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NUCLEAR NONPROLIFERATION

DOE Needs to Take Action to Further Reduce the Use of Weapons-Usable Uranium in Civilian Research Reactors

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Highlights

Highlights of GAO-04-807, a report to the Chairman, Subcommittee on Emerging Threats and Capabilities, Committee on Armed Services, U.S. Senate

Why GAO Did This Study

Nuclear research reactors worldwide use highly enriched uranium (HEU) as fuel and for the production of medical isotopes. Because HEU can also be used in nuclear weapons, the Department of Energy's (DOE) Reduced Enrichment for Research and Test Reactors program is developing low enriched uranium (LEU), which would be very difficult to use in weapons, to replace HEU. To date, 39 of the 105 research reactors in the United States and abroad targeted by DOE have converted to LEU fuel. GAO was asked to examine (1) the status of the remaining research reactors in converting to LEU fuel, (2) DOE's progress in developing new LEU fuels for reactors where conversion is not yet technically feasible, (3) DOE's progress in developing LEU for the production of medical isotopes, and (4) the status of DOE and Nuclear Regulatory Commission (NRC) efforts to improve security at research reactors.

What GAO Recommends

GAO recommends that DOE consider converting the 6 U.S. university research reactors, remove the HEU fuel from the reactors after their conversion, and evaluate providing additional incentives to foreign research reactors to convert to LEU. DOE agreed with our recommendations. GAO did not fully evaluate, and is not making recommendations on, DOE and NRC efforts to improve security at research reactors.

www.gao.gov/cgi-bin/getrpt?GAO-04-807.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Gene Aloise at (202) 512-3841 or aloisee@gao.gov.

What GAO Found

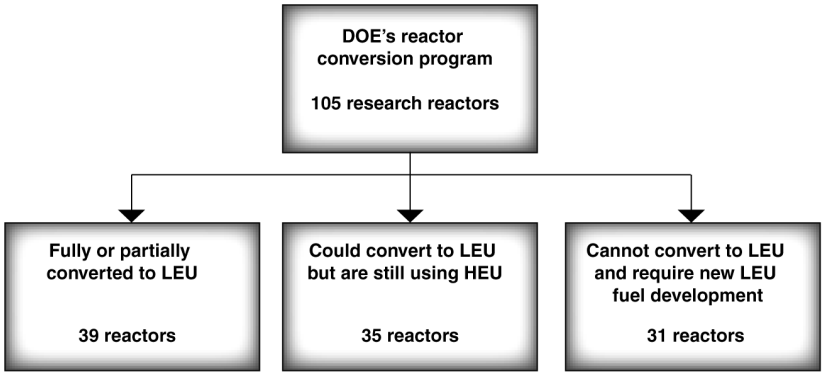
Currently, conversion to LEU fuel is technically feasible for 35 of the 66 research reactors in DOE's program that still use HEU fuel, but most do not have plans to convert. In the United States, 8 research reactors, including 6 university research reactors, have not converted because DOE has not provided the necessary funding. Of the 20 foreign research reactors that use U.S.-origin HEU fuel, 14 do not have plans to convert because they have a sufficient supply of HEU fuel and either do not want to incur the additional cost of conversion or do not have the necessary funding. Finally, only 1 of 7 Russian-supplied research reactors that could use LEU fuel is scheduled to convert.

Conversion to LEU fuel is not technically feasible for 31 research reactors worldwide that still use HEU fuel. DOE has experienced technical setbacks in fuel development that have postponed the conversion of the 31 reactors until 2010 at the earliest. One fuel failed unexpectedly in testing, and DOE may cancel further development, depending on the results of additional tests. Initial testing of another LEU fuel produced positive results, but additional testing is required and the fuel will not be developed until 2010 at the earliest.

Separately from the development of LEU fuel, DOE is developing LEU to replace HEU in the production of medical isotopes. DOE has not yet completed the work that would enable conversion of large-scale medical isotope production to LEU. One reactor has converted to LEU for small-scale production. However, large-scale producers are concerned that the cost of converting to LEU could be prohibitive.

DOE and NRC have taken steps to improve security at foreign and U.S. research reactors. While operators at most research reactors we visited said that security had been upgraded through DOE or NRC efforts, we observed areas where further improvements could be made. Recognizing the possible need for further improvements, DOE and NRC are engaged in separate efforts to assess and improve security.

Conversion Status of Research Reactors Included in DOE's Reactor Conversion Program



Source: Argonne National Laboratory.