

THE ENERGY DEPARTMENT'S MODEST PROPOSAL

Does the DOE's embrace of a stop-gap isotope plan jeopardize the National Biomedical Tracer Facility?

THE U.S. DEPARTMENT OF Energy has embraced a proposal to upgrade an existing linear accelerator as an "interim solution" to chronic radioisotope shortages, but many medical investigators whose research depends on radiotracers have greeted the interim plan with dour suspicion.

These researchers fear that a Faustian bargain has been struck within the Energy Department, which they suspect is looking for a low-cost answer to congressional critics who have questioned the department's lack of support for the proposed National Biomedical Tracer Facility.

The National Biomedical Tracer Facility, or NBTF, envisioned by leading nuclear medicine investigators would include a powerful accelerator dedicated to year-round production of a plethora of radioisotopes crucial to research ranging from cancer therapy to environmental studies. Proponents of the interim plan, set at Brookhaven National Laboratory in New York, argue that upgrading the Brookhaven Linac Isotope Producer, or BLIP, is essential to keep research projects alive until an NBTF is built, which could take five years or more.

The NBTF would host new research and training programs and cost anywhere from \$40-100 million. For the interim plan, Brookhaven scientists are asking for a mere \$6 million.

"I'm afraid what is being called an interim plan will end up being the cheap alternative to the NBTF," says Richard A. Holmes, MD, of the University of Missouri-Columbia. "And there will be no education program, no new research

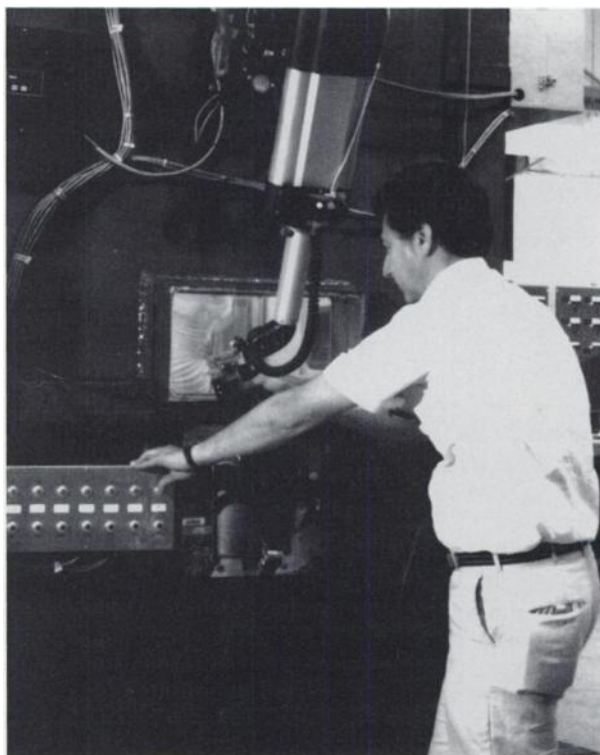


Photo: Brookhaven National Lab

Scientists at the Brookhaven Linac Isotope Producer, or BLIP, hope to gain funding from the Energy Department to upgrade for year-round production of radioisotopes for nuclear medicine and other research. Brookhaven scientist Leonard Mausner, PhD is shown here loading targets for radioisotope production in the linac.

programs other than what already exists at Brookhaven, and not even all of the needed isotopes would be produced." Dr. Holmes was lead author of a planning and feasibility study funded by the DOE two years ago expounding the need for a national accelerator facility. Last fall Congress directed DOE to allocate \$2 million for a Request for Proposal (at this writing in late February, DOE expected to publish the RFP by mid-March). Some dozen institutions have begun vying for the NBTF.

Funding in Peril

But money to actually build the

NBTF is far from in the bag. Given the fiscal belt-tightening emphasized by the Clinton Administration, the NBTF faces mounting competition for research dollars. And Energy Department officials aren't exactly stumbling over themselves to champion the NBTF. On the contrary, as congressional oversight hearings revealed last summer, DOE budgeteers have sidestepped responsibility for the NBTF, even though no fewer than three expert panels convened by the DOE have given the project highest priority (see *Newsline*, October 1992, p. 16N).

DOE officials are worried that Con-

President Clinton Drops Ax on Nuclear Research

President Bill Clinton issued chilling words for nuclear scientists in his February 17 state of the union speech. To cut federal spending by \$246 billion over the next four years, the President would like to eliminate what he called "wasteful" projects "such as nuclear power research and development."

Nuclear investigators funded by the Department of Energy anxiously await announcements of which programs face the budget ax. Among science programs, the Administration has focused mainly on trimming R&D for advanced nuclear electric power

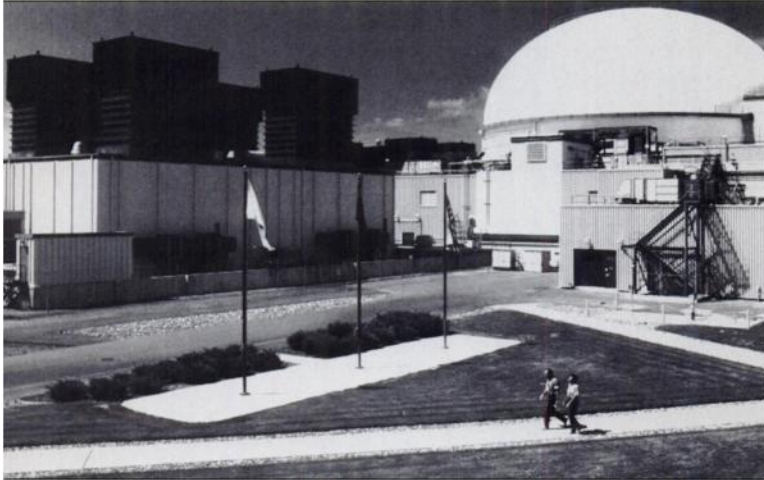
seemed in danger of losing DOE support after costs estimated at about \$400 million eight years ago eventually mushroomed to over \$2 billion. Conceived as a replacement for two aging test reactors at DOE labs, the ANS would be the world's most powerful reactor for neutron scattering experiments and materials science studies. The reactor could also produce radioisotopes for research and industry.

Nuclear power research, in contrast, faces deep cuts proposed by the President, whose plan eliminates \$820 million over the next four years. The plan includes expenditures of \$38 million to fold certain power reactor programs. According to Congressional sources, two programs are marked for elimination: an existing advanced experimental nuclear power reactor at Idaho National Engineering Laboratory and another still in the design phase.

How the Administration will deal with the Fast Flux Test Facility, originally a power reactor program, is not yet clear. The FFTF gained a temporary reprieve from Energy Secretary Hazel O'Leary, who in February stayed her predecessor's order to close the reactor at the DOE's Hanford Site in Washington. The DOE completed the FFTF in 1982 as part of the breeder reactor program that the government promptly canceled in 1983, leaving the facility without a mission. Former Energy Secretary James Watkins announced in 1990 his intention to close the reactor, saying the department could no longer justify the \$88 million a year operation.

Congressional supporters like Sen. Slade Gorton of Washington defend the reactor as "a national asset that is too precious to throw away." Sen. Gorton says that multi-missions could keep the FFTF in business performing waste transmutation experiments and producing plutonium-238 for powering space probes. He says private firms have expressed "strong interest" in producing medical isotopes at FFTF. The intense neutron flux of the reactor is, Hanford physicists say, ideal for generating radioactive elements of extremely high specific activity useful for cancer therapy radiopharmaceuticals.

Critics say the reactor is ill-designed for commercial radioisotope production. It requires halting the chain reaction each time radioisotope targets are inserted or removed. Some also question whether other missions for the reactor would be compatible with making radioisotopes. And medical radioisotope production alone wouldn't come close to justifying the operating expenses of the FFTF. "It would be like running the Taj Mahal as a newspaper stand," says one industry source.



Hanford's Fast Flux Test Facility could fall victim to deficit reduction.

plants. Nuclear-related programs such as nuclear medicine and high-energy physics should survive with relatively minor wounds.

The President's plan, in fact, calls for spending \$420 million to continue work on the Advanced Neutron Source, a research reactor for physics and biology experiments. Overall, less than 2% of the proposed \$54 billion in non-defense cuts identified in the President's deficit-reduction plan are aimed at science and technology funding, according to the House Committee on Science, Space and Technology. The mammoth Advanced Neutron Source, still in the design phase at Oak Ridge National Laboratory in Tennessee,

gress's support for the NBTF will strap them with a program that will soak up funds intended for other DOE research grants. That's why the NBTF proposal has been bounced back and forth between DOE's Office of Nuclear Energy, which handles isotope production, and the Office of Energy Research in charge of biomedical science funding.

Small wonder then that some researchers are wary of supporting the BLIP upgrade. "I think there is a danger in that the interim plan might suggest in many people's minds that the

DOE is not interested in the NBTF," says Wynn A. Volkert, PhD, of the University of Missouri-Columbia, who heads the committee on isotope availability of the Society of Nuclear Medicine.

"Why do we need an interim plan?" asks Dr. Holmes, one of the most outspoken detractors of the BLIP upgrade. "We've suffered without a dedicated accelerator for a long time and I think people are willing to wait until NBTF is online."

Such arguments are dismissed as

"somewhat politically naive" by the administrator in charge of Brookhaven National Laboratory, Nicholas P. Samios, PhD. "In the current fiscal climate, one has to be a bit more flexible to achieve the final goal that we all agree upon," Dr. Samios says. "We all support the NBTF."

Needs Are Immediate

The immediate needs for radioisotopes may overshadow doubts about DOE's intentions. As things stand now, nuclear medicine relies on two DOE ac-

celerators with uncertain futures: BLIP and the Los Alamos Meson Physics Facility in New Mexico. These are the major sources of strontium-82 for clinical rubidium-82 PET studies, germanium-68 for PET attenuation correction, copper-67 for cancer therapy with monoclonal antibodies, and a slew of other promising research isotopes.

Even operating together the two facilities have not met the demand for short-lived radioisotopes and can only deliver them eight months out of the year at best. An operation parasitic on physics experiments, BLIP typically runs from about January to June each year, when electricity rates are cheaper on Long Island. LAMPF is fired up from July through October, also contingent on physics experiments.

This year may be the last for isotope production at LAMPF. The \$64.5 million facility is funded in fiscal 1994, but under the budget for "defense activities." Sources say LAMPF's new mission will not be compatible with isotope production. (Eugene Peterson, director of isotope production at LAMPF did not return repeated telephone calls to confirm or deny this.)

Prospects for BLIP are less bleak. The laboratory plans to keep the linear accelerator, or Linac, online indefinitely, but with fewer and fewer operating hours as a standby proton injector to a new physics instrument, the Relativistic Heavy Ion Collider. Without the interim upgrade, BLIP would continue to depend on physics experiments and run too infrequently to support a viable isotope production effort, perhaps less than the four months currently logged each year. And even three to four months of supply is not good enough, as Brookhaven Senior Scientist Suresh Srivastava, PhD, head of radionuclide and radiopharmaceutical research in the medical department, puts it, "Patients don't wait to get sick."

Plans for BLIP

At \$6 million, the cost of the BLIP upgrade would amount to roughly one-sixth of the medical applications bud-

	Energy (MeV)	Current (μ A)	Operation (wk/yr)	Cost (\$M)	Facility Cost/yr (\$M)	Operating Revenue (\$M)	No. of Isotopes
BLIP:	200	50	20 (75%)	5.5	2.2	0.6	10
BLIP Upgrade:	200	150	46 (75%)	5.5	3.0	3.0	14
NBTF:	100	750	25 (75%)	10	7.0	7.0	25

get. The upfront cost covers Linac modifications to run at a higher beam current (150 μ A 50 μ A), to modify the BLIP design, and to expand hot cells and other processing equipment. The \$5.5 million a year operating funds would enable production 46 weeks a year and would be offset by revenue from the sale of isotopes, optimistically projected to be \$3 million annually.

Scientists at Brookhaven first proposed the BLIP upgrade in 1988. Only after the threatened strike by Canadian reactor workers in July 1992 and the ensuing ruckus raised by Rep. Mike Synar, an outspoken critic of the Energy Department, did the DOE seriously begin to consider the proposal.

Brookhaven scientists are the first to admit the interim plan would not come close to doing all that the NBTF is intended to do. The upgraded BLIP would produce 14 radioisotopes, for example, while NBTF would make 25. Dr. Srivastava says that BLIP could supply less than half of the projected demand for ⁸²Sr and perhaps not all of the demand for ⁶⁸Ge and ⁶⁷Cu. With five times more beam current, NBTF would have greater capacity and produce radioisotopes with higher specific activities than BLIP. And BLIP doesn't pretend to address the research and training needs identified by the NBTF planning study.

Despite its detractors, the BLIP upgrade has some heavyweight support, including the written endorsement of an expert panel on critical technologies convened by the DOE in May 1992 at

Lawrence Berkeley Laboratory. The panel said the National Biomedical Tracer Facility "should receive the highest priority," but added that "since such a facility will take several years to become fully operational, in the interim it would be necessary to identify an *existing DOE facility or facilities* which could be upgraded to immediately improve the situation." [Emphasis added.] The panel was moderated by Harold L. Atkins, MD of the State University of New York at Stony Brook and included Dr. Srivastava and Joanna S. Fowler, PhD, of Brookhaven, Edward A. Deutsch, PhD, of Mallinckrodt Medical Inc., Adrian Nunn, PhD and Richard C. Reba, MD of the University of Chicago, Michael J. Welch, PhD from the Mallinckrodt Institute of Radiology, and Thomas Budinger, MD with the University of California and DOE's Lawrence Berkeley Laboratory in Berkeley, California.

"The interim solution would get us through some tough times," says Dr. Budinger. He expresses deep concern about the possibility of surging overhead costs at PET centers and nascent research projects that would be cut short by extended gaps in radioisotope supply. "Now that I'm operating a PET center, my hands get tied by the availability of everything," he says in exasperation.

Upgrade is Likely

Close observers expect the BLIP upgrade to be part of the fiscal 1994 budget

for medical applications declined to comment on the status of the BLIP proposal, saying that as matter of policy all budget information is embargoed until it is formally presented to Congress later this month.

In the meantime the debate among researchers has shifted to discussion of how best to advance the NBTF. Following a simmering exchange of views at the February SNM Mid-Winter Meeting in Atlanta, the committee on isotope availability agreed on a consensus resolution that "rejects any interpretation of the interim solution as sufficient to satisfy the mission of the NBTF." The resolution also suggests that "it may be beneficial to solicit proposals for an interim solution from groups or sites in addition to BNL" and that "careful consideration be given to establishing appropriate resources for effective distribution of radionuclides."

That is a diplomatic way of reflecting some investigators' demands that the interim solution be peer-reviewed. "Anytime you are putting that much money into a project it should be peer-reviewed," says PET investigator and radiochemist Michael Welch, PhD, of the Mallinckrodt Institute of Radiology in St. Louis.

"History has not shown that Brookhaven is capable of doing what they say they can do," says Dr. Holmes. "And no one else has even had the opportunity to apply," he says.

In defense of the BLIP upgrade, Dr. Budinger says researchers should support the plan, for example, by advising the DOE on the logistics of the distribution of short-lived tracers. "Don't presume that Brookhaven is incompetent to deliver," he says.

In response to concerns about peer review of the interim plan, Brookhaven's Dr. Samios says his institution is the only practical choice. "To be honest, the options are very limited—who's got a 200 MeV cyclotron or linac?" He says that time limits the interim choices to LAMPF or BLIP, and that LAMPF will likely be unavailable. To demonstrate

how seriously the Brookhaven Lab is taking the project, Dr. Samios says that the existing BLIP user committee, a group of outside investigators that provides operational advice and helps set priorities, will be enlarged to include more scientists and the committee will report directly to a higher-level official, Associate Director for Life Sciences Richard Setlow, PhD. "We believe this is very important," says Dr. Samios, "And we are committed to doing it to the satisfaction of the community."

An unspoken concern of some nuclear medicine researchers is that the interim plan will give Brookhaven an advantage in landing the NBTF. "Some people in the field don't want it at the national labs due to the heavy bureaucracy and competing missions there," says an industry investigator who spoke on condition that he not be named.

Dr. Srivastava, who says Brookhaven will "definitely" compete for the NBTF, believes that a national laboratory is the best place to site the facility because of the existing infrastructure and expertise. Although he is worried about pork barrel politics intruding on the NBTF pro-

ject and insists that it be peer-reviewed, he does not think the BLIP upgrade need be reviewed. "I think that [peer review of the upgrade] doesn't make sense, nowhere else can anybody do what BLIP can do immediately. That would be delaying the whole thing by as much as a year," he says. If Congress approved funding for the BLIP upgrade now, the fully expanded capabilities would not be ready until 1996.

All sides agree that year-round availability of promising radioisotopes is necessary to the continued health of nuclear medicine research. Dr. Srivastava is not sure that the demand for radioisotopes and services of the NBTF will increase as envisioned without a continuation of research in the field. "If there is a hiatus in the supply of isotopes for the next four or five years people will move on to using other technologies," he says. "Then of course it would be very hard to justify a bigger facility."

Without the interim plan investigators could find themselves unable to do the research that would continue to demonstrate the need for an NBTF.

J. Rojas-Burke

SNM's Advice to the Office of Energy Research

Members of The Society of Nuclear Medicine met with the Department of Energy's William Happer, PhD, director of the Office of Energy Research, in January to discuss isotope supply problems afflicting medical research. The following letter, which stresses the importance of peer-review of any interim proposal for isotope production, was sent to Dr. Happer on January 11. The interim upgrade now slated for Brookhaven National Laboratory was not subject to peer-review.

We were very pleased that a key part of the project definition phase for the National Biomedical Tracer Facility is to immediately issue a request for proposal (RFP) for the NBTF and consider a second RFP for an interim solution. We await your judgement on this latter matter. By issuing the RFPs in this fashion, DOE should be able to resolve the problem of isotope availability expeditiously. A public, competitive RFP process assures that DOE will have the benefit of experts in the country in identifying different ways of establishing an NBTF. By having an independent peer review committee review these initial proposals, the DOE will be able to select the most effective economical site and design for what will serve as a dedicated national resource. We were gratified with [DOE official James F.] Decker's comment that finding the money, several million dollars, would not be any impediment to implementing the necessary facility upgrade for the interim solution. We would hope that a similar solution would prevail for funding the NBTF RFP without penalizing ongoing programs.