the shifting of emphasis from one aspect of reactor safety to another. This book would be a useful supplement to readings on "technology and society"-type courses at the university for engineering students. For the practitioner, it is the only book-length broad historical perspective of the evolution of the nuclear regulatory process that the reviewer knows of. This book is not just another book on reactor safety; it is much more.

Robert S. Wick (BS, mechanical engineering, Rensselaer Polytechnic Institute, 1946; MS, Stevens Institute of Technology, 1948; PhD, mechanical engineering, University of Illinois, Urbana, 1952) has been professor of nuclear and aerospace engineering at Texas A&M University since 1966. Before that he was at the Westinghouse Bettis Atomic Power Laboratories (starting in 1955), where he was associated with various reactor design projects.

Atomic Physics 7

Editors	Daniel Kleppner and Francis M. Pipkin
Publisher	Plenum Publishing Corp., New York (1981)
Pages	573
Price	$69.50
Reviewer	Howard Grotch

Atomic Physics 7 is a collection of invited papers presented at the Seventh International Conference on Atomic Physics, held August 4-8, 1980, at the Massachusetts Institute of Technology.

There are 22 manuscripts, which cover a broad spectrum of topics in theoretical and experimental atomic physics. In all cases, the authors write about "state-of-the-art" research in their respective areas. As is usually the case for such a collection of manuscripts, the mode of presentation of the individual contributions varies according to the author's conception of the expertise of the average reader. Thus some of the papers are carefully developed, with extensive reference to earlier work, and are clearly intended for an individual who needs an overview, while others are more suited to the expert intent on learning the most recent details of work in the field.

A large subset of papers involves theoretical and experimental discussions in which atomic physics is being utilized as a tool to shed light on our understanding of fundamental theories in physics. In this category, I would place the following articles:

Experiments on Time Reversal Symmetry and Parity
Norman F. Ramsey

Parity Violation Effects Induced by Neutral Currents in Atoms
C. Bouchiat

Status of Experimental Searches for Parity Violation in Atoms
E. D. Commins

Stable Lasers and Optical Frequency Standards for Testing the Postulates of Physics
J. L. Hall

Theoretical Advances in Quantum Electrodynamics
G. Peter Lepage

Tests of Quantum Electrodynamics Using Hydrogen, Muonium, and Positronium
D. W. Gidley and A. Rich

Invariant Frequency Ratios in Electron and Positron Geonium Spectra Yield Refined Data on Electron Structure
Hans Dehmelt

Muonic Helium
Patrick O. Egan

There are four papers that deal with electrons in highly excited states (called "Rydberg states"). In such states, the electrons are far from the nucleus and effects of external fields are enhanced. The papers are:

Rydberg Atoms and Radiation
Serge Haroche

Two Electron Rydberg States
William E. Cooke

Precise Studies of Hydrogen Stark Resonances
Peter M. Koch

Excited States of Atoms in Strong External Fields
Richard R. Freeman

Several other papers also discuss work in strong fields. The paper, "Atomic Physics of High Z-Systems," by P. Kienle, provides a comprehensive treatment of spontaneous positron emission during uranium-uranium collisions. For a short time, the inner electrons see a field produced by two nearby uranium nuclei.

The paper, "Atomic Physics with Relativistic Beams," by H. C. Bryant, K. B. Butterfield, D. A. Clark, C. A. Frost, J. B. Donahue, P. A. M. Gram, M. E. Hamm, R. W. Hamm, and W. W. Smith, involves strong electric fields induced by passing rapidly moving ions through a magnetic field. Lasers are then utilized to study atomic resonances.

The remaining manuscripts, which cover a variety of topics, are:

Nuclear Properties Studies by Atomic Physics
R. Klapisch

Coherent Decay of Collisionally Excited Autoionizing Atoms
Reinhard Morgenstern

Laser Induced Collisional Energy Transfer
S. E. Harris, J. F. Young, R. W. Falcone, W. R. Green, D. B. Lidow, J. Lukasik, J. C. White, M. D. Wright, and G. A. Zdasiuk

Correlation Effects in Electron-Atom Scattering
Frank H. Read

Continuum Capture in the Three-Body Problem
Ivan A. Sellin

Atomic Physics with Synchrotron Radiation: Past, Present, and Future
Francois J. Wuilleumier

Spectroscopy on Localized and Cooled Ions
Peter E. Toschek and Werner Neuhauser

Spin-Polarized Hydrogen
Thomas J. Greytak, Daniel Kleppner, Richard W. Cline, and David A. Smith

Of this latter group of papers, I especially enjoyed the last two. They describe new techniques that offer prospects for interesting experiments.

The paper by R. Klapisch is the only one that involves research on the atomic nucleus. The author describes ongoing work, carried out at the European Council for Nuclear Research, Geneva, in which an on-line mass separator is combined with an accelerator bombarded target to systematically produce and study many radioactive isotopes. The hyperfine structure and isotope shift of atomic spectra provide information on spins, moments, and nuclear charge radii. This paper should be of considerable interest to nuclear physicists.

In summary, *Atomic Physics 7* contains a wealth of information on current research in atomic physics. It is a very important and relevant source of information for atomic physicists. Some of the articles are likely to be of interest to physicists working in the area of elementary particle physics. In my opinion, the book would not be too relevant to a member of the American Nuclear Society, since, except for the article by R. Klapisch, there is very little discussion of contemporary nuclear physics or of nuclear technology.

Howard Grotch is a professor of physics at The Pennsylvania State University at University Park, Pennsylvania. He is a theoretical physicist whose research encompasses a variety of topics in atomic and elementary particle physics. He is also a co-author of a textbook, Physics for Science and Engineering.

The Necessity for Nuclear Power

Author	Geoffrey Greenhalgh
Publisher	Crane, Russak & Company, Inc., New York (1981)
Pages	260
Price	$19.00
Reviewer	Frederick G. Hammitt

This book, written by a prominent British consultant on nuclear affairs, is designed to strongly argue the case for nuclear power as an essential energy source, leading up to the year 2000. While the author commenced his technical career in an oil refinery at Abadan, Iran, during World War II, he joined the nuclear staff at Harwell in 1948, and has held various positions in the British nuclear establishment until 1977, when he became a private nuclear consultant. Hence, he is particularly familiar with the nuclear side, but is not unfamiliar with fossil fuels and oil. The author bases his study on numerous up-to-date energy demand and availability forecasts, including both the utility need and also the possible eventual full extent of the nuclear option. The plethora of health, environmental, and proliferation factors, which have been in the forefront of recent energy/safety discussions, are considered. Topics treated include methods of power generation, nuclear safeguards, waste disposal, and Three Mile Island. Each topic is considered in relation to developing countries, Communist states, and also the United States and Western Europe. The book includes 18 chapters (too numerous to list here) with 60 figures and 78 tables.

In the Foreword, written by Dr. Sigvard Eklund, director-general of the International Atomic Energy Agency, it is stated that the only significant choices we have, at least until the end of this century, for the production of electric power are coal, nuclear, and, in some places, hydropower. It is stated that in 1979, 6% of the world's generating capacity was nuclear. This should increase to 16% by 1985. The book concludes with the statement that the consequences, should nuclear not eventually be needed, are minimal, but the consequences of a world plunged into a severe and widespread energy shortage would be catastrophic.

I strongly recommend the book to the general scientific community interested in the needed solution for our overall energy problems.

Frederick G. Hammitt, presently professor of mechanical engineering at the University of Michigan, was for several years professor of nuclear engineering at the same institute, and his PhD was in fact in nuclear engineering at Michigan. Hence, he is well qualified to review this book concerning the necessity for nuclear power, both as a specialist in that field, and also in conventional engineering (particularly polyphase fluid flow and heat transfer). At present, he is teaching a graduate course on large power plants, which closely involves the material of the book reviewed. He is professor-in-charge, Cavitation and Multiphase Flow Laboratory at Michigan, and has authored more than 300 papers and articles in this field in addition to two books on the general subject of cavitation.

Fast Breeder Reactors
(An Engineering Introduction)

Author	A. M. Judd
Publisher	Pergamon Press, Inc., Elmsford, New York (1981)
Pages	161
Price	$12.50
Reviewer	Ronald J. Onega

The Preface of this book starts with the statement "This book is intended for the newcomer to the study of fast breeder reactors [FBRs], either as a student or at a later stage of his or her career." This book certainly is a good, brief introduction to liquid-metal fast breeder reactors (LMFBRs). Most of the chapters deal with LMFBRs rather than other fast reactor concepts, although other concepts are mentioned.