



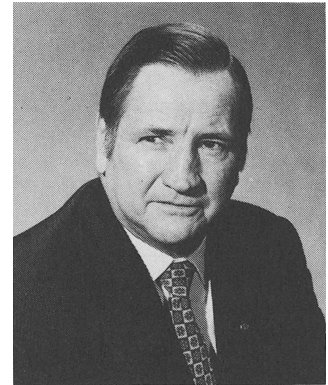
## AUTHORS — DECEMBER 1974

### WASTE MANAGEMENT SYMPOSIUM

#### UNITED STATES ATOMIC ENERGY WASTE MANAGEMENT PROGRAMS AND OBJECTIVES

*Frank K. Pittman*

Frank K. Pittman [BE (magna cum laude), chemical engineering; MS, analytical chemistry, Vanderbilt University; PhD, inorganic chemistry, Massachusetts Institute of Technology] is with the U.S. Atomic Energy Commission. His duties included division directorship of Reactor Development, and now for several years he has been Director, Division of Waste Management and Transportation.

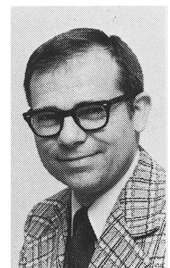


#### RADIOACTIVE WASTE

#### THE HIDDEN COMMITMENT OF NUCLEAR WASTES

*William D. Rowe  
William F. Holcomb*

William D. Rowe (left) (BS, physics, Wesleyan University, 1952; MS, physics, University of Pittsburgh, 1957; MBA, University of Buffalo, 1961; PhD, management science, American University, 1973) is presently Deputy Assistant Administrator for Radiation Programs in the U.S. Environmental Protection Agency, where he is responsible for formulating and administering a national environmental radiation protection program. His interests include using quantitative methods of systems analysis as a management tool, and he holds patents in the area of electronic-logic circuitry and control systems. William F. Holcomb (BS, chemical engineering, New Mexico State University, 1960; MS, metallurgical engineering, University of Idaho, 1967) is a Public Health Service Officer assigned to the Technology Assessment Division of the Office of Radiation Programs, U.S. Environmental Protection Agency. He was previously associated with Argonne National Laboratory and Allied Chemical Corporation at the National Reactor Testing Station in Idaho, with Fenix and Scission, Inc., at the Nevada Test Site, and with Aerojet-General Corporations' Nuclear Division in California. His areas of interest are waste management, fuel reprocessing, and fabrication.



## WASTE MANAGEMENT—LICENSING AND CRITERIA

*S. H. Smiley*

Seymour H. Smiley (MS, chemistry, New York University), Deputy Director for Fuels and Materials in the U.S. Atomic Energy Commission's Directorate of Licensing, is responsible for the Commission's licensing program for construction and operation of all fuel cycle plants including uranium mills,  $UF_6$  plants, uranium and plutonium processing and fabrication plants, fuel reprocessing plants, and waste disposal facilities.



## MANAGEMENT OF RADIOACTIVE WASTES—PROGRAMS OF THE INTERNATIONAL ATOMIC ENERGY AGENCY

*Donald G. Jacobs*

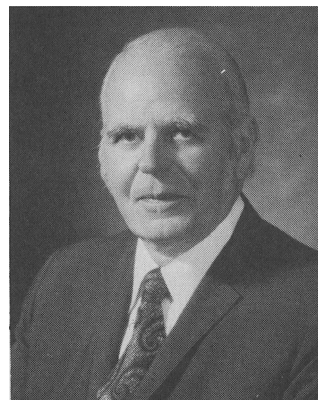
Donald G. Jacobs (BS, agricultural science, 1954; MS, chemistry, 1956; PhD, agronomy, 1958, University of Illinois) is interested in management of radioactive wastes, environmental behavior of radionuclides, and assessment of radiological impacts of nuclear activities. From April 1971 until August 1973, Jacobs was the head of the Waste Management Section, Division of Nuclear Safety and Environmental Protection, International Atomic Energy Agency, Vienna.



## RADIOACTIVE WASTE MANAGEMENT IN SELECTED FOREIGN COUNTRIES

*H. M. Parker*

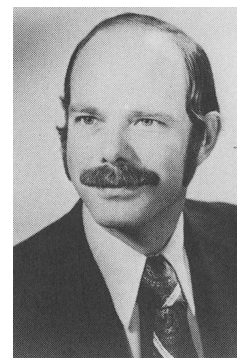
H. M. Parker, a graduate in physics of the University of Manchester (MSc, F-Inst. P.), entered the then new field of radiological physics in 1932. In 1942, he joined the atomic energy project in Chicago and later headed the radiation protection activities at Oak Ridge and Hanford. He was manager of the Hanford Laboratories from 1956 to 1965. Currently, he serves as consultant with special interests in radiation standards, environmental sciences, and waste management.



## COST/BENEFIT CONSIDERATIONS OF NUCLEAR POWER

*Richard L. Rudman*

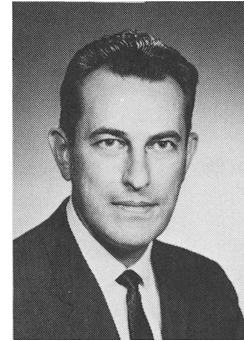
Richard Rudman (BS, 1966; MS, 1968, University of California, Los Angeles) has worked at Los Alamos Scientific Laboratory in the development of an experimental high-temperature gas-cooled nuclear reactor. A consultant on engineering computing, he is now Assistant to the President of the Electric Power Research Institute.



## NUCLEAR RADIATION—SOURCES AND IMPACT

Carl M. Unruh (BS, MS, chemistry, University of Kansas) is manager of the Occupational and Environmental Safety Department at Battelle's Pacific Northwest Laboratories. He has broad experience in radiation protection as well as in measurement and interpretation of radioactivity in the environment.

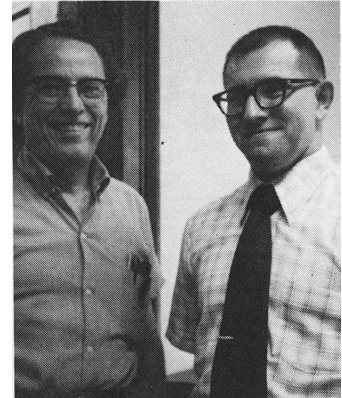
*Carl M. Unruh*



## NUCLEAR FUEL CYCLE AND THE ISOTOPIC COMPOSITIONS

Joseph A. Angelo, Jr. (right) (BS, Manhattan College, 1965; MS, University of Arizona, 1968) is currently staff physicist, United States Air Force, Patrick Air Force Base, and adjunct faculty member with numerous publications in waste management. He is a University of Arizona PhD candidate, studying heat transfer radioactive wastes in deep rock. Roy G. Post (BS, PhD, University of Texas, 1952) has many years experience in fuel cycle and chemical processing research and development. He is a University of Arizona professor, teaching nuclear fuel cycles.

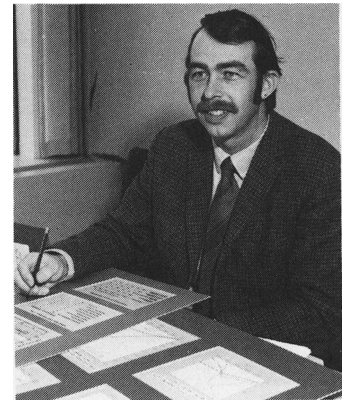
*Joseph A. Angelo, Jr.  
Roy G. Post*



## EVALUATION METHODOLOGY OF WASTE MANAGEMENT CONCEPTS

Duane E. Deonigi (BS, mechanical engineering, Washington State University, 1959) is presently manager of Economics and Operations Research at Battelle-Northwest Laboratories, Richland, Washington. From 1960 to 1969, Deonigi was responsible for economic analysis of plutonium-using fuel cycles; this work included plutonium value analysis, detailed plutonium isotopic determination and cost associated with fuel fabrication, and the reprocessing of spent fuels. During this period, he authored approximately 30 technical papers.

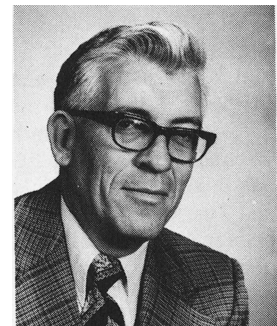
*D. E. Deonigi*



## HANDLING AND PACKAGING OF PLUTONIUM-CONTAMINATED WASTE

J. B. Owen has 22 years of health physics, decontamination, and waste management experience at Rocky Flats, and one year at Karlsruhe, West Germany. He was appointed a certified health physicist in 1964 by the American Board of Health Physics.

*J. B. Owen*



## TRANSPORTATION OF NUCLEAR FUEL AND WASTE

*William Brobst*

William A. Brobst (BS, Northwestern University, 1951), Chief of the Transportation Branch, U.S. Atomic Energy Commission, Washington, D.C., is responsible for the development of transportation policies, standards, and procedures for its operations and for functional direction of USAEC-wide activities related to transportation and traffic management. He is the author of a number of publications in health physics and transportation.



## GEOHYDROLOGIC CONSIDERATIONS IN THE MANAGEMENT OF RADIOACTIVE WASTE

*George D. DeBuchananne*

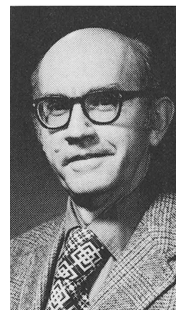
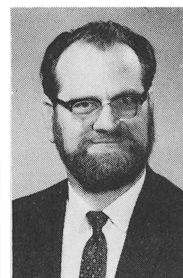
George D. DeBuchananne (BA, geology, University of Iowa, 1942), Chief, Office of Radiohydrology, has been with the Water Resources Division of the U.S. Geological Survey since 1942.



## METHODS FOR REMOVAL OF ACTINIDES FROM HIGH-LEVEL WASTES

*W. D. Bond  
H. C. Claiborne  
R. E. Leuze*

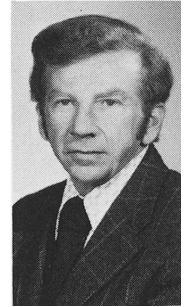
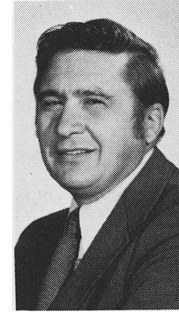
W. D. Bond (top) (PhD, physical chemistry, Vanderbilt University, 1957) is a staff member in the Chemical Technology Division, Oak Ridge National Laboratory. His current interest is the development of processes for removing actinides from commercial high-level wastes. H. C. Claiborne (center) (MS, chemical engineering, University of Tennessee, 1949) is a staff member in the Chemical Technology Division, Oak Ridge National Laboratory. He has been involved in reactor technology and radiation shielding for many years and is currently associated with waste management studies. Rex E. Leuze (bottom) (MS, chemical engineering, University of Tennessee, 1956) is an assistant section chief in the Chemical Technology Division, Oak Ridge National Laboratory. He has been actively involved in chemical process development and in production of transplutonium elements. He is presently associated with both the transuranium element production and waste fractionation programs.



## HIGH-LEVEL WASTE SOLIDIFICATION: APPLICABILITY OF FLUIDIZED-BED CALCINATION TO COMMERCIAL WASTES

B. R. Dickey (top) (PhD, chemical engineering, Texas A&M University) is manager of the fluid bed processing technology section of Allied Chemical's Idaho Operations Office. His experience and interests in the nuclear field include fuel reprocessing, waste management, and mathematical modeling. B. R. Wheeler (center) (MS, chemical engineering, Purdue University) is manager of the process support and technology branch of Allied Chemical's Idaho Operations Office. His experience covers all areas of the nuclear fuel cycle with emphasis on fuel reprocessing, waste management, and process economics. J. A. Buckham (bottom) (PhD, chemical engineering, University of Washington) is assistant general manager of Allied Chemical Corporation's Idaho chemical programs, operator of the Idaho chemical processing plant at the USAEC's National Reactor Testing Station. He has engaged in project research, project management, and program direction in the fields of nuclear fuel reprocessing, radioactive waste management, waste calcining and other fluidized bed processes, and use of nuclear poisons for process safety.

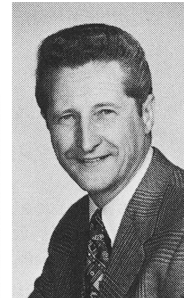
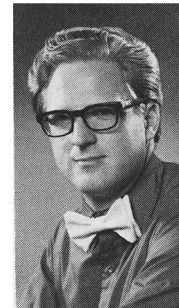
*B. R. Dickey  
B. R. Wheeler  
J. A. Buckham*



## ITSA—ABOVE-GROUND RETRIEVABLE STORAGE METHOD FOR LOW-LEVEL TRANSURANIC WASTES

Paul J. Macbeth (left) (BS, MS, nuclear physics, Brigham Young University) is presently a physicist in Aerojet Nuclear Company's Environment and Waste Management Branch. His current interests are in radioactive waste management and environmental analyses. Winston W. Hickman (BS, mechanical engineering, University of Utah, 1948) has had various assignments in the atomic energy field at the National Reactor Testing Station during the past 22 years. He is presently manager of Aerojet Nuclear Company's Environment and Waste Management Branch, his current interests being radioactive waste management and environmental affairs.

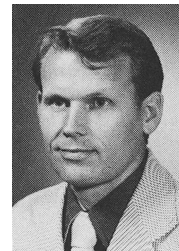
*Paul J. Macbeth  
Winston W. Hickman*



## RETRIEVABLE SURFACE STORAGE FACILITY FOR COMMERCIAL HIGH-LEVEL WASTE

D. C. Nelson (left) (BS, mechanical engineering, South Dakota State University) has held various engineering and management positions in the areas of plutonium processing and waste management. He is presently in charge of the Retrievable Surface Storage Program and Manager, Waste Management Special Studies Section, Atlantic Richfield Hanford Company. D. D. Wodrich (BS, mechanical engineering, Montana State University) has held various engineering and management positions at Hanford, primarily in the fields of irradiated fuels, plutonium processing, and waste management. At present, he is Manager, Development Engineering Department, Atlantic Richfield Hanford Company.

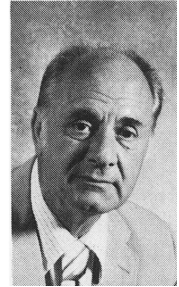
*Dean C. Nelson  
Donald D. Wodrich*



## DISPOSAL OF RADIOACTIVE WASTE IN BEDDED SALT FORMATIONS

*William C. McClain  
A. L. Boch*

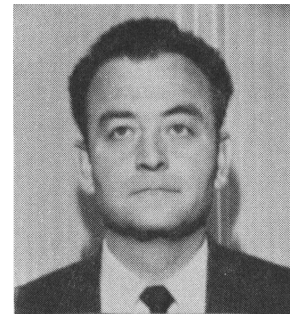
William C. McClain (left), a member of the Chemical Technology Division, Oak Ridge National Laboratory, is Assistant Director of the Salt Mine Repository Project. He received mining engineering degrees from Colorado School of Mines and University of Newcastle-Upon-Tyne, England. He has been engaged in research and development activities in radioactive waste disposal and related geological investigations including the Project Salt Vault experiment in Kansas, hydraulic fracturing of shales, seismology, and rapid excavation. A. L. Boch (BS, Northeastern University) is a member of the Director's Division, Oak Ridge National Laboratory, and Program Director of the Salt Mines Repository Project. Past activities include serving as Project Director of ORNL's Army Reactors Program, the *N.S. Savannah* program, the High Flux Isotope Reactor, and the Oak Ridge Electron Linear Accelerator projects.



## THE MANAGEMENT OF SPENT CANDU FUEL

*W. W. Morgan*

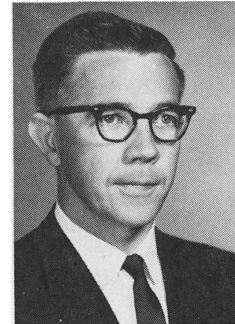
W. W. Morgan (BS, chemistry, University of British Columbia, 1954) has been associated with the nuclear industry in Canada for about 15 years. He is currently concerned with waste disposal projects at Atomic Energy of Canada's Whiteshell Nuclear Research Establishment at Pinawa, Manitoba, Canada.



## EXTRATERRESTRIAL DISPOSAL OF NUCLEAR WASTES

*Kirk Drumheller*

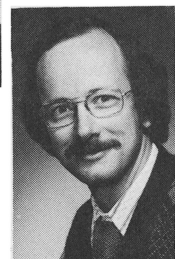
Kirk Drumheller (SB, aeronautical engineering, Massachusetts Institute of Technology, 1945) is an energy program manager with Battelle-Northwest. His activities have been principally in the area of nuclear fuels, isotope utilization, and advanced energy systems. He has directed production, plant design and construction, and research and development activities.



## SEABED DISPOSAL—WHERE TO LOOK

*W. P. Bishop  
C. D. Hollister*

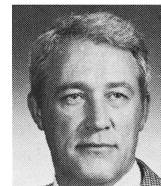
William P. Bishop (left) (PhD, radiation chemistry, Ohio State University, 1967), with post-doctoral in pulsed radiolysis of gases at Sandia Laboratories, has performed diagnostics of the prompt radiation from underground nuclear tests. He joined the study of problems of reactor safety and nuclear waste management at its inception and is program manager for several activities including the study of the ocean environment and the technical feasibility of waste disposal there. Charles Davis Hollister (BS, Oregon State University, 1960; PhD, Columbia University, 1967) marine geologist, Woods Hole Oceanographic Institution, has researched sediment dynamics in the deep sea, oceanographic factors that control sediment distribution, geologic effects of near-bottom currents, behavior of cohesive abyssal sediment in seawater flumes, and development of long piston coring devices.



## CHEMICAL BEHAVIOR AND GROUND MOVEMENT OF SELECTED RADIONUCLIDES

Alvin E. Smith (top) (AB, chemistry, Whitman College; BS, chemical engineering, University of Colorado) is manager of research for Atlantic Richfield Hanford Company. He has spent 25 years at Hanford in plutonium fabrication, equipment development, advanced operational planning, and more recently, is directing research programs dealing with the short- and long-range management of radioactive waste resulting from Hanford operations since its inception. D. J. Brown (center) (BS, geography-geology, University of Utah, 1955), staff geologist for Atlantic Richfield Hanford Company, has conducted field tests and laboratory research on the movement of radionuclides through saturated and partially saturated sediments, groundwater monitoring systems, and logging techniques as applied to radiation monitoring wells from 1955 to 1970. He is currently involved in soil-chemistry, hydrogeology, and seismology research at Hanford. Raymond E. Isaacson (bottom) (BS, chemical engineering, University of Washington) is manager of physical and life science technology for Atlantic Richfield Hanford Company. He has spent 20 years at Hanford in fuel reprocessing, plutonium processing, nuclear materials management, nuclear criticality prevention, and, more recently, is directing research programs concerned with unplanned release prevention, public protection assurance, and site surveillance.

*A. E. Smith  
D. J. Brown  
R. E. Isaacson*



## MEASURING RADIOACTIVITY IN THE ENVIRONMENT—THE QUALITY OF THE DATA

Arthur N. Jarvis (left) (MA, University of Vermont, 1954) is Chief of the Quality Assurance Branch of the Technical Support Laboratory at the Las Vegas Center of the U.S. Environmental Protection Agency's (EPA) National Environmental Research Center. He is in charge of the EPA's Radiation Quality Control Program for insuring the precision and accuracy of environmental radiation data. He also holds an appointment as adjunct professor of radiation biology at the University of Nevada, Las Vegas. David G. Easterly (MS, University of Tennessee) has had extensive experience in the field of radiation research. He is presently a research chemist with the Quality Assurance Branch of the EPA's National Environmental Research Center in Las Vegas, Nevada.

*Arthur N. Jarvis  
David G. Easterly*

