



Highlights of [GAO-08-483](#), a report to congressional committees

Why GAO Did This Study

The Department of Energy (DOE) proposes under the Global Nuclear Energy Partnership (GNEP) to build facilities to begin recycling the nation's commercial spent nuclear fuel. GNEP's objectives include reducing radioactive waste disposed of in a geologic repository and mitigating the nuclear proliferation risks of existing recycling technologies. DOE originally planned a small engineering-scale demonstration of advanced recycling technologies being developed by DOE national laboratories. While DOE has not ruled out this approach, the current GNEP strategic plan favors working with industry to demonstrate the latest commercially available technology in full-scale facilities and to do so in a way that will attract industry investment. DOE has funded four industry groups to prepare proposals for full-scale facilities. DOE officials expect the Secretary of Energy to decide on an approach to GNEP by the end of 2008. GAO evaluated the extent to which DOE would address GNEP's objectives under (1) its original engineering-scale approach and (2) the accelerated approach to building full-scale facilities. GAO analyzed DOE plans and industry proposals and interviewed DOE and industry officials concerning the pros and cons of both approaches.

What GAO Recommends

GAO recommends that DOE reassess its preference for accelerating GNEP. DOE stated it will continue to assess alternative approaches to GNEP.

To view the full product, including the scope and methodology, click on [GAO-08-483](#). For more information, contact Gene Aloise at (202) 512-3841 or aloisee@gao.gov.

GLOBAL NUCLEAR ENERGY PARTNERSHIP

DOE Should Reassess Its Approach to Designing and Building Spent Nuclear Fuel Recycling Facilities

What GAO Found

DOE's original approach of building engineering-scale facilities would meet GNEP's objectives if the advanced technologies on which it focused can be successfully developed and commercialized. The advanced technologies would reduce waste to a greater degree than existing technologies by recycling radioactive material that a geologic repository has limited capacity to accommodate. The advanced technologies would also mitigate proliferation risks relative to existing technologies by increasing the difficulty of theft or diversion of weapons-usable nuclear material from recycling facilities. Nonetheless, DOE's engineering-scale approach had two shortcomings. First, it lacked industry participation, potentially reducing the prospects for eventual commercialization of the technologies. In particular, the approach included some technologies that may introduce unnecessary costs and technical challenges while creating waste management challenges; industry representatives have questioned whether such technologies could be commercialized. Second, DOE's schedule called for building one of the recycling facilities (a reprocessing plant for separating reusable materials from spent nuclear fuel and fabricating recycled fuel) before conducting R&D on recycled fuel that would help determine the plant's design requirements. This schedule unnecessarily increased the risk that the spent fuel would be separated in a form that cannot be recycled. The other two facilities DOE had planned to build (an advanced reactor for using recycled fuel and an R&D facility) would allow DOE to conduct R&D that existing DOE facilities have limited capability to support.

DOE's accelerated approach of building full-scale facilities would likely require using unproven evolutions of existing technologies that would reduce radioactive waste and mitigate proliferation risks to a much lesser degree than anticipated from more advanced technologies. Two of the four industry groups that have received funding under GNEP proposed evolutionary technologies for recycling spent fuel in existing reactors even though the GNEP strategic plan ruled out such technologies. While the evolutionary technologies could allow DOE to begin recycling a large amount of spent fuel sooner than under its original approach, fully meeting GNEP's waste reduction and nonproliferation objectives would require a later transition to more advanced technologies. Two other industry groups proposed technologies that would address GNEP's waste reduction and nonproliferation objectives by using technologies that are not mature enough to allow DOE to accelerate construction of full-scale recycling facilities. Under any of the proposals, DOE is unlikely to attract enough industry investment to avoid the need for a large amount of government funding for full-scale facilities. For example, the industry groups have proposed that DOE fund an advanced reactor, which DOE and industry officials expect would at least initially be more expensive than existing reactors to build and operate and thus not be commercially competitive. DOE acknowledges the limitations of its accelerated approach but cites other benefits, such as the potential to exert more immediate international influence on nonproliferation issues.