Statement of
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of the
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Good Morning, Chairman Rahall, Chairman Costa, and distinguished Members of the Subcommittee on Energy and Mineral Resources. My name is Davitt McAteer and I wish to thank you for this opportunity to appear before you today. I am the Vice President of Sponsored Programs at Wheeling Jesuit University where I am responsible for research efforts at the National Technology Transfer Center (NTTC) and Center for Educational Technologies (CET).

On December 22, 2008, a Coal Ash Impoundment operated by the Tennessee Valley Authority ruptured and sent a billion gallons of sludge across 300 acres of Eastern Tennessee (*New York Times*, January 6, 2009). This facility is one of more than 600 Coal Combustion Waste sites across the United States. Of that number, it is estimated that 300 are impoundments and 300 are landfills used by 440 coal-fired utilities. (EPA Estimate / Notice of Data Availability on the Disposal of Coal Combustion Wastes in Landfills and Surface Impoundments, Docket # EPA-HQ-RCRA-2006-0796-0015).

Currently approximately 129 million tons of coal combustion residues are produced annually and this number is expected to increase dramatically in the coming years. (Annual Energy Outlook, 2007 Energy Information Administration and Department of Energy Report No. 0383/2007). Besides the safety considerations surrounding the methods of disposal, health concerns also exist. Since 1999, the EPA has issued a number of reports warning about substantial risk to human health and to the environment from poorly managed coal ash disposal facilities. (U.S. EPA (Environmental Protection Agency). 2007. *Coal Combustion Waste Damage Case Assessments*. (Available from the docket to the Notice of Data Availability on the Disposal of Coal Combustion Wastes in Landfills and Surface Impoundments, Docket # EPA-HQ-RCRA-2006-0796-0015).

I first would like to commend this Committee and Chairman Rahall for their leadership in acting swiftly to address this growing problem.

Coal ash is presently disposed of in wet or dry impoundments or piles. These impoundments are not unlike coal impoundments which are facilities built of coal waste produced at mines during the cleaning and preparation of the coal before burning. These “coal impoundments” typically consist of rock, coal fines, clay and other impurities which are placed across a valley creating an impoundment. These impoundments provide a permanent storage place for the waste materials and equally, if not more important to the coal operator, a ready supply of cheap water which the mine uses to clean the newly produced coal. Tragically, one of

these impoundments collapsed in 1972 in Buffalo Creek, West Virginia, killing 127 people and destroying hundreds of homes and structures. Following that disaster, the Federal government and the state of West Virginia adopted new regulations governing the construction, design and management for such impoundments. More recently on October 11, 2000 in Martin County, Kentucky an impoundment operated by the Massey Energy Company failed through the impoundment bottom. The slurry then broke through two underground mine seals discharging approximately 300 million gallons of coal slurry and water sludge into the creeks and rivers of West Virginia and Kentucky. (*Coal Waste Impoundments: Risks, Responses, and Alternatives*; Committee on Coal Waste Impoundments, Committee on Earth Resources, Board on Earth Sciences and Resources, National Research Council, 244 pages, 2002). While no one was killed, EPA called the collapse the largest environmental disaster in the south eastern portion of the United States. That is until the release of the TVA Kingston, Tennessee facility on December 22, 2008.

Coal waste impoundments have caused concern and fear among coal field residents for a number of years, at least since Buffalo Creek. The failure at Martin County led to renewed concerns. In order to address the issues surrounding coal impoundments, in June, 2003, with the help of Senator Robert C. Byrd, we established the Coal Impoundment Project at Wheeling Jesuit University's National Technology Transfer Center and Center for Educational Technologies (www.coalimpoundment.org).

The Coal Impoundment Project grew out of the knowledge gained from the Martin County failure, that the people who need to know the most about the impoundments – those living downstream – knew the least about them. Moreover, the project is an effort to address several issues relating to coal waste disposal, including providing information to citizens about impoundments improving safety precautions and conducting research to improve impoundment safety and security.

These investigations have included testing filtration materials, testing automatic wireless instrumentation for monitoring the dam conditions, and the use of robots for remote underground mine mapping under impoundments. Current research includes investigating hand-held computers with Global Positioning Systems, cameras, and audio recording to assist field inspectors with recording information and the ability to automatically upload information to a centralized electronic record center. This technology could improve impoundment inspections, management of the site, engineering oversight, regulatory compliance, and safer conditions for workers and nearby communities.

The project also includes efforts to research new technologies to reduce the amount of impounded materials and to reduce the need for the use of this method of disposal by researching beneficial uses for the material.

The December, 2008 TVA ash impoundment failure thus has a certain ring of history repeating itself and perhaps we can learn from the coal impoundment experience.

The guiding philosophy of the Wheeling Jesuit University Coal Impoundment Program is that better information shared in a coordinated way will help reduce anxiety among coal impoundment neighbors and timely information about incidents/leaks will help responsible parties to react in a more expeditious fashion to minimize risks and improve spill prevention.

One important aspect of the program is the identification of coal impoundments, mapping their locations and making emergency evacuation plans, which are required in West Virginia, publically available. Thru a series of public meetings, citizens in the coalfields have been alerted to the locations of nearby impoundments and several communities have begun to work with local officials to improve notification in case of an emergency, for example, using reverse 911, and to improve the emergency evacuation plans.

In addition, we have initiated table top exercises and information exchanges with state and federal agencies, county emergency management personnel and coal company officials which have improved preparedness and emergency planning.

It seems clear from the Tennessee incident and a second event in Alabama on January 9, 2009, the failure of voluntary industry efforts and inadequate state by state regulatory efforts that coal ash disposal facilities need strong federal regulations. Furthermore, that regulating scheme needs to be multifaceted given the nature of the problem.

As the 2006 National Research Council of the National Academy of Sciences, *Managing Coal Combustion Residues in Mines* report concludes, a strong regulatory approach involving both the Department of Interior Office of Surface Mining (OSM) and the Environmental Protection Agency (EPA) would seem to be the most logical approach given the multiple risks created by the different methods of coal ash waste disposal. OSM under Surface Mine Control & Reclamation Act, 30 USC §1201 et seq., (SMCRA) has the regulatory framework in place to deal with the coal combustion residue placed in mine sites, and EPA, as it had planned to do in 2000, should promulgate regulations covering CCR disposal in landfills under the Resource Conservation and Recovery Act (RCRA)(65 CRF §32214). I would add that involving MSHA in plan application approval and inspector training discussed below could expedite the program. While joint regulatory schemes commonly suffer from a lack of clear jurisdiction, given the nature of this problem such a joint approach seems best suited to quickly address this problem (The NRC Committee also noted that a number of public interest groups had expressed concern that OSM and other SMCRA related agencies lacked the will or ability to deal effectively with this issue; perhaps the joint approach would improve the confidence of the public).

It also should be noted that coal ash impoundments are more like coal impoundments than standard dams, and require different engineering and monitoring approaches. Inspection methods, training, and record keeping techniques need to be specific for these unique facilities. This conclusion is the result of analyzing MSHA's experience with coal impoundments. While standard dams once built are typically static facilities with few variables, coal impoundments and Coal Combustion Residue impoundments are dynamic facilities which have more variables as they are constantly changing, receiving additional materials, etc. Thus, the CCR disposed of at mine sites and impoundments should draw upon MSHA's experience. (See Appendix A, MSHA Impoundment Data Form)

These facilities require frequent monitoring and inspections by the responsible owner and/or operator as well as federal and state agency inspectors. For example, currently, under the Federal Mine Safety & Health Act of 1977, 30 USC §813 et seq. coal impoundments are inspected quarterly by MSHA inspectors and every seven days by company personnel trained by MSHA. Inspection reports are required to be kept and filed with MSHA.

Coal Impoundment incidents, failures, and spills are also required to be reported and investigated, and a protocol is in place to be followed if a serious incident is observed, involving higher up company and government officials - a procedure, which it is reported, did not exist at the Kingston, Tennessee, December 22, 2008 failure site. These reported incidents are also included in the WJU website (http://www.coalimpoundment.org). Such reporting has resulted in owners and operators being proactive in preventing and avoiding incidents, as well as keeping the public informed about the number and severity of those incidents should any occur.

One aspect of the West Virginia regulatory program – the creation by impoundment operators of Emergency Action Plans is an area where the proposed H.R. 493 could be strengthened. These plans are required when impoundments have the potential for negatively impacting people and homes and are ranked as "High Hazard Dams."

One area which MSHA Coal Impoundment Regulations do not adequately cover but which should be of concern for coal combustion residue facilities is the monitoring of chemicals and heavy metals that go into and come out of the facilities. The collection of impurities and harmful materials during the burning of coal to avoid releasing them into the atmosphere produces the fly ash and bottom ash waste products which may have a high concentration of those impurities. Given the nature of the waste it is only logical that monitoring the make up of the material being placed in the facilities as well as monitoring any discharge from the facility through leaching, drainage and/or runoff is essential to protecting human health and the environment. In our experience, this lack of knowledge as to the makeup of coal impounded material - what is in the impoundment - has been recognized as a drawback in the ability of the owner and operator as well as the federal or state agencies to adequately treat runoff or drainage products.

The use of "mine sites" as disposal facilities for CCR raises additional potential concerns as well as additional potential benefits in assessing options the disposal sites. As the National Research Council concluded in its *Managing Coal Combustion Residue in Mines* (NAS 2006) report, putting CCR's in coal mines as part of the reclamation process is a viable management option as long as (1) CCR placement is properly planned and is carried out in a manner that avoids significant adverse environmental and health impacts and (2) the regulatory process for issuing permits includes clear provisions for public involvement (p. 1, Summary 2006).

Mining operations frequently disrupt the rock formation below the coal seam allowing ground water pollution from CCR deposited on mine sites easier access to ground water aquifers. Also underground mine site locations are frequently below the water table where leachates can contaminate the water table.

In our studies of runoff at coal impoundments, we have encountered water contamination that appears to be connected to the coal impoundment leaching, drainage and runoff. The National Academy of Sciences expressed just such a concern in their 2006 study. According to NAS, "A review of 24 proven CCR landfill damage cases reveals one commonality among the incidents: when CCRs react with water and the resulting leachate is not contained, adverse consequences can result.…In some landfill settings, groundwater has been degraded to the point that drinking water standards were exceeded off-site. In other landfills and surface impoundments, contamination of surface waters has resulted in considerable environmental impacts.…The committee concluded that the presence of high levels of some contaminants in

CCR leachates may create human health and ecological concerns at or near some mine sites over the long term," indicating the need for long term monitoring of ground and surface waters at such sites.

Further, a draft EPA report measuring the health risks posed by disposal practices at coal ash dumps finds that pollution from these sites significantly increases both cancer and noncancer health risks and degrades water quality in groundwater supplies. (RTI (Research Triangle Park) 2007. *Human and Ecological Risk Assessment of Coal Combustion Wastes*, Draft Prepared for: U.S. Environmental Protection Agency, Office of Solid Waste.

Other concerns exist about the long term impact of mine site disposal and storage. West Virginia's Department of Environmental Protection director, Randy Huffman testified as recently as Tuesday, February 10, 2009, that WV DEP remains concerned about the negative impact on water supplies from injecting coal mine slurry into underground mines and wells (*Charleston Gazette*, February 11, 2009).

Analysis of the recent fly ash dam failure in Tennessee resulted in contamination of waterways with arsenic and radium. A Duke University report concluded "exposure to radium and arsenic containing particles in the ash could have severe health implications in the affected area." (Duke University press release, January 30, 2009). And although the report found only trace elements beyond the damned tributary, all studies support the conclusion that special care must be taken in the design management and operation of fly ash facilities to ensure environmental and human safety and health protections at CCR facilities.

In the 36 years since Buffalo Creek, MSHA has gained much knowledge and experience in what is good design and management for coal impoundments and this knowledge should serve as a tool for future CCR sites. Moreover, a best practices approach to operation management of CCR's should be part of the approaches considered here. The Coal Impoundment Project has developed a pilot best practices program and recommends the implementation of a tailings management framework consisting of Operation, Maintenance, and Surveillance programs for the integration of environmental and safety considerations into each stage of the life cycle of a tailings facility, from initial site selection and design, through construction and operation, to eventual decommissioning and closure. The future of coal ash facilities should include the integration of environmental and safety considerations in a consistent way for the continuous improvement of the facilities.

Applicants for CCR sites should not only examine the characteristics of the location to be used but also the chemical and physical properties of the materials to be deposited. Facility management must include the studies of short term and long term impact such facilities have on the ecosystem as well as any adverse human impact and should include regular and thorough monitoring of the ground and surface waters around, below and downstream of the disposal site.

In addition, as is the case with Coal Impoundment sites, the federal regulations must ensure that the owner/operator must be sufficiently financially sound to be able to abate adverse effects to humans and the environment should such harmful impacts occur. Currently, performance bonds are required of coal impoundment owners/operators, and it is reasonable that bonds should be required for fly ash disposal sites as well. And as is the case under other

environmental regulations, the handling and storage of coal combustion waste should remain the responsibilities of the generator unless the product is sold for beneficial use.

Currently, MSHA and OSM jointly coordinate and approve Coal Impoundment plans and applications. One suggestion for this Committee is that MSHA be authorized to assist in CCR impoundment plan approvals and that MSHA training be provided for OSM and EPA CCR impoundment inspections.

An additional point raised by the EPA and others is the use of wet versus dry facilities. That same debate exists with regard to coal refuse impoundments. Clearly, the dry disposal methods have significant safety and environmental advantages, although typically more costly to operate than wet disposal. This Committee should consider a phased in approach limiting and/or restricting the wet disposal method in favor of the dry technique, ultimately dry storage is the preferred method in most situations.

Furthermore, we much continue to apply new technologies to reduce the amount of CCR created. Recently, professors at Virginia Polytechnic Institute and State University (Virginia Tech) reported that progress continues to be made in developing an economically viable technology to remove water from even the ultrafine coal slurries. (Virginia Tech News Release, February 9, 2009). Technologies such as these should be applied to the disposal of coal ash and thus help reduce the amount of ash residue created.

Where permitted, future ash lagoons should be developed so as to provide secure containment while allowing the ash to eventually dry and solidify. Such facilities should include the use of composite liners which have a number of advantages and are required for industrial waste facilities and adequate monitoring of ground and surface waters to assure success of the liners, or to avoid accidental harm due to unanticipated breaches of the liner system.

In conducting our research we also examined regulations of CCR's in other countries, the European Union (EU) recently required a registry for fly ash products placed on the market as construction material. On June 1, 2007, the REACH-Regulation (Registration, Authorization, Evaluation and Restriction of Chemicals) of the European Union required that each producer or importer of coal combustion products (CCPs) which were to be placed in the market as construction materials have to pre-register and register their substances. The pre-registration requires information on the substance identity, the tonnages and the name and address of the producer. The registration requires comprehensive information about toxicology and ecotoxicology of the substances. Among other benefits to industrial repurposing of fly ash, this registry provides important information for the protection of human health and drinking water when deciding how and where fly ash can be used beneficially. (Feuerborn, J. 2008. EU and CCP: *Coal Combustion Products and REACH*. ECOBA (European Coal Combustion Products Association), 2008. http://www.ecoba.com/news,document.html?id=274)

In closing, I believe the creation of this enormous amount of material (CCR) for which no beneficial uses have been found is a problem which must be addressed. Beneficial and safe uses of CCR in drywall, concrete, road building, construction fill and other areas should be encouraged and additional safe uses should be developed.

Electricity from coal is a necessary fact of our lives today. Combustion is the means of converting coal to electricity and ash resulting from that combustion is important in preventing impurities and hazardous materials from entering the atmosphere. In effect, in solving one problem, we have created another for which we need to find a better safer and healthier method of disposal. This bill and this Committee's efforts are major steps in the right direction.

The need to solve this problem has been recognized by the National Academy of Sciences National Research Council and the Environmental Protection Agency. The result of the recent failures in Tennessee and Alabama along with the EPA and NAS NRC studies and our experiences with coal impoundments, have made us aware of the negative consequences of failing to act.

Mr. Chairman, Members of the Subcommittee, a comprehensive federal program under EPA & OSM's joint jurisdiction with assistance from MSHA appears to be the most logical approach and most effective in addressing the risks and concerns of coal combustion waste disposal.

Finally, on behalf of Wheeling Jesuit University our Coal Impoundment Project group and myself, I would like to thank the Subcommittee for the opportunity to address this problem which, because of its size alone presents difficult financial and logistic hurdles, but also because of the combined human and environmental concerns present large health, safety and environmental issues. Thank you also, Chairman, for the opportunity to present to you and the Subcommittee, information about this important issue.

Appendix A

Below is the MSHA reviewers form found in the MSHA inspection manual.

IV. IRPI Data from Impoundment Plans

This form will be used by a plan reviewer to capture information from the impoundment plan that will be needed to complete some of the fields in the IRPI. The numbers provided in parenthesis on the form correlate to the fields in the IRPI Database. IRPI fields not captured from the plan review have been omitted on the form and will be compiled by district personnel. This form will assist District personnel in updating the IRPI. A form is needed for each stage of the plan being reviewed. The information should be consistent with the explanations for the IRPI fields contained in Appendix B. This form should be filled out by the plan reviewer at the completion of the review when the plan is recommended for approval, and should be forwarded to the district impoundment supervisor.

IRPI DATA FROM IMPOUNDMENT PLANS

Date _____ Completed by: _____

(2) State _____ (2) County _____

(3) Impoundment Name _____

(4) Impoundment ID No. _____

(8) All Information Pertains to Construction Stage

(9) Nearest Downstream City/Town _____ (10) Distance to Nearest City/Town (mi.) _____

(11) Latitude _____ (12) Longitude _____
(Degrees + (Minutes/60) + (Seconds/3600)) (Degrees + (Minutes/60) + (Seconds/3600))

(15) Stream impoundment is located on or tributary to: _____

(16) Section/Range/Township _____

(20) Company or consultant who prepared plan _____

(35) Foundation Type (rock; rock and soil; soil; unknown) _____

(37) Core Type (earth, plastic, etc.) _____

(38) Core Position (Upstream, Homogeneous, Core) U H C

(40) Type of Construction (Upstream, Downstream, Centerline) U D C

(41) Dam Crest Length _____ feet

(42) Structure Height (from downstream toe) _____ feet

(43) Open Channel Spillway Type Controlled Uncontrolled None

(44) Spillway Width at Maximum Discharge _____ feet

(45) Maximum Storage _____ acre-feet

(46) Normal Storage _____ acre-feet

(47) Maximum Discharge _____ cfs

(49) Drainage Area _____ square miles

(50) Surface Area _____ acres

(51) Decant Pipe Type _____

(52) Decant Pipe Diameter (ID) _____ inches

(54) Mining Underneath or Adjacent: Yes No

(55) Hazard Potential Classification High Significant Low