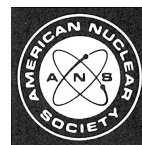


# BOOK REVIEWS

Selection of books for review is based on the editor's opinions regarding possible reader interest and on the availability of the book to the editor. Occasional selections may include books on topics somewhat peripheral to the subject matter ordinarily considered acceptable.



## Alloy 800

<i>Author</i>	W. Betteridge, R. Krefeld, H. Kröckel, S. J. Lloyd, M. Van de Voorde, and C. Vivante
<i>Publisher</i>	North Holland Publishing Company (1978)
<i>Pages</i>	478
<i>Price</i>	\$61.00
<i>Reviewer</i>	O. Norman Carlson

*Alloy 800* is the Proceedings of the Petten International Conference held at the JRC Petten Establishment in The Netherlands in 1978. This was the second international conference on this versatile alloy, which attests to its commercial importance and unique properties. Alloy 800 is the generic term for a class of alloys based on Incoloy 800, which was developed in 1949 by the International Nickel Company for use as a heater element sheathing for radiant heating elements in electrical appliances. It is an iron-base alloy containing 30 to 35% nickel, 19 to 23% chromium, and lesser but varying amounts of titanium, aluminum, and carbon. The alloy's remarkable properties have led to its use over a wide range of temperatures for a number of important applications. In the low temperature range, up to 350°C, it is being used in light water reactors and steam cycle electricity generation; in the intermediate range, 350 to 600°C, in fast reactors; and at high temperatures, above 600°C, in the process-heat high temperature reactors (HTRs), petrochemical processing, coal gasification, and fossil fuel combustion.

The format of the conference consisted of review papers on the different properties or applications of Alloy 800 followed by short research papers. The review papers in particular are complete and thoughtful presentations and are of uniformly high quality. The individual research papers vary considerably both in quality and value perhaps in part because of their brevity resulting from an apparent page limitation. The opening and closing remarks of the conference chairman provide an excellent introduction and

summary for the book. It is enlivened by the questions and comments of the conference audience and the author's reply with several constructive suggestions or criticisms coming out of these discussions.

The sections on the high temperature corrosion and mechanical performance in various environments are unquestionably the highlights of the book. Included are outstanding papers on the effects of chemical process gases, water and steam, liquid sodium, and HTR helium by leading authorities in the field. Certainly in this area, at least, the book will serve as an important reference source for the metallurgical and nuclear engineering communities.

Judging from the list of authors and participants at the conference, this was predominantly a European affair although the presence of North American scientists is evident notably in the mechanical properties and chemical process areas. This may tell us something about where the major research emphasis and support for work on this important alloy currently lie.

*O. N. Carlson is professor of materials science and engineering at Iowa State University and senior metallurgist with the Ames Laboratory, U.S. Department of Energy. His research interests include phase equilibria, metal preparation and purification, mass transport in solids, and effects of solutes on the mechanical properties of refractory metals. He is coauthor of Thorium: Preparation and Properties as well as numerous technical papers and chapters of books.*

## The Energy Center: New Alternative for Effective Energy Use

<i>Author</i>	John F. Hemdal
<i>Publisher</i>	Ann Arbor Science Publishers, Inc. (1979)
<i>Pages</i>	272
<i>Price</i>	\$37.50
<i>Reviewer</i>	W. M. Beasley

In the Foreword of this book, the author expresses concern that a wrong choice of energy programs at this time could lead to disastrous results for the U.S. To help avert such a choice, he would involve an informed public to aid in the determination of our energy future. As a consequence of this view, he has written this book to supply for at least one energy option the information needed "to assist planners, architects, engineers and government officials, as well as the general concerned reader, in this decision-making." Much of the information presented comes from the author's involvement as principal investigator in a feasibility study of energy centers for the state of Michigan.

The concept of an energy center where production of low-cost electrical and thermal energy is integrated with large-scale industrial usage is not a new one, as Hemdal notes. However, the systematic analysis of "symbiotically" related, large-scale energy complexes and their accompanying environmental, social, and economic effects is of relatively recent origin. The author cites in detail five such studies made over the period from 1973 to 1977 for specific locations in Michigan, Oklahoma, Pennsylvania, Puerto Rico, and Utah and makes an exhaustive comparison of data taken primarily from these sources to determine those features that are common to the concept of an energy center and to demonstrate features that derive from regional differences. The ultimate aim of this comparative study is "to present the energy center concept objectively with balanced attention to beneficial as well as potentially negative features." To this end the author is to be lauded for his thorough and even-handed treatment of the prescribed data.

The book is divided into two parts. Part One, which is by far the larger of the two, is concerned with the energy center concept, while Part Two considers the environmental, social, and economic effects deemed to be produced by energy centers.

In the opening chapter a brief review is made of the five energy center studies previously noted. Special emphasis is given to the various definitions of energy center that have been gleaned from these studies. Further, the author examines these studies for common elements and draws conclusions from those found about the roles of economies-of-scale, symbiosis of center components and large [20 000 to 40 000 MW(electric)], complex, integrated power systems in the energy center concept.

In the remaining chapters of Part One and, indeed, the remainder of the book, the Michigan Energy Center feasibility study, which forms a very substantial part of the text, is described in great detail. This study is compared with other energy center studies, where appropriate, to contrast differing points of view. Comparison of the energy center concept with the current common practice of dispersed siting of electrical power plants is made to demonstrate the advantages of collocation of suitable industries with electrical and thermal energy generating units. The various types of industry that would readily lend themselves to a symbiotic role in an energy center, such as, for example, a coal gasification plant, are described and discussed at great length and in much detail. Part One concludes with a chapter that describes the physical and cultural characteristics of the two sites examined for energy center location by the Michigan energy center study group.

Part Two, comprising about one quarter of the text,

is a study of the various impacts energy centers are expected to have on the communities in which they are located and serve. Essentially all of the description and evaluation of the anticipated environmental, social, and economic effects caused by energy center construction and operation as well as public attitudes toward these centers is derived from the feasibility study of energy centers in Michigan. In the final chapter of the book, an attempt is made to assess the practicability of the energy center concept. Conclusions are drawn from the studies made for each of the five widely separated and physically diverse energy center sites, i.e., Harbor Beach or Muskegon, Michigan; Camp Gruber, Oklahoma; the Pennsylvania Energy Park; the Puerto Rico Energy Center near Aguirre; and the Wasatch Front Industrial Complex near Salt Lake City, Utah, to aid in this assessment. Additionally, the author has included an appendix on the legal and regulatory factors impacting on energy centers in Michigan, 52 references, and a glossary.

This book is intended to serve as a primer for the energy center concept and is directed toward a general readership. The subject matter is well presented, and, as such, will greatly aid the non-specialist to readily achieve an overall comprehension of the concept. Thermodynamics is lightly touched upon to illustrate the efficiency achieved in a system where an automatic extraction turbine is used to provide both power and steam. The presentation is rudimentary and should prove to be no obstacle for the intelligent reader since the glossary supplies definitions for unfamiliar terms. For the most part the flow diagrams used in the chapter on industrial collocation are quite straightforward, although several would benefit from brief explanatory notes.

The format of the book is particularly appealing and lends itself to a clarity of expression possessing high pedagogic value. This combined with the author's writing skill makes for a highly readable and informative piece of work. It is regrettable, however, that more of the substance of the energy center studies other than that for Michigan was not presented even though information from these studies was used to provide "contrasts, differences or topics of special interest" in the text. The glossary will be welcomed by the intended reader, but it has several shortcomings. For example, a Btu is defined but a Watt is not. Most of the references are understandably from the 1973 to 1975 time period with but three dated 1977. It would have been useful to have updated the list of references where appropriate before publication of a book in so dynamic a field. Hemdal has contributed to the energy center concept by making a comparative analysis of a number of energy studies and drawing from this analysis a more generalized view of the subject. Overall the book is a useful and accurate review and synthesis of the subject.

I would recommend this book for use by planners in the field, especially those from allied and alien disciplines, and by the interested, general reader.

*Wayne M. Beasley is an associate professor of materials science in the University of New Hampshire. He has done work on the design and production of nuclear fuel for naval vessels and test reactors and has been concerned with energy options for the future for the past several years.*