

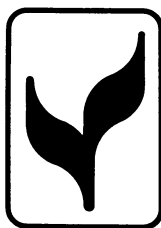
LARGEST CAPACITY OF ANY ROUTINE TISSUE PROCESSOR

Process over 300 routine tissues on this **Shandon Southern Automatic Two-Liter Tissue Processor**, and get the advantages of a solid wax detector that protects tissue against damage . . . 0 to 72-hour delay timer . . . an option of single- or double-load schedules . . . as well as customized programming. For more information, contact Shandon Southern Instruments, Inc., 515 Broad Street, Sewickley, PA 15143.



SHANDON SOUTHERN

A Southern
Instruments
Holdings Group
Company

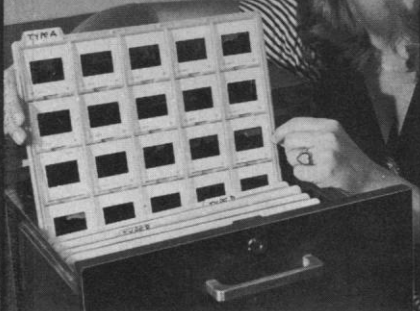


Circle No. 105 on Readers' Service Card

SLIDE-SHO®

by

VPD



**THE VERSATILE SLIDE FILING
AND RETRIEVAL SYSTEM FOR
100 OR 100,000 SLIDES**

adapts to your specific needs

SEE 20 SLIDES AT A GLANCE

on VPD Slide-Sho Pages, molded of lightweight, rigid, translucent plastic with matte, light diffusing back panel. For file cabinets, ring binders, rear-screen illuminators.

**ASK FOR FREE SAMPLE
and brochure "Slide Filing Ideas"**

JOSHUA MEIER DIVISION

W.R. Grace & Co., North Bergen, N.J. 07047

Circle No. 63 on Readers' Service Card

LABELED COMPOUNDS

from
**KOR
ISOTOPES**

Kor Isotopes brings a rich background in isotope technology to the production of a wide range of commercially available stable and radioactively labeled compounds. Our versatility and isotope experience is also available to provide custom synthesis and model research and development services.

If your laboratory could use one or more of our current labeled products:

- Amino acids
- Carbohydrates
- Pharmaceuticals
- Lipids
- Steroids
- Nucleics
- Pesticides
- Reagents,

or if we can develop a derivative for you, write or call our Customer Service Group. We would like to send you our current brochure, featuring ¹³C and ¹⁵N labeled compounds, and forthcoming listings of similar, radioactive products.



ISOTOPES

division of Eco-Control, Inc.
FIFTY-SIX ROGERS STREET
CAMBRIDGE, MA. 02142

For Customer Service, dial (617) 661-8220

Circle No. 302 on Readers' Service Card

Federal Register of 9 September (p. 38425) for general comment by the public and the scientific community.

The NIH also welcomes comments from the readers of *Science*. Copies of the document are available from Dr. Rudolf G. Wanner, Associate Director for Environmental Health and Safety, Division of Research Services. His address is Room 4051, Building 12A, National Institutes of Health, Bethesda, Maryland 20014. Comments on the draft statement should be submitted to the Director, National Institutes of Health, Bethesda, Maryland 20014, by 18 October 1976.

DONALD S. FREDRICKSON
*National Institutes of Health,
Bethesda, Maryland 20014*

Fusion as an Energy Option

The recent series of *Science* articles on fusion power by William D. Metz (Research News, 25 June, p. 1320; 2 July, p. 38; 23 July, p. 307) accurately expresses many of the current concerns of the utility industry about the U.S. fusion program. The articles, however, fail to express the utilities' belief in the need for development of fusion as a commercially and environmentally viable energy source and their confidence that, with proper management, this can be carried out successfully. Fusion power is one of the very few energy options that can provide central-station electric power on a scale sufficient to meet our future needs.

Although the *Science* articles are exceptionally well researched and technically informative, the editorial comments contained therein and in Philip H. Abelson's editorial of 23 July (p. 279) tend to put fusion in an unjustifiably grim perspective. First, the technological problems of neutron damage to materials and of containment and disposal of radioactive by-products have long been known to fusion researchers, if not to the public. It is encouraging that the engineering problems of fusion have been recognized early and are already being tackled.

Second, the early design studies of conceptual fusion reactors—unfortunately mislabeled "reference" designs—have quite naturally yielded cumbersome and expensive products. The purpose of these studies was to identify engineering problem areas; this aim is almost diametrically opposite to that of designing a power plant suitable for commercial application. Again, we are encouraged that this step has been taken

SCIENCE, VOL. 193

and are confident that future designs will bear little resemblance to these "protozoic" behemoths.

Third, the comparison in Abelson's editorial between the cost (\$10 billion) of a 10-megawatt fusion plant and that of a 10-Mw solar electric plant (\$100 million) is deceptive. The 10-Mw figure for fusion is a nominally chosen small positive number to indicate breakeven; fusion reactors would not come in such small sizes. If a fusion reactor took 1000 Mw to energize and produced 1010 Mw of electric power, it would have a net output of 10 Mw. However, if the plasma

confinement time turned out to be twice as long as assumed (and this is well within the present range of uncertainty), the same reactor would produce 2020 Mw, for a net of 1020 Mw. By contrast, increasing the capacity of a 10-Mw solar plant to 1000 Mw would entail a 100-fold duplication of collecting panels and energy storage facilities. Furthermore, the \$100 million figure quoted above is for a single solar electric installation; the \$10 billion figure is the integrated cost of the entire fusion R & D program up to 1990.

The cost of developing fusion into a commercial energy source will be com-

parable to that of any major space, military, or weapons program; its importance to national security could be just as great. The technological problems of putting an American on the moon were staggering; yet they were solved when the nation put its resources behind the space program. Similarly, fusion needs the strong and consistent support of the public and of Congress if it is to become a reality. Without such support the program is destined to failure.

Regardless of how the program has fared in the past, the necessary dialogue between the users (the utilities) and the developers (the government) is now under way. The Electric Power Research Institute (EPRI) and the utilities believe that the fusion program should, at this time, remain broad-based while moving purposefully toward the goal of commercialization. By working closely with the Energy Research and Development Administration (ERDA), EPRI is reflecting utility viewpoints and design requirements into the national R & D effort. The inherent flexibility of fusion, which gives it many options for achieving our energy goals—in terms of plasma configurations, heating methods, fuels, and energy converters, as well as of hybrid schemes such as fission fuel production and waste burning and synthetic chemical fuel production—gives us confidence in the eventual success of the development effort.

The utility industry supports fusion research not only through EPRI but also through individual corporations, such as the Texas Atomic Energy Research Foundation, the Wisconsin Electric Utilities Research Foundation, and Northeast Utilities. Together with ERDA, we feel that, if the fusion R & D program is not prematurely condemned for identifying its problems, these obstacles can be overcome or circumvented. Furthermore, we fully expect that the requirements of the utility industry and of society will be taken into account as the program proceeds toward commercial application.

WILLIAM C. GOUGH

*Fusion Power Program,
Electric Power Research Institute,
3412 Hillview Avenue,
Post Office Box 10412,
Palo Alto, California 94303*

FRANCIS F. CHEN

*EPRI Fusion Advisory Committee,
Department of Engineering and Applied
Science, University of California,
Los Angeles 90024*

MICHAEL LOTKER

*EPRI Fusion Program Committee,
Northeast Utilities,
Hartford, Connecticut 06101*

PILOT PLANT TO FULL PRODUCTION

VIRTIS "SRC" SUBLIMATORS

perfect product uniformity
25 to 250lbs, up to 70 sq ft

25
SRC

50
SRC

100
SRC

250
SRC

PERFORMANCE MATCHED

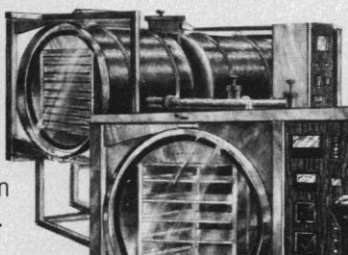
Shelf to Shelf Chamber to Chamber Location to Location

Extra capacity where you need it now! Stainless freeze dry modules wheel where you want, use quick hose connections for cooling water and drain. Plug in to 220v line and start processing!

Run units individually or up to 6 in tandem for full production flexibility. Stopper 5,000 serum bottles or dry 250lbs in trays. Programers, weighing systems, variable vacuum — more! 7 models, performance matched:

**SHELF TO SHELF
TEMPERATURE UNIFORMITY
GUARANTEED
±1°C**





WORLD LEADER IN
FREEZE DRYING



THE VIRTIS COMPANY, INC. P.O. BOX V346 GARDINER, NEW YORK 12525

Circle No. 256 on Readers' Service Card