DOE Notes

Nuclear Export Regulations Simplified

DOE has revised its regulations controlling exports of nuclear technology, making them easier to understand and, thereby, strengthening U.S. nonproliferation policy. The revised regulations, published in the *Federal Register* December 10, 1986, implement Section 57b of the Atomic Energy Act. That section makes it illegal for anyone in the United States to engage directly or indirectly in the production of special nuclear material outside the country unless authorized by the Secretary of Energy.

The changes:

- Provide clear definitions for some key terms, including "public information" that may be exported under a general authorization without specific authorization from the Secretary of Energy.
- Narrow a general authorization for taking part in international meetings.
- Expand the authorization for assisting in radiological emergencies.
- Require disclosure of an authorization except when a firm shows that its competitive position would be damaged by the disclosure.

21 Inventions at DOE Labs Chosen Among Nation's Top 100

Nine DOE laboratories received awards for developing 21 of the 100 most significant new technical products of 1985. The prestigious IR-100 Awards, selected by *Research & Development* magazine annually, recognize innovators and organizations for outstanding practical technical developments. One hundred winning products are selected on the basis of their importance, uniqueness, and usefulness as determined by the magazine's editorial staff, advisory board, and other selected experts.

DOE's winning products range from a 100-trillion-watt fusion energy research device to a small medical kit for "labeling" blood cells with a radioisotope. These latest awards bring to 103 the total won by scientists and engineers at DOE facilities since 1981.

"We can be justifiably proud of this continued tradition of excellence," said Energy Secretary John S. Herrington. "The strong showing of DOE research and development laboratories in the IR-100 Awards demonstrates the department's commitment to the spinoff of basic and applied research to practical products."

The winning laboratories and their projects are as follows:

Ames Laboratory — HeAD-100 Helium Afterflow Discharge Detector

Brookhaven National Laboratory — Hybrid Triple Preamplifier, Whole Blood RBD Kit

Fermi National Accelerator Laboratory — ACP Multi-microprocessor System, Video Data Acquisition System (VDAS)

Idaho National Engineering Laboratory — Vision System for High Luminosity Processes

Lawrence Berkeley Laboratory — Long-Pulse Plasma Density Probe

Lawrence Livermore National Laboratory — Fourier Transform Raman (FTR) Spectrometer, X-Ray Beam Splitter, "Colorad" Color Imaging System, Precision Engineering Research Lathe (PERL)

Los Alamos National Laboratory — Computer-Controlled Laser Alignment System

Oak Ridge National Laboratory — Integrated Gas Analysis and Sensing Chip, Multi-Mode Ionization Detector, Soft X-Ray Emission Spectrometer

Sandia National Laboratories — Particle Beam Fusion Accelerator II (PBFA II), Polysilane Self-Developing Photoresists, Sandia Airborne Computer (SANDAC) IV, Carbon-Resistance Particle Analyzer, Photonic High-Speed Multichannel Data Recorder, X-Ray Microanalyzer.

NSF Notes

12 Universities Get Grants to Strengthen Engineering Education

The NSF has awarded grants totaling $1,142,026 to 12 universities in an experimental program designed to help them more fully use institutional, academic, and industrial resources to strengthen engineering education. The grants were made under a program titled University/Industry/Government Partnerships for Quality Engineering Personnel. Each of the 12 projects provides for dissemination throughout the engineering community of the concepts developed during the one and two years of the grants.

The emphasis of the NSF program is on incorporating major elements of engineering practice into the engineering curriculum. The program enables students to be taught by adjunct faculty with a practical engineering orientation and, in many cases, enables the students to use the same facilities and equipment used by practicing engineers.

The project to strengthen engineering education in Washington state involves high technology industries throughout the state and four universities — Washington State University, University of Washington, Gonzaga University, and University of Idaho. Three areas to be stressed are automated manufacturing, high-frequency electronic circuit design, and electronic measurement.

The Pennsylvania State University and industry cooperative effort will bring engineering practice into the teaching of VLSI design. Live telecasts with interactive audio and video tapes combined with interactive audio and electronic mail will link university students with practicing engineers in Manassas, Virginia. Outside the classroom, students can contact the engineers via computer facilities already in place.

The project involving University of Wisconsin-Milwaukee and Northwestern University at Evanston, Illinois, will involve practicing civil engineers in undergraduate education. The emphasis will be on the sequence of project implementations, from conceptual design to construction and operation.

Continued

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The 12 universities receiving grants are as follows: Colorado School of Mines, Idaho State University, Illinois Institute of Technology, Pennsylvania State University, San Diego State University, Santa Clara University, Syracuse University, University of Miami, University of Tulsa, University of Wisconsin at Milwaukee, Washington State University, and Wayne State University.

EXPRES Project Funds Research to Improve Electronic Information Exchange

The NSF inaugurated its Experimental Research in Electronic Submission (EXPRES) project by awarding $400,000 each to Carnegie Mellon and the University of Michigan. The $6 million EXPRES program is designed to improve the generation and communication of mixed media documents among differing computing environments. Such documents include text, mathematical notation, graphics and images, and could eventually include or interact with voice, animation, sound and video media, and remote computational computers. The project will ultimately provide a basis for electronic information interchange and collaboration among the geographically dispersed science and engineering communities in the United States.

The initial research test for both universities will be the NSF proposal process because it embodies all aspects of the problem and permits the control necessary for experimentation. Both universities will investigate the technological and sociological barriers to generating, transmitting, and processing compound documents in a multidisciplinary, multiuniversity, and multivendor environment.

The research teams will consist of scientists from the lead university, and from other universities and industry. Many other universities will participate with Carnegie Mellon and Michigan as test sites. Each team will install a pilot system capable of creating compound (multimedia) documents, sending them over local and wide-area networks, and allowing storage and retrieval, display and modification by authorized persons en route and at the destination. In the later stages of the three-year EXPRES project, each team is expected to demonstrate the ability to process documents created by the other system.

Center Established to Study Energetic Materials

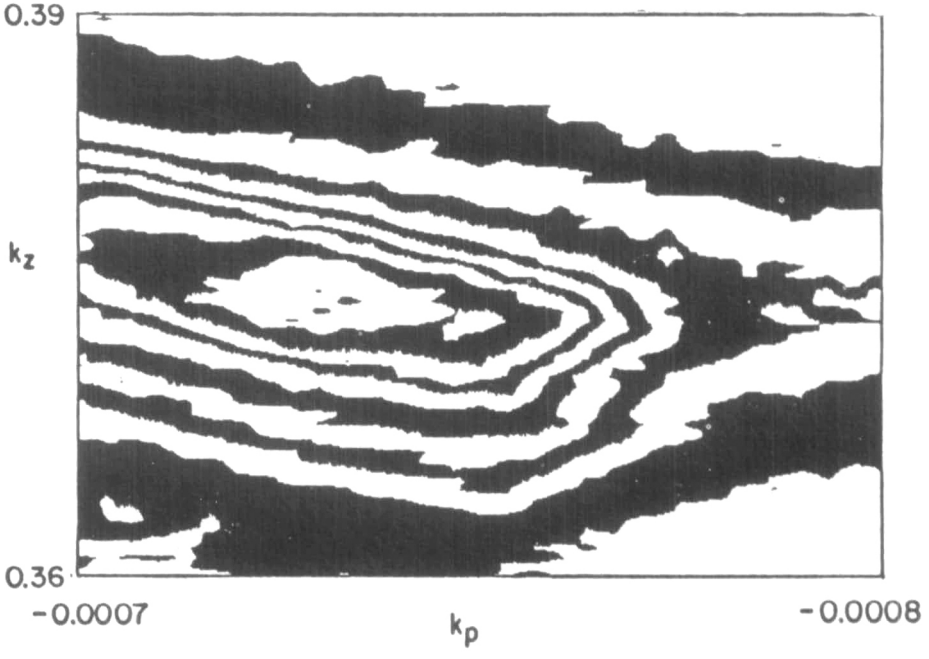
The Research Center for Energetic Materials at New Mexico Tech (Socorro, NM) has been established as part of NSF's Industry-University Cooperative Research Centers Program. The new center, the 31st to be created under the NSF program, will be directed by Dr. Per-Anders Persson, who also heads New Mexico Tech's Center for Explosives Technology Research.

The center will conduct research on new energetic materials to answer questions concerning manufacturing, storage, and transportation safety in addition to those concerning performance. "The new center," said Persson, "will provide the fundamental research into the properties of these new energetic materials to determine their possible use and their inherent safety." The center will also provide research experience for graduate students.

The NSF awarded New Mexico Tech a five-year $500,000 grant to establish the center. For the first five years the center will be supported by the NSF; the U.S. Army Research, Development and Engineering Command; New Mexico Tech; federally funded laboratories; and industrial sponsors. Support after that will be provided solely by industrial sponsors.

EDITOR'S CHOICE

Figures appearing in the EDITOR'S CHOICE are those arising from materials research which strike the editor's fancy as being aesthetically appealing and eye-catching. No further criteria are applied and none should be assumed. When taken out of context, such figures often evoke images beyond and unrelated to the original meaning. Submissions of candidate figures are welcome and should include a complete source citation, a photocopy of the report in which it appears (or will appear), and a reproduction-quality original drawing or photograph of the figure.



The EDITOR'S CHOICE for this issue of the BULLETIN comes from the work of E. Chason, H. Kondo, and T. Mizoguchi (Gakushuin University, Tokyo, Japan); R.C. Cammarata and F. Spaepen (Harvard University, Cambridge, MA, USA); and B. Window, J.B. Dunlop and R.K. Ray (CSIRO National Measurement Lab., Lindfield, NSW, Australia). It appeared in *Rapidly Solidified Alloys and Their Mechanical and Magnetic Properties*, edited by B.C. Giessen, D.E. Polk and A.I. Taub, Materials Research Society Symposium Proceedings, Vol. 58 (1986) p. 72. The figure is a contour plot presentation of diffracted x-ray intensity as a function of scattering vector (in "k"-space) in the region surrounding a second-order diffraction peak. The diffraction arises from the periodicity of composition modulation in a multilayer amorphous film of average composition $Cu_{50}Zr_{50}$ and modulation wavelength 3.28 nm. Axes units are inverse angstroms. The peak is 500 counts/second high and each contour corresponds to 40 counts/second. The asymmetric aspect ratio in the p-z plane (k_p lying in the plane of the film and k_z normal) is attributed to a lateral inhomogeneity of modulation wavelength. The aspect ratio, the ragged contours resulting from poor statistical accuracy at the low-intensity second-order peak, and the authors' addition of shading to alternate contour bands combine to give the appearance of an abstraction of reflections from a shimmering pool.

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