Change (IPCC) (*Science*, 26 January 2001, p. 566). At that level, "future changes in climate are of considerable concern," notes climatologist Tom Wigley of the National Center for Atmospheric Research in Boulder, Colorado. But Forest and colleagues came up with an upper limit even higher than the IPCC's: 7.7 K, compared with the IPCC's 4.5 K. The only way they could bring their scorching upper limit down was to use an expert opinion as the starting point for their statistical analysis of their modeling, an option that climate modeler Michael Schlesinger of the University of Illinois, Urbana-Champaign (UIUC), calls "extremely unsatisfactory." Schlesinger has conducted a similar analysis with Natalia Andronova of UIUC that yields an upper limit as high as 9.3 K, depending on the uncertain role of variations in the brightness of the sun.

Calculation of the likely range of the aerosol effect seemed most successful. Forest and his colleagues found that aerosols have most likely cooled the planet, but not as much as IPCC allowed. The net effect of aerosols could have been to reflect 0.30 to 0.95 watt per square meter of solar energy back into space, according to their result, compared with IPCC's admittedly uncertain range of zero net effect to more than 4 watts per square meter of net cooling. If correct, Forest's modest cooling would mean that most of early greenhouse warming is not being masked by aerosols. But aerosol modeler Joyce Penner of the University of Michigan, Ann Arbor, cautions that Forest probably shouldn't be lumping all types of aerosols together. She notes that some, such as those from field and forest burnings, do not concentrate in northern mid-latitudes, as Forest had to assume. "I wouldn't want to rewrite IPCC," adds climatologist Gabriele Hegerl of Duke University in Durham, North Carolina, but Forest's "range [for aerosols] is more likely than the very high ones of IPCC." To be more confident, researchers must further refine the top-down approach and, like it or not, gain more bottom-up understanding.

–RICHARD A. KERR

HARVARD DISAPPEARANCE

Missing Biologist Found Dead in River

The body of Harvard biochemist Don Wiley was found last month, 5 weeks after he disappeared while attending a professional meeting in Memphis, Tennessee. The corpse was discovered floating in a Mississippi River tributary in Louisiana, more then 300 miles south of the bridge where Wiley's abandoned car was discovered at 4 a.m. on 16 November. Dental records confirmed the identity of the Lasker Prize winner.

"It's a long ways, but the river has a mind of its own," said Lt. Joe Scott of the Memphis Police Department.

As *Science* went to press, Memphis police were awaiting results of an autopsy to determine the cause of Wiley's death. Colleagues have said that they doubt Wiley would have jumped off the bridge, but so far police have found no evidence of foul play (*Science*, 14 December 2001, p. 2265). A wallet containing identification was found with the body.

Harvard president Lawrence Summers issued a statement saying that the loss left a "tremendous void" in the campus community, which was shut down for winter vacation when the news arrived. Wiley's principle research sponsor, the Howard Hughes Medical Institute, has yet to set a timetable for determining the status of the lab, according to institute spokesperson Bob Potter (see Letters, p. 43). "It's just too early for that," says Potter. "Everybody has to come to terms with the fact that Don is not coming back."

–JOSH GEWOLB

NUCLEAR SCIENCE

U.S. Breeder Reactor Runs Out of Lives

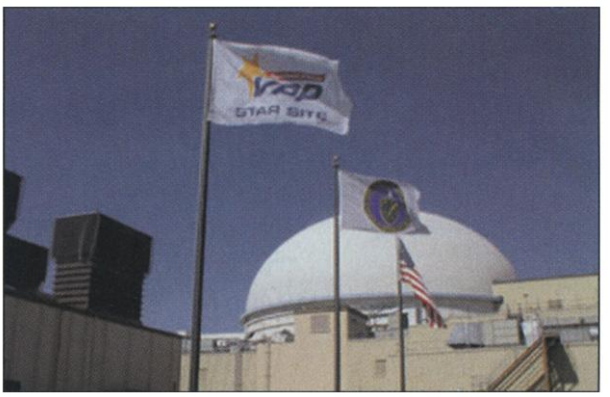
This time the decision looks final. The Bush Administration has abandoned its search for a new mission for the Fast Flux Text Facility (FFTF) in Hanford, Washington, and is planning to decommission the reactor.

The 19 December announcement marks the end of a decade-long saga for the Department of Energy's (DOE's) experimental breeder reactor. Concerns that its fuel might be a tempting target for nuclear terrorists, the high cost of restart, and the lack of a clear mission sealed its fate. But many FFTF opponents are already gearing up for the next fight, over getting the government to spend the $300 million needed to permanently shut down the facility. "The department's final determination is based on sound science, an extensive analysis of the costs and benefits of disposition options, and an in-depth consideration of the feasibility of commercial use options," said Energy Secretary Spencer Abraham in a written statement.

Proponents saw the reactor as an important source of radioisotopes used in cancer therapy and other treatments. But most biomedical researchers say that the isotopes are available from other sources and that restarting the reactor would drain scarce resources from other DOE research programs. "The data were compelling a long time ago that the cost of restarting FFTF relative to the need was not favorable," says Ken Khrone, a radiologist at the University of Washington, Seattle.

FFTF went online in 1980 but was shut down in 1992 because of high operating costs. DOE has since spent about $35 million a year to maintain the reactor in standby mode while exploring possible uses ranging from producing tritium for nuclear weapons to plutonium-powered batteries on deep space probes (*Science*, 4 April 1997, p. 28). Last January, the outgoing Clinton Administration ordered the facility permanently closed, but Abraham stayed the order in April, soon after taking office.

Abraham ultimately rejected two ideas, one from a consortium of companies that wanted to produce and sell medical isotopes, the other to use the facility to research advanced reactor designs. "Both were found to have major drawbacks and present potential DOE liabilities that collectively could exceed $2 billion," concluded DOE's review leader, Robert Card, in a 14 December memo to Abraham. Those costs were too much for a shrinking DOE budget, says Tom Carpenter, who heads the West Coast office of the Government Accountability Project, a public interest law firm that opposed a restart: "The proposal to restart FFTF may have gotten somewhere 10 years ago, but not in this budget climate."



Half-mast. DOE officials flagged uncertain large costs as the main reason for shutting down the reactor.

This same fiscal climate already has chilled other Hanford cleanup operations. Last spring, the Bush Administration requested $430 million less for cleanup activities at Hanford than required under a binding agreement with Washington state and the Environmental Protection Agency, although Congress later restored the funds. With even more money needed next year to begin shutting down the reactor, another round of budget battles seems like a good bet.

–ROBERT F. SERVICE

CREDIT: FFTF