

of work on direct reactions with light ions while Miller and Feshbach contribute useful, clear, very well-written reviews of pre-equilibrium emission and intermediate structure, respectively. Blann summarizes (in a discussion now severely out-of-date) data on fusion of two heavy ions. The Conference Proceedings are further enriched by interesting discussions of nuclear archaeology by Perlman, solar neutrinos by Bahcall, and astrophysics by Clayton. Papers summarizing recent high energy results by Thirion and Rook round out Vol. II. While the price of these volumes is outrageous, Vol. II seems to me to be well worth the money for the person who wants a thorough, well-written summary of the state of nuclear physics as of 1973 for his bookshelf.

*W. D. Loveland is an associate professor of chemistry in the Department of Chemistry and the Radiation Center of Oregon State University in Corvallis, Oregon. After obtaining his PhD degree in nuclear chemistry from the University of Washington in 1966, he worked in nuclear fission research with J. R. Huizenga at the Argonne National Laboratory. After a year's work in cosmochemistry research, Loveland joined the faculty of Oregon State University. His research papers and books have been concerned with the areas of nuclear fission physics, nuclear spectroscopy, radiotracer methodology, and environmental chemistry.*

### **Citizens Groups and the Nuclear Power Controversy**

<i>Authors</i>	Steven Ebbin and Raphael Kasper
<i>Publisher</i>	The MIT Press
<i>Publication Date</i>	3/74
<i>Pages</i>	307
<i>Price</i>	\$6.95
<i>Reviewer</i>	Dick Duffey

*Citizens Groups and the Nuclear Power Controversy* reports on a study by a political scientist (Ebbins)

and a physicist (Kasper) of George Washington University financed by the National Science Foundation. An advisory committee (mostly with environmental connections), interviews with over 100 individuals concerned with plant regulatory procedures, 48 days at hearings, and over 200 referenced sources provided input.

The development of the controversy from the Fermi reactor in 1956 to the recent more direct citizen intervention is outlined. The motivation of citizen groups is attributed to concern over (a) the environmental issues of a nuclear accident, (b) radiation safety, and (c) a general fear of unknowns in advanced technology. The alarming hazards of the 1957 WASH 740 report, "Theoretical Possibilities and Consequences of Major Accidents in Large Nuclear Power Plants," are again paraded. The environmental impact statements following the 1970 National Environmental Policy Act (NEPA), dramatized by the Calvert Cliff decision, are said to have added to the opportunity of citizen participation.

The regulatory procedures are well reviewed by the authors: the reactor safety analyses to satisfy the U.S. Atomic Energy Commission (AEC) regulatory staff, the hearings of the Atomic Safety and Licensing Board (ASLB) and, finally, licensing.

In addition, the procedures for examining more generic safety matters common to many plants, e.g., emergency core cooling systems (ECCS), are described.

To illustrate the extent of citizen involvement and the complexity of the technical and legal procedures, the following three cases are detailed with particular comments on controversial issues. The Midland, Michigan plant of the Consumer Power Company (pressurized water reactor), designed to furnish utility power and supply steam to the Dow Chemical Company, was examined from the point of view of the construction permit procedures. The operational licensing hearings of the Vermont Yankee reactor (boiling water) were studied. Finally, the ECCS hearings for rule-making were considered.

Many quotations reveal the involvement in hearings of a large cast of participants. Intervenor attorneys Myron Cherry (Midland and ECCS) and Anthony Roisman (Vermont Yankee) receive star billing. The mass

of reports and testimony resulted in some plant changes but, in the main, lengthened the proceedings. The Midland plant, announced in 1968, received its construction permit in late 1972, with operations scheduled for about 1980. The Vermont Yankee plant, announced in 1966, received a construction permit in late 1967, with operations in 1972.

Analysis and interpretation occupy much of the book and are pointed toward the procedural roles of citizen and scientific groups, attorneys, the ASLB, and the AEC. Although enlisting public support may have been an AEC motive for the hearing procedure, the authors conclude that the hearings have evolved more into an opportunity for public complaint. The shortcomings of this adversary method to resolve technical issues are brought out by the prolonged acrimonious hearings. Both citizens and attorneys are said to be technically uninformed, and even scientific intervenors are lacking in data. The book is probably dry reading to a technical person; nevertheless, a few clever comments are included. For example, Friends of the Earth, an environmental group, said of the hearings: "Sometimes the dialogue comes across like missing pages of Lewis Carroll." Indeed by comparison, "Who Stole the Tarts" is a model of rational coherence.

The authors find the hearing process a failure and consider the process heavily weighted against the intervening citizen, who has little financing while applicant costs are passed to the public via power charges. Listed recommendations are

1. government-financed independent assessment centers to consider impacts on the environment
2. government adjudication bodies independent of mission-oriented agencies
3. separation of promotional and regulatory activities of the AEC
4. early public announcements of nuclear plants
5. public hearings at both construction and operation stage, but the latter only to check adherence to construction plans
6. more generic hearings

7. better provisions for exchange of information between citizen groups and applicants

8. funding of intervenors by the applicant

9. more layman language in statements

10. legislation to license trade practices to permit industrial groups to be more open in technical presentations.

Establishment of the Nuclear Regulatory Commission (NRC) and the Energy Research and Development Administration (ERDA) and publication of the recent Rasmussen report on Reactor Safety (WASH 1400) seem to satisfy some of the book's recommendations. Limiting the operational

hearings to verifying compliance with the construction requirements would probably be applauded by most applicants, while the proliferation of government review bodies and applicant financing of intervenors would be deplored.

The book's quasi-legal style is likely to be unattractive to the technical man. Nevertheless, he must be aware of the legal problems that affect scheduling, engineering, and, finally, costs. Although the book favors more regulatory administration and, hence, seems weighted to the requirements of attorneys, it does bring important issues into focus and gives the technical man another view of his nonengineering boundary conditions. In conclusion, the book is well worth the attention of the nuclear community. By such attention, the present judicially inelegant exercises to licensing may evolve into a more nearly rational

course of action palatable to both the attorney and the engineer.

*Dick Duffey is a professor of nuclear engineering at the University of Maryland, College Park, Maryland. He received his BS from Purdue University, his MS from the University of Iowa, and his PhD from the University of Maryland. Following work with the U.S. Atomic Energy Commission at Washington, D.C. and Hanford, Washington, he started the nuclear engineering program at the University of Maryland in 1954. He established the nuclear reactor project in 1957, serving as Nuclear Reactor Director through 1967. He was with the Advisory Committee on Reactor Safeguards as Technical Secretary from 1959 to 1967. He was chairman of the Washington Section of the American Nuclear Society in 1973-74, and is now Treasurer of its Environmental Sciences Division.*