Nuclear Power One of Several Green Weapons Against Global Warming

The MIT study of the future of nuclear power, as summarized by Jim Dawson, (PHYSICS TODAY, December 2003, page 34) states that "the management and disposal of high-level radioactive spent fuel from the nuclear fuel cycle is one of the most intractable problems facing the nuclear power industry throughout the world." In reality, it is a problem that exists only in people's minds.

For the first 20 years or so of operation, a power plant stores spent fuel underwater in a small pool. When the pool becomes full, the older fuel—for which much of the radioactivity has decayed away—is removed from the water and stored in dry casks on site. An area the size of a football field is adequate for storing the spent fuel from hundreds of years of a power plant's operation. Considering the huge number of kilowatt hours that are produced, the problem should be regarded as insignificant, rather than "intractable."

The spent fuel is valuable and should be kept in a manner that allows easy retrieval. It still holds about 97% of the original potential energy but may be even more valuable for the fission products it contains. To give one example, rhodium, a platinum metal, makes up about 2% of the fission products, and the price of rhodium fluctuates between the price of gold and 10 times that.

Rhodium has many uses and would replace platinum in many applications if the price could be reduced to a more reasonable value. Fresh fission-product rhodium contains traces of isotopes with half-lives of 2.9 and 3.3 years. It is just a matter of time until these radioactivities decay to negligible levels. The material in US spent fuel is worth billions of dollars and gets more valuable every day as the shorter-lived activities decay away.

Edwin Norbeck
(edwin-norbeck@uiowa.edu)
University of Iowa
Iowa City

A recent story in PHYSICS TODAY summarized the case for nuclear power as a strategy for combating carbon emissions and global warming. Although the MIT study[1] on which the story was based was careful to point out that nuclear power is

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