

GAO

Report to the Ranking Minority Member,
Committee on Commerce, House of
Representatives

October 1995

NUCLEAR REGULATION

Weaknesses in NRC's Inspection Program at a South Texas Nuclear Power Plant





United States
General Accounting Office
Washington, D.C. 20548

**Resources, Community, and
Economic Development Division**

B-262200

October 3, 1995

The Honorable John D. Dingell
Ranking Minority Member
Committee on Commerce
House of Representatives

Dear Mr. Dingell:

This report responds to your request for information about the circumstances surrounding the shutdown of the South Texas Project Electric Generating Station, a nuclear plant located in Matagorda County, Texas, and the effectiveness of the Nuclear Regulatory Commission's inspection program at the plant. The two-reactor plant was off-line for over a year after its shutdown in February 1993.

Unless you publicly announce its contents earlier, we plan no further distribution of this report until 15 days after the date of this letter. At that time, we will send copies to appropriate congressional committees, the Chairman of the Nuclear Regulatory Commission, and other interested parties. We will also make copies available to others upon request.

Please call me at (202) 512-3841 if you or your staff have any questions. Major contributors to this report are listed in appendix III.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'Victor S. Rezendes'.

Victor S. Rezendes
Director, Energy and
Science Issues

Executive Summary

Purpose

In February 1993, the operator (licensee) of the South Texas Project Electric Generating Station—a nuclear power plant—shut down its two reactors because of continuing malfunctions with a portion of the reactors' emergency equipment. The plant, located near Houston, Texas, was shut down for over a year to correct these and other problems.

Citing a long history of problems in the design, construction, and operation of the plant, the Ranking Minority Member of the House Committee on Commerce asked GAO to (1) identify the circumstances surrounding the shutdown of the plant and the seriousness of the event, (2) determine whether the Nuclear Regulatory Commission (NRC) was aware of problems at the plant before the shutdown, and (3) identify any factors that may have prevented NRC from having complete and timely information about the licensee's performance. As requested, this report also contains a chronology of events at the plant between January 1983 and March 1995.

Background

The two reactors at the South Texas plant have emergency systems, including (1) pumps for cooling the reactors and (2) generators to power these pumps and other emergency systems during an electricity blackout.¹ Licensees are responsible for the safe operation of nuclear plants, including the proper functioning of a reactor's equipment. NRC inspects plants to help ensure that they are being operated safely and to help prevent "significant events" from occurring. A significant event is one that could damage a reactor's core and possibly result in a release of radioactive material. If NRC finds problems at a plant, it can take enforcement actions against the licensee.

Results in Brief

Malfunctioning emergency pumps caused the South Texas licensee to shut down the plant's reactors. NRC later determined that one reactor's pump and two of its three generators had been simultaneously inoperable for extended periods. These equipment outages violated several NRC requirements for the safe operation of the reactor and substantially increased the likelihood that the reactor's core could be damaged in an emergency. While the risk increased, according to NRC there was little chance of an accident at the site because of multiple safety features in the reactor's design. Nevertheless, NRC viewed the equipment problems as

¹The reactors have numerous pumps and generators that are unrelated to those discussed in this report. This report generally refers to each reactor's turbine-driven auxiliary feedwater pump as "the pump" and to the standby diesel generators as "the generators."

indicative of deeper problems in the licensee's operation of the plant and fined the licensee \$325,000.

NRC was aware of problems with both reactors' pumps and of maintenance work taking place on one reactor's generators before the plant's shutdown, but NRC did not realize that one reactor's pump and two of its generators were simultaneously inoperable. In such situations, NRC requires the reactor to be shut down. This situation is not unique. Because the licensees are ultimately responsible for the safe operation of their facilities, NRC relies heavily on them to identify and report problems. NRC inspects only a small portion of each licensee's activities to provide independent assurance that the licensees are operating their facilities safely. According to NRC, it rarely detects major problems before its licensees do. Furthermore, although NRC was aware of other long-standing management and technical problems and a decline in the licensee's performance, it did not know the magnitude of these problems until April 1993, when NRC completed a comprehensive evaluation of the plant. As a result of the evaluation, NRC (1) revised its overall assessment of the licensee's performance from good to poor and declining and (2) included the plant on its list of plants requiring additional oversight. According to NRC, the problems with one reactor's pump and generators were but two examples of the licensee's overall poor performance. NRC removed the plant from its list of problem facilities in January 1995. According to NRC, increased oversight was no longer needed because the licensee had, among other things, substantially corrected the weaknesses and underlying root causes that had led to previous problems at the plant.

In March 1995, NRC completed a self-assessment that identified several weaknesses in its inspection program at the plant. For example, NRC found that problems at the plant had been identified repeatedly over a period of years, but the agency had not adequately integrated this information to determine whether the problems indicated systemic weaknesses in the licensee's operations. Furthermore, according to NRC it did not ensure that the licensee had corrected identified problems. NRC reported that these and other weaknesses in the program resulted in missed opportunities to (1) provide a clear and early message to the South Texas plant's licensee about the extent of its performance problems and (2) highlight continuing problems with the licensee's performance within NRC. NRC has taken several actions, and has planned others, to address these weaknesses.

Principal Findings

NRC Found Several Safety Violations but Considered an Accident Unlikely

The licensee shut down both reactors because of continuing problems with their emergency pumps. NRC requires the reactor to be shut down if its pump is inoperable for more than 3 days. NRC later found that one reactor's pump had been inoperable for about 40 days. Two of the reactor's three generators had also been inoperable during portions of this period. One generator was inoperable for 24 days; the other was inoperable for 61 hours. The inoperability of the generators, which violated additional safety requirements, occurred because of shortcomings in the licensee's operation of the plant. For example, the licensee repainted one generator but did not test it to ensure that it worked before (1) returning it to service or (2) removing the reactor's second generator from service for routine maintenance.

The risk of damaging the reactor's core increased from about 1 chance in 5 million to about 1 chance in 83,000 during the period when two or more of the reactor's emergency systems were not working. However, while the risk increased, NRC considered that an accident was unlikely because of the reactor's multiple safety features. For example, according to NRC it was unlikely that the reactor's emergency generators would have been needed because the plant has eight sources of off-site power to avoid an electricity blackout, while most other nuclear plants have fewer sources. However, although NRC considered an accident unlikely, it viewed the equipment outages as indicating overall "sloppiness" in the licensee's operation of the plant. NRC fined the licensee for, among other things, performing improper tests and maintenance of the equipment and for having inoperable equipment well beyond the time frames established for the mandatory shutdown of the reactor.

NRC Was Not Fully Aware of the Licensee's Performance Problems Before the Shutdown

NRC was aware of long-standing malfunctions with the reactors' pumps, including problems with one reactor's pump in the 3-day period preceding the shutdown. However, it was not until after the shutdown that NRC found, among other things, that the licensee had not conducted a valid test of the reactor's pump since December 26, 1992. NRC also knew that the licensee was performing maintenance on the reactor's generators. However, the agency did not know that, in addition to the problems with the pump, (1) painting had immobilized one generator for 24 days and (2) the licensee had removed another generator from service for 61

hours—conditions that substantially increased the likelihood of a core-damaging event at the plant. Although one purpose of NRC’s inspection program is to prevent significant events at plants, in practice NRC rarely detects such events before its licensees do. All 16 significant events that NRC reported for 1993, including the event in South Texas, were initially identified by the licensees rather than by NRC. This situation is unlikely to change because, according to NRC, it has initiatives under way to rely more heavily on licensees to identify and correct problems at nuclear plants.

Similarly, although NRC was aware of other long-standing problems at the plant, the agency did not know the magnitude of the problems until about 2 months after the shutdown. In July 1992, NRC had rated the licensee as a good performer. However, in January 1993—a month before the shutdown—NRC decided to conduct a comprehensive evaluation of the plant to obtain a better understanding of the licensee’s performance. This evaluation—completed in April 1993—identified systemic, long-term problems in the licensee’s operations, maintenance and testing, engineering support, and corrective action programs. As a result, NRC (1) revised its assessment of the licensee’s overall performance and (2) included the plant on its list of problem plants. The licensee restarted the two reactors in February 1994 and May 1994 after NRC agreed that the licensee had completed all actions required for restarting the reactors. In January 1995, NRC removed the plant from its list of problem plants. According to NRC, its increased oversight was no longer needed because the licensee, among other things, had (1) substantially corrected the weaknesses and underlying root causes that had led to the plant’s previous problems and (2) upgraded the reliability of the equipment.

Recent Self-Assessment Identified Weaknesses in NRC’s Inspection Program at the South Texas Plant

According to NRC’s March 1995 self-assessment, one factor that prevented the agency from being aware of the licensee’s problems in a timely manner was a lack of integration within the agency of the available information on the licensee’s problems in operating the plant. For example, NRC found that most of the systemic concerns raised in its April 1993 post-shutdown inspection were “either known or recognizable as issues with roots in previous NRC inspection findings.” However, NRC did not adequately use the findings in assessing the licensee’s overall performance. Furthermore, NRC found that it had not ensured that the licensee had corrected identified problems. Instead, according to NRC, it relied on the licensee’s programs and commitment to correct recurring problems, which, in retrospect, were not effective. As a result, NRC found that it had missed opportunities to

arrive at a fuller and more timely assessment of the extent and depth of the licensee's overall performance problems.

In an effort to address weaknesses in its inspection program, NRC plans to initiate a new inspection activity—termed an “integrated performance assessment process”—to improve its information about the licensees’ performance. According to NRC, the new activity will assess performance using information such as the facilities’ operational reports and data, inspection results, and the licensees’ self-assessments. NRC has also taken steps to better focus inspections on the licensees’ efforts to correct identified problems. The effectiveness of these and other planned actions will depend, to a great extent, on NRC’s ongoing initiatives to rely more heavily on the licensees to identify problems at the plants.

Recommendations

GAO is making no recommendations.

Agency Comments

GAO provided copies of a draft of this report to NRC for its review and comment. NRC provided written comments that generally agreed with the report’s findings and conclusions. However, NRC stated that GAO had misstated the purpose of its inspection program. Specifically, NRC said that the licensees are responsible for the safe operation of their plants and implied that the intent of its inspection program is limited to ensuring that the licensees identify and resolve potential safety issues before they result in significant problems. GAO’s report clearly indicates that (1) the licensees are ultimately responsible for the safe operation of their facilities and (2) NRC’s inspection program is intended to obtain independent assurance that the licensees are operating their facilities safely. However, as discussed in GAO’s report and NRC’s own 1994 annual report, NRC’s inspection program is also “intended to anticipate and preclude significant events and problems by identifying underlying safety problems.” NRC’s comments and GAO’s response to them are included in appendix II and discussed at the end of chapter 3. NRC also suggested a number of editorial and technical changes to clarify information in the report. These changes have been incorporated, as appropriate, into the report.

GAO also met with officials of the licensee, including the Group Vice President of the Houston Lighting and Power Company, to discuss their comments on the draft report. These officials concurred with the report’s findings and conclusions. They suggested several minor changes to clarify the report, which have been incorporated where appropriate.

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Abbreviations

GAO	General Accounting Office
NRC	Nuclear Regulatory Commission
OI	Office of Investigations

Introduction

The Atomic Energy Act of 1954, as amended, authorizes the Nuclear Regulatory Commission (NRC) to license, regulate, and inspect the design, construction, and operation of domestic nuclear power plants. NRC has, among other things, established regulations for the safe operation of the 109 nuclear reactors operating in the United States as of December 31, 1994. For example, NRC requires nuclear reactors to have multiple safety systems to control and contain the radioactive materials used in each plant's operation. NRC also requires its licensees to test and maintain safety equipment to help ensure that this equipment, such as a reactor's emergency safety systems, will operate when needed. The requirements are intended to protect workers and the public from the harmful effects of radiation.

Reactors have specific operating requirements (technical specifications) depending on their design. These requirements are intended to provide a high margin of safety under all operating scenarios. NRC evaluates a reactor's design and related technical specifications when it licenses the reactor's operation. Once approved, these specifications become the requirements for the operation of the reactor. If certain requirements cannot be met, NRC requires the licensed operator (licensee) of the reactor to promptly shut it down.

NRC's Inspection Program

Because the licensees are ultimately responsible for the safe operation of their facilities, NRC relies heavily on them to identify and report problems at their facilities. However, NRC inspects a small portion of each licensee's activities to provide independent assurance that the licensees are operating their facilities safely. According to NRC's 1994 annual report, the agency's inspection program is also intended to identify underlying safety problems at a plant and, by so doing, to anticipate and prevent "significant events"—events that could damage a reactor's core and that could result in a release of radioactive materials.¹ NRC also uses its inspection results to (1) assess each licensee's performance, (2) provide feedback to the licensees about their performance, and (3) allocate its inspection resources among facilities.

At each nuclear facility, daily inspections are conducted by one to three resident NRC inspectors. The resident inspectors observe a variety of activities, including the licensee's (1) operation of the plant's control room and (2) testing and maintenance of selected equipment. NRC's regional and headquarters inspection staff supplement the resident inspectors' efforts

¹We refer to such situations as potential "core-damaging events."

and conduct more detailed reviews of selected areas.² If NRC finds that a licensee has violated its requirements for safe operation, it can take enforcement actions against the licensee. NRC categorizes violations according to four levels of severity—level I violations are the most serious and level IV violations are the least serious.³ Once NRC finds a violation and determines the severity, it can issue a notice of violation and impose a civil penalty (fine) or require the plant to stop operations.⁴

The South Texas Project Electric Generating Plant

The South Texas Project Electric Generating Station (South Texas plant) is located 87 miles southwest of Houston, Texas, in Matagorda County. The plant is owned by the Houston Lighting and Power Company, the cities of San Antonio and Austin, and the Central Power and Light Company. The Houston Lighting and Power Company is the licensed operator of the plant.

The plant has two reactors. The first reactor (unit 1) was started up in March 1988 and the second (unit 2) in March 1989.

Each of the reactors at the South Texas plant has emergency safety systems, including an auxiliary feedwater (water pumping) system and standby diesel generators, for cooling the reactors. Normally idle, the systems are designed to be activated during any emergency that disrupts the reactors' primary cooling systems. The auxiliary feedwater system for each of the South Texas plant's reactors has four pumps. One of the pumps—the turbine-driven auxiliary feedwater pump—is powered by steam, and the other three pumps are powered by electric motors that normally receive electricity from the plant's main generator or from off-site sources of electricity. As figure 1.1 shows, if electricity cannot be obtained from either of these sources—a condition called a “loss of off-site power”—each reactor has three generators for operating its three motor-driven auxiliary feedwater pumps and other emergency systems.⁵

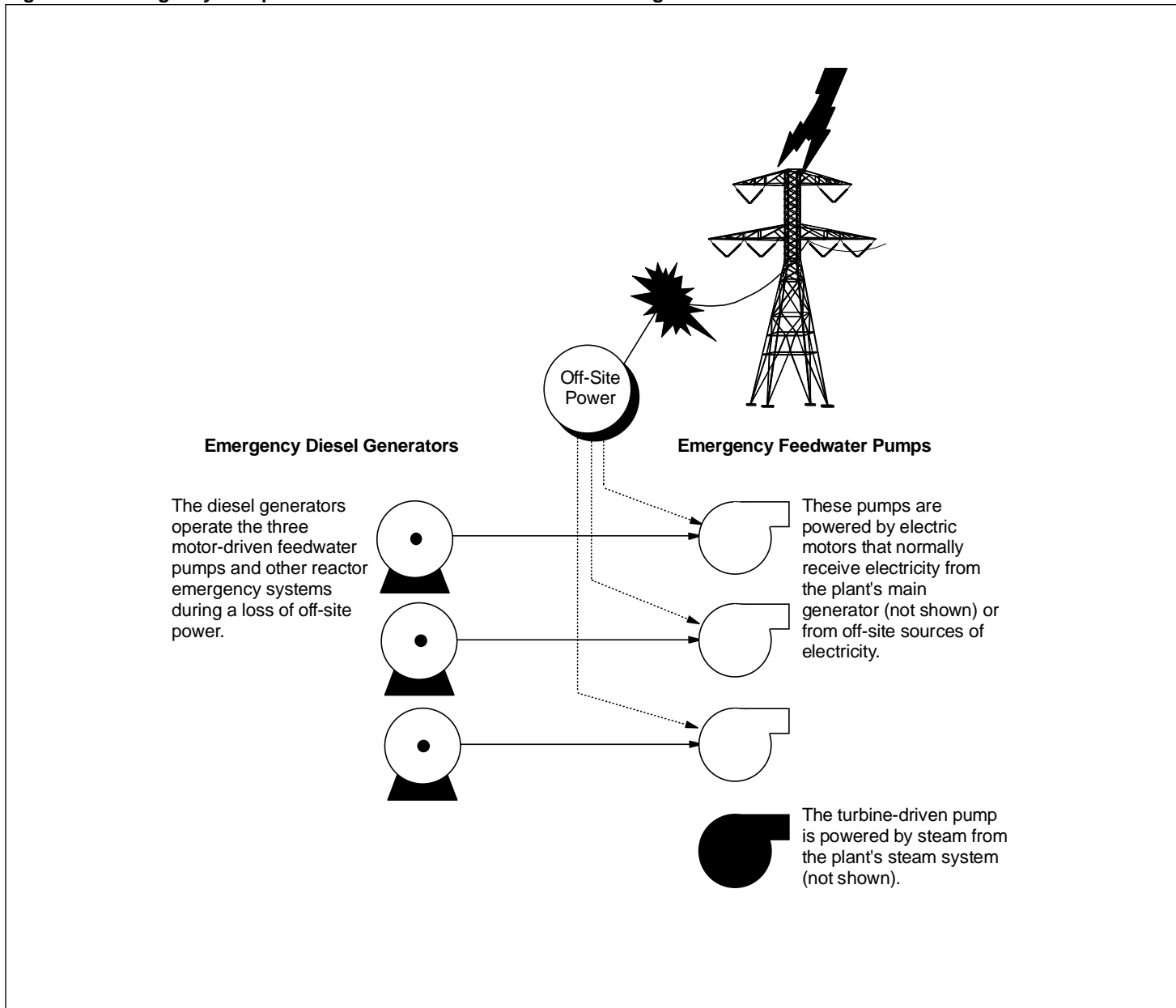
²Regional inspectors for the South Texas plant are based in NRC's Arlington, Texas, office. (This region is commonly referred to as the “Dallas Region.”) NRC headquarters staff are primarily located in Rockville, Maryland.

³NRC considers severity level I, II, and III violations “escalated enforcement actions.”

⁴While NRC is authorized to shut down nuclear facilities, it has only done so once. NRC ordered the Peach Bottom Plant in Pennsylvania to shut down in 1987 after finding that personnel in the control room were sleeping on the job.

⁵The plant has numerous pumps and generators that are unrelated to those discussed in this report. To simplify our discussion, this report generally refers to each reactor's turbine-driven auxiliary feedwater pump as “the pump.” Similarly, we generally refer to the diesel generators as “the generators.”

Figure 1.1: Emergency Pumps and Generators Available for Use During a Loss of Off-Site Power



On February 4, 1993, the licensee at the South Texas plant informed NRC that it was shutting down the unit-1 reactor because of continuing malfunctions with the reactor's turbine-driven auxiliary pump. And,

although the unit-2 reactor had already been shut down for other reasons, the licensee decided not to return the reactor to service because of similar problems with its pump.

Objectives, Scope, and Methodology

The Ranking Minority Member of the House Committee on Commerce asked us to (1) identify the circumstances surrounding the shutdown of the South Texas plant and the seriousness of the event, (2) determine whether NRC was aware of problems at the plant before the shutdown, and (3) identify any factors that may have prevented NRC from having complete and timely information about the licensee's performance.

To identify the circumstances surrounding the plant's shutdown, we reviewed the licensee's reports on the events and NRC's documentation of, among other things, the plant's operating requirements; reports by NRC's resident, regional, and headquarters inspectors; enforcement actions at the plant; and NRC's information notices describing problems with pumps and other relevant emergency equipment at nuclear plants. To determine the seriousness of the events leading to the shutdown, we reviewed NRC's assessment of the possible danger to the public and the environment. We supplemented this information through interviews with NRC headquarters officials in the Office of Nuclear Reactor Regulation and the Office for Analysis and Evaluation of Operational Data, regional officials, and NRC resident inspectors and officials of the licensee at the plant.

To determine whether NRC was aware of problems at the plant before the shutdown, we examined reports by NRC's resident, regional, and headquarters inspectors; minutes from senior NRC management meetings at which the licensee's performance was discussed; NRC's ratings of the licensee over several years; and special NRC evaluations conducted at the South Texas plant after the shutdown. We also reviewed the licensee's memorandums and other documentation responding to NRC's findings. We supplemented this information through discussions with NRC's resident, regional, and headquarters staff and officials representing the licensee.

We used information obtained for the earlier two objectives to identify the factors that may have prevented NRC from having complete and timely information about the licensee's performance. We supplemented our analysis by reviewing NRC's special evaluations—including a March 1995 NRC report evaluating the effectiveness of its inspection program at the plant—to more fully assess NRC's (1) knowledge about the number and nature of problems at the plant and (2) actions to both alert the licensee of

the problems and ensure that the problems had been corrected. In addition, we used an NRC computerized database, NRC's guidelines on staffing of inspectors, and interviews with NRC resident inspectors and regional officials to assess the extent and adequacy of NRC's inspection presence at the plant. We did not attempt to verify the accuracy of NRC's data on the number of hours spent inspecting the plant. However, our findings were consistent with testimonial evidence from cognizant NRC staff and with findings about staffing at the plant from NRC's special evaluation.

We conducted our work from May 1994 through September 1995 in accordance with generally accepted government auditing standards. We provided a draft of our report to NRC for its review and comment. NRC provided written comments to clarify information in the report. NRC's comments are included in appendix II and discussed in chapter 3 of the report. We also met with officials of the licensee, including the Group Vice President of the Houston Lighting and Power Company, to discuss their comments on our draft report. These officials provided several minor comments to clarify the report. We addressed NRC's and the licensee's comments, as appropriate, in the report.

Malfunctioning Pumps Caused the Shutdown, but NRC Found Several Safety Violations Indicating Systemic Problems

The South Texas licensee shut down the plant's two reactors in February 1993 because of continuing problems with the emergency pumps. However, when NRC reviewed the circumstances surrounding the shutdown, it determined that the unit-1 reactor's pump had been inoperable for a period of about 40 days—long past the time requiring shutdown. In addition, NRC found that two of the reactor's three standby diesel generators were also inoperable during portions of this period. The extended inoperability of the emergency equipment (1) violated several requirements for the safe operation of the reactor and (2) substantially increased the risk of an accident at the site. According to NRC, an accident was unlikely because of multiple safety features in the reactor's design. Nevertheless, NRC viewed the equipment problems as significant and indicative of systemic problems in the licensee's operation of the plant. NRC issued a notice of violation and fined the licensee for, among other things, multiple violations related to the testing and maintenance of the equipment. The licensee concurred with NRC's findings.

Malfunctioning Pumps Caused the Licensee to Shut Down the South Texas Plant

In a routine test of a portion of the unit-1 reactor's auxiliary feedwater system on February 1, 1993, the licensee found that the turbine-driven pump was inoperable because of a mechanical failure with a valve associated with the turbine. Two days later, the licensee found similar malfunctions in the unit-2 reactor's turbine-driven emergency pump. NRC's requirements for the safe operation of the South Texas plant's reactors require the licensee to begin to shut down a reactor if its turbine-driven pump is inoperable for more than 3 days. On February 4, 1993, the licensee informed NRC that it had not been able to restore the unit-1 reactor's pump to working order; as a result, the licensee shut the reactor down. In addition, the licensee decided not to return the unit-2 reactor to service because of similar problems with its pump.¹

Post-Shutdown NRC Inspection Disclosed Several Safety Violations

NRC investigated the circumstances surrounding the plant's shutdown and found that the licensee had violated the agency's requirements for the safe operation of the unit-1 reactor. Specifically, although the licensee shut down this reactor within 3 days of determining that its pump was inoperable, an NRC inspection team found that the pump actually had been

¹The unit-2 reactor had tripped on February 3, 1993, because of equipment problems unrelated to the reactor's turbine-driven pump. The trip automatically removed the reactor from full-power operation. The licensee initiated actions to correct the problems and return the reactor to full operation. However, in the interim, the reactor's pump malfunctioned after receiving a signal to start. According to a representative of the licensee, the licensee decided to completely shutdown the unit-2 reactor after finding that both reactors were experiencing similar problems with their pumps.

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Shutdown, but NRC Found Several Safety
Violations Indicating Systemic Problems

inoperable from December 26, 1992, until February 4, 1993—or about 37 days beyond the 3-day time frame that requires the reactor’s shutdown.²

At the same time, NRC’s inspectors found that two of the three standby diesel generators that are intended to supply power to the unit-1 reactor’s emergency systems during a loss of off-site power were also inoperable during portions of this period. The fact that the generators were inoperable violated two additional requirements for the safe operation of the reactor and, consequently, also should have caused the licensee to shut the reactor down.

NRC’s requirements for the safe operation of the reactor specify that the licensee must begin to shut down the reactor if any one of its three generators is out of service for longer than 3 days. The licensee took one of the unit-1 reactor’s generators out of service for painting between December 29, 1992, and December 31, 1992. The equipment was returned to service within 3 days. However, NRC’s inspectors subsequently determined that the licensee did not test the generator to ensure that it worked until January 20, 1993. That test revealed that paint had dripped onto critical parts of the equipment, rendering the generator inoperable. The licensee cleaned the generator and, on January 22, 1993, returned it to service. NRC’s inspectors concluded that the generator had been inoperable for 24 days between December 29, 1992, and January 22, 1993, or 21 days beyond the time frame requiring shutdown. If the unit-1 reactor had lost off-site power during this period, a maximum of two diesel generators would have been available to provide power to its emergency systems.

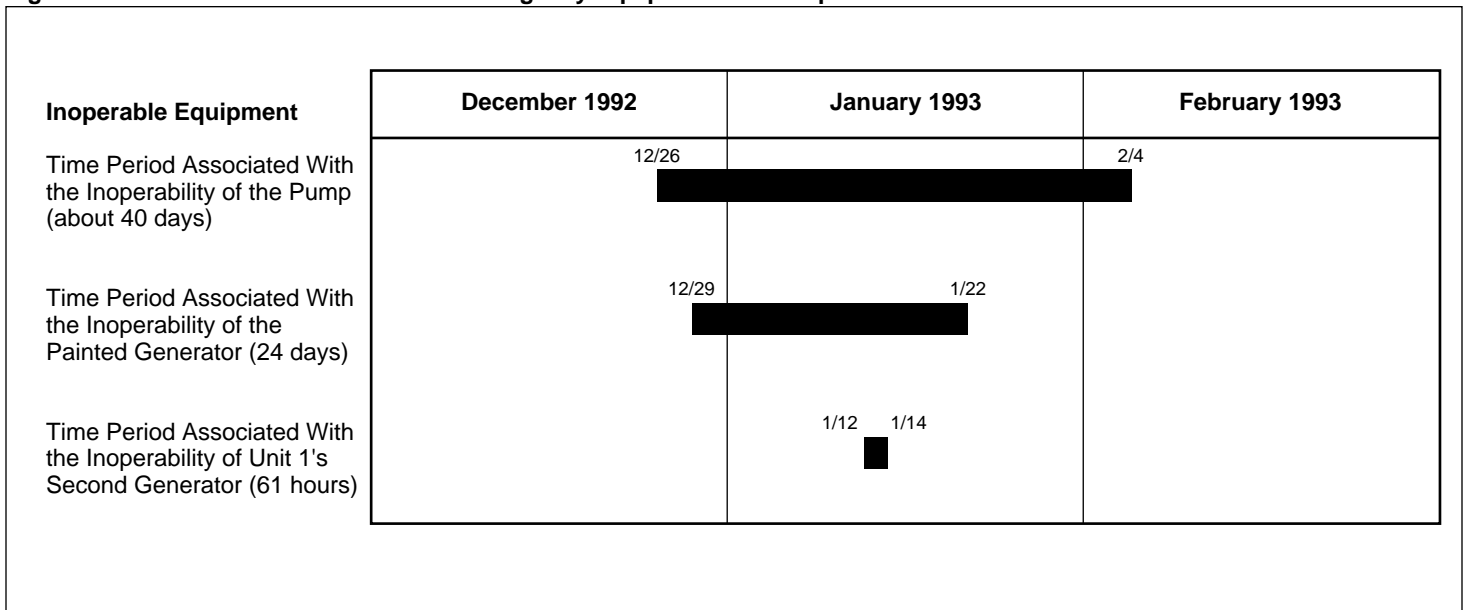
An additional violation occurred when, unaware that the painted generator was not working, the licensee removed another of the reactor’s generators from service for other maintenance. NRC’s requirements for the safe operation of the reactor specify that the licensee must begin shutting down the reactor if two generators are inoperable for over 2 hours. The second generator was off-line for 61 hours between January 12 and January 14, 1993, overlapping the period in which the painted generator was inoperable. Consequently, the reactor operated for about 59 hours beyond the time frame requiring its shutdown. If the reactor had lost

²According to NRC, the reactor’s pump was inoperable “from December 26, 1992, until February 4, 1993, a period of 33 days.” There are between 39 and 41 days in this period, depending on whether the start and end dates of the period are included. We discussed this discrepancy with a member of NRC’s inspection team. He told us that NRC excluded the 3-day periods following two unsuccessful tests of the pump (on Jan. 28 and Feb. 1, 1993) because NRC allows the pump to be inoperable for up to 3 days before shutdown is initiated. While this is true, as we discuss later NRC also found that (1) improper tests had masked problems with the pump and (2) the licensee had not performed a valid test of the pump since December 26, 1992. As a result, the pump appears to have been inoperable for at least 40 days, or 37 days beyond the time requiring the shutdown of the reactor.

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off-site power during this 61-hour period, only one generator would have been available to provide power to the reactor's emergency systems. Figure 2.1 shows when the reactor's emergency equipment was inoperable.

Figure 2.1: Periods When the Reactor's Emergency Equipment Was Inoperable



**The Inoperable
Equipment Increased
Risk, but NRC
Considered an
Accident Unlikely**

No emergency occurred in the unit-1 reactor's primary cooling system between December 26, 1992, and February 4, 1993, when one or more components of the emergency equipment was inoperable. Consequently, the equipment's condition had no adverse affect on the reactor's safe operation. However, according to NRC, if an emergency had occurred, the licensee's ability to respond effectively would have been impaired because the equipment would not have operated as intended. NRC viewed the fact that key components of the reactor's emergency equipment were simultaneously not working as a significant event that could have damaged the reactor's core.

According to NRC, when all of the reactor's equipment is working properly, the chance that an accident will occur is about 1 in 5 million. NRC's calculations indicate that the risk of experiencing an accident increased to about 1 chance in 83,000 during the approximate 24-day period when two

or more of the reactor's emergency components were inoperable.³ While the risk of an accident increased, according to NRC the likelihood of such an event remained small because of the multiple safety features in the reactor's design. For example, even though NRC's requirements for the safe operation of the reactor specify that the licensee must begin shutting the reactor down if the pump is inoperable for 3 or more days, according to NRC—except for the 61-hour period when two generators were also inoperable—any two of the reactor's three motor-driven auxiliary pumps could have supplied enough water to cool the reactor if the plant had lost off-site power.⁴ And, if the licensee had lost off-site power during the 61 hours when only one generator was available, according to NRC the licensee would have had sufficient time to connect other equipment for cooling the reactor. Finally, although NRC requires the licensee to begin to shut down the reactor if (1) any one of its three generators is inoperable for 3 or more days or (2) two generators are inoperable for over 2 hours, NRC considered it unlikely that the generators would have been needed because the plant has eight different sources of off-site power.⁵

NRC Viewed the Equipment Problems as Indicating Deeper Problems in the Plant's Operations

Although the risk of an accident may have been low, the equipment problems were particularly troublesome because NRC had previously alerted all licensees about the need to test emergency pumps under normal standby conditions and to ensure that painting would not immobilize a reactor's emergency generators. In its April 1993 post-shutdown review of the South Texas plant, NRC found that improper testing had masked problems with the pumps and improper painting had immobilized a generator. These equipment outages, NRC concluded, indicated systemic problems at the plant. NRC fined the licensee for, among other things, multiple violations related to the testing and maintenance of the emergency equipment.

The Licensee Did Not Test the Pumps Under Conditions That Would Have Detected the Problems

NRC's requirements for the safe operation of the South Texas plant's reactors specify that the licensee must test the pumps monthly to ensure that they will work properly in an emergency. According to NRC, the tests must be conducted under "suitable environmental conditions." In addition, NRC requires that equipment failures, malfunctions, and other deficiencies be promptly identified and corrected.

³We were unable to determine if NRC evaluated the increased risk associated with the remaining 16-day period when only the pump was inoperable.

⁴As discussed earlier, the motor-driven auxiliary feedwater pumps receive power from the generators during a loss of off-site power.

⁵According to NRC, nuclear plants typically have two or more sources of off-site power, which, in NRC's view, provide a sufficient margin of safety.

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Shutdown, but NRC Found Several Safety
Violations Indicating Systemic Problems

The licensee tested the unit-1 reactor's pump on numerous occasions between the end of December 1992 and early February 1993, when it became aware that problems with the pump warranted shutting the reactor down. The first test occurred on December 27, 1992. The pump immediately malfunctioned. The licensee restarted the pump twice before repeating the test. The subsequent test was successful, and the licensee concluded that the pump was functioning properly. The licensee conducted its next monthly test of the pump on January 28, 1993. Once again, the pump malfunctioned immediately. The licensee worked on the pump for 3 days and retested it on January 30, 1993. The test was successful and the licensee declared the pump to be in working order. However, in view of the pump's earlier problems, on February 1, 1993, the plant's operations manager directed that the pump be tested again. The pump failed to start. Three days later, the malfunction still had not been corrected, so the licensee shut down the reactor.⁶

In analyzing the events leading to the unit-1 reactor's shutdown, NRC's inspectors determined that condensation—resulting, in part, from an improperly adjusted valve—had contributed to the pump's malfunction. The inspectors determined that the licensee's testing program had not been sufficiently rigorous to detect the problem. Specifically, although an emergency start-up would usually occur when the pump was idle or cold, the tests were not performed under these conditions. While the licensee's tests were initially performed when the pump was cold, NRC's inspectors found that the licensee had not returned the pump to its normal standby temperature before retesting it after the initial tests had failed.

According to NRC's inspectors, the improper tests masked obvious problems with the pump. Specifically, NRC inspectors found that the licensee's cold starts of the pump between the end of December 1992 and early February 1993 were routinely unsuccessful. Yet, following several restart attempts, the pump would start because the heat produced by earlier restarts had dissipated condensation in the system. This finding was meaningful because, in March 1988, NRC had informed all licensees that condensation resulting from the improper adjustment of the valves on a reactor's pump had caused similar malfunctions at another nuclear power plant. NRC suggested that all licensees take appropriate action, such as quick starts from cold conditions, to detect the problem. At the South Texas plant, NRC concluded, among other things, that (1) the licensee had not conducted a valid test of the first reactor's pump since December 26,

⁶As discussed earlier, the licensee also shut down the second reactor because of similar malfunctions with that reactor's turbine-driven pump.

1992, and (2) because of inadequate testing and maintenance, the problems with both reactors' pumps had not been resolved.

The licensee concurred with NRC's findings about the pumps' problems. Specifically, it agreed that, among other things, its (1) work processes had not ensured the proper adjustment of the valve, (2) corrective action program had not recognized that the pumps' repeated malfunctions were evidence of a recurring problem warranting resolution, and (3) testing program had not been adequate to identify the pumps' malfunction.

The Licensee Did Not Adequately Supervise Painting and Did Not Test the Generator to Ensure That It Worked

NRC requires that activities that could affect safety—such as painting and other maintenance—be conducted in accordance with documented procedures that, among other things, ensure that the maintenance is satisfactorily performed. The licensee's statement of work for the painting specified that the generator's moving parts must be protected from paint and that the generator must be tested after painting to ensure that it worked. However, NRC's inspectors found that the licensee did not ensure that the painting had been satisfactorily accomplished. For example, NRC found that although plant personnel pointed out areas, such as moving parts, that were not to be painted by the contract painters, the licensee did not adequately oversee the painting to ensure that precautions were being taken to, among other things, ensure the integrity of the generator's moving parts. In addition, NRC found that the licensee did not conduct a post-maintenance test to ensure that the generator worked before (1) returning it to service or (2) removing another generator from service for other maintenance because a plant employee had mistakenly concluded that the test was not necessary. NRC concluded that the painted generator had been inoperable for a total of 24 days before it was cleaned and returned to service on January 22, 1993. NRC's findings about the painted generator were particularly troublesome because, in July 1991, NRC had informed all licensees that improper painting had immobilized generators at two other nuclear plants and recommended that licensees take appropriate action to avoid the problem.

The licensee concurred with NRC's findings about the painted generator. According to the licensee, it was not aware that the painted generator was not working when it returned the generator to service or when it removed the reactor's second generator from service, in part because of (1) inadequacies in its controls over work processes at the plant, (2) the inappropriate omission of the post-maintenance test and, (3) the

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inadequate implementation of NRC's warning about the lessons learned by other licensees who had experienced similar problems.

NRC Took Enforcement
Action Against the South
Texas Licensee

According to NRC's Director for Inspection and Support Programs, Office of Nuclear Reactor Regulation, the agency was concerned because it considered the outages of the pumps and generator indicative of (1) systemic problems at the plant, including a failure to adequately test and maintain emergency equipment and (2) an overall "sloppiness" in the licensee's operation of the plant. NRC issued a notice of violation that categorized its concerns as "significant from a regulatory standpoint"—a severity level III violation. NRC also fined the licensee \$325,000 for multiple violations related to the testing and maintenance of both reactors' pumps and the unit-1 reactor's generators and the lengthy inoperability of the unit-1 reactor's emergency equipment beyond the time frames established for the reactor's shutdown.

NRC Was Not Fully Aware of the Problems at the South Texas Plant

While NRC was aware of problems with the reactors' pumps in the period preceding the plant's shutdown and knew that the licensee was conducting maintenance on the unit-1 reactor's generators, the agency did not realize the full extent of the problems. For example, before the shutdown, NRC did not know that the licensee's maintenance on two of the reactor's generators—combined with the reactor's malfunctioning pump—had resulted in the simultaneous inoperability of three of the reactor's emergency systems. This situation is not unique. According to NRC, its licensees generally detect major problems, including problems that it would classify as "significant," before the agency does. Similarly, while NRC knew about long-standing problems at the plant and had decided to initiate a comprehensive evaluation at the plant, the agency did not know the magnitude of the licensee's overall performance problems until months after the plant's shutdown. The results of that inspection caused NRC to downgrade its assessment of the licensee's performance and to increase regulatory oversight. According to NRC, the problems with the unit-1 reactor's pump and generators were but two examples of the licensee's overall poor performance.

NRC Was Not Fully Aware of the Equipment Problems Related to the Plant's Shutdown

During the 5-year period between January 1, 1988, and February 4, 1993—the day of the shutdown—NRC spent about 23,000 hours inspecting the two reactors at the South Texas plant. The inspections identified numerous problems at the plant, including long-standing problems with the reactors' pumps. Between January 1988 and January 1993, for example, at least six NRC inspection reports documented problems with the reactors' pumps. Most of these problems were documented during the resident inspectors' routine sampling of the licensee's testing, maintenance, and post-maintenance activities at the plant. About a month before the plant was shut down, a regional inspection team documented problems with the unit-2 reactor's pump.

According to the former senior resident inspector at the plant, both he and the other on-site inspector were aware of long-standing malfunctions with the reactors' pumps, including problems with unit-1's pump in the 3-day period preceding the plant's complete shutdown. NRC also was aware that the licensee's troubleshooting and repair activities had not been successful in resolving the malfunction and, consequently, that a shutdown was warranted. While NRC was aware of the problems, it was not until after the shutdown that NRC found that the licensee's improper tests of the pumps had masked problems with the reactors' pumps and that the licensee had not conducted a valid test of unit-1's pump since December 26, 1992.

Furthermore, NRC knew that the licensee was performing maintenance on the diesel generators and, before the painting, had cautioned the licensee about the contents of NRC's information notice describing problems encountered by licensees who had improperly painted their generators. However, it was not until after the shutdown that NRC found that, in addition to the problems with unit-1's pump, (1) painting had immobilized one generator for a period of 24 days or (2) the licensee had removed another generator from service during a portion of that period. Consequently, before the shutdown, NRC did not know that three of the reactor's emergency systems were simultaneously inoperable, a condition that substantially increased the likelihood of a core-damaging event at the plant.

According to NRC, it rarely detects major problems—such as problems that could result in damage to a reactor—before its licensees do. NRC routinely evaluates events experienced at nuclear plants to identify situations that could threaten the public's health and safety. NRC's evaluation for 1993 identified 16 "significant events," including the event at the South Texas plant, that could have damaged a reactor and possibly resulted in a release of radiation.¹ Although NRC's inspection program is intended to, among other things, anticipate and prevent significant events from occurring, none of the 16 events were initially identified by NRC. According to NRC's Director for Inspection and Support Programs, Office of Nuclear Reactor Regulation, it is "reasonably rare" for the agency to detect such problems before a licensee reports them. He said that the purpose of NRC's inspection program is, instead, to ensure that the licensees identify and correct problems that affect the safe operation of their plants. This situation is unlikely to change because, according to NRC officials, the agency has initiatives under way to rely even more heavily on licensees to identify and correct problems at nuclear plants.

¹According to NRC, each of the 16 events occurred at a different reactor.

NRC Was Not Aware of the Magnitude of the Licensee's Overall Performance Problems Until After Shutdown

NRC's rating of the South Texas licensee for the period between January 1989 and January 1990 indicates that the agency considered the licensee to be a "superior" performer. In 1991 and 1992, the licensee's rating declined in several areas. According to NRC, this decline was indicated by, among other things, repeated malfunctions of equipment. The decline in performance was discussed by senior NRC managers at a meeting in 1991.² The managers' concerns were relayed to the licensee, and the licensee initiated programs to correct the problems. Nevertheless, the licensee's performance continued to decline in 1992. For example, in the rating for the assessment period immediately preceding the shutdown (between June 1991 and July 1992), NRC noted that the licensee continued to be challenged by long-standing equipment problems and human errors. Despite this decline in performance in 1991 and 1992, NRC rated the licensee's overall performance as "good" throughout the 2-year period.³

In late 1992, a new regional administrator raised questions about the licensee's performance and determined that there was no consensus on the licensee's performance level within NRC. NRC managers discussed the licensee's performance again in January 1993 and concluded that the licensee's declining performance, while discernible, did not warrant placing it on NRC's list of problem plants. However, the managers decided to conduct a comprehensive inspection—termed a diagnostic evaluation—to obtain a better understanding of the licensee's overall performance. Although this diagnostic evaluation was planned before the February 4, 1993, shutdown, it was performed from March 29 through April 30, 1993—about 2 months later.

NRC Identified Significant, Long-Standing Deficiencies

The 16-member evaluation team of regional and headquarters NRC inspectors and contractor personnel identified significant, long-term deficiencies in the licensee's operations, maintenance, and testing activities and in the engineering support at the plant. According to NRC, the licensee had been aware of many deficiencies for "some time," yet the licensee had not corrected them. For example, NRC's team found

- insufficient plant staff in areas such as operations and engineering,
- some plant equipment in poor material condition,

²NRC's senior managers meet semiannually to, among other things, discuss (1) the safety performance of reactors and (2) plans for overseeing plants with performance problems.

³While NRC rated the licensee's overall performance as good, NRC's 1992 rating pointed out that this was the second consecutive assessment period in which performance had declined and that additional management attention was required to prevent a further decline in performance.

- deficiencies in employees' skills and training, and
- inadequacies in the licensee's identification and correction of some equipment failures.

Regarding staffing, for example, the evaluation team found that heavy workloads and inadequate staff support had adversely affected the safe operation of the plant. According to the team's report,⁴ shift supervisors were frequently consumed with tasks, such as administrative duties, that prevented them from maintaining a broad perspective about the operation of the plant. In addition, according to the team, the plant's operators were "significantly affected" by degraded plant equipment and the administrative burden associated with frequent equipment outages. According to NRC, the inadequate staffing manifested itself in the routine use of overtime and several events at the plant that occurred, in part, because of staff shortages and fatigue. Furthermore, rather than increase staffing, the licensee had reduced the scope and frequency of training to limit employees' absences from their regular duties and thus compensate for the staffing shortages.

NRC's evaluation team also found that staffing in the plant's engineering areas was inadequate to support the plant's operations. The engineers' backlog of work was large and rapidly increasing at the time of NRC's evaluation. According to the team, this backlog caused the engineers to be (1) slow in identifying deficient conditions and (2) "hasty" in investigating the root cause of identified problems. As a result, engineering solutions often corrected the symptom—not the cause—of equipment problems. Furthermore, according to the team, the engineers did not adequately apply the operational experience they had gained in both the industry and at the site, leading to avoidable events and repetitive equipment failures at the plant. Finally, the team found that some engineers at the plant had not been sufficiently trained and lacked the analytical tools necessary to perform some engineering tasks.

The licensee, in an August 1993 response to NRC's evaluation report, indicated that it had already initiated and in several cases completed actions to address NRC's concerns. For example, the licensee stated that it

- had hired senior level managers—with proven track records in the nuclear industry—to facilitate improvement efforts,

⁴Diagnostic Evaluation Team Report on South Texas Project Electric Generating Station, NRC (June 8, 1993).

- had improved staffing at the plant and cancelled work activities that could detract from the operation staff's primary functions of monitoring and controlling the plant's equipment,
- had improved the plant's material condition and reduced the backlog of equipment needing maintenance,
- had improved the effectiveness of its engineering program, and
- was developing (1) a business plan describing its initiatives to effect sustained improvement and its plans for accomplishing the initiatives and (2) an operational readiness plan to address specific issues that needed to be corrected before restarting the reactors.

NRC Revised Licensee's Performance Assessment and Increased Oversight

The diagnostic evaluation caused NRC to revise its assessment of the licensee's performance and add the South Texas plant to its list of problem facilities. A May 1993 NRC memo described the licensee's performance as poor and declining rather than good. According to NRC, the problems with the first reactor's pump and generators were but two examples of the licensee's overall poor performance. To help ensure that unsatisfactory conditions at the plant would not result in a more serious event or accident, in June 1993 NRC placed the South Texas plant on its list of problem plants requiring increased regulatory oversight, including additional NRC inspections.

The South Texas plant remained shut down for over a year to address issues related to the licensee's operation of the plant.⁵ Plant personnel estimated that the reactors' pumps were functioning properly within 3 to 4 months of the plant's shutdown and, according to NRC documentation, the unit-1 reactor's painted generator was cleaned and returned to service within days of the determination that it was inoperable. The remaining time was needed to address NRC's systemic concerns, including (1) the poor material condition of some equipment, (2) deficiencies in the skills and training of employees, and (3) inadequacies in the licensee's identification and correction of problems at the plant. The licensee restarted the unit-1 and unit-2 reactors on February 18, 1994, and May 22, 1994, respectively, after informing NRC that it had completed all actions required for starting up the reactors.⁶

⁵The unit-1 reactor was shut down for about 13 months; the unit-2 reactor was shut down for about 16 months.

⁶After the plant was shut down, NRC issued three letters to the licensee specifying actions that must be completed before restarting the reactors. NRC concurred that the actions had been completed before the licensee reactivated the reactors.

In August 1994, NRC's Dallas region inspected both reactors and concluded that the licensee's performance had improved in virtually all areas. In its October 1994 rating of the plant, NRC also found that the licensee's overall performance had improved. However, according to the rating, several areas—among them the licensee's controls over work processes and corrective action programs—warranted continued management attention.⁷

The Plant Has Been Removed From the List of Problem Facilities

NRC removed the South Texas plant from its list of problem facilities in January 1995. According to NRC, the agency's increased oversight was no longer needed because the licensee had (1) substantially corrected the weaknesses and underlying root causes that had led to previous problems at the plant, (2) established high standards of performance, (3) improved its self-assessment and corrective action programs, and (4) upgraded the material condition of the reactors to enhance the reliability of both reactors' equipment.

Agency Comments and Our Evaluation

In commenting on a draft of this report, NRC said that we had misstated the purpose of its inspection program. Specifically, NRC said that licensees are responsible for safe operation of their plants and implied that the intent of its inspection program is limited to ensuring that the licensees identify and resolve potential safety issues before they result in significant problems.

Our report clearly indicates that (1) licensees are ultimately responsible for the safe operation of their facilities and (2) NRC's inspection program is intended to obtain independent assurance that licensees are operating their facilities safely. However, as discussed in our report and NRC's own 1994 annual report, NRC's inspection program is also "intended to anticipate and preclude significant events and problems by identifying underlying safety problems."

⁷The next rating of the licensee's performance will be available after the current rating cycle ends in early 1996.

Recent Self-Assessment Identified Weaknesses in NRC's Inspection Program at the South Texas Plant

During the course of our review, NRC headquarters initiated a study to assess the effectiveness of its inspection program at the South Texas plant. The study's results are described in a March 1995 report which, among other things, identifies several weaknesses in the agency's inspection program at the plant.¹ For example, although NRC identified early and repeated problems at the plant, NRC did not adequately integrate the information it had to determine whether the problems indicated systemic weaknesses in the licensee's operations until after the plant's February 1993 shutdown. Furthermore, according to NRC it did not ensure that the licensee had corrected identified problems. NRC reported that these and other weaknesses in the agency's inspection program resulted in missed opportunities to (1) provide a clear and early message to the South Texas plant's licensee about the extent of its performance problems and (2) highlight continuing problems with the licensee's performance within NRC. NRC has taken several actions, and has planned others, to address the weaknesses in its inspection program.

NRC Did Not Adequately Integrate Information in Assessing the Licensee's Overall Performance

Our analysis of NRC's April 1993 diagnostic evaluation identified numerous repeated inspection findings. For example, we found several problems that had been identified as many as 24 times in earlier NRC inspection reports. Although NRC had considerable evidence of long-standing problems at the plant, NRC did not adequately use or integrate the information to determine whether the problems indicated systemic weaknesses in the licensee's operation of the plant.

In March 1995, NRC issued a report on the effectiveness of its inspection program at the South Texas plant that confirmed that most of the concerns raised in the April 1993 diagnostic evaluation "were either known or recognizable as issues with roots in previous NRC inspection findings." These issues included (1) deficiencies in the licensee's procedures for conducting work, (2) the licensee's inadequate and untimely actions to correct identified problems, and (3) repeated failures of the plant's components. In addition, although the licensee and independent third parties, including the Institute of Nuclear Power Operations,² had identified similar problems in the years before the plant's shutdown, NRC did not adequately use the information to assess the licensee's overall

¹Task Force Report Concerning the Effectiveness of Implementation of the NRC's Inspection Program and Adequacy of the Licensee's Employee Concerns Program at the South Texas Project, NRC (Mar. 31, 1995).

²The Institute of Nuclear Power Operations is an industry organization representing operators of nuclear reactors.

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performance. As a result, according to NRC, it missed opportunities to arrive at a fuller and more timely assessment of the extent and depth of the licensee's overall performance problems.

We agree with NRC's assessment of the timeliness and adequacy of the agency's use of the available information. For example, we found evidence suggesting that the licensee's procedure for testing the reactors' pumps had not required testing to be conducted under normal standby conditions since the early days of the plant's operation—before the reactors' start-up and about 5 years before NRC fined the licensee for the improper test that contributed to unit-1's shutdown. Specifically, in February 1988 NRC's inspectors observed a preoperational test of the reactor's pump. According to the April 1988 report on the inspection, the pump malfunctioned because of excessive condensation in the steam supply line. The licensee revised its test procedure and removed the condensation before restarting the pump after the malfunction.

In March 1988, NRC had issued an advisory notice to all licensees describing a similar malfunction during a loss of off-site power at the Calvert Cliffs Plant in Maryland. The Maryland licensee determined that its test procedure was inadequate because the procedure did not require testing to be performed under normal standby conditions. To avoid similar problems, NRC recommended that all licensees duplicate the conditions that would exist if the equipment was suddenly called upon to operate (that is, without warming the pump or removing condensation from the pump's steam supply lines).

The licensee at the South Texas plant performed the pump's February 1988 test about 1 month before NRC issued the advisory notice. Consequently, NRC's April 1988 report on the inspection could not have faulted the licensee for repeating the problems encountered at other plants.³ The advisory notice, however, could have caused NRC to question the adequacy of the licensee's test procedures, but NRC did not do so. Furthermore, we found no evidence that NRC subsequently evaluated whether the licensee's improper tests of the pumps in the years following the advisory notice indicated systemic weaknesses in the licensee's

³While NRC does not require its licensees to take any specific actions in response to its information notices, the agency does expect its licensees to (1) review the information for applicability to their facilities and (2) consider actions, as appropriate, to avoid similar problems. Thus, NRC requires its licensees to implement programs that identify, resolve, and prevent problems that affect a plant's operation and safety. According to NRC, a key element of these programs is the licensee's effectiveness in implementing relevant experience encountered by other operators of nuclear facilities. Information about such experience is provided in a variety of sources, including NRC's information notices.

operation of the plant, such as a failure to adequately act on information about the operational problems experienced at other nuclear facilities.

According to NRC, it is taking action to better integrate information about its licensees' performance. Specifically, NRC intends to initiate a new inspection activity—termed an “integrated performance assessment process”—that will assess a licensee's strengths and weaknesses on the basis of a review of available information such as the facilities' operational reports and data, inspection results, and the licensees' self-assessments. According to NRC, the results of this inspection activity will be used (1) as input for ratings by NRC of its licensees' performance and (2) to target future inspections on significant safety-related activities and other areas warranting increased regulatory attention. NRC has tested the new inspection activity at five locations and expects to begin implementing it elsewhere in the fall of 1995. As currently planned, the inspections will be carried out by five-member NRC teams over a 6-week period. During 2 of the 6 weeks, on-site reviews will be performed at the facility being inspected.

NRC Did Not Ensure That the Licensee Had Corrected Identified Problems

NRC's March 1995 report on the effectiveness of the agency's inspection program at the plant analyzed nine problem areas at the plant and found that most of the areas had been discussed in earlier inspection reports. For example, according to the report, within the first year of the plant's operation, NRC had identified problems with the reactors' pumps and the licensee's procedures and controls for conducting work and correcting problems at the plant. While these and other problems were known, NRC did not ensure that they were corrected.

According to NRC's March 1995 report, the agency's failure to pursue questions about the operability of the reactors' pumps and other long-standing problems at the plant represented a major weakness in the inspection program at the South Texas plant. For example, according to the report, long-standing problems with the reactors' pumps should have caused the resident inspectors to question the licensee about the operability of the pumps. Furthermore, the report suggests that the repeated problems should have caused NRC's Dallas region to identify the pumps as an area warranting further review or inspection. According to NRC, its failure to pursue questions about the operability of the pumps may have delayed actions to ensure that the problems had been corrected.

As discussed earlier, we questioned the senior resident inspector about the resident inspectors' activities regarding the reactors' pumps. He said that they were aware of (1) the pumps' long-standing problems and (2) the existence of NRC information notices discussing similar problems encountered by other licensees. However, he said that he did not realize that the licensee's improper tests had masked problems with the pumps. In the days preceding the shutdown, the senior resident inspector said that he and the other resident inspector oversaw the licensee's corrective actions to assure themselves that the licensee was adequately investigating the problem. However, he said that because of staffing constraints and competing inspection priorities, they did not have time to follow up on every aspect of the licensee's corrective actions. Even if time had permitted, he said, the inspection program did not emphasize inspections to assess the adequacy of the licensee's corrective actions.

NRC's March 1995 report identifies additional reasons for the agency's failure to ensure that the licensee had corrected known problems at the plant. According to NRC, weaknesses in its inspection program occurred largely because, from the time of the licensing until mid-1992, NRC had mistakenly concluded that the licensee (1) was a good performer, (2) was responsive to NRC's concerns, and (3) had implemented strong programs to correct the problems NRC had identified.

According to NRC, these factors, together with inadequate inspections to assess the effectiveness of the licensee's programs, caused NRC to rely too heavily on the licensee's programs and commitments to correct recurrent problems at the plant. Specifically, according to NRC, the licensee exhibited strengths in developing programs and conducting critical self-assessments. And, as issues were brought to the licensee's attention, the licensee implemented programs that should have corrected the problems, including programs to (1) reduce the pumps' malfunctions and (2) improve the licensee's procedures for performing work at the plant. However, the programs were not as effective as the licensee's intentions or commitments suggested. For example, because of resource constraints, the licensee's program for improving work procedures did not include procedures for maintaining and testing equipment such as the reactors' pumps. The report indicates that NRC was not aware of early weaknesses in the licensee's corrective action programs because NRC's inspection program, by design, did not emphasize reviews to determine the effectiveness of the licensee's programs but rather reviews of program documents. In addition, NRC's inspection program did not provide guidance

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for evaluating the effectiveness of the licensees' actions to resolve long-standing problems.

According to the March 1995 report, NRC's follow-up of licensees' actions to address recurrent weaknesses is now both more deliberate and focused on results than it was in the past. For example, according to the report NRC now requires (1) more intensive inspections of problems identified by resident inspectors and (2) performance-based inspections to assess the implementation of licensees' programs based on observations of activities rather than reviews of program documents. In addition, NRC has increased the time the inspectors are required to spend inspecting its licensees' corrective action programs from about 40 hours per rating period in 1990 to about 192 hours per rating period in 1995.⁴ The additional time is used to, among other things, assess the adequacy of the licensees' programs to implement the lessons learned by other operators of nuclear plants. Finally, as discussed earlier, NRC plans to implement a new inspection activity to better integrate available information about its licensees' performance. According to NRC, the performance-based inspections will assess areas such as operations, engineering, maintenance, plant support, and the licensee's corrective actions.

While actions have been taken, the report recommends further steps to implement the lessons learned from NRC's inspection program at the South Texas plant. For example, to ensure that broader problems are recognized, the report recommends that NRC improve its guidance for assessing the effectiveness of each licensee's long-term corrective action programs. According to the report, the guidance should address (1) the importance of terminating inspection concerns on the basis of a licensee's actual—not perceived—performance and (2) ways to deal with problems that persist despite a licensee's actions to correct them. Finally, to help ensure that NRC's understanding of future problems is not limited, the report recommends that NRC's regions more effectively monitor each licensee's long-term corrective action programs.

⁴The length of NRC's rating periods varies between 12 months and 24 months, depending on a licensee's performance. Licensees with good performance ratings are inspected less frequently (i.e., the rating period is longer.)

An Inadequate Inspection Presence May Have Contributed to NRC's Untimely Recognition of Performance Problems

An inadequate inspection presence at the plant also may have contributed to NRC's untimely recognition of the magnitude of the licensee's overall performance problems. As discussed earlier, before the plant's shutdown, NRC had identified a decline in the licensee's performance. NRC's guidance for performing inspections specifies that plants where performance is declining should be subject to additional NRC inspections. However, we found that instead of increasing its inspection hours at the plant, NRC decreased them steadily throughout the period. Specifically, during the three rating cycles completed before the shutdown, the average inspection hours per month declined from 541 hours to 380 hours and finally to 351 hours.⁵ During the 6 months following the last rating period and immediately preceding the plant's shutdown, the average number of hours spent on inspections declined further—to 309 hours per month.

Second, in 1989 NRC began implementing a new policy to increase its on-site staffing at nuclear facilities. Except for top-performing plants, the policy specified a minimum of three resident inspectors for sites with two reactors. This policy was expected to be fully implemented by the end of fiscal year 1993. In the interim, the policy specified that the licensees with performance problems should receive additional inspectors before the licensees that were better performers. Despite the licensee's declining performance, NRC did not implement the staffing policy at the South Texas plant until July 1993—about 5 months after the plant's shutdown.

The senior resident inspector told us that insufficient on-site inspector staff was a problem at the plant. In fact, he said that he had repeatedly requested a third inspector so that the resident inspectors could perform more detailed inspections and follow up on the licensee's corrective actions. However, the requests were denied. Compounding this problem, in 1989, shortly after the plant began operating, NRC reassigned the existing resident inspectors and assigned two new inspectors. According to NRC, the new resident inspectors had little operational experience and a large workload.

According to NRC's March 1995 report, several factors—including competing demands for regional inspection resources—may have distracted the Dallas region from focusing adequately on the extent of the licensee's declining performance. In addition, the report cites a 1988 survey by NRC's former Office of Inspector and Auditor that had raised

⁵The three rating periods were January 1, 1989, to January 31, 1990; February 1, 1990, to May 31, 1991; and June 1, 1991, to August 1, 1992. Averages are based on the total number of inspection hours performed by headquarters, regional, and on-site inspectors. We used the average number of inspection hours per month because of variations in the length of NRC's rating periods.

concern that smaller regions—such as the Dallas region—may not have had sufficient resources to adequately inspect licensees' operations. Furthermore, according to NRC's March 1995 report, staffing limitations may have been even more pronounced for the Dallas region because, during the same period, four reactors at two sites in the region, including the South Texas plant, were commencing full operation.

NRC's March 1995 report suggests several actions to address the staffing issues. First, because new plants typically experience more problems during the early years of their operation, the report recommends that NRC consider assigning additional inspectors to any new facilities that may be licensed. Second, the report recommends that NRC should, among other things, ensure that inspectors have the proper skills and experience to effectively implement the inspection program. Finally, the report recommends that NRC consider developing guidance on the importance of questioning licensees about (1) the adequacy of tests that do not demonstrate that a plant's components will function as intended and (2) the operability of equipment that does not perform properly after an initial test. According to NRC, such questions would help to identify equipment problems such as those that caused the shutdown of the South Texas plant.

NRC Did Not Consistently Pursue Enforcement Actions for Known Violations

According to NRC's March 1995 report, inconsistent enforcement actions to address known violations of the regulatory requirements also contributed to NRC's untimely recognition and correction of long-standing performance problems at the plant. As discussed earlier, NRC can take enforcement actions against licensees that violate its regulatory requirements for the safe operation of nuclear facilities. If timely and appropriate, such actions can help to (1) highlight declining trends in a licensee's performance and (2) focus NRC management's attention on licensees that require increased oversight. In addition, because the need for enforcement actions indicates problems at a plant, such actions can harm the licensee's reputation with the public and the financial community and, consequently, result in increased costs for borrowing money to the licensee because of concerns that the licensee may be an increased financial risk. As a result, according to NRC, action to enforce NRC's regulatory requirements—including being placed on the list of plants requiring additional oversight—often encourages licensees to promptly correct their performance problems.

Despite these benefits, NRC's April 1993 post-shutdown diagnostic evaluation found numerous examples of problems that had been reported

repeatedly in inspection reports yet resulted in few, if any, enforcement actions. For example, during one 2-year period, the resident inspectors identified 10 situations involving the licensee's failure to document problems in its internal reporting system which, according to a representative of the licensee, prevented the problems from receiving proper review and action by the licensee's management. Despite the potential seriousness of not ensuring that problems are properly acted upon, NRC took only two enforcement actions against the licensee. Similarly, inadequate licensee staffing was reported 24 times during a 4-year period yet, according to NRC, resulted in only "some" enforcement actions.⁶ Finally, poor work procedures were mentioned over 20 times during a 4-year period without any enforcement action being taken against the licensee. As discussed earlier, poor work procedures contributed to the plant's February 1993 shutdown.

According to NRC, it did not consistently pursue enforcement actions against the licensee because it had developed a "practice" of providing the licensee with "additional latitude" to address known problem areas. This practice occurred because NRC mistakenly considered the licensee to be a good performer that was responsive to NRC concerns. In addition, according to NRC, inspectors periodically did not pursue issues that could have resulted in citations for violations of regulatory requirements because of a lack of guidance on how to handle issues that had already been referred to the licensee's corrective action program for resolution. According to NRC's March 1995 report, these factors resulted in missed opportunities to (1) provide a clearer and earlier message to the licensee about its performance problems and (2) highlight continuing problems with the licensee's performance within NRC.

NRC has taken action to help ensure that all of its licensees will take early and aggressive actions to improve their performance. In May 1993—3 months after the plant's shutdown—NRC decided to issue letters to the managers of plants whose performance was declining. According to NRC, the letters inform the licensee that, unless performance improves, the licensee's plant may be placed on NRC's list of problem plants.

⁶In commenting on a draft of our report, NRC noted that it had considered the licensee's internal reporting problems and staffing inadequacies for enforcement, as appropriate. According to NRC, some of the problems resulted in escalated (severity level I, II, or III) enforcement actions and civil penalties. Others resulted in severity level IV or V violations (non-escalated enforcement actions). (NRC's revised enforcement policy dated June 30, 1995, eliminated severity level-V violations.) In addition, NRC said that it did not cite the licensee for some violations because the violations were additional examples of problems that had already been the subject of enforcement actions against the licensee.

Conclusions

According to NRC, a major purpose of its reactor inspection program is to identify and resolve underlying problems at nuclear plants and, by so doing, anticipate and prevent significant safety events—events with the potential to both damage a reactor's core and release radioactive material. In the case of the South Texas plant, this goal was not achieved.

Furthermore, NRC did not identify the underlying safety problems that contributed to the event at the South Texas plant—another stated purpose of the inspection program—until after the plant's shutdown. Specifically, while NRC's inspection program identified long-standing problems at the plant, NRC did not adequately use its inspection results to determine if the problems were indicative of systemic, or underlying, problems in the licensee's operation of the plant. As a result, it was not until after the plant's shutdown that the agency identified the areas as underlying safety concerns at the plant. By then, the problems had become so acute that it took the licensee more than a year to address the concerns.

NRC's March 1995 report on the effectiveness of its inspection effort at the South Texas plant presents a candid overview of weaknesses in the agency's inspection program, including NRC's failure to (1) assess the significance of identified problems and (2) ensure that long-standing problems at the plant had been corrected. NRC has taken several actions, and planned others, to address the program's weaknesses. The effectiveness of NRC's corrective actions will depend, to a great extent, on NRC's ongoing initiatives to rely more heavily on licensees to identify problems at nuclear facilities.

Chronology of Events at the South Texas Plant

January 1983

The Nuclear Regulatory Commission (NRC) concluded that the South Texas licensee had adequately resolved over 300 technical problems related to the design of the plant. The issues had been reported in a May 1981 report by the Quadrex Corporation.

January 1987

The Government Accountability Project, a public organization, notified NRC that it had begun investigating 700 allegations it received about problems at the South Texas plant. The allegations had been received from former and current employees at the plant. The allegations included concerns about the plant's construction, the licensee's quality assurance and control programs, and harassment and intimidation at the plant.

November 1987

NRC began its own review of the 700 allegations. Of the 700 allegations, NRC subsequently identified 71 for further investigation because of their potential impact on safety at the plant. NRC investigated the 71 allegations and determined that no substantive safety concerns existed that warranted a delay in NRC's issuance of a full-power license for the unit-1 reactor.

March 1988

The unit-1 reactor was started up.

March 1988

NRC issued an advisory notice to all licensees describing a malfunction in a reactor's turbine-driven auxiliary feedwater pump during a loss of off-site power at the Calvert Cliffs Plant in Maryland. The Maryland licensee determined that its test procedure was inadequate because the procedure did not require testing to be performed under normal standby conditions. To avoid similar problems, NRC recommended that all licensees duplicate the conditions that would exist if the equipment was suddenly called upon to operate.

August 1988

The unit-1 reactor began commercial operation.

Appendix I
Chronology of Events at the South Texas
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February 1989

NRC began implementing a new policy to increase its on-site staffing at nuclear facilities by the end of fiscal year 1993. Except for top-performing sites, the policy specified a minimum of three resident inspectors for sites with two reactors, such as the South Texas plant.

March 1989

The unit-2 reactor was started up.

June 1989

The unit-2 reactor began commercial operation.

January 1990

NRC rated the licensee's overall performance for the period between January 1989 and January 1990 as superior.

January 1991

NRC senior managers discussed performance problems at the plant, including repeated equipment failures and errors made by personnel.

May 1991

NRC's rating of the licensee between February 1990 and May 1991 identified a decline in the licensee's performance. According to NRC, the decline was indicated by, among other things, repeated equipment malfunctions. NRC rated the licensee's overall performance as good.

July 1991

NRC informed all licensees that improper painting had immobilized standby diesel generators at two other nuclear plants and recommended that licensees take appropriate action to avoid the problem.¹

¹Nuclear plants have generators that are unrelated to those discussed in this report. To simplify our discussion, we generally refer to a reactor's standby diesel generators as "the generators."

August 1992

NRC's rating of the licensee for the period between June 1991 and August 1992 identified a further decline in the licensee's performance. NRC's rating noted that the licensee continued to be challenged by long-standing equipment problems and human errors. NRC rated the licensee's overall performance as good. However, according to NRC, additional management attention was required to prevent a further decline in the licensee's performance.

January 1993

Senior NRC managers discussed the licensee's performance again and concluded that the licensee's declining performance, while discernible, did not warrant its placement on NRC's list of problem plants. However, the managers decided to conduct a comprehensive diagnostic inspection to obtain a better understanding of the licensee's performance.

February 1, 1993

The licensee conducted a routine test of a portion of the unit-1 reactor's auxiliary feedwater system. The licensee found that the reactor's turbine-driven pump was inoperable because of a mechanical failure with a valve associated with the turbine.²

February 4, 1993

The licensee informed NRC that it had not been able to restore the unit-1 reactor's pump to working order; as a result, the licensee shut the reactor down. The licensee also completely shut down the unit-2 reactor because of similar problems with its pump.

February and March 1993

NRC investigated the circumstances surrounding the plant's shutdown and found that the licensee had violated several NRC requirements for the safe operation of the unit-1 reactor.

²Nuclear plants have numerous pumps that are unrelated to those discussed in this report. To simplify our discussion, we generally refer to a reactor's turbine-driven auxiliary feedwater pump as "the pump."

**Appendix I
Chronology of Events at the South Texas
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April 1993

NRC completed a comprehensive diagnostic evaluation of the plant. The evaluation identified significant, long-term deficiencies in the licensee's operations, maintenance and testing, and engineering support at the plant. According to NRC, the licensee had been aware of many deficiencies at the plant for "some time," yet had not corrected them. (NRC issued its report on this evaluation in June 1993.)

May 1993

NRC fined the licensee \$325,000 for, among other things, multiple violations related to the testing and maintenance of both reactors' pumps and unit-1's generators and the lengthy inoperability of unit-1's emergency equipment beyond the time frames established for shutting down the reactor.

June 1993

NRC placed the South Texas plant on its list of problem plants requiring increased regulatory oversight, including additional NRC inspections.

July 1993

NRC assigned a third on-site inspector to the South Texas plant.

February 15, 1994

The licensee informed NRC that it had completed all actions required for restarting the unit-1 reactor. (After the plant was shut down, NRC issued three letters to the licensee specifying actions that the licensee had to complete before restarting the reactors.)

February 15, 1994

NRC concurred that the licensee had completed all the actions required for restarting the unit-1 reactor.

February 18, 1994

The licensee restarted the unit-1 reactor.

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May 17, 1994

The licensee informed NRC that it had completed all the actions required for restarting the unit-2 reactor. NRC concurred.

May 22, 1994

The licensee restarted the unit-2 reactor.

September 1994

NRC issued a report identifying 16 “significant events” in 1993, including the event at the South Texas plant. According to NRC, each of the events had the potential to damage a reactor’s core and result in a possible release of radioactive material.

October 1994

NRC’s rating of the licensee from August 1992 to September 1994 identified an overall improvement in the licensee’s performance. However, according to the rating, several areas, including the licensee’s (1) controls over work processes and (2) corrective action programs, warranted continued attention from management.

January 1995

NRC removed the South Texas plant from its list of problem plants. According to NRC, increased oversight was no longer needed because the licensee had (1) substantially corrected the weaknesses and underlying root causes that had led to previous problems at the plant, (2) established high standards of performance, (3) improved its self-assessment and corrective action programs, and (4) upgraded the material condition of the reactors to enhance the reliability of both reactors’ equipment.

March 1995

NRC’s Office of The Inspector General issued a report on its investigation of NRC’s handling of allegations that the agency had received about problems at the plant. The report concluded that NRC’s Office of Investigations (OI) did not adequately pursue about 250 allegations of wrongdoing, harassment, and intimidation at the plant.³ In commenting on that report,

³Alleged OI Mishandling of Allegations Pertaining to Wrongdoing and Harassment and Intimidation at the South Texas Project Nuclear Plant, Office of The Inspector General, NRC (Mar. 17, 1995).

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OI stated that it did not pursue the allegations because it could not obtain additional information from the organization representing the individuals who had made the allegations.

March 1995

NRC issued a report on the effectiveness of its inspection program at the South Texas plant. The report identified numerous weaknesses in NRC's program, including a failure to (1) adequately integrate NRC's inspection findings to identify systemic weaknesses in the licensee's performance and (2) ensure that the identified problems had been corrected.

March 1995

NRC issued a report on its review of allegations made by employees at the South Texas plant in response to congressional concerns. (NRC conducted the review to obtain and review allegations brought to the attention of congressional staff by attorneys representing the employees.) NRC found that nearly all of the concerns had been previously identified by NRC, the licensee, or in a previous allegation. Therefore, according to NRC, it was able to close out action on most of the allegations on the basis of NRC's inspection reports, closed allegation files, consultation with NRC technical staff, and the licensee's corrective actions. NRC substantiated some allegations involving technical concerns and isolated examples of discriminatory practices, including harassment and intimidation, at the plant. However, according to NRC, the substantiated allegations did not affect the safe operation of the plant.

Comments From the Nuclear Regulatory Commission

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 11, 1995

Mr. Victor S. Rezendes
Director, Energy and Science Issues
U.S. General Accounting Office
Washington, DC 20548

Dear Mr. Rezendes:

We have reviewed the GAO draft report Nuclear Regulation: Weaknesses in NRC's Inspection Program at the South Texas Nuclear Power Plant, as requested in your letter of August 22, 1995. The following comments are provided and are referenced to the associated pages in the draft report.

See comment 1.

Page 2 (and throughout the report). The fourth paragraph states, "NRC later determined that one reactor's pump and two of its three generators had been simultaneously inoperable for extended periods." For clarity and accuracy, the correct nomenclature for the generators is diesel generators and the correct nomenclature for the pumps is auxiliary feedwater pumps. The plant has numerous pumps and generators unrelated to those discussed in the report.

See comment 1.

Page 3. The first paragraph states on line 8, "Although NRC was aware of other, long-standing management and technical problems and a decline in the licensee's performance, it did not know the magnitude of these problems until April 1993, when the results of a comprehensive evaluation of the plant became available." The letters "NRC" should be added before the word comprehensive in this sentence to identify who performed the evaluation.

See comment 1.

The report notes that, as a result of its evaluation, NRC revised its overall assessment of the licensee's performance from good to poor and declining. While the plant was rated good in overall performance and improvements were noted in certain programs, the NRC did point out in its October 2, 1992, SALP report that this assessment represented the second consecutive assessment period in which performance had declined in certain areas or the effectiveness of improvement initiatives was mixed. The NRC also pointed out that to prevent a further decline in performance, additional management attention was required.

Now on pp. 4 and 22.

Pages 4 & 25. The first sentence of the second paragraph on page 4 should be amended to state, "NRC was aware of problems with the reactor's turbine-driven auxiliary feedwater pump, and recognized that the problems could result in a technical specification-required shutdown of Unit 1 because troubleshooting and repair activities during the three day technical specification allowed outage time had not been successful in resolving the pump overspeed condition." The resident inspectors were aware of the pump troubleshooting activities and had continually apprised Region IV management and supervision of the licensee's activities throughout the 3 day allowed outage time. Furthermore, on the morning of February 4, 1993, a few hours before the expiration of the allowed outage time, a conference call between Region IV and the licensee was conducted to discuss the status of the pump. During this

See comment 1.

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Comments From the Nuclear Regulatory
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conference call, the licensee tried to make a case for considering the pump to be operable; however, because of questions from the NRC staff, the licensee decided to shut down Unit 1 and to continue to troubleshoot the pump. The second paragraph on page 25 also requires clarification for the same reason as noted above.

Now on pp. 4 and 23.

See comment 1.

In addition, as stated on pages 4 and 25, it is true that the NRC was not aware that the painting of the diesel generators had immobilized one generator; however, the NRC was aware that the painting was in progress, and had cautioned the licensee before the painting began about the contents of the information notice that discussed emergency diesel generator painting problems at other plants.

Now on pp. 5 and 23.

See comment 2.

The sentence beginning on line 8 of the second paragraph misstates the purpose of the NRC's Inspection Program. The NRC Inspection Program is designed to ensure, through selective examinations, that the licensee identifies and resolves potential safety issues before they result in significant problems. Responsibility for safe operation of the plant rests with the licensee. This misstatement also occurs on page 26.

Now on pp. 11-12 and 18.

See comment 1.

Pages 10, 11, and 15. The situation described on these pages should be referred to as a "loss-of-offsite power" and not as a "station blackout." Loss-of-offsite power refers to a loss of ac power being supplied externally to the plant, while a station blackout refers to a loss of all ac power, both externally and internally, including the loss of all of the diesel generators.

Now on pp. 12-13 and 15.

See comment 1.

Page 12 and 15. The first sentence at the top of page 12 states, "On February 4, 1993, the licensee at the South Texas plant informed NRC that it was shutting down the two reactors because of continuing malfunctions with the reactors' turbine-driven auxiliary pumps."

Unit 1 was shutdown on February 4, 1993, because the Unit 1 turbine driven auxiliary feedwater pump could not be returned to operable status within the three day allowed outage time. However, Unit 2 had tripped the day before, on February 3, 1993, as a result of low-low steam generator water level (unrelated to the problem with the turbine driven auxiliary feedwater pump). Soon after that trip, the turbine driven auxiliary feedwater pump received a valid start signal but tripped on mechanical overspeed. Unit 2 was already shutdown on February 4, 1993. This factual error is repeated on page 15 in the second full sentence at the top of the page.

Now on p. 15.

See comment 1.

Page 14. The first sentence in the second paragraph states that the turbine-driven auxiliary feedwater pump was inoperable because of "...a mechanical failure in the turbine." The true failure was with a valve associated with the turbine, but not in the turbine itself.

Now footnote 5.

See comment 1.

Page 18. Footnote 4 is not correct in stating the number of required off-site power sources. The footnote should be revised to state, "According to NRC, nuclear plants typically have two or more sources of off-site power, which, in NRC's view, provide a sufficient margin of safety."

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Now on p. 24.

See comment 1.

Page 26. The fifth sentence of the second paragraph should state that the licensee initiated corrective action programs, including a program to reduce the frequency of "plant trips" rather than "pump malfunctions."

Now on p. 31.

See comment 1.

Page 36. The second paragraph states that the senior resident inspector said that, "there were not enough resident inspectors at the plant and, consequently, they did not have time to oversee the licensee's corrective actions." The senior resident inspector has been quoted out of context, and says he stated that due to manpower constraints and competing inspection priorities, they did not followup on every aspect of the licensee's corrective actions. He states that he explained that they did maintain an overview of the licensee's ongoing efforts to assure themselves that the licensee was conducting an appropriate investigation to determine the cause of the overspeed tripping.

Now on p. 35.

See comment 1.

Pages 41-42. The examples pertaining to problem reporting and staffing noted in the second paragraph of page 41 were considered for enforcement, as appropriate. Some resulted in escalated enforcement action (with civil penalties issued). Others resulted in non-escalated enforcement or non-cited violations. Some were not cited because they were determined to be additional examples of violations that were the subject of escalated enforcement and were identified as such in the inspection reports and inspection report cover letters. Not every procedural problem or weakness constitutes a violation of an NRC requirement.

Now on p. 42.

See comment 1.


Page 48. Add the following at the end of the second paragraph, "OI's rebuttal to the OIG report states that the 250 allegations were not pursued because additional information was not forthcoming from the organization representing the allengers. OI's rebuttal was provided to Congressman Wyden by letter dated June 16, 1995."

Now on p. 43.

See comment 1.

To clarify the last paragraph on this page it should be replaced with the following: "NRC issued a report on its review of allegations regarding South Texas Project in response to Congressional concerns. The NRC found that nearly all of these concerns had been previously identified by the NRC, the licensee, or by a previous allegation. Therefore, the NRC was able to close these allegations based on NRC inspection reports, closed allegation files, consultation with the NRC technical staff, and the licensee's corrective actions. While some of the technical issues were substantiated, and isolated examples of discriminatory behavior were identified, the NRC concluded that those substantiated allegations did not affect the safe operation of the plant."

Sincerely,


James L. Blaha
Assistant for Operations
Office of the Executive Director
for Operations

The following are GAO's comments on the Nuclear Regulatory Commission's (NRC) letter dated September 11, 1995.

GAO's Comments

1. NRC suggested a number of changes to clarify information in the report. We incorporated the agency's comments where appropriate.
2. Our report clearly states that (1) the licensees are ultimately responsible for the safe operation of their facilities and (2) NRC conducts inspections to obtain independent assurance that the licensees are operating their facilities safely. However, as discussed in NRC's 1994 annual report, the inspection program is also "intended to anticipate and preclude significant events and problems by identifying underlying safety problems."

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