

November 8, 1999

FOR: The Commissioners

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

SUBJECT: PROPOSED STAFF PLAN FOR RISK-INFORMING TECHNICAL REQUIREMENTS IN 10 CFR PART 50

## PURPOSE:

To provide for Commission approval the staff's plan for performing the study phase of its work to risk-inform the technical requirements in [10 CFR Part 50](#). This study was proposed by the staff as Option 3 of [SECY-98-300](#).

## BACKGROUND:

In [SECY-98-300](#), "Options for Risk-Informed Revisions to 10 CFR Part 50 - Domestic Licensing of Production and Utilization Facilities," dated December 23, 1998, the staff proposed three options for modifying regulations in 10 CFR Part 50 to make them risk-informed and defined four associated policy issues for Commission consideration. These options were:

- (1) Continue with ongoing rulemakings, but make no additional changes to Part 50,
- (2) Make changes to the overall scope of systems, structures, and components (SSCs) covered by those sections of Part 50 requiring special treatment (such as quality assurance, technical specifications, environmental qualification, and 50.59 by formulating new definitions of safety-related and important-to-safety SSCs), and
- (3) Make changes to specific requirements in the body of regulations, including general design criteria (GDCs).

In a June 8, 1999, Staff Requirements Memorandum (SRM), the Commission: (1) approved proceeding with the current rulemakings in Option 1, (2) approved implementing Option 2, and (3) approved proceeding with a study of Option 3. The Commission also approved the staff recommendation that implementation of a risk-informed Part 50 be voluntary for licensees.

For Option 3, the Commission specifically directed the staff to pursue the *"study on an aggressive timetable and provide, for Commission approval, a schedule for this activity. The staff should periodically inform the Commission on progress made in the study. The study should determine how best to proceed with risk-informing the remaining sections of Part 50.... the staff should provide....a detailed plan outlining its recommendations regarding specific regulatory changes that should be pursued."*

This paper provides the staff's plan for the study phase of its work to risk-inform the technical requirements of 10 CFR Part 50 (i.e., Option 3 of [SECY-98-300](#)). This plan reflects discussions in two ACRS subcommittee meetings, held on July 13 and September 24, 1999, and an ACRS full committee meeting on September 30, as well as in a public workshop held on September 15, 1999.

The staff's plan is summarized below and described in more detail in the [attachment](#). Staff work with respect to Option 2 is described in a companion Commission paper, [SECY-99-256](#).

## DISCUSSION:

The staff's work to risk-inform the technical requirements of 10 CFR Part 50<sup>(1)</sup> will consist of two phases: an initial study phase (Phase 1), for which RES has the lead and where recommendations to the Commission on proposed changes will be made; and an implementation phase (Phase 2), where changes resulting from Phase 1 approved by the Commission will be made. Phase 2 will involve developing the technical bases for rule changes (RES lead) and performing rulemakings to implement changes (NRR lead). This paper and its [attachment](#) discuss Phase 1 only.

In Phase 1, the staff will study the ensemble of technical requirements contained in 10 CFR Part 50 (and its associated implementing documents such as regulatory guides and standard review plan sections) to (1) identify individual or sets of requirements potentially meriting change; (2) prioritize which of these requirements (or sets of requirements) should be changed; and (3) develop the technical bases to an extent that is sufficient to demonstrate the feasibility of changing requirements. This work will result in a set of recommended changes to the requirements and associated priorities for implementation. These recommendations will be provided to the Commission for review and approval.

The staff's Phase 1 work will be conducted in the following manner:

- The staff's work will focus on providing a better balance to the Part 50 technical requirements among needed defense-in-depth and safety margins as well as risk. This improved balance will be achieved by systematic consideration of the Part 50 requirements. The staff's approach to risk-informing Part 50 will necessitate a broad assessment of Part 50 requirements, rather than a review of individual regulations. As such, the staff's work may involve changing regulations in sets, rather than individually. That is, risk-informing Part 50 may involve relaxing requirements in some areas in combination with increasing requirements in other areas.
- The set of safety principles established in Regulatory Guide (RG) 1.174 will be applied to possible changes to requirements studied in this phase. That is, the staff expects that the changes to requirements resulting from this work would be consistent with the defense-in-depth philosophy,

would maintain sufficient safety margins, would be performance based to the extent possible, and would result in safety improvements or only small increases in risk, and would reduce any unnecessary burden. This approach would also ensure that adequate protection continues to be maintained. (2)

- The study will focus on potential changes to the technical requirements associated with 10 CFR Part 50. Since the basis for these requirements may be contained in the regulations themselves or in supporting regulatory guides, Standard Review Plan sections, branch technical positions, or other documents, all such documents should be reviewed and, as necessary, be considered for change.
- The study may lead to recommendations which either reduce existing requirements (by modification or elimination) or impose new requirements.
- The criteria applied in this study for risk categorization will build upon and be consistent with those being used in the companion work described in SECY-99-256 (the SECY-98-300 Option 2 work). This work will also build upon and be coordinated with the risk-informed plant oversight program.
- The criteria established in this study with respect to needed quality of a licensee PRA will be consistent with those proposed in SECY-99-256 and RG 1.174. PRA standards, either developed by standards-setting organizations (e.g., ASME and ANS) and endorsed by NRC, or developed by NRC are intended to be important mechanisms for ensuring needed quality.
- The fundamental concept of using a set of design basis accidents (DBAs), and categories of anticipated operational occurrences (AOOs), to set the design of licensed reactors is expected to be retained. However specific DBAs or AOOs may be modified or eliminated or new DBAs or AOOs established.
- The principal focus of this work is on the current set of licensed reactors. As such, the staff intends to study changes to specific existing requirements, rather than making a *de novo* rewrite of Part 50. As discussed below and in the attached plan, one factor in the staff's prioritization process will be the potential impact on future reactors, so that potential regulatory changes that impact both current and future plants will receive higher priority than those only affecting current reactors. Those changes affecting only future plants will be of lowest priority.

Using this approach, and as described in more detail in the attached plan, the staff will perform Phase 1 in three tasks. These three tasks include:

**Task 1: Identification of Candidate Changes to Requirements and Design Basis Accidents** This task will provide a first screening of the technical requirements in 10 CFR Part 50, implementing documents, and DBAs. This screening will use three criteria to identify the best candidates for change. These three criteria are: frequencies of the initiating event and event scenarios; risk contributions of the scenarios and systems, structures, and components (SSCs); and extent of excessive conservatism or non-conservatism in associated methods, assumptions, or acceptance criteria. Each of these criteria will be used to identify requirements and DBAs which appear to have a frequency, risk, or conservatism which is either inordinately high or low.

**Task 2: Prioritization of Candidate Changes to Requirements and Design Basis Accidents** This task will provide a prioritization of candidate changes identified in Task 1. Prioritization criteria to be used include rough estimates of the values and impacts of the candidate change (including values in safety benefit and burden reduction, and impacts in costs to the NRC and the licensee to make the change); and the practicality of the candidate change. Evaluation of the benefits will include consideration of the population of plants expected to be impacted by the change (including both currently licensed reactors and future plants). Backfitting issues associated with candidate changes will also be evaluated at this time.

**Task 3: Identification of Recommended Changes to Requirements** This task will establish the scope and feasibility of implementing candidate changes identified in Task 1 and prioritized high in Task 2. Results of this evaluation will be provided to the Commission in the form of recommendations on specific changes to 10 CFR Part 50 and its associated implementing documents. As discussed in the attached staff plan, this task will be completed by the end of December 2000; however, changes which warrant prompt revision of the requirements will be sent to the Commission on an expedited basis. Also, it should be noted that until Tasks 1 and 2 are completed, the number of high priority candidate changes will not be known. Accordingly, the completion of Task 3 may extend beyond December 2000; however, it is our intent to provide the Commission recommendations for as many items as possible in December 2000, along with a schedule for completing any remaining items.

The staff intends to test this process using at least two example Part 50 modifications, one involving the modification of a single requirement (e.g., hydrogen control requirements in 10 CFR 50.44) and one involving modification of a set of related requirements (e.g., requirements related to special treatment of SSCs). After completion of these test applications, and stakeholder comment, the staff will update the plan and begin a more extensive review of Part 50 requirements.

As noted above, stakeholder input on this plan was obtained at a public workshop held on September 15, 1999, and through a series of meetings with the ACRS. The staff intends to continue to communicate with stakeholders and obtain additional stakeholder input on this work in several ways. For external stakeholders, communications mechanisms include: a series of public workshops on specific issues; periodic interactions with the ACRS; the possible use of pilot studies, including, for example, interactions with the South Texas Project regarding their requests for exemptions from specific regulations; and development of a website providing key information on the staff's work. In parallel, the staff will communicate with internal stakeholders (principally RES, NRR, and OGC staff) via a series of meetings to discuss the identification and prioritization process in more detail, obtain needed input and discuss results. The staff will provide periodic status reports to the Commission on its work and these stakeholder interactions, as directed by the June 8, 1999, SRM. The first such status report will be provided by the end of March 2000.

The staff's work to risk-inform the technical requirements of 10 CFR Part 50 is closely related to staff work to make changes to the overall scope of SSCs covered by those sections of Part 50 requiring special treatment, as described in SECY-99-256. Key links between these two efforts include:

- The modification of the scope of SSCs described in SECY-99-256 provides an important first step in risk-informing the set of special treatment requirements. Work to modify the technical basis of these requirements is an important second step which could lead to greater consistency and realism in required SSC treatment and substantially greater clarity in the regulations. The staff will perform an assessment of approaches for modifying this set of requirements early in Phase 1, using the process described in the attached plan.
- SECY-99-256 recommends the development of a new Appendix T to Part 50, which will use risk information to help define categories of safety classes for plant structures, systems, and components. The process and evaluation criteria for assessing potential changes in technical requirements will build upon and be consistent with the process and criteria established in Appendix T.
- Application of the Appendix T categorization process will result in a list of high and low safety significant SSCs. These lists, as well as those from the reactor oversight significance determination process, will be reviewed to identify candidates for possible changes in Part 50 technical requirements.
- As specific rulemakings are undertaken according to the SECY-99-256 plan, additional changes may be needed to the technical requirements as well as scope requirements. Such technical requirement changes will be evaluated and prioritized using the process described in the attached plan.
- SECY-98-300 identified a policy issue concerning selective implementation of new, risk-informed requirements. This issue is again noted in SECY-99-256 because of its implications on how special treatment requirements may be modified. This issue, and its resolution with respect to special treatment requirements, have important implications to the development of recommendations on changes to Part 50 technical requirements as well as the estimated benefit of sets of requirements identified as meriting change.
- The risk-informed modifications of special treatment requirements and technical requirements of Part 50 both have implications with respect to the needed quality of the underlying PRA. The staff will ensure that the needed quality will be appropriately defined and described in both efforts through reference to standards or other means.

The attached plan shows completion of Phase 1, with recommendations to the Commission on requirements meriting modification, by the end of December 2000. In order to meet this schedule, and in accordance with the SRM guidance to perform this work on an aggressive timetable, **the staff intends to proceed immediately with implementing the attached plan, in parallel with Commission review.** While this entails some risk of resource misallocations in the event of plan modification by the Commission, the staff believes that this risk is tolerable, given the priority and urgency of the work. Also, as stated above, the Commission will be provided a schedule in December 2000 for any items whose evaluation will extend beyond that time.

#### RESOURCES:

The plan includes estimates of resource requirements for completing each of these tasks. To complete Phase 1, the staff estimates that approximately 7.25 FTE and \$1.50 million will be required. These resources are consistent with those discussed in SECY-98-300 for this work, have been included in the FY99 RES budget (projects initiated at Brookhaven and Sandia National Laboratories) and in FY2000 and FY2001 RES plans, and will require no reprogramming. No direct resources are required from other offices for Phase 1 of this activity. It should be noted that these resource estimates are subject to change as the work progresses and the exact scope and number of candidate changes meriting evaluation is better determined. Any additional resource needs will be addressed as they are identified.

The staff's plan for Phase 2 is dependent on the recommendations developed in Phase 1 and associated Commission review and approval. As such, no detailed estimates have been made with respect to the resource requirements for Phase 2.

#### COORDINATION:

The Office of General Counsel has reviewed this paper and has no legal objections. The Office of the Chief Financial Officer has reviewed this paper for resource implications and has no objections. ACRS views on the [attachment](#) were provided in a letter to Chairman Dicus, dated October 12, 1999.

#### RECOMMENDATION:

The staff recommends that the Commission approve the attached plan for performing the study phase of its work to risk-inform the technical requirements of 10 CFR Part 50, including approval of both the approach and the schedule. As discussed above, the staff will proceed to implement this plan in parallel with Commission review.

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*Plan for Risk-Informing the Technical Requirements in 10 CFR 50*

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Plan for Risk-Informing  
the Technical Requirements of 10CFR50

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1.0 INTRODUCTION

1.1 Background

The Nuclear Regulatory Commission (NRC) issued a policy statement in 1995 to describe how probabilistic risk assessment (PRA) should be used in agency regulatory processes. The policy statement said that it was the Commission's intention:

*to encourage the use of PRA and to expand the scope of PRA applications in all nuclear regulatory matters to the extent supported by the state-of-the-art in terms of methods and data. Implementation of the policy statement will improve the regulatory process in three areas: foremost, through safety decision making enhanced by the use of PRA insights; through more efficient use of agency resources; and through a reduction in unnecessary burdens on licensees.*

Since the publication of the policy statement, the staff has developed guidance on the use of risk information for reactor license amendments and is currently processing license amendment applications that use risk information. In addition, the staff is currently changing its processes for overseeing reactor licensees to better reflect risk information on the importance of specific parts of plant design and operations. However, the fundamental reactor regulations (and their implementing regulatory guides and standard review plans) which underlie these amendment and oversight processes remain largely deterministic.

In 1998, the staff developed a set of recommendations on how to change the NRC's reactor regulations to better reflect risk information. In SECY-98-300, the staff proposed high-level options for modifying regulations in 10 CFR Part 50 to make them risk-informed and to delineate associated policy issues for Commission consideration. The staff identified the following three options for risk-informed modifications of 10 CFR Part 50:

- (1) Continue with ongoing rulemakings, but make no additional changes to Part 50,
- (2) Make changes to the overall scope of systems, structures, and components (SSCs) covered by those sections of Part 50 requiring special

treatment (such as quality assurance, technical specifications, environmental qualification, and 50.59) by formulating new definitions of safety-related and important-to-safety SSCs), and

- (3) Study changes to specific requirements in the body of regulations, including general design criteria.

The changes in Option 3 could involve such actions as developing an alternative set of design-basis accidents (including some core melt accidents because of their importance to risk), adding provisions to Part 50 allowing for risk-informed alternatives to the present requirements, revising specific requirements to reflect risk-informed considerations, or deleting unnecessary or ineffective regulations.

In a June 8, 1999 Staff Requirements Memorandum, the Commission directed the staff to proceed with efforts to incorporate risk-informed attributes into 10 CFR Part 50<sup>(3)</sup>. For Option 3, the Commission specifically directed the staff to pursue the *"study on an aggressive timetable and provide, for Commission approval, a schedule for this activity. The staff should periodically inform the Commission on progress made in the study. The study should determine how best to proceed with risk-informing the remaining sections of Part 50.... the staff should provide....a detailed plan outlining its recommendations regarding specific regulatory changes that should be pursued."* The Commission also approved the staff recommendation that implementation of a risk-informed Part 50 be voluntary for licensees. The plan described in this report is in response to this Commission direction with respect to Option 3.<sup>(4)</sup>

## 1.2 Objectives

In SECY-98-300, the staff defined three broad objectives for its work to risk-inform 10 CFR Part 50:

- Enhance safety by focusing NRC and licensee resources in areas commensurate with their importance to health and safety
- Provide NRC with the framework to use risk information to take action in reactor regulatory matters
- Allow use of risk information to provide flexibility in plant operation and design, which can result in burden reduction without compromising safety

The purpose of the staff's work described in SECY-99-256 and in this plan is to develop a revision to 10 CFR Part 50 which accomplishes these broad objectives. The objective of this plan is to describe the staff's work to make this revision by modifying the technical requirements of Part 50, and the associated implementing documents.

## 1.3 Scope and Limitations

The staff's work to modify the technical requirements of Part 50 will be carried out in the following manner:

- The staff's work will focus on providing a better balance to the Part 50 technical requirements among needed defense-in-depth and safety margins as well as risk. This improved balance will be achieved by systematic consideration of the Part 50 requirements. The staff's approach to risk-informing Part 50 will necessitate a broad assessment of Part 50 requirements, rather than a review of individual regulations. As such, the staff's work may involve changing regulations in sets, rather than individually. That is, risk-informing Part 50 may involve relaxing requirements in some areas in combination with increasing requirements in other areas to achieve a better balance.
- The set of safety principles established in Regulatory Guide 1.174 will be applied to possible changes to requirements studied in this phase. That is, the staff expects that the changes to requirements resulting from this work would be consistent with the defense-in-depth philosophy, would maintain sufficient safety margins, would be performance based to the extent possible, and would result in small changes in risk and would reduce any unnecessary burden. This approach would also ensure that adequate protection continues to be maintained. As part of its Phase 1 documentation, the staff will prepare a discussion explaining why the R.G. 1.174 principles, together with other criteria to be applied in Option 3, will provide adequate protection of public health and safety.<sup>(5)</sup>
- The study will focus on potential changes to the technical requirements associated with 10 CFR Part 50. Since the basis for these requirements may be contained in the regulations themselves or in supporting regulatory guides, standard review plan sections, branch technical positions, or other documents, all such documents should be reviewed and, as necessary, be considered for change. In general, this also means that process rules contained in Part 50 will not be studied.
- The study may lead to recommendations which either reduce existing or impose new requirements. Existing requirements may be modified or eliminated; new requirements may need to be implemented.
- The criteria applied in this study for risk categorization will build upon and be consistent with those being used in the companion work described in SECY-99-256 (the SECY-98-300 Option 2 work). It will also build upon and be coordinated with the risk-informed plant oversight process.
- The criteria established in this study with respect to needed quality of a licensee PRA will be consistent with those proposed in SECY-99-256 and RG 1.174. PRA standards, either developed by standards-setting organizations (e.g., ASME and ANS) and endorsed by NRC, or developed by NRC are intended to be important mechanisms for ensuring needed quality.
- The fundamental concept of using a set of design basis accidents (DBAs), and categories of anticipated operational occurrences (AOOs), to set the design of licensed reactors is expected to be retained. However specific DBAs or AOOs may be modified or eliminated or new DBAs or AOOs established.

- The principal focus of this work is on the current set of licensed reactors. As such, the staff intends to study changes to specific existing requirements, rather than making a *de novo* rewrite of Part 50. As discussed below and in the attached plan, one factor in the staff's prioritization process will be the potential impact on future reactors, so that potential regulatory changes that impact both current and future plants will receive higher priority than those only affecting current reactors. Those changes affecting only future plants will be of lowest priority.
- Because of ongoing work to modify 10 CFR Part 50.48 (fire protection), this regulation will not be included in this study.
- Codes and standards referenced in Part 50 will not be addressed in this study.

#### 1.4 Framework for Modifying the Technical Requirements of 10 CFR Part 50

A framework describing the process for modifying the technical requirements of Part 50 is presented in Figure 1.1.

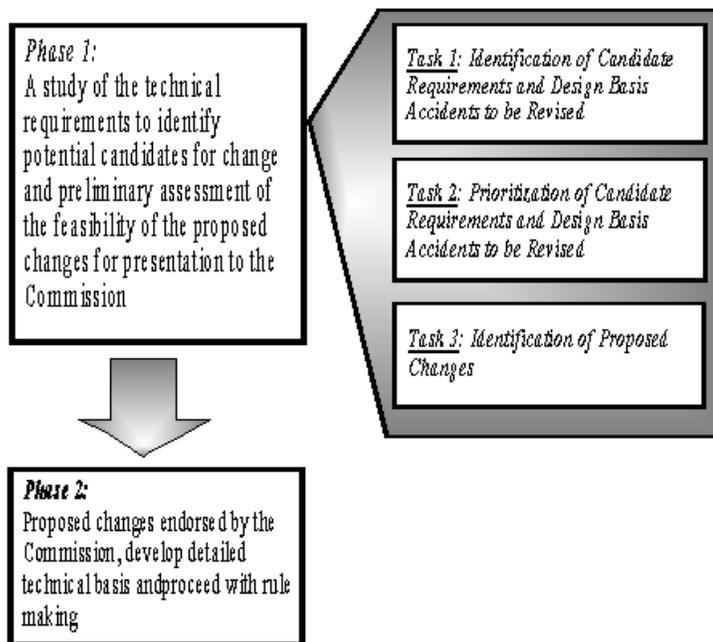


Figure 1.1 Framework for Modifying Part 50 Technical Requirements

As may be seen, two phases are envisioned for the overall program:

- Phase 1: A study of the requirements to identify potential candidates for change and preliminary assessment (i.e., not based on detailed technical and cost analysis) of the feasibility of the proposed changes for presentation to the Commission. RES has the lead for Phase 1. This plan is focused on Phase 1.
- Phase 2: Depending on the Commission's response to Phase 1, for those proposed changes that are endorsed by the Commission, implementation will be accomplished via rulemaking, regulatory guide revisions, etc. Phase 2 will involve developing the technical bases for rule changes (RES lead) and performing rulemakings to implement changes (NRR lead).

Three tasks are to be undertaken to implement Phase 1 and these are outlined in greater detail in Section 2 below. These tasks are interrelated and the whole process of developing changes to the regulations is iterative.

At an early stage of the study, a set of regulations and a single regulation (and their associated implementing documents) will be selected as test cases for application of the three tasks in order to test and refine the criteria and Phase 1 process prior to applying it to the remainder of 10 CFR 50. This is discussed in more detail in Section 2.

#### 1.5 Stakeholder Communications

Communication with stakeholders is an essential part of the process of identifying proposed changes to 10CFR50 technical requirements. The staff intends to obtain external stakeholder input on this work in several ways, including:

- Public workshops scheduled at critical milestones:
  - Development of preliminary plan (workshop held September 15, 1999)
  - Proposed changes to selected requirements

- Proposed recommendations
- Periodic interactions with the ACRS
- The possible use of pilot studies, including, for example, interactions with the South Texas Project regarding their requests for exemptions from specific regulations
- Development of a website providing key information on the staff's work

The public workshop held on September 15, 1999, provided valuable input in developing this plan. Key feedback from the workshop included:

- Problems are more with implementing documents than the regulations
- No consensus regarding candidate changes for top priority:
  - risk-informing 50.44 and 50.46 mentioned
  - looking for relief on specific issues
- Keep design basis concept
- For future reactors, should consider more comprehensive revision

In parallel, the staff will communicate with internal stakeholders (principally RES, NRR, and OGC staff) via a series of meetings to discuss the identification and prioritization process in more detail, obtain needed input and discuss results.

The staff also will provide periodic status reports to the Commission on its work and these stakeholder interactions, as directed by the June 8, 1999, SRM. The first such status report will be provided by the end of March 2000.

## 2.0 APPROACH

Section 1 provides the overall objective, scope, limitations, and high level framework for the Option 3 study. The framework of Figure 1.1 provides an overview of the approach envisioned to make risk-informed changes to Part 50. This approach is described in more detail in the subsections below.

### 2.1 Phase 1: Identify and Determine Feasibility of Changes to Regulations

In order to complete Phase 1, three major steps or tasks will be performed:

- Identify candidate requirements (e.g., regulations, Reg Guides) to be considered for change
- Prioritize candidate changes
- Recommend scope and nature of changes for Commission approval

These three tasks are interrelated and will be performed in a highly iterative manner as shown in Figure 2.1.

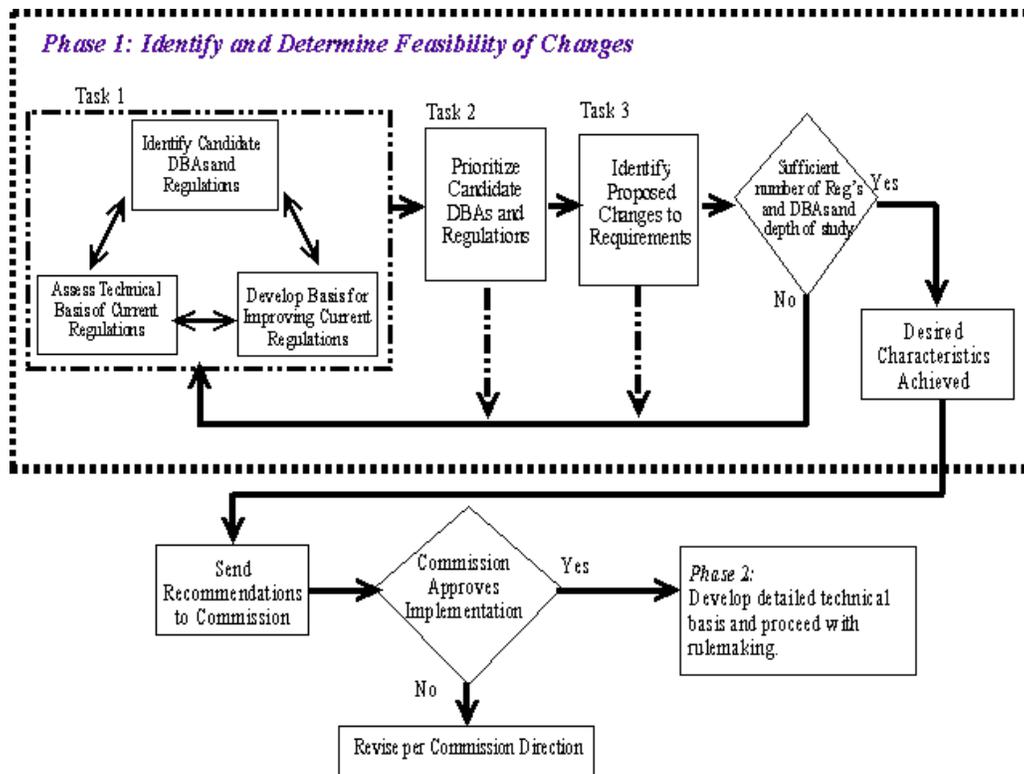


Figure 2.1. Option 3 Approach Flowchart.

Candidate requirements and DBAs will first be selected for further evaluation (Task 1). The selection process will be based on factors such as the contribution to risk, the potential for unnecessary burden reduction, and the potential for safety benefit obtained through risk-informing the requirement.

These identified requirements and DBAs will be reviewed to clearly understand the current technical basis behind the requirements and to identify alternative approaches for making the technical requirements of Part 50 more risk-informed.

With the selection of candidate requirements, these candidates will be prioritized (Task 2). The prioritization will be performed based on factors that measure the anticipated affect of risk-informing on improving safety, reducing unnecessary licensee and NRC burdens, the complexity of the changes, application to current and/or future plants and the amount of resources required to make changes.

Recommended changes to the high priority candidate changes will then be developed (Task 3). The technical basis of a proposed change will be developed to an extent that is sufficient to demonstrate the feasibility of changing requirements, and thus to support recommendations to the Commission regarding Phase 2 rulemaking. Detailed technical evaluations will be performed in Phase 2 only for those recommended changes approved by the Commission.

#### 2.1.1 TASK 1: IDENTIFICATION OF CANDIDATE REGULATIONS AND DESIGN BASIS ACCIDENTS TO BE REVISED

##### **Objective:**

The objective of Task 1 is to identify which parts of 10 CFR 50 and its implementing documents are candidates for risk-informed changes. Such changes may involve modification of individual requirements, or sets of requirements, to best achieve the program's overall objectives. This will include a review of the regulations, Regulatory Guides, Standard Review Plan sections, and design basis accidents (DBAs).

##### **Workscope:**

The identification of those portions of 10 CFR 50 and its implementing documents that are candidates to be risk-informed will be determined based on a set of screening factors, a general understanding of the basis for the current requirements and criteria for improving the current requirements.

Therefore, this task involves three sub-tasks:

Subtask 1.1: Identification of Candidate Changes

Subtask 1.2: Assess Technical Basis of Current Requirements and DBAs

Subtask 1.3: Bases for Improving Current Regulations and DBAs

Task 1 is a highly iterative task. An initial set of requirements and DBAs that are obvious candidates for risk informing will be identified first, then after additional evaluation of the candidate set of requirements and DBAs, the list may be modified.

##### SUBTASK 1.1: IDENTIFICATION OF CANDIDATE CHANGES

The initial identification of candidate changes will be based on risk considerations, judgments regarding excessive conservatism or potential safety benefit. Such considerations will include, at a minimum, the frequency and risk significance of the initiating event, event scenario or design feature and an evaluation of the extent of conservatism. Criteria being considered for this initial identification that would trigger additional evaluation include:

- initiating events with a frequency less than  $10^{-6}/RY$
- event scenarios, systems, structures and components that contribute less than  $10^{-7}/RY$  to CDF or less than  $10^{-8}/RY$  to LERF
- methods, assumptions and acceptance criteria that have excessive conservatism (e.g., beyond known uncertainties and not necessary to maintain the defense-in-depth philosophy)
- risk importance measures (used to help identify risk significant and non-risk significant SSCs and to ensure low risk significant items remain low risk)

The above criteria will build upon and be consistent with the risk criteria being developed under Option 2. For some regulations, application of these criteria will be straight forward. For example, 50.62 addresses the anticipated transient without scram (ATWS) rule and 50.63 addresses station blackout (SBOs), both of which are typically modeled in a PRA. The different options identified in 50.62 for mitigating an ATWS and the SBO coping time required by 50.63 both can be evaluated using risk information. Where quantitative risk information is not available, qualitative information will be used for identification purposes. In addition, requirements addressing accidents screened out in a PRA (e.g., vessel rupture) will be reviewed to ensure they remain low risk and they are not unduly compromised by other RI changes. Many regulations in 10 CFR 50 involve process-related regulations that are not subject to risk informed regulation. For example, Parts 50.20 through 50.24 discusses the required licenses for a nuclear facility and do not appear to be subject to risk-informed considerations. However, some process rules may be included (e.g., 50.59) as identified by the Option 2 work or other considerations.

The staff will make use of a broad base of PRA information in this identification. This will include general perspectives obtained from the Individual Plant Examinations, such as those described in the NUREG-1560, as well as plant-specific PRA results obtained from licensees during public stakeholder interactions.

Based on the work done to date and feedback received from stakeholders an initial set of requirements that are candidates for further review will likely include:

- Regulations associated with special treatment requirements (as discussed in SECY-99-256)
- 10 CFR 50.34(f) "TMI Requirements"
- 10 CFR 50.44 "Combustible Gas Control"
- 10 CFR 50.46 "ECCS"
- 10 CFR 50.61 "Pressurized Thermal Shock"

### SUBTASK 1.2: ASSESS TECHNICAL BASIS OF CURRENT REQUIREMENTS AND DBAS

The technical basis for current requirements and their related material, (e.g. the Standard Review Plan, the Regulatory Guides) will be reviewed. The items reviewed will be those identified in Task 1.1. The review will provide a discussion of the significance of the regulations and the technical requirements imposed by them in terms of their importance to public health and safety. The review will also focus on the interrelationships and linkages among the requirements.

#### Review of the Requirements

For the candidate requirements, a review of the current technical basis will involve identifying:

- the safety function intended to be addressed by the requirement
- the analysis methods, assumptions and acceptance criteria used
- the technical bases for each requirement
  - defense-in-depth, safety margin
  - cost-benefit safety enhancement

In addition to examining individual requirements separately, how defense-in-depth and safety margins are applied across requirements will be considered looking at factors such as the balance between accident prevention and mitigation.

#### Review of the Design Basis Accidents

The challenges to safe operation (i.e., design basis accidents), traditionally considered as part of the plant's design basis, contained in Chapter 15 of Regulatory Guide 1.70 (Format and Content of SAR), Chapter 15 of the Standard Review Plan (NUREG-0800) plus any other specific accidents identified in the regulations (e.g., SBO and ATWS) will be reviewed. The review will focus on the bases for selection of the design basis events and the associated requirements that they impose on plant design and operation. The assessment of each accident will involve identifying:

- the definition of the accident
- the actual requirement(s) for mitigating the accident
  - deterministic values of critical parameters such as temperatures, pressures, flow rates, extent of fuel damage, etc. used as success criteria for recovery from the various design basis accident initiating events
  - the SSCs required to be functional for the accident
- the technical bases for each requirement
  - the analysis methods and assumptions
  - the extent to which plant instrumentation, controls, and reactor protection systems are assumed to function
  - the credit taken for success of operator actions in recovery
  - the extent to which plant malfunctions (single active failures of systems and components), such as stuck control rods or stuck-open valves, and system dependencies, e.g. between safety systems and support systems, are accounted for in the course of the transient

### SUBTASK 1.3: BASES FOR IMPROVING CURRENT REGULATIONS AND DBAS

A set of criteria will be developed to guide risk-informed changes that address risk, defense-in-depth, safety margins and cost-benefit consideration. Therefore, working definitions of defense-in-depth and safety margin that are compatible with a risk-informed regulatory process will be developed. Development of these definitions will start with those in Regulatory Guide 1.174 and modified as needed.

A set of criteria are also needed to guide the process of developing recommended changes to requirements and including risk-informed attributes. Development of these criteria will be based on the desired characteristics of a risk-informed regulatory process as described in SECY-98-300 such that the recommended changes to the requirements will result in:

- deleting unnecessary or ineffective regulations
- adding regulations which could significantly enhance plant safety
- revising specific requirements to reflect risk-informed considerations

Metrics and criteria are likely needed at two levels. First, metrics and criteria are needed, tied to high level guidance such as the Commission Safety Goal Policy, to guide the scope and nature of changes so as to ensure recommended changes are developed on a consistent basis and in accordance with the fundamental principles contained in R.G. 1.174. These metrics and criteria would build upon those discussed above under subtask 1.1, as well as consideration of:

- cost-benefit (i.e., would the change in risk be justified)
- defense-in-depth
- safety margin

Individual requirements as well as sets of requirements (which in combination could rate higher than individually) will be evaluated.

Second, additional metrics and criteria will be developed as needed for particular regulations. For example, a peak clad temperature limit could be set based on engineering calculations that preclude cladding failures; a peak clad temperature limit could be set such that no significant public risk occurs; or a core damage frequency limit for LOCAs could be the basis for setting requirements.

### **Task 1 Products:**

- A process for identifying candidate DBAs or sets of DBAs and requirements
- An identified list of candidate DBAs
- An identified list of candidate requirements or sets of requirements
- Identification of the basis for those requirements (e.g., current regulations and other implementing documents, including regulatory guides and standard review plans) which are candidates for change
- Working definition of defense-in-depth and safety margin
- Proposed metrics and criteria for developing recommended changes

### **Task 1 Related Issues:**

Any policy, technical, process and legal issues associated with the accomplishment of this task will be identified and described. The description shall discuss the potential impact of each issue. Example potential issues include the following:

- Definition of defense-in-depth
- What are the criteria for identifying and recommending candidate changes?
- How should anticipated operational occurrences be treated?
- How will uncertainties be considered:
  - using mean values?
  - using confidence level?
- How should PRA quality, scope and required updates be addressed?
- How should safety margins be included:
  - best estimate analysis with margin added at the end?
  - margin at each step (methods, assumptions, acceptance criteria)?

### 2.1.2 TASK 2: PRIORITIZATION OF CANDIDATE CHANGES TO REGULATIONS, REQUIREMENTS AND DESIGN BASIS ACCIDENTS

#### **Objective:**

The objective of Task 2 is to prioritize candidate changes to regulations, requirements and DBAs for further evaluation and development of proposed changes. The process and evaluation factors for accomplishing this will be identified and exercised.

#### **Workscope:**

In this task the candidate regulations and the identified requirements and DBAs from Task 1 will be prioritized according to a set of factors and associated criteria. This task is expected to be iterative as additional regulations, requirements and DBAs are identified during iterations in Task 1.

#### **Prioritize Candidate Regulations/Requirements/DBAs**

The evaluation factors for prioritizing candidate changes will be identified. Many of the same factors used to identify and screen candidate regulations in Task 1 will also be used here; however, the criteria for applying the factors will differ. For example, in identifying a potential candidate, the criteria was if improvement were even possible; the prioritization will consider how much improvement may potentially occur.

Factors used in assessing the options for risk-informing Part 50 as presented in SECY-98-300 will be reviewed for use in prioritizing candidate changes. The factors from SECY-98-300 that can be used in the prioritization process are the following:

- potential for improving safety
- potential for reducing licensee and NRC burdens
- the anticipated complexity of changes
- NRC resources needed for putting changes in place (both short-term and long-term)
- licensee resources needed for putting changes in place
- calendar time for full implementation (NRC and licensee)
- application to current and/or future plants

Backfitting issues associated with candidate changes will also be evaluated in this task.

Related factors which may be used in this task include:

- the scope of the risk assessment that is required
- the extent to which risk information can be incorporated into risk-informing the requirement
- whether the risk-informing of a candidate requirement would require risk-informing other related requirements
- the number of regulations impacted by the DBA

The actual process of combining this information to obtain the prioritization will be identified. Priorities will be established qualitatively. For example:

#### **Potential for improving safety**

- **High priority** -- substantial improvement is anticipated due to the risk significance of the requirement and the large number of plants affected
- **Medium priority** -- moderate improvement is anticipated due to the risk significance of the requirement and the moderate number of plants affected
- **Low priority** -- little improvement is anticipated due to the risk significance of the requirement and the small number of plants affected

The risk-significance could then be categorized on a contribution to CDF and LERF basis. For example,

**Contribution to CDF**

- **High priority** -- CDF ~ 1E-5/yr range
- **Medium priority** -- CDF ~1E-6/yr range
- **Low priority** -- CDF ~1E-7/yr range or less

**Task 2 Products:**

- A list of evaluation factors for prioritizing candidate changes
- A process for prioritizing candidate changes
- A prioritized list of candidate changes

**Task 2 Related Issues:**

The policy, technical, process and legal issues associated with the accomplishment of this task will be identified and described. The description shall discuss the potential impact of each issue.

- Should candidate changes prioritized medium or low be pursued?
- Which candidates for change warrant prompt revision and should be sent to the Commission on an expedited basis?
- Role of backfit considerations in recommending safety enhancement changes
- Role of value/impact considerations in recommending unnecessary burden reduction changes

**2.1.3 TASK 3: IDENTIFICATION OF PROPOSED CHANGES**

**Objective:**

The objective of Task 3 is to identify proposed changes to be recommended to the Commission for those requirements and DBAs prioritized high.

**Workscope:**

In this task, options to change each of the candidate requirements will be evaluated for those regulations and DBAs identified as high priority in Task 2. Recommendations will be developed and evaluated for consideration by the Commission. The following types of options may be considered with respect to possible changes:

- Change the design basis accident description (i.e., a risk-informed design basis)
- Change the acceptance criteria (peak clad temperature, oxidation limits, etc.) based on new engineering information
- Change the method and assumptions for demonstrating compliance with the acceptance criteria
- Change the SSCs subject to technical requirements

The evaluations will be preliminary, but will provide the Commission with sufficient information regarding feasibility, potential payoff and impact on safety (as well as other factors) to decide whether or not to proceed. As discussed above, the recommendations may be related to individual requirements or sets of requirements.

Documentation will be developed throughout the process. At the completion of Task 3, a complete report containing all of the relevant products will be provided.

**Task 3 Products:**

- A proposed set of changes to be considered for selected regulations (including possible additions)
- A preliminary evaluation of the proposed changes to establish feasibility (i.e., not based on detailed technical and cost analysis)
- A report containing recommendations for Commission consideration

**Task 3 Related Issues:**

The policy, technical, process and legal issues associated with the accomplishment of this task will be identified and described. The description shall discuss the potential impact of each issue. Example potential issues include the following:

- Selective implementation of resulting (changed) requirements
- Resource implications for implementation
- Interactions with ongoing activities and pilot programs
- Impact of proposed changes on new versus existing plants
- The degree to which changes can be plant-specific as opposed to generic

## 2.2 Trial Implementation

The staff intends to test the process described above using at least two example Part 50 modifications, one involving the modification of a single requirement (e.g., hydrogen control requirements in 10 CFR 50.44) and one involving modification of a set of related requirements (e.g., requirements related to special treatment of SSCs). After completion of these test applications, and stakeholder comment, the staff will update the plan and begin a more extensive review of Part 50 requirements.

It is envisioned that this trial application can be completed in January 2000 and a public workshop held in February 2000 to present and receive feedback on the results. A status report will also be provided to the Commission following the workshop.

## 2.3 Phase 2: Implement Changes to Regulations

Phase 2 will be performed upon approval from the Commission on the recommended changes from Phase 1. Upon approval and direction from the Commission, a plan for Phase 2 will be developed.

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## 3.0 SCHEDULE AND RESOURCES

### 3.1 Schedule

The implementation of the study will be performed in an iterative manner. As described in Section 2, a single regulation and a set of regulations that appear to meet the required attributes will initially be selected to be processed through the three tasks to test and refine the process and criteria. The results of this test and the final process and criteria will be the subject of a public workshop in February 2000. A wider range of regulations will then be identified and processed through the various tasks. This process will continue until the requirements identified and approved have been studied. The following schedule is planned:

<b>Milestone</b>	<b>Due Date</b>
Public workshop (preliminary plan)	September 15, 1999 (complete)
Plan to Commission	October 1999
Development of Web-site	November 1999
Complete trial applications	January 2000
Public Notice (e.g., Federal Register Notice):	January 2000
<ul style="list-style-type: none"><li>o Identification of preliminary issues associated with entire process</li><li>o Selection and prioritization factors and criteria</li><li>o Proposed changes to selected requirements of 50.44</li><li>o List of subsequent candidate requirements and DBAs to be examined</li></ul>	
Public workshop	February 2000
Status report to Commission*	March 2000
Iterate set of candidate regulations and DBAs through entire process with proposed set of changes to be recommended to Commission	August 2000
Public workshop	September 2000
Final report to Commission**	December 2000

\* This status report will provide the Commission with a comprehensive discussion regarding progress, technical problem areas, policy issues requiring Commission resolution, and any potential recommendations for specific changes to technical requirements for Commission consideration.

\*\* This report will provide recommendations on as many high priority items as possible. Since the exact number of high priority items will not be known until Tasks 1 and 2 are complete, it may not be possible to complete all items by December 2000. For any items whose evaluation is not complete by December 2000, a schedule for completion will be provided.

### 3.2 Resources

Resources allocated for accomplishing the Phase 1 study include the following:

	<b>FY 1999</b>	<b>FY 2000</b>	<b>FY 2001</b>
Total (\$k)	\$520	\$500	\$500
FTE	0.5	3.25	3.5

These resources are all in RES. No direct resources are required from other offices for Phase 1 of this activity. A plan for Phase 2, including the needed resources, will be developed upon completion of Phase 1 and approval from the Commission.

10 CFR (such as Parts 72 and 100) to be fully effective.

2. As part of its Phase I documentation, the staff will prepare a discussion explaining why the R.G. 1.174 principles, together with other criteria to be applied in Option 3, will provide adequate protection of public health and safety.

3. While this plan discusses potential modifications to Part 50, these modifications could also require changes to other portions of 10 CFR (such as Parts 72 and 100) to be fully effective.

4. The plan for implementing Option 2 of SECY-98-300 is provided in SECY-99-256, "Rulemaking Plan for Risk-Informing Special Treatment Requirements," dated 10/29/1999.

5. As part of its Phase 1 documentation, the staff will prepare a discussion explaining why the R.G. 1.174 principles, together with other criteria to be applied in Option 3, will provide adequate protection of public health and safety.