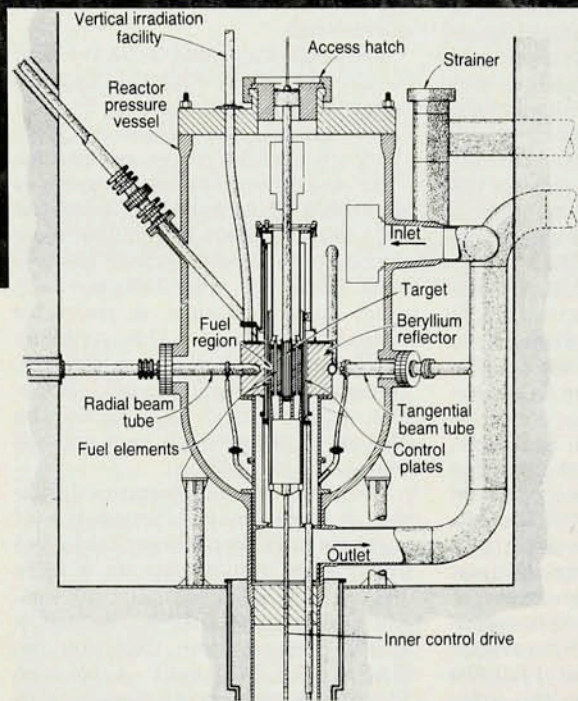




HFIR in woodlands
at Oak Ridge National Laboratory is depicted in diagram. It shows the reactor core surrounded by a thick ring of beryllium, which acts as a neutron reflector. The reactor is equipped with four beam tubes that extend from the core to experiments.

the operation and modernization of defense production plants. He owes his position in the Administration to President Bush's worries about the troubled defense reactors as well as to a commitment to nuclear power. Watkins was one of Admiral Hyman Rickover's "whiz kids" in the design and development of submarine reactors and was a graduate of the Oak Ridge reactor program. He later commanded a nuclear-powered attack submarine and the first nuclear cruiser. Rising to the rank of admiral, Watkins served as chief of naval operations between 1982 and 1986, before retiring. In October 1987 he was appointed chairman of the Presidential Commission on the Human Immunodeficiency Virus (AIDS).

HFIR, designed and built for a relatively cheap \$23.3 million in 1966, is a light-water cooled reactor that ran for 20 years at its design power of 100 MW. For all those years it produced high-grade radioisotopes of transuranic elements, particularly californium and curium, for scientific

and medical research, for cancer treatment, for neutron scattering studies and for tests of fusion materials for radiation damage. Its record for producing the highest thermal flux of 5×10^{15} neutrons/cm²-sec was nearly equalled by high-flux reactors at Brookhaven and the Institut Laue-Langevin. The irony of HFIR's 2½-year dormancy, Trivelpiece observes, is that it did not take part in the frenzied research in high- T_c su-

perconductivity. "It couldn't do one of the things it does best: determine the structure of materials," he says.

The troubles with HFIR were revealed in a 1986 review of all the lab's reactors, ordered by Herman Postma, then director of Oak Ridge, after the Chernobyl disaster in the USSR. The examination found HFIR's pressure vessel to be perilously brittle from 20 years of neutron bombardment. The review did not suggest any immediate danger to the reactor, which is fueled by 93% enriched uranium²³⁵, unlike the 2% to 4% enrichment in US commercial power reactors. But investigators found definite signs of embrittlement in several sample "coupons" of three types of steel that had been placed in the reactor just for the purpose of testing. As a result, Postma decided the prudent course was to shut down HFIR.

Since it was turned off in November 1986, the reactor has been subjected to some 20 different studies. The examinations, conducted by the Department of Energy, the National Research Council, the Oak Ridge management contractor, Martin Marietta, and several independent consultants, called for hundreds of corrective repairs and actions. While the pressure vessel was found to be sound enough for restarting, the examiners called for HFIR to run at reduced power and to require better trained operators. They also recommended that Oak Ridge and DOE managers should keep more careful watch on HFIR. In October 1988 Oak Ridge asked DOE to restart HFIR at 85 MW, and Robert Hunter, Trivelpiece's successor at DOE, accelerated the paperwork and advised Watkins to go ahead. In the end, however, the startup was Watkins's decision. On 18 April the machine went critical and, cautiously at first, reached 50 kW, but by early June it is expected to reach 85 MW. Even shut down, HFIR had run up a bill of \$40 million—nearly twice the cost of its design and construction.

—IRWIN GOODWIN

WASHINGTON INS & OUTS: MOVES FROM HOUSE SCIENCE PANEL; NEW POSITIONS AT NSF AND SSC

Harlan L. Watson, the top Republican staffer for energy and environmental issues on the House Science, Space and Technology Committee, has left Capitol Hill to join his mentor, Manuel Lujan Jr, the newly confirmed Secretary of the Interior. Lujan had been senior Republican on

the science committee until he decided not to run for reelection last year for his House seat from New Mexico. Watson, who is Lujan's science adviser at Interior, is one of three committee staffers to join the department. The others are **R. Thomas Weimer**, minority staff director, who

was an electrical engineer at Lockheed Missiles and Space in the 1970s and at Sandia Labs in the 1980s before coming to the House staff in 1985, and **Maryanne Bach**, a botanist and plant ecologist who joined the House science committee in 1981, a month before Watson. Weimer is special assistant to Lujan, and Bach is deputy assistant secretary for fish and wildlife and parks.

During his eight years at the House science committee, Watson visited every Department of Energy laboratory and earned the respect of many lab directors as well as members of Congress for his knowledge and insight about research projects and budget matters. The committee's executive director, Harold P. Hanson, regarded Watson as "one of the brightest and hardest working staffers around here."

Watson received his PhD in physics from Iowa State University in 1973 and worked as a postdoc in superconductivity at Argonne National Laboratory until 1975. For the next five years he did research at B-K Dynamics and TRW, then spent the next two years on the staff of the Senate energy research subcommittee before crossing over to the House side to join the energy subcommittee in December 1981.

John V. Dugan Jr., staff director of the House Subcommittee on Energy Research and Development since 1981, has become Washington operations director at Cortana Corporation, a defense contractor in submarine research. At a crowded Christmas party on 1 December in the House science committee's largest hearing room, the chairman, Representative Robert A. Roe, a New Jersey Democrat, presented Dugan with a "certificate of appreciation." The citation hails Dugan's "exceptional intellect, enduring wit, strong leadership in formulating national energy policy and dedicated years of service."

Dugan came to the House science committee in 1975, at a critical time for government energy policy. The energy crunch had begun and the Atomic Energy Commission had transmogrified into the Energy Research and Development Administration. In 1976, the Joint Atomic Energy Committee was dissolved and the science committee was given operations oversight and budget authorization for the research programs in the Department of Energy, a transmutation of ERDA. Dugan recalls bitter battles between pro-nuclear and anti-nuclear forces in Congress. "My job on the committee

was to bring some balance into the conflict," says Dugan.

One of the energy subcommittee's toughest issues was magnetic fusion. "There's so much ambivalence about fusion research among scientists and in Congress," Dugan observes. "The field is torn between investing in more basic research and building large experimental machines. The politicians seem at odds over strengthening our domestic program and pushing for international collaboration. My own view is that our national program will be at risk by our participation in ITER, the International Thermonuclear Experimental Reactor, which would bring us into a research program with the European Community, the Soviet Union and Japan to work toward a practical fusion machine."

In 1983 Dugan's subcommittee also struggled with Isabelle, the ill-fated proton-proton Colliding Beam Accelerator, before yielding to the demands of DOE officials and President Reagan's science adviser, then George A. Keyworth II, as well as to the urging of the High Energy Physics Advisory Panel, to kill the half-finished project and go ahead instead with the Superconducting Super Collider. "Now that Congress is confronted with paying for the SSC," says Dugan, "there is an awful danger that some worthy things are on the endangered list. I'm concerned about nuclear physics becoming an orphan. I think Brookhaven's Relativistic Heavy Ion Collider will give us exciting science if it ever gets built, but I fear it will be a casualty in the super-expensive environment of the SSC."

Dugan earned his PhD in physical chemistry at Notre Dame University in 1965 while he was a research scientist at NASA's Lewis Research Center. He remained at Lewis, working in the fields of plasma physics, electronic and atomic collision processes and ion and plasma rocket phenomena, until he joined the House science committee in 1975.

On 7 November **Arnold A. Strassenburg** was named director of Materials Development, Research and Informal Science Education at the National Science Foundation. A high-energy physicist who earned a PhD from Caltech in 1955, Strassenburg taught physics at the University of Kansas from 1955 until 1956, then joined the physics department of the State University of New York at Stony Brook, where he still teaches. He also served as director of the education division at the American Institute of Physics, 1966-1972, and as executive officer of

the American Association of Physics Teachers, 1972-1982. During the period 1975-1977 Strassenburg was director of NSF's materials research development division. He returned to NSF in 1986 to work in science and engineering education, and became director of the divisions of Education and Manpower and of Teacher Preparation and Enhancement.

Roy Schwitters, director of the proposed Superconducting Super Collider, appointed **Raphael G. Kasper** as associate director and chief of staff of the \$6 billion project. Kasper, who joined the SSC team on 13 March, was most recently executive director of the National Research Council's Commission on Physical Sciences, Mathematics and Resources. He served the Research Council, which conducts policy and technical studies for the National Academies of Sciences and Engineering, in various capacities since 1973.

One of his first jobs at the Research Council was staff director of a politically sensitive review of decision making at the Environmental Protection Agency. He left the Research Council in 1977 to conduct studies of dam safety and environmental policies for the Office of Science and Technology Policy at the request of Frank Press, then President Carter's science adviser. Kasper returned to the Research Council at the end of the year as executive secretary of its Environmental Studies Board. He spent nearly all of 1980 as director of studies for a special White House committee appointed by Carter to examine nuclear reactor safety, a subject that was politically volatile after the Three Mile Island mishap in 1979. At the conclusion of the study, its chairman, Bruce Babbitt, then governor of Arizona, commended Kasper for his judgments on technical and policy matters involving nuclear power.

Rafe, as he is known to friends, got his BS in engineering physics from Cornell and his PhD in nuclear engineering in 1971 from the University of California at Berkeley. He has written widely on technology assessment and cost-benefit analysis in the fields of environmental policy and energy use.

In the next few months he will divide his time between the Universities Research Association, which represents 60 research universities in managing SSC and Fermilab affairs, and the SSC's temporary headquarters in Suite 260 at 2550 Beckleymeade Avenue, Dallas, Texas 75327 (telephone: 214-709-9921).

—IRWIN GOODWIN ■