

July 22, 1997

SECY-97-158

FOR: The Commissioners

FROM: L. Joseph Callan /s/
Executive Director for Operations

SUBJECT: QUARTERLY STATUS FOR THE PROBABILISTIC RISK ASSESSMENT
IMPLEMENTATION PLAN

PURPOSE:

This quarterly report (Attachment 1) presents the status of activities for the Probabilistic Risk Assessment (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 submitting quarterly reports on the status of its development of risk-informed standards and guidance. Previous quarterly reports were sent to the Commission on March 26, June 20, and October 11, 1996, and on January 13, 1997.

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DISCUSSION:

Significant achievements in the past quarter include the following:

Publication of a Federal Register Notice (FRN), "Use of PRA in Plant Specific Reactor Regulatory Activities: Proposed Regulatory Guides, Standard Review Plan Sections, and Supporting NUREG," announcing the availability of four draft Regulatory Guides (RG), three draft Standard Review Plan (SRP) Sections, and a draft NUREG series report for public comment. These draft documents, are:

- General Guidance (DG-1061 and SRP)
- Inservice Testing (DG-1062 and SRP)
- Graded Quality Assurance (DG-1064)
- Technical Specifications (DG-1065 and SRP), and
- Reference Information on Expected Attributes of PRA Analysis (NUREG-1602)

Copies of these draft documents can be viewed at the NRC Public Document Room or accessed electronically via the NRC Electronic Bulletin Board on FedWorld, or the NRC's accessed Website.

To facilitate solicitation of public comments, the staff will conduct workshop during the comment period to explain the draft documents and answer questions. The staff is preparing an FRN to announce that the workshop will be held on August 11-13, 1997 at the Doubletree Hotel in Rockville, Maryland. A workshop agenda will be included in the FRN.

The draft RG and SRP section for risk-informed inservice inspection (R-ISI) were completed and copies were sent to the ACRS for review and comment. An overview of the documents was presented to the ACRS full committee on June 11, 1997. Initial and detailed presentations to CRGR are scheduled for June 1997 and July 1997, respectively. Presentations of the ISI RG and SRP section to the ACRS subcommittee and full committee are scheduled for July 1997.

The staff anticipates receiving three pilot plant applications to implement RI-ISI programs by the end of September 1997. The staff and the industry continue to develop methods and complete analyses.

With regard to the pilot program for RI technical specifications (TS), the staff completed the safety evaluation, which provides the basis for granting amendments for TS allowed outage times (AOTs) for the safety injection tanks and low pressure safety injection system at the lead plant, Arkansas Nuclear One, Unit 2 (ANO-2).

The safety evaluation was forwarded to the Commission in SECY-97-095, "Probabilistic Risk Assessment Implementation Plan Pilot Application for Risk-Informed Technical Specifications," on April 30, 1997. On May 28, 1997, the Commission issued a staff requirements memorandum (SRM) which stated that the Commission had not objected to the issuance of an amendment to the ANO-2 TS as described in the safety evaluation attached to SECY-97-095. The SRM also stated that the Commission noted the staff's intention to issue similar amendments for the remaining

Combustion Engineering plants in cases for which the results are comparable to those for ANO-2.

The staff completed five more maintenance rule baseline inspections, which included inspection of licensee methods for using PRA in maintenance programs and in inspection of safety assessments performed by licensees when removing equipment from service for maintenance in accordance with Paragraph (a)(3) of the maintenance rule. As of June 7, 1997 the staff has completed 26 inspections.

On June 13, 1997 the Commission approved the staff's recommendation to accept the industry's proposed voluntary alternative to the Reliability Data Rule. The staff will (1) continue to work with industry to improve the content of the voluntary data, (2) periodically update the Commission on these efforts, and (3) advise the Commission

on whether the voluntary approach remains a viable method of meeting regulatory needs.

COORDINATION:

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

L. Joseph Callan
Executive Director
for Operations

Attachments:
As stated

ATTACHMENT

QUARTERLY STATUS UPDATE OF THE AGENCY-WIDE
IMPLEMENTATION PLAN FOR PROBABILISTIC RISK ASSESSMENT (PRA)
(from March 31, 1997 to June 30, 1997)

SUMMARY OF SIGNIFICANT PROGRESS

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

On April 8, 1997, the staff sent to the Commission SECY-97-077, "Draft Regulatory Guides, Standard Review Plans and NUREG Document In Support of Risk-Informed Regulation for Power Reactors." SECY-97-077 requested Commission approval to publish for comment four draft Regulatory Guides (RGs), three draft Standard Review Plan (SRP) sections, and one draft NUREG series report that support implementation of risk-informed regulation for power reactors. By staff requirement memorandum (SRM), dated June 5, 1997, the Commission approved publication of the draft documents. A notice was placed in the Federal Register announcing availability of the documents and requesting public comment on them.

To facilitate solicitation of public comments, the staff will hold a workshop during the comment period to explain the draft documents and answer questions. The staff is preparing a Federal Register Notice to announce the exact date and location of the workshop. A workshop agenda will be included in the FRN.

The staff is also finalizing a draft RG and SRP for risk-informed inservice inspection programs (RI-ISI) for piping. The staff is scheduled to meet with the ACRS subcommittee on July 8, 1997, to discuss the RI-ISI documents. These documents are scheduled to be sent to the Commission on July 31, 1997. The draft RG and SRP section have been completed and copies have been sent to the ACRS for review and comment. The presentation of the ISI RG and SRP section to the ACRS sub-committee and full committee is scheduled for July 1997. Presentations to the CRGR are also scheduled for July 1997.

(2) Pilot Applications (Task 1.2)

The staff has actively engaged with South Texas Project (STP) personnel to evaluate their proposed approach for implementing graded quality assurance (QA). In response to staff questions, the licensee submitted on January 21, 1997, a revised operational QA program (OQAP). A management meeting was held on March 31, 1997, to discuss issues associated with the graded QA initiative. On the basis of the staff review that identified further questions and concerns on the graded QA description in the OQAP, another request for additional information (RAI) was issued to the licensee on April 14, 1997. In a meeting with STP on April 21, 1997, the staff discussed the RAI and preliminary STP responses to the staff questions. On May 5 through 8, 1997, the staff visited STP to review in greater detail the STP implementation

procedures, planned OQAP revisions to address staff concerns, corrective action processes, and details related to equipment categorization. STP subsequently submitted for staff review another OQAP revision and revised procedures for implementing facets of the graded QA program. The staff is awaiting submittal of a final OQAP that should address all issues raised by the staff. The staff has been preparing a safety evaluation (SE) for graded QA based on the reviews performed.

Regarding the pilot program for RI technical specifications (TS), the staff completed the SE that provides the basis for granting amendments for TS allowed outage times (AOTs) for the safety injection tanks and low pressure safety injection system at the lead plant, Arkansas Nuclear One, Unit 2 (ANO-2). The safety evaluation was sent to the Commission in SE CY-97-095, "Probabilistic Risk Assessment Implementation Plan Pilot Application for Risk-Informed Technical Specifications," on April 30, 1997. On May 28, 1997, the Commission issued an SRM which stated that the Commission had not objected to the issuance of an amendment to the ANO-2 TS as described in the safety evaluation attached to SECY-97-095. The SRM also stated that the Commission noted the staff's intention to issue similar amendments for the remaining Combustion Engineering plants in cases for which the results are comparable to those for ANO-2.

As discussed in SECY-97-095, in approving the proposed ANO-2 TS changes, the staff is relying on a commitment made by the licensee with respect to using a RI configuration control technique to assess the risk associated with the removal of equipment from service during the proposed AOT. The staff stated that because this is a new commitment specific to RI TS changes, the staff will ensure that the commitment is incorporated into the

ANO-2

operating

license. The staff and the Combustion Engineering Owners Group (CEOG) have generally

agreed that the preferred method for incorporating this commitment into the license is

through

the addition of an administrative control TS. However, the staff and the CEOG have not

yet

reached agreement on the content of such a TS. The CEOG has indicated that it would be

prepared to meet in late July or early August to discuss the resolution of this issue.

Once this

issue is resolved with the CEOG, ANO-2 will need to submit a supplemental amendment

request to add the new administrative control TS. Once the supplement is received and

reviewed, the ANO-2 amendments can be issued and the review of the remaining Combustion

Engineering plants completed. The staff expects this process to be completed by the end

of

1997, as indicated in the revised PRA Implementation Plan.

As indicated in the last Quarterly Status Report for the PRA Implementation Plan

(SECY-97-076), dated April 3, 1997, the staff expected to be able to issue SEs for

implementation of

RI-IST at Comanche Peak and Palo Verde by June 30, 1997. The staff has been interacting

with the pilot licensees and developing SEs on their proposed RI-IST programs. The June

30,

1997, completion schedule was contingent upon timely receipt of the two pilot plants'

responses

to staff RAIs. This includes responses to second-round RAIs issued in March 1997, which

addressed several key areas of review as contained in the draft RI-RGs and SRP sections,

as

well as responses to final RAIs aimed at eliciting, in detail, how the pilot licensees

comport with

the draft RI-IST and general RGs. The staff has maintained interaction with the pilot

licensees,

and representatives from the pilots have attended some of the meetings between the staff

and

ACRS during the development of the RGs and SRP sections. Shortly after the

March 1997

RAIs were issued, the staff discussed the questions with the pilot licensees and clarified them via teleconference.

The staff's RI-IST team is currently working on the first drafts of SEs for Comanche Peak and Palo Verde. These drafts will be based on the licensees' proposed RI-IST program submittals in response to the staff's first-round RAI (Palo Verde has only partially responded to the staff's March 1996 RAI). However, open items in the draft SEs can only be resolved after the staff receives documentation from the licensees describing how their proposed RI-IST program comports with the draft RI-IST RG or their rationale for any differences. In late May 1997, the Comanche Peak licensee, Texas Utilities (TU) Electric, indicated that they would try to respond to both the second- and final- round RAIs within 60 days of receipt of the draft RI RGs and SRPs. The staff plans to meet with TU Electric several weeks after the licensee receives the draft RI RGs and SRPs to obtain interim responses to the RAIs so that progress can continue towards completing the staff's SE. The final RAIs related to the RI-IST program for both Comanche Peak and Palo Verde were sent to the licensees on June 9, 1997. It is expected that issuance of the Safety Evaluation on the Comanche Peak RI-IST program will be in October, 1997.

Significant PRA-related technical support has been provided for the agency's maintenance rule (MR) baseline inspection. The goal of the MR baseline program was 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). As of June 7, 1997, the staff has performed 26 full inspections. These inspections were performed 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).

Regarding RI-ISI pilot review, the staff is currently reviewing the Westinghouse Owners Group (WOG) responses to staff RAIs. The staff completed its review of the Electric Power Research Institute (EPRI) methodology and issued its RAI to the industry. The staff has not yet received any of the three pilot plant submittals from the industry. These submittals to NRC are currently scheduled for September 1997. The staff continues to have working meetings with the industry on the WOG and EPRI methods and with Virginia Power on the Surry pilot.

(3) Training for Inspectors (Task 1.3)

The first Senior Reactor Analyst (SRA) training class has been completed. Eight SRAs have taken the training and qualification program, and managers are reviewing their certification packages. Employees are being selected for the remaining two SRA positions in Region III.

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

IPE

1. All 75 IPE submittals have been reviewed (Browns Ferry Unit-3, not included). Staff evaluation reports (SERS) have been issued for all except five, two of which are in progress (Susquehanna and St. Lucie). The other three submittals have

been redone
by the licensees to account for either staff concerns brought out during the IPE review process (Byron and Braidwood) or plant changes that resulted in the original IPE submittal being obsolete (Ginna). SERS are scheduled to be issued for these IPES by the end of July 1997.

2. RES is evaluating the applicability of the TVA multi-unit PRA, (which is a PRA of Unit 2 given operation of Units 1 and 3) as an IPE of Brown's Ferry, Unit 3. RAIs were prepared and transmitted to TVA to support this evaluation.

3. Draft NUREG-1560, "Individual Plant Examination Program: Perspectives on Reactor Safety and Plant Performance," was published in draft form in October (Vol. 1) and November (Vol. 2) 1996. Perspectives are presented on four major objectives as follows:

The impact on reactor safety;
The significant reactor design, containment performance and operational features relative to core damage, containment failure, and radionuclide releases;
The different methods and models developed and quantified in performing the IPES; and
The implication of the IPE results relative to the Commission's Safety Goals and the Station Blackout Rule.

A workshop was held in Austin, Texas, on April 7-9, 1997, to present the insights discussed in draft NUREG-1560. Approximately 100 participants attended from U.S. power utilities, reactor vendor owners' groups, industry consultants, and other Federal and State agencies. Based on written comments, and comments received at the workshop, a final version of NUREG-1560 will be issued by September 30, 1997.

4. The IPE database has been completed and is available to the public (can be

downloaded from the NRC Web page). In addition, the user's manual for the IPE database, draft NUREG-1603 has been published.

IPEEE

Of 74 expected IPEEE submittals, the staff received 61 that were complete and 3 that were partially-complete. Currently, 41 submittals are under various stages of review.

Eleven additional submittals are expected to be received by the end of December 1997, one by June 1998, and the submittal date of one IPEEE has yet to be determined.

A preliminary IPEEE insights report has been developed that summarizes the information presented in the first 24 submittals reviewed by the staff. This preliminary report will be sent to the Commission in September 1997. In September 1998, a final report summarizing all IPEEE reviews will be sent to the Commission.

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

As part of Task 3.1 (Risk-Based Trends and Patterns Analysis Task), a final report on the reactor core isolation cooling (RCIC) system study was issued in June 1997.

In addition, the fire events study report was also issued in June 1997.

(6) Accident Sequence Precursor (ASP) (Task 3.2)

The 1995 ASP report was published as NUREG/CR-4674, Volume 23. The ASP analyses for 1982 and 1983 were completed and are documented in NUREG/CR-4674, Volume 24.

The 1996 event analyses are nearing completion and analysis of 1997 events was begun.

(7) Reliability Data Rule (Task 3.5)

The staff completed its evaluation of industry's proposed voluntary alternative to the rule on schedule. (The proposal was revised in March 1997 to resolve the staff's technical

concerns.)

In May 1997, the staff sent a Commission paper describing its evaluation of the voluntary approach and various options for proceeding. In an SRM, dated June 13, 1997, the Commission approved the staff's recommendation to accept the industry's proposed voluntary alternative to the rule. The staff will (1) continue to work with the industry to improve the content of the voluntary data, (2) periodically inform the Commission of the status of this work, and (3) advise the Commission on whether the voluntary approach remains a viable method of meeting regulatory needs.

(8) Staff Training (Task 3.6)

The new PRA for Technical Managers course was added to the curriculum. This course is 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. Current plans are to present this course three times a year in headquarters.

The first presentation of the new PRA Level 2 course, Accident Progression Analysis, was held February 25, 26, and 27, 1997. This three-day course addresses accident phenomenology under post-core damage conditions and development of PRA models for this severe-accident regime. Based on feedback for the first presentation of the course, the course is undergoing significant modification. The next offering of the course will be in August 1997.

Current plans are to present this course and the Level 3 course twice a year.

The new course on external events has been completed. 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 I

PEEEs. The pilot presentation of course is scheduled for June 1997. The course is scheduled for its first regular presentation in August 1997.

The new PRA Technology and Regulatory Perspectives course is under development and scheduled for presentation in October 1997. Four of the 13 course modules have been reviewed to date. The course will replace the PRA Basics for Regulatory Application course and the Insights Into IPEs course for some basic level users.

REVISIONS TO THE EXISTING PRA IMPLEMENTATION PLAN

Task 1.2 of the PRA plan states that the target schedule for completing the graded QA initiative is June 1997. The staff has focused on the South Texas Project (STP) as that is the only graded QA volunteer plant that submitted a revised graded QA program for staff review and approval. The staff is working on a draft safety evaluation for the STP program that will be transmitted to the Commission in July 1997. Staff monitoring of activities at all three volunteer plants will continue beyond the June target date to observe the results of equipment categorization for additional systems, and the results of the application of graded QA controls and to assess the integrity of the corrective action and operational performance feedback programs. This monitoring effort is expected to continue for an extended period (several years) to provide the staff with lessons learned.

The staff intends by working with the graded quality assurance (GQA) volunteer plants to learn from their implementation strategies, to evaluate their methodologies in relationship to staff prepared guidance documents, and to approve associated QA program changes where necessary. For the purposes of the PRA Implementation Plan, this phase of v

olunteer
plant
interactions will be considered complete when the GQA RG and inspection procedure (IP)
are
issued in final form. In the future, the staff will continue to monitor the
volunteer
plant GQA
implementation, gain feedback to revise the RG and IP as warranted, and evaluate GQA
implementation strategies for other licensees who choose to pursue GQA. Issuance of
the
SER for the STP GQA program is expected by July 1997. The completion date for the GQA
pilot application has been revised to March 1998 to reflect the expected schedule for
issuance
of the final GQA inspection procedure.

In June 1997, the staff informed the Commission of a delay in the expected issuance of
SEs for
implementation of RI-IST at Comanche Peak and Palo Verde. The staff expects
issuance of
the SE on the Comanche Peak RI-IST program in October 1997. The schedule assumes that

TU Electric adequately responds to both the second- and final-round RAI
s within 60
days,
the staff completes its SE within 4 weeks of receiving the licensee's written
responses,
and
managers will review and the Commission will approve the SEs for issuance within 6
weeks of the staff's completion of the SE.

The schedule for issuance of the SE on the Palo Verde RI-IST program remains
uncertain
until
further commitments from the Palo Verde licensee are obtained.

The schedule for issuance of Inspection Manual Chapters 9900 and 2515 (Task 1.3) has
been
extended to allow time for additional technical review based upon the guidance contained
in the
RI SRPs and RGs.

Regarding core inspection procedures (Task 1.3), an additional item to complete revision

to
proposed core inspection procedures has been added to the PRA Implementation Plan. The expected completion date for this item is December 1997.

The first SRA training class has been completed (Task 1.3). Eight SRAs have taken the training and qualification program, and managers are reviewing their certification packages. Employees are being selected for the remaining two SRA positions in Region I II. This activity has been placed in an ongoing status to indicate the continuing need to train new SRAs as current positions become vacant owing to attrition or transfers.

In case of Task 1.9, a brief overview of Accident Management (A/M) treatment in IPE studies is covered in NUREG-1560. Since A/M guidelines are generic in nature, both the generic and plant-specific IPE insights are useful to support evaluations of A/M programs, and future staff audits of implementation of these programs. A more efficient use of the staff resources can be achieved when A/M information is evaluated in concert with other IPE follow-up activities in Task 1.10. A detailed description of a plan for IPE follow-up activities is currently under development by the staff. Disposition of IPE insights to support staff A/M activities will be addressed under Task 1.10.

The work for developing PRA methods (Task 4.1) for use in evaluating medical devices containing nuclear material has been interrupted, because of the loss of key staff and staff assigned to other, higher priority, PRA support activities.

Development of methods for incorporating aging effects in PRA has been delayed because of the loss of the contractor's principal investigator.

The demonstration analysis portion of the human reliability work in Task 2.4 is being

delayed
because the cooperating licensee had to allocate needed resources to other,
higher
priority,
issues at the site.

Work on the development of PRA methods for use on industrial devices contain
ing nuclear
material (Task 4.4) has begun using NRC staff and limited contractor support
, and is
proceeding more slowly than expected. The schedule for completing this work
has been
delayed from June 1997 to the end of FY 1998 in order to assign resources o
n higher
priority
PRA activities. Options to accelerate this effort are currently being asses
sed.

The dates for the component study (Task 3.1) and the initiating event study
(Task 3.1)
changed
due to technical issues that are being resolved and to allow for adequate pe
er review.
The date
for determining the need to revise the LER rule (Task 3.5) was changed to co
ordinate
efforts
with an update of NUREG-1022.

REVISED TASK TABLES

Attachment A2 provides updated to reflect the progress and revisions to the
PRA
Implementation Plan from April 3, to June 30, 1997.

ATTACHMENT -
REVISED PRA IMPLEMENTATION PLAN
TASK TABLE (June 1997)

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.

- * Evaluate available industry guidance.
- * Develop a broad scope standard review plan (SRP) chapters and a series of application specific standard review plan chapters that correspond to industry initiatives.
- * These SRPs will be consistent with the Regulatory Guides developed for the industry.
- * Draft SRPs transmitted to Commission to issue for public comment

General
IST
ISI
TS

- * Issue final SRP

General
IST
ISI
TS

4/97C
4/97C
7/97
4/97C

12/97
12/97
2/98
12/97

NRR

/RES

1.2 PILOT APPLICATION
FOR RISK-INFORMED
REGULATORY
INITIATIVES

* Evaluate the PRA methodology and develop staff positions on emerging, risk-informed initiatives, including those associated with:

1. Motor operated valves.
 2. IST requirements.
 3. ISI requirements.
 4. Graded quality assurance.
 5. Maintenance Rule.
 6. Technical specifications.
 - 6a. Commission Approval
 - 6b. Pilot Amendments Issued
 7. Other applications to be identified later.
- * Interface with industry groups.

* 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.

* Evaluation of industry proposals.

* Evaluation of industry pilot program implementation.

* As appropriate, complete pilot reviews and issue staff findings on regulatory requests.

1. 2/96C
2. 10/97
3. 4/98 (Surry)
12/98 (Others)
4. 7/97 (STP)
3/98 (others)
5. 9/95C
- 6a. 5/97C
- 6b. 12/97

NRR

1.3 INSPECTIONS

* Provide guidance on the use of plant-specific and

generic information from IPEs and other plant-specific PRAs.

- * Develop IC 9900 technical guidance on the use of PRAs in the power reactor inspection program.
- * Revise IC 2515 Appendix C on the use of PRAs in the power reactor inspection program.
- * Propose guidance options for inspection procedures related to 50.59 evaluations and regular maintenance observations.
- * Review core inspection procedures and propose PRA guidance where needed.
- * Complete revision to proposed core inspection procedures
- * Issue draft Graded QA Inspection Procedure for public comment
- * Issue final Graded QA Inspection Procedure
6/97

7/97

10/97

7/97

12/97

9/97

3/98

NRR

- * Provide PRA training for inspectors.

- * Provide PRA training for Senior Reactor Analysts (SRA)
- * Identify inspector functions which should utilize PRA methods, as input to AEOD/TTD for their development and refinement of PRA training for inspectors.
- * Develop consolidated/comprehensive 2-3 week PRA for regulatory applications training course.
- * Conduct training for Maintenance Rule baseline inspections
- * Conduct training courses according to SRA training programs
- * Rotational assignments for SAS to gain working experience

7/96C

10/97

8/96C

Ongoing

Ongoing

NRR

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.

- * Monitor the use of risk in inspection reports.
- * Develop new methodologies and communicate appropriate uses of risk insights to regional offices.
- * Update inspection procedures as needed.
- * Assist regional offices as needed.
- * Conduct Maintenance Rule baseline inspections
Ongoing

7/98
NRR

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.
- * Revise the Examiner Standards (NUREG-1021), as needed, to reflect PRA insights.

8/95C

3/97C

NRR

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.

TBD

NRR

1.7 REGULATORY EFFECTIVENESS EVALUATION

- * Assess the effectiveness of major safety issue resolution efforts 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.

TBD
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

- * 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.

12/96C

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.
- * 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 EVALUATING IPE
INSIGHTS TO
DETERMINE
NECESSARY FOLLOW-
UP ACTIVITIES

- * 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.

- * Determine appropriate approach for tracking the regulatory uses of IPE/IPEEE results.
- * Review the report "IPE Program: Perspectives on Reactor Safety and Plant Performance" and identify the initial list of required staff and industry actions (if any), including insights on A/M.

Finalize list of required staff and industry actions.

- * Audit licensee improvements that were credited in the IPEs to determine effectiveness of licensee actions to reduce risk.
- * Define use for information, clarify "regulatory use", and assess the most effective methods for data collection.
- * If appropriate, develop approach for linking IPE/IPEEE data bases.
9/97

12/97

TBD

12/97

12/98
NRR &
RES

NRR

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.

* Draft PRA Regulatory Guides transmitted to Commission for approval to issue for public comment.

General

IST

ISI

GQA

TS

* Issue final PRA Regulatory Guides.

General

IST

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2.2 TECHNICAL SUPPORT

- * 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.
- * Continue to provide ad hoc technical support to agency PRA users.
- * 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.
- * Support agency efforts in reactor safety improvements in former Soviet Union countries.
- * Initiate PRA standards development

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Regulatory Activity
Objectives
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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.

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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 methods for fire risk analysis
- * Develop and demonstrate methods for assessing reliability/risk of digital systems

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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 preliminary IPEEE insights report

* Issue draft final IPEEE insights report

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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

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3.0 ANALYSIS AND EVALUATION OF OPERATING EXPERIENCE, AND TR

Regulatory
Activity
Objectives
Methods
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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.

* Trend performance of risk-important components.

* Trend performance of risk-important systems.

* Trend frequency of risk-important initiating events

* Trend human performance for reliability characteristi

cs.

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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.

* Develop standard trending and statistical analysis procedure

s for

identified areas for reliability and statistical applications.

* Develop special software and databases (e.g. common cause failure) for use in trending analyses and PRA studies.

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Periodic
updates
AEOD

3.2 ACCIDENT
SEQUENCE
PRECURSOR (ASP)
PROGRAM

* Identify and rank risk significance of operational events.

* Screen and analyze LERs, AITs, IITs, and events identified from other sources to obtain ASP events.

* Perform independent review of each ASP analyses. Licensees and NRC staff peer review of each analysis.

* Complete quality assurance of Rev. 2 simplified plant specific models.

* Complete feasibility study for low power and shutdown models.

* Complete initial containment performance and consequence models.

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* Provide supplemental information on plant specific
performance.

* Share ASP analyses and insights with other NRC offices and
Regions.

Annual rpt

AEOD

Regulatory Activity

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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 framework to periodically evaluate industry trends.

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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 system reliability models & human and organizational performance evaluation methods.

* Develop and test candidate PIs/performance measures

* Implement risk-based PIs with Commission approval.

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3.5 COMPILE
OPERATING

EXPERIENCE DATA

* Compile operating experience information in database systems suitable for quantitative reliability and risk

to

analysis applications. Information should be scrutable

and be

the source at the event level to the extent practical and sufficient for estimating reliability and availability

parameters for NRC applications.

rsight

* Manage and maintain SCSS and the PI data base, provide over

re

and access to NPRDS, obtain INPO's SSPI, compile IPE failure

y data.

data, collect plant-specific reliability and availability

ing

* 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.

ty data

* Evaluation of voluntary approach for collecting reliability

* Final reliability data rule (if necessary)

ry

* Determine need to revise LER rule to eliminate unnecessary

and less safety-significant reporting.

pture

* Determine need to revise reporting rules and to better capture

ASP, CCF, and human performance events.

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on Vol.
Approach.

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Regulatory Activity
Objectives
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Office(s)

3.6 STAFF TRAINING

* Present PRA curriculum as presently scheduled for FY

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* Continue current contracts to present courses as schedu

led.

* Maintain current reactor technology courses that include P

RA

insights and applications.

* Improve courses via feedback.

* Review current PRA course material to ensure consistency

with

Appendix C.

Ongoing

Ongoing

Ongoing
Complete
AEOD

- * Develop and present Appendix C training courses.
- * Prepare course material based on Appendix C.
- * Present courses on Appendix C.

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RES and
AEOD

- * Determine staff requirements for training, including analysis of knowledge and skills, needed by the NRC staff.

- * Review JTAs performed to date.

- * Perform representative JTAs for staff positions (JTA Pilot Program).

- * Evaluate staff training requirements as identified in the PR Implementation Plan and the Technical Training Needs Survey (Phase 2) and incorporate them into the training requirements analysis.

- * Analyze the results of the JTA Pilot Program and determine requirements for additional JTAs.

- * Complete JTAs for other staff positions as needed.

- * Solicit a review of the proposed training requirements.

- * Finalize the requirements.

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Ongoing

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AEOD

- * Revise current PRA curriculum and develop new training

g

program to fulfill identified staff needs.

* Prepare new courses to meet identified needs.

* Revise current PRA courses to meet identified needs

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* Revise current reactor technology courses as necessary t

o

include additional PRA insights and applications.

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AEOD

* Present revised PRA training curriculum.

* Establish contracts for presentation of new PRA curricu

lum.

* Present revised reactor technology courses.

* Improve courses based on feedback.

Ongoing

Ongoing

Ongoing

AEOD

4.0 NUCLEAR

MATERIALS

AND LOW-LEVEL WASTE SAFETY AND SAFEGUARDS REGULATION

Regulatory Activity

Objectives

Methods

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Schedule

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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.

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- * 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
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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

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Final Rule

Published

5/97

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
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RES

4.4 Risk assessment of Material
uses.

- * 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 risk assessment methods for application to medical and industrial licensee activities.
- * Develop and demonstrate methods for determining the risk associated with industrial gauges containing cesium-137 and cobalt-60.
- * Final report as NUREG
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5.0
HIGH-LEVEL NUCLEAR WASTE REGULATION

Regulatory Activity
Objectives
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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

- * 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 licens

application.

* Compare results of NRC's iterative performance

assessment to DOE's TSPA-95 to identify major

differences/issues.

Ongoing

NMSS

5.2 APPLY PRA TO SPENT FUEL STORAGE FACILITIES

* Demonstrate methods for PRA of spent fuel storage facilities.

* Prepare user needs letter to RES

* Conduct PRA of dry cask storage
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RES/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

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NMSS