

and Development Administration, withheld reports about serious accidents from the public. Glenn Seaborg, a former AEC chairman, does not recall being informed of many of the incidents now coming to light. Robert C. Seamans Jr., the onetime head of ERDA, speculates that local managers and agency officials did not pass on accounts of accidents for several reasons: They might worry administrators unnecessarily, draw blame to plant operators, panic local citizens if the incidents were announced publicly, and suggest that the system was incapable of producing adequate quantities of plutonium and tritium for the nation's nuclear arms. Equally important, an obsession with secrecy in defense matters, a legacy of World War II and the cold war, has been the enemy of free-flowing information even within defense-related agencies. Whatever the reason or reasons, by not passing on reports of incidents at the plants, operators and managers were covering their critical assets.

'A bum rap'

For its part, du Pont, which has been involved in nuclear weapons work virtually since Fermi's first chain reaction in 1942, claimed it had dutifully notified regional Federal offices of the many mishaps at Savannah River. The company's chairman, Richard E. Heckert, held a press conference in Washington on 11 October to defend its record and employees. "Things are fine down there if the government will let us go on with our business," he declared. "It's a bum rap." Du Pont decided last April to give up running Savannah River, which it had operated from the beginning. Westinghouse will take over next April.

Though the troubles at the nuclear defense facilities stunned Congress and the public, most of the incidents in fact should have been familiar. A National Research Council study headed by Richard A. Meserve, who has a PhD in physics from Stanford and a JD from the Harvard Law School, found that safety was being compromised at the plants for decades. The Meserve report, issued in October 1987, chastized DOE on three main counts: failure to set clear safety guidelines; skimping on technical and hardware upgrades that would improve safety and compensate for aging; and neglecting to manage and review the operations of its contractors, with the result that "safety oversight of the production reactors is ingrown and largely outside the scrutiny of the public." The Meserve

report also was critical of the backlog of approximately 200 unresolved reactor incidents—mishaps whose causes remained unidentified and whose solutions were unknown.

A new safety oversight board

Anticipating the Meserve report, DOE closed the Hanford N-Reactor and ordered power levels reduced to 45% of full capacity at Savannah River to reduce stress on the aging reactors. Herrington appointed John Ahearne, formerly chairman of the Nuclear Regulatory Commission and now at Resources for the Future, to head an independent safety oversight board within DOE.

Although DOE and its predecessor agencies had claimed most of the defense reactors could be operated indefinitely, it is now obvious that they either have exceeded their designed lifetimes of 20 years or so or are certainly in need of major overhauls. Cracks in the reactor vessel forced the shutdown of the Savannah River C-Reactor in late 1986. The Meserve report noted that "all of the Savannah River reactors may eventually have to be retired from service due to stress corrosion cracking."

A recent report by the Government Accounting Office warns of deteriorating defense production plants, and it singles out Savannah River as being "less than marginal." According to GAO, operating the defense production plants safely would take between \$15 billion and \$25 billion. But to make improvements at all the facilities, install modern waste disposal equipment and clean up the environ-

ment in and around all the plants would run to at least \$100 billion, according to GAO estimates.

Herrington has already announced plans for the construction of two new production plants, which would cost \$6.8 billion in 1988 dollars and, if construction starts in 1990, would be on line in the year 2000.

A cheaper alternative

Meanwhile, DOE is considering a cheaper alternative that may be ready much sooner: the WNP-1, a conventional light-water reactor at Hanford that was 63% completed before financial problems and uncertainties about future electricity demand forced the owner, Washington Public Power Supply System, to stop construction. GAO has calculated that WNP-1 could be converted into a tritium-producing facility for \$2.6 billion plus an undetermined amount that DOE would pay WPPSS for the reactor. The conversion would take about six years.

Congress has taken action in the 1989 Defense Appropriations Act to make the defense reactors safer. One of the provisions of the act amends the Atomic Energy Act of 1954, in order to create the Defense Nuclear Facilities Safety Oversight Board, an independent organization of the sort that DOE has lacked all these years. The new board would operate like the Nuclear Regulatory Commission, monitoring defense reactors just as the NRC now watches commercial ones.

—IRWIN GOODWIN, WITH REPORTING
BY COREY S. POWELL

ACADEMY OF ENGINEERING SETS UP BIG PRIZE HOPING TO RIVAL NOBELS

The National Academy of Engineering has initiated a grand new international award to honor engineers and technologists for "contributing to the advancement of human welfare and freedom." In creating the award, the academy admits it seeks to bestow an aura of prestige that it considers to be lacking from the public image of the engineering profession. "Our society tends to reward the discoverer of basic scientific principles but overlook the engineer who puts that principle into practice in products and services that yield societal and economic benefits," said Robert M. White, the academy's president, announcing the prize at the academy's annual meeting on 28 September. "We hope that in years to come the award named for Charles Stark Draper will be just as well

known and respected as the Nobel Prizes are today for chemistry, physics and medicine."

That could happen, because the prize is surely sizeable. It will consist of a gold medal and \$350,000, which puts it just below the current value of a Nobel Prize. Endowed by the Charles Stark Draper Laboratory of Cambridge, Massachusetts, the new award will be first presented at the annual meeting of the engineering academy next October and given subsequently every other year.

"It is fitting that the award honors 'Doc' Draper," declared White. His life's work epitomized the kind of far-reaching innovation the new prize will recognize." Born in a small Missouri town in 1901, Draper graduated from Stanford University in 1922

with a BA in psychology, but, dissatisfied with his chosen field, he entered MIT the same year to study electrochemical engineering. While an assistant professor of aeronautics and astronautics at MIT, he earned an ScD in physics in 1938.

Draper, who died last year, is called the "father of inertial navigation" for his work on gyroscopes, gunsights and guidance systems. The Space Inertial Reference Equipment, known by the acronym SPIRE, and the Submarine Inertial Navigation System, or SINS, are among his pioneering contributions to the art and science of electronic warfare. Draper's guidance systems went into virtually all of the early ICBMs. His lab developed the inertial guidance for a whole family of Navy missiles, from the Polaris to the new Trident II. He also is credited



Charles Stark Draper: Ennobled

with the navigation and guidance system for NASA's Apollo missions, which placed men on the Moon.

The prize committee is headed by Robert C. Seamans Jr (MIT), a president of the Academy of Engineering in the early 1970s. Among the other dozen committee members are five physicists: retired Air Force General Lew Allen Jr (director of Caltech's Jet Propulsion Laboratory), Harvey Brooks (Harvard), Solomon J. Buchsbaum (AT&T Bell Labs), Thomas E. Everhart (Caltech's president) and Alvin M. Weinberg (Oak Ridge National Laboratory). Their appearance on a such a committee is not surprising. Some outstanding engineers start out as physicists. The academy itself recognizes this. Recipients of the academy's premiere Founders Award include many physicists, including Draper, Edwin Land, John R. Pierce and John Bardeen.

—IRWIN GOODWIN

WASHINGTON INS & OUTS AFTER A WAIT, HUNTER JOINS DOE; KEYWORTH, BERNTHAL TO NEW JOBS

At long last, on 11 August the Senate confirmed **Robert O. Hunter Jr** as director of the Department of Energy's Office of Energy Research. Hunter had been nominated for the post three times by President Reagan, the first time shortly after the resignation of Alvin W. Trivelpiece, who departed DOE in April 1987 to take the helm of the American Association for the Advancement of Science.

The hangup on Hunter's confirmation was tied to the sale of his California company, Western Research Corp, to Thermo Electron Corp of Waltham, Massachusetts. Democrats in Congress refused to confirm Hunter until he sold his majority interest in Western Research, particularly because it held some nuclear defense contracts with DOE. Once Hunter sold his stake in the company, Congress approved Hunter, a plasma physicist who has a PhD from the University of California at Irvine.

George A. Keyworth II, President Reagan's first science adviser, is now director of research at the Hudson Institute, a "think tank" that advises the Defense Department on issues of national security, technological advances and world problems as well as other government agencies on economic policies and energy resources. The institute moved its headquarters to Indianapolis from Hastings-on-Hudson, New York, where it was founded by the late Herman Kahn, who prided himself on "thinking the unthinkable" about nuclear warfare. Among its clients is the Center of Defense Analysis in Arlington, Virginia, where Keyworth has his Washington office for the institute.

Keyworth continues to run his Washington consulting firm, the Keyworth Company, which he formed upon leaving the White House science office at the close of 1985. In addition, he is chairman of the board of the Council on Superconductivity for American Competitiveness, a private group not to be confused with the Advisory Group to the President on Commercial Applications of Superconductivity. He also serves on the board of several commercial companies, including Hewlett-Packard.

One of the architects of the five-year bilateral US-Japan agreement signed at the economic summit in Toronto last 20 June by President Reagan and Prime Minister Takeshita is a physi-

cist who is assistant secretary of State for oceans, international environment and scientific affairs. He is **Frederick M. Bernthal**, who received his PhD from the University of California, Berkeley, in 1969 and worked as a postdoc at Yale's heavy ion accelerator lab the following year before accepting an appointment to teach nuclear physics at Michigan State University. He spent the 1976-77 academic year at the Niels Bohr Institute in Copenhagen and in 1978-79 served as The American Physical Society's Congressional Fellow in the office of Senate Minority Leader Howard Baker. Bernthal wound up as Baker's chief legislative assistant when Baker was Republican majority leader during Reagan's first term.

With Baker's backing, Bernthal became a member of the Nuclear Regulatory Commission in 1983, a post he held until this spring. He resigned from the NRC early this year to join the State Department, where he succeeded John D. Negroponte, who became deputy assistant to the President for national security affairs.

The director of Los Alamos's Center for National Security Studies, **Robert W. Selden**, became Air Force chief scientist on 25 August. In this post Selden is scientific adviser to General Larry Welch, Air Force Chief of Staff. Among Selden's responsibilities are evaluating policies and plans for Air Force R&D and weapons testing and evaluation. The announcement of his appointment stated that Selden will be "principal representative of the Air Force to the civilian scientific and engineering communities."

Selden joined Los Alamos in 1979 after 14 years in various scientific and management jobs at Lawrence Livermore Laboratory. At Los Alamos he was division leader for applied theoretical physics, deputy associate director for strategic defense research and associate director for theoretical and computational physics.

He earned a PhD in physics from the University of Wisconsin in 1963. Selden was a member of the Air Force Scientific Advisory Board in 1984-88, serving on committees studying proposed nuclear and directed-energy weapons for the Strategic Defense Initiative. He also was on the advisory board of the SDI study conducted last year by the US Congress Office of Technology Assessment.

—IRWIN GOODWIN ■