Appendix for Preface:

Joint Legislative Committee Report

PENNSYLVANIA GENERAL ASSEMBLY

JOINT LEGISLATIVE AIR AND WATER POLLUTION CONTROL AND CONSERVATION COMMITTEE

REPORT ON

A PROPOSED MORATORIUM ON THE USE OF FLY ASH IN MINE RECLAMATION PROJECTS

(Without Appendices)

February, 2004

TO: **All Members of the General Assembly**

FROM: **Representative Scott E. Hutchinson, Chairman**
Senator Raphael J. Musto, Vice Chairman

SUBJECT: **A Proposed Moratorium on the Use of Fly Ash in Mine Reclamation Projects**

DATE: **February, 2004**

The following report is a result of a public hearing held by the Joint Legislative Air and Water Pollution Control and Conservation Committee on July 9, 2003 in Tamaqua, Pennsylvania. The purpose of the hearing was to discuss a proposed moratorium on the use of fly ash in mine reclamation projects. The recommendations presented in this report are the result of that hearing.

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2003-2004 Session

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EXECUTIVE SUMMARY

The Joint Legislative Air and Water Pollution Control and Conservation Committee (Committee) has been asked to offer the Pennsylvania General Assembly a recommendation on whether there should be a statewide moratorium on the use of coal combustion waste (CCW), also referred to as fly ash and coal ash, for mine reclamation purposes. In order to gather the necessary information to make such a recommendation, the Committee conducted a public hearing on July 9, 2003 in Tamaqua, Pennsylvania, a site where fly ash is being used to reclaim an abandoned mining pit, and where expanded use of fly ash is being considered.

The issue is both an emotional and technical one and the debate over the use of CCW is marked by impassioned opinions as much as empirical evidence. There have been many questions posed and a number of questions unanswered. The Committee has sought diligently to find the facts using solid, peer-reviewed science to make its recommendations surrounding the use of fly ash in an attempt to answer the many questions posed. While the facts are foremost, they are not the only consideration. Testimony received by the Committee indicated there are many concerns about the use of fly ash, but there are also serious statewide implications about coal mine safety in terms of acid mine drainage, pedestrian safety around abandoned mine workings, and mine subsidence. Just as there are concerns about the impact of fly ash on water quality, there are concerns about the future of cogeneration and its impact on jobs and the economy in Pennsylvania. And, just as there are concerns about the dirt, dust, and transportation impacts, there are concerns about the progress of abandoned mine reclamation throughout the state.

These issues were the subject of testimony at the Committee's public hearing. The testimony reflected differences in opinion and presented differences in matters of fact and interpretation. It is our mandate to weigh the facts, both agreed upon and subject to debate, consider both shared and conflicting concerns, seek reconciliation and use good science to make judgment and recommendation.

The Committee prides itself on its rich history and vital role in offering legislation and recommendations to the General Assembly that have helped strengthen and enhance Pennsylvania's environment over the past 35 years. The Committee has been a pioneer in assisting in the cleanup of abandoned coal mines and has offered legislative recommendations regarding mining and reclamation practices in the past.

The protection of water quality and the conservation of natural resources in Pennsylvania is a Committee priority. Ample evidence has been provided by industry, environmental organizations, academia, federal and state regulatory agencies demonstrating the significant economic and environmental benefits fly ash plays in the reclamation activities of abandoned mine lands if properly managed. The Committee believes that the *improper* use of fly ash can pose a significant environmental and public health threat. However the Committee also believes that proper fly ash use can and is adequately enforced by state and federal regulatory agencies in Pennsylvania.

After reviewing the issue surrounding the use of fly ash for coal reclamation projects, it has become increasingly obvious that Pennsylvania has a carefully crafted regulatory scheme that is a model for the nation. It draws upon 30 years of experience in using fly ash for mine reclamation and integrates the state's residual waste management program with its federally approved surface mining program. The effects of the program on the environment, natural resources, public health and safety, and the economy have been evaluated by the General Assembly and reviewed by related agencies, the Environmental Quality Board and the Independent Regulatory Review Commission, as part of their adoption of legislation, regulations, policies and guidance.

The program, as set forth in historical detail to follow, has peer-reviewed uniform standards for fly ash quality and placement that are implemented in the permitting process and incorporate site-specific considerations of geology and hydrology. The program mandates frequent and detailed monitoring of both fly ash quality at its source and the groundwater quality at the mine site as part of the permitting conditions. Finally, the Pennsylvania Department of Environmental Protection (DEP) exercises extensive oversight, inspection and enforcement power to ensure compliance with the requirements of Pennsylvania's Solid Waste Management Act, 35 P.S. Chapter 6018.101 et seq., the Surface Mining Conservation and Reclamation Act, 52 P.S. Chapter 1396.1 et seq., and the Clean Streams Law, 35 P.S. Chapter 691.1 et seq.

Therefore, the Committee makes the following recommendations with regard to a moratorium on the use of fly ash in Pennsylvania:

1. **The Committee does not recommend or support a statewide moratorium on the use of fly ash in coal mine reclamation projects as requested in the public hearing on July 9, 2003. The beneficial use of coal ash, including mine reclamation, has been well documented and the potential risks have been thoroughly examined and these results have been reported to local, state and federal agencies. The Committee has researched data from a dozen sites in Pennsylvania and found that**

coal ash can be effectively and safely used when properly managed. The information also demonstrates the significant economic and environmental benefits coal ash plays in the reclamation activities in the Commonwealth.

2. **The Committee recommends the continued research into the environmental effects of fly ash on soils and waters of the Commonwealth and the impacts posed by trace elements contained in the material. While the Committee believes that improper use of fly ash can pose a threat to public health and the environment, proper fly ash use is being adequately enforced by state and federal regulatory agencies. However, there is room for improvement. The Committee does, in fact, recognize citizen questions and concerns about the possible presence of certain chemicals in fill material (i.e., hexavalent chromium) and has therefore requested an independent study to be conducted to further investigate the biology, chemistry, placement and use of the ash material in mine reclamation projects in Pennsylvania.**
3. **As an added protection measure to the current regulatory program, the Committee recommends that a statewide, third party oversight subcommittee be established through the Mining Reclamation and Advisory Board or the Citizen's Advisory Council with a specific charge to oversee the state regulatory program. The subcommittee would include representation from groups or individuals concerned with the beneficial use of fly ash on abandoned mine lands. The statewide subcommittee would review results of biological, chemical and physical tests, and make necessary recommendations for changes to the current regulatory standards set by DEP and the United States Environmental Protection Agency (EPA).**
4. **DEP, environmental organizations, industry and the newly established oversight subcommittee should also consider and study the undocumented threat coal refuse piles themselves pose to human health and the environment and evaluate the safety hazards posed by abandoned mines throughout the Commonwealth such as dangerous high walls and water filled pits. The question of whether these unremediated sites may pose significantly more hazards to the environment if they are not beneficially remediated needs to be addressed.**
5. **The electric utility industry needs to address the issue of public education and the utilization of CCW. Environmental performance data needs to be developed and made available to the public from full-scale demonstrations of beneficial use applications. The information that industry, federal and state governments have generated needs to**

be made more available to regulators and the citizens of the Commonwealth and others.

6. **The CCW industry needs to be vigilant about the use of appropriate testing and monitoring methods and interpretation of data, and to communicate with state and federal agencies on the further development of regulatory guidelines for CCW management.**

LEGISLATIVE AND REGULATORY REVIEW OF COAL ASH USE IN PENNSYLVANIA

Prior to examining the regulatory program, it may be important to look at the legislative and regulatory pathway that led to Pennsylvania's coal ash management program. In deciding under what circumstances a material may be beneficially used, the General Assembly has to examine all sides of an issue and balance environmental impacts with social and economic concerns, public health and safety issues, along with the use of our natural resources. Legislative and regulatory control of the beneficial use of CCW began in 1986 when the overwhelming passage of House Bill 2274 amended the Solid Waste Management Act to include the recycling and beneficial reuse of CCW. (Following an extensive review process, HB 2274 passed the House by a 195-2 vote and the Senate by a 49-0 vote and was signed into law as Act 168 on December 12, 1986.)

Such amending legislation authorized the establishment of siting criteria and design and operating standards for the beneficial use of coal ash for use as structural fill, soil substitutes and additives. In its mandate to fulfill Article I, Section 27 of the Pennsylvania Constitution, the General Assembly looked at the nature of coal ash, the economic and environmental impacts of coal ash disposal in landfills, the public health and safety benefits of removing mine hazards, the economic and environmental benefits of abating acid mine drainage and the reclamation of mine sites versus the impact of beneficial uses of coal ash. The General Assembly concluded that any potential adverse impacts associated with the beneficial use of coal ash for mine fill and other purposes were minimal compared to the environmental and social benefits of its use.

At the same time, the Environmental Quality Board (EQB) an independent legislative body charged with promulgating regulations for the management of coal ash adopted the regulations governing coal ash in 1992, and the subsequent amendments in 1997 and 2001. EQB's rulemaking, which provided the public with comment periods that extended well beyond the required periods mandated by the Regulatory Review Act, 71 P.S. Chapter 745.1 et seq. made a reasoned

judgment based on scientific, technical environmental and social benefits to adopt the regulatory program now in place.

In conjunction with the General Assembly and the EQB, the Independent Regulatory Review Commission (IRRC), an independent executive agency, reviewed the beneficial use regulations on three separate occasions and in doing so, also considered all of the same impacts that the previous legislative bodies had considered and concluded that the regulations were in fact, in the public interest.

All three separate bodies reviewed the science, technology and data associated with the beneficial use of coal ash and concluded that the regulatory program is protective of the environment and public health and the adverse impacts, if any, are minimal and balanced by the overall environmental, economic and social benefits of the current program. Nothing that has been presented to the Committee has altered that conclusion.

However the list of oversight doesn't stop there. The General Assembly created the Mining and Reclamation Advisory Board (MRAB) in 1984 by Act 181. The purpose of the board's creation was to assist DEP in expanding reclamation funds provided by the Surface Mining Conservation and Reclamation Act and to *advise* DEP on public matters pertaining to mining and reclamation and abandoned mine reclamation issues.

DEP also solicits and receives input on proposed changes to the mining program from the Citizen's Advisory Council (CAC). The council**,** created in 1971, is the only legislatively mandated advisory committee with the comprehensive charge to review all environmental legislation, regulations and policies affecting DEP. Both the MRAB and the CAC have weighed in on this issue. Both the MRAB and the CAC are supportive of DEP's regulatory program and do not support a moratorium on the use of fly ash.

DEP REGULATIONS

CCW is regulated under Pennsylvania's Solid Waste Management Act (PASWMA). In 1986, the act was amended to establish provisions for the beneficial use of the material. The provisions for beneficial use apply not only to fly ash but also other ash materials derived from the combustion of coal. Regulations regarding the beneficial use of CCW were adopted in 1992 as a part of Pennsylvania's Residual Waste Management Regulations for the use of coal ash as a soil substitute or soil additive and as placement for fill material at surface mines, coal refuse reprocessing operations and coal refuse disposal sites.

DEP administers the program and the Bureaus of Mining and Reclamation and District Mining Operations have the responsibility of managing coal ash on active coal mining operations. The Bureau of Abandoned Mine Reclamation has program responsibilities for use of the material on abandoned mines. The Bureau of Land Recycling and Waste Management has the program responsibility for the beneficial use of coal ash at sites other than coal mining operations.

The Solid Waste Management Act and the residual waste management regulations authorize the beneficial use of coal ash as a structural fill; soil substitute or additive; for reclamation at an active surface coal mine site, a coal reprocessing site, or a coal refuse disposal site; for reclamation at an abandoned coal or an abandoned non-coal industrial mineral site; in the manufacture of concrete; for the extraction or recovery of one or more materials contained within coal ash; for mine subsidence and control, mine fire control and mine sealing as a drainage material or pipe bedding and as a stabilized product where the physical and chemical characteristics are altered so that the potential of the coal ash to leach constituents into the environment is reduced. All of these uses must comply with specified state regulations.

The Pennsylvania regulations reference the federal regulations exempting fly ash and other waste generated primarily from coal combustion or other fossil fuels as hazardous waste (25 PA Code Chapter 261.A.1.4). As mentioned above, CCW is regulated under the Solid Waste Management Act and the residual waste management regulations. In December 1986, this act was amended to authorize the beneficial use of coal ash. Beneficial use of coal ash was implemented through DEP guidelines under the residual waste management regulations, 25 PA Code Chapter 287, which was amended in July 1992 to include the beneficial use of coal ash, 25 PA Code Chapter 287.661-287.666. In January 1997, the beneficial use of coal ash regulations 25 PA Code Chapter 287.663 and 287.664 were amended to change the requirements concerning groundwater monitoring, reporting requirements, beneficial uses and the amounts of coal ash that can be used at active coal mine and abandoned mine sites.

Coal ash is defined in Pennsylvania as fly ash, bottom ash or boiler slag resulting from the combustion of coal.

Pennsylvania residual waste management regulations provide that coal ash may be beneficially used:

- As structural fill upon approval from DEP.
- As a soil substitute or soil additive.

- For reclamation at an active surface coal mine site, a coal refuse reprocessing site, or coal refuse disposal site if the use complies with all the specified requirements under PA Code Chapter 287.663, the Clean Stream Law and regulations promulgated there under, the Surface Mining Conservation and Reclamation Act (52P.S. Chapter 1396.1-1396.19a), the Coal Refuse Disposal Control Act (52 P.S. Chapter 30.51), and the applicable provisions of 86-90.
- For reclamation at an abandoned coal mine site, the use must comply with 25 PA Code Chapter 287.664 and the applicable environmental statutes stated above.
- In the manufacture of concrete.
- For mine subsidence control, mine fire control and mine sealing, as a drainage material or pipe bedding, if the person or municipality proposing the use gives advance written notice to the DEP and the range of pH of the coal ash is in a range that will not cause or allow the ash to contribute to water pollution and is consistent with applicable DEP requirements.

Much of the criticism of Pennsylvania's regulatory program voiced during the Committee's public hearing focused on isolated regulations taken out of a larger context of the residual waste management and mining activity regulatory programs. Critics focused on groundwater quality issues and criticized legislation addressing remining of areas with preexisting pollutional discharges. Clearly, the residual waste regulations at 25 Pa. Code prohibit the placement of coal ash within specific distances (eight feet) of the regional groundwater table, unless it can be proved to DEP that groundwater contamination will not occur as part of an abatement project.

When addressed specifically, the allegations made against the program proved to be unsubstantiated, without technical, scientific or peer-reviewed facts. After examination of the three most significant sites alleged to have caused damage relating to the placement of ash at mine reclamation sites, Ernest, Revloc, and Maple Coal, the sites showed no evidence of environmental damage. In fact, information relating to the groundwater damage cited in testimony were temporary results related to initial disturbance and removal of coal refuse and monitoring of water quality. In some cases, water quality improved over pre-placement levels.

With regard to ash placement versus common soils in the area, independent tests, studies and agency monitoring data all show levels of trace elements and major elements in soils including arsenic, mercury, lead, chromium, cadmium, and others that are comparable to the levels of those elements in ash produced at power plants in the area. If the volume of exposed area of the local soils is compared with ash placement, the soils in the surrounding area contain greater amounts of

background elements than is contained in the placement of ash. This also holds true for culm and gob piles. Although concentrations of trace elements in refuse coal are similar to ash, burning of coal refuse decreases the mobility and toxicity of these elements. Therefore the amount of mobile toxic elements in the abandoned coal refuse piles exceeds the amount in the ash.

Pennsylvania's program has been crafted in cooperation with the federal Office of Surface Mining Enforcement and Reclamation and EPA. The program takes into account the potential for groundwater degradation and effects on human health and the environment by addressing site-specific characteristics prior to ash placement at any mine site. The use of coal ash *must* comply with the SMCRA and the provisions of the regulations and meet certification guidelines for acceptable chemical and physical properties of the ash as set in 25 Pa Code. Those guidelines, which specify maximum leachate concentrations are outlined in the Certification Guidelines for Beneficial Uses of Coal Ash Documents (Document 563-2112-224) and the Coal Ash Beneficial Use Application (Form 5600-PM-MR0011). Coal ash quality data must be submitted as a part of the mining permit application and certified every six months.

In addition to the information regarding the coal ash quality, the permit application must include information regarding the "geology, hydrology and water quality… of all lands within the proposed permit area, the adjacent area and the general area" (25 Pa Code Chapter 88.23) and the geology of the proposed permit area and the adjacent areas, down to and including the aquifer must be described in detail in the permit application. The description must include coal seam thickness, location of mine pool or subsurface water, chemical analysis of the coal, groundwater hydrology, including depth to groundwater, uses of groundwater, and the chemical characteristics (25 Pa Code Chapter 88.25). The permit applicant must describe the placement of the coal ash in relation to the regional groundwater table. The permit application must also include a plan for collecting groundwater and surface water data, including monitoring location and testing frequency.

As mandated by regulation, DEP must conduct a thorough review of site-specific geology and hydrology prior to ash placement. It is evident that Pennsylvania's regulatory program as it has operated for over 15 years, and through testimony presented and a review of the program, has all the elements to ensure that coal ash of the appropriate quality is placed at mine sites with suitable geologic and hydrologic characteristics and is in compliance with approved reclamation plans and permit conditions. The quality of coal and the groundwater is routinely and frequently monitored by the generator/operator.

DEP routinely inspects this data and has the authority to immediately act on any issue that may arise from the placement of coal ash at a particular site. Under

DEP's mine regulations, monitoring is required up until Stage II bond release, which does not occur until backfill and revegetation is completed. On the average, this is usually several years after the ash work is finished. After completion of Stage II, if any signs of discharge appear, the Stage III of the bond release is initiated which requires further monitoring for five years from the time of revegetation.

FLY ASH GENERATION, USES AND BENEFITS

Approximately 90 million tons of CCW are generated annually by the electric utility industry in the United States. Of the amount generated, approximately 19 million tons are beneficially used, primarily as a Portland cement replacement in concrete and concrete products. The remaining 71 million tons is disposed of in surface impoundments (special purpose, on-site landfills) or commercial landfills. The identification of cost-effective, technically sound, and environmentally responsible programs for the beneficial use, rather than disposal, of these materials has been the goal of many power generating facilities and research and demonstration projects in Pennsylvania and throughout the United States.

Approximately 5 million tons of fly ash is produced by Pennsylvania's cogeneration plants each year. Approximately 90 percent or more of this is used for mine reclamation projects and filling of pits and the reclamation of abandoned coal refuse areas. (See Appendix A.) One reason that Pennsylvania dedicates a much higher percentage to mine reclamation is due to the abundance of coal refuse and the many abandoned mines found within the state. Another 5 percent to 8 percent is used as a replacement for lime for acid mine drainage prevention or as a soil amendment/replacement at mining sites. The remaining 2 percent (approximately) is used for other beneficial uses such as anti-skid for roadways and pipe bedding, and other uses as previously mentioned.

Today the Federal Highway Administration (FHWA) recognizes CCW as a valuable material for utilization in concrete, road sub-bases and structural fills including embankments. In doing so the FHWA has stated, "*The trace element concentrations in many fly ashes are similar to those found in naturally occurring soils. Although the leachates of some fly ashes may contain trace elements that exceed drinking water quality standards, this is also true of certain soils. State environmental regulatory agencies can guide you through applicable test procedures and water quality standards…*"

What would happen to this material if it were not beneficially used? The material would be landfilled. Landfilling this material, as discussed later in this report (see Economic and Environmental Consequences of a Moratorium), would be cost prohibitive for waste coal facilities and utilities, and would not utilize a valuable mine reclamation material. If ash can be used for other purposes that are publicly and environmentally safe, cost-effective and productive, then the material should be beneficially used. Keep in mind, that 15 of 19 cogeneration plants in the United States are located in Pennsylvania. (See Appendix B and B1.) Much of the reason for that is the abundance of waste coal piles in close proximity to the cogeneration plants. As a result, as mentioned above, 90 percent or more of the ash produced from cogeneration facilities is used for mine reclamation in Pennsylvania. (See Appendix C.) Elsewhere in the nation, currently between 10 percent and 15 percent of the coal ash produced from power plants is used in some type of mine reclamation and another 20 percent goes to other beneficial uses such as asphalt filler, cement sand, anti-skid material and structural fill. Between 65 percent and 70 percent of the ash generated from power plants is landfilled.

REVIEW OF TESTIMONY

The management of Pennsylvania's ash program, its implementation, its history and enforcement brought us to the event of July 9, 2003. The following is a brief summary of the testimony presented at the public hearing in Tamaqua:

Pennsylvania Department of Environmental Resources

The department was represented by **Mr. Jay Scott Roberts, Deputy Secretary of the Office of Mineral Resources Management, and Nicholas A. DiPasquale, Deputy Secretary of the Office of Air, Recycling and Radiation Protection**.

Mr. Roberts testified that Pennsylvania carries the nation's heaviest burden of abandoned coal mines, and an attendant variety of serious health and safety problems, including water-filled pits, dangerous vertical highwalls, open shafts, 800 abandoned coal refuse sites, mountains of coal waste, acid mine drainage and the threat of buildings collapsing into subsidence holes. On average, four persons are killed each year in accidents related to abandoned mine lands. Mr. Roberts estimated a cost of $4.6 billion just to rectify extreme danger and health and safety problems at land reclamation sites and to restore some but not all streams and rivers. Still unaccounted for are the costs of subsidence stabilization and infrastructure replacement. Federal funding from Title IV of the Surface Mining

Reclamation and Control Act is the mainstay of reclamation efforts, but that funding amounts to only about $25 million each year.

The department further testified that to supplement inadequate funding, the department has sought innovative programs to encourage private industry to reclaim abandoned mine sites. Coal combustion products, particularly the coal or fly ash produced by the burning of waste coal at cogeneration facilities, has proven effective in reclamation and has been used at about 150 mine reclamation sites in Pennsylvania to help address these problems. Approximately 21 million tons of coal ash are produced annually in Pennsylvania from both coal burning power plants and cogeneration plants. The amount being used beneficially amounts to about 25 percent to 28 percent of the total. Beneficial uses, aside from mine reclamation, include concrete products, asphalt production, construction and anti-skid materials, and grout or structural fill. Because limestone is mixed with waste coal during burning, the ash produced is of an alkaline nature good for remediation of acid mine drainage, in the department's opinion.

Mr. Roberts and Mr. DiPasquale stated that extensive research by state and federal agencies, various universities and the private sector, and years of monitoring data, have found that, "…coal ash, when regulated and used properly, does not pose a threat to the environment or the residents of the Commonwealth." Not all coal ash is appropriate for use in mine reclamation, and before coal ash can be used for that purpose, it must be analyzed and receive a Beneficial Use Ash Certification from DEP. Prior to placing the ash, the department conducts reviews of local hydrogeology to ensure there will be no contamination or pollution of nearby aquifers or groundwater sources. Post-placement sampling is done and the department has accumulated 15 years of groundwater monitoring with no detrimental effects.

The department acknowledged the possibility of adverse impacts in cases where the ash is not properly managed, tested and monitored. The department disputed claims of sites in western Pennsylvania where the placement of ash caused groundwater contamination, saying contamination is due to acid mine drainage that existed prior to remining and reclamation of the sites.

The department's (and other nationally recognized) testing and monitoring data indicated the following:

- coal ash is an effective means to reclaim abandoned mine sites when used properly and closely monitored;

- use of coal ash eliminates public safety hazards associated with highwalls, subsidence and mine collapses, reduces acid mine drainage, improves water quality and removes the visual blight of historic mining operations.

United States Environmental Protection Agency

Mr. Paul Gotthold, Chief, PA Operations Branch of the U.S. Environmental Protection Agency (EPA) Region III (Philadelphia) made three specific points regarding EPA's stance on the use of coal combustion products.

The first is that EPA has affirmed three times (in 1980, 1993 and 2000) that coal combustion products do not warrant regulation under the federal hazardous waste program. The agency has concluded, however, that regulation of coal combustion products as a non-hazardous waste is warranted.

The second point is that EPA has not confirmed any specific project where placement of coal combustion products in coal mines has caused damage to human health or to the environment. No failures of minefilling projects have been confirmed. EPA is still developing national regulatory guidelines, but does not expect future rules to ban the use of coal combustion products in minefilling, but rather to how best manage and control its use – probably on a case-by-case basis.

The third point is that EPA is allowing states to assess the environmental impacts of minefilling and assessing the states' effectiveness in doing so. In Mr. Gotthold's opinion, Pennsylvania ranks "…at the top tier of states for regulation of these [coal combustion products] issues."

ARIPPA

Ms. Billie Ramsey, Executive Director and General Counsel for ARIPPA, a Pennsylvania trade association comprised of 13 power plants that use coal refuse for fuel presented testimony to the Committee.

Ms. Ramsey summarized the work performed by Pennsylvania's cogeneration circulating fluidized bed (CBF) combustion system plants as follows: ridding the state of coal refuse; emitting NOx at extremely low rates; capturing particulate emissions efficiently in state-of-the-art bag houses; capturing sulfur through limestone injections; and converting an acid bearing material (waste coal) into an alkaline material (coal or fly ash) ideal for use in mine reclamation.

She testified that coal combustion products have been used for mine reclamation since 1988, with no adverse effects on groundwater, well water or surface water.

She testified that a statewide moratorium on the use of fly ash in mine reclamation would hurt Pennsylvania's environment and economy in the coal regions because it would shut down cogeneration plants – putting some 1,000 people out of work (at an average annual wage of $50,000 per employee). As explained in more detail under "Economic and Environmental Consequences of a Moratorium", based on a survey of costs of landfills, forcing cogeneration plants to landfill ash would impose a cost increase equivalent to 75 percent of gross revenues, a blow the industry could not withstand.

A moratorium would also end the reclamation work that cogeneration facilities are doing. That reclamation work includes: removal of 8 million tons of coal refuse each year, reclaiming an average of 240 acres of abandoned mine lands each year, and providing 5 million tons of alkaline ash each year for reclamation at no cost to taxpayers. She challenged moratorium supporters to explain how such a volume of work would be done if a moratorium were imposed.

Pennsylvania State University

The ensuing witness was **Dr. Barry E. Scheetz, Ph.D, Professor, Graduate Materials Program – Materials Research Institute Civil and Environmental Engineering and Mechanical and Nuclear Engineering Departments**, **at Penn State University (PSU)**.

After describing the peer-reviewed research that he and his students had conducted over the past 10 years into the large-volume utilization of coal combustion by-products, Dr. Scheetz stated that coal combustion by-products should not be considered as a hazardous waste. Dr. Scheetz, who is in his 28th year at PSU, concludes, "I have worked with coal ash in a variety of applications for the past 25+ years and found coal ash to be a useful and valuable material whose many environmental and construction benefits far out strip potential negative connotations that may be attributed to it from rare, isolated examples."

He provided details of a recent project at the "Big Gorilla" site in McAdoo, Schuylkill County, PA, where the addition of fly ash to the mine pool there increased the alkalinity of the deep mine water, lowered levels of aluminum, magnesium, manganese and iron, and, except for sulfate residual content, created water of almost drinking water standards. The Big Gorilla pool was also filled in by cementatious product. He noted that he did not test for PCBs and dioxins

because they are pre-screened out of the ash under the Commonwealth's screening procedures.

(According to DEP, the Big Gorilla project is basically completed in that the backfilling has eliminated nearly all of the mine pool water. More coal ash, to be performed under DEP's Surface Mine Permit, will be added to reach the approximate original contour. Monitoring will continue and a report on the demonstration project will be prepared.)

Earthtech, Inc.

Mr. Dennis Noll, President of Earthtech, Inc., a consultant to ARIPPA, presented testimony. Mr. Noll is also a Registered Professional Geologist with 15 years experience with coal ash placement.

Mr. Noll described a study his firm prepared in 2000 for ARIPPA that looked at the occurrence and fate of selected trace elements in CBF combustion byproducts. After extensive literature and on-site research at 14 ash-placement sites, the conclusions were that combustion and utilization of fly ash for mine reclamation (versus not disturbing abandoned waste coal piles) "significantly diminishes the risk of environmental pollution" from arsenic, cadmium, chromium, lead, mercury, nickel and selenium. Updating of the study data upholds the validity of the conclusions regarding the trace elements, as well as for additional parameters tested to include pH, acidity, alkalinity, iron, manganese, sulfates, calcium, chloride, copper, magnesium, potassium, zinc, total dissolved solids and total suspended solids and other chemistries.

Mr. Noll also described water testing performed by ARIPPA-member plants from 1987-1999 at the 14 placement sites (854 water samples from 66 sampling sites), where a preponderance of CFB generated ash is placed. Noll related that he had personally visited 10 of the 14 sites and for the others relied on maps, logs and interviews. After noting that the median value of the trace elements listed above in the water from coal refuse areas exceeded the median value found in ash placement areas in every instance except for mercury – which was well below laboratory detection limits in both cases- the conclusion was that there was no negative effect upon Commonwealth waters with respect to both the toxic trace elements and more common mine-related pollutants. Conversely, allowing coal refuse piles to remain undisturbed will continue "the negative effect upon the environment that has led to contamination of the waters of the Commonwealth by the pollutants discussed above."

Mr. Noll theorized that if there were to be negative environmental effects from ash placement at the sites described above, he would be "very surprised" if such effects did not appear in the first 14 years.

Schuylkill Headwaters Association

Testimony was presented by **Mr. William Reichert, president of the Schuylkill Headwaters Association** and a part-time employee of the U.S. Department of Agriculture.

Mr. Reichert testified that studies the association, in conjunction with other agencies, had conducted in 2000 and 2001, identified more than 160 acid mine drainage (AMD) discharges within the headwaters of the Schuylkill River. The assessments won Governor's Awards for Watershed Stewardship.

Based on the organization's studies, its members believe that fly ash used for mine land reclamation is safe and can be beneficial for the environment. Mr. Reichert testified that finding a beneficial use for the ash is "just plain common sense." He noted that 15 years of testing by DEP and plant operators has found no negative impact on the water or the environment.

Mr. Reichert stated that cogeneration plants provide economic activity and employment, waste piles are reduced and backfilling mine pits with fly ash eliminates safety hazards, reduces outflow from mine pools and restores natural beauty.

Mr. Reichert acknowledged fly ash issues regarding dust and truck traffic, but suggested these issues are like any other trucking operation and could be solved by relocating truck traffic patterns and more vigilant dust reduction efforts.

Army for a Clean Environment

The following witnesses were Dante Picciano, who works for the law firm of Bell, Boyd and Lloyd in Chicago and who represents the Army for a Clean Environment (ACE) in Tamaqua, Pennsylvania, and Farley Toothman, an attorney and a Greene County Commissioner.

Mr. Picciano stated ACE's opposition to the following: dumping of hazardous and toxic waste into unlined stripping pits as an excuse for mine reclamation; electric utilities dumping fly ash into stripping pits to reduce expenses and maximize profits; uncontrolled and unproven dumping of fly ash

into stripping pits as an excuse for treating acid mine drainage; mixing and dumping of fly ash with hazardous and toxic waste under the guise of beneficial use.

Mr. Picciano presented letters regarding the plans of the Lehigh Coal and Navigation Company to use cement kiln dust to reclaim a stripping pit, citing and criticizing language that would make it a beneficial use if the dust were to be mixed with fly ash.

Mr. Picciano stated the ACE believes there is a coordinated plan among DEP and the states of New York and New Jersey to dump a "toxic mixture" of fly ash and NY-NJ harbor sludge into stripping pits throughout Pennsylvania, and submitted several pieces of correspondence and press clippings he stated proved the existence of such a plan.

Under questioning, Mr. Picciano at first indicated that he had never said anything about a statewide moratorium on the use of fly ash, but later stated he favored a "…moratorium on dumping fly ash into the water table."

In response to a question about whether he [Mr. Picciano] was not willing to look at any use of fly ash at all in mine reclamation as part of a cost-benefit analysis, Mr. Picciano stated, "No, I would be willing to consider the use of fly ash. If it could be shown to be properly placed under proper conditions, it could be properly used."

While providing no written testimony, Mr. Toothman spoke generally of the impact of coal mining in his home county - Greene County in Southwest Pennsylvania. He acknowledged that Greene County had no fluidized bed power plants and he was not sure if Greene County had the same fly ash as that described as being produced by cogeneration plants.

He spoke of the output of toxic materials from coal burning power plants, suggesting that the industry is improperly regulated.

Geo-Hydro, Inc.

Mr. Charles Norris, Licensed Professional Geologist with Geo-Hydro, Inc., a geologic consulting firm from Denver, Colorado, was the next witness. His appearance was supported by the Clean Air Task Force of Boston and ACE.

Mr. Norris supports a moratorium on coal ash placement in mines and testified that Pennsylvania has moved the use of coal ash from proposal to practice

to policy with insufficient evaluation. He further claims that water degradation is "frequently" associated with ash placement in mines in Pennsylvania. He cited four examples: the McDermott site in Cambria County; the "Big Gorilla" in Schuylkill County; the Revloc Refuse Site in Cambria County and the Ernest Mine in Indiana County.

Mr. Norris further claimed that contrary to studies of the beneficial uses of coal ash due to its alkaline nature, coal ash is not effective at abating acid mine drainage, citing the Ernest Mine as evidence. Further, he stated, testing for in-field behavior of fly ash is insufficient, inappropriate and of insufficient duration.

Mr. Norris also called for a moratorium on DEP's General Permit system, which he stated allows for the disposal in non-mine settings of the same or similar ash. He stated that the General Permit system is based on DEP's faulty science in regard to the properties of fly ash.

Under questioning, Mr. Norris stated that he had looked at 10 sites in Pennsylvania without finding evidence of successes in the use of fly ash.

Under further questioning, he acknowledged that he had not conducted any testing on trace elements on any materials or sites in Pennsylvania. The performance criteria Mr. Norris cited came from statutes and regulations as published on DEP's website, through a review of permit documents, and with few exceptions, discussion with DEP staff.

Graphs, charts, and examples accompanied Mr. Norris' testimony.

Clean Air Task Force

The final witness at the hearing was **Mr. Jeffrey Stant, a consultant with the Clean Air Task Force of Boston**. Mr. Stant, whose place of work is Indianapolis, Indiana, provided no written testimony at the hearing.

Mr. Stant testified that there are 17 heavy metals in trace amounts commonly found in coal combustion waste and power plant waste that if not handled properly could do harm.

Mr. Stant presented overhead slides focusing on changes in certain fish species in other states, which he stated were caused by the leaching of fly ash. He cited the Ernest Mine in Pennsylvania, as well as cases in Indiana and New Mexico in which his studies blamed water degradation on fly ash placement.

He submitted a list of sites, the number of which had varied from 56 when first compiled three years ago to 69 sites presently, that he stated represented cases of contamination from coal ash. He noted differences of opinion on the causes with the EPA.

Under questioning, he noted that some of the problems were caused by improper placement of fly ash.

Mr. Stant concluded that there should be a moratorium on the use of fly ash in mines until there is further review of data and more monitoring, including tissue analysis of populations such as amphibians, clams and fish. He advocated more extensive use of passive treatment projects at mine sites.

ECONOMIC AND ENVIRONMENTAL CONSEQUENCES OF A MORATORIUM

Although the environmental and public health issues of coal ash placement have been addressed, we cannot overlook the economic impact a suggested moratorium would have on the utility industry in Pennsylvania. The issue begs the question, "What would happen to the waste coal industry in Pennsylvania if a moratorium were to be enacted?"

The answer is short and simple. A moratorium, as suggested, would have an immediate and devastating impact on all of Pennsylvania's coal waste facilities. It not only has the potential to result in their immediate closure, in all actuality it would result in their closure. This conclusion is drawn with the understanding that the disposal cost per ton of material at a commercial residual waste facility (landfill) is between $45 and $90, including transportation. These cost figures are based upon a survey of landfill costs. Taking the mid range of cost to be $67.50 per ton, the cost of landfilling 5 million tons of ash produced each year by the Commonwealth's waste coal facilities would be approximately $337.5 million per year. Estimating an internal cost of $5 per ton for using the ash for mine reclamation (an industry accepted figure), the incremental cost to Pennsylvania's coal waste plants would be $312.5 million per year. That is equivalent to approximately 75 percent of the total annual gross revenue of the waste coal facilities. Demanding that such a facility absorb an additional expense of 75 percent or more of its gross revenue is in fact demanding its closure. This would lead to the elimination of more than 1,000 direct jobs with an average salary of $50,000 per year.

The cost of shipping the material to a hazardous waste facility as suggested in testimony would result in even higher costs, and the cost to dispose of the ash in a hazardous waste landfill, as suggested in testimony, would actually exceed the plants' gross revenues.

In a nationwide study of the coal-fired utility industry, consultants Resource Data International, Inc. (RDI) estimate similar impacts. The RDI study estimates that designation of CCW as hazardous waste requiring landfilling would increase annual coal combustion wastes management costs by 60-70 percent. The impact would be even greater, according to the report's estimates, if coal-fired power plants are more fully utilized.

Cogeneration and the independent power producers in Pennsylvania differ from that of the traditional power industry, and this bears some explanation. Cogeneration is a process that uses a single energy source to produce electricity. Traditionally, electricity and heat energy come from separate sources. With cogeneration, heat (in the form of steam) and electric power are produced at the same time. Typically, the steam is used in an industrial process or to heat nearby buildings. Cogeneration is an extremely competitive industry. In Pennsylvania's deregulated electric utility industry, cost increases quickly affect a plant's competitive position. Because coal waste plants must burn a much greater volume of fuel to create BTU's, and create a higher volume of ash, they are more susceptible to cost fluctuations, particularly if required to haul CCW greater distances to landfills. Conventional coal plants, with the much smaller volume of ash, do not face the same landfilling costs as waste coal plants do.

In addition, waste coal plant sizes are generally smaller than conventional coal and gas-fired power plants, but require the same operational oversight. The unique Circulating Fluidized Bed (CFB) boilers are expensive to maintain, and the nature of the coal refuse and the 60 percent rock found in the fuel is abrasive and hard on the machinery, further increasing sensitivity to economic factors.

However cogeneration facilities are not permitted to increase or decrease prices when their facility costs fluctuate. Federal legislation known as the Public Utility Regulatory Policies Act of 1978 (PURPA) created the framework that allowed independent power facilities to be developed. Under this act, cogeneration and other small power production facilities are entitled to sell electricity to utilities at a negotiated price. Utilities purchase this electricity from cogeneration facilities through long-term contracts at a fixed price per kilowatt hour. The contracts typically fix the price for a 20 year period, therefore any cost increases must be absorbed by the facility and cannot be passed on to the rate payer, as with traditional power producers.

The economic benefits associated with waste coal facilities cannot be ignored. For example:

- Capital investments by waste coal facilities in Pennsylvania exceed $4 billion.
- Pennsylvania waste coal facilities have a direct annual payroll of $50 million (1,000 jobs X $50,000 salary).
- More than $57 million is spent each year by these plants for materials, goods and services.
- Approximately $1.9 million is paid in local and school taxes by these facilities.
- Subcontracted jobs by these facilities add approximately $7 million annually to the payrolls of Commonwealth employers.

These benefits would be lost with the issuance of a moratorium, as well as the environmental benefits these facilities provide. These facilities have greatly improved the local environment. Independent power production facilities that use abandoned mine refuse piles as fuel sources are required by the same federal act that governs their prices, to also remediate the abandoned site, implement erosion and sedimentation control measures and improve aesthetics. More importantly, reclamation makes this land available for other uses and suitable for investment in areas where economic development is needed. (See Appendix D, E and F.)

EXPLANATION OF POSITION/CONCLUSION

The final purpose of the Committee's investigation has always been clear, specific and simple – to issue a recommendation regarding a statewide moratorium on the use of fly ash in mine reclamation. The process of reaching a point where a recommendation can be made has been more complex. It has entailed listening to opinions from many different sources, amassing information, clarifying information, sorting out facts, reviewing the facts and using the facts to reach a conclusion.

It is the conclusion of the Committee that a statewide moratorium is not warranted. The Committee makes that recommendation for several reasons, based on facts garnered during the July 9, 2003 public hearing and from the Committee's subsequent follow-up study.

Prominent among the facts is the long-standing and well documented history and proven use of fly ash, particularly here in Pennsylvania. Coupled with that is the well established and comprehensive regulatory program in the Commonwealth. That regulatory program is marked by detailed design and performance standards, monitoring and review requirements. A review of testimony reveals a consistent theme voiced by nearly all of those testifying – proper use and proper placement of fly ash is key to its beneficial use. Unlike some other states, Pennsylvania has an organized and tested system to provide for proper use and placement.

Also part of the history of fly ash use is the positive environmental and economic benefits resulting from the industry which generates the fly ash. Such a record is rare and needs to be preserved. The record of the cogeneration industry includes the removal of 88 million tons of acid bearing coal refuse and countless culm piles from the Pennsylvania landscape, and the reclamation of 3,400 acres of abandoned minelands at no cost to taxpayers (It is estimated that the cost of such actions would otherwise average $11,000 per acre - a cost savings of $37 million.) The industry is also a sizable employer, providing close to 1,000 jobs with annual salaries averaging approximately $50,000, many in former mining areas hard hit by industry declines due to mine abandonment.

The use of fly ash for mine reclamation in Pennsylvania has a 15-year history, without controversy until recently. As a matter of fact, as cited elsewhere in this report, its use in reclamation in other parts of the state has received high praise from community leaders. The call for a statewide moratorium now is puzzling and inconsistent with Pennsylvania's historical use of fly ash.

It begs the question of whether local issues are not a driving force in this situation. Using site-specific issues, such as noise, dust, traffic and fill materials for example, to formulate statewide policy is not good policy. There are local government agencies whose responsibility it is to deal with local issues, working with the appropriate statewide regulatory bodies, in this case DEP. Both need to exercise their respective authority in regard to site-specific concerns.

The Committee is not ignoring and has not ignored the questions raised about the chemical content/composition of certain materials used in minefill projects as pointed out by the Jefferson Action Group, Inc. in supplemental material provided to the committee. That is why the Committee has recommended further independent study. However, given the extensive level of regulation of fly ash in Pennsylvania and its record, merely raising the question does not justify a statewide moratorium on use. Nor does the mere presence of certain materials necessarily differentiate fly ash from any other soil or allow for the presumption of

harm. Once again, regulation is prudent and further study sensible, but a moratorium would be misguided, albeit well intentioned, given the facts.

Further, it is the conclusion of the Committee that the testimony presented and subsequent study by Committee staff have answered the questions posed by those requesting a moratorium. The requests for a moratorium on the use of fly ash for mine reclamation, in effect, seek protection from a danger that 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 Committee thanks all of the individuals and organizations who testified at the hearing, offered written testimony and comments and otherwise communicated concerns and information to the Committee. The issue addressed in this report is not and should not be misconstrued as an "us versus them" argument. It is a situation that the Committee has sought to approach on a scientific basis, in which facts are drawn upon to reach a conclusion. No doubt, concerns, often passionate ones, continue to exist. The Committee stands ready to work with community leaders to address those concerns and broaden the scope of scientific knowledge regarding fly ash and mine reclamation in an effort to improve the administration of public policy for the Commonwealth of Pennsylvania.