

Highlights of [GAO-05-339](#), a report to congressional requesters

## Why GAO Did This Study

Spent nuclear fuel—the used fuel periodically removed from reactors in nuclear power plants—is too inefficient to power a nuclear reaction, but is intensely radioactive and continues to generate heat for thousands of years. Potential health and safety implications make the control of spent nuclear fuel of great importance. The discovery, in 2004, that spent fuel rods were missing at the Vermont Yankee plant in Vermont generated public concern and questions about the Nuclear Regulatory Commission's (NRC) regulation and oversight of this material.

GAO reviewed (1) plants' performance in controlling and accounting for their spent nuclear fuel, (2) the effectiveness of NRC's regulations and oversight of the plants' performance, and (3) NRC's actions to respond to plants' problems controlling their spent fuel.

## What GAO Recommends

GAO recommends that NRC (1) establish specific requirements for the control and accounting of loose rods and fragments and plants' conduct of their physical inventories and (2) develop and implement appropriate inspection procedures to verify plants' compliance with the requirements.

Commenting on the draft report, NRC generally agreed with GAO's conclusions and recommendations.

[www.gao.gov/cgi-bin/getrpt?GAO-05-339](http://www.gao.gov/cgi-bin/getrpt?GAO-05-339).

To view the full product, including the scope and methodology, click on the link above. For more information, contact Jim Wells at (202) 512-3841 or [wellsj@gao.gov](mailto:wellsj@gao.gov).

## NUCLEAR REGULATORY COMMISSION

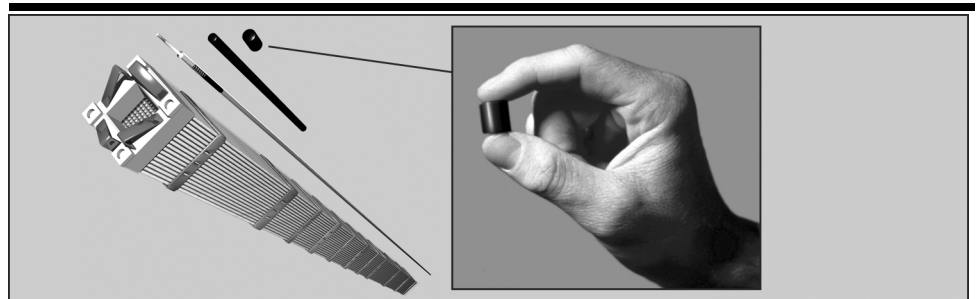
# NRC Needs to Do More to Ensure that Power Plants Are Effectively Controlling Spent Nuclear Fuel

## What GAO Found

Nuclear power plants' performance in controlling and accounting for their spent fuel has been uneven. Most recently, three plants—Vermont Yankee and Humboldt Bay (California) in 2004 and Millstone (Connecticut) in 2000—have reported missing spent fuel. Earlier, several other plants also had missing or unaccounted for spent fuel rods or rod fragments.

NRC regulations require plants to maintain accurate records of their spent nuclear fuel and to conduct a physical inventory of the material at least once a year. The regulations, however, do not specify how physical inventories are to be done. As a result, plants differ in the regulations' implementation. For example, physical inventories at plants varied from a comprehensive verification of the spent fuel to an office review of the records and paperwork for consistency. Additionally, NRC regulations do not specify how individual fuel rods or segments are to be tracked. As a result, plants employ various methods for storing and accounting for this material. Further, NRC stopped inspecting plants' material control and accounting programs in 1988. According to NRC officials, there was no indication that inspections of these programs were needed until the event at Millstone.

NRC is collecting information on plants' spent fuel programs to decide if it needs to revise its regulations and/or oversight. In addition to reviewing specific instances of missing fuel, NRC has had its inspectors collect basic information on all facilities' programs. It has also contracted with the Department of Energy's Oak Ridge National Laboratory in Tennessee to review NRC's material control and accounting programs for nuclear material, including spent fuel. It further plans to request information from plant sites and visit over a dozen of them for more detailed inspection. These more detailed inspections may not be completed until late 2005, over 5 years after the instance at Millstone that initiated NRC's efforts. However, we believe NRC has already collected considerable information indicating problems or weaknesses in plants' material control and accounting programs for spent fuel.



Source: Nuclear Energy Institute.

Nuclear fuel rods are filled with ceramic pellets of uranium and grouped into fuel assemblies, typically 5 to 10 inches square and 12 to 14 feet long.