

annual supply levels adequate only for the requirements up to the year 2000, assuming the highest growth projections. NASAP estimated that uranium supply will satisfy demand in the US at least until 2010 without resorting to the breeder. During that two-year interval, forecasts of future world energy demand dropped sharply, and many countries revised downward their plans for installing nuclear power.

One interesting approach to breeder deployment has been put forth by IBM physicist Richard Garwin. He says that we can greatly reduce the hazard of proliferation associated with the breeder reactor by delaying its deployment and designing reactors that produce less weapons-usable plutonium. Nuclear power experts have traditionally encouraged early deployment of the breeder and development of high breeding ratios (the ratio of isotopes consumed to isotopes produced) in order to generate enough plutonium to fuel succeeding generations of breeders. But Garwin's calculations show that by fueling not only the first generation but each deployed liquid-metal fast breeder reactor initially with U^{235} rather than with reprocessed plutonium, we can sustain a reactor for more than 2000 years of operation at 1000 MW(e), even if there were no excess plutonium production in the mature LMFBR (that is, a breeder ratio of one). According to Garwin, his proposal to start the reactor operating with enriched uranium would allow a large,

rapid deployment of breeders when they are economically desirable without the necessity of premature commercial breeder operation or plutonium separation. An available uranium resource of 3.5 million short tons of U_3O_8 would fuel 1000 LMFBR's for more than 2000 years even if their breeding performance were far worse than has already been demonstrated, he says.

Garwin's approach to breeder deployment has several nonproliferation advantages: We would not need to separate plutonium now to fuel future breeders. Nor would we need to deploy first-generation breeders now, when they are not economically competitive with either LWR or fossil plants. Finally, opting for lower breeding ratios can eliminate the production of excess Pu that could be diverted for weapons uses.

The emphasis of breeder research should therefore shift from trying to raise the breeder ratio to modifying the design of the LMFBR to make it cheaper, safer and reduce the uranium investment required to fuel a new LMFBR, Garwin says.

Garwin's proposal will have a hard time winning acceptance. Both the INFCE and the NASAP studies recognized that breeder deployment decisions will be made for reasons of energy security as well as for economic considerations, and that different countries will reach different conclusions as to the timing and need for the breeder.

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said universities will be hardest hit by the cuts, because the national labs are working under contracts that cannot easily be broken.

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Cornell synchrotron seeks beam proposals

Proposals for experiments to be conducted at the Cornell High Energy Synchrotron Source (CHESS) facility, are now being considered. At present, three beam lines are fully operational and can supply radiation to four experimental stations. Intense polarized radiation in the hard x-ray energy range (a few keV and above) is available at these stations, and the characteristic energy of the radiation lies in a range of up to 35 keV. Proposals that would exploit this feature of the facility will receive preference. CHESS will provide the capability to facilitate studies in EXAFS, x-ray topography, small-angle scattering, Compton scattering, deep level spectroscopy and x-ray crystallography, but experiments need not be limited to these areas. Details on the current instrumentation and available facilities can be obtained from the director, B. W. Batterman, telephone (607) 256-5161.

Beam time will be allocated according to the recommendations of a review panel and the expected schedule of operation of the CESR storage ring. Proposals should be submitted by 15 August to Proposal Secretary, CHESS, Clark Hall, Cornell University, Ithaca, New York 14853.

House group cuts DOE 1980 funds

In its attempt to reduce Federal expenditures the House Appropriations Committee has cut the Department of Energy's Fiscal Year 1980 appropriation for physics research by \$19 million. While considering DOE's 1980 supplemental request and proposed rescissions, an appropriations subcommittee decided to make the additional cuts in the energy research budget. The action was unusual in several respects: For one, it was made halfway through the fiscal year, when some of the money involved had already been promised to national laboratories and universities. Also, the Committee was unusually specific in its proposed cuts, at times getting down to the project level. Such specifics are usually left to the Committee on Science and Technology.

The Appropriations Committee reduced the high-energy physics budget by \$8 million, \$4 million of which is to be removed from Brookhaven's Isabelle construction project budget until 1 October. This will result in a slower construction schedule, Edward Frieman, Director of Energy Research, told

PHYSICS TODAY, and raise the total cost of the project by \$5 million. Heavy-ion physics is reduced \$1 million. Another \$1 million is to be gained by deferring the construction of the National Superconducting Cyclotron at Michigan State University. And \$2 million is to come out of the magnetic fusion program. The Committee recommended that DOE make this cut by stretching out the development and construction schedule of the Elmo Bumpy Torus proof-of-principle project.

Following the Committee's action DOE appealed the rescissions (repeal of funds) to the Senate Appropriations Committee, but as of this writing, the Senate is not expected to disagree with the cuts.

The cutbacks could have some severe effects if they are made law, according to DOE, including staff layoffs and equipment shutdowns. Ronald Young, with DOE's Office of Energy Research, told us that, as an example, SLAC may have to extend its regularly scheduled maintenance shutdown to the end of the fiscal year in September. Frieman

Langenberg named NSF deputy director

Richard C. Atkinson has resigned as director of the National Science Foundation and is now chancellor of the University of California at San Diego. Atkinson had been NSF director since 1977 and served for two years before



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that as Deputy Director and then as Acting Director. He was the first behavioral scientist to head NSF.

Although nobody has been named yet to succeed Atkinson, Donald Langenberg, a University of Pennsylvania solid-state physicist, has been nominated to replace George Pimentel as deputy director. Langenberg received his PhD in 1959 from the University of California at Berkeley. He has been at the University of Pennsylvania since 1960, taking the occasional leave to accept visiting professorships at the University of Paris and Michigan State University and Sloan and Guggenheim fellowships. From 1974 to 1979 Langenberg served as vice provost for graduate studies and research at Pennsylvania. He has been chairman of the NSF advisory council and a member of the committee on government relations since 1977.

Pimentel is now head of Lawrence Berkeley Laboratory's division of chemical biodynamics and an associate director of the laboratory (PHYSICS TODAY, January, page 99).

Hill group funds new faculty posts in Northwest

Over the next five years, the Northwest Area Foundation of St. Paul, Minnesota will make \$1.5 million available to assist young faculty members in the northwestern US. The Universities of Minnesota and Washington will divide equally \$1.25 million to underwrite the salaries and research costs of a total of eleven new assistant professors. In addition, the Foundation has awarded \$250 000 to the Research Corporation, New York City, for distribution to young researchers in the Northwest.

The Northwest Area Foundation is a philanthropic organization devoted to the promotion of the general public welfare. It was created in 1934 by Louis W. Hill Sr, son of James J. Hill, founder of the Great Northern Railway. The Foundation concentrates on the region the railway served: Washington, Oregon, Idaho, Montana, North and South Dakota, Iowa and Minnesota.

By the fall of 1981, the University of Minnesota will have placed one new assistant professor of astronomy, four of physics and a single new assistant professor of biochemistry on its staff. Also by that time, the University of Washington hopes to have hired a physicist, an astrophysicist, an atmospheric scientist and two chemists. The newly employed scientists will be no more than five years past their doctorates and will perform teaching as well as research duties. The universities have agreed to make these tenure-track positions, with tenure to be

awarded through normal university channels.

Discussions on the grant program began in late 1978 between Northwest Area Foundation directors and Warren E. Ibele, dean of the University of Minnesota Graduate School. "With projections of declining enrollments," Ibele noted, "it is unlikely that there will be sufficient support in the [Minnesota] state legislature for maintaining a flow of young talent into the physical sciences at the University of Minnesota." Sometime after the inception of these talks, Ronald Geballe, vice provost for research and dean of the Graduate School at the University of Washington, was invited to enter the negotiations, which were concluded in the latter part of 1979. "The grants are intended to enable young scientific faculty to survive the current period of retrenchment until new money is found or older professors retire," observed Geballe.

The Research Corporation has agreed to handle the administration of grants averaging \$10 000 to academic researchers in the Northwest area. It will also meet the cost of any supplemental support on a case-by-case basis. The Research Corporation is a foundation dedicated to the advancement of the sciences (PHYSICS TODAY, August 1979, page 70).

A lack of academic job positions for newly trained science PhD's has been a topic of concern of various advisory and policy-making groups for several years. Historically, some 75% of US basic scientific research has been conducted in academic institutions. During the 1970's a number of factors—inflation, uncertainty about future funding and a decline in college enrollment—combined to hurt university research programs. As universities lost their discretionary resources, science faculties became top-heavy with tenured staff and little room was made available to incoming PhD holders.

In January 1979, NSF established a cross-directorate Staff Group on Support of Young Investigators. Simultaneously, the NSF director requested that the National Academy of Sciences assess the problem. The NAS study was performed by the Committee on Continuity in Academic Research Performance, which was headed by Robert M. Bock, dean of the Graduate School at the University of Wisconsin. Released last August, the NSF and the Academy reports both identified physics as one of the fields currently suffering from a serious lack of opportunities for the recent PhD. They predict that college enrollment and the retirement rate for tenured professors should grow in the early 1990's; so any assistance program should be designed to last for approximately fifteen years. Various mecha-

nisms for the support of young scientists were suggested in the reports but as yet no national programs have been implemented.

The Northwest Area Foundation has asked Bock to conduct annual evaluations of its grant program. At the end of four years, the program will undergo more extensive evaluation to determine its efficacy. The Foundation hopes that the program will be judged sufficiently effective to merit extension to 15 years (in five-year intervals).—SCA

Industry organization to push fusion power

A group of major high-technology companies has formed Fusion Power Associates, a nonprofit organization that will try to ease the transition to the commercial use of fusion energy. More specifically, the group plans to prepare a fusion engineering development strategy for the 1980's, to publicize fusion energy in the popular media, to sponsor fusion research seminars and meetings and to issue and distribute a newsletter on fusion. Although primarily industry-based, membership is open to all interested public and private organizations. Stephen Dean, formerly in the DOE office of fusion energy, is president and chairman of the board of directors.

Other members of the board are: Henry Gomberg (KMS Fusion); Donald Kummer (McDonnell-Douglas Astronautics Co); Bernard Eastlund (BDM Corp); Ronald Davidson (MIT); Nicholas Krall (JAYCOR); Sherman Naymark (Quadrex Corp); Tihoro Ohkawa (General Atomic Co); Paul Reardon (Princeton Plasma Physics Laboratory); Leonard Reichle (Ebasco Services); Peter Rose (Mathematical Sciences Northwest); Glen Sorenson (ILC Technology Inc); Alvin Trivelpiece (Science Applications Inc); James Williams (Los Alamos); Gerold Yonas (Sandia Laboratories), and Donald Zeifang (Baker and Hostetler law offices).

in brief

MIT and Appalachia-Science in the Public Interest, an Appalachian public service science organization, have each been awarded three-year grants by the National Science Foundation to set up public service science centers, which will sponsor public forums, workshops and demonstrations on the scientific aspects of public policy issues. The grants, totalling \$505 000, were made through NSF's Science for Citizens Program, which expects to support several similar centers.