UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D.C. 20555-0001

May 3, 2000

The Honorable Richard A. Meserve
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

SUBJECT: SUMMARY REPORT - 471ST MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS ON APRIL 5-7, 2000, AND OTHER RELATED ACTIVITIES OF THE COMMITTEE

Dear Chairman Meserve:

During its 471st meeting on April 5-7, 2000, the Advisory Committee on Reactor Safeguards (ACRS) discussed several matters and completed the following reports and letter. In addition, the Committee authorized Dr. Larkins, Executive Director of the ACRS, to transmit the memoranda noted below:

REPORTS

- Draft Final Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants (Report to Richard A. Meserve, Chairman, NRC, from Dana A. Powers, Chairman, ACRS, dated April 13, 2000)

- NRC Program for Risk-Based Analysis for Reactor Operating Experience (Report to Richard A. Meserve, Chairman, NRC, from Dana A. Powers, Chairman, ACRS, dated April 13, 2000)

- Reactor Safety Goal Policy Statement (Report to Richard A. Meserve, Chairman, NRC, from Dana A. Powers, Chairman, ACRS, dated April 17, 2000)

LETTER

- Proposed NRC Research Plan for Digital Instrumentation and Control (Letter to William D. Travers, Executive Director for Operations, NRC, from Dana A. Powers, Chairman, ACRS, dated April 18, 2000)

MEMORANDA

- Final Rule: "Elimination of the Requirement for Noncombustible Fire Barrier Penetration Seal Materials and Other Minor Changes" (10 CFR Part 50) (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated April 6, 2000)

- Draft Regulatory Guide DG-1094, "Fire Protection for Operating Nuclear Power Plants" (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated April 7, 2000)

- SECY-00-0061, Proposed Revision to the Enforcement Policy to Address the Revised Reactor Oversight Process (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated April 10, 2000)

- SECY-00-0071, Draft Regulatory Guide (DG-1095), "Guidance for Implementation of 10 CFR 50.59 (Changes, Tests, and Experiments)" (Memorandum to William D. Travers, Executive Director for Operations, NRC, from John T. Larkins, Executive Director, ACRS, dated April 10, 2000)

HIGHLIGHTS OF KEY ISSUES CONSIDERED BY THE COMMITTEE

1. Spent Fuel Pool Accident Risk for Decommissioning Nuclear Power Plants

The Committee heard presentations by and held discussions with representatives of the NRC staff concerning the draft final technical study of spent fuel pool accident risk at decommissioning nuclear power plants.

The staff stated that decommissioning nuclear power plants poses a different risk to public health and safety than operating nuclear power plants. However, under current regulations, the decommissioning plants are subject to many of the same requirements as operating plants. Exemptions from the regulations are frequently requested by the licensees after a nuclear power plant is permanently shut down. To reduce the need to routinely process exemptions, the staff has undertaken a study to provide the technical basis for rulemaking concerning several exemption issues.

In a Staff Requirements Memorandum dated December 21, 1999, the Commission requested the ACRS to perform a technical review of the validity of the draft study and its risk objectives.

In the draft final study the staff concluded that, provided certain industry decommissioning commitments are implemented at the plants, after one year of decay time the risk associated with spent fuel pool fires is sufficiently low that emergency planning requirements can be significantly reduced. The staff also concluded that after five years, the risk of zirconium fires is negligible even if the fuel is uncovered and thus requirements intended to ensure spent fuel cooling can be reduced.

Conclusion

The Committee issued a report on this matter to Chairman Meserve, dated April 13, 2000.

2. Proposed Research Plan for Digital Instrumentation and Control

The Committee heard presentations by and held discussions with the representatives of the NRC staff regarding the proposed research plan for digital instrumentation and control (I&C). This plan is in response to issues raised by the ACRS and the National Research Council in the area of digital I&C.

The National Research Council, under a contract with the NRC, performed a study on the use of digital I&C systems and issued a report documenting several recommendations. The National Research Council recommended that the NRC develop a research plan that would balance short-term regulatory needs and long-term anticipatory research needs.

The proposed research plan has been developed to address both the short term goal of supporting the effective and efficient regulation of the digital I&C systems, balanced with the long term anticipatory research needs.

The digital I&C research activities are grouped into four areas. The first two areas, Systems Aspects of Digital Technology and Software Quality Assurance, have been developed to meet the short-term goal of improving the review of digital systems by providing tools and methods that can improve the current review process. The third area, Risk Assessment of Digital I&C Systems, has been developed to meet the long-term goal of including digital systems in risked-based regulatory programs. The fourth area, Emerging I&C Technology and Applications, has been developed to meet the long-term goal of reducing the time it takes for the NRC to become ready to review the application of new technology to nuclear power plants.

Conclusion

The Committee issued a letter on this matter to Dr. William D. Travers, Executive Director for Operations, on April 18, 2000.

3. Proposed White Paper on Risk-Based Performance Indicators

The Committee heard presentations by and held discussions with representatives of the NRC staff concerning the proposed White Paper entitled "Development of Risk-Based Performance Indicators: Program Overview." The Committee and the staff discussed the staff's plan for developing risk-based performance indicators (RBPIs) for use in the revised reactor oversight process (RROP). In particular, the Committee and the staff discussed the key attributes of the RROP cornerstones of safety, performance data that are available relative to the cornerstones, modes of plant operation, potential benefits of RBPIs , and the process and planned actions for integrating RBPIs into the RROP. The Committee also discussed the sources for gathering performance data, such as the Equipment Performance Information Exchange System Program and the Sequence Coding and Search System.

Conclusion

The Committee's comments on this matter are included in a report to Chairman Meserve, dated April 13, 2000, on the NRC program for risk-based analysis of reactor operating experience.

4. Human Performance Program

The Committee heard presentations by and held discussions with representatives of the NRC staff concerning SECY 00-0053, "NRC Program on Human Performance in Nuclear Power Plant Safety." The staff summarized the results of research studies related to the quantitative and qualitative contribution of human errors to significant events and outlined human performance activities related to the reactor oversight process, plant licensing and monitoring, the risk-informed regulation implementation plan, and emerging technology and related issues.

The Committee and staff discussed whether there is a human contribution to all errors, how to identify or prevent latent errors, whether there is a need for additional control station design guidance, and the use of human reliability assessment models. They also discussed the use of the supplemental inspection procedure, the premises associated with the significance determination process, and the use of a risk-informed approach for evaluating manual versus automatic actions.

Conclusion

The Committee plans to discuss the preparation of a report to Chairman Meserve on this matter at the May 11-13, 2000, ACRS meeting.

5. Special Studies for Risk-Based Analysis of Reactor Operating Experience

The Committee heard presentations by and held discussions with representatives of the NRC staff concerning the NRC program for risk-based analysis of reactor operating experience. The Committee discussed the staff's individual programs for RBPIs, accident sequence precursor analyses, common-cause failure analyses, system and component reliability and availability studies, and special studies (e.g., study of initiating event frequencies, D. C. Cook draft risk assessment, etc.). The Committee also discussed the development of Standardized Plant Analysis Risk models. These programs were developed by the former Office for Analysis and Evaluation of Operational Data and are now administered by RES.

Conclusion

The Committee issued a report to Chairman Meserve, dated April 13, 2000, on the NRC programs for risk-based analysis of reactor operating experience and on the staff's proposed White Paper on RBPIs.

6. Reports of the Thermal-Hydraulic Phenomena and Materials and Metallurgy and Subcommittees

Thermal-Hydraulic Phenomena Subcommittee — Dr. Wallis, Chairman of the Thermal-Hydraulic Phenomena Subcommittee, provided a report to the ACRS on the results of the Subcommittee meeting on March 15, 2000. The meeting was held to discuss the status of the NRC staff's reviews of the Electric Power Research Institute (EPRI) RETRAN-3D, the Siemens Power Corporation S-RELAP5, and the General Electric (GE) Nuclear Energy TRACG codes and to begin review of thermal-hydraulic issues associated with the NRC staff's reevaluation of the pressurized thermal shock (PTS) screening criterion. The Subcommittee does not anticipate any further review of the RETRAN code, subject to additional action by the staff. The Subcommittee was provided introductory information relative to the S-RELAP5 and TRACG codes as the staff's review has just begun.

RES provided an overview of its program to obtain the necessary thermal-hydraulic inputs (system pressure, downcomer temperature, and fluid-to-wall convective heat transfer) to support revision of the PTS rule. This program consists of ensuring whether these inputs, developed to support the original PTS rule, are still valid or require updating or correction. Experiments will be performed at the Oregon State University test facility to obtain data on loop flow stagnation and downcomer mixing phenomena. Dr. Wallis stated that the Committee should review this program during the July meeting.

<u>Conclusion</u>

The Committee plans to continue its review of the RES PTS thermal-hydraulic program in conjunction with its ongoing review of the PTS Technical Bases Reevaluation Project. The ACRS's review of the above-noted thermal-hydraulic codes will be performed in coordination with the staff's review schedule.

Materials and Metallurgy Subcommittee — The Chairman of the Materials and Metallurgy Subcommittee summarized the presentation made by the staff at the Subcommittee meeting on March 16, 2000, concerning the status of the NRC PTS Technical Basis Reevaluation Project. He provided background on the development of the current PTS screening criterion and described the activities of and interactions among the three groups working in the areas of probabilistic fracture mechanics, probabilistic risk assessments, and thermal-hydraulics. Each group is composed of NRC staff and industry experts.

The Subcommittee Chairman highlighted the expert elicitation process that the staff is using to develop a flaw distribution, the staff's plans for incorporating uncertainties, and the potential approach for revising the PTS acceptance criterion. The Committee discussed the amount of conservatism in the current PTS screening criterion, statistical treatment of the data, location and positioning of assumed flaws, and the possible need for modifying other regulatory guidance based on the results of this project.

<u>Conclusion</u>

The Committee decided to review and comment on the proposed draft Commission paper concerning the potential revisions to the PTS acceptance criterion during the May 11-13, 2000, ACRS meeting. In addition, the results of the expert elicitation process associated with flaw distribution will be reviewed and commented on when available.

7. <u>Proposed Revision of the Commission's Safety Goal Policy Statement for Reactors</u>

The Committee continued its discussions on the proposed revision of the Commission's Safety Goal Policy Statement (SGPS) for reactors. During this meeting, the Committee developed formal comments on the specifics of the proposed revisions to the SGPS.

<u>Conclusion</u>

The Committee issued a report to Chairman Meserve, dated April 17, 2000, on this matter.

<u>RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS</u>

- The Committee discussed the response from the EDO, dated March 6, 2000, to ACRS comments and recommendations included in its letter dated February 11, 2000, concerning the revision of Appendix K, "ECCS Evaluation Models," to 10 CFR Part 50.

  The Committee decided it was satisfied with the EDO's response.

- The Committee discussed the response from the EDO, dated March 20, 2000, to the ACRS comments and recommendations included in the ACRS report dated February 8, 2000, concerning SECY-00-001, "Evaluation of the Requirement for Licensees to Update Their Inservice Inspection and Inservice Testing Programs Every 120 Months."

  The Committee decided that this issue is moot since the Commission will decide on the issue.

- The Committee discussed the response from the EDO, dated April 4, 2000, to the ACRS comments and recommendations included in the ACRS report dated February 14, 2000, concerning "Impediments to the Increased Use of Risk-Informed Regulation."

  The Committee decided to continue its discussion on this matter during future meetings.

OTHER RELATED ACTIVITIES OF THE COMMITTEE

During the period from March 1 through April 4, 2000, the following Subcommittee meetings were held:

- Thermal-Hydraulic Phenomena - March 15, 2000

  The Subcommittee discussed (1) the review of the thermal-hydraulic issues associated with the PTS Screening Criterion Reevaluation Project being conducted by RES; (2) the NRC staff acceptance review of the Siemens S-RELAP5 and the GE Nuclear Energy TRACG codes; and (3) the status of the NRC staff's review of the EPRI RETRAN-3D code.

- Human Factors - March 15, 2000

  The Subcommittee reviewed the proposed Commission paper concerning the NRC program on human performance in nuclear power plant safety, including staff activities associated with quantifying the risk of human performance, the effects of economic deregulation, and latent human errors.

- Materials and Metallurgy - March 16, 2000

  The Subcommittee reviewed the status of the Technical Basis Reevaluation Project, including the probabilistic fracture mechanics analysis, the expert elicitation process for flaw distribution, and the associated probabilistic risk assessments.

- Planning and Procedures - April 4, 2000

  The Planning and Procedures Subcommittee discussed proposed ACRS activities, practices, and procedures for conducting Committee business and organizational and personnel matters relating to the ACRS and its staff.

LIST OF FOLLOW-UP MATTERS FOR THE EXECUTIVE DIRECTOR FOR OPERATIONS

- The Committee plans to review and comment on the proposed draft Commission paper concerning the potential revisions to the PTS acceptance criterion at the ACRS meeting on May 11-13, 2000.

- The Committee plans to review and comment on the expert elicitation flaw distribution when it becomes available.

- The Committee will consider reviewing the proposed final version of Regulatory Guide DG-1095, "Guidance for Implementation of 10 CFR 50.59 (Changes, Tests, and Experiments)" after reconciliation of public comments.

- The Committee plans to review the proposed final version of Regulatory Guide DG-1094, "Fire Protection for Operating Nuclear Power Plants," after reconciliation of public comments.

- The Committee plans to review the results of the PTS Technical Basis Reevaluation Project when available.

PROPOSED SCHEDULE FOR THE 472nd ACRS MEETING

The Committee agreed to consider the following topics during the 472nd ACRS Meeting, May 11-13, 2000:

Initiatives Related to Risk-Informed Technical Specifications
Briefing by and discussions with representatives of the NRC staff and industry groups regarding initiatives related to risk-informed technical specifications, initial industry submittals on risk-informed technical specifications, and related matters.

Potential Revisions to the Pressurized Thermal Shock (PTS) Acceptance Criterion
Briefing by and discussions with representatives of the NRC staff regarding a draft Commission Paper that describes potential revisions to the PTS acceptance criterion.

Proposed Revision to Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis"
Briefing by and discussions with representatives of the NRC staff regarding a proposed revision to Regulatory Guide 1.174 and an associated guidance on the use of risk information in license amendment reviews.

Proposed Regulatory Guide and Standard Review Plan (SRP) Section Associated with NRC Code Reviews
Briefing by and discussions with representatives of the NRC staff regarding the proposed Regulatory Guide and SRP Section associated with the NRC staff's review of the analytical codes.

SECY-00-0062, Risk-Informed Regulation Implementation Plan
Briefing by and discussions with representatives of the NRC staff regarding the risk-informed regulation implementation plan described in SECY-00-0062.

Operating Event at E.I. Hatch Nuclear Power Plant, Unit 1
Briefing by and discussions with representatives of the NRC staff regarding the findings and recommendations of the Augmented Inspection Team, which investigated the January 26, 2000 reactor trip event at the E. I. Hatch Nuclear Power Plant, Unit 1.

Physical Security Requirements for Power Reactors (Open/Closed)
Briefing by and discussions with representatives of the NRC staff regarding the status of revising the physical security requirements for power reactors. The focus will be on the incorporation of insights gained from threat assessment activities conducted by the staff in coordination with other Federal agencies.

Sincerely,

Dana A. Powers

Dana A. Powers
Chairman

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Date Issued: 5/15/2000
Date Signed: 5/22/2000

TABLE OF CONTENTS
MINUTES OF THE 471st ACRS MEETING

April 5-7, 2000

Page

REPORTS, LETTERS, AND MEMORANDA

REPORTS

- Draft Final Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants (Report to Richard A. Meserve, Chairman, NRC, from Dana A. Powers, Chairman, ACRS, dated April 13, 2000)

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APPENDICES

I. Federal Register Notice
II. Meeting Schedule and Outline
III. Attendees
IV. Future Agenda and Subcommittee Activities
V. List of Documents Provided to the Committee

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MINUTES OF THE 471st MEETING OF THE
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
APRIL 5-7, 2000
ROCKVILLE, MARYLAND

The 471st meeting of the Advisory Committee on Reactor Safeguards (ACRS) was held in Conference Room 2B3, Two White Flint North Building, Rockville, Maryland, on April 5-7, 2000. Notice of this meeting was published in the *Federal Register* on March 17, 2000 (65 FR 14634) (Appendix I). The purpose of this meeting was to discuss and take appropriate action on the items listed in the meeting schedule and outline (Appendix II). The meeting was open to public attendance. There were no written statements or requests for time to make oral statements from members of the public regarding the meeting.

A transcript of selected portions of the meeting was kept and is available in the NRC Public Document Room at the Gelman Building, 2120 L Street, N.W., Washington, D.C. [Copies of the transcript are available for purchase from Ann Riley & Associates, Ltd., 1025 Connecticut Avenue, N.W., Suite 1014, Washington, D.C. 20036, and on the ACRS/ACNW Web page at (www.NRC.gov/ACRS/ACNW).]

ATTENDEES

ACRS Members: Dr. Dana A. Powers (Chairman), Dr. George Apostolakis (Vice-Chairman), Mr. John Barton, Dr. Mario V. Bonaca, Dr. Thomas S. Kress, Dr. William J. Shack, Dr. Robert L. Seale, Mr. John D. Sieber, Dr. Robert E. Uhrig, and Dr. Graham B. Wallis. For a list of other attendees, see Appendix III.

I. <u>Chairman's Report</u> (Open)

[Note: Dr. John T. Larkins was the Designated Federal Official for this portion of the meeting.]

Dr. Dana A. Powers, Committee Chairman, convened the meeting at 8:30 a.m. and reviewed the schedule for the meeting. He summarized the agenda topics for this meeting and discussed the administrative items for consideration by the full Committee.

II. Spent Fuel Pool Accident Risk for Decommissioning Plants (Open)

[Note: Dr. Medhat El-Zeftawy was the Designated Federal Official for this portion of the meeting.]

Dr. Thomas S. Kress, ACRS, stated that the purpose of this session was to discuss with the NRC staff the draft final technical study of spent fuel pool (SFP) accident risk at decommissioning nuclear power plants. The ACRS is responding to the Commission's request in the staff requirements memorandum of December 21, 1999, that the ACRS perform a technical review of the validity of the draft study and its risk objectives.

Mr. Glenn Kelly, Office of Nuclear Reactor Regulation (NRR), stated that decommissioning nuclear power plants pose a different risk to public health and safety relative to operating nuclear power plants. However, under current regulations the decommissioning plants are subject to many of the same requirements as operating plants. Exemptions from the regulations are frequently requested by the licensees after a nuclear power plant is permanently shut down.

To reduce the need to routinely process exemptions, the staff has undertaken a technical study to provide the technical basis for rulemaking concerning several exemption issues.

During the 467th meeting of the ACRS (November 4-6, 1999), the Committee reviewed a draft report of a technical study prepared by the NRC staff on the SFP accident risk at decommissioning plants. The staff in its study proposed to take a risk-informed view of power reactor decommissioning requirements and to use the risk insights derived from this review to guide the promulgation of new regulations. The staff's study concluded that the risk at decommissioning plants with recently irradiated fuel in the SFP could not be dismissed as low when compared to operating reactors due to the frequency and consequences of postulated events leading to drainage of the SFP and a zirconium fire. The results of the staff's study are intended to support a rulemaking in regulatory areas such as emergency planning, safeguards, and insurance for decommissioning plants.

The ACRS issued its letter to the EDO on November 12, 1999, regarding the draft study. On December 16, 1999, the EDO responded to the ACRS letter.

The staff has now completed its review and requantification of the preliminary risk assessment study.

The staff in its revised draft of the report estimated, after a period of 1 year following permanent shutdown, that the generic frequency of events leading to zirconium fires at decommissioning plants would be less than 3×10^{-6} per year for a plant that implements the design and operational characteristics assumed in the risk assessment performed by the staff. This frequency was estimated on the basis of the assumption that the industry decommissioning commitments plus additional staff assumptions would be implemented. The staff recognizes that this estimate could be much higher for a plant that does not implement these operational characteristics. The staff noted in its study that the most significant contributor to the SFP risk issue is a seismic event that exceeds the design basis earthquake. However, the staff added that the overall frequency of this event is within the developed SFP performance guideline for large radionuclide releases (related to a zirconium fire) of 1×10^{-5} per year.

The staff's study addressed three main areas, namely how risk-informed decisionmaking can be applied to decommissioning plants, the risk assessment of SFPs at decommissioning plants, and the implications of SFP risks on regulatory requirements. The staff stated that for many of the sequences leading to zirconium fires, there are very large delay times due to the long time required to boil off the large SFP water inventory. Thus, the staff concluded that although the consequences of zirconium fires are comparable to large, early release frequency from postulated operating reactor accidents, the time of release occurs much later following initiation of the accident, and consequently there is a large amount of time to initiate and implement protective actions, including public evacuation.

The report indicates that the risk assessment shows low numerical risk results in combination with satisfaction of the safety principles as described in Regulatory Guide 1.174, such as defense in depth, maintaining safety margins, and performance monitoring. For the report's implications on security, it is not clear what risk insights can be used to assess what target sets are important to protect against sabotage.

Concurrent with providing the Commission a copy of this draft report, the staff will be issuing it for public comment. Following resolution of any Commission and public comments and review by the ACRS, the staff plans to publish the final report in May 2000. The staff will utilize the industry commitments and the conclusions in this report to support an integrated decommissioning rulemaking to be submitted in June 2000 and will develop interim guidelines for any future plants that elect to decommission before establishing revised regulations. On February 22, 2000, a notice was published in the *Federal Register* on the availability of the final draft study. The public comment period expired on April 7, 2000.

Mr. Jason Schaperow, NRC/RES, presented a brief consequence evaluation for spent fuel pool accidents. The object of the analysis was to assess the effect of 1 year of decay on offsite consequences and to assess the effect of early versus late evaluation. The approach undertaken by the staff was to use the MACCS code with fission product inventories for 30 days and 1 year after final shutdown.

The staff concluded that short-term consequences (early fatalities) are reduced by a factor of two, from 30 days to 1 year. In addition, early evacuation reduces early fatalities by up to a factor of 100. However, the long-term consequences (cancer fatalities and societal dose) are less affected by additional decay and early evacuation.

Mr. Schaperow discussed briefly the effect of ruthenium. He stated that small-scale Canadian tests with an air environment show significant ruthenium release following cladding oxidation. The MACCS code calculations show that release of all ruthenium increases early fatalities by a factor of 100. Some of the mitigating factors for ruthenium releases in the SFP could be rubbling of the fuel to limit air ingression, and early evacuation. The PHEBUS test planned to examine the effect of air ingression on a larger scale in an integral facility.

Conclusion

The Committee sent a report on this matter to Chairman Meserve, dated April 13, 2000.

III. Proposed Research Plan for Digital Instrumentation and Control (Open)

[Note: Mr. Amarjit Singh was the Designated Federal Official for this portion of the meeting.]

Dr. Robert E. Uhrig, Chairman of the Subcommittee on Plant Systems, introduced the topic to the Committee. He stated that the purpose of this session was to discuss with the representatives of the NRC staff the proposed research plan for digital instrumentation and control (I&C).

NRC Staff Presentation

Dr. Sher Bahadur led the discussions for the staff. He stated that in the early 1990s the NRC began developing guidance to support the review of digital systems in nuclear power plants. RES commissioned the National Academy of Sciences - National Research Council to review the issue associated with the use of digital I&C systems. The National Research Council issued its report and made several recommendations, including a proposal to develop a research plan that would balance short-term regulatory needs and long-term anticipatory research needs.

Mr. Matthew Chiramal presented the regulatory framework and digital I&C review process. He stated that in 1997 the NRC completed an update to Chapter 7, "Instrumentation and Control," of NUREG-0800, "Standard Review Plan (SRP) for the Review of Safety Analysis Reports for Nuclear Power Plants." The update to the SRP addressed many of the regulatory review issues associated with digital technology. In support of the SRP update, the NRC also developed six regulatory guides addressing software quality assurance. These regulatory guides endorsed eight Institute of Electrical and Electronic Engineers standards, with exceptions. Since the update of the SRP, RES has been supporting the digital I&C regulatory framework by providing review guidelines and technical information on specific I&C issues.

Mr. Steven Arndt presented the proposed research plan for digital I&C. He stated that to meet the short-term and long-term goals of the research plan, research programs have been developed on the basis of the four agency performance goals of maintaining safety, increasing public confidence, reducing regulatory burden, and making NRC activities and decisions more effective, efficient, and realistic.

The digital I&C research program activities are grouped into four areas. The first two areas, Systems Aspects of Digital Technology and Software Quality Assurance, have been developed to meet the short term goal of improving the review of digital systems by providing tools and methods that can improve the current review process. The third area, Risk Assessment of Digital I&C Systems, has been developed to meet the long-term goal of including digital systems in risked-based regulatory programs. The fourth area, Emerging I&C Technology and Applications, has been developed to meet the long-term goal of reducing the time it takes for the NRC to become ready to review the application of new technology to nuclear power plants.

The process for the scheduling of the research activities uses four criteria to prioritize them. In order of importance they are (1) regulatory need (as evaluated for stakeholder input, primarily NRR user needs), (2) dependence of activities on one another, (3) time needed to complete the research, and (4) completion of needed work that has already been initiated. The proposed research plan is to be completed in the next 5 years.

Conclusion

The Committee issued a letter on this matter to Dr. William D. Travers, Executive Director for Operations, on April 18, 2000.

IV. Proposed White Paper on Risk-Based Performance Indicators (Open)

[Note: Mr. Michael T. Markley was the Designated Federal Official for this portion of the meeting.]

Dr. George Apostolakis, Chairman of the ACRS Subcommittee on Reliability and Probabilistic Risk Assessment, introduced the topic to the Committee. He stated that the Subcommittee met on December 15, 1999, to discuss NRC programs for risk-based analysis of reactor operating experience, including the staff's plans to develop a White Paper on risk-based performance indicators (RBPIs). Dr. Apostolakis noted that the Committee had met with the staff about 2 years ago to discuss development of RBPIs and stated that he was somewhat surprised that the development effort was still at such a high level.

NRC Staff Presentation

Messers Patrick Baranowsky and Steven Mays, RES, led the discussion of this topic for the NRC staff. Mr. Hossein Hamzehee, RES, provided supporting discussion. Significant points raised by the staff during the presentation include the following:

- The proposed White Paper is a conceptual document. It updates previous work in this area to be consistent with the revised reactor oversight process (RROP). Some of the detailed work noted in the White Paper has already been accomplished. The staff plans to refine the models sufficient to support risk-informed decisionmaking. However, the staff does not propose the development of new technology in this area.

- The staff's approach is to identify the most significant contributors to risk and to link the RBPIs to the RROP cornerstones of safety. The staff proposes to establish RBPIs for all modes of operation and plant conditions (e.g., full-power, low-power, and shutdown operations, external events, etc.).

- The Committee also discussed the sources' performance data such as the Equipment Performance and Information Exchange System Program (EPIX) and the Sequence Coding and Search System. The EPIX was established as a voluntary industry database in lieu of the proposed Reliability Data Rule.

- The Phase 1 portion of the RBPI development effort would be to identify the most risk-significant contributors to risk as candidate performance indicators (PIs). Phase 2 would entail developing possible indicators that would integrate RBPIs and the results of inspection and assessment.

Dr. Bonaca questioned whether the staff would expect to have "leading indicators" as an outcome of the RBPI effort. The staff noted that data are always "lagging" and asserted that the intent is to make the RBPIs a performance monitoring system that is driven by observed contributors to risk.

Dr. Apostolakis questioned whether there was a need to develop RBPIs for health effects, quality assurance, or safety culture. The staff reiterated that the RBPIs selected must be able to complement the RROP. The staff stated that the RBPIs must be organized logically rather than intuitively and that indicators must be measurable.

Drs. Bonaca and Apostolakis questioned the completeness and consistency of information provided by licensees in the EPIX database. They also questioned the uniformity of terms and definitions used by licensees in providing information for this "voluntary" database. Dr. Powers suggested that the RBPIs might be more effective if they measure plant-specific trends rather than comparing data on an industry-wide basis. The staff acknowledged that there is some variability in the information provided by licensees but expressed reservation concerning how precise the data must be to useful assessments. The staff reiterated that the terms, definitions, and reporting guidelines were agreed upon by the industry in lieu of the Reliability Data Rule.

Dr. Apostolakis suggested that page 8 of the presentation handout be modified to specify that the items listed were "guiding principles" rather than definitions for what constitutes RBPIs. The staff agreed to modify the handout as suggested.

Conclusion

The Committee's comments on this matter are included in a report to Chairman Meserve, dated April 13, 2000, on the NRC program for risk-based analysis of reactor operating experience.

V. Human Performance Program (Open)

[Note: Mr. Noel F. Dudley was the Designated Federal Official for this portion of the meeting.]

Dr. Dana Powers, ACRS Chairman, introduced this topic to the Committee. Mr. Jack Rosenthal, RES, began his presentation by giving background information relating to the development of SECY-00-0053, "NRC Program on Human Performance in Nuclear Power Plant Safety." He described the contents of SECY-00-0053 and the basis for the program on human performance. Mr. Rosenthal summarized the results of the following studies sponsored by the NRC:

- evaluation of human reliability sensitivity studies by the Brookhaven National Laboratory,
- qualitative review of Accident Sequence Precursor (ASP) data by RES, and
- quantitative review of ASP data by the Idaho National Engineering and Environmental Laboratory (INEEL).

Mr. Rosenthal noted that the INEEL review identified latent human errors as a major contributor to significant events. Mr. Rosenthal explained the program's four elements, which consisted of supporting the reactor oversight process, plant licensing and monitoring, the risk-informed regulation implementation plan, and emerging technology and issues.

The Committee members and the staff discussed whether there is a human contribution to all errors, how to identify or prevent latent errors, whether there is a need for additional control station design guidance, and the use of the human reliability assessment models.

Messrs. David Trimble and Richard Eckenrode, NRR, presented NRR activities related to human performance. Several activities involved testing the hypothesis that the effects of human performance on plant safety would largely be reflected in the plant PIs and inspection findings. They described the supplemental inspection procedure for human performance and the human performance significance determination process

The Committee members and the staff discussed how the hypothesis would be tested, use of the supplemental inspection procedure, the premises associated with the significance determination process, and use of a risk-informed approach for evaluating manual versus automatic actions.

Conclusion

The Committee plans to prepare a report to Chairman Meserve on this matter for the ACRS meeting on May 11-13, 2000.

VI. Special Studies for Risk-Based Analysis of Reactor Operating Experience (Open)

[Note: Mr. Michael T. Markley was the Designated Federal Official for this portion of the meeting.]

Dr. Mario Bonaca, cognizant ACRS member for this meeting, introduced the topic to the Committee. He stated that the Subcommittee on Reliability and Probabilistic Risk Assessment met on December 15, 1999, to discuss NRC programs for risk-based analysis of reactor operating experience, including RBPIs, ASP analyses, common-cause failure analyses, system and component reliability and availability studies, and special studies (e.g., study of initiating event frequencies, D. C. Cook draft risk assessment, etc.).

NRC Staff Presentation

Messers Patrick Baranowsky and Steven Mays, NRR, led the discussion on this matter for the NRC staff. Significant points raised during the staff's presentation include the following:

- The staff plans to continue updating and consolidating its initiating event, system, and component reliability studies. The staff plans to prepare an annual report on overall reactor safety performance.

- The staff plans to continue its development of Standardized Plant Analysis Risk (SPAR) models. These programs were developed by the former Office for Analysis and Evaluation of Operational Data and are now administered by RES.

- The staff plans to continue to work closely with the industry to refine the Reliability and Availability Data System.

Drs. Powers and Apostolakis questioned how the staff compared industry operating experience for low-power and shutdown operations when very few models exist against which comparisons can be made. The staff stated that some computer software programs exist but acknowledged that ad hoc models are necessary to analyze emergent plant events and incidents.

Dr. Powers questioned the absence of fire frequency analysis in the EPIX database. The staff stated that there were very few fires at nuclear power plants and noted that much of the available data related to fires is proprietary.

Dr. Apostolakis questioned the fidelity of the SPAR models in validating the information in licensee probabilistic risk assessments (PRAs) and individual plant examinations. He suggested that a peer review of the SPAR models be considered. The staff agreed to take Dr. Apostolakis' comments and suggestions under consideration.

Conclusion

The Committee issued a report to Chairman Meserve, dated April 13, 2000, on the NRC programs for risk-based analysis of reactor operating experience and on the staff's proposed White Paper on RBPIs.

VII. Reports of the Materials and Metallurgy and Thermal-Hydraulic Phenomena Subcommittees (Open)

[Note: Mr. Paul A. Boehnert was the Designated Federal Official for this portion of the meeting.]

Materials and Metallurgy Subcommittee - Dr. William J. Shack, Chairman of the Materials and Metallurgy Subcommittee, summarized the presentation the staff made at the Joint Meeting of the Materials and Metallurgy and the Reliability and Probabilistic Risk Assessment Subcommittees on March 16, 2000, concerning the status of the NRC Pressurized Thermal Shock (PTS) Technical Basis Re-evaluation Project. He first provided background information on the development of the current PTS screening criterion. Dr. Shack then described the activities of and interactions among the three groups working in the areas of probabilistic fracture mechanics, PRAs, and thermal-hydraulics. Each group is composed of NRC staff and industry experts. He highlighted the expert elicitation process that the staff is using to develop a flaw distribution, the staff's plans for incorporating uncertainties, and the potential approaches for revising the PTS acceptance criterion.

The Committee discussed the amount of conservatism in the current PTS screening criterion, statistical treatment of the data, location and positioning of assumed flaws, and the possible consequences of the project results on other regulatory guidance. Dr. Powers questioned whether the staff would consider the effects of PTS on boiling-water reactor vessels when evaluating the request to use automatic depressurization and low-pressure injection systems to reach safe shutdown conditions. Dr. Kress speculated on possible unreviewed severe accident consequences resulting from the failure of a reactor pressure vessel.

Conclusion

The Committee decided to review and comment on the proposed draft Commission paper concerning the potential revisions to the PTS acceptance criterion at the ACRS meeting on May 11-13, 2000.

Thermal-Hydraulic Phenomena Subcommittee - Dr. Wallis, Chairman, Thermal-Hydraulic Phenomena Subcommittee, provided a report to the Committee on the results of its meeting on March 15, 2000. The meeting was held to discuss the status of the NRC staff's reviews of the Electric Power Research Institute (EPRI) RETRAN-3D, the Siemens Power Corporation SRELAP-5, and the General Electric (GE) Nuclear Energy TRACG codes and to begin review of thermal-hydraulic issues associated with the NRC staff's reevaluation of the PTS screening criterion.

Regarding the staff's code reviews, Dr. Wallis first discussed the status of the RETRAN code review, reminding the Committee of the significant problems that the Subcommittee had found with this code during its review last year. He said that NRR discussed the status of its review of RETRAN-3D, indicating that, at this point, any approval of this code by the staff will be on an applicant-specific submittal basis, if at all. Dr. Wallis also noted that an EPRI representative provided additional information on the status of its recent interactions with the staff. The result was disappointing in that EPRI apparently has done little to address the Subcommittee's concerns. Mr. L. Agee of EPRI provided Dr. Wallis with additional information through an e-mail message, but this material also contained errors similar to those seen by the Subcommittee earlier. The Subcommittee does not plan any further action on this matter, subject to further input from the staff.

The Subcommittee was provided introductory information from both the staff and the respective vendors relative to the SRELAP-5 and TRACG codes. Review of these codes by the NRC staff is just beginning. Dr. Wallis said that the Subcommittee is working on a review plan for these codes.

Representatives of RES provided an overview of its program to obtain the necessary thermal-hydraulic inputs (system pressure, downcomer temperature, and fluid-to-wall convective heat transfer) to support revision of the PTS rule. This program consists of ensuring that these inputs, developed to support the original PTS rule, are either still operative or require updating or correction. Experiments will be performed at the Oregon State University's "APEX" test facility to obtain data on loop flow stagnation and downcomer mixing phenomena. Dr. Wallis indicated that one of the RES presentations did not provide adequate information relative to the "big picture" for this work. Consequently, the Committee will need to obtain additional information on the objectives, scope, and goals of this program pursuant to the Committee's ongoing review of this matter. Dr. Kress observed that the problem appears to have been one of poor communication, and that the RES program, particularly the experimental work at the Oregon State University, should be adequate to the task at hand.

Conclusion

The Committee will continue its review of the RES PTS thermal-hydraulic program in conjunction with its ongoing review of the PTS Screening Re-evaluation Project. ACRS review of the above-noted thermal-hydraulic codes will proceed in coordination with the staff's review schedule.

VIII. Proposed Revision of the Commission's Safety Goal Policy for Reactors (Open)

[Note: Mr. Paul A. Boehnert was the Designated Federal Official for this portion of the meeting.]

The Committee continued its discussions of the proposed revision of the Commission's Safety Goal Policy Statement (SGPS) for reactors. During this meeting, the Committee developed formal comments relative to the SGPS.

Conclusion

The Committee issued a report on this matter to Chairman Meserve dated April 17, 2000.

X. Executive Session (Open)

[Note: Dr. John T. Larkins was the Designated Federal Official for this portion of the meeting.]

A. Reconciliation of ACRS Comments and Recommendations

[Note: Mr. Sam Duraiswamy was the Designated Federal Official for this portion of the meeting.]

- The Committee discussed the response from the EDO, dated March 6, 2000, to ACRS comments and recommendations included in its letter dated February 11, 2000, concerning revision of Appendix K, "ECCS Evaluation Models," to 10 CFR Part 50.

The Committee decided it was satisfied with the EDO's response.

- The Committee discussed the response from the EDO, dated March 20, 2000, to the ACRS comments and recommendations included in the ACRS report dated February 8, 2000, concerning SECY-00-001, "Evaluation of the Requirement for Licensees to Update Their Inservice Inspection and Inservice Testing Programs Every 120 Months."

  The Committee decided that this issue is moot since the Commission will decide on the issue.

B. Report on the Meeting of the Planning and Procedures Subcommittee (Open)

The Committee heard a report from Dr. Powers and the Executive Director, ACRS, on the Planning and Procedures Subcommittee meeting held on April 4, 2000. The following items were discussed:

- Review of the Member Assignments and Priorities for ACRS Reports and Letters for the April ACRS Meeting

  Member assignments and priorities for the ACRS reports and letters during the April ACRS meeting were discussed. Reports and letters that would benefit from additional consideration at a future ACRS meeting were also discussed.

- Anticipated Workload for ACRS Members

  The anticipated workload of the ACRS members through June 2000 was discussed. The objectives were: (1) to review the reasons for the scheduling of each activity and the expected work product and to make changes, as appropriate, (2) to manage the members' workload for these meetings, and (3) to plan and schedule items for ACRS discussion of topical and emerging issues.

During this session, the Subcommittee discussed and developed recommendations on the items that require Committee decision, which are included in Section II of the Future Activities list.

- Status of Selecting Candidates for Potential ACRS Membership

  ACRS members and the Screening Panel interviewed four candidates during the March meeting for ACRS membership. Based on the information gathered through the interviews, reference checks, and feedback provided by the members, the Screening Panel developed a list of three candidates for submittal to the Commission for consideration and selection.

- Joint ACRS/ACNW Subcommittee Report on Defense-in-Depth

  During the 118th meeting of the ACNW, March 27-29, 2000, the Committee approved a report titled "Defense-in-Depth in a Risk-Informed Regulatory Process." The ACRS should review and either approve this report; disapprove; or approve with Additional Comments.

- Meeting with Members of the German Reactor Safety Committee

  On March 13, 2000 Lothae Hahn (Chairman of the RSK), Edmund Kersting (Vice Chairman, RSK) and Renzo Candeli (Executive Director of RSK office) met with D. Powers, G. Apostolakis, M. Bonaca, T. Kress, G. Wallis, and J. Larkins. They discussed several topics of mutual interest, including Risk-Informed Performance Based Regulation; Generic Safety Issues; Decommissioning and Emergency Responses; and Reactor Regulatory Research.

  As a result of this technical exchange, the RSK members suggested that the ACRS members travel to Germany in June 2000, to discuss, with members of the RSK and their contractors, the area of digital instrumentation and control. Additionally, it was recommended that the RSK and ACRS meet annually to discuss issues of mutual interest.

- <u>Change in NRC Travel Regulations</u>

  A copy of the February 8, 2000 NRC Yellow Announcement, "Mandatory Usage of the Government Sponsored Charge Card for Travel," was distributed to the members for information during the March meeting. Subsequently, as authorized by the General Services Administration, the NRC has delayed the implementation of the use of government sponsored charge cards until May 1, 2000. NRC plans to provide new guidance prior to May 1, 2000.

- <u>Proposed Rulemaking to Revise FACA Regulations</u>

  The General Services Administration (GSA) is revising the implementation regulations for FACA to make it consistent with legislative changes, shifts in Federal policy, and decisions issued by the Supreme Court and other Federal Courts. Copies of the ACRS/ACNW and Office of Human Resources comments were provided to the members during the March meeting. Since then the Commission has approved issuing the regulations to GSA. OGC submitted their comments to GSA on March 24, 2000.

- <u>ACRS/ACNW Division of Responsibilities in Decommissioning</u>

  As a result of the increased number of regulatory activities in the area of decommissioning, Dr. Savio has been tasked to summarize the NRC staff's current activities in this area and to develop a plan for ACRS or ACNW reviews. Dr. Savio provided a proposal for the division of review activities related to power reactor and non-power reactor decommissioning.

- <u>Meeting with Industry Representatives</u>

  During the March meeting, the Subcommittee discussed ways in which the ACRS could interact with industry representatives, including NEI, INPO, and utilities. This idea stemmed from the January 2000 ACRS retreat. The Subcommittee has recommended that Dr. Savio develop a proposal for this type of interaction and discuss this proposal with the cognizant ACRS members and submit to the Subcommittee for discussion during its April meeting.

- <u>Meeting with the EDO</u>

  The Planning and Procedures Subcommittee met with the EDO and the Deputy EDO to discuss items of mutual interest. A proposed list of topics for this meeting was discussed. Dr. Powers will provide a report to the Committee regarding the meeting with the EDO with emphasis on mutual agreements, and Committee follow-up items.

C. <u>Future Meeting Agenda</u>

Appendix IV summarizes the proposed items endorsed by the Committee for the 472nd ACRS Meeting, May 11-13, 2000.

The 471st ACRS meeting was adjourned at 2:00 p.m. on April 7, 2000.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D.C. 20555-0001

May 22, 2000

MEMORANDUM TO: Sherry Meador, Technical Secretary
Advisory Committee on Reactor Safeguards

FROM: Dana A. Powers, Chairman
Advisory Committee on Reactor Safeguards

SUBJECT: CERTIFIED MINUTES OF THE 471st MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS), APRIL 5-7, 2000

I certify that based on my review of the minutes from the 471st ACRS full Committee meeting, and to the best of my knowledge and belief, I have observed no substantive errors or omissions in the record of this proceeding subject to the comments noted below.

Dana A. Powers

Dana A. Powers, Chairman

May 22, 2000
Date

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D.C. 20555-0001

May 15, 2000

MEMORANDUM TO: ACRS Members

FROM: Sherry Meador
Technical Secretary *Sherry Meador*

SUBJECT: PROPOSED MINUTES OF THE 471st MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS - APRIL 5-7, 2000

Enclosed are the proposed minutes of the 471st meeting of the ACRS. This draft is being provided to give you an opportunity to review the record of this meeting and provide comments. Your comments will be incorporated into the final certified set of minutes as appropriate.

Please note that these minutes are being issued in two parts: (1) main body (working paper form), and (2) appendices. The appendices are being sent only to those members who have requested them.

Attachment:
As stated

NUCLEAR REGULATORY COMMISSION

Advisory Committee on Nuclear Waste Revised

The agenda for the 118th meeting of the Advisory Committee on Nuclear Waste (ACNW) scheduled to be held on March 27–29, 2000, in Room T–2B3, 11545 Rockville Pike, Rockville, Maryland, has been revised to include a discussion on: Uranium Plume Attenuation—Representatives from the NRC Office of Research will present results from a historical case analysis of the transport of uranium. Mechanisms controlling retardation of radionuclides by common soil minerals will be presented. The discussion of the DOE-NRC technical exchange on the resolution of key technical issues (on March 28) has been canceled.

All other items pertaining to this meeting remain the same as published in the **Federal Register** on Thursday, March 9, 2000 (65 FR 12595).

For further information contact: Mr. Richard K. Major, Special Assistant, ACNW (Telephone 301/415–7366), between 8 a.m. and 5 p.m. EST.

Dated: March 13, 2000.

Andrew L. Bates,

Advisory Committee Management Officer.

[FR Doc. 00–6635 Filed 3–16–00; 8:45 am]

BILLING CODE 7590–01–U

NUCLEAR REGULATORY COMMISSION

Advisory Committee on Reactor Safeguards; Meeting Notice

In accordance with the purposes of Sections 29 and 182b. of the Atomic Energy Act (42 U.S.C. 2039, 2232b), the Advisory Committee on Reactor Safeguards will hold a meeting on April 5–7, 2000, in Conference Room T–2B3, 11545 Rockville Pike, Rockville, Maryland. The date of this meeting was previously published in the **Federal Register** on Thursday, October 14, 1999 (64 FR 55787).

Wednesday, April 5, 2000

8:30 A.M.–8:35 A.M.: Opening Remarks by the ACRS Chairman (Open)—The ACRS Chairman will make opening remarks regarding the conduct of the meeting.

8:35 A.M.–10:30 A.M.: Spent Fuel Pool Accident Risk for Decommissioning Plants (Open)—The Committee will hear presentations by and hold discussions with representatives of the NRC staff regarding the proposed final report of a technical study associated with the spent fuel pool accident risk for decommissioning plants, public comments received on the proposed report, and the staff's resolution of public comments.

10:45 A.M.–12:15 P.M.: Proposed Research Plan for Digital Instrumentation and Control (Open)—The Committee will hear presentations by and hold discussions with representatives of the NRC staff regarding the proposed research plan for digital instrumentation and control.

1:15 P.M.–2:45 P.M.: Proposed White Paper on Development of Risk-Based Performance Indicators (Open)—The Committee will hear presentations by and hold discussions with representatives of the NRC staff regarding the proposed white paper on development of risk-based performance indicators.

3 P.M.–4 P.M.: Human Performance Program (Open)—The Committee will hear presentations by and hold discussions with representatives of the NRC staff regarding the revised version of the human performance program.

4 P.M.–5 P.M.: Break and Preparation of Draft ACRS Reports (Open)—Cognizant ACRS members will prepare draft reports for consideration by the full Committee.

5 P.M.–7 P.M. : Discussion of Proposed ACRS Reports (Open)—The Committee will discuss a proposed ACRS report on matters considered during this meeting. In addition, the Committee will discuss a proposed ACRS report on the revision of the Commission's Safety Goal Policy Statement for Reactors as well as an ACRS/ACNW joint report on Defense-in-Depth in a Risk-Informed Regulatory Process.

Thursday, April 6, 2000

8:30 A.M.–8:35 A.M.: Opening Remarks by the ACRS Chairman (Open)—The ACRS Chairman will make opening remarks regarding the conduct of the meeting.

8:35 A.M.–9:45 A.M.: Special Studies for Risk-Based Analysis of Reactor Operating Experience (Open)—The Committee will hear presentations by and hold discussions with representatives of the NRC staff regarding special studies of the staff associated with the risk-based analysis of reactor operating experience.

10 A.M.–11:15 A.M.: Operating Event at Indian Point Unit 2 (Open)—The Committee will hear presentations by and hold discussions with representatives of the NRC staff regarding the findings and recommendations of the Augmented Inspection Team, which investigated the reactor trip and partial loss of AC power event that occurred at Indian Point Unit 2 on August 31, 1999.

11:15 A.M.–11:45 A.M.: Reports of the Materials and Metallurgy and Thermal-Hydraulic Phenomena Subcommittees (Open)—The Committee will hear reports by the Chairmen of the ACRS Subcommittees on Materials and Metallurgy and on Thermal-Hydraulic Phenomena regarding the status of activities associated with the development of a revised Pressurized Thermal Shock Screening Criterion.

1 P.M.–1:15 P.M.: Future ACRS Activities (Open)—The Committee will discuss the recommendations of the Planning and Procedures Subcommittee regarding items proposed for consideration by the full Committee during future meetings.

1:15 P.M.–1:45 P.M.: Report of the Planning and Procedures Subcommittee (Open)—The Committee will hear a report of the Planning and Procedures Subcommittee on matters related to the conduct of ACRS business.

1:45 P.M.–2 P.M.: Reconciliation of ACRS Comments and Recommendations (Open)—The Committee will discuss the responses from the NRC Executive Director for Operations (EDO) to comments and recommendations included in recent ACRS reports and letters. The EDO responses are expected to be made available to the Committee prior to the meeting.

2 P.M.–3 P.M.: Break and Preparation of Draft ACRS Reports (Open)—Cognizant ACRS members will prepare draft reports for consideration by the full Committee.

3 P.M.–7 P.M.: Discussion of Proposed ACRS Reports (Open)—The Committee will discuss proposed ACRS reports.

Friday, April 7, 2000

8:30 A.M.–2 P.M.: Discussion of Proposed ACRS Reports (Open)—The Committee will continue its discussion of proposed ACRS reports.

2 P.M.–2:30 P.M.: Miscellaneous (Open)—The Committee will discuss matters related to the conduct of Committee activities and matters and specific issues that were not completed during previous meetings, as time and availability of information permit.

Procedures for the conduct of and participation in ACRS meetings were published in the **Federal Register** on September 28, 1999 (64 FR 52353). In accordance with these procedures, oral or written views may be presented by members of the public, including representatives of the nuclear industry. Electronic recordings will be permitted only during the open portions of the meeting and questions may be asked only by members of the Committee, its consultants, and staff. Persons desiring to make oral statements should notify Mr. Sam Duraiswamy, ACRS, five days before the meeting, if possible, so that appropriate arrangements can be made to allow necessary time during the meeting for such statements. Use of still, motion picture, and television cameras during this meeting may be limited to selected portions of the meeting as determined by the Chairman. Information regarding the time to be set aside for this purpose may be obtained by contacting Mr. Sam Duraiswamy prior to the meeting. In view of the possibility that the schedule for ACRS meetings may be adjusted by the Chairman as necessary to facilitate the conduct of the meeting, persons planning to attend should check with Mr. Sam Duraiswamy if such rescheduling would result in major inconvenience.

Further information regarding topics to be discussed, whether the meeting has been canceled or rescheduled, the Chairman's ruling on requests for the opportunity to present oral statements and the time allotted therefor, can be obtained by contacting Mr. Sam Duraiswamy (telephone 301/415–7364), between 7:30 a.m. and 4:15 p.m., EST.

ACRS meeting agenda, meeting transcripts, and letter reports are available for downloading or viewing on the internet at http://www.nrc.gov/ACRSACNW.

Videoteleconferencing service is available for observing open sessions of ACRS meetings. Those wishing to use this service for observing ACRS meetings should contact Mr. Theron Brown, ACRS Audio Visual Technician (301–415–8066), between 7:30 a.m. and 3:45 p.m., EST, at least 10 days before the meeting to ensure the availability of this service. Individuals or organizations requesting this service will be responsible for telephone line charges and for providing the equipment facilities that they use to establish the videoteleconferencing link. The availability of videoteleconferencing services is not guaranteed.

Dated: March 13, 2000.

Andrew L. Bates,

Advisory Committee Management Officer.

[FR Doc. 00–6634 Filed 3–16–00; 8:45 am]

BILLING CODE 7590–01–P

OFFICE OF PERSONNEL MANAGEMENT

Privacy Act of 1974; Amendment to a System of Records

AGENCY: Office of Personnel Management (OPM).

ACTION: Notice to amend a system of records.

SUMMARY: OPM proposes to amend a system of records in its inventory of record systems subject to the Privacy Act of 1974 (5 U.S.C. 552a), as amended. This notice is required under the Privacy Act whenever an agency establishes or revises one of its systems of records (5 U.S.C. 552a(e)(4)).

DATES: This amendment will be effective without further notice April 26, 2000, unless comments are received that result in any changes.

ADDRESSES: Send written comments to Mary Beth Smith-Toomey, Office of the Chief Information Officer, Office of Personnel Management, 1900 E Street NW., Room 5415, Washington, DC 20415–7900.

FOR FURTHER INFORMATION CONTACT: Mary Beth Smith-Toomey, (202) 606–8358.

SUPPLEMENTARY INFORMATION: This notice updates OPM/Internal-3, Security Officer Control Files, by adding a database tracking system for investigative reports. This tracking system will provide data on pending and completed schedules, types of investigations, position sensitivity levels, clearances granted and issues developed.

U.S. Office of Personnel Management.

Janice R. Lachance

Director.

OPM/INTERNAL–3

SYSTEM NAME:

Security Officer Control Files

SYSTEM LOCATION:

U.S. Office of Personnel Management, Office of Contracting and Administrative Services, 1900 E Street NW., Washington, DC 20415–7100

CATEGORIES OF INDIVIDUALS COVERED BY THE SYSTEM:

This system contains records on active, inactive and pending OPM employees and contractors.

CATEGORIES OF RECORDS IN THE SYSTEM:

The records in the system contain date of birth; social security number; classification as to position sensitivity; types and dates of investigations; investigative reports, including those from Federal law enforcement agencies, Department of Defense and internal inquiries; dates and levels of clearances; names of agencies and the reasons why they were provided clearance information on OPM employees and contractors.

AUTHORITY FOR MAINTENANCE OF THE SYSTEM INCLUDES THE FOLLOWING WITH ANY REVISIONS OR AMENDMENTS:

Executive Orders 10450 and 12958.

PURPOSE:

These records are used exclusively by OPM Security Officers and the employees of other security offices to assist them in controlling position sensitivity and personnel clearances.

ROUTINE USES OF RECORDS MAINTAINED IN THE SYSTEM, INCLUDING CATEGORIES OF USERS AND THE PURPOSES OF SUCH USES:

Routine uses 1, 3, 5 and 6, of the Prefatory Statement at the beginning of OPM's system notices (60 FR 63075, effective January 17, 1996) apply to the records maintained within the system. The routine uses listed below are specific to this system of records only.

a. To disclose information to an agency in the executive, legislative, or judicial branch, or the District of Columbia Government, in response to its request related to issuing a security clearance or conducting a security or suitability investigation of an individual. Only information that is relevant and necessary to the requesting agency's decision on the matter will be released.

b. To verify a security clearance in response to an inquiry from a security office of an agency in the executive legislative, or judicial branch, or the District of Columbia Government. Also, to provide OPM employees and contractors access to classified data or areas, when their official duties require such access.

POLICIES AND PRACTICES FOR STORING, RETRIEVING, ACCESSING, RETAINING AND DISPOSING OF RECORDS IN THE SYSTEM:

STORAGE:

These records are maintained in file folders and in an automated data base.

RETRIEVABILITY:

These records are retrieved by name, social security number, and date of birth of the individual on whom they are maintained.

SAFEGUARDS:

The disks and file folders are stored in fire-resistant safes contained within a secured area, in lockable metal file cabinets, or in secured rooms. The file folders do not leave the Security Office.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

March 14, 2000

SCHEDULE AND OUTLINE FOR DISCUSSION 471st ACRS MEETING APRIL 5-7, 2000

WEDNESDAY, APRIL 5, 2000, CONFERENCE ROOM 2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND

1) 8:30 - 8:35 A.M. Opening Remarks by the ACRS Chairman (Open)
   - 1.1) Opening statement (DAP/JTL/SD)
   - 1.2) Items of current interest (DAP/NFD/SD)
   - 1.3) Priorities for preparation of ACRS reports (DAP/JTL/SD)

2) 8:35 - 10:30 A.M. Spent Fuel Pool Accident Risk for Decommissioning Plants (Open) (TSK/MME)
   - 2.1) Remarks by the Subcommittee Chairman
   - 2.2) Briefing by and discussions with representatives of the NRC staff regarding the proposed final report of a technical study associated with the spent fuel pool accident risk for decommissioning plants, public comments received on the proposed report, and the staff's resolution of public comments.

   Representatives of the nuclear industry will provide their views, as appropriate.

40 - 11:00
~~10:30~~ - ~~10:45~~ A.M. ***BREAK***

11:00 - 12:40
3) ~~10:45~~ - ~~12:15~~ P.M. Proposed Research Plan for Digital Instrumentation and Control (Open) (REU/AS)
   - 3.1) Remarks by the Subcommittee Chairman
   - 3.2) Briefing by and discussions with representatives of the NRC staff regarding the proposed research plan for digital instrumentation and control.

12:40 - 1:30
~~12:15~~ - ~~1:15~~ P.M. ***LUNCH***

1:30 - 3:05
4) ~~1:15~~ - ~~2:45~~ P.M. Proposed White Paper on Risk-Based Performance Indicators (Open) (GA/MTM)
   - 4.1) Remarks by the Subcommittee Chairman
   - 4.2) Briefing by and discussions with representatives of the NRC staff regarding the proposed white paper on risk-based performance indicators.

   Representatives of the nuclear industry will provide their views, as appropriate.

3:05 - 3:20
~~2:45~~ - ~~3:00~~ P.M. ***BREAK***

5) 3:20 - 4:55
~~3:00~~ - 4:00 P.M. Human Performance Program (Open) (GA/NFD)
5.1) Remarks by the Subcommittee Chairman
5.2) Briefing by and discussions with representatives of the NRC staff regarding the revised version of the human performance program.

6) 4:55 - 5:10
~~4:00~~ - 5:00 P.M. Break and Preparation of Draft ACRS Reports
Cognizant ACRS members will prepare draft reports for consideration by the full Committee.

7) 5:10 -
~~5:00~~ - 7:00 P.M. Discussion of Proposed ACRS Reports (Open)
Discussion of proposed ACRS reports on:
7.1) Spent Fuel Pool Accident Risk for Decommissioning Plants (TSK/MME)
6:35-6:48 7.2) Proposed Research Plan for Digital Instrumentation and Control (REU/AS)
7.3) Proposed White Paper on Risk-Based Performance Indicators (GA/MTM)
6:25-6:35 7.4) Human Performance Program (GA/NFD)
7.5) Proposed Revision of the Commission's Safety Goal Policy Statement for Reactors (TSK/GA/PAB)
5:15-6:25 7.6) ACRS/ACNW Joint Report on Defense in Depth in a Risk-Informed Regulatory System (TSK/JS/MTM)

THURSDAY, APRIL 6, 2000, CONFERENCE ROOM 2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND

8) 8:30 - 8:35 A.M. Opening Remarks by the ACRS Chairman (Open) (DAP/SD)

9) 8:35 - 9:55 ~~9:45~~ A.M. Special Studies for Risk-Based Analysis of Reactor Operating Experience (Open) (MVB/MTM)
9.1) Remarks by the Subcommittee Chairman
9.2) Briefing by and discussions with representatives of the NRC staff regarding special studies of the staff associated with the risk-based analysis of reactor operating experience.

9:55 - 10:10
~~9:45~~ - ~~10:00~~ A.M. ***BREAK***

~~10) 10:00 - 11:15 A.M. Operating Event at Indian Point Unit 2 (Open) (JJB/PAB)~~
~~10.1) Remarks by the Subcommittee Chairman~~
~~10.2) Briefing by and discussions with representatives of the NRC staff regarding the findings and recommendations of the Augmented Inspection Team, which investigated the reactor trip and partial loss of AC power event that occurred at Indian Point Unit 2 on August 31, 1999.~~

Joint Subcommittee Discussion

Representatives of the Indian Point Licensee will provide their views, as appropriate.

10:30 - 11:10 Discuss Self-Assessment Review

11) ~~11:15~~ - ~~11:45~~ A.M. 11:10 - 11:50 am Reports of the Materials and Metallurgy and Thermal-Hydraulic Phenomena Subcommittees (Open) (WJS/GBW/NFD/PAB)
Discussion of the reports by the Chairmen of the ACRS Subcommittees on Materials and Metallurgy and on Thermal-Hydraulic Phenomena regarding the status of activities associated with the development of a revised Pressurized Thermal Shock Screening Criterion.

Representatives of the nuclear industry will provide their views, as appropriate.

11:50 - 1:15
~~11:45~~ - ~~1:00~~ P.M. ***LUNCH***

1:15 - 1:18 Thank You Letter re Naval Reactor Tour on 4-5-00

12) ~~1:00~~ - ~~1:15~~ P.M. 1:18 - 1:40 Future ACRS Activities (Open) (DAP/JTL/SD)
Discussion of the recommendations of the Planning and Procedures Subcommittee regarding items proposed for consideration by the full Committee.

13) 1:40 - 2:20 ~~1:15~~ - ~~1:45~~ P.M. Report of the Planning and Procedures Subcommittee (Open) (DAP/JTL)
Report of the Planning and Procedures Subcommittee on matters related to the conduct of ACRS business.

14) 2:25 - 2:30 ~~1:45~~ - 2:00 P.M. Reconciliation of ACRS Comments and Recommendations (Open) (DAP, et al./SD, et al.)
Discussion of the responses from the NRC Executive Director for Operations to comments and recommendations included in recent ACRS reports and letters.

15) 2:35 - ~~2:00~~ - 3:00 P.M. Break and Preparation of Draft ACRS Reports
Cognizant ACRS members will prepare draft reports for consideration by the full Committee.

16) 3:00 - 8:00 ~~7:00~~ P.M. Discussion of Proposed ACRS Reports
Discussion of proposed ACRS reports on:

5:40-7:55 16.1) Spent Fuel Pool Accident Risk for Decommissioning Plants (TSK/MME)

3:00-3:45 16.2) Proposed Research Plan for Digital Instrumentation and Control (REU/AS)

16.3) Proposed White Paper on Risk-Based Performance Indicators (GA/MTM)

16.4) Human Performance Program (GA/NFD)

4:35-5:20 16.5) Special Studies for Risk-Based Analysis of Reactor Operating Experience (MVB/MTM)

3:45-4:35 16.6) Proposed Revision of the Commission's Safety Goal Policy Statement for Reactors (TSK/GA/PAB)

~~16.7) ACRS/ACNW Joint Report on Defense-in-Depth in a Risk-Informed Regulatory System (TSK/JS/MTM)~~

FRIDAY, APRIL 7, 2000, CONFERENCE ROOM 2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND

17) 8:30 - 2:00 P.M. **(12:00-1:00 P.M. LUNCH)** — Discussion of Proposed ACRS Reports (Open)
Continue discussion of proposed ACRS reports listed under Item 16.

~~18) 2:00 - 2:30 P.M. Miscellaneous (Open) (DAP/JTL)~~
~~Discussion of matters related to the conduct of Committee activities and matters and specific issues that were not completed during previous meetings, as time and availability of information permit.~~

NOTE:

- **Presentation time should not exceed 50 percent of the total time allocated for a specific item. The remaining 50 percent of the time is reserved for discussion.**
- **Number of copies of the presentation materials to be provided to the ACRS - 35.**

9:25-9:50 Spent Fuel Pool (Draft Final)
8:30-9:10 Risk-Based Analysis Rx Op Exp (Draft Final)

APPENDIX III: MEETING ATTENDEES

471st ACRS MEETING
April 5-7, 2000

<u>NRC STAFF</u> (April 5, 2000)
G. Millman, OEDO
G. Bagchi, NRR
E. Throm, NRR
G. Kelly, NRR
L. Kopp, NRR
C. Grattan, NRR
B. Huffman, NRR
G. Perry, NRR
S. Richards, NRR
T. Ulses, NRR
J. Schaperow, NRR
M. Cheok, NRR
G. Mencinsky, NRR
T. Eaton, NRR
J. Lee, NRR
T. Collins, NRR
J. Hannon, NRR
F. Kantor, NRR
R. Skelton, NRR
D. Barss, NRR
D. Jackson, NRR
M. Chiramal, NRR
F. Gallardo, NRR
G. Hubbard, NRR
M. Rubin, NRR
M. Johnson, NRR
R. Eckenrode, NRR
D. Trimble, NRR
J. Costello, RES,
S. Arndt, RES
J. Calvert, RES
J. Kramer, RES
C. Antonesa, RES
S. Bahadur, RES
J. Mitchell, RES
J. Persensky, RES
M. Mayfield, RES
J. Rosenthal, RES

M. Federline, RES
T. Wolf, RES
P. Baranowsky, RES
D. Marksberry, RES
D. Yielding, RES
N. Kadambi, RES
E. Trager, RES
P. Lewis, RES
I. Schoenfeld, RES
N. Siu, RES

<u>ATTENDEES FROM OTHER AGENCIES AND GENERAL PUBLIC</u>
R. Kennedy, RPK Structural Mechanics Consulting
A. Nelson, NEI
A. Wyche, SERCH/Bechtel
P. Atherton, Nuclear Safety Consultant
D. Raleigh, SERCH/Bechtel
T. Houghton, NEI
S. Floyd, NEI
J. Forester, Sandia Labs

<u>NRC STAFF</u> (April 6, 2000)
G. Millman, OEDO
T. Wolf, RES
J. Mitchell, RES
D. Marksberry, RES

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

April 17, 2000

SCHEDULE AND OUTLINE FOR DISCUSSION 472nd ACRS MEETING MAY 11-13, 2000

THURSDAY, MAY 11, 2000, CONFERENCE ROOM 2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND

1) 8:30 - 8:35 A.M. Opening Remarks by the ACRS Chairman (Open)
   - 1.1) Opening statement (DAP/JTL/SD)
   - 1.2) Items of current interest (DAP/NFD/SD)
   - 1.3) Priorities for preparation of ACRS reports (DAP/JTL/SD)

2) 8:35 - 10:00 A.M. Initiatives Related to Risk-Informed Technical Specifications (Open) (JDS/GA/MTM)
   - 2.1) Remarks by the Subcommittee Chairman
   - 2.2) Briefing by and discussions with representatives of the NRC staff and industry groups regarding initiatives related to risk-informed technical specifications, initial industry submittals on risk-informed technical specifications, and related matters.

10:00 - 10:15 A.M. ***BREAK***

3) 10:15 - 11:45 A.M. Potential Revisions to the Pressurized Thermal Shock (PTS) Acceptance Criterion (Open) (WJS/NFD)
   - 3.1) Remarks by the Subcommittee Chairman
   - 3.2) Briefing by and discussions with representatives of the NRC staff regarding a draft Commission Paper that describes potential revisions to the PTS acceptance criterion.

   Representatives of the nuclear industry will provide their views, as appropriate.

11:45 - 12:45 P.M. ***LUNCH***

4) 12:45 - 2:15 P.M. Proposed Revision to Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis" (Open) (GA/MTM)
   - 4.1) Remarks by the Subcommittee Chairman
   - 4.2) Briefing by and discussions with representatives of the NRC staff regarding proposed revision to Regulatory Guide 1.174 and an associated guidance on the use of risk information in license amendment reviews.

   Representatives of the nuclear industry will provide their views, as appropriate.

2:15 - 2:30 P.M. *****BREAK*****

5) 2:30 - 4:00 P.M. Proposed Regulatory Guide and Standard Review Plan (SRP) Section Associated with NRC Code Reviews (Open) (GBW/PAB)
   - 5.1) Remarks by the Subcommittee Chairman
   - 5.2) Briefing by and discussions with representatives of the NRC staff regarding proposed Regulatory Guide and SRP Section associated with the NRC staff's review of the analytical codes.

6) 4:00 - 5:00 P.M. Break and Preparation of Draft ACRS Reports
   Cognizant ACRS members will prepare draft reports for consideration by the full Committee.

7) 5:00 - 7:00 P.M. Discussion of Proposed ACRS Reports (Open)
   Discussion of proposed ACRS reports on:
   - 7.1) Risk-Informed Technical Specifications (JDS/GA/MTM)
   - 7.2) Potential Revisions to the Pressurized Thermal Shock Acceptance Criterion (WJS/NFD)
   - 7.3) Proposed Revision to Regulatory Guide 1.174 (GA/MTM)
   - 7.4) Proposed Regulatory Guide and Standard Review Plan Section Associated with NRC Staff Code Reviews (GBW/PAB)
   - 7.5) Human Performance Program (GA/NFD)

FRIDAY, MAY 12, 2000, CONFERENCE ROOM 2B3, TWO WHITE FLINT NORTH, ROCKVILLE, MARYLAND

8) 8:30 - 8:35 A.M. Opening Remarks by the ACRS Chairman (Open) (DAP/SD)

9) 8:35 - 10:00 A.M. SECY-00-0062, Risk-Informed Regulation Implementation Plan (Open) (GA/MME)
   - 9.1) Remarks by the Subcommittee Chairman
   - 9.2) Briefing by and discussions with representatives of the NRC staff regarding risk-informed regulation implementation plan that is described in SECY-00-0062.

   Representatives of the nuclear industry will provide their views, as appropriate.

10:00 - 10:15 A.M. *****BREAK*****

10) 10:15 - 11:30 A.M. Operating Event at E.I. Hatch Nuclear Power Plant, Unit 1 (Open) (JJB/AS)
   - 10.1) Remarks by the Subcommittee Chairman

10.2) Briefing by and discussions with representatives of the NRC staff regarding the findings and recommendations of the Augmented Inspection Team, which investigated the January 26, 2000 reactor trip event at E. I. Hatch Nuclear Power Plant, Unit 1.

Representatives of the E. I. Hatch Licensee may provide their views, as appropriate.

11) 11:30 - 11:45 A.M. <u>Reconciliation of ACRS Comments and Recommendations</u> (Open) (DAP, et al./SD, et al.)
Discussion of the responses from the NRC Executive Director for Operations to comments and recommendations included in recent ACRS reports and letters.

11:45 - 12:45 P.M. *****LUNCH*****

12) 12:45 - 2:15 P.M. <u>Physical Security Requirements for Power Reactors</u> (Open/Closed) (TSK/NFD)
12.1) Remarks by the Subcommittee Chairman
12.2) Briefing by and discussions with representatives of the NRC staff regarding the status of revising the physical security requirements for power reactors by incorporating insights gained from threat assessment activities being conducted by the staff in coordination with other Federal agencies.

[NOTE: A portion of this session will be closed to discuss safeguards information.]

2:15 - 2:30 P.M. *****BREAK*****

13) 2:30 - 2:45 P.M. <u>Future ACRS Activities</u> (Open) (DAP/JTL/SD)
Discussion of the recommendations of the Planning and Procedures Subcommittee regarding items proposed for consideration by the full Committee.

14) 2:45 - 3:30 P.M. <u>Report of the Planning and Procedures Subcommittee</u> (Open) (DAP/JTL)
Report of the Planning and Procedures Subcommittee on matters related to the conduct of ACRS business.

15) 3:30 - 4:30 P.M. <u>Break and Preparation of Draft ACRS Reports</u>
Cognizant ACRS members will prepare draft reports for consideration by the full Committee.

16) 4:30 - 7:00 P.M. <u>Discussion of Proposed ACRS Reports</u>
Discussion of proposed ACRS reports on:
16.1) Risk-Informed Regulation Implementation Plan (GA/MME)
16.2) Risk-Informed Technical Specifications (JDS/GA/MTM)

APPENDIX V
LIST OF DOCUMENTS PROVIDED TO THE COMMITTEE
471st ACRS MEETING
April 5-7, 2000

[Note: Some documents listed below may have been provided or prepared for Committee use only. These documents must be reviewed prior to release to the public.]

MEETING HANDOUTS

AGENDA ITEM NO.		DOCUMENTS
1		Opening Remarks by the ACRS Chairman
	1.	Items of Interest, dated April 5-7, 2000
2		Spent Fuel Pool Accident Risk for Decommissioning Plants
	2.	Draft Final Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants, presentation by G. Kelly, NRR [Viewgraphs]
	3.	Consequence Evaluation for Spent Fuel Pool Accidents, presentation by J. Schaperow, RES [Viewgraphs]
	3a	Comments from NEI on Spent Fuel Pool Accident Risk for Decommissioning briefing held on 4/5/00 (e-mail from A. Nelson to M. El-Zeftawy)
3		Proposed Research Plan for Digial Instrumentation and Control
	4.	Research Plan for Digital Instrumentation and Control (I&C), presentation by RES and NRR [Viewgraphs]
4		Proposed White Paper on Risk-Based Performance Indicators
	5.	Risk-Based Performance Indicators and Industry-Wide Performance Measures Development Program, presentation by RES
5		Human Performance Program
	6.	Draft NRC Inspection Manual, Inspection Procedure 71841: Supplemental Inspection for Human Performance, received April 3, 2000 [Handout #5.1]
	7.	NRC Program on Human Performance in Nuclear Power Plant Safety, presentation by RES, NRR
	8.	NRR Human Performance Activities in Reactor Oversight Process, presentation by NRR
9		Special Studies for Risk-Based Analysis of Reactor Operating Experience
	9.	Operating Experience Risk Analysis Branch Program Overview, presentation by RES

12 Future ACRS Activities

10. Future ACRS Activities - 472nd ACRS Meeting, May 11-13, 2000 [Handout #12-1]

13 Report of the Planning and Procedures Subcommittee

11. Final Draft Minutes of Planning and Procedures Subcommittee Meeting - [Handout #13.1]

14 Reconciliation of ACRS Comments and Recommendations

12. Reconciliation of ACRS Comments and Recommendations [Handout #14.1]

MEETING NOTEBOOK CONTENTS

TAB	DOCUMENTS

2 Spent Fuel Pool Accident Risk for Decommissioning Plants

1. Table of Contents
2. Proposed Schedule
3. Status Report, dated April 5, 2000
4. SECY 99-168, dated June 30, 1999
5. ACRS letter dated November 12, 1999
6. EDO Response, dated December 16, 1999 and ACRS Analysis dated January 28, 2000
7. Letter from David Lochbaum to NRC dated March 15, 2000
8. Staff Requirements, SECY 99-168 dated December 21, 1999
9. Request for extension (e-mail) dated January 4, 2000

3 Proposed Research Plan for Digital Instrumentation and Control

10. Table of Contents
11. Proposed Schedule
12. Status Report
13. Memorandum to J. T. Larkins, Executive Director, ACRS, from S. Bahudur, Chief, Engineering Research Applications Branch, RES, Subject: Transmission of Draft NRC Research Plan for Digital Instrumentation and Control Rule, dated March 17, 2000

4 Proposed White Paper on Risk-Based Performance Indicators

14. Table of Contents
15. Proposed Schedule
16. Status Report
17. Memorandum dated February 25, 2000, from A. Thadani, RES, to S. Collins, NRR, Subject: White Paper: Development of Risk-Based Performance Indicators (RBPIs) Program Overview
18. Report dated March 15, 2000 from D. Powers, Chairman, ACRS, to R. Meserve, Chairman, NRC, Subject: Revised Reactor Oversight Process
19. Letter dated June 10, 1999, from Dana A. Powers, Chairman, ACRS, to W. Travers, EDO, NRC, Subject: Pilot Application of the Revised Inspection and Assessment Programs, Risk-Based Performance Indicators, and Performance-Based Regulatory Initiatives and Related Matters
20. Report dated February 23, 1999, from D. Powers, Chairman, ACRS, to S. Jackson, Chairman, NRC, Subject: Proposed Improvements to the NRC

Inspection and Assessment Programs

5 Human Performance Plan

21. Table of Contents
22. Proposed Schedule
23. Status Report dated April 5, 2000
24. Letter dated February 19, 1999, from D. Powers, Chairman, ACRS, to W. Travers, EDO, NRC, Subject: SECY-98-244, "NRC Human Performance Plan"
25. U.S. Nuclear Regulatory Commission, SECY 0053, "NRC Program on Human Performance in Nuclear Power Plant Safety," dated February 29, 2000

9 Special Studies for Risk-Based Analysis of Reactor Operating Experience

26. Table of Contents
27. Proposed Schedule
28. Status Report
29. Letter dated November 22, 1996, from T. Kress, Chairman, ACRS, to J. Taylor, EDO, NRC, Subject: NRC Programs for Risk-Based Analysis of Reactor Operating Experience

11 Re-Evaluation of PTS Screening Criterion

30. Table of Contents
31. Proposed Schedule
32. Status Report
33. Memorandum dated March 27, from P. Boehnert to G. Wallis, ACRS Member, Subject: Minutes of the ACRS Thermal-Hydraulic Phenomena Subcommittee Meeting, March 15, 2000
34. Memorandum dated March 24, 2000, from N. Dudley, ACRS, to Drs. W. Shack and G. Apostolakis, ACRS Members, Subject: Working Copy of Minutes for Joint Subcommittee Concerning the NRC Pressurized Thermal Shock Screening Criterion Re-evaluation Project, March 16, 2000

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

471st FULL COMMITTEE MEETING

April 5, 2000

NRC STAFF SIGN IN FOR ACRS MEETING

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NAME	BADGE NO.	NRC ORGANIZATION
Goutam Bagchi	B-8626	NRR/DE
Edward D Throm	B-7179	NRR/DSSA
Glenn Kelly	B-6358	NRR/DSSA
LARRY KOPP	A-7085	NRR/DSSA
Chris Grattan	B-6180	NRR/DSSA
Bill Huffman	B-8052	NRR/DLPM/PD-IV
Garett Parry	B-8060	NRR/DSSA
STUART RICHARDS	B 8536	NRR/DLPM
Tony ULSES	A-7611	NRR/~~DSSA~~
Jason Schaperow	B-7363	
Mike Cheok	B-7917	NRR/DSSA
GEORGE MENCINSKY	B 7463	NRR/DRIP
Tanya Eaton	B-8086	NRR/DSSA
Jay Lee	B-6664	NRR/SPSB
Timothy Collins	A-7568	NRR/DSSA
John Hannon	A-6149	NRR/DSSA
FALK KANTOR	B-6350	NRR/DIPM
ROBERT SKELTON	A-6704	NRR/DIPM
JF Costello	B-6395	NRC/RES/DET
DAN BARSS	A-6041	NRR/DIPM
DIANE JACKSON	B-8592	NRR/DSSA/SPLB

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

_____ FULL COMMITTEE MEETING

____

NRC STAFF SIGN IN FOR ACRS MEETING

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NAME	BADGE NO.	NRC ORGANIZATION
M. CHIRAMAL	A6337	NRR
STEVEN ARNDT	B8390	RES
John A. Calvert	B8392	RES
Joel Kramer	B8401	RES
Christina Antonescu	B-6023	RES
Sher Bahadur	A-6989	RES
Jocelyn Mitchell	B-6685	RES
J PERSENSKY	B8413	RES
F. GALLARDO	F-6109	NRR (FOREIGN ASSIGNEE)
George Hubbard	B-6279	NRR
Mark Rubin	B7052	NRR.
Michael Mayfield	A6973	RES/DET
Jack Rosenthal	A6661	RES
Margaret Federline	A-6075	RES
Michael Johnson	B-7542	NRR
Gil Millman	B-6804	EDO
Tom WOLF	B-7299	RES
Patrick Baranowsky	B8391	RES
Don Marksberry	B8062	RES
DALE YIELDING	B7450	RES
N P Kadambi	B6343	RES
Richard Eckenrode	A6357	NRR
David Trimble	B-8545	NRR
E. TRAGER	B-8425	RES
P LEWIS	B-6680	RES
I. Schoenfeld	B-6987	RES
N. Siu	B8131	RES

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

MEETING OF THE 471st

FULL COMMITTEE MEETING

April 5, 2000

ATTENDEES - PLEASE SIGN BELOW

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NAME	AFFILIATION
Robert P. Kennedy	RPK Structural/Mechanics Consulting
Alan Nelson	NEI
Altheia Wyche	SERCH Licensing/Bechtel
Peter J Atherton	Nucl Safety Consultant
Deann E. Raleigh	SERCH Licensing Bechtel
Tom Houghton	NEI
Steve Floyd	NEI
JOHN FORESTER	SANDIA LABS

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

471st FULL COMMITTEE MEETING

April 6, 2000

NRC STAFF SIGN IN FOR ACRS MEETING

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NAME	BADGE NO.	NRC ORGANIZATION
Tom Wolf	B-7299	RES
Jocelyn Mitchell	B-6685	RES
Gil Millman	B-6804	EDO
Don Marksberry	B-8064	RES

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①

ITEMS OF INTEREST

471ST ACRS MEETING

APRIL 5-7, 2000

ITEMS OF INTEREST
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
471ST MEETING
APRIL 5-7, 2000

NRC NEWS

UNITED STATES NUCLEAR REGULATORY COMMISSION

OFFICE OF PUBLIC AFFAIRS

Office of Public Affairs **Telephone: 301/415-8200**
Washington, DC 20555-001 **E-mail: opa@nrc.gov**
Web Site: http://www.nrc.gov/OPA

No. S-00-06 March 28, 2000

[PDF Version (114 KB)]

REMARKS OF

DR. RICHARD A. MESERVE, CHAIRMAN U.S. NUCLEAR REGULATORY COMMISSION

AT THE

TWELFTH ANNUAL REGULATORY INFORMATION CONFERENCE

WASHINGTON, D.C. MARCH 27, 2000

**"NRC After 25 Years:
New Regulatory Initiatives - Enduring Fundamental Mission"**

Contents

Overview

Good afternoon. I am pleased to be able to meet with you today and to share some thoughts on NRC's regulatory activities - where we are now, and where we are headed in the future. This is an especially appropriate forum in which to address these issues and I thank Sam Collins and his staff for hosting this important event.

I note that tomorrow is the 21st anniversary of the Three Mile Island Unit 2 accident, an event which resulted in a multitude of studies, safety reviews, regulatory reforms, industry initiatives, and new regulations. As you all well know, the TMI event stimulated a decade of reform. I think that we are in a similar period of change now. Fortunately, the NRC's current efforts are not the result of an event like TMI, but rather grow from the desire to achieve greater credibility, effectiveness, and efficiency as a regulator. There is no better time than now to emphasize the importance of clear and open dialogue with all stakeholders on the initiatives we are undertaking and their potential impact. I suspect that our approach to regulation and the ways in which it may change in the future are of interest to all of you. In return, your feedback is an essential ingredient to successful regulatory reform.

During my swearing-in ceremony as the Chairman of the NRC, I stated that I believed the NRC was on the right track and that my task was to maintain the pace of change. But I also noted that great deal of work remained to be done. After five months as Chairman, I am firmly convinced that my assessment of the situation was accurate. We are headed in the right direction. I am even more aware, however, that the path ahead of us will be long and difficult. My aim today is to discuss a few aspects of the journey on which we are embarked.

Enduring Fundamental Mission

I want to emphasize at the outset that the compass for our journey is well defined. NRC's fundamental mission and responsibilities are unaltered. The Atomic Energy Act of 1954 and the Energy Reorganization Act of 1974 established our obligation to regulate the Nation's civilian use of nuclear materials to ensure adequate protection of public health and safety, to promote the common defense and security, and to protect the environment. Today, that mission, and NRC's regulatory philosophy, remain unchanged. The NRC fundamental objective is to ensure that the health and safety of the public are protected. As always, the responsibility for safe operation of commercial nuclear power plants rests with our licensees. But the public expects that the NRC will be a strong and independent regulator as well. Although the means by which we seek to achieve our objective may be changing, our mission remains the same.

The Environment for NRC's Reforms

The NRC initiatives that I will discuss with you today are not taking place in a vacuum; they are both a reflection of a changing external environment and a response to it. We are in a period of improved safety and operational effectiveness. While outliers exist, the overall safety performance of America's 103 operating commercial nuclear power plants is at an all-time high. The Institute of Nuclear Power Operations (INPO) recently released the results of a study of the U.S. industry using the performance indicators of the World Association of Nuclear Operators (WANO). In every case, the median score achieved by the US plants on the WANO performance indicators over the last five years was an improvement over the performance of the previous five years. In the period from 1995 to 1999, the average number of automatic scrams was reduced from one scram per reactor per year to 0.5 scrams per reactor per year, a 50% reduction. In addition, between 1995 and 1999, collective occupational radiation exposure was reduced by over 30%. Moreover, 95% of the industry achieved the safety system performance goals established for the year 2000.

At the same time as this improvement in safety performance, there has been a parallel improvement in operational performance. According to the Nuclear Energy Institute (NEI), the nuclear industry's net generation for 1999 was 725 billion kilowatt-hours, an all-time generation record. Nuclear power plants in the United States operated with an overall capacity factor of 86.8 percent in 1999-an all-time record. U.S. nuclear power plants contribute approximately one-fifth of the total electricity generation in the nation, and, although 1999 generation statistics are still being tallied, the percentage of power generated by nuclear power during 1999 is expected to have increased over previous years. The data show that excellent safety performance in fact goes hand-in-hand with excellent economic performance.

While achieving these safety and operating performance milestones, reactor licensees are dealing with sweeping changes in the business environment in which they operate. Restructuring and consolidation in the industry, and deregulation of the price of electricity are new influences and could constitute potential distractions. No doubt these influences are having a significant impact on most of you and will continue to do so for the next several years. In the growing number of states in which the competitive market determines the price of electricity, profitability for all forms of electricity generation is dependent on achieving economically efficient operations. The NRC understands that there will be special pressures on our licensees to reduce costs and to operate as efficiently as possible. Our job is to ensure that these pressures do not become incentives to cut corners on safety.

The changed economic environment confronted by our licensees has also reinforced the obligation of the NRC to operate as efficiently as possible. The Commission recently proposed a Fiscal Year 2001 budget of 488.1 million dollars, the second lowest budget in the history of the agency in real terms. In recognition that some of our activities do not directly benefit NRC licensees -- such as our activities in overseeing Agreement States -- we are seeking over five years to phase in the recovery of 10 percent of our budget from general revenues rather than from licensee fees. The number of employees at the agency also continues to decline, and our budget reflects almost a 20% reduction in staff since Fiscal Year 1993. As I have testified before the Congress, the NRC is stretched thin, particularly in a time of regulatory change. But we have tried to respond to the fact that the cost of our activities is largely paid by our licensees.

In addition to achieving efficiencies in our activities, we have also sought to reduce unnecessary regulatory burden. I must emphasize the word "unnecessary." Regulation of any sort imposes a burden on our licensees; the challenge is to determine the appropriate degree of burden consistent with the fulfillment of our mission. To do this requires a careful approach in developing and implementing regulatory initiatives to make sure that the costs are justified and that there are meaningful safety benefits.

In this context, let me discuss a few of our regulatory initiatives. Four of the most significant initiatives are the application of risk insights in regulatory revisions, reactor license renewal, license transfer programs, and the modification of the reactor oversight process. I will discuss each of these topics briefly. They will be covered in detail during various sessions of this conference.

Risk-Informed Regulation

We have embarked on a far-reaching program to develop and implement a risk-informed approach to nuclear power plant regulation. In fact, risk-informed regulation is now a fundamental theme for all of our regulatory activities. This approach uses risk insights, together with other information, to establish requirements that better focus licensee and regulatory attention on design and operational issues commensurate with their importance to public health and safety. In this way we seek to use risk insights as a means to augment and improve our traditional, deterministic approach to safety.

Let me give a few examples of the activities that are underway. We have initiated a program to evaluate the technical bases that underpin the requirements in 10 CFR Part 50 and to modify them to focus on safety-significant issues. The Commission has approved the staff's draft rulemaking plan for the modification of the scope of the special treatment regulations in 10 CFR Part 50. The plan proposes an alternative regulatory framework that will enable licensees to use a risk-informed process to categorize structures, systems, and components according to their safety significance, thereby enabling a more precise definition of the equipment that warrants heightened requirements. Other initiatives include the revision of the regulations or regulatory guidance governing decommissioning, fire protection, and reactor safeguards. More changes will come over time. In short, we are launched on a multi-year effort to rethink many of the fundamental underpinnings of the regulatory system reflected in Part 50.

Everyone should understand that risk-informed regulation is a double-edged sword. Some regulatory requirements may be relaxed or eliminated if a risk-informed assessment demonstrates that they have minimal impact on safety. However, new requirements may also be established if such an assessment shows that current requirements do not adequately address issues of substantial safety concern. For example, consideration of risk may show that equipment that has heretofore been seen as "non-safety related" in fact has safety significance. In such a case, strengthened requirements may be justified. In short, as a result of consideration of risk insights, some requirements may be reduced, while others are tightened.

We have already moved ahead with implementation of a number of risk-informed programs. We are receiving and reviewing a considerable number of risk-informed license amendment requests, and we have also seen wide interest in risk-informed in-service inspection programs. These are voluntary efforts, in the sense that we have established programs and processes for those licensees who choose to make use of them. I commend those of you who have been involved in developing and piloting these processes. In many cases, you have invested resources that will benefit both the NRC and the industry.

License Renewal

Perhaps the most profound manifestation of change in the nuclear industry has been the sudden upsurge of interest in license renewal. A few years ago, many pundits predicted that the deregulation of electricity prices would cause so much financial pressure that a large percentage of operating nuclear plants would be forced to shut down before the end of their 40-year licenses. Despite these dire predictions, the NRC proceeded with the development of a process for renewal of operating plant licenses. Baltimore Gas and Electric stepped forward to make its Calvert Cliffs plant a so-called "test site" for the license renewal program. I am particularly pleased to inform you that we issued a renewed license to Calvert Cliffs last Thursday. The staff completed its work within 24 months, well within the target 30-month schedule. I view this entire process as a significant achievement, in particular the fact that the agency was able to establish a schedule and meet its milestones in a highly competent fashion. The Oconee license renewal is similarly on track for a Commission decision by this July.

I am confident that the industry considers the license renewal process a success as well because to date licensees have indicated an intention to submit 17 applications for renewal, comprising some 25 units, and many other licensees have expressed an interest in renewal. The same analysts who were predicting massive early shutdowns are now projecting that up to 85% of operating plants may ultimately apply for license extensions. Over the next several months, NRC will be assessing the lessons learned from the Calvert Cliffs review, and determining where we may be able to improve the license renewal review process.

License Transfer Programs

As you know, the restructuring of the industry has resulted in a large number of license transfer applications. I also believe that the NRC has an exemplary record in dealing with these complex license transfer cases. We were the first Federal regulator to analyze and act on the transfer of the Pilgrim operating license to Entergy Corporation from Boston Edison. We were among the first to approve the Three Mile Island Unit 1 transfer from GPU to Amergen, and we acted promptly on the Clinton transfer from Illinois Power to Amergen. These cases sometimes require a significant expenditure of talent and energy by our staff to insure a high quality and timely product. But we are seeking to process these applications expeditiously.

Revised Reactor Oversight Process

Perhaps the new initiative that will have the most direct impact on the day-to-day operations of our licensees is our new reactor oversight process. Over the years, the NRC has been widely criticized for its Systematic Assessment of Licensee Performance (or SALP) program. Licensees told us that the process was too subjective and too dependent on NRC inspectors' interpretation of inspection results. Other stakeholders complained that the "retrospective" aspect of SALP did not give an accurate and timely indication of current plant performance. Our response to this criticism was to include the reactor inspection program within our ongoing self-assessment activities.

As a result, during the past three years, the NRC has developed a new integrated program that will provide more objective and timely evaluation of plant performance, with a focus on operational aspects with the highest safety significance. We have actively involved a broad spectrum of NRC managers and staff in this endeavor, and, in the spirit of improving the way in which we communicate with the public, we have sought input from our external stakeholders, including representatives of the nuclear industry, states, and public interest groups. I believe that the new oversight program we have developed, which was implemented on a pilot basis over the last year, will result in a significant improvement in our inspection activities.

The revised oversight process focuses inspection efforts on those areas that present the greatest risk. Performance indicators provide objective measures of operator and plant accomplishments and will be made available to the public, which should better enable the public to understand our assessment of the plants. The baseline inspection program will consider areas of safety significance that are not covered by performance indicators and will provide a fundamental examination of licensee performance. As you may know, a diverse panel that was formed to evaluate the pilot program concluded that, while there were still issues to be resolved and improvements to be made, the program should be implemented on an industry-wide basis. The initial implementation is to begin at all nuclear power plants in a few days. We recognize, however, that this is a work in progress, and we will have to make appropriate adjustments in the months ahead. There will no doubt be some problems but together with our stakeholders we will address them.

In my view, the new oversight process and the means by which it was established show the NRC's great progress -- the oversight process demonstrates by itself the NRC's focus on safety, our efforts to improve objectivity, our continuing commitment to stakeholder involvement, and our promise to improve transparency for the benefit of our licensees and the public.

Other Significant NRC Initiatives

External change is also stimulating significant NRC initiatives outside of the reactor arena. In the materials and nuclear waste areas, large challenges are also looming. For example, the agency continues to grapple with the problems associated with the regulation and licensing of a disposal site for high-level waste - a task that involves thorny technical, legal, social, and political issues. DOE is currently scheduled to submit a site recommendation on Yucca Mountain to the President in 2001, with a possible license application as early as 2002. If the President should decide to proceed with the Yucca Mountain project, the NRC will be obligated to review and decide on whether to issue a license to the Department of Energy. We are preparing for that eventuality. For example, in February, we provided comments on DOE's draft environmental impact statement. NRC is required to adopt the DOE Final Environmental Impact Statement, to the extent practicable, as part of NRC's licensing actions for the repository.

In the interim until a repository is available, we recognize that our licensees must have the capability to store spent fuel. As a result, we have continued to address the issues associated with dry cask and pool storage. The staff has revised its internal procedures, issued standard review plans, and made significant process improvements that should result in efficiencies in NRC's licensing, certification, and amendment processes for spent fuel storage either at or away from reactor sites and related transportation cask certification.

In addition, utilities are seeking new ways to satisfy the license termination rule while reducing decommissioning costs. This includes issues such as rubblization and partial site release. The staff will be challenged to consider new concepts under a performance-oriented approach while ensuring that radiological criteria are met. To facilitate these efforts, the NRC staff has been working with the industry and other stakeholders to develop guidance to implement the License Termination Rule.

Other materials-related activities of importance include the Commission's efforts to determine whether to initiate a rulemaking governing the release of solid material that is slightly contaminated with radioactivity. This activity has attracted a great deal of attention, in part because of a decision by the State of Tennessee to allow the release from a DOE facility of a large volume of recycled nickel that contained trace amounts of fission products. As you may be aware, DOE recently announced its decision not to release the nickel in order to await guidance from the NRC.

The Commission's decision on how to proceed, including whether to initiate a rulemaking, is highly controversial. The Commission recently directed the staff to request that the National Academy of Sciences conduct a study and provide recommendations on possible alternatives for release of slightly radioactive contaminated materials. The outcome of the NRC's efforts in this area will have important implications for all licensees.

It is also necessary and appropriate to apply in the materials context some of the lessons learned from the development of a risk-informed and performance-based approach to the regulation of reactors. We recognize that the characteristics of nuclear materials regulation differ in important respects from those relating to reactor regulation --- materials regulations are driven by exposure standards, as opposed to measures of facility damage; there is a far wider diversity of activities undertaken by materials licensees than by reactor licensees; materials activities are not dominated by a clear-cut risk feature, such as core damage; and operational risk, as opposed to accident risk, may be the central feature of the regulation of materials. Nonetheless, despite these differences, we believe the application of risk insights can and should be applied to materials regulation in the years ahead. As a result, you should anticipate reform in the materials arena that will parallel the activity in the reactor arena.

Public Confidence

Let me turn now to some of the ingredients for success in achieving change in both the reactor and materials arenas. First, it is essential that we maintain public confidence. To do our job effectively, we must involve the public on our processes and we must find ways to communicate clearly with the public about how we do our job and how we come to our decisions. If we are successful, the resulting public trust and confidence will benefit not only the NRC, but also those whom we regulate. As I have stated repeatedly since becoming Chairman, NRC regulatory decisions must be fair and must be perceived to be fair. The NRC must approach all of its challenges in a manner that includes the affected stakeholders and the public in ways that are meaningful and that contribute to sound decisions.

I must note in this regard that achieving success presents a considerable challenge. On the one hand, the NRC must reach decisions expeditiously. We cannot become so ensnared in our regulatory processes that we fail to achieve timely resolution of the issues before us. We recognize that justice delayed is often justice denied. On the other hand, our full engagement with interested members of the public both provides valuable insights that can illuminate the path to sound decisions and serves to foster public confidence. Indeed, the public will probably reject decisions that are the product of processes from which the public is excluded. Because public involvement can cause delay, there is an obvious tension between the objectives of achieving timely decisions and assuring public participation. The Commission is reviewing its procedures in an effort to achieve a reconciliation of these competing objectives.

Research Program

Another essential ingredient for success in our regulatory initiatives is a sound research program. The Office of Research is a vital part of the NRC, and its work helps provide the technical bases for our activities. We could not hope to move forward with our efforts to risk inform our regulations without the NRC's developmental work in probabilistic risk assessment much of which has been performed or sponsored by NRC's Office of Research. This work began in the mid-70s with the landmark WASH-1400 study. Similarly, the work conducted by the Office of Research on plant aging provides insights essential for license renewal.

Our research program is currently gearing up to support new agency work in areas such as mixed-oxide and high-burnup fuel; to provide the basis for adoption of new technology, such as digital instrumentation and control systems; and to lay the foundation for our new risk-informed regulatory approaches and revised reactor oversight process. The thermal-hydraulics program, traditionally one of the centerpieces of our research, is using state-of-the-art techniques to develop new analytical tools and models that will remove excess conservatism from reactor safety analyses, while maintaining adequate margins.

In short, our regulatory initiatives would not be possible without the technical foundation offered by research activities. An important recent report on the NRC sponsored by the Center for Strategic and International Studies specifically identified the need for the NRC to strength its research programs so as to provide the technical underpinnings necessary for the agency to remain an effective regulator. This is an assessment with which I fully agree.

International Responsibilities

The NRC international program is another activity that provides an important underpinning for long-term success by our reactor and materials licensees. The recent incidents in Japan and Thailand remind us that a nuclear-related event anywhere in the world can cause heightened concern about nuclear enterprises everywhere. These incidents reinforce the need for the NRC to continue to work with counterparts abroad to advance nuclear safety throughout the globe. We benefit not only because domestic nuclear activities are linked in the public consciousness with activities elsewhere, but also because we gain knowledge from sharing experience and insights with our foreign colleagues. As a result, the NRC's international activities are an important aspect of our overall program.

Conclusion

This has been a whirlwind tour through our many activities. The main theme, as I stated at the outset, is that the NRC is an organization that is in the midst of a period of immense change. We have taken some important steps to improve safety, to regulate efficiently, and to improve public confidence. But, if we are to be successful, we need your cooperation. Our effectiveness is ultimately dependent on assistance from our stakeholders -- both licensees and the general public -- in helping us to chart an appropriate course. It also relies upon the continued vigilance by our licensees in ensuring the safe operation of their facilities. Together we can reinforce and sustain this remarkable period of safe and efficient operation.

Thank you.

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No. S-00-05 March 21, 2000

[PDF Version (60 KB)]

**REMARKS BY
RICHARD A. MESERVE
CHAIRMAN
U.S. NUCLEAR REGULATORY COMMISSION
AT THE
WOMEN'S HISTORY MONTH PROGRAM
10:30 A.M. TUESDAY, MARCH 21, 2000
NRC AUDITORIUM**

Good Morning, ladies and gentlemen. I am pleased to welcome you to NRC's Women's History Month program and to participate with you in this celebration of women's history, accomplishments, and struggle for equality.

As Barbara Williams noted a moment ago, our theme for Women's History 2000 is "Extraordinary Century - Now Imagine the Future." By nearly any standard, the 20th century was indeed an extraordinary time of change, particularly for those who are among the disadvantaged in society. When sufficient time has elapsed for historians to develop an objective evaluation of the major trends and impacts of the 20th century, the revolutionary change in the status of women worldwide, and particularly in America, may well be the hallmark of the past 100 years and the most important influence on our society in the new millennium.

The 20th Century certainly did not start out this way. To put the past century in perspective, imagine for a moment that it is March 21, 1900. William McKinley is President, and the Nation is once again focused on domestic issues after the successful conclusion of the Spanish-American War. It is the beginning of the Progressive Era. Nevertheless, although a women's movement has existed for nearly 30 years, only the women of Wyoming, Colorado, Utah, and Idaho have been granted full voting rights. The status of women is defined by their role in the family and a lack of broad access to education and work. American society expects women to be oriented toward marriage and homemaking. Working women are relatively few, mostly poor, and working in agriculture or menial jobs. At the dawn of the 20th Century, there would be little reason to believe that the next 100 years will be much different for women than the last 100 years.

Fifty years later, things have changed, but the impact of change is not yet noticeable. It is March 21, 1950. Harry Truman is President, and while the Nation is at peace, the Cold War has already begun and the Korean War is a scant three months away. Women have entered the workforce in large numbers during two world wars, but have generally not remained employed once hostilities ended. A baby boom is in progress, but it will not last long. Societal expectations for women are still oriented toward the family and home, although a substantial number of women are seeking college degrees or are in the workforce. Women have been enfranchised for over 30 years, but without noticeable impact. Only one woman holds a seat in the U.S. Senate - Margaret Chase Smith of Maine. Although she will become one of the most powerful figures in Congress in the years ahead and will be the first woman to compete for her party's nomination for President 14 years later, her continual reelection to office is considered an anomaly even by women. As someone who grew up in New England, I suspect that her status was viewed generally as a product of Downeast eccentricity. From the perspective of 1950, we would conclude that while progress in the advancement of women has been made, the pace is glacial.

This morning, it is March 21, 2000. From the perspective of the new century, a quiet revolution seems to have occurred. Spurred by the civil rights movement and other developments in the tumultuous 60s, women have successfully pressed their case for equal treatment both in law and in fact. Today, women continue to constitute the majority of the U.S. population. Since 1990, they have made up the majority of enrolled college students at all levels in both full- and part-time categories. And in the 25-35 age cohort, they are more likely than male contemporaries to have a high school diploma and a bachelor's degree. There are now nearly 62 million working women in the U.S., which is nearly 46% of the total labor force; 30% of these women are either managers or professionals. Since the beginning of the 1990s, women have increasingly sought and won elective office at all levels. They now constitute 11.7 % of the House of Representatives and 9% of the Senate. Since 1991, the number of women in the full-time judiciary has increased by 65%. In short, the force of change has accelerated.

What of the future? Although our theme invites us to imagine the future, the outlines of that future seem clear. Among the most important signs is the permanent change in American society's expectations concerning women. We see a continuing shift away from family and the home and toward the workplace, perhaps with a countervailing shift in the roles of men. We also see continuing high rates of enrollment of women in colleges and universities, which positions women well in an economy that is increasingly based on knowledge. These systemic changes will continue to ensure that the "revolution" in the status of women in the 20th century continues on in the 21st. The changes give us hope that in the 21st century, gender will no longer determine whether an individual can reach his or her full potential. We can see the day when the value of any individual will be determined solely by ability and character. As a father of two daughters, I hope that that day is soon upon us.

Thank you.

Now I have the pleasure to introduce our guest speaker for today's observance. Ms. Paula Nelson, entrepreneur and best-selling author, is well known to millions as a result of her commentary on CNN Business News and the Today show. Before she was thirty, she co-founded three electronics companies and wrote the Joy of Money, a book on excellence and success, and dedicated to women's economic and financial freedom. The book sold over 500,000 copies and is one of four she wrote on the subject.

In 1882, Ms. Nelson wrote Where to Get Money for Everything, a 300-page book packed with money-making wisdom on everything from home financing to venture capital. In 1985, she authored Paula Nelson's Guide to Getting Rich, which shares ten concepts for tapping your economic opportunity. Her latest book, Soar with your Strengths, shows how most successful leaders and educators achieve excellence by focusing on strengths and managing weaknesses. The Chicago Sun Times called Ms. Nelson " a corporate whiz kid and an articulate advocate of financial freedom" and Barron's has called her " the leading exponent of the power of positive thinking school of finance."

Please join me in welcoming Paula Nelson.

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No. S-00-02 February 28, 2000

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REMARKS BY

RICHARD A. MESERVE

**CHAIRMAN OF THE
U.S. NUCLEAR REGULATORY COMMISSION
AT THE
BLACK HISTORY MONTH PROGRAM**

10:30 A.M. MONDAY, FEBRUARY 28, 2000

NRC AUDITORIUM

Good morning, ladies and gentlemen, and welcome to NRC's year 2000 observance of Black History Month. I am honored to participate in this annual observance and to join you in celebrating African-American history, culture, and traditions. With me this morning are my colleagues on the Commission -- Nils Diaz, Edward McGaffigan, and Jeffrey Merrifield. Greta Dicus is on official travel today and regrets that she is unable to be here for this event.

As Barbara Williams has already noted, the national theme for Black History Month this year is "Heritage and Horizons: The Legacy of African Americans and the Challenge of the 21st Century." It is a theme that invites us to look both forward and back in time, and in taking that journey, we are not simply viewing the past and future from an African-American perspective. We are also examining what we are as a Nation and where we are headed in the new century on which we have just embarked. The African-American and national perspectives that I have in mind are closely interwoven.

The experience of African Americans is today much better known than it was just a few decades ago, thanks in large part to the consistent focus provided by programs like this one . It is a story of a continuous, four-century struggle for freedom and equality led by many distinguished leaders from many different walks of life. It is also the story of individual triumph and tragedy, and of moving accounts of courage and persistence in rising above prejudice. Unfortunately, many of these individual accounts may never be fully known, either because they were never recorded or the records have been lost.

I have a personal anecdote on this point that I would like to share with you. In the early years of the Civil War, a Union Army regiment consisting of residents of western Massachusetts was ordered to attack a Confederate fort along the Texas coast. The regiment landed on the beach in anticipation of artillery support from the Navy. As often happens in war, coordination between the regiment and naval forces broke down, with the result that the entire regiment was captured. All but two members of the regiment were released on parole, which means they could return to Massachusetts if they pledged not to participate further in the war effort. All of these men were white. The other two soldiers were African-Americans who had been free men since birth. They were sold in slavery.

When I first joined my law firm as a young lawyer, an elderly partner, who had become a well-respected Civil War historian, asked if I could help find out what happened to these men. Although I conducted exhaustive record searches with the aid of the Massachusetts Historical Society and a variety of local historical organizations, town clerks, and churches in western Massachusetts, I never found any record of these two men after they were captured in Texas. I can tell you with near assurance that they never made it home and thus their ultimate fate is simply unknown. I have worried for 20 years how these men fared.

Such questions-indeed, African-American history in its entirety-have an importance much greater than simply satisfying our curiosity. Rather, we must look back in time to see where we, as a society, have been and thereby help chart the course as to where we should go. In my view, an examination of this history raises one essential question -- it raises the question of whether the principles of equality set forth in the Declaration of Independence were merely an expedient of the moment or whether instead they represent fundamental principles on which individual Americans are prepared to act.

The Nation has taken a long time --too long-- to answer this challenge. It is only in our own time that we have come close to matching in practice the spirit of the Declaration. In response to the Civil Rights Movement led by Doctor Martin Luther King, Jr., and other distinguished Americans, basic political and legal rights have been achieved and a viable Black middle class has developed. These substantial achievements have been spurred in part by a series of Supreme Court decisions beginning with Brown v. Board of Education; by Congressional action, including passage of the Civil Rights Act of 1965; and by the Executive Branch's aggressive enforcement of the law.

Nonetheless, we have much work undone. For example, we have come to recognize that legal equality is closely linked to economic equality, making the achievement of either less meaningful without parallel progress in the other. Although we have made progress in achieving legal equality, we have found that achieving progress in economic equality has and may continue to be difficult. The challenge arises in part from the normal operation of a market system. Our booming economy has served to widen the economic gulf in our population -- the already rich have gotten richer. Moreover, one of the most exciting and promising developments of the 21st century, the continuing expansion and enhancements of computer technology, may leave significant portions of our population behind unless extraordinary measures to enhance education and improve access to technology are achieved.

These and other related important issues, of course, will eventually be resolved at the national, state, and local levels through political processes. What is important for us here today and on into the new century is that we each personally pledge to bring reality to the principles of equality set forth in 1776. Each of us must be dedicated to creating a culture that is, as Dr. Martin Luther King, Jr. phrased it, "transformed into an oasis of freedom and justice ... where men will not be judged by the color of their skin but the content of their character." In addition, we need to recognize that we are partners - American cousins, if you will - in pursuit of common enterprises -- whether that enterprise is defined as protection of the public health and safety or building better neighborhoods, schools, and communities. That, in my view, is the fundamental message of the Black History Month program we are observing today.

I now take great pleasure in introducing our guest speaker, Dr. Mona Lake Jones, poet laureate of Seattle, Washington. Dr. Jones is a writer, orator, and educator who uses poetry and prose to celebrate life and living. She was one of twelve women featured in the National Distinguished Black Women's

Calendar for 1995. She has published in *Essence Magazine* and has written two books of poetry entitled *The Color of Culture, I and II.*

Dr. Jones has appeared on various programs with Oprah Winfrey; Actor Danny Glover; Susan Taylor, the Editor-in-Chief of *Essence Magazine;* Bernice King, daughter of Dr. Martin Luther King, Jr.; and with such political leaders as Maxine Waters, Shirley Chisholm, Myrlie Evers-Williams, and Randall Robinson. Dr. Jones also composed the lyrics for Vanessa Williams' musical recording of "Open Your Eyes, You Can Fly."

Dr. Jones has received numerous awards, including the Blackbird Literary Award and the Langston Hughes Award. She has served as president of the Washington State Community College Black Educators, as National Vice-President of the Council of Black American Affairs, and as President of the Black Child Development Institute.

Please join me in welcoming Dr. Mona Lake Jones. Thank you.

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No. S-00-07 March 30, 2000

[PDF Version (68 KB)]

"Even If You Are on the Right Track...You Can Get Run Over"

by

The Honorable Greta Joy Dicus
Commissioner
U.S. Nuclear Regulatory Commission

Regulatory Information Conference
Capital Hilton Hotel
Washington, D.C.

March 28, 2000

Contents

Introduction

Good afternoon, ladies and gentlemen.

I am delighted to be here with you at the NRC's annual Regulatory Information Conference. I want to reassure you that I fully understand the position that I am in today -- that is that I am the only thing between you and lunch. Actually, I prefer this position. I found that the before-meal audience is more attentive, more focused (although not necessarily on the speaker) and that there are generally fewer questions, especially tough questions. In fact, if I go just 5 or so minutes over my allotted time, I can pretty much avoid questions altogether. And if I do get a really tough question, I can always sidestep the issue by simply saying, "Good question. Who's ready to eat?" I am, of course, kidding and will leave plenty of time for questions -- even tough questions.

Some of you may recognize that the title of my speech is derived from Will Roger's quote: "Even if you're on the right track, if you just sit there you'll get run over." I think it is fair to say that the NRC and the commercial power reactor industry and material licensees are on the right track. However, we all need to be concerned and vigilant that our regulatory reforms and industry improvements do not stall or that we become so self-congratulatory that complacency sneaks in. No matter what changes we make today, we must always consider tomorrow. A true commitment to creative thinking and to reform is predicated on a continuous reassessment and the resolve to make things better. In that regard, regulatory reform is a journey and we must expect to continue to learn and to adjust along the way.

Let me begin by stating that, today, I believe that the NRC's focus on the future is clear and that achieving our goals will take resolve, dedication, discipline, and, of course, time. In order for our goals to be achieved, they must be shared goals. They must be shared by not only by the Commission, but by you and all our stakeholders. Moreover, the implementation of changes to support our goals must not only be the right actions, but these actions must be perceived to be the right actions. We therefore must work diligently to consider all relevant concerns and ensure that we communicate effectively with everyone. We are seeking to make these changes in a way that will endure, that will continue to ensure safety, and that will provide stability, clarity, and predictability in the regulatory process.

In the last 6 months, events overseas remind us that the use of nuclear technology has a global impact and whether we are operating the technology, handling or safeguarding nuclear material or providing independent oversight, we engender a responsibility that has implications beyond corporate boardrooms and Commission tables. As the electric power industry moves toward deregulation and as the NRC moves toward improved regulatory processes, we must all be ever mindful of our most important responsibility and principal duty - safety.

I might also mention that with all five Commissioners speaking, you might hear the same message five times. There could be worse things - you could be hearing five different messages. But let me provide you with my perspective on some of the most important issues facing the agency.

Revised Reactor Oversight Process

The Commission is currently considering the staff's recommendation to implement the revised reactor oversight process in the next few weeks. The success of the new reactor oversight process is important. I believe that these broad-scale changes will allow the NRC staff to make conclusions about licensee safety performance that are objective, predictable, defendable, and more easily communicated to our stakeholders. As you heard yesterday, at a recent Commission meeting, there was consensus, from a diverse group of stakeholders, that the new process is a better, more objective, oversight process than the current process.

Some of you may know that a recent issue has been raised with regard to one or more of the Performance Indicators associated with the new oversight process.

My view is simple. The new reactor oversight process is better, but not perfect. Both the NRC and the industry will continue to learn through implementation at all power reactors and we expect additional changes within the next year or so. I believe that any changes in the process should be fully vested with our stakeholders and that proposed changes should be implemented incrementally, through a deliberate process that will include extensive stakeholder involvement. We should be thoughtful about how we make changes at this point in the revised reactor oversight process to ensure that we do not undermine stakeholder confidence in the either the approach that led to its development or in NRC's oversight role.

If I could take some literal license with Will Rogers' quote, one might draw an analogy that when we are all traveling together "on the right track", it is best to readjust our seats, not while the train is moving, but at the next station.

As we move into this oversight process, we need to keep the lessons of the past close. We should not think that this new process, although it is much improved, will completely immunize us against declining safety performance. We can and should discuss which performance indicators are leading and which are lagging or how much risk is considered through the indicators. However, it remains highly debatable, at what point, under the new oversight program, NRC would have had to intervene to address the declining performance of some plants in the mid-1990's. So my message is simple, no tool can substitute for your continued effective management and the other actions that you take to run your plants in a prudent, safe and conservative manner.

Reactor License Renewal

I am pleased to tell you that the power reactor license renewal process is progressing well, -- extremely well by most measures. As you are aware, last Thursday, March 23, the Commission issued a renewed license for the Calvert Cliffs nuclear power plants -- an historic event. While the review was completed in just under 24 months, it was not completed at the expense of ensuring that the public health and safety and the environment would be protected. The next application for the Oconee nuclear power plants, is scheduled to be completed by August 2000. We had initially projected a 30 -36 month schedule to complete license renewal reviews and I am optimistic that the staff, industry, and Commission will be able build on the experiences of the Calvert Cliffs and Oconee reviews and further streamline the license renewal process.

Perhaps the most important performance indicator that speaks to the initial success of the reactor license renewal program is the growing industry interest and queuing up, for license renewal. Utilities are lining up for staff resources to support license renewal for their facilities. I want to underscore Chairman Meserve's comment and that is that early dialogue with regard to projected license renewal submissions are important so that the NRC can ensure that resources are available to support the reviews, consider potential technical issues, and continue to implement process improvements.

As the electric power industry moves toward deregulation, we are examining our processes to ensure that regulatory impacts are more fully understood and that our review processes are properly focused, stable, predictable, and, where appropriate, made more effective and efficient.

The industry is clearly being reshaped by deregulation. The Commission recently directed the staff be more proactive and increase its interactions with stakeholders to identify emerging policy issues related to trends in industry consolidation. The staff is scheduled to report back to the Commission on the implications of industry restructuring, both for reactor and material licensees, in June of 2001.

Continuing to Improve the Way We Communicate

Reforming our regulatory processes begets a public confidence challenge. We must do more than merely proclaim that we are improving our regulations because it is not always intuitive, from the stakeholders' point of view, that when we improve regulatory requirements we are also maintaining safety. We can all do better in explaining complex technical issues in a manner that is clear, understandable, and placed in the proper context. This is perhaps our biggest communications challenge-- to maintain stakeholder confidence as we change our regulatory processes.

We are meeting this challenge and have made great strides in improving the way we communicate with our others. We continue to react constructively to criticism and suggestions as to how we can improve our processes for interfacing with stakeholders. The Commission and staff have sought to make greater use of the electronic media and the world-wide web through informative and comprehensive webpages. We have webpages for contemporary issues such as the new reactor oversight process and reactor license renewal and most recently for the steam generator tube failure at Indian Point Unit 2. We developed an informative webpage for this conference and, provided for online conference registration. In addition, some recent and ongoing initiatives will help ensure that information will be made available to all members of the public at the same time. We agree that ADAMS, however, is still a work in progress. To be an effective steward for nuclear safety, our actions must be such that the public, those we regulate, and other stakeholders in the national and international community have respect for and confidence in the NRC.

Many of you are familiar with our efforts to improve communications and involve all stakeholders in our decision-making processes for reactor-related issues. Let me now discuss, and demonstrate, that improving communication and public confidence touch all agency activities.

The effort to develop a geological repository program, unlike the early development of nuclear power, is taking place in the context of not only greater public scrutiny, but greater public involvement in the process.

As a result, we are addressing both highly complex technical issues and public communication issues at the same time. Consequently, I want to share with you how the Nuclear Regulatory Commission is approaching its role and responsibilities as an independent regulator with respect to the proposed Yucca Mountain geological repository.

I want to make clear at the outset that the Commission remains firmly convinced that a permanent geological repository is the appropriate mechanism for the United States to ultimately manage spent nuclear fuel and other high-level radioactive waste. The NRC continues to progress in its review and pre-licensing consultation under existing law related to the Department of Energy (DOE) program to develop a high-level waste repository. We will work with DOE to make sure we have in place all necessary regulatory requirements and to assure DOE understands those requirements. Nevertheless, if DOE decides to submit the application for construction and operation of Yucca Mountain, it will be up to DOE to submit an application that demonstrates compliance with the NRC regulatory requirements and the acceptability of the site for licensing will be based on the merits of the site as demonstrated in the application.

Through the site characterization and suitability process, DOE must determine if the proposed Yucca Mountain site will be able to perform as designed and intended to contain and isolate spent nuclear fuel and high-level waste, and be able to provide adequate and reliable protection of public health, safety, and the environment. If the results of the site characterization and suitability process are positive and there is subsequent approval by the President and the Congress, DOE will commence preparation of a license application for a geological repository at the Yucca Mountain site.

To address the public confidence aspects of this process and to permit timely and significant public involvement in the development of repository implementing regulations, NRC determined that it had an obligation to make public as soon as possible how it would implement its risk-informed, performance-based health and safety standards. Proposed rule 10 CFR Part 63 is the NRC's proposed regulation for a geological repository at Yucca Mountain and contains specific technical criteria to which the repository's operator will be legally bound to adhere. This proposed regulation was noticed in the Federal Register (64 FR 8640) in February of 1999 for public comment. We expect to complete this regulatory framework by issuing our final Part 63 later this year.

Additionally, the Environmental Protection Agency (EPA) issued their proposed geological repository radiation protection standards in August. The main difference between the two standards being the 25 millirem/year all-pathways (Total Effective Dose Equivalent) proposed by the NRC and the 15 millirem/year Committed Effective Dose Equivalent plus 4 millirem/year separate groundwater proposed by the EPA. As legislation mandates (Energy Policy Act of 1992), the NRC is required to conform Part 63 health and safety standards to the EPA's final rule. This same legislation also designates the NRC as the agency responsible for the implementation of Part 63 standards and requirements, and for ensuring that the repository operator demonstrates adequate compliance in protecting public health, safety, and the environment.

There has been much discussion here and elsewhere about the differences between NRC and EPA as regards the appropriate standards to use for Yucca Mountain. I want to say at the outset that both NRC's proposed standard and EPA's standard do protect the public. While I know EPA has argued forcefully for their proposed standard, I do not believe a careful, objective scientific analysis can conclude that application of either standard would endanger public health and safety in any way. I do not intend to go into detail here as to the body of scientific study supporting the NRC standards. Rather, there is another issue affecting this decision that is related to basic principles of "good regulation" which should be considered once health and safety issues have been addressed. It is my understanding that EPA's position on the appropriate Yucca Mountain radiological standards is at least partially motivated by a desire to have consistency with other EPA standards for hazardous materials. Actually, it is this consistency issue that most prompts me to stand behind the NRC proposed radiation protection standards.

I firmly believe that we should not have a mix of radiation standards applying to different situations with similar risks. The health effects of radiation do not vary based on the particular source of the radiation dose. To that end I have strived since arriving at the Commission for opportunities to use good science to promote uniformity in radiological standards whenever the opportunity arises. International radiological standards applied around the world are consistent with the standards NRC has promulgated for Yucca Mountain. I find compelling the benefits of having consistent radiation standards as opposed to trying to have consistent standards for materials that do not have similar health effects. While EPA may have a history of using groundwater standards as a measure for a variety of hazardous materials with different health and safety concerns, I believe the uniformity of effects from radiation doses no matter what the source dictate that we begin moving towards using uniform criteria across the board for radiological risks.

Clear communication and the enhancement of public confidence through stakeholder meetings, public workshops, and our general efforts to be more open to constructive criticism, are elements of this regulatory framework. The NRC believes that stakeholder interactions provide early signals of the need for change and that by remaining receptive and responsive to those signals, the NRC can continue to improve its credibility as an open minded, objective regulator, while at the same time, ensuring a predictable and stable regulatory framework as demanded by those same stakeholders.

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Conclusion

Establishing a high-level waste repository, a revised reactor oversight process, or a more efficient and effective license renewal process are probably cases where Will Rogers' quote is particularly relevant.

While I believe that we have been, and are, on the right track with these issues, we need to be sensitive to ensure that our stakeholders do not feel they have been "run over" or "left at the station."

We rely on your feedback to help us understand if the regulatory environment is "on the right track" and then together, the NRC and its stakeholders can either "speed-up, slowdown or change tracks". When we all act, the less we react, and change that results from action is more stable than change that results from reactions.

Even if we are on the right track it seems to me that the NRC needs to make sure that we continue to move at the "right speed" so we avoid getting run over and we avoid running over all our stakeholders that are on the same track.

If your palettes can last, I would be pleased to answers some questions.

Thank you.

NRC NEWS

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No. S-00-04 March 20, 2000

[PDF Version (69 KB)]

"Scientific, Legal, and Socio-Political Dimensions in Radioactive Waste Management"

Remarks of
Greta Joy Dicus, Commissioner
United States Nuclear Regulatory Commission

at the

International Conference on the Safety of Radioactive Waste Management

March 13 - 17, 2000
Cordoba, Spain

Contents

Good afternoon everyone. It's such a pleasure for me to be in Cordoba, a place that houses such great beauty and a warm Spanish culture. I would like to begin by first extending my appreciation to the

Spanish Government for hosting this very important conference, and second, to welcome all experts participating in this week's events. With the number of Member States present here today, as well as those States that are not present, but are contracting parties to this Treaty, it is clear that the international nuclear community has a sincere collective interest in establishing and implementing a sound infrastructure to safely manage our legacy and future spent nuclear fuel and radioactive waste inventories. We are all here because we recognize that it is our international responsibility to safely manage radioactive wastes in a way that reasonably assures adequate protection to our workers, our public, and our environment for our present and future generations. Of equal importance, we are also here to discuss the fundamental infrastructure essentials for establishing, implementing, and integrating related policies, laws, technology, and science, as well as socio-political aspects, such as public outreach, public confidence, and transparency. We've had the pleasure today of hearing from several distinguished presenters on portions of these very issues, and my particular topic, **"Scientific, Legal, and Socio-Political Dimensions in Radioactive Waste Management,"** provides a comprehensive programmatic roadmap that addresses the essential fundamental elements for developing and implementing a technically sound, open, and objective radioactive waste management program.

Since the beginning of the twentieth century, research and development in the field of nuclear science and technology has led to wide scale applications in research, medicine, industry and in the generation of electricity by nuclear fission. In common with certain other human activities, these practices generate waste that requires management to ensure protection of human health and the environment now and in the future, without imposing undue burdens on future generations. Radioactive waste may also result from the processing of raw materials that contain naturally occurring radionuclides. To achieve the objective of safe radioactive waste management requires an effective and systematic approach within a legal framework within each of our countries, in which the roles and responsibilities of all relevant parties are defined. Each Member State needs to have a national framework that sets forth the necessary and sufficient elements and requirements for radioactive waste management.

As a contracting party to the Joint Convention, Member States in which radioactive waste exists shall have a national policy for the management of this waste to ensure that acceptable levels of protection for human health and the environment, now and in the future can be adequately achieved without imposing undue burdens on our future generations. National strategies to implement this policy also will need to be developed and will depend on related national circumstances, structures, and priorities, and the diversity in the types of radioactive waste.

The objective of these strategies is to ensure that within the Member State, the components of a comprehensive radioactive waste management system are established. This should include both an operational capability for dealing with the waste and an independent regulatory capability for controlling the way in which it is dealt with. For the operational capability, appropriate facilities and operators are required. For the regulatory capability, a Member State must have a legal framework and a regulatory body to enforce compliance with legal requirements. The use of the term "system" does not necessarily imply a single centralized system within the Member State. It is a summation of all individual components, such as, laws, policies, strategies, regulatory organizations, facilities, and operators, that are required in order to comprehensively manage these wastes.

However, it is recognized that the extent to which the components of a national radioactive waste management system are developed will vary from country to country depending upon national needs, and parts of that system may be implemented in cooperation with other countries and international organizations, but the essential requirements of a radioactive waste management system should include the following:

- identification of the parties involved in the different steps of radioactive waste management, including waste generators and their responsibilities;
- a rational set of safety, radiological, and environmental protection objectives from which standards and criteria may be derived within the regulatory system;
- identification of existing and anticipated radioactive wastes, including their location, radionuclide content, and other physical and chemical characteristics;
- control of radioactive waste generation;

20

- identification of available methods and facilities to process, store, and dispose of radioactive waste in an appropriate time-frame;
- taking appropriately into account, interdependencies among all steps in radioactive waste generation and management;
- appropriate research and development to support the operational and regulatory needs; and
- the funding, structure, and allocation of resources that are essential for radioactive waste management, including decommissioning, and where appropriate, maintenance of repositories and post-closure surveillance.

Additionally, Member States must also address needs for public information and consider issues related to public consultation with respect to the overall management and disposition of these wastes.

As I've just summarized the global framework of the Joint Convention infrastructure, I'm now going discuss these same elements on an individual basis, and with respect to radioactive waste management responsibilities associated with a State Party to the Joint Convention. The detail provided in each element is not an item-by-item delineation of what requirements are specifically needed by all Member States, but an overview of fundamental essentials that should be considered when developing and implementing a comprehensive waste management program.

1. *Establishing and Implementing a Legal Framework*

Radioactive waste should be managed within an appropriate national legal framework including clear allocation of responsibilities and provision for independent regulatory functions. The legal framework consists of the necessary laws and subsidiary legal requirements, such as regulations for example. The specific components of this framework will vary from country to country depending on the political structure, governmental organizations involved, national legislation, regulatory practices, types and amounts of radioactive waste, and the level of technical development. The national government or the government of a sub-national region should take direct responsibility for some or all of the related waste management activities. To achieve safe radioactive waste management, the legal framework should include the following:

- safety, radiological, and environmental protection objectives;
- a regulatory system, including licensing or other authorizations, as appropriate;
- an appropriate level of institutional control;
- enforcement of legal requirements;
- definitions and classifications of radioactive wastes;
- quality assurance;
- documentation and reporting;
- emergency planning; and
- appropriate public information and consultation.

2. *Establishing a Regulatory Body*

A regulatory body should be established or designated that has the responsibility for independently carrying out the regulatory function with regard to safety and the protection of human health and the environment. This body should be empowered to enforce legal requirements related to all aspects of radioactive waste management in cooperation with other government agencies or departments where appropriate, and also be empowered to issue, amend, renew, suspend or cancel licenses or authorizations, or to recommend such actions to the government. An important condition for the proper exercise of the regulatory function is its effective independence from operating organizations, designers, vendors, and constructors involved in waste management activities. This is necessary so that regulatory judgements may be made, and enforcement actions taken, without influence from interests that may compete with safety.

The organizational structure and size of the regulatory body will typically take into account the following elements:

21

- the legal and administrative system of the Member State;
- the amounts and types of radioactive waste;
- the complexity of nuclear applications;
- the requisite technical disciplines to adequately evaluate proposed nuclear applications resulting in waste generation;
- the organization and structure of waste generators and operators of radioactive waste management facilities; and
- the need to ensure the independence of the regulatory body.

3. *Defining Responsibilities of Waste Generators and Operators of Radioactive Waste Management Facilities*

The roles and responsibilities of waste generators and operators that process, transport, store, or dispose of radioactive waste need to be clearly defined. The responsibility for the safety of these waste management activities should be assigned to the waste generators and operators. Interdependency among all involving waste generation and management should be appropriately taken into account. The basic interdependent steps included in radioactive waste management, depending on the type of waste, are pretreatment, treatment, conditioning, storage, and disposal. It is essential that those responsible for a particular waste management process step or operation adequately recognize interactions and relationships, so that overall safety and waste management effectiveness can be balanced. This also includes taking into account waste stream identification, characterization, and transport implications. Conflicting requirements that could compromise operational and long-term safety should be avoided, and as far as reasonably practicable, the effects of future radioactive waste management activities, particularly disposal, should be taken into account when any one waste management activity is being considered.

4. *Providing for Adequate Resources*

Appropriate steps should be taken to ensure that adequate financial, human, and technical resources are made available or will be provided to support the radioactive waste management system, so that it can operate in an orderly, effective, and efficient manner.

5. *Enforcing Compliance with Legal Requirements*

It is the responsibility of the regulatory body to monitor and enforce compliance with the established legislative and statutory framework for safety and environmental protection. No other responsibility assigned to the regulatory body should jeopardize or conflict with this mission. In fulfilling this responsibility, the regulatory body should implement the licensing process and in cooperation with other government agencies or departments, conduct the following, as appropriate:

- develop and update rules, criteria, guidelines, and other related documentation that are required to implement the legal framework;
- take appropriate steps to ensure that activities generating radioactive waste will not be started without provisions for suitable and sufficient storage capacity on an appropriate time-scale;
- ensue that financial resources are made available for future decommissioning and restoration activities;
- develop a system of technical performance indicators that encompasses safety thresholds and non-compliance situations; and
- take the necessary steps to ensure that adequate records of radioactive waste management facilities or sites are maintained for an appropriate period of time.

6. *Implementing the Licensing Process*

The regulatory body has the responsibility to review, approve, or reject applications and to issue, amend, modify, suspend, cancel, or otherwise act upon plans, licenses, or other authorizations, or to recommend such actions to the government. Licenses or other authorizations should include clear, unambiguous, and technically sound and legally enforceable requirements and conditions governing the established radioactive waste management activities. In implementing the licensing process the regulatory body should consider the following:

- reviewing environmental impact and safety related documentation, such as preliminary and final safety analysis reports, for example;
- implementing a comprehensive and complementary inspection program for monitoring and evaluating licensee or operator performance, and for enforcing regulatory and license requirements ; and
- requiring operators or licensees to take compensatory or corrective measures when necessary and in an appropriate time-frame.

It is important that the license approval, amendment, modification, and cancellation process, as well as the inspection program be implemented in a fair, consistent, and independent manner.

7. *Advising the Government*

Where appropriate, the regulatory body should make recommendations to the relevant governmental authority regarding the development and implementation of national policy, strategies, laws, and objectives to ensure consistent and continuous safe radioactive waste management.

8. *Managing Radioactive Waste Safely*

Waste generators and operators of waste management facilities should keep the generation of these wastes to the minimum practicable. Suitable facility and process design, operation, decontamination, and decommissioning activities are essential for establishing and implementing a safe, sound, and efficient waste management program. Interdependencies among all process or operation steps should be appropriately considered. Overall safety rests with the operator's and/or licensee's who have the responsibility to address and are accountable for the following:

- performing safety and environmental impact assessments;
- demonstrating the required level of safety, to ensure adequate protection of the workers, the general public, and the environment, including emergency plans and procedures;
- ensuring that suitable staff, equipment, facilities, and training and operating procedures are available to safely perform essential operations;
- establishing and implementing a quality assurance program;
- establishing and maintaining records of appropriate information regarding the generation, processing, storage, disposal, and transaction inventories of all radioactive wastes;
- providing surveillance and control as required by the regulatory body;
- collecting, analyzing, and, as appropriate, sharing operational experiences to ensure continued safety improvements; and
- conducting or otherwise ensuring appropriate research and development to support operational needs.

9. *Public Consultation and Participation*

The regulatory body should include those public citizens who have a vested interest, as well as other interested parties, in the overall regulatory development and licensing process, and make available to the general public, all related non-secure or sensitive licensing, inspection, and enforcement information. The objective of this important step is not try and please every individual, but to demonstrate that the regulatory body and process operates in a fair, objective, and independent manner, and can reasonably ensure adequate protection of public health and safety, and the environment. This approach will help build public trust, gain public confidence, and demonstrate that the regulatory process is being carried-out in a transparent manner. Establishing and implementing formal public participation mechanisms, such as public meetings and workshops, addressing and reconciling public concerns in a fair manner and with an open mind, using plain language and terminology that is generally understood or recognized, and including external and world recognized expert body's to review, evaluate, and address public health, safety, and environmental issues, will not only help to establish public trust and confidence, but to maintain it as well. Clearly communicating our thoughts and processes to the public, involving them through formal participation mechanisms, and demonstrating a general effort to be open to constructive criticism, are elements that are essential to effective and successful regulation and program implementation. These interactions with vested parties and members of the public will provide early signals regarding dominant interests and concerns of those individuals and communities that will be directly or indirectly impacted by the action. By remaining receptive and responsive to those signals, one can continue to improve their credibility as an open minded, objective regulator, while at the same time, ensuring a predictable and stable regulatory framework that is protective of the worker, the public, and the environment. To be effective and successful in the radioactive waste management industry, our actions must be such that the public, those we regulate, and other international communities have respect for and confidence in not just one piece of, but the overall legal, administrative, and regulatory framework.

As I hope my presentation has made clear, the regulator in today's environment must not only have a sound technical basis for its regulatory requirements, but must also ensure that these requirements are understood and are reasonably acceptable to the public, whose safety is our first priority. I hope that the insights and examples I've shared with you today provides a clear picture of what essential fundamentals should be considered in order to develop and implement a technically sound, open, and objective radioactive waste management program. Let us never forget our international responsibility to safely manage and dispose of these wastes in a manner that protects our current and future generations.

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No. S-00-03 March 6, 2000

[PDF Version (65 KB)]

"First Steps into the New Century"

By

The Honorable Greta Joy Dicus
Commissioner
U.S. Nuclear Regulatory Commission

at the

NARUC Winter Meeting
Renaissance Washington Hotel
Washington, D. C.

March 6, 2000

Good Morning. Once again, I am very pleased to be joining you for this meeting. I recognize that this is the first meeting of the new century. Notwithstanding, this year finds the NRC as busy as ever with progress in several areas that affect you and the utilities you regulate. Today I want to address several of these items which will impact you in the coming months and years.

The first of these items that I know is of great interest to you all is the proposed disposal of high-level radioactive waste in a geological repository at Yucca Mountain, Nevada. There has been much discussion of individual issues associated with Yucca Mountain where views may vary, but I want to talk for just a moment about the overall framework which will be progressing significantly in the next year or two. For one of the few times in the history of the U.S. Nuclear Regulatory program, the development of regulatory requirements that will govern a nuclear-related activity is proceeding in parallel with the concept definition and feasibility phases rather than following along after a period of operational experience. The advantage of this parallel approach is that the regulator has the opportunity to participate "up front" in establishing implementing regulations from an anticipatory rather than retrospective viewpoint.

These regulatory requirements are more results oriented, requiring that the operator demonstrate total system performance to isolate and contain high-level waste for a 100 year operational and a 10,000 year post-closure period, which adequately protects public health, safety, and the environment. This is what we call risk-informed, performance-based regulation.

The effort to develop a geological repository program, unlike the early development of nuclear power, is taking place in the context of not only greater public scrutiny, but greater public involvement in the process. The specifics of how that public input will be handled is still under discussion and I will bring you up to date on those developments.

As a result, we are addressing both highly complex technical issues and public communication issues at the same time. Consequently, I want to share with you how the Nuclear Regulatory Commission is approaching its role and responsibilities as an independent regulator with respect to the proposed Yucca Mountain geological repository.

I want to make clear at the outset that the Commission remains firmly convinced that a permanent geological repository is the appropriate mechanism for the United States to ultimately manage spent nuclear fuel and other high-level radioactive waste. The NRC continues to progress in its review and pre-licensing consultation under existing law related to the Department of Energy (DOE) program to develop a high-level waste repository. We will work with DOE to make sure we have in place all necessary regulatory requirements and to assure DOE understands those requirements. Nevertheless, if DOE decides to submit the application for construction and operation of Yucca Mountain, it will be up to DOE to submit an application that demonstrates compliance with the NRC regulatory requirements and the acceptability of the site for licensing will be based on the merits of the site as demonstrated in the application.

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Turning back to our discussion of NRC's overall framework for considering a repository application, as previously mentioned, Part 63 is a risk-informed, performance-based regulation that would implement health and safety-based standards that apply solely to the proposed Yucca Mountain repository. The NRC's philosophy addressing risk-informed, performance-based regulation is an approach in which risk insights, engineering analysis and judgement (i.e., Defense-in-Depth), and performance history are used to ensure that all relevant hazards that could result in unacceptable consequences have been adequately evaluated and appropriate protective measures have been demonstrated to protect against radiation exposures and inadvertent material releases. As used in Part 63, integrated safety analysis (ISA) means joint consideration of safety measures that, considered separately, may not achieve the overall level of required protection. Specific repository performance objectives will have to be systematically demonstrated through the ISA.

Clear communication and the enhancement of public confidence through stakeholder meetings, public workshops, and our general efforts to be more open to constructive criticism, are elements of this regulatory framework. The NRC believes that stakeholder interactions provide early signals of the need for change and that by remaining receptive and responsive to those signals, the NRC can continue to improve its credibility as an open minded, objective regulator, while at the same time, ensuring a predictable and stable regulatory framework as demanded by those same stakeholders.

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Further, although some details are still being discussed, there will be an opportunity for a hearing on the DOE application once received by NRC as a capstone to several years of other informal opportunities for receipt of public input on various issues associated with Yucca Mountain. To bring you up to date in this area, you should be aware that the Commission is currently reviewing a proposal for a comprehensive rewrite of our rules for hearings, both informal and formal. Our goals include improving the efficiency of the hearing process, assuring undue expense and burden are not placed on intervenors, state and local governments, Indian Tribes, and applicants who participate in our proceedings, and providing more consistency across the various types of hearings we conduct. This comprehensive set of improvements to the hearing process will be published for public comment in the near future and, after consideration of public comments on the rule, I expect any final revised procedures to be in effect for the Yucca Mountain licensing proceeding.

License Renewal

Because of its potential impact on your activities I will turn now to a discussion of developments related to License Renewal. The Commission will shortly decide upon the first application for license renewal involving the Calvert Cliffs Nuclear Power Plant. We received the staff briefing recommending renewal of the Calvert Cliffs license just last Friday. While I am sure the important thing for Baltimore Gas & Electric was that the staff has recommended approval of the license renewal, of importance to the Commission was that we met our goal of reaching a decision, whether approval or disapproval, within the 30-36 month timeframe we set for ourselves. It also appears that we will meet that 30 month goal with respect to the second renewal application for Duke Power's Oconee Plant with no detriment to public health, safety and welfare. These proceedings did not have hearings since intervenors did not meet requirements for being entitled to a hearing. The intervenors have challenged in federal court certain procedural aspects of the hearing process, in particular certain aspects related to time limits for submittal of valid hearing issues. The D. C. Court of Appeals heard oral argument on that appeal last Thursday and the Commission is hopeful that the validity of its procedures will be affirmed by the court.

We expect to receive increasing numbers of license renewal applications. We have recently received the renewal application for Arkansas Nuclear One and Hatch Nuclear Power Plants. The licensee Turkey Point has also informed the NRC of their intent to submit a license renewal application in 2000. A number of other licensees have indicated interest in pursuing license renewal but have not committed formally to an application submittal date. We have every reason, however, to believe that the pace of applications will increase. NRC is already planning on resource adjustments necessary, and maximum use of lessons learned in the first few applications, to assure that all health and safety issues are reviewed and addressed in a timely manner as we consider these renewal applications.

NRC recognizes that long term planning by utilities, as well as PUC's, requires early decisions on whether plant licenses will be renewed or whether plans must be made for replacement power. For that reason NRC's regulations (10 CFR Part 54) allow utilities to apply for license renewal 20 years prior to the expiration of their current operating license. With our experience with the first two applications we have every reason to believe that these schedules will allow sufficient time for utilities and PUC's to plan for future power needs.

That concludes my prepared remarks and I would be happy to answer any questions you may have on these or other NRC activities.

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NRC NEWS

UNITED STATES NUCLEAR REGULATORY COMMISSION

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No. S-00-01 February 28, 2000

"Leaping into the Future: Time, Careers, and Research"
by
The Honorable Greta Joy Dicus
Commissioner

U.S. Nuclear Regulatory Commission
Massachusetts Institute of Technology
Nuclear Engineering Department Seminar

February 28, 2000

[PDF Version (51 KB)]

Contents

INTRODUCTION

Good afternoon everyone.

Let me begin by thanking the faculty and student leaders for inviting me and hosting me this afternoon. Dan Caputo, your ANS Chapter President, has been great.

As a speaker you always try to find some way to connect with your audience. So when Dan asked me to speak with you, I thought it would be insightful to see what kinds of research you all were doing up here, and I asked my staff to give me a read on the hot research topics. So we reviewed Dan's presentation on his research entitled "Understanding Environmental Actinide Transport and Speciation Using Nuclear Magnetic Resonance (NMR) Imaging with a Lanthanide Probe." Wow. So when that did not work, I asked my staff to talk with some other MIT graduates at the NRC (we have several) to see if they could provide any insights. We could not find them-- you know how researchers work unusual hours. Finally, I just tried to find a picture of Dr. Apostolakis goofing off at an Advisory Committee meeting and was told that never happens. Wow. Dr. Apostolakis - your staff is well trained.

I am delighted to be in Cambridge, at the Massachusetts Institute of Technology, on the eve of a remarkable event. For those of you that followed the Year 2000 transition closely you know that tomorrow we mark a special leap year. A special leap year, a leap year that occurs once every 400 years. Some of you may know that the rules for determining whether a year is a leap year were established by Pope Gregory XIII in 1582, when he modified the Julian Calendar. It was good to be the Pope. The rules are:

- Years divisible by four **<u>are</u>** leap years, unless...
- They are also divisible by 100, in which case they **<u>are not</u>** leap years, except.
- Years that are divisible by 400 **<u>are</u>** leap years.

While we no longer worry whether the sun will come up or the moon will fall from the sky, we are now concerned with whether power will stay on and planes will continue to fly. In some cases we have changed so dramatically in the last 400 years, yet are remarkably similar. We have just modernized our worries and given time the chance to outsmart us. So if you need to excuse yourself to gather water, dust off your Y2K emergency shelter or test run your generator, I will understand.

You may be surprised to know that the NRC and the Federal government are taking some extra precautions during the "leap day" transition. Federal agencies have staffed the Information Coordination Center (ICC) Operations Center and Joint Public Information Center (JPIC). These two centers were in operation during the Y2K transition. During the "leap day" period a small NRC response team will be available to provide reports to the ICC. Nuclear power plant status information will be obtained by the NRC Headquarters Operations Officer shortly after midnight local time. The Y2K Early Warning System (YEWS), an internet-based communication system, will be operational this evening and NRC plans to use this system to notify the nuclear industry of potential leap-day problems.

At a recent meeting between the Commissioners and the Advisory Committee on Reactor Safeguards, one esteemed member of the Committee, present with us today, remarked, and I quote, "[b]ut the intent, Commissioner, was not to solve the problem. It was to contribute to the debate." See if that approach works on your next exam.

So let me adopt a similar approach and, together, we can contribute to the debate on two important topics. Those topics are nuclear careers and the role of research in a changing regulatory environment.

CAREERS IN NUCLEAR ENGINEERING AND HEALTH

PHYSICS

I resisted the temptation to give you the "We need you" speech. But we do need you and the nuclear industry needs you. You are the best and brightest and I believe that one day, in the not too distant future, there will be a resurgence. The nuclear industry will grow and your skills and knowledge will be in high demand. That day may be today. Acquisitions and mergers are occurring at a record pace and Wall Street and foreign investors are more bullish on nuclear power investment opportunities.

Annually, NRC and DOE contract with the Oak Ridge Institute for Science and Education to prepare labor market trends for nuclear engineers and health physicists. The latest report, dated October 1999, provides some important insights that I would like to share with you.

First for Nuclear Engineers, the current labor market in terms of job opportunities for new nuclear engineering graduates continues to improve substantially since the mid-1990s. Starting salaries for nuclear engineers in the nuclear energy/nuclear weapons fields increased 6.6% for B.S. level graduates, 5.2% for M.S. level graduates, and 5.8% for Ph.D. level graduates between 1998 and 1999.

These are the largest increases reported during the 1990s. Moreover, the increases in starting salaries between 1997 and 1998 for B.S. and M.S. level graduates (3.6% and 4.6%, respectively) were also larger than any increases experienced since 1991. The improvement in job opportunities for nuclear engineering graduates resulted from a combination of two primary factors and one secondary factor. The primary factors were:

- The number of nuclear engineering degrees earned annually decreased by over 45% between 1995 and 1998 and

- Nuclear engineering majors are finding many job opportunities outside of the "traditional" nuclear energy/nuclear weapons fields.

Information provided by a limited number of university academic departments indicate that as many as 50% of their graduates are currently obtaining employment outside of the traditional nuclear energy/nuclear weapons fields either as nuclear engineers or in related occupational categories. Some new nuclear engineering positions are occurring in the nuclear energy/nuclear weapons fields due to growth and, as attrition occurs, more of the vacated positions are being replaced rather than left empty. Part of the growth has been in the DOE laboratories, especially in weapons laboratories. Based on data from a sample of utilities, employment of nuclear engineers in nuclear electric utilities has also increased slightly and some replacement hiring is occurring.

For health physicists, the total number of health physics degrees earned in 1999 was 215. The number of degrees earned in 1999 represented a decrease of over one-third in just two years. Health physics enrollments also decreased in a similar manner.

In addition, the employment of health physicists appears to have stabilized or to be decreasing very slowly. Thus, after several years of somewhat excess supply of new graduates, the demand for and supply of new graduates now appears to be fairly balanced. As a result, we saw a jump in the percentage increase in entry level salaries in 1999.

Projections of employment trends, job openings, and the supply of new graduates through 2005, indicates that the relative number of job openings available for new graduates should continue to increase as the employment level stabilizes. At the same time, the decreases in enrollments experienced during the 1997 to

1998 academic years should result in four-year or two-year college graduates with a wide variety of majors, and provided the training for them to become radiation protection technicians.

CHANGING REGULATORY ENVIRONMENT

Now for the good stuff. But, before I continue I need to first describe the NRC's regulatory environment to provide the context for my views of research in the future. In the last few years, the NRC has been transforming itself, with sweeping changes to many of our regulatory functions. Why are we doing this? We are doing it because the industry's environment is changing, and we must change with it if we are to carry out our mission effectively. We have taken a hard look -- helped by input from our stakeholders -- at the way we are doing business, and we have embarked on a path to change and to improve our regulatory programs. We are seeking greater efficiencies and effectiveness in our processes, and trying to eliminate unnecessary regulatory burdens where they may exist. At the same time, we are continuing to maintain safety and public confidence. This is no small undertaking, and I can tell you that the NRC staff and the Commission have devoted a great deal of time and energy to accomplish it.

The U.S. nuclear industry has accumulated a great deal of operating experience. The issues that we are dealing with today are more likely to be variations on issues that we are familiar with, rather than the new licensing issues that were present when we were forming our regulatory framework. For the near future, the issues of concern are those associated with aging, renewal of expiring licenses, and decommissioning. Although we have certified several advanced reactor designs, and stand ready to license new power reactor facilities, no orders are projected in the foreseeable future.

As a result of industry restructuring, several difficult issues have emerged. For example, cost-cutting measures and reduced staffing must be done in a manner that maintains safety; the availability of funds for decommissioning must be ensured when companies consolidate or split; the extent of foreign ownership must be considered on purchases to ensure the nation's security is protected; the extent of control by non-owner or contract operators of nuclear power plants must be evaluated to determine compliance with licensing requirement. Moreover, increased numbers of independent system operators supplying power to the North American grid can affect the reliability of offsite power supplies and increase the importance of emergency diesel generators.

NRC INITIATIVES IN RESPONSE TO THE ENVIRONMENT

In response to the changing environment, we started several initiatives. First, we have just launched a pilot version of our new power reactor oversight program. The new program offers sweeping changes to our inspection, assessment, and enforcement processes. We received feedback from our stakeholders that our processes were too subjective, difficult to understand, and therefore not predictable. In addition, our processes did not adequately recognize the improving performance of the nuclear industry as a whole. The new framework is designed to address these issues. We have worked closely with industry and our stakeholders to develop a concept of "cornerstones"-- key areas of licensee performance that must be monitored to ensure that unacceptable public risks do not arise from nuclear reactor operations. We utilized the results of our ongoing research in measures of performance to develop quantitative performance indicators in each of these cornerstones. This will allow both licensees and the NRC to more easily identify areas that need attention, and to focus our resources accordingly. We began testing this pilot program at nine sites in June of this year, and we are cautiously optimistic that the program will be able to be implemented for the entire industry in April 2000.

Another focus area for the NRC has been the renewal of licenses for our older plants, and I am very pleased to report to you on the progress that we have made. We have aggressively worked through literally hundreds of technical issues on the first two applications by Calvert Cliffs and Oconee nuclear power plants, and the projected time to review a license has been reduced from over five years to about 24 months. The staff developed a technical basis for the reviews through research on aging issues, then reached regulatory resolution on the issues by working closely with industry. It really is a good example of firm, fair regulation, while considering stakeholder concerns.

You may have heard a good deal about "risk-informing" our regulations, but you may not be too sure what that means. In general terms, it represents a philosophy whereby risk insights are considered, along with other factors, to establish requirements that better focus attention on issues commensurate with their importance to public health and safety. Looking back, our regulatory framework was established years ago using experience, testing programs, engineering margins, and a philosophy of defense-in-depth, but without the benefit of quantitative estimates of risk. That framework has served our nation quite well for many years, and we don't expect to throw it out and start over. Rather, we are researching the technical basis for our current regulations, with an objective of reducing unnecessary conservation where appropriate and possibly identifying areas with insufficient conservatism. Is this easy? Absolutely not! But that doesn't mean we should not do it. I expect that we will approach this very carefully, and as our methods of analyzing risk improves, we will continue to refine our approach. The U.S. has taken a leadership role in this area, and I can tell you that the rest of the world is watching to see what we will come up with.

As I mentioned, decommissioning appears to be a growth area. We all recognize that our nuclear facilities are aging. Those that cannot demonstrate their value or are not economical will be shut down and decommissioned. We have recognized that there may be inefficiencies in our current regulatory framework, since we hold our decommissioned facilities bound by regulations that were designed primarily for operating facilities. As a result, in the power reactor area, the NRC is taking a formal look at our whole approach to decommissioning to see if we need to create a new regulatory framework, and to see if we can focus on the areas of greatest risk. Research is contributing by examining various analytical tools and studying the viability of possible approaches to decommissioning, such as entombment.

In developing these initiatives, the Commission has actively worked with our stakeholders to implement new processes that are commensurate with increased regulatory insights, improved industry performance, and continuing advancements in risk assessment methodology. I believe that we have demonstrated the willingness to re-examine our existing programs in a fundamental manner. However, this does not mean we are bowing to industry complaints and political pressures! In all of our efforts, we have not lost sight of our focus on the most safety significant aspects of facilities. We will not promise that our efforts will satisfy all of our stakeholders. However, we are committed to considering all inputs in making our regulatory decisions, and we strive to ensure that our stakeholders understand how we arrived at our decisions. My experience is that even if our stakeholders don't always agree with our decisions, if the process is understood, then their confidence in the NRC is enhanced. At the end of the day, we believe that what we are doing will both ensure safety and provide stability, clarity, and predictability to our regulatory processes. The key to ensuring this happens is having a solid technical basis for our decisions, a basis that is established by our research program.

NRC RESEARCH YESTERDAY AND TODAY

How should research continue to support our initiatives? To address this question, I will provide some historical perspective on our research program. The NRC has funded research on nuclear issues for all of its existence, but not always at the same level. In the early 1980's, the NRC's budget for the Office of Research peaked at over $200 million. At the time, this research supported the development of the technical basis for many broad areas, including Three Mile Island items, severe accident phenomena, formulation of the NRC's Safety Goal and Severe Accident Policies, and modeling of thermal-hydraulic behavior. Many of these endeavors required the use of large scale experimental facilities. Subsequently, the focus of research shifted to issues such as the development and application of risk methods, revising the source term, aging research, and support of advanced reactor design reviews and certifications. However, this research has been less resource-intensive, and with no new plants being ordered in this country over the last two decades, the funding for research has gradually declined.

Today, as I look at where we are, I see that our research program still spans a wide variety of relevant technical issues. We categorize our research into two broad areas. The first is what we call Confirmatory Research, and it constitutes perhaps 80-90% of our budget. This area supports user needs requests from our front-line regulatory offices, and therefore focuses on current safety issues. This purpose of this type of research can generally be described as to remove unnecessary conservatism in our regulations and to provide assurance that our regulatory judgements are valid. Examples of this in the reactor area includes risk-informing our regulations in 10 CFR Part 50, independently reviewing industry operating experience, ongoing research into structural and geological engineering issues, and radionuclide transport and health effects.

A second area of NRC research is called Anticipatory Research, and it constitutes the remaining 10-20% of our research budget. The purpose of this type of research is to anticipate future needs, and to provide the technical basis to support future regulatory actions for emerging safety issues. Examples of this type of research include addressing PRA limitations as the NRC transitions to a risk-informed regulatory process, development of risk-based performance indicators, assessing links between performance and plant safety, and deregulation and its impact on plant safety.

From a program perspective, I believe that we are focusing our research in appropriate areas, and we are anticipating our future needs. From a resource perspective, we are operating with a FY2000 budget for research of around $40 million. We are actively pursuing opportunities to leverage our research funds through cooperative efforts. We are prioritizing our research activities in consideration of risk, uncertainties, and future challenges. And yet, I feel that we can do more, and I will elaborate on that in just a minute.

RESEARCH IN THE NEW MILLENNIUM

What is a vision for research for the new millennium? The challenge in answering this question is to be able to successfully project yourself into the future based on trends today. Of course, if I could do that consistently, my stock portfolio would be much healthier than it is, so you must treat any predictions with that fact in mind. Nonetheless, I shall attempt this rather lofty goal.

For trends, I think the industry is maturing and will focus on optimizing their current plant configurations rather than developing new and innovative designs. I also think that industry consolidation will continue, thereby reducing the number of utilities as well as the number of companies supporting the utilities. In addition, commercially available parts and hardware may be used more often rather than parts with a long Quality Assurance pedigree. Finally, the use of computers for modeling in lieu of actual experimentation will likely increase.

The NRC has already taken action to address some of the trends, and these are the new NRC initiatives that I had previously described to you. But these are just the start. New technology, such as advanced instrumentation and controls, can certainly have an impact on plant safety. For example, advancement in computers and information technology are coming at a rapid pace today, but research is needed on the reliability of this technology before it can be widely applied to nuclear power plants.

Advancements in fuel design and materials are an emerging area, particularly the use of high burnup and mixed oxide fuels. In addition, although the NRC is nearing a decision on issuance of the first renewals of licenses, research into aging and associated materials research will continue. Finally, risk-informing our regulations will require research to establish a sound basis in both technical issues and probabilistic risk assessment (PRA) techniques. I must also briefly mention high-level nuclear waste disposal, which remains a difficult problem that will only be resolved with continued research. Let me say that the Commission remains firmly convinced that a permanent geologic repository is the appropriate mechanism for the U.S. to ultimately manage spent fuel and other high-level radioactive waste. We are continuing to develop a Yucca Mountain review plan and to resolve key technical issues to prepare for reviewing a DOE license application for Yucca Mountain, should that occur. If a decision is made to submit a license application for Yucca Mountain, it is expected in 2002.

Earlier I said that I would elaborate on ways I thought we could continue to improve our research processes. I believe that we must reassess the way we do our research, just like we have done in other regulatory areas. Let me say at the outset that I believe in the value of research, and believe that the budget for it should be maintained as a minimum, and perhaps should even be increased. As a regulatory agency, we must preserve our independence and maintain a broad perspective to fulfill our mission of maintaining safety. Nonetheless, I also recognize that the environment is changing, and we do not have the ability to conduct extensive exploratory research. Long term research has a place, but many things today do not lend themselves to that. Instead, we must develop feedback mechanisms so that our programs can be continuously examined to ensure that the research is relevant. We must develop and refine our prioritization processes to ensure that our resources are being focused on the most significant issues. We must ensure that our research is linked to the needs of our stakeholders. In other words, our research programs must have a certain agility to respond to the environment.

Our research programs must be timely and responsive to both internal and external stakeholders. Too many times I have seen a well-thought out and well-executed research project completed, but not really used because it was either not timely or not responsive to user needs, or both. I recognize that high quality research takes time, so the challenge is to focus our available resources in a way that ensures a quality product in a timely manner. In addition, we must emphasize delivering products that contain recommendations for applicability. Again, I cannot tell you how many fine two-inch thick research projects I have seen that do not provide relevant recommendations and leave it up to the reader to figure out how the research should be applied. One way to improve our programs is to adopt the approach the NRC has learned in responding to the changing environment: listening carefully to its stakeholders. We recognize that our stakeholders have very valuable insights, and we have also found that they are not bashful about volunteering them! These insights can be used to help focus our resources and to shape our efforts in the future.

My vision of the NRC Office of Research in the new millennium would be a center of excellence and source of expertise. This center would maintain a cadre of reactor safety specialists in various key areas, with independent and unbiased expertise across a broad spectrum of advanced nuclear technology, to provide the technical basis for robust and transparent regulatory decisions. Experimental facilities and resources would be maintained to ensure our ability to respond in a timely manner to new or emerging issues. The Office would complement the front-line regulatory activities of the agency and independently examine evolving technology and anticipated issues.

Finally, new and creative approaches to research will increasingly be used. Partnerships with industry, foreign organizations, and other government agencies will become more common. Our joint research with the European Union, and the recent Memorandum of Understanding with DOE on Cooperative Nuclear

Safety Research are good examples of this. As the costs of large-scale experimentation rise, we will have an increased need to leverage the work of others, even while maintaining our necessary independence on regulatory matters.

So thank you for you patience and attention and I would be pleased to answer any questions.

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No. S-00-08 March 30, 2000

[PDF Version (73 KB)]

REMARKS OF

JEFFREY S. MERRIFIELD
COMMISSIONER

AT THE

REGULATORY INFORMATION CONFERENCE
WASHINGTON, D.C.

MARCH 29, 2000

Contents

Good Morning. Thank you very much for the opportunity to speak to you today. This is the second Regulatory Information Conference that I have participated in since I became a Commissioner in 1998. This is not only a great opportunity for the NRC, the nuclear industry, and our stakeholders to share insights on the many safety and regulatory challenges we are facing, but it also provides an opportunity for the Commissioners to discuss their priorities as well as the course they would like to set for the agency. I will try to do just that. Today I would like to focus on 4 areas:

1. First, I'll look back at 1999 and give you my views on the state of the NRC.
2. Second, I'll share with you my priorities for 2000.
3. Third, I'll discuss the issue of organizational accidents.
4. And finally, I'll give you my perspective on the NRC's role as communicator and its challenge of enhancing public confidence.

State of the NRC

First, I'd like to share my views on the state of the NRC and look back at some of our most significant accomplishments of 1999.

The NRC is engaged in one of the most aggressive regulatory reform efforts ever undertaken within the federal government. During the fourteen years I have spent in Washington, I cannot think of a federal agency that has made more of a commitment to reinvention than the NRC has made during the last 18 months. We have become more risk-informed, we have reduced unnecessary regulatory burden, we have brought greater objectivity and predictability to our regulatory processes, we have held our managers and staff more accountable, and we have become more responsive to our external stakeholders. Some of our critics would have you believe our reform efforts amount to regulatory retreat. On the contrary, I would argue that these efforts are entirely consistent with our strong commitment to safety, since the changes we are making will allow our licensees and our staff to focus more attention on truly risk-significant aspects of the plants and spend less time on regulatory burdens that contribute little or nothing to safety.

I would like to outline a few reasons why 1999 was a year the NRC can be very proud of.

- We met or beat every milestone we set for the Calvert Cliffs and Oconee license renewals. The fact that the overwhelming majority of licensees have expressed an interest in pursuing license renewal speaks volumes of our success in establishing a thorough, predictable, and timely process.
- We met or beat every milestone we set for license transfers, such as those associated with Three Mile Island Unit 1, Pilgrim, and Clinton.
- We successfully improved the timeliness of our spent fuel cask certifications.
- We successfully set the course for the long journey we call risk-informed regulation.
- We moved forward on changing Appendix K so that it would remove unnecessary restrictions on plant operations and allow many licensees to seek power uprates.
- We published a final rule allowing licensees to amend their design basis to use revised source terms in design basis accident radiological analysis.
- We issued the final design certification rule for the AP 600.
- We successfully piloted a new reactor oversight program, one which institutionalizes the objectivity, predictability, consistency, openness, and risk insights that were missing from our previous inspection and assessment programs.
- Finally, we improved our planning and review efforts associated with applications for extended power uprate. Remarkably, during the 90s, we approved power uprates that resulted in over 1400 megawatts of new electric generating capability in the United States. I am proud to say that we did so in a manner consistent with our mission to protect public health and safety.

I could go on, but I believe I have made my point that the NRC has served the American people very well. However, the dynamic nature of the electric industry dictates that we live in a "what have you done for me lately?" environment. While 1999 was a success, I am under no illusion that it is time to celebrate. So, now let me focus on 2000.

Priorities For 2000

If David Letterman can have his top ten list, so can I. So, here are my top 10 priorities for 2000 in the reactor arena:

- **First** and foremost, we must carefully plan and budget our resources so that we don't fall victim to our own success in the areas of license renewals and license transfers. We must dedicate the resources necessary to build a robust and predictable regulatory infrastructure in these areas while at the same time providing the resources necessary to perform ongoing reviews in a thorough and even more timely manner.
- **Second**, we must go forward with the new reactor oversight process recognizing that it is very much a work in progress, but one which is far superior to the subjective and often unpredictable process we left behind. We cannot allow ourselves to be held hostage by those who demand perfection at the expense of improvement.
- **Third**, we must get our act together in the area of reactor decommissioning. We must get our arms around the numerous technical and regulatory issues associated with decommissioning, and bring realism, clarity, and consistency to our regulatory framework.
- **Fourth**, we must not fail in carrying out our regulatory responsibilities associated with dry cask storage of spent fuel. While we have been successful in improving the timeliness and predictability of our cask certification process, we need to achieve further process efficiencies and resolve the generic technical issues like credit for high burnup fuel.
- **Fifth**, we must bring realism to our physical security requirements without compromising on the protection of the plants. As a result of my plant visits this last year, it has become obvious to me that both we and our licensees are guilty of allowing regulatory creep to enter into the OSRE process. I have seen protective strategies that range from innovative to outlandish overkill. We must work to provide plant security requirements that respond to the realistic and clearly defined threats of modern society; nothing more, nothing less.
- **Sixth**, we **must** make the revised maintenance rule and 50.59 rule **work**. If our regulatory or inspection guidance is inadequate, or if inconsistency is allowed to find its way into either how licensees implement or how our inspectors regulate, the rules will fail. We cannot allow years of hard work on the rules be derailed by regulatory creep on the part of our inspectors or short cuts on the part of our licensees.
- **Seventh**, we must move forward swiftly, yet cautiously, in the area of risk-informed regulation. While I am optimistic that we can use risk insights to improve many aspects of Part 50, I am not convinced that there is sufficient industry support to justify the cost of making a wholesale change to Part 50. Although I am willing to provide the resources necessary to take the important initial steps, I will not support additional resources if there is not sufficient industry interest in using these alternative regulations.
- **Eighth**, we must reach **closure**, and I stress the word **closure**, on our fire protection initiatives. Clearly, none of our stakeholders - not the public, not our staff, not our licensees, and not Congress - feels good about where we stand in the area of fire protection. We must complete our work associated with both fire protection circuit analysis and our comprehensive regulatory guide, and reach closure on milestones that will ultimately lead us to a risk-informed NFPA standard.

- **Ninth**, we must improve the recruitment, the training, and the professional development of our staff. As our workforce ages, and as retirements continue, our corporate knowledge is threatened. At the same time, emerging technologies and new technical challenges associated with such things as plant aging, power uprates, and even the prospect of a new plant order, are on the horizon. It is essential that we have a staff that is capable of meeting these challenges.
- Finally, we, as an agency, must continue to make strides in the areas of fiscal responsibility and accountability. We have had great success in rightsizing our agency and in reducing our cost to licensees and the American taxpayers. Nonetheless, I believe we in the Commission have the obligation to scrutinize our budget line by line to ensure that we are utilizing only those resources necessary to effectively and efficiently carry out our mission; no more, no less. As stakeholders of the NRC, you should demand nothing less of the Commission.

Organizational Accidents

Now let me change gears and talk about the issue of organizational accidents.

Today, the outlook for nuclear power is arguably the brightest its been since the Three Mile Island accident. Competitive market forces have led to a resurgence of nuclear power by forcing dramatic improvements in the manner in which nuclear plants are managed and operated. Licensees have improved operator training, made significant process improvements, developed sound maintenance and corrective action programs, shortened refueling outages, and as a result, significantly increased generation. Plants today are operating better than ever before, with forced outage rates at an all time low and capacity factors at an all time high.

Despite this success, my message to the nuclear industry is the same one I frequently leave with the NRC staff - this is no time to celebrate. I recently read a book by Mr. James Reason entitled Managing the Risks of Organizational Accidents. I recommend this book as it is a stark reminder that success is fragile, and if not managed properly, can lead to the insidious buildup of latent conditions that could set the stage for organizational accidents.

I'll briefly try to capture the essence of Mr. Reason's message.

Our agency, the nuclear industry, and the public have been well served by the defense-in-depth principle. Successive layers of protection, one behind the other, each guarding against the possible breakdown of the one in front. However, no one defensive layer is entirely intact. Each one possesses gaps and holes created by combinations of active failures and what the author refers to as latent conditions.

Latent conditions include such things as poor design, gaps in supervision, undetected manufacturing defects and maintenance failures, unworkable procedures, shortfalls in training, and less than adequate equipment. They arise from decisions made by organizational managers, manufacturers, designers, and even regulators, and can lie dormant for many years. However, when the gaps produced by active failures line up with those created by latent conditions, successive defenses are compromised and a window of opportunity exists for a serious accident. While these windows of opportunity are rare, Chernobyl, the Bhopal chemical accident, and the Challenger accident have reminded us that they are indeed possible.

Despite our most recent successes, as the NRC moves forward with our regulatory reform efforts, and as the nuclear industry transitions into a deregulated electric market, we and our licensees must continue to wage an aggressive campaign against the buildup of latent conditions and we simply must not forget to worry. As Mr. Reason states in his book, "If eternal vigilance is the price of liberty, then chronic unease is the price of safety." The NRC and the nuclear industry simply must maintain a high level of unease. Let me now briefly touch on 3 aspects of plant operation I believe warrant chronic unease on the part of ourselves and on the part of our licensees.

First, licensees and the NRC must continue to challenge complacency. Now I'm not using the term complacency in the classic sense - it is clear to me that INPO and our licensees have their arms around that. Instead, I use it in terms of forgetting the past. As the industry reaps the benefits associated with improved performance, and as the NRC and the industry pursue greater efficiencies and regulatory reform, we must be careful not to roll back the safety improvements made over the last 20 years. We must ensure that lessons of the past do not get "reformed out" or "budgeted out" of our programs.

While the industry is performing well, it was not that long ago that many plants were plagued with operational problems. We cannot allow ourselves to forget about the Davis-Besse feedwater event, the fire at Browns Ferry, the Millstone saga, and the extended shutdowns of the 80s and early 90s. We cannot allow ourselves to lose sight of the fact that the performance improvements the industry is enjoying today came at very high price -- a price that we cannot afford to repeat.

The **second** area I believe warrants chronic unease is insularity. As the electric industry proceeds down the road toward deregulation, we are likely to see a dramatic shift in the ownership of nuclear plants across the nation. It is clear that many nuclear plants will be sold, resulting in a significant reduction in the number of plant owners. Overall, I hope this consolidation will serve as an opportunity to further improve the operational performance of these plants. However, this opportunity will be lost if consolidation and competition breed insularity and provincialism.

My message to you is this: As consolidation in the ownership of nuclear plants continues, the few large companies operating these plants must not become insular, they must continue to recognize the value of looking outside of their organization for solutions, and of sharing information outside of their organization for the common good of the industry. Plant managers within these large companies must never become comfortable benchmarking themselves only against their organizational peers, mistakenly believing that rest of the U.S. nuclear fleet and the international nuclear community offer few operational insights that cannot be more readily acquired from within.

For those who are so bold as to believe that all of the nuclear industry's solutions, all of its best practices, all of its operating experience, lie within your organization, I ask you this: "Are you bold enough to stake your assets on it?" I hope and expect the answer is no.

The **third** aspect of plant operation I believe warrants chronic unease is the relationship between the NRC's new reactor oversight program and how licensees manage plant performance. By almost any standard, the nuclear industry is performing better now than at any time in its history. This improved performance provided an opportunity for the NRC to rethink our approach to reactor oversight and led to what I believe are comprehensive and innovative changes to our oversight program.

As you know, the NRC's new oversight program will measure plant performance using a combination of objective performance indicators and a risk-informed inspection process. The strength of this new program lies in its emphasis on strong corrective action programs. I hope it clear to everyone that the purpose of the new oversight program is to measure and assess performance to assure the plants are being operated safely. Nobody should have any illusions that it is intended to assure operational excellence. Operational excellence is the responsibility of our licensees, not the NRC.

As we approach the final days before initially implementing the new oversight program, critics of the program and even the ACRS are voicing concerns that our licensees will manage their plants to the NRC's performance indicators, and that our indicator thresholds provide licensees little incentive to improve performance. I strongly disagree with the premise of these concerns, and have expressed so publicly on many occasions.

In contrast to some, I believe that the individuals that manage nuclear plants in the U.S. are sophisticated enough to realize that managing solely to the NRC's performance indicators is a recipe for failure. I believe it is clear to each of them that green is not good, and that the NRC's performance indicators are a mere subset of the indicators that must be monitored to ensure that plants are managed and operated efficiently and effectively. I believe that there is a common understanding in the industry that it is essential to identify performance trends early and to intervene long before a performance indicator threshold is reached.

I am not asking critics of the new oversight program to trust me, the NRC staff, or our licensees. I believe that its merits will speak for themselves. Clearly, I have a great deal of confidence that the objectivity and transparency of the new program will provide an even greater incentive to licensees to maintain the highest levels of performance. I also believe that we should not lose sight of the fact that our licensees have many other incentives to operate their plants well, including those associated with a deregulated electric market. How long do you think the market will tolerate multiple scrams, multiple unplanned shutdowns, or multiple safety system failures in a given year? I would argue that the market

is just as punishing a regulator as the NRC. The market demands operational excellence, outstanding equipment reliability, and high capacity factors at all times. Those plants that are content to operate on the border between green and white will fail to satisfy the demands of the market. They will simply be too costly and too unreliable to survive. For those licensees that prove me wrong and do manage strictly to the NRC's indicators and are content to operate on the border between green and white, I refer you to SECY-99-168. That paper explains all of the wonderful work we are doing in the area of decommissioning.

Communication and Public Confidence

Let me close today by briefly touching on an area that the NRC continues to struggle with. It is an area directly linked to one of the agency's key performance goals, yet is very difficult to measure, and even more difficult to influence. It is an area in which the NRC is extremely vulnerable, and thus one for which I believe the agency must rethink the way it is doing business. I am speaking about Enhancing Public Confidence.

In the past, the NRC approached public confidence in much the same way the Maytag repairman approaches his job. We were passive in our communications with the public. We allowed our critics to define what our agency was, what its actions meant, and how these actions should be perceived. As a result, the agency frequently found itself in the difficult position of playing catch-up. This approach had its roots with the old AEC. The AEC's organizational philosophy simply did not recognize a role for the agency in enhancing public confidence. The agency paid a very heavy price for this passive approach.

Many within the NRC believe that if they simply do their job well, public confidence will naturally follow. There is some merit to that approach. However, while I agree that the most effective way to improve public confidence is by **demonstrating** through our actions that the NRC is a credible regulator, I would argue that if we do not effectively convey to the public that we are a credible regulator, how are they to know? Who will carry that message for us?

I believe the NRC must become more proactive and forthright in its communications. We must be the first to communicate with the public about important regulatory decisions and must clearly articulate the reasoning behind them. We should change our organizational philosophy so that we no longer allow inaccurate assertions in the public arena to go unaddressed. When spent fuel casks are referred to as mobile Chernobyl's, I think we should rebut the assertion and clearly present the true basis for why we feel dry cask storage is safe. When opponents of the new oversight process or our decision on N+1 label them as regulatory retreat, we must accurately and promptly respond so that the public is not left with a mistaken understanding of our programs. When we are accused of wasting public monies in our pursuit of our international cooperation, we must explain why international involvement is vital to protecting public health and safety. How will the NRC ever enhance public confidence if we remain passive in the public arena? We simply won't. I sincerely believe that if we have a true and defendable story to tell, it is irresponsible for us not to tell it - a disservice to our licensees, our stakeholders, and our staff.

The NRC must also do a better job conveying to the public what we mean when we use the term "unnecessary regulatory burden". It has become the mantra for many of our regulatory reform efforts, yet few really understand its true meaning. It is a term that carries great weight, and one that also provokes great anxiety. Many in the NRC and the nuclear industry have reduced this important concept to a sound-bite, thereby losing a great deal of its meaning in the translation. If the word "unnecessary" is lost on our stakeholders, regulatory reform begins to look like regulatory retreat. How much public confidence do you think we engender with such a fatal flaw in our message? Very little!

The problem, as I see it, is that we inappropriately treat "reducing unnecessary regulatory burden" and "becoming more risk-informed" as two separate and unrelated goals. I would argue that the two goals are, in fact, closely linked. Think about it. The premise behind our efforts to risk inform our regulations and our efforts to reduce unnecessary regulatory burden is the same. It is that these efforts allow licensees and the NRC to spend less time on regulatory burdens that contribute little or nothing to safety so that more attention can be focused on truly risk-significant aspects of a plant. Very often, that premise is lost in the sound-bite. So, I encourage the NRC staff and the nuclear industry to ensure that when they discuss risk-informing Part 50, or the new reactor oversight process, or any of our other regulatory reform efforts, they do so in an accurate and responsible manner that explains why these reforms were made. If we communicate honestly and responsibly, our stakeholders will understand the safety benefits associated with our efforts, and burden reduction will be secondary to the discussion. If we fail to do so, naysayers will use our own words against us to distort our message. At the very least, this will add a great deal of unnecessary burden to our own reform efforts. At the very worst, the groundswell resulting from a lack of public confidence will manifest itself in regulatory gridlock - derailing our reform efforts. I hope you're not willing to accept such a heavy price. I know I'm not.

In closing, I want to thank you again for giving me this opportunity to share some of my thoughts with you this morning. I hope this conference has met or exceeded your expectations and I hope my remarks are useful. If you have any questions, I intend to stay at the conference for a while and I'd be pleased to discuss them with you between sessions. Thank you.

[NRC Home Page | News and Information | E-mail]

PNO-II-00-012 - Carolina Power & Light Co.

[Preliminary Notification index | News and Information | Main NRC Home Page | E-mail]

March 3, 2000

PRELIMINARY NOTIFICATION OF EVENT OR UNUSUAL OCCURRENCE PNO-II-00-012

This preliminary notification constitutes EARLY notice of events of POSSIBLE safety or public interest significance. The information is as initially received without verification or evaluation, and is basically all that is known by Region II staff in Atlanta, Georgia on this date.

Facility	Licensee Emergency Classification
Carolina Power & Light Co.	X Notification of Unusual Event
Brunswick 1 2	Alert
Southport, North Carolina	Site Area Emergency
Dockets: 50-325,50-324	General Emergency
	Not Applicable

Subject: ***Unit 1 Loss of Offsite Power***

On March 3, 2000, with Unit 1 in cold shutdown (Mode 5) for a refueling outage, a loss of offsite power to the Unit 1 balance-of-plant and emergency busses occurred at 0931. Unit 2 was at 100% power at the time of the event. A Notification of Unusual Event (NOUE) was declared at 0950 due to the loss of offsite power. The reactor cavity and spent fuel pool were fully flooded and the fuel transfer gates opened to support refueling activities. Reactor coolant temperature was approximately 86 degrees Fahrenheit. All four emergency diesels (EDGs) started as expected with EDGs numbers 1 and 2 loading and supplying power to their respective Unit 1 emergency busses. Cooling to the water surrounding the fuel in the unit was briefly interrupted. Cooling was restored in approximately 21 minutes after power to the emergency busses was restored from the EDGs. Reactor coolant increased a small amount, peaking at 89 degrees fahrenheit. All movement of fuel maintenance work for the outage was suspended.

While attempting to return the power supply for the 4160 volt E2 emergency volt bus from the EDGs to offsite power, EDG number 2 tripped on overcurrent. An EDG building fire protection actuation (release of halon) was received. There was no immediate evidence of a fire in the area. During this period, shutdown cooling was again interrupted.

Shutdown cooling was restored by starting the alternate train pumps within 18 minutes.

The loss of the Unit 1 bus resulted in the decision by operators to begin a shutdown of Unit 2 because two offsite power circuits were inoperable and there was no power to the Unit 2 equipment powered from the Unit 1 E2 bus. Operators initiated a shutdown sequence at 1356.

At 1756, the licensee restored offsite power and terminated the shutdown of Unit 2. At 1843, the licensee exited the Unusual Event for Unit 1.

The NRC resident and senior resident inspector were on site and have been evaluating the activities associated with the event. Region II staffed the Incident Response Center to establish an open line of communication with the licensee to monitor their recovery activities. Region II has notified the State.

The licensee issued a press release to address local media and government inquiries and notified State agencies. Region II notified the State and has responded to media inquiries.

This information is current as of 1900 EST.

Contact: S. CAHILL
(404)562-4480

[**Preliminary Notification index** | **News and Information** | **Main NRC Home Page** | **E-mail**]

Luncheon Speech

Joe F. Colvin
President and Chief Executive Officer
Nuclear Energy Institute

NRC Regulatory Information Conference
March 28, 2000
Washington, D.C.

Thank you ... good afternoon. It's hard to believe this is the 12th annual NRC Regulatory Information Conference. When the agency held its first conference in 1988, the industry wasn't quite sure what to make of it. I don't think any of us had ever seen that many NRC staff together in one place before. But we got used to it.

Over the years, these gatherings have evolved into dynamic working meetings, with a lot of good dialogue between the NRC and its various stakeholders. I think it's especially valuable for the public to have an opportunity to see the NRC and its programs explored in so much detail. Even for those of us who are directly involved in nuclear energy, it isn't always an easy industry to follow. I commend the NRC for its efforts to make the regulatory process more open and scrutable. That's a win-win situation.

At this conference, we've talked about the new regulatory oversight process, which will be implemented *across the industry next month*. It represents a *major change* in how the NRC regulates—and in how the industry thinks about and manages its business.

I think we've seen more change in the regulatory process in the past two years—*real, substantive, positive change*—than we saw in the previous *10 years*. Someone asked me, recently, what motivated the NRC to change the regulatory process *now*. What really got things moving?

One key factor is that the NRC recognized the industry's sustained high level of performance and its improved ability to compete in the marketplace. Far from the beleaguered industry of a few years ago, the NRC saw an important technology with a promising future—a future that could depend, in part, on the efficiency of the regulatory process.

Another factor, of course, is that Congress provided support and encouragement to the NRC's reform efforts. That support *has been*, and *continues to be*, very important.

But there is still more to the story. The pace of change accelerated for three reasons: One, the industry and the NRC already had spent *years* laying the groundwork. Two, economic deregulation of the electricity industry made it clear that safety regulations must be as effective and efficient as possible. And three, change seems to follow an exponential pattern.

There's an old story about an Indian rajah who was so delighted with the game of chess ... that he offered the inventor anything he wanted in the kingdom. The inventor thought for a moment. Then he said, "Just one grain of rice, your excellency, on the first square ... two on the second ... four grains of rice on the third ... and so on through the 64 squares of the chessboard."

On the first half of the chessboard, it's not that big a deal. The rajah has to give him 2^{32} grains of rice—that's four billion grains, which he could easily get from his rice fields.

But by the time he reaches the 64^{th} square on the chessboard, the total will be 18 *billion trillion* grains of rice. According to the story, that's enough rice to cover the Earth twice over.

That's the power of exponential change.

In case you were wondering, we're now on the second half of the chessboard—so hold on to your chairs.

This story leaves one key question unanswered: Did the rajah go bankrupt—or did the inventor lose his head? I like to think that they worked out a win-win solution ... because that's what one has to *do* in a period of rapid change.

To achieve a win-win solution, we have to look at this industry from a fresh perspective.

> **First**, I *encourage* you to step back from your immediate concerns and *absorb* the positive developments that are taking place related to nuclear energy. Gain a fuller appreciation of the tremendous value this technology offers.
>
> **Second**, I *encourage* you to change the way you think and talk about this industry. Change the way you look at your job. Discard any old, pessimistic ideas you may have about nuclear energy's future and replace them with the positive view of someone on a winning team.
>
> **Third—and most important**—I *encourage* you to make this industry the benchmark for safety and quality in the energy business. A real winner

never grows complacent, just because he or she is between races—or between *inspections*. A real winner is guided by an internal standard. Aim high!

I encourage you to recognize where nuclear energy is *today* ... and to chart your course from this point.

Competition is drawing positive attention to this technology. It is focusing political attention on the strategic importance of nuclear energy. It is removing stranded costs as an issue and allowing us to focus on operational economics going forward. And competition is acting as a powerful impetus to consolidation, and to the economies of scale that it can achieve.

I remember an article in *The Wall Street Journal* last fall that referred to a "renaissance" taking place in this industry. The article said that such a development would have been unthinkable five years ago.

Too many of us are looking at the nuclear industry today from the perspective of five years ago—maybe 10 years ago, in some cases.

This is today's nuclear energy industry:

- Safety, performance and reliability are up.
- Economic performance is solid, with output and cash flow up.
- The business fundamentals are very strong and trends are moving in the right direction ... and there is *more value yet to be gained* from U.S. nuclear power plants.
- Policymakers and the public are beginning to recognize that emission-free nuclear energy is vital to support continued economic growth, while protecting the environment for future generations.

Last year, U.S. nuclear plants achieved an average capacity factor of 86.8 percent. Output was up 8 percent over 1998 ... for a total of 728 billion kilowatt-hours. In fact, because of the increased output from U.S. *nuclear* plants, the equivalent of about 12 large-scale power plants has come on line since 1990.

Nuclear power plants are being bought and sold—and as demand for these units increases, so do the asking prices. Why would anyone buy a nuclear power plant? A recent newspaper article put it this way:

You don't have to be a nuclear engineer to understand the reasons. Nuclear plants, particularly large ones, have some of the lowest electricity production costs in the country.

The same article quoted a financial analyst, who said: "It's hard to come up with transactions that are anywhere near this profitable."

As I mentioned a moment ago, I believe there is far more value *still to be gained* from the industry's nuclear generating assets. NEI has identified seven key points that we call the *building blocks of additional value* for these plants. **Performance** and **electricity price** are the first two. They're pretty obvious.

Some of the other building blocks of value *aren't* so obvious.

What did you pay for gas the last time you filled up your tank? Any of you have oil heat? Energy price spikes mean *tough times* for many businesses and individual consumers. **The third building block of value for nuclear power plants is that they provide a *high degree of price stability.***

In competitive markets, we are seeing large electricity users willing to pay a premium above the average market price to *lock in* an assured source of electricity supply at a known price ... and they view nuclear energy plants as the way to *provide* that stability.

Building block four is transmission system support. As you know, nuclear power plants provide ancillary services such as voltage and frequency support ... and helping to maintain the reliability of the grid. These services have significant economic value in a deregulated electricity market.

Many plants also have significant additional site value. That's the **fifth building block**. In some cases, sites that host one or two units were originally planned for more units ... so they have space that could be used to build additional generating facilities—fossil ... or *even new nuclear units*. This extra space *already* is equipped with switchyards, grid access and spare cooling capacity.

Building block six is the clean air compliance value associated with nuclear energy plants. The emissions avoided by these plants alleviate compliance obligation and associated costs for affected fossil-fired power plants. This is becoming increasingly important as the United States faces stricter clean air requirements.

Today, nuclear energy plants do not receive credit—monetary or otherwise—for these services ... but we see that coming in the future.

The final building block of value is management. Operating a world-class nuclear generation business requires a special set of capabilities, management tools and techniques. These tools and techniques have value beyond the energy business. For example, one nuclear company won a contract to provide maintenance management services for a major retailer with stores all over the country.

These seven building blocks of additional value are part of the industry's message to Wall Street. Nuclear energy offers:

1. Competitive price
2. Solid performance
3. Price stability
4. Transmission system support
5. Site value
6. Clean air value
7. Management expertise.

This is the *short course* on the benefits of nuclear energy.

With these benefits in mind, **I encourage you** to change both your perspective on nuclear regulation and the way you do your job. If the new regulatory oversight approach is to achieve its promise, a fresh, new perspective is essential.

Here is one of my favorite quotes:

> This Commission believes that it is an absorbing concern with safety that will bring about safety—not just the meeting of narrowly prescribed and complex regulations.

These words date from 1979—the Kemeny Commission's report on the accident at Three Mile Island.

The Kemeny Commission advocated *"an absorbing concern with safety."*

In many respects, I believe the NRC's new, objective, safety-focused oversight process meets that criterion. Twenty-one years ago, we didn't have the experience or the tools to implement this type of approach—but we do now.

Under the new process, the NRC puts more emphasis on *results* than *paperwork*. Both plant operators and the agency have better tools today for identifying what is important to safety. Subjectivity is yielding to objectivity—the most *obvious* form being the performance indicators.

These changes are positive, and they're unsettling at the same time. At its worst, it can seem as if the world has tilted just a bit.

Some of the old assumptions no longer hold true—if they ever did. How many times have you heard someone say to the regulator, "Tell me what I have to do to be in compliance"—or words to that effect? How many times have you heard the regulator say, "You didn't check the right box; I'm concerned about that"?

My point is that the new oversight process demands a more thoughtful way of approaching the way we do things. You may have to learn a new language—the language of probabilistic risk assessment—and what it means for plant operation and regulatory oversight.

In some respects, the new approach places more responsibility on nuclear plant management—where it belongs. With the NRC regulating for *results*, plant management must ensure that its programs *achieve* the necessary results. Modify those programs or practices until they *do* achieve the right results.

If you fail to do so ... the NRC staff *will be more than happy to help you*.

While I'm talking about the oversight process, I want to comment on the performance indicators. As most of you know, the industry has worked closely with the NRC in developing a set of performance indicators. The fact that these indicators are undergoing a great deal of scrutiny *should not come as a surprise* to anyone in this audience.

These indicators will be used *by the public ... by the regulator ...* and *by the men and women who work in our nuclear facilities*.

They will be used in a variety of ways—for example, in evaluating the need for maintenance ... in determining the need for more inspection activity ... and in financial analysis. These indicators are a vital part of the new oversight process, so it's important to weigh carefully the potential consequences that may arise through their use.

Earlier this month, NEI sent a letter to the NRC on this issue. Some experienced nuclear executives are concerned about the possibility of unintended consequences related to the counting of manual scams.

This issue will be the subject of a meeting tomorrow with the NRC. I am confident that it will be resolved shortly.

Lastly, I encourage you to make nuclear energy the benchmark for safety and quality in the energy business. Nuclear energy is a winning technology with tremendous prospects for the future. The U.S. nuclear industry has worked very hard to get performance to its present level ... and we're justifiably proud of our success. Nuclear energy isn't a market leader among U.S. electricity sources—but it's a major player ... and the largest source of emission-free generation.

While I encourage you to feel positive about this industry's future, I also caution you against the three C's that can throw a winner off stride: conceit, conservatism and complacency.

Conceit ... where you think you have all the answers. "Trust us; we know what we're doing." We tried that, years ago, in our public communications—with disastrous results.

Conservatism ... where you always think *inside* the box. Where *new* approaches are just a slight variation on *old* approaches.

And finally, complacency ... where things are going *well*, you get *comfortable* and you think you can give *less than your best*.

Back in the 18th century, an old miser hired artist William Hogarth to paint a representation of the pharaoh's army in the Red Sea. The old man wanted the painting done at a greatly reduced price.

Hogarth painted the entire canvas red—and pronounced the work finished. The old man who was buying the painting was astonished. He asked, "Where are the Israelites?"

Hogarth answered, "They've all crossed over."

"Then where are the Egyptians?" sputtered the man.

"They've all drowned," the artist replied.

Like the miser in this story, if the industry puts less than its best into the new regulatory oversight process, we'll have no masterpiece. Just a canvas slathered with paint.

Possibly even *red paint*—the NRC's color for unacceptable performance.

I haven't seen any sign of complacency in this industry—far from it. I mentioned last year's average capacity factor of 86.8 percent. The latest performance data from the Institute of Nuclear Power Operations *also* show a continued high level of performance.

This industry has shown that it knows how to achieve and maintain high levels of safety, reliability and efficiency. To do this, it takes pride in accomplishment ... constant vigilance ... and a questioning attitude.

Let's set an even *higher* challenge for ourselves: Let's be the industry *others copy*.

Thank you.

B 54

NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs **Telephone: 301/415-8200**
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No. 00-051 March 23, 2000

NRC Renews Licenses for Calvert Cliffs Nuclear Power Plant for an Additional 20 Years

The Nuclear Regulatory Commission has renewed the operating licenses for the two units of the Calvert Cliffs Nuclear Power Plant for an additional 20 years, the first license extensions granted to a commercial nuclear power plant.

The Commission unanimously approved the extension of the licenses following a March 3 briefing by the NRC technical staff.

Baltimore Gas & Electric Co. submitted an application to the NRC in April 1998 to renew the licenses for Calvert Cliffs Units 1 and 2. The Calvert Cliffs Nuclear Power Plant is located in Lusby, Maryland. The current licenses expire on July 31, 2014, for Unit 1 and August 31, 2016, for Unit 2. The NRC conducted an extensive review of the license renewal application in accordance with Parts 51 and 54 of Title 10 of the Code of Federal Regulations.

The NRC's environmental review, under Part 51, is described in a site specific supplement to the NRC's "Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants," (NUREG-1437, Supplement 1). In this Final Environmental Impact Statement issued in October, the staff concluded there were no impacts that would preclude renewal of the licenses for environmental reasons.

In the "Safety Evaluation Report Related to the License Renewal of Calvert Cliffs Nuclear Power Plant, Units 1 and 2," (NUREG-1705) issued in November, the staff concluded that there were no safety concerns that would preclude renewal of the licenses, because the licensee had demonstrated the capability to manage the effects of plant aging.

Three inspections of the plant also were conducted to verify information submitted by the licensee.

On December 10, the NRC's Advisory Committee on Reactor Safeguards -- an independent body of technical experts which advises the Commission -- issued its recommendation that the operating licenses for Calvert Cliffs be renewed. That recommendation is contained in the ACRS "Report on the Safety Aspects of the License Renewal Application for Calvert Cliffs Nuclear Power Plants Units 1 and 2."

Copies of these documents and others relating to the license renewal are available at: http://www.nrc.gov/OPA/reports/renewal.htm on the NRC's web site. A copy of the staff's recommendation on the renewal of the Calvert Cliffs licenses, which contains the license conditions for Calvert Cliffs, is available in the NRC Public Document Room at 2120 L Street, N.W., Washington, D.C. 20555; telephone (202) 634-3273 and has been posted at the same web site.

The NRC is currently reviewing license renewal applications for six other operating nuclear power plants: Oconee 1, 2 and 3, operated by Duke Power Co., 30 miles west of Greenville, South Carolina; Arkansas Nuclear One, Unit 1, operated by Entergy Operations., Inc., near Russelville. Arkansas; and Hatch 1 and 2, operated by the Southern Nuclear Operating Co., near Baxley, Georgia.

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NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

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No. 00-055 March 29, 2000

NRC To Expand Use of Revised Reactor Oversight Process

The Nuclear Regulatory Commission has revised its inspection and assessment programs of commercial nuclear power plants by approving initial implementation of its revised reactor oversight process at all commercial nuclear power plants (with the exception of the D.C. Cook plants, due to their extended shutdown) beginning in April. The NRC expects to make additional refinements to the program during the first year of implementation.

The revised reactor oversight process reflects several important themes for all of NRC's activities - a focus on safety, an effort to improve objectivity, a commitment to stakeholder involvement, and improved transparency of agency activities for both licensees and the general public.

The staff made its recommendation for initial implementation of the expanded program at a March 7 briefing for the Commission that was open to the public. The recommendation was based on the results of a six-month pilot test of the program conducted at 13 nuclear power plants at nine sites from May to November 1999. In the briefing, NRC senior managers said the pilot program demonstrated the fundamental soundness of the revised reactor oversight process. The new program provides an objective, understandable and predictable approach to the oversight of nuclear reactors and uses risk insights to focus NRC and licensee attention on issues most important to safety.

As an adjunct to the pilot effort, the NRC created an independent panel to evaluate the program and consider whether revisions were necessary before it was expanded to include all operating reactors. The panel, which included NRC staff from headquarters and regional offices, together with representatives of the Nuclear Energy Institute, participating nuclear power plant licensees, the Union of Concerned Scientists, and the Illinois Department of Nuclear Safety, used 19 criteria to evaluate the results of the pilot program. During that program, NRC held numerous public meetings and workshops around the country to solicit comments from the public as well as industry, state and local government representatives, incorporating suggestions as appropriate.

The Commission has also approved a staff recommendation that the Systematic Assessment of License Performance (SALP) process, which was suspended in late 1998, be officially terminated. The SALP reports, which were issued every 12 to 24 months, will be replaced by a continual assessment process, to be summarized by an annual end-of-cycle assessment letter to the licensee. In the future, NRC will post quarterly updates of plant performance information and semi-annual updates to each plant's inspection plans at http://www.nrc.gov/NRR/OVERSIGHT/ASSESS/index.html on its web site. Additional details on the results of the pilot program are available on NRC's web site at: http://www.nrc.gov/NRC/COMMISSION/activities.html in SECY paper 00-0049. A description of the revised reactor oversight process is available at http://www.nrc.gov/OPA/primer.htm .

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56

NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs Telephone: 301/415-8200

Washington, DC 20555-001 E-mail: opa@nrc.gov

Web Site: http://www.nrc.gov/OPA

No. 00-047 March 17, 2000

Relocation of NRC Technical Training Center Deferred

The Nuclear Regulatory Commission is deferring its recent decision to relocate its Technical Training Center from Chattanooga, Tennessee, to a location in close proximity to the NRC headquarters in Rockville, Maryland, pending completion of a General Accounting Office (GAO) study on the merits of the move.

The Commission had decided to relocate the facility in order to improve the agency's training program. The move would enable experts at headquarters to work more closely with trainers to ensure that the NRC training program meets the demands of the NRC's new regulatory reform efforts.

However, in light of Congressional concerns, the Commission has decided to delay implementation until the GAO has had an opportunity to conduct an independent study. The Commission has directed the NRC staff to take no further action to implement the relocation of the Chattanooga facility until the GAO has issued its report and the Commission has had an opportunity to review any GAO recommendations.

Under the plan approved by the Commission on February 24, the Technical Training Center would have remained in Chattanooga until at least March 2003, although a portion of the Center's 26 staff members would have been relocated in Maryland by September 2001.

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ADVANCE REGISTRATION FORM
2000 ANS Annual Meeting
June 4-8, 2000 • Town & Country Hotel & Convention Center • San Diego, CA

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	Preregistration fees paid by **May 12**		Registration fees paid after **May 12**	
	MEMBER	**NON-MEMBER***	**MEMBER**	**NON MEMBER***
Full ANS Meeting & Embedded Topical Meetings *Includes one ticket to President's Reception*	**[01] ❒ $470**	**[02] ❒ $620**	**[09] ❒ $545**	**[10] ❒ $695**
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SPECIAL EVENTS AND TOURS

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Monday, June 5, 2000		
Balboa Park-"Smithsonian of the West"	[22] # of tickets____	@ $36 each = $______
Operations and Power Division Lunch	[23] # of tickets____	@ $30 each = $______
Fuel Cycle Waste Management & DD&R Divisions Lunch	[24] # of tickets____	@ $30 each = $______
Casa Guadalajara - "Fiesta Grande" Dinner	[25] # of tickets____	@ $30 each = $______
(Children under 12, no charge)	[26] # of tickets____	@ N/C
Tuesday, June 6, 2000		
Old Town Trolley Historical Tour	[27] # of tickets____	@ $33 each = $______
Honors and Awards Luncheon	[28] # of tickets____	@ $30 each = $______
Multi-Division Mixer	[29] # of tickets____	@ $40 each = $______
From Electrons to Neutrons *(limited to first 30)**	[30] # of tickets____	@ $20 each = $______
Wednesday, June 7, 2000		
Temecula Winery Tour and Lunch	[31] # of tickets____	@ $40 each = $______
NISD Luncheon	[32] # of tickets____	@ $30 each = $______
Harbor Dinner Cruise	[33] # of tickets____	@ $40 each = $______
San Onofre Technical Tour*	[34] # of tickets____	@ $32 each = $______
Thursday, June 8, 2000		
Leading Edge Science on Torrey Pines Mesa*	[35] # of tickets____	@ $15 each = $______

(*All participants for tours 30, 34 and 35 must complete the Technical Tour Form on the following page and submit it no later than Friday, May 19, 2000, to assure proper time for clearance.)

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Registration for **ANS Professional Development Workshops** is separate from, and in addition to, the **2000 Annual Meeting**. If attending both a **Workshop and the Annual Meeting**, you must register and pay for them both. Registration for the Workshops includes copies of available papers and materials. **Please register early, space is limited!**

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ANS Nat'l Member [50] ☐ @ $350 Non-Member [51] ☐ @ $450 $______

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ANS Nat'l Member [54] ☐ @ $350 Non-Member [55] ☐ @ $450 $______

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TOTAL OF ALL FUNCTIONS AND EVENTS

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59

TECHNICAL TOUR FORM

Please check tour(s) you will be taking:

- ☐ **#30 From Electrons to Neutrons—Tuesday, June 6, 2000**
- ☐ **#34 San Onofre Technical Tour—Wednesday, June 7, 2000**
- ☐ **#35 Leading Edge Sciences on Torrey Pines Mesa—Thursday, June 8, 2000**

PLEASE PRINT – COMPLETE FOR ALL TOURS:

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60

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PREFERRED ACCOMMODATIONS:

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TECHNICAL SESSIONS BY SUBJECT

Plenary Session

*ANS Plenary: Nuclear Science and Technology: Beginning a New Era

Special Sessions

*Bridging Radiation Science and Policy–Panel

*Food Irradiation: Is It Finally Here?–Panel

*International Atomic Energy Agency—I–Panel

*International Atomic Energy Agency—II–Panel

*International Atomic Energy Agency—III–Panel

*Exchange of Information Among Nuclear Societies

Accelerator Applications (AAD)

Accelerator Applications: Systems and Physics Modeling

Accelerator Applications: Medical

Accelerator Applications: Liquid-Metal Targets

Biology and Medicine (BMD)

(*Nuclear Analytical Techniques)

(*Applications of ^{252}Cf—I)

(*Applications of ^{252}Cf—II)

(*Applications of ^{252}Cf—III–Panel)

(*Applications of ^{252}Cf—IV)

(*Relicensing of Research Reactors)

(*Medical Applications of Isotopes and Radiation)

(Asterisks indicate special sessions.)

(Sessions in parentheses indicate cosponsorship.)

Decommissioning, Decontamination, and Reutilization (DDRD)

*Decommissioning Hot Topics and Emerging Issues–Panel

*Free Release Standards Governing the Release of Solid Materials

*Clearance of Solid Materials–Panel

*Cost Performance of Both Commercial and U.S. Department of Energy Facilities in Decommissioning

*Increased Awareness and Activities Impacting Industrial and Environmental Safety

*Update of Decommissioning and Decontamination Standards–Panel

*Regulatory Reform and License Termination Planning for Decommissioning of Commercial Nuclear Plants

Education and Training (ETD)

(Student Research in Nuclear Criticality Safety)

Fuel Cycle and Waste Management (FCWMD)

Innovative Fuel Utilization and Waste Management Concepts

(*Numerical Simulations in Nondestructive Waste Characterization and Imaging)

*U.S. Department of Energy Experimental Melter Technology Developments

Waste Handling and Packaging

Fusion Energy (FED)

Recent Technical Advances in the U.S. Fusion Program

Human Factors (HFD)

Man-Machine Interfaces and Artificial Intelligence Applications for Reactor Monitoring and Control

Human Factors Impact on Design–Tutorial

Isotopes and Radiation (IRD)

*Nuclear Analytical Techniques

*Applications of ^{252}Cf—I

*Applications of ^{252}Cf—II

*Applications of ^{252}Cf—III–Panel

*Applications of ^{252}Cf—IV

(*Advances in Reactor Fluence and Dose Evaluations)

*Relicensing of Research Reactors

(Transport Methods: General)

*Medical Applications of Isotopes and Radiation

Mathematics and Computation (MCD)

(Advances in In-Core Fuel Management)

*Numerical Simulations in Nondestructive Waste Characterization and Imaging

*Current Issues in Computational Methods–Round Table

Computational Methods: General

Transport Methods: General

Nuclear Criticality Safety (NCSD)

The Tangled World Wide Web of Criticality Safety–Poster

Data and Analysis for Nuclear Criticality Safety—I

Data and Analysis for Nuclear Criticality Safety—II

Student Research in Nuclear Criticality Safety

Application of Fixed Absorbers as Engineered Safety Features

Operations and Power (OPD)

*License Renewal: Lessons Learned—Status Update–Panel

(Man-Machine Interfaces and Artificial Intelligence Applications for Reactor Monitoring and Control)

*Making Plant Changes: Status of 10 CFR 50.59 and NEI 96-07, Rev. 1–Panel

*Technical Support for Operations and Maintenance–Panel

*Overview of Space Nuclear Technology—I: Concepts and Experience

Operations and Power (OPD) *(cont'd)*

*Overview of Space Nuclear Technology—II: Human Factors

*Overview of Space Nuclear Technology—III: Review of Challenges and Opportunities–Panel

*The Economics of Nuclear Power in a Deregulated Environment—I–Panel

*The Economics of Nuclear Power in a Deregulated Environment—II–Panel

*Enhancing Public Confidence in the U.S. Nuclear Regulatory Commission–Panel

(*Relicensing of Research Reactors)

*Have We Turned the Corner? Nuclear Energy and the Environmental Perspective–Panel

Performance Monitoring and Trending in Support of the Maintenance Rule Activities

Radiation Protection and Shielding (RPSD)

(*Numerical Simulations in Nondestructive Waste Characterization and Imaging)

(*Advances in Reactor Fluence and Dose Evaluations)

(*Current Issues in Computational Methods–Round Table)

(Transport Methods: General)

Reactor Physics (RPD)

Advances in In-Core Fuel Management

(*Numerical Simulations in Nondestructive Waste Characterization and Imaging)

*Advances in Reactor Fluence and Dose Evaluations

*Reactor Physics Issues of Innovative Plutonium Cycles in Thermal Reactors

Reactor Physics: General

(Transport Methods: General)

Thermal Hydraulics (THD)

Thermal Hydraulics: General—I

Thermal Hydraulics: General—II

All Members
MTM

THE *NUCLEAR NEWS* INTERVIEW

Apostolakis: On PRA

The chairman of the ACRS's PRA subcommittee offers a clear explanation of the specialized methodology that can help ensure plant safety.

Probabilistic Risk Assessment (PRA) is the systematic process that can be used to examine how nuclear power plant employees and engineered systems work together to ensure plant safety. PRA is quantitative, in that probabilities of events with potential public health consequences are calculated, as are the magnitudes of these potential health consequences. The risk of such events is the product of the event probabilities and their consequences. As practiced in the field of nuclear power, PRA generally focuses on accidents that can severely damage the plant's reactor core and can also challenge the surrounding containment structures, since these pose the greatest potential risk to the public.

PRA integrates into a uniform assessment tool the relevant information about plant design, operational practices, operating history, component reliability, human performance, the physical progression of core-damage accidents, and the potential environmental and health consequences in as realistic a manner as practical.

Apostolakis: Use of PRA "raises the safety culture of the plant . . ."

George Apostolakis is an expert in PRA and a professor of nuclear engineering at the Massachusetts Institute of Technology. He is vice chairman of the Nuclear Regulatory Commission's Advisory Committee on Reactor Safeguards and chairman of its PRA and Human Factors subcommittees. He received the 1999 Tommy Thompson Award from the American Nuclear Society's Nuclear Installations Safety Division.

Apostolakis talked with Rick Michal, *NN* senior associate editor, about how the use of PRA has evolved in the nuclear industry and how it is changing the way the industry is regulated.

What is PRA?

Probabilistic Risk Assessment, PRA, is an integrated safety analysis methodology that can be summarized by the following four steps:

First, a number of undesirable events must be defined. Some examples of such events are core damage, the release of radioactivity from the containment, and public consequences [fatalities].

Second, for each of these events, the methodology systematically identifies the accident sequences, also called scenarios, that can lead up to it. This is done using logic diagrams, especially for core damage events, that take into account the failure of various emergency safety systems that have been designed for the plant. Phenomenological models are also used as needed, especially for containment phenomena. These scenarios include events such as equipment failures, human errors during tests and maintenance, human recovery actions, loss of coolant accidents [LOCAs], transients, and various external events such as earthquakes and fires. Precisely because these diverse events are included in the accident scenarios, this methodology is called an integrated approach to reactor safety.

Third, the probability of occurrence of each scenario is calculated; thus probability theory is needed. Statistical evidence that is available regarding failures must be taken into account. Also, expert judgments must be used, because many times these events are very rare and have never been seen before.

The fourth and final step, after the probabilities have been identified, is to rank the accident sequences according to their probability of occurrence. This is done because risk must be managed; knowing the major contributors to each undesirable event that was defined in the first step is a major element of

64

risk management. Also ranked are the SSCs—systems, structures, and components—according to their contribution to the undesirable event.

The ultimate result of the PRA is the probability of each undesirable event and a list of the major contributors to its occurrence.

Is PRA the proper terminology, or should it be PSA, for Probabilistic Safety Assessment?

It depends on the undesirable event. If risk is analyzed—in other words, the undesirable events are latent fatalities or acute fatalities—then I think the proper name is PRA.

On the other hand, if only core damage events or containment failures are analyzed, then PSA is more appropriate.

PRA is primarily used in the United States. In other countries most people use PSA, although now the terms are being used interchangeably.

What is the history of PRA and nuclear power? Have there been successive generations of PRA and has its use in U.S. nuclear power increased over time?

These are interesting questions, because the history of PRA is tied to the history of reactor safety. During the early days of nuclear power development, the 1950s and '60s, people who were designing these facilities and were concerned about licensing them realized that the consequences of a nuclear accident could be catastrophic. Therefore, it was important to keep the probability of these accidents very low. But even though people wanted these probabilities to be very low, they did not have the means for quantifying them. Over the years, a design philosophy evolved that had as cornerstones the concepts of defense in depth and safety margins.

"... [T]he history of PRA is tied to the history of reactor safety."

Defense in depth is usually understood to mean the existence of multiple barriers to prevent the release of radioactivity. Examples of barriers are fuel cladding, primary system pressure boundaries, and the containment structure. Some people expand this definition to mean essentially any measure that enhances our confidence that the probability of accidents is kept low. This would include emergency planning, for example. At the same time, the concept of single failure criterion was developed and a distinction was made between credible and incredible accidents. The focus was on credible accidents. A major focus was protection against large LOCAs. All of this was the deterministic approach to reactor safety.

The first call for a "new approach" to reactor safety was by Reg Farmer, of the U.K. Atomic Energy Authority, in Vienna in 1967. Farmer argued that it was not logical to distinguish between credible and incredible accidents, but that the whole spectrum of accidents should be studied. He used as a measure of risk the release of iodine-131. He proposed to look at sequences of events—the accident scenarios that I mentioned earlier—that lead to release of various amounts of iodine. He also proposed acceptance criteria. Essentially, he formulated the basic idea of PRA.

The first real PRA—the way it is understood now—was published in the United States in 1974 in draft form, and in final form in 1975. It is known as the Reactor Safety Study [WASH-1400], or the Rasmussen report, because Norm Rasmussen, who was a professor at MIT, was the director of that study. The findings of the study created a new thinking about reactor safety. The main concern until that time had been to protect against large LOCAs. The Reactor Safety Study identified as dominant contributors to core damage small LOCAs and transients. The probability of core damage had not been quantified until that time. The Reactor Safety Study came up with numbers for that probability—the best estimate was about five core damage events every 100 000 reactor years—that surprised some people, because they had thought that it was much smaller than this value. The study did an uncertainty analysis and concluded, with very high confidence, that the core damage probability was smaller than three events per 10 000 reactor years, an unexpectedly large number indeed.

"When the Three Mile Island accident occurred in 1979 ... there was renewed interest in PRA methodology."

At the same time, the study showed that the consequences of core damage events were not as significant as previously thought. It also pointed out that operator actions and the support systems, such as the component cooling water system, were very important.

One other important observation is that the Reactor Safety Study identified an important sequence that had been missed until that time. This was the V sequence, which is the failure of two check valves in the PWR emergency core cooling system pressure isolation boundary. This finding demonstrated the value of the integrated approach that I described earlier.

The Reactor Safety Study has an interesting history. It is probably the most reviewed and criticized major study in the history of nuclear power. The focal point of the critics was the executive summary. That summary showed figures that compared the frequencies of certain societal impacts—deaths, for example—from nuclear accidents to those from other man-made phenomena such as airplane crashes. The problem was that the frequency of airplane crashes that killed a certain number of people was known with relatively high precision because it was based on statistics. The frequency of reactor accidents is based primarily on models, judgment, and analysis, and therefore, it is not known as precisely as the other frequency. The critics felt that such comparisons of the frequencies were inappropriate, because the uncertainty about the frequency of nuclear accidents was very large and was not displayed. There was a controversy regarding this point, which unfortunately led the Nuclear Regulatory Commission to decide not to use the Reactor Safety Study in its work. As a result, the study fell victim to the inadequacies of the executive summary.

When the Three Mile Island accident occurred in 1979, people realized that the small LOCA that occurred there was in fact in the Reactor Safety Study. The precise sequence of events that led to the small LOCA was not in the study, of course, but small LOCAs were analyzed in the study. So there was renewed interest in PRA methodology.

The next milestone was the release in 1981 of the PRAs for Zion and Indian Point-2 and -3. The nuclear industry sponsored these PRAs and was aware of the criticisms of the Reactor Safety Study. Extra attention was given to the handling and display of uncertainties in these PRAs. An important result of these studies for Zion and Indian Point was the finding that external events—earthquakes and fires—were significant contributors to risk for these facilities. These events had been dismissed by the Reactor Safety Study. Another major result revealed in these studies was that the containment did not always fail following a severe core damage event.

The next major milestone is the NUREG-1150 study by the NRC that was issued in 1989. This one looked at five plants, and the focus was on severe accidents and containment performance. A general finding of the study was that risks were lower than calculated in the Reactor Safety Study. This was attributed to a better understanding of accidents and better models, because this study was released about 15 years after the Reactor Safety Study.

The NUREG-1150 study used expert judgment to estimate various parameters of phenomena that are expected to occur in the containment after a core damage event. This turned out to be controversial, because objections were raised over the fact that experiments and data were being replaced by expert judgments. But this was not true. The whole idea was to develop a snapshot in time of the risks. There simply was not the time nor the resources to run all the experiments that would be needed to get this harder information.

The NRC issued a generic letter [GL 88-20] in 1988 requesting that each licensee in the United States use PRA-like methodologies to perform a plant-specific search for vulnerabilities that might lead to severe accidents. These studies are known as the Individual Plant Examinations, IPEs. The NRC completed its review of the program a few years ago. This program was successful in the sense that both the NRC staff and nuclear power plant personnel familiarized themselves with the methodology of PRA.

Then a major milestone occurred in 1995, when the NRC reversed itself and issued the PRA policy statement that directed the NRC staff to use PRA in all regulatory matters to the extent supported by the state of the art. However, the Commissioners included an important statement, which was that PRA's use should be in a manner that complemented the defense-in-depth philosophy. This is important because it shows how cautious the NRC was regarding the use of PRA. Defense in depth, the traditional cornerstone of reactor safety, was placed at a higher level than PRA. The Commissioners also encouraged the NRC staff to use PRA to reduce unnecessary conservatism associated with current regulatory requirements.

Following this, a couple of years ago, the NRC issued a number of risk-informed regulatory guides. Regulatory Guide 1.174, issued in July 1998, is a major milestone because it states how PRA can be used formally when a licensee requests a change in the licensing basis. It lists a number of principles and expectations, and goes into detail as to how to do that. In my view, it is one of the major milestones.

Has PRA's specialized nature retarded its acceptance in additional applications in the nuclear industry?

Yes, I think that is true. It goes back to the strength of the PRA. I said earlier that PRA is an integrated approach to reactor safety and I mentioned that in the accident sequences such things as LOCAs and human errors have to be included. Each one of these requires special expertise. The analysis team must include experts in human performance assessment, experts in how equipment works, and so on. This appears overwhelming to some people, and I think it has contributed to the slow spread of the methodology.

I think it is unrealistic to expect the user of PRA—or even the PRA specialist—to be an expert in all of these diverse disciplines. The users—and I think we're going to have many more users than PRA specialists—have to be aware of the major assumptions behind the PRA models, so that potentially erroneous conclusions will be avoided. That is easier said than done. How it is to be accomplished is something that the industry is learning now how to do.

There is another reason why I think PRA has not been as popular as it should be, and that is that over the years, since the days of the Reactor Safety Study, the NRC has been eager to take negative results of PRA—such as accident sequences that had not been identified before—and issue new relevant regulations.

On the other hand, PRA results were never used to relax some of the NRC's existing regulations. So the industry saw PRA as perhaps only an excuse for imposing new regulations. This of course dampened the enthusiasm the industry had for it. But with the new risk-informed regulatory guides that were issued by the NRC a couple of years ago, I am confident that the use of PRA will be much wider in the near future.

How does the use of PRA in U.S. nuclear power compare with similar use in Europe and Asia?

It varies a lot from country to country, especially in its scope. In some countries, there are complete full-scope PRAs that calculate public risk. In others, there are more limited PRAs that stop at the release of radioactivity or core damage. Where the United States really differs is in spending a lot of effort now to risk-inform the regulations. This is something that is being pioneered here. I think the rest of the world is looking to the NRC and the American industry to see how this revolution will materialize.

What are the strengths of PRA in the United States?

Continued

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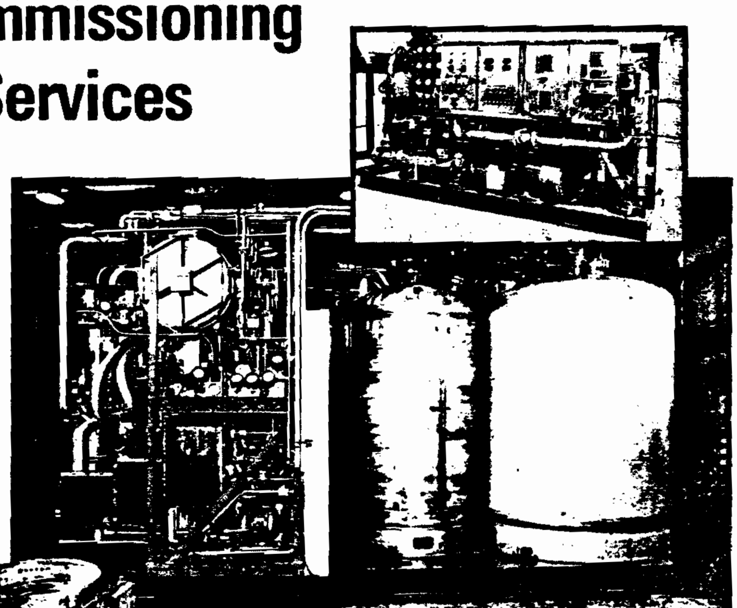

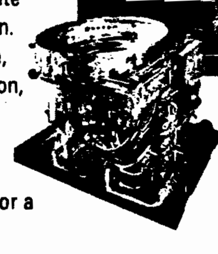

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66

I believe the most important strength is the ranking of accident sequences and the ranking of the SSCs, because these rankings are essential to rational risk management and the wise allocation of resources. These results come from analyses that include everything that could be thought of that can go wrong at the facility.

This integrated approach is the new thing that PRA is introducing. Defense in depth was applied earlier to individual issues, individual systems of the plant, as well as the whole plant, without the benefit of the integrated approach of PRA and its ranking of accident sequences and SSCs. The result was that unnecessary regulatory burden was created in some instances, such as in quality assurance requirements, and at the same time some important accident sequences were overlooked, such as the V sequence that I mentioned earlier.

Another very important strength of PRA is its value as a communication tool. The analysts and users can use PRA diagrams that depict the accident sequences to any desired level of detail to communicate to others their work. I have found this to be very useful. A reviewer can now express his or her disagreement in specific technical terms and the ensuing debate is a very healthy step toward consensus.

What about weaknesses that exist in PRA, and how could they be eliminated?

I think that it's clear by now that PRA is very ambitious. It looks at the plant as an integrated system, and because of this ambitious approach there are several areas where improvements are still needed. There are issues of scope; for example, low-power and shutdown modes of operation must be understood better than they are today. There also are modeling needs, such as human reliability assessment. Perhaps there needs to be a better job done in assessing the risk from fires and so on.

Could you give examples of how PRA has made contributions in such areas as on-line maintenance and improving NRC regulations?

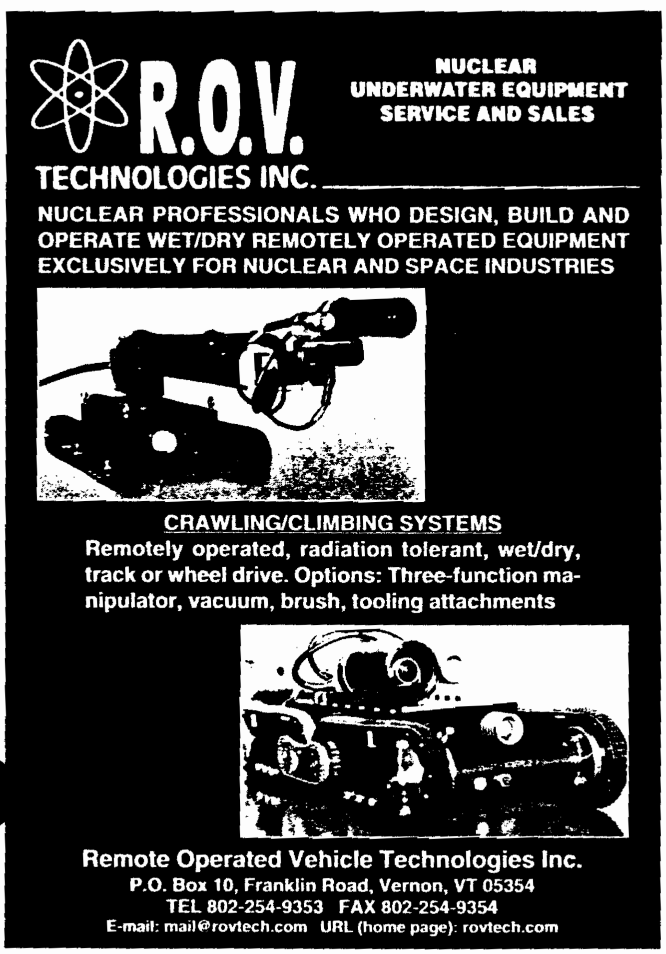
I think the main use for PRA has been in evaluating very quickly the core damage frequency for different configurations. For plants that do on-line maintenance, what needs to be understood is the impact on safety of the maintenance tasks that are being performed on line. So PRA provides the tool to determine quickly what could be taken out of service and for how long. It essentially helps control the plant configurations, typically by looking at the changes in the core damage frequency that result from taking certain equipment out of service.

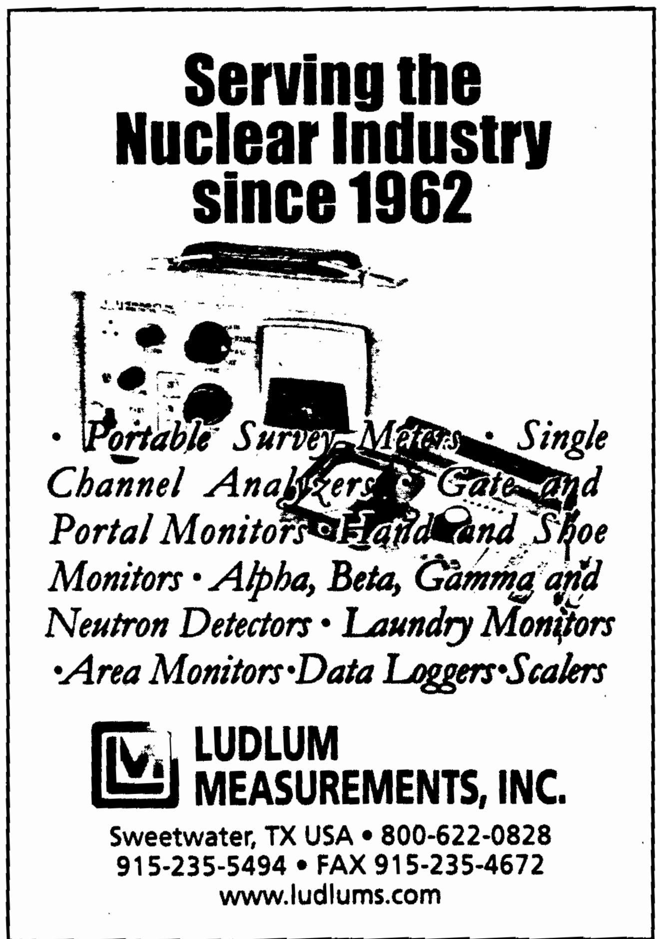
The same thing applies to the NRC Maintenance Rule that was implemented in 1996. The Maintenance Rule requires that the SSCs important to safety be maintained so that they will perform their safety functions when required. PRA, using the ranking methods that I mentioned earlier, reveals which SSCs are risk-significant. It helps to set the performance criteria for these SSCs, such as maximum unavailabilities. It helps to assess the impact of the removal of SSCs from service.

PRA is also used to manage outages. This is an interesting area, because there is still work to be done for low-power and shutdown modes. But there is also work that has already been done. What the utilities are using now to manage outages is a combination of defense-in-depth measures and risk insights from the PRAs that have been done for shutdown modes.

PRA has also been used in training. The idea here is to improve human performance. The operators, by studying the PRA, learn what the dominant accident sequences are, which accident sequences involve critical operator actions, and why. These can then be discussed in groups. So the level of understanding increases. Also, PRA can help select important scenarios to run on simulators.

Regarding risk-informed regulatory applications, the major regulatory guides that were issued a couple of years ago deal with such areas as risk-informed in-service inspection, risk-informed graded quality assurance, risk-informed technical specifications, and risk-informed in-service testing. Some utilities are using these regulatory guides already. One utility has indicated that if it implemented only the graded quality assurance guidance, its savings would be up to \$2 million a year, because it now spends a lot of money on quality assurance requirements for SSCs that are insignificant from the risk point of view.





67

Another major current activity is the NRC's revision of the reactor oversight process, which is becoming risk informed in a number of ways. This is still in the pilot stage, but it represents a major change in the NRC inspection and enforcement process.

Could you discuss PRA standards?

One of the conclusions of the review of the Individual Plant Examinations was that there was large variability in the results from unit to unit. Part of this can be explained as being due to design differences, but another part is due to different models and methods that the individual utilities used. Given this state of affairs, there is a real issue here. For example, if a utility comes before the NRC using the risk-informed approach to request something, how does the NRC decide that this is a good analysis? So, standards are very desirable. The problem with standards is that in some areas where more development is needed, perhaps progress will be inhibited, because once something is published, people think that it is good enough.

The American Society of Mechanical Engineers is working on a PRA standard for internal events, and the American Nuclear Society is developing another standard for external events—earthquakes, fires, tornadoes—and also for low-power and shutdown modes.

I think it's a good idea to have a standard, especially if the standard specifies minimum requirements for a good PRA. For example, there can be a list of various kinds of LOCAs and transients that must be included in the PRA. Common cause failures must be analyzed. But I'm not sure that a standard should actually specify what is a good PRA, because what is good or adequate depends on the application.

"One utility has indicated that if it implemented only the graded quality assurance guidance, its savings would be up to $2 million a year. . . ."

How has PRA been used in other industries?

There are several applications of PRA in other industries. The chemical industry is calling it QRA, Quantitative Risk Assessment, rather than PRA. The Center for Chemical Process Safety has been issuing a series of books that provide guidance on how to do it, and an experienced nuclear PRA practitioner can open these books and recognize that the methods there are very similar to the ones that the nuclear industry is using.

In the aerospace industry, PRA has been applied to the space shuttle and to the Cassini mission RTGs [radioisotope thermoelectric generators].

An interesting application of PRA was sponsored by the U.S. Army. The Army, as part of its chemical stockpile disposal program, has built a facility in Utah, which is called the Tooele chemical agent disposal facility. It is an incinerator that disposes of extremely hazardous chemical agents and munitions. The Army commissioned a complete PRA that estimates public and worker health consequences from the incineration process. They also estimated the risk from continuing storage of the chemical munitions. Thus, the Army had all the information that was needed to make a decision as to whether to go ahead and incinerate these chemical munitions or just keep them in storage. This was really an impressive piece of work, and it was requested by the National Academy of Sciences, which oversees the activities of the Army in this respect.

Also, PRAs have been used to analyze the hazards from offshore structures such as oil rigs. They are not exactly like the complete methodology that we call PRA for reactors, but the ideas are there and a lot of the tools like fault trees and event trees are used.

How could the use of information technology improve the use of PRA?

I think it's already improving it and has had a strong impact. The main impact is that there is now the ability to calculate very quickly the core damage frequency or the frequency of large releases for different configurations and under various assumptions. Sensitivity studies can be done very quickly. In applications such as on-line maintenance or the Maintenance Rule, that capability is needed to produce results for different configurations very quickly, as I said before. This has been a major change. I remember 15 to 20 years ago when a change in something in the PRA meant perhaps days of calculations to get the final result. Now it can be done in a minute or two.

Utilities are also installing safety monitors. This means that television monitors are installed in various rooms of the facility that show the current core damage frequency given the reactor's configuration. Southern California Edison's safety monitor, for example, solves a complete PRA in less than one minute at its San Onofre Nuclear Generating Station. This is remarkable. An interesting observation here, something that was unexpected: By placing all these television monitors in all these rooms, now the people who work at the plant—not just the operators and the PRA analysts but the general personnel there—can look up and see what the current value of the core damage frequency is. Sometimes they know that if they complete the task they are performing at that time, the core damage frequency will decrease. So it raises the safety culture of the plant, which is an important if unexpected result. NN

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68

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS BRIEFING

ON

Draft Final Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants

Glenn B. Kelly
Probabilistic Safety Assessment Branch
Office of Nuclear Reactor Regulation

April 5, 2000

TECHNICAL CONTRIBUTORS

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TECHNICAL CONTRIBUTORS
(Cont.)

Heavy Loads:	Edward Throm
Safeguards:	Robert Skelton
EP:	James O'Brien

BACKGROUND AND STATUS

- June 1999 preliminary draft report concluded that:

  - Zirconium fires can occur for several years after shutdown

  - The offsite consequences are very high

  - Frequency about 2E-5 per year. Dominated by human error

- **Extensive scrutiny by industry and other stakeholders; NRC sponsored technical review of preliminary draft**

- **Industry committed to design and operational actions, and proposed a seismic checklist**

- **Risk has been requantified and draft report prepared**

- **Draft-for-comment issued 2/15/00**

TECHNICAL RESULTS

- In current draft report, risk is reduced significantly due primarily to industry commitments

  - Human-error driven sequences reduced to about 2E-7 per year

  - Heavy load sequences reduced to about 2E-7 per year

TECHNICAL RESULTS
(Cont.)

- Seismic failure frequency bounded by 3E-6 per year, but not fully quantified due to seismic checklist approach

- Overall risk estimate reduced by about an order of magnitude

• Criticality issue and most stakeholder comments addressed

TECHNICAL RESULTS
(Cont.)

- NRC analysis to date shows that zirconium fires will generally not be possible after 5 years. Acceptance of shorter times would require plant-specific analysis

COMPARISON WITH OTHER RISK MEASURES AND RESULTS

• **Decommissioning reactor large release frequency:**	**<3E-6**
• **RG 1.174 large <u>early</u> release (LERF) baseline guideline (below which only a small increase in risk will be allowed):**	**1E-5**
• **Range of IPE LERF estimates:**	**2E-6 to 2E-5**
• **Pool Performance Guideline:**	**1E-5**

THREE PHASES OF A SPENT FUEL POOL

- **IMMEDIATELY AFTER PLANT SHUT DOWN:**

  Large early offsite release due to zirconium fire possible.

  Design basis systems and operating practices retained. Full requirements for EP, indemnification, and security in place

- **EARLY DECOMMISSIONING PHASE**

  Large late releases possible. Relaxation of EP requirements justified technically.

  Meeting industry commitments, seismic checklist, and staff assumptions required.

Frequency of large releases within RG 1.174 guidance that allows for small increases in risk. NRC might consider insurance relief.

Staff analyzed pools with one year of cool down, but shorter times might be justified.

- ZIRCONIUM FIRES NO LONGER POSSIBLE:

Report justifies 5 years. Shorter times might be justified plant-specifically

There may be technical justification for elimination of Offsite EP and insurance requirements in this phase

RISK INFORMED-DECISION MAKING

- **Baseline risk and changes to risk**

  The results of the risk assessment show that the estimated risk from operating decommissioning spent fuel pools is within the PPG guidelines that are based on RG 1.174.

- **Margin**

  Thermal inertia of fuel and SFP volume give significant time for heat up to a zirconium fire.

- **Defense in Depth (DID)**

  Given the margin in SFPs, DID is not a major issue. However, given risk analysis findings including uncertainties, the technical results provide justification for retaining a baseline level of EP, including procedure to classify accidents and notify offsite authorities.

  In the late decommissioning phase, there is no technical basis for retaining EP.

- **Monitoring performance**

  Licensees should monitor characteristics important to controlling risk, including industry commitments, staff assumptions, and seismic checklist.

IMPACT ON RULE MAKING

- Slow evolution of release justifies reduction in EP requirements. Risk insights and defense-in-depth considerations indicate need for retaining a baseline EP capability.

- Risk analysis does not justify reduction in security function. Reduction of requirements might be justified on the basis of reduced complexity

- Current report does not take a position on indemnification. The frequency of zirconium fire is not "incredible," but may be low enough for the commission to conclude that licensees could be relieved from insurance requirements. However, some operating plants have comparably low frequencies of large releases.

- **Rule making should include requirement to monitor performance in areas important to risk.**

- **In the late decommissioning phase, there is no technical basis for retaining EP. The draft report did not directly address indemnification issues.**

Consequence Evaluation for Spent Fuel Pool Accidents

Presentation to the Advisory Committee on Reactor Safeguards

Jason Schaperow
Safety Margins and Systems Analysis Branch
Division of Systems Analysis and Regulatory Effectiveness
Office of Nuclear Regulatory Research

April 5, 2000

(3)

Consequence Assessment

Object of the analysis

Assess effect of 1 year of decay on offsite consequences
Assess effect of early vs. late evacuation

Summary of approach

Use the MACCS code with fission product inventories for 30 days and 1 year after final shutdown

Conclusion

Short-term consequences (early fatalities) reduced by a factor of 2 from 30 days to 1 year. Early evacuation reduces early fatalities by up to a factor of 100.

Long-term consequences (cancer fatalities and societal dose) less affected by additional decay and early evacuation

Results

Mean Consequences for Surry Population Density				
Decay Time Prior to Accident	Distance (miles)	Early Fatalities	Societal Dose (person-rem)	Cancer Fatalities
30 days	0-100	1.75	4.77×10^6	2,460
1 year	0-100	1.01	4.54×10^6	2,320
1 year[1]	0-100	.0048	4.18×10^6	1,990

[1]Based on evacuation before release.

Effect of Ruthenium

Small-scale Canadian tests with an air environment show significant ruthenium release following cladding oxidation.

MACCS calculations show that release of all ruthenium increases early fatalities by up to a factor of 100, because the assumed form (oxide) has a large dose per Ci inhaled due to its long clearance time from the lung.

Mitigating factors for ruthenium releases in spent fuel pool accidents

> **rubbling of the fuel may limit air ingression**
>
> **1 year half-life of ruthenium**

PHEBUS test planned to examine effect of air ingression on a larger scale in an integral facility

Results

Mean Consequences for Surry Population Density				
Decay Time Prior to Accident	Distance (miles)	Early Fatalities	Societal Dose (person-rem)	Cancer Fatalities
1 year	0-100	1.01	4.54×10^6	2,320
1 year (100% ruthenium release)	0-100	95.3	9.53×10^6	9,150
1 year (100% ruthenium release)[1]	0-100	.13	6.75×10^6	6,300

[1]Based on evacuation before release.

Conclusion: Effect of ruthenium release can be very significant, but can be offset by early evacuation.

3a

Comments from NEI on spent fuel pool accident risk for decommissioning briefing held on 4-5-00

From: "NELSON, Alan" <apn@nei.org>
To: "'mme@nrc.gov'" <mme@nrc.gov>
Date: Wed, Apr 5, 2000 4:29 PM
Subject: Revision 2 to the detailed Seismic Technical Comments

Based on the discussions presented this morning by the NRC staff on the "Draft Final Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants,"
NEI would like to submit the attached comments referring to Appendix 2.b. "Structural Integrity Seismic Loads." We would like to have our comments considered as the ACRS reviews the merits of the draft technical study.

Thank you
Alan Nelson

CC: "HENDRICKS, Lynnette" <lxh@nei.org>

Comments on Appendix 2.b.
"Structural Integrity Seismic Loads"

Summary of NRC Draft

To increase the efficiency and effectiveness of decommissioning regulations, the NRC staff has engaged in rulemaking activities that would reduce the need to routinely process exemptions once a plant is permanently shut down. Reference 1 provides the technical basis for determining the regulatory requirements for decommissioning plants using risk-informed decision making. Table 3.1 (Reference 1) provides a summary of the annual frequency of fuel uncovery associated with internal and external initiating events. Based on Table 3.1 it is estimated that the frequency of a zirconium fire is less than 3 x 10^{-6}, with the dominant contribution coming from seismic events. The seismic contribution is estimated to be less than 3 x 10^{-6}, while the contribution from all other initiating events is estimated to be 4 x 10^{-7}. As described by the staff, other considerations indicate that the seismic contribution may be considerably lower. Assumption of the generic frequency of events leading to a zirconium fire at decommissioning plants to be less than 3 x 10^{-6} per year is based on a plant satisfying the design and operational characteristics assumed in the risk assessment performed by the staff.

Comments on Appendix 2b Structural Integrity of Spent Fuel Pools Subject to Seismic Loads (Reference 1)

1. Introduction

No significant comments on this section other than to concur that spent fuel pools (SFPs) at operating nuclear power plants and at decommissioning NPPs are inherently rugged in terms of being able to withstand loads substantially beyond those for which they were designed. Consequently, SFPs have significant seismic capacity.

2. Seismic Checklist

It is not clearly noted in this section, but the important point is that successful application of the revised seismic checklist provides a high degree of assurance that the SFP HCLPF is 0.5g or greater. The comments on the conservatisms (in paragraph 2) associated with the design basis earthquake at licensed NPPs should be moved to a separate section. Furthermore, the deterministic method should be contrasted with the probabilistic method. This contrast is important because the deterministic method provides a powerful counter to the veracity of the probabilistic results at low probability levels.

Deterministic Methods vs Probabilistic Methods

Deterministic Methods

The design basis earthquake ground motion, or the SSE ground motion, for NPPs were based on the assumption of the largest event geophysically ascribable to a tectonic province or to a capable structure at the closest proximity of the province or fault to the site. In the case of the tectonic province in which the site is located, the event is assumed to occur at the site. For the Eastern seaboard, the Charleston event is the largest magnitude earthquake and current research has established that such large events are confined to the Charleston region. The New Madrid zone is another zone in the Central US where very large events have occurred. Recent research has identified the source structures of these large New Madrid earthquakes. Both of these earthquake sources are fully accounted for in the assessment of the SSE for currently licensed NPPs. The SSE ground motions for NPPs are based on conservative estimates of the ground motion from the largest earthquake estimate to be generated from the current tectonic regime. In deterministic analyses used in the licensing of existing NPPs, one standard deviation is considered sufficient to incorporate all the conservatism in the final ground motion estimate. For CEUS sites the typical NPP is designed for about a magnitude 5.3 to 5.5 (about 0.15g). The largest design basis earthquake for a CEUS site, based on detailed seismological, geological, and geophysical investigations, is magnitude 6.0 (about 0.25g). In no EUS licensing proceeding has there been compelling data to require design to an earthquake of a magnitude which would challenge the seismic capacity of an SFP that satisfies the seismic checklist. For WUS sites the design basis ground motion is generally governed by known active faults at known distances. Based on fault length and other deterministic factors the maximum earthquake potential can be estimated.

Probabilistic Methods

References 2 and 3 describe the Lawrence Livermore National Labs (LLNL) and Electric Power Research Institute (EPRI) seismic hazard methodologies. A seismic hazard analysis (SHA) estimates the seismic hazard at a site due to the potential occurrence of earthquakes in the region surrounding the site. Importantly, the historic seismic data is insufficient, at least for the CEUS, to use as the sole source of information for estimating the various parameters of the overall probability model. Therefore, it is necessary to rely on "expert opinion" to supplement the data. One fundamental expert opinion input to the SHA is the upper bound magnitude distribution for each earthquake source. Figure 1 contrasts the distribution of upper bound magnitude estimates assessed by the experts in the LLNL study for the host zones containing a New England NPP with the SSE determined by the 10CFR Part 100 Appendix A process. This distribution of upper bound magnitude may be plausible, but not necessarily a possible outcome. In other words, it is not based on any known structure in each host zone description that could cause earthquakes this large. Within this context, the assessed seismic hazard will generally be higher – because less is known and the distribution has more probability associated with extreme outcomes, **or, outcomes that in fact cannot occur**. The effect of including these extreme outcomes is to predict incredible ground motions at credible probability levels. Expert opinion on the distribution of upper bound magnitude is but one of the many opinions rendered in the LLNL and EPRI studies that have profound effects on the perceived seismic hazard at low (10^{-6}) probability levels.

The LLNL methodology was initially developed in 1979 to determine SSE values for older NPPs in the Systematic Evaluation Program. The methodology was further developed to address the Charleston Issue (SECY-91-135, Reference 4), i.e., to evaluate the contribution to the seismic hazard from large earthquakes along the eastern seaboard outside the Charleston region. It should be noted that the focus of these studies was on the relative contribution of large earthquakes to the overall seismic hazard, not on the absolute effect. Also, comparisons between the LLNL and EPRI results was typically made at the SSE level (0.15g to 0.25g - annual probability of 10^{-3} to 10^{-4}), not at the ground motion level associated with a HCLPF of 0.5g. It is noted that given a HCLPF of 0.5g the median capacity (A_m) of an SFP is about 1.0g (A_m = HCLPF/$e^{-1.65(Bc)}$) – far from typical SSE values. Realistically, only large Charleston like earthquakes can generate ground motions of the amplitude, frequency content, and duration to challenge the seismic capacity of spent fuel pools. However, at high ground motion values (1000 cm/sec^2), the tail of the attenuation random uncertainty distribution (sigma) allows, with some non-negligible probability, relatively small events to contribute to the probability of exceeding a ground motion of 1000 cm/sec^2. Figure 2 shows the effect of changing sigma for a point source at a given distance. These results were analytically determined. As can be seen, at low ground motions (125 cm/sec^2), changes in sigma have a small effect on the probability of exceedance. However, at high accelerations (1000 cm/sec^2) the effect of changes in sigma is profound. The high probability of exceeding 1000 cm/sec^2 based on use of a sigma of 0.6g in Figure 2, is driven by the tail of the attenuation random uncertainty term. For example, 1000 cm/sec^2 is about 3 standard deviations above the expected ground motion from a magnitude 6.5 earthquake at 100 km. Clearly there must be a physical limit on the strength of ground motion that a given earthquake can generate. These results don't make sense and provide a basis for truncating the tail of the random uncertainty term at high ground motion values. As described previously, in deterministic analyses one standard deviation is considered sufficient to incorporate all the conservatism in the final ground motion estimate. Use of a smaller sigma value is a form of truncation. As can be seen on Figure 2, the probability of exceeding 1000 cm/sec^2 is reduced by about a factor 600 by simply changing sigma from 0.6 to 0.4. EPRI results are based on use of a sigma of 0.5. Based on this information and information previously described in Reference 5, use of the LLNL probabilistic estimates at high ground motion values may not be credible. EPRI results are also likely to be overly conservative at high ground motion values.

3. Seismic Risk - Catastrophic Failure

The staff concludes that for those CEUS plants where 3 X SSE is less than or equal to the NEI screening criterion of 0.5g, then the seismic risk is acceptable low. A similar conclusion is reached for those WUS plants where 2 X SSE satisfies the screening criterion. For CEUS plants that exceed the 3 X SSE screening criterion, a detailed SFP assessment will be required to demonstrate the SFP HCLPF equals 3 X SSE. A similar conclusion is reached for those WUS plants where 2 X SSE exceeds the screening criterion. This requirement that some plants with higher SSE values perform detailed HCLPF assessments of their SFPs is not be warranted. The assumption of this requirement is that the SSE is correlated with seismic hazard, in other words, the higher the SSE the higher the seismic hazard. Previous studies have shown that the SSE is poorly correlated with the seismic hazard (see Figure 3). In particular, there are many 0.2g to 0.25g SSE sites with lower seismic hazard estimates than 0.1g to 0.2g SSE sites. SSE tends to be more correlated with plant vintage than seismic hazard. **Based on this information, we conclude that there should be no SFP screening level distinctions based on plant SSE for the CEUS.** For the WUS, it is reasonable to require that certain plants demonstrate a HCLPF of

2 X SSE.

4. Seismic Risk - Support System Failure

No comments.

5. Conclusion

The staff concludes that for SFPs in the CEUS with HCLPF values of 3 X SSE or 0.5g whichever is greater and for WUS SFPs with HCLPF values of 2 X SSE or 0.5g, whichever is greater, the SFP failure frequency due to seismic is bounded by 3 x 10^{-6} per year. As stated by the staff, "other considerations indicate that the frequency may be significantly lower."

For CEUS plants that satisfy the seismic checklist and 3 X SSE is less than 0.5g, the seismic risk is considered by the staff to be acceptably low and no additional work is required. According to the staff, those CEUS sites (about 27) for which 3 X SSE exceeds 0.5g and 2 WUS sites for which 2 X SSE exceeds 0.5g would have to perform additional plant specific analyses to demonstrate a HCLPF value for their SFPs of 3 X SSE and 2X SSE respectively in order to demonstrate acceptably low seismic risk.

The conclusion that the SFP failure frequency is bounded by 3 x 10^{-6} per year can be found in previous submittals. In particular, it was shown that the assumption of a 0.5g HCLPF and applying Dr. Kennedy's conservative methodology to estimate SFP failure frequency at all CEUS sites using both the LLNL and EPRI seismic hazard results, the SFP failure frequency is bounded by 3 x 10^{-6} per year. It is noted that no distinction was made in the previous analysis concerning cases where 3 X SSE was greater than 0.5g. The basis for requiring a higher HCLPF value for plants with 3 X SSE greater than 0.5g is neither clear nor compelling. If the basis for requiring a higher HCLPF value for plants with high SSEs is that the SSE is assumed to be correlated with hazard it can readily be shown that seismic hazard and SSE are poorly correlated (Figure 3). Furthermore, it can be also be shown, using just the LLNL results and Dr. Kennedy's methodology, that there are many sites where 3 X SSE is greater than 0.5g **AND** the SFP failure frequency is well below those sites where 3 X SSE is less than 0.5g.

Successful application of the revised seismic checklist provides a high degree of assurance that the SFP HCLPF is 0.5g or greater. It is noted that given a HCLPF of 0.5g the median capacity of an SFP is about 1.0g. Realistically, only large Charleston like earthquakes can generate ground motions of the amplitude, frequency content, and duration to challenge the seismic capacity of spent fuel pools. In no EUS licensing proceeding has there been compelling data to require design to an earthquake of a magnitude which would challenge the seismic capacity of an SFP that satisfies the seismic checklist. The focus of previous seismic hazard studies (LLNL and EPRI) has been at the SSE level. At high ground motion values (ground motion values that can be associated with damage to SFPs), the tail of the attenuation random uncertainty distribution (sigma) allows, with some non-negligible probability, relatively small events to contribute to the probability of exceeding these high ground motion values. These results don't make sense and provide a basis for truncating the tail of the random uncertainty term at high ground motion values. In deterministic analyses used in the licensing of existing NPPs, one standard deviation is considered sufficient to incorporate all the conservatism in the final ground motion estimate. Based on this information and information previously described in Reference 5, use of the LLNL probabilistic estimates at low probability values may not be credible. EPRI results are also likely to be overly conservative at high ground motion values.

Based on the results of both probabilistic and deterministic evaluations, it is concluded that for all CEUS and some WUS NPPs, regardless of SSE value, satisfaction of all the requirements of the seismic checklist provides sufficient documentation of an acceptably low level of seismic risk. For the 2 WUS plants at known high seismic hazard locations, a HCLPF value of 2 X SSE should be demonstrated. This acceptably low level of seismic risk is deemed to be considerably lower than the bounding value of 3E-6 per year.

References:

1. USNRC, Draft for Comment Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants, February, 2000.

2. NUREG/CR-5250, Seismic Hazard Characterization of 69 Nuclear Plant Sites East of the Rocky Mountains, Lawrence Livermore Nation Laboratory, January, 1989.

3. EPRI NP-6396-D, Probabilistic Seismic Hazard Evaluations at Nuclear Plant Sites in the Central and Eastern United States: Resolution of the Charleston Issue, Electric Power Research Institute, April 1989.

4. SECY-91-135, Conclusions of the Probabilistic Seismic Hazard Studies Conducted for Nuclear Power Plants in the Eastern United States, May 14, 1991.

5. Appendix 5e, USNRC, Draft for Comment Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants, February 2000.

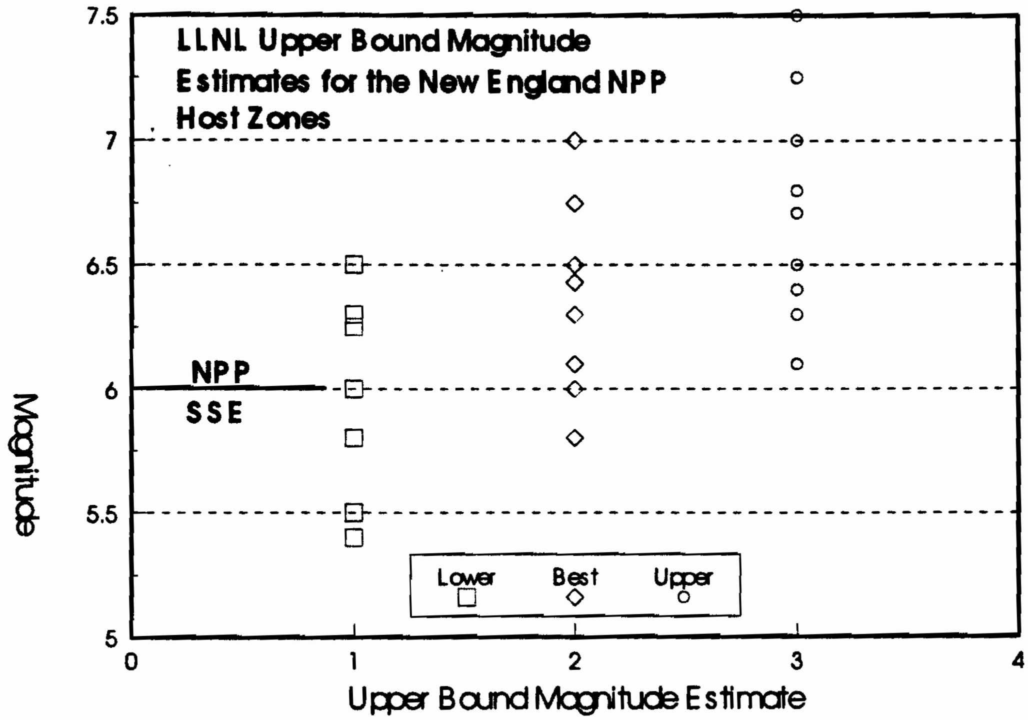


Figure 1 – Distribution of Upper Bound Magnitude Estimates from Reference 2 for a New England site.

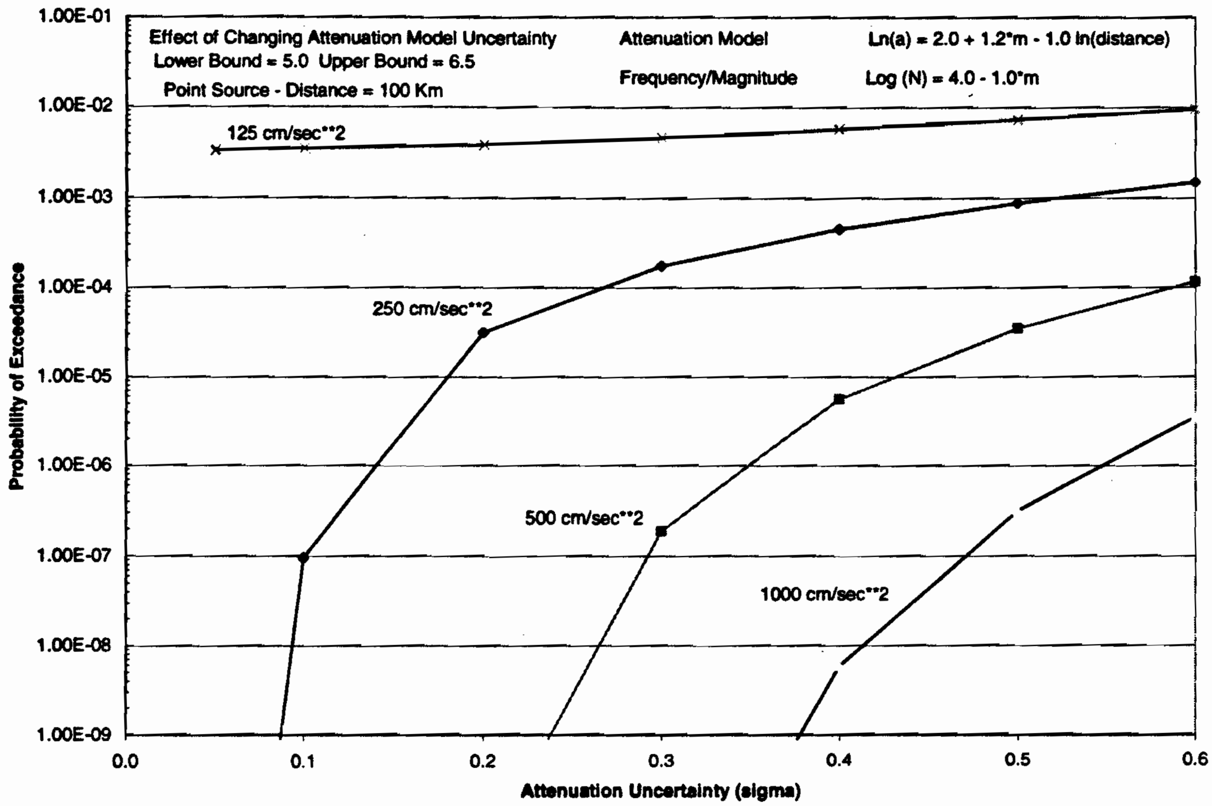


Figure 2 Effect of Attenuation Random Uncertainty on Probability of Exceedance from a Point Source

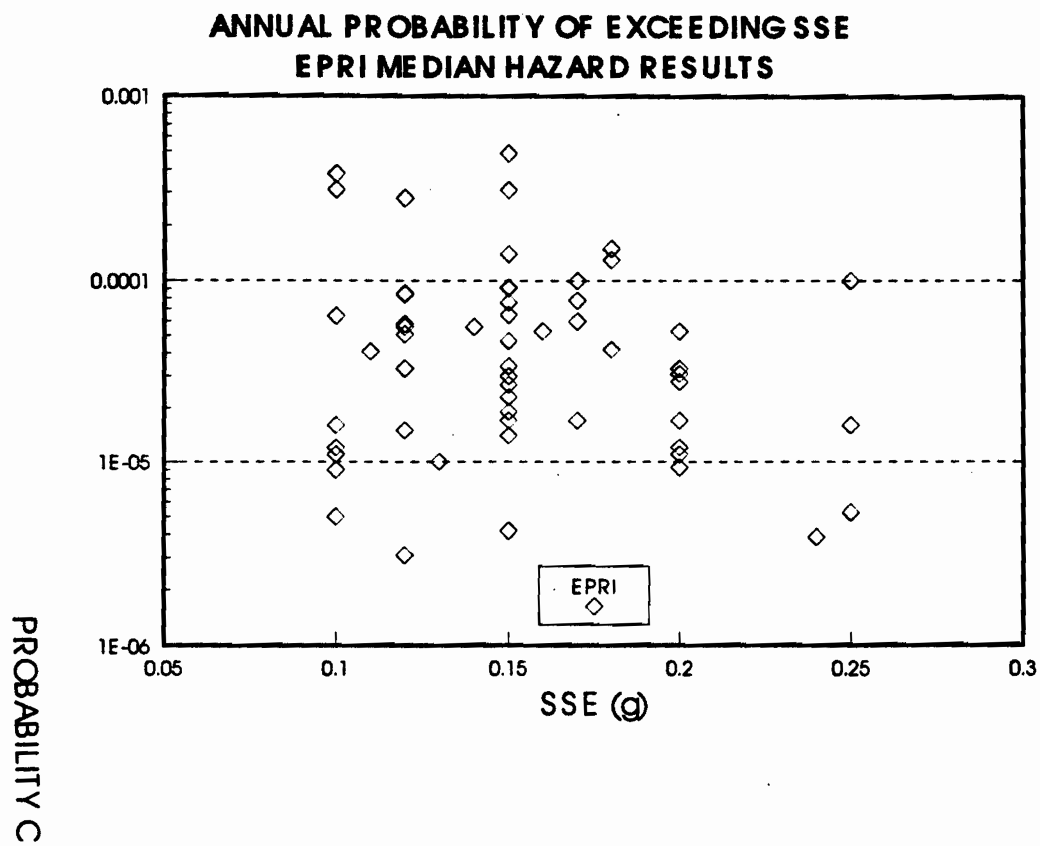


Figure 3 – Annual Probability of Exceeding the SSE at CEUS sites based on EPRI (Reference 3)

Research Plan for Digital Instrumentation and Control (I&C)

ACRS Meeting

April 5, 2000

Steven Arndt , SMSAB/DSARE/RES
Sher Bahadur, ERAB/DET/RES
Matthew Chiramal, EEIB/DE/NRR

(7)

Presentation Outline

- Introduction - Sher Bahadur, Chief, ERAB/DET/RES
- Regulatory Review - Matthew Chiramal, EEIB/DE/NRR
- Research Plan - Steven Arndt, SMSAB/DSARE/RES
- Conclusion - Sher Bahadur, Chief, ERAB/DET/RES

Introduction

- Purpose
  - To Present the Digital I&C Research Plan for ACRS Review.
- Basis for the Plan
  - Input From Various Organizations
    - Workshop on Man-Machine Interface (NUREG/CR-5348), 7/1989
    - Workshop on Digital Systems Reliability (NUREG/CP-0136), 9/1993
    - NRC/NAS Report on Digital Instrumentation and Control Systems in Nuclear Power Plant: Safety and Reliability Issues, 1/1997
    - ACRS Report on Research Programs, 1998
    - Expert Panel on Digital Systems Research, 9/1999
  - NRR Needs to Respond to Industry Efforts
  - Agency's Need to Get Prepared for Future
- Briefing Include two parts:
  - (i) Regulatory Framework and
  - (ii) Description of the Digital I&C Research Plan

Digital I&C System Review Process

- Guidance for review in sections of SRP Chapter 7
  Review of digital systems based on IEEE Standards 603 (10 CFR 50.55a(h)) and 7-4.3.2 (RG 1.152)
- Topical Report reviews and Plant Specific reviews (To Be Completed in FY2000)
  - Five topical reports: (1) Siemens Teleperm XS, (2) ABB-CE Common Q, (3) Westinghouse ASIC, (4) Triconex PLC, and (5) Westinghouse Ovation (E-3)
  - Expect plant-specific applications using approved platforms

NRR User Need for RES

- **SRP Chapter 7 guidance adequate for review of digital I&C**
- **Based on the combination of meeting NRC Goals** (maintain safety, increase public confidence, reduce unnecessary regulatory burden, and make NRC activities and decisions more effective, efficient, consistent, and practical) **and keeping pace with the rapid changes in digital technology and assessment practices, NRR requested RES conduct research in support of new user needs for digital I&C**
- **With the primary goal of maintaining safety, the user needs aim to:**
  - **Improve efficiency of the review of plant-specific applications using approved platforms**
  - **Address reliability and risk considerations**
  - **Reflect evolving technology aspects**
  - **Keep current with industry standards and practices**

Program Goal and Outputs

- Program Goal
  - Continue to assure, no unanticipated failures on digital system in the face of implementation of ever changing technology.

<u>Outputs</u>

- Improved methods and tools needed to support improvements in the review of digital systems;
- Risk and reliability models for digital systems;
- Regulatory guidance for emerging technology in the digital area.

Outcomes

- An improved regulatory review process;
- Reduction in the time it takes to develop new regulatory guidance;
- New capabilities to address digital I&C systems in PRA's and other tools.

NRC Performance Goals to Support Nuclear Reactor Safety

1. Maintain Safety;
2. Increase Public Confidence;
3. Reduce unnecessary regulatory burden; and
4. Make NRC activities and decisions more effective, efficient and realistic.

Research Program Outputs

1. Improved methods and tools needed to support improvements in the review of digital systems;
2. Risk and reliability models for digital systems; and
3. Regulatory guidance for emerging technology in the digital area.

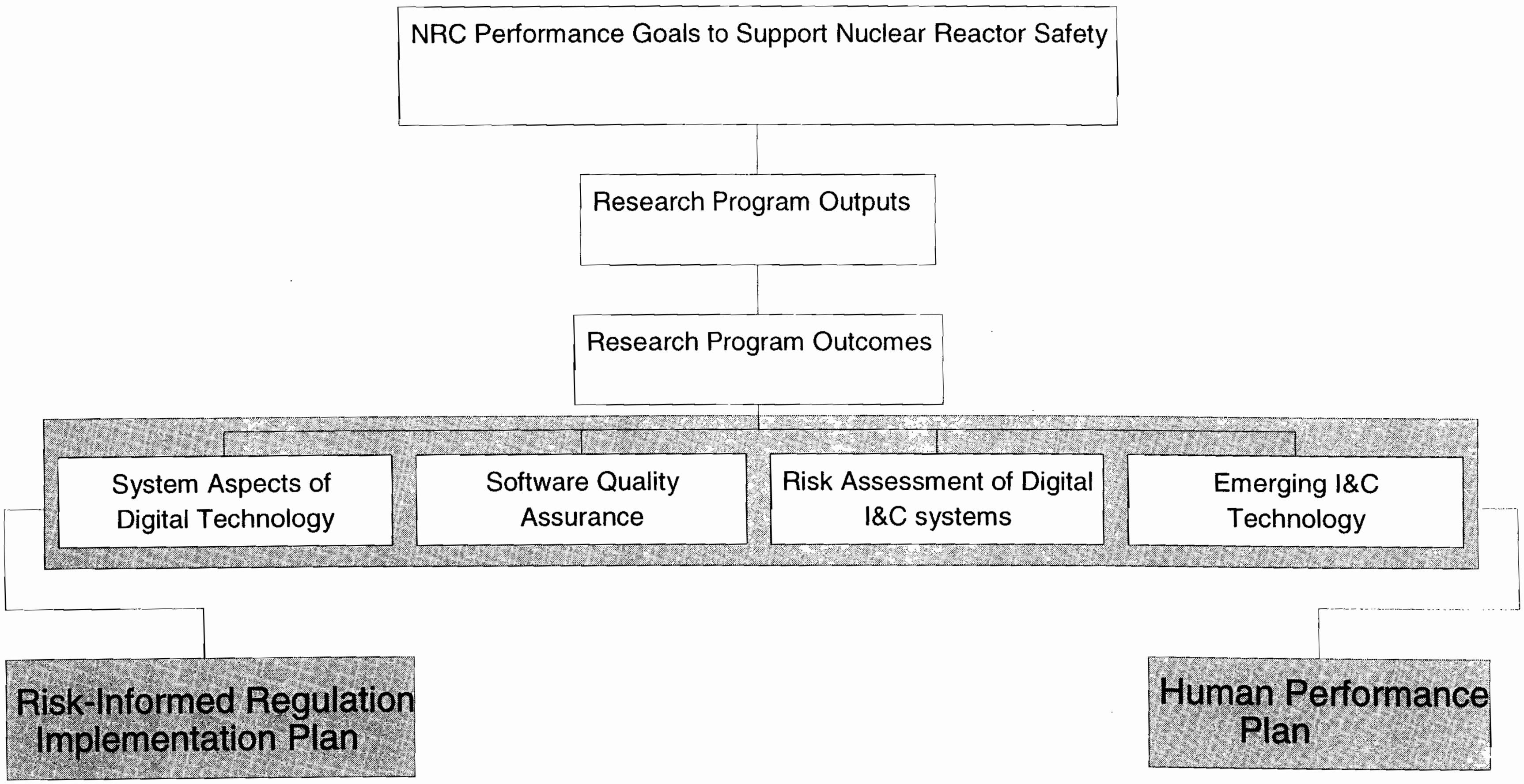
Research Program Outcomes

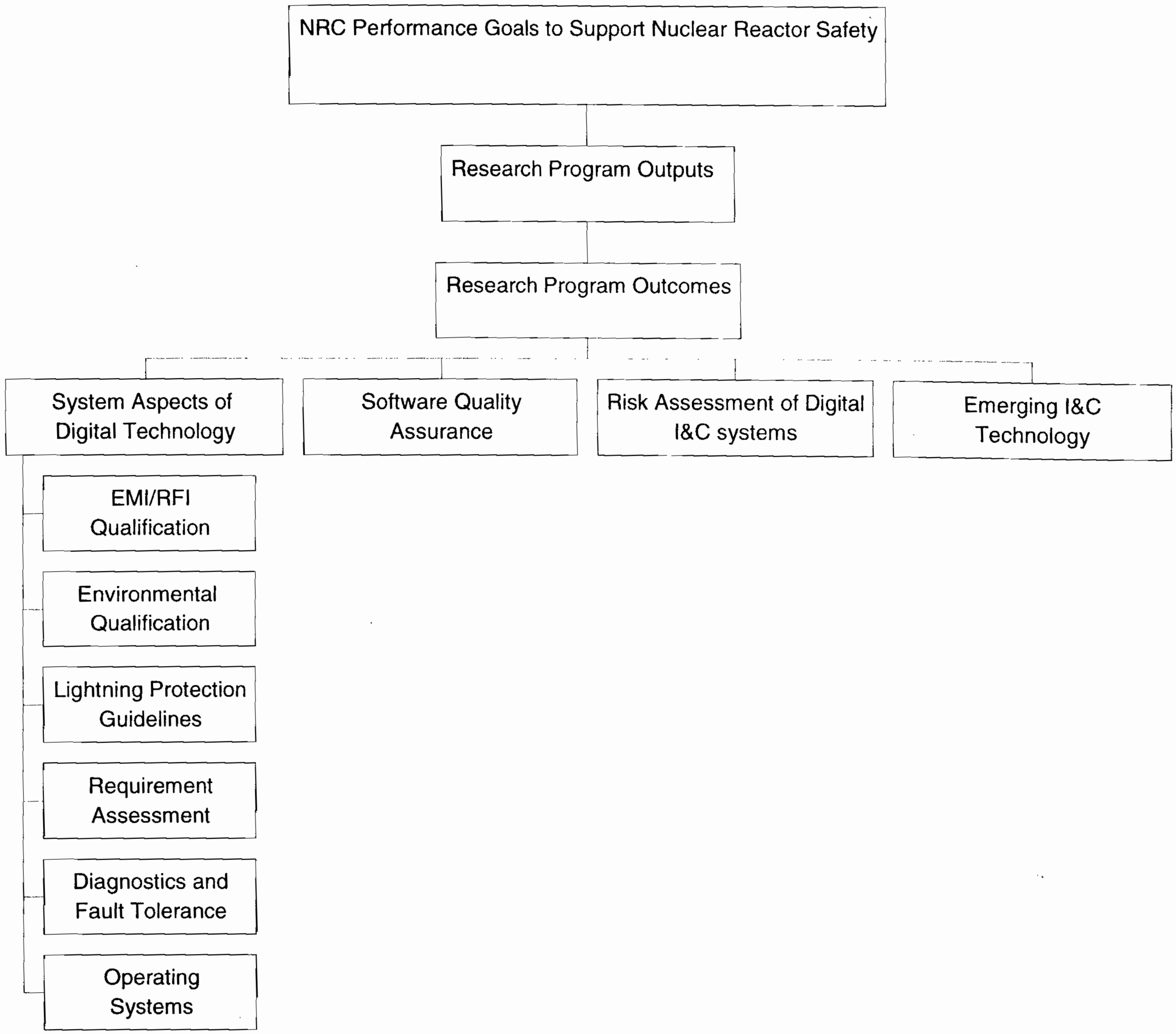
1. An improved regulatory review process;
2. Reduction in the time it takes to develop new regulatory guidance;
3. New capability to address digital I&C in PRA's.

System Aspects of Digital Technology	Software Quality Assurance	Risk Assessment of Digital I&C Systems	Emerging I&C Technology

Research Areas

- System Aspects of Digital Technology
- Software Quality Assurance
- Risk Assessment of Digital I&C Systems
- Emerging I&C Technology and Applications


NRC Performance Goals to Support Nuclear Reactor Safety
Research Program Outputs
Research Program Outcomes
System Aspects of Digital Technology
Software Quality Assurance
Risk Assessment of Digital I&C systems
Emerging I&C Technology
Risk-Informed Regulation Implementation Plan
Human Performance Plan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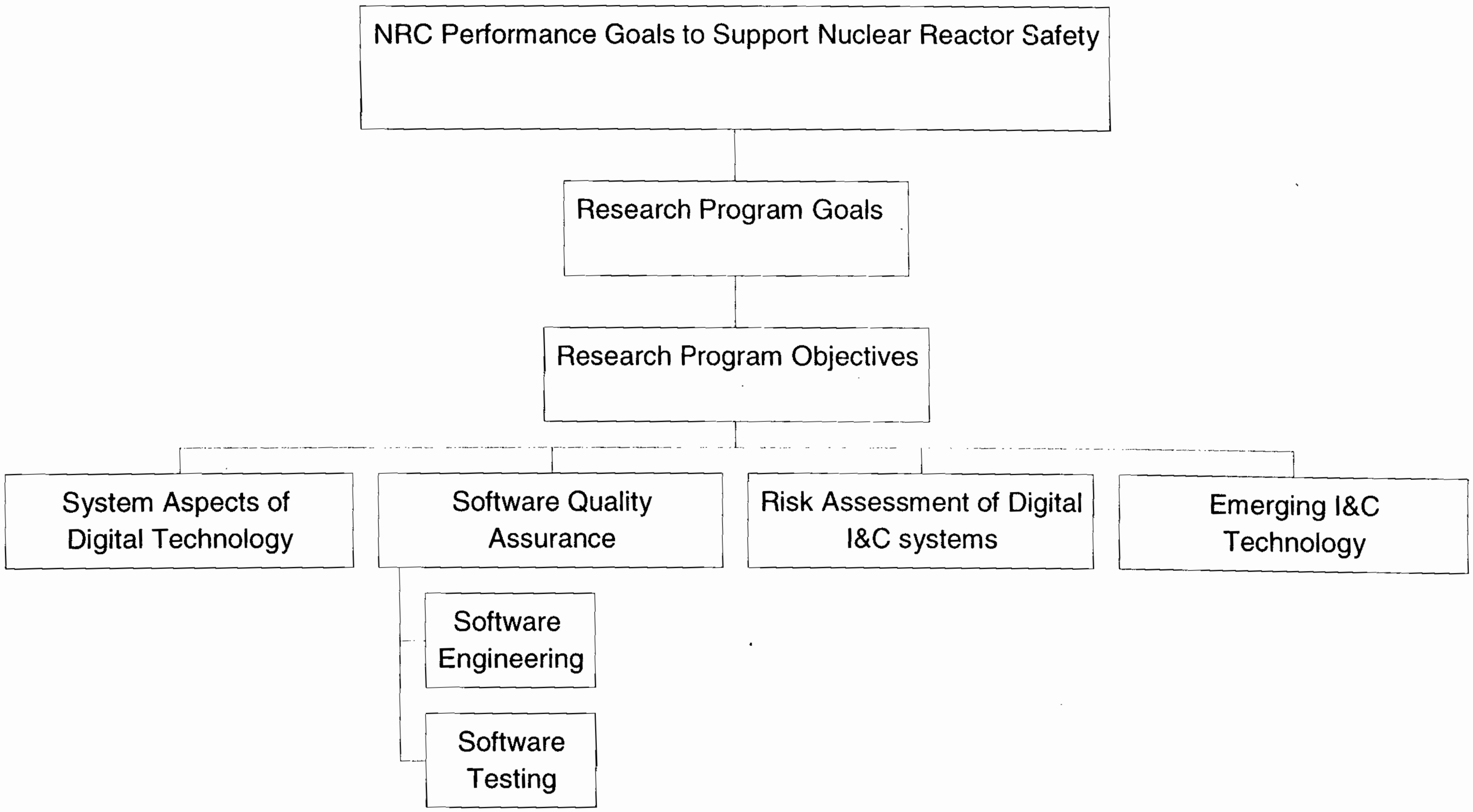
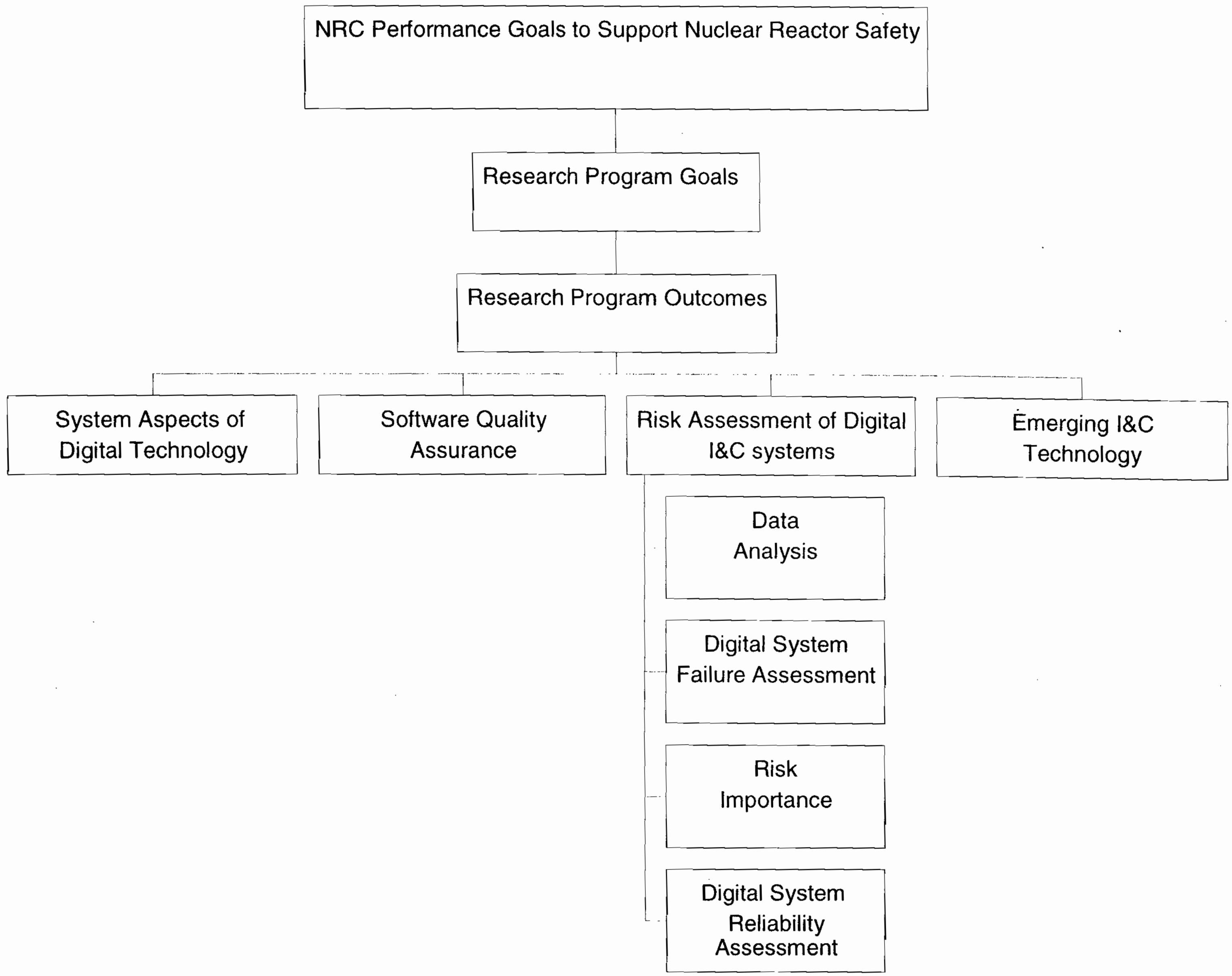
Requirement Assessment
Diagnostics and Fault Tolerance
Operating Systems


NRC Performance Goals to Support Nuclear Reactor Safety
Research Program Goals
Research Program Objectives
System Aspects of Digital Technology
Software Quality Assurance
Risk Assessment of Digital I&C systems
Emerging I&C Technology
Software Engineering
Software Testing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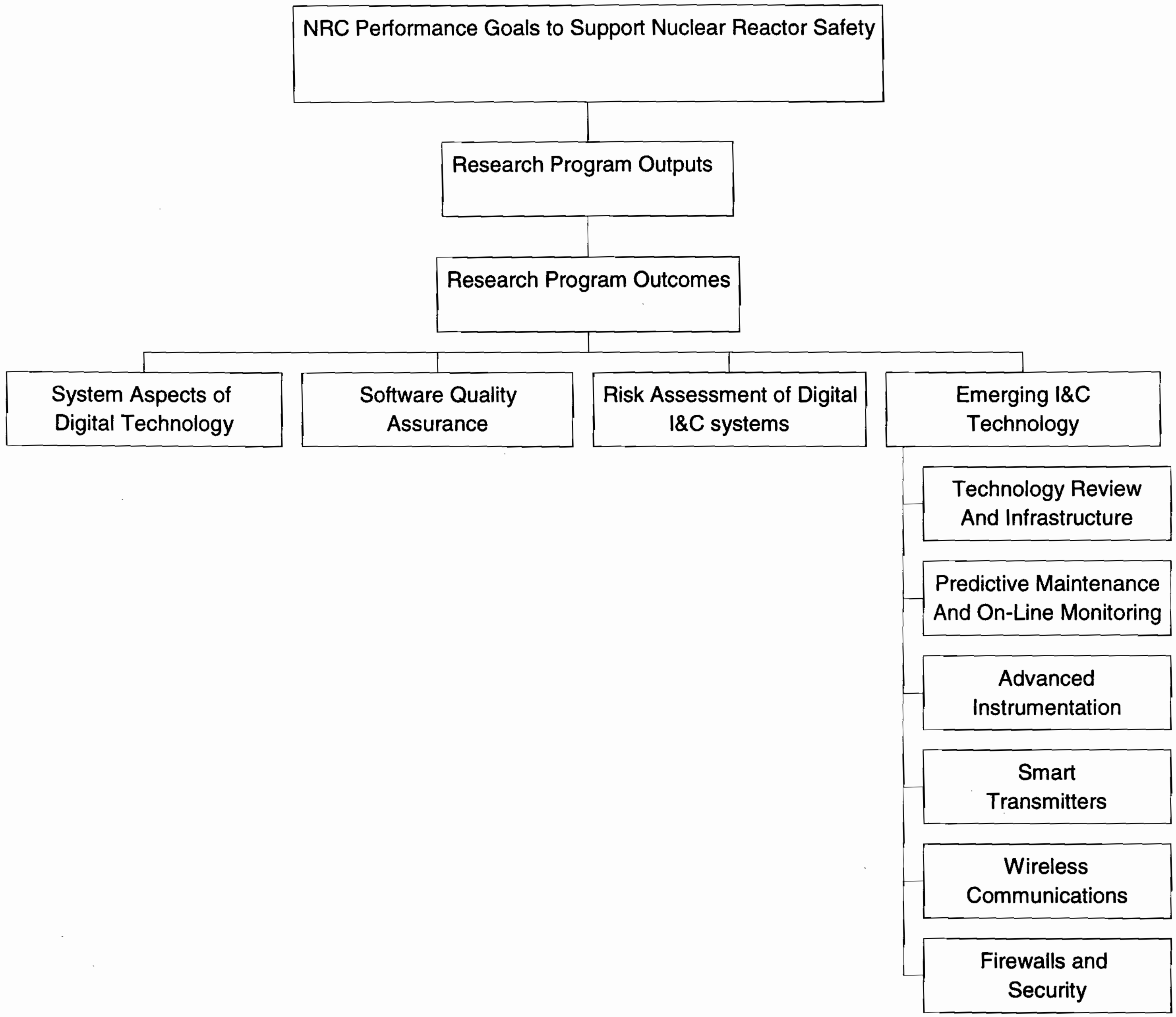
Data Analysis
Digital System Failure Assessment
Risk Importance
Digital System Reliability Assessment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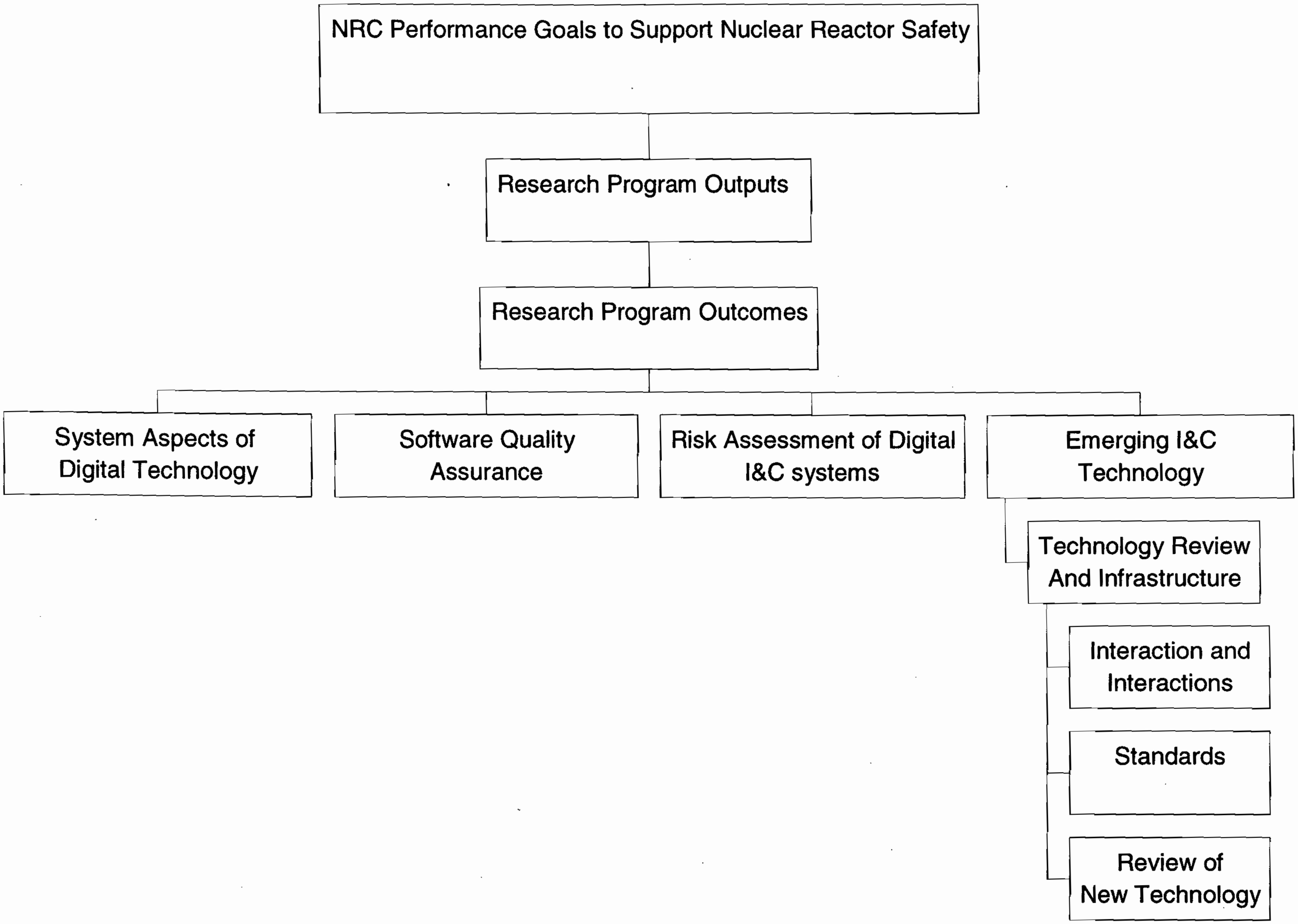
Emerging I&C Technology
Technology Review And Infrastructure
Predictive Maintenance And On-Line Monitoring
Advanced Instrumentation
Smart Transmitters
Wireless Communications
Firewalls and Security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Technology Review And Infrastructure
Interaction and Interactions
Standards
Review of New Technology

Conclusions

- Forward looking five year Research Plan
- Plan includes NRR user needs
- Plan also addresses emerging technology
- Implementation of the Plan would involve in-house research, contractor assistance, cooperative programs at universities, and participation in International programs.
- Schedule

Back-up slides

Topical Report Reviews and Issues

- Issues associated with the digital equipment under review:
  - Commercial-grade dedication process
  - Environmental qualification
  - Defense-in-depth and diversity
  - Verification and validation activities
  - Configuration management
  - Interface with plant equipment
  - Real-time performance

Topical Report Reviews and Issues (contd.)

- Plant-specific issues:
  - System requirements
  - Hardware differences and existing plant equipment interfaces
  - Application-specific software integration with qualified platform
  - Technical specification modifications
  - Defense-in-depth and diversity determination
  - Implementation of design
- Topical Report reviews expected to be completed this year

Systems Aspects of Digital Technology

- *Environmental Stressors*
  - Includes electromagnetic interference/radio-frequency interference (EMI/RFI), temperature, humidity, smoke, and lightning. Research efforts will provide appropriate acceptance criteria for the qualification of digital equipment against these stressors.
- *Digital Requirement Specifications*
  - Currently, it is difficult to review requirement specifications for correctness and completeness. Research efforts will provide the best methods and tools for the review of requirements specifications.

Systems Aspects of Digital Technology

- *Diagnostics and Fault-Tolerance*
  - Special features that enable the system to detect internal problems and either avoid, handle, or alert the operator to the problem. Research efforts will investigate both positive and negative safety impacts and determine the amount of credit that should be given to them in a review.
- *Operating Systems*
  - Controls communication functions, memory management, and processor scheduling. These systems are becoming larger and more complex, making the review of such systems difficult. Research efforts will identify the aspects of operating systems that may adversely impact safety.

Software Quality Assurance

- *Objective software engineering criteria*
  - Research results from academia and other industries show potential software measures that could be used to establish minimum software quality acceptance levels. Research efforts will investigate the potential of using such measures for NRC regulatory purposes.
- *Criteria for software testing*
  - Software tests and testing criteria are important to the assessment of software quality. Research efforts will support software quality assessments by analysis of software test criteria.

Risk Assessment of Digital I&C Systems

- *Digital I&C failure data*
  - Research efforts will gather and assess digital failure data from domestic/foreign nuclear power plants and other industries having digital systems that are critical to safety. Particular attention will be paid to commercial off-the-shelf digital I&C equipment.
- *Digital failure assessment methods*
  - Used by defense and aerospace industries to determine types of failures and their impact on overall safety, these methods can be useful in nuclear application. To ensure the quality of digital failure assessments, research efforts will provide criteria outlining the use of failure assessment methods.

Risk Assessment of Digital I&C Systems

- *Risk-importance of digital I&C systems*
  - Risk-importance can help NRC determine the required level of regulatory review for digital upgrades and focus research efforts on those aspects of digital I&C systems having a significant impact on plant safety. This research will focus on the development of methods to support this.
- *Digital reliability assessment methods*
  - Several reliability assessment methods have been used by other industries and show potential for use in the nuclear industry. Research efforts will identify digital reliability assessment methods that are applicable to the nuclear industry and provide criteria for their proper use.

Emerging I&C Technology and Applications

- *Predictive maintenance and on-line monitoring systems*
  - Provide the automatic capability to determine system/component failure or the need for maintenance. Research efforts will analyze the positive and negative safety impacts of this technology.
- *Advanced instrumentation*
  - Measuring flow, temperature, pressure, neutron flux, and other plant variables hold the potential to improve upon plant efficiency, safety, or both. To make timely and informed regulatory decisions involving advanced instrumentation the NRC will develop the technical bases surrounding this emerging technology.

Emerging I&C Technology and Applications

- *Smart transmitters*
  - Smart transmitters can provide additional information and capabilities for providing compensating measures for instrument error or control functionality. Research efforts will provide information on this technology.
- *Wireless communication*
  - This technology can eliminate some of the problems associated with cables, it also has its own inherent problems which will be identified by the digital I&C research program.
- *Firewalls*
  - Research will be conducted to assess the potential for corruption/degradation of computers in nuclear power plants.

Emerging I&C Technology and Applications

Technology Review and Infrastructure

- *Develop and maintain interactions and interfaces*
  - Formal and informal interactions with the industrial, academic and regulatory communities with relevant digital I&C applications as recommended by the National Academy of Science report.
- *Standards*
  - Revise existing regulatory guides, as appropriate to include updated standards.
- *Review new technology*
  - Review new technology; attend professional meetings; and develop new technical capabilities.

NRC Performance Goals to Support Nuclear Reactor Safety
1. Maintain Safety;
2. Increase Public Confidence;
3. Reduce unnecessary regulatory burden; and
4. Make NRC activities and decisions more effective, efficient and realistic.

Research Program Outputs
1. Improved methods and tools needed to support improvements in the review of digital systems;
2. Risk and reliability models for digital systems;
3. Regulatory guidance for emerging technology in the digital area.

Research Program Outcomes
1. An improved regulatory review process;
2. Reduction in the time it takes to develop new regulatory guidance;
3. New capability to address digital I&C in PRA's.

- System Aspects of Digital Technology
  - EMI/RFI Qualification
  - Environmental Qualification
  - Lightning Protection Guidelines
  - Requirement Assessment
  - Diagnostics and Fault Tolerance
  - Operating Systems
- Software Quality Assurance
  - Software Engineering
  - Software Testing
- Risk Assessment of Digital I&C systems
  - Data Analysis
  - Digital System Failure Assessment
  - Risk Importance
  - Digital System Reliability Assessment
- Emerging I&C Technology
  - Technology Review And Infrastructure
  - Predictive Maintenance And On-Line Monitoring
  - Advanced Instrumentation
  - Smart Transmitters
  - Wireless Communications
  - Firewalls and Security

RISK-BASED PERFORMANCE INDICATORS
and
INDUSTRY-WIDE PERFORMANCE MEASURES
DEVELOPMENT PROGRAM

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OFFICE OF NUCLEAR REGULATORY RESEARCH

PRESENTATION TO ACRS
APRIL 5, 2000

5

RISK-BASED PERFORMANCE INDICATOR DEVELOPMENT

- **Purpose of the risk-based performance indicator white paper:**

  To provide an overview of the current effort to develop risk-based performance indicators (RBPIs)

- **Briefing includes:**

  - **Background**
  - **What are RBPIs?**
  - **Benefits of RBPIs**
  - **Where RBPIs potentially fit into revised reactor oversight process (RROP)**
  - **Process of developing RBPIs**

BACKGROUND

• RBPI concept presented to Commission	August 1995
• Plan revised for risk-based analysis of reactor operating experience	December 1995
• RBPI concept presentations to ACRS	1995 to present
• EDO tasking memorandum Task III.A	August 1998
• AEOD RBPI program plan memorandum to NRR and RES	October 1998
• Revised Chairmans' tracking memorandum Task III.B	January 2000
• Draft RBPI white paper	February 2000

WHAT ARE RBPIs?

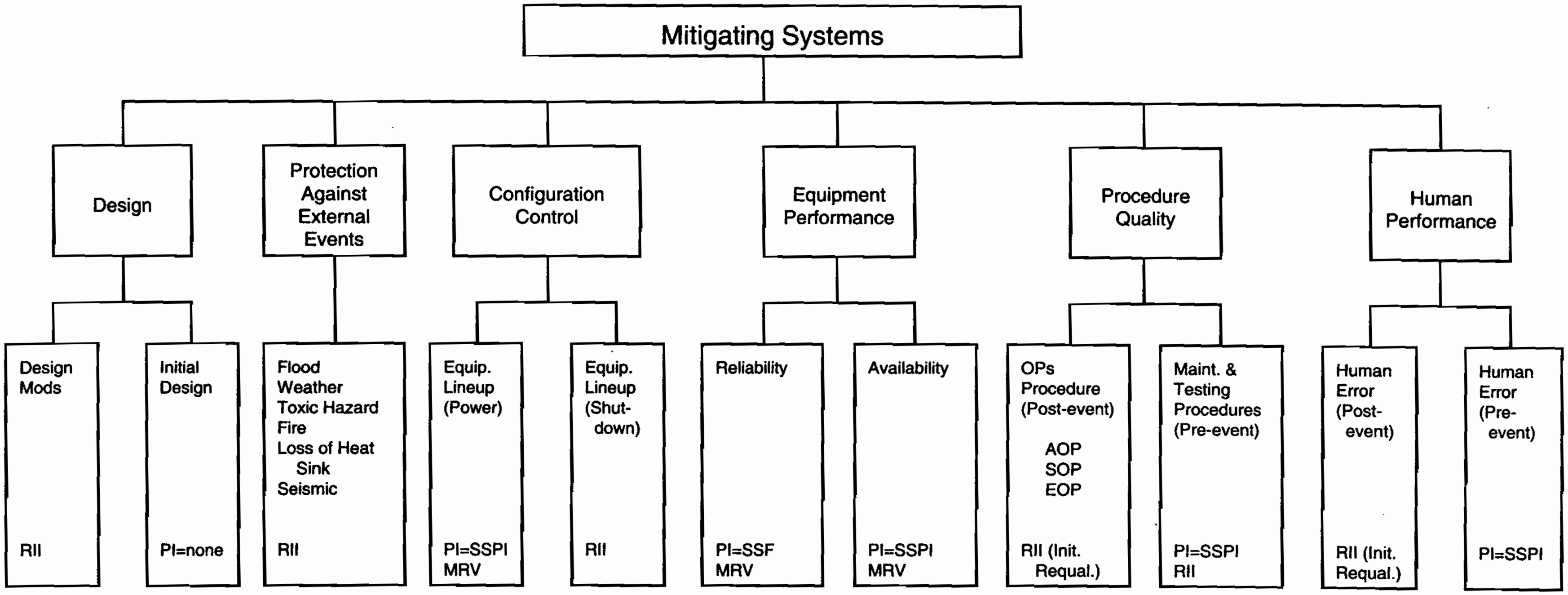
- RBPIs reflect changes in licensee performance logically related to risk and associated models

- "Performance" refers to those activities in design, procurement, construction, operation and maintenance that support achievement of the objectives of the cornerstones of safety in the revised reactor oversight process

WHAT ARE RBPIs?

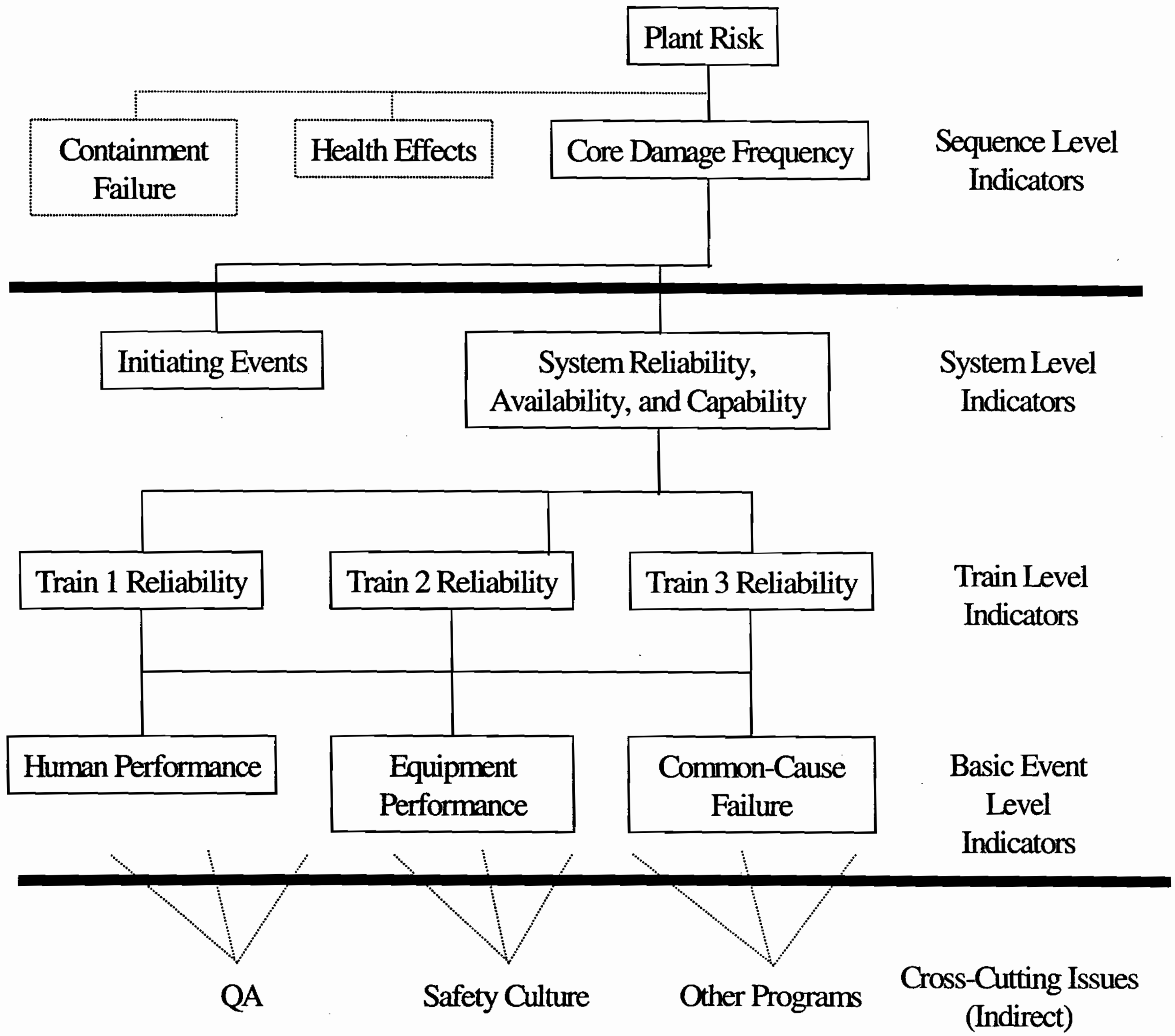
- **RBPIs are developed by:**
  - Determining risk-significant key attributes of each cornerstone of safety (e.g., design, configuration control, human performance) [see Figure 1]
  - Determining risk-significant elements of each risk-significant key attribute (e.g., system train reliability/availability, CCF) [see Figure 2]
  - Obtaining performance data for each of these elements
  - Identifying indicators from data that are capable of detecting performance changes in a timely manner
  - Identifying performance thresholds from data consistent with a graded approach to performance evaluation outlined in SECY 99-007

FIGURE 1. KEY ATTRIBUTES



SSPI	= Safety System Performance Indicators
Init	= Initial Operator Exam
Requal	= Operator Requal
RII	= Risk Informed Inspections
MR	= Maintenance Rule
V	= Verification and Validation
SSF	= Safety System Failures

FIGURE 2. ELEMENTS OF RISK



WHAT ARE RBPIs?

- **How do RBPIs fit into the revised Reactor Oversight Process?**
  - RBPIs should be compatible with, and complementary to, risk-informed inspection activities of the RROP
  - RBPIs should cover all modes of plant operation
  - Within each mode, RBPIs should cover risk-important structures, systems and components (SSCs) to the extent practical
  - RBPIs should be capable of implementation without excessive burdens to licensees or NRC in areas of data collection and quantification
  - To the extent practical, RBPIs should identify declining performance before performance becomes unacceptable without incorrectly identifying normal variations as degradation
  - RBPIs should be amenable to establishment of plant-specific thresholds consistent with the RROP

BENEFITS OF RBPIs

- **Potential benefits of RBPIs to the RROP:**

  - Reliability indicators will be developed at the component/train/system level to provide both safety cornerstone and cross-cutting issue performance indication

  - RBPIs for shutdown modes and fire events will be developed consistent with available models, data and methods

  - RBPIs and their thresholds will be more plant-specific to reflect risk-significant differences in plant designs

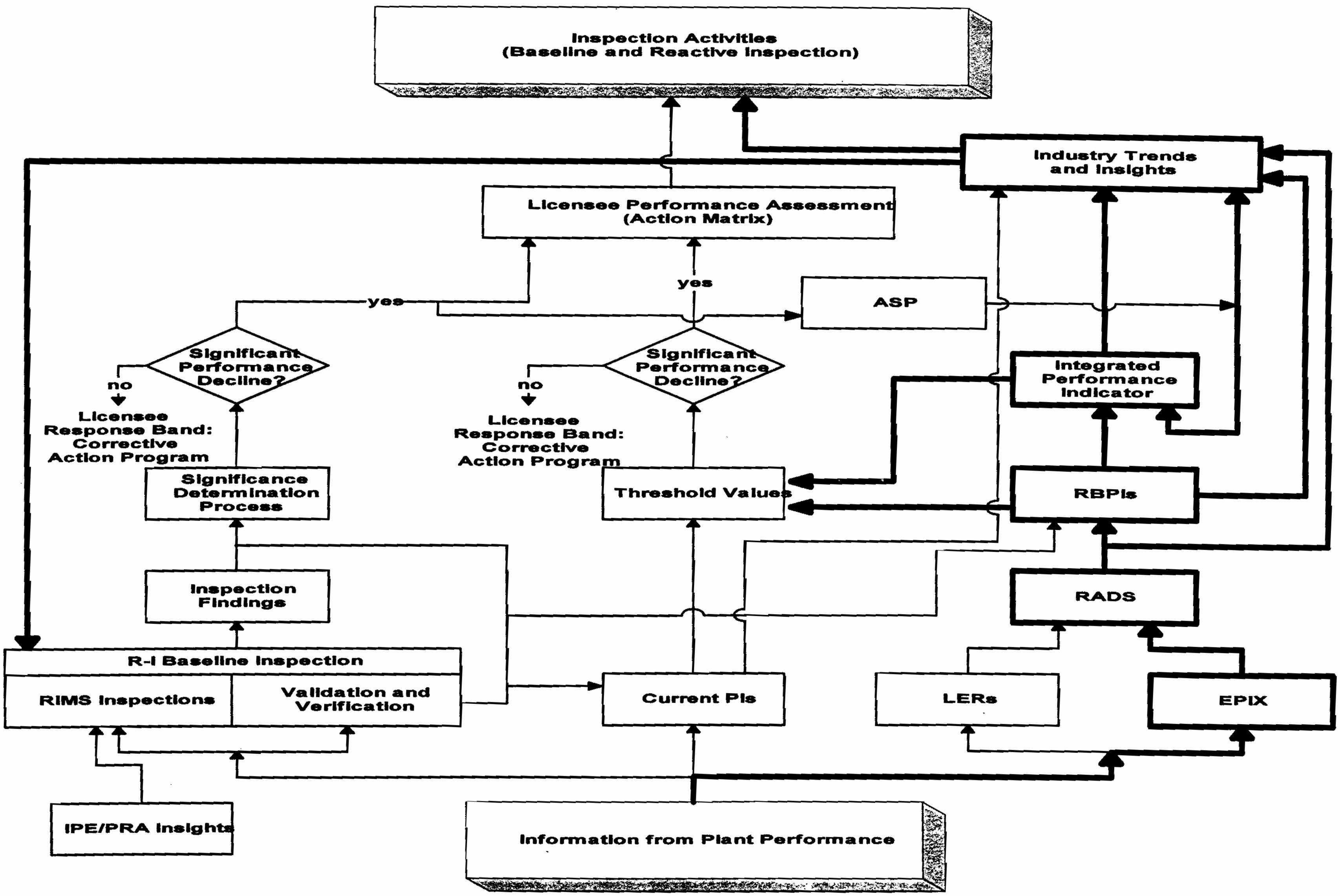
  - An integrated indicator will be developed to identify and assess risk-significant changes in multiple performance areas at the same time

  - Trending of risk-significant performance at an industry-wide level, including insights and identification of key contributors to any observed trends, will be provided. This will include trending of existing indicators and other performance data such as ASP events and common-cause failure events that cannot be tracked at a plant-specific level

WHERE RBPIs POTENTIALLY FIT INTO REVISED REACTOR OVERSIGHT PROCESS

- **The potential integration of RBPIs into the RROP involves development activities in the following major areas:**
  - **Data**
  - **RBPIs**
  - **Industry trends and insights**
  - **Integrated perfomance indicator**
- **The potential relationship of these activities to the RROP is shown in Figure 3**

FIGURE 3. WHERE RBPIs POTENTIALLY FIT INTO REVISED REACTOR OVERSIGHT PROCESS



WHERE RBPIs POTENTIALLY FIT INTO REVISED REACTOR OVERSIGHT PROCESS

- **Purpose of industry-wide performance measures:**
  - To determine whether the industry continues to maintain safe operations per the Draft FY 2000-2005 Strategic Plan - "No statistically significant adverse industry trends in safety performance"
  - Provides a succinct statement on reactor safety performance to Commission and public
  - Provides a measure of success of reactor safety program (RSP) [RROP performance indicators, RBPIs, other indicators]
  - Helps identify broad areas and specific aspects of the RSP that should be improved or have resources redirected to them, including reactor safety research
  - Relates to independent role of RES in preparing analysis of industry-wide reactor safety performance - Monitor/analyze data and provide insights independent from, but closely coordinated with, NRR assessment of RROP

WHERE RBPIs POTENTIALLY FIT INTO REVISED REACTOR OVERSIGHT PROCESS

- **How would industry-wide performance measures be used?**
  - Determine whether safety is improving, deteriorating, or remaining constant by providing performance trends on risk-significant industry indicators and identifying performance insights
  - Provide timely, continuous, useful operating experience feedback to RROP which NRR could use to adjust oversight activities in a predictable and orderly manner
  - Support risk-informed regulatory activities, such as updating risk-informed inspection guidance and support analysis of regulatory effectiveness
  - Support Increasing public confidence with "independent" and succinct source of information on industry reactor safety performance
  - Support other resource planning, budgeting, and redirection activities

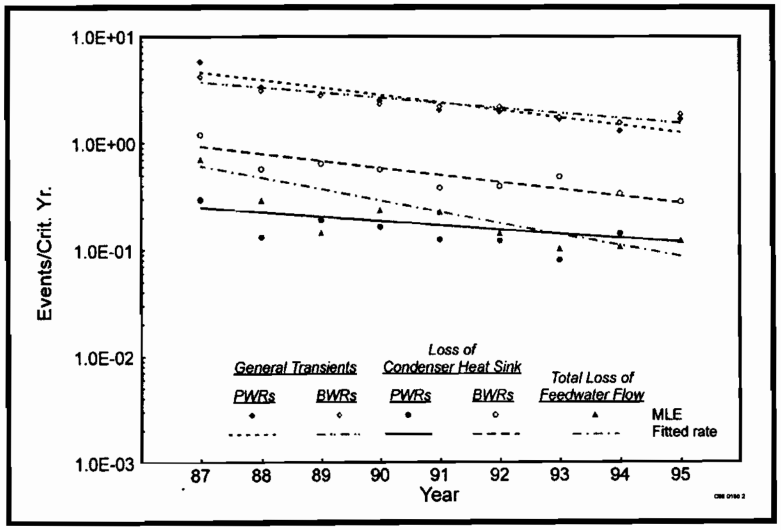
WHERE RBPIs POTENTIALLY FIT INTO REVISED REACTOR OVERSIGHT PROCESS

- **What are industry-wide performance measures? [see Figure 4]**
  - Industry or group averages for the RROP performance indicators
  - RBPIs following review and approval
  - Other complementary, indicators of risk-significance performance that can not track plant-specific performance due to sparseness of data

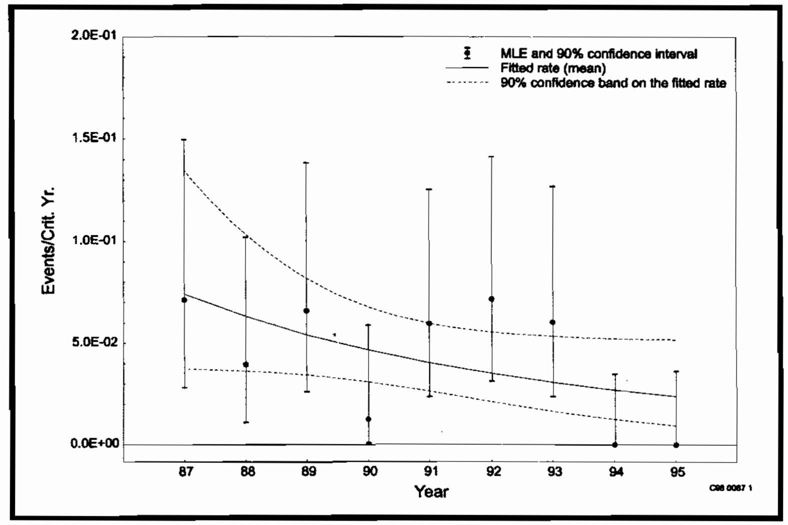
ASP trends	LOSP frequency
SGTR frequency	LOCA frequency
CCF trends	Collective RAD exposure

FIGURE 4. EXAMPLES OF INDUSTRY TRENDS

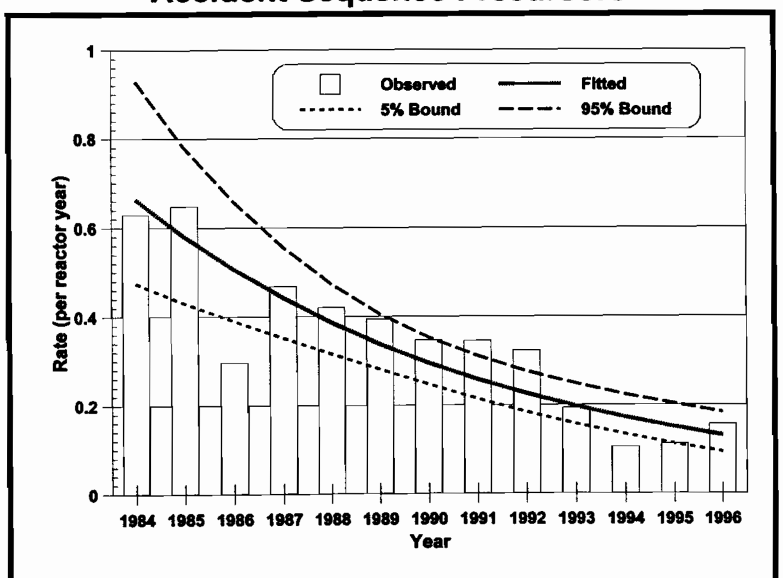
Reactor Transients



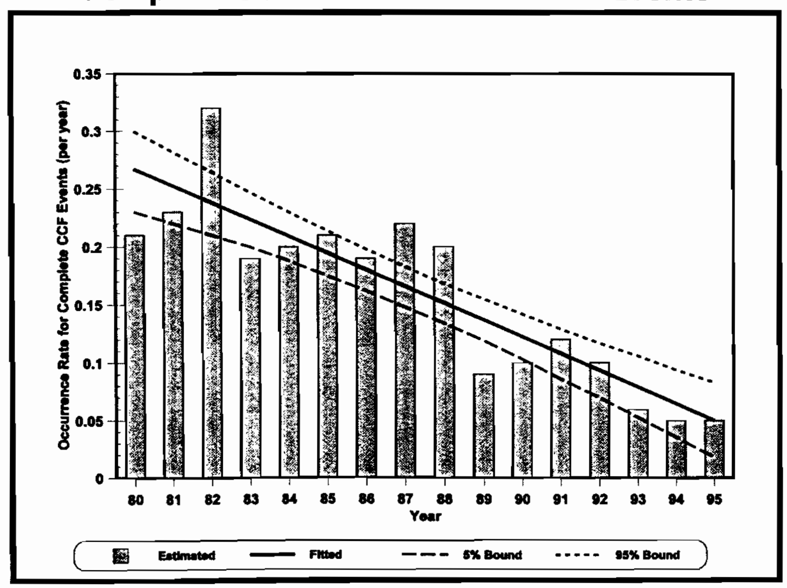
Loss-of-Offsite Power



Accident Sequence Precursors



Complete Common-Cause-Failure Events



PROCESS OF RBPI DEVELOPMENT

- Steps to accomplish RBPI development are:
  - Issue RBPI program overview white paper for stakeholder comment
  - Brief ACRS and Commission on RBPI development plan outlined in program overview white paper
  - Issue Phase 1 RBPI development progress report including example RBPIs for stakeholder comment
  - Brief ACRS and Commission on Phase 1 RBPI development progress
  - Issue Phase 2 RBPI development progress report, including example of RBPIs, for stakeholder comment
  - Brief ACRS and Commission on Phase 2 development progress

PROCESS OF RBPI DEVELOPMENT

- **Industry-Wide Performance Measures**

  - Use ASP, existing PIs, system, component, and initiator trends to the extent possible

  - RES will systematically identify, develop, test, and document bases for additional industry-wide reactor safety performance indicators

  - RES will work with NRR (possibly through task group arrangement to assure plan and products meet NRR needs)

  - Several management (and ACRS) briefings during the project

  - RES will prepare SECY

    - To explain concepts, needs and uses of work
    - To obtain endorsement to go forward

  - Management briefings and SECY on industry-wide performance measures could be in conjunction with or part of briefings and SECY on RBPIs

PROCESS FOR RBPI DEVELOPMENT

- Phase 1 of RBPI development will include:
  - Containment Barrier cornerstone
  - Reliability indicators for the Mitigating System cornerstone
  - Fire events
  - Shutdown modes
  - Industry trends

PROCESS FOR RBPI DEVELOPMENT

- Additional phases of RBPI development will include:
  - An integrated indicator
  - Improvements to indicators based on advances in models, methods, and data (e.g., fire, shutdown, and plant-specific availability)
  - Follow-up work to improve existing indicators in response to NRC/industry lessons learned from the RROP
  - Other external event indicators (e.g., seismic and wind)
  - Follow-up development of new or improved industry-wide performance measures

PROCESS OF RBPI DEVELOPMENT

Schedule

• Issue RBPI program overview white paper for comment	March 2000
• Brief ACRS on RBPI program overview white paper	April 2000
• Brief Commission on RBPI program overview white paper	June 2000
• Issue SECY on industry-wide performance measures	June 2000
• Issue Phase 1 RBPI development progress report for comment	July 2000
• Brief ACRS on Phase 1 RBPI development progress	October 2000
• Brief Commission on Phase 1 RBPI development progress	December 2000
• Issue Phase 2 RBPI progress report for comment	July 2001
• Brief ACRS on Phase 2 RBPI development progress	October 2001
• Brief Commission on Phase 2 RBPI development progress	December 2001

EXAMPLE OF PRELIMINARY RBPI DEVELOPMENT RESULTS

- Example includes:
  - General risk perspective
  - Identification of risk-significant key attributes
  - Identification of risk-significant elements
  - Collection and review of performance data
  - Selection of risk-based performance indicators
  - Determination of performance thresholds

GENERAL RISK PERSPECTIVE

Individual Accidental Death Risk (per year)

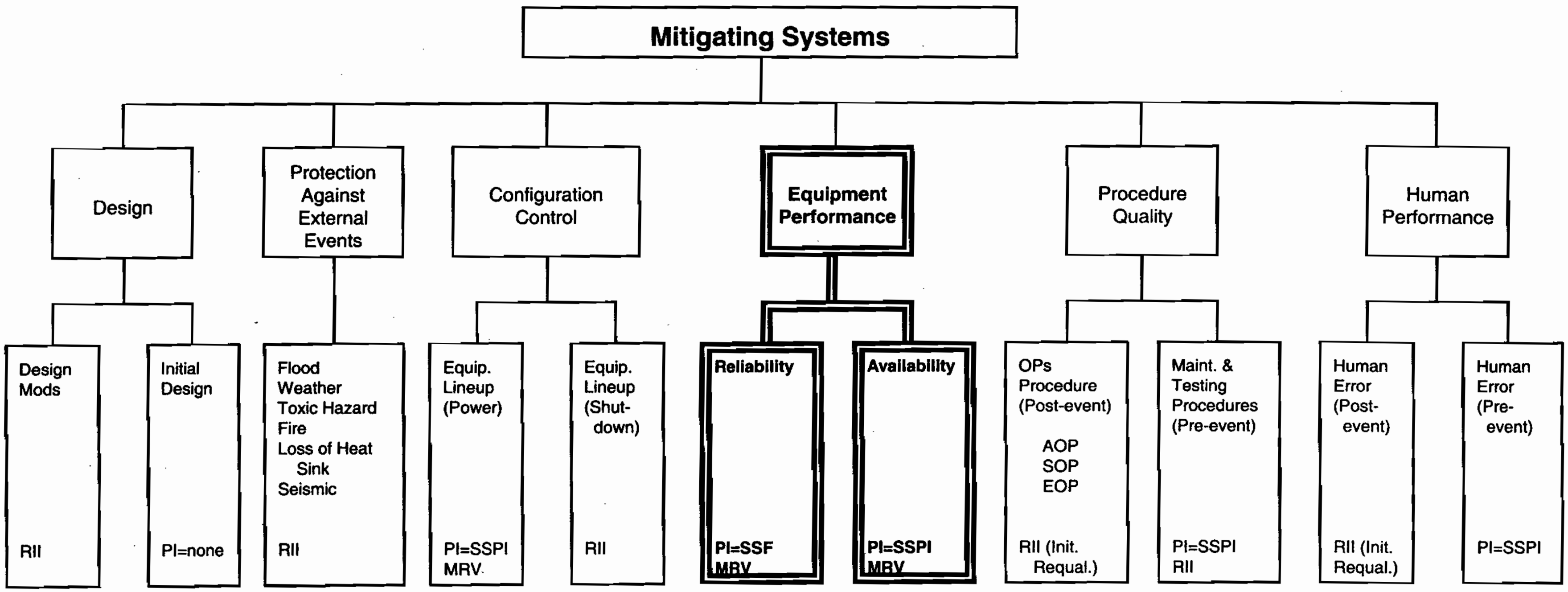
Background risk from accidents	0.000 5
NRC Quantitative Health Objective	0.000 000 5
Risk from 10^{-4} CDF*	0.000 000 02
Risk from 10^{-5} ΔCDF	0.000 000 002
Risk from 10^{-6} ΔCDF	0.000 000 000 2
Risk near nuclear power plant (NPP) with 10^{-4} CDF	0.000 500 02
Risk near NPP with 10^{-4} CDF + 10^{-5} ΔCDF	0.000 500 022
Risk near NPP with 10^{-4} CDF + 10^{-6} ΔCDF	0.000 500 020 2

*Derived from NUREG 1150 comparisons to safety goals

IDENTIFICATION OF RISK-SIGNIFICANT KEY ATTRIBUTES

- Example: For a PWR plant - full power internal events for Mitigating System cornerstone
- Issue: How to identify the risk-significant key attributes
- Approach: Use insights from plant-specific IPEs, ASP results, and system/component/event studies
- Preliminary results: (Figure from SECY-99-007)

KEY ATTRIBUTES



SSPI	= Safety System Performance Indicators
Init	= Initial Operator Exam
Requal	= Operator Requal
RII	= Risk Informed Inspections
MR	= Maintenance Rule
V	= Verification and Validation
SSF	= Safety System Failures

IDENTIFICATION OF RISK-SIGNIFICANT ELEMENTS

- Example is for reliability attribute
- Issue: How to identify risk-significant systems, trains and/or components
- Approach: Use Fussell-Vesely and Risk Achievement Worth importance measures
- Preliminary Results:
  - Auxiliary Feedwater system (AFW)
  - High-Pressure Injection system (HPI)
  - Component Cooling Water system (CCW)
  - Emergency AC Power
  - Power-Operated Relief Valves (PORVs)
  - Residual Heat Removal system (RHR)
  - Service Water system (SSW)

COLLECTION AND REVIEW OF PERFORMANCE DATA

- Issue: What data is available to assess risk-significant system reliability performance?

- Approach: Available data included EPIX, LERs, MORs, CCF and SSPI

- Preliminary Results: RADS was used for the period January 1997 through September 1999 (2.75 years)

SELECTION OF RISK-BASED PERFORMANCE INDICATORS

- Issue: Which performance indicators and at what level of performance (system, train, or component) would be capable of detecting performance changes in a timely manner?

- Approach: Used statistical methods and models developed in system, component and event studies to assess the appropriate monitoring level and monitoring interval.

- Preliminary Results:

System-Level	Train-Level	Component-Level
Auxiliary Feedwater High-Pressure Injection Residual Heat Removal PORVs	Emergency AC Power Component Cooling Water Service Water	Motor-driven pumps Turbine-driven pumps Motor-operated valves Air-operated valves

DETERMINATION OF PERFORMANCE THRESHOLDS

- **Issue: How to set performance thresholds so that a graded approach described in SECY-99-007 can be achieved**

- **Approach:**

  - **Used plant-specific SPAR models and performance indicators identified in the previous steps**

  - **Reliability values for each performance indicator were increased to reach a change in CDF of 1.0E-6, 1.0E-5, and 1.0E-4**

  - **Results were reviewed to determine whether they met the required performance indicator characteristics**

  - **95% for Green/White threshold will also be looked at**

- **Preliminary Results: (See following table)**

MITIGATING SYSTEMS THRESHOLD SUMMARY

System	Baseline Unreliability	Green/White Threshold (ΔCDF =1E-6/yr)	White/Yellow Threshold (ΔCDF =1E-5/yr)	Yellow/Red Threshold (ΔCDF =1E-4/yr)
Auxiliary Feedwater (No CCW or SSW supports modeled)	1.6E-4 (System-Level)	1.7E-4	3.0E-4	2.1E-3
Component Cooling Water (CCW)	2.0E-4 (Train-Level)	8.9E-3	1.0E-1	5.5E-1
Emergency AC Power	4.2E-2 (Train-Level)	4.3E-2	5.5E-2	1.3E-1
High-Pressure Injection (Includes CVCS trains)	3.3E-6 (System-Level)	4.0E-4	1.2E-2	2.0E-1
Power Operated Relief Valves	3.2E-2 (System-Level)	5.7E-2	2.6E-1	1E-4 Not Reached Even with System Failed
Residual Heat Removal	7.3E-3 (System-Level)	1.1E-2	3.4E-2	2.6E-1
Service Water (SSW)	1.6E-4 (Train-Level)	1.6E-3	5.5E-3	1.7E-2

Presentation To:

Advisory Committee On Reactor Safeguards

April 5, 2000

Subject:

NRR Human Performance Activities In Reactor Oversight Process

David Trimble
Richard Eckenrode

6

Human Performance Areas Of Interest In Reactor Oversight Process

- Cross Cutting Issue
- Performance Indicator
- Inspection Procedure
- Significance Determination Process

Human Performance
in
Reactor Oversight Process

Assumption:

Effects of Human Performance on Plant Safety Will Largely Be Reflected in the Plant Performance Indicators and Inspection Findings

Two-pronged Effort of Proof:

- Research - Insights - Operating Experience
  - Past Human Performance Analyses
  - Risk Studies
- HFIS - Comparison - Historical Data (5 Years)
  - New Process Data

Supplemental Inspection Procedure
for
Human Performance

IP-71841

Objectives: With Respect to Human Performance,

1. Assess Licensee's Root Cause Evaluation and Corrective Actions.

2. Assess Extent of Condition.

IP-71841 Topic Areas

Human System Interface
- Visual Information/Display
- Control Function/Control Device
- Alarm/Annunciation

Environment

Communication

Coordination of Work/Supervision

Work Practices

Procedure Use/Adherence

Training and Qualifications (IP-41500)

Fitness for Duty

Human Performance Significance Determination Process

Functional Areas:
- Operations
- Maintenance
- Surveillance
- Testing
- Health Physics
- Security

Issue Areas:
- Training
- Procedures
- Human/System Interface
- Environment
- Supervision
- Communication
- Staffing
- Fitness for Duty

SDP
Basic Premise

Every Human Action Requires Information (e.g. Display Parameters, Training, Procedures, Supervisory Direction) to Initiate the Action and Control Capability (e.g. Switch, Keyboard, Wrench, Test Equipment) to Accomplish the Action.

Second Premise

<u>No</u> Information or Control Capability Is Better Than <u>Incorrect</u> Information or Control Capability.

Third Premise

Anything Less Than Complete Failure to Perform an Action (e.g. Untimely, But Completed), <u>May</u> Not Be As Risk-Important As Complete Failure.

Risk Importance

Regulatory Guide 1.174 - An Approach for Using Probabilistic Risk Assessment In Risk-Informed Decisions On Plant-Specific Changes to the Licensing Basis

Draft - Guidance for the Review of Changes to Risk-Important Human Actions - Brookhaven National Laboratory

Operator Requalification SDP

- Written Exam
  - Quality
  - Security
  - Number Of Failures

- Job Performance Measures
  - Quality
  - Number Of Failures

- Simulator
  - Fidelity
  - Scenario Quality
  - Operational Test
    - Single/Multiple Crew Failures
    - Remediation

(7)

ACRS MEETING HANDOUT

Meeting No.	Agenda Item	Handout No.:
471^{ST}	5	5.1

Title: Human Performance Program

Authors: NRC Staff

List of Documents Attached

Draft NRC Inspection Manual, Inspection Procedure 71841: Supplemental Inspection for Human Performance, received April 3, 2000

5

Instructions to Preparer
1. Paginate Attachments
2. Punch holes
3. Place Copy in file box

From Staff Person
N. Dudley

PREPARED FOR INTERNAL COMMITTEE USE

DRAFT

NRC INSPECTION MANUAL

AAAA

Inspection Procedure 71841

SUPPLEMENTAL INSPECTION FOR HUMAN PERFORMANCE

PROGRAM APPLICABILITY: 2515

FUNCTIONAL AREA:
Initiating Events
Mitigating Systems
Barrier Integrity
Emergency Preparedness
Occupational Radiation Safety
Public Radiation Safety
Physical Protection

INSPECTION BASIS:

This supplemental inspection procedure is to be implemented when human performance issues have been identified (either by the NRC or the licensee) as contributing to one degraded cornerstone or three white inputs (either PIs or inspection findings) in a strategic performance area. This procedure is performed in conjunction with supplemental Inspection Procedure 95002.

71841-01 INSPECTION OBJECTIVE(S)

The objective of this inspection is to (1) assess the adequacy of the licensee's root cause evaluation and corrective actions with respect to human performance and (2) to independently assess the extent of condition associated with the identified human performance root causes.

71841-02 INSPECTION REQUIREMENTS

To substantiate that the licensee has adequately identified in their evaluation the root cause(s)or contributing causes(s) and taken appropriate corrective actions for each human performance related issue.

To independently assess extent of condition with respect to human performance such that each human performance identified problem has been evaluated for potential impacts on other plant equipment, programs or processes.

In completing this inspection procedure it is not expected that NRC inspectors perform a full evaluation of each causal factor listed below. However, the inspectors should assure themselves that they have independently reviewed the underlined topic areas to determine their applicability to the human performance issue(s) of concern. The inspector should check each topic area for possible applicability and if the area is applicable should then review each causal factor within that section of the table. Questions to address each causal factor are provided in the specific guidance area of this procedure.

Topic Areas and Causal Factors:

(See tables starting on page 6 for more detail)

02.01 Human-System Interface

a. Visual Information/display

- incorrect
- mistrusted
- visibility less than adequate (LTA)
- content LTA
- organization/format LTA
- too much information
- insufficient information
- identifiers (labels and tagouts, warnings and postings) LTA
- confusing
- accessibility LTA
- navigation (method of movement through displays) LTA
- conflicting
- missing
- unstable

b. Control function/control device

- missing
- accessibility/location for hard-wired controls LTA
- accessibility of soft (software mediated) controls LTA
- movement/motion LTA
- function LTA
- too many concurrent actions
- response/feedback LTA
- identification (labels and tagouts) LTA

c. Alarm/annunciation

- missing
- too many/not prioritized
- auditory warning LTA
- organization/format LTA
- content LTA
- visibility/conspicuity LTA
- continuously illuminated
- continuously repeated
- disabled
- alarm procedure availability and adequacy LTA
- computer printout and control room log differ
- alarm response LTA

02.02 Environment

- too hot
- too cold
- too humid
- too dark
- too bright
- too noisy
- cramped/inaccessible workplace
- dangerous work place
- distractions prevalent
- high radiation/toxicity
- vibration impedes work

02.03 Communication

- missing/lack of information
- content LTA
- untimely information
- misunderstood/misinterpreted
- inconsistent information
- repeat-back LTA
- verification LTA
- mode/communication devices LTA
- logbook maintenance LTA
- work package LTA
- document management LTA
- standard terminology LTA
- information about system/equipment LTA
- information not sought
- information not used

02.04 <u>Coordination of Work/Supervision</u>

- supervisory availability LTA
- task description/explanation LTA
- coordination of team activities LTA
- assignments of roles and responsibilities LTA
- task progress monitoring LTA
- chain of command LTA
- oversight LTA
- staff working hours program LTA
- pre-job briefing LTA
- shift turnover LTA
- planning and scheduling work LTA
- resource allocation LTA

02.05 <u>Work Practices</u>

- formalization of work practices LTA
- self-checking LTA
- independent verification LTA
- walkdowns LTA
- inattention to detail
- lack of questioning attitude
- lack of awareness of equipment status
- lack of awareness of plant condition (situation awareness LTA)
- lack safe work practices
- improper tools/materials used
- teamwork LTA
- housekeeping LTA
- too many task interruptions

02.06 <u>Procedure use/adherence (for procedure quality use IP42001 or IP42700)</u>

- no procedure/unavailable
- procedure/references not used
- procedure prerequisites not met
- procedure steps circumvented
- procedure modification process LTA
- incorrect procedure used
- procedure believed to be incorrect

02.07 <u>Training and qualifications (use IP41500 and NUREG-1220)</u>

02.08 <u>Fitness For Duty</u>

- substance abuse (chemical and alcohol)
- illness
- fatigue/excessive overtime
- excessive workload

- working too long without resting working continuously without breaks
- time pressure to complete tasks
- too many concurrent tasks
- too many distractions
- night work
- called into work outside regular schedule
- cognitive overload
- cognitive underload (boredom)

71841-03 INSPECTION GUIDANCE

General Guidance

This inspection procedure is designed to be used to assess the adequacy of the licensee's evaluation of human performance issues. As such, a reasonable time (generally within 30-60 days) should be allowed for the licensee to complete their evaluation; however, all corrective actions may not be fully completed upon commencement of this procedure.

The following tables are provided as guidance to help the inspector fulfill the inspection requirements contained in paragraph 02. It is not intended that the inspector perform a full evaluation of each causal factor, however to the extent that the human performance issue contains features related to the causal factor that entire section should be consulted. The intent is that the inspector use the guidance contained in the tables to verify that the licensee's evaluation identified the deficiencies associated with the performance issue.

Inspectors should be aware that more than one corrective action may be necessary to correct a particular contributing or root cause. In addition, the inspectors may need to look at several identified contributing or root causes for the human performance issue. Although unlikely, one human performance root cause may cover an entire white, yellow or red input or more likely may be one of several root causes identified within a white, yellow or red input.

Definitions

Root Cause(s) is defined as the basic reason(s) (i.e., hardware, process, human performance), for a problem, which if corrected, will prevent recurrence of that problem.

Contributing Cause(s) is defined as causes that by themselves would not create the problem, but are important enough to be recognized as needing corrective action. Contributing causes are those actions, conditions, or events which directly or indirectly influence the outcome of a situation or problem.

Extent of Condition is defined as the extent to which an identified problem has the potential to impact other plant equipment, programs or processes in the same manner identified in the root cause analysis.

Human-system Interface (HSI) is defined as the technology through which personnel interact with systems, e.g. alarms, displays, controls, procedures, valve handles, test points.

Specific Guidance

The information contained in this section provides the inspector with specific guidance on how to determine if the licensee's root cause evaluation and corrective actions were adequately performed and implemented. The inspector will, using the information provided to him by the licensee (e.g., licensee's root cause analysis and corrective action plan/results), selectively apply the guidance in the attribute table(s) that relates to the problem evaluated by the licensee to determine whether the licensee's evaluation and corrective action processes have adequately considered the attributes contained in the relevant tables. For example, if it is determined that a human-system interface deficiency (ies) such as incorrect information being displayed by an instrument was identified as a cause by the licensee in its evaluation, the inspector would use the Visual Information table to evaluate the thoroughness of the licensee's evaluation of this cause. ***It is intended that the inspector will incorporate an explanation in the inspection report to document the licensee's responses to items in columns (1) through (3) for each of the applicable attributes that the inspector evaluates.***

With respect to "extent of condition", the inspector is expected to determine if the licensee adequately determined if the identified root cause(s) could have impacted other plant equipment, programs or processes. If the licensee did not adequately investigate extent of condition of the human performance problem then it is expected that the inspector will independently follow-up. The inspector should use column 3 as a guide to ask the appropriate questions to ascertain if other potential areas or conditions also need corrective actions.

Human-System Interface

Visual Information/Display

(1) Causal Factors: (Root Cause or contributing cause)	(2) For each of the items provide the evidence used to identify the root cause	(3) For the immediate condition as well as for any other related applicable conditions has the licensee:	(4) References
missing	What is the specific missing information?	provided the missing information satisfactorily?	
incorrect	What is incorrect about the information?	corrected the information satisfactorily?	NUREG-0700, Rev. 1, Paragraph (0700) - 1.4
mistrusted	Why is the information mistrusted?	eliminated the reason for mistrust satisfactorily?	0700 - 1.4
visibility LTA (LTA = less than adequate)	Why is the information difficult to see? Is it in a poor location? Too small? Poor contrast to background (color, brightness, glare)?	relocated the information? Enlarged the font? Improved the contrast improved?	0700 - 1.1, 1.2, 1.3, 1.5
content LTA	What specifically is inadequate about the information content?	improved the content satisfactorily?	0700 - 1.1, 1.4
organization/ format LTA	Is the organization/format confusing? What specifically is confusing?	improved the organization/format satisfactorily to eliminate the confusion?	0700 - 1.1, 1.2, 1.3
too much information	Is there unneeded information such that the needed information is difficult to find?	removed the unneeded information or provided a method of prioritizing the needed information?	0700 - 1.1
insufficient information	Is there not enough information to meet the need?	added information to meet the need?	0700 - 1.1-10
identifiers (labels and tagouts, warnings and postings) LTA	Is the equipment not labeled or labeled poorly such that it is not easily identified? Are the identifiers missing, inaccurate, confusing or difficult to detect? Do tagouts obscure other information?	labeled or improved the information labeling satisfactorily? Provided evidence that warnings and postings are inadequate? Improved the identifier program to eliminate problems?	0700 - 1.1, 1.2, 1.3

confusing	Is the information as presented confusing? What is the source of the confusion?	taken steps to eliminate the confusion?	0700 - 1.1, 1.2, 1.3
accessibility LTA	Why is the information difficult to access?	improved the accessibility of the information?	0700 - 1.1, 2.5
conflicting	Are there conflicts between multiple sources of the same information?	corrected the source of the information conflict?	0700 - 1.4
unstable	Is there a mismatch between the parameter being measured and the displayed information for that parameter?	identified the source of the mis match (e.g.,display, signal, sensor)? Corrected the source of the information mismatch?	0700 - 1.4

Control Function/Control Device

(1) Causal Factors: (Root Cause or contributing cause)	(2) For each of the items provide the evidence used to identify the root cause	(3) For the immediate condition as well as for any other related applicable conditions has the licensee:	(4) References
missing	What specific control function is missing?	provided the necessary control function where needed?	
accessibility/ location for hard-wired controls LTA	Is the control too high? Too low? Too far from associated displays? Is it blocked/covered by other equipment?	moved the control to a satisfactory location or removed impeding equipment?	0700 - 3.1, 3.3, 3.4
accessibility of soft controls LTA	Is the control accessible? Why is the control inaccessible?	improved the accessibility of the control?	0700 - 2.1, 3.1, 3.2, 3.4
movement/ motion LTA	Is the direction of motion correct/intuitive? Is it difficult to operate (tension too great, range of movement too great, too small?). Is the control size/shape uncomfortable?	corrected the control movement/motion/feel?	0700 - 3.1, 3.2, 3.3
function LTA	Is the function of the control appropriate? Does it do what is required of the task/action?	corrected the control to provide the required function?	0700 - 2.1, 2.2, 2.3, 2.5, 2.6, 2.7
too many concurrent actions	Does the operator have to perform too many control actions concurrently or within too short of a time period?	corrected the concurrent action problem satisfactorily?	0700 - 2.1

response/ feedback LTA	Is the response/feedback satisfactory? Can the operator understand what the control action has accomplished? Is response/feedback timely?	provided a satisfactory and timely response/feedback?	0700 - 2.4, 3.4
identification (labels and tagouts) LTA	Is the control function not labeled or labeled poorly such that it is not easily identified?	labeled or improved the control function labeling satisfactorily?	0700 - 2.1, 3.1, 3.2, 3.3, 3.4

<u>**Alarm/annunciation**</u>

(1) Causal Factors: (Root Cause or contributing cause)	(2) For each of the items provide the evidence used to identify the root cause	(3) For the immediate condition as well as for any other related applicable conditions has the licensee:	(4) References
missing	What specific alarm is missing? What function needs to be alarmed that currently is not?	provided the needed alarm satisfactorily?	0700 - 4.2
too many/not prioritized	Do too many alarms activate simultaneously such that the operator does not know how to respond? Are the alarms not prioritized?	reduced the number of alarms such that the operator can respond properly? Has the licensee implemented an effective alarm prioritization system?	0700 - 4.2, 4.3, 4.4, 4.5
auditory warning LTA	Auditory warning too loud? Too soft? Wrong pitch? Not sufficiently discriminable from other alarms or background?	corrected the auditory deficiencies?	0700 - 4.5.6.3
organization/ format LTA	Are the alarms located and grouped in a way that makes it difficult to quickly locate alarms that are related to each other and to the systems that trigger them?	corrected deficiencies in location and organization of alarms?	0700 - 4.1, 4.5
content LTA	Is the information presented by the alarm insufficient to quickly and clearly understand the condition which it is intended to convey?	corrected the alarm presentation to convey the intended information?	0700 - 4.1, 4.2, 4.5

visibility/ conspicuity LTA	Why is the alarm difficult to see or discern? Is it in a poor location? Is it obscured by other equipment? Is it too small? Does it visually standout from its background? Is the information presented on the alarm difficult to read do to size, color, contrast, font, number of characters, etc.?	relocated or redesigned the alarm or removed obscuring equipment?	0700 - 4.5, 4.10
continuously illuminated	Is an alarm condition continuously illuminated, if the continuous illumination is not necessary for operator information or action?	corrected all inappropriately illuminated alarms?	0700 - 4.2
continuously repeated	Does an alarm inappropriately continue to activate even after it has been acknowledged?	corrected alarms that inappropriately repeat after acknowledgment?	0700 - 4.2
disabled	Has an alarm been inappropriately been disabled? Has the licensee determined why?	corrected this problem?	
alarm procedure availability and adequacy LTA	Are the alarm procedures readily available and is the content and format suitable?	performed an appropriate verification and validation of the alarm procedures?	0700 - 4.5, 4.9
computer printout and control room log differ	Are the alarm list and control room log consistent?	determined the source of the difference and resolved the problem?	
navigation LTA	Are computer-based alarms accessible without excessive need to search thru numerous computer screens?	improved the navigation for alarm systems?	0700 - 4.6.1
alarm response LTA	What was inadequate about the alarm response?	improved the response?	0700 - 4.5.3, 4.6, 4.9

Environment

(1) Causal Factors: (Root Cause or contributing cause)	(2) For each of the items provide the evidence used to identify the root cause	(3) For the immediate condition as well as for any other related applicable conditions has the licensee:	(4) References
too hot	What is the evidence that the working environment was too hot for sustained safe task performance? What is the evidence that support tools and equipment (coolers), protective gear (Cold Suit), or appropriate work practices and procedures (exposure limits) were unavailable or not used.	taken steps to reduce the temperature?	0700 - 7.3.1, 7.3.2, 8.5.1 NUREG/CR-5680, Para. (5680) - 4.2, 4.3, 4.5
too cold	What is the evidence that the working environment was too cold for sustained safe task performance? What is the evidence that support tools and equipment (heaters), protective gear (insulated clothing), or appropriate work practices and procedures (exposure limits) were unavailable or not used.	taken steps to increase the temperature?	0700 - 7.3.1, 7.3.2, 8.5.1 5680 - 5.2, 5.3, 5.5
too humid	What is the evidence that the working environment was too humid for sustained safe task performance? What is the evidence that support tools and equipment (fan), or appropriate work practices and procedures (exposure limits) were unavailable or not used.	taken steps to reduce the humidity?	0700 - 7.3.1, 7.3.2, 8.5.1 5680 - 4.2, 4.3, 4.5
too dark	What is the evidence that the working environment was too dark for safe task performance? What is the evidence that support tools and equipment (temporary lighting) or appropriate work practices and procedures were unavailable or not used.	taken steps to improve the lighting?	0700 - 7.3.3, 7.3.4, 8.5.3 5680 - 6.2, 6.3, 6.5
too bright	What is the evidence that lighting in the working environment impeded safe task performance or personnel safety? What is the evidence that brightness, aim, location, glare or beam angle adversely effected visual performance?	taken step to reduce the brightness, glare, etc.?	0700 - 7.3.3, 7.3.4, 8.5.3 5680 - 6.2, 6.3, 6.5

too noisy	What is the evidence that the working environment was too noisy for sustained safe task performance or masks necessary auditory signals and communications? What is the evidence that protective gear (hearing protectors) or appropriate work practices and procedures (exposure limits) were unavailable or not used?	taken steps to reduce the noise?	0700 - 7.3.5, 8.5.2 5680 - 3.2, 3.3, 3.5
cramped/ inaccessible workplace	What is the evidence that cramped/inaccessible workplaces detracts from sustained safe task performance? What is the evidence that support equipment (creeper, ladder), training, labels, or appropriate work practices and procedures were unavailable or not used?	taken steps to enlarge the working area and improve access?	0700 - 7.4, 8.2, 8.5.2
dangerous work place	What is the evidence that the work environment contributes to slips, falls or other physical injuries? What is the evidence that poor housekeeping contributed to the situation? What is the evidence that warnings and cautions are not present?	taken steps to correct the dangerous working conditions?	
distractions prevalent	What is the evidence that distractions impede safe task performance? What are the distractions?	taken steps to eliminate the distractions?	
high radiation/ toxicity	What is the evidence that excessive radiation or toxicity in the working environment adversely effected sustained safe task performance or personnel safety? What is the evidence that support equipment (alarming dosimeter), protective gear (rad protection suit), or appropriate work practices and procedures (exposure limits) were unavailable or not used.	taken steps to correct the situation?	
vibration impedes work	What is the evidence that there was excessive vibration in the working environment which impeded sustained safe task performance? What is the evidence that equipment was insufficiently balanced, damped or isolated, protective gear, or appropriate work practices and procedures (exposure limits) were unavailable or not used.	taken steps to reduce the vibrations?	5680 - 2.2, 2.3, 2.5

Communication

The factors below apply to (1) both written and/or verbal communications, (2) both intra- and inter-departmental communications and (3) all situations e.g. control room, pre-briefings, shift turnover, etc.

(1) Causal Factors: (Root Cause or contributing cause)	(2) For each of the items provide the evidence used to identify the root cause	(3) For the immediate condition as well as for any other related applicable conditions has the licensee taken steps to ensure that:	(4) References
missing/lack of information	Did the sender send and the receiver receive the necessary information?	the necessary information is sent and received?	NUREG-1545, Para. (1545) - 2.3, 2.4, 2.5, 2.6
content LTA	Was the information correct? Was the message appropriate for the work environment, the job at hand, and the receivers level of knowledge? Was the terminology familiar to the receiver?	the proper, accurate and concise information is provided?	1545 - 2.3.1, 2.4.1, 2.5, 2.6
untimely information	Was the message sent at the correct time to be useful?	information is transmitted in a timely manner?	1545 - 2.4.1
misunderstood/ misinterpreted	Did the receiver interpret the message consistent with the sender's meaning?	message content is clear and understandable?	
inconsistent information	Was the information consistent with other information about performing the task?	transmitted messages contain consistent information?	
repeat-back LTA	Did the receiver confirm receipt and understanding of information by repeating what was heard in appropriate situations.	the proper repeat-back procedure is understood and implemented?	1545 - 2.4.1
verification LTA	Did the sender ensure that the information was received and understood? Did the receiver confirm the correct interpretation of the message?	message verification procedures are in place and properly implemented?	1545 - 2.4.1
mode/ communication devices LTA	Was the message produced so that it was easy to hear or read?	all communication devices are available and in proper working order?	0700 - 6.1, 6.2, 6.3 1545 - 2.4.1
logbook maintenance LTA	Are entries accurate and timely? Do they reflect plant activities and status?	logbooks are properly maintained according to plant procedure?	
Work package LTA	Is the information complete? Is it accurate?	work packages are properly filled out, and contain complete and accurate information?	

document management LTA	Were there omissions and/or technical inaccuracies in developing and managing technical documentation resulting in communication errors?	the document management system is effective and is implemented properly?	
standard terminology LTA	Was standard terminology used?	standard terminology is in place and is used in all appropriate communications?	
information about system/ equipment LTA	Were deficiencies or status changes reported/recorded?	system/equipment status is properly understood, reported and recorded?	
information not sought	Did the receiver seek out the information needed to perform the job?	necessary information is requested as appropriate?	
information not used	Did the receiver use the necessary information?	necessary information is used when received?	

Coordination of Work/Supervision

(1) Causal Factors: (Root Cause or contributing cause)	(2) For each of the items provide the evidence used to identify the root cause	(3) For the immediate condition as well as for any other related applicable conditions has the licensee taken steps to ensure that:	(4) References
supervisory availability LTA	Were supervisors available to the workers as necessary?	the proper supervisors are available when required?	NUREG/CR-5455, Vol. 2, Sec. (HPIP) - 16
task description/ explanation LTA	Did the supervisors ensure that the workers understood the assigned tasks? Did the supervisors coordinate between departments as necessary?	workers fully understand what they are to do and how to accomplish it?	
coordination of team activities LTA	what was the evidence that there was insufficient coordination of team activities	team coordination is understood and being implemented?	HPIP - 16
assignments of roles and responsibilities LTA	Did the supervisors match tasks to the appropriate personnel?	assignments are appropriate to the skills and availability of personnel?	HPIP - 16
task progress monitoring LTA	Were the work activities tracked?	work activities and progress are appropriately monitored?	

chain of command LTA	Were reporting responsibilities clear?	reporting responsibilities are clear and are being implemented properly?	
oversight LTA	Did the supervisor provide appropriate oversight of all work activities within their organizational unit?	oversight is being appropriately implemented?	HPIP - 16
staff working hours program LTA	Was circadian cycle considered during scheduling work? Was overtime considered during work scheduling? **** See fitness for duty for additional questions.	the Commission's policy statement was taken into consideration in the overtime planning and implementation?	Generic Letter 82-12, Commission Policy Statement 10 CFR 26.20
pre-job briefing LTA	Did the supervisor ensure adequacy of pre-job briefings? Was a pre-job briefing held if necessary?	pre-job briefings contain complete and accurate information, including all necessary cautions and warnings, and are conducted properly?	HPIP - 16
shift turnover LTA	Did the supervisor ensure adequacy of shift turnover?	shift turnover process has been improved to provide complete and accurate status information?	
planning and scheduling work LTA	Was work planned adequately e.g. site visits, job walkthru, special requirements and constraints identified? Were personnel workload and workflow well managed? Was work prioritized? Were possible conflicts identified?	the work planning and scheduling process has been improved to mitigate the problems identified?	HPIP - 16
resource allocation LTA	Were sufficient workers assigned, appropriate materials available and sufficient time allocated for the job?	sufficient resources have been made available to accomplish the planned activities?	

Work Practices

(1) Causal Factors: (Root Cause or contributing cause)	(2) For each of the items provide the evidence used to identify the root cause	(3) For the immediate condition as well as for any other related applicable conditions has the licensee:	(4) References
formalization of work practices LTA	Are work practices formalized? How were work practices formalized?	developed a formal work practice?	
self-checking LTA	Was there evidence of self-checking? Was there adequate self-checking?	emphasized self checking in training?	

independent verification LTA	Was there evidence of independent verification? Was there adequate independent verification?	supplied adequate staffing for independent verification?	
walkdowns LTA	Did a walkdown occur during turnover? Was the walkdown conducted adequately?	improved the walkdown process?	HPIP - 16
inattention to detail	What evidence does the licensee have that the root cause was inattention to detail? Why was inattention to detail selected as the root cause?	fixed the problem to prevent recurrence?	
lack of questioning attitude	What evidence was there of a questioning attitude? Was there evidence of a general lack of questioning attitude?	put into effect programs that are likely to improve questioning attitude among staff? addressed any generic findings?	
Lack of awareness of equipment status	What evidence was there of a lack of awareness of equipment status?	taken the appropriate steps to assure that staff is aware of equipment status?	
Lack of awareness of plant condition (situation awareness LTA)	What evidence was there of a lack of awareness of the plant condition?	address any generic findings?	
lack safe work practices	What is the evidence that supports that staff is not using safe work practices? Does the evidence support the finding?	address the finding with an appropriate corrective action? Does the corrective action address any generic findings?	
improper tools/ materials used	Why was improper equipment used? Availability? Did the work control system indicate the appropriate tools needed?	addressed this issue?	
teamwork LTA	What is the evidence of lack of proper teamwork?	taken steps to improve teamwork ? Are these steps adequate?	HPIP - 16
housekeeping LTA	What is the evidence of poor housekeeping?	taken steps to improve housekeeping? Are these steps adequate?	
too many task interruptions	What is the evidence that task interruptions had an impact on job performance?	taken steps to correct the situation?	

Procedure use/adherence (for procedure quality use IP42001 or IP42700)

(1) Causal Factors: (Root Cause or contributing cause)	(2) For each of the items provide the evidence used to identify the root cause	(3) For the immediate condition as well as for any other related applicable conditions has the licensee taken steps to:	(4) References
no procedure/ unavailable	Why did the procedure not exist or was unavailable?	ensure a procedure was made available?	
procedure/ references not used	What is the evidence that a procedure/reference was not used?	ensure that procedures/references will be used in the future?	SECY-90-337
procedure prerequisites not met	Why were prerequisites not met?	ensure all procedure prerequisites will be met in the future?	SECY-90-337
procedure steps circumvented	Why were procedure steps circumvented?	ensure that steps will not be circumvented in the future?	SECY-90-337
procedure modification process LTA	What is the evidence that the procedure modification process is LTA? What is wrong with the process?	correct the deficiency?	SECY-90-337
incorrect procedure used	What is the evidence that an incorrect procedure was used? Why was an incorrect procedure used?	ensure that incorrect procedures will not be used in the future?	
procedure believed to be incorrect	What is the evidence to believe that the procedure was incorrect? Was it incorrect?	restore confidence in the correctness of procedures?	

TRAINING AND QUALIFICATIONS (USE IP41500 AND NUREG-1220)

FITNESS FOR DUTY:

(1) Causal Factors: (Root Cause or contributing cause)	(2) For each of the items provide the evidence used to identify the root cause	(3) For the immediate condition as well as for any other related applicable conditions has the licensee:	(4) References

substance abuse (chemical and alcohol)	What is the evidence that substance abuse was responsible for/or contributed to human performance error? Did the licensee complete for-cause testing as soon as possible in accordance with 10 CFR 26.24 (3) in cases of suspected substance abuse?	assured that substance abuse would not be tolerated at the plant?	10 CFR 26.20, 26.24
illness	What is the evidence that Illness/injury was responsible for/or contributed to human performance error? Did the licensee complete a medical records check of personnel directly involved as soon as possible after the event?	assured that sick employees would not be assigned to safety significant jobs?	10 CFR 26.20
excessive overtime	What is the evidence that excessive overtime was responsible for/or contributed to human performance error? Did the licensee complete a check of the shift logs and timekeeping records as soon as possible after the event?	taken action to reduce excessive overtime?	10 CFR 20
excessive workload	What is the evidence that excessive workload was responsible for/or contributed to human performance error? Did the licensee complete a check of work request records as soon as possible after the event? Did the licensee interview personnel involved with the event concerning their workload as soon as possible after the event?	taken action to reduce excessive workload?	
working too long without resting working continuously without breaks	What is the evidence that personnel working excessive time without rest breaks was responsible for/or contributed to human performance error? Did the licensee complete a check of the shift logs and timekeeping records as soon as possible after the event? Did the licensee interview personnel involved with the event concerning their work periods as soon as possible after the event?	assured that fatigue would not result from working too long?	10 CFR 26.20

time pressure to complete tasks	What is the evidence that working under excessive time pressure to complete tasks was responsible for/or contributed to human performance error? Did the licensee interview personnel involved with the event concerning their perception of time pressure to complete tasks as soon as possible after the event?	reduced the effects of time pressures?	10 CFR 26.20
too many concurrent tasks	What is the evidence that working too many concurrent tasks was responsible for/or contributed to human performance error? Did the licensee complete a check of work request records as soon as possible after the event? Did the licensee interview personnel involved with the event concerning their perception of their workload as soon as possible after the event?	redistributed work responsibilities?	
too many distractions	What is the evidence that being distracted was responsible for/or contributed to human performance error? Did the licensee interview personnel involved with the event concerning their perception of distractions as being a contributor to the event?	reduced distractions from critical work situations?	
night work	What is the evidence that working under nighttime work conditions was responsible for/or contributed to human performance error? Did the licensee complete a check of the shift logs and timekeeping records as soon as possible after the event? Did the licensee interview personnel involved with the event concerning their work periods as soon as possible after the event?	reduced the effects of night work?	

called into work outside regular schedule	What is the evidence that working irregular hours/hours outside regularly scheduled hours was responsible for/or contributed to human performance error? Did the licensee complete a check of the shift logs and timekeeping records as soon as possible after the event? Did the licensee interview personnel involved with the event concerning their work periods as soon as possible after the event?	reduced the effects of unscheduled work hours?	
cognitive overload	What is the evidence that task complexity was responsible for/or contributed to human performance error? Did the licensee interview personnel involved with the event concerning their perception of the complexity of the tasks they were performing as being a contributor to the event?	taken into account cognitive overload?	
cognitive underload (boredom)	What is the evidence that boredom was responsible for/or contributed to human performance error? Did the licensee interview personnel involved with the event concerning their perception of the complexity of the tasks they were performing as being a contributor to the event?	taken steps to relieve boredom?	

XXXXX-04 RESOURCE ESTIMATE

It is estimated that this procedure will take between 8 and 40 man-hours to complete for each human performance issue. The inspector or inspectors assigned should be familiar with the discipline associated with the subject of the licensee's evaluation. For planning purposes, a resource estimate near the lower end of the scale should be used for licensees with corrective actions programs that have been determined to be thorough during the annual inspection for the identification and resolution of problems. For licensees with corrective action programs that have been previously determined to be ineffective, a resource estimate near the higher end of the scale should be used.

71841-05 REFERENCES

10 CFR Part 26, Fitness for Duty Programs

SECY-90-337, Procedural Adherence Requirements

Generic Letter No. 82-12, Nuclear Power Plant Staff Working Hours

NUREG-0700, Rev. 1, Vol. 1 - Human-System Interface Design Review Guideline

NUREG-1220, Rev. 1, Training Review Criteria and Procedures

NUREG-1545, Evaluation Criteria for Communication-Related Corrective Action Plans

NUREG/CR-5680, The Impact of Environmental Conditions on Human Performance

NUREG/CR-5455, Vol. 2, Development of the NRC's Human Performance Investigation Process (HPIP), Investigator's Manual

END

NRC Program on Human Performance in Nuclear Power Plant Safety

ACRS

April 5, 2000

Jack Rosenthal
Office of Nuclear Regulatory Research

David Trimble
Richard Eckenrode
Office of Nuclear Reactor Regulation

8

PRESENTATION OUTLINE

- SECY-00-0053 - J. Rosenthal, RES
- NRR Activities With Reactor Oversight Process - D. Trimble, NRR
  R. Eckenrode, NRR
- Future Planning Activities - J. Rosenthal, RES

Background

- Initial Version of Human Performance Program - 1995
- SECY-98-244, October 1998
  - Work in Progress
  - Described Risk-Informed Process
- ACRS Review, February 1999
  - Agreed with Process
- SECY-00-0053, February 2000

SECY-00-0053

- Status Report
- Mission
- Basis for the Program
- Program Elements
- Future Activities

Basis for the Program

- User Needs
- Risk Reviews
- Industry and International Activities
- Activities at Other Agencies
- Related NRC Programs

Risk Reviews

- Evaluated Human Reliability Sensitivity Studies -BNL
- Qualitative Review of ASP Data - RES
  - 5 Years of Events
  - Events with CCDP > 10 E-5
  - Reviewed LERs and Inspection Reports
- Quantitative Review of ASP Data -INEEL
  - Same Events
  - Isolated Human Performance Contribution
  - Reviewed LERs and Inspection Reports

INEEL STUDY

Objective - Study how human performance influences risk at commercial nuclear plants to provide a basis to support development of Human Performance Program

Method - Review Events to determine specific human and process related influences.

Results -

- Range of Human Performance Contribution = 10% to 100% (16 events)
- Ratio of latent to active errors = 4:1

Category (followed by human performance influence)	Latent Errors	Active Errors
Operations		
Command and control issues including crew resource management	6	5
Failure to follow safe procedures	1	
Improper diagnostics	1	1
Inadequate knowledge or training	7	3
Design and Design Change Work Process		
Design deficiencies	7	
Inadequate design and design change testing	2	
Inadequate engineering evaluation	3	
Ineffective indications for abnormal condition		1
Inadequate knowledge during design process	1	
Drawing configuration management	1	
Maintenance Work Process		
Poor work package preparation, QA and use	3	
Inadequate maintenance practices	4	
Inadequate technical knowledge	2	
Procedural Design and Development Process		
Inadequate procedures	6	
Inadequate alarm response procedures	1	
Organizational Learning and Corrective Action Program		
Failure to respond to industry and internal notices	8	
Failure to follow industry operating practices	2	
Failure to identify by trending	2	
Failure to validate vendor reports	1	
Work Prioritization		
Failure to correct known deficiencies	5	
Continue to operate during unstable conditions		1

Program Elements

- Reactor Oversight Process
- Plant Licensing and Monitoring
- Risk-informed Regulation Implementation Plan
- Emerging Technology/Issues

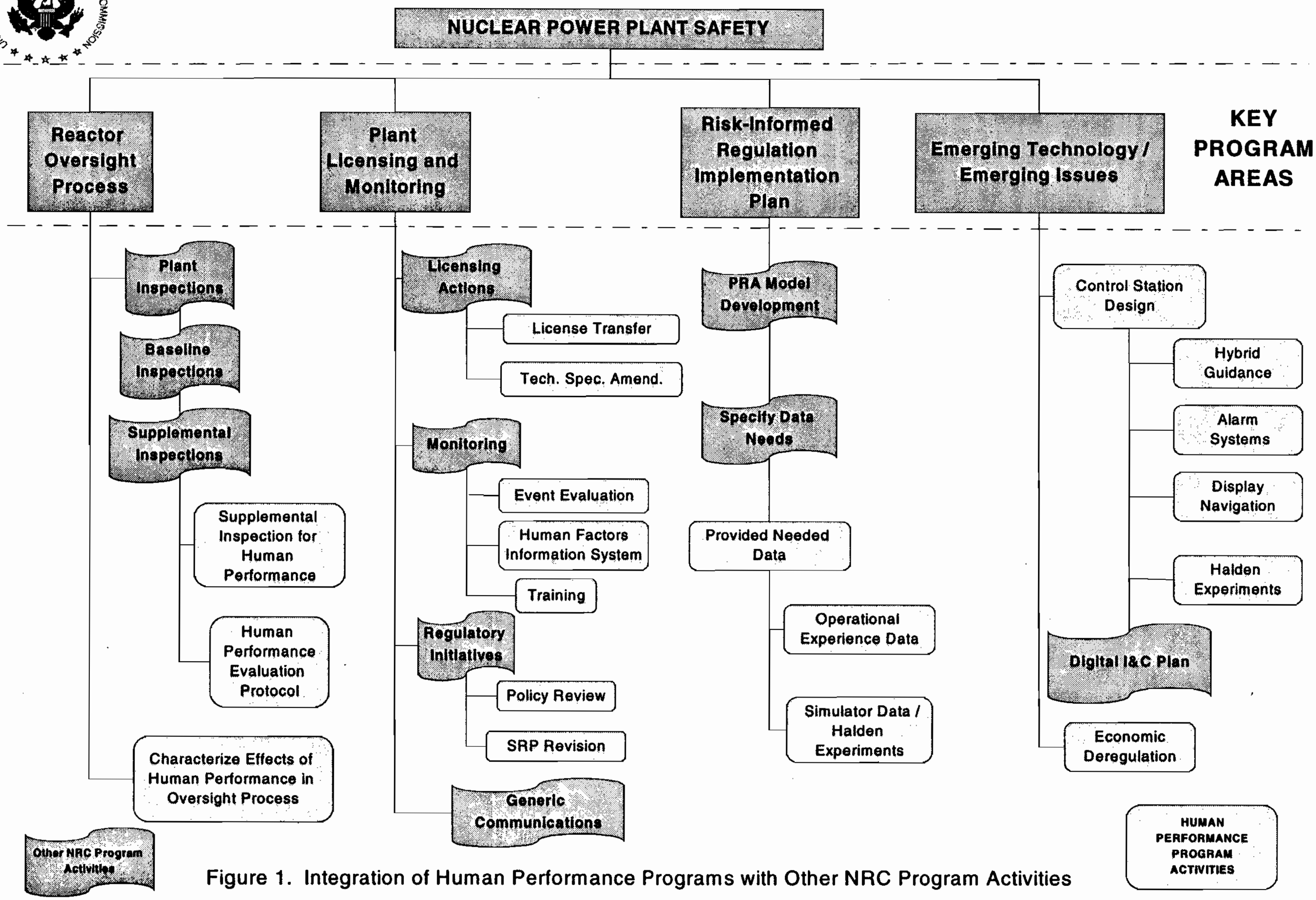


Figure 1. Integration of Human Performance Programs with Other NRC Program Activities

NRR Activities With the Reactor Oversight Process

David Trimble
Richard Eckenrode

Future Activities

- Budget Prioritization
- ACRS Review
- Continued Data Assessment
- Peer/Stakeholder Review
- International Cooperation
- Standards Support

OPERATING EXPERIENCE RISK ANALYSIS BRANCH PROGRAM OVERVIEW

PATRICK W. BARANOWSKY
STEVEN E. MAYS

OFFICE OF NUCLEAR REGULATORY RESEARCH
DIVISION OF RISK ANALYSIS & APPLICATIONS

PRESENTATION TO ACRS
APRIL 6, 2000

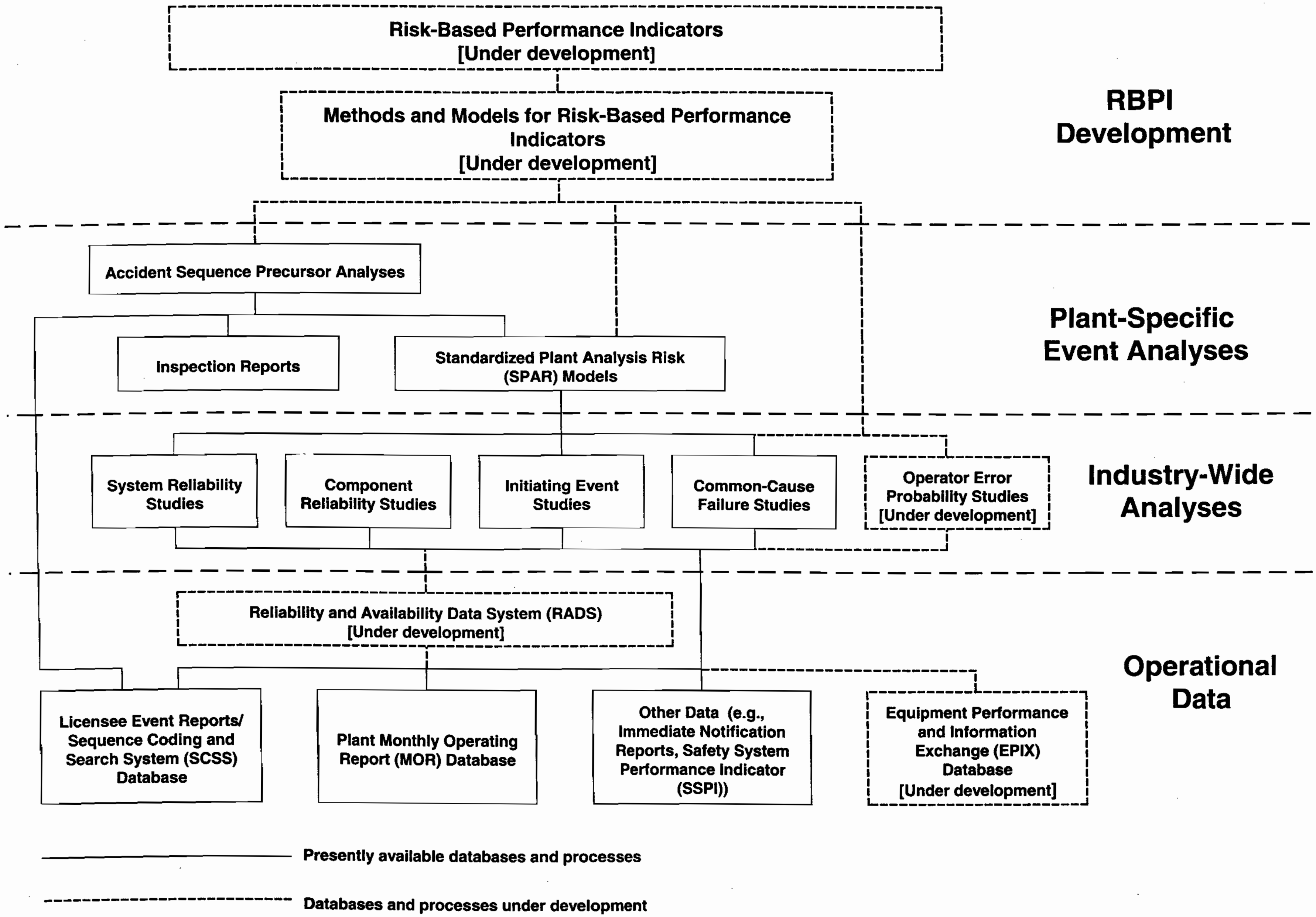
6

OPERATING EXPERIENCE RISK ANALYSIS BRANCH PROGRAM OVERVIEW

- **Purpose of Presentation**
  - Provide ACRS with an Overview of OERAB Activities
  - Discuss Role of OERAB Activities in Regulatory Process
  - Present Sample Results of Recent Activities

- **Content Presentation**
  - Overview of Program Elements
  - Data Sources
  - Reliability Studies
  - Common Cause Failure
  - Accident Sequence Precursor Program
  - Risk-Based Performance Indicators (Program detailed to ACRS yesterday)

OERAB PROGRAMS AND ACTIVITIES



OERAB ROLE IN REGULATORY PROGRAMS

- Risk-Based Analysis of Reactor Operating Experience is a Fundamental Mission Activity
- Supports Agency Goals of:
  - Maintaining Safety
  - Improving Regulatory Effectiveness and Efficiency
  - Reducing Unnecessary Burden
  - Improving Public Confidence

OERAB PROGRAM RESULT USES

<table>
<tr><th>OERAB Program Elements</th><th>Application</th></tr>
<tr><td rowspan="11">Data Sources - SCSS/EPIX/RADS

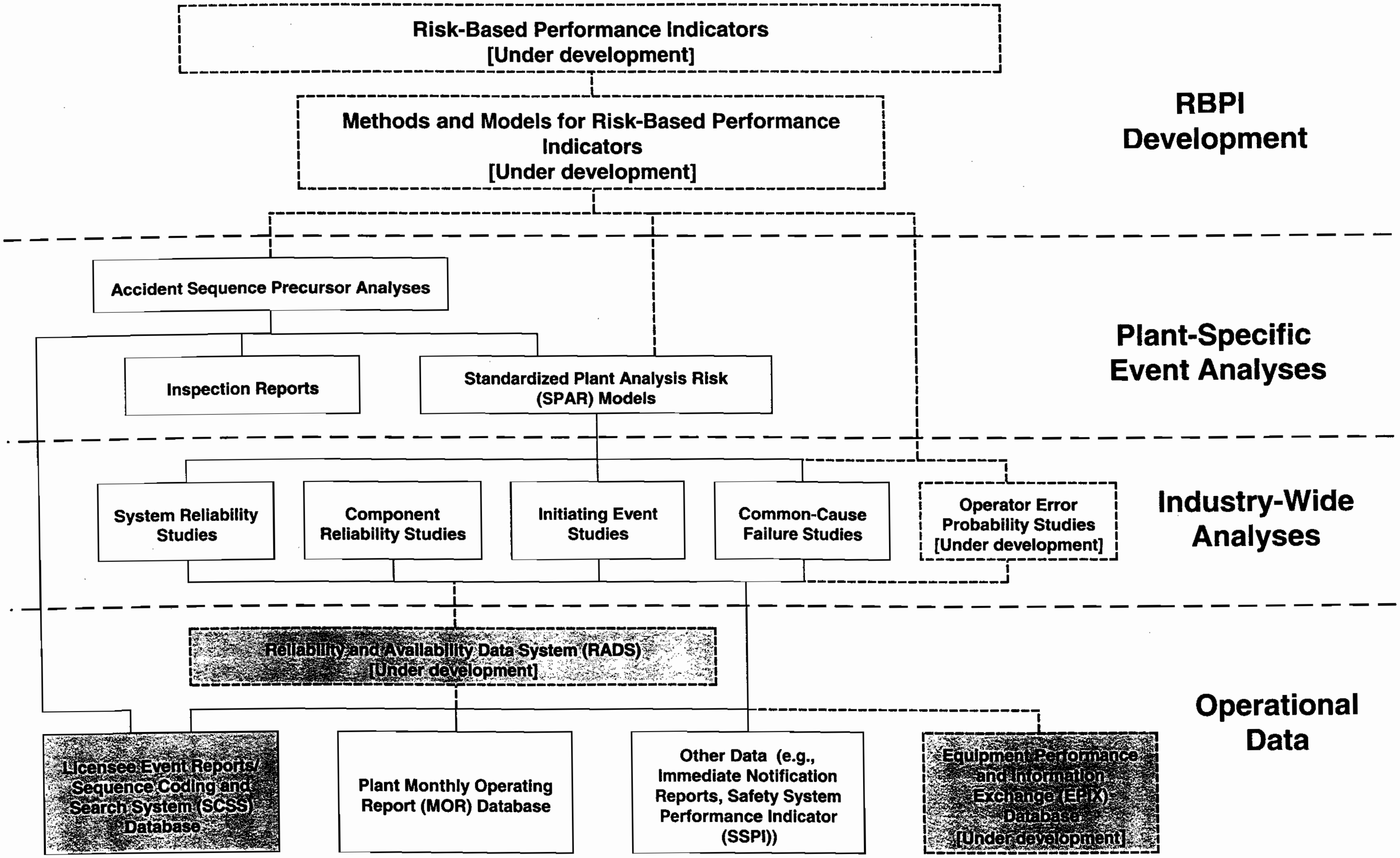
Reliability Studies - System and component failure probabilities and dominant failure modes, operating experience trends, and engineering insights

Common Cause Failures- CCF parameters and insights

ASP - Risk-Significant Events and SPAR model development

RBPI - Plant-specific indicators and industry trends</td><td>Risk-Informed Inspections</td></tr>
<tr><td>Risk Assessment of Operational Events</td></tr>
<tr><td>Review of Risk-Analyses Performed by Licensees</td></tr>
<tr><td>Monitor Plant Safety in Light of Both NRC and Licensee Safety Initiatives</td></tr>
<tr><td>Input to Revised Reactor Oversight Process</td></tr>
<tr><td>Input to Risk-Informed Requests for Technical Specification Changes</td></tr>
<tr><td>Review, Prioritization, and Resolution of Generic Issues</td></tr>
<tr><td>Input to Risk-Based Performance Indicator of Plant-Specific System and Component Performance</td></tr>
<tr><td>Determine Need for Generic Communications</td></tr>
<tr><td>Verification of Licensee Risk Analyses for Regulatory Guides 1.174, 1.175 and 1.177 Applications</td></tr>
<tr><td>Update Plant-Specific Data in Accident Sequence Precursor Program Models</td></tr>
</table>

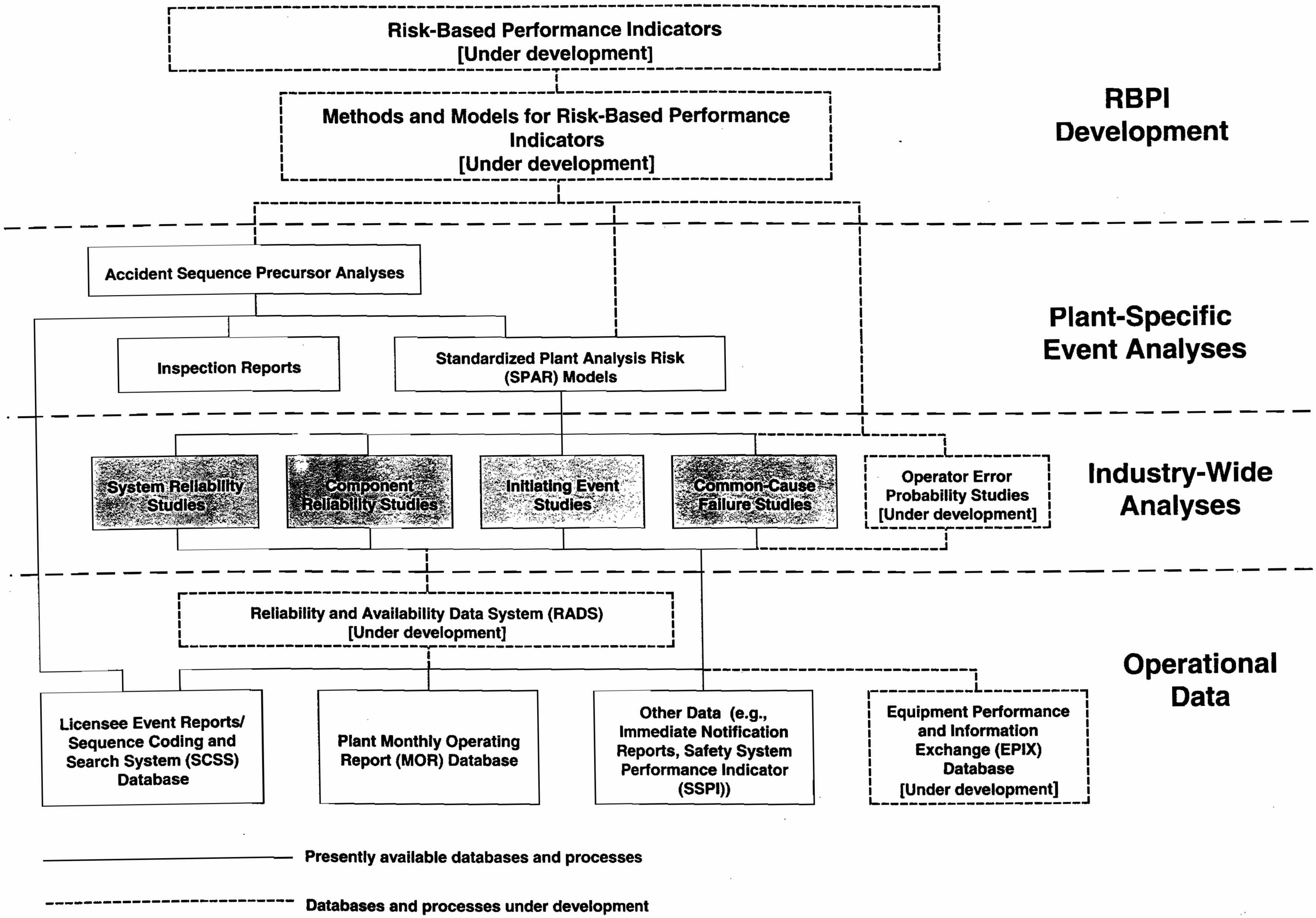
DATA SOURCES



——— Presently available databases and processes

- - - - Databases and processes under development

RELIABILITY STUDIES



RELIABILITY STUDIES
and
INITIATING EVENT FREQUENCIES

- **Purpose: Evaluate Reliability/Availability or Frequency and Provide Engineering Insights of Risk-Important Systems, Components and Accident Initiators Based on Operating Experience**

- **Objectives:**
  - o Use Actual Event Demands, Failures and Unavailabilities where Practical
  - o Analyze Trends
  - o Quantify Uncertainties
  - o Compare Findings with Published PRA/IPE Values
  - o Identify Plant-Specific Differences
  - o Provide Engineering Insights
  - o Compare Results with Applicable Regulatory Activities

SYSTEM RELIABILITY STUDY RESULTS SUMMARY

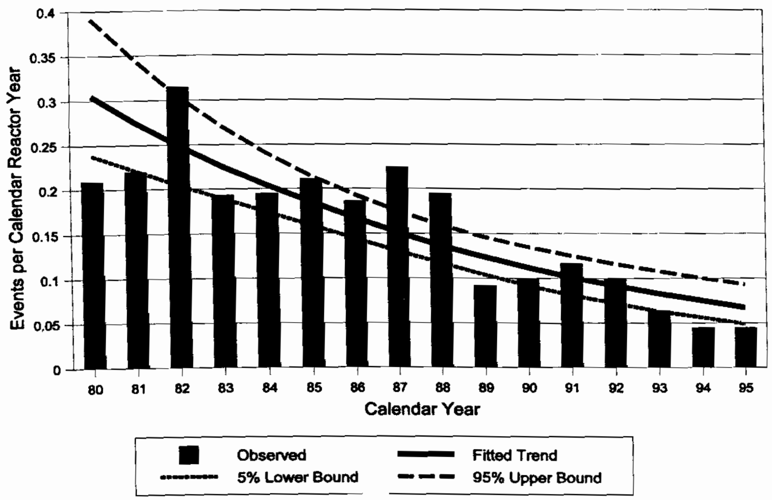
Study	Mean Unreliability (w/recovery)	Unplanned Demand Trend	Failure Rate Trend	Unreliability Trend	Consistency with PRA/IPEs	Unreliability vs Plant Age Trend
HPCI-*DRAFT* (1987-1998)	0.07	↘	↘	⇨	PRAs 3 times lower than operating experience	None
HPCS-*DRAFT* (1987-1998)	0.06	↘	⇨	⇨	General agreement--Fail-to-run contribution lower in PRAs	None
RCIC-*DRAFT* (1987-1998) Short (<15 min) Long (>15 min)	 0.03 0.06	↘	↘	⇨	PRAs 3 times lower than operating experience; restart different in PRAs	None
Isolation Condenser (1987-1993)	0.02	⇨	⇨	⇨	General agreement--nature of failures differ	None
AFW (1987-1995)	3.0×10^{-5}	↘	⇨	⇨	Fail-to-run and suction contributions lower in PRAs	None
HPI (1987-1997)	4.0×10^{-4}	↘	↘	⇨	General agreement--some variability among HPI designs with diversity	None
EDG--RG1.108 (1987-1993)	0.04	↘	↘	⇨	General agreement--fail-to-run higher in PRAs	None
W RPS (1984-1995)	2.0×10^{-5}	↘	N/A	N/A	General agreement--reactor trip breaker contribution different	N/A
GE RPS (1984-1995)	6.0×10^{-6}	↘	N/A	N/A	One order of magnitude lower than IPEs	N/A

INITIATING EVENTS INSIGHTS

- Combined initiating events frequencies for all initiators are lower than the frequencies used in NUREG-1150 and IPEs by factors of 4 to 6
- General transients contribute 77% of all initiating events. Events that pose a more severe challenge to the plant's mitigation systems (non-general transients) contribute the remaining 23%
- A decreasing trend was identified in approximately 60% of all the categories and headings that had sufficient data for trending analysis (i.e., 10 or more events)
- Most risk-significant initiator frequencies decreased at a faster rate than the overall initiating event frequencies
- Loss of coolant accident frequencies are lower than those used in NUREG-1150 and industry-wide IPEs

COMMON CAUSE FAILURE DATA AND ANALYSIS

Complete CCF Event Trend



CCF Parameter Estimates

System and Component	Alpha Factor	Failure Mode
HPCI/RCIC Inj. MOVs	1.72×10^{-2}	Fail to Close
BWR RHR MOVs	2.68×10^{-2}	Fail to Open
PWR HPSI MOVs	3.68×10^{-2}	Fail to Open
PWR HPSI MOVs	2.30×10^{-2}	Fail to Close
PWR Cont. Spray MOVs	5.18×10^{-2}	Fail to Open
EDGs	3.14×10^{-2}	Fail to Start
PWR AFW MDPs	7.87×10^{-2}	Fail to Start
PWR HPSI MDPs	2.20×10^{-2}	Fail to Start

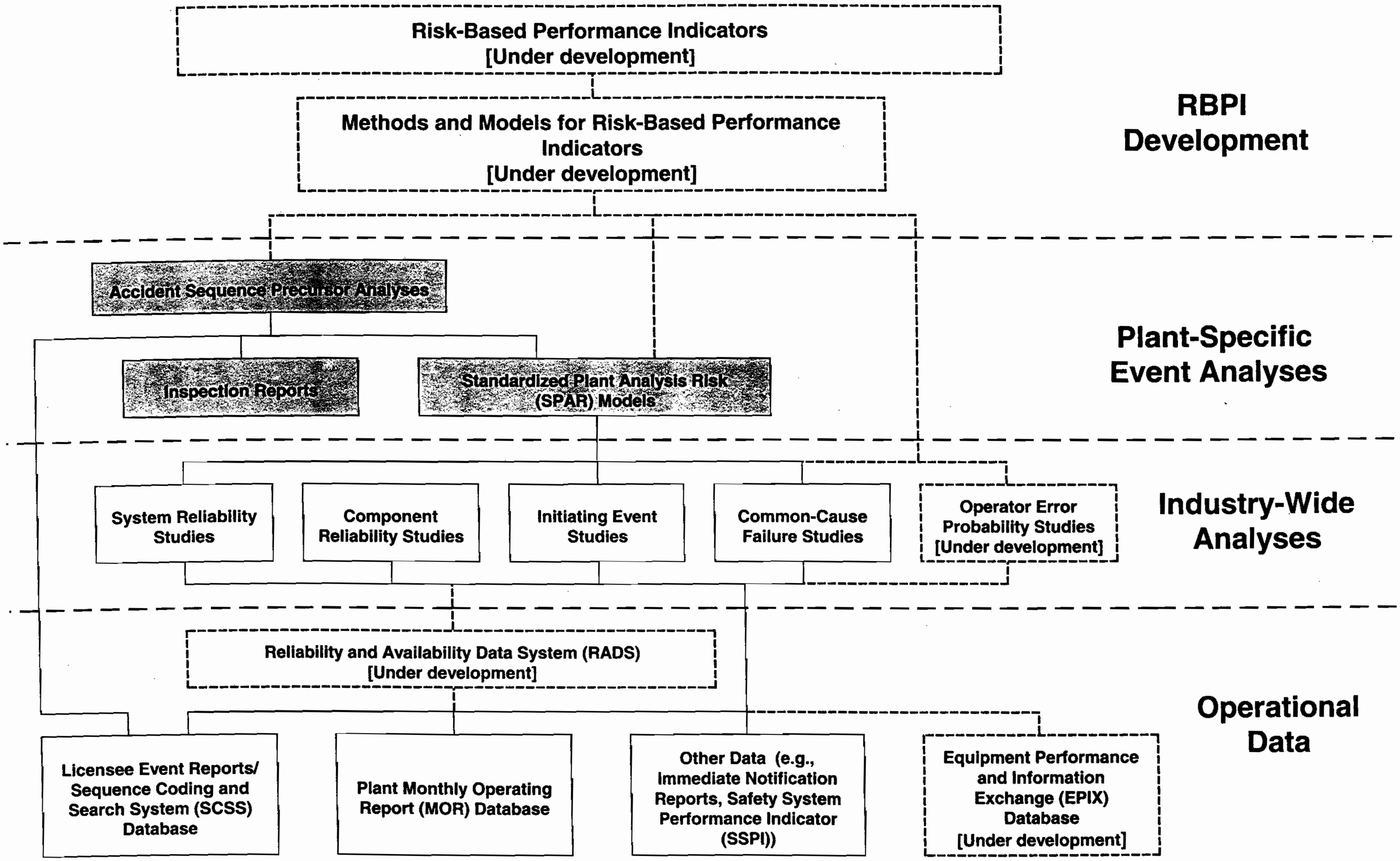
Example EDG CCF Insights

- 130 EDG CCF events from 1980 through 1995; 24 complete CCF events during the period
- Instrumentation and Control subsystem has the most CCF events (30%) Engine (15%), Fuel Oil (13%), and generator (12%)
- No discernable CCF difference among EDG manufacturers
- EDG CCF occurrence rate trend is decreasing
- Most CCF events are detected by test and inspections

CCF Regulatory Uses

- Insights from the CCF program were used in the resolution of Generic Issue 145. Insights were sent to utilities via Regulatory Issue Summary 99-03
- CCF parameter estimates are used in the ASP Program.
- CCF parameter estimates are and will used in the SPAR models
- Insights reports will provide component-specific CCF insights that can be used in inspections, etc

ACCIDENT SEQUENCE PRECURSORS



——— Presently available databases and processes

- - - - - Databases and processes under development

ASP USES AND USERS

- Prompt Assessments of the Risk Significance of Operational Events to Support Regulatory Decisions by Senior Management [NRR, Regional Offices]

- Evaluate the Significance of Inspection Findings as Part of the Agency's Improved Reactor Oversight Process [NRR, Regional Offices]

- Evaluate the Change in Risk Associated with Licensing Amendments Submitted by Licensees Requesting Changes in Surveillance Frequencies or Allowed Outage Times [NRR]

- Determine the Need for Generic Communications (Such as Information Notices) [NRR]

- Systematic Screening, Review , and Analysis of Operational Experience Data for Accident Sequence Precursors [RES]

- Evaluate the Generic Implications of Precursors, Trend Industry Performance, and Check Against PRAs [RES]

- Regulatory Analyses for Resolution of Generic Issues [RES]

EVALUATION OF RISK TRENDS IN ASP PRECURSOR DATA

- **Trends in the Occurrence of Precursors from 1984 -1998**
  - Statistically significant decreasing trends were found in for all of the ASP CCDP bins (i.e., $\geq 10^{-3}$, 10^{-4}, 10^{-5}, 10^{-6}), except for precursors with CCDP $\geq$ $1.0\text{x}10^{-3}$
  - With no precursors in 1999 with CCDP $\geq 1.0\text{x}10^{-3}$, a decreasing trend for this bin will become statistically significant
- **Comparison of an Annual ASP Index with Core Damage Frequencies from Individual Plant Examinations (IPEs)**
  - On an order of magnitude basis, the ASP Index over the last seven years Is consistent with the order of magnitude of estimates of CDFs from the IPEs
  - CDF average value estimates from IPEs is $6\text{x}10^{-5}$/RY. Average annual ASP Index for 1992-1998 is $1\text{x}10^{-5}$/RY

EVALUATION OF RISK TRENDS IN ASP PRECURSOR DATA (cont'd)

- **Modes and Causes of Precursors Compared in PRAs and IPEs**

  - Review of 1994-97 precursor results showed that about 15% of these events involved event initiators or conditions that are not included in the IPEs

  - Examples:

- Wolf Creek	1994	Blowdown of the RCS to the refueling water storage tank during hot shutdown
- LaSalle 1 and 2	1996	Fouling of the cooling water systems due to concrete sealant injected into the service water tunnel

ASSESSMENT OF RISK-SIGNIFICANCE
OF D.C. COOK ISSUES

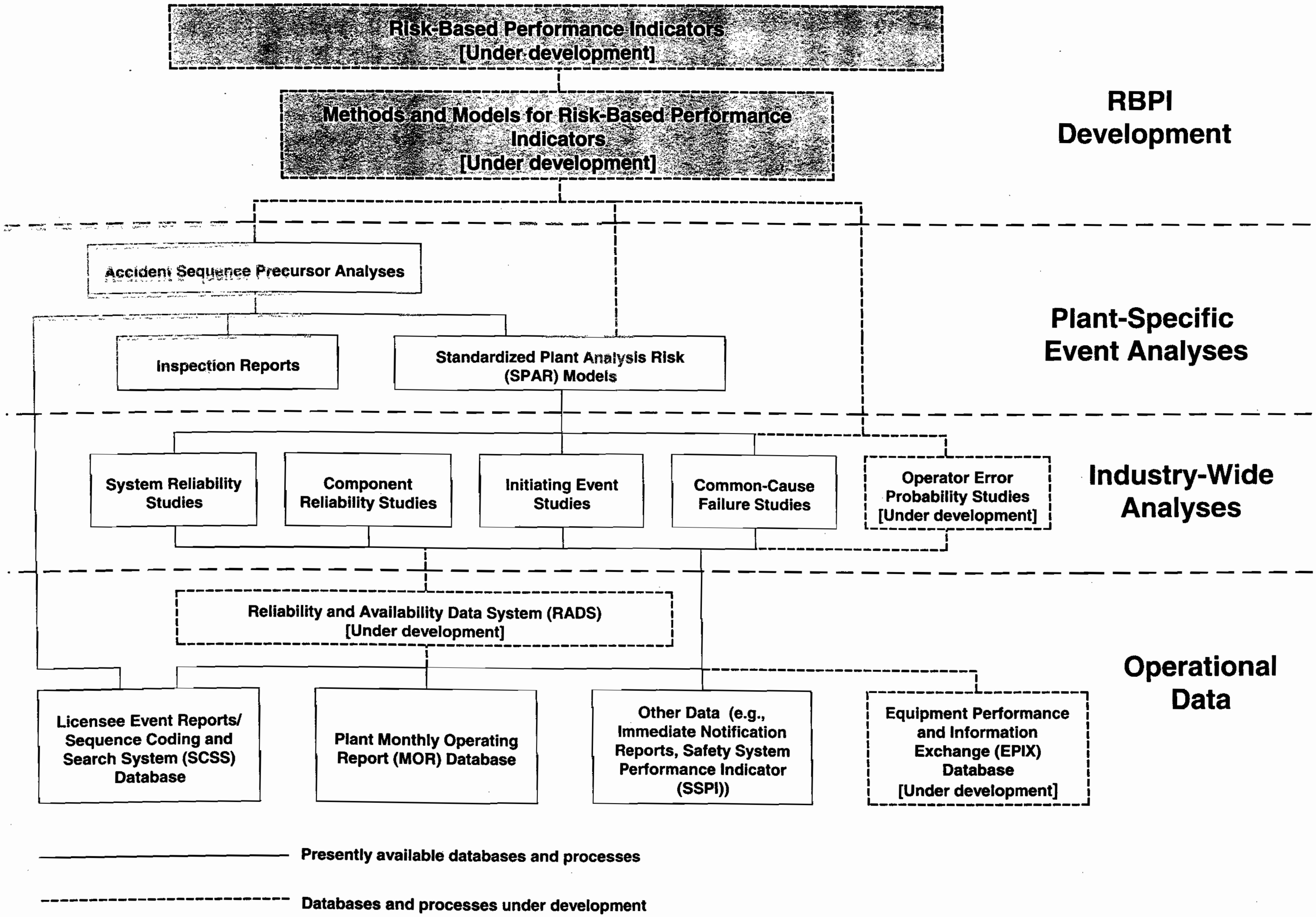
- Special study using ASP methodology
- Analyzed risk associated with licensee's and NRC's findings
- 141 issues analyzed individually and integrally
- To date identified 1 issue meeting ASP criteria (> 1E-06)
- HELB has the potential fail loss of both CCW trains leading to RCP seal LOCA and loss of HPI
- Four additional issues which have the potential (i.e. under review) to meet ASP criteria
  - HELBs with the potential to fail all AFW, both trains of vital AC buses, or both emergency diesel generators
  - Pressure locking condition in two MOVs that may fail sump recirculation capability
  - Seismic event that may cause non-recoverable loss of all ESW trains
  - Seismic event that may cause collapse of block walls and potential loss of multiple safety-related systems

SPAR MODEL DEVELOPMENT PROGRAM

Purpose: Provide Standardized Plant Analysis Risk (SPAR) Models for Use By The NRC In Risk Informed Regulation at Operating Nuclear Power Plants

- Responsibility for SPAR Model Development
- Users Identified Need for Simplified Methodologies to Address the Following:
  - Plant Specific Level 1 Analyses
  - Level 2/3 Analyses
  - Capability for Analyzing: Low Power/Shutdown (LP/SD) Events; External Events (Fire, Seismic, Flood)

RISK-BASED PERFORMANCE INDICATORS



FUTURE DIRECTIONS

- Streamline, make more current, and consolidate the initiating event, system/component reliability, and common cause failure operating experience analyses
- Make ASP more current, coordinate with the RROP and SDP
- Prepare annual report on industry-wide reactor safety performance: Trends and insights
- SPAR model development to support specific regulatory needs
- Database updates, RADS implementation
- Continue development and begin production of approved RBPIs

10

ACRS MEETING HANDOUT

Meeting No.	Agenda Item	Handout No.:
471st	12	12-1

Title

FUTURE ACRS ACTIVITIES

Authors

John T. Larkins

List of Documents Attached

Future ACRS Activities - 472nd ACRS Meeting, May 11-13, 2000

12

Instructions to Preparer

1. Paginate Attachments
2. Punch holes
3. Place Copy in file box

From Staff Person

John T. Larkins

ANTICIPATED WORKLOAD
APRIL 5-7, 2000

LEAD MEMBER	BACKUP	ENGINEER	ISSUE	FULL COMM. REPORT	SUBC. MTG.	
					CHAIR.	MEMBER
Apostolakis	--	Dudley	Human Performance Program	Report	RSK mtg. 3/13 HF 3/15	M&M 3/16 P&P4/5 NR 4/4
	--	Markley	Proposed White Paper on Risk-Based Performance Indicators	Report		
Bonaca	Apostolakis	Markley	Special Studies for Risk-Based Analysis of Reactor Operating Experience	Report	--	RSK mtg. 3/13 HF 3/15 P&P 4/5 M&M 3/16 NR 4/4
Kress	--	El-Zeftawy	Spent Fuel Pool Accident Risk for Decommissioning Plants	Report	--	RSK mtg. 3/13 HF 3/15 THP 3/15 M&M 3/16 NR 4/4
	Apostolakis	Boehnert	Proposed Revision of the Safety Goal Policy	Report		
	Apostolakis	Markley/Sorensen	ACRS/ACNW Joint Report on Defense in Depth	Report		
Shack	Apostolakis	Dudley	Proposed Approach for Revising 10 CFR 50.61, PTS Rule - **Subcommittee Report**	--	M&M 3/16	COMM. Mtg. 3/24, NR 4/4
Sieber	Barton	El-Zeftawy	Proposed Reg. Guide and Associated NEI Document 96-07, "Guidelines for 10 CFR 50.59 Safety Evaluations"[1]	--	--	HF 3/15 NR 4/4

[1] As recommended by the Planning and Procedures Subcommittee, the Committee decided during the February 2000 meeting not to review this matter at this time and that this matter be closed via a Larkinsgram after receiving the documents.

ANTICIPATED WORKLOAD
APRIL 5-7, 2000

LEAD MEMBER	BACKUP	ENGINEER	ISSUE	FULL COMM. REPORT	SUBC. MTG.	
					CHAIR.	MEMBER
Uhrig	--	Singh	Proposed Digital I&C Research Plan	Report	--	NR 4/4
Wallis	--	Boehnert	Thermal Hydraulic Aspects of the Proposed Revision to 10 CFR 50.61, PTS Rule - **Subcommittee Report**	--	THP 3/15	RSK Mtg. 3/13

ANTICIPATED WORKLOAD
MAY 11-13, 2000

LEAD MEMBER	BACKUP	ENGINEER	ISSUE	FULL COMM. REPORT	SUBC. MTG.	
					CHAIR.	MEMBER
Apostolakis	--	Markley El-Zeftawy	Proposed Revision to Reg. Guide 1.174 Risk-Informed Regulation Implementation Plan	Report --	M&M/RPRA 4/27 (P.M.) (Co. Chair) PO/RPRA. 4/28 (Co-Chair)	P&P. 5/10
Barton	--	Singh	Reactor Trip Event at Hatch	--	--	M&M/RPRA 4/27 (P.M.) PO/RPRA 4/28
Kress	--	Dudley	Reevaluation of the Power Reactor Physical Protection Regulations (Tentative)	--	--	THP 4/27 (A.M.) M&M/RPRA 4/27 (P.M.) PO/RPRA 4/28
Shack	--	Dudley	Potential Revision to the PTS Acceptance Criterion	Report	M&M/RPRA 4/27 (P.M.) (Co-Chair)	PO/RPRA 4/28
Sieber	Apostolakis	Markley	Initiatives Related to Risk-Informed Technical Specifications	Report	PO/RPRA 4/28 (Co-Chair)	M&M/RPRA/ 4/27 (P.M.)
Wallis	--	Boehnert Boehnert	Proposed Reg. Guide and SRP Associated with NRC Code Reviews SRELAP-5/TRACG/RETRAN-3D **Subcommittee Report**	Report --	THP 4/27 (A.M.)	M&M/RPRA 4/27 (P.M.) PO/RPRA 4/28

ANTICIPATED WORKLOAD
JUNE 7-9, 2000

LEAD MEMBER	BACKUP	ENGINEER	ISSUE	FULL COMM. REPORT	SUBC. MTG.	
					CHAIR.	MEMBER
Aposlolakis	--	Markley	Status of Risk-Informed Revisions to 10 CFR Part 50/NEI Letter	Report	RPRA/5/19	P&P 6/6
Barton	--	Markley	Reactor Trip and Partial Loss of AC Power/Steam Generator Tube Rupture Events at Indian Point	--	--	RPRA 5/19
	Sieber	Singh	Davis Besse Plant visit	--	--	--
Bonaca	--	Dudley	Use of Voluntary Initiatives in the Regulatory Process	Report	--	SAM 5/18 RPRA 5/19
Kress	--	El-Zeftawy	Proposed Resolution of GSI-173A, Spent Fuel Storage Pool for Operating Facilities	Report	SAM 5/18	RPRA 5/19
	--	Boehnert	Proposed final Reg. Guide and SRP on Revised Source Term	Report		
Seale	--	Dudley	Steam Generator Tube Integrity Issues	Report	--	SAM 5/18 RPRA 5/19
Uhrig	--	Singh	ABB/CE and Siemens Digital I&C Applications	--	--	RPRA 5/19
		El-Zeftawy	Proposed Update to 10 CFR Part 52[1]	Report (Tentative)		

[1] P&P Subcommittee recommends that Dr. Uhrig provide his views on the need for the Committee to review proposed update to 10 CFR Part 52.

II. ITEMS REQUIRING COMMITTEE ACTION

6. Safety Culture (Open) (GA/NFD/JS) ESTIMATED TIME: ½ hour

Purpose: Decide on a Course of Action

ACRS Initiative. The staff prepared a Commission Paper related to assessing the safety culture at operating nuclear power plants. In the Commission paper, the staff included five options and recommended discontinuing any further agency efforts. In a Staff Requirements Memorandum (SRM) dated September 1, 1998, the Commission approved the continuation of the current policy that safety culture be evaluated only on a for-cause basis.

On November 19, 1999, Mr. Sorensen ACRS Senior Fellow, briefed the Human Factors Subcommittee on this subject. The members also discussed this matter at the January 2000 ACRS retreat. In addition, the Human Factors Subcommittee discussed this matter during its March 15, 2000 meeting.

Dr. Apostolakis recommends that Mr. Sorensen complete his white paper on safety culture and that the Committee prepare a report to the Commission at the July 2000 ACRS meeting. The Planning and Procedures Subcommittee agrees with the recommendation by Dr. Apostolakis.

7. Reevaluation of the Power Reactor Physical Protection Regulations (Open/Closed) (TSK/NFD) ESTIMATED TIME 2 hours

Purpose: Decide on a Course of Action

Review requested by the ACRS. The staff issued SECY-00-0063 on March 9, 2000. The SECY paper requested Commission approval to reevaluate the physical protection regulations and the definition of radiological sabotage by providing design criteria as the basis for physical protection regulation. The staff proposes developing performance criteria that protects critical safety functions. Another aspect of the SECY is to replace the Regulatory Effectiveness Review (RER) and the Operational Safeguards Response Evaluation (OSRE) programs with an industry proposal for a Self-Assessment Program. A rulemaking may be required to implement the proposed changes. The staff is awaiting direction from the Commission before it proceeds.

Dr. Kress has agreed to recommend a course of action after receiving a copy of the expected Staff Requirements Memorandum.

The Planning and Procedures Subcommittee recommends that about 3 hours be allocated for discussion of this item during the May meeting.

8. Risk-Informed Regulation Implementation Plan (Open) (GA/MME) ESTIMATED TIME: 1 ½ hours

Purpose: Decide on a Course of Action

Review requested by the NRC staff. On March 16, 2000, the staff issued SECY-00-0046, "Risk-Informed Regulation Implementation Plan." This plan was developed in response to a March 1999 General Accounting Office (GAO) report recommending that the PRA Implementation Plan be restructured to more clearly describe NRC risk-informed activities, provide linkage to the agency's Strategic Plan, and change the frequency of updating from quarterly to semi-annually. SECY-00-0046 provides the NRC's integrated plan for managing risk-informed initiatives and activities in all program arenas (e.g., nuclear reactor safety, nuclear materials safety, and nuclear waste safety). The staff provided SECY-00-0046 to the Committee in mid-March 2000 and requests to brief the Committee at the May 11-13, 2000 ACRS meet

The Planning and Procedures Subcommittee recommends that this item be scheduled for the May ACRS meeting.

9. Draft Safety Evaluation Report for the South Texas Project Exemption Request to Exclude Certain Components from the Scope of Special Treatment Requirements Required by Regulations (Open) (GA/JDS/MTM) ESTIMATED TIME: 2 hours

Purpose: Decide on a Course of Action

This item is on the Chairman's Tasking Memorandum (CTM). On July 13, 1999, South Texas Project Nuclear Operating Company (STPNOC) submitted a license amendment requesting exemption from the scope of special treatment requirements in 10 CFR Part 50 and other regulations. STPNOC requested these exemptions based on insights from the STP probabilistic risk assessment (PRA) and as an extension of its risk-informed programs for graded quality assurance (GQA). STPNOC requested these exemptions as an industry initiative related to the NRC staff's proposed risk-informed revisions to 10 CFR Part 50. The NRC staff has submitted requests for additional information (RAIs) to STPNOC concerning these exemption requests. Contingent on STPNOC response to the RAIs, the staff expects to provide its draft safety evaluation report to the Committee in early June 2000 and requests to brief the Committee during the July 12-14, 2000 ACRS meeting.

The Planning and Procedures Subcommittee recommends that this item be scheduled for the July ACRS meeting and that the licensee be invited to attend the meeting.

10. Proposed Revision to the Enforcement Policy to Address the Revised Reactor Oversight Process (Open) (JJB/MTM) ESTIMATED TIME: 1 ½ hours

Purpose: Decide on a Course of Action

Review not requested by the staff. On March 9, 2000, the staff issued SECY-00-0061, "Proposed Revision to the Enforcement Policy to Address the Revised Reactor Oversight Process." In this document, the staff proposes to adopt the Interim Enforcement Policy tested during the pilot program reviews of the revised reactor oversight process (RROP). The Committee reviewed the RROP in March 2000 and issued a report to the Commission dated March 15, 2000. In SECY-00-0061, the staff proposes to integrate the significance determination process (SDP) of the RROP into the NRC Enforcement Policy for the disposition of apparent violations. The staff plans to issue the proposed to revision to the Enforcement Policy to support initial implementation of the RROP in April 2000.

The Planning and Procedures Subcommittee recommends that the Committee not review this matter and that Mr. Barton provide his views.
(LARKINS GRAM APPROVED)

11. Common-Mode Failure Results in Loss of Both Low-Pressure Safety Injection Pumps at Arkansas Nuclear One, Unit 1 (JJB/MTM) ESTIMATED TIME: 1 ½ hours

Purpose: Decide on a Course of Action

Briefing requested by the ACRS. On February 5, 2000, the licensee declared both low-pressure safety injection (LPSI) pumps inoperable after the inboard pump bearing temperature exceeded the alarm setpoint. At the time, the licensee had taken the Unit offline to perform scheduled maintenance. The Unit was in HOT SHUTDOWN and the licensee placed the LPSI system in service for decay heat removal. A high bearing temperature alarm annunciated and the licensee secured the pump.

Further investigation revealed that a design change had been made in 1992 to replace the cast iron inboard and outboard bearing housings with stainless steel inboard bearing housings for increased corrosion resistance. In 1999, the licensee also implemented a design change to increase the oil viscosity and to minimize wear. The engineering evaluations for these changes do not appear to have sufficiently considered low service water temperature as a design limiting case for component bearings. Accordingly, the licensee did not provide the vendor with adequate specifications in its procurement request.

The NRC subsequently dispatched a Special Inspection Team (SIT) to the site to investigate this matter. Preliminary findings of the SIT indicate that the licensee did not demonstrate component performance for all limiting conditions after the design and maintenance changes. Common-mode failure of both LPSI pumps have resulted in the loss of emergency core cooling system recirculation. High pressure injection would not be available and reactor building spray pumps would not serve as an equivalent backup for recirculation cooling. The SIT report is not yet available for ACRS review.

The Planning and Procedures Subcommittee recommends that the Plant Operations Subcommittee discuss this matter prior to full Committee discussion and that Mr. Barton provide his views.

12. Use of MAAP Code for Severe Accidents (Open/Closed) (TSK/PAB)
ESTIMATED TIME: 1 ½ hours

Purpose: Decide on a Course of Action

Review requested by the ACRS. Dr. Kress recommended hearing a presentation by industry on the MAAP code in order to understand how the code handles containment heatup, reactor coolant boil-off, and transport of fission products, given that this code is in wide use by the nuclear power industry. The present Version 4 of the code has undergone limited review by NRR in conjunction with the AP600 design review.

Subsequent discussions with Dr. Kress have led to a request for relevant documentation on the details of the code models. This material has been provided to Dr. Kress for his perusal.

Recent discussions with representatives of NRR have given indication that the staff may be considering conducting a review of Version 4 of MAAP. Future Committee action will be pending the result of the staff review.

The Planning and Procedures Subcommittee recommends that the Committee review this matter after the staff has completed its review of Version 4 of the MAAP code and that Dr. Kress provide his views.

13. Pressurized Thermal Shock Rule Flaw Distributions Expert Elicitation (Open) (WJS/NFD) ESTIMATED TIME: 1 ½ hours

Purpose: Decide on a Course of Action.

Review Requested by the NRC Staff. The NRC staff is continuing with its development of a technical basis for promulgating a risk-informed revision to 10 CFR 50.61. The staff briefed the Joint Subcommittee on Materials and Metallurgy and on Reliability and Probabilistic Risk Assessment on March 16, 2000, concerning the potential revisions to the pressurized thermal shock (PTS) acceptance criterion and the expert elicitation process for determining flaw distributions.

The staff plans to provide the Committee a draft report on the flaw distributions in early June 2000, and brief the Committee at the July 12-14, 2000 ACRS meeting.

The Planning and Procedures Subcommittee recommends that this item be scheduled for the July ACRS meeting and that Dr. Shack provide his views.

14. Proposed Final Revision to Appendix R of 10 CFR Part 50 to Eliminate The Requirement for Noncombustible Fire Barrier Penetration Seal Materials (Open) (JDS/DAP/AS)

Purpose: Decide on a Course of Action

In a Staff Requirements Memorandum (SRM) dated June 30, 1998, the Commission directed the staff to amend Section III. M of Appendix R to 10 CFR Part 50 to eliminate the requirement that penetration seal designs should utilize only noncombustible materials. During its July 8-10, 1998 meeting, the Committee discussed the draft Supplement 1 to NUREG 1552, "Fire Barrier Penetration Seals in Nuclear Power Plants", which provided an assessment of the fire barrier penetration seals. The Committee provided a report to Chairman Jackson dated July 20, 1998, stating that it agrees with the Commission direction in the June 30, 1998, SRM that Appendix R should be amended to eliminate the requirement to use only noncombustible materials for fire barrier penetration seals. The proposed rule was issued for public comment on August 18, 1999. The staff received eight comment letters, six supporting the elimination of the requirement and two objecting to the change. After resolving the public comments, the staff has developed the proposed final revision to Appendix R. A copy of the proposed final revision of the rule was provided to Dr. Powers, previous Chairman of the Fire Protection Subcommittee. The staff would like to know whether the ACRS wants to review the proposed final rule.

The Planning and Procedures Subcommittee recommends that Dr. Powers, previous Subcommittee Chairman, and Mr. Sieber, current Subcommittee Chairman, propose a course of action.

Dr. Powers recommends that the Committee not review this matter because: the rule change is as directed by the Commission; the Committee has already agreed with the Commission direction; and there are no significant changes made to the rule since the issuance of the Committee report dated July 20, 1998. The Committee should seek Mr. Sieber's view.

The Planning and Procedures Subcommittee agrees with Dr. Powers' recommendation.

LARKINSGRAM APPROVED

ACRS MEETING HANDOUT

(11)

Meeting No.	Agenda Item	Handout No:
471ST	13	13.1

Title MINUTES OF PLANNING & PROCEDURES SUBCOMMITTEE MEETING - APRIL 4, 2000

Authors JOHN T. LARKINS

List of Documents Attached

13

Instructions to Preparer
1. Punch holes
2. Paginate attachments
3. Place copy in file box

From Staff Person
JOHN T. LARKINS

April 6, 2000

MINUTES OF THE
PLANNING AND PROCEDURES SUBCOMMITTEE MEETING
TUESDAY, APRIL 4, 2000

The ACRS Subcommittee on Planning and Procedures held a meeting April 4, 2000, in Room 2B1, Two White Flint North Building, Rockville, Maryland. The purpose of the meeting was to discuss matters related to the conduct of ACRS business. The meeting was convened at 2:00 p.m. and adjourned at 5:45 p.m..

ATTENDEES

D. A. Powers, Chairman
G. Apostolakis
M. Bonaca

ACRS STAFF

J. T. Larkins
H. Larson
R. P. Savio
S. Duraiswamy
C. Harris, Part time
S. Meador, Part time

DISCUSSION

1) Review of the Member Assignments and Priorities for ACRS Reports and Letters for the April ACRS Meeting

Member assignments and priorities for ACRS reports and letters for the April ACRS meeting are included in a separate handout. Reports and letters that would benefit from additional consideration at a future ACRS meeting were discussed.

RECOMMENDATION

The Subcommittee recommends that the assignments and priorities for the April 2000 ACRS meeting be as shown in the handout. Instead of writing a separate report on the proposed White Paper on Risk-Based Performance Indicators, the Committee should consider including its comments on this matter in the ACRS report on the NRC Program for Risk-Based Analysis of Reactor Operating Experience.

2) Anticipated Workload for ACRS Members

The anticipated workload of the ACRS members through June 2000 is included in a separate handout. The objectives are: (1) to review the reasons for the scheduling of each activity and the expected work product and to make changes, as appropriate, (2) to manage the members' workload for these meetings, and (3) to plan and schedule items for ACRS discussion of topical and emerging issues.

During this session, the Subcommittee discussed and developed recommendations on the items that require Committee decision, which are included in Section II of the Future Activities list.

RECOMMENDATION

The Subcommittee recommends that the members provide comments on the anticipated workload. Changes will be made, as appropriate. Subcommittee recommendations on the items in Section II of the Future Activities list are included in a separate handout.

3) Status of Selecting Candidates for Potential ACRS Membership

ACRS members and the Screening Panel interviewed four candidates during March for ACRS membership. Based on the information gathered through the interview, reference checks, and feedback provided by the members, the Screening Panel has developed a list of three candidates for submittal to the Commission for consideration and selection.

RECOMMENDATION

The Subcommittee recommends that the Committee endorse the recommendation of the ACRS Member Candidate Screening Panel and not issue a separate recommendation.

4) Joint ACRS/ACNW Subcommittee Report on Defense-in-Depth

During the 118th meeting of the ACNW, March 27-29, 2000, the ACNW approved a report titled "Defense-in-Depth in a Risk-Informed Regulatory Process." The ACRS should review and either approve this report; disapprove; or approve with Additional Comments. This report was provided to the members on Wednesday, April 5, 2000.

RECOMMENDATION

The Subcommittee recommends that this report be reviewed and discussed early in the meeting and the full Committee make a decision.

5) Meeting with Members of the German Reactor Safety Committee (RSK)

On March 13, 2000 Lothar Hahn (Chairman of the RSK), Edmund Kersting (Vice Chairman, RSK) and Renzo Candeli (Executive Director of RSK office) met with D. Powers, G. Apostolakis, M. Bonaca, T. Kress, G. Wallis, and J. Larkins to discuss several topics of mutual interest, including Risk-Informed Performance Based Regulation; Generic Safety Issues; Decommissioning and Emergency Responses, and Reactor Regulatory Research.

As a result of this technical exchange, the RSK members suggested that the ACRS members traveling to Germany in June 2000 amend their agenda to include a discussion with members of the RSK and their contractors working in the area of digital instrumentation and control. Additionally, it was recommended that the RSK and ACRS meet annually to discuss issues of mutual interest.

RECOMMENDATION

The Subcommittee recommends that the members traveling to Germany in June 2000, subsequent to their trip, propose a course of action with regard to future interactions between RSK and ACRS.

6) Change in NRC Travel Regulations

A copy of the February 8, 2000, NRC Yellow Announcement, "Mandatory Usage of the Government Sponsored Charge Card for Travel," was distributed to the members for information during the March meeting. Subsequently, as authorized by the General Services Administration, the NRC has delayed the implementation of the use of government sponsored charge cards until May 1, 2000 (see attachment, p. 1). NRC plans to provide new guidance prior to May 1, 2000.

Recommendation

This is for information only. The ACRS staff will provide the members with new guidance, when available.

7) Proposed Rulemaking to Revise FACA Regulations

The General Services Administration (GSA) is revising the implementation regulations for FACA to make it consistent with legislative changes, shifts in Federal policy, and decisions issued by the Supreme Court and other Federal Courts. This is the second time the NRC has commented on proposed changes to FACA, the first being on the Advance Notice of Proposed Rulemaking announced on June 10, 1997. Copies of the ACRS/ACNW Office and Office of Human Resources comments were provided to the members during the March meeting. Since then the Commission has approved issuing to GSA. OGC has submitted agency comments (attached, pp. 2-6) to GSA on March 24, 2000.

RECOMMENDATION

Agency comments on the proposed revision to FACA are provided for information.

8) ACRS/ACNW Division of Responsibilities in Decommissioning

As a result of the increased number of regulatory activities in the area of decommissioning, Dr. Savio was tasked to summarize the NRC staff's current activities in this area and develop a plan for ACRS or ACNW reviews. Dr. Savio has provided a proposal for the division of review activities related to power reactor and non-power reactor decommissioning (pp. 7-22).

RECOMMENDATION

The subcommittee recommends that the Committee review and approve Dr. Savio's proposal for division of work on decommissioning.

9) Meeting with Industry Representatives

During its March meeting, the Subcommittee discussed ways in which the ACRS could interact with industry groups, including NEI, INPO, and utilities. This idea stemmed from the January 2000 ACRS retreat. The Subcommittee recommended that Dr. Savio develop a proposal for this type of interaction and discuss this proposal with the cognizant ACRS members and submit to the Subcommittee for discussion during its April meeting. Accordingly, Dr. Savio has developed the attached proposal (pp. 23-24).

RECOMMENDATION

The Subcommittee recommends that members provide comments on Dr. Savio's proposal. Dr. Savio should revise the proposal, as needed, incorporating the members' comments and submit the revised proposal to the Planning and Procedures Subcommittee for review during its May 2000 meeting. Subsequently, it will be referred to the full Committee for review and approval during the May 2000 ACRS meeting.

10) Meeting with the EDO

The Planning and Procedures Subcommittee met with the EDO and the Deputy EDO to discuss items of mutual interest. A proposed list of topics for this meeting is attached (pp. 25-29).

RECOMMENDATION

The Subcommittee recommends that Dr. Powers provide a report to the Committee regarding the meeting with the EDO with emphasis on mutual agreements and Committee follow-up items.

UNITED STATES
NUCLEAR REGULATORY COMMISSION

Announcement No. 013

Date: March 10, 2000

To: **All NRC Employees**

SUBJECT: TWO MONTH POSTPONEMENT ON THE MANDATORY USAGE OF THE GOVE] SPONSORED CHARGE CARD FOR OFFICIAL TRAVEL

GSA has authorized NRC a delay to the implementation of the provisions for the mandatory use of the government sponsored charge card until May 1, 2000. Therefore, we are rescinding Yellow Announcement No. 11 effective immediately. We will issue new guidance prior to May 1, 2000. Employees are encouraged to apply for and use the government sponsored charge card (Citibank VISA for NRC) for their official travel needs during this period. Employees are reminded that the Citibank VISA card may not be used to make personal purchases at any time under any circumstances. The Citibank VISA card may only be used to make purchases for official travel related items. (See Part 5 of Management Directive 14.1 [Official Temporary Duty Travel] which contains NRC policy on the use of the government sponsored charge card.)

Questions concerning the charge card program should be directed to John Walker at (301) 415-6259 or E-mail JRW2.

/s/
James Turdici, Director
Division of Accounting and Finance
Office of the Chief Financial Officer

J. Larkins

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

OFFICE OF THE
GENERAL COUNSEL

March 24, 2000

Mr. James L. Dean
Director
Committee Management Secretariat (MC)
General Services Administration
Office of Governmentwide Policy
1800 F Street, N.W.
Room G-230
Washington, D.C. 20405

Dear Mr. Dean:

We appreciate the opportunity to comment on the proposed rule published in the Federal Register of January 14, 2000, which would revise the regulations implementing the Federal Advisory Committee Act (FACA). We commend this effort to update the regulations to reflect pertinent developments over the past decade but believe that further clarification is needed on several issues.

Subcommittees

The preamble states that a subcommittee which reports to a parent advisory committee is not subject to the FACA. 65 FR 2504. This could be read to mean that, no matter what the circumstances, subcommittee meetings are not subject to FACA. However, the guidance in the first key point in the table in section 102-3.200 provides that, while subcommittees need not open their meetings to the public, it also "cautions" agencies against closing subcommittee meetings to the public:

> "where a subcommittee develops substantive advice or recommendations which are subject to only nominal review by the parent committee before being submitted to a Federal agency or official. Such exclusions would run counter to FACA's provisions requiring contemporaneous access to the committee deliberative process."

Further clarification is needed as to whether and, if so, when subcommittee meetings are subject to FACA.

In addition, the definition of a subcommittee provides that its members could be drawn "in whole or in part from the parent committee." It has been our understanding that all members of an advisory subcommittee are also members of the full committee. Providing otherwise would create uncertainties about the application of personnel and conflict of interest laws to subcommittee members who are not members of the full committee. We believe that the proposed rule should address the status of subcommittee members who are not members of the parent committee, how they can be appointed, and what restrictions apply to them.

2

Utilized

The activities of "utilized committees" are subject to FACA. The major change in the definition of a "utilized committee," according to the preamble, would be to emphasize the degree to which the Executive Branch exercises "actual management and control" over a group not directly established by an agency. The definition in the proposed rule provides that a committee not established by the Federal Government is utilized under FACA when the President or a Federal agency exercises actual management and control over its operation. 41 CFR 102-3.30.

Further discussion of this definition of the term "utilized" states, in the first key point and guidance in section 102-3.40, that advice and recommendations from external groups on a one-time or regular basis where the agency does not exercise "actual management and control" over the group would not be subject to FACA. Examples in the table under section 102-3.40 would exclude from FACA a local citizens group meeting with Federal officials regarding improvement of the condition of forest trails and quality of concessions, as well as Federal officials' attending meetings of external groups where advice and recommendations are offered during the discussions.

The preamble and these provisions suggest that, absent "actual management and control" over the meetings by a Federal agency, there would be no FACA implications if Federal employees regularly met with private groups, including those established by agency contractors and licensees, to deliberate on issues that fall under the responsibility of the Federal agency. However, paragraph B of the guidance in section 102-3.40 advises agencies that the group is not automatically excluded from FACA even if the agency did not appoint the group's members, determine its composition, set its agenda, or fund its activities. Furthermore, it states that agencies may need to reconsider the status of the group under FACA if the relationship in question is essentially indistinguishable from an advisory committee established by an agency.

We find this advice to be internally inconsistent and believe further clarification is needed on this important issue. We, therefore, recommend that the definition and the key points and principles on a "utilized" committee be amended to eliminate this confusion and develop clear criteria. The rule should explain what type and degree of "management and control" by a Federal agency would meet the standard of a "utilized" committee. In particular, we would appreciate a clarification regarding situations where there are meetings between Federal officials and representatives of outside parties. At what point would such a meeting be subject to the FACA? For example, would there be a FACA committee if Federal employees meet and deliberate with a private group on a Federal matter at the invitation of the group at the private group's premises? Would the answer change if the contractor is invited by the agency to meet on the agency's premises and a Federal employee ran the meeting?

Operational committees

"Operational committees" are not subject to FACA. The definition of an operational committee is basically identical to the current regulation. 41 CFR 101-6.1104(g). However, the guidance in section 102-3.40 lists the following characteristics of an operational committee: specific functions and/or authorities provided by Congress by law; an ability to make and implement decisions; a dedicated budget and staff; a legal, authoritative relationship with an agency; and a

3

membership appointed by the President, Congress, and/or agency head. We believe that the result of requiring all these characteristics would be the elimination of almost all operational committees and would thus defeat the original intent of this term. We, therefore, recommend that the guidelines state that an "operational" committee may have some or all of these characteristics, but does not necessarily need all of them.

Seeking feedback

The proposed rule would require agencies to continually seek feedback from advisory committee members and the public regarding the effectiveness of the committee's activities. At regular intervals, agencies should communicate to the committee how its advice has affected their programs and decisionmaking. There is nothing in the proposed rule about how these requirements are to be implemented. We presume that this provision would not require additional efforts by advisory committees that already actively seek and receive such feedback. However, as to other advisory committees, this provision could also result in agencies' devoting substantial resources to implementation of FACA. We note that there is no statutory requirement mandating this provision and recommend reconsideration of the need for this provision.

Additional comments are set forth in an enclosure to this letter.

We again appreciate the opportunity to provide the views of the NRC on the proposed rule. Please contact John Szabo of the Office of the General Counsel if you have any questions at 301/415-1610 or e-mail at jls@nrc.gov.

Sincerely,

Karen D. Cyr

Karen D. Cyr
General Counsel

Enclosure: Additional Comments on Proposed Rule

4

ADDITIONAL COMMENTS ON PROPOSED RULE

Section 102-3.75(b): To satisfy the requirement that agencies must consult with the Secretariat before establishing, reestablishing, or renewing an advisory committee, this provision would provide agencies with the option to develop and submit an annual plan or submit a letter and the proposed charter to the Secretariat. We recommend that this provision explain more fully what is meant by an "annual plan" in this context.

Section 102-3.80: Although the proposed rule would require a public notice in the Federal Register when a discretionary advisory committee is established, reestablished, or renewed, there is no similar requirement for revisions to a committee charter. We recommend that the rule require that a notice be published when there is a major revision to a committee charter.

Section 102-3.140: This provision would require the designation of a Federal employee to serve as the Designated Federal Official (DFO) for each advisory committee and its subcommittees. Because there may be situations where the DFO may not be able to attend committee meetings or carry out other DFO duties, we recommend that this provision be amended to provide for the selection of other employees to serve as "alternate DFO."

Sections 102-3.150(d), (e), and (g): These provisions on determining compensation for advisory committee members, committee staff, and committee consultants would tie the rates of pay for members, staff, and consultants to the General Schedule. Because, as an excepted agency, the NRC is not under the General Schedule pay system, we recommend that these provisions be appropriately amended to add the phrase "or equivalent agency system" to include agencies that are not under the General Schedule.

Section 102-3.190(e): This provision would require that committee and subcommittee minutes be "finalized" within 90 calendar days of the meeting. We recommend that this term be changed to "certified," which would be consistent with the first paragraph of this section, which requires that the committee chairperson "certify" to the accuracy of the minutes.

Section 102-3.200: The first key point and guidance in the table in this provision relate to opening all advisory committee and subcommittee activities to the public. Paragraph B of the guidance "cautions" agencies to avoid excluding the public from a subcommittee meeting that develops substantive advice or recommendations which are subject to only nominal review by the parent committee. To prevent inadvertent violations and provide clear guidance, we recommend that the Paragraph B be relettered as Paragraph A and that it read as follows:

> "Subcommittee meetings must be open to the public when the meeting develops substantive advice or recommendations which are subject to only nominal review by the parent committee before submission to a Federal agency or official. Closing these types of meetings would run counter to FACA's provisions requiring contemporaneous access to the committee deliberative process."

We also recommend that paragraph A be relettered as paragraph B and that the following clause be added at the end:

if the subcommittee activity will receive a full review by the parent committee, is pre-deliberative, or focuses solely on administrative matters of the committee.

6

Power Reactors Licenses 3/31/00

1. Improving Decommission Regulations for Nuclear Power Plants

SECY-99-168 describes and approach for the consolidation of a number of ongoing rulemakings related to decommissioning into an integrated risk-informed rule. The SECY also describes a proposal for a comprehensive regulatory review of Title10 to be preformed to determine what regulations are applicable to decommissioning nuclear power plants and to identify where clarifications or modifications are appropriate, based on risk significant differences between operating and decommissioning plants. Decommissioning regulations would be consolidated into a new location in Title 10.

The an risk informed integrated rulemaking will address the following issues.

- Emergency Planning
- Financial indemnity
- Safeguards/Physical Security
- Operator staff and required training
- Backfit rule applicably

These issues were currently being addressed in separate rulemakings actions and consolidating these actions into a single rulemaking will facilitate a consistent approach. As stated, the NRC is to use a risk-informed approach in this integrated rulemaking. The staff is considering including fitness for duty requirements in this integrated rule making.

Milestones:

- Rulemaking Plan on integrated rulemaking issues 6/30/00
- Rulemaking Plan for consolidation of decommissioning regulations 7/15/00

Proposed Lead Committee

7

- Areas to be addressed in the integrated rulemaking , with the exception of financial indemnity, are in the ACRS area of expertise and traditional responsibility. It is proposed that neither Committee undertake a review of financial indemnity issues. It is proposed that the Joint ACRS/ACNW Subcommittee take the responsibility for the review of the rulemaking plan for consolidated risk-informed rule.

Proposed Action

- ACRS review of rulemaking plan for the integrated rule and subsequent review of all areas to be addressed in the proposed rule with the exception of financial indemnity. Lead ACRS members would review the staff proposals and make recommendations as to what parts of the staff proposals needed to be addressed by the ACRS.
- Joint ACRS/ACNW Subcommittee review of rulemaking plan for consolidated risk-informed rule with subsequent review of the proposed rule. The Joint Subcommittee would refer responsibility for parts the proposed rule to either the ACRS or the ACNW after review of the rulemaking plan. The possible approaches to consolidating and risk-informing decommissioning regulations could be discussed during the ACNW workshop on decommissioning.

2. Spent Fuel Pool Accident Risk Assessment

Accidents associated with spent fuel pool storage are being examined as a significant source of risk for permanently shutdown nuclear power plants. Loss of spent fuel pool water with uncovering of the stored fuel and the occurrence of zirconium fires is being examined.

Milestones:

- Discussion during April 5-7, 2000 ACRS meeting and ACRS report 4/00

8

- NRC staff finalize spent fuel pool accident risk report 5/30/00

Proposed Lead Committee

- Assigned to ACRS in 12/21/99 SRM

Proposed action

- ACRS review and comment on content of the NRC staff report and ACRS discussion as to the status of the classification of design basis accidents for decommissioning power reactors
- ACRS followup on issues identified in its 11/12/99 report

3. Technical Specifications for decommissioning nuclear power plants

Regulatory oversight by the NRC is accomplished in part through the use of Technical Specifications. The associated needs change when the plant is in the decommissioning process. Standard Technical Specifications (STP) are being developed for decommissioning plants.

Milestones

- Final STP for PWRs FY01
- Proposed STP for BWRs FY00
- Final STP for BWRs FY01

Proposed lead Committee

- Areas to be addressed are in ACRS areas of expertise and traditional responsibility

Proposed Action

9

- A small team of ACRS members review the documents when available and identify issues for which ACRS review is needed

4. Evaluation of design basis accidents for decommissioning nuclear power plants

Design bases accidents for decommissioning plants be different from those associated with an operating plant. This activity will involve identification and evaluation of these design bases accidents. The NRC staff paper on spent fuel pool fires will partially address this issue.

Milestones

- To be determined

Proposed Lead Committee

- Areas to be addressed are in ACRS area of expertise and traditional responsibility.

Proposed Action

- Explore the NRC staff's plans for and thinking on this issue within the context of the ACRS review of the NRC staff paper on spent fuel pool accident risk and identify any need for further ACRS (or ACNW) involvement.

5. Regulatory Guides, SRPs, and inspection plans for decommissioning of power reactors.

This item covers the following staff activities

- Final Regulatory Guide DG 1067 on decommissioning of nuclear power reactors

To ACRS/ACNW 3/00

10

- Final Regulatory Guide DG 1071, "Standard Format and Content for Post Shutdown Decommissioning Activities Report."
- To ACRS/ACNW 3/00

- SRP for License Termination Plans 5/00

- Revisions to IMC 2561 "Decommissioning Inspection Program" TBD

- Guidance on Maintenance Rule compliance for decommissioning plants
  To be completed FY2000

- Final Regulatory Guide on fire protection for decommissioning plants, DG-1069
  To be completed Early FY2001

- Guidance for evaluation of safety reviews (10CFR50.59) at permanently shutdown reactors i FY2000

<u>Milestones</u>

- As noted above

<u>Proposed Lead Committee</u>

- As stated under proposed action

<u>Proposed action</u>

- ACRS lead members review of guidance on maintenance rule compliance, fire protection, and 10CFR50.59 reviews and identification of any areas for which ACRS review is appropriate. ACNW review of Regulatory Guides DG1067 and

//

DG-1078. No Committee review of decommissioning inspection guidance. ACNW has reviewed a draft version of the SRP for License Termination Plans. The final version is expected not to be changed in any significant way. ACNW will receive the final version of the SRP for what level of review it believes appropriate.

6. ACRS and ACNW briefing on NRC and utility experience with power reactor decommissioning

It is proposed that a group of ACRS and ACNW members visit a Region office and the site of a decommissioning reactor and receive briefings from Region offices and utility personnel on the issues and lesson-learned associated with the Region and utility experience with decommissioning. This would provide a opportunity for the attendees to learn more about actual field experience and the issues identified.

Milestone

- Schedule in FY2001

Proposed Lead Committee

- Do as a Joint ACRS/ACNW activity with the appropriate ACRS and ACNW members

Proposed action

- Participating members of brief their committee on issues of interest after this visit.

7. NRR Licensing Oversight for Decommissioning reactor Facilities

NRR is currently provides management and licensing oversight for 16 decommissioning reactor facilities at a level commensurate with the associated risk

Milestones

- Ongoing activity

Proposed Lead Committee

- Joint ACRS/ACNW activity

Proposed Action

- Schedule as information briefing, repeated at about two year intervals, during which NRR would brief a Joint ACRS/ACNW group on the status of the NRR work. Participating members would then provide a report to their Committee on insights and issues of interest to that Committee.

Non-Power Reactors Licenses

1. Clearance Rule

The NRC is developing a rulemaking that would set specific requirements on the releases of solid materials. The ACNW was briefed on this issue during its December 1999 meeting and has issued a report. The final of NUREG 1640 will be issued in FY2001

Milestones

- Issue final NUREG 1640 (may be delayed for one year) 1/01

Proposed Lead Committee

- ACNW has the lead

Proposed Action

- ACNW will continued to follow the staff work on this matter as stated in the ACNW report.

2. Rubblized concrete dismantlement

Maine Yankee has expressed a interest in utilizing rubblization in its decommissioning. The process as proposed involves (a) removing all equipment from buildings, (b) some decontamination of the building surfaces, (c) demolishing the above grade structures into concrete rubble, and (f) covering, regrading, and landscaping the site surface.

Milestones

- License Termination Plan review 11/00

Proposed Lead Committee

- ACNW already has the lead and has written a report (1-24-2000)

Proposed action

- ACNW stated in its report that it would continue to interact with the NRC in the development of this option.

3. Entombment

The SRM on SECY 96-068 that addressed DSI-24 requested a NRC staff analyses as to whether they view entombment as a viable option. The staff stated in SECY 98-099 that consideration of entombment as a viable option has merit. In SECY 99-187 the staff stated that they believe that entombment can be a safe and viable option for many situations. The staff based this conclusion in part on PNNL assessment. The staff has conducted a workshop (12/99) during which they solicited stakeholder views.

Milestones

- Staff paper providing recommendations to the Commission 6/00

Proposed Lead Committee

16

- Areas to be addressed are in the ACNW area of expertise and traditional responsibility. ACRS members with operating reactor expertise could be involved.

Proposed Action

- Review staff paper and report to the Commission. Stakeholder input should be sought on controversial issues.

4. Decommissioning criteria for West Valley

The NRC staff is developing decommissioning criteria for use by DOE for the West Valley Demonstration Project and for any follow-up licensing activities.

Milestones

• SECY proposing a decommissioning criteria policy statement to Commission for approval	8/30/00
• Issue Policy Statement in FR	11/30/00
• Approve specific criteria for West Valley site	TBD

Proposed Lead Committee

- Areas to be addressed an in the ACNW area of expertise and traditional responsibility.

Proposed Action

- Review the Policy Statement and specific criteria for the West Valley site

17

5. Site Decommissioning Management Plan

The Site Decommissioning Management Plan (SDMP) was developed and submitted to the Commission on March 29, 1990 (SECY-90-121) There are now 26 SDMP sites (proposed 23 in FY2001, 10 in FY2002, and 9 in FY2003)

Milestone

- DandD pilot to evaluate adequacy of screening criteria TDB
- ACNW visit to a SDMP site TBD

Proposed Lead Committee

- ACNW already has the lead

Proposed Action

- Discuss DandD pilot with the NRC staff and visit a selected SDMP site. Object of the site visit would be for ACNW to have a opportunity to familiarize itself with materials site decommissioning field experience and engage in public outreach.
- Shortly after the December 1999 ACNW meeting Richard Major distributed a package with reviews of 6 decommissioning reviews for materials sites. The ACNW should decide if they need to be briefed by the NRC staff.

6. Standard Review Plan for Decommissioning

The NMSS staff is developing a SRP for decommissioning. The document was provided to the ACNW in August, 1999. Assignments were subsequently made to members.

19

Milestones

- Issue dose modeling SRP 7/00

- Issue SRP 7/00

Proposed Lead Committee

- ACNW already has the lead

Proposed Action

- Review status of members work during the March 2000 ACNW meeting and decide on course of action

7. Pilot for performing decommissioning of a materials site without the submittal of a decommissioning plan

This activity implements the Commission's direction under DSI-9 to initiate a pilot study for decommissioning without the submittal of a decommissioning plan and providing a regulatory framework for encouraging lower cost decommissioning waste disposal options

Milestones

- Status report to the Commission 1/01

Proposed Lead Committee

- ACNW has the lead

Proposed Action

- ACNW should stay informed and make a decision as to if it should review this topic in early FY2001

19

8. NRC interactions with EPA and ISCORS to resolve issues of mutual concern

Topics addressed in these ongoing interactions include risk harmonization unnecessary duplication of regulatory requirements, mixed waste, recycling, decommission, cleanup, and sewer reconcentration.

Milestones

- Ongoing activity

Proposed Lead Committee

- Areas to be addressed are in the ACNW area of expertise and traditional responsibility

Proposed action

- ACNW should stay generally informed and involve itself only if the Commission requests its involvement or if a related issue arises within the context of ACNW review of some other topic. "Risk Harmonization" is a Second Ten Priority item on the ACNW's CY2000 Action Plan

9. RES work related to decommissioning issues

The work involves code and model development and some data acquisition. (See attachment)

Milestones

- Provide PC version of SEDSS that will implement DandD screening methodology and 1-D flow and transport groundwater pathway 5/00

20

- Update MARSSIM to incorporate public comments following 2-year testing period 7/00

- Verify and validate testing of 4 SIGHT 10/00

- Develop a probabilistic version of RESRAD and publish NUREG/CR 11/00

- Develop probabilistic version and DandD and publish NUREG/CR 11/00

- Provide draft technical report on test applications of methodology for selecting and testing conceptual models with respect to a specific site 2/01

- Provide PC version of SEDSS with multi-dimensional groundwater pathways 3/01

Proposed Lead Committee

- ACNW already has lead
-

Proposed Action

- ACNW should continue to say informed as to the progress of the staff's work and continue to review this work in the context of its annual RES-sponsored research review.

21

Activities for which ACRS ACNW review is not recommended - documents will be given to lead committee member for information

1. Decommissioning Project Manager's Handbook

2. NUREG-1628, "Decommissioning Questions and Answers."

3. Revisions to IMG 2561, "Decommissioning Inspection Program" and other decommissioning inspection procedures.

4. Resident Inspector Training and guidance for decommissioning

5. Guidance related to evaluating decommissioning cost and establishing financial indemnity.

6. Guidance on FSAR conversion often permanently ceasing power operation.

22

4/3/2000

Prepared for Internal Committee Use Only

R. Seale
J. Barton
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J. Sieber
R. Uhrig

. During the March 2000 Planning and Procedures Subcommittee I was given the job of developing a proposal for ACRS interaction with the industry. We did not discuss the ground rules to any great extent but I attempted to keep my proposal in line with ACRS's current workload and resource limitations. I am also suggesting that for whatever we end up doing, we be sensitive to having the involvement of groups like UCS or Public Citizen. I would be inclined to avoid long meetings to which multiple industry organizations were invited. By my thinking we want to hear what the various industry representatives have to say without the pressures of confronting and/or accommodating other industry viewpoints in a public meeting.

What I am suggesting is as follows:

(1) Schedule a discussion with senior NEI representatives and a few NEI Board Members (who would be selected by NEI) during a ACRS meeting in the near future. Industry trends, agenda, and regulatory needs could be discussed. The NEI staff offered us such a meeting during this and last year's self assessment interviews.

(2) Plan regular attendance by members and ACRS staff at industry or professional society workshops and meetings where the agenda suggests the useful information as to the industries broader regulatory concerns would be obtained. (An example of this type of activity would be R. Uhrig's attendance at the ANS Amelia Island meeting.) I have asked NEI staff to send me the list of whatever NEI workshops and NEI meetings of this type are currently planned. I understand that INPO has a CEO's annual meeting to which the NRC Commissioners are invited to attend. If you are interested I can get more information on this INPO meeting. (John Barton recommends that either the ACRS

Chairman or Vice Chairman attend.) A more comprehensive of workshops and meetings could be developed if ACRS want to pursue this kind of attendance.

(3) Continue to have our annual visit to a Region Office and to a licensee's plant. This would provide another opportunity for discussion of Region Office and licensee insights and concerns.

(4) One or two ACRS members could make a short visit to a plant, without the level of preparation that goes into our annual visit to a Region office and a plant. We would notify the EDO and the Region Office of our visit but not ask for this level of support that we get for our annual visit. These kinds of visits were included as possible members' activities in the Adopted Plant program. (John Barton believes that these meetings would not provide benefits consistent with the ACRS and Region and licensee effort that would be required.)

(5) We will be making site visits to plants for which the licensee has submitted a License Renewal Application. These visits would provide another opportunity for discussion of that licensee's insights and regulatory needs.

(6) There was some discussion of having meetings with INPO. I would like to talk more with you as to what could be done in this regard. My sense is that INPO will be less accessible than NEI.

I will give you each a call.

Dick Savio

24

DISCUSSION ITEMS FOR

MEETING BETWEEN

EDO AND ACRS

APRIL 4, 2000

25

ITEMS FOR DISCUSSION

1. <u>Coordination of ACRS Scheduling Activities</u>

ACRS/NRC coordination is an important factor in the accurate and efficient scheduling of items for ACRS review. Poor coordination can adversely impact resources and the Committee's timeliness. The interim process of using Office coordinators is currently viewed as an improvement, but further improvement is possible and necessary.

Discussion Points

- Need for timely and accurate input to develop Committee agenda
- Need for timely submittal of review material
- Mechanisms to assure sufficient allotment of time for ACRS reviews in staff schedules and SRMs
- Revision of Memorandum of Understanding -- progress of ACRS initiative
- Dissemination of information about process to staff
- EDO Coordinator function

ITEMS FOR DISCUSSION (Contd.)

2. <u>ACRS Report on the NRC Research Program</u>

This is the third annual report by the ACRS on the NRC research program. The report is a high level overview of issues the Commission may face and the need for research to assist in the development of a better knowledge base to address those issues. The report identifies the major roles and desirable features of the NRC research program. The report does not provide a section on recommendations, which are, rather, imbedded in the report.

Discussion Points

- ACRS would appreciate EDO's view on the ACRS report, including whether report meets the needs of the Commission.
- Recommendations in future reports

ITEMS FOR DISCUSSION (Contd.)

3. <u>License Renewal and Other Major Initiatives</u>

A large fraction of ACRS resources have been utilized in the area of license renewal and it appears that this review activity may increase in the next few years. The ACRS has proposed a strategy to do these reviews more effectively and efficiently. License renewal, risk-informing the regulations, and the research report are a few areas of significant resource burden to the ACRS.

Discussion Points

- Acceptability of ACRS license renewal strategy.
- Need for strategy for other initiatives in FY2001 - 2003 time-frame.

4 <u>ACRS Letters and Recommendations</u>

Occasionally, the Committee's recommendation differs with the staff's position (e.g., 120-month update requirement). Do we need to address how we follow-up on such issues?

92

ITEMS FOR DISCUSSION (Contd.)

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