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Major Management Challenges and Program Risks

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The President of the Senate
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This report addresses the major performance and management challenges that have limited the Nuclear Regulatory Commission's (NRC) effectiveness. The report also provides information on actions that NRC has taken or initiated to address these challenges. For many years, we have raised concerns about whether NRC is effectively carrying out its safety mission. The performance and management challenges identified are the result of NRC not defining the conditions that are necessary for a nuclear plant's safety, not being aggressive in requiring utilities to comply with safety regulations, and not holding utilities accountable for fixing problems more promptly and addressing management issues more directly.

NRC has undertaken various initiatives to help ensure that it carries out its regulatory mission more effectively and efficiently. These efforts show a commitment by NRC to strengthen its oversight and resolve long-standing challenges. However, given the nature and extent of the challenges facing NRC, it will take time to implement and assess the impact of the various initiatives.

This report is part of a special series entitled the Performance and Accountability Series: Major Management Challenges and Program Risks. The series

contains separate reports on 20 agencies—one on each of the cabinet departments and on most major independent agencies as well as the U.S. Postal Service. The series also includes a governmentwide report that draws from the agency-specific reports to identify the performance and management challenges requiring attention across the federal government. As a companion volume to this series, GAO is issuing an update to those government operations and programs that its work has identified as "high risk" because of their greater vulnerabilities to waste, fraud, abuse, and mismanagement. High-risk government operations are also identified and discussed in detail in the appropriate performance and accountability series agency reports.

The performance and accountability series was done at the request of the Majority Leader of the House of Representatives, Dick Armey; the Chairman of the House Government Reform Committee, Dan Burton; the Chairman of the House Budget Committee, John Kasich; the Chairman of the Senate Committee on Governmental Affairs, Fred Thompson; the Chairman of the Senate Budget Committee, Pete Domenici; and Senator Larry Craig. The series was subsequently cosponsored by the Ranking Minority Member of the House Government Reform Committee, Henry A. Waxman; the Ranking Minority Member, Subcommittee on Government Management, Information and Technology, House Government Reform Committee, Dennis J. Kucinich; Senator Joseph I. Lieberman; and Senator Carl Levin.

Copies of this report series are being sent to the President, the congressional leadership, all other Members of the Congress, the Director of the Office of Management and Budget, the Chairman of the Nuclear Regulatory Commission, and the heads of other major departments and agencies.

David M. Walker
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Overview

Today, nuclear energy supplies electricity to about 65 million households, meeting about 20 percent of the nation's needs. The Nuclear Regulatory Commission (NRC) is responsible for, among other things, ensuring that the nation's 103 operating commercial nuclear power plants pose no undue risk to public health and safety. We, the Congress, NRC's Office of the Inspector General (OIG), and others have raised concerns about whether NRC is effectively carrying out its safety mission. NRC's management challenges have a long history, and the agency has been assessing the strengths and weaknesses of its regulatory programs and policies to address them. Now, however, the entire electric utility industry is faced with an unprecedented, overarching development: the economic restructuring of the nation's electric power system, from a regulated industry to one driven by competition. According to one study, as many as 26 of the nation's nuclear sites are vulnerable to shutdown because production costs are higher than the projected market prices of electricity. As the electric utility industry is deregulated, operating and maintenance costs will affect the competitiveness of nuclear power plants. Competition challenges NRC to reduce any unnecessary regulatory burden while ensuring that safety

margins are not compromised by utilities' cost-cutting measures.

The Challenges

Today, the major management challenges at NRC are as follows:

NRC Lacks Assurance of Nuclear Plants' Safety

NRC lacks assurance that its current regulatory approach ensures safety. NRC assumes that plants are safe if they operate as designed and follow NRC's regulations. However, NRC's regulations and other guidance do not define, for either a licensee or the public, the conditions necessary for a plant's safety; therefore, determining a plant's safety is subjective. Furthermore, six major reviews of NRC since 1979 have pointed out that NRC's regulatory approach is punitive rather than results oriented, licensees are forced to expend considerable resources on complying with regulations that may have a limited impact on safety, and NRC's focus on achieving compliance with paperwork requirements can divert attention from safety activities.

NRC Is Slow to Require Corrective Action

NRC's oversight has been inadequate and slow. Although NRC's indicators show that conditions throughout the nuclear energy

industry have generally improved, they also show that several nuclear plants are chronically poor performers. At three nuclear plants with long-standing safety problems that we reviewed, NRC did not take aggressive action to ensure that the utilities corrected the problems. The problems ranged from failures of equipment to work properly when tested to weaknesses in licensees' conduct of maintenance programs. As a result of NRC's inaction, the conditions at the plants worsened, reducing safety margins.

NRC's Culture and Organizational Structure Impede Effective Actions

NRC's culture and organizational structure have made the process of addressing concerns with the agency's regulatory approach slow and ineffective. Since 1979, various reviews have concluded that NRC's organizational structure, inadequate management control, and inability to oversee itself have impeded its effectiveness.

Progress and Next Steps

Even before competition became an issue, NRC and the nuclear utility industry embarked on initiatives to address long-standing regulatory issues, including the management challenges described in this report, in a way that would ensure that NRC

carried out its regulatory mission more effectively and efficiently. These initiatives are designed to improve safety decisionmaking through the analysis of risk, use agency resources more efficiently, and reduce unnecessary burdens on utilities. In August 1998, NRC identified various regulatory efforts and milestones for their completion. Although NRC will implement some initiatives in the near future, it will take some years to complete its efforts.

A framework within which NRC can accomplish its missions has been provided by the Government Performance and Results Act of 1993. The Results Act requires federal agencies to develop goals, objectives, strategies, and performance measures in the form of strategic and performance plans. In our review of NRC's first annual performance plan, covering program activities set out in the agency's fiscal year 1999 budget, we noted that the plan could provide a clearer picture of intended performance across NRC and better discuss the strategies and resources the agency will use to achieve its performance goals. Although the plan lists specific strategies NRC will use against licensees that fail to meet regulatory standards, including halting operations if performance falls below an acceptable level,

NRC has not developed specific criteria for what is "acceptable." The development of strategic and performance plans is a dynamic process. Until more experience in setting goals and measuring results is achieved, better information will not be available to evaluate progress towards improving NRC's performance.

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Major Performance and Management Issues

Commercial nuclear power plants operate in 31 states and provide about 20 percent of the nation's electricity. Five states (Connecticut, Illinois, New Jersey, South Carolina, and Vermont) rely on nuclear power for about half of their electricity. One of NRC's missions is to ensure that utilities operating nuclear power plants do so safely. Identifying nuclear plants with safety problems and making sure that their owners—licensees—correct these problems promptly are activities essential to NRC's safety mission. With the restructuring of the nation's electric power industry and the emergence of competition in the business of electricity generation, NRC will need to exercise vigilance to ensure that utilities' decisions related to safety will not be driven primarily by economic considerations.

We, NRC's OIG, and others have documented problems with NRC's performance and management and have recommended reforms. This report summarizes these various findings, including NRC's lack of a definition of safety and lack of aggressiveness in requiring utilities to comply with safety regulations, as well as the impediments to effective oversight presented by NRC's culture and organization.

NRC Lacks Assurance of Nuclear Plants' Safety

Six major reviews conducted between 1979 and 1994 concluded that NRC lacks objective criteria for many of its regulatory actions and that its focus on achieving compliance on paper can divert attention from such safety activities as inspection and enforcement.[1] Since that time, NRC has undertaken various actions to improve its regulatory programs, and industrywide safety indicators have shown continued and significant improvements. Nevertheless, in 1997, we found that NRC lacks assurance that its current regulatory approach ensures safety at all plants. We reported that the Congress and the public need confidence in NRC's ability to ensure that the nuclear industry performs to high safety standards. Although we made no judgments about the safety of nuclear plants or the appropriateness of NRC's current regulatory structure, the many safety problems

[1]The six reviews were (1) The Report of the President's Commission on the Accident at Three Mile Island (1979); (2) Three Mile Island: A Report to the Commissioners and to the Public (1980); (3) Survey by Senior Management to Obtain Viewpoints on the Safety Impacts of Regulatory Activities From Representative Utilities Operating and Constructing Nuclear Power Plants (1981); (4) a three-part survey: Industry Perceptions of the Impact of the U.S. Nuclear Regulatory Commission on Nuclear Power Plant Activities, Results of Industry Survey on Licensee Management Involvement in Inspections and Audits, and Survey of Staff Insights on Regulatory Impact (1989); (5) Nuclear Power - Technical and Institutional Options for the Future, National Academy of Sciences (1992), and (6) Nuclear Regulatory Review Study (1994).

identified at three plants we examined raised questions about whether NRC's regulatory program was working as it should. Specifically, we found the following:

- Determining the safety of nuclear plants is difficult because NRC does not precisely define safety. Instead, NRC assumes that plants are safe if they operate as designed (in accordance with their design bases) and meet NRC's regulations. Yet NRC's regulations and other guidance focus on procedural and operational requirements for plants' equipment and utility practices and do not define, for either licensees or the public, the conditions necessary for plants' safety. NRC reasons that the many redundant safety features and systems built into a plant's design provide an adequate margin of safety, even when some are not working properly. However, changes made to a plant over time—for example, replacing components with different parts and reconfiguring systems—can alter the plant's design, thus potentially affecting how certain safety systems may work in an emergency. NRC does not have an effective way to quantify the safety of plants that deviate from their approved designs.

- NRC has incomplete knowledge of the extent to which nuclear plants are operating as designed. In the mid- to late 1980s, NRC found that some utilities were not documenting changes that could affect the safe operation of the plants. However, it was not until October 1996, after problems were discovered with Millstone Unit 1 in Connecticut, that NRC required utilities to certify that their plants were operating as designed. To follow up on utilities' certifications, NRC inspected 21 sites (26 units), all previously targeted for follow-up inspections, to verify that the plants were operating under the terms and conditions of their licenses. Generally, NRC found that some utilities had not maintained current information on their plants' designs and had not examined the impact of modifications on the safety of the plants' operations. NRC identified significant problems during these inspections, including instances in which utilities had not properly tested safety-related components and had made errors in their analyses of how emergency cooling systems would work in case of an accident. NRC concluded that the majority of the problems resulted from errors in the original design or from design modifications, inadequate testing, and discrepancies in documentation. As of November 1998, NRC had completed all the planned inspections

and was evaluating the results. As a result of the inspections, NRC initiated escalated enforcement actions for violations found at five plants. A utility shut down one of the five plants as a result of an inspection's findings.

- NRC faces many challenges to make its regulatory program work as effectively as possible, particularly in light of major changes taking place in the nuclear industry. As the electric utility industry is deregulated, safety margins may be compromised when licensees cut costs to stay competitive. According to one study, as many as 26 of the nation's nuclear sites are vulnerable to shutdown because production costs are higher than the projected market prices of electricity. NRC will be deciding what constitutes safety and how nuclear plants should be regulated in the future. NRC also has initiated a major effort to consider risk in its regulatory decisions and activities. NRC's regulatory approach needs to be anchored in goals and objectives that are clearly articulated and performance measures that hold NRC managers as well as licensees accountable.

During deliberations on the fiscal year 1999 budget, both the Senate and House Committees on Appropriations were highly

critical of NRC. Most of the Committees' concerns focused on NRC's oversight of commercial nuclear power plants in the areas of inspection, performance assessment, and enforcement; risk-informed, performance-based regulation; and organizational structure and resources. Questions from Members of Congress revealed a perception that NRC's requirements and expectations for utilities that operate commercial nuclear power plants are not clear and that NRC has created an atmosphere of regulatory uncertainty. In response to the criticisms raised, NRC has been assessing the strengths and weaknesses of its regulatory programs and policies to (1) better understand their impact on the industries it regulates and (2) determine whether it responds effectively to changes in the regulatory environment. Specifically, in August 1998, NRC identified various areas—including risk-informed regulation, inspection, enforcement, organizational structure, resources, and other issues, such as license transfers and decommissioning—and compiled a catalog of short- and long-term actions and milestones to address each of the areas. We agree that the actions NRC has under way are worthwhile steps. Although NRC will implement some initiatives in the near future, it will take some years to complete these activities.

NRC Is Slow to Require Corrective Action

NRC did not take aggressive action at three facilities we examined that had long-standing safety and performance problems. The problems ranged from failures of equipment to work properly when tested to weaknesses in how licensees conducted their maintenance programs. As a result, conditions at the plants worsened, reducing safety margins. NRC staff repeatedly gave the plants' operators more time to take corrective actions and were slow to place plants with declining performance on NRC's "Watch List"—a list of plants with declining performance trends that require closer regulatory attention.

NRC's programs are designed to ensure that utilities comply with NRC's regulations, take prompt actions to correct any deficiencies found, and operate their plants safely. NRC gives utilities considerable latitude to fix their problems. This strategy works well when the utilities' managers place priority on maintaining a strong safety culture. We found, however, that this condition was not present in the three plants we examined and that the problems worsened when NRC did not hold the utilities accountable for fixing them. For example, some of the problems that caused the 1994-95 shutdown of the Cooper Nuclear Station in Nebraska dated

back to 1974, when the plant started operations. According to NRC inspectors with whom we spoke, the utility's management should have addressed the problems years earlier. In addition, NRC was very slow to impose fines on the three plants we examined. For example, NRC levied the first fine on one utility well after its plants had begun to decline. NRC's OIG reported similar findings, noting that one utility lulled NRC into allowing an excessive amount of time to institute proposed corrective actions. NRC is strengthening its processes for assessing the effectiveness of utilities' corrective action programs and tracking and verifying utilities' commitments.

We also found that NRC's safety oversight has not focused on the competency of nuclear plant management, even though the nuclear industry and NRC officials widely agree that such competency is perhaps the most critical factor in safe performance. For example, NRC found safety problems at nuclear plants in Illinois in January 1997 that the agency attributed to weak management processes and a lack of involvement by management. Although NRC staff had proposed options to assess the performance and competency of the utilities' management, the agency rejected the options in June 1998 and

directed its staff to continue inferring competency on the basis of plant inspections and other routine assessments.

NRC's Chairman has complained about the consequences of NRC's patience with some problem utilities, adding that the agency is reviewing its internal processes to strengthen its ability to identify and act on utilities' corrective action programs. NRC staff agreed that they need to do a better job of making utilities fix their problems and bring to management's attention those utilities that are not responsive. NRC is examining its inspection, enforcement, and plant performance assessment programs to, in part, address these issues. These efforts show a commitment by NRC to strengthen its oversight. In doing so, NRC must hold utilities accountable for fixing problems more promptly and addressing management issues more directly.

NRC's Culture and Organizational Structure Impede Effective Actions

At the heart of safe plant operations is NRC's holding utilities accountable for fixing problems more promptly and addressing management issues more directly. The need to ensure that NRC's regulatory programs work as effectively as possible is extremely important, particularly in light of major

changes taking place in the electric utility industry. Yet changing NRC's culture will not be easy. Six major reviews conducted since 1979 found chronic and significant problems with NRC's regulatory culture. The most recent review, sponsored by the industry and completed in October 1994, concluded that NRC had been unable or unwilling to address its own problems. The 1994 review also found that NRC's management did not adequately control and oversee its own staff, programs, and operations and that each NRC unit acted somewhat independently, resulting in decisions that often conflicted with one another. The review also found that because of significant duplication and conflict in roles and responsibilities among various NRC offices, licensees had differing relationships with the offices, leading to confusion in regulatory interpretations.

Since the 1994 review, NRC has taken various actions to improve its organization and culture. For example, in August 1995, NRC initiated the Strategic Assessment and Rebaselining Project to streamline its operations. This effort was intended to take a new look at NRC, redefine the basic nature of the work and the means by which that work is accomplished, and apply the redefined activities to a rigorous screening

to produce a new set of assumptions, goals, and strategies (rebaseline). The rebaselining project provided the foundation for NRC to implement the Government Performance and Results Act and to develop an agencywide planning, budgeting, and performance management process that builds in accountability and self-assessment and provides a mechanism for NRC to refocus its efforts and resources in response to change. In 1996, NRC began to strengthen its skills in certain key processes and to identify opportunities for efficiency and effectiveness.

Despite these activities, in the fall of 1997, NRC's OIG surveyed NRC staff to obtain their views on the agency's safety culture. In its June 1998 report, the OIG noted that the staff had a strong commitment to protecting public health and safety but expressed high levels of uncertainty and confusion about the new directions in regulatory practices and challenges facing the agency. The employees said that, in their view, they spend too much time on paperwork that may not contribute to the safety mission of the organization. From the results of the survey as a whole, the OIG concluded that without significant and meaningful improvement in management's leadership, employees'

involvement, and communication, NRC's current climate could eventually erode the employees' outlook and commitment to doing their job.

Related GAO Products

Results Act: NRC's Annual Performance Plan for Fiscal Year 1999 (GAO/RCED-98-195R, May 27, 1998).

Nuclear Regulation: Preventing Problem Plants Requires More Effective NRC Action (GAO/RCED-97-145, May 30, 1997).

Nuclear Regulatory Commission: Preventing Problem Plants Requires More Effective Action by NRC (GAO/T-RCED-98-252, July 30, 1998).

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