

#### **EDITOR**

ROY G. POST Department of Nuclear Engineering University of Arizona, Tucson, Arizona 85721

# ANS OFFICERS

JOHN W. LANDIS, President JAMES R. LILIENTHAL, President Elect J. ERNEST WILKINS, Jr. Treasurer OCTAYE J. DU TEMPLE, Executive Secretary

#### ANS STAFF

NORMAN H. JACOBSON Publications Manager RUTH FARMAKES Assistant Staff Editor KATHRYN L. FROEHLICH Copy Editor SIEGFRIED H. KRAPP Production Manager LINDA DOLBY Production Assistant MERRILL ALBERTUS Production Coordinator

#### Advertising

RICHARD HARRIS Advertising Sales Manager ROSEMARY HARVEY Circulation Manager

### **EDITORIAL ADVISORY BOARD**

SPENCER H. BUSH, ERIC T. CLARKE, VAUGHN E. CULLER, GARY J. DAU, W. KENNETH DAVIS, MILTON C. EDLUND, WALTER H. ESSELMAN, PAUL R. FIELDS, JOHN H. FRYE, JR., STEPHEN J. GAGE, O. H. GREAGER, MARSHALL GROTENHUIS, VINCENT P. GUINN, DAVID B. HALL, DANIEL F. HANG, JOSEPH M. HENDRIE, PAUL KRUGER, STEPHEN LAWROSKI, FORREST J. REMICK, WALTON RODGER, ZOLTON ROSZTOCZY, WILSON TALLEY, EDWIN L. ZEBROSKI

Address all manuscript and editorial communications to the editorial offices, Nuclear Technology, Department of Nuclear Engineering, The University of Arizona, Tucson, Arizona 85721.

Nuclear Technology is published monthly by the American Nuclear Society, Inc., with executive and business offices at 244 East Ogden Avenue, Hinsdale, Illinois 60521, telephone 312/325-1991. Subscription rate is \$30 or \$110/four volumes per year. Single copy price is \$13 (special issue slightly higher). It is printed in Danville, Illinois, and second class postage is paid at Hinsdale, Illinois, and at additional mailing offices. Copyright © 1972 by the American Nuclear Society, Inc.

Statements made by authors of contributions to the various departments or of technical papers and notes do not necessarily reflect the viewpoint of the American Nuclear Society nor should their appearance herein be construed as tacit approval or endorsement by the Society. Abstracts in Nuclear Technology may be freely republished anywhere at any time.

## ON THE COVER:

This month's cover is a photo taken of a channel excavated by explosives (courtesy of Lawrence Livermore Laboratory, R. L. LaFrenz).

# CONTENTS - JULY 1972

# TECHNICAL PAPERS

REACTORS	
Critical Experiments with Homogeneous PuO <sub>2</sub> -Polystyrene at 50 H/Pu / S. R. Bierman, E. D. Clayton 5	5
The Potential of a Laser-Induced Fusion Device as a Thermal-Neutron Source / R. M. Brugger 14	4
Single- and Two-Phase Pressure Drops on a $6 \times 6$ Rod Bundle at 70 atm $/$ $P.$ $Grillo$ , $G.$ $Mazzone$ 25	5
FUEL CYCLES  Waste Disposal Systems for Closed Cycle Water Reactors / Charles T. Chave 36	5
MATERIALS  Review of the Low Energy Scattering Cross Sections of Deuterium / B. R. Leonard, Jr 49	9
RADIOISOTOPES	
Developments in Use of Californium-252 for Neutron Radiography / John P. Barton 56	5
A New Model for Estimating Space Proton Dose to Body Organs / R. W. Langley, M. P. Billings 68	3
NUCLEAR EXPLOSIVES	
Explosive Excavation Research: Projects TUGBOAT and TRINIDAD / Robert L. LaFrenz, Walter C. Day 75	5
Chimney Gas Radiochemistry in Nuclear Gas Stimulation Applications / C. F. Smith 85	5
TECHNICAL NOTE	
REACTORS  Advantages of Primary System Flow Control During Reactor Scram in an LMFBR / William J. Metevia, Jon C. Gilbertson 93	3
DEPARTMENTS	
AUTHORS 2	,
BOOK REVIEW 99	_