Nuclear reactor safety assailed in report

The nation's nuclear power plants have for years operated under inadequate safety guidelines, and existing guidelines have been applied inconsistently, according to a report released last week by the General Accounting Office. The critical assessment, which focuses largely on shortcomings of the Nuclear Regulatory Commission (NRC), culminates months of research by government investigators. It conflicts with statements by NRC officials who, since the nuclear accident at Chernobyl, have sought to downplay the possibility of a serious accident occurring in the United States.

Sen. Alfonse M. D'Amato (R-N.Y.), who first requested the study, immediately cited it as a reason to keep the recently completed Shoreham nuclear power plant in New York from coming on line. "The GAO report shows that the NRC has failed in its basic responsibility to ensure public safety," D'Amato said in a prepared statement. "The NRC's top priority should be to reexamine those plants that are operating [and] to determine if they are safe, not bringing new plants — like Shoreham — on line."

Foremost among the report's criticisms is a purported lack of standards for shutting down plants that have been deemed unsafe. "NRC's commissioners cannot agree on the specific types and/or degree of safety problems that could endanger public health and safety" enough to require the shutdown of a nuclear power plant, the report states. It notes that while the NRC has shut down five plants during the past 25 years, other plants with similar problems have been allowed to continue operating. Indeed, the report finds, in at least four cases utility companies themselves had to shut down their reactors because of safety problems — after the NRC, despite knowledge of chronic safety violations, failed to take matters into its own hands.

"I don't quite know what they're talking about," Joseph J. Fouchard, director of the NRC's office of public affairs, told SCIENCE NEWS. "Each plant has technical specifications that run hundreds of pages that tell the utility that if it does not meet these certain requirements the plant must be shut down or other remedial measures taken promptly. If anybody were to violate a tech spec and not do what they're supposed to do, we would clobber them."

The new report, however, cites examples in which plants were shut down because of concern about their ability to meet NRC seismic standards, or because control room workers were sleeping on the job, while other plants were allowed to continue operating despite similar concerns by the NRC.

The report also criticizes the NRC's failure to resolve in a timely fashion "generic safety issues" — design, construction or operating problems that affect entire groups of plants. As of December 1986, according to the report, 32 such generic safety issues fell within the highest safety-significance category. Yet the NRC "takes from several months to 10 or more years to resolve these issues."

As part of its conclusion, the report recommends that the NRC further centralize its management of the nation's nuclear industry. Under the current system, the NRC delegates to its regional offices the responsibility of tracking violations and corrective actions taken by utilities. Although thousands of safety violations are logged every year (nearly 3,000 at U.S. nuclear reactors in 1986, according to a recently released study by Public Citizen, a nonprofit research group in Washington, D.C.), the NRC does not consolidate this information. Thus it is difficult to identify safety trends or to determine the status of corrective actions, says the government report.

NRC officials, however, have repeatedly insisted during the past month that nuclear power plants are acceptably safe. A Sept. 9 NRC draft report examining Chernobyl's regulatory implications on the U.S. nuclear power industry concludes that "In general, regulatory provisions at nuclear power plants in the United States are adequate. . . ."

At a recent symposium on Nuclear Radiation and Public Health, NRC experts reiterated their faith in the nation's nuclear power plants. "Many people don't like to be reminded of their mortality," said Herbert Kouts, former director of research at NRC, now chairman of the department of nuclear engineering at Brookhaven National Laboratory in Upton, N.Y. Nevertheless, he said, "There should be no tightening of the screws just to satisfy the public."

Meanwhile, the cleanup continues at Three Mile Island, site of the worst U.S. nuclear accident. About half of the 293,000 pounds of radioactive debris from that permanently damaged reactor has yet to be transferred into special canisters that are then to be shipped by rail to a Department of Energy Laboratory in Idaho. — *R. Weiss*

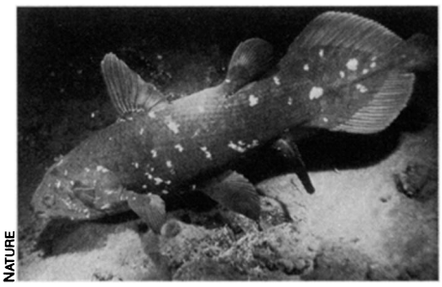
'Living fossils' display unusual behavior

They swim backwards, they drift upside down, they even perform an underwater version of a headstand. Such are the antics that West German scientists observed when they set out in a submersible to study a primitive fish that was once thought extinct.

Sometimes called "living fossils," these are the only remaining examples of crossopterygians — an ancient line of fish that many scientists believe spawned the first tetrapods, or four-legged land animals. This is the first time scientists have observed them in their habitat, and there is hope that these fish, called coelacanths, will aid in understanding the vertebrate transition from water to land.

Paleontologists had believed that coelacanths died out around 60 million years ago, until a living specimen was discovered off the coast of Madagascar in 1938. Since then, scientists have studied the behavior of line-caught coelacanths by releasing them at the surface. But coelacanths normally live under great pressure at depths of 200 meters, and they die within several days of surface existence.

The West German scientists, from the Max Planck Institute in Seewiesen and the Zoological Institute of the University of the Saarland in Saarbrüken, performed 40 dives near the Comore islands, which lie to the northwest of Madagascar. They observed six of the coelacanths for a total of 80 hours, capturing the sometimes inexplicable behavior of this nocturnal creature in still photography, videotape and film.



NATURE

Photographed in their native habitat, coelacanths average 1.5 meters long.

In the past, scientists had speculated that coelacanths might use a pair of pectoral fins and a pair of pelvic fins to crawl along the ocean bottom. The fins are connected to the body by fleshy lobes, which are believed to be the evolutionary forerunners of limbs.

The West German team found that "paired fins are not used for locomotion on the bottom such as crawling or stalking." Yet a close analysis of the film did reveal that opposite pectoral and pelvic fins sometimes moved in synchrony, a pattern common to horses and other tetrapods but rare among fish, say the researchers in the Sept. 24 NATURE.

Other researchers question the relevance of this observed behavior, contending that coelacanths are distantly related to tetrapods, if at all. However, say the West German scientists, "Such coordination could indicate another preadaptation in the crossopterygian group that could have facilitated the transition to locomotion on land." — *R. Monastersky*