NRC NEWS

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U.S. PRESENTATION TO THE CONVENTION ON NUCLEAR SAFETY OF THE SECOND REVIEW MEETING OF THE CONVENTION ON NUCLEAR SAFETY

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Chairman
U.S. Nuclear Regulatory Commission

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Vienna, Austria

Good morning, Mr. Chairman, ladies and gentlemen. I am pleased to join you today as the representative of the United States.

This convention presents a unique opportunity for representatives from more than 50 countries that have a common interest in improving nuclear safety to benefit by sharing our different approaches and experiences. In that spirit of cooperation, it is a pleasure for me to present the United States' National Report for your review and to respond to your questions.

I would like to begin by making some general comments before discussing the substance of the United States' National Report.

Current State of the Nuclear Industry In the United States of America

The nuclear industry in the United States is healthier than it has been for many years. Economic performance is strong, which is reflected in the fact that the production cost for nuclear power is less on average than that for electricity produced from coal or natural gas - its direct competitors. As a result, there is a strong interest in maintaining or even expanding nuclear power production. Even more important in this context, safety performance has improved in parallel with economic performance. An objective measure of this improvement is illustrated by the NRC's systematic tracking of significant events, which include failures of safety systems, unanticipated plant responses, degradation of key systems or components, and operator errors. Over the past 15 years, the number of significant events has dramatically declined. Other performance indicators, such as automatic scrams while critical, safety system actuations, and collective radiation exposure to plant personnel, have shown substantial improvement as well.

Perhaps as a consequence of this improved economic and safety performance, the nuclear industry in the United States appears to be entering a renaissance. After 25 years in which there have been no new reactor orders, several electric generating companies have expressed interest in building new plants. In addition, the increasing need for additional power and the improved performance of nuclear power plants over the past decade have caused an increasing number of licensees to apply for power uprates and to consider renewing their licenses instead of decommissioning their plants.

In general, our best-performing licensees also tend to be the most economically successful. This is not unexpected because improvement in both safety and economic performance stem from the same causes: an attention to detail, rigorous preventative maintenance, effective training, and the maintenance of a strong safety culture. I believe as well that the NRC's efforts to establish a stable, predictable regulatory regime have played a role in establishing a climate that has encouraged the current levels of safety and economic performance.

The United States' Commitment to Continuous Learning and Improvement

We recognize, however, that complacency opens the door to decline. In the nuclear business, if you are not steadily struggling to improve, you will find that you are sliding backwards. Consequently, the NRC and our licensees are committed to continuous learning and improvement.

In recent weeks, the United States had a powerful reminder of the need for unremitting attentiveness to safety issues. I am referring to the discovery of corrosion damage to the reactor vessel head at the Davis Besse Nuclear Power Station. Most of you are probably familiar with the underlying facts, so I will describe them here only briefly.

The Davis Besse Nuclear Power Station shut down to conduct a refueling outage in February of this year. In response to an NRC Bulletin issued last August concerning the circumferential cracking of reactor pressure vessel head penetration nozzles, the licensee had committed to inspect the nozzles in the course of the outage. The particular focus was to be on the nozzles associated with the control rod drive mechanisms (CRDMs). The licensee found indications of cracking in the nozzles for five CRDMs and committed to repairing them. In the course of performing repairs, however, the licensee encountered anomalies that caused it to investigate the condition of the pressure vessel head. When the licensee removed boric acid deposits from the top of the head they found a large cavity encompassing an area of five inches by seven inches. The wastage had progressed all the way through the 6.5 inch carbon steel base material to the 0.3 inch stainless steel interior cladding. This discovery clearly constituted a serious degraded condition. And, as we have examined the matter further, it has become apparent that there were indications of the problem that the licensee failed to recognize. We will be looking at this systematically to determine if this problem represents a weakness in our oversight program or a failure by the licensee to take appropriate measures or both.

Although the United States believes that it has a comprehensive program for nuclear safety, the Davis Besse event reinforces the need to remain watchful. We cannot fall into the trap of assuming that safety is necessarily assured even with improved technology, good performance, and strong regulatory oversight. Continuous vigilance to consider what may have been missed is also necessary.

The Convention on Nuclear Safety is an excellent forum to encourage such vigilance and to learn from the experiences of others. We see this meeting as an opportunity to generate ideas and to share international experiences. It will also inform and enhance our collective efforts to improve worldwide safety. We all benefit because an accident anywhere in the world affects us all. Consequently, my fellow Commissioners and I have given the Convention a high priority. We fully support the Convention's goal of enhancing nuclear safety worldwide through national measures and international cooperation.

With that as a backdrop, let me now turn to the U.S. National Report. In preparing our report, we considered each of the Convention's obligations and focused on explaining our means of fulfilling those obligations. Each of the chapters relates to an article of the Convention and describes how the U.S. seeks to fulfill the obligations arising from this article. The United States also received some questions concerning our report. We have also sought to respond to each of your questions. Our written responses are provided in a supplement to our National Report, which has been made available to you. Additionally, we have prepared a CD-ROM containing certain reference documents and other information that may be of interest.

As you may know, this is the first time the United States is participating in a Review Meeting. Nonetheless, in preparing our National Report, we did consider the issues that were raised in the final report of the First Review Meeting.

SCOPE OF TODAY'S PRESENTATION

Given the number and depth of the questions that were presented to the United States, I believe it is apparent that most of you are very familiar with our report. Indeed, it has become apparent to me over the time that I have been at the Commission that many of our international colleagues have an impressive knowledge of the U.S. regulatory program. In order to preserve ample time for a dialogue, I will not consume your valuable time by repeating information we have presented in our report. Instead, I believe it will be more meaningful and productive to focus on certain general themes in two broad areas that emerged from the questions you posed. Then I invite an extended discussion of these themes or of other matters of interest.

The broad areas that I will discuss are:

Nuclear Reactor Regulation at the NRC today, which includes:

- risk-informed regulation;
- reactor oversight process;
- safety culture; and
- safety reviews

and recent initiatives, which include

- license renewal; and
- new reactor licensing

Following my discussion of these themes, I welcome the opportunity to clarify aspects of the United States' report in response to your questions.

RISK-INFORMED REGULATION

Overview of Risk-Informed Regulation

Let me focus first on our agency's initiatives concerning a risk-informed approach to regulation.

The evolution to a more risk-informed approach to regulation is perhaps the most significant change occurring at the NRC today and is a theme central to the NRC's activities. This effort represents a significant shift away from our traditional approach.

Our historical regulatory framework is based on a "deterministic" approach that rests in part on a defense-in-depth philosophy, and employs conservative safety margins, accident analyses with prescribed acceptance criteria, and qualitative assessments of risk. We believe this approach has served us well. Nonetheless, there are modern analytical tools that should be more systematically applied. We now have more than 25 years of progress in the development of probabilistic risk assessment (PRA), stemming from the Rasmussen Report of 1975, and over 40 years of operating experience from which to develop input data on equipment reliability. A PRA provides a direct measure of safety and is connected to the fundamental purpose of our regulatory system. As a result, the NRC adopted a policy to promote the increased use of PRAs, to the extent practical.

I should emphasize, however, that our aim is to use risk insights to *complement* the existing deterministic approach. We take this incremental approach in recognition of the uncertainties in PRA analysis and the reality that we cannot impose a wholly new regulatory system to operating plants. This complementary aspect explains why the NRC refers to its actions as being "risk-informed" and not "risk-based." We do not intend to jettison the existing regulatory system, but instead to use risk insights as a tool for its modification and improvement.

We are introducing this new effort carefully and deliberately. As we have developed risk-informed regulations and regulatory practices, we have invited the public to comment so that we can gain the benefit of a broad range of input from outside the NRC. We hold public workshops and meetings with stakeholders as we consider risk-informed improvements. And as we evolve toward a risk-informed regulatory system, we will continue to require informed input from the nuclear industry and from other stakeholders, both within the United States and internationally.

Benefits of Risk-Informed Regulation

This group asked many questions about our risk-informed approach to regulation. For example, you asked what benefits the NRC has realized, how we measure them, and how many licensees are taking advantage of those benefits.

The NRC has initiated several risk-informed changes to our regulatory programs. We believe those changes have numerous benefits:

- They focus attention on the areas of highest safety priority and result in more realistic regulatory decisions. Risk insights can cut both ways -- justifying increased regulatory requirements in some cases and reductions in others. Let me emphasize a fundamental point: the elimination of regulatory requirements that do not affect safety can itself improve safety by encouraging increased attention to those requirements that are important. Thus both the reduction of requirements and the addition of requirements on the basis of risk considerations serve to enhance safety overall.

- Risk-informed reform enables the reduction of unnecessary regulatory burden. For example, recent risk-informed initiatives concerning in-service inspection and testing have allowed licensees to focus their resources on highly risk-significant systems and components, while systems and components that are less risk-significant receive less attention, consistent with their lower safety influence. Similarly, the improved standard technical specifications reduce the regulatory burden on both the licensee and the regulator without adverse risk impacts by generally allowing more appropriate surveillance testing and longer times to correct problems before requiring a plant to change modes. These allowances help to reduce the number of unnecessary scrams, power reductions, and plant shutdowns. Ultimately, these activities serve both to reduce needless cost and to increase safety.

- Risk-informed initiatives improve communication among the NRC, the nuclear industry, and the public. The careful consideration of risk enables the systematic and principled examination of the foundations for regulatory action. This enhances public acceptance because the reasons for and benefits of regulatory change are more transparent.

In most cases, risk-informed changes to regulations and regulatory practices are voluntary. That is, licensees may continue to apply existing deterministic criteria to show compliance with NRC requirements, or may voluntarily switch to alternative, risk-informed processes. (Of course, if risk insights reveal a significant weakness in the existing regulatory standards, the deterministic criteria will be amended.) The value of the new approach is best demonstrated by the number of licensees who have chosen to implement voluntary risk-informed alternative approaches to regulatory requirements. Risk-informed in-service inspection has been implemented at 43 units, risk-informed changes to technical specifications concerning allowed outage times have been implemented at 41 units, and standard technical specifications have been implemented at 63 units. The United States currently has 103 operating commercial reactors.

Challenges in Implementing Risk-Informed Regulation

In taking the first steps in risk-informing our regulatory system, we expected challenges along the way and we have encountered many. The shift from a traditional prescriptive, deterministic approach toward a risk-informed approach has challenged both the NRC and the regulated industry because the new approach requires rethinking the foundations of the entire regulatory structure. Moreover, our regulatory requirements contain intricate interconnections, so all of the implications of change must be carefully evaluated.

In order to guide and inform the industry, the public, and our own staff on how best to use risk information, the NRC has developed many guidance documents addressing various aspects of risk-informed regulatory methods. Several of these documents are included on the CD we have made available.[1] In addition, the NRC developed a Risk-Informed Regulation Implementation Plan (RIRIP) which is updated regularly to reflect both progress and new challenges. Our aim through this guidance is to manage these activities more efficiently in order to achieve results more quickly.

Let me provide an example of an application of risk insights - our revised maintenance rule. The rule added new requirements to:

- Verify the adequacy of risk assessments for the existing plant configuration;
- Consistently perform risk assessments before conducting maintenance activities;
- Ensure the availability of key safety functions through the use of risk assessment tools; and
- Identify and implement appropriate risk management activities.

The application of the rule presents challenges in that it requires an in-depth understanding of plant equipment functions and interdependencies. But the rule provided a way to assure safety while a plant, as a result of maintenance activities, was in an abnormal configuration. And the assessment of risk associated with the maintenance activities has offered licensees a mechanism by which they may show in some cases that on-line maintenance is safer than maintenance during shutdown, thereby enabling both improved safety and efficiency. I am happy to report that industry has embraced the requirements of the rule and is seeking to use the methodologies for risk management developed in connection with the maintenance rule in other regulatory areas, such as in connection with the development of risk-informed technical specifications.

Various other risk-informed rule changes are underway. These include possible changes to our rules governing special treatment requirements (the special requirements governing safety-related equipment; 10 CFR 50.69, passim), combustible gas control (50.44), emergency core cooling systems (50.46), and pressurized thermal shock (50.61). Although the efforts to use risk insights to revise our regulatory system have proceeded somewhat more slowly than we initially anticipated, we continue to believe the potential gains in developing a more consistent and rational regulatory structure are worth pursuing.

REACTOR OVERSIGHT PROCESS

Overview of the Reactor Oversight Process

The most visible aspect of our efforts to apply a risk-informed philosophy to our regulatory system is our *reactor oversight process* (or "ROP"). The NRC developed the ROP to focus the inspection of operating plants on areas involving the greatest risk, while making our oversight of the nuclear industry more objective and transparent. A number of the documents associated with the

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[1] These include:

1) Addressing PRA Quality in Risk-Informed Activities" (SECY-00-0162)
2) Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis (Regulatory Guide 1.174)
3) An Approach for Plant-Specific Risk-Informed Decisionmaking: Grades Quality Assurance" (Regulatory Guide 1.176)

development and implementation of the ROP are included on the CD that we have made available.[2] During my discussion, I will cover the following aspects of the NRC's Reactor Oversight Process:

- Implementation and resource requirements;
- Inspection program;
- Use of performance indicators; and
- Ongoing development and evaluation

We realized that, despite our successes in regulating and improving the performance of U.S. nuclear power plants over the past 40 years, our inspection, assessment, and enforcement processes did not always focus on the most important safety issues. In some situations, our inspection activities were inefficient and, at times, they were overly subjective. In addition, our regulatory actions were not always sufficiently understandable or predictable to either the public or the regulated industry.

The reactor oversight process addresses these concerns by defining several regulatory objectives:

- Focus inspections on activities involving the greatest potential risks;
- Devote greater regulatory attention to facilities with performance problems;
- Use objective measurements of plant performance;
- Give all stakeholders timely and understandable assessments of plant performance;
- Minimize unnecessary regulatory burdens on nuclear power plants; and
- Respond to violations of regulatory requirements in a predictable manner, consistent with their risk and safety impact.

The key features of the ROP are new methods for assessing and reporting performance and for conducting inspections to ensure safe operation. The process also clearly spells out what licensees can expect if they achieve good performance, as well as what actions the agency will take if performance declines.

The ROP is anchored in the NRC's fundamental mission to ensure public health and safety in the operation of nuclear power plants. Its objective is to monitor performance in three areas that are important to safety – reactor safety, radiation safety (by which we mean exposures in normal operations), and plant security – each of which is associated with one or more "cornerstones" of safe nuclear plant operation. These cornerstones are the fundamental building blocks of the ROP.

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[2] These include:

1) A plain language discussion of the ROP (NUREG-1649)
2) Recommendations for Reactor Oversight Process Improvements (SECY-99-007 and 007A)
3) Development of an Industry Trends Program (SECY-01-0111)
4) Results of the Initial Implementation of the New Reactor Oversight Process(SECY-01-0114)
5) Regulatory Assessment Performance Indicator Guideline (NEI 99-02)
6) Enforcement Policy (NUREG-1600)

In addition, there are three "crosscutting elements" that apply to all areas of safety, and thus to all of the cornerstones. These elements are:

- Human performance
- A safety-conscious work environment to ensure management attention to safety and to protect the ability of workers to raise safety issues; and
- Corrective action programs to identify and fix problems.

These aspects of the ROP are shown graphically on the slide.

Implementation and Required Resources

I want to briefly touch on how the ROP has been implemented and how much staff effort has been required.

In developing the ROP, the NRC sought input from the nuclear industry, citizens groups, and the general public. We held public workshops to obtain feedback from interested stakeholders while we were developing the process and establishing the pilot program so that we could gain the benefit of stakeholder views before implementation. We continue to seek public input as we gain experience with the ROP and are using insights from experience to further revise the program.

The assessment of licensee performance in the ROP rests upon two major elements: data from performance indicators and results of inspections. The results are reported using a color-coded system that reflects the safety significance of the findings. "Green" indicates that the findings present very low risk significance. Findings characterized as white, yellow or red reflect the increasing levels of risk significance. With this as a backdrop, let me describe the inspection program and performance indicators in more detail and show how the NRC's actions are keyed to the assessment results.

Inspection Program

The inspection program includes a baseline effort and supplemental inspections that may be added for a variety of reasons. The baseline inspection effort reflects the required minimum level of inspection for a licensee. It is designed to assess licensee performance in areas in which performance indicators are not available and to verify the validity of the indicators. About 15% to 20% of the NRC's baseline inspection program is devoted to ensuring that licensees have effective programs for identifying and resolving deficiencies. The baseline inspection program requires a total of about 5,000 inspector hours per year for a two-unit site. In addition to the baseline program, licensees may be subject to additional inspections for any baseline inspection findings that are not color-coded as "green." Such inspections range from less than 30 hours to as much as 2,000 hours, depending upon the significance and complexity of the issue. Inspections are also conducted in response to events and to assess the resolution of generic safety issues, with the level of effort commensurate with the risk significance. Thus, the inspection effort for a two-unit site can be significantly more than 5000 inspector hours if performance indicators, inspection findings, or significant operational events cross established thresholds.

Use of Performance Indicators

Licensee performance is also assessed using information from performance indicators. For example, typical performance indicators are based on the number of unplanned reactor scrams, safety system unavailability, or effluent releases. Performance indicators use objective data to provide information on licensee performance in each of the cornerstones. Our licensees generate performance indicator data for submission to the NRC, and the NRC verifies the accuracy and completeness of the data as part of the baseline inspection program.

We are continuing the search for appropriate performance indicators. Ideally, of course, such indicators should serve as a means to identify emerging safety problems early, rather than merely to confirm the existence of a problem. Moreover, the development of a broader suite of indicators is desirable because the indicators cover only part of plant performance. The limited scope of performance indicators is part of the reason for baseline inspections.

Allow me to note in passing that Article 19 of the Convention requires the Contracting Parties to take appropriate steps to ensure that their programs promote the collection, analysis, and communication of operating experience. We believe that one effective and objective method for communicating and sharing international operating experience is the use of some form of common performance indicators. Such indicators could provide a useful point of reference for evaluation of the national reports.

The Action Matrix

The ROP also specifies the regulatory action that follows from performance indicators and inspection findings. To do this, we developed an "action matrix"[3] to ensure that our regulatory response to declining licensee performance is applied in a consistent fashion. The decisions are guided by establishment of thresholds that enable the performance indicators and inspection results to be addressed in a consistent way across the fleet of plants. For example, if a single performance indicator or cornerstone inspection area crosses its threshold, the NRC will consider a supplemental inspection to ensure that the licensee has identified the root causes and specified appropriate corrective actions. More significant changes in performance could lead to more significant actions. The last performance band, "Unacceptable Performance," is reserved for plants at which the degradation in performance is so serious and pervasive that continued operation of such plants would threaten our ability to ensure reasonable protection of public health and safety.

Our premise is that licensees are responsible for ensuring the safety of their facilities, and our thresholds help to determine the level of regulatory engagement that is appropriate in each cornerstone. Our intention is that enhanced regulatory oversight will prod the correction of problems before an incident occurs. Nonetheless, past experience suggests that we can still expect a limited number of risk-significant events to continue to occur with little or no prior indication of overall declining performance. If such events do occur, we will conduct follow-up inspections to ensure that the causes of these events are understood and that licensee corrective actions are adequate to prevent recurrence. Similarly, if we receive allegations from licensee employees or public stakeholders, we may conduct follow-up

[3] The Action Matrix is included as an Appendix to the Questions and Answers.

inspections. We will then factor the results of such inspections into our assessment process, along with performance indicator data and the results of risk-informed baseline inspections.

Ongoing Development and Evaluation

On the basis of lessons learned and feedback from stakeholders, we are confident that the ROP has met the goal of being more objective, risk-informed, understandable, and predictable than our previous process. Nonetheless, we realize that we will have to continue to assess and modify the ROP, and we have established a self-assessment program to identify areas for improvement.

As we have made the transition from deterministic oversight methods to the ROP, we confronted a variety of issues, some of which we have resolved and others we are still addressing. One significant issue relates to the assessment of the risk-significance of inspection findings. Since some inspection findings cannot be analyzed using PRA tools -- such as those in the areas of security, radiation protection, and emergency preparedness -- the NRC has to develop and refine a process to assess the significance of the inspection findings. We are also still working to address the standardization of performance indicator definitions, minimizing the unintended consequences of the performance indicators, and establishing thresholds for documenting inspection findings. The Advisory Committee on Reactor Safeguards, an independent group of technical experts providing advice and guidance to the Commission, has been of considerable assistance in these efforts.

We recognize that the reactor oversight process that we are implementing in the US would be difficult to apply uniformly throughout the world. It works for us, in part, because we have a mature industry with more than 100 units that have collectively accumulated several thousand reactor-years of operating experience. That experience provides a sound basis for risk-informing our regulatory processes. We recognize that this approach may not be appropriate for all.

ASSESSMENT OF SAFETY CULTURE

Overview of Safety Culture

Let me turn now to safety culture.

I mentioned earlier that, in general, the best-performing licensees from a safety standpoint also tend to be the most economically successful. Conversely, breakdowns in economic and safety performance can often be traced to failures in safety culture. These facts suggest that a strong safety culture is a singularly important attribute of a licensee’s organization.

Although safety culture is a broad concept, there is general agreement as to its basic elements. These include licensee emphasis on safety as the highest priority; training for all staff (at all levels) to ensure that each employee understands his or her responsibilities for ensuring safe operations; conservative, safety-conscious decision making; a philosophy of continuous improvement, including critical self-assessment and a questioning attitude; and a willingness to address promptly and effectively any problems that may arise.

How the NRC Assesses Safety Culture

I believe that the United States explicitly or implicitly addresses most of the elements of safety culture in the NRC's regulatory processes, despite the fact that we do not directly regulate safety culture. We believe that it is unnecessary to assess a licensee's safety culture as a distinct component because the concept of safety culture is similar, if not integral, to the licensee's more specific responsibilities. If a licensee has a poor safety culture, problems and events will continue to occur at that facility either causing various performance indicators to exceed their thresholds, or surfacing during the NRC's baseline inspection activities. In fact, the baseline inspection program specifically includes reviews of a licensee's programs to identify and correct problems, and also verifies that the licensee has properly implemented the Maintenance Rule, which ensures effective resolution of deficiencies that involve risk-significant systems and components. This inspection effort assesses a central aspect of safety culture -- the willingness to identify and correct problems. If necessary, the NRC can also assess the work environment at a licensee's facilities and require a licensee to conduct an independent or third-party survey of its safety-conscious work environment. Indeed, the health of the licensee's safety culture will be indicated by performance indicators or baseline inspections, and if necessary can be evaluated by special inspections.

Other processes, programs, and regulatory requirements also help provide the NRC with a basis by which to assess the health of a licensee's safety culture. Specific examples include requirements for a quality assurance program and for allegations management.

Our quality assurance (QA) regulatory requirements, as codified in Appendix B to 10 CFR Part 50, define 18 criteria, many of which are related to the elements of safety culture that I mentioned earlier. These include management involvement; training; prompt and effective corrective action; and critical self-assessment by means of an audit program. Rigorous implementation of an effective QA program helps to foster the development of a healthy safety culture.

Licensees are also required to deal effectively and conscientiously with issues and allegations raised by their employees or contractors. This responsibility promotes the questioning attitude and critical self-assessment that contribute to a healthy safety culture. If plant employees believe that their concerns are not being effectively addressed by licensee management, they can bring these issues to the NRC for further investigation. We believe that such an allegations program is an essential factor in nurturing nuclear safety as specified by Article 10 of the Convention. Indeed, we believe that future Conventions should urge Contracting Parties to report on how they ensure the open identification and discussion of safety issues without fear of retribution.

In sum, we believe that the NRC has the benefit of a variety of tools to probe the existence of an appropriate safety culture among our licensees.

HOW THE NRC FULFILLS PERIODIC SAFETY REVIEW OBJECTIVES

Let me turn now to periodic safety reviews. Most countries have decided to perform periodic safety reviews in accordance with the recommendations of the International Atomic Energy Agency (IAEA). The objective of these reviews is to ensure a high level of safety throughout the life of a nuclear power plant, given the cumulative effects of plant aging, modifications, operating experience, and technical developments.

The NRC agrees that vigilant oversight and regular review are essential to ensure a high level of safety throughout the life of a nuclear power plant. Although a number of our regulatory review processes, specifically our reactor oversight process, are periodic in nature, our regulatory environment calls for continuous oversight. We believe that the United States meets the obligation to provide safety assessments throughout a nuclear installation's life through our ongoing reviews and through upgrades to our requirements. Let me discuss these processes further.

Prior to issuing the original operating license for a nuclear power plant, the NRC performs comprehensive reviews to ensure that the proposed design, construction, and operation of the plant meet the NRC's requirements and provide reasonable assurance of adequate protection of the health and safety of the public. After issuance of the license, the licensing basis of a plant does <u>not</u> remain fixed. Rather, the licensing basis evolves throughout the term of the license through the NRC's ongoing regulatory activities, as well as the activities of the licensee.

The NRC's activities that provide ongoing assurance of an acceptable level of safety include daily oversight by the resident inspectors, periodic regional inspections, audits, investigations, evaluations of operating experience, independent research, and regulatory actions to resolve identified safety issues. The NRC evaluates new information and determines if changes to the licensing basis are warranted from a safety perspective by applying certain regulatory criteria (termed the "Backfit Rule"). These processes continue through each plant's operating life.

A licensee may also request changes to the licensing basis for its plant. Such licensee-initiated changes are subject to the NRC's formal regulatory controls, which ensure that a documented basis exists for licensee-initiated changes, and that the licensee obtains NRC review and approval, if required, before implementing the proposed changes. (I should note that some changes might not require prior NRC approval if they do not raise new safety issues.) The evolving nature of the licensing basis for each plant is documented in periodic updates to the plant's final safety analysis report, which are required by NRC regulations.

In short, we believe that our comprehensive reviews, combined with our continuous oversight by way of the Reactor Oversight Process, meet the need for safety assessments throughout a nuclear installation's life.

LICENSE RENEWAL AND NEW REACTOR LICENSING

Now let me turn to two current initiatives -- license renewal and new reactor licensing.

NRC Requirements for License Renewal

In the United States, the Atomic Energy Act authorizes the agency to issue operating licenses to nuclear plants for up to 40 years. Because the U.S. Congress based the 40-year license period on economic considerations, rather than a technical assessment of the length of time these plants can operate safely, the act also authorizes the NRC to extend operating licenses.

As I mentioned earlier, the increasing need for electric power and the improved performance of nuclear power plants over the past decade have inspired an increasing number of licensees to consider renewing their licenses instead of decommissioning their plants. To date, the NRC has received license renewal applications for 23 units and, ultimately, we expect that most licensees of our 103 operating power reactors will apply to extend their licenses.

The NRC has made license renewal a high priority. We realize that the simultaneous review of many renewal applications is a considerable challenge. However, we also recognize the safety implications of license renewal, and are committed to devoting significant attention and resources to this effort. We have also recently revised our guidance for the license renewal process to improve our effectiveness and efficiency in the years ahead. Accordingly, we have set performance goals for the processing of applications — 30 months, if there is a hearing, and 25 months, if not.

The License Renewal Rule focuses on providing assurance that licensees will manage the aging of long-lived passive structures and components, in accordance with the plant's current licensing basis, throughout the renewal term in the same manner and to the same extent as during the original license period. We focus on passive components because we determined that the performance of active components is adequately controlled during operations. The NRC also assesses the scope and impact of environmental effects that would be associated with license renewal of U.S. plants.

To meet the requirements of the License Renewal Rule, licensees have developed aging management programs that generally focus on prevention, mitigation, condition monitoring, or performance monitoring. In some instances, licensees may implement more than one type of aging management program to ensure that the aging effects are adequately addressed. Under the license renewal process, licensees can now reference our report on generic aging lessons learned for aging management programs, rather than having to submit details of their individual programs, because the NRC has previously determined that certain programs are acceptable on a generic basis.

Various documents associated with license renewal process are included on the CD.[4]

NRC Requirements for New Reactor Licensing

In addition to renewing licenses of existing facilities, a few electric generating companies have expressed interest in building new plants. As I am sure you are aware, there have been no new reactor orders in the U.S. for about 25 years. To prepare for new construction, the NRC revised its regulations in 1989 to provide a more stable and predictable process for licensing nuclear power plants. This process, incorporated into the NRC's regulations as 10 CFR Part 52, includes the use of early site permits, standard design certifications, and combined construction permits and operating licenses.

This process is shown graphically on the overhead figure.

Under the Part 52 process, the NRC has already certified three new designs – namely, the General Electric Advanced Boiling Water Reactor, the ASEA Brown Bovari/Combustion Engineering System 80+ which is now part of the BNFL/Westinghouse portfolio, and the Westinghouse AP600. In addition, the staff is currently reviewing the Westinghouse AP1000, design that was submitted for

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[4]These include:
1) The Generic Issues Lessons Learned Report (NUREG-1801)
2) The Standard Review Plan for License Renewal (NUREG-1800)
3) The Environmental Standard Review Plan for License Renewal (NUREG-1655)

design certification earlier this month. Industry representatives have also expressed interest in applying for early site permits, other advanced reactor design certifications, possible combined licenses, and restarting of suspended construction projects.

To ensure that we can effectively carry out our regulatory responsibilities associated with an early site permit application, a license application, and the construction of a new nuclear power plant, the NRC recently formed its New Reactor Licensing Project Office. The NRC's Office of Research is also helping to develop the technical foundation to support our review of new, innovative reactor designs. This is necessary because of the need to prepare to review some unusual reactor types; such as gas-cooled reactor designs.

We face challenges in dealing with these new reactor concepts. Much of our current regulatory basis assumes that the plant has a nuclear steam supply system with a light water-cooled and -moderated reactor. Applying a risk-informed regulatory approach to alternative plant designs, such as gas-cooled designs, requires much more than just a revision of current regulations. We are currently studying options for developing proper risk-informed criteria for such designs.   I must also note that we seek international partners in the conduct of research so as to make effective use of experience in other nations relevant to these reactor designs.

Our Policy Statement on Advanced Reactors states that advanced reactors must, at a minimum, provide at least the same degree of protection of the public and the environment as our current light-water reactors. The policy further states that we expect future reactor designs to achieve a higher level of safety for certain technical and severe accident issues than the designs of currently operating nuclear power plants. These expectations were realized in the three designs that we have already certified and we expect they will be satisfied with other new designs.

In sum, we have the prospect in the United States for the continued substantial contribution of nuclear energy to electrical supply through both the life extension of existing reactors and the possibility of new construction. We are dedicated to ensuring that these activities maintain very high safety standards.

CONCLUSION

Let me conclude this statement by noting that the U.S. Government and the NRC believe that this Convention represents a milestone in international cooperation in furtherance of nuclear safety. It presents an unprecedented opportunity for the Contracting Parties to work together to enhance the level of nuclear safety worldwide.

Our review of the reports of other Contracting Parties has challenged the NRC to think about the variety of approaches to nuclear reactor regulation. They have caused us to reflect upon our national regulatory processes and how they might be improved. I hope that I have clarified some of the areas of the United States National Report in which you expressed interest and that some of our approaches have similarly stimulated interest in you. I look forward to additional discussion of our practices, both during today's session and in the years to come.

Mr. Chairman, this completes my statement. Thank you.