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## **POLICY ISSUE** (Information)

January 13, 1997

SECY-97-009

**FOR:** The Commissioners

**FROM:** Hugh L. Thompson, Jr.  
Acting Executive Director for Operations

**SUBJECT:** QUARTERLY STATUS UPDATE FOR THE PROBABILISTIC RISK  
ASSESSMENT (PRA) IMPLEMENTATION PLAN

### PURPOSE:

To present a quarterly update on the progress of activities in the PRA Implementation Plan, including the development of risk-informed standards and guidance.

### BACKGROUND:

In a memorandum dated January 3, 1996, from the Executive Director for Operations to Chairman Jackson, the staff committed to submit quarterly updates on the status of developing risk-informed standards and guidance. Previous updates on the status of activities in the PRA Implementation Plan, including the status of developing risk-informed standards and guidance, were sent to the Commission on March 26, June 20, and October 11, 1996.

### DISCUSSION:

The staff has updated the status of activities in the agency's PRA Implementation Plan in the Attachment. Significant accomplishments in the past quarter follow:

- The staff has incorporated proposed resolutions of the policy, technical, and process issues in new drafts of the broad-scope general regulatory guide (RG) and standard review plan (SRP) and the application-specific RG and SRP for Inservice Testing (IST), Graded Quality Assurance (GQA) and Technical Specifications (TS) and has discussed the new drafts with senior agency management, the Advisory Committee on Reactor

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Safeguards (ACRS) and the Committee to Review Generic Requirements (CRGR). Additional modifications are being developed to address the issue of whether it is appropriate to allow the industry to propose changes that could lead to systematic increases in risk to public health and safety.

- The staff has completed a total of twelve maintenance rule baseline inspections, which included inspection of licensee methods for applying PRA in maintenance programs.
- Draft NUREG-1560, "Individual Plant Examination [IPE] Program: Perspectives on Reactor Safety and Plant Performance," Vol. 1, Part 1, was issued for public comment in October 1996. Draft NUREG-1560 reports perspectives gained from reviewing 75 IPE submittals covering 108 nuclear power plants. Volume 2, Parts 2 through 5, provided additional perspectives and was published for public comment in November 1996.
- NUREG/BR-0228, "Guidance for Professional Development of NRC Staff in Regulatory Risk Analysis," was issued to all agency managers and contains recommended PRA training programs for NRC staff. NUREG/BR-0228 will help NRC managers prepare training and development programs for their staff in the PRA area.
- The annual report to the Commission on the status of the Accident Sequence Precursor (ASP) Program was issued as SECY-96-241 on November 25, 1996.

In the status report for the last quarter, the staff made recommendations regarding the following four policy issues:

- (1) the role of performance-based regulation in the PRA Implementation Plan
- (2) plant-specific application of safety goals
- (3) risk neutral vs. increases in risk
- (4) implementation of changes to risk-informed IST and ISI (Inservice Inspection) requirements

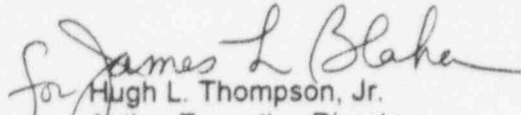
and listed key technical and process issues identified in the development of the RGs and SRPs and through the risk-informed pilot applications. The staff has incorporated its resolutions of the technical and process issues, and its recommended option for policy issues 2 and 3 (above) in new drafts of the broad-scope general RG and SRP and the application-specific RG and SRP for IST, GQA and TS. The new drafts were discussed with the ACRS and the CRGR, and are currently being revised to address the comments from those committees. Further revisions to these draft documents will be made as necessary following expected Commission guidance from SECY-96-218.

Several key issues in the development of RGs and SRPs remain to be resolved related to risk informed decision criteria. These issues involve the decision criteria relating to allowable changes that increase overall plant risk. The staff expects to incorporate proposed resolutions of open issues into revised RGs and SRPs, send the revised documents to the ACRS and CRGR for their review in January 1997, and, to the Commission, by the end of March 1997, for approval to issue for public comment. Additionally, due to delayed submittals from industry on ISI, the draft ISI RGs and SRPs will not be issued until May 1997.

The staff is continuing to resolve technical and process issues regarding risk-informed regulation as part of the development of RGs and SRPs. The staff will continue to interact with risk-informed pilot licensees, industry representatives, ACRS, CRGR, and the public about the increased use of risk insights in our regulatory processes.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objections.

  
for Hugh L. Thompson, Jr.  
Acting Executive Director  
for Operations

Attachment:  
As stated

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## ATTACHMENT

### QUARTERLY STATUS UPDATE OF THE AGENCY-WIDE IMPLEMENTATION PLAN FOR PROBABILISTIC RISK ASSESSMENT (PRA) (from October 1, 1996 to December 31, 1996)

#### SUMMARY OF SIGNIFICANT PROGRESS

(1) Regulatory Guide (RG) and Standard Review Plan (SRP) Development (Tasks 1.1 and 2.1)

The staff incorporated its proposed resolutions of policy, technical, and process issues into new drafts of the broad-scope general regulatory guide (RG) and standard review plan (SRP) and the application-specific RG and SRP for Inservice Testing (IST), Graded Quality Assurance (GQA) and Technical Specifications (TS). The new drafts were discussed with senior agency management, the Advisory Committee on Reactor Safeguards (ACRS) and the Committee to Review Generic Requirements (CRGR), and are currently being revised to address their comments. Several key issues remain to be resolved. These issues involve the criteria for changes in plant risk. The staff expects to incorporate proposed resolutions of open issues into the revised RGs and SRPs, forward the revised documents to the ACRS and CRGR for their review by the end of January 1997, and, to the Commission, by the end of March 1997 for approval to issue for public comment. The development of the draft RG and SRP for Inservice Inspection (ISI) is continuing. The staff has completed its review of the draft Nuclear Energy Institute Guideline and Westinghouse Owners Group methodology for risk-informed ISI and has provided its comments to the industry.

The staff has determined that because of the provisions in 10 CFR 50.54(a) which control changes to the quality assurance (QA) program, it may not be necessary for the licensee to submit a Graded Quality Assurance (GQA) program change in advance for NRC review and approval. Consequently, instead of expending its limited resources to prepare an SRP when it is questionable whether corresponding licensee submittals will be made, the staff will develop an inspection procedure for GQA. Such a procedure will allow the staff to thoroughly assess GQA program changes, including the use of PRA in the change process. The necessity of a GQA SRP will be revisited in the future pending potential changes to 50.54a.

(2) Pilot Applications (Task 1.2)

On November 21, 1996, the staff examined a representative sampling of procurement activities performed by Grand Gulf as part of its GQA implementation. The staff is awaiting the resubmittal of a QA program change from South Texas in response to previously issued staff questions. The staff is also reviewing a submittal from Palo Verde (dated September 12, 1996) describing changes made to Palo Verde's GQA procurement procedures based on staff evaluation comments that were sent to the licensee in December 1995.

Regarding the risk-informed TS pilot application, the staff and its contractors have completed their review of the response to all requests for additional information (RAIs) from the lead plant (Arkansas Nuclear One, Unit 2 (ANO-2)) for the changes to the TS for the safety injection tank (SIT) and the low-pressure safety injection (LPSI) system. The staff has received a final technical evaluation report (TER) from its contractor and will use that report as the basis for

preparing the safety evaluation for the lead plant. The staff visited Ft. Calhoun, on December 12, 1996, as part of its review of the overall approach used by the Combustion Engineering Owners Group (CEOG) in preparing the CEOG Joint Application Reports for all of the participating Combustion Engineering plants.

Significant PRA-related technical support has been provided for the agency's maintenance rule (MR) baseline inspection effort. The goal of the MR baseline program is to conduct a full team inspection at each reactor facility in the first two years following the implementation date of the rule (July 10, 1996). To date, 12 full inspections have been conducted. These inspections have been conducted with the support of experienced staff and contractor personnel trained in the use of PRA, using an inspection procedure that focuses on the inspection and assessment of the relevant PRA-related technical aspects of the NRC-approved industry guideline for implementing the rule (i.e. NUMARC 93-01). Although items of non-compliance with the MR have been identified from the inspections, the staff has not noted significant deficiencies in the use of probabilistic analyses that support implementation of the rule.

(3) Training for Inspectors and Technical Staff (Task 1.3)

Development of a new PRA course for inspectors and other technical personnel within the reactor program is continuing. The new course, PRA Technology and Regulatory Perspectives, will address the special needs of regional inspectors, resident inspectors, and other technical personnel who require knowledge of PRA issues and who need to gain insights to better evaluate the effects of design, testing, maintenance, and operating strategies on system reliability. The course will concentrate on the application of PRA results in planning inspections, monitoring licensee performance, and reviewing licensee risk-informed submittals. The pilot course is planned to be presented next spring.

(4) Individual Plant Examination (IPE) and IPE of Externally Initiated Events (IPEEE) Reviews (Task 2.5)

Draft NUREG-1560, "Individual Plant Examination Program: Perspectives on Reactor Safety and Plant Performance," Vol. 1, Part 1, was issued for public comment in October 1996. Draft NUREG-1560 reports perspectives gained from reviewing 75 IPE submittals covering 108 nuclear power plants. The EDO transmitted this report to each utility chief nuclear officer. Volume 2, Parts 2 through 5, provided additional perspectives and was published for public comment in November 1996.

(5) Risk-Based Trends and Patterns Analysis (Task 3.1)

During this period, two reports were completed in a series of reports documenting the results of studies of the reliability of risk-significant systems: The final report on the reliability of boiling-water reactor (BWR) isolation condensers was completed and distributed in September 1996; the draft report on the reliability of the BWR reactor core isolation cooling system was completed and issued for staff review and comment in October 1996. The NRC staff submitted its response to the draft report in November 1996, and the final report is being prepared. Progress in the NRC's programs for the risk-based analysis of operating experience was discussed with the Advisory Committee on Reactor Safeguards (ACRS) in meetings with the subcommittee on PRA on October 30, 1996, and with the full Committee on November 7, 1996. The annual report to the Commission on the status of the Accident Sequence Precursor (ASP) Program was issued as



SECY 96-241 on November 25, 1996. The Milestone for "trend frequency of risk important initiating events" has been delayed 5 months to May 1997 due to resource limitations.

(6) Accident Sequence Precursor (Task 3.2)

The staff's contractor, Idaho National Engineering Laboratory, issued the "Accident Sequence Precursor Extension to Low Power, Shutdown, and External Events Feasibility Study" in August 1996. This completes the feasibility study on PRA models to be used to identify and rank the risk significance of operational events during low power and shutdown. The staff is reviewing this feasibility study to determine whether further development of the low power, shutdown, and external events PRA models is appropriate.

(7) Reliability Data Rule (Task 3.5)

Work continues on the modifications to the regulatory guide, the regulatory analysis supporting the rule, and the response to comments on the rule and the regulatory guide. Efforts to obtain the necessary reliability data from licensees through a voluntary program are continuing in parallel with the rulemaking activities. Industry has proposed a voluntary alternative to the rule and the Institute of Nuclear Power Operations (INPO) has provided a sample of the proposed voluntary data to the NRC for evaluation. The staff is now evaluating the voluntary approach and plans to make a recommendation to the Commission by April 1997. If the Commission decides at that time that a rule is needed, the staff could publish the final rule 6 months after the Commission's decision.

(8) Staff Training (Task 3.6)

The staff has published a guidance document for agency managers to help them prepare training and development programs for their staff in the PRA area. The document, NUREG/BR-0228, "Guidance for Professional Development of NRC Staff in Regulatory Risk Analysis," was issued to all agency managers and contains recommended Technical Training Center (TTC) sponsored PRA training programs for NRC staff.

The staff has completed its development of the PRA for Technical Managers course (P-107). This course was designed to provide all levels of staff managers with a basic understanding of PRA methods, strengths, and limitations needed to implement risk-informed, performance-based regulations. The course will be presented for the first time in February 1997.

A new PRA Level 2 course, Accident Progression Analysis, has been developed. This three-day course will address accident phenomenology under post-core-damage conditions and development of PRA models for this severe-accident regime. The course is scheduled to be presented for the first time in February 1997. A new PRA Level 3 course, Accident Consequence Analysis, has also been developed. This three-day course will address environmental transport of radionuclides and estimation of offsite consequences from core-damage accidents. This course is scheduled to be presented for the first time in March 1997.

The staff is developing a new course on external events. This three-day course will address external events (such as fires, floods, earthquakes, high winds, and transportation accidents) and the development of external-event PRA models, such as those used in the IPEEEs. Course development is currently in the design phase. The first presentation of this course is scheduled for August 1997.

## REVISIONS TO THE EXISTING PRA IMPLEMENTATION PLAN

As discussed in the memorandum from the EDO to Chairman Jackson dated December 10, 1996, the draft risk-informed RGs and SRPs that were scheduled to be completed in December 1996 are now scheduled to be completed by March 31, 1997.

Although formal submittals from ISI pilot plants have been substantially delayed, the staff is continuing to finalize draft risk-informed ISI RG and SRP based on a review of the Nuclear Energy Institute (NEI) guidelines, insights gathered from the methodology review of one pilot plant, and interactions with ASME and EPRI. The NEI has indicated that it is planning to meet with the staff in January 1997, to discuss an integrated approach that incorporates the ASME and the EPRI risk-informed ISI methodologies into a single guideline. The staff plans to review and, where appropriate, incorporate aspects of the NEI integrated guidelines into the draft RG and draft SRP by March 1997. The staff will meet with the ACRS and CRGR to discuss the revised documents and intends to forward the revised draft RG and SRP for risk-informed ISI to the Commission by May 31, 1997.

The staff is evaluating the pilot licensees' submittals for risk-informed IST (Comanche Peak and Palo Verde); however, a shift in resources from work on the pilot applications to work on the RGs and SRPs has contributed to delays in these pilot projects. In the process of developing the RG and SRP for risk-informed IST, the staff has identified a number of significant technical issues that remain to be resolved in order for the staff and licensees to agree on a pilot approach to risk-informed IST. The staff is preparing requests for additional information and making plans to discuss them with licensees. Accordingly, the staff has postponed submitting its recommendation to the Commission on implementing the risk-informed IST at the pilot facilities from March 1997 until June 1997.

The staff's recommendation to the Commission regarding the risk-informed TS pilot (Task 1.2) has been delayed 3 months from the earlier schedule because the staff decided to visit a third pilot site before ending its review of the SIT and LPSI changes and because its resources shifted from work on the pilot applications to work on the RGs and SRPs. The staff now expects to send its recommendation on the TS pilot applications to the Commission by March 31, 1997. Guidance for risk informed inspection procedures related to 50.59 evaluations and regular maintenance observations has been delayed until October 1997 to allow utilization of revised inspection manual guidance.

The Inspection Manual Chapter 9900 revision which provides technical guidance on the use of PRAs in the power reactor inspection program was issued to regional offices for review and comment in October 1996 (Task 1.3). Because significant risk informed inspection resources were diverted to maintenance rule baseline inspections and because a number of significant comments were received from the regional offices, the schedule for formally issuing the guidance has been delayed three months to March 1997. Also, due to this resource reallocation, guidance for risk-informed inspection procedures related to 50.59 evaluations and regular maintenance observations has been delayed until October 1997. This delay will allow the staff to ensure that these inspection activities are consistent with the high level risk informed guidance being developed in Manual Chapter 9900.

In the October 1996 PRA Implementation Plan update (SECY 96-218), the staff indicated that it could not conclude, from the licensees' submittals, that all the licensees met the intent of Generic Letter 88-20. In that Commission paper, the staff indicated that essentially all IPE reviews will be

completed by December 1996, but that due to delays in responses from several licensees to staff questions, approximately three IPE SERs will not be completed by December 1996. Because of additional delays in receiving licensee information and in reviewing additional licensee submittals, this number is now between five and eight.

In regard to the application of risk insights in operator licensing (Task 1.4), the staff recommended in SECY-96-123, "Proposed Changes to the NRC Operator Licensing Program," that the revised operator licensing process be implemented on a voluntary basis with the issuance of Revision 8 of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," and that the Commission approve the staff's pursuit of rulemaking to require power reactor facility licensees to prepare the operator licensing examinations in accordance with NUREG-1021. In a staff requirements memorandum (SRM) dated July 23, 1996, the Commission asked the staff to develop a detailed rulemaking plan to justify changes that may be necessary to 10 CFR Part 55 and directed the staff to address a number of issues regarding the proposed examination process. The staff responded to the SRM with SECY 96-206, "Rulemaking Plan for Amendments To 10 CFR Part 55 to Change Licensed Operator Examination Requirements," on September 25, 1996, and is still awaiting a decision from the Commission. If the Commission approves the new examination methodology, the staff will publish Revision 8 of NUREG-1021. Revision 8 will be implemented six months after the date of publication. The staff expects a Commission decision before March 1997.

NMSS has added two new tasks (i.e., 5.2 and 5.3) to the PRA Implementation Plan. Task 5.2 reflects a study to determine the feasibility of applying PRA to spent fuel storage facilities. This study will determine the extent to which it is cost beneficial to apply PRA to spent fuel storage facilities. Appropriate recommendations will be made on the basis of the study. The staff is developing a detailed plan and schedule for this task.

Task 5.3 covers the use of PRA methods, their results, and insights to evaluate regulations governing the transportation of radioactive material. As part of this task, the staff will revalidate the results of NUREG-0170, "Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes," February 1977, for spent fuel shipment risk estimates by June 1999 and update the database on transportation of radioactive materials by the end of fiscal year 1999.

## **REVISED TASK TABLES**

The attached task tables have been updated to reflect the progress and revisions to the PRA Implementation Plan from October 1, 1996 to December 31, 1996.



REVISED PRA IMPLEMENTATION PLAN  
TASK TABLE (December 1996)

## 1.0 REACTOR REGULATION

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office(s)
1.1 DEVELOP STANDARD REVIEW PLANS FOR RISK-INFORMED REGULATION	Standard review plans for NRC staff to use in risk-informed regulatory decision-making.	<ul style="list-style-type: none"> <li>* Evaluate available industry guidance.</li> <li>* Develop a broad scope standard review plan (SRP) chapters and a series of application specific standard review plan chapters that correspond to industry initiatives.</li> <li>* These SRPs will be consistent with the Regulatory Guides developed for the industry.</li> <li>* Draft SRPs transmitted to Commission to issue for public comment</li> </ul> <p>General IST ISI TS</p> <ul style="list-style-type: none"> <li>* Issue final SRP</li> </ul> <p>General IST ISI TS</p>	<p>3/97 3/97 5/97 3/97</p> <p>12/97 12/97 12/97 12/97</p>	NRR
1.2 PILOT APPLICATION FOR RISK-INFORMED REGULATORY INITIATIVES	<ul style="list-style-type: none"> <li>* Evaluate the PRA methodology and develop staff positions on emerging, risk-informed initiatives, including those associated with:               <ol style="list-style-type: none"> <li>1. Motor operated valves.</li> <li>2. IST requirements.</li> <li>3. ISI requirements.</li> <li>4. Graded quality assurance.</li> <li>5. Maintenance Rule.</li> <li>6. Technical specifications.</li> <li>7. Other applications to be identified later.</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>* Interface with industry groups.</li> <li>* Evaluation of appropriate documentation (e.g., 10 CFR, SRP, Reg Guides, inspection procedures, and industry codes) to identify elements critical to achieving the intent of existing requirements.</li> <li>* Evaluation of industry proposals.</li> <li>* Evaluation of industry pilot program implementation.</li> <li>* As appropriate, complete pilot reviews and issue staff findings on regulatory requests.</li> </ul>	<p>1. 2/96C*</p> <p>2. 6/97</p> <p>3. 6/97</p> <p>4. 6/97</p> <p>5. 9/95C</p> <p>6. 3/97</p>	NRR

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office(s)
1.3 INSPECTIONS	* Provide guidance on the use of plant-specific and generic information from IPEs and other plant-specific PRAs.	<ul style="list-style-type: none"> <li>* Develop IMC 9900 technical guidance on the use of PRAs in the power reactor inspection program.</li> <li>* Revise IMC 2515 Appendix C on the use of PRAs in the power reactor inspection program.</li> <li>* Propose guidance options for inspection procedures related to 50.59 evaluations and regular maintenance observations.</li> <li>* Review core inspection procedures and propose PRA guidance where needed.</li> <li>* Issue draft Graded QA Inspection Procedure for public comment</li> <li>* Issue final Graded QA Inspection Procedure</li> </ul>	3/97  6/97  10/97  6/97  9/97  3/98	NRR
	* Provide PRA training for inspectors.          *Provide PRA training for Senior Reactor Analysts (SRA)	<ul style="list-style-type: none"> <li>* Identify inspector functions which should utilize PRA methods, as input to AEOD/TTD for their development and refinement of PRA training for inspectors.</li> <li>* Develop consolidated/comprehensive 2-3 week PRA for regulatory application training course.</li> <li>* First course offering.</li> <li>* Conduct training for Maintenance Rule baseline inspections</li> <li>* Conduct training courses according to SRA training programs</li> <li>* Rotational assignments for SRAs to gain working experience</li> </ul>	7/96C  5/97  5/97 8/96C  3/97  3/97	NRR  NRR/AEOD NRR/AEOD  NRR NRR/RES
	* Continue to provide expertise in risk assessment to support regional inspection activities and to communicate inspection program guidance and examples of its implementation.	<ul style="list-style-type: none"> <li>* Monitor the use of risk in inspection reports.</li> <li>* Develop new methodologies and communicate appropriate uses of risk insights to regional offices.</li> <li>* Update inspection procedures as needed.</li> <li>* Assist regional offices as needed.</li> <li>* Conduct Maintenance Rule baseline inspections</li> </ul>	Ongoing     7/98	NRR

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office(s)
1.4 OPERATOR LICENSING	Monitor insights from HRAs and PRAs (including IPEs and IPEEEs) and operating experience to identify possible enhancements for inclusion in planned revisions to guidance for operator licensing activities (initial and requalification)	* Revise the Knowledge and Abilities (K/A) Catalogs (NUREGs 1122 and 1123) to incorporate operating experience and risk insights.	8/95C	NRR
		* Revise the Examiner Standards (NUREG-1021), as needed, to reflect PRA insights.	3/97	NRR
1.5 EVENT ASSESSMENT	* Continue to conduct quantitative event assessments of reactor events while at-power and during low power and shutdown conditions.	* Continue to evaluate 50.72 events using ASP models.	Ongoing	NRR
	* Assess the desirability and feasibility of conducting quantitative risk assessments on non-power reactor events.	* Define the current use of risk analysis methods and insights in current event assessments. * Assess the feasibility of developing appropriate risk assessment models. * Develop recommendations on the feasibility and desirability of conducting quantitative risk assessments.	TBD	NRR
1.6 EVALUATE USE OF PRA IN RESOLUTION OF GENERIC ISSUES	* Audit the adequacy of licensee analyses in IPEs and IPEEEs to identify plant-specific applicability of generic issues closed out based on IPE and IPEEE programs.	* Identify generic safety issues to be audited. * Select plants to be audited for each issue. * Describe and discuss licensees' analyses supporting issue resolution. * Evaluate results to determine regulatory response; i.e., no action, additional audits, or regulatory action.	6/97	NRR
1.7 REGULATORY EFFECTIVENESS EVALUATION	* Assess the effectiveness of two major safety issue resolution efforts (i.e., SBO and ATWS rules) for reducing risk to public health and safety.	* Develop process/guidance for assessing regulatory effectiveness. * Apply method to assess reduction in risk. * Evaluate result, effectiveness of rules. * Propose modifications to resolution approaches, as needed. * Identify other issues for assessment if appropriate.	9/97	NRR & RES
1.8 ADVANCED REACTOR REVIEWS	* Continue staff reviews of PRAs for design certification applications.	* Continue to apply current staff review process.	Ongoing	NRR
	* Develop SRP to support review of PRAs for design certification reviews of evolutionary reactors (ABWR and System 80+).	* Develop draft SRP to tech staff for review and concurrence. * Finalize SRP.	6/98 12/99	NRR

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office(s)
	* Develop independent technical analyses and criteria for evaluating industry initiatives and petitions regarding simplification of Emergency Preparedness (EP) regulations.	* Reevaluate risk-based aspects of the technical bases for EP (NUREG-0396) using insights from NUREG-1150, the new source term information from NUREG-1465, and available plant design and PRA information for the passive and evolutionary reactor designs.	12/96	NRR & RES
1.9 ACCIDENT MANAGEMENT	* Develop generic and plant specific risk insights to support staff audits of utility accidents management (A/M) programs at selected plants.	<p>* Perform an assessment of A/M-related information contained in IPE databases to develop generic insights into A/M strategies and capabilities and document it in IPE Insights Report.</p> <p>* Develop plant-specific A/M insights/information for selected plants to serve as a basis for assessing completeness of utility A/M program elements (e.g., severe accident training)</p>	<p>6/97</p> <p>TBD</p>	NRR & RES
1.10 EVALUATING IPE INSIGHTS TO DETERMINE NECESSARY FOLLOW-UP ACTIVITIES	<p>* Use insights from the staff review of IPEs to identify potential safety, policy, and technical issues, to determine an appropriate course of action to resolve these potential issues, and to identify possible safety enhancements.</p> <p>* Determine appropriate approach for tracking the regulatory uses of IPE/IPEEE results.</p>	<p>* Review the report "IPE Program: Perspectives on Reactor Safety and Plant Performance" and identify required staff and industry actions (if any).</p> <p>* Audit licensee improvements that were credited in the IPEs to determine effectiveness of licensee actions to reduce risk.</p> <p>* Define use for information, clarify "regulatory use", and assess the most effective methods for data collection.</p> <p>* If appropriate, develop approach for linking IPE/IPEEE data bases.</p>	<p>12/97</p> <p>TBD</p> <p>12/97</p> <p>12/98</p>	<p>NRR &amp; RES</p> <p>NRR</p>

\*C=Complete

# 2.0 REACTOR SAFETY RESEARCH

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office(s)
2.1 DEVELOP REGULATORY GUIDES	Regulatory Guides for industry to use in risk-informed regulation.	<ul style="list-style-type: none"> <li>* Draft PRA Regulatory Guides transmitted to Commission for approval to issue for public comment.               <ul style="list-style-type: none"> <li>General</li> <li>IST</li> <li>ISI</li> <li>GQA</li> <li>TS</li> </ul> </li> <li>* Issue final PRA Regulatory Guides.               <ul style="list-style-type: none"> <li>General</li> <li>IST</li> <li>ISI</li> <li>GQA</li> <li>TS</li> </ul> </li> </ul>	3/97 3/97 5/97 3/97 3/97  12/97 12/97 12/97 12/97	RES
2.2 TECHNICAL SUPPORT	<ul style="list-style-type: none"> <li>* Provide technical support to agency users of risk assessment in the form of support for risk-based regulation activities, technical reviews, issue risk assessments, statistical analyses, and develop guidance for agency uses of risk assessment.</li> </ul>	<ul style="list-style-type: none"> <li>* Continue to provide ad hoc technical support to agency PRA users.</li> <li>* Expand the database of PRA models available for staff use, expand the scope of available models to include external event and low power and shutdown accidents, and refine the tools needed to use these models, and continue maintenance and user support for SAPHIRE and MACCS computer codes.</li> <li>* Support agency efforts in reactor safety improvements in former Soviet Union countries.</li> </ul>	Continuing Continuing  Continuing	RES RES  RES



Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office(s)
2.3 SUPPORT FOR NRR STANDARD REACTOR PRA REVIEWS	* Modify 10 CFR 52 and develop guidance on the use of updated PRAs beyond design certification (as described in SECY 93-087).	* Develop draft guidance and rule. * Solicit public comment. * Finalize staff guidance and rule.	5/98 11/98 12/99	RES RES RES
2.4 METHODS DEVELOPMENT AND DEMONSTRATION	* Develop, demonstrate, maintain, and ensure the quality of methods for performing, reviewing, and using PRAs and related techniques for existing reactor designs.	* Develop and demonstrate methods for including aging effects in PRAs. * Develop and demonstrate methods for including human errors of commission in PRAs.  * Develop and demonstrate methods to incorporate organizational performance into PRAs. * Develop and demonstrate risk assessment methods appropriate for application to medical and industrial licensee activities.	9/97 6/97  9/97 6/97	RES RES  RES RES & NMSS
2.5 IPE AND IPEEE REVIEWS	* To evaluate IPE/IPEE submittals to obtain reasonable assurance that the licensee has adequately analyzed the plant design and operations to discover vulnerabilities; and to document the significant safety insights resulting from IPE/IPEEEs.	* Complete reviews of IPE submittals. * Complete reviews of IPEEE submittals. * Continue regional IPE presentations. * Issue IPE insights report for public comment. * Final IPE insights report * Issue interim IPEEE insights report * Issue draft final IPEEE insights report	12/96* 12/98 Ongoing 10/96 6/97 9/97 9/98	RES RES RES RES RES RES RES
2.6 GENERIC ISSUES PROGRAM	* To conduct generic safety issue management activities, including prioritization, resolution, and documentation, for issues relating to currently operating reactors, for advanced reactors as appropriate, and for development or revision of associated regulatory and standards instruments.	* Continue to prioritize and resolve generic issues.	Continuing	RES

\* Approximately 5-8 SERs may slip beyond 12/96, staff is awaiting additional information from licensees

### 3.0 ANALYSIS AND EVALUATION OF OPERATING EXPERIENCE, AND TRAINING

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office
3.1 RISK-BASED TRENDS AND PATTERNS ANALYSIS	* Use reactor operating experience data to assess the trends and patterns in equipment, systems, initiating events, human performance, and important accident sequence.	<ul style="list-style-type: none"> <li>* Trend performance of risk-important components.</li> <li>* Trend performance of risk-important systems.</li> <li>* Trend frequency of risk-important initiating events.</li> <li>* Trend human performance for reliability characteristics.</li> </ul>	2/97 Annual rpt-9/97  5/97  TBD	AEOD
	* Evaluate the effectiveness of licensee actions taken to resolve risk significant safety issues	* Trend reactor operating experience associated with specific safety issues and assess risk implications as a measure of safety performance.	As Needed	AEOD
	* Develop trending methods and special databases for use in AEOD trending activities and for PRA applications in other NRC offices.	<ul style="list-style-type: none"> <li>* Develop standard trending and statistical analysis procedures for identified areas for reliability and statistical applications.</li> <li>* Develop special software and databases (e.g. common cause failure) for use in trending analyses and PRA studies.</li> </ul>	Complete  CCF- Complete Periodic updates	AEOD
3.2 ACCIDENT SEQUENCE PRECURSOR (ASP) PROGRAM	* Identify and rank risk significance of operational events.	<ul style="list-style-type: none"> <li>* Screen and analyze LERs, AITs, IITs, and events identified from other sources to obtain ASP events.</li> <li>* Perform independent review of each ASP analyses. Licensees and NRC staff peer review of each analysis.</li> <li>* Complete quality assurance of Rev. 2 simplified plant specific models.</li> <li>* Complete feasibility study for low power and shutdown models.</li> <li>* Complete initial containment performance and consequence models.</li> </ul>	Ongoing  Annual report, Ongoing  3/97  11/96C  Complete	AEOD  AEOD RES  RES  RES
	* Provide supplemental information on plant specific performance.	* Share ASP analyses and insights with other NRC offices and Regions.	Annual rpt	AEOD

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office
3.3 INDUSTRY RISK TRENDS	* Provide a measure of industry risk that is as complete as possible to determine whether risk is increasing, decreasing, or remaining constant over time.	* Develop program plan which integrates NRR, RES, and AEOD activities which use design and operating experience to assess the implied level of risk and how it is changing. * Implement program plan elements which will include plant-specific models and insights from IPEs, component and system reliability data, and other risk-important design and operational data in an integrated frame work to periodically evaluate industry trends.	Complete  8/97	AEOD
3.4 RISK-BASED PERFORMANCE INDICATORS	* Establish a comprehensive set of performance indicators and supplementary performance measures which are more closely related to risk and provide both early indication and confirmation of plant performance problems.	* Identify new or improved risk-based PIs which use component and system reliability models & human and organizational performance evaluation methods. * Develop and test candidate PIs/performance measures. * Implement risk-based PIs with Commission approval.	Complete  3/98 9/98	AEOD
3.5 COMPILE OPERATING EXPERIENCE DATA	* Compile operating experience information in database systems suitable for quantitative reliability and risk analysis applications. Information should be scrutable to the source at the event level to the extent practical and be sufficient for estimating reliability and availability parameters for NRC applications.	* Manage and maintain SCSS and the PI data base, provide oversight and access to NPRDS, obtain INPO's SSPI, compile IPE failure data, collect plant-specific reliability and availability data. * Develop, manage, and maintain agency databases for reliability/availability data (equipment performance, initiating events, CCF, ASP, and human performance data).  * Revise reporting rules to better capture equipment reliability information.  * Evaluation of voluntary approach for collecting reliability data  * Final reliability data rule ( if necessary)  * Determine need to revise LER rule to eliminate unnecessary and less safety-significant reporting  * Determine need to revise reporting rules and to better capture ASP, CCF, and human performance events.	Ongoing  Ongoing  10/97  4/97  6 mo. After Decision on Vol. Approach.  4/97  6/98	AEOD

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office(s)
3.6 STAFF TRAINING	* Present PRA curriculum as presently scheduled for FY 1996	<ul style="list-style-type: none"> <li>* Continue current contracts to present courses as scheduled.</li> <li>* Maintain current reactor technology courses that include PRA insights and applications.</li> <li>* Improve courses via feedback.</li> <li>* Review current PRA course material to ensure consistency with Appendix C.</li> </ul>	Ongoing Ongoing Complete	AEOD
	* Develop and present Appendix C training courses.	<ul style="list-style-type: none"> <li>* Prepare course material based on Appendix C.</li> <li>* Present courses on Appendix C.</li> </ul>	Complete Complete	RES and AEOD
	* Determine staff requirements for training, including analysis of knowledge and skills, needed by the NRC staff.	<ul style="list-style-type: none"> <li>* Review JTAs performed to date.</li> <li>* Perform representative JTAs for staff positions (JTA Pilot Program).</li> <li>* Evaluate staff training requirements as identified in the PRA Implementation Plan and the Technical Training Needs Survey (Phase 2) and incorporate them into the training requirements analysis.</li> <li>* Analyze the results of the JTA Pilot Program and determine requirements for additional JTAs.</li> <li>* Complete JTAs for other staff positions as needed.</li> <li>* Solicit a review of the proposed training requirements.</li> <li>* Finalize the requirements.</li> </ul>	Complete Complete Complete  Ongoing  Ongoing Ongoing Ongoing	AEOD
	* Revise current PRA curriculum and develop new training program to fulfill identified staff needs.	<ul style="list-style-type: none"> <li>* Prepare new courses to meet identified needs.</li> <li>* Revise current PRA courses to meet identified needs.</li> <li>* Revise current reactor technology courses as necessary to include additional PRA insights and applications.</li> </ul>	12/97 12/97 Complete 3/96	AEOD
	* Present revised PRA training curriculum.	<ul style="list-style-type: none"> <li>* Establish contracts for presentation of new PRA curriculum.</li> <li>* Present revised reactor technology courses.</li> <li>* Improve courses based on feedback.</li> </ul>	Ongoing Ongoing Ongoing	AEOD

## 4.0 NUCLEAR MATERIALS AND LOW-LEVEL WASTE SAFETY AND SAFEGUARDS REGULATION

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office(s)
4.1 Validate risk analysis methodology developed to assess most likely failure modes and human performance in the use of industrial and medical radiation devices.	* Validate risk analysis methodology developed to assess the relative profile of most likely contributors to misadministrations for the gamma stereotactic device (gamma knife).	* Hold a workshop consisting of experts in PRA and HRA to examine existing work and to provide recommendations for further methodological development.  * Examine the use of Monte Carlo simulation and its application to relative risk profiling.  * Examine the use of expert judgement in developing error rates and consequence measures.	8/94 Completed  9/95 Completed  9/95 Completed	NMSS
	* Continue the development of the relative risk methodology, with the addition of event tree modeling of the brachytherapy remote afterloader.	* Develop functionally based generic event trees.	TBD	RES/ NMSS
	* Extend the application of the methodology and its further development into additional devices, including teletherapy and the pulsed high dose rate afterloader.	* Develop generic risk approaches.	TBD	RES/ NMSS
4.2 Continue use of risk assessment of allowable radiation releases and doses associated with low-level radioactive waste and residual activity.	* Develop decision criteria to support regulatory decision making that incorporates both deterministic and risk-based engineering judgement.	* Conduct enhanced participatory rulemaking to establish radiological criteria for decommissioning nuclear sites; technical support for rulemaking including comprehensive risk based assessment of residual contamination.  * Work with DOE and EPA to the extent practicable to develop common approaches, assumptions, and models for evaluating risks and alternative remediation methodologies. (Risk harmonization)	8/94 PR Complete Final Rule 12/96- 3/97 (Dependent on EPA)  Ongoing	RES & NMSS
4.3 Develop guidance for the review of risk associated with waste repositories.	* Develop a Branch Technical Position on conducting a Performance Assessment of a LLW disposal facility.	* Solicit public comments * Publish final Branch Technical Position	1/97 8/97	NMSS & RES



## 5.0 HIGH-LEVEL NUCLEAR WASTE REGULATION

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office(s)
5.1 REGULATION OF HIGH-LEVEL NUCLEAR WASTE	* Develop guidance for the NRC and CNWRA staffs in the use of PA to evaluate the safety of HLW programs.	* Assist the staff in pre-licensing activities and in license application reviews. * Develop a technical assessment capability in total-system and subsystem PA for use in licensing and pre-licensing reviews. * Combine specialized technical disciplines (earth sciences and engineering) with those of system modelers to improve methodology.	Ongoing	NMSS
	* Identify significant events, processes, and parameters affecting total system performance.	* Perform sensitivity studies of key technical issues using iterative performance assessment (IPA).	Ongoing	NMSS
	* Use PA and PSA methods, results and insights to evaluate proposed changes to regulations governing the potential repository at Yucca Mountain.	* Assist the staff to maintain and to refine the regulatory structure in 10 CFR Part 60 that pertains to PA. * Apply IPA analyses to advise EPA in its development of a Yucca Mountain regulation * Apply IPA analyses to conform 10 CFR 60 to EPA's regulations	Ongoing	NMSS
	* Continue PA activities during interactions with DOE during the pre-licensing phase of repository development, site characterization, and repository design.	* Provide guidance to the DOE on site characterization requirements, ongoing design work, and licensing issues important to the DOE's development of a complete and high-quality license application.  * Compare results of NRC's iterative performance assessment to DOE's TSPA-95 to identify major differences/issues.	Ongoing	NMSS
5.2 DETERMINE FEASIBILITY OF APPLYING PRA TO SPENT FUEL STORAGE FACILITIES	* Determine the extent to which it is cost beneficial to apply PRA to spent fuel storage facilities.	* Develop a cost estimate for a feasibility study on Probabilistic Risk Assessment applications for spent fuel storage facilities. * Perform feasibility study * Implement recommendations of feasibility study	1/97  TBD TBD	NMSS
5.3 CONTINUE USE OF RISK ASSESSMENT IN SUPPORT OF RADIOACTIVE MATERIAL TRANSPORTATION	* Use PRA methods, results, and insights to evaluate regulations governing the transportation of radioactive material.	* Update the database on transportation of radioactive materials for future applications * Revalidate the results of NUREG-0170 for spent fuel shipment risk estimates	end of FY 99  6/99	NMSS