PREFACE

The Department of Environmental Protection (DEP) and its predecessor, the Department of Environmental Resources (DER), have regulated coal ash as a residual waste since the establishment of DER in 1970. The enactment of Act 241, the Pennsylvania Solid Waste Management Act of 1968 provided the Department with the first statute to regulate the disposal of ash generated by power plants. However, regulations adopted under Act 241 were limited and primarily directed at managing the proper disposal of ash. Since more than 50 percent of Pennsylvania's electrical power production comes from coal-fired power plants, large amounts of coal ash from these power plants traditionally were disposed of in slurry impoundments and large monofill disposal areas at these plant sites. The amendment of the Solid Waste Management Act in December, 1986, and the promulgation of the residual waste management regulations (25 Pa. Code Chapter 287) on July 4, 1992, resulted in the development of numerous other options for the beneficial use of coal ash including the placement of coal ash in reclamation of active and abandoned coal mine sites. The electrical power industry, the coal mining industry, and DEP have participated in a transformation from the traditional practices of residual waste disposal to an emphasis on the beneficial uses of coal ash, especially abandoned mine reclamation. As the beneficial use of coal ash in mine reclamation has increased in the past 20 years, the amount of monitoring data on the ash and ground water quality in DEP files has increased proportionally.

In recent years, the environmental effects of the use of coal ash in mine reclamation have become a controversial issue on the local and statewide scale in Pennsylvania, and on the national scale involving major environmental groups and federal agencies. DEP believes that we have a commitment to make our monitoring data and related research results available in a readable form for scrutiny and use by the scientific community, government agencies, environmental groups, and the general public. Therefore, it was determined that DEP would publish this book in cooperation with the Pennsylvania State University, as a peer-reviewed document on the beneficial use of coal ash in mine reclamation and mine drainage remediation in Pennsylvania.

Most of the contents of this book were compiled, written, peer-reviewed, and edited during the past two years. However, the two main elements of the foundation of the work presented in the book represent more than 20 years of research and data evaluation on coal ash. They are: 1) coal ash research at the Materials Research Institute (MRI) of the Pennsylvania State University, and 2) the collective permitting and compliance monitoring experience and permit file data of the Pennsylvania Department of Environmental Protection (DEP), pertaining to the beneficial use of coal ash at mine sites in Pennsylvania. While the Penn State researchers and DEP staff have cooperated on numerous projects during that 20 year period, a specific contract was developed in 1999 to have MRI conduct a rigorous scientific evaluation of coal ash placement and mine drainage interactions on three waste management demonstration permit sites in the Anthracite Coal Region of Pennsylvania. That research effort, led by Dr. Barry E. Scheetz and Dr. William B. White of MRI, resulted in a M.S. thesis in 2000 and a Ph.D.

dissertation in 2003 by Dr. Caroline M. Loop. It was determined that this research work would make up the core of the book (i.e. Chapters 7, 8, 9 and 11) and that additional chapters would be written by DEP authors and other scientists and engineers to set forth the full range of beneficial uses of coal ash in mine reclamation and mine drainage remediation in Pennsylvania.

An editorial committee composed of five DEP staff and two Penn State professors was formed to insure consistency in the technical content, format, and quality of the written material. The members of the committee were: Dr. William B. White and Dr. Barry E. Scheetz of MRI and Roger J. Hornberger, Alfred Dalberto, Timothy Kania, Michael J. Menghini, and Dr. Scott Walters of DEP. The editorial committee also coordinated the peer review process.

The editorial committee wishes to acknowledge the support of the following DEP staff in producing this book. J. Scott Roberts, Deputy Secretary for Mineral Resources Management, provided significant support and encouragement for the preparation and publication of the book as well as several years of support for the research effort conducted by the Materials Research Institute of Penn State on the three Waste Demonstration Permit sites. Joseph G. Pizarchik, Director of the Bureau of Mining and Reclamation and Michael Terretti, Director of the Bureau of District Mining Operations ensured that the project received critical staff and management support to complete the writing and editing of numerous chapters of the book. As this book was produced as a cooperative effort with the DEP waste management program staff, significant support was also provided by Nicholas A. DiPasquale, former Deputy Secretary of Air, Recycling and Radiation Protection, Thomas K. Fidler, Acting Deputy Secretary of that deputate, and Michael Forbeck, Acting Director of the Bureau of Land Recycling and Waste Management. Within the waste management program staff, special credit is owed to William F. Pounds, Chief of the Division of Municipal and Residual Waste of the Bureau of Land Recycling and Waste management and William Tomayko, Regional Waste Management Manager of the Northeast Regional Office, for their many years of practical experience and significant expertise with coal ash, as well as their good judgment in regulatory affairs, that led to the issuance of the three one-of-a-kind Waste Demonstration Permits.

The Office of Surface Mining (OSM) of the U.S. Department of the Interior has established a multi-interest group steering committee on the placement of coal-combustion byproducts (CCB) at mine sites, and has conducted national interactive forums on CCB placement since 1996. Mr. Kimery C. Vories (of OSM Mid-Continent Regional Coordinating Center) Chairman of the CCB Steering Committee recommended numerous peer reviewers to the editorial committee. The members of the CCB Forum Steering Committee are affiliated with the American Coal Ash Association, the Council of Industrial Boiler Owners, the Illinois Department of Commerce and Economic Opportunity, Southern Illinois University at Carbondale, the Ohio State University, the Pennsylvania Department of Environmental Protection, TXU Energy, the University of North Dakota, the U.S. Department of Energy – National Energy Technology Laboratory (NETL), OSM, and the U.S. Geological Survey. The peer reviewers for individual

chapters of this book were Kimery C. Vories, Peter Michael, and Jay Hawkins of OSM, Viktoras Skema of the PA Geological Survey, Dr. Tarunjit Butalia of Ohio State University, Dr. Ann Kim and Dr. Sai Golakota of U.S. DOE-NETL, Ishwar Murarka of Ish, Inc., David Martin of Anthracite Regional Independent Power Producers Association (ARIPPA), Deborah Pflughoeft-Hassett of the University of North Dakota, Dr. W. Lee Daniels of the Virginia Polytechnic Institute and State University, and Keith B.C. Brady of the Pennsylvania Department of Environmental Protection.

In addition to the work of the national committee organized by OSM, there have been other efforts on a national and state-wide scale to evaluate coal ash placement at mine sites during the past two years while this book was being written. The U.S. Environmental Protection Agency (EPA), OSM, and the Interstate Mining Compact Commission (IMCC) have collaborated on a national committee project to evaluate coal ash "mine fills." EPA has held several "listening sessions" throughout the U.S. to solicit public comments on these coal ash mine fill placement practices. In Pennsylvania, the Joint Legislative Air and Water Pollution Control and Conservation Committee (JCC) conducted a public hearing on July 9, 2003, concerning a request for a statewide moratorium on the use of coal ash for mine reclamation. They issued a report to the Pennsylvania General Assembly on February 5, 2004. The report included a finding that "The requests for a moratorium on the use of fly ash for mine reclamation, in effect, seek protection from a danger than does not exist. A moratorium, however, would allow very real dangers – acid mine drainage, dangerous highwalls, water-filled abandoned pits, open mine shafts and the like – to go unremediated and untouched." The complete text of the JCC report is included as an appendix in this book.

Draft review copies of the book were released to all of the participants of the Technical Interactive Forum on State Regulation of CCB Placement at Mine Sites held in Harrisburg, PA, on May 4-6, 2004. Copies were also made available for further public review after the Technical Interactive Forum. DEP considered all comments submitted to the Bureau of Mining and Reclamation by June 30, 2004. The final publication incorporates these comments as well as those received from the peer reviewers.

William B. White, Chair
Editorial Committee