommendation are presented below.

4.2 SAFETY OBJECTIVE

The overall safety objective of the NRC's reliability data collection initiative is:

- ▶ *To enhance the NRC's capability to effectively and efficiently evaluate the impact on plant risk of (1) the implementation of the maintenance rule, (2) other NRC rules and regulations, and (3) licensee performance.*

To achieve the overall safety objective, the following regulatory goals were established to guide the rulemaking process:

- ▶ *The frequency, form and substance of data collection shall be standardized and compatible with the intent of the maintenance rule and the needs of risk-based regulation, including the need to reduce uncertainty.*

The Preferred Alternative will achieve this goal. The NRC has promulgated the maintenance rule and has initiated analytical programs and developed PRA models to support its efforts to evaluate plant risk.

The maintenance rule requires that licensees conduct program evaluations taking into account, where practical, industry-wide operating experience and make adjustments where necessary to ensure that the objective of preventing failures through maintenance is appropriately balanced against the objective of minimizing unavailability due to monitoring or preventive maintenance. In some circumstances, it also requires monitoring of performance or condition) against licensee-established goals. Further, the NRC will monitor to ensure that licensees effectively implement the maintenance rule and that the maintenance rule is effective in reducing risk.

The PRA models developed, although evolving, identify the data necessary to perform calculations of risk. A brief description of one of these programs, the Accident Sequence Precursor (ASP) Program, is presented in Appendix A.

By establishing the frequency of data collection, the Preferred Alternative assures that the latest data are fed back, thus that they are available for analysis and that they are trendable. Trendability is desired because it provides an indication of improvement or degradation over time and, thus, can provide an early warning of potential trouble. By establishing the form and substance for data collection, the rule assures that (a) the appropriate data are collected, and (b) that the data collected are comparable across the spectrum of power reactors. The form of data submittal will be specified in a regulatory guide. Comparability of data allows both the industry and the NRC staff to identify when improvements made at certain plants could become "a lesson learned the easy way" for other plants. By collecting data in a form compatible with NRC's maintenance rule and risk models, the NRC staff can devote more of its time to safety analysis instead of data reduction and manipulation, thereby increasing its efficiency and effectiveness.

The treatment of uncertainties is important to regulatory decisionmaking. Uncertainties exist in any regulatory approach and result from knowledge limitations which are manifest in imperfect models and data. The Preferred Alternative will improve considerably the quality of the data currently being used to drive PRA models and, thus, reduce uncertainties. As uncertainties are reduced, the NRC expects to reduce unnecessary conservatism in current regulatory requirements.

- ▶ *The process shall support those activities that will engender public confidence in risk-based regulation.*

The Preferred Alternative will achieve this goal. The NRC has committed, via its safety goal and PRA policies, to move toward risk-based regulation. As noted previously, with respect to analytical tools, support for this transition is manifest in the development of appropriate probabilistic models, methods and data. The data requested under the Preferred Alternative are a prerequisite for the coherent and efficient transition to risk-based regulation.

To implement its policies, the NRC has invested resources in the development of rules, models and methods. The Safety Goal and PRA policies have committed the NRC toward the greater use of PRA in all nuclear regulatory activities "...to the extent supported by state-of-the-art in PRA methods and data..." (NRC94). NRC's models and methods are the state-of-the-art. However, use of NRC's probabilistic models and methods to the degree envisioned by the Commission in its policy statements is unlikely to be realized without appropriate data. The Preferred Alternative identifies these data, and the state-of-the-art in data collection would permit its electronic transmission and storage in a data base.

- ▶ *The process shall be electronic to the extent practical, and facilitate access by multiple users.*

The Preferred Alternative will achieve this goal. The data to be collected are limited and closely defined, greatly facilitating their placement on an open data base.

- ▶ *To maximize the values of the proposed rule, it shall be implemented on a schedule consistent with the effective date of the NRC's maintenance rule (July 1996).*

If promulgated as planned, the Preferred Alternative will share the same effective date as the maintenance rule. This would achieve the goal of having a data management system in place to begin benefitting from the useful data expected to be generated. The data to be collected under the Preferred Alternative is to be collected from a subset of the systems and equipment to be monitored as part of the maintenance rule. Accordingly, many licensees will find it beneficial to implement data collection programs for the reliability data and maintenance rules at the same time.

4.3 Resources

The estimated impact to the nuclear power plant industry and the NRC of the Preferred Alternative in conjunction with implementation of risk-based regulation and PRA policies for the remaining lifetime of its reactors is a savings of at least \$10,000,000, excluding benefits to industry of risk-based regulation. The latter has not been quantified, however, industry's total cost for the Preferred Alternative will be offset if the information and insights provided by the data avert only one day of down-time per plant every 30 years.

4.4 Administrative Goals

The NRC's administrative goal for this rulemaking is consistent with those established for the Marginal-to-Safety Program and published in the Federal Register on January 27, 1993 (58 FR 6196):

- ▶ *The details of which safety-significant system and component data are to be reported shall be specified in regulatory guides as an incentive to licensees to develop innovative and improved means of obtaining and reporting data.*

The Preferred Alternative will achieve this goal. A regulatory guide is under preparation which will provide the methodology and criteria for identifying those plant systems and equipment considered risk-significant. Further, the guide will encourage utilities to adopt innovative means for collecting and reporting the data provided that the regulatory goal of comparability across the industry is not defeated in the process.

4.5 Other Considerations

Significant societal cost reduction is possible from the adoption of the Preferred Alternative.

Implementation of a compliance program is judged to be feasible given that the industry has had over a decade of experience complying with existing requirements, and submitting data to the NPRDS. Although there will be some new aspects to the new rule, its implementation will be essentially the same.

No regulatory obstacles are foreseen in implementing the requirements of the new rule except as may be reasonably anticipated with a new rule regarding issues of common understanding of requirements and objective inspection and enforcement of those requirements. Implementation of the Proposed Rule is discussed in Chapter 5.

Environmental Impact: Categorical Exclusion. The Preferred Alternative sets forth requirements for the collection, maintenance, and reporting of risk-significant system and equipment reliability and availability data. The staff has determined that this Preferred Alternative is the type of action described in categorical exclusion, 10 CFR 51.22(c)(3)(iii). Therefore, neither an environmental impact statement nor an environmental assessment has been prepared in support of this proposed regulation.

Backfit Analysis. The Preferred Alternative sets forth requirements for reporting and recordkeeping. The NRC staff has determined that the Backfit Rule's requirements and definitions, as specified in 10 CFR 50.109, do not apply.

4.6 Summary

In establishing a common understanding with licensees on how to measure progress in achieving the full benefits of the maintenance rule and other regulatory and safety goals, the NRC was guided by its Safety Goals, its proposed policy of moving toward risk-based regulation, and ongoing discussions with licensees. By directing resources at the most risk-significant systems and components, understanding and safety should be enhanced. Further, a better understanding of reliability and availability of risk-significant systems will help mitigate two impediments to the greater use of PRA, the lack of data and model uncertainties. The staff is confident that it has communicated effectively with the licensees and the public on the reasoning supporting the Preferred Alternative. It is a fundamental principle of this rulemaking that changes to existing data collection requirements will be based objectively upon the risk significance of systems and components as determined by established analytical methods. To facilitate a common understanding, the NRC is proposing to endorse industry's guidance document on the specifics of data collection in its own regulatory guide.

The anticipated use of a guidance document developed by industry and approved for use by the NRC also helps to ensure consistent interpretation and application of compliance requirements.

In consideration of the analyses presented above, the staff believes that the Preferred Alternative is consistent with, and supportive of, the requirements established for the maintenance rule and performance-based regulations.

5. Implementation

This chapter provides the proposed schedule for enacting and implementing the Proposed Rule, and assesses interfaces with other existing or proposed regulatory requirements.

5.1 Schedule

To implement the Proposed Rule, the following schedule of actions is proposed.

The NRC

- Publish Proposed Rule - 6/95
- Issue Draft Regulatory Guide - 11/95
- Publish Final Rule/RG - 5/96
- Effective Date - 7/96

5.2 Relationship to Other Existing or Proposed Requirements

The Proposed Rule will require the collection of data from a subset of the systems and equipment to be monitored as part of the maintenance rule. Accordingly, it is appropriate that the Proposed Rule become effective in a time frame consistent with the effectiveness of the maintenance rule.

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- NRC90F Park, C.K., et al., "Evaluation of Severe Accident Risks: Zion, Unit 1, Main Report," NUREG/CR-4551, BNL-NUREG-52029, Vol. 7, Rev. 1, Part 1, March 1993.
- NRC90G U.S. Nuclear Regulatory Commission, Memo Chilk to Taylor, "SECY-89-102 - Implementation of the Safety Goals," June 1990.
- NRC91 U.S. Nuclear Regulatory Commission, "Interim Guidance on Staff Implementation of the Commission's Safety Goal Policy," SECY-91-270, August 1991.
- NRC92 U.S. Nuclear Regulatory Commission, "Elimination of Requirements Marginal to Safety," SECY-92-263, July 24, 1992.
- NRC93 U.S. Nuclear Regulatory Commission, Memo Heltemes to Larkins, "Staff Approach for Assessing the Consistency of the Present Regulations with Respect to the Commission's Safety Goals," April 1993.
- NRC93A U.S. Nuclear Regulatory Commission, "Reliability Analysis Technical Evaluation Handbook," NUREG/BR-0184, August 1993.
- NRC93B U.S. Nuclear Regulatory Commission, "Workshop on Program for Elimination of Requirements Marginal to Safety," NUREG/CP-0129, Bethesda, Maryland, April 1993.
- NRC94 U.S. Nuclear Regulatory Commission, "Proposed Policy Statement on the Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities," SECY-94-218, August 1994.
- NRC95 U.S. Nuclear Regulatory Commission, "Performance-Based Containment Leak Test Program," NUREG-1493, Draft, January 1995.
- PNL83 Battelle Pacific Northwest Laboratories, "Handbook for Value-Impact Assessment," NUREG/CR-3568, December 1983.

APPENDIX A

DESCRIPTION OF THE
ACCIDENT SEQUENCE PRECURSOR
PROBABILISTIC RISK ASSESSMENT MODELS

Seventy-five simplified, plant-specific probabilistic risk assessment (PRA) models have been developed for the Accident Sequence Precursor (ASP) Program. The models exist in the SAPHIRE (IRRAS) format, with four event trees for boiling water reactors (BWRs) (Transient, Small Loss-of-Coolant Accident [LOCA], Loss of Offsite Power [LOSP], and Anticipated Transient Without Scram [ATWS]), and five event trees for pressurized water reactors (PWRs) (the same as for BWRs plus Steam Generator Tube Rupture [SGTR]). Fault trees are detailed to the train level except where it is necessary to use super-component groups to properly represent dependencies between trains of the same system or between functions in the event trees. Except for emergency and alternate AC power, support systems are not included. These models were developed from plant descriptions contained in the Safety Analysis Reports (SARs) submitted by licensees. Information about plant-specific systems that have significant influence on core damage frequency (CDF) has been gleaned from Individual Plant Examination (IPE) and Station Blackout Rule submittals.

ASP models were designed to estimate conditional core damage probabilities and CDF increments associated with the requirements of 10 CFR 50.72 and 50.73. They are also useful in estimating the increments in CDF associated with inspection findings and proposed changes in plant design or operations. The models could also be used to estimate the risk significance of changes in the availability of the safety systems as would be reported under the proposed reliability data rule.

The following systems are represented in the ASP models:

BRWs

Reactor Protection System
Main Steam / Condenser
Main Feedwater
Condensate
HPSI or HPCS
RCIC or IC
ADS
CRD (injection)
LPCI
LPCS
RHRSW or Fire Water (injection)
RHR (SP and RCS cooling)
Containment Venting
SLC
EDGs
Alternate AC Power

PWRs

Reactor Protection System
Main Feedwater
Auxiliary Feedwater
Pressurizer PORVs
Charging System
High Pressure Injection
Low Pressure Injection
Atmospheric Steam Dumps
Main Steam / Condenser
RHR
ECCS recirculation
Boration
EDGs
Alternate AC Power

Attachment 5

DRAFT PRESS RELEASE

DRAFT PUBLIC ANNOUNCEMENT

NRC PROPOSES RULE FOR REPORTING EQUIPMENT RELIABILITY DATA

The Nuclear Regulatory Commission (NRC) is proposing to amend its regulations dealing with the information that commercial nuclear power reactors report to the NRC.

The proposed rule would append the Commission's regulations in 10 CFR 50 to require that licensees for commercial nuclear power reactors report to the NRC summary reliability and availability data for risk-significant systems and equipment. The proposed rule would also require licensees to maintain on-site, and to make available for NRC inspection, records and documentation that provide the basis for the summary data reported to the NRC. The proposed reporting requirements would apply to the event mitigating systems and equipment which have or could have a significant effect on estimated core damage frequency or the conditional probability of early containment failure given a core damage accident.

This information would substantially improve licensees' implementation and NRC oversight of the NRC's maintenance rule. It would also substantially improve the NRC's ability to make risk-effective regulatory decisions and would improve the regulatory process through more efficient use of agency resources and reductions in unnecessary burdens on licensees.

A draft NRC regulatory guide will be published for public comment at a later date. The guide will provide methods for selecting systems and equipment subject to the rule, definitions of the reliability and availability data to be reported, guidelines for defining system and train boundaries, and a suggested format for reporting the data to NRC.

Attachment 6

DRAFT CONGRESSIONAL LETTERS

The Honorable Dan Schaefer, Chairman
Subcommittee on Energy and Power
Committee on Commerce
United States House of Representatives
Washington, D. C. 20515

Dear Mr. Schaefer:

The NRC has sent to the Office of the Federal Register for publication the enclosed proposed amendment to the Commission's rules in 10 CFR Part 50. The proposed rule, if adopted, would require licensees to report to the NRC summary reliability and availability data for risk-significant systems and equipment. This information would substantially improve licensees' implementation of the NRC's maintenance rule and the NRC's oversight of the maintenance rule. It would also substantially improve the NRC's ability to make risk-effective regulatory decisions and would improve the regulatory process through more efficient use of agency resources, and reductions in unnecessary burdens on licensees.

The Commission is issuing the proposed rule for public comment. A draft regulatory guide will be published for comment at a later date.

Sincerely,

Dennis K. Rathbun, Director
Office of Congressional Affairs

Enclosure: As stated

cc: Representative Frank Pallone

The Honorable Larch Fairloth, Chairman
Subcommittee on Clean Air, Wetlands,
Private Property and Nuclear Safety
Committee on Environment and Public Works
United States Senate
Washington, D. C. 20510

Dear Mr. Fairloth:

The NRC has sent to the Office of the Federal Register for publication the enclosed proposed amendment to the Commission's rules in 10 CFR Part 50. The proposed rule, if adopted, would require licensees to report to the NRC summary reliability and availability data for risk-significant systems and equipment. This information would substantially improve licensees' implementation of the NRC's maintenance rule and the NRC's oversight of the maintenance rule. It would also substantially improve the NRC's ability to make risk-effective regulatory decisions and would improve the regulatory process through more efficient use of agency resources, and reductions in unnecessary burdens on licensees.

The Commission is issuing the proposed rule for public comment. A draft regulatory guide will be published for comment at a later date.

Sincerely,

Dennis K. Rathbun, Director
Office of Congressional Affairs

Enclosure: As stated

cc: Senator Bob Graham