The last two chapters are applications of the information presented in the previous chapters and show how one might use this knowledge to solve complex problems in nuclear engineering. The chapter on codes and two-phase flow heat transfer calculations, in which RELAR-4 and TRAC are considered as examples of codes for thermohydraulic calculations, is by Hsu. Applications to LMFBRs with SIMMER code as an example is written by Grand.

Although there has been some additional information available since 1978, the date of formulation of this book, this book fills a long-awaited need, especially for the advanced graduate student and for the practicing nonspecialist in the field of nuclear engineering. Although the title suggests that it is meant for nonnuclear disciplines, the emphasis and philosophy are heavily biased toward nuclear applications. Of course an interested nonnuclear reader will still find use for this book as quite a bit of the book is directed toward understanding the general mysteries of two-phase flow. It was a delight to review this book.

Varada Charyulu is a professor in the School of Engineering at Idaho State University. He has had varied experience and interests. His main areas of research are in fast reactor safety and physics. Recently he was at Kernforschungszentrum-Karlsruhe in the Federal Republic of Germany on sabbatical leave where he did some work on two-phase flow and fast reactor safety. He has been a consultant to energy conservation firms and has been active in promoting conservation energy programs.

The Energy Crisis, Conservation and Solar

Authors	Harvey Rose and Amy Pinkerton
Publisher	Butterworths, Woburn, Massachusetts (1981)
Pages	203
Price	$14.95
Reviewer	Varada Charyulu

Conservation and solar are two important and noble topics; throw in the phrase "energy crisis" and you have a pretty catchy title for a book. According to Denis Hayes, Director of Solar Energy Research Institute, who wrote the Foreword to the book, the authors

> . . . have shown us how to conserve energy while enhancing our lifestyles. They have demonstrated how to reduce further our foreign oil bill and how to put solar energy to work for us. They have given us a vision of a better, more equitable and more resilient society into which the United States could evolve. *The Energy Crisis, Conservation and Solar* points the way toward a stable, sustainable energy future.

From the title and the Foreword, it would be natural for the reader to expect substantial information on these topics from the book.

This book is in two sections. The first section deals with energy conservation while the second section is concerned with solar energy. There is no third section; the authors seem to have forgotten about the very first topic of the title of the book! The energy crisis is not discussed at all in the book! Perhaps, according to the authors, there exists no energy crisis.

Each section has a brief introduction followed by five chapters. At the end of the two sections there is a special chapter on conclusions. The five topics considered in the first section are: conservation in buildings, conservation in industry, cogeneration, recycling, and transportation. Chapter titles under the section on Solar Energy are: "Passive Solar Energy," "Active Solar Energy," "Photovoltaic Cells," "Wind Energy," "Alcohol Fuels," and "Biomass Energy." It is surprising that the last two topics are considered to be solar energy forms while energy from the tides, ocean thermal gradients, coal, and nuclear fuels, and other solar-originated energy forms have been excluded! After all, aren't the earth's resources the results of solar phenomena?

Reading through, one finds that there are hardly any new or substantive ideas in the book. Most of these topics have already been reported several times in newspapers, television or radio broadcasts, or popular magazines. In fact, a majority of references cited in the book are from the news media. Each chapter includes a section that relates to policy aspects in some form or other. These policy recommendations advocate some sort of legislation that results in either taxation to promote the authors' ideas, gives incentives in the form of tax rebates, or curtails individual freedom in some form. Some of their recommendations have already been implemented either at the federal or state level, and many of us have realized the fruits of these legislations!

One nice thing about the book is the style. It is very casual, and so it is easy to read. However, many times it is very hard to understand or follow the logic of the authors. For example, consider the very first paragraph from the chapter on cogeneration. To quote the paragraph (the numbers in the parentheses refer to the authors' references in the text):

> There is an energy-saving opportunity in U.S. industry that requires no technical breakthroughs, lifestyle changes or economic sacrifice; could supply more than enough electricity for all U.S. industries (1); and could save as much oil as the Alaskan North Slope will produce (2). Yet most people have not even heard of cogeneration, although it was used by 56% of U.S. industries in the 1930s (3), and may become our major new source of electricity in the next 10-15 years (4).

Is this form of energy advocated for the industrial sector or is it implied that "common people" should be using cogenerated energy? Are industries unaware of cogeneration? Why has it not been popular with the industrial sector? Doesn't the industrial customer have to make some "sacrifices?" Since this form of energy does not directly affect most of the public, it makes no impact on us except perhaps to point out how uninformed or reluctant or unconcerned the utilities are!

This book is beset with such loosely written statements, which, when closely examined, lead to meaningless conclusions. The general theme of the book is that conservation and solar energy reduce dependence on foreign oil and goods. However, it advocates the use of heat exchangers made by Mitsubishi Electric Corporation!

In several places the book refers to "dangerous forms of energy" either directly meaning nuclear or implying it but

never substantiating the claim or clarifying their feelings as to why or how it is dangerous.

This book is written by authors whose academic background is in policy sciences. However, they are writing about energy--a major part of which is a technical subject. They should have sought the help of a scientist or engineer so they could have "cleaned up" some of the technical blunders. One such serious one being on p. 99, when they talk about "storing heat." According to thermodynamics, heat is defined as energy realized in transition and neither heat nor work can be stored!

All in all, this book is not meant for a technically minded reader and as for the general lay public, there doesn't seem much to be gained from this book. At best, it is a very shallow treatment of two very important and noble ideas.

Varada Charyulu is a professor in the School of Engineering at Idaho State University. He has had varied experience and interests. His main research interests are in fast reactor safety and physics. Recently he was at Kernforschungszentrum Karlsruhe in the Federal Republic of Germany on sabbatical leave where he was doing some work on two-phase flow and fast reactor safety. He has been a consultant to energy conservation firms and has been active in promoting conservation energy programs.

Near-Field Phenomena in Geologic Repositories for Radioactive Waste

Publisher	Nuclear Energy Agency; (Organisation for Economic Co-Operation and Development) (1981)
Pages	408
Price	$20.00
Reviewer	Claudio Pescatore

The disposal of nuclear waste in deep geologic formations may be accompanied by a substantial alteration in the physical, chemical and mechanical properties of the original mined facility. These changes should be well understood, as they may act as negative feedbacks on the performance of the repository. In the early life of a repository, changes in physical, chemical, and mechanical properties are mostly associated with the thermal and radiation fields generated by the stored waste. The localized scale on which these fields play a role is termed the "near-field" of the repository.

The book under review consists of the proceedings of a workshop on near-field phenomena in geologic repositories for radioactive waste held in Seattle, Washington, from August 31 to September 1, 1981. It brings together state-of-the-art contributions by specialists from Belgium, Canada, Finland, France, the International Atomic Energy Agency, Germany, Japan, the United Kingdom, and the United States, all having a vigorous nuclear waste research program.

Radiation-related phenomena are only cursively touched on. Thus, the emphasis is on thermally controlled phenomena. Topics covered include rock mechanics in stressed and heated conditions, thermally induced groundwater flow in fractured rocks, chemical changes to rock surfaces associated with changes in the chemical and thermal environment, chemical solubilities and sorption properties of radionuclides, long-term integrity of containers and packing materials for waste packages, and source terms for irradiated fuel. The contributed papers are conveniently organized into six sessions, each session reporting the round of questions and answers at the end of the various presentations. A seventh session reports on the conclusions reached by working group discussions on (a) granite and crystalline host rocks, (b) salt formations, and (c) other host media (e.g., clay and tuff) and engineered barriers.

Fundamental issues are raised by the participants in this workshop. It is suggested, for instance, that further work should be done in order to include constitutive equations for creep in thermomechanical analyses of repositories, that the effort needs to be greater in the near-field model integration area than in new model areas, and that near-field thermomechanical and chemical phenomena are least understood for tuff and clay formations. Also, a wide consensus is reported about the need for adequate experimental data to support the presented models. At the same time, we learn that thermally driven groundwater flow is possibly the principal transport mechanism in fissured rocks and that estimated migration times for radionuclides are long enough that canister lifetime does not play a role in the dose rate to man unless the canister is extremely long lived (in excess of 10^5 yr!). Indeed, the book is a stimulating one, and areas for further research are consistently indicated.

With few exceptions, the content of the papers is highly technical, which makes them challenging but effective reading for the novice desiring to explore these new areas constructively and desirable reading for the more experienced researcher in the field. I would recommend it to both.

Claudio Pescatore is a recent PhD graduate in nuclear engineering from the University of Illinois at Urbana-Champaign. He has been active in modeling of nuclear waste form leaching during the past four years. He is presently an assistant nuclear engineer on the research staff of the Nuclear Waste Management Group at Brookhaven National Laboratory.

Neutron-Transmutation-Doped Silicon
(3rd International Conference, Copenhagen, August 27-29, 1980)

Editor	Jens Guldberg
Publisher	Plenum Press, New York (1981)
Pages	505
Price	$59.50
Reviewer	Heinz Herzer

The third international conference covered in this publication deals mainly with three different fields of interest (as can also be seen from the list of participants):