

August 18, 1999

SECY-99-211

FOR: The Commissioners

FROM: William D. Travers /s/  
Executive Director for Operations

SUBJECT: STATUS REPORT ON THE PROBABILISTIC RISK ASSESSMENT  
IMPLEMENTATION PLAN

PURPOSE:

To report the status of the Probabilistic Risk Assessment (PRA) Implementation Plan (PIP) for the period January 1 to June 30, 1999.

BACKGROUND:

In a memorandum dated January 3, 1996, from the Executive Director for Operations to the Chairman, the staff committed to submitting quarterly reports on the status of its development of risk-informed standards and guidance. Previous progress reports were sent to the Commission quarterly beginning on March 26, 1996, with most recent update provided as SECY-99-082, dated March 18, 1999, covering the period July 1 to December 30, 1998. Because of the need to meet high priority staff commitments to actions identified in the Chairman's tasking memorandum, this update covers the period from January 1, 1999 to June 30, 1999. This update also reflects recent staff reorganizations, including the assimilation of AEOD work into RES, NRR and HR.

DISCUSSION:

During the reporting period, substantial progress has been made on the items listed in the PIP. Attachment 1 provides a discussion of the key highlights of staff work accomplished during the reporting period.

Most notable among these accomplishments are (1) initiation of work in response to the SRMs on SECY 98-300 and SECY 99-100 directed towards risk-informing reactor and non-reactor regulations, (2) initiation of the pilot test of the risk-informed plant oversight process,

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(3) completion of twelve IPEEE reviews, (4) initiation of Phase 2 of the PRA Standard development, (5) initiation of work to develop risk-based performance indicators and (6) modification of the enforcement policy to be more risk-informed.

Additional detail on specific milestones and schedules is provided in the Tables (Attachment 2).

Over the reporting period, there have been interactions with ACRS on the above topics and also on research work related to PRA and risk-informed regulation. ACRS, in the recently issued NUREG-1635, Vol. 2, "Review and Evaluation of the Nuclear Regulatory Commission Safety Research Program," provided several recommendations related to the research work. The staff will be reviewing these recommendations and responding to ACRS in the near future.

During the reporting period, the General Accounting Office (GAO) issued a report on NRC's risk-informed regulation efforts (GAO/RCED-99-95). In the March 1999 report, the GAO made the following recommendation:

To help ensure the safe operation of plants and the continued protection of public health and safety in a competitive environment, we recommend that the Commissioners of NRC direct the staff to develop a comprehensive strategy that includes but is not limited to objectives, goals, activities, and time frames for the transition to risk-informed regulation; specifies how the Commission expects to define the scope and implementation of risk-informed regulation; and identifies the manner in which it expects to continue the free exchange of operational information necessary to improve the quality and reliability of risk assessments.

The Chairman responded to this recommendation in a June 18, 1999, letter to Senator Fred Thompson and others indicating that the staff is developing, for Commission approval, a document describing the agency's strategy for risk-informed regulation that will specify the scope and approach for implementation. Consistent with the Chairman's response, the staff intends to pursue this recommendation and, if the Commission agrees, plans to revise the PIP to include a strategy for risk-informing our approach to regulation. This strategy will provide a clear link to the strategic goals, performance goals, and strategies of NRC's overall strategic plan. The intent is to have the strategy provide a vision and a road map as to where the agency is planning to go in risk-informing its requirements and activities, including how it is decided whether or not to risk-inform an activity. An outline of this strategy is being developed and will be provided to the Commission for review in mid-September. Also, due to the longer term nature of many of the activities which will be addressed in the PIP, the staff intends to change the frequency of update of the PIP from quarterly to semiannually unless the Commission directs otherwise. Therefore, the next PIP will cover the period of July 1999 through December 1999.

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The staff's work to risk-inform the reactor and non-reactor regulations and to develop a strategy for risk-informed regulation is evolving at a rapid pace. While these topics are discussed only briefly in this paper, the staff expects that the presentations at the planned PIP Commission briefing will be more substantive and will include a discussion of the approaches being taken, work done to date, and potential policy, implementation and technical issues.

COORDINATION

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

original /s/ by Frank J. Miraglia for

William D. Travers  
Executive Director  
for Operations

Attachments: As stated

**ATTACHMENT 1**

**SIGNIFICANT STAFF ACCOMPLISHMENTS**

**Section 1: Reactor Regulation**

**1.1 Standard Review Plans for Risk-Informed Regulation**

The staff's annual review of Regulatory Guide (RG) 1.174 and Standard Review Plan (SRP) Chapter 19 was completed and provided to the Commission by memorandum dated June 30, 1999. As discussed in the memorandum, the RG and SRP chapter should be updated beginning in early CY2000, and is expected to include revisions to endorse the ASME standard on PRA quality, expand the guidance for shutdown conditions and discuss the use of seismic margins methods.

The first annual reviews of the application-specific RGs and SRPs for in-service testing, technical specifications, and graded quality assurance are currently underway. These are scheduled to be provided to the Commission in August 1999.

**1.2 Pilot Applications for Risk-Informed Regulatory Initiatives**

**Inservice Testing**

The staff recently completed its review of a limited-scope risk-informed inservice testing (RI-IST) relief request from the South Texas Project licensee. That review was begun in December 1998. The licensee proposed to extend the test intervals for twelve containment isolation check valves in each unit's component cooling water and safety injection system from the current 18-month interval to an Appendix J Option B test interval (i.e., not to exceed 5 years). The staff completed its safety evaluation of this risk-informed proposal in July 1999.

The staff is continuing its review of a full-scope RI-IST Program for the San Onofre Nuclear Generating Station (SONGS). That review was started in January 1999. This proposal is similar to the approved Comanche Peak RI-IST pilot plant program and involves test interval extensions for up to 6 years for safety-related pumps and valves of low safety significance. A request for additional information was sent to the SONGS licensee on April 20, 1999. The staff received a response from the licensee on June 17, 1999. The staff expects to complete its evaluation of the San Onofre RI-IST Program by October 1999.

**Inservice Inspections**

A request from ANO-1 for a risk-informed inservice inspection (RI-ISI) program change is currently under review and scheduled to be completed by the end of August 1999.

Browns Ferry Unit 2 submitted an application in October 1998 which would combine the intergranular stress corrosion cracking augmented program inspections with the ASME Section XI inspection. In conjunction with this application, the staff is working together with industry to determine how, and if, the augmented programs can be included within the risk-informed program. However, the Tennessee Valley Authority (TVA) recently submitted an application for the Browns Ferry Unit 3 RI-ISI program and requested that the NRC shift its focus from the Unit

2 RI-ISI program submittal to the Unit 3 program submittal. In light of this request, the staff has suspended its review of the Unit 2 submittal and initiated review of the Unit 3 submittal. The Unit 3 review is scheduled to be completed by December 31, 1999.

A topical report describing the Electric Power Research Institute (EPRI) methodology for RI-ISI was submitted to the staff on April 5, 1999. On May 5, 1999, EPRI and the staff discussed the methodology with the ACRS. The staff is currently working on the safety evaluation report which is scheduled to be completed by October 31, 1999.

On September 28, 1998, the staff completed its review and issued its safety evaluation report regarding the ANO, units 1&2 request for relief from the staff position in NUREG-0737 for hydrogen monitoring. This request had been made as a part of "Task Zero" of the Risk-Informed, Performance-Based Pilot Program ("Whole Plant Study") proposed by NEI. In regards to that request, the staff is continuing its review of the San Onofre request to remove hydrogen recombiners from the scope of the regulations. The staff expects to complete this review by the end of July 1999.

### 1.3 Inspections and Assessments

The staff is continuing its work reported to the Commission in SECY-99-007 and SECY-99-007A to develop and pilot test a risk-informed licensee oversight process, including inspection, performance assessment, and enforcement. The staff continues to work toward a November 1999 target date for the completion of the pilot process and an April 2000 target date for full implementation of the revised process at all plants.

The last two of the ten Senior Reactor Analysts have completed their training and rotational assignments and have submitted their certification requests for permanent appointment to their positions.

The staff met with the Committee for Review of Generic Requirements (CRGR) on December 8, 1998 to discuss the proposed inspection procedure (IP) for risk-informed graded quality assurance (RI-GQA) programs. The CRGR identified several concerns with the proposed IP, and ultimately concluded that as proposed it should not be used. On the basis of CRGR's feedback, the staff revised the IP and forwarded it to CRGR for final approval on June 25, 1999. The staff expects to issue the IP by the end of July.

### 1.10 IPE Follow-up Activities

On June 8, 1999, the Commission issued a Staff Requirements Memorandum (SRM) regarding risk-informed revisions to 10 CFR Part 50. In the SRM, the Commission approved staff's recommended course of action for making Part 50 more risk-informed. The staff believes the goals and objectives of IPE follow-up activities are closely related to the Part 50 work. Consequently, the staff is currently working with the industry groups to develop IPE follow-up activities that are complementary with the risk-informed Part 50 process. Details of these activities will be incorporated in the PIP when they are finalized.

### 1.11 Risk-Informing Part 50

On June 8, 1999, the Commission issued a SRM on SECY-98-300 regarding risk-informed revisions to 10 CFR Part 50. In the SRM, the Commission approved staff's recommended course of action for making Part 50 more risk-informed, including, (1) establishing risk-informed

definitions for "safety-related" and "important to safety" systems, structures and components (SSCs) and using the definitions to modify the scope of SSCs for those sections of Part 50 requiring special treatment, (2) changing the existing scope of the Maintenance Rule (50.65) to conform to new risk-informed definitions for "safety-related" and "important to safety" SSCs, and (3) performing a study to determine how best to proceed with risk-informing the remaining sections of Part 50 to be performed by RES. The staff is currently preparing plans and schedules to implement these recommendations, including a rulemaking plan for items 1 and 2 listed above. These plans include public meetings with our stakeholders. These plans and schedules will be transmitted to the Commission in October 1999.

## Section 2: Reactor Safety Research

### 2.1 Regulatory Guides

As stated in Section 1.1, the staff's annual review of Regulatory Guide (RG) 1.174 and Standard Review Plan (SRP) Chapter 19 was completed and provided to the Commission by memorandum dated June 30, 1999.

The first annual reviews of the application-specific RGs and SRPs for in-service testing, technical specifications, and graded quality assurance are currently underway. These are scheduled to be provided to the Commission in August 1999.

### 2.4 Methods Development and Demonstration

Work continued on developing improved fire risk assessment methods, tools, and data. These improvements will support more robust assessments in an area of large uncertainty and will support NRC's efforts to make increased use of risk insights in fire protection applications. The topics addressed include circuit failure analysis, fire modeling, model uncertainties, historical event analysis, and turbine building fire analysis. Data obtained from NRC-sponsored fire experiments were processed and published in CD-ROM form; the CD-ROMs were distributed in June 1999. A plan for the overall NRC fire risk research program was developed, consistent with the material presented to the ACRS Subcommittee on Fire Protection in January 1999. The plan was widely distributed in June 1999; numerous presentations of the plan were also made in a variety of forums, e.g., an industry-sponsored conference, the NRC Regulatory Information Conference, a meeting with EPRI concerning cooperation in fire research, an international workshop on fire risk assessment, and meetings with international members of the NRC-led International Cooperative PRA Research Program -- COOPRA. The staff's plan has been well received to date. Further interactions with stakeholders are planned to ensure proper direction to the program, including a November 1999 briefing of ACRS. The Commission will be informed of the results of these interactions in the next PIP update.

### 2.5 IPE and IPEEE Reviews

The staff completed its review of an additional 12 IPEEE submittals (bringing the total to 22) and issued the SERs for these plants. The staff concluded that all these submittals met the intent of Supplement 4 to GL 88-20. The staff completed an assessment of the impact of Appendix R fire protection exemptions on fire risk. Nine plants were selected for review based on the relatively high core damage frequencies reported in the licensees' IPEEE fire analyses. The results of this limited scope study, which were provided to Commission, showed that a large majority (about 85 percent) of the 169 Appendix R exemptions that were examined had a small or very small impact on plant risk. The risk significance of 22 of the 169 issues was not

able to be determined, given current fire risk insights and methods. As a follow-up to this study, the staff will examine the analysis in more detail for the 3 plants where exemptions appear to be risk-significant including modeling assumptions and supporting data. If initial results of the risk significance of exemptions in these plants are confirmed, the staff will determine if a plant-specific backfit is justified. To reduce the potential for similar circumstances in the future, the staff intends to encourage licensees to consider the risk significance of potential exemption requests before submittal to NRC.

In addition, the staff reviewed industry's responses to the staff's generic questions on EPRI's Fire PRA Implementation Guide (FPRAIG) and concluded that the generic responses are acceptable. Based on this effort, EPRI will issue supplemental guidance to the FPRAIG and will provide recommendations to licensees that they can use to prepare plant-specific responses to requests for additional information (RAIs) on their fire IPEEEs. Having acceptable industry responses to the generic RAIs is a significant milestone leading to completion of the IPEEE program. Previously reported delays in completing the generic response had significantly delayed completion of the IPEEE program.

The IPE review program has been completed; the final SER, on the Browns Ferry 3 IPE, was issued to the licensee in May of 1999.

## 2.6 Reactor Generic Issues Program

During this period, Generic Issues B-61 (Allowable ECCS Equipment Outage Periods) and GI-165 (Spring Actuated Safety and Relief Valves) were resolved with no new requirements identified. Generic Issue 107 (Main Transformer Failure) was re-prioritized and dropped from the list of outstanding safety issues based on staff re-examination of its risk significance.

## 2.8 Standards Development

ASME received numerous comments from the public on their draft "Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications." ASME is currently evaluating the comments and updating the draft based on these comments and plans on issuing a final revision for consensus review in December 1999. Based on the work done to date, the staff is concerned that this schedule may not be met; however, the staff is continuing to work closely with the ASME in the timely development of this standard and in the resolution of outstanding technical issues. This ASME standard is Phase 1 which only covers internal events (excluding fire) at full power and a Level 1 and limited Level 2 PRA. ANS has initiated Phase 2 which will include low power shutdown and seismic.

## 2.9 Low Power and Shutdown

In early calendar year 1999, the staff initiated work to evaluate the current state-of-technology of low power and shutdown (LPSD) risk assessment and to formulate the need for supplementing or updating RG 1.174 which supports risk-informed regulatory decision making. The program involves the review of lessons learned from previous NRC studies and from domestic and international work on LPSD risk; the insights will be summarized in a "perspectives" report. On the basis of these insights the staff will develop a program plan for the continuation of this program consistent with Commission guidance. The plan will focus on methods and tools needed to provide the technical basis for supplementing or updating RG 1.174, and for developing a consensus standard for risk-informed regulatory applications related to LPSD operations. The staff will issue its perspectives report in December 1999.

## 2.10 Safety Goal

The staff is continuing to study possible modifications to the Safety Goal Policy Statement. As part of this process, in SECY-99-191, the staff has summarized the status of its assessment of the eleven possible safety goal modifications and has requested authorization to proceed with a study of the feasibility of developing a safety policy that would set forth those broad safety principles that apply to all agency safety activities. Because of the complexity of the issues involved, (i.e., the need to ensure consistency between the broad principles, the Safety Goal Policy Statement, activities ongoing in the PRA Implementation Plan, and the need for extensive ACRS/ACNW and stakeholder involvement), the completion date has been changed to March 2000.

## 2.11 Regulatory Effectiveness

The staff has undertaken an evaluation of the effectiveness of the station blackout rule. The preliminary report of this evaluation will be provided to the Commission by the end of FY99. The approach being used is to compare actual operating experience (risk and performance parameters) with staff estimates of costs and risk reduction developed at the time the rule was initially prepared. The effectiveness of two other rules will be assessed in FY 2000 and the methods employed will be documented as a process or guidance document in FY2001.

## 2.12 Review of Agency Programs and Processes

As discussed in Section 1.11, the Commission issued an SRM on SECY-98-300, regarding risk-informed modifications for 10CFR 50. The SRM directed the RES staff to perform (as recommended), a study (Option 3) to identify specific reactor regulations which merit modification to make them more risk-informed. The plan for this study will be transmitted to the Commission in October 1999.

The PRA Steering Committee met on 3 occasions between January 1, 1999, and June 30, 1999. Guidance to the staff was provided on items such as the following:

- Approach for responding to the SRM on SECY-98-300
- Framework for risk-informing NMSS regulatory process
- Development of an overall strategy for risk-informed regulation

## 2.13 Risk-Based Trends and Patterns Analysis

The results, findings, conclusions, and information contained in the studies noted below are intended to support several risk-informed regulatory activities. These reports can provide information on relevant operating experience that can be used to enhance plant inspections of risk-important systems. In addition, this information can be used to support staff technical reviews of proposed license amendments, including risk-informed applications. This work will also be used in the development of risk-based performance indicators.

The report "Rates of Initiating Events at U.S. Nuclear Power Plants: 1987-1995" (NUREG/CR-5750) was issued in February 1999. This is the first major analysis and update of initiating



event frequency estimates since 1985. Also, this report is the first significant effort to update LOCA pipe break frequencies since 1975 when WASH-1400, "Reactor Safety Study," was issued.

The reports "Reliability Study: Westinghouse Reactor Protection System, 1984-1995" (NUREG/CR-5500, Vol. 2) and "Reliability Study: General Electric Reactor Protection System, 1984-1995" (NUREG/CR-5500, Vol. 3) were issued in April 1999 and May 1999 respectively. These were the first systematic evaluations of reactor protection system (RPS) performance since the ATWS rulemaking in 1986.

An assessment of the risk associated with the licensing issues identified at D. C Cook Units 1 and 2 was started. The issues are being analyzed using the accident sequence precursor (ASP) program methods. Information contained in inspection reports, LERs, and the licensee's self assessment reports is being used to identify issues that affect core damage frequency (CDF) and containment performance. The assessment is being coordinated with NRR and Region III. Interim findings will be presented to the licensee in August 1999, and a final report will be published in April 2000.

The report "Development and Findings of the Performance Trending Methodology" (NUREG/CR-6618) was issued in April 1999. It summarizes the work that was done to develop a performance trend methodology that was used as one factor to identify plants as subjects for Senior Management Meeting (SMM) discussions.

#### 2.14 Accident Sequence Precursor (ASP) Program

Preliminary analysis of 1998 events is continuing. Four 1998 events were identified as potential severe accident precursors and preliminary staff analyses were transmitted to the respective licensees for review and comment. These events were: (a) the tornado-caused loss of offsite power at Davis-Besse in June 1998, (b) an inoperable sump recirculation valve at San Onofre in February 1998, (c) the long-term unavailability of an EDG at Byron in September 1998, and (d) problems with the RWST and containment emergency sump level instrumentation at Oconee in February 1998.

As a result of implementation of the new reactor oversight process, questions raised by some regions about the QA review of the Level 1 Revision 3 models, and the completion of six PWR and two BWR prototype LERF models, the staff is reassessing the direction of the ASP model development (SPAR) effort. Reassessment of the SPAR model development program (including Level 1 Revision 3, LERF, SD/LP, and external events) will be carried out over the next 2 months to ensure that this program will adequately support the reactor oversight process, regional needs, and the ASP program in an efficient and practical manner.

#### 2.16 Risk-Based Performance Indicators

RES has a program underway to develop (in FY2000) risk-based performance indicators in support of the reactor plant oversight process. A presentation on the RBPI program was made to the full ACRS on June 2, 1999. The presentation included discussion of the need for RBPIs in the new regulatory oversight process and the candidate indicators proposed for trail application. Comments were received in the ACRS letter of June 10, 1999, and are being reviewed by staff.

## 2.17 Operating Experience Data

The Reliability and Availability Data System (RADS) database system prototype was reviewed in January 1999 and the first data upload from the industry's Equipment Performance and Information Exchange (EPIX) database was successfully performed in May 1999. EPIX is an industry database which contains information on the demands, operating hours, and failures of components in nuclear power plants. Staff access to the industry's EPIX database was obtained in accordance with the SRM directions regarding the voluntary alternative to the Reliability and Availability Data rule.

A Subcommittee of the EPIX Ad Hoc Working Group at an April 1999 meeting recommended that the EPIX vision should be to make EPIX the industry's single, common reporting system for all performance indicators (including availability and reliability data) and equipment failure information. This recommendation was endorsed by a meeting of the full EPIX Ad Hoc Group on May 27, 1999, and approved by INPO's Industry Review Group on June 2, 1999. At the April and May meetings, NRC recommended that EPIX include additional data on demands and planned unavailability. These improvements were discussed at a meeting with industry in July 1999. Recommendations from that meeting will be addressed at the EPIX Ad Hoc Group subcommittee meeting in October. The staff will continue to pursue any other issues per the SRM direction to "work with industry to address shortfalls and limitations in the data."

### Section 3: Staff Training

The 2-week PRA Technology and Regulatory Perspectives course (P-111) continues to be presented each quarter. In FY 1999, courses have been held in Regions I, II and III and a course is planned for Region IV in October. FY 2000 course presentations will be at the Technical Training Center. Sufficient courses are planned to meet NRR's goal of having all resident inspectors and senior resident inspectors complete the course by the end of FY 2000 and to have all qualified reactor operations inspectors complete the course by the end of FY 2001.

The 4-day PRA Basics for Regulatory Applications course (P-105) and the 3-day PRA for Technical Managers course (P-107) have continued to be offered as necessary to meet staff needs. The P-105 course has been presented 7 times, and the P-107 course 3 times. Advanced user courses such as Probability and Statistics for PRA, SAPHIRE Basics and Advanced SAPHIRE have been presented as needed.

The PRA course contractor, INEEL, will soon start development of a new PRA course manual that will provide a reference document for courses such as PRA Basics for Regulatory Applications, PRA for Technical Managers, and PRA Technology and Regulatory Perspectives. Completion of the manual is planned for early 2000.

The PRA Training Focus Group (PTFG) has completed the work for which it was established. It provided excellent advice as new courses were developed and provided in support of the PRA Implementation Plan. User groups were identified and courses developed to provide the staff with the tools necessary to support the agency's commitment to risk-informed regulation. Since the PRA curriculum has matured, future revisions to the PRA curriculum will be coordinated directly with the program offices and specific users.

Sufficient PRA courses will continue to be scheduled to meet identified needs for Senior Reactor Analysts training, other advanced users, and general staff.

Section 4: Nuclear Materials, Low Level Waste Safety and Safeguards Regulation

4.4 Risk Assessment of Material Uses

In March, 1999, the staff informed the Commission of the methodology that had been developed under NRC sponsorship for assessing the risk associated with the many industrial and medical uses of nuclear material that are regulated by NRC and its Agreement States (SECY-99-062). A draft report was issued for technical peer review and public comment in July, 1999.

4.5 Use of PRA in Regulating Nuclear Materials

In March, 1999, the staff completed the scoping effort for developing a framework for risk-informed regulation in NMSS. In SECY-99-100, the staff reported the results of this effort and also proposed both a framework and an approach for its implementation to the Commission. The Commission approved the framework and the staff's proposed implementation approach in its SRM of June 28, 1999. As proposed in SECY-99-100, the staff will track progress toward implementation of the framework in the PRA Implementation Plan. Thus, the staff will develop milestones for implementation (based on Attachment 4 to SECY-99-100) to be included in the next update.

4.6 Risk-Informed Regulation of Fuel Cycle Facilities

Significant progress has been accomplished to develop a risk-informed, performance-based proposed revision to 10 CFR Part 70 in an effort to improve the safety at fuel cycle facilities while concurrently optimizing the regulatory burden on both the NRC and its licensees. The Commission approved the proposed revisions in July 1999, which culminated a substantial staff effort and outreach program that included extensive coordination with interested stakeholders. The proposed changes to the regulation require a systematic and integrated review of potential accidents while allowing flexibility in terms of specific preventative and mitigative measures. Staff continues to work with industry and other stakeholders to resolve comments concerning the associated Standard Review Plan (SRP). Staff intends to issue a draft version of the SRP, incorporating all resolved comments up to that point, when the proposed rule is published for public comment.

4.7 Risk-Based Fuel Cycle Safety Inspection Program Revision

Staff has initiated a revision of the fuel cycle safety inspection program to optimize the regulatory burden while ensuring safe operations. The staff's initiative is further described in SECY 99-188, "Evaluation and Proposed Revision of the Nuclear Fuel Cycle Facility Safety Inspection Program," which was issued in July. A task force was established to develop performance indicators, and identify available risk insights, to assess facility performance. A public meeting with stakeholders is scheduled for September 1999.

4.8 Pilot Applications for Risk-Informed Regulatory Initiatives for Fuel Cycle Facilities

Staff initiated the development of a pilot program for alternate disposition of Severity Level IV safety violations at the two Gaseous Diffusion Plants and other fuel cycle facility licensees with NRC approved corrective action programs. This program will allow lower risk issues to be dispositioned by the licensees through the corrective action programs.

Section 5: High-Level Nuclear Waste Regulation

5.1 Proposed regulations for disposal of high-level radioactive wastes in a proposed geological repository at Yucca Mountain, Nevada were issued for comment in February 1999 and the comment period closed on June 30, 1999. The staff continued utilizing its performance assessment to identify and address technical issues and develop review guidance. In response to a request from the Commission, the staff developed SECY 99-186, outlining its plans for reassessing its regulatory approach toward defining and ensuring a defense-in-depth philosophy is applied to the repository review. In finalizing the regulatory requirements (Part 63) and review guidance the staff will incorporate the Commission's defense-in-depth philosophy as described in the White Paper on Risk-informed and Performance Based Regulation dated March 1, 1999.

Section 6: Enforcement

The Office of Enforcement (OE) held a number of meetings with the various stakeholders that discussed the utilization of risk insights in the enforcement process. In addition, OE continues to participate in development of the new power reactor oversight process. The result of these activities was a recommendation to the Commission in SECY-99-087 that the enforcement policy be made more explicitly risk-informed by specifically stating that risk information might be used to increase or decrease the severity level of a violation. The staff also recommended that the efforts to risk-inform the enforcement policy supplements be discontinued in view of the efforts to risk-inform the enforcement process as part of the integrated reactor oversight effort. These recommendations were approved in the Commission's June 15, 1999, SRM.

The staff has revised the enforcement manual to state that risk considerations can be used to raise or lower the severity level of violations. The enforcement policy has been revised to incorporate a more risk informed approach to the treatment of severity level IV violations. The Commission approved SECY-99-087 enforcement policy changes will be completed during August 1999.

## **ATTACHMENT 2<sup>1</sup>**

PRA IMPLEMENTATION PLAN ACTIVITY TABLE (July 1999)

1.0 REACTOR REGULATION

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<sup>1</sup> See Abbreviations Table at the end of this report

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Regulatory Activity

Objectives

Methods

Target

Lead

Status (this

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1.1 STANDARD REVIEW

Develop standard review plans \* Evaluate available industry

NRR

(Section 1 is continued on the next page.)



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Regulatory Activity

Objectives

Methods

Target

Lead

Status (this

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1.2 PILOT APPLICATIONS

Evaluate the PRA methodology \* Interface with industry groups

NRR/RES

(Section 1 is continued on the next page.)

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Regulatory Activity

Objectives

Methods

Target

Lead

Status (this

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1.3      INSPECTIONS AND      Provide guidance on the use of \*      Develop IMC 9900 technical      6/97 C      NRR

(Section 1 is continued on the next page.)

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Regulatory Activity

Objectives

Methods

Target

Lead

Status (this

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1.3 INSPECTIONS AND

\* Refine SDP process based on 4/00



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1.4 OPERATOR Monitor insights from human \* Revise the Knowledge and 8/95 C NRR

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1.5      EVENT ASSESSMENT    Continue to conduct quantitative \*    Continue to evaluate 50.72    Ongoing    NRR

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1.6      USE OF PRA IN      Audit the adequacy of licensee      NRR/RES      Now tracked

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1.7      REGULATORY      Assess the effectiveness of      RES/NRR      It is tracked

(Section 1 is continued on the next page.)

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office(s)	Status (this quarter)
1.8 ADVANCED REACTOR REVIEWS	Continue staff reviews of PRAs for design-certification applications.  Develop independent technical analyses and criteria for evaluating industry initiatives and petitions regarding simplification of emergency preparedness (EP) regulations.	* Continue to apply current staff review process  * 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	9/98 C  12/96 C	NRR  NRR/RES	
1.9 ACCIDENT MANAGEMENT	Develop generic and plant-specific risk insights to support staff audits of utility accident management (A/M) programs at selected plants.	* 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)	TBD	NRR/RES	
1.10 IPE FOLLOW-UP ACTIVITIES	Evaluate specific improvements and analyses proposed as basis for resolution of generic safety issues at specific plants.  Use results from the staff review of IPEs to identify potential safety issues and determine an appropriate course of action to address these potential issues.	* Evaluate analyses of issues requested in Generic Letter 88-20  * Evaluate unsolicited analyses of selected voluntary generic issues (GSI23) submitted by licensees.  * Recommendations to Commission regarding follow up on accident management programs and licensee-stated actions.  * Define use for information, clarify "regulatory use," and assess the most effective methods for data collection.	5/99  12/99  deferred  5/98 C	RES  NRR  NRR/regions  NRR/regions	Changed Note 1.10
1.11 RISK INFORMED REVISIONS TO PART 50	Implement Option 2 to SECY-98-300 as directed by the Commission's SRM.	Develop a preliminary plan to implement risk informed modifications to 10 CFR PART 50 related to special treatment of SCCs.	10/99	NRR	New Note 1.11

(Section 1 is continued on the next page.)

## Notes for Section 1

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Note Number	Note
1.1	Memo of 6/30/99 from EDO to Commission describes process for RG and SRP updates.
1.2a	Completion date revised to reflect EPRI Topical as final ISI Pilot activity.
1.2b	SER issued 6/30/99. Exemption to be issued 8/99.
1.3a	The Inspection Plan has been revised following CRGR guidance and has been resubmitted for final CRGR consideration.
1.3b	Implementation date for revised oversight process changed per SRM 98-007A.
1.10	Work on IPE follow up has been deferred in order to refine the program's objectives and approach. The staff is currently exploring the options for IPE insights follow up with industry that will be complementary with the Part 50 risk informed process. Details of this approach will be factored into the PIP when finalized.
1.11	Responds to SRM on SECY 98-300.

## 2.0 REACTOR SAFETY RESEARCH



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Regulatory Activity

Objectives

Methods

Target

Lead

Status (this quarter)

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2.1 REGULATORY GUIDES

Develop RGs to

\* Transmit draft PRA RGs to the

RES/NRR

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2.2 TECHNICAL SUPPORT Provide technical \* Continue to provide ad hoc technical Continuing RES



(Section 2 is continued on the next page.)

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Regulatory Activity

Objectives

Methods

Target

Lead

Status (this quarter)

2.4 METHODS	Develop, demonstrate, * Final report on development and	9/99	RES	See Note 2.4.
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2.5 IPE AND IPEEE

Evaluate IPE/IPEEE

\* Complete the reviews of the three

RES



(Section 2 is continued on the next page.)

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office(s)	Status (this quarter)
2.6 GENERIC SAFETY ISSUES PROGRAM	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 safety issues	Continuing	RES	See Note 2.6
2.7 NEI INITIATIVE TO CONDUCT "WHOLE PLANT" RISK STUDY	Review NEI initiative to conduct three pilot "whole plant" risk-informed studies of requirements vs. risk and cost.	* Agree on ground rules for study * Complete study	TBD TBD	RES/NRR	Note 2.7
2.8 PRA STANDARDS DEVELOPMENT	Work with industry to develop national consensus standard for PRA scope and quality.	* Initiate Phase 1 activity (ASME) * Issue initial ASME draft standard * Issue ASME draft standard for select public comment * Finalize Phase 1 standard (ASME) * Initiate Phase 2 effort (ANS) * Issue initial ANS draft standard - LPSD - Seismic	9/97 C 7/98 C 1/99 C 12/99 5/99 C TBD	RES	Note 2.8a Completed Note 2.8b
2.9 LOW POWER AND SHUTDOWN (LPSD) BENCHMARK RISK STUDY	Collect studies of LPSD risk as a benchmark for assessing the need for further staff activities.	* Collect and review existing LPSD risk information (domestic and foreign) to develop perspectives with respect to the need for revising of RG 1.174 and performing additional work * Initiate additional work, as necessary, based on developed plan	12/99 1/00	RES	Note 2.9
2.10 SAFETY GOAL REVISION	Assess need to revise Commission's Safety Goal to make core damage frequency a fundamental goal and make other changes.	* Initiate discussion with ACRS * Make recommendation to Commission * Provide information paper * Provide final recommendations	2/98 C 4/98 C 7/99 3/00	RES	Completed Note 2.10

(Section 2 is continued on the next page.)

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Regulatory Activity

Objectives

Methods

Target

Lead

Status (this quarter)

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2.11 REGULATORY

Assess the

\* Evaluate the effectiveness of

9/99

RES/NRR

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2.12 REVIEW OF AGENCY

Perform a broad

\*

Identify options for modifying Part 12/98C

RES/NRR

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2.13 RISK-BASED TRENDS

Use reactor operating

\*

Trend performance of risk-

3/00

RES

(Section 2 is continued on the next page.)

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Regulatory Activity

Objectives

Methods

Target

Lead

Status (this



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2.14 ACCIDENT SEQUENCE Identify and rank risk significance \* Screen and analyze LERs, Ongoing RES

Provide supplemental information \* Share ASP analyses and Annual RES

(Section 2 is continued on the next page.)

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office	Status (this quarter)
2.15 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.	<ul style="list-style-type: none"> <li>* Develop program plan to integrate NRR, RES, and AEOD activities using design and operating experience to assess the implied level of risk and how it is changing</li> <li>* Implement program plan elements to include plant-specific models and insights from IPEs, component and system reliability data, and other risk-important design and operational data in an integrated framework to periodically evaluate industry trends</li> </ul>	C  1/01	RES	
2.16 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.	<ul style="list-style-type: none"> <li>* Identify new or improved risk-based PIs which use component and system reliability models and human and organizational performance evaluation methods</li> <li>* Brief ACRS and Commission. Publish candidate RBPIs for NRC and public comment .</li> <li>* Brief ACRS and Commission on RBPIs and request implementation approval.</li> </ul>	C  2/00  10/00	RES	Note 2.16

(Section 2 is continued on the next page.)

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office	Status (this quarter)
2.17 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/EPIX, obtain INPO's SSPI, compile IPE failure data, collect plant-specific reliability and availability data	Ongoing	RES	
		* Develop, manage, and maintain agency databases for reliability/availability data (equipment performance, initiating events, CCF, ASP, and human performance data)	Ongoing		
		* Determine need to revise LER rule to eliminate unnecessary and less safety-significant reporting	6/98 C		
		* Determine need to revise reporting rules and to better capture ASP, CCF, and human performance events	6/98 C		
		* Publish revised LER rule			
		* Develop database to collect reliability and availability data (RADS)	2/00 4/00		

## Notes for Section 2

Note Number	Note
2.4	Draft report has been completed and is internal staff review.
2.6	During this period, Generic Issues B-61 (Allowable ECCS Equipment Outage Periods) and GI-165 (Spring Actuated Safety and Relief Valves) were resolved with no new requirements identified. Generic Issue 107 (Main Transformer Failure) was re-prioritized and dropped from the list of outstanding safety issues based on staff re-examination of its risk significance.
2.7	The staff has subsumed its interactions with NEI on the "whole plant study" into the recommended approach to risk-inform 10 CFR 50 as discussed in SECY-98-300
2.8a	ASME standard (Phase 1) covers internal events only (excluding fire) at full-power, a level 1 and a limited Level 2 PRA.
2.8b	ANS has Phase 2 which includes a PRA for low power shutdown conditions and seismic events.
2.9	Work delayed due to higher priority work as described in the staff's response to the Chairman's Tasking Memorandum (CTM)
2.10	This task has been delayed because of the need to ensure that any proposed modifications to the Safety Goal Policy statement will be consistent with Commission directives on risk-informing 10 CFR 50 (SECY 98-300), on-going activities related to the oversight program and to provide for extensive coordination with ACRS/ACNW and other stakeholders.
2.12	Responds to SRM on SECY 98-300.
2.16	Deadlines have been extended due to the determination during the initial development phase that identification of appropriate indicators and threshold was more complicated than originally planned. The final target schedule will not be affected.

### 3.0 STAFF TRAINING

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Regulatory Activity

Objectives

Methods

Target

Lead

Status (this

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3.0 STAFF TRAINING

Present PRA curriculum as

\* Continue current contracts

Ongoing

HR



(Section 3 is continued on the next page.)

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Regulatory Activity

Objectives

Methods

Target

Lead

Status (this

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3.0 STAFF TRAINING

Develop and present Appendix C \* Prepare course material

C

HR





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Regulatory Activity

Objectives

Methods

Target

Lead

Status (this

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4.1 VALIDATE RISK

Validate risk analysis

\* Hold a workshop consisting 8/94 C

NMSS

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Continue the development of the \* Develop functionally based TBD RES/



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Extend the application of the

\* Develop generic risk

TBD

RES/

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4.2 CONTINUE USE OF

Develop decision criteria to

\* Conduct enhanced

8/94 C

RES/NMSS

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4.3

Develop a branch technical

\* Solicit public comments

5/97 C

NMSS/RES

(Section 4 is continued on the next page.)

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office(s)	Status (this quarter)
4.4	Develop and demonstrate a risk assessment for industrial gauges containing cesium-137 and cobalt-60 using PRA and other related techniques. The assessment should allow for modification based on changes in regulatory requirements. Use empirical data as much as practicable.	* Develop and demonstrate methods for determining the risk associated with industrial gauges containing cesium-137 and cobalt-60 * Issue final report as a NUREG	9/98 C  9/99	RES	Changed (Note 4.4a)
	Develop and demonstrate risk assessment methods for application to medical and industrial licensee activities.	* Through working group with contractor assistance, identify and document a technical basis for a risk-informed approach to the regulation of nuclear byproduct material, and develop plans for a graded approach to nuclear byproduct material regulation based on risk information  • Publish draft risk report and associated documents for comment.  • Provide final report to the Commission	3/99  7/99  1/00	NMSS	Completed (Note 4.4b)  Note 4.4c  Note 4.4c
4.5	Develop and implement a framework for applying PRA to nuclear material uses, similar to the one developed for reactor regulation (SECY-95-280), where appropriate.	* Provide plan for developing framework * Complete scoping effort • Complete framework • Establish milestones for implementation of the framework.	6/98 C  3/99 3/99 C 9/99	NMSS	Note 4.5a  Note 4.5b

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office(s)	Status (this quarter)
4.6 RISK-INFORMED REGULATION OF FUEL CYCLE FACILITIES	Revise 10 CFR Part 70 to be risk-informed and performance-based	<ul style="list-style-type: none"> <li>• Revise current regulation to place emphasis on major accidents and on an integrated safety analysis approach using appropriate risk insights</li> <li>• Develop broad-scope SRP Chapters corresponding to regulated safety discipline areas</li> <li>• Establish an outreach program effectively using internet tools to interface with industry and interested stakeholders</li> <li>• Transmit draft rule and SRP to the Commission for approval to issue for public comment</li> <li>• Transmit final rule and SRP to the Commission for approval</li> </ul>	6/99  6/99  Ongoing  6/99  5/00	NMSS	Note 4.6 Complete  Complete  Complete

(Section 4 is continued on the next page.)

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office(s)	Status (this quarter)
4.7 FUEL CYCLE SAFETY INSPECTION PROGRAM REVISION	Optimize regulatory burden on both the NRC and its licensees with respect to safety inspection activities while ensuring safe operations	Establish a management task force to develop the framework for a safety inspection program optimizing on plant performance indicators, risk insights, and third party inspections	4/99	NMSS & Regions	Note 4.7 Complete
		<ul style="list-style-type: none"> <li>Establish a procedure writing task force to revise current inspection procedures using the new indicators</li> </ul>	9/99		
		<ul style="list-style-type: none"> <li>Establish an outreach program to interface with industry and interested stakeholders</li> </ul>	8/99		
		<ul style="list-style-type: none"> <li>Develop a new set of NRC Inspection Manual Chapters</li> </ul>	1/00		
		<ul style="list-style-type: none"> <li>Develop and complete inspector training</li> </ul>	4/00		
		<ul style="list-style-type: none"> <li>Implement pilot program for revised fuel cycle safety inspection program</li> </ul>	3 <sup>rd</sup> QTR FY00		
		<ul style="list-style-type: none"> <li>Incorporate 10 CFR Part 70 risk insights when available and revise program as necessary</li> </ul>	9/01		
4.8 PILOT REGULATORY INITIATIVES FOR FUEL CYCLE FACILITIES	Evaluate opportunities for reducing regulatory burden while ensuring equivalent safety	Develop a pilot program for alternate disposition of SLIV violations at the GDPs and fuel cycle facilities with approved corrective action programs	8/99	NMSS & OE	Note 4.8
		<ul style="list-style-type: none"> <li>Train inspectors to the new initiative and implement activity</li> </ul>	10/99		
		<ul style="list-style-type: none"> <li>Evaluate effectiveness of pilot program</li> </ul>	8/01		
4.9 PILOT REGULATORY INITIATIVES FOR MEDICAL LICENSEES	Evaluate opportunities for reducing regulatory burden while ensuring equivalent safety	Develop a pilot program with performance indicators focused on safety-related outcomes	8/99	NMSS/OE	Note 4.9
		<ul style="list-style-type: none"> <li>Train inspectors on initiative</li> </ul>	10/99		
		<ul style="list-style-type: none"> <li>Evaluate effectiveness of pilot program</li> </ul>	12/00		

(Section 4 is continued on the next page.)

## Notes for Section 4

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Note Number	Note
4.4a	NMSS completed review of the draft NUREG in January 1999. Comment resolution has been more resource intensive than was originally anticipated; scheduled publication is now September, 1999.
4.4b	SECY-99-062 transmitted the draft working group report to the Commission on March 1, 1999. The schedule for SECY-99-062 was extended to allow coordination with SECY-99-100 which was prepared as part of Regulatory Activity 4.5.
4.4c	New item.
4.5a	In March, 1999, the staff completed its scoping effort. In SECY-99-100, the staff reported the results of this effort and proposed a framework and an approach for its implementation to the Commission. The Commission approved the framework and the staff's proposed implementation approach in its SRM of June 28, 1999.
4.5b	In SECY-99-100, the staff proposed to track progress toward implementation of the framework in the PRA Implementation Plan. Under this new item, the staff will develop milestones for implementation (based on Attachment 4 to SECY-99-100) to be included in the next quarterly update.
4.6	New item.
4.7	New item.
4.8	New item
4.9	New item.



5.0 HIGH-LEVEL NUCLEAR WASTE REGULATION

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office(s)	Status (this quarter)
5.1 REGULATION OF HIGH-LEVEL WASTE	Develop guidance for the NRC and CNWRA staffs in the use of performance assessment (PA) to evaluate the safety of HLW programs.	<ul style="list-style-type: none"> <li>* Assist the staff in pre-licensing activities and in license application reviews</li> <li>* Develop a technical assessment capability in total- system and subsystem PA for use in licensing and pre-licensing reviews</li> <li>* Combine specialized technical disciplines (earth sciences and engineering) with those of system modelers to improve methodology</li> </ul>	Ongoing	NMSS	
	Identify significant events, processes, and parameters affecting total system performance.	<ul style="list-style-type: none"> <li>* Perform sensitivity studies of key technical issues using iterative PA (IPA)</li> </ul>	Ongoing	NMSS	
	Use PA and PSA methods, results, and insights to evaluate proposed changes to regulations governing the potential repository at Yucca Mountain.	<ul style="list-style-type: none"> <li>* Assist the staff in maintaining and refining the regulatory structure in HLW disposal regulations that pertain to PA</li> <li>* Apply IPA analyses to advise EPA in its development of a Yucca Mountain regulation</li> <li>* Apply IPA analyses to develop a site-specific regulation for a Yucca Mountain site</li> </ul>	Ongoing	NMSS	Note 5.1(a)
	Continue PA activities during interactions with DOE during the pre-licensing phase of repository development, site characterization, and repository design.	<ul style="list-style-type: none"> <li>* 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</li> <li>* Compare results of NRC's iterative performance assessment to DOE's Viability Assessment (VA) to identify major differences/issues</li> </ul>	Ongoing	NMSS	Note 5.1(b)
5.2 PRA APPLICATION TO SPENT FUEL STORAGE FACILITIES	Demonstrate methods for PRA of spent fuel storage facilities.	<ul style="list-style-type: none"> <li>* Prepare user needs letter to RES</li> </ul>	4/97 C	RES/NMSS	
		<ul style="list-style-type: none"> <li>* Conduct ISA of VSC-24 dry-cask storage system using probabilistic methods</li> </ul>	7/99 C		Note 5.2a
		<ul style="list-style-type: none"> <li>• Conduct PRA for dry cask storage</li> </ul>	Ongoing		Note 5.2b

(Section 5 is continued on the next page.)

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office(s)	Status (this quarter)
5.3 CONTINUAL 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.	<ul style="list-style-type: none"> <li>* Update the database on transportation of radioactive materials for future applications</li> <li>* Revalidate the results of NUREG-0170 for spent fuel shipment risk estimates</li> <li>• Update NUREG/CR-4824 (Modal Study)</li> </ul>	6/01  12/99  12/04	NMSS	Note 5.3

## Notes for Section 5

Note Number	Note
5.1a	Proposed regulations for deep geologic disposal at Yucca Mountain were issued for comment in February, 1999. The staff has held public outreach meetings in Nevada. At the close of the comment period on June 30, 1999, 91 commentors had provided approximately 1,000 comments.
5.1b	DOE provided the viability assessment for NRC review in 12/98. The staff completed its review and reported its findings to the Commission in SECY-99-074 on March 11, 1999.
5.2a	The ISA of the VSC-24 dry cask storage system has been forwarded to RES to be used as background information in the development of the dry cask storage PRA.
5.2b	In July, 1999 RES initiated a PRA and will use the Holtec Hi-Storm cask design as the basis for the analysis. RES will perform the analysis with in-house staff in coordination with NMSS/SFPO.
5.3	New item.

6.0 REACTOR ENFORCEMENT

Regulatory Activity	Objectives	Methods	Target Schedule	Lead Office(s)	Status (this quarter)
6.1 CONSIDERATION OF RISK IN THE ENFORCEMENT PROCESS	Ensure the consistent Application of the Enforcement Policy in the Area of Risk Informed Enforcement Actions.	<ul style="list-style-type: none"> <li>* Prepare an enforcement guidance memorandum (EGM)</li> <li>* Update the Enforcement Manual to reflect the guidance developed in the EGM</li> </ul>	<p>6/ 97 C</p> <p>8/98 C</p>	<p>OE</p> <p>OE</p>	
6.2 RISK INSIGHTS DURING WEEKLY ENFORCEMENT PANELS	Ensure risk-informed decisions are made in developing enforcement actions.	* Include regional senior reactor analyst evaluation on paneled enforcement cases when warranted	Ongoing	OE	
6.3 CHANGE THE ENFORCEMENT POLICY SUPPLEMENTS TO INCLUDE ADDITIONAL EXAMPLES OF HOW RISK SHOULD INFLUENCE SEVERITY LEVEL	Provide the staff with more useful guidance for determining the Severity Level of Violations.	* Interface with NRR (SPSB) to consider additional examples for the policy supplements	deleted per SRM 6/15/99	OE	

## ABBREVIATIONS

ABWR	advanced boiling-water reactor
AEOD	Office for Analysis and Evaluation of Operational Data
ACRS	Advisory Committee on Reactor Safeguards
AFW	auxiliary feedwater
AIT	augmented inspection team
ANO	Arkansas Nuclear One
AOT	allowed outage time
A/M	accident management
APS	Arizona Public Service
ASME	American Society of Mechanical Engineers
ASP	accident sequence precursor
ATWS	anticipated transient without scram
BF3	Browns Ferry Unit 3
C	completed
COL	combined construction and operating license
CCF	common-cause failures
CFR	<i>Code of Federal Regulations</i>
CRGR	Committee to Review Generic Requirements
CY	calendar year
CNWRA	Center for Nuclear Waste Regulatory Activities
DOE	Department of Energy
EDG	emergency diesel generator
EGM	Enforcement Guidance Memorandum
EP	emergency preparedness
EPA	Environmental Protection Agency
EPIX	Equipment Performance and Information Exchange
FY	fiscal year
HLW	high-level waste
HRA	human reliability analysis
GSI	generic safety issue
GQA	graded quality assurance
JTA	job task analysis
IE	initiating event
IMC	inspection manual chapter
INPO	Institute of Nuclear Power Operations
IP	inspection procedure
IPA	iterative performance assessment
IPE	individual plant examination
IPEEE	individual plant examination, external events
IIT	incident inspection team
IST	inservice testing
ISI	inservice inspection
LAN	local area network
LER	licensee event report
LOSP	loss of offsite power
LLW	low-level waste
LP&S	low power and shutdown
MACCS	MELCOR Accident Consequence Code System
MR	Maintenance Rule
NEI	Nuclear Energy Institute
NOED	notice of enforcement discretion
NPRDS	nuclear plant reliability data system
NRR	Office of Nuclear Reactor Regulation
NMSS	Office of Nuclear Material Safety and Safeguards
OCIO	Office of the Chief Information Officer
OE	Office of Enforcement
OGC	Office of the General Counsel
PA	performance assessment
PI	performance indicator
PIP	PRA Implementation Plan
PIPB	Inspection Program Branch, NRR
PM	project manager
PRA	probabilistic risk assessment
RAI	request for additional information
RCP	reactor coolant pump
RES	Office of Nuclear Regulatory Research
RG	regulatory guide
SAMG	severe-accident management guidance
SAPHIRE	Systems Analysis Programs for Hands -on Integrated Reliability Evaluations
SBO	station blackout
SECY	Office of Secretary of the Commission
SER	safety evaluation report

SGTR	steam generator tuber rupture
SONGS	San Onofre Nuclear Generating Station
SPSB	Probabilistic Safety Assessment Branch
SCSS	sequence coding and search system
SRP	standard review plan
SRA	senior reactor analysts
SRM	staff requirements memorandum
SSPI	Safety System Performance Indicator
TBD	to be determined
TTD	Technical Training Division
TS	technical specifications
TU	Texas Utilities
FY	Fiscal Year
VA	viability assessment