Independent Assessment of Science and Technology for the Department of Energy's Defense Environmental Cleanup Program

Committee

Patricia J. Culligan

Chair

Patricia J. Culligan, Ph.D., is the Robert A. W. and Christine S. Carlton Professor of Civil Engineering at Columbia University and co-Director of the Urban Design Lab for Columbia's Earth Institute. From July 2012 until July 2017, she served as the Founding Associate Director of Columbia's Data Science Institute. Dr. Culligan's expertise lies in the field of geo-environmental engineering, with an emphasis on water resource management in both urban and rural settings. She has conducted research aimed at understanding and controlling the migration of contaminants from waste disposal sites. She has also studied the behavior of miscible contaminants, non-aqueous phase liquids and colloids in soil and fractured rock and the effectiveness of in situ remediation strategies for the cleanup of waste sites. In addition, she has interest and experience in the design of land-based disposal sites for waste materials. Dr. Culligan has served on the Nuclear and Radiation Studies Board and on several National Academies studies including the study titled Development and Implementation of a Cleanup Technology Roadmap. She earned a B.Sc. in civil engineering from University of Leeds and an M.Phil. and Ph.D. in civil engineering from Cambridge University, England.

M. John Plodinec

Vice Chair

M. John Plodinec, Ph.D., has over 40 years of experience in waste characterization and immobilization. During his involvement with the Department of Energy's Defense Waste Processing Facility (DWPF) he was responsible for programs ranging from waste characterization to waste form development. He was the primary technical lead for the DWPF product qualification program tasked with achieving the concurrence of the regulatory community. He also coordinated waste immobilization programs across the DOE complex, and internationally, for DOE's Office of Environmental Management (EM). He represented EM in development of the Waste Acceptance Product Specifications, which govern all of the HLW glass products produced in the US. He was made a Fellow of the American Ceramic Society in recognition of his work on HLW immobilization. He received his BA in chemistry from Franklin and Marshall College, and his Ph.D. in physical chemistry from the University of Florida.

Sue B. Clark

Member

Sue Clark, Ph.D., is a Regents Distinguished Professor of Chemistry with tenure at Washington State University in Pullman, Washington and holds the position of Battelle Fellow and Chief Scientist and Technology Officer in the Energy and Environment Directorate with Pacific Northwest National Laboratory. In this joint appointment, she leads research efforts focused on the chemistry and chemical engineering of processing nuclear materials. Her current research areas include chemistry of radioactive waste systems, environmental chemistry, actinide separations, and radioanalytical chemistry. Her research support has included grants and contracts from the U.S. Department of Defense, the U.S. Department of Homeland Security, the U.S. Nuclear Regulatory Commission, and the U.S. Department of Energy's Office of Science and National Nuclear Security Administration. Dr. Clark served as a Board Member on the US Nuclear and Radiation Studies Board from 2011 to 2014, and served on the National Academies' Nuclear and Radiation Studies Board from 2004 to 2009; she was also a member of many of the study committees established by the Board. Dr. Clark currently serves as a consultant to the Helmholtz Association in Germany, and previously to the Nuclear Energy Agency of France, the Korean Atomic Energy Research Institute, and the Battelle Memorial Institute. She received a B.S. in chemistry from Lander College, an M.S. in inorganic chemistry from Florida State University, and a Ph.D. in inorganic and radiochemistry from Florida State University.

Paul T. Dickman

Member

Paul Dickman, M.S., is a senior policy fellow with Argonne National Laboratory focusing on international nuclear energy, nonproliferation, and national security policy. For more than 30 years, Mr. Dickman has been in the forefront of nuclear energy and national security programs in the United States and internationally. He has held senior leadership positions at the U.S. Nuclear Regulatory Commission, where he served as Chief of Staff to Chairman Dale E. Klein, and at the U.S. Department of Energy's (DOE's) National Nuclear Security Administration, where he served as Deputy Director for the Office of Policy. During his career he has held several managerial and senior staff positions within the DOE and national laboratory system. He also serves as an adviser to the Japanese government on the decommissioning of the Fukushima accident site. Mr. Dickman received a B.A. in history of science from University of Denver and an M.S. in natural sciences in nuclear chemistry and physics from University of Wyoming.

Barbara L. Hamrick

Member

Ms. Hamrick currently serves as the Radiation Safety Officer and chief Health Physicist at University of California, Irvine (UCI) Health. Prior to joining the UCI Health team, Ms. Hamrick spent nearly 20 years as a health physicist in regulatory programs at the federal, state, and local levels. While with the California Department of Public Health, Ms. Hamrick worked closely with other regulatory partners across multiple jurisdictions coordinating decommissioning efforts at several sites in California. She currently serves on the US Environmental Protection Agency's Radiation Advisory Committee. Ms. Hamrick's professional interests lie in the acute and long-term health effects of radiation exposure, risk communication, and the intersection of science and administrative law. Ms. Hamrick received a JD in Law from Loyola Law School in Los Angeles, and a MS and BS in Physics from UCI. She is a Diplomate of the American Board of Health Physics, and a Fellow of the Health Physics Society.

Robert T. Jubin

Member

Robert Jubin, Ph.D., is project manager for the U.S. Department of Energy's Nuclear Technology Research and Development —Material Recovery and Waste Form Development Programs at Oak Ridge National Laboratory. He has more than 40 years of experience with nuclear fuel reprocessing, including solvent extraction and development of advanced centrifugal contactors; management of volatile radionuclides; and management of gaseous radioactive wastes. His solvent extraction experience includes an extended assignment with the Commissariat a l'energie atomique et aux energies alternatives at Fontenay-aux-Roses, near Paris, France, where he helped to develop the DIAMEX process for separation of actinides and lanthanides from high-level liquid wastes. Dr. Jubin is a Fellow of the American Institute of Chemical Engineers and received its 2013 Robert E. Wilson Award for outstanding chemical engineering contributions and achievements in the nuclear industry. He received the 2016 American Nuclear Society (ANS) Fuel Cycle & Waste Management Division Significant Contributions Award for his work in the area of nuclear fuel reprocessing and radioactive waste treatment technologies. He also chairs the American Society of Mechanical Engineers' Gas Processing Subcommittee. He retired from the U.S. Air Force Reserve in 2007 at the rank of colonel. He received a B.S. in chemical engineering from the University of Akron and an M.S. in engineering management and a Ph.D. in chemical engineering, both from the University of Tennessee.

Bill Lee

Member

Bill Lee, Ph.D., is co-director of the Institute of Security Science and Technology at Imperial College, London, and chair in ceramic science and engineering. His research focuses on the relation between processing, properties, and microstructures in a broad range of ceramics. He is the immediate past-president of the American Ceramic Society, , a member of the Leverhulme Trust Panel of Advisors, the Royal Academy of Engineering International Activities Committee, and the Scientific and Environmental Advisory Board Tokamak Energy Ltd. He is also an IAEA technical expert. Dr. Lee was Deputy Chair of the UK Government advisory Committee on Radioactive Waste Management (CoRWM) from 2007-2013, a member of the UK Government's Nuclear Innovation and Research Advisory Board (NIRAB) from 2014-17, and has acted as special advisor nuclear to the House of Lords Science and Technology Committee (2013). He received a B.Sc. in physical metallurgy from Aston University and a D.Phil. on radiation damage in sapphire from Oxford University.

Alexandra Navrotsky

Member

Alexandra Navrotsky, Ph.D., is the Distinguished Interdisciplinary Professor of Ceramic, Earth and Environmental Materials Chemistry, and the Edward Roessler Chair in Mathematical and Physical Sciences at the University of California Davis. Her research interests have centered about relating microscopic features of structure and bonding to macroscopic thermodynamic behavior in minerals, ceramics, and other complex materials. She has made contributions to mineral thermodynamics; mantle mineralogy and high pressure phase transitions; silicate melt and glass thermodynamics; order-disorder in spinels; framework silicates; and other oxides; ceramic processing; oxide superconductors; nanophase oxides, zeolites, nitrides, perovskites; and the general problem of structure-energy-property systematics. The main technical area of her laboratory is high temperature reaction calorimetry. She is director of the UC Davis Organized Research Unit on Nanomaterials in the Environment, Agriculture and Technology (NEAT-ORU). She received a B.S., M.S., and Ph.D. from the University of Chicago.

James Rispoli

Member

James Rispoli, M.Sc.,M.A. is a former Assistant Secretary of Energy for Environmental Management who served for three and a half years during the administration of President George W. Bush. As Assistant Secretary of Energy, Rispoli led the nation’s cleanup of waste and environmental contamination from nuclear-related research and production activities. He managed the largest capital construction portfolio in the Department of Energy (DOE), with the biggest project valued at more than $12 billion and the smallest in excess of $400 million. His previous position was as director of the DOE's Office of Engineering and Construction Management. He is currently Senior Executive Advisor at Project Time and Cost, LLC, an Atlanta-based engineering company of which he was previoulsy president and CEO for three years. Additionally, he is a Professor of Practice at North Carolina State University, where he teaches at the graduate level. Prior to joining the Department of Energy, Mr. Rispoli was vice president and managing principal of Dames & Moore’s Pacific-Ocean area operations, and president of M&E Pacific, responsible for Metcalf and Eddy’s Hawaii offices. In both firms, he led major engineering, environmental, and construction projects for private clients, state and federal governmental agencies. He served in the United States Navy, retiring at the rank of Captain, Civil Engineer Corps where he held executive level environmental, construction, and facilities management positions. He serves on the National Academies’ Board on Infrastructure and the Constructed Environment, and is chair of the NAS’s Federal Facilities Council. Mr. Rispoli also serves on the Department of Energy’s Environmental Management Advisory Board. Mr. Rispoli received a B.Engineering in civil engineering from Manhattan College, an M.Sc. in civil engineering from the University of New Hampshire, and an M.A. in business management from Central Michigan University. A licensed engineer in five states, he is a Board Certified Environmental Engineer (radiation protection), a Distinguished Member of the American Society of Civil Engineers, and a member of the National Academy of Construction.

Rebecca A. Robbins

Member

Rebecca A. Robbins is currently the predisposal unit head within the Division of Nuclear Fuel Cycle and Waste Technology at the International Atomic Energy Agency (IAEA). In this role she is responsible for working with IAEA member states to develop and disseminate IAEA guidance in all aspects of the characterization, processing, packaging, and storage of radioactive waste. She has more than 20 years' experience in the nuclear industry working originally for BNFL in the UK and then its associated companies in the US, including EnergySolutions. She began her career working in research and development into innovative waste management technologies at BNFL's corporate laboratory before moving into the field of LLW disposal. She supported the post-closure safety case for the UK LLW waste disposal site at Drigg and the development and deployment of technologies for processing of radioactive waste for storage and dispsoal. She has devised and implemented process flowsheets for both solid and liquid waste processing plant, including the Advanced Mixed Waste Treatment Plant for the processing of 65,000 m3 of TRU waste at the Idaho National Laboratory site for BNFL Inc. Her experitise in radioactive waste management has been applied to the development of strategies to manage legacy waste clean-up challenges world-wide for both government and commercial entities. She served on the National Academies committee on Low-Level Radioactive Waste Management and Disposition: A Workshop. She earned a Ph.D. in chemistry from the University of Leeds, UK.

Robin D. Rogers

Member

Dr. Robin D. Rogers is a Research Professor at The University of Alabama and President, Owner, and Founder of 525 Solutions, Inc., in Tuscaloosa, AL USA. He has previously served at Northern Illinois University as Presidential Research Professor, The University of Alabama as Robert Ramsay Chair of Chemistry, Distinguished Research Professor, and Director of the Center for Green Manufacturing, The Queen's University of Belfast in Northern Ireland as Chair of Green Chemistry and Co-Director of QUILL, the Chinese Academy of Sciences Institute for Process Engineering as Honorary Professor, and McGill University as Canada Excellence Research Chair in Green Chemistry and Green Chemicals. His research interests cover the use of ionic liquids and green chemistry for sustainable technology through innovation and include materials (advanced polymeric and composite materials from biorenewables), separations (novel strategies for separation and purification of value added products from biomass), energy (new lubricant technologies and selective separations), and medicine (elimination of waste while delivering improved pharmaceutical performance). He has served on several National Academies studies on radioactive waste management and cleanup. Dr. Rogers obtained a B.S. in chemistry and Ph.D. in chemistry from The University of Alabama.

Pol D. Spanos

Member

Pol Spanos, Ph.D., is Lewis B. Ryon Professor of Mechanical Engineering and of Civil Engineering at Rice University. Professor Spanos' research efforts focus on the dynamics and vibrations of structural and mechanical systems under a variety of loads. Systems exhibiting nonlinear behavior and/or exposed to hazard/risk inducing conditions receive particular attention. His group is also interested in fatigue and fracture issues of modern composite materials, and in signal processing algorithms for dynamic effects in biomedical applications. Solution techniques developed by Professor Spanos are applied to diverse themes such as vehicle and robot dynamics; estimation of seismic spectra; flow-induced vibrations of offshore rigs, marine risers, and pipelines; dynamic analysis and certification of payloads in aerospace missions; directional oil well drilling; vibration and aseismic protection of structures and equipment; wind loads simulation; and signal processing for electrocardiograms, electroencephalograms, and bone mechanics. He is a member of the academies of several foreign countries; and a member of the National Academy of Engineering (USA) and of the American Academy of Arts and Sciences. He received a 5-year diploma in engineering sciences and mechanical engineering from the National Technical University of Athens; and an M.S. in civil engineering, and a Ph.D. in applied mechanics from the California Institute of Technology.