Management of Certain Radioactive Waste Streams Stored in Tanks at Three Department of Energy Sites

Committee

Frank L. Parker

Chair

FRANK L. PARKER, Chair, NAE, (Ph.D., water resources engineering, Harvard University) is a distinguished professor of civil and environmental engineering at Vanderbilt University. Dr. Parker's research interests include hazardous chemical and radioactive waste disposal policy, risk analysis of hazardous and radioactive waste disposal, as well as thermal pollution, and water resources engineering. He served in the U.S. Army in a variety of engineering positions and worked for the U.S. Bureau of Reclamation and the Rockland Light and Power Company as a civil and water resources engineer. After graduating from Harvard, Dr. Parker worked for a consulting hydraulic engineering firm and then went to the Oak Ridge National Laboratory, where he became head of Radioactive Waste Disposal Research. He also served as head of Radioactive Waste Disposal Research for the International Atomic Energy Agency. In recent years, he focused on radioactive and hazardous chemical waste problems, with increasing attention to the policy questions associated with these problems both at the national and at the international level. Dr. Parker was elected to the National Academy of Engineering (NAE) in 1988 for world leadership in the development of basic information required for the safe disposal of high-level radioactive wastes. Dr. Parker has served on several National Research Council (NRC) committees and boards, including the Board on Radioactive Waste Management, which he chaired from 1984 to 1991.

Hadi Abu-Akeel

Member

HADI ABU-AKEEL, NAE (Ph.D., mechanical engineering, University of California-Berkeley) is president of AMTENG Corp., an independent consulting firm. Dr. Abu-Akeel recently retired from FANUC Robotics NA, Inc., an industrial robotics firm, where he was senior vice president and chief engineer. His main areas of expertise include: 1) optimization of robot design including trade-offs of performance, cost, manufacturability, application requirements, and user friendliness; 2) utilization of robotic devices to overcome manufacturing productivity challenges and provide cost effective manufacturing process alternatives; 3) development and application of micro-sensors for intelligent robots, robotic assist devices, autonomous robots, and remote presence; and 4) risk assessment, safety, and safeguarding of robot applications. In 1997 he was elected NAE member for contributions to design, control, and implementation of industrial robots. Since then, he served on the NRC Panel for Manufacturing Engineering and the Mechanical Engineering Peer Committee.

John S. Applegate

Member

JOHN S. APPLEGATE (J.D., Harvard University) is Associate Dean for Academic Affairs and Walter W. Foskett Professor of Law at the Indiana University School of Law-Bloomington. He teaches and writes about environmental law, regulation of hazardous substances, risk, environmental remediation, and the Department of Energy. Mr. Applegate co-chaired the long-term stewardship and accelerated Cleanup subcommittees of the Department of Energy's Environmental Management Advisory Board. He was previously the James B. Helmer, Jr., Professor of Law at the University of Cincinnati College of Law and chaired the Fernald Citizens Advisory Board and has been a visiting professor at Vanderbilt University Law School, a judicial clerk to the United States Court of Appeals for the Federal Circuit, and an attorney in private practice. He is the author or co-author of over 20 articles and author or editor of books on risk and environmental law.

Howie Choset

Member

HOWIE CHOSET (Ph.D., mechanical engineering, California Insitute of Technology) is an associate professor of mechanical engineering and robotics at Carnegie Mellon University where he conducts research in motion planning and design of serpentine mechanisms, coverage path planning for de-mining and painting, mobile robot sensor based exploration of unknown spaces, and education with robotics. In 1997, the National Science Foundation awarded Dr. Choset its career award to develop motion planning strategies for arbitrarily shaped objects. In 1999, the Office of Naval Research started supporting Dr. Choset through its Young Investigator Program to develop strategies to search for land and sea mines. Recently, the MIT Technology Review elected Dr. Choset as one of its top 100 innovators in the world under 35. Dr. Choset directs the undergraduate robotics minor at Carnegie Mellon and teaches an overview course on robotics which uses series of custom developed Lego labs to complement the course work. Finally, Choset is a member of an urban search and rescue response team using robots with the Center for Robot Assisted Search and Rescue.

Allen G. Croff

Member

ALLEN G. CROFF (Master, nuclear engineering, Massachusetts Institute of Technology and M.B.A., University of Tennessee) retired from Oak Ridge National Laboratory (ORNL) in 2003. While employed at ORNL, Mr. Croff was involved in technical studies and program development focused on waste management and nuclear fuel cycles. Mr. Croff also brings a historical perspective on the three DOE sites considered. Mr. Croff chaired a committee of the National Council on Radiation Protection and Measurements that produced the 2002 report titled Risk-Based Classification of Radioactive and Hazardous Chemical Wastes; he also chaired the Nuclear Energy Agency's Nuclear Development Committee for a decade. Mr. Croff is currently vice-chairman of the U.S. Nuclear Regulatory Commission's Advisory Committee on Nuclear Waste and a member of the Nuclear Energy Research Advisory Committee. Mr. Croff is currently serving on the NRC Board on Radioactive Waste Management and has worked on numerous NRC committees.

Patricia J. Culligan

Member

PATRICIA J. CULLIGAN (Ph.D., civil engineering, Cambridge University, England) is an associate professor of civil engineering and engineering mechanics at Columbia University. Her research focuses on applying geoengineering principles to understand and control the migration of contaminants from waste disposal sites. In particular, she studies the behavior of miscible contaminants and nonaqueous phase liquids in soil and fractured rock and the effectiveness of in situ remediation strategies for the cleanup of waste sites. She also has interest and experience in the design of land-based disposal sites for waste materials. Dr. Culligan has received numerous awards including the Arthur C. Smith Award for Undergraduate Service (1999) and the National Science Foundation CAREER Award (1999). She is also the author or coauthor of more than 50 journal articles, book chapters, and refereed conference papers.

Kenneth R. Czerwinski

Member

KEN CZERWINSKI (Ph.D., nuclear chemistry, University of California, Berkeley) is an associate professor in the chemistry department at the University of Nevada, Las Vegas and director of the radiochemistry Ph.D. program. His expertise is in actinide chemistry focusing on understanding, evaluating, and predicting the chemical forms of actinide elements in differing conditions with research efforts in speciation of actinides in the environment, actinide separations in the nuclear fuel cycle, and actinide chemical forms in solids. Dr. Czerwinski has been an associate professor in the Nuclear Engineering Department at the Massachusetts Institute of Technology and an associate research scientist for the Institut für Radiochemie Technische Universität München. He has been accorded the Presidential Early Career Award in Science and Engineering.

Rachel J. Detwiler

Member

RACHEL J. DETWILER (Ph.D., civil engineering materials, University of California, Berkeley) is senior engineer at Braun Intertec Corporation. in Minneapolis, Minnesota. Her areas of expertise are concrete durability, transport properties, microstructure, and test methods for concrete and cement-based materials. Dr. Detwiler served in an advisory role for the initial development of a formulation of grout for the stabilization of radioactive and hazardous waste in underground storage tanks at the Savannah River Site until 1996. She has served as a principal engineer at Construction Technology Laboratories; an assistant professor at the University of Toronto; postdoctoral research fellow at Norges Tekniske Hogskole, Trondheim, Norway; and a design and materials engineer with ABAM Engineers, Inc. She is a member of the American Society for Testing and Materials and as a fellow of the American Concrete Institute, where she has served as chair of Committee 227 on Radioactive and Hazardous Waste Management and as a member of Committee 234 on Silica Fume in Concrete. She has received a Norges Teknisk-Naturvitenskapelige Forskningrad Fellowship and the Carlson-Polivka Fellowship, and has published over 50 technical papers related to concrete microscopy, durability, and testing.

Edwin E. Herricks

Member

EDWIN E. HERRICKS (Ph.D., biology, Virginia Polytechnic Institute and State University) is professor of environmental biology in the Department of Civil and Environmental Engineering at the University of Illinois at Urbana-Champaign. His areas of expertise include aquatic ecology and stream ecosystem and watershed management, and he has broad experience in the identification, assessment, and restoration of the adverse effects of man's activities on streams, rivers, lakes, and their watersheds. His current research has focused on the development of methods to restore stream habitat, manage wildlife on and around airports, manage stormwater runoff, and develop ecohydrology and ecohydraulics methods. Dr. Herricks has recently served on NRC panels dealing with endangered species and the Platte River and evaluation of the Corps of Engineers project process. He has written numerous articles and papers on the broad theme of improving engineering design and environmental decision making. He is a member of the Urban Water Resources Research Council of the American Society of Civil Engineers and chairman of a task group on receiving system effects from urban runoff.

Tissa H. Illangasekare

Member

TISSA H. ILLANGASEKARE (Ph.D., civil engineering, Colorado State University) is the AMAX distinguished chair of environmental sciences and engineering and a professor of civil engineering at the Colorado School of Mines (CSM). He is also the director of the Center for the Experimental Study of Subsurface Environmental Processes (CESEP) located at CSM. His expertise is in mathematical and numerical modeling of flow and transport in porous and fractured media, unsaturated and saturated zone processes, surface-subsurface interaction, snow hydrology, multiphase flow, aquifer remediation, and physical modeling of flow and transport in laboratory test tanks. He is a registered professional engineer and is a fellow of the American Geophysical Union. He is the hydrology editor of Earth Science Review and serves on the editorial boards of Water Resource Res., Journal of Hydrology, Journal of Contaminant Hydrology, and Vadose Zone Journal.

Milton Levenson

Member

MILTON LEVENSON, NAE, (Bachelor of Chemical Engineering, University of Minnesota) is nationally recognized for his ability to apply creative new insights to major engineering challenges in the nuclear industry and for his organizational and leadership skills. In addition, Mr. Levenson brings a historical perspective on the three DOE sites being investigated in this study. Currently an independent consultant, Mr. Levenson is a chemical engineer with more than 50 years of experience in nuclear energy and related fields. His technical experience includes work related to nuclear safety, fuel cycle, water reactors, advanced reactors, and remote control. His professional experience includes research and operations positions at the Oak Ridge National Laboratory, the Argonne National Laboratory, EPRI (formerly named the Electric Power Research Institute), and Bechtel. He was elected to the National Academy of Engineering (NAE) in 1976. Mr. Levenson is a fellow and past president of the American Nuclear Society, a fellow of the American Institute of Chemical Engineers, and recipient of the American Institute of Chemical Engineers' Robert E. Wilson Award in Nuclear Chemical Engineering. He is the author of more than 150 publications and presentations and holds three U.S. patents. Mr. Levenson also is a member of the National Academies' Board on Radioactive Waste Management (BRWM). He served as chairman or committee member in several recent studies by the BRWM and the Board on Radiation Effects Research.

Paul A. Locke

Member

PAUL A. LOCKE (Doctorate in Public Health, Johns Hopkins University and J.D., Vanderbilt University) is a faculty member at the Johns Hopkins University Bloomberg School of Public Health in the Department of Environmental Health Sciences. Dr. Locke has worked extensively on environmental health and policy issues, including radiation protection and radioactive waste disposal, indoor air quality, alternatives to animal testing, and risk assessment. Dr. Locke currently serves on EPA's Clean Air Act Advisory Committee, is a member of the NRC Board on Radioactive Waste Management and a councilor of the National Council on Radiation Protection and Measurements. In addition, he is a member of the editorial board of Risk Analysis: An International Journal, and is a past councilor of the Society for Risk Analysis. Dr. Locke is also a lawyer licensed to practice before the bars of the states of New York and New Jersey, the District of Columbia and the United States Supreme Court. In addition to his expertise in public health, Dr. Locke also brings a state perspective to the committee.

Michael H. Mobley

Member

MICHAEL MOBLEY (M.Sc., physics, University of Tennessee and M. Public Administration, Tennessee State University) is a private consultant on regulatory radiation-related issues. The focus of most of his activity is in the commercial low-level waste processing arena. He is a retired director of the Tennessee Division of Radiological Health and has worked in every aspect of the division's Radiation Control Program. He has represented the state of Tennessee since 1984 as a commissioner for the Southeast Low-Level Radioactive Waste Management Compact Commission. Mr. Mobley is a past chairperson of the Conference of Radiation Control Program Directors, Inc. (CRCPD), has served as that organization's treasurer, and has served on numerous committees and working groups for the CRCPD. He served on the Federal Facilities Committee, which has been charged by the CRCPD with developing and coordinating information regarding federal facility radiological impact issues. Mr. Mobley received the Gerald S. Parker Award in 1996 for his significant contributions to radiation protection and to the CRCPD. In 2000 he was awarded Life Member status of the CRCPD (one of four awarded in 35 years). Mr. Mobley has also served as the state liaison officer for Tennessee to the U.S. Nuclear Regulatory Commission. In addition to his expertise in health physics, Mr. Mobley also brings a state perspective to the committee.

Dianne R. Nielson

Member

DIANNE R. NIELSON (Ph.D. geology, Dartmouth College) is the executive director of the Utah Department of Environmental Quality. Her current responsibilities include regulating the Envirocare commercial low-level waste facility and the White Mesa and Ticaboo Uranium Mills, and maintaining state primacy for implementing federal programs. Dr. Nielson's department receives some funds from the U.S. Department of Energy as some of its transuranic waste transits through Utah to reach the Waste Isolation Pilot Plant in New Mexico. Further DOE funding is anticipated in the future for state response if shipments of commercial spent fuel go through Utah. Dr. Nielson is a member of the American Association of Petroleum Geologists and a fellow of the Geological Society of America. She was a past member of the Board on Earth Sciences and Resources and has served on several NRC committees. In addition to her expertise in geology, Mrs. Nielson also brings a state perspective to the committee.

Kalathil E. Philipose

Member

KEN E. PHILIPOSE (Master, Engineering, Concordia University, Canada) is a project manager with the Decommissioning and Waste Management Business unit at Chalk River Nuclear Laboratories of Atomic Energy of Canada Limited. His current responsibilities include research and development on the storage of cement grouted fissile high-level liquid waste (in particular molybdenum-99) and decommissioning planning of large, buried carbon steel tanks containing heels of high-level waste. Mr. Philipose has over 30 years of experience in durable concrete development studies and applications, waste management and decommissioning, design coordination, and project management of nuclear structures and facilities. Mr. Philipose has participated in several international studies concerning material research and development and has authored or co-authored several publications.

Alfred P. Sattelberger

Member

ALFRED P. SATTELBERGER (Ph.D., inorganic chemistry, Indiana University) is a research fellow and former director of the Chemistry Division, Office of Science Programs, and the Science and Technology Base Program Office at Los Alamos National Laboratory. Dr. Sattelberger's research interests include actinide coordination, organometallic chemistry, technetium chemistry, and metal-metal multiple bonding. He was elected a fellow of the American Association for the Advancement of Science in 2002 in recognition of his scientific contributions to early transition metal and f-element chemistry. Prior to his appointment at Los Alamos in 1984, Dr. Sattelberger held a faculty appointment in the chemistry department at the University of Michigan. He is the immediate past chair of the Inorganic Chemistry Division of the American Chemical Society and serves on the board of directors for the Inorganic Syntheses Corporation and on the editorial advisory board of the Journal of Coordination Chemistry. He served as a reviewer on the 1996 general inorganic chemistry Environmental Management Science Program merit review panel, the 1996 NRC Committee on Building an Effective EM Science Program, the 1999 NRC Committee on Cesium Processing Alternatives at Savannah River Site, and the 2000 NRC Committee on Radionuclide Separation Processes for High Level Waste.

Anne E. Smith

Member

ANNE E. SMITH (Ph.D., economics, Stanford University) is an expert in integrated assessment of environmental and energy problems, specializing in risk management, decision analysis, benefit-cost analysis, and economic modeling. She has applied these techniques to issues such as contaminated site management, nuclear waste management, global climate change, air quality, and food safety. Dr. Smith is knowledgeable about risk communication methods and issues, and has experience in projects where risk communication has been a key component. Additionally, she has experience in assessing societal values for risk changes or environmental benefits. Dr. Smith has developed and reviewed decision support tools for risk-based ranking of contaminated sites and for making risk trade-offs in selecting remediation alternatives. Dr. Smith is a vice president of Charles River Associates (CRA) in Washington D.C. Previously, she was a vice president of Decision Focus Incorporated, and an economist with the the U.S. Environmental Protection Agency. She has served on several NRC committees reviewing issues involving risk management within DOE's Environmental Management program.

J. L. Smith

Member

J. LESLIE SMITH (Ph.D., geological sciences, University of British Columbia) is the Cominco Chair in Minerals and the Environment at the University of British Columbia in Vancouver. His expertise is in the areas of subsurface hydrology and contaminant transport processes. His current research interests include transport processes in fractured rock masses, hydrologic processes in unsaturated waste rock piles, hydrogeological decision analysis and risk assessment, inverse modeling, and radionuclide transport in watersheds near the Chernobyl Nuclear Power Plant in the Ukraine. Dr. Smith has served on several NRC committees, including the Committee for a Review of the Hanford Site's Environmental Remediation Science and Technology Plan and the Committee to Review Specific Scientific and Technical Safety Issues Related to the Ward Valley, California, Low Level Radioactive Waste Site.

Donald W. Steeples

Member

DONALD W. STEEPLES (Ph.D., geophysics, Stanford University) is currently the Dean A. McGee Distinguished Professor of Applied Geophysics, Department of Geology at the University of Kansas, and president of Great Plains Geophysical, Inc. Previously, he held positions at the Kansas Geological Survey. Dr. Steeples is involved in the development and application of noninvasive geophysical techniques, specifically, shallow seismic reflection methods applied to environmental and groundwater problems. Dr. Steeples currently receives funding from DOE-Office of Science through an Environmental Management Science Program on automated shallow 3-D seismic imaging. This is a basic science project not related to any specific DOE site. Dr. Steeples also chairs the geoscience reviews of the Laboratory Director?s Advisory Board at the Idaho National Laboratory. He has published more than 100 articles on the application of geophysical methods and is currently an editorial referee for more than 20 scholarly journals. Dr. Steeples served on several NRC studies, including one on non-invasive techniques for characterization of the shallow subsurface for environmental engineering applications.

Micah Lowenthal

Staff Officer