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Fact Sheet for the Chairman,
Environment, Energy, and Natural
Resources Subcommittee, Committee
on Government Operations, House of
Representatives

April 1992

NUCLEAR SCIENCE

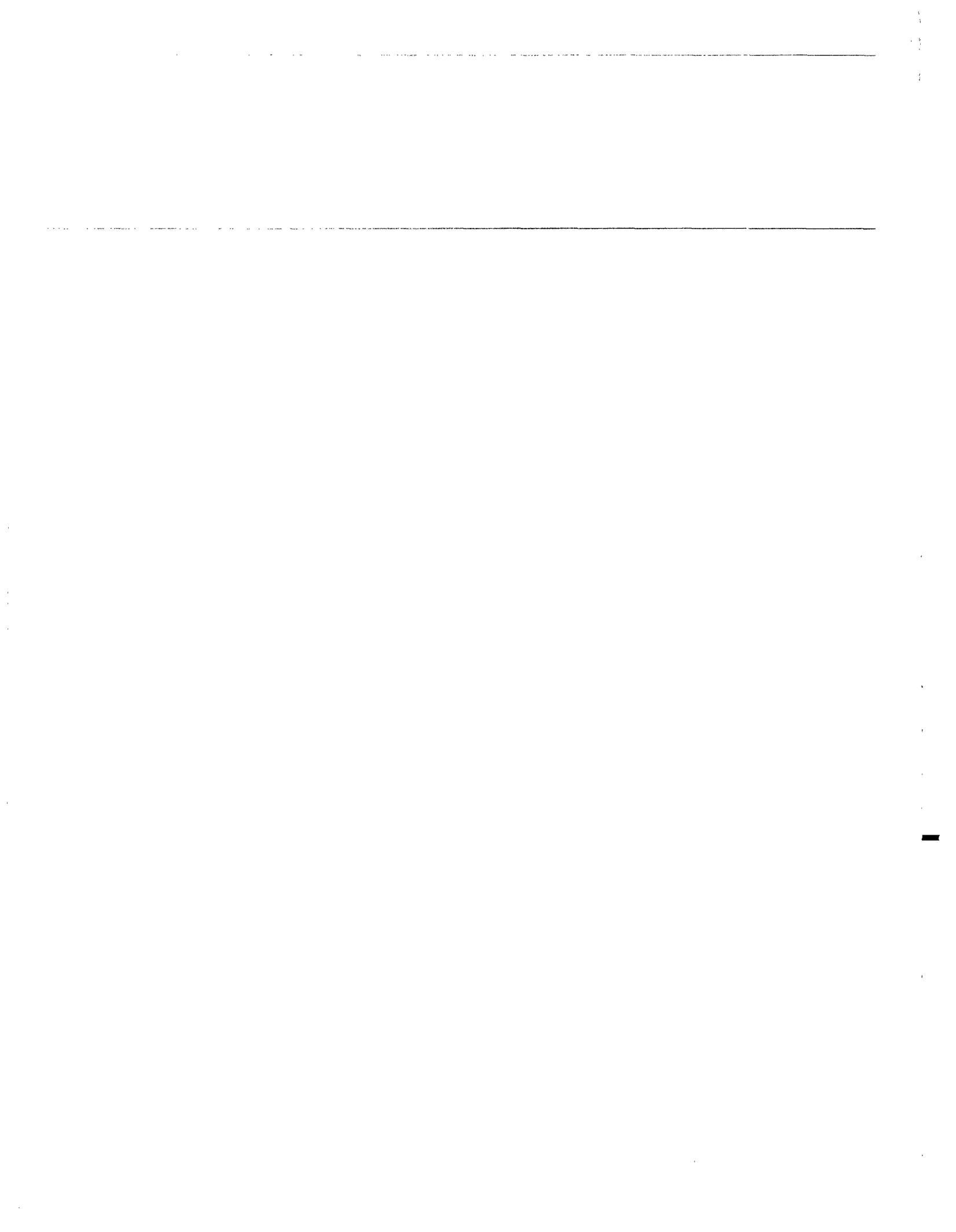
Fast Flux Test Facility on Standby, Awaiting DOE Decision on Future Missions



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United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-247436

April 9, 1992

The Honorable Mike Synar
Chairman, Environment, Energy, and
Natural Resources Subcommittee
Committee on Government Operations
House of Representatives

Dear Mr. Chairman:

In response to your request, we determined the rationale for the Department of Energy's (DOE) 1990 decision to shut down the Fast Flux Test Facility (FFTF) and DOE's response to proposals to keep FFTF operating. We also discuss DOE's March 13, 1992, decision to place FFTF on standby.

FFTF, a liquid metal-cooled 400 megawatt reactor located at the Hanford Reservation in Washington State, is DOE's newest and largest test and research reactor facility. FFTF was designed primarily to test how well materials and components proposed for use in advanced reactors work in an operating test reactor. It started operation in 1982.

In summary, we found the following:

- DOE planned to close FFTF on April 1, 1992, because DOE had not been able to find a mission or missions to pay FFTF's nearly \$90 million annual operating costs. However, on March 13, 1992, the Secretary of Energy stated that FFTF would be put on nonoperating standby status, effective April 1, 1992. He stated that this will give DOE more time to consider FFTF for possible future DOE missions, which may materialize in the next several years.
- DOE has examined and rejected a number of proposals for FFTF, including most of those made recently by the Governor's Office of the state of Washington and the Westinghouse Hanford Company (FFTF's operating contractor). DOE concluded that these proposals for domestic and international utilization of FFTF would (1) produce too little annual income to support FFTF, (2) be too costly to initiate, (3) be too low-priority for scarce funds, and/or (4) be more viable at other DOE

facilities. However, DOE is still considering a proposal for FFTF to produce plutonium 238, a power source for electricity used during space missions. DOE is expected to make its decision on production of plutonium 238 by the fall of 1992.

In addition, DOE is considering FFTF as a possible option for the production of tritium. The tritium mission might occupy the entire FFTF and thus exclude other missions. In the meantime, DOE will keep FFTF on a nonoperating standby status at an annual cost of about \$50 million to \$60 million. DOE estimates that FFTF will not be restarted until 1996 at the earliest because there is a sufficient inventory of plutonium 238 and tritium to last at least the next several years.¹ DOE is still discussing the details of the standby status (the extent of standby, costs, schedules, number of personnel required, and other items) internally and with Westinghouse Hanford.

Section 1 discusses the events leading to DOE's stated decision to close FFTF. Section 2 discusses efforts to keep FFTF operating and DOE's conclusion regarding these proposals.

SCOPE AND METHODOLOGY

We conducted our review from April 1991 through mid-March 1992, in accordance with generally accepted government auditing standards. To complete our work, we interviewed officials at DOE headquarters and the Richland Field Office, the Nuclear Regulatory Commission, the Westinghouse Hanford Company, the state of Washington, the Electric Power Research Institute, the Argonne National Laboratory East and West, and other nuclear reactor experts around the country. We also used a consultant, Dr. George W. Hinman, a nuclear physicist, to help interpret technical proposals for keeping FFTF operating. We reviewed pertinent documents, including plans for proposed FFTF missions, but, as agreed, we did not analyze these proposals in detail.

¹We have previously raised questions with DOE concerning what options should be considered for producing tritium now that the requirements for tritium have decreased. See our report entitled Nuclear Materials: Decreasing Tritium Requirements and Their Effect on DOE Programs (GAO/RCED-91-100, Feb. 8, 1991).

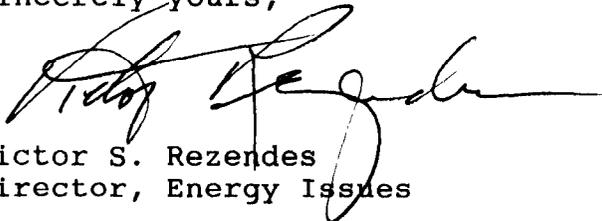
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We discussed the results of our work with officials from DOE's Office of the Assistant Secretary of Nuclear Energy, who agreed with the facts as presented, and we incorporated their comments where appropriate. As requested, we did not obtain written agency comments on this fact sheet.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this fact sheet until 30 days from the date of this letter. At that time we will provide copies to the appropriate congressional committees; the Secretary of Energy; the Westinghouse Hanford Company; the Governor's Office for the state of Washington; the Director, Office of Management and Budget; and other interested parties. We will also make copies available upon request.

If you have any questions about this fact sheet, I can be reached on (202) 275-1441. Major contributors to this fact sheet are listed in appendix I.

Sincerely yours,



Victor S. Rezendes
Director, Energy Issues

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ABBREVIATIONS

DOE	Department of Energy
EBR-II	Experimental Breeder Reactor number 2
FFTF	Fast Flux Test Facility
GAO	General Accounting Office
RTG	radioisotope thermoelectric generators

SECTION 1
EVENTS LEADING TO DOE'S STATED DECISION TO CLOSE FFTF

Two major events led to DOE's stated 1990 decision to close FFTF. These events involve the loss of FFTF's primary mission to support DOE's advanced liquid metal-cooled breeder reactor development program and a 1989 mission to produce plutonium 238.

FFTF SUPPORTED DOE'S LIQUID METAL REACTOR PROGRAM

FFTF was constructed to support the Clinch River Breeder Reactor Development Project, which was part of DOE's advanced liquid metal-cooled breeder reactor program. The Clinch River Project was cancelled in 1983, and FFTF lost its primary mission. However, DOE redesigned and redirected its advanced liquid metal-cooled breeder reactor program, and FFTF was part of the redirected program.

In 1986, DOE switched the focus of its liquid metal-cooled reactor program from the development of oxide-fueled reactors to metal-fueled reactors. FFTF was designed to use an oxide fuel, the standard fuel used in international programs to develop breeder reactors. Managers for DOE's breeder reactor development program became convinced in 1986 that metal-fueled, liquid metal-cooled breeder reactors would be more efficient than oxide-fueled reactors and that a reactor fuel recycling process using metal fuel would be more efficient and less costly than one using oxide fuel. DOE's 27-year old Experimental Breeder Reactor number 2 (EBR-II) at the Argonne West Laboratory in Idaho uses a metal fuel. Thus, after 1987, DOE's advanced liquid metal-cooled reactor program focused on EBR-II, to the increasing exclusion of FFTF.

From 1986 to 1990, FFTF did obtain other missions, such as, materials and components testing for the U.S. space program and U.S. fusion program and support of Japan's oxide-fueled breeder reactor program. These missions, however, did not provide enough funding to fully pay FFTF's operating costs, and most were either finished or moved to EBR-II in anticipation of FFTF's eventual closure.

IN 1989 DOE CONSIDERED AND REJECTED FFTF FOR PLUTONIUM 238 PRODUCTION

In 1989 DOE rejected a proposal to produce plutonium 238 at FFTF, and this event, which left FFTF without a prospective major mission, helped lead DOE to its 1990 decision to close FFTF.¹

¹As of Mar. 1992, DOE was reconsidering FFTF for this substantial mission. (See sec. 2.)

Until shutdown of the production reactors at DOE's Savannah River Plant in South Carolina for safety upgrades in 1988, the reactors produced plutonium 238 as a by-product of tritium production. Plutonium 238 is used in radioisotope thermoelectric generators (RTGs), which are used to provide electric power for use in space missions and some defense projects. With the shutdown, DOE considered moving plutonium 238 production to FFTF. In January 1989, the then Secretary of Energy told the Senate Committee on Energy and Natural Resources that an independent study would be done by the National Academy of Sciences to help DOE decide the matter, but none was ever done.²

Instead, in late 1989, DOE did its own analysis, which questioned FFTF's ability to meet production requirement schedules for plutonium 238 and concluded that operations would be more costly at FFTF. The Westinghouse Hanford Company challenged the validity of DOE's analysis. Westinghouse was concerned that in DOE's cost comparison none of the Savannah River's K reactor's operating costs were attributed to the production of plutonium 238 because it was considered as a by-product of the manufacture of tritium by this reactor. On the other hand, all of FFTF's costs were attributed to the production of plutonium 238 and not offset by funding from other existing or potential missions.

²The impetus for this independent study was lost when the administration of DOE changed.

SECTION 2
RECENT EFFORTS TO KEEP FFTF OPERATING

The following summarizes the efforts to keep FFTF operating. These proposals were made after DOE announced its intention to close FFTF. DOE rejected most of the missions proposed for FFTF but is reconsidering it for production of plutonium 238 and, possibly, the production of tritium

PROPOSALS TO KEEP FFTF OPERATING
THAT WERE REJECTED

In 1990, when the Secretary of Energy announced his decision to close FFTF, Members of Congress, the Governor's Office of the state of Washington, the Westinghouse Hanford Company, and some officials within DOE suggested that DOE decisionmakers consider other possible missions to keep FFTF operating, including support of international research. In 1990 and 1991, the Governor's Office and the Westinghouse Hanford Company proposed some domestic missions for FFTF, and the Governor's Office and Westinghouse marketed the services of FFTF internationally. DOE directed Westinghouse Hanford Company to develop a formal plan with cost estimates and potential revenues for each of these proposed missions. DOE considered these missions and concluded that those proposed for U.S. users, mainly DOE, would not provide enough funding to continue FFTF, might be costly to implement, could be performed by other DOE facilities, and/or were not high priority for scarce DOE funding. Furthermore, DOE determined that potential funding from international groups would be too small to justify continued FFTF operations.

The proposed missions that DOE evaluated and rejected included advance liquid metal-cooled reactor support, irradiation testing of materials and components, waste transmutation development and demonstration, passive safety testing and demonstration, isotope production, generation and sale of electric power, testing large steam generators, and support of international research efforts.¹ Westinghouse Hanford estimated that these missions would probably generate a total of less than \$20 million in the first year but would likely build up to 50 percent or more of FFTF's annual operating cost in 5 years. In response, a representative of the Assistant Secretary for Nuclear Energy's Office, which is responsible for FFTF, told us that funds are too scarce for DOE to take the long-term financial risk of keeping FFTF operating while trying to build up services for it. DOE officials said that keeping FFTF on standby, rather than operating it while awaiting

¹Westinghouse Hanford had also proposed a plutonium 238 production mission for FFTF. As stated below, a DOE task force is studying this, along with other options, as a source for plutonium 238.

prospective suitable missions, may save a total of \$100 million over the next several years.

MISSION PROPOSALS THAT ARE
STILL BEING CONSIDERED

DOE plans to keep the FFTF on a nonoperating standby status while considering it for two other missions--production of plutonium 238 and, possibly, tritium.

In November 1991 DOE established a task force to again study the long-range options for production of plutonium 238. DOE took this action in part because the Savannah River reactors have not been restarted. Moreover, with the cutback in the need for tritium, the Savannah River K reactor, if restarted, may be operated only on an "as needed" basis to make tritium. Consequently, this operating schedule may not be suitable to meet future needs for production of plutonium 238. The options that are now being considered and compared by the task force are production at Savannah River, FFTF, DOE's Advanced Test Reactor in Idaho, and/or purchase overseas.² (The Advanced Test Reactor is 25 years old, has an annual operating budget of about \$60 million, and is used primarily to support the Naval Reactor Program.) Using information from this task force's report, DOE is expected to select a production option by fall of 1992 that provides a reliable, long-term source for radioisotope power systems. Production of plutonium 238 would likely pay most (if not all) of FFTF's annual operating costs. However, according to DOE, even if FFTF is selected for the plutonium 238 mission, FFTF will not be needed until 1996 at the earliest since there is currently enough plutonium 238 for scheduled missions.

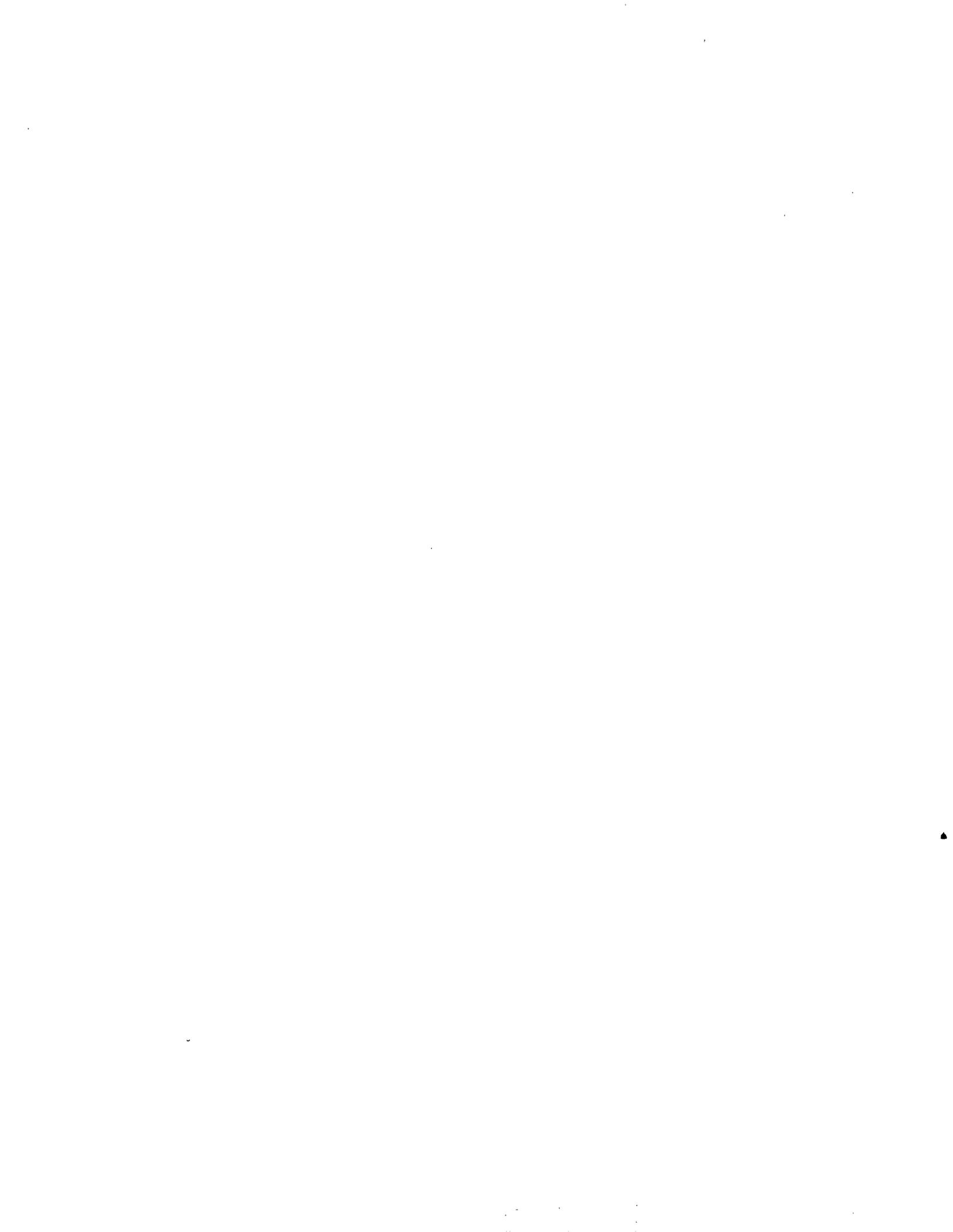
DOE is also considering FFTF for the production of tritium, which is used in nuclear weapons. With the need for tritium dropping because of the cutback in requirements for nuclear weapons, FFTF and other options are being considered at least as possible interim sources until a new production source is identified and constructed. According to Westinghouse Hanford and DOE officials, the tritium mission might need to use the entire FFTF. Thus, other missions might not be performed if FFTF is selected for tritium production. According to DOE officials, even if FFTF is selected for this mission, it would not be needed for at least the next several years because the current supply of tritium is sufficient.

²DOE officials recently obtained approval to negotiate an initial purchase of plutonium 238 from the former Soviet republics. This purchase would provide DOE with a small amount of its future need.

MAJOR CONTRIBUTORS TO THIS FACT SHEET

RESOURCES, COMMUNITY, AND ECONOMIC DEVELOPMENT DIVISION,
WASHINGTON, D.C.

James E. Wells, Jr., Associate Director
Robert E. Allen, Jr., Assistant Director
Dr. Duane G. Fitzgerald, Technical Director
Jack H. Paul, Evaluator-in-Charge
William J. Mohan, Evaluator



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