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“So Where Are We Now and Where Do We Go From Here?”:
Nuclear Power Industry and Nuclear Regulatory Challenges

by

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Good morning, ladies and gentlemen. As always, it is a pleasure to address the Regulatory Information Conference again this year--even if I must do it in this videotaped format. This conference provides an excellent opportunity to focus on questions important to the U.S. Nuclear Regulatory Commission (NRC), the regulated nuclear power industry, and the public. I apologize that I cannot be physically present at the conference this year, as I committed last year to present the keynote address in Mumbai, India, at the International Conference on Fire Protection in Nuclear Installations--"Fire Safety '98." This is an important focus area for the NRC. It is important then to share our experiences and approaches in this area, and to learn from others. Nonetheless, I feel very strongly that, as NRC Chairman, it is critical that I provide my perspectives and address important regulatory issues at the beginning of each Regulatory Information Conference.

Last year I welcomed our two newest NRC Commissioners to their first Regulatory Information Conference--Commissioner Edward McGaffigan and Commissioner Nils Diaz. Another year has passed, and the Commission has been busy and engaged, and there have been a number of exciting developments. I am sure you are look forward to their remarks, along with those of our other Commission veteran, Commissioner Greta Dicus. In addition, since the last Regulatory Information Conference, my esteemed friend and colleague Commissioner Kenneth C. Rogers has moved on, after completing his second term at the Commission. Commissioner Rogers had contributed almost ten years of technical insight, policy excellence, and wise counsel--and we already miss him.

In this last year, a stalwart figure in the nuclear power industry has moved on in his career. This gentleman has provided both firm leadership for and a stabilizing influence on the nuclear energy industry both here and abroad. I am speaking of Dr. Zack Pate, who retired recently as Chairman and CEO of the Institute of Nuclear Power Operations (INPO). I deeply admire his contributions during his tenure at INPO, and I am pleased that he will continue to work with the World Association of Nuclear Operators (WANO). I salute Dr. James Rhodes--as Dr. Pate's

very capable successor at INPO--and I look forward to continued excellence from that organization.

Today I would like to discuss with you four areas that I believe are of prime importance to the nuclear power industry, and that also are the focus of considerable attention by the NRC Commission and the NRC staff: (1) regulatory excellence; (2) license renewal; (3) maintaining the proper balance in our design and operational emphasis; and (4) nuclear power plant performance measurement.

Regulatory Excellence

The NRC is finalizing an Excellence Plan for all its functions. The Excellence Plan has three goals: (1) to improve a manageable but broad range of NRC regulatory programs, rules, standards, and regulatory guidance; (2) to improve NRC processes, as well as NRC managerial and support functions, so as to enhance the efficiency and performance of the NRC staff; and (3) to create an environment that will promote enhanced effectiveness and efficiency in NRC activities, with the support of--and input from--our internal and external stakeholders.

The three excellence goals will be implemented through a set of 12 active strategies. These strategies represent the most significant improvement initiatives being undertaken at the NRC. Specific plans are being finalized for each of these strategies describing the purpose, approach, criteria for measuring success, benefits, resources involved, and the involvement of our stakeholders. The implementation of these strategies will strengthen the NRC, make it more efficient and effective, and maintain our primary focus on safety, while benefiting those we regulate through the development of better requirements, guidance, and a more efficient regulatory process.

License Renewal

One area that has benefited directly from this careful approach to excellence, is the NRC effort related to license renewal for operating commercial nuclear power plants. The NRC understands that, in an era of electric utility deregulation, complex business decisions hinge on economic assessments and forecasts, which for some of our nuclear power reactor licensees involve possible license renewal. To prepare early on for this possibility, the NRC issued the license renewal rule (Part 54 of Title 10 of the Code of Federal Regulations) in 1991, to establish the technical and procedural requirements for renewal of operating licenses. Based on initial experience in implementing the rule, the Commission recognized that a more stable and predictable regulatory process for license renewal could be established, and amended the rule in 1995--to limit the scope of the license renewal review to time-limited aging analyses, and to aging management of long-lived passive structures, systems, and components. Additionally, the NRC environmental regulation (Part 51 of Title 10 of the Code of Federal Regulations) was amended in 1996 to enhance our environmental review process for license renewal. This revision streamlined the environmental review process by having a large number of environmental issues addressed in a Generic Environmental Impact Statement, thereby eliminating the need for such issues to be addressed individually by each license renewal applicant.

Up to this point, the industry approach to license renewal has been to submit for NRC approval plant-specific and Owners' Group technical reports on specific topics, before submitting complete license renewal applications. This approach is intended to establish a foundation of

technical information that a licensee can use to evaluate the feasibility of a license renewal application, and to reference that information later in the application itself. But, even as I tape this video presentation, Baltimore Gas and Electric is on the verge of submitting their license renewal application for their Calvert Cliffs plant to the NRC. Additionally, I understand that Duke Power Company is readying their application for the Oconee units. The Southern Nuclear Operating Company recently announced plans to consider license renewal for its Hatch units.

This means that license renewal is no longer a discussion topic with activities moving along at a studied pace. Therefore, our focus has changed. The NRC is working to ensure that a predictable license renewal path exists, fair to all parties involved--one that rests on the technical merits of the applications.

In that regard, I have tasked the Executive Council of the NRC (comprised of the Executive Director for Operations, the Chief Financial Officer, and the Chief Information Officer) to ensure that the implementation of license renewal is a unified and coherent process. These senior managers will focus on three areas: oversight, coordination, and strategic implementation. I have reminded the Executive Council to ensure that policy matters warranting Commission attention are promptly identified and communicated to the Commission. In addition, the NRC Chief Financial Officer and Chief Information Officer have been tasked, under the aegis of the Executive Council, with establishing a process for efficiently shifting or refocusing resources, as needed, to ensure a timely license renewal review.

The Commission itself is considering the implementation of measures identified by our Office of the General Counsel (OGC) that would streamline the hearing process for license renewal. These measures include issuing a policy statement clearly delineating Commission expectations with regard to license renewal; establishing an efficient and reliable adjudicatory schedule--imposed by order, as necessary and appropriate--while ensuring a fair resolution of contested issues; timely surfacing of any open generic policy issues for Commission decision; and effective integration of the review of technical issues into the adjudicatory process.

In developing the FY98 budget, to control costs, the Commission deferred work associated with the review of generic license renewal activities not specifically related to the pending license renewal applications. The work deferred included generic technical reports prepared by the Babcock & Wilcox Owners' Group, the Boiling Water Reactor Owners' Group, and the Westinghouse Owners' Group. These reports address the renewal requirements for certain major structures and components, for reference in future license renewal applications. If licensees, such as the Southern Nuclear Operating Company, do commit to license renewal, the Commission will reassess the deferral of work on reports relevant to specific cases. Additional licensees are active in the generic license renewal activities, but have not informed the NRC formally of their intentions to submit license renewal applications. The Nuclear Energy Institute continues to sponsor various industry initiatives for license renewal, and has established an industry working group to address license renewal issues.

In summary, the Commission is committed to ensuring a fair, effective, and efficient process for license renewal. We believe that the framework of regulations and guidance currently in place provides the basis for such a process, and we will continue to structure ways to enhance the process.

Maintaining the Proper Balance In Our Design and Operational Emphasis

A second area of extensive Commission focus has been the effort to achieve and maintain a proper balance between our design and operational emphasis. It is now well understood, within the NRC, that in our effort to respond quickly to the industry-sponsored Towers Perrin report of 1994, we moved away from an important balance--difficult to maintain--that ensures the effective inspection of both design and operational aspects of the reactor facilities we license. This shift in balance was in response to the 1994 industry contention that team inspections "interfere with other plant priorities which may have greater safety significance." Other factors may have contributed to the shift in NRC focus away from detailed design inspections toward more event-driven operational inspections: for example, the shift of agency resources away from initial licensing reviews as most plants received their operating licenses, or the post-Three-Mile-Island (TMI) emphasis on the importance of operator response actions.

Other aspects of the Towers-Perrin report were insightful and relevant, but I do not intend to revisit here, in any overall sense, either the report or the lessons we learned from it. Rather, I present these thoughts as an introductory context to discussing the need for proper balance in our design and operational emphasis.

Many of you who value Southern colloquialisms will appreciate this statement from an NRC manager, an Oklahoma native, who also happens to be a former industry engineer and NRC Senior Resident Inspector. During a discussion of the importance of maintaining a proper design and operational balance in NRC inspections, this gentleman succinctly summed up our discussion with the following - "You know, Chairman, you can't tell by the honk of the horn how much gas is in the tank."

To extend that metaphor a bit further this morning, imagine if one successfully designs and begins to operate an automobile powered by natural gas, which has certain environmental and operational advantages, but also carries an explosive risk associated with a potential collision. In design, this risk is offset with specially designed tanks, hi-tech protective features, periodic pressure monitoring, perhaps a back-up braking system. Based on a detailed analysis of these features, one can conclude that the vehicle is acceptably safe. Now suppose that, in operating the vehicle over the next several years, one begins to discount the value of some of these features--one modifies the tank size and resistance to collision damage, changes the pressure-switch tolerances (to get additional operating margins per tank of gas), or neglects the periodic hydrostatic test of the tank. If the focus is exclusively on operational performance, changes of this sort may go unnoticed for an extended period. Indeed, one can begin to feel pretty good about the performance of the vehicle--it starts up every morning, it does not stall while one waits at intersections--in fact, those little changes have even helped to squeeze out additional operating margins--and best of all, one has never had an accident. By all the parameters one monitors, safety performance is up, and one could find it completely intolerable that a regulator wants to know why one made these design changes without proper analysis, documentation, or notification. But, one could be asked--notwithstanding the monitoring of certain parameters--if the vehicle no longer matches the original design bases, on what grounds can one continue to have confidence in the original safety analyses? This question summarizes what has driven us to where we are today. We have gone through some painful steps to get here, but a proper balance is being achieved.

Over two years ago I directed the NRC staff to perform a "Lessons Learned" review to improve existing oversight processes, and/or to develop new processes to aid in earlier recognition of deficient conditions or adverse trends at all of our nuclear power plant licensees. As I discussed at this conference last year, the NRC staff identified design and configuration control

deficiencies at a number of plants, that raised questions about whether licensee programs are sufficient to demonstrate that plant physical and functional characteristics are consistent with the established design bases, and whether plants are being maintained and operated in accordance with their design bases, particularly regarding the ability of key systems to perform their intended functions.

Design-related inspection findings have continued as the NRC has re-emphasized its oversight of this area. A recent design inspection at a Region I plant noted deficiencies in the auxiliary feedwater system that would have challenged the capability of the system to perform selective aspects of its design and licensing basis safety functions. These deficiencies were the result of recent engineering weaknesses. A similar inspection at a Region III plant revealed that revisions to Emergency Operating Procedures in the 1992 time-frame created a single-failure vulnerability that could have caused both trains of centrifugal charging and safety injection to be lost during a loss-of-coolant accident.

Nonetheless, we understand the level of concern and anxiety in the nuclear power industry about the focus the NRC gives to this area. We will continue to give it appropriate attention. Some recent Commission decisions have clarified how it wishes the staff to proceed in this area.

The Final Safety Analysis Report (FSAR) is an essential facet of the NRC regulatory scheme, and plays a primary role in assuring that licensed facilities remain within NRC requirements. Last summer, the Commission reaffirmed that the staff should enforce the implementation of the FSAR update rule, 10 CFR 50.71(e), to ensure that FSARs are updated to the fullest extent possible to reflect changes to the design bases, and to reflect the effects of other analyses performed since original licensing, which should have been included by the terms of that regulation.

In May 1997, the NRC requested public comment on 22 topical areas related to the implementation of 10 CFR 50.59. Following an analysis of public comments, the NRC staff sent to the Commission a paper entitled "Integration and Evaluation of Results from Recent Lessons-Learned Reviews." This paper recommended that immediate guidance be issued to clarify the role of 10 CFR 50.59 in the resolution of degraded and nonconforming conditions.

The paper presented options to the Commission to improve the NRC regulatory process in various design-related areas: (1) the implementation of 10 CFR 50.59, "Changes, tests and experiments"; (2) the use and content of Updated Final Safety Analysis Reports (UFSARs) and design basis documents; (3) the NRC oversight of licensee commitments; and (4) other related internal process improvements.

The Commission recently has requested that the staff initiate an expedited rulemaking to modify the language of 10 CFR 50.59 in order to clarify and to simplify the current rule, and to incorporate knowledge gained from risk insights, as appropriate. In order to establish realistic and safe limits allowing licensees to make changes under the rule without prior NRC approval, the Commission has asked the staff to eliminate the de facto "zero increase" criteria and allow "minimal" increase in the probability of occurrence or consequences of an accident or malfunction of equipment, as well as "minimal" reduction in the margin of safety. In formulating what constitutes a "minimal" change, the staff will be considering the work it has done in updating the Standard Review Plan and in developing risk-informed regulatory guidance. In addition, consistent with and concurrent with the rulemaking enhancement, the staff will continue to work with Nuclear Energy Institute to reconcile areas of disagreement with industry

guidance, to endorse those portions it considers to be appropriate, and to report to the Commission any items that should not be endorsed.

The Commission also has asked that regulatory guidance be developed to clarify the scope and methods needed to update FSARs. In this regard, safety and risk significance will be used to support the prioritization of information to be included in the updated FSARs, and to aid in the removal or relocation of obsolete or unnecessary information. In formulating this guidance, the staff will bear in mind how the 10 CFR 50.59 change process and the FSAR are used in licensing, in operating plant activities, and in reactor decommissioning.

Concurrently, the staff will be working on (1) revising the Enforcement Policy in this area; (2) ensuring that the "scope" of 10 CFR 50.59 is appropriate (i.e., that licensees are reviewing all that should be included--and only what should be included--when evaluating changes); and (3) developing guidance regarding the type of information to be considered "design basis" information. The Commission and the NRC staff will be involved actively in these topics over the coming year, as we strive to provide clarity and consistency, and to incorporate risk insights as appropriate.

I would like to comment on one final aspect of this design and operation discussion. Often, licensees will state that compliance with certain requirements is burdensome and/or is not directly related to safety. I have discussed this issue in several previous speeches, and in numerous discussions with both licensee managers and NRC personnel--but I would like to highlight that the Commission, as a body, addressed this issue last Fall by publishing a position paper entitled "Safety and Compliance." Hopefully, this paper has received a wide distribution in your organizations. I will quote one paragraph from that short paper.

Safety is the fundamental regulatory objective, and compliance with NRC requirements plays a fundamental role in giving the NRC confidence that safety is being maintained. NRC requirements, including technical specifications, other license conditions, orders, and regulations, have been designed to ensure adequate protection--which corresponds to "no undue risk to public health and safety"--through acceptable design, construction, operation, maintenance, modification, and quality assurance measures. In the context of risk-informed regulation, compliance can play a very important role in ensuring that key assumptions used in underlying risk and engineering analyses remain valid.

The paper goes on to state that the Commission recognizes that requirements that are duplicative, unnecessary, or unnecessarily burdensome can actually have a negative safety impact; and that since some requirements are more important to safety than others, the Commission should use a risk-informed approach wherever possible when adding, removing, or modifying NRC regulations. All of this both undergirds and should generate specific improvements growing out of the NRC Excellence Plan. We look to your comments and insights in assessing areas that are appropriate for revision.

Nuclear Power Plant Performance Measurement

Last year, *Life* magazine ran a story on the Top 10 people of the Millennium. I am sure we will see many versions of this list over the next year-and-a-half. Who would you include on that list? For those of you who did not see the story, I am sorry to inform you that no nuclear executive made the list. To my dismay, they did not even have an NRC Chairman on the list! One person who did make the list, however, was Galileo Galilei, the son of an impoverished

Italian nobleman who made significant advances in the experimental method. It is from Galileo that I take this quote: "Measure what can be measured, and make measurable what cannot be measured."

I would like to offer two additional quotes, and then to discuss the premises that underlie these statements within the context of nuclear plant performance assessment.

First, a recent Nuclear Energy Institute newsletter had an article entitled "The NRC Watch List and Plant Safety--Is there any Connection?" In discussing both the Watch List and the Systematic Assessment of Licensee Performance (SALP), the statement was made that "neither tool is particularly useful in allocating NRC resources."

Second, the General Accounting Office (GAO), in its May 1997 report, entitled "Nuclear Regulation - Preventing Problem Plants Requires More Effective NRC Action," recommended that the NRC develop strategies to take more aggressive action on safety deficiencies when they are discovered. To achieve this goal, the GAO recommended that the NRC: (1) provide increased documentation of licensee corrective actions and NRC responses to nonconformance with planned actions; (2) make licensee responsiveness to identified problems a major feature of the Senior Management Meetings (SMMs); and (3) assess licensee management competency as a mandatory component of the NRC inspection process.

As you know, the NRC uses several processes to assess the safety performance of nuclear reactor facilities. These processes are rooted in inspection, and include plant performance reviews (PPRs), SALPs, and Senior Management Meetings. These processes were developed and implemented at different times over the past 18 years to address specific agency concerns. All three of these processes have been subject to periodic, detailed re-evaluation.

Over a year ago, the NRC set out to enhance the effectiveness of the Senior Management Meeting process, and to make the process more objective, transparent, consistent, and fair. As a part of this study, I requested the NRC staff to identify objective, meaningful, performance indicators--including predictive or "leading" indicators--for example, indicators that would highlight precursors to declining safety of operations. Where have we come since then?

As indicated in our response to the GAO report, the NRC is developing--and in some cases already has instituted--a variety of improvements to its reactor performance assessment processes. These improvements include: (1) the development of better indicators to provide a more objective basis for judging whether a plant should be placed on or removed from the NRC watch list; (2) the enhanced use of enforcement information; and (3) the development of tools for assessing licensee management effectiveness. In addition, the NRC plans to develop standardized criteria for inspector close-out of issues identified in NRC inspection reports.

In addition to these "tunings" of our current processes, the Commission realized that we had never conducted an integrated review of the entire assessment process. As a result of discussions on this issue, last October the NRC initiated the Integrated Review of the NRC Assessment Process for Operating Commercial Nuclear Reactors (referred to as IRAP). The IRAP consists of a team of individuals from the Regions and Headquarters tasked with addressing weaknesses with the current set of assessment processes. The primary goals of the IRAP are: (1) to clarify objectives; (2) to eliminate redundancies; (3) to define roles, responsibilities, and authorities; (4) to improve consistency; (5) to match processes to NRC staff resources; and (6) to reduce administrative burden.

The IRAP is still in progress. Many of you are aware of the Commission meeting held two weeks ago to discuss proposed changes to the NRC assessment process, based on this integrated review. These proposed changes include:

(1) streamlining the performance assessment process; (2) assigning significance directly to performance assessment data, and tying these assessments directly to regulatory actions; (3) improving the systematic use and categorization of data; (4) developing and using threshold criteria; (5) focusing on performance results; and (6) providing opportunity for licensee response at appropriate stages. As proposed, these changes would align the overall assessment process with the NRC Enforcement Policy, and would use a decision model to provide a predictable, structured context for NRC actions. If implemented, these changes likely will result in a single, integrated process for objectively and efficiently assessing the safety performance of operating commercial nuclear reactors. The Commission currently is evaluating this proposed program. Whatever the outcome, our plant assessment process (or processes) must be focused where the risk is greatest, must allow the NRC to clearly spot declining performance, must be results-focused, and must invoke the correct regulatory action based on the results.

Our criteria for success then are clear--effectiveness, timeliness, scrutability, being risk-informed, and defensibility. We must continue periodically to assess our own effectiveness in implementing this process. Both within the NRC and in our oversight of the industry, we must--as stated by a nuclear executive in his recent book, *The ABCs of Successful Leadership*--"give much personal attention to the establishment and measurement of performance indicators. They are a key to success." We must be results-focused. I have pushed for improvements in our current process to further these goals. I will continue to oversee the implementation of our assessment program, to ensure that we are providing NRC staff, NRC managers, the public, and our licensees with a substantive evaluation process that assists in correcting negative trends in a timely manner.

Let me highlight a final area related to performance measurement that I have implicitly referenced earlier--that is, our effort to implement strategies that will make the entire NRC regulatory framework more risk-informed (i.e., such that areas of highest risk receive the greatest focus) and, where appropriate, more performance-based, (i.e., more results-oriented and more open to allowing licensee flexibility in how to meet NRC regulatory requirements). Being risk-informed and being performance-based are different. Sometimes, a situation allows for more of one or the other. The ideal is to be both risk-informed and performance-based. We are going there in steps.

Areas in which a risk-informed approach has been used to enhance safety decision-making include the Senior Management Meeting improvements I already have discussed, an enhanced risk focus in inspection, the consideration of risk evaluations during the NRC enforcement process, and the resolution of emergent technical issues (e.g., certain spent fuel pool issues) without the creation of new generic requirements. We also are continuing an aggressive program to provide related training in this area to technical staff and managers throughout the agency.

The NRC already has made progress toward the completion of important milestones in risk-informed reactor regulation. The NRC staff has developed generic regulatory guidance, in the form of a regulatory guide and standard review plan, on the use of probabilistic risk assessment (PRA) findings and insights in support of licensee requests for changes to their licensing requirements. The Commission expects to issue these guidance documents for use shortly.

Pilot applications have approved graded quality assurance requirements and increased allowed outage times for equipment in Technical Specifications. Out of these pilots, application-specific regulatory guides and standard review plans have been developed and are under review by the Advisory Committee on Reactor Safeguards (ACRS). The NRC staff currently is developing a draft safety evaluation report for a risk-informed pilot in-service testing program. The NRC also has issued for public comment a draft regulatory guide and draft standard review plan on risk-informed in-service inspection.

Conclusion

In conclusion, I return to the questions from the title of this address: “Where are we now? Where do we go from here?” Today, I have outlined some of the challenges facing the nuclear power industry and the NRC: achieving regulatory excellence, license renewal, maintaining the proper balance in our design and operational emphasis, and nuclear power plant performance measurement. Where we go from here is a function of how we handle what is before us now. We have made improvements, we are taking new steps, and in so doing we are laying the foundation for the future. Progress must involve all stakeholders, and should be predicated on goodwill.

We all have much to do. Shrinking budgets are becoming the standard. High expectations continue to be the norm. Both technical design issues and operational event reviews must be addressed in a timely manner and corrected based on regulatory and risk significance. License renewal must be approached fairly and efficiently, but clearly will rest on the technical merits of the application.

I, for one, relish these challenges, and I view them as opportunities. I have every confidence that the NRC can and will meet the goals and implement the strategies that have been established to meet these challenges. I look forward to working with the nuclear power industry, with the public, and with all our stakeholders, in this coming year. I wish for you all a most successful conference.

Thank you.