

APPENDIX L

**U.S. General Accounting Office, GAO/RCED-96-10,
“Nuclear Regulation: Weaknesses in NRC’s Inspection
Program at a South Texas Nuclear Power Plant”,
October 1995.**



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', written in a cursive style.

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.

