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"CURRENT REGULATORY CHALLENGES"

BY

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TO

NUCLEAR POWER REACTOR SAFETY COURSE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
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INTRODUCTION

Good afternoon ladies and gentlemen. I am pleased to have this opportunity to participate in this year's Nuclear Power Reactor Safety Course here at M.I.T. Maintaining the safety of operating nuclear power plants is of paramount importance to everyone involved in the nuclear industry and particularly to the U.S. Nuclear Regulatory Commission (NRC). I commend the organizers and sponsors for devising this annual safety course, which provides a forum for senior nuclear safety experts to share their broad experiences and vast knowledge with nuclear safety practitioners and the nuclear community at large. Reactor safety, over the years, has become more disciplined, and with this discipline has come a number of challenges, which present regulatory challenges for the NRC. I would like to use this opportunity to talk about some of these challenges. To provide a proper context, I will first discuss the changing environment in which NRC must conduct its business, the agency safety philosophy, vision and goals, and finally, the Commission focus on some key areas needing to be addressed.

CHANGING ENVIRONMENT

Industry Competition, Utility Restructuring and Mergers

As you are well aware, the electric utility industry has entered a period of deregulation and restructuring that potentially could have profound impacts on the long-term ability of NRC's power reactor licensees to obtain adequate funds to operate and to decommission their nuclear plants safely.

The NRC is not an economic or rate regulator. While the NRC has seen much evidence that an efficiently operated facility is a safe facility, we are and must remain vigilant lest the responses of utility management to economic pressures result in degradation in safety at operating plants.

While transition strategies for deregulation will vary from state to state, and from utility to utility as issues such as "stranded assets," taxes, and other matters, are grappled with, and must be grappled with, the NRC needs to ensure that adequate decommissioning funding is available whether nuclear plants operate to the end of their license terms, or shut down prematurely. In addition, given the potential for significant write-down of assets and reduced market share that deregulation may engender for power reactor licensees, some increase in financial qualifications monitoring may be appropriate as electric utilities are deregulated. The NRC needs to be sure that we are apprised, in a timely manner, of any potential changes affecting our licensees, or those who exercise control over them, that could impact on safety or our safety oversight, and whether significant changes in the organizational and/or financial support for each plant are contemplated.

Traditionally, the electric utility industry has functioned as a regulated monopoly, providing essential electric service under exclusive franchises in exchange for having rates closely regulated by State Public Utility Commissions and the Federal Energy Regulatory Commission. This economic regulatory system has provided over 100 years of reliable and relatively reasonably priced power, while maintaining the financial health of almost all electric utilities. Primarily due to this established economic regulatory process, the NRC has exercised limited financial oversight of its electric utility licensees. The NRC also allows these licensees, unlike most other licensees, to accumulate funds for decommissioning over the 40-year terms of their operating licenses. However, with the advent of deregulation, our assumptions regarding the assurance of access to funds must be re-evaluated. Almost certainly, we will need to change some of our policies based on this re-assessment.

These changes, coupled with reduction in NRC resources, and the potential for the same for our licenses, mean that the NRC must re-assess what it is doing in response. Armed with the experience from 30+ years of nuclear power plant operation, and the emergence and further development of new technologies, the

NRC must and can continue to focus its resources on the most safety significant issues.

In response to this potentially revolutionary change in the industry, I initiated a re-evaluation of NRC policy regarding decommissioning funding last fall. In January, the Commission directed the staff to develop a comprehensive action plan to provide a framework for this re-evaluation. As one of the elements of this action plan, we issued an Advance Notice of Proposed Rulemaking in April that seeks additional information on electric utility restructuring. As we are developing a proposed rulemaking, we are evaluating the 41 comments received on the Advance Notice for Proposed Rulemaking.

The NRC also is evaluating the issuance of a Draft Policy Statement and Standard Review Plan, on the specific actions we intend to take and the procedures we intend to use in response to deregulation initiatives. In addition, we have sent an Administrative Letter to our power reactor licensees to remind them of their obligation to inform us when significant restructuring or ownership changes are planned. We are actively pursuing increased contacts with the Public Utility Commissions, through the National Association of Regulatory Utility Commissioners, and with the Federal Energy Regulatory Commission, to broaden areas of cooperation where our interests and responsibilities overlap.

Notwithstanding our initiatives in these areas, I do not think there has to be any inconsistency between the goals of the NRC as a regulator and the interests of businesses operated for profit. With appropriate coordination among the NRC as safety regulator, the Federal Energy Regulatory Commission and the Public Utilities as rate regulators, and licensees, I believe that the nation can continue to maintain adequate protection of public health and safety, and enjoy the economic benefits of a deregulated environment: increased competition and reduced electricity prices. Although both of these objectives are being pursued by the many parties with a stake in them, I need to reiterate very clearly that the NRC mission focusses on the protection of public health and safety and the environment.

AGENCY SAFETY PHILOSOPHY, VISION, AND GENERAL GOALS

That mission was first defined in the Atomic Energy Act of 1954, by means of which Congress authorized the civilian use of nuclear energy, subject to regulation by the Atomic Energy Commission, later the Nuclear Regulatory Commission. Over the years, the Commission has created a body of regulations, decisions, and practices through which the Commission's safety and safeguards philosophy is expressed.

The guiding elements of the NRC safety philosophy have been constant over the years, and have contributed to NRC having earned its reputation as the foremost nuclear regulatory body in the world. Those elements are defense-in-depth, licensee responsibility, safety culture, and accountability to the public.

Mission Statement

The Atomic Energy Act of 1954 and the Energy Reorganization Act of 1974 provide the foundation for NRC's mission.

> NRC's mission is to regulate the Nation's civilian use of byproduct, source, and special nuclear materials to ensure adequate protection of the public health and safety, to promote the common defense and security, and to protect the environment.

At this stage in the U.S. nuclear power industry, a critical part of the health and safety mission of the NRC is the regulatory oversight of operational safety, which focuses on conservatism in operations and the assurance that equipment -- especially the most safety- significant equipment -- is appropriately maintained during a time of economic challenge and restructuring.

In light of the changing environment in which NRC conducts its business, the Commission has been in the process of attempting to better articulate its vision of the agency's current and future role.

Vision

The basic tenet of that vision is that NRC's actions should be such that the general public, those it regulates, and other stakeholders in the national and international nuclear community have the utmost respect for and confidence in the NRC.

The vision incorporates three principles which have guided a number of our recent initiatives: (1) affirming our fundamental health and safety mission, including its national defense and security elements; (2) ensuring regulatory effectiveness; and (3) positioning the NRC for change.

Let me speak to our fundamental health and safety mission, and the NRC goals deriving from it.

General Goals

The NRC will implement its mission and achieve its vision consistent with its Safety Philosophy. To this end, the NRC has developed a set of goals which affirm our mission, derive from

our vision, and which will guide our strategic planning. These goals focus on:

- anticipating and proactively addressing a changing environment;
- consistency in our regulations;
- maintaining the highest ethical standards and professionalism;
- open communication and public participation in the regulatory process;
- a risk-informed, performance-based regulatory framework, which provides flexibility to achieve the required level of safety and security by the most cost effective means;
- ensuring that NRC responsibilities, and actions, are clearly understood by the public and regulated community;
- ensuring that NRC regulations are based on the best available knowledge and are consistently, and fairly, administered;
- providing a work environment and resources which enable NRC employees to maximize their contribution to the agency mission.

Regulatory Effectiveness

Ensuring regulatory effectiveness has many facets. It means keeping a primary focus on adequate protection of public health and safety, and minimizing risk at reasonable cost as a basis for any new regulation or change to an existing one. It also means requiring of regulations: ease of implementation, consistency with other applicable statutes and guidelines, fairness, and the fit of the regulations into the entire regulatory program.

An important element of regulatory effectiveness is the use of risk analysis insights. The movement to risk-informed, performance-based regulation allows both the NRC and nuclear licensees to focus their resources on the most safety-significant aspects of nuclear operations, although we must ensure that the objectives of our defense-in-depth concept are not compromised. I will return to this point later.

Positioning for Change

Over the past several months, the Commission has identified several areas for increased focus that are key in implementing

its mission, achieving its vision, and positioning itself for change. I want to discuss briefly three of these areas: (1) risk assessment activities, (2) aging issues, and (3) license renewal. There are others.

COMMISSION FOCUS: Risk Assessment Activities

The application of risk assessment methods represents an extension and enhancement of traditional regulatory approaches. Since the 1980's, risk assessment methods have been applied successfully in several regulatory activities and have proved to be a valuable complement to deterministic engineering approaches. Several recent Commission policies or regulations have been based, in part, on Probabilistic Risk Assessment methods and insights.

While risk assessment techniques are finding increased application in the regulatory decision-making process, there is little formal agency guidance (internal or external) regarding the use of these techniques. Obtaining the full benefit offered by Probabilistic Risk Assessment in regulation requires a clear delineation of standards, requirements, limitations and applicability of approaches. The NRC staff has developed a Probabilistic Risk Assessment Implementation Plan which includes a task to develop guidelines for determining when it is practical to use risk assessment technology and results in regulatory activities. I recently have accelerated the preparation of these guidance documents with final guidance to be in place by December 1997.

Probabilistic Risk Assessment Policy Statement

In August 1995, in its final policy statement on the use of risk assessment methods in nuclear regulatory activities, the Commission set forth its intention to encourage the use of Probabilistic Risk Assessment and to expand the scope of Probabilistic Risk Assessment applications in all nuclear regulatory matters to the extent supported by the state-of-the-art in terms of methods and data. Over time, the Commission would expect some streamlining and refocusing of its rules and regulations as part of this process. However, current rules and regulations remain enforce and form the fundamental regulatory infrastructure until any revisions to them have been identified and implemented. In addition, current policy is that the Commission's safety goals and their subsidiary numerical objectives are to be used for generic requirements.

Probabilistic Risk Assessment Implementation Plan

The Probabilistic Risk Assessment Implementation Plan was developed to ensure that increased use of Probabilistic Risk Assessment methods and technology in nuclear regulatory activities would be implemented in a consistent and predictable manner that promotes regulatory stability and efficiency. The implementation plan provides the framework for management oversight of the increased and appropriate use of Probabilistic

Risk Assessment methods and technology in regulatory activities. The plan was first issued in August of 1994, and since March of this year is being updated quarterly.

Recent revisions to the implementation plan include (as indicated earlier) acceleration of the development of regulatory guidance documents and standard review plans. These guidance documents are intended to ensure thorough review as well as consistent and appropriate application of PRA methods, and will focus the agency's resources and regulations on issues most important to safety.

As part of the Probabilistic Risk Assessment Implementation Plan, the Commission is working with industry groups and individual utilities to support several industry-sponsored, risk-informed pilot programs, including in-service testing of pumps and valves and in-service inspection programs. The ABB-Combustion Engineering Owners Group and some utilities are working with the staff on incorporating changes to a facility's Technical Specifications based on risk insights. These activities require staff review and approval prior to licensees making changes to their programs. The Commission supports these risk-informed initiatives and has assigned a high priority to review activities associated with industry risk-informed pilot programs.

Individual Plant Examinations Reviews

In November of 1988, the Commission issued Generic Letter 88-20 requesting each utility licensed to operate nuclear power plants to perform Individual Plant Examinations to search for vulnerabilities to severe accidents. As a result of performing an Individual Plant Examination, a licensee is expected to develop an appreciation of severe accident behavior, to gain an understanding of the most likely severe accident sequences that could occur at its plants, to gain a more quantitative understanding of overall probabilities of core damage and fission product releases, and to reduce, if necessary, these probabilities by modifying the design or procedures.

The focus of NRC reviews of the Individual Plant Examinations is on the adequacy of the process in ensuring that the program has accomplished its intended objectives. Those reviews, thus far, show that the Individual Plant Examination program has accomplished its goals. The Individual Plant Examinations were performed either entirely by utility personnel or with the support of contractors and substantial utility involvement. All licensees chose to perform a level 1 (and most a level 2) Probabilistic Risk Assessment in order to gain an understanding of the most important sequences as well as a more quantitative understanding of risk. The licensees used their Individual Plant Examinations to derive insights regarding plant performance under

severe accident conditions, and to identify potential plant improvements to reduce the probability of these sequences. The IPE program was not structured to be the basis of regulations or regulatory change as such. Therefore, the challenge ahead is to identify if and how Individual Plant Examinations might be used in regulations, and in development of guidance to staff and industry on the review of licensee submittals of technical specification changes and license amendments.

The staff has completed its initial review of all the Individual Plant Examinations submittals and continues to make progress on the Individual Plant Examination External Event Reviews.

Reassessment of Regulatory Requirements, Risk-informed Performance-based Regulation

In developing a proposed strategy for reassessment of regulatory requirements, and for moving to risk-informed, performance-based regulations, our fundamental objective is to incorporate more explicit risk-informed thinking into regulations and activities which are directed at controlling risk contributors so that requirements and actions are consistent with the risk importance of the contributors. The most severe requirements and highest resource commitments should be directed at the highest risk contributors. Less severe requirements and lesser amounts of resources should be directed at less important contributors.

Recent examples of the risk-informed and performance-based rules are Appendix J revisions and the Maintenance Rule.

Appendix J Revisions

On September 26, 1995, the Commission published a risk-informed, performance-based revision to its regulation for primary reactor containment leakage testing for water-cooled power reactors contained in Appendix J of *10 CFR Part 50*. This revision was the Commission's first major rulemaking to establish risk-informed, performance-based regulatory approaches. Extensive information from risk studies conducted by the Commission over the last ten years was used to conclude that containment leakage at very low levels was not risk significant. Based on this finding and a review of operating data over the last twenty years, a performance-based testing methodology was developed to establish the frequency of testing of containment structures, systems, components based on past performance. This has resulted in longer test intervals for certain components and structures that have performed well, and more focused activities on those components and structures that have performed less well. The approaches established in this area will allow better targeting of licensee activities based on the performance and safety significance of key structures, systems and components, with

attendant economic savings for the licensee. The initial feedback from the nuclear power industry on the implementation of these approaches has been positive.

Maintenance Rule

The Maintenance Rule, *10 CFR 50.65*, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," which became effective on July 10, 1996, has successfully blended deterministic and probabilistic considerations into a performance-based regulation that uses risk insights. The maintenance rule includes a requirement in Paragraph (a)(1) that licensees establish performance goals for structures, systems, and components, commensurate with safety significance, in a manner to provide reasonable assurance that the structures, systems, and components can fulfill their safety functions. Under paragraph a(2) of the rule, the licensee is required to establish performance or condition-monitoring criteria. However, being performance-based, the maintenance rule does not prescribe in detail how this is to be accomplished, but rather leaves each licensee to develop a program that satisfactorily complies with this requirement.

In addition, licensees are required to consider industry-wide operating experience, where practical, when performing the periodic evaluations of maintenance program effectiveness in accordance with Paragraph (a)(3) of the rule. This includes assessing the impact of new information on the risk-significance determination.

COMMISSION FOCUS: Aging Effects

Age Related Degradation in Operating Nuclear Power Plants

The NRC believes that, as operating plants age, an important step in ensuring that licensees continue to focus on safety-important plant equipment is our risk-informed, performance-based Maintenance Rule. But even with this framework, there are a number of specific age-related technical problems which need to be addressed. Two that are of great importance are reactor pressure vessel embrittlement, and steam generator tube integrity.

Reactor Pressure Vessel Embrittlement and Thermal Annealing

Let me address reactor pressure vessel embrittlement first. The reactor pressure vessel is the key element in the primary system pressure boundary. If the reactor pressure vessel should rupture, it is the only component in the primary system for which the engineered safety systems cannot ensure protection from core

damage. Thus, ensuring the integrity of the reactor pressure vessel is essential to ensuring the safe operation of nuclear power plants. Reactor pressure vessels become embrittled due to neutron irradiation during operation. Those constructed with weld materials with high traces of copper and nickel are especially susceptible to this phenomenon. The NRC has established regulatory limits to ensure that plants do not reach an unsafe level of embrittlement. However, certain combinations of susceptible materials and the accumulated effect of neutron irradiation may cause a few reactor vessels to reach the embrittlement screening criteria set forth in our regulations before the end of their license terms, or to limit the possibilities of plant life extension.

Thermal annealing has the potential for restoring the ductility and toughness of the vessel steel to very near the original, unirradiated condition, thus enabling licensees to "reset the clock" on vessel irradiation embrittlement and to increase the safe operating life of the reactor vessel. However, thermal annealing of a reactor vessel is a complex process which has not yet been attempted at a commercial nuclear power plant in the U.S. It involves significant engineering issues and financial risk to utilities. The Commission has recently developed the regulatory framework within which the NRC could eventually assess reactor pressure vessel integrity following annealing. While it is important that this framework not be unnecessarily burdensome to licensees, it is important that assurance of public health and safety is maintained, and that the public is fully informed. The Department of Energy is nearing completion of the Marble Hill annealing test, with the Midland test planned for this fall. DOE is conducting these tests in conjunction with a coalition which includes the Electric Power Research Institute. The NRC is closely monitoring these demonstration programs, and will incorporate the results into the regulatory review process.

Steam Generator Tube Degradation

A second aging issue is steam generator tube degradation. The thin-walled tubing of steam generators comprises more than one-half of the primary coolant system boundary in a pressurized-water reactor, and also serves as the containment boundary as well. As a result, steam generator tube failures represent a failure of two of the principal fission product boundaries in this type of nuclear power plant.

The predominant form of tube degradation being experienced today is axially-oriented stress corrosion cracking at tube support plates, and circumferential stress corrosion cracking at the top of the tube sheet, which can begin on either the primary side or the secondary side.

Many licensees believe that the current repair limit for steam generator tubes in plant technical specifications is too conservative for the types of degradation currently being experienced. Proposed modifications to the current repair criteria in plant technical specifications are possible, provided that a sufficient technical basis is provided to support the modification. Unfortunately, the necessary technical bases that would support alternate repair criteria for some of the more prevalent forms of degradation have not been developed.

Specifically, improved crack detection capability has not yet led to the technology to accurately characterize the degree of degradation and its rate. This is critical for determining the structural acceptability of a degraded tube. Another key need is more data from degraded tubes in operating steam generators.

The Commission is now considering, through a steam generator rulemaking, a generic approach for dealing with steam generator tube degradation that will reduce plant-specific regulatory decisions, yet ensure defense-in-depth through a balance of prevention and mitigation.

However, until the methods and associated database are developed for accurately sizing and determining the growth rates of steam generator tube defects for the various degradation mechanisms being experienced, issuance of the Steam Generator Rule is not expected to change substantially the way industry is currently dealing with degraded steam generator tubes.

In the end, many plants may have to replace their steam generators, and indeed a number have, in order to continue to operate safely.

COMMISSION FOCUS: License Renewal

Although, as the technical issues I have described illustrate, nuclear power plants are aging, the NRC has recognized that, if aging is addressed properly, it clearly makes sense that the nation should make the most efficient use of its energy resources. In the case of nuclear power, this means creating an effective regulatory environment in which plants still capable of additional years of safe operation may continue to operate. The Maintenance Rule and the proposed Steam Generator Rule are elements of that environment.

The process and the criteria for license renewal for up to an additional 20 years of operation of a nuclear reactor are established in the NRC regulations *10 CFR Part 54*, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants." The requirements for considering environmental issues for all NRC

actions, including license renewal, are found in *10 CFR Part 51*, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions." All other existing regulatory requirements, such as *10 CFR Part 50*, will continue to apply through the extended period of operation.

The license renewal focus is on the management of long-lived and passive structures and components, and on the evaluation of time-limited aging analyses. Examples of some of the "long-lived" and "passive" structures and components are: reactor vessel, steam generators, storage tanks, penetrations, electrical cables, and piping. In addition, the regulations recognize that aging may have been addressed in the current operating term by a time-limited aging analysis based on the 40 year term. The rule requires a re-evaluation of these analyses. The NRC is ready to review a license renewal application when one is received. Reports from industry groups to discuss generic license renewal programs have been received but no license renewal application has yet been filed.

EMERGING POLICY ISSUES

As the NRC and the nuclear power industry move toward a more risk-informed, performance-based approach to nuclear regulation, several new policy issues have been emerging. I will briefly discuss some of them. They all relate to risk-informed, performance-based regulation.

Risk-Informed, Performance-Based Regulation

I believe it is important for us to have a common understanding on the meaning of the term "risk-informed, performance-based regulation." It is also important to know why and if it makes sense to talk about only risk-informed, performance-based regulation or about risk-informed approaches to regulation within the existing framework. Recently, increased attention has been focused on performance-based regulation. Performance-based initiatives should be selected where objective performance criteria can be established for performance monitoring, and where failure to meet the performance criteria results in tolerable conditions for which appropriate corrective action will be taken. An essential component of the risk-informed, performance-based initiative is the feedback of actual experience into the risk-informed activities. As data from performance monitoring of structures, systems, and components are accumulated, the NRC expects licensees to evaluate the impact of the performance data on the risk-informed activities.

The NRC established its regulatory requirements to ensure that a licensed facility is designed, constructed, and operated without

undue risk to the health and safety of the public. These requirements are largely based on deterministic engineering criteria, involving the use of multiple barriers and application of a defense-in-depth philosophy. Probabilistic Risk Assessment methods offer the potential to improve both the efficiency and effectiveness of these regulatory requirements. Probabilistic Risk Assessment information and insights have been applied successfully in numerous regulatory activities and have proved to be a valuable complement to deterministic engineering approaches. Probabilistic Risk Assessments complement and enhance the traditional engineering and operational approaches by considering risk in a coherent and complete fashion, thereby providing a method to quantify and, as necessary, adjust the overall level of safety and completeness (or lack there of) of our regulations.

The defense-in-depth concept should be viewed as complementary to risk-informed, performance-based approaches as opposed to a competitive process. The concept derives from the early belief that redundancy and diversity would lead to low public risk. Defense-in-depth is a design and operational concept that ensures that successive compensatory measures are incorporated to mitigate potential failures. These successive measures may employ diverse means to compensate for common initiators. Redundant identical trains of a common system may be more susceptible to common mode failures. The net effect of defense-in-depth designed and operated systems is that they tend to be more tolerant of failures. Probabilistic Risk Assessment on the other hand is a tool designed to quantify the performance of systems in terms of some appropriate risk measure. The design concept employed is input to the Probabilistic Risk Assessment in terms of the actual system structure. The notion of Probabilistic Risk Assessment results being used to compromise the defense-in-depth concept is related to the issue of uncertainty. The magnitude of a single number cannot be used to eliminate safety barriers without due consideration of uncertainty. Multiple barriers provide assurance against catastrophic events.

Typically, each layer of a multi-barrier system will have much higher failure rates than a single, stand-alone barrier. Each layer also likely has an associated operational database that can be used to provide some level of confidence in the performance of that particular barrier. Relaxations based on risk information would likely involve situations where one barrier of a multi-barrier system is believed to have a much lower unavailability than others, suggesting that the requirements on the others may be unduly burdensome. This single barrier will likely have to have a much lower unavailability than a single barrier of a multi-barrier system under normal circumstances. In addition, for the single barrier system with low unavailability, there is likely not to be an experience database to provide the desired

confidence in the performance measure of the system. Consequently, any argument to remove barriers, based on Probabilistic Risk Assessments, must be accompanied by a scrutable and well-defined methodology for addressing uncertainty.

For example, if one considered a simple Bayesian model with some reasonable distributional assumptions, it can be shown that with error factors of 10 and 100 and a median system unavailability of 1E-5 (from a Probabilistic Risk Assessment), the assurance probability of meeting a goal of 1E-4 is .88 and .64 respectively. In other words, the uncertainty parameter is key in determining the assurance level associated with meeting any pre-established goal or criterion. This example clearly shows that comparing a single number to a criterion without regard to the associated uncertainty can be misleading. In addition, note that a calculated 1E-5 median system unavailability does not guarantee that the 1E-4 goal has been met. I believe, therefore, that it is important that we develop approaches and methods for adequately treating uncertainty in the decision-making process. The issue is not, "how do we eliminate all the uncertainty associated with Probabilistic Risk Assessments," -- because I believe the answer is, "we can not." So the question that remains is how can we better use Probabilistic Risk Assessment results in the decision-making process in spite of the large uncertainty, while reducing those remaining uncertainties where practical. There is a separate discipline on making decisions under uncertainty that can be brought to bear on these issues.

A second issue relates to plant-specific application of the Commission's safety goals.

Plant-Specific Application of Safety Goals

As part of its efforts to develop guidance on risk-informed, performance-based decision-making, the NRC staff is developing criteria to judge the risk contributions of licensees' proposed regulatory changes. It may be appropriate for these criteria to reference various elements of the Commission's safety goals or their subsidiary numerical objectives, and thus become, in effect, plant-specific applications of the goals and subsidiary objectives. The Commission has instructed the staff not to apply the safety goals on a plant-specific basis without first requesting Commission guidance. The Commission may want to reconsider this issue and the need to restate the Commission's safety goal policy so as to have it apply to individual plants.

A third issue is risk neutrality.

Risk Neutrality vs. Risk Increase

Related to the safety goal issue is the issue of whether only risk neutral plant changes should be allowed. The industry has requested relaxation of regulatory burdens in some areas, although the calculated plant risk would increase. Industry proposed guidance includes different levels of allowed risk increase for permanent plant modifications, depending on the baseline risk. The question is whether the NRC should allow increases in risk, or require compensatory measures in the same or other areas to "neutralize" the risk increases. Such a requirement might tend to penalize plants which start with very low risk estimates. This is central to the issue of risk management and the question of "what is safe enough." Regardless of whether we attempt to maintain risk neutrality, all risk-informed applications will require adequate maintenance of defense-in-depth. The new regulatory guidance now under development will establish a position on this issue.

The final emerging issue I will discuss relates to in-service testing and in-service inspection requirements.

Risk-Informed In-Service Testing and In-Service Inspection Requirements

The NRC staff proposes to invoke provisions of *10 CFR 50.55a* for the review and approval of risk-informed in-service testing and in-service inspection procedures for plants which have requested or are in the process of submitting changes from current in-service testing and in-service inspection requirements stipulated in *10 CFR 50.55a*. *10 CFR 50.55a* provides a means for approving proposed alternatives to these requirements for in-service testing and in-service inspection when authorized by the Director of the Office of Nuclear Reactor Regulation, provided the licensee demonstrates that the proposed alternative would provide an acceptable level of quality and safety.

The NRC staff proposes to use the acceptable alternative approach for approval of the pilot plants' applications after satisfactory staff review of the pilot plant submittals. Concurrently, the staff would review and comment on the industry's proposed guidance documents, and would continue its development work on the Regulatory Guides and Standard Review Plans. The staff expects that the interaction with pilot licensees will directly benefit the work on the Regulatory Guides and Standard Review Plans, and should lead to refinements in industry guidance documents.

The Commission has not yet concluded that this is the approach to be taken. The staff will be coming to the Commission prior to granting approval of the pilot projects. However, to provide the permanent approach to risk-informed in-service testing and in-service inspection, the staff intends to utilize the experience

gained through the pilot applications to modify *10 CFR 50.55a* through a proposed rule.

SUMMARY AND CONCLUSIONS

In conclusion, I would like to reiterate several of the points that I have made in my remarks. The first is that safety is the business of the NRC and, therefore, we are concerned about how restructuring and deregulation activities may affect the ability of power reactor licensees to pay for safe plant operations and, particularly, for safe decommissioning, when required. These concerns have prompted the NRC to take a closer look at the adequacy of its financial review processes and its regulations for decommissioning funding assurance.

Of course, changes in the industry on the scale we have been discussing should also be expected to prompt other substantive changes at the NRC. In that regard, I have recently taken a new look at the agency as an organization, and believe that three fundamental principles characterize our operational regulatory approach to the challenges we face: (1) affirming our fundamental health and safety mission, including its national defense and security elements; (2) ensuring regulatory effectiveness; and (3) positioning the NRC for change.

We have also identified three additional broad areas to receive increased focus in light of the changes and challenges that we face: (1) risk-assessment activities, (2) aging effects, and (3) license renewal.

The NRC staff has redirected its efforts on the Probabilistic Risk Assessment Implementation Plan to focus on the completion of regulatory guidance documents in an expedited manner. The development of Regulatory Guides and Standard Review Plans will enable the staff to establish and standardize industry applications and staff reviews in anticipation of increasing use of risk-informed, performance-based regulatory approaches. Significant progress has been made in several Probabilistic Risk Assessment-based industry pilot reviews, which are providing valuable technical insights for developing criteria and standards for regulatory decision-making. Significant progress also has been made in other areas of the agency's Probabilistic Risk Assessment Implementation plan which are separate from, but complementary to, the development of Regulatory Guides and Standard Review Plans.

Aging effects are being addressed through implementation of the Maintenance Rule, enhanced inspection activities, and additional rulemaking activities. The regulatory structure for license

renewal is in place and the staff has received reports on generic license renewal programs from industry groups.

I appreciate being invited here to speak at this annual safety course. I thank you for your attention.