PREFACE

High-level radioactive waste management has become a topic of discussion throughout the scientific and engineering communities, a subject for our nation's newspapers to review for the lay public, and a major issue for interveners in the nuclear program. While many papers of good technical quality, but of limited scope, have been written on this subject, there is presently available no single source that presents an overview of high-level radioactive waste management. This volume of the *Advances in Chemistry Series* is intended to fill the gap.

High-level radioactive waste management covers a broad area of federal government and commercial activities. Chronologically, the first wastes of this nature were generated in the Manhattan Project of World War II vintage. The U.S. Atomic Energy Commission (now the Energy Research and Development Administration), the outgrowth of the Manhattan Project, pursued two simultaneous courses after World War II. On the one hand, support for our national defense plans required plutonium, while on the other hand, a program for peaceful use of atomic energy promoted an increasingly sophisticated nuclear technology devoted to production of electrical power. A common product of both courses is high-level radioactive waste. However, the waste takes a multitude of forms and has no conveniently simple definition.

There are several natural subdivisions of the overall topic that have been considered in organizing this volume. First, the Atomic Energy Commission's philosophy and consequent policy are presented in Dr. Frank K. Pittman's paper titled "Management of Commercial Radioactive Waste."

These papers describe the programs directed to high-level radioactive waste management at the Atomic Energy Commission sites where the waste was generated in support of AEC programs. In this context, "Solid Waste Forms for Savannah River Plant Radioactive Wastes" are discussed in some depth by R. M. Wallace et al. C. M. Slansky describes the "High-Level Waste Management Program" at the National Reactor Testing Station. W. W. Schulz and M. J. Kupfer review "Solidification and Storage of Hanford's High-Level Radioactive Liquid Wastes." These three papers present in considerable detail the aggressive programs being actively pursued at the Atomic Energy Commission sites.

Two papers about high-level waste management plans for commercial reprocessing plants complete the overview of operating plant activities. J. P. Duckworth details the Nuclear Fuel Services plans. R. G.

In High-Level Radioactive Waste Management; Campbell, Milton H.;
Advances in Chemistry; American Chemical Society: Washington, DC, 1976.

Barnes et al. describe the Midwest Reprocessing Plant projections in depth.

There is also a significant research effort directed toward the long-term solution of high-level radioactive waste management. J. O. Blomeke and W. D. Bond give an overview of the Oak Ridge National Laboratory program, while J. E. Mendel et al. present the scope of Battelle Pacific Northwest Laboratories activities. Further papers present topical discussions of significant individual investigations. G. S. Barney describes a unique hydrothermal reaction for incorporating caustic wastes in a synthetic mineral; S. Fried et al. tell of unusual techniques they have developed to assess the distribution of plutonium in rock containment environments; M. W. Wilding and R. W. Rhodes report on a process for removing cesium and strontium from fuel storage basin water. N. W. Golchert addresses the important consideration for measuring transuranics in environmental water. The overview is completed by the description of waste management practices in Europe presented by R. M. Walton, Jr.

This volume was not assembled simply to reassure the reader, or to project the thought that all the best solutions have been identified and are being implemented. Rather, the intent is to report responsibly to our professional peers the status of this technology on the occasion of the symposium in 1974. Your editor and most of the authors are still active in the field. They stand fully ready to provide information on recent work and continue a constructive dialogue with any reader. Further, we solicit responsible recommendations for alternative solutions; and your editor pledges a professional consideration for such proposals.

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