Book Reviews

Proliferation, Plutonium and Policy. By Alexander De Volpi. Pergamon Press, New York (1979). 361 pp.

Does it make sense to review a book two years after publication? In the case of *Proliferation, Plutonium and Policy*, by Alexander De Volpi, I believe it does. This book remains timely and may be more effective now than when published. It was "a direct result of President Carter's statement about avoiding nuclear weapons proliferation because of potential diversion from the commercial reactor fuel cycle." Although it may seem that the incentive for the book has disappeared, sound ideas behind policy are always in order and could have increased influence at this time.

Proliferation, Plutonium and Policy is more than a literature review, although it contains about 200 references and many quotations. The author does not hesitate to include his carefully thought out views and commentary, some inviting controversy. The book, however, prepares the reader for thoughtful evaluation, whether in agreement or disagreement.

Chapter 1 discusses proliferation generally. It refers to vertical proliferation, expansion of stockpiles by nuclear states, and horizontal proliferation, increase in the number of nuclear states. Although the author considers vertical proliferation the greater risk, he emphasizes horizontal proliferation as more relevant to Carter's plutonium policy. In particular, De Volpi makes a case for using plutonium instead of hiding it and counters the dogma that plutonium cannot be denatured effectively.

Chapter 2 discusses antiproliferation techniques in general, and a proposal for isotopic denaturing of plutonium in detail. The proposal, buildup of even plutonium isotopes by extended exposure in a reactor, calls for long-range planning and international support. Its potential effectiveness is compared with that of other techniques, and a refreshing suggestion is tradeoff with safeguards provisions.

The other two chapters are entitled "The Impact of Denatured Plutonium upon Worldwide Reactor Operation" and "Policy Ramifications." Without pretending to supply all the answers, the author discusses denaturant supply and cost, and influence of isotopically denatured plutonium on reprocessing and waste disposal, as well as safeguards. He points out items that require more study. Policy is treated in an international context, more generally than the effect of denatured plutonium. Responsibilities of superpowers are recommended, and the importance of controlling vertical proliferation is reiterated.

The text of *Proliferation, Plutonium and Policy* is easily assimiliated because the author has relegated the more tedious details to 13 appendixes. Chapter 2 contains more technical detail than the others because the proposal for isotopic denaturing of plutonium is thorough. The reader more interested in generalities than techniques may wish to scan this chapter lightly, but should include Appendix F, "Differences in Interpretation or Emphasis," with the chapters to be given most attention. The book is comprehensive, nonparochial, and is recommended for readers from all nations.

The following comment is not intended to qualify this recommendation, but appears to be invited by the final sentence of the Preface, "The camera-ready text for this book was entered, edited, and composed using a newly developed word-processing system, TXT, a description of which is to be published." I find the result legible but unattractive, and I regret that De Volpi did not experiment with an Argonne National Laboratory report instead of a book that should be read widely.

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About the Reviewer: Hugh C. Paxton has been engaged in the nuclear energy business since the early 1940s, having been a member of the team first to separate the uranium isotopes by gaseous diffusion in pre-Manhattan Project days. He is recently retired from the Los Alamos National Laboratory, where for more than a score of years he directed the critical experiments laboratory. Dr. Paxton continues active in the American Nuclear Society's Nuclear Criticality Safety Division and its standards efforts. His academic training was at the University of California.

Handling Radioactivity. By Donald C. Stewart. John Wiley & Sons Inc., New York (1981). 282 pp. $35.00.

Handling Radioactivity is generally a good book for its stated purpose of presenting a practical, nonmathematical overview of principles and procedures for handling radioactive materials and regulating the exposure of persons to radiation. The author has pulled together a useful compilation of material that includes laboratory design, shielding, instruments and specialized equipment, transportation, waste handling, criticality, radiation effects on materials, and radiation protection standards. The book contains a large number of figures, tables, and graphs with numerical data. The author provides extensive references to the open literature and to technical reports that will be valuable to the reader who wishes to go into greater depth.

A drawback to the text, in this reviewer's opinion, is the style of writing. Perhaps it is the author's conscious decision

to employ so much jargon, but the price is unnecessary imprecision in the presentation (e.g., p. 95, "Shielding of isotope alphas produced externally to the body is thus not a great problem."). In addition, the clarity and even accuracy of the physics is compromised in many instances (for example, p. 16, "A charged particle moving at high speed is loaded with electrical-magnetic forces;" p. 105, ". . . neutrons are destroyed . . . by absorption in matter;" p. 106, "A thermal neutron will be moving at speeds comparable to those of the atoms about it."). It is often difficult to separate the logical facts from the writer's style. A few factual inaccuracies also occur. On p. 8, Becquerel's discovery of radioactivity is said to have happened in 1896 but on p. 161 in 1895. The mockup of the Y-12 criticality accident was not made at the Oak Ridge National Laboratory Health Physics Research Reactor, as stated on p. 238, but at the Oak Ridge Critical Experiments Facility.

With this rather serious reservation about the style and details of the physics in places, I would still recommend this book to the author's audience of "those entering the nuclear field for the first time and to those working in related areas . . . " (Preface). Book writing is an awful lot of work, and the author has obviously spent a great deal of time, thought, and devotion on his task. His documentation is thorough. On balance, the introductory reader will profit from having this book available.

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About the Reviewer: James Turner, a member of the senior staff of the Health and Safety Research Division of Oak Ridge National Laboratory, has contributed to these columns on several previous occasions. He completed his graduate studies at Vanderbilt, has broad teaching experience at the university level, served the U.S. Atomic Energy Commission in its Division of Biology and Medicine, and has authored, coauthored, and translated a variety of books. Dr. Turner is on the Board of Directors of the Health Physics Society and a member of the National Council on Radiation Protection and Measurements.