Roughly $60 million of the new funds sought for this year are to be transferred from the Pentagon to DOE, presumably for one or more underground tests in Nevada, beyond the two to four tests already scheduled for this fiscal year at a cost of $157.8 million. In fiscal year 1987, the underground testing account will jump to $226 million, or enough for three to five explosions. (The budget for underground testing of the weapons has exceeded that for laboratory research for several years.) In addition to the x-ray laser, a variety of nuclear-driven weapons such as particle beams, microwaves, hypervelocity pellets, and optical lasers are also under investigation and may eventually be tested.

"These nuclear power sources, if you want to consider them that way (they are explosions but they act as power sources)," may ultimately be unnecessary for a ballistic missile defense, Wagner testified. But "the first stages of the SDI program, which . . . may last decades, I believe and the Department believes will have this nuclear component, this new kind of nuclear-driven directed energy weapon as one of its very important options." ■ R. JEFFREY SMITH

Briefing:

New Shuttle Director Promises Emphasis on Safety

A new emphasis on safety will be the hallmark of the space shuttle's operations when flights resume, according to Rear Admiral Richard Truly, the new associate administrator for space flight at the National Aeronautics and Space Administration (NASA). Speaking on 25 March before an enthusiastic crowd at the Johnson Space Center in Houston, Texas, Truly outlined a series of activities that he said are "required to establish a realistic and achievable launch rate that will be safely sustainable."

Specifically, the entire budget and program management "philosophy, structure, reporting channels and decision-making process will be thoroughly reviewed," he said. All shuttle components considered vital to the safety of the orbiter and the crew will be reassessed, as will all waivers of engineering redundancy. Inspection and test requirements will be reviewed, and the booster joints, widely recognized to have been the cause of the shuttle accident in January, will be redesigned under the direction of the Marshall Space Flight Center in Huntsville, Alabama.

In addition, new launch criteria will be established at the outset, Truly said. "When it's time for the first flight, we are going to do it as safely as possible. We are going to launch in the daytime from Kennedy [Space Center in Florida], we're going to have a conservative flight design, [and] we're going to have a repeat payload, one that we have experience with." No civilians will fly during the first year, and all flights will occur in warm weather, he indicated.

Truly explained that the rules are necessary to restore the agency's credibility in the wake of the Challenger disaster (*Science*, 28 March, p.1495). The agency's present plan is to conduct roughly nine flights a year, beginning a year from now. First priority will be given to launching military satellites, as well as a tracking and communications satellite destroyed by the accident. "We cannot print enough money" to make the flights risk-free, Truly added. "But we certainly are going to correct any mistakes that we may have made in the past, and we are going to get going again just as soon as we can." ■

R. JEFFREY SMITH

Panel Sees Decline in Undergraduate Education

A National Science Board committee report says that the nation's undergraduate programs in science, mathematics, and engineering "have declined in quality and scope to such an extent that they are no longer meeting national needs." This poses a "grave, long-term threat to the nation's scientific and technical capacity, its industrial and economic competitiveness, and the strength of its national defense," the panel warns.

On the basis of evidence gathered in its inquiry, the committee pinpointed three areas that require highest priority attention.

■ Laboratory instruction was described as "often uninspired, tedious, and dull." Instrumentation and facilities were found to be obsolete and inadequate—the need for new instruments was put at $2 billion to $4 billion.

■ Faculty members in too many cases were seen as unable to maintain their teaching skills, currency in their disciplines, and command of new technology. Serious shortages of qualified faculty were noted in some disciplines.

■ Courses and curricula were described as "frequently out-of-date in content, unimaginative, poorly organized for students with different interests, and (they) fail to reflect recent advances in the understanding of teaching and learning."

According to the report, institutions of all types in all regions of the country are affected. The problems of engineering disciplines were said to be most serious.

The committee was formed last May to assess the state of undergraduate education in science, mathematics, and engineering and make recommendations on the role the National Science Foundation should take in improving it. Its chairman was Homer A. Neal, provost of the State University of New York at Stony Brook. The committee reported to the National Science Board, which is the policy-making body for the foundation.

In its recommendations, the committee said that NSF lacks the resources to solve the problems itself, but should take a leadership role in stimulating the states and the private sector to increase their investment in undergraduate science, engineering, and math education. The panel does recommend that NSF expenditures in the field be increased by $100 million a year in "leveraged" program support. Some $5.5 million for college instrumentation is the only program in undergraduate education in the NSF budget this year. NSF director Erich Bloch is charged with converting the committee recommendations into proposals to be incorporated in next year's NSF budget. ■

JOHN WALSH

Nuclear Meltdown: A Calculated (and Recalculated) Risk

For years, the nuclear industry has been trying to persuade the government to see a silver lining in the cloud that gathered over Three Mile Island. Broadly, the argument is that the 1979 nuclear accident was much less dangerous than official risk estimates would have led people to expect. Therefore, the risk studies should be rewritten. Eventually, if analysis confirms what the accident at Three Mile Island suggested, safety regulations may be adjusted to reflect a calmer view of what would happen in a meltdown.

An exercise of this kind has begun at the Nuclear Regulatory Commission (NRC), called the "source terms" review (*Science*, 5 April 1985, p. 31). The phrase refers to mathematical terms used to calculate leakage from radioactive sources. This project was inspired by the fact that radiation escaping from Three Mile Island was only a fraction of what might have been expected. Also, radioactive iodine was less volatile during the accident than many had predicted. Rather than venting to the atmosphere in a pure