

News Briefs

Developments

NBS, WESTINGHOUSE TO CALIBRATE NEW RADIATION DETECTORS

NBS and the Westinghouse Research and Development Center are engaged in a cooperative research program to develop techniques to *verify calibrations of a new generation of solid state track recorders (SSTRs) recently introduced by Westinghouse for the nuclear power industry*. SSTRs are passive radiation detectors used in nuclear power reactors to monitor the accumulated neutron radiation dose received by critical components, such as the containment vessel. Because neutrons from the reactor core gradually embrittle steel, this accumulated dose is a major factor in determining the safe operating lifetime of many first-generation power reactors. Calibration of an SSTR requires an accurate measurement of minute masses of uranium, plutonium, and neptunium. The new Westinghouse SSTRs use extremely thin deposits of these fissionable materials—picogram (0.000 000 000 001 g) amounts. Using special fission-rate measurement capabilities and microgram-size mass standards, bureau scientists are helping Westinghouse develop mass assay procedures that enhance the reliability of these detectors.

INDUSTRY, NBS WORKING TO IMPROVE CARPET FIRE TEST

Interior materials such as carpeting can be highly flammable, contributing to the spread of a fire. Several tests are available to determine the flammability of carpets, including one developed by NBS in the 1970s to *estimate flame spread of*

floor coverings in corridors and exitways. In a project funded by the Carpet and Rug Institute, the American Textile Manufacturers Institute, and the Man-Made Fiber Producers Association, the NBS Center for Fire Research is working to *improve this widely used test method*. It was adopted in 1978 as a voluntary industry test method (Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source, ASTM E 648). This project was prompted by some variations in results during a recent round of testing by industry laboratories. NBS will study all factors which might influence the test and recommend changes in the apparatus, test procedure, and/or interpretation of the results. A final report will be issued by NBS in spring 1989.

ROLE OF STANDARDS IN WORLD TRADE REPORTED

NBS recently examined the level of U.S. participation in selected international standardization activities. A preliminary analysis of the data shows *some correlation between U.S. participation and recent export performance for several major product categories*. The report offers recommendations for enhancing U.S. international competitiveness through increased participation in standardization activities. The report also describes the role of international standards, their increasing importance in world trade, and the extent of past and current U.S. participation in the two major international standardization bodies, the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC).

Copies of *A Review of U.S. Participation in International Standards Activities* (NBSIR 88-3698) are available for \$14.95 prepaid from the National Technical Information Service, Springfield, VA 22161. Order by PB#88-164165.

FIRST MEASUREMENTS OF ULTRA-COLD ATOMIC COLLISIONS

NBS researchers working in collaboration with The University of Maryland (UM) have used a new “laser trap” to hold and cool large numbers of atoms, and make the *first measurements of an atomic collision process at ultra-cold temperatures*—within one thousandth of a degree of absolute zero. Collision processes underlie our understanding of large parts of physical chemistry. Ultra-cold collisions—which were impossible to study before the development of laser cooling techniques in the past several years—differ in fundamental ways from higher-temperature collisions; and offer *new insights* into the theory of atomic processes. The quantum-mechanical wave-like nature of the atoms, which is unimportant at higher temperatures, becomes of paramount importance in ultra-cold collisions. The results of the NBS/UM experiments in “Observation of Associative Ionization of Ultra-Cold Laser-Trapped Sodium Atoms,” appear in the Feb. 29 *Physical Review Letters*.

NBS FINDS DAT COPY-PREVENTION SYSTEM DEFICIENT

An encoding system proposed by CBS Records to *prevent prerecorded music from being copied by new digital audio tape (DAT) recorders is inadequate on three counts*, NBS concluded after a 5-month study at the request of the U.S. Congress. Specifically, NBS found that “the system does not achieve its stated purpose” because it sometimes permits the recording of material that is encoded to prevent copying and sometimes inhibits the recording of material that is not encoded. Listening tests showed that for some listeners and some musical selections, inclusion of the copy-prevention code in recorded material makes a “discernable difference.” In addition, NBS found that the copy-prevention system can be bypassed easily.

The work was in part funded by two groups concerned with this issue, the Home Recording Rights Coalition and the Recording Industry Association of America.

Copies of the NBS report, *Evaluation of a Copy Prevention Method for Digital Audio Tape Systems* (NBSIR 88-3725), are available for \$25.95 (\$51.90 for foreign mailing) from the National Technical Information Service, Springfield, VA 22161, telephone: 703/487-4650. Request PB#88-169537.

NEW TELEPHONE SERVICE TO SET CLOCKS IN COMPUTERS

NBS is initiating an Automated Computer Time Service (ACTS) to allow *automated checking or setting of clocks through commercial telephone lines*. Computers, whether personal microcomputers or huge mainframes, often need to have their internal clocks accurately set to the time of day. For example, seismological and astronomical data need to be accurately tagged with time and date. The new service will provide accuracy levels between 1/10 and 1/1000 second (depending on mode). The service will be in a test phase for the first 6 months, with NBS soliciting comments on format and operation. The telephone number for modem dial-up initially is 303/494-4774.

Documentation of the service, instructions on how to use it, and example programs to set personal computer clocks (on a 5 1/4-inch, 360-kilo-byte DOS diskette) are available for \$35 prepaid from the Office of Standard Reference Materials, B311 Chemistry Building, National Bureau of Standards, Gaithersburg, MD 20899, telephone: 301/975-6776. Specify “Automated Computer Time Service (ACTS), RM 8101.”

IMPROVING AIRCRAFT SAFETY IS GOAL OF JOINT FEDERAL RESEARCH PROJECT

Safer aircraft takeoffs and landings are the aims of a joint project by the National Bureau of Standards (NBS) for the Federal Aviation Administration (FAA).

Navigation and landing aids often are placed on structures on or near airport runways. To reduce damage from possible collisions with these structures, the FAA and the Transportation Systems Center, a Department of Transportation administration office, have investigated “breakaway” structures. These “Low Impact Resistance Structures” (LIRS) are intended to sustain environmental loads, such as high winds, yet break apart easily if struck by a lightweight aircraft.

Researchers in the NBS Center for Building Technology are developing computer models to simulate what happens when an aircraft collides with such a structure. At present, the only way to test a design is by building a full-scale model, simulating a collision, and observing how well the design works. These tests are expensive, only give information on a particular design, and do not take into account environmental conditions.

The NBS researchers are using the bureau's large-scale structural test facility to simulate the forces of jet blast and the environmental loads these structures are exposed to. The computer models being developed by NBS for this project will be evaluated and validated using data from these tests. The first structure being tested is a prototype breakaway tower 20-feet high by 10-feet square. The tower was designed by the project members and fabricated by Jaquith Industries of Syracuse, using a fiberglass-reinforced plastic material. After the environmental load tests are completed at NBS, the structure will be shipped to a crash test facility selected by FAA.

In other testing, Richard Fields of the NBS Metallurgy Division has evaluated the behavior of electrical cables located inside the breakaway structures. During a collision with an aircraft, these cables can cause considerable damage unless they also "break away." Under a simulated aircraft impact, Fields measured the energy and forces required to break through the cables. He then tested the strength of the cables spliced with commercially-available connectors designed to give way when struck. Fields found that the cables with the connectors were strong enough to sustain environmental loads and yet easily fell apart during a simulated collision.

Standard Reference Materials

NEW SAMPLES TO AID IN MEASURING CHOLESTEROL, VITAMINS

A standard reference material (SRM) to help laboratories measure several *nutrients—fat-soluble vitamins as well as cholesterol—in food products* is now available from NBS. The packaged material combines known quantities of the nutrients in coconut oil, a natural fat product used in the preparation of many foods such as infant formula. Food chemists and nutritional scientists should find the material useful as a standard to check the operation of laboratory equipment as well as to develop and validate methods for analyzing some fat-based food samples. Each SRM contains 10 vials of material: five have natural coconut oil only and five are fortified with certified levels of cholesterol, vitamin E (as dl-alpha-tocopheryl acetate), vitamin A (as retinyl acetate), and vitamin D₂ (ergocalciferol).

The material, SRM 1563, is \$181 from the Office of Standard Reference Materials, B311 Chemistry Building, National Bureau of Standards, Gaithersburg, MD 20899, telephone: 301/975-6776.

Standard Reference Data

NEW DIFFRACTION AND CRYSTAL DATABASES AVAILABLE

Analytical chemists in industry, universities, and government will be interested in two new computerized standard reference databases for use in identifying the structures in materials. The *NBS/Sandia/ICDD Electron Diffraction Database*, developed by the bureau, Sandia National Laboratory, and the International Centre for Diffraction Data (ICDD), contains evaluated data for more than 70,000 inorganic substances. It is an important *analytical tool for researchers using electron microscopes to identify unknown substances*. The *NBS Crystal Database* contains complete crystallographic and chemical data on more than 120,000 compounds. In addition to its use in identifying unknown crystalline materials, the software program permits chemical data to be combined with crystal structure information to solve many chemistry problems.

Both databases are available for lease in a variety of formats, including tapes and disks, from the International Centre for Diffraction Data, 1601 Park Lane, Swarthmore, PA 19081, telephone: 215/328-9400.

For information on the NBS Standard Reference Data Program, write or call: Office of Standard Reference Data, A323 Physics Building, National Bureau of Standards, Gaithersburg, MD 20899, telephone: 301/975-2208.