

CONTENTS

VOLUME I

Preface	iii
Acknowledgments	v

Chapter 1

Invited Speakers

"Address Before the Second Topical Meeting on the Technology of Controlled Nuclear Fusion," Mike McCormack	1
"The Role of Advanced Energy Systems in Meeting Our Long-Term Energy Needs," Chauncey Starr	7

Chapter 2

Noncommercial Reactor Designs

"Tokamak Experimental Power Reactor," W. M. Stacey, Jr., M. A. Abdou, P. J. Bertoncini, C. C. Bolta, J. N. Brooks, K. Evans, Jr., J. A. Fasolo, J. C. Jung, R. L. Kustom, V. A. Maroni, R. F. Mattas, J. S. Moenich, A. Moretti, F. E. Mills, B. Misra, J. H. Norem, J. S. Patten, W. F. Praeg, P. Smelser, D. L. Smith, H. C. Stevens, L. Turner, S-T Wang and C. K. Youngdahl, Argonne National Laboratory, Argonne, IL, (Invited Paper)	21
"General Atomic Company Experimental Power Reactor Conceptual Design," C. C. Baker, General Atomic Company, San Diego, CA, (Invited Paper)	47
"Results and Conclusions from ORNL Tokamak Experimental Power Reactor Conceptual Studies," M. Roberts, Oak Ridge National Laboratory, Oak Ridge, TN, (Invited Paper)	59
"TETR - A Tokamak Engineering Test Reactor to Qualify Materials and Blanket Components for Early DT Fusion Power Reactors," G. L. Kulcinski, R. W. Conn, C. W. Maynard, K. Audenaerde, H. Avci, D. Blackfield, R. W. Boom, E. Cheng, J. R. Conrad, S. Dalhed, G. A. Emmert, B. Feinberg, Y. Gohar, S. Hong, J. Kesner, E. Larsen, R. Nygren, K. Okula, E. Ramer, J. Scharer, D. Schluderberg, T. Sung, I. Sviatoslavsky, D. K. Sze, W. F. Vogelsang, P. Wilkes, W. R. Wilkes, L. Wittenberg, J. Wrazel, T. Wu, T. Yang, W. C. Young, University of Wisconsin, Madison, WI	73
"Tokamak Engineering Technology Facility," W. M. Stacey, Jr., M. A. Abdou, C. C. Bolta, J. A. Fasolo, R. L. Kustom, V. A. Maroni, R. F. Mattas, F. E. Mills, B. Misra, J. S. Moenich, J. S. Patten, D. L. Smith, H. C. Stevens, S-T. Wang, C. K. Youngdahl, Argonne National Laboratory, Argonne, IL; D. L. Jassby, Plasma Physics Laboratory, Princeton University	95
"The Field Reversed Mirror as a Power Reactor," W. C. Condit, Jr., G. A. Carlson, R. S. Devoto, J. Doggett, and W. Neef, Lawrence Livermore Laboratory, Livermore, CA	107
"Studies of Catalyzed-D and D- ³ He Fusion Reactor System," G. H. Miley, F. H. Southworth, C. K. Choi, and G. A. Gerdin, University of Illinois, Urbana, IL	119

Chapter 3
Radiation Damage

"Recent Progress in CTR Bulk Radiation Effects Studies," F. W. Wiffen and J. O. Stiegler, Oak Ridge National Laboratory, Oak Ridge, TN (Invited Paper)	135
"Neutron Sputtering," O. K. Harling, Massachusetts Institute of Technology, Cambridge, MA; M. T. Thomas, Battelle, Pacific Northwest Laboratories, Richland, WA (Invited Paper)	149
"Ion, Photon-Surface Interactions in Fusion Reactors," M. Kaminsky, Argonne National Laboratory, Argonne, IL (Invited Paper)	169
"Irradiation Behavior of Graphite at Very High Temperatures," W. C. Morgan, E. M. Woodruff, and W. J. Gray, Battelle, Pacific Northwest Laboratories, Richland, WA	189
"Elevated-Temperature Tensile Properties of V-15Cr-5Ti Containing Helium Introduced by Ion Bombardment and Tritium Decay," R. F. Mattas, H. Wiedersich, Argonne National Laboratory, Argonne, IL; D. G. Atteridge, A. B. Johnson, and J. F. Remark, Battelle, Pacific Northwest Laboratories, Richland, WA	199
"Neutron-Irradiation Effects on Molybdenum and Molybdenum Alloys," J. Bentley and F. W. Wiffen, Oak Ridge National Laboratory, Oak Ridge, TN	209
"Comparison of Ion Irradiation Damage in Three Grades of Unalloyed Molybdenum," E. R. Bradley, Battelle, Pacific Northwest Laboratories, Richland, WA	219
"Determination of the Damage-Energy Cross Section of 14-MeV Neutrons from Critical-Property Changes in Irradiated Nb ₃ Sn," C. L. Snead, Jr., Brookhaven National Laboratory, Upton, NY; D. M. Parkin, Los Alamos Scientific Laboratory, Los Alamos, NM; M. W. Guinan and R. A. Van Konynenburg, Lawrence Livermore Laboratory, Livermore, CA	229
"GRASS-Code Calculation for the Behavior of Helium in Austenitic Stainless Steels," Che-Yu Li, Cornell University; Jeffrey Rest, Steven Danyluk, and Roger B. Poeppel, Argonne National Laboratory, Argonne, IL	239
"Some Considerations of Temperature, Displacement Rate Gradients, and Specimen Dimensions on Penetrating Ion Irradiation Experiments," R. H. Jones and D. L. Styris, Battelle, Pacific Northwest Laboratories, Richland, WA	247

Chapter 4
Plasma Engineering

"Theta Pinches and Other High-Beta Concepts," F. L. Ribe, Los Alamos Scientific Laboratory, Los Alamos, NM (Invited Paper)	259
"Status of Tokamak Plasma Physics," M. B. Gottlieb, Princeton University, Princeton, NJ (Invited Paper)	267
"Physics of Mirror Fusion Systems," R. F. Post, Lawrence Livermore Laboratory, Livermore, CA (Invited Paper)	281
"MHD Equilibria for Plasmas in a Tokamak Engineering Test Reactor (TETR)," T. F. Yang, R. W. Conn, and G. A. Emmert, University of Wisconsin, Madison, WI	293
"Operation and Control of High Density Tokamak Reactors," S. E. Attenberger, Oak Ridge National Laboratory, Oak Ridge, TN; D. G. McAlees, Exxon Nuclear Co., Inc., Richland, WA	303

"Impurity Control in Near-Term Tokamak Reactors," W. M. Stacey, Jr., D. L. Smith, and J. N. Brooks, Argonne National Laboratory, Argonne, IL	315
"Nonlinear Temperature-Density Stability in Tokamak Reactors Operating on the D-T Cycle," W. L. Ferrell and W. E. Kastenberg, University of California, Los Angeles, CA	333
"Thermal Stability Considering the Slowing-Down Process of Alpha Particles, M. Ohnishi, T. Hoshino, and J. Wakabayashi, Kyoto, Japan	343
"Scaling for Tormac Fusion Reactors," M. A. Levine, I. G. Brown, and W. B. Kunkel, Lawrence Berkeley Laboratory, Berkeley, CA	353
"Operating Point Considerations for the Reference Theta-Pinch Reactor (RTPR)," R. A. Krakowski, R. L. Miller, and R. L. Hagenson, Los Alamos Scientific Laboratory, Los Alamos, NM	359