U.S. Civilian Reactor Produces Tritium

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Departing from a long-standing U.S. tradition of separating civilian and military nuclear activities, Washington transferred tritium produced in a commercial nuclear reactor in late August to a Department of Energy facility in South Carolina for eventual use in nuclear weapons.

Tritium is a radioactive gas used to boost the yield of nuclear weapons and is a necessary component of U.S. nuclear weapons. It has a half-life of roughly a dozen years, so it must be replenished and replaced regularly. However, the United States has not produced new tritium since 1988, when the Energy Department reactors in Savannah River, South Carolina, were shut down for safety reasons. Since then, the United States has been recycling the gas from nuclear weapons dismantled under START I in order to meet current requirements.

The Energy Department has long contended that it would need to find a new production source for tritium by this year to maintain the current arsenal at the START I level and maintain a five-year reserve supply. In 1998, following an extensive review of options, the Energy Department announced that it would adopt the lowest-cost option of producing tritium in a commercial plant in Watts Bar, Tennessee. (See ACT, November/December 1998.) Some critics have claimed that further production of tritium is not needed because of projected future cuts in the U.S. arsenal, but the government does not publicly release data that would allow this question to be answered by outside experts.

In 2003, 240 rods were inserted into the Watts Bar reactor. For the next 18 months, the rods were irradiated, converting the lithium contained within into tritium. The rods were removed in April, cooled, and transported to Savannah River for storage. The tritium is to be extracted from the rods at Savannah River's $506 million Tritium Extraction Facility, slated to become operational in 2007, at which point the gas will be used to support the nuclear weapons arsenal. The Tennessee Valley Authority continues to produce tritium at Watts Bar, having inserted an additional 240 rods into the reactor after the first round was extracted in April.

The production of tritium at Watts Bar challenges the so-called no-dual-use policy, the established practice of separating civilian and military nuclear operations, which has been U.S. policy since the 1954 Atomic Energy Act. Critics charge that violating this separation undermines U.S. nonproliferation policy by encouraging other countries to use their commercial reactors for weapons purposes. Indeed, one of the key points of a recent U.S.-Indian nuclear agreement was that New Delhi agreed to separate the reactors it used for power production from those it uses for weapons purposes.

Still, no law or regulation directly prohibits the civilian production of tritium for military use. Although the 1983 Hart-Simpson amendment to the Atomic Energy Act expressly prohibits the civilian production of "special nuclear material," such as uranium-233 and plutonium, tritium does not meet that classification because it is not a fissile material capable of sustaining a nuclear reaction.

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