Potential Human Health Effects of Surface Coal Mining Operations in Central Appalachia

Committee

Paul A. Locke

Chair

PAUL A. LOCKE is an Associate Professor at the Johns Hopkins Bloomberg School of Public Health in the Department of Environmental Health and Engineering. He holds a joint appointment in the Department of Health Policy and Management. At Hopkins, Dr. Locke leads an integrated program that designs and implements research-to-practice initiatives that maximize public health protection at federal and international levels by advancing evidence-based in vitro toxicology and radiation protection policy. He has published in both law reviews and peer-reviewed scientific journals, including Health Physics, Scientific American, Environmental Health Perspectives, the Columbia Journal of Environmental Law, the New York University Environmental Law Journal, Frontiers in Oncology, the Journal of Law, Medicine and Ethics and the International Journal of Risk Assessment and Management. His research spans science and law and includes studies evaluating the predictivity of in vitro models for hepatocarcinogenesis, personalized cancer risk assessments for space radiation exposures, and an analysis of how to improve US federal chemicals laws such as the Toxic Substances Control Act and the Federal Insecticide, Fungicide, and Rodenticide Act. Dr. Locke teaches three cross-disciplinary courses in environmental law and policy and animal law and also directs the Doctor of Public Health program in environmental health sciences. He co-directs a certificate program in humane sciences and toxicology policy. He has twice been recognized by Johns Hopkins for his excellence in teaching. Dr. Locke has been appointed to eight scientific committees by the US National Academies of Sciences, Engineering, and Medicine (NASEM). He chaired the NASEM committee that wrote Uranium Mining in Virginia: Scientific, Technical, Environmental, Human Health and Safety, and Regulatory Aspects of Uranium Mining and Processing in Virginia and participated in the committees that studied the lessons learned from the Fukushima nuclear accident for safety and security at US nuclear power plants. Dr. Locke is admitted to practice law in the state of New York and the District of Columbia, the Southern District Court of New York and is a member of the bar of the United States Supreme Court. He has organized, and participated in, scientific briefings for the US House of Representatives and Senate and the EU Parliament. Dr. Locke has an M.P.H. from Yale University School of Medicine, a Dr.PH. from the Johns Hopkins University Bloomberg School of Public Health and a J.D. degree from Vanderbilt University School of Law.

Carmen T. Agouridis

Member

CARMEN T. AGOURIDIS is an Extension Associate Professor of Ecosystem Restoration in the Department of Biosystems and Agricultural Engineering (BAE) at the University of Kentucky. Dr. Agouridis' research focuses on using applied research to address current issues in the natural resource management, particularly restoration of water systems impacted by mining. Other research includes mined land reclamation, environmental policy, geospatial analysis, and water quality assessment. Her research also examines methods to improve stormwater management through the use of low-impact development techniques such as rain gardens and stormwater wetlands as well as novel approaches such as weep berms and woodchip bioreactors. Dr. Agouridis serves as director of the Stream and Watershed Graduate Certificate and was formerly co-director of the Greenhouse Environment and Sustainability Residential College. She has served as principal or co-principal investigator on over $6 million in grants, authored nearly 40 refereed publications and over 20 extension publications, and advised over 30 undergraduate and graduate research projects. Dr. Agouridis received the American Society of Biological and Agricultural Engineers 2014 A.W. Farrall Young Educator Award. She is a certified professional engineer in Kentucky. Dr. Agouridis holds a B.S. in agricultural engineering and an M.S. in agricultural and biosystems engineering from the University of Tennessee. She holds a Master's of Public Policy and Ph.D. in biosystems and agricultural engineering from the University of Kentucky.

Fiona M. Doyle

Member

FIONA M. DOYLE is the Donald H. McLaughlin Professor of Mineral Engineering as well as Dean of the Graduate Division at the University of California, Berkeley (UCB). Dr. Doyle's research focuses on solution chemistry in the processing and behavior of minerals, materials, wastes, and effluents, such as acid mine drainage. In 2016, she was inducted into the National Academy of Engineering for her contributions to environmentally benign hydrometallurgy leading to separation of materials from solutions and for leadership in engineering education. Since 2014, Dr. Doyle has served as chair for the Laboratory Operation and Safety Committee in the Office of Environment, Health, and Safety at UCB. She has also served the state of California in assessing the environmental impact of mining and mineral processing operation in developing policies for addressing environmental damage attributable to historic mining activities. Dr. Doyle served on the editorial boards of the International Journal of Mineral Processing and Hydrometallurgy from 1999-2008 and 1986-2010, respectively. As an educator, she has taught undergraduate and graduate courses relating to engineering chemistry, mineral engineering, surface and colloid properties of materials, solution processing of materials, corrosion, and electrochemistry. Dr. Doyle holds a B.A. and M.A. in natural sciences from the University of Cambridge, England and an M.Sc. in extractive metallurgy and Ph.D. in Hydrometallurgy from Imperial College, London.

Herman Gibb

Member

HERMAN J. GIBB is President of Gibb Epidemiology Consulting, LLC, in Arlington, Virginia. Prior to forming Gibb Epidemiology Consulting, he was president of Tetra Tech Sciences where he consulted to a variety of government, private, and international clients. Before joining Tetra Tech in 2004, Dr. Gibb had a career at the Environmental Protection Agency (EPA) where he participated in the epidemiologic assessment of a variety of substances and was the primary author of an influential study on the risk of lung cancer among chromium production workers. He was a member of the Carcinogen Assessment Group—the beginning of EPA's approach to carcinogen risk assessment and is the recipient of numerous EPA awards, including the Gold Medal for his work on the risk assessment of arsenic. He was an invited participant on all of the World Health Organization's (WHO) Final Review Boards on Concise International Chemical Assessment Documents and a member of WHO's Risk Assessment Steering Group. He is an author of WHO's Principles for the Assessment of Risks to Human Health from Exposure to Chemicals. In 2011, Dr. Gibb was awarded the Practitioner of the Year award by the Society for Risk Analysis. He currently chairs a WHO task force on chemicals in food. Dr. Gibb is a Lieutenant Colonel (ret.) U.S. Army Reserves. Dr. Gibb holds a B.S. in pre-medical studies from the Pennsylvania State University, an M.P.H. in environmental health from the University of Pittsburgh, and a Ph.D. in epidemiology from Johns Hopkins University.

William A. Hopkins, III

Member

WILLIAM A. HOPKINS is a Professor in the Department of Fish and Wildlife Conservation and is the Director of the Global Change Center at Virginia Tech. His research program focuses on physiological ecology and wildlife ecotoxicology—addressing pressing questions in both basic and applied science. Dr. Hopkins studies how wildlife respond physiologically and behaviorally to anthropogenic disturbances. He is particularly intrigued by tradeoffs among physiological processes—such as reproduction, thermoregulation, and immune function—and how global changes may force animals to reprioritize their investments of time and energy. Much of Dr. Hopkins' research is also focused on maternal effects and how maternal behavior and physiology may influence a mother's fitness and the fitness of her offspring. Emphasis is on maternal transfer of teratogenic compounds and resulting effects on developing offspring. Dr. Hopkins' previous research experience at the Savannah River Ecology Laboratory, Mercer University's Medical School, Auburn University, and the University of South Carolina includes quantification of diverse physiological responses of invertebrates and vertebrates to natural and anthropogenic stressors. Hopkins has served on the editorial boards of three journals, the Scientific Advisory Board for the International Center for Birds of Prey, the Science Council for the Biodiversity Research Institute, and as a member of two prior National Academies committees. He is a key scientific contributor to four of the U.S. Department of Interior's Natural Resource Damage Assessment and Restoration cases, where he has worked effectively with multiple stakeholder groups, including industry, state government, federal government, local concerned citizens, NGOs, private consultants, and other academic institutions. He also regularly serves in advisory capacities at the local, state, national, and international levels on issues pertaining to waste management, sustainability, and the global decline of biodiversity. Dr. Hopkins received his B.S. in biology from Mercer University, an M.S. in zoology from Auburn University, and a Ph.D. in ecology, evolution, and organismal biology from the University of South Carolina.

Nancy E. Johnson

Member

NANCY E. JOHNSON is an Assistant Professor in the Department of Preventive Medicine and Environmental Health at the University of Kentucky College Of Public Health. Her main interests include exposure assessment, measurement, and control. Dr. Johnson is the primary investigator for two pilot projects evaluating trace element exposure related to drinking water and residential topsoil for the Markey Cancer Center's Lung Cancer Epidemiology project in Kentucky's Appalachian coalfields. Dr. Johnson is an experienced industrial hygienist and has worked for state Occupational Safety and Health Administration programs and has been a consultant for a private occupation and environmental management firm. As an industrial hygienist, she worked with inhalation risks affecting public, private, and industrial sites and implemented corporate heath and safety programs for engineers, geologists, and technicians. Her work has been published by the Journal of Occupational and Environmental Medicine, and she has presented at conferences for the American Industrial Hygiene Association (AIHA) and Geological Society of America (GSA), among others. Dr. Johnson holds a B.A. in biology from Northwestern University, an M.S.P.H., Dr.P.H. in epidemiology and completed a post-doctoral fellowship in Rural Cancer Control at the University of Kentucky.

Braden Lusk

Member

BRADEN T. LUSK is Chair of the Mining and Nuclear Engineering Department at the Missouri University of Science and Technology. Previously, he was a Professor of Mining Engineering at the University of Kentucky (UK). His research interests primarily focus on industrial and mine blasting and blast mitigation, including optimizing blasting operations for fragmentation, productivity, product selection, and environmental effects. His research specialties also include numerical modeling using physics-based models for high energy events, blast resistant testing and evaluation, and monitoring and analysis of vibrations for mining and industrial blasting. Dr. Lusk received the UK College of Engineering's Dean's Award for Excellence in Research in 2014 and has received the Tau Beta Pi Outstanding Teacher in Mining Engineering Award seven times. Active in the International Society of Explosives Engineers (ISEE), Dr. Lusk has served on the ISEE board of directors since 2013 and currently serves as secretary. He received the ISEE President's Award in 2012. Also in 2012, he received the Society of Mining, Metallurgy and Exploration (SME) Coal and Energy Division, J.W. Woomer Award. Dr. Lusk received a B.S. and Ph.D. in mining engineering from the Missouri University of Science and Technology in 2000 and 2006, respectively.

John T. Popp

Member

JOHN T. POPP is a geologist with over 40 years of experience working in the public and private sectors, focused primarily in the coal basins of Appalachia and Illinois. Most recently, he worked as Chief Geologist at Natural Resource Partners, L.P., based in Huntington, WV. In this role, he managed geological functions for the company and was primarily involved with reserve and data base analysis, Securities and Exchange Commission reporting, acquisition reviews, and technical support. Previously, Mr. Popp worked as Senior Geologist for Alliance Coal, LLC/Mapco Coal Inc. in Lexington, KY. There he evaluated geology-related mining problems, coordinated drilling programs, and evaluated coal quality issues. Earlier, in his time at the Illinois State Geological Survey, Mr. Popp supported the coal section in geological mapping of underground coal mines, collecting coal quality data, and responding to inquiries from the public and private sectors. Mr. Popp holds professional registration in Indiana, Kentucky, and Virginia. He has held leadership positions with the American Institute of Professional Geologists–Kentucky Section and the Kentucky Society of Professional Geologists. Additionally, he is a member of the Geological Society of America and has served as a reviewer for the International Journal of Coal Geology. Mr. Popp received a B.S. in geology from Eastern Illinois University in 1972 and an M.S. in geology from Southern Illinois University in 1975.

Michael K. Robinson

Member

MICHAEL K. ROBINSON has 41 years of state and federal government regulation experience regarding environmental, public health, and safety effects of coal mining in Appalachia. He began his career with the West Virginia Department of Natural Resources in 1972 following the coal-mining-related Buffalo Creek dam failure. He was responsible for development of a regulatory dam safety program encompassing the inspection, review, and design approval of thousands of coal waste, recreational, industrial, water supply, and other dams, as well as coal waste disposal embankments. Following the 1977 passage of the Federal Surface Mining Control and Reclamation Act (SMCRA), Mr. Robinson was hired to help implement the new program. This included drafting regulations, outfitting staff with technical equipment, and performing technical evaluations of a wide range of health and safety issues regarding coal mining and reclamation, such as water quality, slope stability, excess spoil and coal waste disposal, blasting, revegetation, bonding, and reclamation, among others. He has dealt with all aspects of the SMCRA regulatory and abandoned mine land reclamation provisions, such as regulatory reform, policy development, inspection and enforcement, citizen complaint review, and litigation, as well as regional/national technology transfer, research, and technical training programs. In his final position with the Office of Surface Mining Reclamation and Enforcement (OSM), Mr. Robinson supervised an interdisciplinary team of 50 technical and program specialists supporting technical and program assistance efforts to states and OSM within the Appalachian Region. He was instrumental in the implementation of OSM's nationwide Technology Innovation and Professional Service program, which provided high-end computer tools for technical evaluation of mining permits and on-the-ground technical issues; the Clean Streams Initiative, addressing the widespread acid mine drainage issues in Appalachia; and the Appalachian Regional Reforestation Initiative. He also served as liaison with the Environmental Protection Agency, Army Corps of Engineers, Fish and Wildlife Service, National Park Service, Forest Service, and other agencies and is familiar with their coal mining-related requirements. Mr. Robinson was the chair of the interagency steering committee that developed the October 2005 Mountaintop Mining/Valley Fills in Appalachia Programmatic Environmental Impact Statement. He is the recipient of the Department of the Interior’s highest honors—the Meritorious and Distinguished Service Awards. His B.S. in geology from Marshall University was conferred in 1971.

Gregory A. Wellenius

Member

GREGORY A. WELLENIUS is an Associate Professor of Epidemiology at the Brown University School of Public Health and Associate Director of the Brown University Center for Environmental Health and Technology. His main research interests include characterizing environmental determinants of cardiovascular disease, including outdoor and indoor air pollution and the built environment. Much of his research has focused on studying the effects of short- and long-term ambient air pollution on the risk of cardiovascular events such as heart disease, stroke, and hypertension and its effects on cardiovascular physiology. He has received various grants to research these topics as either principal or co-investigator from the Centers for Disease Control and Prevention, the National Institutes of Health, and the National Institute of Environmental Health Sciences, among others. Additionally, he has served as a grant reviewer for the National Institutes of Health, the Health Effects Institute in Boston and funding agencies in the UK and elsewhere. Dr. Wellenius has served as an ad hoc reviewer for a variety of leading journals, and his own published works have been included in leading journals such as the Archives of Internal Medicine, Circulation, Stroke, Hypertension, the American Journal of Cardiology, Epidemiology, and Environmental Health Perspectives. Dr. Wellenius holds B.Sc. and M.Sc. degrees in physiology from McGill University. He received his Sc.D. in environmental health and epidemiology from Harvard University.

Judith T. Zelikoff

Member

JUDITH T. ZELIKOFF is a Professor in the Department of Environmental Medicine of the New York University Medical Center. Her research interests are in immunotoxicolgy and reproductive and developmental toxicity associated with inhaled metal oxide nanomaterials, respirable particulate matter, and metal-bearing air-pollution mixtures. Toxicological studies in her laboratory demonstrated that inhalation of smoke generated from the burning of a commonly used wood for home heating dramatically compromises pulmonary resistance against infectious bacterial agents. These results help explain the epidemiological evidence that suggests an increased incidence, duration, and severity of infectious respiratory diseases in children living in homes heated with wood-burning devices. She was a member of the National Toxicology Program Board of Scientific Councilors and is an active member of the Society of Toxicology, having served as Secretary. She was also President of the Metals Specialty Section as well as the Immunotoxicity Specialty Section, where she was awarded an Achievement Award for her work in environmental immunotoxicology. She is currently a member of the NIH Systemic Injury by Environmental Exposure Study Section. Her published works have appeared in an array of journals and she served in editorial positions for multiple toxicology and environmental health journals. Dr. Zelikoff has also taught toxicology graduate courses internationally in Thailand, Australia, and New Zealand. She was a member of the National Academies' Committee on Spacecraft Exposure Guidelines. She holds a B.S. in biology from Upsala College and an M.S. in microbiology and a Ph.D. in experimental pathology from the University of Medicine and Dentistry of New Jersey, currently known as Rutgers Medical School.