COAL COMBUSTION WASTE STORAGE AND WATER QUALITY

(111–27)

HEARINGS

BEFORE THE

SUBCOMMITTEE ON
WATER RESOURCES AND ENVIRONMENT

OF THE

COMMITTEE ON
TRANSPORTATION AND
INFRASTRUCTURE
HOUSE OF REPRESENTATIVES

ONE HUNDRED ELEVENTH CONGRESS

FIRST SESSION

APRIL 30, 2009

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April 29, 2009

SUMMARY OF SUBJECT MATTER

TO: Members of the Subcommittee on Water Resources and Environment

FROM: Subcommittee on Water Resources and Environment Staff

SUBJECT: Hearing on "Coal Combustion Waste Storage and Water Quality"

PURPOSE OF HEARING

On Thursday, April 30, 2009, at 10:00 a.m., in Room 2167 Rayburn House Office Building, the Subcommittee on Water Resources and Environment will receive testimony from representatives from the United States Environmental Protection Agency, the Maryland Department of Environmental Quality, academia, and other interested parties. The purpose of this hearing is to gather more information on the relationship between the storage and disposal of coal combustion waste (CCW) and water quality.

BACKGROUND

This memorandum provides information on coal combustion storage, waste, disposal and reuse practices, regulations concerning storage, disposal and reuse, and the water quality implications of storage and disposal.

Coal Combustion Waste

In 2007, 131 million tons of ash[1], or CCW, was produced by the 460 coal-fired power plants located across the United States. CCW consists of a variety of residues that remain after coal has been burned. These materials include coarse particles that settle to the bottom of the power plant's

[1] Coal ash is referred to by a number of names, including coal combustion byproducts, waste, product, or residue. Regulatory agencies generally refer to the material as CCW. We will use this nomenclature in this memorandum.

combustion chamber, as well as fine particles that are removed from the flue gas. The various types of CCW include:

- *Fly ash:* Fly ash is captured in the power plant's stack, or chimney, by particulate removal processes, such as electrostatic precipitation or fabric filters, to avoid release into the air. It has a fine consistency like talcum powder.

- *Bottom ash:* Bottom ash consists of coarse, gritty particles that are too large to be carried in flue gases. This material either gathers on the furnace walls or falls through open grates on the floor of the furnace into an ash hopper. Bottom ash has a size and consistency similar to fine sand or gravel.

- *Boiler slag:* Boiler slag is produced when molten coal slag comes into contact with water used in power plant furnaces. The molten slag fractures, crystallizes, and then forms pellets. Boiler slag is uniform in size, hard, and durable.

- *Flue gas desulfurization (FGD) material:* FGD is a chemical process implemented in order to meet Clean Air Act emissions requirements. The process chemically combines the sulfur gases released during combustion by reacting them with a binding agent, or sorbent, such as limestone, lime, or ammonia. Depending on the FGD process used at a particular plant, the FGD material produced can be either a wet sludge or dry powder.

Of the 131 million tons of coal ash produced in 2007, the American Coal Ash Association estimates that 71 million tons is fly ash, 20 million tons is bottom ash and boiler slag, and 40 million tons is FGD material.

The physical and chemical characteristics of CCW are a function of the chemical characteristics of the source coal, coal-cleaning processes and technologies, the chemical characteristics of any co-fired materials, and the processes or technology used to burn the coal and filter the ash at a given plant. CCW represents the noncombustible constituents of coal. Therefore, the chemical constituency of the coal component of CCW is strongly influenced by the source coal used. CCW can also include the chemical characteristics of non-coal substances that may be co-fired along with the coal, such as wood, biomass, plastics, petroleum coke, tire-derived fuel, refuse-derived fuel, or manufactured gas plant waste. Finally, CCW characteristics are affected by the combustion, air emission control, and residue-handling, or CCW-handling (collection systems that will result in either wet or dry CCW), technologies used at a particular plant.

The principle constituents found in CCW include silica, alumina, iron oxide, potassium, calcium, and magnesium. The distribution of these components is a function of the regional source of the coal. Different regions produce different types of coal: for example, bituminous, sub-bituminous, or lignite.

Coal also naturally contains arsenic, barium, beryllium, boron, cadmium, chromium, thallium, selenium, molybdenum, and mercury in small concentrations, among other elements. When coal is burned, the metals become concentrated at levels higher than that found in the natural, unburned coal. Most of these metals are captured in the ash and FGD materials. While levels of these metals will vary, based on the particular source of the CCW, all CCW will likely include these materials. CCWs will also likely include toxic organic materials, such as dioxins and polycyclic aromatic hydrocarbons (PAH) compounds.

As the nation's energy needs increase and air pollution regulations become more stringent, the Department of Energy's (DOE) National Energy Technology Laboratory anticipates that the volumes of CCW produced will increase. DOE anticipates an additional 30 million tons of CCW will be produced annually within at least ten years.

Regulation of Coal Storage and Disposal

CCW is currently subject to regulation as a non-hazardous (solid waste) substance under the Resource Conservation and Recovery Act (RCRA), and is exempt from federal hazardous waste management regulations under that statute. As a result, it is regulated primarily by the states. These state statutory and regulatory requirements vary considerably. In practical terms, the primary federal role in the management of CCW storage and disposal is through Clean Water Act permitting requirements (for those CCW storage and disposal facilities subject to them).

Federal Regulation: The federal government has weighed the regulation of CCW since at least 1980. During the 1980 RCRA reauthorization, Representative Bevill introduced an amendment, which was adopted, that required EPA to defer the imposition of hazardous waste regulatory requirements for CCW until data regarding the materials' potential hazard to human health or the environment could be analyzed. This is referred to as the Bevill Amendment. According to the Congressional Research Service (CRS), since 1980, EPA has conducted various studies, submitted reports to Congress, and made regulatory determinations in response to the directives in the Bevill Amendment. Other federal agencies, such as the Department of Interior's Office of Surface Mining (OSM), have also engaged in actions concerning the storage or disposal of CCW.

In 1999, partly as a result of variations in state requirements, EPA determined that national regulations under RCRA regarding CCW disposal were needed. On May 22, 2000, EPA issued a regulatory determination[2] that concluded that CCW waste from power producing facilities did not warrant regulation as a hazardous waste under Subtitle C of RCRA.[3] However, EPA determined that national regulations as non-hazardous waste (solid waste) under Subtitle D of RCRA were warranted for CCW when disposed or stored in landfills or surface impoundments. In order to consistently regulate CCW, EPA stated its intent to promulgate regulations under Subtitle D. To date, regulations pursuant to this regulatory determination have not been proposed or issued.

In its May 22, 2000 regulatory determination, EPA also concluded that no additional regulations were warranted for CCW to be reused or used beneficially. The agency stated that it did

[2] 65 FR 32214.

[3] RCRA was enacted in 1976. It is intended to protect human health and the environment from the potential hazards of waste disposal and to ensure that wastes are managed in an environmentally sound manner. RCRA's Subtitle C creates a hazardous waste management program that directs EPA to develop criteria for identifying the characteristics of hazardous waste and to develop waste management criteria applicable to that hazardous waste. RCRA's Subtitle D establishes state and local governments as the primary planning, regulating, and implementing entities for the management of solid waste. Solid waste under Subtitle D commonly includes household garbage and non-hazardous solid waste. In 1984, the Hazardous and Solid Waste Amendments to RCRA directed EPA to establish national criteria for municipal solid waste landfills under Subtitle D.

not wish to place any unnecessary barriers on the beneficial use of CCW so that the material could be used in applications that conserve natural resources and reduce disposal costs.

In March, 2007, OSM issued an advance notice of proposed rulemaking regarding the disposal of CCW in active and abandoned mines. However, draft rules have not yet been proposed. In addition, following the December 2008 CCW release at the Tennessee Valley Authority's Kingston Fossil Plant (Harriman, Tennessee), the EPA announced on March 9, 2009 that the agency would propose regulations to address CCW disposal in landfills and surface impoundments by the end of 2009.

Some CCW storage or disposal units – especially surface impoundments, which handle wet CCW – may be subject to federal water pollution control regulations. A storage or disposal unit that has an outfall that discharges to surface water is required to meet the effluent guidelines pursuant to the Clean Water Act, and specified in a facility's National Pollutant Discharge Elimination System (NPDES) permit.

State Regulation: Other than federal water pollution regulations, and in the absence of federal solid waste regulations under RCRA, the de facto controlling regulatory regime for CCW storage and disposal is subject to the requirements of the state in which a particular facility is located. State regulations for CCW storage and disposal vary from state to state. They can also vary from storage unit to storage unit. For example, a given state may regulate landfills and surface impoundments using different regulatory requirements. Additionally, for example, older units may be treated differently than newer units, based on 'grandfathering' provisions.

CCW Management Approaches

Currently, CCW is stored in approximately 1,300 locations across the United States. Of these, 620 are actively being used. This subset includes landfills, storage ponds, and surface impoundments. The remaining approximately 700 locations are old, unused, or closed sites.

After the coal is burned in a power plant furnace, the residue is removed from the plant. Depending on a given plant's technology and processes, the CCW residue is removed in either a dry or wet form. To aid the transportation from the furnace to storage or disposal facilities, some facilities use technology that mixes the ash with water. This slurry is then pumped to storage facilities known as surface impoundments. Over time the solids will settle out in these facilities, leaving water at the surface. This water is ultimately removed from the impoundment. Surface impoundments, used for the storage of wet CCW, may be a natural or a man-made depression or diked area formed of earthen materials. Ash that is removed from facilities in a dry form is stored, or disposed of, in landfills. CCW is also disposed of, in either wet or dry forms, or as an amalgamation with other materials, in either surface or underground mines. The Utilities Solid Waste Activities Group estimates that 45 percent of operating storage and disposal sites are surface impoundments.

States use a variety of regulatory approaches for their storage facilities. Many states use their dam safety requirements to regulate the construction, operation, and maintenance of surface impoundments. CRS notes, however, that "the presence of strong dam safety requirements is not a guarantee that regulated units will actually be operated and maintained according to those requirements. The requirements may be only as strong as a state's ability to enforce them." Some states do require groundwater monitoring to detect contamination from a disposal unit. However, CRS notes that a lesser number are likely to have regulatory requirements to prevent groundwater contamination from occurring. For example, water contamination could be prevented in such an instance by the installation of a liner in older, unlined impoundments or landfills.

Water Quality Implications

In recent years, EPA has renewed its research on the potential for coal ash constituents to leach into groundwater and nearby surface water. In a series of studies, EPA researchers found traditionally applied leachate methods and tests for testing contaminant infiltration may not reliably reflect actual leaching and infiltration processes in the field. As a result, researchers have been developing more sophisticated testing techniques that better encompass the range of conditions expected to be found in the field. In late 2008, EPA's Office of Solid Waste recommended the use of some of these newer leachate methods and tests, and is in the process of adopting these testing protocols in its primary guidance for testing and evaluating solid waste.[4] Analyzing samples in conditions more similar to those actually found in the field, EPA researchers have often found significantly higher leachability of contaminants, compared to the older, traditional leachate methods. Among their findings were:

- Boron and cadmium levels that ranged from being in compliance with drinking water standards to levels ten times higher, in FGD material leachate;
- Selenium levels that ranged from being in compliance with drinking water standards to levels at least 60 times higher, in FGD material leachate;
- Barium, beryllium, boron, cadmium, chromium, thallium, selenium, and molybdenum levels that ranged from being in compliance with drinking water standards to levels not in compliance with those standards, in leachate from fly ash;
- Arsenic levels that ranged from being in compliance with drinking water standards to levels 30 times higher, in leachate from fly ash.

EPA conclusions from these studies were that CCW should not be stored or used in environments where it will come into contact with water.

Incidents of water contamination have taken place. In December 2007, a Maryland judge signed a $54 million settlement between Constellation Energy and residents of Gambrills, Maryland. Constellation Energy was penalized for dumping CCW into a wet sand and gravel quarry, ostensibly as part of a reclamation project. The CCW contaminated private wells in the area with aluminum, arsenic, beryllium, cadmium, lead, manganese, and thallium, at levels above drinking water standards.

The potential for CCW to leach contaminants after being reused (i.e. beneficial use) is a function of whether the waste is bound or encapsulated. For example, adding CCW as a component of concrete, or as a cement additive, would 'lock' toxic contaminants into the material. However, an unencapsulated use, such as for structural fill without a liner or as a soil additive, may result in the leaching of contaminants.

[4] This EPA guidance is referred to as SW-846, or 'Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.'

In addition, in March 2006, the National Research Council (NRC) issued a study that warned of the potential for water contamination from CCW disposal in underground mines.[5] The NRC committee found that the disposal of CCW in underground coal mines is a viable management option as long as the waste placement was properly planned. This planning requires an integrated process involving waste characterization, site characterization, management and engineering design of placement activities, and design and implementation of a monitoring regime. The NRC also noted that relatively little is known about the potential for the disposal of CCW in mines to degrade groundwater and surface waters, particularly over the long term.

Beneficial Reuse of CCW

Coal ash can be recycled into other products, which is referred to as "beneficial reuse." The American Coal Ash Association estimates that 43 percent of all coal ash produced in the United States was "beneficially reused" in 2007, amounting to approximately 56 million tons.[6]

Types of Beneficial Reuse: One of the most common beneficial uses of coal combustion waste is the application of fly ash in the production of portland cement, an ingredient used to make concrete. Fly ash contains silica, alumina, calcium, and iron oxides that bind to components of portland cement, which actually increase the long-term durability of concrete.[7] Additionally, fly ash used in portland cement reduces the significant greenhouse gas emissions that are normally released during the production of portland cement. Several recent projects have used fly ash in portland cement, including the new I-35W bridge in Minnesota and the Ronald Reagan Building and International Trade Center in Washington, D.C.

CCW can also be applied as a soil amendment that chemically or physically modifies the composition of the soil. It can be used to add nutrients in nutrient deficient soils, reduce soil acidity, increase the aeration in clay solids, or increase the water-bearing capacity of sandy soils.[8] However, these practices should be properly monitored to prevent soil toxicity, because constituents may leach into groundwater.

Another increasingly common beneficial reuse of coal combustion wastes is that of flue gas desulfurization residues, which are used as synthetic gypsum in order to make wallboard. This has become economically attractive to the wallboard industry, which has increasingly opened new plants near coal utility facilities.[9]

There are also several other less common examples of beneficial reuse of CCW. Bottom ash and fly ash may also be used to create structural fill to produce road base materials, manufactured aggregates, flowable fills, and embankments. Boiler slag is commonly used as a component of roofing tiles and shingles, as well as a component of sand-blasting abrasives. Additionally, CCW is

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[5] NRC. 2006. *Managing Coal Combustion Residues in Mines.*
[6] *See Ibid.*
[7] Federal Highway Administration. "Fly Ash Facts for Highway Engineers." http://www.fhwa.dot.gov/pavement/recycling/fafacts.pdf
[8] Carlson, C.L., and D.C. Adriano. 1993. Environmental impacts of coal combustion residues. Journal of Environmental Quality 22:227-247.
[9] National Academy of Sciences. "Managing Coal Combustion Residues in Mines." Page 47.

used as traction control material on snow- and ice-covered roadways and as a performance enhancing product in paints, coatings, and adhesives.[10]

Potential Issues with Beneficial Reuse: There has been broad agreement that beneficial reuse of CCW is preferable to the storage of coal ash in landfills, mines, or surface impoundments. The EPA came to a similar conclusion in its 2000 regulatory determination on CCW, which explicitly states that its regulation under RCRA Subtitle C or D is unwarranted when coal ash is "beneficially reused." EPA concluded that such uses are unlikely to present significant risks to human health or the environment, and that regulating CCW as a hazardous waste would probably discourage its reuse and result in a greater harm to the environment.[11]

However, it is worth noting that broad studies have not been conducted examining the potential ecological or human health impacts of beneficially reused CCW. Some environmentalists have voiced skepticism that all beneficial reuses of CCW are safe. For example, one study shows that the use of fly or bottom ash in golf course root mix resulted in increased toxicity levels in leachate, compared to a control group.[12] EPA and other organizations recognize that CCW needs to be managed properly and that precautions should be applied when using CCW in unencapsulated uses. Therefore, while beneficial reuse may be less environmentally harmful than storing CCW in landfills, surface impoundments, or mines, more research may be necessary to make a more reliable determination of the circumstances when beneficial reuse of CCW is appropriate.

WITNESSES

Panel I

Mr. Barry Breen
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Accompanied By:
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Acting Assistant Administrator
U.S. Environmental Protection Agency
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[10] National Academy of Sciences. "Managing Coal Combustion Residues in Mines." Page 46-47.
[11] EPA. "Regulatory Determination on Wastes from the Combustion of Fossil Fuels; Final Rule." 40 CFR Part 261. http://www.epa.gov/osw/nonhaz/industrial/ special/fossil/ff2f-fr.pdf
[12] Schlossberg, Maxim J. and William P. Miller. "Trace Element Transport in Putting Green Root Mixes Amended by Coal Combustion Products (CCP)." *Coal Combustion Byproducts and Environmental Issues.* 2006.

Ms. Catherine McCabe
Acting Assistant Administrator
U.S. Environmental Protection Agency
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Hon. Shari Wilson
Secretary
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Vice President of Environmental Services
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Mr. David Goss
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Aurora, Colorado
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Dr. Conrad Volz
Assistant Professor, of Environmental and Occupational Health
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Pittsburgh, Pennsylvania
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HEARING ON COAL COMBUSTION WASTE STORAGE AND WATER QUALITY

Thursday, April 30, 2009

HOUSE OF REPRESENTATIVES
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT,
Washington, DC.

The Subcommittee met, pursuant to call, at 10:00 a.m., in Room 2167, Rayburn House Office Building, the Honorable Eddie Bernice Johnson [Chairwoman of the Subcommittee] presiding.

Ms. JOHNSON. I would like to call the Subcommittee to order this morning. We will be holding a hearing on coal combustion waste storage and water quality.

A month ago, this Subcommittee met to evaluate the impacts of the coal ash slide at the Tennessee Valley Authority's Kingston power plant. In that hearing, I noted that this issue was going to be something that this panel would be revisiting in the future. Today's hearing is a first step towards fulfilling that commitment.

In March we learned about the implications of Federal neglect. The collapse of the Tennessee Valley Authority's Kingston coal ash impoundment was not an act of God, nor was it the result of random fate. The release of millions of cubic yards of coal sludge onto a formerly beautiful landscape and the desiccation of a thriving river were the predictable results of regulatory neglect and ineffective Federal oversight. In short, Federal standards for structural integrity would have gone a good way towards preventing an incident that has impacted the lives of thousands in Tennessee.

Our hearing in March forced us to ask the question: How many other Kingstons are out there? The Kingston spill opened this Subcommittee's eyes to the presence of hundreds of similar facilities around the Country. This is not just a Kingston problem or a Tennessee Valley Authority issue; it is a national problem.

A simple question therefore arises: How safe are these coal ash storage facilities? As we learn more about these storage sites, it becomes clearer that there are some significant public safety, human health, and ecological risks associated with many of them.

Even if these storage facilities do not rupture, they can threaten grave human health concerns. Because of the propensity of certain types of these facilities to leach contaminants, nearby residents face significantly higher risks of developing cancer or suffering from other harmful effects from contaminated groundwater and surface water.

These coal ash storage facilities aren't just statistical threats of course. In recent years, the Environmental Protection Agency has demonstrated damage to groundwater or surface water from a number of these sites. Indeed, a number of these “damage” or “potential damage” sites are located in the districts of Members of this Committee. At sites in Alabama, Wisconsin, and Illinois, the EPA has noted instances where groundwater and surface water contamination has taken place, likely as a result of irresponsible coal ash storage practices. These violations of the law and threats to human health must be put to an end.

It should be obvious by now that this hearing is about the impacts of coal ash storage on human health and the environment. Any insinuation that this hearing is for anything otherwise would seem to be an effort to distract attention away from the harms that are taking place. We are holding this hearing today to ensure that the true costs of burning coal, and its subsequent disposal, are not passed downstream. Families should not have to bear the brunt of pollution to cut corners on costs. Cancer should not be the price borne by working men and women for reckless coal ash disposal.

That a variety of human health risks have been shown in EPA studies, and in that EPA has demonstrated actual damages raises a number of questions about the regulation of coal combustion waste. As such, this hearing is as much about EPA’s past and future role on this issue as anything else.

By the time this hearing is complete, I hope to have answers or commitments on a number of issues:

One, has EPA initiated enforcement actions or required corrective actions at all of the facilities identified in its 2007 Damage Assessment in which damage has been proven?

Two, does EPA stand by its findings that surface impoundments, especially unlined surface impoundments, cause a grave threat to water quality, aquatic ecosystems, and human health?

Three, in addition to investigating structural integrity, will EPA make a commitment to administrative action that will result in a minimization of risks to water quality?

I, along with other Members of the Subcommittee, look forward to what will be an illuminating hearing today.

I thank you for being here and I now recognize the Ranking Member, Mr. Boozman of Arkansas.

Mr. BOOZMAN. Thank you, Madam Chair. I appreciate our witnesses taking the time to be with us today.

Today, the Subcommittee continues its review of the potential water quality impacts of coal ash storage. This hearing continues what is becoming an all too familiar refrain from the Committee on Transportation and Infrastructure: the declining state of our Nation’s infrastructure.

While public and private utilities have safely operated approximately 600 coal ash sites for decades, with only a few documented failures, the spill at the TVA Kingston site once again reminded us of the damages that can occur when our infrastructure is taken for granted. Homes were rendered uninhabitable, water mains and gas lines were ruptured, and nearby neighborhoods had to be evacuated.

Thankfully, no one was hurt. But it is my sincere hope that what occurred at the Kingston coal ash disposal site was an isolated incident.

Additional laws or Federal regulations would probably not have prevented this terrible accident. New laws or regulations will not replace homes, family treasures, heirlooms, or other personal property lost as a result of the Kingston spill. Even if coal ash was regulated as a hazardous material under Subtitle C of the Resource Conservation Recovery Act, it is unlikely this spill or others would have been prevented.

In fact, the Environmental Council of the States recently reiterated its position that the States, not the Federal Government, should be responsible for the regulation of coal ash as a nonhazardous waste. When Carol Browner was the Administrator of the EPA during the Clinton Administration, she determined, in May 2000, that fossil fuel combustion waste should not be regulated as hazardous waste. In addition, in 2006, the EPA also determined that mercury is retained by the resulting coal combustion residents and is unlikely to be leached at levels of environmental concern.

When managed properly, coal combustion waste can be beneficially reused for construction materials used on our highways, bridges, buildings, and other infrastructure projects. This reuse has resulted in significant economic, social, and environmental benefits. Since 2000, it is estimated that the recycling of coal combustion waste has displaced more than 120 million tons of greenhouse gases. During that same time, more than 400 million tons of coal combustion waste had been recycled in not just construction materials, but in mine reclamation, agriculture applications, soil mediation, and many other everyday uses.

Recently, it has come to light that the coal combustion waste was a key component in the construction materials used in the I-35 bridge replacement project in Minnesota. In addition, coal combustion waste was used in the construction of the Ronald Reagan Building here in Washington, D.C., which houses many of the EPA offices.

Coal combustion waste can be properly managed to reduce its risk and turn much of it into beneficial products. We must be careful that we do not needlessly over-regulate coal combustion waste. If we try to regulate it has a hazardous substance, recyclers are afraid to handle it and make good use of this material.

I appreciate you, Madam Chair, Mrs. Johnson, for holding this important hearing, and, again, I appreciate the fact of the witnesses here and look forward to their testimony. Thank you very much. I yield back.

Ms. JOHNSON. Thank you very much.

On our first panel, we are pleased to have witnesses from both EPA and the State of Maryland. Testifying first is EPA's Acting Administrator for Solid Waste and Emergency Response, Mr. Barry Breen. Accompanying Mr. Breen is EPA's Acting Administrator for Water, Michael Shapiro, and the Acting Administrator for Enforcement and Compliance Assurance, Catherine McCabe. Mr. Shapiro and Ms. McCabe will be available for questions.

Our second witness is Maryland's Secretary for the Environment, Shari Wilson.

We welcome all of you. Your full statements will be placed in the record, and we ask if you would try to limit your oral testimony to five minutes.

I will now call on Mr. Breen.

TESTIMONY OF BARRY BREEN, ACTING ASSISTANT ADMINISTRATOR, U.S. ENVIRONMENTAL PROTECTION AGENCY, OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE, ACCOMPANIED BY MICHAEL SHAPIRO, ACTING ASSISTANT ADMINISTRATOR, U.S. ENVIRONMENTAL PROTECTION AGENCY, OFFICE OF ENFORCEMENT AND COMPLIANCE ASSURANCE, AND CATHERINE MCCABE, ACTING ASSISTANT ADMINISTRATOR, U.S. ENVIRONMENTAL PROTECTION AGENCY, OFFICE OF ENFORCEMENT AND COMPLIANCE ASSURANCE; AND THE HONORABLE SHARI WILSON, SECRETARY, MARYLAND DEPARTMENT OF THE ENVIRONMENT

Mr. BREEN. Thank you, Madam Chairman and Members of the Subcommittee. As you said, I am the Acting Assistant Administrator for the EPA's Office of Solid Waste and Emergency Response. Thank you for the opportunity to be with you this morning.

EPA's efforts involve multiple offices within the agency, as you observed, and with me today are two of my EPA colleagues, Mike Shapiro, the Acting Assistant Administrator for the Office of Water, and Catherine McCabe, the Acting Assistant Administrator for the Office of Enforcement and Compliance Assurance.

The testimony today will provide a brief history of EPA's regulatory efforts on coal combustion residuals and an update of our current rulemaking activities. I will summarize my testimony, but, as you indicated, if you would include the full testimony in the record, we would be grateful.

Coal combustion residuals, or CCR, are one of the largest waste streams generated in the United States. Approximately 131 million tons were generated in 2007. In 2007, approximately 36 percent was disposed in landfills, 21 percent was disposed of in surface impoundments, 38 percent was beneficially reused, and 5 percent was used as mine fill.

The beneficial use of coal combustion residuals provides environmental benefits in terms of energy savings, greenhouse gas emission reduction, and resource conservation. In 2007, 56 million of the 131 million tons generated were reused. However, as we know, coal combustion residuals typically contain a broad range of metals, including arsenic, selenium, and cadmium; and, due to the mobility of these metals and the large size of a typical disposal unit, metals, especially arsenic, may leach at levels of potential concern from impoundments and unlined landfills.

In May 2000, EPA issued its regulatory determination on waste from the combustion of fossil fuels. At that time, we conveyed EPA's determination that these residuals did not warrant regulation as hazardous waste under Subtitle C of the Resource Conservation and Recovery Act. But we also concluded that Federal regulation as a non-hazardous waste under Subtitle D of RCRA was warranted.

After that 2000 regulatory determination, EPA continued to collect new information and conduct additional analyses. In August 2007, we made this information available for public comment through a Notice of Data Availability. The comment period closed in February 2008 and we received nearly 400 comments. We commissioned a peer review of the draft risk assessment, and that peer review was finished in September 2008

The failure of the ash disposal cell at the TVA's Kingston plant in December served as a wake-up call to many about the importance of our coal combustion residual efforts, and it highlighted the issue of impound stability. Our previous regulatory efforts had not included this element. But we are now analyzing and considering whether to specifically include impoundment integrity as part of our CCR regulatory development.

We are committed to issuing proposed regulations for the management of coal combustion residuals by electric utilities by December 2009. We are currently evaluating a number of different approaches, including revising our May 2000 regulatory determination. As part of our efforts, we are reviewing all the information we have, including all of the comments received, from our 2007 Notice of Data Availability and the peer review of the risk assessment.

The spill also provided the impetus for our efforts to assess the stability of impoundments and other management units that contain wet-handled coal combustion residuals. We are gathering facility information and performing site visits or other independent assessments of other State and regulatory agency inspection reports and appropriate follow-up.

In March, we sent out information request letters under the Superfund statute to 162 facilities and 61 utility headquarters. We have all of the responses but two of the individual facility responses, and we will be following up with those, as well as an additional 43 facilities that we have since identified. We plan to begin our facility field work in May, next month

In addition to the ongoing work of our office, the Office of Solid Waste and Emergency Response, the Office of Water has its own efforts underway regarding water discharges from surface impoundments and is currently studying whether national effluent limitation guidelines for power plants need to be updated. EPA is also evaluating disposal practices at coal-fired power plants to determine if these facilities are in compliance with existing Federal environmental laws, and we will take enforcement action, where appropriate, to address serious violations.

That concludes my prepared remarks. Thank you for the opportunity to appear, and my colleagues and I would be pleased to answer your questions as we proceed.

Ms. JOHNSON. Thank you very much.

Ms. Wilson.

Ms. WILSON. Good morning, Chairwoman Johnson and Members of the Committee. It is a pleasure to be here. My name is Shari Wilson, and I am the Secretary of the Maryland Department of the Environment. We are pleased to have the opportunity to share with you an overview of our experience and our regulatory program for coal combustion waste.

By way of background in Maryland, 60 percent of our energy comes from coal-fired power. Our Maryland plants generate approximately 2 million tons of coal combustion waste product annually. With the implementation of more stringent air quality requirements over the next several years to improve air quality in Maryland, we expect the volume of material of coal combustion waste to double, so our material will double by 2013. We are also active supporters of the notion of the reuse of this material. There are many safe, beneficial reuses.

In Maryland, we have essentially three types of storage or disposal. We have an active mine reclamation program, so this material can be used in the reclamation of coal mines and the reclamation of surface mines, and then our third type of disposal is a straight-up landfill type disposal. We do not have the liquid waste lagoons, such as Tennessee had and experienced with that spill, yet, we think our experience with this product is important to share.

In 2007, with a new State administration in place, we began to review the requirements in the State for the disposal of this material, both through mine reclamation and straight-up disposal. Concurrently with that review, we were faced with two contamination situations: one surface mine reclamation site, where over 5 million tons of material was disposed of, was resulting in groundwater contamination and, very unfortunately, that resulted in four residential wells that were impacted.

As a result of that situation, the State brought the third largest water enforcement case in State history, required remediation of the site and immediate provision of an alternative water supply and eventual connection to a public water supply for the homes that were impacted.

There is a second ongoing enforcement action related also to surface disposal that is resulting in impacts to surface water.

So while we don't have the liquid slurry type of lagoons in storage, we have experienced contamination problems from the type of disposal that we did have.

We made a decision in 2007 that, since EPA had not moved forward to set standards, that the State would, and since that time, through an outstanding effort by our technical staff and with the support of advocates and the regulated community, we have put in place a series of requirements that I wanted to share with you this morning.

For surface mine reclamation and landfill type disposal situations, we have put in place new permit requirements that are basically equivalent to modern industrial landfill standards, and we have done that through State regulation.

We have improved the requirements related to the use of coal combustion waste in coal mine reclamation, mostly enhanced groundwater monitoring to make sure that that process is safe.

We have also put in place a reporting requirement for our generators of coal combustion waste, so we receive now annual reports on the volume of material that is generated and the characteristics of that material, which is very important for the disposal scheme. There are many types of coal combustion waste. The proper disposal is determined in large part by the type of coal that was burned, so it is important to know exactly the type of material that we are dealing with.

And, most recently, during the past State legislative session, the General Assembly of Maryland has authorized the Department of the Environment to place a per ton fee on the generation of this material, specifically to pay for those regulatory efforts I just mentioned. We do not have a funding source for that activity, and this will sort of close the loop and allow us to fully move forward implementing this new regulatory scheme.

We have some future steps that we are planning for this year. We are going to put in place regulatory requirements for the transportation of the material and, also, we are going to put in place requirements to define the safe, beneficial reuses of the material. Our goal is to reuse the material where it can be done safely, but we would like to put in place standards setting forth where that is practical and safe.

We have been a strong advocate for the fact that there should be Federal standards for the disposal of coal combustion waste. We testified before the Subcommittee on Energy and Mineral Resources, last summer, that there should be some minimum Federal threshold. We are very encouraged by EPA's actions to move forward and we look forward to working with them and providing our experiences and opinions on the best way to do that.

For your purposes this morning, though, I wanted to reiterate that, from our perspective, it is not only the liquid waste that needs to be controlled, but it is also other types of disposal, as well as beneficial reuse. So we really appreciate your taking the time this morning to address these issues. We appreciate the opportunity to share Maryland's experience. We have enjoyed great support from Congresswoman Edwards, and we appreciate her interest in the issue, and we would be happy to try to answer any questions you may have. Thank you very much.

Ms. JOHNSON. Thank you very much. Let me just ask you, given the experience of groundwater contamination in Gambrills, does the State of Maryland believe that the coal ash contains hazardous substances?

Ms. WILSON. As I said earlier, there are distinct types of coal ash, and the toxicity levels of that ash are determined in part by the type of coal that is burned to generate the power. In the case of the Gambrills contamination, the groundwater contamination, yes, we were concerned that there were constituents of hazardous substances that could possibly leach to monitoring wells. So the answer to that question would be yes.

We do not, however, believe that it is necessary to regulate coal combustion waste as a hazardous waste. By and large, the data that we have shows that it is not a hazardous waste.

Ms. JOHNSON. It is not a hazardous waste, but sometimes it contains hazardous substances.

Ms. WILSON. Yes.

Ms. JOHNSON. Give me an idea of how you think it should be dealt with.

Ms. WILSON. Well, we believe that the disposal needs to be controlled through essentially requirements that are similar to those that we use for landfills. So, in other words, in Maryland we did not have, at the Gambrills site, we did not have a liner in place for the disposal of that material. Clearly, we know now that that is required and our new standards do in fact require that.

Based on our technical staff's assessment of the coal combustion waste and, again, the range of different types of coal combustion waste, it is essential to have proper controls in place to ensure that, as rain falls, materials are not leaching through and reaching groundwater. We know from our experience in regulating both municipal solid waste landfills and industrial landfills that it is possible to put those types of controls in place and to prevent that leaching, which is the goal here, in our view.

Ms. JOHNSON. Thank you.

Mr. Breen, at what date did EPA determine that it would develop regulations for coal ash storage and disposal?

Mr. BREEN. In May 2000, we determined that it was appropriate to move forward in developing regulations, and we published that regulatory determination then; and, of course, we have continued to reevaluate that. Then, of course, after the Kingston spill in December, it brought a new focus to the kind of regulation that would be needed.

Ms. JOHNSON. So there are currently regulations in place?

Mr. BREEN. No, ma'am, not at the Federal level, and not under RCRA. There are probably dam regulations that the EPA does not administer, but not at the Federal level under RCRA.

Ms. JOHNSON. So nothing really has happened in EPA the last eight years.

Mr. BREEN. In May 2000 we made the regulatory determination, but we also indicated it was worth continued evaluation, and several things have happened since then. There was a National Academy of Sciences study that was finished in 2006 on the mine filling of coal combustion residuals. In addition, we re-prepared and revised the risk assessment for the material and we revisited the damage cases, and we published that material in August 2006 for public comment. We took public comment and got about 400 comments, and then we put the draft risk assessment out for peer review, and that was finished in approximately September 2008.

Ms. JOHNSON. So, in eight years, hardly anything happened, and now you are beginning to look at—do you believe that delay has resulted in any health consequences?

Mr. BREEN. That is hard to know. It is also hard to know what would have happened, of course, but it is a complicated area, both factually and legally, and the steps we have to go through to prepare a rulemaking are those that involve preparing a careful record.

Ms. JOHNSON. So it is cumbersome.

Mr. BREEN. Yes, ma'am, of course.

Ms. JOHNSON. So, because it is cumbersome, you just ignored it.

Mr. BREEN. No, ma'am.

Ms. JOHNSON. Tell me what you did to——

Mr. BREEN. From May 2000 to now? The National Academy of Sciences study, took several years, and it involved some of the best scientists available to advise not just the EPA, but to advise Federal agencies and the Congress generally. The draft risk assessment needed to be prepared and the peer review on that, by top scientists as well; and then the damage cases, the review of now, we think, 24 proven damage cases and the assembly of the facts on those; and then the public comment on all of that material.

Ms. JOHNSON. So you are saying that you just had discussion with some of the scientists and nothing else. What were the findings?

Mr. BREEN. The National Academy of Sciences found that enforceable Federal standards should be established for mine filling, and it listed several possibilities, some within EPA's jurisdiction and some within the Office of Surface Mining jurisdiction.

But I think it is also fair to say that there are other beneficial reuses as well, and one of the things we have done is explore what beneficial reuses can safely be made, such as in drywall, for example, or in some cement and concrete applications; and that work has gone forward as well, in addition to the draft risk assessment that involved a careful study of what the risks are. There are several metals of concern and each of them needs to be thought through.

Ms. JOHNSON. What causes it to be eight years with few results?

Mr. BREEN. Of course, the results are what they are, and it just takes time.

Ms. JOHNSON. Thank you.

Mr. Shapiro, do you have any idea why EPA has allowed many power plants to discharge toxic metals and pollutants into the Nation's water, with no permit limits whatsoever?

Mr. SHAPIRO. The releases from these facilities are subject to the NPDES permitting program, the National Pollutant Discharge Elimination Systems, which is run by EPA but administered, in most cases, by authorized State agencies. Those limits have to reflect required national effluent limits, as well as any controls that are necessary to meet local water quality standards in the receiving waters. Our national effluent guideline limits for this industry segment are quite old. They only require limits on total suspended solids, as well as oil and grease; they do not address, currently, any individual toxic metal components or other individual components.

In some cases, States have added requirements to monitor certain toxic components, such as selenium and mercury, but, again, in those cases they may not have established numeric limits. That would be at the discretion of the permit writer, and it is very difficult to establish such limits given the information currently available.

Ms. JOHNSON. Has it occurred to you that you might have some responsibility to initiate some measure to protect the public's health?

Mr. SHAPIRO. Yes. We are actually in the process of reviewing those existing effluent guidelines and will be making a determination later this year as to whether to revise them in order, for example, to address limitations on specific toxic constituents.

Ms. JOHNSON. Now, I know the last guidelines that I am aware of were developed in 1982. Has anything been done since then?

Mr. SHAPIRO. We initiated work, I think two years ago now, to review those guidelines and to begin to gather data from the industry and from our own onsite sampling in order to make sure that we can characterize properly the effluent from these facilities and begin to evaluate the need for new regulations and understand the technologies that would be necessary if we should establish new limits.

Ms. JOHNSON. Have you decided it is important to do something about this or——

Mr. SHAPIRO. We haven't reached any final decisions yet. I think there is significant data that we have accumulated that make this decision a very high priority for us.

Ms. JOHNSON. Who is we?

Mr. SHAPIRO. The Environmental Protection Agency. The program is administered by the Office of Water.

Ms. JOHNSON. Do you feel you have any responsibility to initiate some leadership in making sure that something gets attention and perhaps get some procedures in place to correct it?

Mr. SHAPIRO. Well, again, the information that we have to date I think makes addressing this decision a high priority for us, and we intend to do so as soon as we can complete our work and put together a series of recommendations that would ultimately have to be approved by the Administrator.

Ms. JOHNSON. Could you submit to this Committee your plans and procedures that you are putting together in the next 30 days?

Mr. SHAPIRO. I would be happy to do so.

Ms. JOHNSON. Thank you.

Mr. Boozman.

Mr. BOOZMAN. Thank you, Madam Chair.

Ms. Wilson, you noted that, in February 2009, EPA requested the States to express their preference concerning three possible options, and I believe that you chose the non-hazardous waste option. Can you tell us the advantages of that approach versus the other options that EPA laid out?

Ms. WILSON. Yes. We are continuing to examine the issue, so it is a process that is iterative. But the advantages of regulating under Subtitle D, we believe, are that we think that that is a very known process. We already have it in place, there aren't legal authority questions associated with it, and we think that, given the nature of this material, it will be effective.

There are also advantages and disadvantages of regulating it as a hazardous waste. One of the concerns we have with regulating as a hazardous waste under Subtitle C would be that that is a very stringent regulatory process, and we are concerned that it would have the unintended consequence of discouraging beneficial reuse. And with the increase in the volume of this material that I think we are all going to face, it is very important to ensure that we are doing all we can to encourage beneficial reuse.

So you can see the merits of all three of the different approaches. I think that, at this point—and we may learn more which could change our opinion, but, at this point, regulating under Subtitle D would seem to us to be, one, protective, and that is the most important aspect, of course, of public health; but it also is a known process and we are confident that it will work.

Mr. BOOZMAN. So if you are in a building and the concrete there has hazardous waste in it, you are working in the building and the office wall, like I say, has hazardous waste, it really helps the integrity of—the concrete is inert, it is just something that most people might not want.

Ms. WILSON. Well, as Mr. Breen said, there are many safe, beneficial reuses, concrete being one. I believe that if EPA were to regulate the material as the hazardous waste, there would be an exemption for beneficial reuse and there would still be an intent to encourage reuse. So it is not so much that situation as just generally——

Mr. BOOZMAN. But there would be some stigma associated with that.

Ms. WILSON. Yes, I agree.

Mr. BOOZMAN. That was the point I was trying to make.

Ms. WILSON. Yes, I agree.

Mr. BOOZMAN. Mr. Breen, you have heard from Ms. Wilson that her State feels like that is the route to go. In your questioning and things, the Environmental Council of States have expressed a similar view. Have any of the States chosen one of the other two alternatives?

Mr. BREEN. I am not aware of any States choosing another alternative at this time. But, at the same time, I haven't done an exhaustive study. There is an important review and survey of that work prepared by the Association of State and Territorial Solid Waste Management Officials, and we would be happy to provide that to you for your use.

Mr. BOOZMAN. Good. Thank you. I guess, really, we are talking about a couple different things: we are talking about storage problems and then we are talking about whether or not it is hazardous waste or not. I mean, those are two different issues. Are most of the storage problems—and I agree with Ms. Johnson in the sense that we need to fix this where it is safely stored. We also need to regulate it such so, when it eventually winds up in the water system, that it is safe water going back in there. Okay?

Are most of the problems that we are experiencing, do they have to do with the older facilities versus the new facilities that are coming online? Is the standard higher with the new facilities?

Mr. BREEN. We do have some information on that. We have a study of facilities that were new between 1994 and 2000, so a 10- to 11-year period, and all of the surface impoundments built during that time have liners, which is an important safeguard; and nearly all, but not quite all, of the landfills have liners, 97 percent have liners. In terms of groundwater monitoring, 81 percent of the surface impoundments have groundwater monitoring, so many, but, again, not all have groundwater monitoring. And of the landfills, 98 percent. So many, many, but not quite all have groundwater monitoring.

So there is a good record, but not a perfect record in that regard.

Mr. BOOZMAN. And the facility that we had problems with, it did not have a liner, is that correct?

Mr. BREEN. That is my understanding. And we can get you more information on that facility if you would like.

Mr. BOOZMAN. Very good.

Thank you, Madam Chair.

Ms. JOHNSON. Thank you very much.

The Chair now recognizes Ms. Edwards.

Ms. EDWARDS. Thank you, Madam Chairwoman, and thank you to all of our witnesses today.

I have a question for you, Mr. Breen. In layperson's terms, what exactly is the definition of a hazardous waste?

Mr. BREEN. Thank you. I will do my very best. One judge calls this a mind-numbing problem.

A hazardous waste is a defined term under the Resource Conservation and Recovery Act, and it can be defined as hazardous waste in either of two ways: either EPA has listed it as a waste, and there are several hundred listed waste streams; or it can be a hazardous waste if it exhibits any one of four toxicity characteristics: TCLP, toxicity, corrosivity, ignitability, and reactivity. Thank you. ICRT.

Ms. EDWARDS. All right. So let me ask you what is it about coal ash, the waste, that makes it not a hazardous waste?

Mr. BREEN. Thank you. So EPA has not listed it as hazardous.

Ms. EDWARDS. Okay, I got that part.

Mr. BREEN. So on the first one, and, in fact, under a statute often called the Bevell amendment, named after Congressman Bevell, there are special steps we would have to go through in that regard. But, in addition, coal ash, as a whole, and coal combustion residuals, rarely test positive for those four characteristics. A small percentage of the time they do, but overwhelmingly they don't test positive for the four characteristics.

At the same time, they contain, within them, metals. For example, arsenic and mercury, and those metals are identified as hazardous substances under CERCLA, under the Superfund statutes. So there are hazardous substances in coal combustion residuals, even though, as a whole, they have not been listed as hazardous waste and tend not to test out under those four characteristics.

Ms. EDWARDS. So let me ask you this. According to the EPA's 1999 report to Congress on waste from combustion of fossil fuels, "Low income communities and people of color shoulder a disproportionate share of the health risks from these wastes. The poverty rate of people living within one mile of power plant waste facilities is twice as high as the national average and the percentage of non-white populations within one mile is 30 percent higher than the national average."

And it goes on to say "Similar high poverty rates are found in 118 of the 120 coal producing counties where power plant wastes increasingly are being disposed of in unlined, unregulated mines, often directly into groundwater."

So for those 118 low income communities and communities of color, what is the hazard to them?

Mr. BREEN. Thank you. So there are probably several hazards. One is a groundwater release in an unlined facility, especially, a release in groundwater and metals——

Ms. EDWARDS. And a substantial number of them are unlined?

Mr. BREEN. Yes, especially those built longer ago than those built recently. So groundwater contamination is certainly of concern; surface water contamination is of concern; and then, of course, the stability of the impoundments themselves, the kind of catastrophic single disaster event like in the Kingston facility, would be of concern too. Not so much a long-term exposure, but just the sheer volume of over a billion gallons of water in the Kingston example.

Ms. EDWARDS. And have you updated the 1999 report?

Mr. BREEN. Not to my knowledge, but we can check.

Ms. EDWARDS. So you don't have recent data on the phenomenon of the impact on low income communities and people of color of 118 of the 120 coal producing counties?

Mr. BREEN. I haven't seen an update.

Ms. EDWARDS. Thank you.

Lastly, Secretary Wilson, thank you for being here. I think we are doing tremendous things in Maryland. Would Maryland have a problem complying with EPA regulations should EPA decide to regulate coal ash as a hazardous waste?

Ms. WILSON. No. If that is a determination, Maryland will abide by the Federal requirements, so we would not have a problem complying. It is really more a matter of a policy question and what the most effective approach is.

Ms. EDWARDS. And have you had an opportunity to analyze any of the data that you have collected from groundwater monitoring; looking at, particularly, the impact unlined facilities from neighboring states where contaminated water has seeped over into Maryland's waterways?

Ms. WILSON. I am not aware of any impact from out-of-State facilities to Maryland, but we are certainly aware of an impact from our in-State facilities to our groundwater and are very concerned about those public health impacts.

Ms. EDWARDS. Thank you, Madam Chair.

Ms. JOHNSON. Thank you very much.

Mr. Hall, who knows firsthand what neglect will do for cleanup.

Mr. HALL. Thank you, Madam Chair, Ranking Member Boozman, and thank you to our witnesses.

Acting Assistant Administrator Breen, I wanted to ask you if you could elaborate more on your guidelines for mine filling, please.

Mr. BREEN. At the present time, I don't know that we have guidelines at the Federal level on mine filling, and I will turn to Secretary Wilson to see if she can elaborate.

Ms. WILSON. Thank you for the question.

We have requirements for two types of mines, deep coal mines and then surface mines. With regard to the latter, surface mines, our new set of requirements are basically akin to State industrial landfill type regulations. With regard to the deeper coal mines, the requirements are primarily twofold: one is to make sure that the volume of coal combustion waste product and the type of that product is appropriate so that you get the right balance to combat acid mine drainage and to make sure that the characteristics of the leachater are stable and they are positive and not a negative impact; and then the second important part of that set of requirements is groundwater monitoring.

Mr. HALL. You said in your testimony you were concerned not only about liquid wastes, but also by-products. What would those be?

Ms. WILSON. Well, I may not have been very clear, but, in Maryland, we don't have these impoundments that contain liquid waste; we are mostly dealing with mine reclamation and just disposal. So while, rightfully so, there has been a tremendous amount of discussion about liquid waste and slurry lagoons, we don't face that situation yet; we are concerned about ensuring that public health is protected in the mine reclamation area and then in the regular disposal of non-slurried coal combustion waste.

Mr. HALL. Thank you.

Acting Assistant Administrator Breen, would you be agreeable to, or do you think the Agency would be agreeable to, labeling of or notification for concrete or lightweight aggregate or other materials that are made with CCW as a component?

Mr. BREEN. Thank you. Congressman, may I first ask my colleague to answer part of your question that you asked a moment ago about mine filling? The drinking water program does have a role in that.

Mr. SHAPIRO. Thank you. Just to add to Barry's comment, under the underground injection control program, which is a program administered by EPA and authorized States under the Safe Drinking Water Act, certain types of mine backfilling operations would be considered injection wells and would be regulated under one of the categories of our underground injection control program, and there are minimum national requirements which some States build upon in regulating these kinds of facilities. Again, not necessarily every backfill operation, but those that constitute wells, of which, in 1999, we documented there were about 5,000 such backfill wells in the Country are subject to our underground injection control program.

Mr. HALL. Okay. And regarding labeling or notification of products that have "beneficial uses" and that have CCW as a component, like concrete or cinder blocks, would you speak to these products?

Mr. BREEN. And your question, Congressman, is whether we would be open to considering providing some guidelines for labeling in that regard?

Mr. HALL. Right.

Mr. BREEN. And we would be happy to.

Mr. HALL. And regarding the metals of concern that you spoke about, cadmium, arsenic, mercury, et cetera, which are generally considered to be poisons, especially when they exceed the standards by 30 times or so, are they the same in coal as they are in clean coal?

Mr. BREEN. I am going to have to get you that answer for the record, I am not familiar.

Mr. HALL. Well, I have just been watching TV a lot, and I guess I have heard that term enough times that I wanted to ask that question on the record.

Mr. BREEN. Thank you.

Mr. HALL. Is clean coal any different than regular coal in terms of the content of, or emissions of, or residue of arsenic, mercury, cadmium, and other poisonous metals?

Mr. BREEN. I will get you that answer for the record. I am not personally familiar.

Mr. HALL. Thank you very much, Madam Chair. I yield back.

Ms. JOHNSON. Thank you very much.

Mr. Teague.

Mr. TEAGUE. Thank you, Madam Chair and Ranking Member. I would like to also thank all of the members of the panel that are here.

Secretary Wilson, could you describe to me Maryland's position towards the regulation of the reuse of the coal combustion waste material?

Ms. WILSON. I will not be able to do that in too much detail because we are just beginning our efforts to better define that, but I can tell you what our concerns are. We want to make sure that we are doing all we can to encourage safe reuse. Fiberboard, cement seem to very safe, so we want to look at those, but we are generally not as concerned with those reuses as with some others, such as using material in highway embankments. There are a range of suggested uses and we don't have standards in place currently that are aimed at both encouraging the reuse, but making sure that it is safe. So we are really just about to embark on that effort, so that is about all I can tell you.

Mr. TEAGUE. Also, is there going to be some consideration of maybe using certain quantities of it as a soil additive or in agriculture as a fertilizer or anything along those lines?

Ms. WILSON. We do have a process in place to review, from a regulatory perspective, that kind of use. Right now we don't have a tremendous demand in Maryland for that, but we would look at that.

I should also add that it is a very large task for a State like Maryland to embark on this kind of effort. So to the extent we can get assistance from the Environmental Protection Agency and the Federal Government, it is much welcomed.

Mr. TEAGUE. But you do think that there should be safeguards put in place to regulate the reuse of that material?

Ms. WILSON. Yes, sir.

Mr. TEAGUE. Mr. Breen, on the Kingston spill, did the spill occur from a lack of regulation or monitoring? Are you familiar with that?

Mr. BREEN. I am familiar with the spill. It is hard to answer. It was regulated by the State of Tennessee and periodically inspected by regulators. But, at the same time, there is a question whether it would have made a difference had there been Federal regulations, and it is always hard to know what would have happened, because you just don't have that kind of certainty. But that is one of the things we are considering and moving forward in the rulemaking, to what extent can we prevent this kind of catastrophe from happening again, and that is the kind of thing we would like to do.

Mr. TEAGUE. One of the things I am concerned with is that we are not setting up a new tier of regulations here because somebody wasn't monitoring or regulating; somebody wasn't doing the job that they were supposed to be doing. And rather than make some hard decisions at that spot, are we setting up a whole other tier of regulations to get around that?

Mr. BREEN. Congressman, your question would be are we making sure that we are not duplicating work that is already underway?

Mr. TEAGUE. Or be sure that we are just not letting somebody not do their job, and instead of telling them to start doing their job, that we are making up another layer of regulations.

Mr. BREEN. I see. Thank you. Of course, in almost anything we do in this area, it would be a partnership between States and the EPA, and it would be important to have a close working relationship in which we don't duplicate each other's work and rely on each other.

Mr. TEAGUE. Okay, so as you set the regulations, the State and local agencies will be involved in setting those regulations?

Mr. BREEN. Yes, very much so.

Mr. TEAGUE. Okay. Thank you.

Ms. JOHNSON. Thank you very much.

Ms. Titus.

Ms. TITUS. Thank you, Madam Chairman.

I would address this to the members of the EPA. You have made it really clear that you are not regulating these coal combustion waste storage facilities, and you also mentioned several times that this is what the States are doing. You just now said you will have a close working relationship with the States in the future, just as you have now. Well, there is considerable evidence that there is wide variation between the States or among all the States when it comes to this regulation, and even within States, among the different facilities, some are lined, some aren't.

Now, this fragmentation seems to me not only to hurt the people who live in the States that have lax regulation, but it can hurt people in next door States who may have strict regulation, because we know water doesn't recognize State boundary lines. In fact, that is happening in Nevada with the proposed coal-fired pine in White Pine County; people across the State line are getting involved in that debate.

I would ask you what is Nevada's policy for regulation? How many of these facilities do we have in the State and which ones are lined and which ones aren't?

Mr. BREEN. Thank you. I don't have with me information specific to Nevada. It is the case, though, that we are committed that, by December of 2009, we will propose a Federal regulatory package on this. So the fact that there are no Federal standards under the Resource Conservation and Recovery Act at this time is not a permanent situation.

Ms. TITUS. Well, I hope so, but I keep hearing that you said this nine years ago, eight years ago, ten years ago, six years ago. Now it is December. I hope it really will be December. But what worries me is that you say you don't have that information about Nevada. I get the feeling that not only have you not been regulating it, but you don't have much oversight on what is happening in the different States. So there is not much incentive for the States to get busy and do something on their own to make up for the fact that you haven't been doing it at the Federal level.

And I would just carry that one step further and ask if you know what the States are doing about regulating beneficial use. Do you have any sense of what the States are doing across the country in that area and do you have any plans on starting to regulate beneficial use at the Federal level?

Mr. BREEN. We have a study on State programs in this area that I would be happy to provide you; I just don't have all the State by State information in my head. But I would be happy to provide you the copy of the study that we have.

In terms of regulating beneficial use, it is an important part of this issue, which is that we would want good, safe practices to continue. So, for example, in some concrete and cement applications, coal combustion residuals are actually superior to some of the virgin products that would otherwise have to be mined out of the environment. This is an important part of what we are doing.

Ms. TITUS. So you do have plans, then, to put in place some regulation or something?

Mr. BREEN. What we would want to do is recognize the beneficial uses in the plan that we do put in place so that we don't do more harm than good in that regard.

Ms. TITUS. Well, I heard the Secretary, Ms. Wilson, mentioning that Maryland was moving in that direction to come up with some plans or guidelines or something. Are you going to do that at the national level or are you going to leave that to the States?

Mr. BREEN. I can't say yet what the regulatory package will look like at the end of the year; we still have a lot of work to do between now and December.

Ms. TITUS. Thank you.

Ms. JOHNSON. Thank you very much.

Mrs. Napolitano.

Mrs. NAPOLITANO. Thank you, Madam Chair, and thank you for convening this hearing on a very important issue as it relates to hazardous waste. As the Chair of the Water and Power Committee under Natural Resources, this is of great interest to me, and the fact that EPA has a lot of information or does not have information on some of these issues is troubling.

I would like to ask Mr. Breen if there is enough information that you have on the storage problem? How many of these facilities are actively being used throughout the Country? And to that you say that most of them are lined. Are the new ones being required to be lined? Those which are lined with clay, are they being checked for cracks to ensure that there is no seepage into the aquifers? How do you know this? Do you have sufficient staff funding to be able to carry out that which will protect the environment?

And dovetailing with Ms. Edwards' questions about siting in low income and poverty areas, that is quite an issue for a lot of us and it concerns us. Do you look at that as part of the siting permitting?

I know that is a lot of questions, but they are all based on one.

Mr. BREEN. Thank you so much. One of your questions was how do we know and what do we know about the size of this group of facilities. Last month, on March 9th, we sent out information requests using the authority of the Superfund statute, and information request is actually a term of art. These were enforceable demands for information, and a failure to answer would be an enforceable offense. We sent those to 61 corporations representing 162 facilities, where we added up just over 300 individual units. So a corporation could have more than one facility and a facility could conceivably have more than one unit.

One of the questions we asked of the corporations was are there any other facilities that are not currently on our list, because we used a survey from the Energy Information Administration from 2005 to develop our information requests.

Mrs. NAPOLITANO. I am assuming they don't have to come to you for permitting.

Mr. BREEN. I am sorry?

Mrs. NAPOLITANO. They do not have to come to you for permitting to establish——

Mr. BREEN. That is correct. There is no Federal requirement with the EPA for a permit at this time.

Mrs. NAPOLITANO. Should there be?

Mr. BREEN. I am sorry?

Mrs. NAPOLITANO. Should there be?

Mr. BREEN. Well, that is an important question that we have to resolve in the rulemaking. Under Subtitle C, there would typically be a requirement for a federally authorized permit, and under Subtitle D there would not necessarily be that requirement.

Just to finish up, though, on your question, when we asked the corporations are there any facilities that are not on our current list, we identified 43 additional facilities. So earlier this week I sent a letter to the managers at each of those 43 facilities to answer the same questions that their colleagues had answered last month.

So we now are aware of about 400 units at just over 200 different facilities, and they have all been sent the same letter now that asks questions about the stability of their dams, of their impoundments, with a goal towards being sure that another Kingston-like spill is prevented. We will send teams out, starting in May, to visit facilities that have not recently been visited and we will make sure that we, by the end of this year, have looked at every one of the units.

Mrs. NAPOLITANO. Can you tell me how many personnel you have to be able to do this job? And you are starting next year or this year in May?

Mr. BREEN. Right. I do not have a specific number of people working on this project, although I can tell you that, when I sit in meetings, we have a lot, and it is a current high priority for us.

Mrs. NAPOLITANO. A lot being roughly how many?

Mr. BREEN. Oh.

Mrs. NAPOLITANO. Because if we are going to have you inspect—well, you say the ones that have not been inspected are the ones that are due for inspection, and there are 400 of them, and those are the ones that are reported. When will we have a good idea as to their status and whether they are not or are in violation of EPA rules?

Mr. BREEN. In fact, I can help with what we know so far about that, and I should share with you that most of the assessments on a facility basis, where people go out and visit a facility, will be done by engineers that we have hired through a contract, rather than civil servants.

Mrs. NAPOLITANO. Okay, contract.

Mr. BREEN. So it turns out, at least within the EPA, we don't have the number of people with this kind of talent, but, at the same time, we have gotten them through a contractor.

What we can say so far is that, from the approximately 160 facilities that have answered our letter that we sent last month, we have identified 44 that are in locations that could present a hazard if there were a breach. These are called high hazard. Not to suggest that the dams themselves are in danger of breaking, but that their location presents a hazard, that is, they are kind of uphill.

Mrs. NAPOLITANO. My time has expired, but I would like to ask that you render to this Committee some of that information that you have garnered, State by State, the numbers that are lined, the number unlined, and what time-frame you feel is going to be necessary to be able to review those.

Thank you, Madam Chair.

Ms. JOHNSON. Thank you very much.

Before I call on Mr. Kagen, let me just ask you. You talked about the facility structures, but not water quality or water content. In terms of that survey, are you concerned about the contents and quality of the water or just the facility structures?

Mr. BREEN. Madam Chairman, there were a number of questions, and what I should do, I think, is give you, after the hearing, the list of questions so you can see for yourself what we asked of each of the facilities.

Ms. JOHNSON. Mr. Boozman.

Mr. BOOZMAN. Thank you.

Ms. Wilson, you testified that if you were forced to or if it came down that this would be regulated as hazardous waste, can you give us an idea of what that would do to utility rates? We have concern about various individuals. What is that going to do to the single moms and the working poor that are trying to pay their electricity bill every month?

Ms. WILSON. I really can't tell you what impact that would have on utility rates other than——

Mr. BOOZMAN. Would it have an impact?

Ms. WILSON. I don't know, other than to reiterate that——

Mr. BOOZMAN. What is your gut feeling?

Ms. WILSON. I really could not tell you. But I would like to say that I would hope that if the material were regulated as a hazardous waste, there would be a clear defined process that would exempt beneficial reuse so that we could really encourage the reuse of the material.

Mr. BOOZMAN. Thank you, Madam Chair.

Ms. JOHNSON. Thank you very much. We have a vote on, although, Mr. Kagen, you might be able to get your questions in.

Mr. KAGEN. Thank you, Madam Chairwoman, and thank you for appearing here today. I gather that you are the new kids on the block, that you are just getting in the saddle, so I won't give you a 100 days grade yet, because this is not CNN, this is the United States Congress, and we are trying to figure out what is the best thing to do not just for our waterways, but also for our human health.

And when Ranking Member Boozman brings up the question about the cost to the consumer for the excessive use of coal, the utility costs may go up, but we also have to put into balance, the human cost. I don't know what the safe level is of mercury, but it has got to be almost zero. So there are other costs that come along.

The EPA did do a study with regard to the metals and other toxic materials leaching out of the coal waste, and I noticed that the report mentioned boron and cadmium and selenium, barium, beryllium, boron, arsenic, but it didn't mention mercury. And if you don't have that answer today, I would like you to provide answers to this Subcommittee with regard to the amount of mercury that the coal waste has contributed to our waterways.

In northeast Wisconsin, our fish have a high concentration of mercury, and we believe that about 40 percent of the mercury in the fish in the Great Lakes in northern Wisconsin and Minnesota may have come from dirty coal across the globe in China. So this is not your area of purview, but I would appreciate it if you could chase around the EPA and find those numbers. If those numbers don't exist, I would like you to propose a study to take a look at that.

I would like to ask the three of you from the EPA if you couldn't please provide us with the three most important things you think you are intending to do in the next six months and then, in a follow-up letter three months from now, please provide this Subcommittee with answers as to how you are progressing.

Let's start with Mr. Shapiro.

Mr. SHAPIRO. Sorry. When you say with respect to this specific problem, the three most significant things?

Mr. KAGEN. That is right.

Mr. SHAPIRO. I can give you two right off the bat, one I mentioned earlier. We are thorough reexamining our effluent guideline and will make a determination as to whether we need to develop new guidelines that reflect some of the issues that you discussed with respect to heavy metals such as mercury and other materials in the effluent. So that is number one.

Number two isn't specific to this kind of facility generally, but has important significance, and that is we are reexamining our water quality criterion for selenium, which is one of the contaminants of concern from these kinds of facilities. We had proposed a revised standard in 2004, got a lot of comments on that. We went back to the drawing board, so to speak, and we expect to propose a revised standard later this year.

Number three, we are developing guidance for permit writers to assist them in making sure that, with the existing authorities we have in the NPDES program, they are asking the right questions and looking at the right issues at these facilities. And, again, that is something that we will complete within the next six months.

Mr. KAGEN. Thank you.

Mr. BREEN. If I might offer four, instead of three, to answer your question.

Mr. KAGEN. In the interest of time, do so in writing, but give me your number one.

Mr. BREEN. Oh, the number one?

Mr. KAGEN. Yes.

Mr. BREEN. It is always hard to pick a favorite child. I would just list for you the intent to do the rulemaking by December of 2009 is certainly one of them.

Mr. KAGEN. Very good.

Ms. McCabe?

Ms. MCCABE. Of course, from the Enforcement Office's perspective, it is our responsibility to review the compliance of the coal-fired power plants with surface impoundments with existing laws. As we have heard testimony, of course, we don't have much existing law under RCRA. We also have Clean Water Act, some discharges from end of pipes, permits and regulations that apply to the facilities, and we are in the process of investigating the situations based on all the information that the Agency has collected that we think might present significant threats to public health or the environment for which Federal enforcement action could be appropriate.

Mr. KAGEN. Thank you. I look forward to your report in three months to the Subcommittee.

I will just close with a comment and a question, as to whether or not there is such a thing as “clean coal.” It is dirty when you mine it, it is dirty when it is hauled to the place of combustion, and it produces not exactly the cleanest of air and effluent materials. So we have to ask the question is there anything really clean about coal, especially when you think of the energy that we are getting out of it, where 50 percent of the energy that is in the coal is taken up along its transportation route to the facility, where it is going to generate the electricity that we so desperately need.

So I yield back my time. Thank you very much for being here.

Ms. JOHNSON. Thank you very much.

The Chair of our Full Committee, Mr. Oberstar.

Mr. OBERSTAR. Thank you, Madam Chair. Thank you and Mr. Boozman for conducting this hearing, and to EPA for being here to respond.

For me, the issue is not whether the material is toxic or hazardous, but that it is behind a retaining structure, a levee or a dam; and the issue of hazard, I think, can be very simply answered. A 60-foot high wall of water is hazardous to anything in its path. Whether it is toxic or not is of secondary significance. So the structural integrity of the retaining facilities is a real issue here.

We had, along the north shore of my district, meaning the north shore of Lake Superior, an iron ore mining processing plant that has a power facility and stores fly ash. That fly ash facility retaining facility failed and a wall of fly ash 20 feet high rolled down the hillside, spilled over U.S. Highway 61, and some of it spilled into Lake Superior. Traffic was stopped for a couple of days and there was no other route; the only way is to get in a canoe and paddle along Lake Superior.

I am familiar with fly ash. When I was in college, I worked at a ready-mix concrete facility which made, as part of its work, concrete blocks with fly ash. They were one of the early ones to experiment with fly ash. I appreciated the fly ash blocks because they weighed half the amount of a full concrete block, 21 pounds rather than 42 pounds; 48 pounds for a corner block. I still remember.

Was this facility lined or unlined?

Mr. BREEN. The facility is the Kingston facility?

Mr. OBERSTAR. Yes.

Mr. BREEN. I don’t have that answer readily in front of me, and unless one of my colleagues does, we will get it for you for the record.

Mr. OBERSTAR. Was this a pancake type structure, that is, layer added upon layer upon layer, without broadening the base?

Mr. BREEN. Let me get you that for the record.

Mr. OBERSTAR. It is my understanding that is what it was. The average height of these retaining structures are in the range of 15 to 20 feet. This one was 60 feet. Who has the primary responsibility for evaluating the integrity of the structure itself?

Mr. BREEN. One of the things we want to do is to follow up, so we have written the letters to every electric utility, coal-fired facility in the Country, and we are gathering that information right now. We have answers to all but two of those that we sent last month. Then we sent another group out earlier this week.

Mr. OBERSTAR. Of course, the company itself, in this case, TVA, has the primary responsibility. Is there a State dam inspection facility?

Mr. BREEN. The answer depends on the State, but in Tennessee's case there is an active and excellent group of inspectors.

Mr. OBERSTAR. And EPA's responsibility, does EPA conduct on its own or contract out to inspection services to do inspection of facilities that contain hazardous material?

Mr. BREEN. With respect to the dam integrity, EPA does not have regulations to enforce——

Mr. OBERSTAR. I understand that.

Mr. BREEN. And we don't have the talent and the numbers that we would need——

Mr. OBERSTAR. Could you contract out to the Corps of Engineers, engage them to do that work on EPA's behalf?

Mr. BREEN. We have contracted out to a private contractor, after consulting with several other Federal agencies, including the Army Corps of Engineers, and we went to a private contractor who could mobilize very quickly.

Mr. OBERSTAR. And the Corps did not, could not, or was not interested, or their price was too high, or what?

Mr. BREEN. I don't think it was a matter of price, but this would require—we wanted to be able to see every facility that needed to be seen in person by the end of this year.

Mr. OBERSTAR. Well, this Committee, many years ago and then more recently, enacted dam safety legislation requiring inspection of dams of all size, configuration, height, and use; and then we, during the previous majority, reauthorized that legislation, and the Corps of Engineers has the principle responsibility for doing that work. I think it would be beneficial to get the Corps back into this picture, however good your private contractor may well be. But I think it is good to have their experience in this matter.

Mr. BREEN. Mr. Chairman, in that regard, when we get the results from the private contractor, we intend to share them with other Federal agencies for advice and counsel about what to make of those reports.

Mr. OBERSTAR. Good. Well, there is not only the risk of failure, but there is the risk of seepage. We have those problems all along the Mississippi River from just south of St. Paul all the way to New Orleans; levees that are in place, that are old, that have been weakened by burrowing owls, by rodents, by vegetation, and they are leaking and they were not built deep enough, they were built to withstand the 1 percent, that is, once in 100 year flood occasion, and now we are having events of far greater ferocity, and the Corps has to go back and reevaluate all these structures. Similarly with these fly ash retention facilities.

We will look forward to your report. Thank you very much.

Ms. JOHNSON. Thank you very much.

We will conclude the first panel. Thank you for coming. Look forward to hearing from you.

We have a vote on, so the second panel will be up as soon as we can get back.

[Recess.]

Ms. JOHNSON. We will come to order.

Our second panel of witnesses consists of Mr. Eric Schaeffer, the Executive Director of the Environmental Integrity Project. Mr. Schaeffer is also testifying on behalf of Earthjustice. As many of you know, Mr. Schaeffer is the former head of EPA's Office of Civil Enforcement. We look forward to your insights on this issue.

He will be followed by Mr. John McManus. Mr. McManus is the Vice President for Environmental Services with American Electric Power. He is also testifying on behalf of Edison Electric Institute and the Utility Solid Waste Activities Group.

Our third witness is Mr. David Goss, who is testifying on behalf of the American Coal Ash Association.

And the final member of the second panel is Dr. Conrad Volz from the University of Pittsburgh's Department of Environmental and Occupational Health. He is also Director of Pitt's Center for Healthy Environments and Communities.

Your full statements will be placed in the record, and we ask you to limit your testimony to about five minutes as a courtesy to others, and you can be sure that we will read them.

Again, we will proceed in the order in which the witnesses are listed, so, Mr. Schaeffer, you may proceed.

TESTIMONY OF ERIC SCHAEFFER, EXECUTIVE DIRECTOR, ENVIRONMENTAL INTEGRITY PROJECT, WASHINGTON, D.C.; JOHN M. MCMANUS, VICE PRESIDENT OF ENVIRONMENTAL SERVICES, AMERICAN ELECTRIC POWER, COLUMBUS, OHIO, TESTIFYING ON BEHALF OF EDISON ELECTRIC INSTITUTE AND UTILITY SOLID WASTE ACTIVITIES GROUP; DAVID GOSS, FORMER EXECUTIVE DIRECTOR, AMERICAN COAL ASH ASSOCIATION, AURORA, COLORADO; AND DR. CONRAD VOLZ, ASSISTANT PROFESSOR OF ENVIRONMENTAL AND OCCUPATIONAL HEALTH, DIRECTOR, CENTER FOR HEALTHY ENVIRONMENTS AND COMMUNITIES, UNIVERSITY OF PITTSBURGH, PITTSBURGH, PENNSYLVANIA

Mr. SCHAEFFER. Thank you, Madam Chairman and Congressman Boozman, for the introduction and a chance to testify today.

I want to follow up on a couple of points that were made in the earlier discussion. There was some back and forth about whether coal ash is hazardous, and just make two points in response to that. One is the National Research Council, in 2006, in their study of the placement of coal ash in abandoned mines, said very clearly that burning coal concentrates the toxic constituents that are in coal, like arsenic and selenium, many times over. Those toxic elements will leak out of coal ash if that ash is saturated, and especially when it is stored in wet environments. And that is from the National Research Council.

The U.S. EPA has lots of data which shows that the leachate, or the runoff from the coal ash, is quite toxic. It is full of metals that are known to be hazardous to human health and the environment.

So whatever EPA decides to call coal ash at the end of the day, it sure acts like a hazardous waste, and I think we need to keep that reality in front of us.

I wanted to talk briefly about how these dangerous pollutants can get into our waterways, thinking now about rivers and wetlands and creeks and bays. There are three ways that we can have that pollution hit our freshwater and saltwater systems. One, of course, is that a dike or dam can break or give way. That is what happened in Kingston and the Committee has been very alert to that problem and asking great questions about it, and I know you will continue to do that.

The second problem, more insidious and, I think, more dangerous in the long-term, is, as has been discussed, the toxic constituents—arsenic, cadmium, selenium, other metals—will leak out of the bottom of a landfill that is not properly lined or maintained. So just to make the point that it won't do you any good to keep building the walls up around these landfills if the pollutants that we care about keep leaking out through the bottom; and that is a problem. Once groundwater is contaminated, it can poison drinking wells, but it can also interact with wetlands and with creeks and rivers, and the contaminants can get into our water systems that way.

A third problem, and one that may have received less attention, is the toxic pollutants can be discharged directly as the wastewater from ash pits and from scrubber sludge ponds is drawn off and discharged through pipes or ditches directly into wetlands or rivers. And I have a couple of charts at the back of the testimony that I would just like to draw your attention to.

We have, as the first example, selenium, which is highly toxic to fish and aquatic life. EPA has recommended that the level of selenium in freshwater not exceed 5 micrograms per liter; the standard or the criteria for saltwater is 71 micrograms per liter. And, again, levels above that are thought to, in effect, poison fish and aquatic features, and eventually get into bird life and potentially threaten humans. So the standard is very tough.

As you can see from the chart, we have a number of coal plants that routinely discharge selenium, a very deadly toxic pollutant, at concentrations far above what EPA deems to be safe for fish and aquatic life.

I just want to recognize that I am talking about what comes out of the pipe. That is what is discharged. Once it hits the river or freshwater system, it may be diluted. So, you are going to get some dilution, but these levels are so high that it is hard to believe that they are not going to have an impact and, in some cases, a dramatic impact. I mean, I just look to the Tampa Bay example, Tampa Electric's Big Bend Plant. The discharges are at nearly 3,000 micrograms. You compare that to a saltwater standard of 71, and EPA needs to be asking what happens when that much of that kind of toxic metal hits the bay.

Another example, arsenic. As I think everybody knows, we have a drinking water standard of 10 micrograms per liter for arsenic. EPA has recommended a much lower standard for rivers and streams that is designed to keep fish from being poisoned and, therefore, being made unsafe for humans to eat. That standard is actually less than a microgram per liter.

Again, looking at the discharges from these plants, they are far above that level. Even recognizing there will be some mixing and dilution, that is an awful lot of arsenic from these plants, sometimes going into wetlands or very small creeks, a big slug of toxic metals.

Looking across the Country, we found that almost none of these plants had limits. States do have authority to set limits on toxic metal discharges; almost none of them have done so. Certainly, that has not been the case at the TVA plants. Of the plants in the charts, we found only two that had actual limits, and those limits had been violated frequently in the last several years. So this is an emerging problem.

I think it is worth emphasizing because we are pushing the power industry hard to install scrubbers and to clean up the waste that comes out of the smoke stack. What we don't want to happen is for the toxic metals to get stripped out of the smoke stack and end up in the water. We recognize that industry is installing these air pollution controls to comply with laws and they are doing, in effect, what we have asked them to do. But what we are in danger of experiencing right now is pulling the stuff out of the air and putting it in the water, and that would not be a good outcome.

This is a place where EPA should regulate. The Agency has already promised to set standards for safe disposal. We think the Agency also needs to regulate the discharges that occur from these plants as well.

Thank you for giving me that time.

Ms. JOHNSON. Thank you very much.

Mr. McManus.

Mr. MCMANUS. Thank you, Madam Chair. I would like to thank the Subcommittee for the opportunity to present this statement on behalf of American Electric Power, the Edison Electric Institute, and the Utility Solid Waste Activities Group.

The electric utility industry remains committed to ensuring the integrity and safe operation of the landfills and impoundments in which we manage coal combustion byproducts, including coal ash. The accident that occurred at TVA is unacceptable and, as an industry, we need to do a better job of how we manage coal combustion byproducts. We have taken steps to ensure the safe management of CCBs and we support efforts to enhance current requirements and oversight.

In the wake of the spill, utility companies across the Country, including AEP, reexamined their dam safety and inspection activities to ensure that these programs are up to date and functioning properly. A number of State regulatory agencies have also conducted additional inspections of utility impoundments to assess their structural soundness and, as we heard earlier, EPA has initiated a nationwide effort to assess the safety of coal combustion byproduct impoundments. We welcome this additional level of scrutiny.

As you heard earlier, EPA intends to propose Federal regulations for coal combustion byproduct disposal by the end of this year. The electric utility industry has worked in a constructive and cooperative manner with EPA and State regulatory agencies as they have evaluated regulatory options for CCBs, and we intend to continue that spirit of cooperation.

It is important to remember that the issue of whether CCBs should be regulated as hazardous waste has been thoroughly evaluated and resolved. On four different occasions, in its 1988 and 1999 reports to Congress, and in final regulatory determinations promulgated in August 1993 and May 2000, EPA concluded that CCBs do not warrant regulation as hazardous waste. In its most recent determination in 2000, EPA found that the RCRA Subtitle D, non-hazardous waste regulations, are the most appropriate mechanism for ensuring that CCB waste disposed of in landfills and surface impoundments are managed safely.

We agree with EPA and support development of Federal non-hazardous waste regulation under RCRA Subtitle D that would be implemented by the States. Such regulations would ensure that CCBs are managed in a manner that is protective of groundwater.

We earlier heard Secretary Wilson express support for regulation of CCBs under Subtitle D. In fact, the States have consistently gone on record as opposing Federal regulation of CCBs as hazardous waste, explaining that it is unnecessary and would effectively end the beneficial use of coal ash in many States.

Our industry remains committed to continuing and expanding the array of beneficial uses of CCBs. In 2000, EPA concluded that hazardous waste regulation of CCBs would place a significant stigma on these wastes, the most important effect being that it would adversely impact beneficial use. The States and coal ash marketers and users agree that beneficial use would essentially come to an end if EPA were to regulate coal ash as hazardous.

As one example of the value of beneficial use, in 2007, more than 13 million tons of fly ash was used to replace portland cement, saving nearly 73 trillion Btus of energy and reducing greenhouse gas emissions by 12.5 million metric tons.

Our industry also remains committed to protecting the aquatic environment in the vicinity of our plants. All discharges from power plants to surface waters, such as lakes, streams, or rivers, are regulated through the Clean Water Act's National Pollutant Discharge Elimination System permitting program. Discharge permit limits are developed based on two separate groups of standards: effluent guidelines and water quality standards. Effluent guidelines are industry-specific limits based on available technologies. Water quality standards include federally established water quality criteria protecting human health and aquatic life. If there is a reasonable potential for a plant's discharge to exceed any water quality criterion, the regulator will set a limit for that criterion in the permit.

Testimony received by this Subcommittee has suggested that discharges of metals such as selenium and arsenic from coal ash impoundments are not protective of the environment. We do not believe this to be the case. The NPDES permitting program integrates the industry-specific technology-based effluent guideline limits and the water quality-based effluent limits into a well established, effective permitting system which is protective of human health, fish, and wildlife.

NPDES permits must be renewed every five years. At each five year interval, State regulators review new data on the facility, apply an established system of analysis to the data, and develop a new permit. This permit renewal cycle ensures that additional discharge requirements can be established as needed.

EPA stated earlier that it is conducting a detailed study of the wastewater discharges of our industry as part of its regular review of all effluent guidelines. Our industry has actively assisted EPA with this study for more than three years, and we will continue to engage the Agency on all aspects of this effort.

In sum, the industry's goal is to manage coal ash safely, with appropriate environmental protections, and to use it in beneficial ways. We support the regulation of CCPs as non-hazardous waste as part of a Federal CCP regulatory program under RCRA Subtitle D, as well as dam safety inspection and response planning requirements which collectively will protect groundwater and surface water and ensure the structural integrity and safety of coal combustion byproduct impoundments.

I thank the Subcommittee for the opportunity to present the views of AEP and the industry today, and I would be happy to answer any questions that you have. Thank you.

Ms. JOHNSON. Thank you very much.

Mr. Goss.

Mr. GOSS. Madam Chair, Members of the Committee, and distinguished panelists, we thank you for the opportunity to appear today. My name is Dave Goss. I am the former Executive Director of the American Coal Ash Association.

Our Association promotes the recycling of coal combustion products, as we term those, which includes fly ash, bottom ash, boiler slag, and air emission control residuals such as synthetic gypsum. It is our opinion that the EPA's regulatory determinations, both in 1993 and again in 2000, are still correct and that CCPs do not need to be regulated as a hazardous waste.

The recycling of these materials is really a tremendous success story. We have displaced over 120 million tons of greenhouse gases alone since the year 2000. During that same period, approximately 400 million tons of CCPs have been recycled into a variety of applications: road construction, architectural work, agriculture, mine reclamation, mineral fillers in paints and plastics, wallboard panel products, soil remediation, and many other uses that would have required other materials to be excavated or mined had these not been available.

The use of CCPs goes back 40 years. In the last three decades, the EPA, other Federal agencies, numerous universities and private research institutes have extensively studied CCP impact on the environment. The Department of Energy and the Department of Agriculture have both funded, evaluated, and conducted certain mining and land test applications and studies using a variety of these materials. Consistently, these Federal agencies found that, when properly characterized, managed, and placed, CCPs do not have a harmful impact on the environment or on public health.

The EPA reported to Congress in March of this year the results of data collected and analyzed by the Agency from the TVA spill at the Kingston station. That data showed there were no exceedances in drinking water quality or air quality standards, and the information was based on hundreds of water samples and over 26,000 air samples.

Furthermore, State Departments of Transportation, using environmental and technical guidelines set by the American Society for Testing Materials, Federal Highway Administration, and the American Association of State Highway and Transportation Officials, have used millions of tons of CCPs without incident or risk.

The goal of this Committee, I believe, should be, in part, to understand how the use of CCPs has had and can continue to have a positive impact on our Nation's resource conservation goals. They have been and should remain a key part of resource conservation efforts because CCPs, safely used in lieu of earth, clays, aggregates, or soils, helps promote a zero waste goal. Fly ash, bottom ash, and synthetic gypsum are used to replace the production of portland cement, which in turn reduces significant carbon dioxide emissions and similarly conserves other natural resources. There are national and international protocols that recognize the greenhouse gas reduction benefits of using these materials.

When fly ash is used in concrete, it produces longer lasting, more durable structures and pavements. Nearly half the concrete placed in the United States incorporates fly ash because it makes concrete better. We, in fact, I believe, would need Congressional support to promote a green supply chain and further encourage higher replacement rates of fly ash and broader usage. Building longer lasting concrete structures by using fly ash allows our Country to move forward towards a greener and more sustainable economy: less rebuilding in the future, lower life cycle costs, and fewer CO2 emissions.

A key part of the strategy of recycling industrial materials must be to minimize their need for landfills or disposal facilities. By recycling fly ash and concrete, we bind the fly ash into a matrix, significantly eliminating the potential for any impact on water resources. Beneficial use regulations are crafted at the State level to promote recycling and accommodate local environmental conditions.

The recycling of nearly 43 percent of the 130 million tons of CCPs produced annually is an excellent example of environmental stewardship and sustainability. Any effort by EPA or Congress to designate coal ash as hazardous, even if only for the purposes of disposal, could have a dramatic impact of eliminating nearly all these safe beneficial uses. America would have to find environmentally safe disposal facilities for 130 million tons more of the CCPs produced annually. Producers and end-users would no longer use CCPs because of the stigma that a "hazardous" designation would have. Recycling would end, in our opinion, due to the cradle to grave liability associated with a hazardous waste label.

This Nation should develop a culture where safe use and reuse of products and waste streams conserves our Nation's resources. CCPs have played and should continue to play an important role in sustainability. Ample technical guidance is available to ensure the environment is protected, while still recycling millions of tons of these resources. State specific regulatory guidance will be best able to address local conditions.

As part of the recent economic stimulus efforts supported by the President and Congress, green building has been highlighted. We believe that a key component is the creation of a green supply chain. Developing green jobs as part of the green supply chain and implementing projects that include safe recycling of CCPs should be a vital part of these projects. With an emerging focus on greenhouse gases, the recycling of CCPs contributes measurably to the reduction of CO2 and should, therefore, be encouraged more aggressively. We must better manage our scarce natural resources by using and recycling our existing industrial mineral resources, including CCPs.

Thank you for this opportunity to speak.

Ms. JOHNSON. Thank you very much.

Dr. Conrad Volz.

Mr. VOLZ. Thank you very much, Madam Chair. I am from Pittsburgh, the smoky city. Just to let you all know that we can't even, in our city, monitor for and do high-tech experiments without putting millions of dollars into research laboratories to filter out all the fly ash that has been put into air over the last century of coal burning in Pittsburgh. You cannot drive in Pittsburgh five miles without driving past a coal pile, coal ash pile, or driving over a mine fill that has coal ash. It is a very serious problem in our area.

My research is focused on using fish and aquatic receptors as indicators of pollution sources and as sentinels for human health, and I am funded by the Centers for Disease Control, the environmental public health tracking network, to do this.

My testimony today to you concerns known water quality impacts of coal combustion waste storage, including evidence that, number one, coal combustion waste mixtures have direct ecotoxicological effects on aquatic animals, without question; two, trace toxic elements from coal combustion waste impoundments enter groundwater and are known to contaminate drinking water resources; three, the predominant location of fly ash piles and coal combustion waste surface impoundments near large surface water drinking sources creates an unreasonable threat to public health and the environment; and that, four, the placement of fly ash piles and coal combustion waste impoundments constitutes a major environmental justice issue to communities across the United States.

Table 1 in my written testimony lists 16 studies, from the peer review to academic literature, that demonstrates that coal combustion waste has direct effects on aquatic animals. Many of these species are fellow vertebrate animals with similar hormone signaling systems to humans, and are, thus, the canary in the coal mine for human health effects.

Coal combustion waste effects in the southern toad have been extensively studied. Ash-exposed toads exhibited elevated levels of 11 metals, including a 47 percent increase for lead and over a 5,000 percent increase for arsenic. These studies suggest that coal combustion waste trace metals are associated with decreased respiratory quotients in these animals, and many of the metals in coal combustion waste are pulmonary toxicants, even if they are ingested in water, just as in humans.

In a study that assessed concentrations of numerous metals in whole bodies of larval and adult life stages of toads after exposure to coal combustion waste, it was found that selenium and strontium concentrations remained elevated in later life stages. This study demonstrates that toads and frogs exposed to metals in fly ash ponds can move these trace metals to uncontaminated terrestrial and aquatic environments.

In study of the bird-common grackle feeding in coal combustion waste basins and turtles raised in ash basins, selenium was found in significantly higher concentrations in ash basin eggs and in reference eggs. Selenium contamination represents one of the few clear cases where environmental pollution has led to devastation of wildlife populations directly from power plant coal fly ash receiving ponds. Elevated concentrations of selenium have degraded many freshwater ecosystems throughout the United States.

It has also been observed that as much as 8 percent of total chromium is converted to chrom6 during oxidative combustion of coal, and remains in the resulting ash and is significantly mobile in water-based leaching. Thus, chrom6, a known human carcinogen and pulmonary toxicant, can enter groundwater and can run off of coal combustion waste sites into tributary streams. There is no known safe level of exposure to chrom6. Any increase in its concentration in water carries with it an increased risk of the development of cancer in humans.

I am going to end there and, please, I would like to enter my complete testimony with you. Thank you.

Ms. JOHNSON. Thank you very much.

We will begin our first round of questions.

Mr. Schaeffer, I would like to ask you a couple of questions. In your testimony, you note that we should not have to make a choice between cleaner air or dirtier water. Would you explain what you mean by that in more detail?

Mr. SCHAEFFER. I would be glad to, Madam Chairman. The piles of ash and sludge that are generated by power plants are primarily driven by the fact that the companies have to remove air pollutants from the stack, and the Clean Air Act requires them to do so and we recognize that. The problem is that the residue, the waste from that process, has been largely unregulated, and that is where the problem comes from.

So we need to close the loop. We need to make sure that the waste that is generated from burning coal is properly regulated. EPA has promised to do that. We do think it should be regulated as the hazardous material it is when it is disposed of, and we think you can do that in a way that encourages recycling. And we think if you are going to discharge wastewater that comes off those processes, you ought to have to meet Clean Water Act limits for toxic metals, just as other industries have to do.

So, again, we understand the industry is complying with the Clean Air Act when they put the pollution controls in—that is good—but they create mountains of waste, 130 million tons a year now, and that amount is growing, and we need to make sure that that waste isn't creating another kind of problem.

Ms. JOHNSON. In light of the information that is available, did EPA's enforcement program over the past eight years fulfill its responsibility for enforcement with regard to both the known damage and potential ash damage cases?

Mr. SCHAEFFER. I came out of the enforcement program at EPA, so they are my colleagues. I think the program has come late to this issue and I probably share responsibility for that. In the last

1990s we were very focused on getting scrubbers into large coal plants. We wanted that to happen because the air pollution can be very bad if you don't scrub the toxins out of the stack and if you don't take sulfur dioxide out of the stack.

So I gave you the Big Bend in Tampa as an example of where lots of selenium appears now to be coming off the scrubber sludge and going into Tampa Bay. I was part of the discussions that led to the settlement and we celebrated the fact that that plant was going to put in a scrubber, because we knew it was going to clean up air pollution. Quite honestly, we did not focus on the other problem, which is the sludge coming off that process could eventually create a problem for water.

So I don't want to be too hard on the enforcement program because they were very fixed on one set of problems. I think they have said they are looking hard at this issue now and they are willing to take some action.

Ms. JOHNSON. Do you think they are overwhelmed with the responsibilities?

Mr. SCHAEFFER. I do. It is a big Country, lots of sources. People would be surprised to learn how thinly staffed enforcement is. I think the Agency, at one point—and I don't think it has changed—had about 30 staff nationwide to handle all wetland violation issues. We have a couple hundred million acres of wetlands; 30 people to patrol that. So they are understaffed and overwhelmed, and I think that is true of State agencies as well.

Ms. JOHNSON. One last question. Just as I was leaving, one of the people sitting out there indicated that they are interested in recycling this waste and making something positive out of it for a green project. Do you think that the reuse can be dealt with?

Mr. SCHAEFFER. Sure, if the question is addressed to me as well. I think Mr. Goss has pointed out the benefits of responsible recycling of fly ash, the greenhouse gas reductions you can get. There are safe ways to recycle and reuse fly ash, and that is a very good thing. That is not inconsistent with regulating the disposal of ash as a hazardous waste. EPA makes those distinctions all the time. EPA has programs that recognize that disposal is a long-term problem. When you are handling hazardous waste, you need tight regulations.

And then they create conditional exemptions for safe recycling. You can, today, take quite toxic waste, put it into a coal plant boiler and burn it without that waste being considered hazardous, because it is recognized that when you do that you are destroying the material. It is organic, you are eliminating it, so problem solved. There is a way to regulate disposal as hazardous and treat responsible recycling as basically exempt as long as certain rules and practices are followed, and EPA has a track record of doing that.

Ms. JOHNSON. Thank you very much.

Mr. Boozman.

Mr. BOOZMAN. Mr. Schaeffer and Dr. Volz, you presented some data showing there were areas in the Country that are doing a poor job, evidently, and I think we would all agree with that, that that is inappropriate. I think, as Mr. Oberstar alluded to with the other panel, we all agree that we have to ensure that this stuff is secured properly, however we secure that.

You mentioned these areas that are doing a poor job. In your data, did you find any of the new units where you didn't see the increases that you are talking about?

Mr. SCHAEFFER. To make sure I understand your question——

Mr. BOOZMAN. Did you measure any sites that you didn't see the extremely elevated areas like you are talking about around coal-fired——

Mr. SCHAEFFER. Our analysis, the information we presented to the Committee, focuses on what is discharged from pipes or ditches at these plants, and in some cases the processes leading to the discharge are relatively new. That is because the plant has only recently installed a scrubber. It turns out that scrubber sludge can be highly toxic and the wastewater that comes off it can be pretty hot, and that is certainly true for a pollutant like selenium. So we didn't look at the age of the plant or the age of the——

Mr. BOOZMAN. I guess what I am saying, though, is that in the plants you monitored, you showed us the plants that were doing a poor job, where you had increased levels.

Mr. SCHAEFFER. Right.

Mr. BOOZMAN. Did you find plants that were doing a good job, where the levels were much less elevated, as opposed to the data you presented?

Mr. SCHAEFFER. We did. We found a handful of plants where the reported discharges are quite a lot. I don't think we can distinguish based on whether it is a new or old; it may have to do with the treatment process.

The other thing I do have to point out is there is actually very little monitoring that is done, so the number of plants we were able to get the data for—and it all comes from EPA—was a pretty small universe. So plants that we didn't look at, weren't able to look at, could be doing significantly better; they could be doing much worse. We know some plants are trying to keep the waste onsite and avoid discharging altogether, and if the waste can be safely managed onsite and you are not putting the toxics into the stream or river, that is obviously a better thing.

Mr. BOOZMAN. How about you, Dr. Volz, did you find plants that did not show, with the water that they were discharging did not show the high levels that you are talking about?

Mr. VOLZ. I think I can generally say that the newer impoundments that are lined, we don't see the problem of groundwater intrusion that we are seeing in the unlined impoundments. That, I can say for sure. There is a problem, though, and one of the major problems, quite frankly, is this reliance that we have on coal and burning huge quantities of coal.

We don't know what to do with the waste anymore. We are overburdened with this waste. We are filling up ash piles at rates that are unsustainable. And even those that have liners, we can't keep up with the rise in the levels of these plants, so we have runoff from them.

So, yes, the liners do help, they stop the downward hydrogeological movement of these movements. But we still are going to have a problem because the water is creeping up the hollows from Pennsylvania into West Virginia and into Ohio.

Mr. BOOZMAN. You mentioned the increased stuff in the air. Does Pittsburgh have a significant increase in cancer compared to the rest of the Country?

Mr. VOLZ. Pittsburgh has some cancer rates that are high. The problems, though, that we see in Pittsburgh are more related to problems of premature birth, as well as low birth weight; and that is found in some of these areas that they are environmental justice areas where there is coal-fired plant waste storage.

Mr. BOOZMAN. I agree. We have a problem. I think we all would agree that we have to deal with the waste. I think you, Mr. Schaeffer, unintended consequences, and I would just encourage us to look at the plants that are doing a good job, to focus not only on the ones that are doing the bad job, but to focus on the ones that are doing, and see what the difference is.

Then, the other thing is really think through the designation of the hazardous waste in the sense that we are not going to be done with coal tomorrow. No matter what we decide on, it is going to be around, I think, for many, many years. So as we do a better job of scrubbing and whatever, we are going to have even increased residue.

So I appreciate your testimony and yield back, Madam Chair.

Ms. JOHNSON. Thank you very much.

Mr. Hare.

Mr. HARE. Thank you, Madam Chairman.

Mr. McManus, in your testimony, you state “Testimony received by this Subcommittee has suggested that discharges of metals such as selenium and arsenic from coal ash impoundments are not protective of the environment. We do not believe this to be the case.” Does American Electric Power believe that the discharge of arsenic and selenium into the rivers is actually safe? And if you do, at what levels are the discharges of these two substances not safe?

Mr. MCMANUS. I believe the discharges at an appropriate level can be safe. Those levels can be established in the NPDES permit, the water discharge permit. Those permits are developed with the State regulatory agencies, looking at circumstances around that individual facility, the water body that is being used to discharge into, the characteristics of that water body, the size of it.

So there is not necessarily a specific level that applies across the board, but through that permitting process we can work with the agencies to establish that appropriate level and then manage our facilities to ensure that we stay within those levels. If that requires some additional treatment of that discharge, then we can put that in.

As has been pointed out by Mr. Schaeffer, we are installing a lot of scrubbers across the Country these days. What we have seen at AEP is, as we designed those scrubbers and looked at how it changes the characteristics of the water discharge, we are putting on additional water treatment facilities so that we are dealing with this issue that was brought up, of moving these materials from one medium to another medium to ensure that, overall, we are being protective of the environment both from the air emissions and from the water discharge.

Mr. HARE. Are selenium and arsenic not permitted to be discharged?

Mr. MCMANUS. We have limits in some of our permits; we don't have limits in all of our permits. In some cases we have monitoring requirements so that the agencies can see what those levels are and establish limits if they believe it is appropriate.

Mr. HARE. Well, just to be candid, I would tell you I don't know what the level would be, but I think selenium and arsenic in any type of measure into water would be a dangerous thing.

Dr. Volz, let me ask you. You described environmental justice impacts. I wonder, can you elaborate on what you mean by that and can you give us something on the findings you had from that?

Mr. VOLZ. Sure. We are a community-based participatory research outfit at the Center for Health Environments and Communities, and we work with communities that are affected by a number of pollution source. I will tell you that as communities around these large ash impoundments, the people there are not only exposed or potentially exposed to groundwater sources, they are exposed to the air pollution also from the coal powered plants that are very close.

Oftentimes, these are industrial valleys, where there is legacy pollution problems from steel mills that aren't there anymore. These areas, actually, people move away from, if they can, to more healthy and aesthetically pleasing areas, leaving essentially behind a tax base that is shattered, both municipally and for school districts, with the resulting consequence, quite frankly, that the Federal Government and State government has to come in and fund these school districts and municipalities to keep them going, and this is an unrecognized subsidy to the coal-fired plant industry.

Mr. HARE. I am running out of time, and not to put words in your mouth, but given the evidence and the harm from coal combustion waste, I would assume that you would like to phase out the impoundments in favor of dry storage of the waste?

Mr. VOLZ. Well, I think we need to stop adding any additional waste to unlined impoundments. That needs to stop right away. And we have to cover these impoundments, because any air movement over the top of the areas that dry entrains particles with up to 30 percent respirable dust in them, and people are inhaling this dust and it is full of arsenic, chromium, lead, cadmium, and even radionucleides.

Mr. HARE. Thank you, Madam Chair.

Ms. JOHNSON. Thank you very much.

The Chair now recognizes the distinguished Chair of the Full Committee, Mr. Oberstar.

Mr. OBERSTAR. Thank you, Madam Chair.

Mr. Schaeffer and Mr. Volz, what are the health consequences of ingesting selenium and arsenic at the levels shown in your charts on aquatic creatures, frogs, toads, fish, shellfish, and those at the top of the food chain, humans?

Mr. VOLZ. Well, we have done studies in the Allegheny River near Pittsburgh where we have some natural background levels of about .2 to .3 parts per billion of selenium. We find that there are ecotoxicological effects on freshwater mussels at only 3 to 5 times that level, meaning at about 1 part per billion.

The problem with selenium is that it is highly bioaccumulative. It moves through the food chain and top level predators actually, just like mercury, bioconcentrate it in their tissues. It is in a very complex cycle cycling through the aquatic system, and we found bioconcentration factors in the literature showing concentration in aquatic species of over 773 times in their tissue those concentrations found in water.

Mr. OBERSTAR. And what is the health consequence to those aquatic creatures?

Mr. VOLZ. They are many and varied. Freshwater mussels essentially develop gill filament problems; they are unable to breathe. Fish have endocrine systems much like our own. Selenium is known to cause jaw malformations and other problems in aquatic creatures, including fish, and especially even eggs, once they are laid, can accumulate selenium, or it can be transferred from the mother through the egg to the fish.

Mr. OBERSTAR. I was interested in your comment about Pittsburgh and its current state. I remember Pittsburgh in 1955, the summer of 1955. I was a student driving with my classmates to Quebec; I was going there because I had won a scholarship to study French at Laval University. We went through Gary and Hammond, and you couldn't see across the city.

I thought I had gone to heaven because this is where the iron ore went from the iron ore mining country that I grew up in, and this is what happens to it, it now becomes steel. When you got to Pittsburgh, and your eyes, by then, were smarting and your skin was irritated, and I thought, oh, this is heaven, there are jobs here. But what a price we are paying.

Then, some years later, when I was administrative assistant to my predecessor, John Blatnik, whose picture is over there in the corner, there was a steelworker convention in Duluth. A busload of steelworkers came to Hotel Duluth and they unloaded. One of them rushed through the lobby to the pay phone, called home—this was, of course, the days before cell phones—got his wife on the phone and he said, honey, you can't believe this place; people breathe air they can't see.

Those are the consequences of the industrial revolution.

Mr. VOLZ. Yes.

Mr. OBERSTAR. And we are living with those now, and our challenge is to contain them. So, on the one hand, as you have described, the air pollution controls on power plants removed toxic substances from the air and now put it in sludge that is on the ground. So it is very likely that the concrete blocks that I was working with, made of coal ash, were cleaner than concrete blocks made of coal ash today, because the selenium and the arsenic and the other toxic components were in the air at that time and they landed some place else.

Mr. VOLZ. I agree totally.

Mr. OBERSTAR. They didn't go into the coal ash that was made into ready-mix or concrete blocks. I hadn't thought about this.

Mr. VOLZ. As we get more efficient with our air cleaning, we make fly ash more toxic.

Mr. OBERSTAR. Now, Mr. Schaeffer and Dr. Volz, what about the effect on groundwater? If these retention facilities do not have an impermeable layer either of a very thick Mylar plastic or other material or an extremely dense clay layer that is virtually impermeable, what is the likelihood of seepage into groundwater of these toxic materials?

Mr. VOLZ. It is actually highly likely. It is more likely the more literature you read, because particularly species of arsenic do not exist as metallic arsenic, they exist as oxy-anionic species of arsenic in freshwater, and although the prevailing wisdom is that metals will not be mobile when we increase pH, as we do in these fly ash pits, we have evidence that oxy-anionic species of arsenic actually increase mobility through these matrices because they actually compete with the hydroxide that is mixed in with the fly ash for binding sites.

And we have evidence that it is going into groundwater, especially during summer months, when we have particularly low levels of rain and we have that part of surface water actually makes up more of the groundwater.

Mr. OBERSTAR. So if you have an acidic environment that is conducive to absorbing these oxy-anionic materials and making them available, then, to uptake in plant, then you have a higher likelihood of toxic effect on humans, at the top of the food chain, and other aquatic species.

Mr. VOLZ. Essentially, under conditions that we are seeing now, we think that there is quite a bit——

Mr. OBERSTAR. Do these facilities have monitoring wells at distances out from the containment facilities? Are there groundwater monitoring wells?

Mr. VOLZ. There are in some cases, but I believe that they are totally insufficient.

Mr. OBERSTAR. Okay.

Mr. SCHAEFFER. Mr. Chairman?

Mr. OBERSTAR. Yes.

Mr. SCHAEFFER. Just to add one point. EPA has pretty extensive data that I think will answer your question, or at least help to answer it. For example, they have a risk assessment, very comprehensive, that estimates the chances of getting cancer if you are in an area around an unlined pit or pond that is used to store fly ash; and that is, we think, a pretty conservative methodology that they have used. I am sure they would be glad to provide it to you and explain.

Mr. OBERSTAR. I will request that.

Rainwater tends to be neutral or better, and in itself would not be conducive to freeing such materials for uptake, such metals for uptake. But there is acidity in the fly ash itself that would contribute to the acidification, right, to the absorbability of toxics? Is that correct?

Mr. VOLZ. Well, essentially, we still have a problem with acid rain in this Country, not only from our own sources, but from foreign sources, and the problem is that we also see mobility of metals because these lagoons are not just being pumped full of fly ash, they are settling basins for essentially drainage of rain, and acids that go into them actually can help mobilize metals also.

Mr. SCHAEFFER. Just one quick point, Mr. Chairman. The National Research Council 2006 study makes the point—I think EPA agrees—that acidity can drive the release of some metals; others will be mobilized under more alkaline or neutral conditions. I think arsenic is one of those contaminants.

Mr. VOLZ. Arsenic is one of them.

Mr. SCHAEFFER. So certainly the acid content of rain can make a dramatic difference, but there are other cases where, even at neutral or alkaline levels, you can get release.

Mr. OBERSTAR. Thank you, that is very helpful to understand this in its total context.

Mr. McManus, you said you would support regulation of coal combustion byproducts as non-hazardous waste, is that correct?

Mr. MCMANUS. That is correct.

Mr. OBERSTAR. What do you mean by regulation? What is your understanding of regulation?

Mr. MCMANUS. Regulation under RCRA Subtitle D program, which is the program EPA talked about earlier that they are planning to issue a proposal by the end of the year. So we are supportive of a regulatory program at the Federal level, but under Subtitle D, as opposed to Subtitle C or hazardous waste.

Mr. OBERSTAR. Would you, then, in that context, support a national standard for coal storage facility integrity?

Mr. MCMANUS. We see that as a separate but related issue, and we definitely see that there is some value in having either some type of Federal standard or Federal guidelines, because even in my company—we operate in a number of States—we see differences in how our States apply dam safety and structural integrity requirements. So we think we have good programs at our plants and in our States, but we see value in some type of a Federal standard, at a minimum, and that makes sense to us.

Mr. OBERSTAR. I raised the question because I think there are two issues at stake here. There is the release of materials that are hazardous to the health of humans and to aquatic vegetation and fauna, but there is also the hazardous effect of a structural failure that sends a wall of water or ash material or anything else that wipes out homes and facilities and lives in the process.

So regulating the discharge for its health consequences is one issue, but regulating the structure, the containment structure that is kind of a different issue. I think we need two elements here: you need liner materials or standards for liners in these retention basins so that toxic materials are not leaking into groundwater. We have such standards for solid waste facilities. Landfills that are now being used throughout the country, and have been for many years, have very rigorous liner standard requirements.

But we also need both standards for the retention facilities themselves and some frequency of inspections of the retention facilities themselves. Do you support the latter?

Mr. MCMANUS. In terms of the inspection frequency, absolutely, and that is something that the industry is prepared to work with, whatever the appropriate agency is, whether it is EPA or another agency, to come up with an appropriate standard. The effort that EPA has underway now that they talked about earlier, this information collection request, is a good first step in developing that information base on what is out there, what are the standards for inspection, what is done at the State level, and then use that to build an appropriate program.

Mr. OBERSTAR. What are the standards that you use? Mr. Goss, you are representing the Fly Ash Association. I didn't realize there was an association for fly ash—there is an association for everything in this country. Everyone has a right to be represented.

Mr. GOSS. Yes, sir.

Mr. OBERSTAR. So even the lowly fly ash needs to be elevated to a standard of representation.

Whose standards, that is, which agency standard or private engineering standards, are used in the construction of these retention facilities, whether you call them levees or dams or just retention basins?

Mr. GOSS. Well, sir, I am probably not the right one to answer that question. We focus on the beneficial use. The standards that would apply to the beneficial use I could answer. The disposal facilities I would have to defer to maybe one of the other panelists.

Mr. OBERSTAR. Mr. McManus?

Mr. MCMANUS. At least speaking for AEP, we rely on, initially, guidelines that are developed by FEMA, the Federal Emergency Management Association——

Mr. OBERSTAR. FEMA?

Mr. MCMANUS.—in terms of how you manage and how you determine the risk of an impoundment or a dam, and whether that is fly ash impoundments or whether it is cooling water impoundments that we have at some plants, whether it is hydroelectric dams. We use FEMA guidelines or we may use FERC requirements as it relates to ensuring the structural integrity of those facilities.

Mr. OBERSTAR. I am puzzled by that. I have been associated with FEMA, its oversight, its structure, its operation for probably 30 years, when it was the Civil Defense Organization. I didn't know they promulgated standards for impoundments.

Mr. MCMANUS. This is an area that we will check on and get accurate information.

Mr. OBERSTAR. It would seem to me that the Corps of Engineers would be the authoritative organization, then there are civil engineering standards for dams and there is a certain aspect, height to base ratio, that has to be followed to assure the retention strength of the structure itself. And we are having those issues reviewed by the Corps of Engineers now for levees all along the Mississippi River. We are seeing vastly greater weather events, greater in intensity and volume of water discharge from storms, and the levees seem to be inadequate to stand up to these increased weather events, increased intensity weather events.

So it would seem to me that the integrity of these facilities needs to be revisited.

Earlier, I asked the question of whether these are built up on a pancake basis, just straight up, and didn't get an answer to that question; EPA doesn't know. When you increase the height, you also have to increase the base to improve the retention strength.

You don't know the answer to those questions?

Mr. MCMANUS. The earlier question about the pancake I think was specific to Kingston, and I am not familiar with that.

Mr. OBERSTAR. Okay.

Mr. MCMANUS. But we will check on what kind of standards that we apply and make sure you have accurate information. And I may have misspoken, I think the FEMA guidelines are more in determining what is considered a high hazard facility and what kind of——

Mr. OBERSTAR. That would be more appropriate, yes.

Mr. MCMANUS.—what kind of emergency action plan requirement you may have in public response if you see an issue. So FEMA is probably more related to that aspect, as opposed to the actual engineering standards of an impoundment.

Mr. OBERSTAR. [Presiding] Mr. Boozman, do you have any further questions?

Mr. BOOZMAN. The only thing I would like to—you being around a long time and helped write a lot of this stuff. And I think you described it very well. We are talking about the integrity of the structure; making sure that it doesn't burst like it did, making sure it doesn't leach out with a liner or depending on the soil, or however you determine those things.

Then, the other thing is ultimately some of that is actually discharged into the stream, and I guess I am wondering why, through the permitting process that EPA doesn't already control that and why you have these very, very high—now, we had testimony that they had found situations, plants located around that actually had—that that was good water that was being—I guess what don't understand and get a little frustrated with is why, under the current Clean Water Act, why they can't enforce that through the permitting process to do away with the situation in Miami and some of these really——

Mr. OBERSTAR. It seems to me that EPA should have Clean Water Act pollutant discharge regulatory authority for—and to treat any discharge from such facilities that are, or have, point sources. If they have a pipe discharging into a ditch, it ought to be regulated and ought to be subject to existing EPA authority under the Clean Water National Pollution Discharge Permit authority. We will pursue that further with EPA.

Mr. Hare, do you have any further questions?

Mr. HARE. No.

Mr. OBERSTAR. Anything that any of the witnesses want to add for the good of the order?

[No response.]

Mr. OBERSTAR. Thank you very much for your contribution. There are a number of issues we will have to pursue further. We want to assure the integrity of these impoundment structures, whether they are levees, dams, or just simple impoundments, both the structure itself and protecting its internal construct from leakage or seepage into groundwater.

Thank you very much for your contributions.

The Committee is adjourned.

[Whereupon, at 12:52 p.m., the Subcommittee was adjourned.]

Harry E. Mitchell

Statement of Rep. Harry Mitchell
House Transportation and Infrastructure Committee
Subcommittee on Water Resources and Environment
4/30/09

--Thank you Madam Chairwoman

--As the coal ash spill at the Tennessee Valley Authority's (TVA) Kingston Fossil Plant reminded us, spills can put water resources at risk.

--This committee has a responsibility to protect our nation's water resources, and that is why I am glad we are having this hearing today.

--I look forward to hearing from today's witnesses about what is currently being done to protect our water resources from coal combustion waste as well as any additional measures that may be necessary.

--I yield back.

TESTIMONY OF BARRY BREEN
ACTING ASSISTANT ADMINISTRATOR
OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE
U.S. ENVIRONMENTAL PROTECTION AGENCY
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
SUBCOMMITTEE ON WATER RESOURCES AND THE ENVIRONMENT
U.S. HOUSE OF REPRESENTATIVES

April 30, 2009

Madam Chairwoman and members of the Subcommittee, thank you for the opportunity to testify on the U.S. Environmental Protection Agency's (EPA's) coal combustion regulatory development activities and management unit assessment efforts. My testimony provides a brief history of EPA's regulatory efforts on coal combustion residuals, as well as an update on our current rulemaking activities. I will also discuss and provide an update of EPA's assessment of coal combustion residuals management units.

Regulation of Coal Combustion Residuals

Coal combustion residuals (CCR) are one of the largest waste streams generated in the United States, with approximately 131 million tons generated in 2007. Of this, approximately 36% was disposed of in landfills, 21% was disposed of in surface impoundments, 38% was beneficially reused, and 5% was used as minefill. In comparison, EPA's Biennial Hazardous Waste Report shows that approximately 33.7 million tons of hazardous waste was generated in the United States in 2007. CCR typically contain a broad range of metals, including arsenic, selenium, and cadmium; however, the leach levels, using EPA's Toxicity Characteristic Leaching Procedure (TCLP), rarely reach the Resource and Conservation Recovery Act (RCRA) hazardous waste characteristic levels. Due to the mobility of metals and the large size of the typical disposal unit, metals (especially arsenic) may leach at levels of potential concern from impoundments and unlined landfills.

The beneficial use of CCR provides environmental benefits in terms of energy savings, greenhouse gas emission reductions, and resource conservation. In 2007, 56 million tons of CCR were reused. For example, use of CCR contributed to the construction of the Hoover Dam, the San Francisco-Oakland Bay Bridge, and the new I-35 bridge in Minneapolis, Minnesota. Many state environmental statutes and regulatory programs, as well as state road construction agencies, provide for the beneficial use of CCR. In 2007, use of coal fly ash as a substitute for Portland cement in concrete reduced energy use in concrete manufacturing by 73 trillion British thermal units (BTUs), with associated greenhouse gas emission reductions estimated at 12.5 million tons of carbon dioxide equivalent (MTCO2).

Regarding EPA's regulatory efforts for CCR, in May 2000, EPA issued a "Regulatory Determination on Wastes from the Combustion of Fossil Fuels" which conveyed EPA's determination that CCR did not warrant regulation as hazardous waste under Subtitle C of RCRA. However, EPA also concluded that federal regulation as a non-hazardous waste under Subtitle D of RCRA was warranted. EPA based this determination on a number of important findings: (1) the constituents present in CCR include metals that could present a risk to human health and the environment under certain conditions; (2) EPA identified 11 documented cases of proven environmental damage due to improper management of CCR in landfills and surface impoundments; (3) many sites managing CCR lacked controls, such as liners and ground water monitoring; and (4) while state regulatory programs had shown improvement, gaps still existed. With respect to other uses, EPA determined that beneficial uses of CCR, other than minefilling, did not pose a risk and thus did not require federal regulation. EPA also determined that minefilling should be regulated under RCRA Subtitle D or the Surface Mining Control and Reclamation Act (SMCRA).

After the Regulatory Determination, EPA continued to collect new information and conduct additional analyses as part of its effort to develop regulations. In August 2007, EPA made this information available for public comment through a Notice of Data Availability. This notice solicited comment on three documents – an updated draft risk assessment characterizing potential human and ecological risks associated with disposal of CCR in surface impoundments and landfills; an updated report on damage cases associated with disposal of CCRs, which identified an additional 13 proven damage cases; and a Department of Energy / EPA survey of recent disposal practices. In addition, EPA also made available for comment two alternative management approaches, one recommended by a consortium of environmental groups and the other by the utility industry. The comment period on the notice closed on February 11, 2008. EPA received close to 400 comments. After the comment period closed, EPA commissioned a peer review of the draft risk assessment which was completed in September 2008.

The failure of an ash disposal cell at the Tennessee Valley Authority's (TVA's) Kingston plant in December 2008 highlighted the issue of impoundment stability. Our previous regulatory efforts had not included this element; however, we are now analyzing and considering whether to specifically include impoundment integrity as part of our CCR regulatory development.

EPA is committed to issuing proposed regulations for the management of CCR by the electric utilities by December 2009. We are currently evaluating a number of different approaches for regulating CCR, including revising the May 2000 Regulatory Determination. As part of our efforts, we are reviewing all of the information we have on CCR, including all of the comments received from our August 2007 NODA and the peer review of the risk assessment.

Regulation of Water Discharges

Wastewater discharges from surface impoundments are subject to Clean Water Act regulations implemented through the National Pollutant Discharge Elimination System (NPDES). NPDES permits incorporate technology-based effluent limits (i.e., effluent limitations guidelines), water-quality based effluent limits, and standard and special conditions.

NPDES regulatory requirements that address impoundment integrity include standard permit conditions to "...properly operate and maintain all facilities and systems of treatment and control (and related appurtenances)...to achieve compliance with the conditions of this permit" [See 40 CFR part12.41(e)]. In addition, best management practices can be incorporated in NPDES permits as necessary to achieve limitations or to carry out the purpose and intent of the Clean Water Act [See 40 CFR part 122.44(k)].

EPA reviewed a sample of existing NPDES permits to see what types of conditions were currently in permits to address impoundment integrity. EPA determined that additional technical assistance is needed to help permit writers better address coal ash impoundment integrity. As a result, EPA is developing model permit language and implementing guidance that will be discussed with our state counterparts and then made available for state and EPA permit writers. EPA also is considering technical assistance for permit writers to help them identify and apply appropriately sensitive analytical test methods to effectively measure the impacts of both permitted discharges and any future spills.

The effluent limitation guidelines for steam electric power plants were last issued in 1982 and are codified in Part 423 of the Code of Federal Regulations (40 CFR part 423). Since 2005, EPA has conducted an intensive review of wastewater discharges from coal-fired power plants to determine whether new Clean Water Act regulations are needed. As part of this effort, EPA sampled wastewater from surface impoundments and advanced wastewater treatment systems, conducted on-site reviews of the operations at more than two dozen power plants, and issued a detailed questionnaire to thirty power plants using authority granted under section 308 of the Clean Water Act. EPA's data collection efforts focused on three target areas: (1) identifying treatment technologies for the wastewater generated by newer air pollution control equipment; (2) characterizing the practices used by the industry to manage or eliminate discharges of fly ash and bottom ash wastewater; and (3) identifying methods for managing power plant wastewater that allow recycling and reuse, rather than discharge to surface waters. EPA has engaged in extensive dialogue with our state partners to ensure their comments about power plant discharges are taken into account.

In August 2008, EPA published an interim report describing the status of the detailed study and findings to date. Much of the information EPA collected, including the laboratory data from sampling and the questionnaire data were made available to the public. The study is still in progress and in December 2008 EPA received the laboratory results from its most recent sampling event. Upon completion of the study this year, EPA will determine whether the current national effluent limitations guidelines for power plants need to be updated. EPA's interim study report, *"Steam Electric Power Generating Point Source Category: 2007/2008 Detailed Study Report,"* can be found online at http://epa.gov/waterscience/guide/304m/2006/steam-interim.pdf.

Assessment Efforts

As noted previously in my testimony, the failure of an ash disposal cell at TVA's Kingston plant in December 2008 highlighted the issue of impoundment stability. As a result, EPA has embarked on a major effort to assess the stability of those impoundments and other management units which contain wet-handled CCR. This assessment has three phases: information gathering through an information request letter; site visits or independent assessments of other state or federal regulatory agency inspection reports; and final reports and appropriate follow up. Currently, we are still in the information gathering phase and plan to begin field work in May of this year.

On March 9, 2009, EPA sent information request letters under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 104(e) to 162 facilities and to 61 utility headquarters offices. These information requests asked specific questions related to the stability of the management units and required a response within ten working days of receipt. Further, in order to emphasize the priority placed on this effort, EPA's

Administrator signed the cover letter for each of these requests. I am happy to report that all of the corporate responses and all but two of the individual facility responses have been submitted. We are following up with those facilities that have not responded. In addition, through this effort an additional 43 facilities with impoundments or management units for wet-handled CCR have been identified. EPA has sent information requests to these facilities. Overall, the assessment responses have identified more than 400 management units that have free liquid.

EPA is in the process of analyzing these responses to determine the appropriate next step for each facility. We plan to conduct assessments for all of these facilities on a case-by-case basis and are evaluating the best methods for conducting these assessments. EPA has retained a contractor to assist in the assessments and we plan to have our first teams in the field in May. We will work closely with our state partners on the scheduling of any site assessments and our state partner agencies will be invited to participate.

If our assessments indicate that corrective measures are needed, EPA will work closely with our state partners to ensure that these measures are taken. In addition, EPA expects to prepare a report for each of the units assessed and make those reports available to the public. Our goal is to complete all of the assessments this year. We will continue to share information about our assessment efforts as they progress.

EPA also is evaluating CCR disposal practices at coal-fired power plants to determine if these facilities are in compliance with existing federal environmental laws and will take enforcement action, where appropriate, to address serious violations.

Conclusion

EPA will continue its regulatory development process and its management unit assessment efforts and we will continue to keep the Committee informed on progress related to these efforts.

U.S. House of Representatives
Committee on Transportation and Infrastructure
Washington, DC 20515

James L. Oberstar
Chairman

David Heymsfeld, Chief of Staff
Ward W. McCarragher, Chief Counsel

John L. Mica
Ranking Republican Member

James W. Coon II, Republican Chief of Staff

June 25, 2009

Mr. Barry Breen
Acting Assistant Administrator
Office of Solid Waste and Emergency Response
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Dear Acting Assistant Administrator Breen:

Thank you for your testimony before the Subcommittee on Water Resources and Environment on April 30, 2009, concerning "Coal Combustion Waste and Water Quality." I am pleased that the Agency was able to appear and testify on behalf of the Environmental Protection Agency. The Subcommittee gained valuable insight from the information provided by representatives from EPA at the hearing.

Enclosed please find additional questions for written responses for the record for the hearing. The Subcommittee appreciates written responses from the Agency no later than July 10, 2009. Please submit your response via US mail to Jenna Tatum at B-376 Rayburn House Office Building, Washington, D.C., 20515. Additionally, please provide an electronic version of your response via e-mail to jenna.tatum@mail.house.gov.

If you have any questions, please do not hesitate to contact the Subcommittee staff at (202) 225-0060.

Sincerely,

Eddie Bernice Johnson

Eddie Bernice Johnson, M.C.

Enclosure

Follow-Up Questions for Acting Assistant Administrator Breen
House Committee on Transportation and Infrastructure
Subcommittee on Water Resources and Environment
Hearing on Coal Combustion Waste Storage and Water Quality
Thursday, April 30, 2009 at 10 a.m.

1. In his testimony, Mr. Eric Schaeffer of the Environmental Integrity Project testified that "burning coal concentrates the toxic constituents that are in coal, like arsenic and selenium, many times over," and that these "toxic elements will leak out of coal ash if it is saturated." In your opinion, do you believe that a lack of federal regulations for the storage and management of coal ash can result in these substances posing hazards to human health?

2. Please submit to the Committee any plans or procedures that EPA will undertake in the next thirty days regarding the Office of Solid Waste and Emergency Response's review of its guidelines for the storage for coal combustion wastes.

3. Please provide the Committee with the Office of Water's timeline, process, and any other relevant information for determining whether or not it will be necessary to establish new Effluent Limitation Guidelines for power plants (Steam Electric Power Generation), as well as new discharge limits for the range of constituents associated with coal combustion and coal combustion waste in order to protect human and ecological health?

4. During the question and answer period of the hearing, Congressman Hall asked Acting Assistant Administrator Breen about the presence of toxic chemicals (arsenic, mercury, cadmium, etc.) in coal and 'clean coal.' For the record, would you please provide the Committee with an analysis of the chemical differences between the substances found in coal and 'clean coal'? In your answer, please provide a specific response as to the presence of arsenic, mercury, cadmium, chromium, boron in clean coal – as well as any other potentially toxic substances found in coal ash. For the record, please respond to Congressman Hall's questions regarding clean coal.

5. In Acting Assistant Administrator Breen's testimony, he noted that EPA is currently conducting a survey of 61 corporations representing 162 coal-fired power production facilities. During the question and answer period, Congresswoman Napolitano asked him to provide to the Committee a copy of the survey instrument sent by EPA to these corporations, as well as any subsequent information or results from the survey. Please provide the Committee with a copy of the survey that was sent to each of these 61 corporations. Additionally, please provide to the Committee any analysis or data compilation that is currently available from these surveys. If there is no such information available, please provide to the Committee a time frame in which EPA hopes to have the analysis complete.

   Please also provide information about any of the 61 corporations that have not satisfactorily responded to the survey, as well as information about any of the 162 facilities for which information was not provided, pursuant to the survey.

6. During the question and answer period, Congresswoman Titus asked you to provide a list of State regulations regarding the beneficial use of coal ash, as well as any regulations regarding the storage of coal combustion waste. In addition to providing the Committee with this information, please provide the committee with a list of coal-fired power plants in the State of Nevada and specify whether or not these storage facilities are wet or dry impoundments, and are lined (identifying liner type used) or unlined. Please also provide information on what each liner consists of, and whether there are NPDES permits associated with these coal combustion waste retention facilities.

7. In his testimony, Mr. Eric Schaeffer of the Environmental Integrity Project testified that the discharges of a number of constituents into waters of the United States – such as selenium and arsenic – from a variety of coal-fired power plants were well in excess of either chronic freshwater standards for aquatic life, chronic saltwater standards for aquatic life, human health standards for the consumption of organisms, or federal drinking water standards, albeit these discharges were consistent with the permit terms of the facilities' NPDES permits.

   Going forward, what active response will EPA take to ensure that discharges from industrial, power, and other facilities do not exceed chronic freshwater standards for aquatic life, chronic saltwater standards for aquatic life, human health standards for the consumption of organisms, or federal drinking water standards, as demonstrated in Mr. Schaeffer's testimony?

8. Does EPA believe that the current Effluent Limitation Guideline (ELG) for Steam Electric Power Generation, as it applies to coal-fired power plants, is protective of human health and the environment?

9. Is the ELG for Steam Electric Power Generation, as it applies to coal-fired power plants, sufficient to:

   a) Restore and maintain the chemical, physical and biological integrity of all waters of the United States, ground waters, waters of the contiguous zone, and the oceans?
   b) Ensure the protection and propagation of shellfish, fish, and wildlife for classes and categories of receiving waters, and to allow recreational activities in and on the water; and
   c) Protective of human health?

   Please also provide a response that takes the bioaccumulative factors of some of these constituents into account.

10. During the hearing, you cited a statistic on coal combustion waste storage and disposal facilities constructed between 1994 and 2001 as being "lined" facilities. Are all coal combustion waste storage and disposal facilities constructed between 1994 and 2001 "lined" facilities? What proportion of these facilities use clay liners, and what proportion use synthetic liners? What are the current Federal regulations that require coal combustion waste disposal and storage facilities to used liners?

In addition, does EPA have detailed information on the types of liners used for each of the facilities surveyed (with regards to the survey referenced in Question #5)? Please provide information or analyses regarding these. If EPA does not have this information, please provide the Subcommittee with a timeline for which EPA will gather and provide information on the presence and types of liners for all storage and disposal facilities surveyed.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 14 2009

OFFICE OF CONGRESSIONAL AND
INTERGOVERNMENTAL RELATIONS

The Honorable Eddie Bernice Johnson
Chairwoman
Committee on Transportation and Infrastructure
Subcommittee on Water Resources and Environment
U.S. House of Representatives
Washington, D.C. 20515

Thank you for your letter of June 25, 2009 to Barry Breen, Acting Assistant Administrator of the U.S. Environmental Protection Agency's (EPA's) Office of Solid Waste and Emergency Response, transmitting questions for the record from the April 30, 2009, hearing titled, "Coal Combustion Waste and Water Quality."

Enclosed please find EPA's responses to the questions posed by the Subcommittee. Also, at Enclosure 3, please find the materials that EPA committed to providing to the Subcommittee for the record: an April 1, 2009, letter to EPA from the Association of State and Territorial Solid Waste Management Officials regarding coal combustion residuals (CCR); results from a 2009 ASTSWMO survey of states with facilities managing CCR; and information related to the Tennessee Valley Authority's Kingston facility.

Again, thank you for your letter. If you have further questions, please contact me or your staff may contact Amy Hayden in EPA's Office of Congressional and Intergovernmental Relations at (202) 564-0555.

Sincerely,

David G. McIntosh
Associate Administrator

Enclosures

cc: The Honorable John Boozman, Ranking Member

Follow-Up Questions for Written Submission
House Committee on Transportation and Infrastructure
Subcommittee on Water Resources and Environment
Hearing on Coal Combustion Waste Storage and Water Quality
April 30, 2009

1. In his testimony, Mr. Eric Schaeffer of the Environmental Integrity Project testified that "burning coal concentrates the toxic constituents that are in coal, like arsenic and selenium, many times over," and that these "toxic elements will leak out of coal ash if it is saturated." In your opinion, do you believe that a lack of federal regulation for the storage and management of coal ash can result in these substances posing hazards to human health?

Response: As demonstrated by the damage cases that the U.S. Environmental Protection Agency (EPA) cited in an August 2007 Federal Register Notice of Data Availability, coal ash can pose risk in certain situations. We do note, however, that newly constructed units are generally lined and have ground water monitoring. Federal regulations will help ensure that storage and disposal practices will be protective of human health and the environment.

2. Please submit to the Committee any plans or procedures that EPA will undertake in the next thirty days regarding the Office of Solid Waste and Emergency Response's review of its guidelines for the storage for coal combustion wastes.

Response: EPA is continuing to evaluate all options, and is proceeding to draft a proposed rule to be published in the Federal Register for public comment by the end of the calendar year.

3. Please provide the Committee with the Office of Water's timeline, process, and any other relevant information for determining whether or not it will be necessary to establish new Effluent Limitation Guidelines for power plants (Steam Electric Power Generation), as well as new discharge limits for the range of constituents associated with coal combustion and coal combustion waste in order to protect human and ecological health?

Response: Since 2005, EPA has been carrying out an intensive review of wastewater discharges from coal-fired power plants to determine whether new Clean Water Act regulations are needed. As part of this effort, we sampled wastewater from surface impoundments and advanced wastewater treatments systems, conducted on-site reviews of the operations at more than two dozen power plants, and issued a detailed questionnaire to thirty power plants using authority granted under section 308 of the Clean Water Act. Our data collection efforts focused on four target areas: (1) determining the pollutant characteristics of power plant wastewater; (2) identifying treatment technologies for the wastewater generated by newer air pollution control equipment; (3) characterizing the practices used by the industry to manage or eliminate discharges of fly ash and bottom ash wastewater; and (4) identifying methods for managing power plant wastewater that allow recycling and reuse, rather than discharge to surface waters. Much of the information collected thus far, including laboratory data from sampling, were made available to the public in an interim study report, "*Steam Electric Power Generating Point Source Category: 2007/2008 Detailed Study Report*," that can be found online at http://www.epa.gov/waterscience/guide/304m/2006/steam-interim.pdf.

The study is now in its final stages. We are finishing technical analyses of the wastewater sampling data and other information, and drafting the final report for the detailed study. Upon completing the study and reviewing its findings, EPA will determine whether revisions to the current effluent limitations guidelines and standards (ELGs) are warranted. We plan to present our findings and announce the decision in the Federal Register notice for the Preliminary 2010 Effluent Guidelines Program Plan, currently planned for October of this year.

In addition to reviewing information to determine whether the ELGs should be revised, EPA is evaluating specific industrial processes, wastewaters, and types of facilities to identify the potential scope of a rulemaking effort. Upon deciding to initiate a rulemaking and defining its scope, EPA will identify data collection requirements and develop the schedule for issuing proposed and final ELGs.

4. During the question and answer period of the hearing, Congressman Hall asked Acting Assistant Administrator Breen about the presence of toxic chemicals (arsenic, mercury, cadmium, etc.) in coal and 'clean coal.' For the record, would you please provide the Committee with an analysis of the chemical differences between the substances found in coal and 'clean coal'? In your answer, please provide a specific response as to the presence of arsenic, mercury, cadmium, chromium, boron in clean coal – as well as any other potentially toxic substances found in coal ash. For the record, please respond to Congressman Hall's questions regarding clean coal.

Response: While there are compositional differences between the various types of coal (e.g. bituminous, etc), we are not aware of any coal referred to as "clean coal." Rather, "clean coal" describes a new generation of energy processes that reduce air emissions and other pollutants from coal-burning power plant technologies. These technologies are primarily aimed at reducing air emissions. We are unaware of studies regarding differences in substances in the solid waste residuals.

EPA's Office of Research and Development is planning to evaluate data on fly ash (chemical and physical composition, and leaching potential) in addition to an evaluation of scrubber residues, as well as evaluating the potential fate of mercury and other metals from a range of coal combustion residual management practices. Once completed, these reports will be publically available on the EPA web site.

5. In Acting Assistant Administrator Breen's testimony, he noted that EPA is currently conducting a survey of 61 corporations representing 162 coal-fired power production facilities. During the question and answer period, Congresswoman Napolitano asked him to provide to the Committee a copy of the survey instrument sent by EPA to these corporations, as well as any subsequent information or results from the survey. Please provide the Committee with a copy of the survey that was sent to each of these 61

corporations. Additionally, please provide to the Committee any analysis or data compilation that is currently available from these surveys. If there is no such information available, please provide to the Committee a time frame in which EPA hopes to have the analysis complete.

Please also provide information about any of the 61 corporations that have not satisfactorily responded to the survey, as well as information about any of the 162 facilities for which information was not provided, pursuant to the survey.

Response: EPA has posted on its web site, noted below, the information request letter and a list of the facilities and the corporate officers to whom this was sent.

http://www.epa.gov/epawaste/nonhaz/industrial/special/fossil/coalashletter.htm

We have included (Enclosure 1) a copy of the information request letter. In the coming weeks, EPA expects to post to the EPA website a summary of the information we have received, as well as the survey responses from a number of the facilities. This will be an ongoing process – as we compile the results and resolve claims of confidential business information, we will update the web site with additional information.

6. During the question and answer period, Congresswoman Titus asked you to provide a list of State regulations regarding the beneficial use of coal ash, as well as any regulations regarding the storage of coal combustion wastes. In addition to providing the Committee with this information, please provide the committee with a list of coal-fired power plants in the State of Nevada and specify whether or not these storage facilities are wet or dry impoundments, and are lined (identifying liner type used) or unlined. Please also provide information on what each liner consists of, and whether there are NPDES permits associated with these coal combustion waste retention facilities.

Response: Regarding state beneficial use programs, a report has been prepared by the Association of State and Territorial Solid Waste Management Officials (ASTSWMO). This report is not specifically limited to the beneficial use of coal ash, but rather addresses all industrial materials. This report provides information on, and links to, state programs. This report can be found at

http://www.astswmo.org/files/publications/solidwaste/2007BUSurveyReport11-30-07.pdf

While EPA does not have a list of state regulations regarding the storage of coal combustion residuals, the report titled, "Coal Combustion Waste Management at Landfills and Surface Impoundments, 1994-2004,"summarizes various aspects of state non-hazardous industrial waste regulations and can be found at:

http://www.fossil.energy.gov/programs/powersystems/pollutioncontrols/coal_waste_report.pdf

Enclosure 2 provides information on coal-fired power plants in Nevada.

7. In his testimony, Mr. Eric Schaeffer of the Environmental Integrity Project testified that the discharges of a number of constituents into waters of the United States – such as selenium and arsenic – from a variety of coal-fired power plants were well in excess of either chronic freshwater standards for aquatic life, chronic saltwater standards for aquatic life, human health standards for the consumption of organisms, or federal drinking water standards, albeit these discharges were consistent with the permit terms of the facilities' NPDES permits.

Going forward, what active response will EPA take to ensure that discharges from industrial, power, and other facilities do not exceed chronic freshwater standards for aquatic life, chronic saltwater standards for aquatic life, human health standards for the consumption of organisms, or federal drinking water standards, as demonstrated in Mr. Schaeffer's testimony?

Response: The Clean Water Act (CWA) prohibits the discharge of any pollutant from a coal-fired power plant or point source into waters of the United States except in compliance with a National Pollutant Discharge Elimination System (NPDES) permit (see CWA sections 301(a) and 402). EPA or states authorized to administer the NPDES program, issue NPDES permits. These permits must contain technology-based effluent limitations which represent the degree of control that can be achieved by point sources using various levels of pollution control technology (see CWA sections 301, 304, and 306) and more stringent limitations, commonly known as water quality-based effluent limitations (WQBELs), when necessary to ensure that the receiving waters achieve applicable water quality standards (see CWA section 301(b)(1)(C)).

As noted above, NPDES permits must contain WQBELs when necessary to achieve applicable water quality standards. The procedure for determining the need for WQBELs is called a "reasonable potential" analysis. Under EPA's regulations at 40 CFR 122.44(d)(1)(i), effluent limitations must control all pollutants that the permitting authority determines "are or may be discharged at a level [that] will cause, have the reasonable potential to cause, or contribute to an excursion above any [applicable] water quality standard." Thus, if a pollutant discharge has the reasonable potential to cause or contribute to an exceedence of applicable water quality standards, the discharger's NPDES permit must contain a WQBEL for that pollutant (see 40 CFR 122.44(d)(1)(iii)-(vi)). The procedure for determining reasonable potential must consider the variability of the pollutant in the effluent, other loading sources, and dilution (when allowed by the water quality standards) (see 40 CFR 122.44(d)(1)(ii)). The limit derivation procedures should account for effluent variability; consider available receiving water dilution; protect again acute, chronic and human heath impacts; and protect the applicable water quality standards.

We understand that pollutants are present in the discharge from coal combustion waste impoundments that may have the potential to impact water quality and human health. EPA is developing guidance to assist permit writers and reviewers in specifically addressing such discharges under the NPDES program. The guidance will provide information on conducting thorough reasonable potential analysis and establishing appropriate WQBELs for discharges from coal combustion waste impoundments.

Through this process, we intend to provide tools for permit writers to better protect applicable water quality standards.

8. Does EPA believe that the current Effluent Limitation Guideline (ELG) for Steam Electric Power Generation, as it applies to coal-fired power plants, is protective of human health and the environment?

Response: ELGs are technology-based requirements established for categories of point sources to reduce pollutants present in the process wastewater to the maximum extent achievable by the best wastewater treatment that is economically achievable. ELGs are part of the national strategy for improving water quality and protecting human health and the environment; however, the criteria on which these regulations are established do not directly address site-specific factors. The existing ELG for the steam electric category established numeric limitations for pollutants based on the application of the best available technology economically achievable. The technology-based effluent limitations established by applying the ELG in a permit may be sufficient to attain applicable water quality standards established to protect human health and the environment. In addition to ensuring that the effluent achieves the requirements of an applicable ELG, the NPDES permit also must ensure that the discharges protect human health and the environment. That process includes a site-specific analysis to determine if the discharge has a reasonable potential to cause or contribute to an excursion of an applicable water quality standards established to protect human health and aquatic life. If a discharge is determined to have reasonable potential, a water quality-based limitation is needed. Such a water quality-based limitation is established at a level to protect human health and the environment.

The process for updating the ELG is outlined here. First, EPA identified the steam electric power industry for study during the 2005 annual review of effluent guidelines. At that time, publicly available data reported through the NPDES permit program and the Toxics Release Inventory (TRI) indicated that the industry ranked high in discharges of toxic and nonconventional pollutants. Because of these findings, EPA initiated the detailed study that will be completed this year.

During the detailed study, EPA investigated whether pollutant discharges reported under the NPDES and TRI programs accurately reflected current discharges for the Steam Electric Power Generating point source category, including those associated with recent process and technology changes being implemented by the industry. EPA found that the existing publicly available data were insufficient to fully evaluate the industry's discharges. To fill these data gaps, EPA collected information on the wastewater characteristics and treatment technologies through on-site evaluations at approximately thirty facilities, sampling of ash ponds and flue gas desulfurization (FGD) wastewater at six facilities, issuing a questionnaire that obtained data for thirty facilities, and various secondary data sources.

EPA focused these data collection activities on certain discharges from coal-fired steam electric power plants. EPA's review determined that most of the toxic loadings for this category are associated with metals and certain other elements present in wastewater discharges, and that the waste streams contributing the majority of these pollutants are associated with ash handling and wet FGD systems. Other potential sources of these pollutants include coal pile runoff, metal cleaning wastes, coal washing, leachate from landfills and wastewater impoundments, and certain low-volume wastes. If EPA decides to proceed to initiate rulemaking, it will focus on the best technology economically affordable to address these toxic discharges.

9. Is the ELG for Steam Electric Power Generation, as it applies to coal-fired power plants sufficient to:

a) Restore and maintain the chemical, physical and biological integrity of all waters of the United States, ground waters, waters of the contiguous zone, and the oceans?
b) Ensure the protection and propagation of shellfish, fish, and wildlife for classes and categories of receiving waters, and to allow recreational activities in and on the water; and
c) Protective of human health?

Please also provide a response that takes the bioaccumulative factors of some of these constituents into account.

Response: As part of the detailed study, EPA reviewed available information on environmental effects attributed to intentional permitted discharges to surface water and other releases of the pollutants present in coal combustion wastes. Some studies have shown that the pollutants present in the intentional permitted discharges from coal-fired power plants can affect aquatic organisms and wildlife, resulting in lasting environmental impacts on local habitats and ecosystems. Peer-reviewed literature has documented the impacts resulting from intentional and accidental surface water discharges of wastewater from coal-fired power plants, as well as environmental impacts from leachate from waste management units (i.e., surface impoundments and landfills) entering the ground water system.

It should be noted that a number of variables can affect the composition of coal combustion wastewater, including parent coal composition, the inclusion of other chemicals in the combustion process, type of combustion process, flue gas cleaning technologies implemented, and management techniques used to dispose of coal combustion wastewater. In particular, the practice of commingling coal combustion wastewater with other waste streams from the plant in surface impoundments can result in a chemically complex effluent that is ultimately released to the environment. Discharges of coal combustion wastewater have been associated with fish kills, reductions in the growth and survival of aquatic organisms, behavioral and physiological effects in wildlife and aquatic organisms, potential impacts to human health (i.e., drinking water contamination), and changes to the local habitat.

An increasing amount of evidence indicates that the characteristics of coal combustion wastewater have the potential to impact human health and the environment. Many of the common pollutants found in coal combustion wastewater (e.g., selenium, mercury, and arsenic) are known to cause environmental harm and potentially represent a human health risk. Although coal-fired power plants often dilute coal combustion wastewater with other large volume wastewater (e.g., cooling water) to reduce the pollutant concentrations prior to discharge, the effluent can contain large mass loads (i.e. total pounds) of pollutants. Some of the pollutants in these discharges, although present at low concentrations, can bioaccumulate and present an increased ecological threat due to their tendency to persist in the environment, resulting in slow ecological recovery times following exposure. In addition, leachate from impoundments and landfills containing coal combustion wastes, if released from a management unit, can contain high concentrations of pollutants (i.e., exceeding Maximum Contaminant Levels, or MCLs for drinking water) and have been linked to ground water and surface water impacts.

As noted above in the answers to questions 7 and 8, the ELG provides the treatment technology based limitations for steam electric facilities. When the permitting authority finds that additional controls are needed to protect a state's applicable Water Quality Standards (WQS), such water quality-based limits are required. Analysis for compliance with WQS is the mechanism permitting authorities use to determine the need for additional controls beyond those prescribed by the ELG. The WQS directly address human health and the environment and afford a mechanism to address the site specific factors which will determine whether a potential impact may occur.

10. During the hearing, you cited a statistic on coal combustion waste storage and disposal facilities constructed between 1994 and 2001 as being "lined" facilities. Are all coal combustion waste storage and disposal facilities constructed between 1994 and 2001 "lined" facilities? What proportion of these facilities use clay liners and what proportion use synthetic liners? What are the current Federal regulations that require coal combustion waste disposal and storage facilities to used liners?

In addition, does EPA have detailed information on the types of liners used for each of the facilities surveyed (with regard to the survey referenced in Question #5)? Please provide information or analyses regarding these. If EPA does not have this information, please provide the Subcommittee with a timeline for which EPA will gather and provide information on the presence and types of liners for all storage and disposal facilities surveyed.

Response: In its May 2000 Regulatory Determination for fossil fuel combustion residuals, EPA reported, as of 1995, that overall 57% of the landfills and 26% of the surface impoundments were lined. EPA did note an improving trend; for newer units (those constructed between 1985 and 1995), 75% of the landfills and 60% of the surface impoundments were lined. This trend continued and for new units constructed between 1994 and 2004, when 97% of the landfills and 100% of the surface impoundments were lined.

For landfills and surface impoundments commissioned or laterally expanded from 1994-2004, 25% of the 56 new waste units had clay liners, 18% used single/synthetic liners, 4% used double liners, 27% used combination liners, and 2% had no liners.

There are no current federal regulations requiring coal combustion residual disposal and storage facilities to use liners. EPA is in the process of completing field visits to coal combustion residuals impoundment units, many of which lack detailed information on the types of liners being used. To date, 11 of 27 units at 16 facilities have liners. EPA's assessment effort, which was aimed at gathering information associated with dam integrity, was not focused on the presence of liners, nor the type of liner system that individual facilities were using in their impoundments. However, the contractor staff conducting the dam integrity assessments on behalf of EPA are obtaining that information when conducting field inspections. At the first 22 facilities visited by EPA contractors, there were 43 impoundments. Of these, 13 of the units had liners, including: two with clay liners; two with High Density Polyethylene (HDPE) liners; two with Reinforced Polyethylene (RPE) liners; one with an unspecified geo-membrane liner; and five with single composite liners (a synthetic liner - HDPE, RPE, etc. -- placed over compacted clay).

Enclosure 1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 9 2009

Via CERTIFIED MAIL/RETURN RECEIPT REQUESTED

OFFICE OF
SOLID WASTE AND
EMERGENCY RESPONSE

Plant Manager
Gorgas Power Station
460 Gorgas Rd
Parrish, Alabama 35580

RE: Request for Information Under Section 104 (e) of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. 9604(e)

Dear Sir or Madam:

The United States Environmental Protection Agency is requesting information relating to the surface impoundments or similar diked or bermed management unit(s) or management units designated as landfills which receive liquid-borne material from a surface impoundment used for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals. EPA is requesting this information pursuant to the authority granted to it under Section 104 (e) of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. 9604(e) which provides in relevant part that whenever the Agency has reason to believe that there may be a release or a threat of a release of a pollutant or contaminant, they may require any person who has or may have information to furnish information or documents relating to the matter, including the identification, nature, and quantity of materials which have been or are generated, treated, stored or disposed at the facility and the nature or extent of a release or a threatened release. EPA believes that the information requested is essential to an evaluation of the threat of releases of pollutants or contaminants from these units. **EPA hereby requires that you furnish to EPA, within ten (10) business days of receipt of this letter a response to each request for information set forth in the Enclosure, including all documents responsive to such request.**

Please provide a full and complete response to each request for information set forth in Enclosure A. The provisions of Section 104 of CERCLA authorize EPA to pursue penalties for failure to comply with or respond adequately to an information request under Section 104(e). In addition, providing false, fictitious or fraudulent statements or representations may subject you to criminal penalties under 18 U.S.C. 1001.

Your response must include the following certification signed and dated by an authorized representative of the Gorgas Power Station.

I certify that the information contained in this response to EPA's request for information and the accompanying documents is true, accurate, and complete. As to the identified portions of this response for which I cannot personally verify their accuracy, I certify under penalty of law that this response and all attachments were prepared in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Signature: ___________
Name: _____________
Title: ______________

This request has been reviewed and approved by the Office of Management and Budget pursuant to the Paperwork Reduction Act, 44 U.S.C., 3501-3520.

Please send your reply to:

Mr. Richard Kinch
US Environmental Protection Agency (5306P)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

If you are using overnight or hand delivery mail, please use the following address:

Mr. Richard Kinch
US Environmental Protection Agency
Two Potomac Yard
2733 S. Crystal Dr.
5th Floor; N-5783
Arlington, VA 22202 2733

EPA expects the owners and operators of these units to exercise the utmost care and diligence in examining whether there are any potential concerns at the units and to take appropriate actions to address them. We ask that this effort be a priority at the highest levels of your organization to ensure the protection of public health, safety, and the environment.

If you have any questions concerning this matter, please contact Mr. Kinch in the Office of Solid Waste and Emergency Response at (703) 308-8214. I appreciate your attention to this critical matter.

Sincerely,

Barry N. Breen
Acting Assistant Administrator

Enclosure

Enclosure

Please provide the information requested below for each surface impoundment or similar diked or bermed management unit(s) or management units designated as landfills which receive liquid-borne material for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals. This includes units that no longer receive coal combustion residues or by-products, but still contain free liquids.

1. Relative to the National Inventory of Dams criteria for High, Significant, Low, or Less-than-Low, please provide the potential hazard rating for each management unit and indicate who established the rating, what the basis of the rating is, and what federal or state agency regulates the unit(s). If the unit(s) does not have a rating, please note that fact.

2. What year was each management unit commissioned and expanded?

3. What materials are temporarily or permanently contained in the unit? Use the following categories to respond to this question: (1) fly ash; (2) bottom ash: (3) boiler slag; (4) flue gas emission control residuals; (5) other. If the management unit contains more than one type of material, please identify all that apply. Also, if you identify "other," please specify the other types of materials that are temporarily or permanently contained in the unit(s).

4. Was the management unit(s) designed by a Professional Engineer? Is or was the construction of the waste management unit(s) under the supervision of a Professional Engineer? Is inspection and monitoring of the safety of the waste management unit(s) under the supervision of a Professional Engineer?

5. When did the company last assess or evaluate the safety (i.e., structural integrity) of the management unit(s)? Briefly describe the credentials of those conducting the structural integrity assessments/evaluations. Identify actions taken or planned by facility personnel as a result of these assessments or evaluations. If corrective actions were taken, briefly describe the credentials of those performing the corrective actions, whether they were company employees or contractors. If the company plans an assessment or evaluation in the future, when is it expected to occur?

6. When did a State or a Federal regulatory official last inspect or evaluate the safety (structural integrity) of the management unit(s)? If you are aware of a planned state or federal inspection or evaluation in the future, when is it expected to occur? Please identify the Federal or State regulatory agency or department which conducted or is planning the inspection or evaluation. Please provide a copy of the most recent official inspection report or evaluation.

7. Have assessments or evaluations, or inspections conducted by State or Federal regulatory officials conducted within the past year uncovered a safety issue(s) with the management unit(s), and, if so, describe the actions that have been or are being taken to deal with the issue or issues. Please provide any documentation that you have for these actions.

8. What is the surface area (acres) and total storage capacity of each of the management units? What is the volume of materials currently stored in each of the management unit(s)? Please provide the date that the volume measurement(s) was taken. Please provide the maximum height of the management unit(s). The basis for determining maximum height is explained later in this Enclosure.

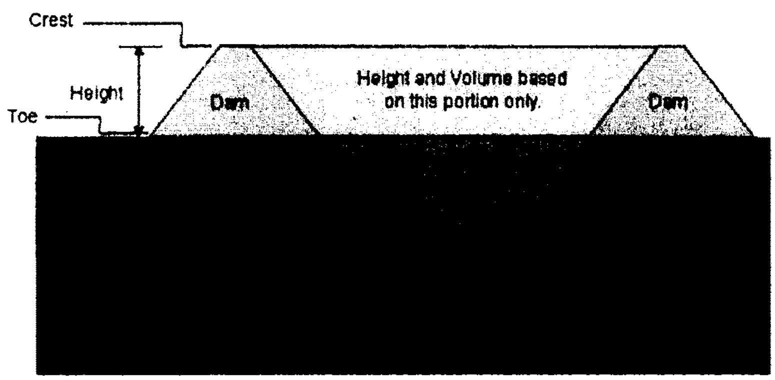
9. Please provide a brief history of known spills or unpermitted releases from the unit within the last ten years, whether or not these were reported to State or federal regulatory agencies. For purposes of this question, please include only releases to surface water or to the land (do not include releases to groundwater).

10. Please identify all current legal owner(s) and operator(s) at the facility.

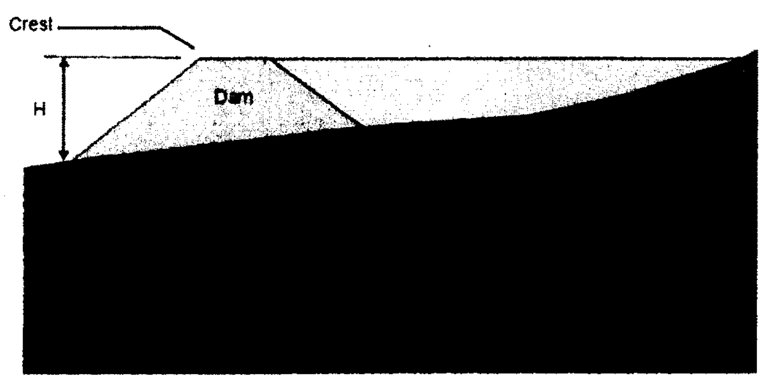
Enclosure (Cont'd)

Dam Height

Height of the dam, in feet to the nearest foot, which is defined as the vertical distance between the lowest point on the crest of the dam and the lowest point in the natural, undisturbed ground. See diagrams below.



NOTE: On slopes, the height of the dam should be measured from the downhill or downstream toe of the dam to the lowest point on the crest of the dam.



Enclosure 2

Coal-Fired Power Plants in Nevada

According to DOE's EIA 2007 database, the following coal-operated power plants are located in Nevada:

Plant Name	County
El Dorado Energy	Clark
Apex Generating Station	Clark
Nevada Cogen Associates 2 Black Mountain	Clark
Nevada Cogen Assoc#1 GarnetVly	Clark
Clark	Clark
Reid Gardner	Clark
Sunrise	Clark
Chuck Lenzie Generating Station	Clark
Bighorn Electric Generating Street	Clark
Saguaro Power	Clark
Fort Churchill	Lyon
Tracy	Storey
North Valmy	Humboldt
Mohave	Clark
Silverhawk	Clark
TS Power Plant	Eureka

Based both on that database and on our own recent survey, none of these plants use wet handling. EPA does not have information on whether these units have liners and if so, the type of liners used for these operations.

TVA KINGSTON FACILITY

TVA operates the Kingston Fossil Fuel Plant located in Roane County, Tennessee, near the confluence of the Emory and Clinch Rivers. The plant was originally built in the early 1950s to provide power for the Department of Energy's facility in Oak Ridge, Tennessee. In approximately 1958, the plant began use of a 244-acre wet settling pond for containment of the ash that remains after coal is burned. This settling pond covered the area where the current settling pond, stilling pond and landfill cells 1, 2, 3 and 4 now reside.

On June 29, 1999, TVA submitted an application to the Tennessee Department of Environment and Conservation (TDEC) for a Class II landfill permit for the disposal of ash waste from the operation of the Kingston Fossil Fuel Plant. TDEC issued TVA the requested Class II landfill permit on September 26, 2000. On September 1, 2003, TDEC issued TVA its most recent National Pollutant Discharge Elimination System (NPDES) permit for the Kingston Fossil Fuel Plant. The permit authorizes discharge of water from the ash settling pond to the plant intake channel (the intake draws water from the Emory River) and discharge of cooling water to the Clinch River downstream from the mouth of the Emory River. The permit requires that a certain amount of free water volume be maintained in the settling pond to provide adequate treatment prior to discharge. This requirement necessitates periodic dredging of the ash settling pond. The NPDES permit further includes a general requirement that TVA properly operate and maintain all facilities and systems for collection and treatment, and expressly prohibits overflows of wastes to land or water from any portion of the collection, transmission, or treatment system other than through permitted outfalls.

On December 22, 2008, containment structures surrounding portions of the Class II landfill failed resulting in a release of approximately 5.4 million cubic yards of wet ash which flowed into area waters, including the Emory River, adjacent tributaries and sloughs, and adjoining shorelines. The bottom of the failed ash storage landfill was clay (no synthetic liner). The two impoundment ("dike") walls closest to the river were made of rolled earth. The other staggered dike layers, which increasing in height but have smaller surface area as the height increases, were made with rolled and compacted ash.

The Emory River is a navigable-in-fact water of the United States. The release also extended to approximately 300 acres of land outside of the ash storage area. The Tennessee River is the source of drinking water for the City of Kingston, Tennessee, and the Watts Bar Reservoir is used by several municipalities as a source of drinking water

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAY 29 2009

OFFICE OF CONGRESSIONAL AND INTERGOVERNMENTAL RELATIONS

The Honorable Eddie Bernice Johnson
Chairwoman
Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure
U.S. House of Representatives
Washington, D.C. 20515

Dear Chairwoman Johnson:

At the April 30, 2009, hearing titled, "Coal Combustion Waste Storage and Water Quality," you asked Acting Assistant Administrator for the Office of Water, Mike Shapiro, to submit within 30 days his "plans and procedures" regarding a decision on the Agency's steam electric industry study.

Since 2005, we have been carrying out an intensive review of wastewater discharges from coal-fired power plants to determine whether new Clean Water Act (CWA) regulations are needed. As part of this effort, we have sampled wastewater from surface impoundments and advanced wastewater treatment systems, conducted on-site reviews of the operations at more than two dozen power plants, and issued a detailed questionnaire to thirty power plants using authority granted under CWA section 308. Our data collection efforts have been primarily focused on three target areas: (1) identifying treatment technologies for the wastewater generated by newer air pollution control equipment; (2) characterizing the practices used by the industry to manage or eliminate discharges of fly ash and bottom ash wastewater; and (3) identifying methods for managing power plant wastewater that allow recycling and reuse, rather than discharge to surface waters. Much of the information collected thus far, including laboratory data from sampling, were made available to the public in an interim study report, *Steam Electric Power Generating Point Source Category: 2007/2008 Detailed Study Report*, that can be found at: http://epa.gov/guide/304m/2008/steam-detailed-200809.pdf

The study is now in its final stages. We are finishing technical analyses of the wastewater sampling data and other information, and drafting the final report for the detailed study. Upon completion of the study and reviewing its findings, we will determine whether revisions to the current effluent limitations guidelines and standards are warranted. We plan to present our findings and announce the decision in the *Federal Register* notice for the Preliminary 2010 Effluent Guidelines Program Plan, currently planned for October of this year.

If you have any additional questions, please feel free to contact me or your staff may call Greg Spraul, in EPA's Office of Congressional and Intergovernmental Relations, at (202) 564-0255.

Sincerely,

Joyce K Frank

Joyce K. Frank
Acting Associate Administrator

Testimony of the

American Coal Ash Association

15200 E. Girard Ave., Suite 3050
Aurora, Colorado 80014-3955

To be presented by David Goss

To the House Committee on Transportation and Infrastructure
Subcommittee on Water Resources and Environment

April 30, 2009

10:00 am
Room 2167 of the Rayburn House Office Building

Testimony of David C. Goss

For the American Coal Ash Association

Hearing Before the House Subcommittee Water Resources and Environment

"Coal Combustion Waste Storage and Water Quality"

April 30, 2009

Madame Chairman, Members of the Committee and Distinguished Panelists:

My name is Dave Goss, former Executive Director of the American Coal Ash Association (ACAA) and I have been asked to appear before you today by ACAA's current Executive Director and its membership. ACAA promotes the recycling of coal combustion products (or CCPs) which include fly ash, bottom ash, boiler slag and air emission control residues, such as synthetic gypsum. It is our opinion, that the U.S. Environmental Protection Agency (EPA) regulatory determinations, made in 1993 and reaffirmed in 2000, are still correct that CCPs DO NOT warrant regulation as hazardous waste.

The recycling of these materials is a tremendous success story that has displaced more than 120 million tons of greenhouse gases since 2000. During that same period, more than 400 million tons of CCPs have been recycled in road construction, architectural applications, agriculture, mine reclamation, mineral fillers in paints and plastics, wallboard panel products, soil remediation and numerous other uses that would have required other materials if these CCP products were not available. Use of 400 million tons of CCPs displaces enough landfill capacity to equal 182 billion days of household trash.

The use of CCPs goes back more than forty years. In the last three decades, the EPA, other federal agencies, numerous universities and private research institutes have extensively studied CCP impact on the environment. The U.S. Department of Energy and the U.S. Department of Agriculture have both funded, conducted and evaluated mining and land case studies using a variety of applications. Consistently, these federal agencies found that when properly characterized, managed and placed, CCPs do not have a harmful impact on the environment or on public health.

EPA reported to Congress on March 31, 2009, results of data collected and analyzed by the Agency from the Tennessee Valley Authority ash spill on December 22, 2008. This data showed that there were no exceedances to drinking water or air quality standards. This information was based on hundreds of water samples and more than 26,000 air samples.

State Departments of Transportation, using technical and environmental guidance issued by the American Society for Testing and Materials (ASTM), the U.S. Federal Highway Administration and the American Association of State Highway and Transportation Officials (AASHTO), have used millions of tons of CCPs without incident or risk. Many years of monitoring and studies following the use of CCPs in road construction have not identified any cases where there has been a negative impact on public health or on the environment.

A goal of this committee, I believe, should be to understand how the use of CCPs has had and can continue to have a positive impact on our nation's resource conservation goals. CCPs have been and should remain a key part of resource conservation efforts because CCPs safely used in lieu of earth, clays, aggregates or soils promote a zero waste goal. Fly ash, bottom ash and synthetic gypsum used to displace the production of portland cement reduce significant carbon dioxide emissions and similiarly conserve natural resource consumption (i.e., the need for quarrying shale, clays or rock gypsum). International and domestic protocols recognize the greenhouse gas reduction benefit of using these materials.

When fly ash is used in concrete, it produces longer lasting, more durable structures and pavements. The fly ash is not just a substitute recycled product; it improves the performance of the concrete. Nearly half of the concrete placed in the U.S. incorporates fly ash because it makes concrete better. We need Congressional support to promote a green supply chain promoting higher replacement rates of fly ash and broader usage. Building longer lasting concrete structures by using fly ash allows our country to move toward a greener and more sustainable economy -- less rebuilding in the future, lower life cycle costs and fewer CO_2 emissions.

A key part of the strategy of recycling industrial materials must be to minimize the need for landfills or disposal facilities. By recycling fly ash in concrete, we bind the fly ash into a concrete matrix and significantly eliminate the potential for any impacts on water resources. Beneficial use regulations are crafted at the state level to promote recycling and to accommodate local environmental conditions. Regulatory programs and policies, developed and implemented by the states, provide for the proper use of CCPs.

The recycling of nearly 43 percent of the 130 million tons of CCPs produced annually is an excellent example of environmental stewardship and sustainability. An effort by EPA or Congress to designate coal ash as hazardous, even if only for the purposes of disposal, could have the dramatic impact of eliminating nearly all these safe, beneficial uses. As America joins the world in seeking to address climate change, a hazardous designation would significantly handicap America as it would not use and therefore not be able to rely upon CO2 reductions from the use of CCPs in lieu of portland cement or other applications. Also, America would have to find environmentally safe disposal facilities for 130 million tons or more of CCPs produced annually. Producers and end-users would no longer use CCPs because of the stigma that a "hazardous" designation would have upon the end user. Furthermore, recycling would end due to the "cradle to grave" liability associated with a "hazardous waste" label.

If this nation is going to develop a culture where safe use and reuse of products and waste streams conserves our nation's resources, CCPs have played and should continue to play an important role in sustainability. Ample technical guidance is available to ensure the environment is protected while still recycling millions of tons of these mineral resources. State specific regulatory guidance will best be able to address local conditions.

As part of the recent economic stimulus efforts supported by the President and Congress, green building has been highlighted. ACAA believes a key component must be the creation of a green supply chain. Developing green jobs as part of a green supply chain and implementing projects that include safe recycling of CCPs should be a vital part of these sustainable projects. With an emerging focus on greenhouse gases, recycling of CCPs contributes measurably to reduction of CO_2 and should, therefore, be encouraged more aggressively. We must better manage our scarce natural resources by using and recycling our existing industrial resources, including CCPs.

Thank you for this opportunity to address this committee.

David Goss

TESTIMONY OF JOHN M. MCMANUS

FOR AMERICAN ELECTRIC POWER, THE EDISON ELECTRIC INSTITUTE AND THE UTILITY SOLID WASTE ACTIVITIES GROUP

HEARING BEFORE THE HOUSE SUBCOMMITTEE ON WATER RESOURCES & ENVIRONMENT

"COAL COMBUSTION WASTE STORAGE AND WATER QUALITY"

April 30, 2009

Good morning. My name is John McManus. I am the Vice President, Environmental Services for American Electric Power ("AEP"). I would like to thank the Subcommittee for the opportunity to present this statement on behalf of AEP, the Edison Electric Institute ("EEI") and the Utility Solid Waste Activities Group ("USWAG") on "Coal Combustion Waste Storage and Water Quality."[1]

Utility Commitment to the Sound Management of Coal Ash

The electric utility industry remains committed to ensuring the integrity and safe operation of landfills, dams and impoundments in which we manage coal combustion byproducts (CCBs), including coal ash. The accident that occurred at TVA is unacceptable and we need to do a better job at managing CCBs. We have taken steps to ensure the safe management of CCBs in dams and impoundments and we support steps to enhance current requirements and oversight.

In the wake of the spill, utility companies across the country, including AEP, have re-examined their dam safety and inspection activities to ensure that these programs are up-to-date and functioning properly. A number of State regulatory agencies have also conducted additional inspections of utility impoundments to assess their structural soundness. The U.S. Environmental Protection Agency ("EPA") has initiated a nation-

[1] EEI is an association of U.S. shareholder-owned electric companies, international affiliates, and industry associates worldwide. EEI's U.S. members serve roughly 90 percent of the ultimate customers in the shareholder-owned segment of the industry and nearly 70 percent of all electric utility ultimate customers in the nation, and generate nearly 70 percent of the electricity produced in the United States. USWAG is a consortium of EEI, the National Rural Electric Cooperative Association ("NRECA"), and over 100 electric utility operating companies located throughout the country. NRECA is the national association of rural electric cooperatives, many of which are small businesses. Together, USWAG members represent more than 85 percent of the total electric generating capacity of the United States.

wide effort to assess the safety of CCB impoundments. We welcome this additional level of scrutiny to provide assurance that our facilities are being operated in a safe manner.

It is our understanding that EPA intends to propose Federal regulations for CCB disposal by the end of this year. The electric utility industry has long worked in a constructive and cooperative manner with EPA as it has evaluated regulatory options for CCBs and we look forward to continuing to work with EPA and state regulatory agencies on this effort. We believe that the states have an important role in this program.

CCB Regulation

The issue of whether CCBs should be regulated as hazardous wastes has been thoroughly evaluated and resolved. On four different occasions, U.S. EPA has concluded that CCBs do not warrant regulation as hazardous waste: in the 1988 and 1999 Reports to Congress issued pursuant to the 1980 Bevill Amendment to the Resource Conservation and Recovery Act ("RCRA"), and in final regulatory determinations promulgated in August 1993 and May 2000. In its 2000 Regulatory Determination, EPA found that coal ash does *not* warrant hazardous waste regulation, concluding instead that RCRA Subtitle D [non-hazardous waste] regulations are "the most appropriate mechanism for ensuring that these wastes disposed of in landfills and surface impoundments are managed safely." 65 Fed. Reg. 32214 (May 22, 2000).

We agree with EPA and we support the development of federal, non-hazardous waste regulation under RCRA Subtitle D, implemented by the states. Such regulations would ensure that CCBs are managed in a manner that is protective of groundwater. The states have consistently gone on record as opposing federal regulation of CCBs as hazardous waste, explaining that it is unnecessary and in fact would be counter-productive, because it would effectively end the beneficial use of coal ash in many states. We agree with the states that any additional federal controls should focus on filling any gaps in existing state regulations.

An August, 2006 EPA/DOE report (Coal Combustion Waste Management at Landfills and Surface Impoundments, 1994-2004) confirms the improving trend in the state regulation of CCBs, finding that, over the last decade, the amount and quality of environmental controls for coal ash management units have increased and that there is a trend towards dry handling of coal ash. In short, state CCB controls have become more robust.

Utilities across the country implement measures to ensure the structural integrity of CCB surface impoundments, including ensuring that:

- surface impoundments are designed, constructed and maintained in accordance with prudent engineering practices;
- surface impoundments are regularly inspected for changes in appearance or structural weaknesses; and
- if a structural weakness is identified, steps are taken to remedy the condition.

AEP's Dam Safety Inspection and Monitoring Program serves as one example of the industry's CCB impoundment operations. AEP has operated coal ash impoundments for decades and currently owns and operates more than 40 earthen dam impoundments used to store fly ash, bottom ash and cooling water at its power plants. This total includes:

- Eleven large fly ash and bottom ash impoundments located in Ohio, West Virginia, Kentucky and Indiana;
- Six large water storage impoundments located in Texas, Oklahoma, Arkansas and Louisiana; and
- Several smaller ash management impoundments located throughout our service territory.

AEP's Safety Inspection and Monitoring Program is based on federal dam safety guidelines and applicable state dam safety regulations and includes the following key components:

- AEP's large dams are inspected annually by engineering staff under the direction of a professional engineer. The large dams are also inspected more frequently by plant staff.
- Many of AEP's smaller facilities are inspected routinely by plant staff and every two to three years by engineering staff.
- The large dams at several plants are equipped with instrumentation (for example, piezometers, surface survey monuments and slope indicators) to monitor the dam's structural conditions. Monitoring data for the instrumented dams are collected at least annually and a report outlining the condition and inspection results and recommendations is provided to the plant for implementation.

Design modifications and expansions to existing dams are performed by professional engineers and reviewed by an independent professional engineer. In addition, the designs are reviewed and approved by the appropriate state regulatory dam safety officials.

We realize that there are different state approaches to regulating dam or impoundment safety, and therefore the principle of having some level of Federal oversight or standards to provide consistency across the country has merit. We support, as part of a Federal CCB regulatory program under RCRA Subtitle D, dam safety, inspection and response planning.

Beneficial Use of CCBs

We also want to insure that the re-use and recycling of coal combustion materials continues to be encouraged. As part of ensuring the environmentally sound management of CCBs, our industry also remains committed to continuing and expanding the array of beneficial uses of CCBs, including, among others, as raw material in Portland cement, for mine reclamation, as replacement for cement in concrete and grout, as mineral filler in asphaltic concrete, as aggregate for highway subgrades and road base material, and as a component of flowable fill. The beneficial use of CCBs conserves natural resources and energy, reduces greenhouse gas ("GHG") emissions, and reduces the amount of CCBs that need to be disposed.

The U.S. EPA extolled the benefits of CCB beneficial use in its written testimony during the Senate Environment and Public Works Committee oversight hearings on the TVA coal ash release held earlier this year. The EPA noted that by recycling 13.7 million tons of fly ash in 2007, in place of Portland cement, the United States saved nearly 73 trillion BTUs of energy. This is equivalent to the annual energy consumption of more than 676,000 households. This also reduced greenhouse gas emissions of 12.4 million metric tons of CO_2, which is equivalent to the annual GHG emissions of 2.3 million cars. Given these environmental benefits, AEP and the utility industry strives to maximize the options for CCB beneficial use. However, until full beneficial use of CCBs is achieved, continued management of CCBs in an environmentally responsible manner will remain an essential commitment of electric power generators.

Regulating coal ash as a hazardous waste would have a devastating impact on the beneficial use of these materials. In its 2000 Regulatory Determination, EPA concluded that hazardous waste regulation would place a "significant stigma on these wastes, the most important effect being that it would adversely impact beneficial use;" EPA did not want to place "unnecessary barriers on the beneficial use of these wastes, because they conserve natural resources, reduce disposal costs and reduce the total amount of waste destined for disposal." *Id.* at 32232. The States and coal ash marketers and users agree that beneficial use would essentially come to an end if EPA were to regulate coal ash as hazardous, resulting in among other things an increase of over 12 million tons of greenhouse gases annually.

Water Quality Issues

Our industry is committed to protecting the aquatic environments in the vicinity of our plants. All discharges from power plants to surface waters such as lakes, streams or rivers are regulated through the Clean Water Act's ("CWA") National Pollutant Discharge Elimination System ("NPDES") permitting program. Discharge permit limits are developed based on two separate groups of standards: effluent guidelines and water quality standards. Effluent guidelines are industry-specific limits based on available technologies. Water quality standards include federally established water quality criteria protecting human health and aquatic life. Those criteria address over 100 pollutants, including metals such as mercury, arsenic and selenium. For every permit, the regulator assesses whether the discharges may cause an exceedance of applicable water quality criteria. If the regulator finds that there is a "reasonable potential" for the discharge to exceed any water quality criterion, the regulator will set a limit for that criterion in the permit. Therefore, any power plant discharge that has any potential to violate water quality criteria for priority pollutants is subject to limits set by the permitting authority.

NPDES permits must be renewed every five years. At each five year interval, state regulators review new data on the facility, apply an established system of analysis to the data, and develop a new draft permit. The draft permit is then subject to public notice and comment and review by an EPA regional office. Thus any potential problems with specific constituents can be raised and addressed during the permit renewal cycle. This permitting system has resulted in greatly improved water quality in many areas of our country since its inception more than 30 years ago.

Additionally, EPA is conducting a detailed study of the wastewater discharges of our industry as part of its regular review of all effluent guidelines. This study has included wastewater sampling and information gathering visits to more than 40 facilities, and a questionnaire to nine utilities owning coal-fired facilities. For more than three years, our industry has actively assisted EPA with this study, providing information on wastewater characterization and technology performance, and recommending sampling techniques and analytical methods. As an example, AEP has hosted EPA staff on visits to four of our power plants and has completed the questionnaire. EPA has said it will issue a decision on whether to revise the steam electric effluent guidelines this year. Our industry will continue to engage EPA on all aspects of this study. The current process should continue in a transparent and scientifically valid manner.

Testimony received by this subcommittee has suggested that discharges of metals such as selenium and arsenic from coal ash impoundments are not protective of the environment. We do not believe this to be the case. The NPDES permitting program integrates the industry-specific technology-based effluent guidelines limits and the water quality-based effluent limits into a well established, effective permitting system which is protective of human health, fish and wildlife.

Conclusion

In sum, the industry's goal is to manage coal ash safely and to use it in beneficial ways. We support the regulation of CCBs as non-hazardous wastes under a program that is designed to protect groundwater and surface water and that ensures the structural integrity and safety of coal combustion byproduct impoundments. This can be achieved under RCRA's non-hazardous waste Subtitle D program.

I would like to thank the Subcommittee for the opportunity to present the views of AEP, EEI and USWAG on this issue. I would be happy to address any questions the Subcommittee may have.

U.S. House of Representatives

Committee on Transportation and Infrastructure

James L. Oberstar
Chairman

David Heymsfeld, Chief of Staff
Ward W. McCarragher, Chief Counsel

Washington, DC 20515

May 21, 2009

John L. Mica
Ranking Republican Member

James W. Coon II, Republican Chief of Staff

Mr. John M. McManus
Vice President, Environmental Services
American Electric Power
1 Riverside Plaza
Columbus, Ohio 43215-2373

Dear Mr. McManus:

Thank you for testifying before the Subcommittee on Water Resources and Environment at the April 30, 2009 hearing on "Coal Combustion Waste Storage and Water Quality." The following are a few supplemental questions for the hearing record:

1. What do the most up-to-date data tell us regarding the leaching and soil/groundwater mobility of arsenic, selenium, chromium, and similar constituents that could be released from coal combustion residual disposal facilities, landfills, and surface impoundments?

2. You state in your testimony that the power industry believes its water discharges are protective of human health and the environment. Other witnesses have asserted that discharges of toxic metals are not restricted and generally not even monitored.

   a. Please describe why the power industry believes its water discharges are protective of human health and the environment.

   b. Would you describe the requirements for NPDES permit applications applicable to the power industry, including the data and other information that are required?

   c. Would you provide details on the scope of pollutants normally covered in an NPDES permit, including whether (and where) there is ongoing monitoring required and the level of review that regularly occurs between state permitting authorities and individual power plants?

   d. Would you discuss what states are doing to address flue gas desulfurization scrubber wastewater generated as a result of installing air pollution control equipment?

3. One of the hearing witnesses, Mr. Eric Schaeffer of the Environmental Integrity Project (EIP), stated at the hearing that "discharges of toxic metals are generally not restricted under Clean Water Act permits at power plants and are often not even monitored." Is this an accurate statement or not? Please address this statement, based on your knowledge of the Clean Water Act permitting program and the electric utility industry.

4. Mr. Schaeffer also asserted in his testimony that industry discharges of selenium and arsenic, such as those presented on the bar charts appended to his testimony, are harming, or have the potential to harm, fish populations. Mr. Schaeffer later submitted to me a letter, which aimed to "clarify" several points made in his original written testimony submission. For example:

   a. He acknowledged, in his supplemental submission, that discharges from ash or sludge systems at four plants (Big Bend, Roxboro, Cape Fear, and Kingston) "appear to mix with other effluent, such as cooling water, before final discharge to surface water," and that the "expanded volume of the combined discharge will significantly reduce concentrations of these toxic metals, although it will not reduce their mass." He provided revised bar charts with a note indicating that concentrations are likely to be lower at these plants at the final point of discharge. (A copy of these new charts is provided for your reference.)

   b. He removed the Yates plant from the revised bar charts, "as it appears that discharges from the scrubber system may undergo additional treatment prior to their final release," and a "lack of monitoring makes it difficult to determine the concentration at the final outfall."

   c. He noted that a chart displayed in a May 3, 2009 *Washington Post* story indicated that EPA had established an arsenic water quality criterion of 10 micrograms per liter to protect saltwater aquatic life, and acknowledged that that criterion was incorrect. He noted that the 10 micrograms per liter figure is a drinking water standard, not an ambient water quality criterion. He also said that "some states (Tennessee) have also adopted the ten microgram standard to protect humans from exposure during recreational use of rivers and streams."

   d. He said he "tried to make clear in both written and oral testimony that water quality criteria apply to surface waters and do not necessarily legally limit what can be discharged at the end of the pipe, and advocated for further investigation by EPA and for EPA "to develop effluent limitation guidelines that limit both the concentration and mass of toxic metals discharged from power plants."

   e. He provided new charts "documenting selenium or arsenic concentrations in discharges from ash ponds or scrubber systems at 40 plants, which also identifies whether those discharges are direct (most cases), or may be mixed with other effluents before final release. The charts also provide an estimate of the mass associated with each discharge where that is possible to determine from flow rate data. As noted in our testimony, many plants do not monitor discharges of arsenic, selenium, or other toxic metals at all." (A copy of his new charts is provided for your reference.)

   Would you provide your perspectives on his data, the clarifications that Mr. Schaeffer made, and the claims or assertions that Mr. Schaeffer made in his hearing testimony and subsequent submission?

Mr. John M. McManus
May 21, 2009
Page 3

5. You noted in your testimony that an August 2006 EPA/Department of Energy report confirms the improving trend in the State regulation of coal combustion residuals, finding that, over the last decade, the amount and quality of environmental controls for coal combustion residual management units have increased and that there is a trend towards dry handling of coal combustion residuals. Please describe some of the ways that state controls have become more robust.

6. In what ways would regulating coal combustion residuals as a "hazardous waste" instead of as a non-hazardous solid waste impact on the management (including handling and disposal) and beneficial reuse of such materials? What would be the cost impacts? What would be the increased regulatory burdens?

7. Please provide me with any supplemental or clarifying testimony, comments, and data that you may have regarding coal combustion residuals management and beneficial reuse.

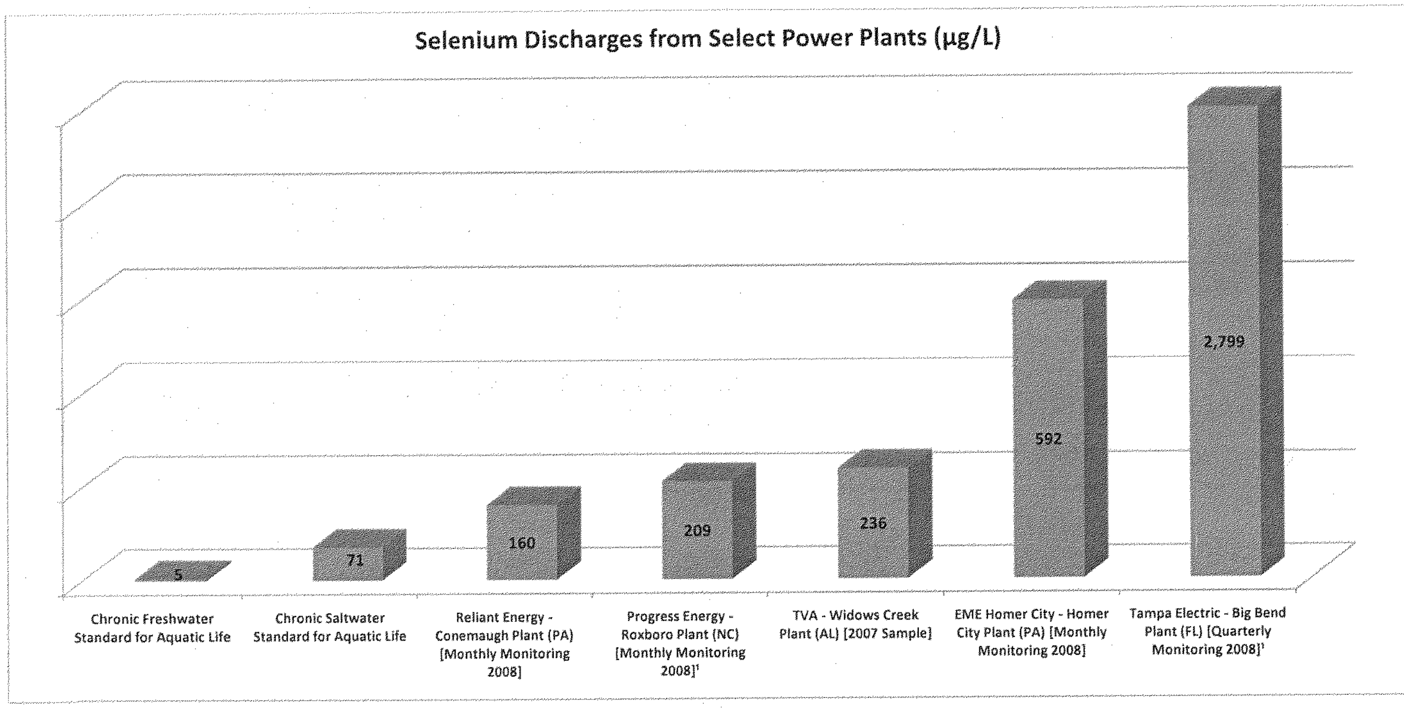
To ensure that your responses to these questions are included in the hearing record, I would appreciate receiving your written responses by Friday, May 29, 2009. Please submit the responses in electronic form (MS-Word or PDF format), by e-mail, to Jon Pawlow of the Subcommittee, at *Jon.Pawlow@mail.house.gov*. His telephone number is (202) 226-6303, if there are any questions. Thank you.

Sincerely,

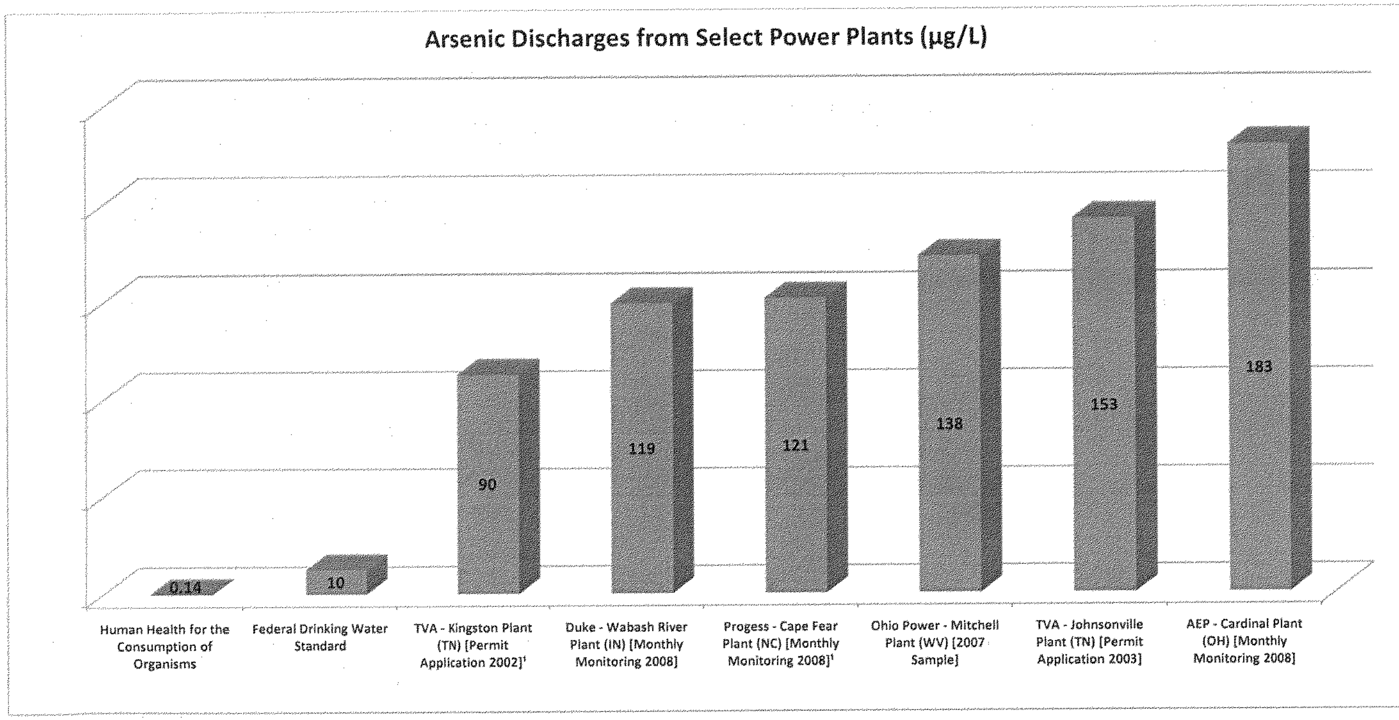
John Boozman

John Boozman
Ranking Republican Member
Subcommittee on Water Resources
and Environment

Enclosures



[1] Data reports that scrubber sludge from the Big Bend and Roxboro facilities are mixed with other effluents before final discharge. Concentrations in final discharge will likely be lower.



[1]Data reports that effluent from the Cape Fear and TVA Kingston ash ponds may be mixed with other effluents before final discharge. Concentrations in final discharge will likely be lower.

Selenium Monitoring Results at Select Facilities

EPA Recommended Chronic Freshwater Criteria for Aquatic Life = 5 µg/L; EPA Recommended Chronic Saltwater Criteria for Aquatic Life = 71 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maximum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentration Flow Maximum)	Primary Source	EPA Docket ID
AL	TVA	Widows Creek	008	FGD Waste Pond	Direct Discharge to Tennessee River	3.88	9.9	1	131	131	4.2390	10.8159	NPDES Permit No. AL0003875 App. (Apr. 2004)	EPA-HQ-OW-2006-0771-1797.84
AL	TVA	Widows Creek	SP-2	FGD Waste-water	Direct Discharge to Widows Creek	1.68	Data Not Available	1	236	236	3.3066	N/A	Sample (9/11/2007)	EPA-HQ-OW-2006-0771-1733
FL	Tampa Electric	Big Bend	130	FGD Waste-water	Discharge through Internal Outfalls D0011, D0012, D0013, and D0014 to Discharge Canal to Hillsborough Bay[1]	0.25	0.313	4	2,798.5	4,911	5.8347	7.3051	ECHO Quarterly Monitoring (2008)	EPA-HQ-OW-2006-0771-1797.7
GA	Georgia Power	Bowen	01A	Ash Pond	Through Outfall 01 to Etowah River[2]	Data Not Available	Data Not Available	1	37	37	N/A	N/A	Sample (11/20/2006)	EPA-HQ-OW-2006-0771-0592.45

Selenium Monitoring Results at Select Facilities

EPA Recommended Chronic Freshwater Criteria for Aquatic Life = 5 µg/L; EPA Recommended Chronic Saltwater Criteria for Aquatic Life = 71 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentration Flow Maximum)	Primary Source	EPA Docket ID
GA	Georgia Power	Yates	01	Ash Pond	Direct Discharge to Chattahoochee River	21.6	Data Not Available	1	59	59	10.6283	N/A	Sample (12/4/2006)	EPA-HQ-OW-2006-0771-0592.67; -0592.55
GA	Georgia Power	Yates	01	Ash Pond	Direct Discharge to Chattahoochee River	21.6	Data Not Available	1	32	32	5.7645	N/A	Sample (12/5/2005)	EPA-HQ-OW-2006-0771-0378; 0592.55
IL	Ameren	Mere-dosia	004	Ash Pond	Direct Discharge to Illinois River	0.2	0.6	1	26	26	0.0434	0.1301	NPDES Permit No. IL0000116 App. (2002)	EPA-HQ-OW-2006-0771-1797.57
IN	Duke Energy	Cayuga	002	Ash Pond	Direct Discharge to Wabash River	1.25	3.6	24	<20	50	<0.2085	0.6005	NPDES Permit No. IN0002763 App. (Feb. 2006)	EPA-HQ-OW-2006-0771-1797.17

Selenium Monitoring Results at Select Facilities

EPA Recommended Chronic Freshwater Criteria for Aquatic Life = 5 μg/L; EPA Recommended Chronic Saltwater Criteria for Aquatic Life = 71 μg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (μg/L)	READING: MAXIMUM SAMPLE VALUE (μg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentrati on Flow Maximum)	Primary Source	EPA Docket ID
IN	Vectren	A.B. Brown	004	Ash Pond	Direct Discharge to Unnamed Tributary to Ohio River	1.4	1.4	1	130	130	1.5178	1.5178	ECHO Sample (3/31/ 2008)	EPA-HQ-OW-2006-0771-0341
KY	AEP	Big Sandy	001	Ash Pond	Direct Discharge to Blaine Creek	6.421	12.13	6	27	35	1.4458	2.7314	NPDES Permit No. KY0000221 App. (Sept. 2005)	EPA-HQ-OW-2006-0771-1797.8
KY	Louisville Gas & Electric	Mill Creek	002	Ash Pond	Data Not Available	Data Not Available	Data Not Available	4	58.3	75	N/A	N/A	Quarterly Moni-toring (2006)	EPA-HQ-OW-2006-0771-0416.15
MD	Mirant	Brandy-wine	002	Discharge from Ash Disposal Facility	Data Not Available	Data Not Available	Data Not Available	5	20.4	35	N/A	N/A	ECHO Monthly Moni-toring (2008)	
MD	Mirant	Brandy-wine	006	Discharge from Ash Disposal Facility	Data Not Available	Data Not Available	Data Not Available	8	25.4	59	N/A	N/A	ECHO Monthly Moni-toring (2008)	

Selenium Monitoring Results at Select Facilities

EPA Recommended Chronic Freshwater Criteria for Aquatic Life = 5 µg/L; EPA Recommended Chronic Saltwater Criteria for Aquatic Life = 71 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentrati on Flow Maximum)	Primary Source	EPA Docket ID
NC	Duke Energy	Cliffside	002	Ash Pond	Direct Discharge to Broad River	7.33103	14.3233	12	22.4	30.2	1.3695	2.6758	ECHO Monthly Moni-toring (2008)	EPA-HQ-OW-2006-0771-1797.18
NC	Duke	Marshall	004	FGD Waste-water	Through Outfall 002 (ash basin) to Lake Norman (i.e., Catawba River)[3]	1.02119	1.21443	5	86	200	0.7324	0.8710	ECHO Monthly Moni-toring (8/2008 to 12/ 2008)	EPA-HQ-OW-2006-0771-1742
NC	Progress Energy Carolinas	Ashe-ville Steam Plant	001	Ash & FGD Waste-water	Direct Discharge to French Broad River	1.9175	5.215	12	62.1	91.3	0.9931	2.7009	ECHO Monthly Moni-toring (2008)	EPA-HQ-OW-2006-0771-1797.3
NC	Progress Energy	Roxboro	010	FGD Waste-water	Through Outfall 003 (discharge canal) to Hyco Lake[4]	0.578	1.265	9	209.5	510	1.0099	2.2102	ECHO Monthly Moni-toring (2008)	EPA-HQ-OW-2006-0771-1556; 0300.9

Selenium Monitoring Results at Select Facilities

EPA Recommended Chronic Freshwater Criteria for Aquatic Life = 5 µg/L; EPA Recommended Chronic Saltwater Criteria for Aquatic Life = 71 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentrati on Flow Maximum)	Primary Source	EPA Docket ID
OH	AEP and Buckeye	Cardin-al[5]	019	Ash and FGD Leachate	Direct Discharge to Blockhouse Hollow Run	9.398	16.85	5	68	100	5.3297	9.5558	ECHO Monthly Mon-itoring , NPDES Permit No. OH001258 1 App. (Aug. 2008 Dec. 2008)	EPA-HQ-OW-2006-0771-1797.15
OH	American Electric Power and Buckeye Power	Cardinal	019	Ash and FGD Leachate	Direct Discharge to Blockhouse Hollow Run	11	18	1	53	53	4.8621	7.9562	NPDES Permit No. OH001258 1 App. (Jan. 2007)	EPA-HQ-OW-2006-0771-1797.15

Selenium Monitoring Results at Select Facilities

EPA Recommended Chronic Freshwater Criteria for Aquatic Life = 5 µg/L; EPA Recommended Chronic Saltwater Criteria for Aquatic Life = 71 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maximum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentration on Flow Maximum)	Primary Source	EPA Docket ID
OH	AEP and Duke Energy	Cones-ville	601	Ash and FGD Waste Pond	Through Outfall 001 to Muskingum River[6]	13.61	22.9	1	25	25	2.8376	4.7745	NPDES Permit No. OH005956 1 App. (Jan. 2007)	EPA-HQ-OW-2006-0771-1797.20
OH	Dayton Power & Light	J.M. Stuart	013	Ash Pond	Final Outfall to Ohio River	11.6818	21.8762	12	52.9	95.4	5.1537	9.6513	ECHO Monthly Moni-toring (2008)	
PA	Reliant Energy	Cone-maugh	007	Mixed	Direct Discharge to Conemaugh River	0.228	0.395	11	159.6	560	0.3035	0.5258	ECHO Moni-toring (2008)	EPA-HQ-OW-2006-0771-0123
PA	EME Homer City	Homer City	027	FGD Waste-water	Direct Discharge to Blacklick Creek	0.11	0.17	12	591.7	2,600	0.5428	0.8389	ECHO Monthly Moni-toring (2008)	EPA-HQ-OW-2006-0771-0683
TN	TVA	Allen	001	Ash Pond	Direct Discharge to McKellar Lake	9.56	9.79	1	30.5	30.5	2.4317	2.4902	ECHO Moni-toring (Aug. 2008)	EPA-HQ-OW-2006-0771-1797.1

Selenium Monitoring Results at Select Facilities

EPA Recommended Chronic Freshwater Criteria for Aquatic Life = 5 µg/L; EPA Recommended Chronic Saltwater Criteria for Aquatic Life = 71 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentration on Flow Maximum)	Primary Source	EPA Docket ID
TN	TVA	Allen	001	Ash Pond	Direct Discharge to McKellar Lake	8.21	11.52	1	38	38	2.6019	3.6508	NPDES Permit No. TN0005355 App. (Oct. 2004)	EPA-HQ-OW-2006-0771-1797.1
TN	TVA	Cumber-land	001	Ash & FGD Waste Pond	Through DSN002 to Cumberland River[7]	19.7	32.9	1	130	130	21.3583	35.6694	NPDES Permit No. TN0005789 App. (May 2005)	EPA-HQ-OW-2006-0771-1797.21
TN	TVA	Gallatin	001	Ash Pond	Direct Discharge to Cumberland River	25.17	28.2	3	29	39	6.0875	6.8203	ECHO Moni-toring (2008)	EPA-HQ-OW-2006-0771-1797.30

Selenium Monitoring Results at Select Facilities

EPA Recommended Chronic Freshwater Criteria for Aquatic Life = 5 µg/L; EPA Recommended Chronic Saltwater Criteria for Aquatic Life = 71 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentrati on Flow Maximum)	Primary Source	EPA Docket ID
TN	TVA	Gallatin	001	Ash Pond	Direct Discharge to Cumberland River	22.1	88.5	13	26	40	4.7921	19.1899	NPDES Permit No. TN000542 8 App. (May 2004)	EPA-HQ-OW-2006-0771-1797.30
TN	TVA	Kingston	001	Ash Pond	Through Plant Intake Canal to Clinch River	24.7	42.2	1	24	24	4.9438	8.4466	NPDES Permit No. TN000545 2 App. (Dec. 2002)	EPA-HQ-OW-2006-0771-1797.45
VA	Dominion	Chester-field	004	Ash Pond	Direct Discharge to James River, Farrar Gut	7.7	10.5	4	23	27	1.4770	2.0141	NPDES Permit No. VA000414 6 App. (Aug. 2001)	EPA-HQ-OW-2006-0771-1797.16
WI	Wisconsin Electric	Pleasant Prairie	102	FGD Waste-water	Through Outfall 001 to Lake Michigan[8]	0.0648	0.0648	35	6,488.5	18,000	3.5065	3.5065	FGD Monitor-ing Data (2007)	EPA-HQ-OW-2006-0771-0699; 1542.1; 1542.2; 1803.1

Selenium Monitoring Results at Select Facilities

EPA Recommended Chronic Freshwater Criteria for Aquatic Life = 5 µg/L; EPA Recommended Chronic Saltwater Criteria for Aquatic Life = 71 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maximum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentration on Flow Maximum)	Primary Source	EPA Docket ID
WV	Appalachian Power	John B. Amos	001	Ash Pond	Direct Discharge to Little Scary Creek	0.16	8.43	12	24.3	31.1	0.0324	1.7084	ECHO Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-0589.2
WV	Appalachian Power	Mountaineer	001	Ash Pond	Direct Discharge to Ohio River	3	7.7	12	77.8	152	1.9465	4.9960	ECHO Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-1797.64
WV	Ohio Power	Mitchell	004	Ash Pond	Direct Discharge to Fish Creek (to Ohio River)	1.872	11.913	12	53.1	94.7	0.8290	5.2756	ECHO Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-1736

[1] There was no monitoring data available from the applicable Discharge Canal at the Big Bend facility for selenium.

[2] There was no monitoring data available for Outfall 01 on ECHO from the Bowen facility for selenium.

[3] The ECHO database provided selenium readings from Outfall 002 of 11.6 ug/L (maximum) and 6.53 (average of 5 months) for the Marshall facility. These readings are lower than those from Outfall 004, but still higher than the recommended 5 ug/L limit.

[4] The Roxboro Power Plant does not monitor or report selenium discharges from Outfall 003 to EPA's ECHO database.

[5] EPA's ECHO database did provide selenium values for the months of January to August of 2008 in addition to the months on this chart for AEP's Cardinal Power Plant. However, because the numbers reported for those months were abnormally high (25,150 - 98,050 µg/L), EIP excluded these values from the average.

[6] Selenium readings from Outfall 001 in the same Conesville permit application were 67 ug/L (maximum daily) and 1.7 ug/L (mean of 44 samples).

[7] The selenium concentration from DSN002 in the same permit application was 1 ug/L with an average flow reading fo 2,485 MGD. Therefore, although the concentration of selenium in the effluent from DSN002 appears to be lower, the amount of selenium being discharged into the Cumberland River was roughly the same as what was coming out of Outfall 001 - an average of 20.724 lbs/day.

[8] There was no selenium monitoring data available from Outfall 001 for the Pleasant Prairie facility.

Arsenic Monitoring Results from Select Facilities

Federal Drinking Water Standard = 10 µg/L, TN Recreational Criteria = 10 µg/L, EPA Recommended Human Health (Consumption of Organism) = 0.14 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentra-tion Flow Average)	LBS/DAY (Mean Concentra-tion Flow Maximum)	Primary Source	EPA Docket ID
AL	AL Power	Gadsden	002	Ash Pond	Direct Discharge to Coosa River	2.42	7.89	12	50.3	184	1.0152	3.3098	ECHO Monthly Monitoring (2008)	
AL	AL Power	Gaston	004	Ash Pond	Direct Discharge to Coosa River	13	29.4	4	32.8	43	3.5561	8.0422	ECHO Quarterly Monitoring (2008)	EPA-HQ-OW-2006-0771-1797.24
AL	TVA	Widows Creek	SP-2	FGD Effluent	Direct Discharge to Widows Creek	N/A	N/A	1	46.7	46.7	N/A	N/A	Sample (9/11/2007)	EPA-HQ-OW-2006-0771-1733
AL	TVA	Widows Creek	001	Ash Pond	Direct Discharge to Tennessee River	24.15	51.84	11	36	55	7.2506	15.5641	NPDES Permit No. AL8640006690 App. (Apr. 2004)	EPA-HQ-OW-2006-0771-1797.84
KY	TVA	Paradise	001	Ash Pond	Direct Discharge to Jacobs Creek	25.5	36.5	1	23	23	4.8913	7.0013	NPDES Permit No. KY0004201 App. (Feb. 2002)	EPA-HQ-OW-2006-0771-1797.66
IN	Duke	Wabash River	002	Ash	Direct Discharge to Wabash River	7.01	9.81	12	118.7	181	6.9395	9.7113	ECHO Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-1797.81

Arsenic Monitoring Results from Select Facilities

Federal Drinking Water Standard = 10 µg/L, TN Recreational Criteria = 10 µg/L, EPA Recommended Human Health (Consumption of Organism) = 0.14 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentra-tion Flow Average)	LBS/DAY (Mean Concentra-tion Flow Maximum)	Primary Source	EPA Docket ID
MO	Ameren	Sioux	006	Ash Pond	Discharge to Mississippi River via Poeling Lake	2.4	2.8	1	20	20	0.4003	0.4670	NPDES Permit No. MO0000353 Application	EPA-HQ-OW-2006-0771-1797.78
NC	Duke	Buck	002	Ash Pond	Direct Discharge to Yadkin River	0.1	9.7	4	42.2	57.9	0.0352	3.4138	ECHO Quarterly Monitoring (2007)	EPA-HQ-OW-2006-0771-1797.13
NC	Duke	Dan River	002	Ash Pond	Direct Discharge to Dan River	0.2	1.7	11	35	59.9	0.0584	0.4962	ECHO Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-1797.22
NC	Duke	River-bend	002	Ash Pond	Direct Discharge to Catawba River (Mountain Island Lake)	1.4	7.8	5	31.1	69.4	0.3631	2.0231	Echo Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-1797.74
NC	Progress	Asheville	001	Ash Treat-ment System	Direct Discharge to French Broad River	1.9	10.6	12	38.3	66.5	0.6069	3.3858	ECHO Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-0300.2
NC	Progress	Cape Fear	005	Ash Pond	Discharge to Unnamed Tributary to Cape Fear River via Outfall 007[1]	0.6	0.6	2	121	128	0.6055	0.6055	ECHO Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-1797.14

Arsenic Monitoring Results from Select Facilities

Federal Drinking Water Standard = 10 µg/L, TN Recreational Criteria = 10 µg/L, EPA Recommended Human Health (Consumption of Organism) = 0.14 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentra-tion Flow Average)	LBS/DAY (Mean Concentra-tion Flow Maximum)	Primary Source	EPA Docket ID
NC	Progress	Mayo	002	Ash	Direct Discharge to Mayo Lake	6.525	15.31	4	33.3	45	1.8121	4.2518	ECHO Quarterly Monitoring (2008)	EPA-HQ-OW-2006-0771-0300.26
OH	AEP	Cardinal	19	Ash Pond	Direct Discharge to Blockhouse Hollow Run	9.398	77.09	12	182.6	320	14.3117	117.3965	ECHO Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-1797.15
SC	Santee Cooper (SCPSA)	Grainger	001	Ash Pond	Discharge to Waccamaw River[2]	0.52	2.8	10	31.8	72	0.1379	0.7426	ECHO Monthly Monitoring (2008)	
SC	Santee Cooper (SCPSA)	Jefferies	003	Ash Pond	Discharge to Tailrace Canal[3]	3.299	3.426	10	52.8	103	1.4527	1.5086	ECHO Monthly Monitoring (2008)	
TN	TVA	Allen	001	Ash Pond	Direct Discharge to McKellar Lake	8.21	11.52	1	43	43	2.9442	4.1312	NPDES Permit No. TN0005355 App. (Oct. 2004)	EPA-HQ-OW-2006-0771-1797.1
TN	TVA	Gallatin	001	Ash Pond	Direct Discharge to Cumberland River	22.1	88.5	13	18	34	3.3176	13.2853	NPDES Permit No. TN5640006677 App. (May 2004)	EPA-HQ-OW-2006-0771-1797.30

Arsenic Monitoring Results from Select Facilities

Federal Drinking Water Standard = 10 μg/L, TN Recreational Criteria = 10 μg/L, EPA Recommended Human Health (Consumption of Organism) = 0.14 μg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maximum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (μg/L)	READING: MAXIMUM SAMPLE VALUE (μg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentration Flow Maximum)	Primary Source	EPA Docket ID
TN	TVA	Johnsonville	001	Ash Pond	Direct Discharge to Tennessee River	20.5	35.3	5	153	243	26.1578	45.0425	NPDES Permit No. 9640006681 App. (May 2003)	EPA-HQ-OW-2006-0771-1797.42
TN	TVA	Kingston	001	Ash Pond	Discharge to Clinch River via Plant Intake Canal	24.7	42.2	1	90	90	18.5394	31.6746	NPDES Permit No. TN8640006682 App. (Dec. 2002)	EPA-HQ-OW-2006-0771-1797.45
TN	TVA	Kingston	007	Ash Pond Seepage	Discharge to Clinch River via Plant Intake Canal	0.51	0.51	1	31	31	0.1319	0.1319	NPDES Permit No. TN8640006682 App. (Dec. 2002)	EPA-HQ-OW-2006-0771-1797.45
VA	Dominion Energy	Bremo	002	Ash Pond	Direct Discharge to James River	1.945	7.9056	1	158	158	2.5629	10.4171	NPDES Permit No. VA0004138 App. (Feb. 2005)	EPA-HQ-OW-2006-0771-1797.12
WV	AEP	Amos	001	Ash Pond	Direct Discharge to Little Scary Creek (to Kanawha River)	0.16	8.9	12	24.3	49	0.0324	1.8037	ECHO Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-1797.41
WV	Ohio Power	Mitchell	Sample Point 4	Ash Pond Effluent	Ash Pond Directly Discharges to Fish Creek	9.663[4]	9.663[4]	1	138	138	N/A	N/A	Oct. 2007 Sample	EPA-HQ-OW-2006-0771-1736; 0139.1

[1] The ECHO database did not provide arsenic concentration readings for the applicable months from Outfall 007 at the Cape Fear facility.

[2] The Grainger plant discharges to the Waccamaw River, but ECHO data did not confirm whether Outfall 001 discharges directly into the Waccamaw.

[3] The Jefferies plant discharges to the Tailrace Canal, but ECHO data did not confirm whether Outfall 003 discharges directly into the Tailrace Canal.

[4] This sample did not measure flow. EPA's ECHO database reports maximum flow of 9.663 MGD in October of 2007 from Discharge from ash pond.

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VIA E-MAIL

May 29, 2009

The Honorable John Boozman
Ranking Member
Subcommittee on Water Resources and Environment
House Transportation & Infrastructure Committee
Washington, DC 20515

Re: Coal Combustion Waste Storage and Water Quality Follow-up Questions

Dear Mr. Boozman:

Set forth below are my responses to the follow-up questions from the Subcommittee hearing held on April 30, 2009, entitled "Coal Combustion Waste Storage and Water Quality." On behalf of American Electric Power, the Edison Electric Institute, and the Utility Solid Waste Activities Group I would again like to thank the Subcommittee for the opportunity to present our views on this issue.

Please contact me at (614) 716-1268 or jmmcmanus@aep.com if you have questions regarding the answers set forth below.

Very truly yours,

John M. McManus

John M. McManus
Vice President, Environmental Services

cc: Eddie Bernice Johnson
James L. Oberstar
John L. Mica
Jonathon Pawlow

Attachments (6)

1. What do the most up-to-date data tell us regarding the leaching and soil/groundwater mobility of arsenic, selenium, chromium, and similar constituents that could be released from coal combustion residual disposal facilities, landfills, and surface impoundments?

Recently, we have heard a lot about coal ash leaching and potential environmental impacts in newspaper, press releases, testimonies, etc. This is often presented as though it is new information. In fact, the U.S. Environmental Protection Agency (EPA), U.S. Department of Energy (DOE), the Electric Power Research Institute (EPRI) and others have been evaluating leaching, geochemistry, and environmental mobility of trace constituents in ash for decades, and there is a wealth of knowledge on their behavior. This research includes both extensive laboratory studies to evaluate coal ash leaching and attenuation mechanisms under controlled conditions, and field studies at many disposal sites to provide "ground truth" under actual management and environmental conditions.

Coal ash leaching is a function of many variables, including coal type and chemistry, combustion conditions, particulate collection equipment, ash handling methods, constituent speciation, and environmental conditions, particularly pH and oxidation-reduction potential. For example, arsenic is more commonly associated with eastern bituminous coal ash than western subbituminous, and selenium is more readily captured with cold-side electrostatic precipitators than with hot-side precipitators. Similarly, mobility in the soil and groundwater environment is controlled by an array of factors such as soil type and chemistry, constituent speciation, flow rates, oxidation-reduction conditions, and pH. The interplay of these various factors and how they affect leaching and environmental mobility is too complex to discuss in detail here, but EPRI and others have amassed a considerable amount of scientific knowledge on these topics since 1980. Therefore, it is important to view in a critical light the presentation of a few measurements, or one or two specific studies, as being representative of the risks posed by coal ash against the backdrop of the much larger information base in the published scientific literature.

It is well documented that arsenic, selenium, and chromium occur in coal ash, and their leaching and mobility in soils and groundwater have been extensively studied. EPRI has developed extensive information detailing the concentration, speciation, leaching and mobility of these three constituents, evaluating the potential for release and movement under actual environmental conditions.

Knowledge of the leaching characteristics and geochemistry of arsenic, selenium, and chromium, along with other constituents present in coal ash, is critical to the electric utility industry. The large body of scientific literature developed over the last 20 years provides a sound basis for engineering disposal sites suitable for coal combustion products, assessing environmental risks, and developing effective treatment technologies for wastewater discharges. EPRI continues to evaluate changes in leaching characteristics of coal combustion products (CCPs) as new air emissions control technologies are employed and as the scientific literature advances. They are also coordinating research with EPA Office of Research and Development (ORD). EPA ORD is currently developing a new set of laboratory leaching procedures, as well as a broad database of leaching characteristics for coal ash and FGD solids under variable pH conditions and liquid to solid ratios. The data developed under that study are being compared to the EPRI field leachate database for consistency.

Below is a list of representative reports and literature that may be helpful as background information.

Wang, T., J. Wang, Y. Tang, H. Shi, K. Ladwig, 2009, *Leaching Characteristics of Arsenic and Selenium from Coal Fly Ash: Role of Calcium,* Energy & Fuels, in publication.

EPRI 2008a, *The Leaching Behavior of Arsenic and Selenium From Coal Fly Ash,* 1015545.

EPRI 2008b, *Chemical Constituents in Coal Combustion Product Leachate: Arsenic,* 1015550.

EPRI, 2008c, *Impact of Air Emissions Controls on Coal Combustion Products,* 1015544.

U.S. EPA 2008, *Characterization of Coal Combustion Residues from Electric Utilities Using Wet Scrubbers for Multi-Pollutant Control,* EPA/600/R-08/077, July 2008.

Wang, T., J. Wang, J. Burken, H. Ban, K. Ladwig, 2007, *The Leaching Characteristics of Selenium from Coal Fly Ashes,* J. of Env. Quality, 36:1784–1792.

Huggins, F. C. Senior, P. Chu, K. Ladwig, G. Huffman, 2007, *Selenium and Arsenic Speciation in Fly Ash from Full-Scale Coal-Burning Utility Plants, Env. Science & Technology,*41:3284-3289.

EPRI 2007a, *The Leaching Characteristics of Selenium from Coal Fly Ashes,* E226748.

EPRI 2007b, *Arsenic Health and Ecological Effects: Soil and Water,* 1014015.

EPRI 2006a, *Characterization of Field Leachates at Coal Combustion Product Management Sites,* 1012578.

EPRI 2006b, *Chemical Attenuation Coefficients for Selenium Species Using Soil Samples Collected from Selected Power Plant Sites,* 1012585.

U.S. EPA 2006, *Characterization of Mercury-Enriched Coal Combustion Residues from Electric Utilities Using Enhanced Sorbents for Mercury Control,* EPA-600/R-06/008 February 2006.

EPRI 2005, Arsenic *and Selenium Speciation in Fly Ash and Wastewater,* 1005567.

EPRI, 2004, *Chemical Attenuation Coefficients for Arsenic Species Using Soil Samples Collected from Selected Power Plant Sites: Laboratory Studies,* 1005505.

EPRI 2000, *Environmental Chemistry of Arsenic: A Literature Review,* 1000585.

EPRI 1998, *Leaching of Inorganic Constituents From Coal Combustion By-Products Under Field and Laboratory Conditions: Volume 1,* TR-111773-V1.

EPRI, 1994, *Chemical Attenuation Reactions of Selenium,* TR-103535.

EPRI 1988, *Chromium Reactions in Geologic Materials,* EA-5741.

EPRI, 1987a, *Chemical Form and Leachability of Inorganic Trace Elements in Coal Ash,* EA-5115.

EPRI, 1987b, *Chemical Characterization of Fossil Fuel Combustion Wastes,* EA-5321.

EPRI, 1986a, *Geochemical Behavior of Chromium Species,* EA-4544.

EPRI, 1986b, *Mobilization and Attenuation of Trace Elements in an Artificially Weathered Fly Ash,* EA-4747.

2a. Please describe why the power industry believes its water discharges are protective of human health and the environment.

Regulations written to implement the Clean Water Act provide a very comprehensive and effective program that prohibits any point source discharges that are harmful to human health and the environment, whether from the power industry or other industries. Two major portions of the Clean Water Act program regulate discharges to surface waters: (1) effluent guidelines and (2) water quality standards. Each power industry facility permit application is required to contain information that allows the permit writer to evaluate the proposed discharges for compliance with both the applicable effluent guidelines (which provide industry-specific and wastewater-specific limits for discharges direct to surface waters or to public treatment systems) and water quality standards (which consist of waterbody-specific criteria, use designations, and antidegradation policies).

The Clean Water Act requires the permit writer to evaluate the permit application from two perspectives. He or she must determine if the facility is in compliance with effluent guidelines specifically designed for the industry, and determine if the discharges from the facility will cause the waterbody to exceed water quality standards. Effluent guidelines for a specific industry must be applied to all permits issued to facilities of that industry. To protect the water quality standards, the permit writer will examine the effluent quality and the waterbody quality. From this information, the permit writer will issue water quality-based effluent limits that will ensure the protection of human health and the environment. Since water quality standards are designed to provide protection for designated uses of the waterbody (*e.g.,* fishing, recreation, or drinking water supply), and to prevent any degradation of the waterbody, water quality-based effluent limits are a very effective check on any harmful discharges that are not controlled by effluent guidelines.

Many power industry permits contain water quality-based effluent limits as well as effluent guidelines-based limits. At those facilities, the environmental agency permit writer found that a particular discharge contained a pollutant or pollutants that had a "reasonable potential" to exceed water quality criteria for those pollutants, and therefore set a water quality-based effluent limit for those pollutants. In setting such a limit, the permit writer applies a model to determine the assimilative capacity of the waterbody during low flow conditions at the location of the discharge for the pollutant of concern and back calculates the discharge limits based on this conservative model. At some power industry facilities, however, the permit writer has found no "reasonable potential" for any discharge to exceed any applicable water quality criterion, and therefore has not applied any water quality-based limit. In other cases the permit writer determines he or she has too little information and requires the permit holder to gather data on the concentration of pollutants in the effluent and report the results.

All power industry NPDES permits are reviewed at least every 5 years when they are subject to renewal and all are evaluated for application of both industry-specific effluent guidelines and waterbody-specific water quality standards. EPA has developed its water quality criteria based on existing scientific literature about the toxicity of individual pollutants (*e.g.,* copper) to a range of aquatic species. These criteria are applied conservatively by the environmental agency permit writers to ensure that no acute or chronic toxic effects to aquatic species occur. EPA also has developed a separate set of human health criteria designed to prevent all toxic effects to humans. If they are needed, permit limits are based on the most stringent criteria, whether they are aquatic or human health-based. In this way, the Clean Water Act prevents harmful discharges to surface waters.

2b. Would you describe the requirements for NPDES permit applications applicable to the power industry, including the data and other information that are required?

All power industry facilities requesting permission to discharge to surface waters must file Federal Form 2D (for new sources) or Form 2C (for existing sources) or the state agency equivalent of these forms. I am attaching, for your information, blank copies of Forms 2C and 2D. State agencies use these same forms or nearly identical forms for permit applications. For each permit application, the applicant is required to test its discharges for many pollutants of concern. For example, Form 2C requires steam electric facilities to test for 15 metals (including arsenic, lead, mercury, and selenium), cyanide, dioxin, 28 volatile compounds (such as benzene and vinyl chloride) 11 acid compounds, and 45 base neutral compounds. The applicant must also report values for biochemical oxygen demand, chemical oxygen demand, total organic carbon, total suspended solids, ammonia, nitrogen, phosphorus, sulfate, sulfide, temperature and pH, to name a few of the typical "classical" pollutants required by the form. All tests for these substances must use U.S. EPA approved analytical methods and all results must be lab certified.

The form also requires information on plant operations, including a flow diagram, flow rates (both daily maximum and long-term average) for each discharge, and the exact location of each discharge (stated in longitude and latitude). For each discharge, the applicant must specify which plant operations contribute to the discharge and describe treatment processes employed for each discharge. The entire permit application must be certified to and signed by an authorized corporate representative.

After reviewing the initial permit application, the environmental agency permit writer may request any additional information he or she believes is warranted. For instance, if a facility is using a new process, the permit writer might request additional information characterizing the wastewater from that process, or he may ask for vendor information about the process. Once the permit writer has drafted a proposed permit, it is then subject to public notice and comment, and is subject to review by the EPA regional office. These layers of review help to ensure that the permit adheres to the regulations in force and protects the environment and human health. All concerns raised by the Regional EPA office or the public must be addressed by either changing the permit or providing an explanation for not changing the permit. If the explanation is considered unsatisfactory, the Regions and the public have further avenues to challenge the explanation of the permitting agency.

2c. Would you provide details on the scope of pollutants normally covered in an NPDES permit, including whether (and where) there is ongoing monitoring required and the level of review that regularly occurs between state permitting authorities and individual power plants?

The steam electric effluent guidelines provide limits for specific discharges such as fly ash and bottom ash transport water (*i.e.*, discharges from ash impoundments), cooling tower blowdown, once-through cooling water, chemical metal cleaning wastes, and coal pile runoff. Each set of limits was developed by U.S. EPA based on the common characteristics of the wastewater in question. For instance, fly ash and bottom ash transport water has limits for total suspended solids and oil and grease. Each ash impoundment that discharges to a surface water must have permit limits for total suspended solids and oil and grease. Similarly, all discharges of once-through cooling water have limits for total residual chlorine. Therefore, the effluent guidelines specific to the steam electric industry are found in each permit and normally are subject to monthly monitoring and reporting.

As already noted, whenever the permit writer finds that a discharge has a "reasonable potential" to cause an exceedance of a water quality criterion, he must develop a water quality-based effluent limit for that discharge. A single discharge point may be subject to multiple water quality-based effluent limits. Whenever a water quality-based effluent limit is included in a permit, the facility must install new treatment or make other operational changes and then is required to monitor and report for that constituent, normally on a monthly or quarterly basis.

As to the level of review between the permit applicant and state regulators, normally there is considerable discussion between the facility and the permit writer, upper management within the state permitting agency, and the EPA regional office. The permit process also includes public notice and comment and can include a public hearing.

Once a permit is issued, coordination between the permit holder and the state regulator does not cease. The permit holder files monthly discharge monitoring reports. If discharge limits are exceeded, the permitting agency has the legal authority to require corrective action on the part of the discharger and to levy fines. Also, when there are changes at the facility that may affect the characteristics of the discharge, the permit holder much notify its regulator. The regulator may reopen and modify a permit as needed to address changes in discharges.

2d. Would you discuss what states are doing to address flue gas desulfurization scrubber wastewater generated as a result of installing air pollution control equipment?

Wastewater from flue gas desulfurization (FGD) systems is not a new issue. In the 1970s and 1980s, some plants installed FGD systems with wastewater treatment systems. Some NPDES regulators, therefore, have experience in regulating FGD wastewater. In regulating this type of discharge, the NPDES regulators use their water quality criteria and standards to evaluate the particular needs of the receiving waterbody in light of the characteristics of the proposed discharge. After this evaluation, as with any other discharge, if an FGD wastewater discharge has a "reasonable potential" to exceed any water quality criterion, then it receives a water quality-based effluent limit and treatment is implemented to comply with the limit.

Since the 1970s, FGD technologies and wastewater treatment have advanced, and there are now many more types of FGD systems available to the power industry. In addition, in order to comply with new air regulations, power companies have accelerated the building of new FGD systems, committing tens of billions of dollars to construction of these systems.

Advanced FGD wastewater treatment systems exist in Florida, Ohio, West Virginia, Pennsylvania, North Carolina, Wisconsin, and many other states. In each of these states, the state regulators have worked with the permit applicant to ensure that the FGD wastewater discharge is properly limited and does not cause harm to human health or the environment.

In addition, NPDES regulators are forging ahead and sharing information about FGD wastewater and its treatment. In March, the Ohio River Valley Water Sanitation Commission (ORSANCO), a coalition of entities that set standards for the Ohio River, sponsored an FGD wastewater treatment workshop. In October, the International Water Conference will include a section on FGD wastewater treatment.

Due to different coal types, FGD system designs, treatment additives, and other varying factors, each FGD wastewater discharge is unique. No one set of limits may be universally applicable to every FGD discharge. Therefore, regulation through the water quality-based effluent limits program is ideally suited to this situation. Each proposed discharge is evaluated based on the site-specific needs of the waterbody, and is limited based on those needs. The NPDES regulators are proving that the current system of regulation is appropriate and effective for FGD wastewater discharges.

3. One of the hearing witnesses, Mr. Eric Schaeffer of the Environmental Integrity Project (EIP), stated at the hearing that "discharges of toxic metals are generally not restricted under Clean Water Act permits at power plants and are often not even monitored." Is this an accurate statement or not? Please address this statement, based on your knowledge of the Clean Water Act permitting program and the electric utility industry.

This statement gives the mistaken impression that regulators are not monitoring industry discharges to determine if they contain toxic metals. Nothing could be further from the truth. Each power plant that intends to discharge to a surface water must file a permit application and go through a rigorous review process before being granted a permit. My answers to questions 2a and 2b more thoroughly explain how the Clean Water Act and EPA regulations prevent harmful discharges to the environment.

Significantly, to the extent the characteristics of discharges change due to any operational changes – such as installation of air emission control technologies – the permitting system ensures that the permit writer must be informed of the change and has an opportunity to determine whether further limits are necessary in light of the changes. See 40 C.F.R. 122.41(l) and 40 C.F.R. 122.62. Therefore, contrary to the impression left by Mr. Schaeffer's testimony, there is no danger of industry facilities pulling pollutants out of the air only to release them to water without any regulatory review. The existing water permit program already ensures that all discharges to surface water are subject to evaluation before the discharge begins and at least every five years thereafter when the permit is renewed, and also whenever there are modifications such that the character of the discharge is changed.

4a. Mr. Schaeffer acknowledged, in his supplemental submission, that discharges from ash or sludge systems at four plants (Big Bend, Roxboro, Cape Fear, and Kingston) "appear to mix with other effluent, such as cooling water, before final discharge to surface water," and that the "expanded volume of the combined

discharge will significantly reduce concentrations of these toxic metals, although it will not reduce their mass." He provided revised bar charts with a note indicating that concentrations are likely to be lower at these plants at the final point of discharge. Please provide your perspectives on the data, the clarifications that Mr. Schaeffer made, and the claims or assertions that Mr. Schaeffer made in his hearing testimony and subsequent submission.

The revised bar charts are still very misleading. The goal of the water quality standards program in the Clean Water Act is to reduce the concentration of pollutants in the receiving waterbody. The toxicity of a substance depends on its concentration and duration of exposure to the organism whether it be humans or aquatic life. Selenium, for instance, is an essential mineral that is intentionally added to many multi-vitamins. Clearly, it is the concentration and form of selenium and the length of exposure that sometimes renders selenium toxic.

Also, the bar chart contains some selenium data from *internal monitoring points* (*e.g.*, Big Bend, Roxboro). Comparing internal waste stream concentrations (*i.e.*, concentrations of a pollutant in process water inside a plant, before treatment or discharge) to a water quality criterion is totally inappropriate because it does not reflect how the water quality standards program is implemented, and leaves the false impression that facilities are in violation of water quality criteria. It is also totally inappropriate and misleading to compare selenium end-of-pipe concentrations with the water quality criterion. As explained earlier, the permit writer calculates the assimilative capacity of the waterbody for the criterion of interest and then back calculates the actual permit limit based on the modeling of the waterbody's assimilative capacity at low flow conditions. The resulting permit limit is not the water quality criterion, but a higher value that accounts for the assimilative capacity of the waterbody. By comparing internal waste streams and final discharge points to the water quality criterion, Mr. Schaeffer has created the false impression that these facilities are in violation of set limitations.

4b. He removed the Yates plant from the revised bar charts "as it appears that discharges from the scrubber system may undergo additional treatment prior to their final release," and a "lack of monitoring makes it difficult to determine the concentration at the final outfall." Please provide your perspectives on the data, the clarifications that Mr. Schaeffer made, and the claims or assertions that Mr. Schaeffer made in his hearing testimony and subsequent submission.

I have asked my colleagues at Southern Company to comment on this matter, since Plant Yates is owned and operated by Southern. They believe that Mr. Schaeffer still mischaracterizes Plant Yates. Yates has a closed-loop, recirculating FGD wastewater treatment system which, under normal operations, never discharges. The Yates wastewater sample reference in the original bar chart was collected from within an FGD scrubber, which is part of the air emission control system at Plant Yates. Metals are expected to be high within the scrubber itself, where sulfur dioxide and many other air pollutants are removed from the plant's emissions. But at Yates, wastewater from the scrubber is never discharged to a surface water under normal operations. Instead, it travels through a system of settling ponds and is recycled back into the scrubber system. Since this wastewater is never discharged under normal operating conditions, it is completely erroneous to claim that the Yates selenium data for the scrubber process water is a "release" of toxic metals in concentrations "hundreds of times higher than the water quality standards," as Mr. Schaeffer claimed in his original testimony. Process water samples from within a plant are not relevant to an assessment of the plant's compliance with applicable water quality standards.

This mistake is all the more egregious because the scrubber water sampling data, which was submitted to U.S. EPA at U.S. EPA's request, was accompanied by a cover letter which explicitly identified that sample data related to an internal sample from within the Yates scrubber. Attached is the May 4, 2007 cover letter from the U.S. EPA Effluent Guidelines Plan docket.

4c. He noted that a chart displayed in a May 3, 2009 *Washington Post* story indicated that EPA had established an arsenic water quality criterion of 10 micrograms per liter to protect saltwater aquatic life, and acknowledged that that criterion was incorrect. He noted that the 10 micrograms per liter figure is a drinking water standard, not an ambient water quality criterion. He also said that "some states (Tennessee) have also adopted the ten microgram standard to protect humans

from exposure during recreational use of rivers and streams."

Mr. Schaeffer's misleading bar chart used during the hearing led to the inaccurate reporting in the *Washington Post*. The *Washington Post* chart was apparently based on the arsenic chart Mr. Schaeffer presented during his testimony. It is unfortunate that the use of this incorrect data resulted in sensationalizing the report in the *Washington Post*. It is difficult to understand, especially in light of Mr. Schaeffer's past U.S. EPA enforcement background how such an egregious error could have occurred. He presented data comparing arsenic discharges with a standard that is not relevant (*i.e.*, drinking water standards) with the effect of artificially inflating the comparison but used a water quality criteria on the selenium bar chart.

4d. Mr. Schaeffer said he "tried to make clear in both written and oral testimony that water quality criteria apply to surface waters and do not necessarily legally limit what can be discharged at the end of the pipe, and advocated for further investigation by EPA and for EPA "to develop effluent limitation guidelines that limit both the concentration and mass of toxic metals discharges from power plants."

Mr. Schaeffer's statements imply that there is a disconnect between the existence of water quality criteria for metals and a legal mechanism to use those criteria in the setting of effluent limitations for power plants, with the inference that metals in power plant discharges have gone unregulated. As we have described in the responses to the previous questions, there in fact is a clear legal requirement for environmental agency permit writers to consider the levels of metals in discharges from all permittees with respect to water quality standards established for the protection of the receiving water bodies. As we have also described, permit writers have for years been incorporating effluent limits for metals in power plant discharges where their analysis dictates they are warranted. We should also point out that U.S. EPA has put significant effort into reviewing the effluent limitations guidelines for power plants, and continues to do so. Recent congressional testimony by USEPA representatives has also made mention of this work.

4e. Mr. Schaffer provided new charts "documenting selenium or arsenic concentrations in discharges from ash ponds or scrubber systems at 40 plants, which also identifies whether those discharges are direct (most cases) or may be mixed with other effluents before final release. The charts also provide an estimate of the mass associated with each discharge where that is possible to determine from flaw rate data. As noted in our testimony, many plants do not monitor discharges of arsenic, selenium, or other toxic metals at all."

The industry has not been able to comprehensively study all the data presented in Mr. Schaeffer's new charts and tables. However, the estimates of mass loadings based on maximum flows that Mr. Schaeffer supplies in both the selenium and arsenic tables are likely overestimates for many facilities. That is because maximum flows reported on a permit application typically are generated based on several years' prior data, and the maximum flow often represents the flow from a coal ash impoundment immediately after major precipitation events. Any calculation of loadings based on maximum flow rates is therefore likely to be biased high. For example, the maximum flow of 88.5 MGD for TVA Gallatin Outfall 001 was due to a massive storm event that occurred before the weekly flow reading was collected. The typical yearly maximum for this outfall is 43 MGD. Therefore, using a single concentration in combination with the maximum flow is not at all representative of Gallatin's typical discharge from that outfall.

Also, it is misleading that Mr. Schaeffer used system performance data for selenium *from the start up phase for Pleasant Prairie Station's new FGD system.* See page 8 of the table labeled "Selenium Monitoring Results at Select Facilities." During this startup period, We Energies was not discharging FGD wastewater to Lake Michigan, but was testing the wastewater within the plant and recycling it to ensure that the system was functioning properly. As is not uncommon during a startup phase for major new equipment, the performance data demonstrate that the system needed several adjustments before it operated according to its specifications. Therefore, use of this performance data for any purpose is misleading.

Additionally, there are some inaccuracies in the data. For TVA's Cumberland Station, the mean and maximum selenium concentration values listed for Outfall 001 are both 130 ppb. See page 7 of the selenium table. This is not correct. The long-term average concentration value for this outfall is 44 ppb, as based on quarterly sampling and provided in the permit application referenced by Mr. Schaeffer.

For AEP's Cardinal Station, the arsenic mass loadings reported in Mr. Schaeffer's clarification are incorrect. The maximum flow of 77.09 MGD is clearly an error. The maximum daily flow, as stated in the permit application, is 17.75 MGD. The long-term average flow is 11.04 MGD. An appropriate maximum flow rate for this outfall is likely 17-18 MGD.

Monitoring of arsenic values at AEP's Mitchell Plant shows the highest value in October 2007 to be 110 ug/l. All other values are below 89 ug/l. We are uncertain the source of the 138 ug/l value reported by Mr. Schaeffer.

5. **You noted in your testimony that an August 2006 EPA/Department of Energy report confirms the improving trend in the State regulation of coal combustion residuals, finding that, over the last decade, the amount and quality of environmental controls for coal combustion residual management units have increased and that there is a trend towards dry handling of coal combustion residuals. Please describe some of the ways that state controls have become more robust.**

Coal Combustion Waste Management at Landfills and Surface Impoundments, 1994-2004 ("DOE/EPA Report" – copy attached), documents the pronounced improvement in the management of coal combustion waste (CCW) by utilities at new and expanded disposal facilities and strengthened regulatory oversight of CCW disposal by state regulatory agencies. The DOE/EPA Report confirmed an increase of regulatory controls for CCWs destined for disposal since 1988 and that the grants of variances from regulatory controls by state regulators had sound scientific support. It also found dramatic improvement in the management of CCWs in new or expanded disposal units, confirming the increasing trend to dry handling of CCWs, the use of liners and the monitoring of groundwater.

DOE/EPA reviewed data on state regulatory controls on CCW disposal to determine whether there had been improvements in state oversight since 1995. DOE/EPA also focused on the *implementation* of existing regulatory programs eleven states[1] and found that the vast majority

[1] Alabama, Florida, Georgia, Illinois, Indiana, Missouri, Ohio, Pennsylvania, Texas, Virginia, and Wisconsin.

of states exercise control over the disposal of CCW and that there has been a trend in recent years toward more stringent state requirements. DOE/EPA's review of the permitting requirements for CCW disposal in landfills and surface impoundments found that nearly all new CCW disposal units had installed liners, and nearly all new landfills were monitoring groundwater, thereby addressing groundwater protection concerns.

DOE/EPA also used the current regulatory requirements obtained from the eleven states and data obtained in 1988 (the latest useable set of data) to determine whether states had tightened or relaxed several regulatory requirements related to CCW disposal. DOE/EPA determined that significantly more states, accounting for the vast majority of the reviewed net CCW disposal capacity, had tightened their regulatory requirements than had relaxed their requirements. This was true for each of the eight sets of requirements examined: regulatory designation of CCWs, solid waste permitting, liners, groundwater monitoring, leachate collection, closure/post-closure care, siting, and financial assurance. DOE/EPA Report. at 49-51.

The DOE/EPA Report demonstrates that the vast majority of states rely on varying permit or other authorities to impose environmental controls on CCW disposal units. Furthermore, the DOE/EPA Report documents the trend showing that state regulatory requirements for CCW disposal have become more stringent in recent years. In fact, that trend continues to this day. As Secretary Wilson of the Maryland Department of the Environment testified, Maryland has issued regulations that would establish new requirements for generation, storage, handling, processing, of CCWs and recently announced it would develop regulations addressing disposal, recycling, beneficial use, or other uses of coal combustion byproducts.[2]

To assess actual implementation of these state program requirements, the DOE/EPA Report reviewed permits supplied for recently expanded or constructed units to identify all instances where a variance from state regulatory requirements was requested for a CCW disposal unit. The DOE/EPA Report categorized each of these requests by the type of requirement for which the variance was requested (*e.g.*, groundwater monitoring), determined whether the request had been granted, and identified the rationale for granting or rejecting the request. DOE/EPA found that variances from state regulations are granted only on the basis of sound technical justifications, demonstrating effective state regulation of CCW disposal and concluded that "State regulators have not issued variances unless a sound scientific basis supports the

[2] 35 Md. Reg. 2080 (Nov. 21, 2008), See Maryland Depart of the Environment Press Release at http://www.mde.state.md.us/PressReleases/1157.html

request. Variances are generally granted only when the underlying regulation was developed for settings unlike those of CCW units . . . or when the operator has demonstrated that an alternative approach or materials will achieve the same objective as intended by the regulation." *Id.* at 67.

The DOE/EPA Report accurately documents the overall tightening of state regulatory controls applicable to CCW disposal units. In addition, it demonstrates the seriousness with which state regulators administer their programs. States base their approval of regulatory requirements on technically-supported justifications. This record assembled by DOE and U.S. EPA manifestly puts to rest the myth that the absence of federal regulations amounts to no regulation. Plainly, the states take their regulatory responsibilities for overseeing CCW disposal seriously.

6. In what ways would regulating coal combustion residuals as a "hazardous waste" instead of as a non-hazardous solid waste impact on the management (including handling and disposal) and beneficial reuse of such materials? What would be the cost impacts? What would be the increased regulatory burdens?

In short, the regulation of coal combustion residuals (or coal combustion byproducts, "CCBs") CCBs as hazardous waste would kill beneficial use. In its April 1, 2009 letter to U.S. EPA (copy attached) the Association of State and Territorial Solid Waste Management Officials (ASTSWMO) made several important points. ASTSWMO stated that "many State regulations prohibit the beneficial use of CCB if it is declared hazardous." In addition, hazardous waste regulation would stigmatize the material in a way to adversely affect beneficial use. The American Coal Ash Association, in a March 25, 2009 letter to EPA (copy attached) states that hazardous waste regulation of CCBs would "have a devastating effect" on the CCB beneficial use. ACAA notes the "myriad new uncertainties and perceived risks associated with marketing, handling, transporting and utilizing" CCBS that would confront producers, marketers and users of the material. Much, if not all, of the 51 million tons of CCBs that are currently being beneficially used would have to be disposed, resulting in increased disposal costs and a loss of revenue from beneficial use. In sum, hazardous waste designation would have the unintended consequences of dramatically increasing the volumes of CCBs disposed and would eliminate the significant environmental, economic, and sustainability benefits accomplished by CCB beneficial use.

7. **Please provide me with any supplemental or clarifying testimony, comments, and data that you may have regarding coal combustion residuals management and beneficial reuse.**

The Subcommittee heard testimony calling for the closure of CCB impoundments. As I stated in my testimony, CCBs can be safely managed as non-hazardous wastes and the electric utility supports the development of performance-based regulations designed to protect the environment. The implications for closing all CCB impoundments, without regard to their operational safety, would have significant impacts. We estimate that the mandatory closure of surface impoundments used for the management of CCBs would affect a significant number of electric utility power plants. Based on representative engineering and cost data, we estimate that the present value cost to the electric utility industry of a regulation mandating the closure of CCB surface impoundments would be approximately $39 billion. Annualized over 20 years, this represents a cost of approximately $2.5 billion per year. In some cases, these costs could be sufficiently high to render a facility, or some smaller generating units at facilities, uneconomic and result in the closure of such facilities or generating units. Closure of this generating capacity could potentially affect system reliability as well as energy prices.

TABLE OF CONTENTS OF EACH DOCUMENT TO BE HELD IN THE COMMITTEE OFFICE (FOR TRANSCRIPT):

Attachments to Letter from John M. McManus, Vice President, Environmental Services, American Electric Power, to Rep. John Boozman, Ranking Member, Subcommittee on Water Resources and Environment, Committee on Transportation and Infrastructure (May 29, 2009) (re: Responses to Coal Combustion Waste Storage and Water Quality Hearing Follow-up Questions):

Attachment 1: U.S. Environmental Protection Agency, *Application Form 2C -- Wastewater Discharge Information - Consolidated Permits Program,* EPA Form 3510-2C (Rev. Aug. 1990, Office of Enforcement).

Attachment 2: U.S. Environmental Protection Agency, *Application Form 2D -- New Sources and New Dischargers: Application for Permit to Discharge Process Wastewater,* EPA Form 3510-2D (Aug. 1990, Office of Water Enforcement and Permits).

Attachment 4: Elcock, D. and N.L Ranek, *Coal Combustion Waste Management at Landfills and Surface Impoundments, 1994-2004*, DOE Report No. DOE/PI-0004 and ANL Report No. ANL-EVS/06-4, prepared by the Environmental Science Division, Argonne National Laboratory for the U.S. Department of Energy and U.S. Environmental Protection Agency (Aug. 2006).

EPA-HQ-OW-2006-0771-375

Attachment 3

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(205) 587-4846 (cell)

SOUTHERN COMPANY
Energy to Serve Your World

May 4, 2007

Mr. Ronald Jordan
Environmental Engineer
Engineering and Analysis Division (4303T)
EPA West/Connecting Wing (Rm 6233W)
1301 Constitution Ave., NW
Washington, DC 20004

RE: Draft Engineering Site Visit Report for Georgia Power's Plant Yates

Dear Ron:

Please find enclosed the answers to your questions that were posed in EPA's draft site visit report for Georgia Power's Plant Yates. I very much appreciate the extension of time you granted us to respond, and your clarification of the scope of the questions. None of the information discussed in this report or in our response is considered confidential business information.

Also enclosed are the monitoring data that you requested. Table 1 provides the revised analyses of the Yates FGD wastewater sample collected on September 28, 2005. This sample is a slurry sample from the absorber and not a final gypsum pond discharge. Table 2 contains the Total Suspended Solids (TSS) data from the plant's NPDES Operations Monitoring Reports from January 1, 2004 through February 28, 2007. Tables 3, 4, and 5 contain total recoverable metals data for ash pond blowdown grab samples taken during 2004, 2005, and 2006, respectively. Source water data are also provided in these tables.

Please contact me at (205) 257-5234 if you have any questions about this information.

Sincerely,

Donna B. Hill

Donna B. Hill
Principal Environmental Specialist
Southern Company Services, Inc.

Enclosures

Association of State and Territorial
ASTSWMO
Solid Waste Management Officials

Attachment 5

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April 1, 2009

Matt Hale
Director
Office of Resource Conservation and Recovery
USEPA Headquarters
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Mail Code: 5301P
Washington, DC 20460

Dear Matt,

ASTSWMO has a demonstrated track record of active interest in the management of coal combustion by-products (CCB). ASTSWMO's Fossil Fuel Combustion Waste (FFCW) Work Group gathered information about State regulation of CCB in late 2006 – early 2007. The results of that effort indicated that the majority of the responding States had regulatory programs in place for the management of CCB. On February 11, 2008, the FFCW Work Group provided comments on USEPA's "Notice of Data Availability (NODA) on the Disposal of Coal Combustion Wastes in Landfills and Surface Impoundments." Comments were based in part on the 2006-2007 survey results. The FFCW Work Group recommended a more flexible regulatory approach that allows consideration by the permitting authority of the waste type, climate, site geology and environment, and encourages a scientific and engineering approach to minimize potential risks to acceptable standards. They stated that this approach was the current practice in many States. The FFCW Work Group questioned the need for additional federal regulations related to CCB materials.

The Tennessee Valley Authority (TVA) spill in December 2008 brought renewed attention to the question about the need for federal regulation of CCB. In response to EPA's fast-track regulatory process for coal combustion waste, the ASTSWMO Board of Directors formed a CCB ad hoc Workgroup in January 2009 to review and respond to EPA's proposed regulatory schemes.

The first action of the group was to modify and reissue the 2006 survey of States initially designed by the FFCW Workgroup. In February 2009, ASTSWMO's CCB ad hoc Workgroup surveyed State waste and water program managers, working in conjunction with ECOS and ASIWPCA. There were three parts to the survey: general information about CCB management, questions specific to landfills and questions specific to surface impoundments. The survey has been completed by 44 States. Eight States do not have CCB. Fourteen States do not have CCB surface impoundments. Enclosed as an attachment to this letter are the summary results from the survey for States that have CCB.

The Workgroup also called on States to provide comments on EPA's possible regulatory proposals. A compilation of State responses is also enclosed as an attachment to this letter.

There is no question that releases, such as the December 2008 TVA Impoundment Failure in Kingston, Tennessee, should be prevented to the extent practical though appropriate engineering, design, and operating standards. However, it is also critical that all relevant factors be considered in deciding the appropriate course of action.

Presented below are the pros and cons of the possible regulatory proposals for CCB prepared by the CCB ad hoc Workgroup, based on the survey results and State comments.

Justification of preference for Subtitle D regulation of CCB:

USEPA should implement an approach to coal combustion by-product (CCB) regulations similar to the approach that is taken with municipal solid waste pursuant to 40 CFR Part 258, commonly referred to as RCRA Subtitle D. Using the lessons learned by States since the adoption of 40 CFR Part 258 and historical CCB data collected by States, RCRA Subtitle D could be modified to specifically address CCB waste disposal facility requirements and is the framework that the USEPA should build upon.

Most States regulate CCB. Thirty-six out of 42 States that have CCB have permit programs for CCB landfills (86 percent). Only 3 States responded "no" and 3 States did not respond. Twenty-five out of 36 States that have CCB surface impoundments have permit programs for those impoundments (69 percent). Only 3 States responded "no" and 8 States did not respond. Most States regulate CCB under general solid waste regulations (43 percent) and general industrial waste regulations (43 percent). Several States use regulations specifically designed for CCB (29 percent). According to USEPA, the design and performance standards will likely be the same no matter what regulatory scheme is chosen. Many States voluntarily impose minimum performance standards for both landfills and surface impoundments under Subtitle D, demonstrating that minimum federal Subtitle D requirements will be sufficient to ensure that States properly regulate CCB.

Percentage of States with CCB landfills and surface impoundments with specific regulatory requirements		
Regulatory Requirement	Landfills	Surface Impoundments
Bottom Liner	64%	33%
GW Monitoring	81%	39%
Leachate Collection	52%	14%
Final Cover System	79%	36%
Post Closure Care	79%	39%
Siting Controls	83%	39%
Corrective Action	86%	42%
Structural Stability	69%	36%
Financial Assurance	69%	31%

The fact that more than half the States already require each of the technical standards identified above for landfills demonstrates that minimum federal Subtitle D requirements will be sufficient to ensure that States properly regulate CCB. A considerable number of States have these requirements for surface impoundments as well, although we acknowledge that more States may have to upgrade their surface impoundment requirements than will have to for landfills. Establishing federal minimum standards under Subtitle D will provide the impetus needed for all States to conform. It is also important to note that currently, 36 percent of States with CCB are contemplating changes to their CCB regulations and 27 percent of those already have draft revised regulations.

State experiences

Michigan - "Michigan currently regulates coal ash as a solid waste under Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA) ... in 1993 when Michigan became an approved State under the Resource Conservation and Recovery Act (RCRA) Subtitle D program. Based on the analytical information that we have seen on coal ash, we believe that the levels of contaminants contained in coal ash are similar in nature to those found in cement kiln dust, wood ash, foundry sands, paper mill wastes, or steel mill waste. With the promulgation of the 1993 rules, we consider all these waste to be low-hazard industrial waste (i.e. they leach less than ten percent of the hazardous waste limits when using the appropriate leaching tests)."

West Virginia - "I have been regulating coal ash facilities for 26 years for the State of West Virginia. I have never found a TCLP [Toxicity Characteristics Leaching Procedure] or other chemical characterization that would indicate that coal ash could be labeled as a hazardous waste. Most of the time the metal concentrations, which would be the main characteristic that could be considered hazardous, are at or below MCL for drinking water."

Iowa - "The Department understands that the USEPA is considering options to regulate [CCB] as a hazardous waste under RCRA Subtitle C. This option is not supported by the historic data that has been collected from generators of [CCB] in Iowa which shows that [CCB] does not exceed RCRA Subtitle C hazardous waste characteristics."

Arguably, municipal solid waste (MSW) presents more extensive environmental concerns than CCB. Municipal waste streams contain not only heavy metals, but also organic, acidic and alkaline materials. The organics in MSW can be more problematic than industrial wastes, which are generally inorganic in nature. Logically, if Subtitle D is adequate for MSW, then it certainly should be sufficiently protective for CCB.

Based on federal minimum standards for location, design, environmental monitoring, operation, closure, post-closure care, corrective action, and financial assurance, the States have established federally approved Subtitle D State programs. These programs have proven successful dealing with municipal solid waste, including household hazardous wastes and Conditionally Exempt Small Quantity Generator (CESQG) waste at the State's option. A substantial number of damage cases supported the federal adoption of minimum national Subtitle D municipal solid waste landfill standards. A similar Subtitle D approach can successfully implement minimum federal standards for coal combustion waste disposal facilities. The Subtitle D approach can address any concern regarding the stability of a CCB disposal facility through establishing minimum federal design standards and routine inspection and evaluation.

Most States have some mechanism to recognize and regulate the beneficial use of Subtitle D wastes. According to the ***2006 ASTSWMO Beneficial Use Survey Report***, 34 out of the 40 reporting States (85 percent) indicated they had either formal or informal decision-making processes or beneficial use programs relating to use of non-hazardous solid wastes.
The Subtitle D approach, with minimum federal standards, will facilitate the continued beneficial use of CCB. As the anticipated volume of CCB produced is expected to increase or even double in many States as the Clean Air Act requirements for installation of scrubbers for flue gas desulfurization (FGD) are implemented, it is vital that the recycling of those materials which can be safely used in products or as raw materials be so used. Adopting a Subtitle D approach to the regulation of high volume, low toxicity coal combustion by-products would offer the best fit with existing and developing State beneficial use programs.

Explanation of opposition to Subtitle C regulation of CCB:

State experiences

Iowa – "Declaring CCB a hazardous waste creates an even greater hardship in Iowa because of the amount that is generated and the fact that there is no RCRA C permitted disposal facilities in the State. The likelihood of siting such a facility borders on the impossible. The implications of this action are that CCB generators would be forced to ship materials to surrounding States for disposal. That could become very costly for Iowans and extremely difficult to justify when there is little scientific data supporting such drastic measures."

Michigan – "RCRA Subtitle C wastes in Michigan are currently regulated under Part 111, Hazardous Waste Management, of the NREPA. The regulation of coal ash under full RCRA Subtitle C would end the current beneficial uses of coal ash. Existing surface impoundments and landfills would be subject to more stringent design standards and would require either 1) retrofitting of existing landfills (if even possible) or 2) closure of those disposal facilities. Neither of these options could be implemented immediately."

Florida – "If USEPA decides to call coal ash a hazardous waste under Subtitle C, then current Florida law (Section 403.7222, Florida Statutes) would prohibit the disposal of this coal ash in landfills unless it was first treated to be non-hazardous. This could add tremendous costs to the power industry for managing this material. They would either have to treat their ash before disposal or ship it out of State for disposal. It is also likely that if existing disposal areas were disturbed after USEPA determined coal ash was a hazardous waste, then these old disposal sites could become hazardous waste disposal units too."

Virginia – "If USEPA was to regulate CCB as a hazardous waste under the RCRA Subtitle C authorities, Virginia would no longer allow these materials to be beneficial reused under our CCB Regulations (9 VAC 20-85) and, also, there would be no beneficial reuse exclusions/exemption under our Virginia Solid Waste Management Regulations (9 VAC 20-80), as well."

As noted above, the vast State experience with testing CCB shows that it is generally not characteristically hazardous. Coal combustion by-products rarely if ever fail the criteria by which materials are determined to be hazardous waste. To artificially classify them as hazardous will needlessly limit the management options for both the CCBs and other wastes legitimately classified as hazardous which will be competing with CCBs for limited hazardous waste disposal capacity, while not producing any greater degree of environmental protection. Transportation, manifesting and licensing requirements for CCBs as a listed hazardous waste are excessively burdensome without sufficient evidence of a benefit. It would be more appropriate to regulate and manage CCBs using design and operation standards specified for Subtitle D programs except in the cases where a particular source material is deemed hazardous upon testing for characteristics.

The prospect of adding a significant new waste stream to be managed by severely underfunded State hazardous waste programs is unconscionable unless a significant amount of new sustained funding is included. ASTSWMO's Hazardous Waste Subcommittee conducted a pilot program to determine the cost to States for implementing a complete and adequate RCRA Subtitle C Program (hereafter referred to as "RCRA C" or "RCRA") in 2006. The report entitled ***State RCRA Subtitle C Core Hazardous Waste Management Program Implementation Costs - Final Report (January 2007)*** revealed that the cost to States of implementing a complete and adequate RCRA Program (converted to 2008 dollars) is, at a minimum, \$367M in State and federal funding. The State share should be \$92M (25 percent) with the remaining \$275M in State Hazardous Waste Financial Assistance grants. However, the FY 2008 federal appropriation was only slightly more than half of what States needed. Congress appropriated \$101M rather than \$175M. States are making up the difference for these federally mandated programs from already strained State budgets. These programs are already stretched to the breaking point. Expectations should not be high for a successful incorporation of CCB into State Subtitle C programs without the guarantee of commensurate increases in State grant funding.

USEPA should avoid a "one size fits all" approach that will unnecessarily divert limited technical resources away from existing permitting or compliance and enforcement work. Instead, USEPA should recognize that many States have adequate controls in place and allow them to maintain their programs. USEPA could then focus its efforts on correcting any deficiencies identified by their investigations.

The most compelling reason not to impose Subtitle C regulations is that the beneficial use of CCB has been very successful. The "hazardous" label of Subtitle C would be detrimental to State CCB beneficial use programs, as discussed below. Regulation under RCRA Subtitle C has the potential to put an end to many beneficial uses for CCB. In most States, a primary requirement for a beneficial use determination is that the waste not be hazardous. RCRA Subtitle C wastes in Michigan are currently regulated under Part 111, Hazardous Waste Management, of the NREPA. The regulation of coal ash under full RCRA Subtitle C would end most of the current beneficial uses of coal ash. Existing surface impoundments and landfills would be subject to more stringent design standards and would require either 1) retrofitting of existing landfills (if even possible) or 2) closure of those disposal facilities. Neither of these options could be implemented immediately.

Implications for beneficial use if CCB is regulated under Subtitle C:

The American Coal Ash Association reports that 43 percent of CCB is currently used in a beneficial way rather than disposed in a landfill. About 20 percent of CCB is used in products – 14 percent is bound in concrete and cement; 6 percent is used to make gypsum wallboard. Currently, 56 percent, or 75 million tons, is not beneficially used. States are concerned that designating CCB as a hazardous waste under Subtitle C or a hybrid Subtitle D/C regulation would prevent beneficial use of CCB and result in all 134 million tons of CCB being shipped to hazardous waste landfills that in many States have insufficient capacity. As the anticipated volume of CCBs produced is expected to increase or even double in many States as requirements for FGD are implemented, it is vital that the recycling of those materials which can be safely used in products or as raw materials be so used.

Not only do many State regulations prohibit the beneficial use of CCB if it is declared hazardous (see State experiences insert), such a designation will stigmatize the material in a way that will adversely affect beneficial use. The stigma issue also applies to the proposed hybrid Subtitle D/C approach. The uncertainty that a presumed non-hazardous material could be deemed hazardous as a result of a determination that a generator failed to follow the Subtitle D requirements will create too much uncertainty and liability concerns for the beneficial user.

State experiences

Michigan – "Michigan currently has regulations in place governing the reuse and disposal of coal ash that are protective of public health and the environment. If coal ash were determined to be subject to regulation under Subtitle C, it would necessitate considerable changes to Michigan solid and hazardous waste statutes and regulations. Such changes would likely be subject to considerable opposition from any industry and/or municipality that generates coal ash waste, and would likely lead to increased costs for energy generation."

Missouri – "Given the current State of CCB management activities in Missouri there does not appear to be a compelling reason, from a human health or environmental protection standpoint, to manage these materials as hazardous waste under RCRA Subtitle C. To do so would be an undue disruption to current State CCB and UWLF management practices and would likely result in a significant increase in the cost of CCB management without a corresponding increase in human health or environmental improvement/protection."

Coal combustion by-products or residue generally consists of fly ash, bottom ash, or wet slurry depending on the combustion unit and associated air pollution control devices. The character of the end stream varies and is dependent upon several factors. However, all seem to be lumped together in this regulatory analysis without discussion of segregate characteristics or potential for beneficial use.

States require testing of beneficially reused materials. Testing can include initial analysis of the material and additional testing when sources of fuel change or when there is a change in plant processes, if such changes cause a change in the constituents generated. States report that their beneficial programs do not allow the use of coal ash in road construction if the material fails the Toxicity Characteristics Leaching Procedure (TCLP). Many States report that they do not have any data to suggest that coal ash projects that have been reviewed have failed TCLP.

Examples of the beneficial use of CCB

- a component of concrete, grout, mortar, or casting molds
- a raw material in asphalt for road construction
- aggregate or road or building material which will be stabilized or bonded by cement, limes or asphalt
- road base or construction fill that is covered with asphalt, concrete, or other material approved by the State
- a soil amendment or for soil stabilization provided the materials meet State criteria

States have incorporated technical standards in their regulations and approvals for storage of CCB. For example, in Missouri, a waste to be beneficially reused is kept above the seasonal high groundwater table, unless a variance is obtained from the department's Water Protection Program (WPP.) This requires an interpretation by a geologist registered in the State. A 3-foot cap of clean soil is required unless the material is placed under a structure or a paved/concreted area.

Recycling this waste material into new products, rather than having to mine additional virgin material, is integral to sustainable development and sustainable infrastructure. To disallow the beneficial use of coal combustion by-products (CCB) would cause an increase in the use of valuable mineral resources rather than reusing a waste product. This would in turn increase disposal costs for the utilities which would be passed on to the consumer. Counties and municipalities which use bottom ash as snow and ice control would instead have to purchase chemicals or salts to treat the roads. State transportation departments and other entities using CCB would have to purchase soil to use in place of the fly ash currently used for structural fill, road base, as a soil amendment or for soil stabilization. This could impact the number of miles of roads that can be constructed or repaired and increase costs. In other cases, specific beneficial use projects limit the amount of transportation that would otherwise be needed if the material were considered a hazardous waste. Some coal-fired power plants are co-located near gypsum wallboard manufacturers. The FGD sludge is transported by conveyor belt directly to the wallboard facility for beneficial use. These operations result in safe uses and minimal transport of the FGD sludge.

Concerns about existing facilities:

An issue that has not been addressed adequately in discussions is whether USEPA plans to address existing facilities, and if so how. If USEPA pursues the Subtitle C regulatory route, it might subject all existing facilities in a State to RCRA corrective action. Additionally, bringing existing facilities under Subtitle C raises resource-intensive permitting issues. States generally have legislatively prescribed staffing levels based upon workload, mission, funding, and statutes passed to implement federal RCRA authority or delegation. As noted previously, ASTSWMO's report entitled ***State RCRA Subtitle C Core Hazardous Waste Management Program Implementation Costs - Final Report (January 2007)*** demonstrates that State Subtitle C programs are already seriously underfunded. Additionally, retrofitting of existing Utility Waste Landfills (UWLFs) to meet Subtitle C standards is likely to be technically impracticable. Even if technically feasible, the cost of retrofitting UWLFs to meet current RCRA Subtitle C standards would likely be prohibitively expensive. Any additional compliance costs borne by the utility companies in retrofitting existing UWLFs or permitting new ones would undoubtedly be passed along to consumers at a time when economic conditions in the U.S. are less than ideal.

Enforcement:

There have been suggestions that Subtitle C is necessary so that USEPA will have enforcement authority. States are held accountable by their citizens through State statutes and obligations to regularly inspect landfills and investigate complaints, and to utilize State enforcement authority as warranted. Subtitle D requires State programs to have the necessary enforcement authority as part of the federal approval process. This approach has been successful for over a decade as evidenced by the relative absence of federal citizen suits or demonstrated failure of State Subtitle D programs. The States are not aware of USEPA expressing concerns regarding this State based enforcement approach in the municipal solid waste landfill program. A similar Subtitle D approach can successfully ensure compliance with minimum federal standards for coal combustion waste disposal facilities.

Applicability of Federal Regulations:

Based upon discussions to date with USEPA and States, it appears that the intended coverage of any federal CCB regulations would be limited to CCBs generated by coal-fired utilities, and not extended to CCBs generated by other industries. If this is correct, then the federal regulations should clearly make this distinction. Otherwise, an unreasonable burden will be placed upon the States to individually sort out the applicability issue, likely resulting in uneven application of the base federal requirements.

State Program Authorization:

Regardless of the regulatory approach selected, the States request that the procedures for authorization of State programs to implement the CCB rules be streamlined and designed to operate in harmony with existing Subtitle D (and/or Subtitle C) program authorization procedures. Where there are existing State programs in place regulating these materials, considerable deference should be given to the State program in the authorization process. States with CCB programs in place should be provided the option to 1) demonstrate that their programs are consistent with and not less stringent than the federal program, and 2) be more stringent than the federal program if they so choose. Further, authorization for any new CCB regulations should be treated as an amendment to a State's existing Subtitle D (or Subtitle C, as applicable) program authorization, as opposed to considering the CCB program as separate and distinct from existing authorizations.

Funding:

Federal funding may be necessary to help build State program capacity in the few States that do not have CCB programs if USEPA mandates standards under Subtitle D. It should be noted that some State Subtitle D programs would likely not seek federal funding for a Subtitle D program because of the impact that would have on current State solid waste program financing structures. As the ASTSWMO survey demonstrates, many States already have Subtitle D CCB programs and would not incur a financial hardship. On the other hand, State Subtitle C programs, which are supposed to be funded at a level of 75 percent federal funding, would require significant new appropriations. Thus, the federal funding needs for a Subtitle D approach would be much less than a Subtitle C regulatory approach.

Any decisions to regulate the management and disposal of coal ash will likely have an implication for State regulatory programs including: the need to undertake regulatory action; authorization/approval for implementation (if necessary); budgetary impacts; and staffing/workload resource issues related to implementation (i.e., possible permitting/compliance/enforcement program impacts). The implications could have a dramatic impact on the already strained budgets of many State environmental agencies. It is hoped that USEPA's decision will include review of the work that many States have undertaken to regulate coal combustion by-products.

Summary:

The ATSWMO ad hoc CCB Workgroup, based on results of a survey of States and State comments, recommends that if it is determined that federal regulation of CCB is necessary, Subtitle D regulations would be the preferred approach. Most States already regulate CCB under Subtitle D regulations. Furthermore, a Subtitle D approach would foster the beneficial use of appropriate CCB rather than inhibit it, as would a Subtitle C or hybrid Subtitle C/D approach.

On behalf of ASTSWMO, we thank you for your diligence in ensuring that the most efficient and effective regulatory approach to CCB is proposed.

Sincerely,

Brian Tormey

Brian Tormey (IA)
Chair
ASTSWMO Solid Waste Subcommittee

Stephen Cobb (AL)
Chair
ASTSWMO Hazardous Waste Subcommittee

cc: Rick Brandes (USEPA ORCR)
Rich Kinch (USEPA ORCR)
ASTSWMO Board of Directors
ASTSMWO ad hoc CCB Workgroup
Steve Brown (ECOS)
Linda Eichmiller (ASIWPCA)

ACAA

C²P² COAL COMBUSTION PRODUCTS PARTNERSHIP

Attachment 6

March 25, 2009

Mr. Matt Hale
Director, Office of Resource Conservation and Recovery
United States Environmental Protection Agency
1200 Pennsylvania Ave NW
MC 5301P
Washington, DC 20460

Dear Mr. Hale,

The American Coal Ash Association strongly opposes any designation of coal combustion products (CCPs) as hazardous waste. We believe it would have significant and long lasting effect upon society's willingness to beneficially re-use fly ash and other CCPs by destabilizing their markets. Regulatory schemes that would designate these materials as hazardous for purposes of disposal will stigmatize them and eliminate many examples of environmentally and socially sound beneficial use. CCP disposal standards can and should be addressed without unnecessarily stigmatizing resources with high potential for safe beneficial use as a preferred alternative to disposal. We welcome dialogue with the Agency and the environmental community to ensure that future regulatory frameworks promote the safe beneficial re-use of CCPs.

We understand one strategy being discussed for improving disposal standards could involve designating CCPs as "hazardous waste" when bound for disposal, but exempting CCPs from the hazardous waste designation when used beneficially. As described in detail in the Appendix to this letter, ACAA contacted the states of Pennsylvania, Maryland, Virginia, Florida, Delaware, North Carolina, Colorado, Tennessee, Georgia, Michigan, North Dakota, Wyoming, Indiana, Illinois, and Montana. Of the responses received to date, every state indicated that beneficial use of CCPs would not be permitted under current regulations if they were to be designated hazardous, even only if for the purposes of disposal. Iowa and Wyoming both indicated they were not at all in favor of a hazardous determination because of the complications it would bring to the state regulatory agency. To remove the opportunity to conserve natural resources or reduce greenhouse gasses by designating CCPs as hazardous would be a reversal of environmentally sound policies in place for three decades. This would have a devastating effect on the beneficial use of these valuable resources.

ACAA believes that a hazardous waste designation in any setting is not supported by nearly three decades of EPA study and formal determinations marked by strong scientific integrity. In

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addition to the EPA itself, members of academia, state agencies, the Department of Energy, the Federal Highway Administration, the Department of Agriculture, the Recycled Materials Resource Center, the Electric Power Research Institute, the Utility Solid Waste Activities Group, electric utilities and many others have repeatedly evaluated the constituents found in CCPs (such as fly ash, bottom ash, boiler slag and air emission control residues). Using the criteria outlined in Subtitle C of the Resource Conservation and Recovery Act (RCRA) CCPs have been evaluated for toxicity, ignitability, corrosivity and reactivity and been found to be well below the criteria in Subtitle C that would require a hazardous classification.

CCP Utilization Progress Since the 2000 Determination

On May 22, 2000, the EPA published its Regulatory Determination on Wastes from Fossil Fuels - Final Rule in which the agency concluded that these materials "do not warrant regulation under subtitle C of RCRA and is retaining the hazardous waste exemption under RCRA section 3001(b)(3)(C)." The determination also discussed an issue raised wherein the electric utility and ash utilization industries indicated that they believed subjecting any CCPs to a subtitle C regime would place a significant stigma on these materials, the most important effect being that it would adversely impact beneficial reuse. Industry stated that the concern was that, even though beneficially reused CCPs would not be hazardous under the contemplated subtitle C approach, the link to subtitle C would nonetheless tend to discourage purchase and re-use of the materials. In the determination the EPA also stated, "We do not wish to place any unnecessary barriers on the beneficial uses of these wastes, because they conserve natural resources, reduce disposal costs and reduce the total amount of waste destined for disposal."

In 2009, that concern has not changed and is even greater. In 1999, CCPs utilization was estimated to be 30% or approximately 30 million tons annually. In 2008, that number had risen to 43% and 56 million tons annually, nearly double the tonnage reported in 1999. This is a remarkable achievement considering total tonnage of CCPs produced has grown significantly during the same period.

The "Waste" Stigma

If the EPA were to assign a hazardous waste designation for CCPs, even for the limited purpose of disposal operations, we believe it would have a devastating effect on the beneficial use of the resource. Producers, marketers and users of CCPs would be confronted with myriad new uncertainties and perceived risks associated with marketing, handling, transporting and utilizing CCPs. By impeding the beneficial use of CCPs, a hazardous waste designation would have the unintended consequences of dramatically increasing the volumes of material disposed and eliminating the significant environmental, economic, and sustainability benefits accomplished by beneficial use.

CCP disposal standards can and should be addressed without unnecessarily stigmatizing resources that have the high potential for safe beneficial use as a preferred alternative to disposal. We are not aware of any beneficial uses where properly managed CCPs were proven to have had an adverse impact on public health or the environment.

EPA and others have consistently recognized that consumers of beneficially used CCPs are highly sensitive to concerns about the materials they are using. For example:

- In the U.S. Department of Energy's 1993 Report to Congress titled "Barriers to the Increased Utilization of Coal Combustion/Desulfurization By-Products by Government and Commercial Sectors," the agency identified "restrictive regulation of fly ash as a solid waste" as an institutional barrier to CCP utilization.

- In a 1998 update to the DOE report, the Energy and Environmental Research Center reported that adoption of beneficial use guidelines by states continued to be impeded in some areas by an "overly cautious approach."

- Beginning in 2002, at beneficial use summits sponsored by the EPA and hosted by EPA regional offices, a recurring theme discussed at these summits was the barrier that was found in many states by regulating industrial byproducts, including CCPs, as "wastes" rather than products. The perception that a waste could not have the same characteristics or benefits as a virgin material were cited in many presentations given by members of industry, state agencies and end-users.

- In the International Energy Agency's January 2005 report on "Benefits and Barriers in Coal Ash Utilisation," the Agency writes that "Fly ash utilisation is hindered where it is regarded as a waste or by-product."

- In EPA's June 2008 Report to Congress on Increasing Usage of Recovered Mineral Components, end user perception of health and safety issues is clearly identified as a barrier to increasing CCP utilization.

- On October 7, 2008, EPA issued a new final rule that streamlines regulation of hazardous secondary materials to encourage beneficial recycling and help conserve resources. In explaining the rule change, EPA wrote: "By removing unnecessary regulatory controls, EPA expects to make it easier and more cost-effective to safely recycle hazardous secondary material." These actions recognize that hazardous waste designations impose requirements that create significant barriers to efficient recycling. Furthermore, the streamlining of regulations under the October 2008 final rule only pertains to recycling on-site or under tightly controlled conditions and would not be responsive to the widely dispersed beneficial use pathways that have been developed for CCPs.

- Just last week, the Iowa Department of Natural Resources wrote to EPA urging the Agency not to designate CCPS as hazardous waste, explaining that such regulation is not supported by the data, and cautioning that such action "has the potential to put an end to many beneficial uses" for coal combustion wastes in Iowa.

Historical Successes

The development of broad-based partnerships, regionally and nationally, supporting the safe beneficial use of CCPs is one of the greatest success stories of American environmental policy. Industry and environmental regulators have cooperatively and effectively focused on the common goals of reducing landfill use and building a "green supply chain" for construction materials. That green supply chain has, in turn, created enormous benefits in conserving natural resources, reducing energy usage, improving quality of finished products, and reducing greenhouse gas emissions. The increase in beneficial use of nearly 30 million tons annually since the Final Rule in May 2000 shows the measurable impact that partnerships promoting proper CCP use can have. Besides avoiding as much as 115 million tons of greenhouse gases through the use of fly ash in concrete products, approximately 402.3 million tons of CCPs have been diverted from disposal since 2000. Of this large number, a similarly large number of other materials were not extracted, processed and used since these CCPs were available and used instead.

In 2003, the EPA, in partnership with the Department of Energy, the Federal Highway Administration, the Utility Solid Waste Activities Group and the American Coal Ash Association created the Coal Combustion Products Partnership, or C^2P^2. In the last three years, the US Department of Agriculture- Agriculture Research Service, the Electric Power Research Institute and the National Ready Mix Concrete Association have joined C^2P^2. The stated purpose of this partnership is "... to help promote the beneficial use of Coal Combustion Products (CCPs) and the environmental benefits that result from their use." The C^2P^2 website identifies a number of specific environmental benefits for the partnership including: greenhouse gas and energy benefits; benefits from reducing the landfilling of CCPs; reducing the need to mine virgin materials as well as performance and economic benefits. Each of these benefits is described in detail, which argues strongly to making sure that beneficial use continues.

In 2004, EPA Region 3 in partnership with the Federal Highway Administration founded the Green Highways Initiative (now known as the Green Highways Partnership (GHP). This effort, which is focused in the Mid-Atlantic region of the United States, emphasizes the need for watershed-driven storm water management, conservation and ecosystem management, and recycling and re-use of industrial byproducts. In the four plus years of its efforts, the GHP has formed alliances with organizations such as the AASHTO Center for Environmental Excellence, the Maryland State Highway Administration, the Industrial Resources Council, the National Ready Mix Concrete Association, the American Concrete Pavement Association, state departments of environment or natural resources, contractors and academia. The common goal of all partners is a more sustainable method of designing, building operating and maintaining our nation's transportation systems. Incorporating CCPs, and other industrial materials, is but one part of this strategy.

Any proposals to regulate disposal of CCPs as "hazardous waste" threaten to undo this progress. This letter will illustrate that nearly 30 years of technical study with high scientific integrity has concluded that there is no basis for a hazardous waste designation for CCPs – for disposal or beneficial use. Similarly, going back to 1980, years of federal regulatory determinations have also concluded that a hazardous waste designation is unwarranted. And most importantly, a hazardous determination would undo and nearly completely stop beneficial uses for all CCPs.

America Needs to Use CCPs Today Even More

In his Order on Scientific Integrity dated March 9, 2009, the President of the United States indicated that "Science and the scientific process must inform and guide decisions of my Administration..." As stated in the paragraphs above, extensive scientific study under the direction of Administrations of both Democrats and Republicans has concluded that beneficial use of CCPs is safe for public health and the environment. Furthermore, there is no scientific evidence to support a hazardous waste designation for CCPs in any setting – beneficial use or disposal.

EPA is well aware of federal efforts that recognize and support a green supply chain that, for example, promotes fly ash re-use as a partial replacement for portland cement. Wherever concrete is used, fly ash should be used to improve the concrete product making it not only green and less costly but also more durable and less permeable. Executive Order 13423, "Strengthening Federal Environmental, Energy, and Transportation Management" requires federal agencies to purchase green products and services, including recycled content products. Federal Comprehensive Procurement Guidelines (CPGs) and Environmentally Preferable Purchasing (EPP) encourage and assist federal agencies in purchasing environmentally preferable products and services. The Ronald Reagan Building is cited as a case study in which used fly ash was used in concrete for the construction of this facility. Federal concrete projects used an estimated 5.3 million metric tons of coal fly ash in 2004 and 2005 combined. The increases in beneficial use have occurred despite the ongoing resistance by project owners to implement CPG and EPP guidelines. If such use was required as part of a broader national strategy, then beneficial use of CCPs could growth even more rapidly.

These examples of federal purchasing guidelines are helping set a model for a new "green supply chain." Architects, builders and project owners follow not only federal leadership they also adhere to construction recommendations like Leadership in Energy and Environmental Design (LEED) and the Green Globes Initiatives to promote more sustainable construction. The passage of the recent stimulus package and funding for infrastructure construction demand implementation of practices that address lifecycle costs and long term durability attributes that CCPs can provide in many applications. Besides reducing the need for landfill space and conserving other natural materials, CCPs can offset carbon dioxide emissions and are generally less expensive that competing materials.

In 2005, the American Coal Council performed an economic assessment of the impact that the CCP industry has on the nation's economy. At that time, it was estimated that the combined direct and indirect economic benefits that CCPs provided was approximately $4.5 billion. That number has grown substantially since 2005 since production and utilization has increased nearly 10% and green building has expanded even more since the study was completed. This incorporation of CCPs into the "green supply chain" has created jobs and has been used in countless sustainable projects that illustrate the long term benefits of products containing CCPs as well as reducing green house gasses and providing locally available materials to many sites. Reducing the amount of waste generated in this nation, while reducing the costs of projects and conserving other materials for higher values of use are essential elements of a more sustainable America.

In a recent report by the Freedonia Group on March 17, 2009, it was reported that recycled-content (e.g., fly ash, blast furnace slag) concrete sales reached $9.5 billion in 2008, representing 15 percent of green building materials demand. That capped a climb from $6.4 billion in 2003, equivalent to an 8.3 percent annual growth rate. Demand for recycled content concrete is forecast to grow 8.4 percent per year to $14.3 billion in 2013, accounting for an increasing share of total concrete used. This growth of fly ash in concrete products would be severely limited, if not eliminated, by a hazardous classification.

<u>Some Consequences of a Hazardous Label for CCPs</u>

Any effort to regulate disposal of CCPS as hazardous waste would have catastrophic effects on the ability to maintain, much less increase, the beneficial use of the materials. New barriers to beneficial use would be erected because:

- State regulator resistance to beneficial use of materials otherwise designated hazardous
- Heightened consumer resistance to beneficial use of materials with a hazardous waste stigma
- Operational complications created for CCP producers, marketers and consumers

We have included in the Appendix to this letter specific examples of the impact we have already seen upon beneficial use as a result of news media accounts that have inaccurately labeled CCPS as "toxic" or "hazardous." We have also contacted a number of producers, marketers, end-users and state agencies that have offered opinions to us as to what they think a hazardous determination (even if just for disposal) would have on future beneficial use. These statements are also included in the Appendix as are a number of pieces of correspondence, mainly in the form of emails that ACAA has received concerning this issue.

ACAA is are aware of no regulatory precedent for a material that is regulated in one setting as a hazardous waste for disposal while being allowed in substantially the same form in other settings as a widely available construction material. Rules drafted, but never adopted, for cement kiln dust may be cited as a potential example. However, the beneficial use pathways for cement kiln dust (CKD) differ substantially from the pathways used by CCPs. In the case of CKD, the regulations anticipated that the material would never leave the possession of the cement manufacturers that created it. Therefore, higher standards for disposal could possibly be assumed to create incentives for the cement manufacturers to reuse CKD in their own operations. In the case of CCPs, the reuse pathways are mostly external to the producer. There are no precedents for industries avoiding handling materials as hazardous waste on their own properties by dispersing the materials to hundreds or thousands of properties owned by others.

The European Union also has addressed the issue of beneficial use of CCPs as part of its development of a Waste Framework Directive. The barrier to beneficial use created by a "waste" classification was clearly discussed in a 2005 paper by the United Kingdom Ash Quality Association that concluded: "In fact, the directive is in danger of having the opposite effect – to reduce the existing use of byproducts and suppress the development of new means of and recycling."

A significant consequence of a hazardous waste designation would be that the United States would have millions more tons of hazardous waste to dispose of every year as resources would no longer be desirable for beneficial use. In addition to increasing the need for additional highly engineered hazardous waste landfills, the loss of beneficial use applications would eliminate economic benefits of reuse, further exhaust natural mineral resources, and significantly curtail environmental practices that today reduce the United States greenhouse gas emissions footprint by approximately 15 million tons per year. There are currently only 21 hazardous waste facilities permitted in the United States, many of which are located nowhere near electric generating stations or industrial boilers. ACAA is assuming that any rulemaking for CCPs would affect other production units such as industrial and commercial boilers that produce essentially the same type of CCPs in their generating, process heat or manufacturing operations.

There are no commercial hazardous waste disposal sites in Montana, North Dakota, Minnesota, Wisconsin, Iowa, Missouri, Kentucky, Tennessee, North Carolina or 23 other states. Each site is limited by permit to specific daily tonnages and total acres of space to receive hazardous materials. The construction of new sites would be costly, if even possible, given widespread public opposition to hazardous waste disposal in most communities.

<u>State Regulatory Implications of a Federal Hazardous Designation</u>

Beneficial use of CCPs depends on acceptance by state environmental regulators, usually in the form of Beneficial Use Determinations. A federal designation of CCPs as hazardous waste would disqualify CCPs from consideration for beneficial use in every state jurisdiction surveyed by the American Coal Ash Association so far.

In states where beneficial use of CCPs is permitted by regulations or even exempted, ACAA is of the opinion that a hazardous determination for CCPs in disposal would curtail use in these same states. During the week of March 9, ACAA contacted the states of Pennsylvania, Maryland, Virginia, Florida, Delaware, North Carolina, Colorado, Tennessee, Georgia, Michigan, North Dakota, Wyoming and Montana. Of the responses received to date, every state indicated that the beneficial use of CCPs would not be permitted under current state regulations if they were to be designated hazardous, even only if for the purposes of disposal. The Appendix to this letter cites statements made by these state agencies.

Resistance by Producers, Marketers and End-Users

Likewise, ACAA polled many of its member producers and marketing firms. Their responses were the same as the states. A hazardous determination would eliminate beneficial use. Their statements, emails or letters are also cited in the appendix to this letter.

In informal conversation, ACAA also discussed this issue with some firms or organizations that did not want to place their comments in writing, since the idea of a hazardous designation was simply speculation at this point in time. However, some of their statements are illustrative of our concern.

A large wallboard manufacturer stated, for example, were FGD gypsum to be designated hazardous for the purposes of disposal that would eliminate that firm's use of FGD gypsum entirely. Their logic is the designation of hazardous for any ingredient in wallboard production would make the wallboard likewise hazardous and they will not produce a product that could be perceived as hazardous, even if testing were to demonstrate it is not. The liability issues around such a convoluted arrangement would be far too great to chance on continuing under such a scenario.

At the American Concrete Institute's Board Advisory Committee on Sustainable Development meeting held in San Antonio on March 15, 2009, this question was posed to the members: "If CCPs were to be designated as hazardous by the EPA, what would be ACI members' reactions?" The responses were almost unanimous. Any such designation would virtually eliminate the use of fly ash in concrete, despite the fact that fly ash is bound in the matrix. The perception that portland cement concrete contained "hazardous" constituents would stop ready mix producers, specifiers, concrete products manufacturers and others from incorporating fly ash in their various concrete applications. One member stated it would be a dangerous precedent since some of the characteristics of fly ash (pH, chemical composition, etc.) are similar to the same characteristics of portland cement. Another person stated that since supplementary cementitious materials, such as fly ash, are an important part of the sustainable nature of concrete, removing fly ash from concrete products would set back efforts to reduce the cement industry carbon footprint (elimination as raw feed for clinker, elimination of FGD gypsum in the finishing process, no more blending of fly ash and portland cement at the kiln, no more blending of fly ash and cement at the ready mix producers facilities, etc.)

Similarly, at the ACI Committee 232.2 (Fly Ash in Concrete) meeting on March 16, 2009 the same question was posed to those members. Similarly, members were assertive in their reply that any designation of hazardousness to fly ash would eliminate that use of fly ash in almost all concrete applications. The perception of risk to those not familiar with the properties and characteristics of concrete would necessitate countless efforts to re-educate end-users about the actual risk. Already producers of concrete products are being questioned about fly ash safety based on widely distributed media coverage of the Kingston event. Committee members also described questions they are receiving about the anticipated impact of mercury capture on fly ash use. There is a fear that using any fly ash involved in mercury capture processes will expose workers to health risks associated with mercury. There have been questions about off-gassing of mercury for fresh and hardened concrete, as well as concerns about the leaching of mercury for de-constructed concrete. These examples about mercury are indicative of the far greater reaction the industry would see were fly ash to be considered hazardous for any situation.

Operational Impacts of a Hazardous Waste Designation

Discussions of a hazardous waste designation for CCPs often focus on the "truck scenario": If a truck leaving a power plant turns left to go to a disposal site, the material is hazardous; if it turns right to go to a beneficial use application it is not. This scenario is not that simplistic and does not reflect reality, wherein a hazardous designation creates costs, risks, and requirements at numerous stages of the product life cycle. For instance:

- Insurance and Indemnity - Insurance costs and requirements for hazardous wastes are higher and more complex than for non-hazardous industrial byproducts. Furthermore, indemnification issues between producers, marketers and consumers of CCPs would complicate the ability to accomplish beneficial use.

- Retroactive liability – to classify CCPs as hazardous would raise questions about all the previous projects where CCPs were used in small or large scale projects. Would land reclamation activities, soil stabilization projects, pavements, wallboard products, grouts and numerous other applications now require removal and disposal to make that project safe? The average citizen as well as public officials would no longer accept materials now considered hazardous to be used in commercial applications, not to mention the fears that would be raised about past uses. Class action lawsuits against producers, marketers, contractors, and end-users would be overwhelming, as demonstrated by the "Chinese wallboard" and "sulfate" issues discussed below under Market Reaction Examples.

- Regulatory Oversight - What oversight would the Occupational Safety and Health Administration and other worker safety organizations provide in overseeing worker exposure to CCPs? Would increased protective gear be required, or unnecessarily perceived to be needed, for workers handling CCPs at various levels of the product distribution chain? What other worker training would be required? Issues related to hexavalent chromium in portland cement have been seen to generate widespread concern among workers, despite health risk information demonstrating this is not a serious concern in most typical situations.

- Transportation - Would trucks and railcars transporting CCPs be required to carry hazardous waste placarding, lading paperwork and perform related transportation agency licensing and notifications? What clean-up standards would be enforced in the event of spills? Will all drivers now be required to obtain additional licenses to haul hazardous wastes, when going to a landfill or to a utilization location? Would transport vehicles (truck, rail and/or barge) have to be cleaned between the shipments of different commodities? How would clean-up residues be handled?

- Facility Handling – Would coal-fueled power plants be required to implement new operational procedures now that they are producing materials that could be treated as hazardous wastes? Would operational activities need oversight similar to those found at a nuclear power plant since the plant now produces and handles "hazardous" substances? Would CCPs be regulated differently at a concrete batch plant or other manufacturing facility? In the event of spills, would CCPs face stricter clean-up requirements than for other products with similar chemical constituents, such as cement? Could incidental spill clean-up wastes be sent to local MSW landfills or would they be required to go to hazardous waste landfills?

- Secondary Waste - What would be the regulatory status of products containing CCPs that need to be disposed? For instance, a small amount of concrete is almost always disposed after completing a job. If that concrete contains coal fly ash, would its disposal be governed by hazardous waste regulations? Furthermore, when structures containing CCPs are demolished, would their disposal be governed by hazardous waste regulations? What about sample shipping and testing laboratory requirements? Would labs need to be certified for hazardous waste handling? How would disposal of samples after testing be handled?

- Secondary Product Types - If CCPs are combined with other materials prior to marketing as a product, will those materials be affected by the regulatory status? For instance, will the production of blended cements be discouraged because inclusion of the CCPs may result in higher insurance and regulatory exposure?

- In-place Worker Exposure - Would enhanced worker protection be required if products containing CCPs were modified during their useful life? For instance, what would be the impact on concrete cutting and coring operations?

Effects of Operational Impacts on CCP Producers

The combined effects of the operational impacts of a hazardous waste designation would discourage producers of CCPs from seeking beneficial uses. CCP producers would have little or no incentive to widely distribute a material that is already designated hazardous in one setting and may later be determined hazardous in other settings. To do so would expose producers to risks of widely dispersed clean-up operations and potential individual and class action litigation.

One of the reasons for a significant increase in CCP beneficial use rates since EPA's 2000 Final Regulatory Determination has been the reliance of CCP producers on EPA's decision. The Final Regulatory Determination was issued after a vigorous public discussion that gave industry confidence that matters pertaining to a hazardous waste designation were settled and that they could move forward on beneficial use implementation with little fear of retroactive liability. Many CCP producers began increasing capital investments in facilities needed to direct CCPs to beneficial use rather than disposal. Wisconsin is often cited as a model state for beneficial use of CCPs. Clearly defined state regulations encouraging beneficial use have supported the development of a robust market for CCPs in a manner protective of the public health and environment. Similar policies in states like Pennsylvania and Texas have shown that encouraging beneficial use is a powerful incentive to producers and marketers of CCPs.

If EPA now reverses its Final Determination with respect to CCP disposal, CCP producers will likely have little confidence in their ability to rely on any assurances by the Agency that beneficial use applications will remain classified as non-hazardous. Risk of retroactive liability will return as a significant decision-making factor when evaluating resources devoted to promoting beneficial use.

Effects of Operational Impacts on CCP Marketers

The increased costs associated with transporting, handling, permitting, recordkeeping, and indemnifying materials that may be deemed hazardous would negatively alter the economics of marketing CCPs. Even more difficult would be overcoming the stigma associated with selling a product that is considered hazardous in other settings (See Market Reaction Examples below)

Effects of Operational Impacts on CCP Consumers

Consumer attitudes toward CCPs would be negatively affected on two levels. Manufacturing consumers – such as ready mixed concrete producers – would be less likely to use a product that carries the risk of increased regulatory scrutiny or worker exposure issues (as stated by the wallboard manufacturer and members of ACI committees discussed above). End use consumers that already require extensive education on the health and environmental safety of CCP beneficial use would likely abandon consideration of the products entirely. Brief discussions with several LEED accredited professionals have speculated that architects would no longer request fly ash in concrete because of perceived risks.

Three Market Reaction Examples

The effort to increase beneficial use of CCPs is already negatively affected by misinformation about health and safety issues and by popular news media stories that mischaracterize CCPs as "toxic" or "hazardous." An official designation of CCPs as hazardous in any setting will only exacerbate the issue. A regulatory double standard would discourage CCP producers from distributing materials into a marketplace that could be rife for speculative litigation. Although it is difficult to determine the exact marketplace reactions, we offer three examples of situations wherein the tainting of CCPs with a label of "toxic" or with some widely held perception has had a negative impact on the industry.

California CHPS

The California Collaborative for High Performance Schools (CHPS) has established a green rating system, similar to LEED that provides guidance to CHPS members that want to increase their use of recycled content materials in their sustainable construction practices. Section ME4.1, "Recycled Content," contains the following text:

> "For California school projects, credit is not offered under this credit for concrete containing fly ash with a concentration of mercury more than 11 ppb (0.011 mg/L) as determined by a Waste Extraction Test (WET) used by the Department of Toxic Substance and Control (DTSC) found in California Hazardous Waste Code Title 22, Chapter 11, Appendix II WET procedures. For non-California school projects mercury concentration should not be more than 5.5 ppb (0.0055 mg/L) as determined by a Toxicity Characteristic Leaching Procedure (TCLP) following EPA 7470A."

In this example, CHPS has singled out a perceived negative characteristic of fly ash and imposed a unique condition that is not applied to any other construction material. For example, other materials that might contain mercury, such as granite, stone, aggregates, portland cement, ceramics, etc. are not included in this precaution. Common items, such as lighting fixtures, contain higher amounts of mercury that could conceivably be released in a school, but they are not included in similar warnings. The CHPS motivation is to discourage use of fly ash from coal fueled power plants, rather than a genuine concern in protecting human health. Testing data from EPRI, Ohio State University, the University of Nevada-Reno and other sources was provided to CHPS to help them understand the actual risk (almost non-existent) to building occupants from mercury that might be found in the concrete matrix. Industry arguments were to no avail. This stigmatizing of fly ash is a modest example of the complications that would arise from a hazardous designation. The CHPS note in this section is being replicated in other similar CHPS programs and as recently as March 2009, was found in the draft Colorado CHPS guide.

Florida Wallboard

In Ft. Myers, Florida a class-action complaint was filed on January 30, 2009 in U.S. District Court charging wallboard made by the Knauf Company was "inherently defective" and claims this Knauf drywall is made from fly ash, compounds of which combine with moisture to form sulfuric acid that can corrode copper tubing and electrical wiring. About 10 million sq ft of Knauf-made drywall was used in the state between 2004 and 2006, according to the complaint. ACAA has discussed this lawsuit with the Gypsum Association which has been following the issue closely. Both Associations understand that the Chinese drywall was made from gypsum ore (not FGD gypsum) and DOES NOT contain fly ash. Furthermore, no wallboard produced in North American is made using fly ash. There is speculation that the attorneys for the lawsuit have deliberately included fly ash in the complaint because it tends to portray negative connotations, given the incident in Tennessee in December. Despite attempts to persuade attorneys to remove "fly ash" as part of the argument (since it is not present in that wallboard), they have refused. Media coverage about fly ash in the US has used inflammatory words such as "toxic sludge" or "hazardous waste" which furthers the goals of the class action claimants, despite the fact that no fly ash is contained in the Chinese wallboard or any other wallboard used in the US. These types of misperceptions about wallboard have spread to other parts of the country as reported by ACAA members.

California Sulfate Attack

In California beginning in the mid-1990s, there were numerous lawsuits based on allegations of sulfate attacks on concrete foundations. Several law firms were successful in winning suits wherein homeowners were supposedly experiencing defects in their concrete foundations due to damage resulting from sulfate chemicals in soils that were in contact with concrete. Arguments were successfully made that suppliers used excessive water when mixing the concrete and that the wrong types of cement was used. However, in 2006 a California judge ruled that the plaintiffs seeking more than $5 million in damages in that particular case had failed to demonstrate that the defendant concrete suppliers had actually supplied defective concrete. Since the beginning of the lawsuits in the 1990s, nearly $1 billion in settlements had taken place. The judge also rejected the decisions of previous lawsuits allowing the defendants to recover the expenses their incurred for expert witnesses. At the heart of the lawsuits was the question, whether or not the foundations had actually been damaged or weakened by sulfates in the soil and if so, had this endangered the structures themselves. The judge concluded that there was insufficient evidence to prove the concrete supplied by the defendants was improperly proportioned or contained a type of cement unsuitable for the service. The judge further noted that when a method of presenting evidence is "veiled in the clothing of objective science" it may be difficult for juries to evaluate complex data. Furthermore he said that when controls are lacking linked to general scientific acceptance, juries may be inappropriately swayed by expert opinion based upon junk science, potentially leading to unsupported conclusions.

Conclusions

We believe the three examples cited above of market reactions to alleged risks related to mercury in fly ash, fly ash in wallboard and sulfate attack indicate the grave risk to beneficial use were CCPs to be classified as hazardous in some manner. To overturn nearly thirty years of scientific evaluations, assessments, investigations and evidence to the contrary would set back decades of beneficial use. CCP disposal standards can and should be addressed without unnecessarily stigmatizing resources with high potential for safe beneficial use as a preferred alternative to disposal. Improved methods of disposal, appropriate regulatory oversight and characterization of CCPs with their intended application will allow beneficial use to be safely conducted in the future. Encouraging beneficial use, which commensurately reduces the need for landfill is a far better method of regulatory action. The numerous examples of incentives and support from government agencies that could increase beneficial uses described in the June 2008 Report to Congress offer positive incentives that would increase CCP utilization. To remove the opportunity to conserve natural resources or reduce greenhouse gases by designating CCPs as hazardous would be a reversal of environmentally sound policies in place for three decades.

Any decision the EPA makes about a hazardous designation has international implications as well. The C^2P^2 program and the Green Highways Partnerships have been recognized by international CCP managers as leading the way toward sustainable construction. The strong encouragement by the EPA has been cited by members of ECOBA (European Coal Byproducts Association), CIRCA (Canadian Industries Recycling Coal Ash) and others as outstanding examples of governmental support that should be replicated across the globe. In many ways, the United States is viewed as a leader in responsible CCP management by virtue of the numerous state and federal guidance documents promoting beneficial use.

We have attempted to portray some of the consequences and the implications we believe that a hazardous determination would have upon CCPs and the nation. The extraordinary costs associated with such a decision are difficult to quantify, but they would be measured in billions of dollars and in job losses of tens of thousands. Sustainable practices would be affected across the nation and natural resources of this nation depleted even more rapidly than seen now.

We thank you for your time and consideration of this information. We are available at your convenience to discuss any information contained within.

Sincerely,

Thomas H. Adams

Thomas H. Adams
Executive Director

Copies:

M. Vickers
R. Dellinger
P. Grevatt
R. Kinch
T. Degeare
J. Sager

Appendix to ACAA Letter to Matt Hale dated March 25, 2009

This appendix contains a number of statements from organizations and individuals that ACAA contacted during March. These individuals or organizations were asked to provide ACAA information about what they thought a determination of "hazardous" for CCPs, even if just for purposes of disposal, would have on beneficial use. Please note these statements are personal opinions of the entities indicated.
Also included are examples of communications received unsolicited from CCP users concerned about characterizations of fly ash in media accounts of the Kingston incident.

From State Regulators

From the Commonwealth of Pennsylvania

Dave,

I wanted to run your question by folks in our Bureau of Waste Management before responding.

(1) If something is declared hazardous waste, even if the laws permitted its beneficial use, it would not be beneficially used simply because of public opposition. We get opposition for things that are not hazardous. I don't know how we could defend the beneficial use of something that was declared hazardous.

(2) Here's a comment I received from our Waste program:

"If coal ash was listed as hazardous waste and the general, current hazardous waste regulatory scheme remained as it is, it would be difficult to continue beneficial uses, especially where the use involves placement on the land. There are certain beneficial-use-like exclusions in the current hazardous waste regulations (i.e. using hazardous waste as an effective substitute for commercial products, etc.), however, none of those exclusions allow placement on the land or incorporation into products that are placed on the land unless many other hoops are gone through (like demonstrating that the hazardous constituents have undergone a chemical reaction so as to become inseparable by physical means, and meeting the land disposal restriction standards)."

(3) Here's another comment from our folks in the Waste program concerning what EPA would have to go thru to list ash as hazardous:

EPA would, in (his) opinion, have a long, uphill battle since their own listing regulation at 40 CFR Part 261, Subpart D states that "*the Administrator will indicate his basis for listing the classes or types of wastes listed in this subpart by employing one or more of the following Hazard Codes:*

Ignitable Waste .... (I)
Corrosive Waste .... (C)
Reactive Waste .... (R)
Toxicity Characteristic Waste ... (E)
Acute Hazardous Waste .... (H)
Toxic Waste .... (T)
Appendix VII identifies the constituent which caused the Administrator to list the waste as a Toxicity Characteristic Waste (E) or Toxic Waste (T) in §§ 261.31 and 261.32."
There are no "codes" to cover the hazard associated with damming up a billion gallons in an inadequate structure. I guess we will see what they are thinking as far as attempting to apply the hazardous waste regulations.
(4) The ash that we beneficially use in PA in no way comes even close to exceeding the limits for the 8 RCRA metals. Below is a comparison of the RCRA leaching limits & our own requirements for beneficial use.

	RCRA mg/L (TCLP)	PA Beneficial Use mg/L (SPLP)
Ag	5.0	2.5
As	5.0	0.25
Ba	100.0	50
Cd	1.0	0.125
Cr	5.0	2.5
Pb	5.0	0.375
Se	1.0	1.0

If EPA were to declare all ash as hazardous I'm curious as to what their basis would be. Despite claims to the contrary, we have not seen pollution from beneficially used ash. Last year PA used over 11 million tons of ash in the mining program. With the amount that's been used for mine reclamation in PA, if it were going to pollute we should be seeing pollution. We aren't.

From the State of Maryland

Dave-

My answer is speculative, as your question notes. My opinion is that any designation of a waste as hazardous would definitely stigmatize the ability to reuse or recycle the material to the maximum extent practicable. My sense is that if there were a federal designation as hazardous, any reuse/recycling would have to be done within the confines/construct of Subtitle C requirements. If EPA were to make such a designation, my personal opinion is that it would be incumbent on the Agency to provide additional criteria/guidance on how the materials can or should be beneficially used within Subtitle C. Since Subtitle C is a delegated program, my sense is States are going to have their hands tied somewhat within the constraints dictated by EPA. I am not aware of a circumstance where a waste is designated as hazardous if disposed but non hazardous if beneficially used. Am not saying it does not occur, but that I don't know of any instance where it is occurring.

Be aware my response is purely my opinion and has not been vetted with legal counsel or technical staff.

From the State of Michigan:

Michigan currently regulates coal ash as a solid waste under Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). Michigan's program for Solid Waste Management has been in place since 1978. These regulations were amended in 1993 when Michigan became an approved state under the Resource Conservation and Recovery Act (RCRA) Subtitle D program. Based on the analytical information that we have seen on coal ash, we believe that the levels of contaminants contained in coal ash are similar in nature to those found in cement kiln dust, wood ash, foundry sands, paper mill wastes, or steel mill waste. With the promulgation of the 1993 rules, we consider all these waste to be low-hazard industrial waste (i.e. they leach less than ten percent of the hazardous waste limits when using the appropriate leaching tests.) Low-hazard industrial waste in Michigan may be disposed of in a landfill that has less-stringent design standards than a landfill taking either industrial or municipal solid waste, or it may be disposed of in a permitted surface impoundment.

Michigan currently has eight sites that accept only coal ash and/or associated wastes from coal-fired power plants. Four of the facilities are surface impoundments, and four are solid waste landfills. Coal ash is also disposed of in combination with other wastes in numerous low-hazard industrial waste landfills, industrial landfills, and municipal solid waste landfills located throughout the state.

The four active surface impoundments were all in existence prior to the enactment of Michigan's Solid Waste Management Act in 1978, and were "grandfathered in" without necessarily meeting the current requirements for the design and siting of such facilities. Three of the four surface impoundments are in the process of closing and/or converting to dry handling systems.

The statutory provisions of Part 115, of the NREPA also exempt coal ash from regulation as a solid waste under certain conditions when the ash is used as:

- a component of concrete, grout, mortar, or casting molds;
- a raw material in asphalt for road construction;

- aggregate or road or building material that will be stabilized or bonded by cement, limes or asphalt; or
- a road base or construction fill that is covered with asphalt, concrete, or other material approved by the state.

RCRA Subtitle C wastes in Michigan are currently regulated under Part 111, Hazardous Waste Management, of the NREPA. The regulation of coal ash under full RCRA Subtitle C would end the current beneficial uses of coal ash. Existing surface impoundments and landfills would be subject to more stringent design standards and would require either retrofitting of existing landfills (if even possible) or closure of those disposal facilities. Neither of these options could be implemented immediately.

Michigan currently has regulations in place governing the reuse and disposal of coal ash that are protective of public health and the environment. If coal ash were determined to be subject to regulation under Subtitle C, it would necessitate considerable changes to Michigan solid and hazardous waste regulations. Such changes would likely be subject to considerable opposition from any industry and/or municipality that generates coal ash waste and would likely lead to increased costs for energy generation and for businesses or industries utilizing the material.

From the State of Florida:

Dave,

If EPA decided to declare coal ash a hazardous waste, I suspect the beneficial use of coal ash would stop in Florida unless EPA also created some special exemptions. For example, I imagine cement plants that take coal fly ash may have to be permitted as hazardous waste treatment facilities and this would likely be difficult even if the cement plants wanted to do it. I also think it is unlikely we would allow folks to build roads with a hazardous waste. So we would be left with some sort of disposal. But last time I checked Florida does not allow hazardous waste disposal facilities, so that would mean generators would either have to ship the ash out of state or do some sort of on-site treatment to render it non-hazardous. I guess whether or not it could be treated to be non-hazardous would depend on the reason EPA gives for calling it a hazardous waste in the first place. And what about the existing on-site ash disposal areas around the state? Would these now become hazardous waste disposal facilities needing cleanup or HW permits?

I think we all agree that the TVA coal ash spill in Tennessee is a terrible mess. EPA needs to determine if we have other slurry impoundments like this that may fail in the country and work on preventing that, of course. Maybe they should provide more materials and training on how to do good inspections for these facilities. Also, can the power plants that have slurry impoundments just convert from a wet to a dry process? Encouraging changes in the power generation process may be a better solution than trying to define coal ash as a hazardous waste. But maybe I just don't know the details well enough.

I will copy others who know more about the HW world than I do who may want to comment also.

From the State of Virginia:

Hi, Dave,

xxxxx has asked that I respond to you in regards to the use of CCPs. If EPA were indeed to reverse their prior position and decided to regulate CCPs as a hazardous waste under the RCRA Subtitle C authorities, it is very likely that Virginia would no longer allow these materials to be beneficial reused under our Coal Combustion By-Products Regulations (9 VAC 20-85) and there would also be no beneficial reuse allowances our Virginia Solid Waste Management Regulations (9 VAC 20-80), as well. And there is no speculation on what/if any effect the 2008 DSW ruling would have on some reuse potential if CCPs were declared hazardous waste (by the way, Virginia has yet to decide on seeking authorization for that rule).

From the State of Iowa:

Listing coal combustion byproducts as a hazardous waste would eliminate beneficial use in Iowa per Iowa Administrative Code (IAC) 567-Chapter 108. Iowa's beneficial use regulations pertain to "solid by-products," which expressly exclude hazardous wastes. Thus, if coal combustion byproducts were regulated as a hazardous waste, they could not be beneficially used in Iowa and an entire beneficial use market would be eliminated. In addition, Iowa has no hazardous waste landfills, which means all the coal combustion byproducts that were being beneficially used would have to be exported (easily over one million tons per year) to a hazardous waste landfill in Peoria, Illinois. If this facility was not available, Iowa utilities would have to seek a disposal in a hazardous waste landfill more than one state away (i.e. Colorado, Oklahoma, Indiana are the next closest.

From the State of Indiana:

Regulating coal combustion byproducts as hazardous waste would effectively end beneficial use in Indiana. Iowa State statute (IC 13-19-3-3) exempts nine uses from regulation as a solid waste. The statute directs that the coal combustion byproducts are "(A) not included in the definition of hazardous waste or is exempt from regulation as a hazardous waste under 42 USC 6921". EPA's designation of coal ash a hazardous waste would effectively remove this material from the beneficial use portion of the Indiana statute.

From CCP Producers

From AES ILP Indianapolis, IN :

There probably would be no further beneficial use in Indiana. We have a statute (IC 13-19-3-3) that exempts nine uses from regulation as a solid waste. The statute requires that the CCP "(A) is not included in the definition of hazardous waste or is exempt from regulation as a hazardous waste under 42 USC 6921". I suppose EPA could make disposal a hazardous waste, but also exempt use under 6921, but discussions I have had with marketers, even that legal fix would probably not allay the "stigma" fear. I am pretty sure it would prevent IPL's use/disposal at coal mines, which is very important to us, especially if they phase out ponds for disposal. I haven't research this, but I think there are ASTM issues that would arise with use as a raw material to make cement as cement replacement in concrete under C-618. These are our two major ash uses. An even bigger problem for us would be use of FGD gypsum as raw material in manufacture of wall board. We believe we can sell/use all of our approximately 600K tpy gyp (and maybe more). If we have to put this in a landfill, it would be not only an economic disaster (not only for us but the board manufacturers who would have to go back to mining more rock gyp), but also in my view an indefensible environmental travesty to dispose something that is useful, especially when coming from an environmental agency who changed name OSW to Resource Conservation and Recovery.

From ARRIPA, Harrisburg, PA:

"If EPA or PADEP classifies CFB coal ash as hazardous waste; the <u>tax free</u> conversion of PA's second largest environmental problem (AML-AMD) <u>into alternative energy</u>, as well as its correlating labor force and economies that have been providing such benefits for several decades, <u>will likely disappear."</u>

From We Energies, Milwaukee, WI:

Mr. Thomas H. Adams, Executive Director
American Coal Ash Association
15200 E. Girard Avenue, Suite 3050
Aurora, CO 80014

The purpose of this letter is to express our serious concern regarding the potential impacts to our successful coal combustion products utilization program at We Energies if coal combustion products were to be labeled a "hazardous" substance. The valuable mineral resources contained in coal combustion products need to be matched nationally to environmentally sustainable practices rather than destined for disposal. A hazardous label will be extremely harmful to these efforts. Product information is already recorded on Material Safety Data Sheets for users. Our industry also already provides required information under the federal Toxics Release Inventory (TRI) reporting requirements. The addition of a "hazardous" label will likely have the effect of creating an unwarranted concern for potential users. The net effect will be an increase in the amount of these mineral resources wasted and disposed, and at the same time create an increase in the mining of essentially the same "natural" minerals with associated environmental production impacts.

We Energies has worked diligently to develop, and patent several beneficial uses for virtually all of our fly ash, bottom ash and flue gas desulfurization gypsum in recent years. In fact we have gone so far as to recover previously disposed materials from landfills at times to meet customer demand for these commodity resources. Our fly ash is primarily utilized as a cementitious material in the production of concrete, and controlled low strength materials for the construction industry. Smaller amounts are also used for soil stabilization, full depth (in-situ) recycling of asphalt pavements, raw feed material for cement manufacturing, and for mine subsidence prevention. Our bottom ash materials are used primarily as an alternative to mined aggregates for use as bases for concrete/asphalt pavements and foundations. Some bottom ash is also used as raw feed material for cement manufacturing. Our flue gas desulfurization (FGD) gypsum has essentially all been used from the first day of production in wallboard manufacturing, and more recently also in agriculture. All of these uses essentially replace mined materials of the <u>same</u> composition, or manufactured materials with their own environmental impacts.

- The preservation of natural mined gypsum, sand, stone, and cement raw feed materials (clay, shale and limestone) for use by future generations, and elimination of the environmental impacts associated with additional mining operations.

- The complete use of residual energy in higher carbon coal ashes for cement production, or concrete quality fly ash production preserves mined coal for future use.

- The significant energy and fuel used in the kiln production of cement and lime can be conserved and offset by fly ash use in concrete and other products.

- The various emissions associated with cement and lime production (including approximately one ton of CO_2 emitted for each ton produced) can be offset with each ton of fly ash utilized.

The following are patents held by We Energies for CCP Activities:

Carbon dioxide sequestration in foamed controlled low-strength materials (7,390,444)

Mercury removal from activated carbon and/or fly ash (7,217,401)

Ammonia removal from fly ash (6,945,179)

Electrically conductive concrete and controlled low-strength materials having carbon fibers (6,821,336)

Ammonia removal from fly ash (6,755,901)

Coal combustion products recovery process (6,637,354)

Electrically conductive concrete and controlled low-strength materials (6,461,424)

Re-burning of coal ash (5,992,336)

In conclusion, we acknowledge the need for improved safety and inspection of disposal facilities where warranted in light of the failure at TVA and other locations. However, a "hazardous" label on coal combustion products will be counter-productive as it is likely to discourage the safe, beneficial use of these materials, create more disposal, increase demands on limited disposal facilities, dedicate more land to disposal with associated impacts, increase mineral resource mining, and at the same time severely damage the numerous existing proven beneficial uses to society of these valuable mineral resources.

From Ameren Energy, St. Louis, MO:

Tom,

Over the years, Ameren has been very proactive in pursuing and developing beneficial use opportunities for our ash materials. Our ash is currently used in many beneficial use applications ranging from engineered structural fill, cement replacement in concrete, cement kiln feedstock, concrete and asphalt filler, flowable fill applications, soil drying and amendment, mine reclamation applications, grit blasting, and roofing shingles. All these applications have been engaged by Ameren and our ash customers based on the principle that ash is non-toxic, non-hazardous, and a less expensive alternative to other resources. A reclassification of ash as hazardous or toxic would severely impact Ameren's beneficial use options, ultimately resulting in significantly higher operating costs for our plants. Our ash customers would also be impacted as they would have to switch to possibly higher cost material alternatives.

Though we have no formal correspondence in hand at this time to share, we have discussed with several of our cement replacement customers the potential impact a "hazardous" reclassification of fly ash would have on their ash use. They have stated emphatically that it would "kill" the use of fly ash as a cement replacement in concrete. During 2008, nearly 35 percent of Ameren's total ash production was utilized as a cement substitute in concrete. With a reclassification this beneficial use option would most likely be eliminated for Ameren's fly ash materials.

A reclassification would also severely limit and probably eliminate Ameren's ash use and interest in structural fill projects, mine reclamation, soil drying and amendment, flowable fill, concrete filler, grit blasting and roofing shingle applications. The hazardous classification would impose regulatory barriers that would end many of these applications, and the remaining ones would have to be evaluated to determine whether continuing to participate in these applications is a prudent business strategy in light of reclassification. Depending on project timing and year, these applications have utilized in the range of 35 to 60 percent or more of Ameren's total annual ash production.

Based on discussions with our customers, cement kiln feedstock maybe the only viable beneficial use application that may survive after a reclassification. Some cement kilns are permitted to handle hazardous wastes whether or not ash that has been reclassified hazardous could be used in kilns near our plants is unknown. One of our current cement kiln customers indicated that they are not currently permitted to accept hazardous waste feedstock materials. It's possible that they could seek a permit modification. But there are costs associated with seeking the permit and ultimately accepting and operating with a hazardous waste. They could decide that there are less expensive, lower risk alternative materials available and not pursue ash use. During 2008, about 8 percent of Ameren's total ash production was utilized as cement kiln feedstock.

One thought to keep in mind is that none of Ameren's ash customers have to use ash in their projects or product applications. All things equal, our customers use ash because it offers a less expensive alternative to other materials ultimately providing them with lower project and/or operating costs. If ash is reclassified as hazardous, the perceived risks and higher costs associated with using ash become high as compared to other materials. Our ash has not changed (makeup or constituents), but the hazardous labeling will assign unnecessary costs to using ash. Ameren's customers will simply turn to lower cost, lower perceived risk materials. The switching costs to our customers to utilize alternative materials in lieu of ash are expected to be very low.

Obviously for Ameren and the industry, the costs associated with ash reclassification would be very high. Ash materials that once generally represented a revenue source for the Company would possibly become a very high operational cost item. Disposal costs and options are not known with reclassification. But even if we were allowed to utilize the remaining ash disposal capacity at our plants, this space would be quickly depleted with the ash volumes that would now be placed in these facilities. Existing contracts with ash customers, marketers, contractors, and transportation organizations would possibly have to be either force majeured or renegotiated. Past ash beneficial use applications, projects, products, and on-site ash disposal facilities may all need to be re-evaluated and possibly mitigated in light of a reclassification. The costs and risks for the Company and industry could be very high.

I believe one of the most important concepts that the ACAA needs to communicate here, and hopefully the regulators will understand this message, is that ash customers do not have to use ash materials. There are alternative materials available. By classifying ash as toxic or hazardous, ash customers will simply switch to lower perceived risk, non-hazardous materials and not deal with ash. I believe it is as simple as this.

I hope you find this quick write-up helpful. Please let me know if you need additional information or have questions.

From Public Service of New Hampshire, Manchester, NH:

Nothing new to you, but ash reuse is difficult enough with the solid waste stigma. I can't even imagine that it's possible to continue burning coal if they elevate the regulatory status. It's not possible to "stabilize" that volume of "hazardous waste" and landfill capacity would disappear. I doubt we could operate our plants due to worker protection standards if the coal dust blowing about was classified as a "toxic material." Last month the NHDES requested my input on an ASTSWMO survey regarding impoundments. NHDES is on our side and support regulation at the state level

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From Progress Energy, Raleigh, NC:

Dave and Thomas,

Should CCBs be classified as a hazardous waste, we don't believe that any of Progress Energy's CCBs generated from our North Carolina, South Carolina or Florida plants would be used in our ongoing or future beneficial re-use applications. Our current beneficial reuse projects include concrete, Portland cement, structural fill projects, concrete block, wallboard and a variety of products utilizing cenospheres.

Information regarding FDEP's Solid Waste Regulations and industrial by-products is provided below. We are unaware of any North or South Carolina State Regulations.

http://www.dep.state.fl.us/waste/quick_topics/rules/documents/62-701.pdf

Florida Rule Chapter 62-701.220 **General Applicability**

> **Industrial byproducts**, if
>
> 1. A majority of the industrial byproducts are demonstrated to be sold, used, or reused within one year;

2. The industrial byproducts are not discharged, deposited, injected, dumped, spilled, leaked, or placed into or upon any land or water so that such industrial byproducts or any constituent thereof may enter other lands or be emitted into the air or discharged into any waters, including ground water, or otherwise enter the environment such that a threat of contamination in excess of water quality standards and criteria or air quality standards is caused; and

3. **The industrial byproducts are not hazardous wastes;**

Please feel free to contact me if you have any questions

From AEP, Columbus, OH:

In an interview with an AEP CCP Manager, he pointed out there areas of concern that AEP has on the issue of hazardous designation:

- CCPs are not hazardous and there is ample data to demonstrate it
- End-users have already contacted AEP asking about the hazardousness of CCPs and their perception that will have to stop using them because of it
- Corporately, he doubts that company attorneys will permit AEP to continue marketing materials that are considered hazardous for disposal, but not for beneficial use. The liability risks to the corporation are too great.

From CCP Marketers

From the SEFA Group, Lexington, SC

Tom,

To follow-up on our phone conversation this afternoon – The SEFA Group is very concerned about the "unintended consequences" and the overall negative dynamic that would impact the beneficial reuse of coal fly ash **IF** coal fly ash were designated as a hazardous waste. We do not think that the facts support such a designation and we think that the negative connotations associated with such an aspersion would be ruinous for The SEFA Group – and for the Fly Ash Industry.

The SEFA Group is a marketer of coal fly ash; that is what we do. We have been in business since 1976. We have spent over 40 years developing a market for coal fly ash as a quality-enhancing additive for concrete. During the last four decades we have worked closely with our customers to change their perception of our product from "fly trash" – something that can be used in concrete to make it cheaper – to fly ash, a key ingredient for concrete that needs to be used in order for concrete to maximize its potential for strength and durability. All that we have built – our customers, our reputation, our business, our industry – would disappear overnight, **IF** coal fly ash were designated as a hazardous waste.

The SEFA Group is a marketer of coal fly ash – that is how we derive our revenue. Our employees have jobs because we have developed a market for fly ash in concrete construction. Our employees would lose their jobs, **IF** coal fly ash were designated as a hazardous waste.

Of course, we have heard the refrain that this designation would ONLY apply to fly ash that would be disposed – a feeble attempt to make a distinction between disposal and utilization. However, the truth (and the perception) remains that The SEFA Group would become a purveyor of hazardous material and our customers would drop us like a hot potato, **IF** coal fly ash were designated as a hazardous waste.

From our customers' perspective, if coal fly ash that is disposed at a power plant is considered hazardous, then they would consider fly ash delivered to their concrete plants to be hazardous. They would be exposing their employees to the health hazards associated with handling a hazardous waste. During the normal course of their employees' daily duties, they handle/use specification-grade fly ash to produce ready-mix concrete. Therefore, they have asked us a reasonable question – "what is my liability if I continue to use fly ash in my concrete."

From our customers' perspective, if fly ash is considered hazardous, then they would be exposing their customers to the health hazards associated with hazardous waste. Why would their customers want the hospitals and the schools that they build to be built with a hazardous material? What is their liability? What is the risk for their children who will attend these schools?

Tom, let us know what we can do to keep this destructive designation from being applied to fly ash. The facts do not support such a designation.

From Lafarge, NA, Herndon, VA:

In a personal conversation in San Antonio, Tom Adams talked with a senior executive of Lafarge. That person stated that Lafarge was very concerned about a potentially hazardous designation for coal ash. Since Lafarge uses and markets large volumes of CCPs in cement manufacturing, wallboard production and to end users, they see a potentially devastating downturn in these markets if CCPs are in some manner considered hazardous.

The following is a marketer's internal memo sent to senior managers of major ready mixed concrete

<Dear Producer>
Date: January 21, 2009

Subject: Fly Ash –Current Environmental Issues Related to its' Use in Ready Mix Concrete

Executive Summary

Over the course of the past several weeks it has become apparent that there is increasing concern regarding the future viability of fly ash. This is largely due to the recent events which have drawn attention to the storage of coal ash and groundwater contamination. In addition, there is pending legislation regarding control of mercury emissions from coal burning power plants.

On December 24, 2008, a spill of approximately 1 billion gallons of coal ash sludge occurred at the Kingston Fossil Plant outside of Knoxville, Tennessee. On December 31, 2008, a $54 million class action lawsuit was awarded to residents of Gambrills, Maryland due to contaminated groundwater from coal ash deposition in a sand and gravel quarry. These recent events have reignited a debate as to whether classify coal ash as a hazardous waste, especially, if future regulations require mercury to be captured within the fly ash.

Fly ash, for use in concrete, will be required to be processed as the mercury emission reduction regulations become effective for coal burning power plants which may affect its' **quality, availability and cost.** This federal reduction requirement will most likely not go into effect for several years; however, state authorities may adopt requirements sooner. Carbon treatments are the most efficient methods to remove the mercury, necessitating power companies and/or fly ash marketers to install carbon treatment or carbon removal equipment to maintain acceptable fly ash quality.

We will continue to monitor this situation and update you as information becomes available.

Legislation

Mercury is found in coal that is utilized at coal burning power plants and has not historically been a regulated emission. In 2000, the Clinton administration decided to initiate an expensive plan to regulate mercury emissions from power plants. The decision culminated a lengthy process that began with the 1990 Clean Air Act Amendments, which required the Environmental Protection Agency to evaluate mercury and other toxic emissions to determine if they warranted more stringent regulation.

On December 14th, 2000, the EPA announced that mercury emissions from coal fired plants pose significant hazards to public health and must be reduced. The agency proposed mercury regulations in 2003 and would issue final rules by December 2004. If fully implemented in 2005, the rules were projected to reduce mercury emissions by nearly 50% from 1990 levels.

In March 2005, the EPA removed Coal- and Oil-Fired Electric Utility Steam Generating Units from mercury emission requirements, stating that their original findings "lacked foundation and because recent information demonstrates that it is not appropriate or necessary to regulate coal and oil-fired Utility Units".

On February 8, 2008, a three-judge panel on the U.S. Circuit Court of Appeals for the District of Columbia ruled the EPA violated the Clean Air Act in 2005 when it exempted coal-burning power plants from the act's most stringent requirements for cleaning up hazardous pollutants. This decision means the EPA must start over in crafting a regulation to cut mercury emissions. The judges also invalidated the agency's plan to adopt a "cap and trade" program to cut mercury emissions from power plants. The program would have allowed power plants to buy and sell mercury pollution credits.

As a result of the court's decision, it is likely the EPA will develop a Maximum Achievable Control Technology (MACT) standard, which will require every oil or coal based power plant to install mercury specific controls. This rule making could take several years to finalize and might not require emission reductions for more than 5 years*. However, some states may be incorporating the mercury reduction requirement locally, before the EPA develops national regulations. * Source: Edison Electric Institute

Environmental

Power plants in the United States emit a small amount of mercury compared to natural processes and non-U.S. manmade sources. Once released, mercury vapor travels long distances and deposits in distant locations. It is estimated that only 20% of mercury emitted by U.S. power plants is deposited locally.

Human exposure to elemental mercury (Hg) directly emitted from power plants is not harmful. To become a human health hazard, mercury must undergo a complex transformation into the compound methylmercury (MeHg), which must be ingested, primarily through fish, in a sufficiently large dose. It is not possible to quantify how much MeHg in fish results from electric utility plants, therefore, the EPA does not know whether reducing mercury emissions from power plants will reduce MeHg levels in fish.

Current controls in place for other regulated pollutants, sulfur dioxide (SO2) and nitrous oxide (NOx) have already reduced the mercury levels. As a result, mercury levels have declined significantly from 77 tons in 1995 to 40 tons today from coal and oil fired Utility Units.

Mercury Removal Technology

There are many technologies available to control mercury emissions from a power plant. The most cost effective and efficient (> 90% removal) method is the use of activated carbon injection (ACI) which absorbs the mercury and is then transferred along with the fly ash. This elevates the carbon content (and mercury content) of the fly ash rendering it unusable for concrete unless it is further processed. This process results in elevated levels of mercury in the fly ash.

Fly ash marketers/suppliers either currently have or are developing technology to treat or remove the elevated carbon levels that result from this mercury removal process. These include:

Boral - Fly Ash Carbon Treatment (FACT)

Headwaters - In Development

SEFA - removal using Staged Turbulent Air Reactor (STAR)

Separation Technologies (STI) - removal electrostatically

Effects on Concrete

There are two main concerns regarding concrete containing fly ash with elevated levels of carbon and mercury.

1. How does the activated carbon affect concrete performance?

2. Do the elevated levels of mercury in the fly ash pose any performance or health risks?
If the activated carbon is not removed or treated, it is impossible to entrain adequate air into the concrete rendering it unusable. Several studies have been conducted regarding the elevated mercury levels in fly ash and shown to be of no concern when encapsulated in concrete. The highest emission levels occur during initial curing and progressively reduce as the concrete hardens. Interestingly, concretes containing no fly ash had the highest level of mercury emission rates when compared to concretes containing fly ash of any kind. This is primarily due to the improved permeability when fly ash is incorporated into the concrete mixture. In any case, only a very small percentage of the mercury was released and does not pose any health concerns.

Miscellaneous emails from end users

From: <Community Advocate>
Sent: Wednesday, January 21, 2009 8:07 AM
To: <CCP Marketer>

Subject: FW: Fly ash - <Project Site>

Dear <Marketer>:

I exchanged emails with you last April as I was collecting information about the suitability of a fly ash/soil mixture for the refurbishment of trails in an inner city nature park in <Location>. Over the course of that investigation, I was sent and read the ACAA booklet about soil stabilization with self-cementing coal fly ash. I also read numerous documents available on the web, and was in touch with Dr. <Local University Professor>, who sent me material from a study he had conducted about soil leachates from coal by-product-containing road construction materials.

Recently, however, the articles attached below have stirred up a lot of local concern again about whether we should be using fly ash in the park. My reading of all of these materials is that it does not pose any danger to humans or animals and that there is minimal danger from leachate. However, I am not sure that I can convince all of these people. Could you help me to formulate a statement that might allay their fears?

I appreciate any help.
Best wishes, <Community Advocate>

From: <Interested Third Party>
Sent: Wednesday, January 21, 2009 6:56 AM
To: <Community Advocate>
Subject: Fly ash - <Project Site>

<Advocate>,

When you reported to the <Local Club> concerning plans to use fly ash to build up trails in <Project Site> I recalled there had been some historic concerns expressed upon its environmental impact, but assurances you offered at that time, as I recall, of its inert and safe nature was accepted as fact.

Recent events with the fly ash spill at the TVA project has brought renewed attention to the issue and a Google search has revealed several articles referring to the product as containing concentrations of arsenic, heavy metals and carcinogens. A search of the EPA website was not readily helpful or revealing.

I feel a responsibility to bring these concerns to your attention, however, given the immediate implications concerning comments concerning it being a safe product to use when handled properly and in the right applications and encourage you to explore the true safety of the product before utilizing it to build up pathways in <Project Site>.

This is copied to two folks I understand that serve on your <Project Site> Board, as well as, the President of <Project Board> as you serve in the environmental chair position of that latter organization.

Two representative articles from the media are copied below for your information.

American Coal Ash Association
15200 East Girard Avenue, Suite 3050, Aurora, CO 80014-3955
Phone - 720 870 7897, Fax - 720 870 7889, info@acaa-usa.org
www.acaa-usa.org

U.S. House of Representatives
Committee on Transportation and Infrastructure
Washington, DC 20515

James L. Oberstar
Chairman

David Heymsfeld, Chief of Staff
Ward W. McCarragher, Chief Counsel

John L. Mica
Ranking Republican Member

James W. Coon II, Republican Chief of Staff

June 25, 2009

Mr. John M. McManus
Vice President of Environmental Studies
Office of Solid Waste and Management
American Electric Power
Columbus, Ohio

Dear Mr. McManus:

Thank you for your testimony before the Subcommittee on Water Resources and Environment on April 30, 2009, concerning "Coal Combustion Waste and Water Quality." I am pleased that you were able to appear and testify on behalf of the Edison Electric Institute and the Utility Solid Waste Activities Group. The Subcommittee gained valuable insight from the information you provided at the hearing.

Enclosed please find additional questions for written responses for the record for the hearing. The Subcommittee appreciates your written responses no later than July 10, 2009. Please submit your response via US mail to Jenna Tatum at B-376 Rayburn House Office Building, Washington, D.C., 20515. Additionally, please provide an electronic version of your response via e-mail to jenna.tatum@mail.house.gov.

If you have any questions, please do not hesitate to contact the Subcommittee staff at (202) 225-0060.

Sincerely,

Eddie Bernice Johnson

Eddie Bernice Johnson, M.C.

Enclosure

Follow-Up Questions for the Honorable John M. McManus
House Committee on Transportation and Infrastructure
Subcommittee on Water Resources and Environment
Hearing on Coal Combustion Waste Storage and Water Quality
Thursday, April 30, 2009 at 10 a.m.

1. In the question and answer period of the hearing, Chairman Oberstar asked you to explain which agency or entity you think should oversee the many safety aspects relating to the storage of coal ash. For the hearing record, please provide to the Committee an analysis of which agency or entity (federal, state, local, or private) you believe should be responsible for developing, overseeing and regulating the design and construction of coal ash storage facilities, including the inspection of the retention walls of the facilities and the development of liner requirements.

2. Should any new coal combustion waste storage or disposal facilities be built that are not dry storage design units? Please provide detail in your response.

3. Should any new coal combustion waste storage or disposal facilities be built without composite liners? Please provide detail in your response.

4. If a coal combustion waste storage impoundment is leaching any level of toxic constituent into groundwater or nearby surface water, what should the response be? Please refer to potential responses by the facility owners, the state in which the facility is located, and the federal government.

5. Please explain the high discharge levels of arsenic at American Electric Power's Cardinal facility in Ohio? Does AEP agree or disagree that this discharge level is in excess of the human health standard for the consumption of organisms, as well as in excess for the federal drinking water standard for arsenic? Please explain your response.

   Does AEP's Cardinal facility routinely discharge arsenic into surface waters? Does AEP believe that its NPDES permit should include permit limits for arsenic? Please explain your response.

   Does AEP believe that mixing zones are an acceptable pollution reduction or pollution mitigation strategy?

6. In your testimony you state "An August 2006 EPA/DOE report...confirms the improving trend in the state regulation of CCBs, finding that, over the last decade, the amount and quality of environmental controls for coal ash management units have increased... In short, state CCB controls have become more robust."

   The EPA/DOE report upon which your statement relies was published in 2006. This said, the TVA coal ash spill took place in late 2008 – two years later. However, if state controls were truly becoming more robust, we would not have expected the catastrophic TVA Kingston coal ash storage facility collapse to have taken place. Please reconcile these two seemingly contradictory pieces of information.

7. In your testimony you noted that American Electric Power operates at least 40 surface impoundments. Are these 40 surface impoundments for the storage and/or disposal of wet coal combustion waste? How many landfills – or facilities for the storage of dry coal combustion waste – does AEP operate?

   For AEP's [wet coal combustion waste] surface impoundments: How many of these are unlined, how many of these use clay liners, and how many use composite liners?

   For AEP's [dry coal combustion waste] landfills: How many of these are unlined, how many of these use clay liners, and how many use composite liners?

   To the knowledge of AEP, have any of these facilities (surface impoundments and landfills) ever leached CCW constituents into groundwater or surface water? If so, please provide the Subcommittee with relevant details, including the name of the power facility, and constituents leached.

   To the knowledge of AEP, have any of these facilities (surface impoundments and landfills) leached CCW constituents into groundwater or surface water in the past year? If so, please provide the Subcommittee with relevant details, including the name of the power facility, and constituents leached.

   How many inactive surface impoundments does AEP have possession of? How many of these are unlined, how many use clay liners, and how many use composite liners? Is AEP monitoring all of these? Why? Why not?

8. Please provide a list of all AEP coal-fired power facilities that have associated National Pollutant Discharge Elimination System (NPDES) permits. Per NPDES permit, please provide a list of constituents that have associated permit limits. Per NPDES permit, please also provide a list of constituents for which there are associated monitoring requirements.

AMERICAN ELECTRIC POWER

American Electric Power
1 Riverside Plaza
Columbus, OH 43215-2373
AEP.com

July 10, 2009

Eddie Bernice Johnson
Chairwoman
Subcommittee on Water Resources and Environment
U.S. House of Representatives
Committee on Transportation and Infrastructure
Washington, DC 20515

Re: Coal Combustion Waste Storage and Water Quality Follow-up Questions

Dear Congresswoman Johnson:

Set forth below are my responses to the additional follow-up questions dated June 25, 2009 from the Subcommittee hearing held on April 30, 2009, entitled "Coal Combustion Waste Storage and Water Quality." On behalf of American Electric Power, the Edison Electric Institute, and the Utility Solid Waste Activities Group I would again like to thank the Subcommittee for the opportunity to present our views on this issue.

Please contact me at (614) 716-1268 or jmmcmanus@aep.com if you have questions regarding the answers set forth below.

Very truly yours,

John M. McManus
Vice President, Environmental Services

cc: Jenna Tatum
Tony Kavanagh

Attachment

Response to Follow-Up Questions for the Honorable John M. McManus
House Committee on Transportation and Infrastructure
Subcommittee on Water Resources and Environment
Hearing on Coal Combustion Waste Storage and Water Quality
Thursday, April 30, 2009 at 10 a.m.

1. In the question and answer period of the hearing, Chairman Oberstar asked you to explain which agency or entity you think should oversee the many safety aspects relating to the storage of coal ash. For the hearing record, please provide to the Committee an analysis of which agency or entity (federal, state, local, or private) you believe should be responsible for developing, overseeing, and regulating the design and construction of coal ash storage facilities, including the inspection of the retention walls of the facilities and the development of liner requirements.

We believe that oversight of the many safety aspects relating to coal ash storage should be the responsibility of state environmental agencies working in cooperation with the appropriate state dam safety program managers, and in some cases the local dam safety officials. We believe that approach, coupled with new federal regulations addressing dam safety, will improve oversight of coal ash storage facilities. As AEP Executive Vice President Nick Akins testified earlier this year before the House Subcommittee on Energy and Mineral Resources regarding proposed federal legislation focusing on coal ash dam safety issues, ".....because different state approaches exist for regulating dam safety, the principle of having some level of federal oversight or standards to provide consistency across the country has merit."

The utility industry supports the development by USEPA of federal non-hazardous waste regulations under Subtitle D of the Resource Conservation and Recovery Act ("RCRA") applicable to the operation of coal ash storage facilities, including design and construction standards. We also agree with the unanimous position of the more than 20 state environmental protection agencies that have been asked by USEPA to weigh in on this precise question that such regulations should be administered and implemented by the states. The federal regulations developed by USEPA, to include dam safety requirements, should serve as the regulatory floor for coal ash byproduct controls that would be administered and implemented by the states. USEPA should develop those regulations in consultation with other federal agencies such as the Corps of Engineers that have expertise in the design, construction and inspection of dams. Indeed, this state-led approach was favored by Shari Wilson, Secretary of the Maryland Department of the Environment, during her testimony before the Subcommittee ("We believe that EPA could implement similar rules [to those already in place in Maryland] under Subtitle D and afford States the opportunity to demonstrate that they can implement those standards much more quickly than regulation under Subtitle C."). In their letters to USEPA, the states have explained persuasively that, due to the multitude of site-specific issues associated with coal ash storage facilities, they are in the best position to effectively administer and implement regulatory controls applicable to management of coal ash.

We recognize that there currently are different state approaches to regulating coal ash storage facilities, including for example varying state regulations applicable to the inspection of coal ash facility retention walls. Therefore, any future federal Subtitle D regulations for coal ash storage facilities should include some level of federal oversight to provide consistency across state regulatory programs for coal ash dams and impoundments, with emphasis on dam safety. We believe that new federal regulations that address dam safety, dam inspection and emergency response planning are advisable, in light of what happened at TVA's Kingston Plant in December 2008.

With that being said, we believe that the key to ensuring the long-term safety of any dam or surface impoundment, whether used to retain coal ash, drinking water, storm water, mine tailings, sewage sludge, or any other flowable material, is proper engineering design, good construction oversight, and ongoing inspection and maintenance. It is important to underscore the fact that dam safety issues are *not* unique to coal ash. Please see the U.S. Army Corps of Engineers' web site at https://nid.usace.army.mil for information on the National Inventory of Dams for detail. There are over 11,000 high hazard potential dams in the United States, of which only a small fraction (less than 0.4%) involve coal ash. We believe that the accident at Kingston suggests that *all* dams and surface impoundments in the United States rated as high or significant hazard potential to the extent not already subject to regular inspections by a registered Professional Engineer, should be inspected.

2. Should any new coal combustion waste storage or disposal facilities be built that are not dry storage design units? Please provide detail in your response.

Yes. The management of coal ash in ponds is an integral and essential operational component at many power plants in the country. When properly designed, constructed, operated and maintained, coal ash ponds pose no greater risk to the public or environment than any other dam or surface impoundment used to store liquids or other flowable materials. As explained in my response to Question 1, the utility industry supports the development of federal risk-based performance standards under RCRA Subtitle D for all coal ash management facilities – whether wet or dry – that would include groundwater monitoring and the requirement to undertake corrective measures as necessary. These types of controls would ensure that all coal ash management facilities are operated in a manner that is protective of health and the environment. With these types of controls in place, there is no need for a blanket prohibition on the construction of properly designed coal ash impoundments.

Coal ash should not be singled out when questions arise with respect to safety issues associated with the design, construction and maintenance of dams and impoundments. As noted in response to Question 1, coal ash storage impoundments represent only a fraction of the thousands of high hazard potential dams in the United States. The utility industry believes that the Kingston spill was unacceptable and it has taken pro-active steps since the Kingston dike failure to re-inspect and ensure the integrity of its dam systems.

3. Should any new coal combustion waste storage or disposal facilities be built without composite liners? Please provide detail in your response.

In some cases, yes, because there may be no practical purpose served by installing composite liners in new coal combustion byproduct storage or disposal facilities. The engineering and environmental need for a liner in a pond or landfill is based on a number of site-specific factors, including the physical and chemical properties of the material stored, the design of the landfill or impoundment walls, local geology and hydrology, in-place soils, state or local regulatory requirements, and the proximity to sources of drinking water. For any new landfill or pond, the design engineer, in accordance with applicable environmental controls and regulatory oversight, evaluates these site-specific factors and specifies a liner if necessary. For example, the engineer may determine a liner is needed for the long-term structural integrity of the impoundment walls, groundwater protection, or both. In other cases, these concerns may not exist and no liner would be necessary, or it may be determined, based on site-specific characteristics, that a clay liner, as opposed to a composite liner, is fully protective of human health and the environment.

These decisions are not made in isolation and involve state regulatory agencies. We look to the states for regulatory guidance that is customized for the locale where new coal combustion product storage and disposal facilities are proposed to be constructed. We believe that the states are in an excellent position to evaluate what the site-specific conditions require in the way of a liner. There are times when a composite liner is not required.

4. If a coal combustion waste storage impoundment is leaching any level of toxic constituent into groundwater or nearby surface water, what should the response be? Please refer to potential responses by the facility owners, the state in which the facility is located, and the federal government.

If a coal combustion byproduct storage impoundment is leaching a constituent into ground or surface water that is causing harm to people or the environment, the utility should take action to abate the threat. In assessing possible response options, the relevant state environmental protection agency is generally in the best position to judge the severity of the problem and to work with the facility owner in designing and implementing the appropriate corrective measures. The best solution will result from an objective scientific and technical review of the facility design and local conditions. Corrective measure options could range from modifying the impoundment's design or operations, to closing the impoundment altogether if no other technical or economically viable alternative exits.

In addition to state involvement in helping to identify and implement the appropriate corrective measures, USEPA has ample authority under RCRA's "imminent and substantial endangerment" provision to order any owner or operator of a coal ash surface impoundment that *may* pose a threat to health or the environment due to a release of constituents to take immediate measures to abate the threat.

5. Please explain the high discharge levels of arsenic at American Electric Power's Cardinal facility in Ohio? Does AEP agree or disagree that this discharge level is in excess of human health standard for consumption of organisms, as well as in excess of the federal drinking water standard for arsenic? Please explain your response.

First, it is inappropriate to directly compare the numeric standards for drinking water with concentrations of arsenic in wastewater at Cardinal Plant. The standards for drinking water are meant to apply to the finished product being supplied by the drinking water treatment plant and do not apply to the Cardinal wastewater discharge. In the context of municipal systems, applying this standard to a wastewater discharge implies that the public should be able to drink the water being discharged directly from the city's sewage treatment plant. Drinking water treatment is not the function of these facilities nor is it the function of the Cardinal Plant fly ash pond.

Cardinal Plant is a coal-fired power plant. Arsenic is naturally present in the coal and therefore is present in the fly ash that remains after burning. Arsenic concentrations in fly ash differ from plant to plant and over time based upon variable concentrations within the coal. Cardinal Plant fly ash sluice water is pumped to the fly ash impoundment for treatment and, after settling, the stream is discharged through an outlet that is regulated under an NPDES permit issued by the Ohio EPA.

AEP does not agree that the discharge from the Cardinal Plant is exceeding human health standards for fish consumption, or drinking water. These standards do not apply to the stream that receives the discharge. The fly ash impoundment discharges to Blockhouse Hollow Run, a tributary to the Ohio River. As part of the Ohio EPA's continual assessment of all state waters, they have designated that stream as a "Limited Resource Water" with respect to the protection of aquatic life. With respect to the stream's use as a water supply, Ohio EPA has classified Blockhouse Hollow Run for "Industrial Water Supply" and not for "Public Water Supply". Therefore, neither drinking water standards nor fish consumption criteria are applicable. We note that, as explained in more detail in our response to the question of permit limits for arsenic, Ohio EPA has also evaluated the potential for impacts on the Ohio River and determined that the levels of arsenic in the discharge will not cause an exceedance of the Ohio River standard, even under conservative modeling assumptions.

Does AEP's Cardinal facility routinely discharge arsenic into surface waters? Does AEP believe that its NPDES permit should include permit limits for arsenic? Please explain your response.

As stated above, arsenic is an element that is naturally present in coal and is consequently present in trace levels in the waste streams associated with its use as a fuel. In my response dated May 29, 2009 to the supplemental questions posed by the Subcommittee, I described the process by which permit limits are established. The Clean Water Act requires permitting authorities to determine if the facility's discharges would cause a violation of the applicable water quality criteria for the receiving stream. During each NPDES permit renewal for the Cardinal Plant, the Ohio EPA has reviewed the need for effluent limits for each pollutant detected in the discharge. The agency's methodology assesses whether reported arsenic levels meet the regulatory test of "reasonable potential" to exceed the water quality standard. As stated above, the receiving stream (Blockhouse Hollow Run) is designated by the Ohio EPA as a "Limited Resource Water" and an "Industrial Water Supply." Additionally, as part of their analysis, the Ohio EPA has reviewed the resulting levels of arsenic for impacts to the Ohio River. Ohio EPA's independent evaluation has determined that a permit limit for arsenic is not needed, but that the discharge is required to be monitored for arsenic twice per month. AEP is in agreement with Ohio EPA's conclusion that no NPDES permit limit for arsenic is necessary at the fly ash pond outlet because the levels of arsenic in the discharge do not pose a reasonable potential to cause or contribute to an exceedance of the applicable water quality criteria.

Does AEP believe that mixing zones are an acceptable pollution reduction or pollution management strategy?

Yes. Mixing zones are permitted under the Clean Water Act in order to establish applicable effluent limits. AEP believes that the use of mixing zones is appropriate and should be granted by regulatory agencies as long as applicable regulatory requirements are met. The use of mixing zones is regulated by the USEPA and the states. EPA states in its *Water Quality Standards Handbook* that mixing zone characteristics must ensure that:

- mixing zones do not impair the integrity of the water body as a whole,
- there is no lethality to organisms passing through the mixing zone, and
- there are no significant health risks, considering likely pathways of exposure.

Following these guidelines, permitting authorities provide for conditions that are protective of both human health and the environment when using mixing zones.

6. In your testimony you state "An August 2006 EPA/DOE report...confirms the improving trend in the state regulation of CCBs, finding that, over the last decade, the amount and quality of environmental controls for coal ash management units have increased... In short, state CCB controls have become more robust."

The EPA/DOE report upon which your statement relies was published in 2006. This said, the TVA coal ash spill took place in late 2008 – two years later. However, if state controls were truly becoming more robust, we would not have expected the catastrophic TVA Kingston coal ash storage facility collapse to have taken place. Please reconcile these two seemingly contradictory pieces of information.

I do not believe there is any contradiction between the finding in the August 2006 USEPA/DOE report that state coal ash programs are becoming more robust and the failure of the Kingston facility's coal ash storage unit. The recent release of the "root cause" analysis of the Kingston coal ash release demonstrates that the cause of the release was due to engineering and related issues, and not to the type of environmental controls addressed by the USEPA/DOE report.

The USEPA/DOE report upon which my testimony was based is one of the most comprehensive and up-to-date reports on the status of state *environmental* controls – such as groundwater monitoring and permitting/licensing requirements – applicable to coal ash management facilities. That report correctly observed that state controls for these facilities are improving and are even more robust today than in 2000, when USEPA determined (for the fourth time) that coal ash does not warrant hazardous waste regulation. Indeed, one of the other witnesses at the Subcommittee's hearing, Shari Wilson, Secretary of the Maryland Department of the Environment, underscored this point when expressing Maryland's opposition to the hazardous waste regulation of coal ash based, in part, on Maryland's new and more expansive regulations applicable to coal ash.

In contrast, the root cause analysis of the Kingston coal ash release explains that the failure was due to a series of engineering and related failures, and not to the lack of environmental controls addressed in the USEPA/DOE report. The engineering issues evaluated in the root cause analysis were not the subject of the environmental controls addressed in the 2006 USEPA/DOE report.

7. In your testimony you noted that American Electric Power operates at least 40 surface impoundments. Are these 40 surface impoundments for the storage and/or disposal of wet coal combustion waste? How many landfills – or facilities for the storage of dry coal combustion waste – does AEP operate?

American Electric Power (AEP) operates 44 surface impoundments (42 active, 2 inactive) for the treatment, storage and/or disposal of coal combustion byproducts. AEP operates 14 coal combustion byproduct landfills.

For AEP's [wet coal combustion waste] surface impoundments: How many of these are unlined, how many of these use clay liners, and how many use composite liners?

We interpret that the reference to "clay liners" for surface impoundments means engineered liners where clay is specifically placed and compacted to an engineering specification for permeability. In many cases, ponds have been constructed in locations where the predominant soil is clay; however, liners were not specifically installed. We have included these ponds in the "unlined" category. Of the 42 surface impoundments that AEP operates for coal combustion byproducts, 36 are unlined, 3 have clay liners, and 3 have composite liners, meaning a combination of placed clay and synthetic material.

For AEP's [dry coal combustion waste] landfills: How many of these are unlined, how many of these use clay liners, and how many use composite liners?

Of the 14 landfills that AEP operates for coal combustion byproducts, all have liners of which there are six with clay liners, and eight with composite liners, meaning a combination of placed clay and synthetic material. Please note that an input parameter in landfill design can be the naturally occurring soils that are confirmed to be within the landfill footprint ("in-situ"). Naturally occurring clay deposits can be effective in providing low permeability, in-situ material that serves to impede the travel of leachate. Landfill liner design can take advantage of native soils with high clay contents, compacted in place at the time of original construction.

To the knowledge of AEP, have any of these facilities (surface impoundments and landfills) ever leached CCW constituents into groundwater or surface water? If so, please provide the Subcommittee with relevant details, including the name of the power facility, and constituents leached.

Some of AEP's ash ponds and landfills are not required to have, and do not have groundwater monitoring wells. The Company has committed voluntarily to implement the *Utility Industry Action Plan* and install groundwater monitoring wells around all ash disposal ponds and landfills not currently monitored. We expect that USEPA also will address requirements for groundwater monitoring around ash disposal facilities in the upcoming draft rules scheduled to be published later this year. Those expected federal performance standards may modify some of the plans made under the voluntary groundwater monitoring program.

The AEP ash ponds and CCB landfills that have a state-approved groundwater monitoring program with statistical analysis requirements are listed below for those plants where statistically significant increases (SSIs) in certain parameters attributable to effects from operation of the ash pond or landfill were observed.

WV

Mountaineer Little Broad Run Landfill – Groundwater statistical evaluations began in 1994. SSIs were observed at monitoring well MW-4 in 1995 and it was determined that this well was impacted by CCB leachate. Monitoring well MW-4 monitored a perched aquifer confined to a small ridge area. Constituents leached included boron, molybdenum, sulfate, total dissolved solids, and conductivity. Groundwater monitoring at MW-4 was ceased in 2005 at the time the well was closed due an expansion of the landfill in this area. In 2006 it was determined that SSIs occurring in monitoring well MW-3 for boron, molybdenum, specific conductance, and sulfate may have been the result of a release of leachate from an older portion of the landfill. Monitoring well MW-3 also monitors a perched water table and is of limited aerial extent. An investigation is ongoing to determine the extent of this potential release.

VA

Clinch River Industrial Waste Landfill – Previous exceedances above background concentration for selenium in monitoring well M-3 has resulted in a compliance monitoring program for this particular well.

Glen Lyn Industrial Waste Landfill – Previous exceedances above background concentrations for cadmium and sodium in monitoring wells MW-8 and MW-17 has resulted in a compliance monitoring program for these wells.

OH

Cardinal FAR II – Previous exceedances above background have been identified for boron in monitoring wells M-11 and M-21 as well as molybdenum in M-11. Approval, by the state regulatory agency, has been requested for a proposed compliance monitoring program for these wells.

Conesville Surface Impoundment – In 1976, a 50-acre portion of the CCB impoundment was developed for dry disposal of stabilized FGD byproduct. Groundwater monitoring conducted from 1979 – 1984 detected localized releases of CCB constituents to groundwater. CCB constituents included arsenic, cadmium, chromium, lead, sulfate and total dissolved solids. FGD filtrate was re-routed from the impoundment to the thickener tanks as a mitigative measure. In addition, the dry disposal area was closed, capped and seeded in 1988.

AR

Flint Creek Landfill - In May 2001, analyses of groundwater data indicated SSIs in iron, fluoride, sulfate, total dissolved solids, and pH. In January 2005, analyses of groundwater indicated SSIs in sulfate, pH, total dissolved solids, and selenium. As a result the facility entered into an assessment phase that required groundwater protection standards to be developed for each constituent that experienced a SSI. In April 2009 selenium was determined to be at a statistically higher concentration than its groundwater protection standard sending the facility into assessment of corrective actions which requires a *Nature and Extent* study to be performed. Work continues on the *Nature and Extent* study. There is a periodic leachate seep internal to the landfill that is being conveyed to the bottom ash pond. Analytical results have shown elevated concentrations of arsenic, chromium, selenium, total dissolved solids, and sulfate. The pH of the groundwater has shown a statistically significant change.

OK

Northeastern Landfill – There are two seeps originating from the landfill that enter a surface water. Analytical testing of both seeps indicates the following constituents in elevated concentrations: arsenic, barium, beryllium, cadmium, chromium, lead, selenium and sulfate. In addition, an increase in pH was observed.

To the knowledge of AEP, have any of these facilities (surface impoundments and landfills) ever leached CCW constituents into groundwater or surface water in the past year? If so, please provide the Subcommittee with relevant details, including the name of the power facility, and constituents leached.

Of the plants listed above, Mountaineer Plant's LBR landfill, Cardinal FAR II, Flint Creek Landfill and Northeastern Landfill were shown to be leaching statistically significant levels of certain coal combustion constituents between June 26, 2008 and June 25, 2009.

How many inactive surface impoundments does AEP have possession of? How many of these are unlined, how many use clay liners, and how many use composite liners? Is AEP monitoring all of these? Why? Why not?

In addition to the 42 active surface impoundments identified above, AEP has possession of 2 inactive surface impoundments for coal combustion byproducts. Both impoundments fall into the "unlined" category. At one facility, both groundwater and its surface water discharge (impoundment collects only area storm water run-off) are monitored. The other facility is full and contains no open water. AEP is working with the state environmental agency to determine closure requirements. Groundwater at that facility is not currently monitored.

8. Please provide a list of all AEP coal-fired power facilities that have associated National Pollutant Discharge Elimination System (NPDES) permits. Per NPDES permit, please provide a list of constituents that have associated permit limits. Per NPDES permit, please also provide a list of constituents for which there are associated monitoring requirements.

AEP operates 21 coal-fired power facilities. All have NPDES permits. Several of these facilities have multiple NPDES permits associated with them. These include permits for the main power plant facility, the coal combustion byproduct landfill, and for storm water discharges. Table 1 (attached) itemizes each NPDES permit for each coal-fired power facility, and identifies for each NPDES permit, those constituents that have associated permit limits and those constituents that have only monitoring requirements. The total of constituents with permit limits is 201. The total of constituents with monitoring requirements is 313, for a total of 514 constituent/permit combinations listed in the table. The 21 coal-fired power facilities are:

John E. Amos
Big Sandy
Cardinal
Clinch River
Conesville
Flint Creek
General James M. Gavin
Glen Lyn
Kammer
Kanawha River
Mitchell
Mountaineer
Muskingum River
Northeastern 3&4
Oklaunion
Picway
Philip Sporn
Pirkey
Rockport
Tanners Creek
Welsh

Table 1. AEP Coal-Fired Plants - List of NPDES Parameters

State	Plant	NPDES Permit	Parameter	Monitor Only	Limits
AR	Flint Creek	AR0037842	Chlorine, Total Residual		X
AR	Flint Creek	AR0037842	Flow		X
AR	Flint Creek	AR0037842	Oil & Grease		X
AR	Flint Creek	AR0037842	pH		X
AR	Flint Creek	AR0037842	Solids, Total Suspended		X
AR	Flint Creek	AR0037842	Temperature		X
AR	Flint Creek	AR0037842	Toxicity, Whole Effluent	X	
AR	Flint Creek (Storm Water)	ARR00B277	Copper, Total	X	
AR	Flint Creek (Storm Water)	ARR00B277	Nickel, Total	X	
AR	Flint Creek (Storm Water)	ARR00B277	Oil & Grease	X	
AR	Flint Creek (Storm Water)	ARR00B277	pH	X	
AR	Flint Creek (Storm Water)	ARR00B277	Solids, Total Suspended	X	
AR	Flint Creek (Storm Water)	ARR00B277	Zinc, Total	X	
IN	Rockport	IN0051845	Chemical Oxygen Demand	X	
IN	Rockport	IN0051845	Chlorine, Free Available		X
IN	Rockport	IN0051845	Chromium, Hexavalent	X	
IN	Rockport	IN0051845	Chromium, Total		X
IN	Rockport	IN0051845	Copper, Total		X
IN	Rockport	IN0051845	CT-1300	X	
IN	Rockport	IN0051845	Flow	X	
IN	Rockport	IN0051845	Flow, Upstream	X	
IN	Rockport	IN0051845	Fluoride, Total		X
IN	Rockport	IN0051845	Iron, Total		X
IN	Rockport	IN0051845	Lead, Total		X
IN	Rockport	IN0051845	Mercury, Total	X	
IN	Rockport	IN0051845	Nitrite Plus Nitrate, Total	X	
IN	Rockport	IN0051845	Nitrogen, Total Kjeldahl	X	
IN	Rockport	IN0051845	Oil & Grease		X
IN	Rockport	IN0051845	pH		X
IN	Rockport	IN0051845	Phosphorus, Total	X	
IN	Rockport	IN0051845	Selenium, Total		X
IN	Rockport	IN0051845	Solids, Total Suspended		X
IN	Rockport	IN0051845	Sulfate		X
IN	Rockport	IN0051845	Temperature	X	
IN	Rockport	IN0051845	Zinc, Total		X
IN	Tanners Creek	IN0002160	Arsenic, Total	X	
IN	Tanners Creek	IN0002160	Cadmium, Total	X	
IN	Tanners Creek	IN0002160	Chemical Oxygen Demand	X	
IN	Tanners Creek	IN0002160	Chlorination/Bromination Dose	X	
IN	Tanners Creek	IN0002160	Chlorination/Bromination Frequency	X	
IN	Tanners Creek	IN0002160	Chlorine, Total Residual		X
IN	Tanners Creek	IN0002160	Chromium, Total	X	
IN	Tanners Creek	IN0002160	Copper, Total		X
IN	Tanners Creek	IN0002160	Flow	X	
IN	Tanners Creek	IN0002160	Iron, Total		X
IN	Tanners Creek	IN0002160	Mercury, Total	X	
IN	Tanners Creek	IN0002160	Nickel, Total	X	
IN	Tanners Creek	IN0002160	Nitrite Plus Nitrate, Total	X	
IN	Tanners Creek	IN0002160	Nitrogen, Total Kjeldahl	X	
IN	Tanners Creek	IN0002160	Oil & Grease	X	
IN	Tanners Creek	IN0002160	Oxidants, Total Residual		X
IN	Tanners Creek	IN0002160	pH		X
IN	Tanners Creek	IN0002160	Phosphorus, Total	X	
IN	Tanners Creek	IN0002160	Plant Capacity Factor	X	
IN	Tanners Creek	IN0002160	Selenium, Total	X	
IN	Tanners Creek	IN0002160	Solids, Total Suspended		X
IN	Tanners Creek	IN0002160	Temperature	X	
IN	Tanners Creek	IN0002160	Temperature, Intake	X	
IN	Tanners Creek	IN0002160	Temperature, Mixed River	X	
IN	Tanners Creek	IN0002160	Zinc, Total	X	
KY	Big Sandy	KY0000221	Antimony, Total	X	
KY	Big Sandy	KY0000221	Arsenic, Total	X	
KY	Big Sandy	KY0000221	Beryllium, Total	X	

Table 1. AEP Coal-Fired Plants - List of NPDES Parameters

State	Plant	NPDES Permit	Parameter	Monitor Only	Limits
KY	Big Sandy	KY0000221	Biochemical Oxygen Demand		X
KY	Big Sandy	KY0000221	Cadmium, Total	X	
KY	Big Sandy	KY0000221	Chlorine, Free Available		X
KY	Big Sandy	KY0000221	Chlorine, Total Residual		X
KY	Big Sandy	KY0000221	Chromium, Total		X
KY	Big Sandy	KY0000221	Coliform, Fecal		X
KY	Big Sandy	KY0000221	Copper, Total		X
KY	Big Sandy	KY0000221	Dissolved Oxygen		X
KY	Big Sandy	KY0000221	Flow	X	
KY	Big Sandy	KY0000221	Hardness, Total	X	
KY	Big Sandy	KY0000221	Iron, Total		X
KY	Big Sandy	KY0000221	Lead, Total	X	
KY	Big Sandy	KY0000221	Mercury, Total	X	
KY	Big Sandy	KY0000221	Nickel, Total	X	
KY	Big Sandy	KY0000221	Nitrogen, Ammonia (NH3)		X
KY	Big Sandy	KY0000221	Oil & Grease		X
KY	Big Sandy	KY0000221	Oxidants, Total Residual		X
KY	Big Sandy	KY0000221	pH		X
KY	Big Sandy	KY0000221	Selenium, Total	X	
KY	Big Sandy	KY0000221	Silver, Total	X	
KY	Big Sandy	KY0000221	Solids, Total Suspended		X
KY	Big Sandy	KY0000221	Thallium, Total	X	
KY	Big Sandy	KY0000221	Toxicity, Whole Effluent		X
KY	Big Sandy	KY0000221	Zinc, Total		X
OH	Cardinal	0IB00009	Alkalinity, Total	X	
OH	Cardinal	0IB00009	Arsenic, Total	X	
OH	Cardinal	0IB00009	Barium, Total	X	
OH	Cardinal	0IB00009	Boron, Total	X	
OH	Cardinal	0IB00009	Cadmium, Total	X	
OH	Cardinal	0IB00009	Chemical Oxygen Demand		X
OH	Cardinal	0IB00009	Chloride, Total	X	
OH	Cardinal	0IB00009	Chlorine, Total Residual		X
OH	Cardinal	0IB00009	Chromium, Hexavalent	X	
OH	Cardinal	0IB00009	Chromium, Total	X	
OH	Cardinal	0IB00009	Coliform, Fecal		X
OH	Cardinal	0IB00009	Copper, Total	X	
OH	Cardinal	0IB00009	Flow	X	
OH	Cardinal	0IB00009	Fluoride, Total	X	
OH	Cardinal	0IB00009	Iron, Total	X	
OH	Cardinal	0IB00009	Lead, Total	X	
OH	Cardinal	0IB00009	Mercury, Total	X	
OH	Cardinal	0IB00009	Nickel, Total	X	
OH	Cardinal	0IB00009	Nitrite Plus Nitrate, Total	X	
OH	Cardinal	0IB00009	Nitrogen, Ammonia (NH3)		X
OH	Cardinal	0IB00009	Nitrogen, Total Kjeldahl	X	
OH	Cardinal	0IB00009	Oil & Grease		X
OH	Cardinal	0IB00009	pH		X
OH	Cardinal	0IB00009	Residue, Total Dissolved	X	
OH	Cardinal	0IB00009	Selenium, Total	X	
OH	Cardinal	0IB00009	Sludge Volume	X	
OH	Cardinal	0IB00009	Solids, Total Suspended		X
OH	Cardinal	0IB00009	Specific Conductance	X	
OH	Cardinal	0IB00009	Sulfate	X	
OH	Cardinal	0IB00009	Temperature	X	
OH	Cardinal	0IB00009	Thallium, Total		X
OH	Cardinal	0IB00009	Thermal Discharge - Heat Rejected		X
OH	Cardinal	0IB00009	Zinc, Total	X	
OH	Conesville	0IB00013	Boron, Total	X	
OH	Conesville	0IB00013	Cadmium, Total	X	
OH	Conesville	0IB00013	Chemical Oxygen Demand		X
OH	Conesville	0IB00013	Chloride, Total	X	
OH	Conesville	0IB00013	Chlorine, Total Residual		X
OH	Conesville	0IB00013	Coliform, Fecal		X

Table 1. AEP Coal-Fired Plants - List of NPDES Parameters

State	Plant	NPDES Permit	Parameter	Monitor Only	Limits
OH	Conesville	0IB00013	Copper, Total		X
OH	Conesville	0IB00013	Flow	X	
OH	Conesville	0IB00013	Iron, Total	X	
OH	Conesville	0IB00013	Lead, Total	X	
OH	Conesville	0IB00013	Mercury, Total	X	
OH	Conesville	0IB00013	Nickel, Total	X	
OH	Conesville	0IB00013	Nitrogen, Ammonia (NH3)	X	
OH	Conesville	0IB00013	Oil & Grease		X
OH	Conesville	0IB00013	Oxidants, Total Residual		X
OH	Conesville	0IB00013	pH		X
OH	Conesville	0IB00013	Residue, Total Dissolved	X	
OH	Conesville	0IB00013	Selenium, Total		X
OH	Conesville	0IB00013	Solids, Total Suspended		X
OH	Conesville	0IB00013	Sulfate	X	
OH	Conesville	0IB00013	Temperature	X	
OH	Conesville	0IB00013	Thermal Discharge - Heat Rejected	X	
OH	Conesville (FGD Landfill)	01N00101	Alkalinity, Total	X	
OH	Conesville (FGD Landfill)	01N00101	Arsenic, Total	X	
OH	Conesville (FGD Landfill)	01N00101	Barium, Total	X	
OH	Conesville (FGD Landfill)	01N00101	Calcium, Total	X	
OH	Conesville (FGD Landfill)	01N00101	Chloride, Total	X	
OH	Conesville (FGD Landfill)	01N00101	Flow	X	
OH	Conesville (FGD Landfill)	01N00101	Iron, Total	X	
OH	Conesville (FGD Landfill)	01N00101	Manganese, Total	X	
OH	Conesville (FGD Landfill)	01N00101	Nitrogen, Ammonia (NH3)	X	
OH	Conesville (FGD Landfill)	01N00101	pH		X
OH	Conesville (FGD Landfill)	01N00101	Precipitation, Total	X	
OH	Conesville (FGD Landfill)	01N00101	Residue, Total Dissolved	X	
OH	Conesville (FGD Landfill)	01N00101	Selenium, Total	X	
OH	Conesville (FGD Landfill)	01N00101	Sodium, Total	X	
OH	Conesville (FGD Landfill)	01N00101	Solids, Total Suspended		X
OH	Conesville (FGD Landfill)	01N00101	Specific Conductance	X	
OH	Conesville (FGD Landfill)	01N00101	Sulfate	X	
OH	Conesville (FGD Landfill)	01N00101	Temperature	X	
OH	General James M. Gavin	0IB00006	Boron, Total		X
OH	General James M. Gavin	0IB00006	Chemical Oxygen Demand		X
OH	General James M. Gavin	0IB00006	Cobalt, Total	X	
OH	General James M. Gavin	0IB00006	Coliform, Fecal		X
OH	General James M. Gavin	0IB00006	Color, Severity	X	
OH	General James M. Gavin	0IB00006	Copper, Total		X
OH	General James M. Gavin	0IB00006	Dissolved Oxygen		X
OH	General James M. Gavin	0IB00006	Flow	X	
OH	General James M. Gavin	0IB00006	Fluoride, Total	X	
OH	General James M. Gavin	0IB00006	Mercury, Total	X	
OH	General James M. Gavin	0IB00006	Nickel, Total	X	
OH	General James M. Gavin	0IB00006	Nitrogen, Ammonia (NH3)		X
OH	General James M. Gavin	0IB00006	Nitrogen, Total	X	
OH	General James M. Gavin	0IB00006	Odor, Severity	X	
OH	General James M. Gavin	0IB00006	Oil & Grease		X
OH	General James M. Gavin	0IB00006	pH		X
OH	General James M. Gavin	0IB00006	Solids, Total Suspended		X
OH	General James M. Gavin	0IB00006	Toxicity, Whole Effluent		X
OH	General James M. Gavin	0IB00006	Turbidity, Severity	X	
OH	Muskingum River	0IB00003	Arsenic, Total	X	
OH	Muskingum River	0IB00003	Chemical Oxygen Demand		X
OH	Muskingum River	0IB00003	Chlorine, Total Residual		X
OH	Muskingum River	0IB00003	Cobalt, Total	X	
OH	Muskingum River	0IB00003	Coliform, Fecal		X
OH	Muskingum River	0IB00003	Copper, Total	X	
OH	Muskingum River	0IB00003	Flow	X	
OH	Muskingum River	0IB00003	Iron, Total	X	
OH	Muskingum River	0IB00003	Mercury, Total	X	
OH	Muskingum River	0IB00003	Nickel, Total	X	

Table 1. AEP Coal-Fired Plants - List of NPDES Parameters

State	Plant	NPDES Permit	Parameter	Monitor Only	Limits
OH	Muskingum River	0IB00003	Nitrogen, Ammonia (NH3)	X	
OH	Muskingum River	0IB00003	Oil & Grease		X
OH	Muskingum River	0IB00003	Oxidants, Total Residual		X
OH	Muskingum River	0IB00003	pH		X
OH	Muskingum River	0IB00003	Solids, Total Suspended		X
OH	Muskingum River	0IB00003	Temperature	X	
OH	Muskingum River	0IB00003	Thermal Discharge - Heat Rejected	X	
OH	Muskingum River	0IB00003	Toxicity, Whole Effluent	X	
OH	Muskingum River	0IB00003	Zinc, Total	X	
OH	Picway	4IB00000	Flow	X	
OH	Picway	4IB00000	Oil & Grease		X
OH	Picway	4IB00000	pH		X
OH	Picway	4IB00000	Solids, Total Suspended		X
OH	Picway	4IB00000	Temperature	X	
OH	Picway	4IB00000	Thermal Discharge - Heat Rejected		X
OK	Northeastern	OK0034380	Ammonia, Total	X	
OK	Northeastern	OK0034380	Chlorine, Free Available		X
OK	Northeastern	OK0034380	Chlorine, Total Residual		X
OK	Northeastern	OK0034380	Flow	X	
OK	Northeastern	OK0034380	Mercury, Total	X	
OK	Northeastern	OK0034380	Oil & Grease		X
OK	Northeastern	OK0034380	pH		X
OK	Northeastern	OK0034380	Solids, Total Suspended		X
OK	Northeastern	OK0034380	Temperature	X	
OK	Northeastern	OK0034380	Toxicity, Whole Effluent	X	
OK	Northeastern 1 & 2 (Storm Water)	OKR050644	Visual Monitoring	X	
OK	Northeastern 3 & 4 (Storm Water)	OKR050581	Visual Monitoring	X	
TX	Oklaunion	WQ0002574000	Arsenic, Total		X
TX	Oklaunion	WQ0002574000	Barium, Total		X
TX	Oklaunion	WQ0002574000	Cadmium, Total		X
TX	Oklaunion	WQ0002574000	Chemical Oxygen Demand		X
TX	Oklaunion	WQ0002574000	Chromium, Total		X
TX	Oklaunion	WQ0002574000	Copper, Total		X
TX	Oklaunion	WQ0002574000	Flow	X	
TX	Oklaunion	WQ0002574000	Lead, Total		X
TX	Oklaunion	WQ0002574000	Manganese, Total		X
TX	Oklaunion	WQ0002574000	Mercury, Total		X
TX	Oklaunion	WQ0002574000	Nickel, Total		X
TX	Oklaunion	WQ0002574000	Oil & Grease		X
TX	Oklaunion	WQ0002574000	pH		X
TX	Oklaunion	WQ0002574000	Selenium, Total		X
TX	Oklaunion	WQ0002574000	Silver, Total		X
TX	Oklaunion	WQ0002574000	Solids, Total Dissolved		X
TX	Oklaunion	WQ0002574000	Solids, Total Suspended		X
TX	Oklaunion	WQ0002574000	Zinc, Total		X
TX	Oklaunion (Storm Water)	TXR05K809	Iron, Total	X	
TX	Pirkey	WQ0002496000	Biochemical Oxygen Demand		X
TX	Pirkey	WQ0002496000	Chlorine, Total Residual		X
TX	Pirkey	WQ0002496000	Copper, Total		X
TX	Pirkey	WQ0002496000	Flow	X	
TX	Pirkey	WQ0002496000	Iron, Total		X
TX	Pirkey	WQ0002496000	Oil & Grease		X
TX	Pirkey	WQ0002496000	pH		X
TX	Pirkey	WQ0002496000	Selenium, Total		X
TX	Pirkey	WQ0002496000	Solids, Total Suspended		X
TX	Pirkey	WQ0002496000	Temperature		X
TX	Pirkey	WQ0002496000	Toxicity, Whole Effluent	X	
TX	Pirkey (Storm Water)	TXR05N745	Iron, Total	X	
TX	Welsh	WQ0001811000	Biochemical Oxygen Demand		X
TX	Welsh	WQ0001811000	Chlorine, Free Available		X
TX	Welsh	WQ0001811000	Chlorine, Total Residual		X
TX	Welsh	WQ0001811000	Copper, Total		X
TX	Welsh	WQ0001811000	Flow		X

Table 1. AEP Coal-Fired Plants - List of NPDES Parameters

State	Plant	NPDES Permit	Parameter	Monitor Only	Limits
TX	Welsh	WQ0001811000	Iron, Total		X
TX	Welsh	WQ0001811000	Oil & Grease		X
TX	Welsh	WQ0001811000	pH		X
TX	Welsh	WQ0001811000	Selenium, Total		X
TX	Welsh	WQ0001811000	Solids, Total Suspended		X
TX	Welsh	WQ0001811000	Temperature	X	
TX	Welsh	WQ0001811000	Toxicity, Whole Effluent	X	
TX	Welsh (Storm Water)	TXR05P514	Iron, Total	X	
VA	Clinch River	VA0001015	Biochemical Oxygen Demand		X
VA	Clinch River	VA0001015	Chlorine, Total Residual		X
VA	Clinch River	VA0001015	Chromium, Total		X
VA	Clinch River	VA0001015	Coliform, Fecal		X
VA	Clinch River	VA0001015	Copper, Total		X
VA	Clinch River	VA0001015	Flow	X	
VA	Clinch River	VA0001015	Oil & Grease		X
VA	Clinch River	VA0001015	pH		X
VA	Clinch River	VA0001015	Solids, Total Suspended		X
VA	Clinch River	VA0001015	Toxicity, Whole Effluent	X	
VA	Clinch River	VA0001015	Zinc, Total		X
VA	Glen Lyn	VA0000370	Flow	X	
VA	Glen Lyn	VA0000370	Nickel, Total	X	
VA	Glen Lyn	VA0000370	Oil & Grease		X
VA	Glen Lyn	VA0000370	pH		X
VA	Glen Lyn	VA0000370	Solids, Total Suspended		X
VA	Glen Lyn	VA0000370	Thermal Discharge - Heat Rejected		X
VA	Glen Lyn	VA0000370	Zinc, Total	X	
WV	John E. Amos	WV0001074	Aluminum, Total		X
WV	John E. Amos	WV0001074	Arsenic, Total		X
WV	John E. Amos	WV0001074	Biochemical Oxygen Demand		X
WV	John E. Amos	WV0001074	Chemical Oxygen Demand	X	
WV	John E. Amos	WV0001074	Chloride, Total		X
WV	John E. Amos	WV0001074	Chlorine, Total Residual		X
WV	John E. Amos	WV0001074	Chromium, Total	X	
WV	John E. Amos	WV0001074	Coliform, Fecal		X
WV	John E. Amos	WV0001074	Copper, Total		X
WV	John E. Amos	WV0001074	Dissolved Oxygen	X	
WV	John E. Amos	WV0001074	Flow		X
WV	John E. Amos	WV0001074	Hardness, Total	X	
WV	John E. Amos	WV0001074	Iron, Total		X
WV	John E. Amos	WV0001074	Lead, Total	X	
WV	John E. Amos	WV0001074	Mercury, Total		X
WV	John E. Amos	WV0001074	Nickel, Total	X	
WV	John E. Amos	WV0001074	Nitrogen, Ammonia (NH3)		X
WV	John E. Amos	WV0001074	Nitrogen, Total	X	
WV	John E. Amos	WV0001074	Oil & Grease		X
WV	John E. Amos	WV0001074	pH		X
WV	John E. Amos	WV0001074	Phosphorus, Total	X	
WV	John E. Amos	WV0001074	Selenium, Total		X
WV	John E. Amos	WV0001074	Solids, Total Suspended		X
WV	John E. Amos	WV0001074	Sulfate	X	
WV	John E. Amos	WV0001074	Temperature	X	
WV	John E. Amos	WV0001074	Toxicity, Whole Effluent		X
WV	John E. Amos	WV0001074	Zinc, Total		X
WV	John E. Amos (FGD Landfill)	WV0116254	Alkalinity, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Aluminum, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Arsenic, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Barium, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Boron, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Cadmium, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Calcium, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Carbon, Total Organic	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Chemical Oxygen Demand	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Chloride, Total	X	

Table 1. AEP Coal-Fired Plants - List of NPDES Parameters

State	Plant	NPDES Permit	Parameter	Monitor Only	Limits
WV	John E. Amos (FGD Landfill)	WV0116254	Chromium, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Copper, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Flow	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Hardness, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Iron, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Lead, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Magnesium, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Manganese, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Mercury, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Molybdenum, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Nickel, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Nitrogen, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	pH	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Phosphorus, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Selenium, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Sodium, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Solids, Total Dissolved	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Solids, Total Suspended	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Specific Conductance	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Sulfate	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Vanadium, Total	X	
WV	John E. Amos (FGD Landfill)	WV0116254	Zinc, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Alkalinity, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Aluminum, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Arsenic, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Barium, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Boron, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Cadmium, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Calcium, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Carbon, Total Organic	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Chemical Oxygen Demand	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Chloride, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Chromium, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Copper, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Flow	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Hardness, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Iron, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Lead, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Magnesium, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Manganese, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Mercury, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Molybdenum, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Nickel, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Nitrogen, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	pH	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Phosphorus, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Selenium, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Sodium, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Solids, Total Dissolved	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Solids, Total Suspended	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Specific Conductance	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Sulfate	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Sulfate	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Vanadium, Total	X	
WV	John E. Amos (Quarrier Landfill)	WV0077046	Zinc, Total	X	
WV	Kammer	WV0005291	Aluminum, Total	X	
WV	Kammer	WV0005291	Biochemical Oxygen Demand		X
WV	Kammer	WV0005291	Chlorine, Total Residual		X
WV	Kammer	WV0005291	Coliform, Fecal		X
WV	Kammer	WV0005291	Copper, Total	X	
WV	Kammer	WV0005291	Flow		X
WV	Kammer	WV0005291	Iron, Total	X	
WV	Kammer	WV0005291	Nitrogen, Total	X	

Table 1. AEP Coal-Fired Plants - List of NPDES Parameters

State	Plant	NPDES Permit	Parameter	Monitor Only	Limits
WV	Kammer	WV0005291	Nitrogen, Total Kjeldahl		X
WV	Kammer	WV0005291	Oil & Grease		X
WV	Kammer	WV0005291	pH		X
WV	Kammer	WV0005291	Phosphorus, Total	X	
WV	Kammer	WV0005291	Solids, Total Suspended		X
WV	Kammer	WV0005291	Temperature	X	
WV	Kammer	WV0005291	Thermal Discharge - Heat Rejected		X
WV	Kammer	WV0005291	Toxicity, Whole Effluent	X	
WV	Kammer	WV0005291	Zinc, Total	X	
WV	Kanawha River	WV0001066	Aluminum, Total	X	
WV	Kanawha River	WV0001066	Chlorine, Total Residual		X
WV	Kanawha River	WV0001066	Flow	X	
WV	Kanawha River	WV0001066	Iron, Total	X	
WV	Kanawha River	WV0001066	Nitrogen, Total	X	
WV	Kanawha River	WV0001066	Oil & Grease		X
WV	Kanawha River	WV0001066	pH		X
WV	Kanawha River	WV0001066	Phosphorus, Total	X	
WV	Kanawha River	WV0001066	Solids, Total Suspended		X
WV	Kanawha River	WV0001066	Temperature	X	
WV	Kanawha River	WV0001066	Thermal Discharge - Heat Rejected		X
WV	Kanawha River	WV0001066	Zinc, Total	X	
WV	Mitchell	WV0005304	Aluminum, Total		X
WV	Mitchell	WV0005304	Antimony, Total	X	
WV	Mitchell	WV0005304	Arsenic, Total		X
WV	Mitchell	WV0005304	Barium, Total	X	
WV	Mitchell	WV0005304	Beryllium, Total	X	
WV	Mitchell	WV0005304	Biochemical Oxygen Demand		X
WV	Mitchell	WV0005304	Boron, Total	X	
WV	Mitchell	WV0005304	Cadmium, Total	X	
WV	Mitchell	WV0005304	Calcium, Total	X	
WV	Mitchell	WV0005304	Chloride, Total		X
WV	Mitchell	WV0005304	Chlorine, Total Residual		X
WV	Mitchell	WV0005304	Chromium, Total	X	
WV	Mitchell	WV0005304	Coliform, Fecal		X
WV	Mitchell	WV0005304	Copper, Total		X
WV	Mitchell	WV0005304	Flow	X	
WV	Mitchell	WV0005304	Iron, Total		X
WV	Mitchell	WV0005304	Lead, Total	X	
WV	Mitchell	WV0005304	Magnesium, Total	X	
WV	Mitchell	WV0005304	Manganese, Total	X	
WV	Mitchell	WV0005304	Mercury, Total		X
WV	Mitchell	WV0005304	Molybdenum, Total	X	
WV	Mitchell	WV0005304	Nickel, Total	X	
WV	Mitchell	WV0005304	Nitrogen Nitrate	X	
WV	Mitchell	WV0005304	Nitrogen Nitrite	X	
WV	Mitchell	WV0005304	Nitrogen, Ammonia (NH3)		X
WV	Mitchell	WV0005304	Nitrogen, Total	X	
WV	Mitchell	WV0005304	Nitrogen, Total Kjeldahl		X
WV	Mitchell	WV0005304	Oil & Grease		X
WV	Mitchell	WV0005304	pH		X
WV	Mitchell	WV0005304	Phosphorus, Total	X	
WV	Mitchell	WV0005304	Selenium, Total		X
WV	Mitchell	WV0005304	Sodium, Total	X	
WV	Mitchell	WV0005304	Solids, Total Dissolved	X	
WV	Mitchell	WV0005304	Solids, Total Suspended		X
WV	Mitchell	WV0005304	Specific Conductance	X	
WV	Mitchell	WV0005304	Sulfate	X	
WV	Mitchell	WV0005304	Thallium, Total	X	
WV	Mitchell	WV0005304	Zinc, Total	X	
WV	Mountaineer	WV0048500	Aluminum, Total	X	
WV	Mountaineer	WV0048500	Arsenic, Total		X
WV	Mountaineer	WV0048500	Chloride, Total	X	
WV	Mountaineer	WV0048500	Chlorine, Total Residual		X

Table 1. AEP Coal-Fired Plants - List of NPDES Parameters

State	Plant	NPDES Permit	Parameter	Monitor Only	Limits
WV	Mountaineer	WV0048500	Copper, Total		X
WV	Mountaineer	WV0048500	Flow	X	
WV	Mountaineer	WV0048500	Iron, Total	X	
WV	Mountaineer	WV0048500	Mercury, Total	X	
WV	Mountaineer	WV0048500	Nickel, Total		X
WV	Mountaineer	WV0048500	Nitrogen, Ammonia (NH3)		X
WV	Mountaineer	WV0048500	Nitrogen, Total	X	
WV	Mountaineer	WV0048500	Oil & Grease	X	
WV	Mountaineer	WV0048500	pH		X
WV	Mountaineer	WV0048500	Phosphorus, Total		X
WV	Mountaineer	WV0048500	Selenium, Total	X	
WV	Mountaineer	WV0048500	Solids, Total Suspended		X
WV	Mountaineer	WV0048500	Zinc, Total	X	
WV	Mountaineer (Landfill)	WV0077038	Alkalinity, Total	X	
WV	Mountaineer (Landfill)	WV0077038	Aluminum, Total	X	
WV	Mountaineer (Landfill)	WV0077038	Arsenic, Total	X	
WV	Mountaineer (Landfill)	WV0077038	Barium, Total	X	
WV	Mountaineer (Landfill)	WV0077038	Boron, Total	X	
WV	Mountaineer (Landfill)	WV0077038	Cadmium, Total	X	
WV	Mountaineer (Landfill)	WV0077038	Calcium, Total	X	
WV	Mountaineer (Landfill)	WV0077038	Chemical Oxygen Demand	X	
WV	Mountaineer (Landfill)	WV0077038	Chloride, Total	X	
WV	Mountaineer (Landfill)	WV0077038	Chromium, Total	X	
WV	Mountaineer (Landfill)	WV0077038	Flow	X	
WV	Mountaineer (Landfill)	WV0077038	Iron, Total	X	
WV	Mountaineer (Landfill)	WV0077038	Lead, Total	X	
WV	Mountaineer (Landfill)	WV0077038	Magnesium, Total	X	
WV	Mountaineer (Landfill)	WV0077038	Manganese, Total	X	
WV	Mountaineer (Landfill)	WV0077038	Molybdenum, Total	X	
WV	Mountaineer (Landfill)	WV0077038	Nickel, Total	X	
WV	Mountaineer (Landfill)	WV0077038	pH	X	
WV	Mountaineer (Landfill)	WV0077038	Selenium, Total	X	
WV	Mountaineer (Landfill)	WV0077038	Solids, Total Dissolved	X	
WV	Mountaineer (Landfill)	WV0077038	Solids, Total Suspended	X	
WV	Mountaineer (Landfill)	WV0077038	Specific Conductance	X	
WV	Mountaineer (Landfill)	WV0077038	Sulfate	X	
WV	Mountaineer (Landfill)	WV0077038	Vanadium, Total	X	
WV	Mountaineer (Landfill)	WV0077038	Zinc, Total	X	
WV	Philip Sporn	WV0001058	Aluminum, Total	X	
WV	Philip Sporn	WV0001058	Arsenic, Total		X
WV	Philip Sporn	WV0001058	Barium, Total		X
WV	Philip Sporn	WV0001058	Boron, Total	X	
WV	Philip Sporn	WV0001058	Cadmium, Total		X
WV	Philip Sporn	WV0001058	Calcium, Total	X	
WV	Philip Sporn	WV0001058	Chloride, Total	X	
WV	Philip Sporn	WV0001058	Chlorine, Total Residual		X
WV	Philip Sporn	WV0001058	Chromium, Total		X
WV	Philip Sporn	WV0001058	Copper, Total	X	
WV	Philip Sporn	WV0001058	Flow	X	
WV	Philip Sporn	WV0001058	Iron, Total		X
WV	Philip Sporn	WV0001058	Lead, Total		X
WV	Philip Sporn	WV0001058	Magnesium, Total	X	
WV	Philip Sporn	WV0001058	Manganese, Total	X	
WV	Philip Sporn	WV0001058	Mercury, Total	X	
WV	Philip Sporn	WV0001058	Molybdenum, Total	X	
WV	Philip Sporn	WV0001058	Nickel, Total		X
WV	Philip Sporn	WV0001058	Nitrogen, Total	X	
WV	Philip Sporn	WV0001058	Oil & Grease		X
WV	Philip Sporn	WV0001058	pH		X
WV	Philip Sporn	WV0001058	Phosphorus, Total	X	
WV	Philip Sporn	WV0001058	Selenium, Total		X
WV	Philip Sporn	WV0001058	Sodium, Total	X	
WV	Philip Sporn	WV0001058	Solids, Total Dissolved	X	

Table 1. AEP Coal-Fired Plants - List of NPDES Parameters

State	Plant	NPDES Permit	Parameter	Monitor Only	Limits
WV	Philip Sporn	WV0001058	Solids, Total Suspended		X
WV	Philip Sporn	WV0001058	Specific Conductance	X	
WV	Philip Sporn	WV0001058	Sulfate	X	
WV	Philip Sporn	WV0001058	Temperature	X	
WV	Philip Sporn	WV0001058	Temperature, Downstream	X	
WV	Philip Sporn	WV0001058	Temperature, Upstream	X	
WV	Philip Sporn	WV0001058	Thermal Discharge - Heat Rejected	X	
WV	Philip Sporn	WV0001058	Toxicity, Whole Effluent	X	
WV	Philip Sporn	WV0001058	Vanadium, Total	X	
WV	Philip Sporn	WV0001058	Zinc, Total		X
			TOTAL	313	201

Joint Testimony of Eric Schaeffer, Director, Environmental Integrity Project
and Lisa Evans, Attorney, Earthjustice
before the Subcommittee on Water Resources and the Environment
of the Committee on Transportation and Infrastructure
U.S. House of Representatives

April 30, 2009

Thank you, Mr. Chairman, for the opportunity to testify before the Subcommittee on Water Resources and Environment today. My name is Eric Schaeffer, and I am Director of the Environmental Integrity Project, a nonprofit and nonpartisan organization that advocates for more effective enforcement of federal environmental laws. I also served as director of the USEPA's civil enforcement program from 1997 to 2002. The testimony that follows is offered on behalf of myself and my colleague Lisa Evans, a senior attorney at Earthjustice and one of the nation's leading experts on coal ash. Our testimony will make the following points:

1) Coal ash is a hazardous material that tends to leak toxic metals into groundwater and surface water, especially when the ash is saturated or stored in wet ponds.

2) The discharge of wastewater from coal ash ponds, as well as the runoff from so-called dry landfills, can release arsenic, selenium and other pollutants in amounts known to be toxic to human health and aquatic life in our rivers and lakes. Despite the risks, discharges of toxic metals are generally not restricted under Clean Water Act permits at power plants and are often not even monitored.

3) Air pollution control equipment installed to comply with the Clean Air Act will generate thousands of tons of scrubber sludge at a typical power plant. USEPA and industry data show that the wastewater discharged from scrubber sludge treatment systems can release toxic metals like selenium in concentrations that are hundreds of times higher than water quality standards designed to protect aquatic life.

4) USEPA has promised to develop federal safeguards for the disposal of coal ash, but is also evaluating whether to set limits on the toxic discharges from ash and sludge treatment systems. The monitoring data indicate that such limits are overdue, and there is little time to lose.

Coal Ash is Hazardous

Coal contains toxic metals like arsenic, boron, cadmium, chromium, lead, and selenium. The National Research Council (NRC) observed in a 2006 report, Managing Coal Residue in Mines, burning coal increases the concentration of these pollutants; if the ash is saturated, these pollutants are likely to leak into groundwater or surface water. The NRC examined the growing practice of depositing ash in mines to reduce acid runoff and warned that, "the presence of high concentration levels in many leachates may increase the health or environmental risks near some mine sites." In fact, the USEPA has determined in recent reports that coal ash, when tested with a reliable leach test, exceeds the toxicity characteristic (the threshold for a hazardous waste determination) under the Resource Conservation and Recovery Act for both selenium and thallium.

Most ash is disposed of in landfills or in large ash ponds like the one that collapsed at the Tennessee Valley Authority's Kingston plant in Tennessee just before Christmas. While catastrophic releases remain a real risk at some disposal sites, the leak or discharge of toxic metals from the sites is a daily event at many locations. The USEPA has identified at least 67 proven or likely instances in which groundwater, creeks, wetlands or lakes have been seriously contaminated by arsenic, boron, selenium, and other metals released from ash disposal sites.

Many additional confirmed cases of contamination from coal ash are not on the USEPA's list, including ones that resulted in the destruction of drinking water supplies; the Agency acknowledged in 2000 that the threats from coal ash are likely to be far larger, due to the lack of monitoring at so many coal ash sites. For example nearly two-thirds of the ash ponds in America did not have groundwater monitoring as of 1999, and little has changed since then to require monitoring at these sites.

The U.S. electric power industry generates about 130 million tons of ash, scrubber sludge and other combustion residues annually according to the USEPA, or about 1,000 pounds per person. This volume of waste would fill 1 million train cars, and USEPA predicts that volume will swell to some 175 million tons annually in just six more years. That's comparable to the amount of household garbage that we generate in the U.S. every year, with one important difference: in most states, municipal landfills are subject to significantly more regulation that coal ash dump sites. Leaks from these unregulated operations may not only contaminate drinking water wells, but can also reach rivers and streams through adjacent aquifers.

Discharge of Toxic Metals from Coal Ash

While toxic metals held in ash ponds, landfills, and treatment systems can leak into groundwater, the wastewater residue from such operations is also routinely discharged into wetlands, creeks, rivers and lakes. Based on annual industry reports to the USEPA's Toxics Release Inventory, power plants are the second largest discharger of metals and metal compounds, releasing more than 2 million pounds in 2008. The actual volume may be significantly larger, since these discharges are not regulated by the USEPA, and are not routinely monitored or reported at many plants.

Our analysis of the limited data that are available through the USEPA indicates that power plants routinely discharge some toxic metals – particularly selenium – in concentrations that exceed water quality standards. For example, selenium is a toxic pollutant found in coal ash that is deadly to fish, and which can also damage the liver and other soft tissues in humans. USEPA has determined that chronic exposure to selenium at levels above 5 micrograms per liter – or about 5 parts per billion – is harmful to freshwater fish and other aquatic life. Some states have also adopted standards to limit acute (short-term) exposures to no more than 20 micrograms.

Data compiled from permit applications, monitoring reports, and sampling conducted for the USEPA identified at least thirty sites in which routine long-term discharges of selenium exceed 20 micrograms, and sometimes 100 micrograms (See attached Selenium chart). Selenium water quality standards are meant to protect receiving waters, and do not necessarily apply to the actual discharge of wastewater from pipes. But we have already learned the hard way that releasing selenium into rivers and lakes can decimate fish populations and make the surviving species unsafe to eat. For example, according to the USEPA, the discharge of selenium from a power plant wiped out 16 of 20 fish species in Belews Lake in North Carolina in the 1980s, while selenium contamination from Texas power plants in approximately the same decade led the state to recommend limiting consumption of fish.

Discharge of Toxic Metals from Scrubber Sludge

U.S. power plants that haven't already done so are scrambling to install scrubbers to reduce emissions of sulfur dioxide, in anticipation of Clean Air Act deadlines or to comply with enforcement increases. That is a welcome trend, since scrubbers can remove 95% of the sulfur compounds that cause acid rain and promote formation of fine particles that trigger asthma attacks, heart disease, and premature death. Less welcome is the news that alarming amounts of some of the metals that are stripped out of the smokestack are ending up in our waterways.

Scrubbers generate sludges that need to be periodically treated or dewatered to remove contaminants and reduce the need for additional landfill space. The limited monitoring data available from the USEPA show that selenium levels in wastewater that is discharged from scrubber sludge can be sky-high, reaching concentrations in excess of 1000 parts per billion, or hundreds of times higher than the USEPA's recommended water quality standard of 5 parts per billion.

Release of Arsenic and Other Pollutants

The limited monitoring data available show that power plants also release other pollutants at levels that exceed drinking water standards or limits meant to protect recreational uses like swimming and fishing. The USEPA has established a maximum contaminant level of 10.0 micrograms per liter for arsenic in drinking water. States like Tennessee use the same threshold in waters used for recreational purposes, recognizing that arsenic becomes increasingly concentrated as it moves up the food chain, which could potentially make some fish unsafe to eat. USEPA data identify at least 20 power plants where arsenic levels in wastewater discharges routinely exceed 20 micrograms per liter, or at least twice the recommended federal standard for drinking water or recreational waters. Again, this is likely an understatement, as so few monitoring data actually exist.

EPA Needs to Regulate Before It Is Too Late

Air pollution controls create mountains of ash and sludge, and these already staggering volumes will grow rapidly as companies move to comply with new Clean Air Act requirements. But cleaner air should not mean dirtier water, and the USEPA needs to establish strict standards to make sure that we are not just trading one problem for another.

- After decades of delay, the USEPA has promised to propose standards for safe disposal of coal ash no later than the end of this year. Those standards should recognize that coal ash is a hazardous waste. In addition, those standards should apply to scrubber sludges and other types of combustion residue, and address potential risks to both human health and the environment. In particular, the regulations should prevent both the contamination of drinking water, and the pollution of surface waters from adjacent aquifers from both existing and retired coal ash dump sites.

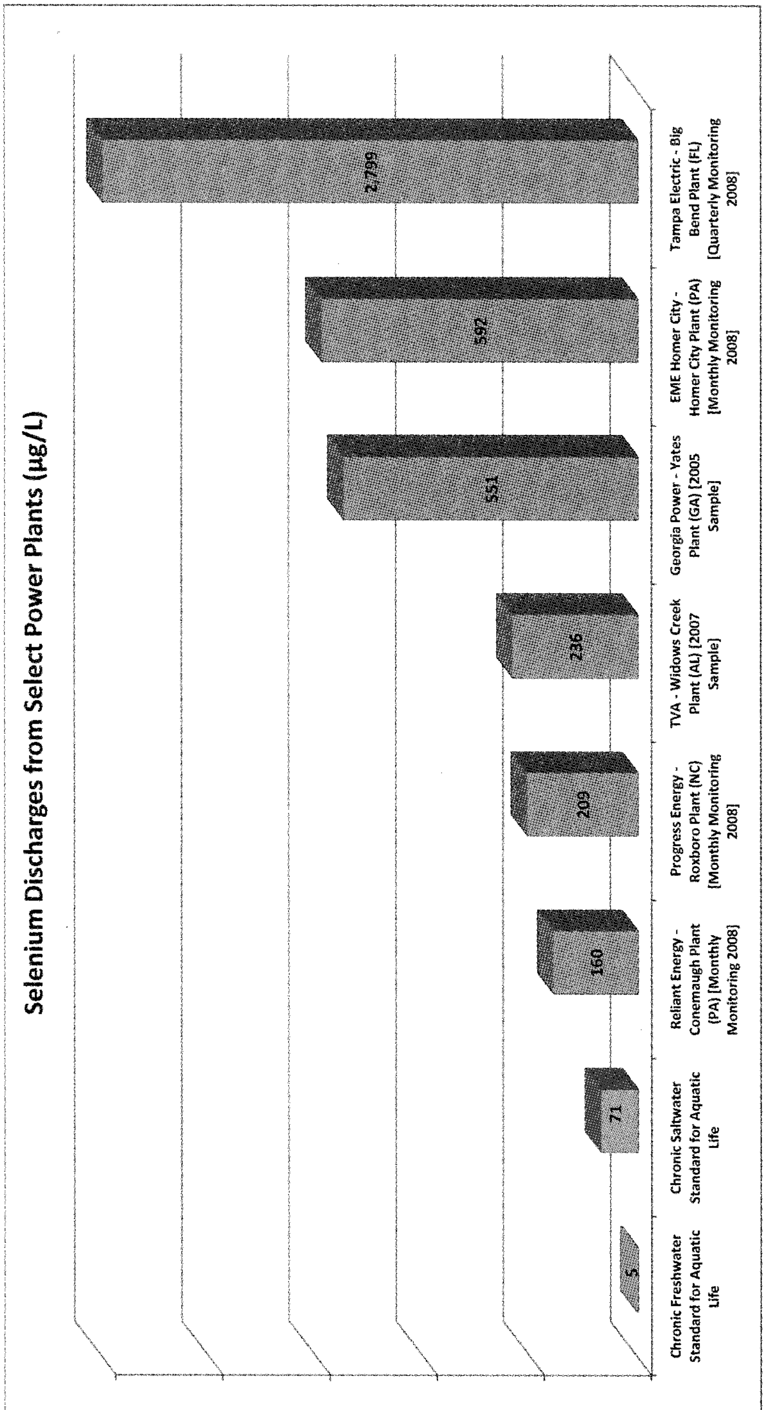
- USEPA standards should also apply to the disposal of coal ash in mines, quarries and other sites that have escaped virtually any common sense safeguards due to exemptions in state laws that are exploited in the absence of federal action.

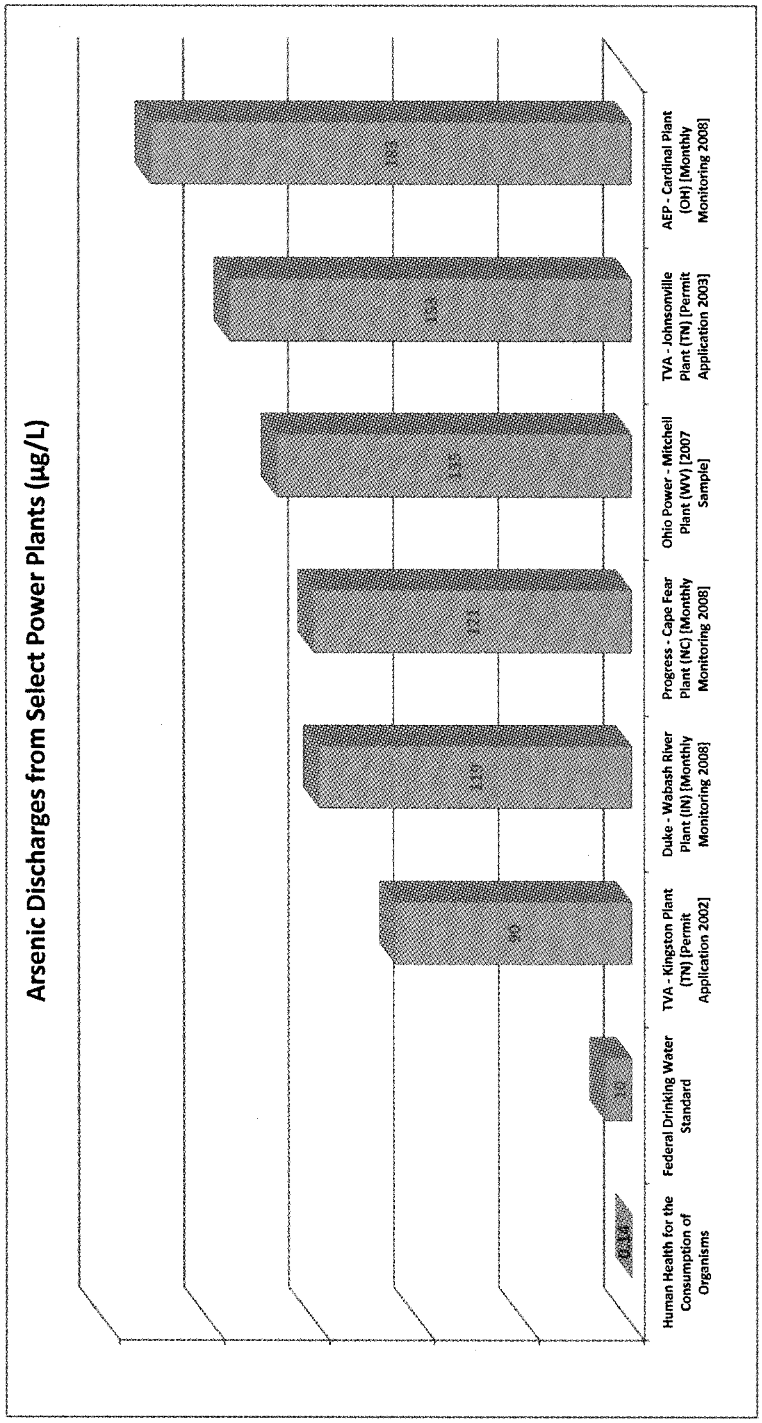
- Wet storage of coal ash should be phased out as quickly as possible, as the highest threats to human health and the environment occur when coal ash is placed in water.

- USEPA is evaluating the need to set limits on toxic discharges from coal plants – the data it has gathered so far, and the expected growth in waste from new air pollution control equipment, indicate that there is little time to lose. USEPA should move immediately to require more extensive monitoring of the discharge of arsenic, selenium, and other toxic pollutants from power plants and should set discharge limits, including zero discharge limits, consistent with water quality criteria for toxic substances.

- In at least some cases, power plants may be violating federally enforceable permit requirements or rules that limit discharges that contribute to a violation of water quality standards. USEPA's enforcement program, working with state agencies, should investigate and take action where serious violations can be established.

Thank you again for the opportunity to testify and for your attention to this important issue, and I will be pleased to answer any questions that you may have.


Selenium Discharges from Select Power Plants (μg/L)
5
71
160
209
236
551
592
2,799
Chronic Freshwater Standard for Aquatic Life
Chronic Saltwater Standard for Aquatic Life
Reliant Energy - Conemaugh Plant (PA) [Monthly Monitoring 2008]
Progress Energy - Roxboro Plant (NC) [Monthly Monitoring 2008]
TVA - Widows Creek Plant (AL) [2007 Sample]
Georgia Power - Yates Plant (GA) [2005 Sample]
EME Homer City - Homer City Plant (PA) [Monthly Monitoring 2008]
Tampa Electric - Big Bend Plant (FL) [Quarterly Monitoring 2008]


Arsenic Discharges from Select Power Plants (µg/L)
0.14
10
90
119
121
135
153
183
Human Health for the Consumption of Organisms
Federal Drinking Water Standard
TVA - Kingston Plant (TN) [Permit Application 2002]
Duke - Wabash River Plant (IN) [Monthly Monitoring 2008]
Progress - Cape Fear Plant (NC) [Monthly Monitoring 2008]
Ohio Power - Mitchell Plant (WV) [2007 Sample]
TVA - Johnsonville Plant (TN) [Permit Application 2003]
AEP - Cardinal Plant (OH) [Monthly Monitoring 2008]

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May 6, 2009

Eddie Bernice Johnson, Chairwoman
Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure
U.S. House of Representatives
111th Congress
2165 Rayburn House Office Building
Washington, DC 20515

Dear Congresswoman Johnson:

Thank you again for the opportunity to testify last week regarding the discharge of toxic metals from coal ash ponds and scrubber sludge treatment systems. I am writing to clarify several points in light of questions that have arisen about some of the data we presented and the May 3, 2009 story published in the *Washington Post.*

1) Our charts included arsenic or selenium concentrations at four plants – Big Bend, Roxboro, Cape Fear, and Kingston – where discharges from ash or sludge systems appear to mix with other effluent, such as cooling water, before final discharge to surface water. The expanded volume of the combined discharge will significantly reduce concentrations of these toxic metals, although it will not reduce their mass. Unfortunately, the plants apparently do not monitor or report selenium concentrations at the final discharge point. We have attached a revised bar chart with a note indicating that concentrations are likely to be lower at these plants at the point of final discharge.

2) We have removed the Yates plant from the revised bar charts, as it appears that discharges from the scrubber system may undergo additional treatment prior to their final release. The company reported discharging a large quantity of selenium (1200 pounds) to surface waters in 2007, according to the USEPA's Toxics Release Inventory, but lack of monitoring makes it difficult to determine the concentration at the final outfall.

3) We have confirmed after closely reviewing permit applications and other available data that discharges from ash and scrubber systems on the original bar charts flow directly to receiving waters. In addition, we are attaching detailed charts documenting selenium or arsenic concentrations in discharges from ash ponds or scrubber systems at 40 different plants, which also identifies whether those discharges are direct (most cases), or may be mixed with other effluents

before final release. The charts also provide an estimate of the mass associated with each discharge where that is possible to determine from flow rate data. As noted in our testimony, many plants do not monitor discharges of arsenic, selenium, or other toxic metals at all.

4) The chart displayed in the *Washington Post* story on May 3, 2009 indicated that EPA had established arsenic water quality criteria of ten micrograms per liter to protect saltwater aquatic life. As the chart presented in our testimony clearly indicates, that is incorrect; ten microgram per liter is a drinking water standard designed to protect human health. As noted in our testimony, some states (Tennessee) have also adopted the ten microgram standard to protect humans from exposure during recreational use of rivers or streams.

5) We tried to make clear in both written and oral testimony that water quality criteria apply to surface waters and do not necessarily legally limit what can be discharged at the end of the pipe. But we feel strongly that discharges of this magnitude warrant investigation by the EPA's enforcement program and should compel the agency to develop effluent limitation guidelines that limit both the concentration and mass of toxic metals discharged from power plants.

We appreciate this opportunity to clarify our testimony, and your own thoughtful inquiry into this important matter.

Sincerely,

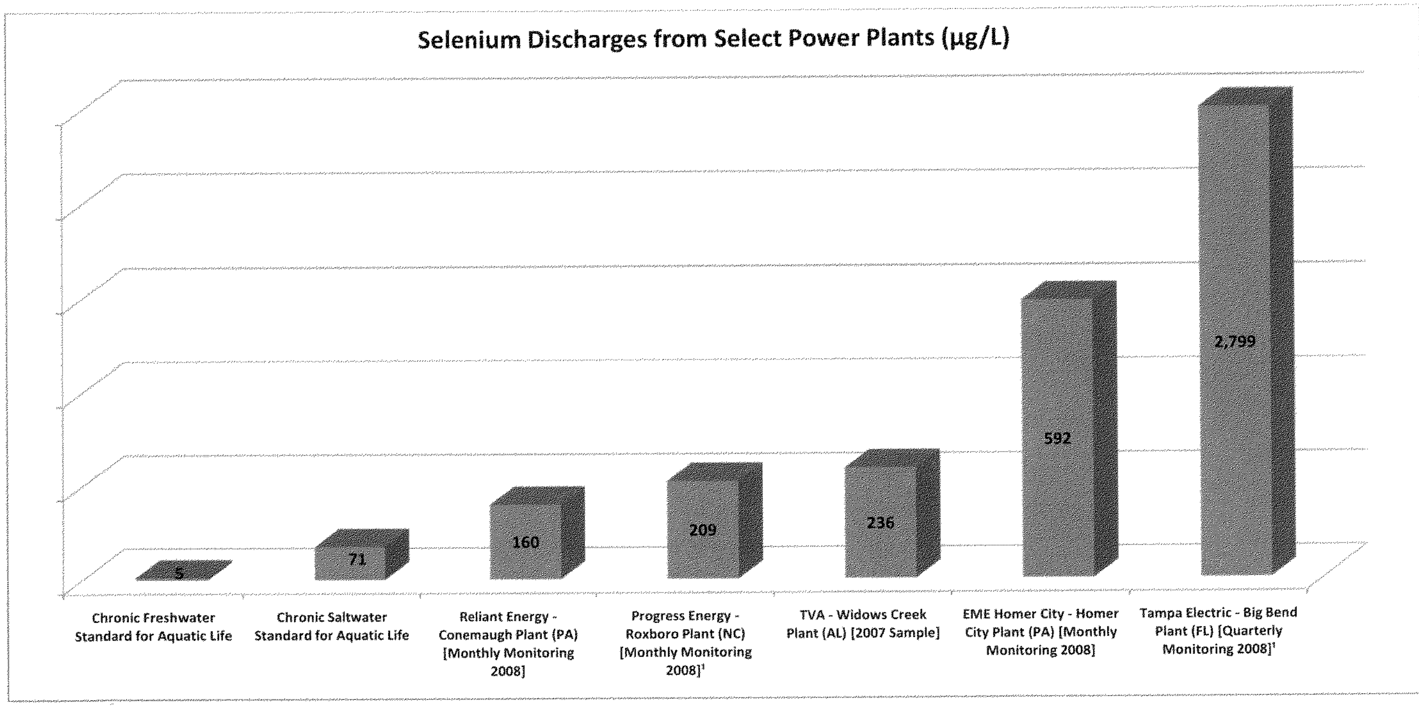
Eric Schaeffer

Eric Schaeffer, Director
Environmental Integrity Project

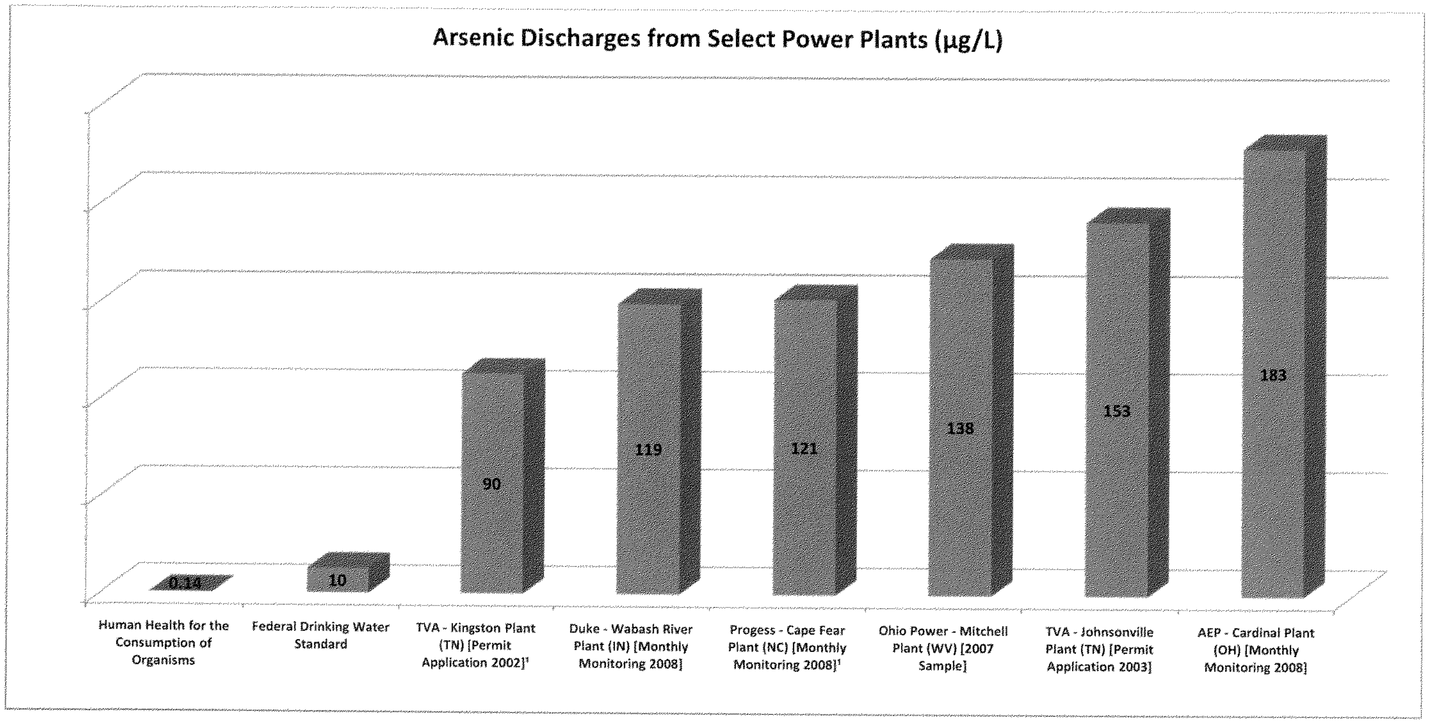
Lisa Evans, Senior Attorney
Earthjustice

CC: John Boozman, Ranking Member
Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure
U.S. House of Representatives
111th Congress
2165 Rayburn House Office Building
Washington, DC 20515

Enclosures



[1]Data reports that scrubber sludge from the Big Bend and Roxboro facilities are mixed with other effluents before final discharge. Concentrations in final discharge will likely be lower.



[1]Data reports that effluent from the Cape Fear and TVA Kingston ash ponds may be mixed with other effluents before final discharge. Concentrations in final discharge will likely be lower.

Selenium Monitoring Results at Select Facilities

EPA Recommended Chronic Freshwater Criteria for Aquatic Life = 5 μg/L; EPA Recommended Chronic Saltwater Criteria for Aquatic Life = 71 μg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (μg/L)	READING: MAXIMUM SAMPLE VALUE (μg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentra-tion Flow Maximum)	Primary Source	EPA Docket ID
AL	TVA	Widows Creek	008	FGD Waste Pond	Direct Discharge to Tennessee River	3.88	9.9	1	131	131	4.2390	10.8159	NPDES Permit No. AL0003875 App. (Apr. 2004)	EPA-HQ-OW-2006-0771-1797.84
AL	TVA	Widows Creek	SP-2	FGD Waste-water	Direct Discharge to Widows Creek	1.68	Data Not Available	1	236	236	3.3066	N/A	Sample (9/11/2007)	EPA-HQ-OW-2006-0771-1733
FL	Tampa Electric	Big Bend	130	FGD Waste-water	Discharge through Internal Outfalls D0011, D0012, D0013, and D0014 to Discharge Canal to Hillsborough Bay[1]	0.25	0.313	4	2,798.5	4,911	5.8347	7.3051	ECHO Quarterly Moni-toring (2008)	EPA-HQ-OW-2006-0771-1797.7
GA	Georgia Power	Bowen	01A	Ash Pond	Through Outfall 01 to Etowah River[2]	Data Not Available	Data Not Available	1	37	37	N/A	N/A	Sample (11/20/2006)	EPA-HQ-OW-2006-0771-0592.45

Selenium Monitoring Results at Select Facilities

EPA Recommended Chronic Freshwater Criteria for Aquatic Life = 5 µg/L; EPA Recommended Chronic Saltwater Criteria for Aquatic Life = 71 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentration Flow Maximum)	Primary Source	EPA Docket ID
GA	Georgia Power	Yates	01	Ash Pond	Direct Discharge to Chattahoochee River	21.6	Data Not Available	1	59	59	10.6283	N/A	Sample (12/4/ 2006)	EPA-HQ-OW-2006-0771-0592.67; -0592.55
GA	Georgia Power	Yates	01	Ash Pond	Direct Discharge to Chattahoochee River	21.6	Data Not Available	1	32	32	5.7645	N/A	Sample (12/5/ 2005)	EPA-HQ-OW-2006-0771-0378; 0592.55
IL	Ameren	Mere-dosia	004	Ash Pond	Direct Discharge to Illinois River	0.2	0.6	1	26	26	0.0434	0.1301	NPDES Permit No. IL0000116 App. (2002)	EPA-HQ-OW-2006-0771-1797.57
IN	Duke Energy	Cayuga	002	Ash Pond	Direct Discharge to Wabash River	1.25	3.6	24	<20	50	<0.2085	0.6005	NPDES Permit No. IN0002763 App. (Feb. 2006)	EPA-HQ-OW-2006-0771-1797.17

Selenium Monitoring Results at Select Facilities

EPA Recommended Chronic Freshwater Criteria for Aquatic Life = 5 µg/L; EPA Recommended Chronic Saltwater Criteria for Aquatic Life = 71 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentration on Flow Maximum)	Primary Source	EPA Docket ID
IN	Vectren	A.B. Brown	004	Ash Pond	Direct Discharge to Unnamed Tributary to Ohio River	1.4	1.4	1	130	130	1.5178	1.5178	ECHO Sample (3/31/2008)	EPA-HQ-OW-2006-0771-0341
KY	AEP	Big Sandy	001	Ash Pond	Direct Discharge to Blaine Creek	6.421	12.13	6	27	35	1.4458	2.7314	NPDES Permit No. KY0000221 App. (Sept. 2005)	EPA-HQ-OW-2006-0771-1797.8
KY	Louisville Gas & Electric	Mill Creek	002	Ash Pond	Data Not Available	Data Not Available	Data Not Available	4	58.3	75	N/A	N/A	Quarterly Moni-toring (2006)	EPA-HQ-OW-2006-0771-0416.15
MD	Mirant	Brandy-wine	002	Discharge from Ash Disposal Facility	Data Not Available	Data Not Available	Data Not Available	5	20.4	35	N/A	N/A	ECHO Monthly Moni-toring (2008)	
MD	Mirant	Brandy-wine	006	Discharge from Ash Disposal Facility	Data Not Available	Data Not Available	Data Not Available	8	25.4	59	N/A	N/A	ECHO Monthly Moni-toring (2008)	

Selenium Monitoring Results at Select Facilities

EPA Recommended Chronic Freshwater Criteria for Aquatic Life = 5 μg/L; EPA Recommended Chronic Saltwater Criteria for Aquatic Life = 71 μg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maximum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (μg/L)	READING: MAXIMUM SAMPLE VALUE (μg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentration on Flow Maximum)	Primary Source	EPA Docket ID
NC	Duke Energy	Cliffside	002	Ash Pond	Direct Discharge to Broad River	7.33103	14.3233	12	22.4	30.2	1.3695	2.6758	ECHO Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-1797.18
NC	Duke	Marshall	004	FGD Wastewater	Through Outfall 002 (ash basin) to Lake Norman (i.e., Catawba River)[3]	1.02119	1.21443	5	86	200	0.7324	0.8710	ECHO Monthly Monitoring (8/2008 to 12/ 2008)	EPA-HQ-OW-2006-0771-1742
NC	Progress Energy Carolinas	Asheville Steam Plant	001	Ash & FGD Wastewater	Direct Discharge to French Broad River	1.9175	5.215	12	62.1	91.3	0.9931	2.7009	ECHO Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-1797.3
NC	Progress Energy	Roxboro	010	FGD Wastewater	Through Outfall 003 (discharge canal) to Hyco Lake[4]	0.578	1.265	9	209.5	510	1.0099	2.2102	ECHO Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-1556; 0300.9

Selenium Monitoring Results at Select Facilities

EPA Recommended Chronic Freshwater Criteria for Aquatic Life = 5 µg/L; EPA Recommended Chronic Saltwater Criteria for Aquatic Life = 71 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentrati on Flow Maximum)	Primary Source	EPA Docket ID
OH	AEP and Buckeye	Cardin-al[5]	019	Ash and FGD Leachate	Direct Discharge to Blockhouse Hollow Run	9.398	16.85	5	68	100	5.3297	9.5558	ECHO Monthly Mon-itoring, NPDES Permit No. OH001258 1 App. (Aug. 2008 - Dec. 2008)	EPA-HQ-OW-2006-0771-1797.15
OH	American Electric Power and Buckeye Power	Cardinal	019	Ash and FGD Leachate	Direct Discharge to Blockhouse Hollow Run	11	18	1	53	53	4.8621	7.9562	NPDES Permit No. OH001258 1 App. (Jan. 2007)	EPA-HQ-OW-2006-0771-1797.15

Selenium Monitoring Results at Select Facilities

EPA Recommended Chronic Freshwater Criteria for Aquatic Life = 5 µg/L; EPA Recommended Chronic Saltwater Criteria for Aquatic Life = 71 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentrati on Flow Maximum)	Primary Source	EPA Docket ID
OH	AEP and Duke Energy	Cones-ville	601	Ash and FGD Waste Pond	Through Outfall 001 to Muskingum River[6]	13.61	22.9	1	25	25	2.8376	4.7745	NPDES Permit No. OH005956 1 App. (Jan. 2007)	EPA-HQ-OW-2006-0771-1797.20
OH	Dayton Power & Light	J.M. Stuart	013	Ash Pond	Final Outfall to Ohio River	11.6818	21.8762	12	52.9	95.4	5.1537	9.6513	ECHO Monthly Moni-toring (2008)	
PA	Reliant Energy	Cone-maugh	007	Mixed	Direct Discharge to Conemaugh River	0.228	0.395	11	159.6	560	0.3035	0.5258	ECHO Moni-toring (2008)	EPA-HQ-OW-2006-0771-0123
PA	EME Homer City	Homer City	027	FGD Waste-water	Direct Discharge to Blacklick Creek	0.11	0.17	12	591.7	2,600	0.5428	0.8389	ECHO Monthly Moni-toring (2008)	EPA-HQ-OW-2006-0771-0683
TN	TVA	Allen	001	Ash Pond	Direct Discharge to McKellar Lake	9.56	9.79	1	30.5	30.5	2.4317	2.4902	ECHO Moni-toring (Aug. 2008)	EPA-HQ-OW-2006-0771-1797.1

Selenium Monitoring Results at Select Facilities

EPA Recommended Chronic Freshwater Criteria for Aquatic Life = 5 µg/L; EPA Recommended Chronic Saltwater Criteria for Aquatic Life = 71 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentrati on Flow Maximum)	Primary Source	EPA Docket ID
TN	TVA	Allen	001	Ash Pond	Direct Discharge to McKellar Lake	8.21	11.52	1	38	38	2.6019	3.6508	NPDES Permit No. TN000535 5 App. (Oct. 2004)	EPA-HQ-OW-2006-0771-1797.1
TN	TVA	Cumber-land	001	Ash & FGD Waste Pond	Through DSN002 to Cumberland River[7]	19.7	32.9	1	130	130	21.3583	35.6694	NPDES Permit No. TN000578 9 App. (May 2005)	EPA-HQ-OW-2006-0771-1797.21
TN	TVA	Gallatin	001	Ash Pond	Direct Discharge to Cumberland River	25.17	28.2	3	29	39	6.0875	6.8203	ECHO Moni-toring (2008)	EPA-HQ-OW-2006-0771-1797.30

Selenium Monitoring Results at Select Facilities

EPA Recommended Chronic Freshwater Criteria for Aquatic Life = 5 μg/L; EPA Recommended Chronic Saltwater Criteria for Aquatic Life = 71 μg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (μg/L)	READING: MAXIMUM SAMPLE VALUE (μg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentration Flow Maximum)	Primary Source	EPA Docket ID
TN	TVA	Gallatin	001	Ash Pond	Direct Discharge to Cumberland River	22.1	88.5	13	26	40	4.7921	19.1899	NPDES Permit No. TN0005428 App. (May 2004)	EPA-HQ-OW-2006-0771-1797.30
TN	TVA	Kingston	001	Ash Pond	Through Plant Intake Canal to Clinch River	24.7	42.2	1	24	24	4.9438	8.4466	NPDES Permit No. TN0005452 App. (Dec. 2002)	EPA-HQ-OW-2006-0771-1797.45
VA	Dominion	Chester-field	004	Ash Pond	Direct Discharge to James River, Farrar Gut	7.7	10.5	4	23	27	1.4770	2.0141	NPDES Permit No. VA0004146 App. (Aug. 2001)	EPA-HQ-OW-2006-0771-1797.16
WI	Wisconsin Electric	Pleasant Prairie	102	FGD Waste-water	Through Outfall 001 to Lake Michigan[8]	0.0648	0.0648	35	6,488.5	18,000	3.5065	3.5065	FGD Monitor-ing Data (2007)	EPA-HQ-OW-2006-0771-0699; 1542.1; 1542.2; 1803.1

Selenium Monitoring Results at Select Facilities

EPA Recommended Chronic Freshwater Criteria for Aquatic Life = 5 µg/L; EPA Recommended Chronic Saltwater Criteria for Aquatic Life = 71 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentrati on Flow Maximum)	Primary Source	EPA Docket ID
WV	Appalachian Power	John B. Amos	001	Ash Pond	Direct Discharge to Little Scary Creek	0.16	8.43	12	24.3	31.1	0.0324	1.7084	ECHO Monthly Monitor-ing (2008)	EPA-HQ-OW-2006-0771-0589.2
WV	Appalachian Power	Moun-taineer	001	Ash Pond	Direct Discharge to Ohio River	3	7.7	12	77.8	152	1.9465	4.9960	ECHO Monthly Monitor-ing (2008)	EPA-HQ-OW-2006-0771-1797.64
WV	Ohio Power	Mitchell	004	Ash Pond	Direct Discharge to Fish Creek (to Ohio River)	1.872	11.913	12	53.1	94.7	0.8290	5.2756	ECHO Monthly Monitor-ing (2008)	EPA-HQ-OW-2006-0771-1736

[1] There was no monitoring data available from the applicable Discharge Canal at the Big Bend facility for selenium.

[2] There was no monitoring data available for Outfall 01 on ECHO from the Bowen facility for selenium.

[3] The ECHO database provided selenium readings from Outfall 002 of 11.6 ug/L (maximum) and 6.53 (average of 5 months) for the Marshall facility. These readings are lower than those from Outfall 004, but still higher than the recommended 5 ug/L limit.

[4] The Roxboro Power Plant does not monitor or report selenium discharges from Outfall 003 to EPA's ECHO database.

[5] EPA's ECHO database did provide selenium values for the months of January to August of 2008 in addition to the months on this chart for AEP's Cardinal Power Plant. However, because the numbers reported for those months were abnormally high (25,150 - 98,050 µg/L), EIP excluded these values from the average.

[6] Selenium readings from Outfall 001 in the same Conesville permit application were 67 ug/L (maximum daily) and 1.7 ug/L (mean of 44 samples).

[7] The selenium concentration from DSN002 in the same permit application was 1 ug/L with an average flow reading fo 2,485 MGD. Therefore, although the concentration of selenium in the effluent from DSN002 appears to be lower, the amount of selenium being discharged into the Cumberland River was roughly the same as what was coming out of Outfall 001 - an average of 20.724 lbs/day.

[8] There was no selenium monitoring data available from Outfall 001 for the Pleasant Prairie facility.

Arsenic Monitoring Results from Select Facilities

Federal Drinking Water Standard = 10 µg/L, TN Recreational Criteria = 10 µg/L, EPA Recommended Human Health (Consumption of Organism) = 0.14 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentra-tion Flow Average)	LBS/DAY (Mean Concentra-tion Flow Maximum)	Primary Source	EPA Docket ID
AL	AL Power	Gadsden	002	Ash Pond	Direct Discharge to Coosa River	2.42	7.89	12	50.3	184	1.0152	3.3098	ECHO Monthly Monitoring (2008)	
AL	AL Power	Gaston	004	Ash Pond	Direct Discharge to Coosa River	13	29.4	4	32.8	43	3.5561	8.0422	ECHO Quarterly Monitoring (2008)	EPA-HQ-OW-2006-0771-1797.24
AL	TVA	Widows Creek	SP-2	FGD Effluent	Direct Discharge to Widows Creek	N/A	N/A	1	46.7	46.7	N/A	N/A	Sample (9/11/2007)	EPA-HQ-OW-2006-0771-1733
AL	TVA	Widows Creek	001	Ash Pond	Direct Discharge to Tennessee River	24.15	51.84	11	36	55	7.2506	15.5641	NPDES Permit No. AL8640006690 App. (Apr. 2004)	EPA-HQ-OW-2006-0771-1797.84
KY	TVA	Paradise	001	Ash Pond	Direct Discharge to Jacobs Creek	25.5	36.5	1	23	23	4.8913	7.0013	NPDES Permit No. KY0004201 App. (Feb. 2002)	EPA-HQ-OW-2006-0771-1797.66
IN	Duke	Wabash River	002	Ash	Direct Discharge to Wabash River	7.01	9.81	12	118.7	181	6.9395	9.7113	ECHO Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-1797.81

Arsenic Monitoring Results from Select Facilities

Federal Drinking Water Standard = 10 μg/L, TN Recreational Criteria = 10 μg/L, EPA Recommended Human Health (Consumption of Organism) = 0.14 μg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maxi-mum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (μg/L)	READING: MAXIMUM SAMPLE VALUE (μg/L)	LBS/DAY (Mean Concentra-tion Flow Average)	LBS/DAY (Mean Concentra-tion Flow Maximum)	Primary Source	EPA Docket ID
MO	Ameren	Sioux	006	Ash Pond	Discharge to Mississippi River via Poeling Lake	2.4	2.8	1	20	20	0.4003	0.4670	NPDES Permit No. MO0000353 Application	EPA-HQ-OW-2006-0771-1797.78
NC	Duke	Buck	002	Ash Pond	Direct Discharge to Yadkin River	0.1	9.7	4	42.2	57.9	0.0352	3.4138	ECHO Quarterly Monitoring (2007)	EPA-HQ-OW-2006-0771-1797.13
NC	Duke	Dan River	002	Ash Pond	Direct Discharge to Dan River	0.2	1.7	11	35	59.9	0.0584	0.4962	ECHO Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-1797.22
NC	Duke	River-bend	002	Ash Pond	Direct Discharge to Catawba River (Mountain Island Lake)	1.4	7.8	5	31.1	69.4	0.3631	2.0231	Echo Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-1797.74
NC	Progress	Asheville	001	Ash Treat-ment System	Direct Discharge to French Broad River	1.9	10.6	12	38.3	66.5	0.6069	3.3858	ECHO Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-0300.2
NC	Progress	Cape Fear	005	Ash Pond	Discharge to Unnamed Tributary to Cape Fear River via Outfall 007[1]	0.6	0.6	2	121	128	0.6055	0.6055	ECHO Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-1797.14

Arsenic Monitoring Results from Select Facilities

Federal Drinking Water Standard = 10 μg/L, TN Recreational Criteria = 10 μg/L, EPA Recommended Human Health (Consumption of Organism) = 0.14 μg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maximum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (μg/L)	READING: MAXIMUM SAMPLE VALUE (μg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentration Flow Maximum)	Primary Source	EPA Docket ID
NC	Progress	Mayo	002	Ash	Direct Discharge to Mayo Lake	6.525	15.31	4	33.3	45	1.8121	4.2518	ECHO Quarterly Monitoring (2008)	EPA-HQ-OW-2006-0771-0300.26
OH	AEP	Cardinal	19	Ash Pond	Direct Discharge to Blockhouse Hollow Run	9.398	77.09	12	182.6	320	14.3117	117.3965	ECHO Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-1797.15
SC	Santee Cooper (SCPSA)	Grainger	001	Ash Pond	Discharge to Waccamaw River[2]	0.52	2.8	10	31.8	72	0.1379	0.7426	ECHO Monthly Monitoring (2008)	
SC	Santee Cooper (SCPSA)	Jefferies	003	Ash Pond	Discharge to Tailrace Canal[3]	3.299	3.426	10	52.8	103	1.4527	1.5086	ECHO Monthly Monitoring (2008)	
TN	TVA	Allen	001	Ash Pond	Direct Discharge to McKellar Lake	8.21	11.52	1	43	43	2.9442	4.1312	NPDES Permit No. TN0005355 App. (Oct. 2004)	EPA-HQ-OW-2006-0771-1797.1
TN	TVA	Gallatin	001	Ash Pond	Direct Discharge to Cumberland River	22.1	88.5	13	18	34	3.3176	13.2853	NPDES Permit No. TN564000667 7 App. (May 2004)	EPA-HQ-OW-2006-0771-1797.30

Arsenic Monitoring Results from Select Facilities

Federal Drinking Water Standard = 10 µg/L, TN Recreational Criteria = 10 µg/L, EPA Recommended Human Health (Consumption of Organism) = 0.14 µg/L

State	Company	Plant	Outfall	Waste Type	Receiving Water	Flow Average (mgd)	Flow Maximum (mgd)	# of Samples	READING: MEAN SAMPLE VALUE (µg/L)	READING: MAXIMUM SAMPLE VALUE (µg/L)	LBS/DAY (Mean Concentration Flow Average)	LBS/DAY (Mean Concentration Flow Maximum)	Primary Source	EPA Docket ID
TN	TVA	Johnsonville	001	Ash Pond	Direct Discharge to Tennessee River	20.5	35.3	5	153	243	26.1578	45.0425	NPDES Permit No. 9640006681 App. (May 2003)	EPA-HQ-OW-2006-0771-1797.42
TN	TVA	Kingston	001	Ash Pond	Discharge to Clinch River via Plant Intake Canal	24.7	42.2	1	90	90	18.5394	31.6746	NPDES Permit No. TN8640006682 App. (Dec. 2002)	EPA-HQ-OW-2006-0771-1797.45
TN	TVA	Kingston	007	Ash Pond Seepage	Discharge to Clinch River via Plant Intake Canal	0.51	0.51	1	31	31	0.1319	0.1319	NPDES Permit No. TN8640006682 App. (Dec. 2002)	EPA-HQ-OW-2006-0771-1797.45
VA	Dominion Energy	Bremo	002	Ash Pond	Direct Discharge to James River	1.945	7.9056	1	158	158	2.5629	10.4171	NPDES Permit No. VA0004138 App. (Feb. 2005)	EPA-HQ-OW-2006-0771-1797.12
WV	AEP	Amos	001	Ash Pond	Direct Discharge to Little Scary Creek (to Kanawha River)	0.16	8.9	12	24.3	49	0.0324	1.8037	ECHO Monthly Monitoring (2008)	EPA-HQ-OW-2006-0771-1797.41
WV	Ohio Power	Mitchell	Sample Point 4	Ash Pond Effluent	Ash Pond Directly Discharges to Fish Creek	9.663[4]	9.663[4]	1	138	138	N/A	N/A	Oct. 2007 Sample	EPA-HQ-OW-2006-0771-1736; 0139.1

[1] The ECHO database did not provide arsenic concentration readings for the applicable months from Outfall 007 at the Cape Fear facility.

[2] The Grainger plant discharges to the Waccamaw River, but ECHO data did not confirm whether Outfall 001 discharges directly into the Waccamaw.

[3] The Jefferies plant discharges to the Tailrace Canal, but ECHO data did not confirm whether Outfall 003 discharges directly into the Tailrace Canal.

[4] This sample did not measure flow. EPA's ECHO database reports maximum flow of 9.663 MGD in October of 2007 from Discharge from ash pond.

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June 22, 2009

Eddie Bernice Johnson, Chairwoman
Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure
U.S. House of Representatives
111th Congress
B-376 Rayburn House Office Building
Washington, DC 20515

Re: Coal Combustion Waste and Water Quality Follow-Up Questions

Dear Congresswoman Johnson:

Thank you for giving us the opportunity to respond to a recent letter from Mr. McManus raising questions about our testimony before the House Subcommittee on Water Resources on April 30, 2009. We have addressed his principal concerns below, and have attached relevant documents that we hope will be included in the hearing record along with our response.

The disposal of coal ash presents significant risks to human health and the environment.

Mr. McManus is correct that the potential risks of coal ash to humans and the environment have been well examined over the years, but the list of studies he provided to the Committee is incomplete. In 2006, the National Research Council completed a Congressionally-mandated study recommending that federally enforceable regulations be adopted to protect human health and the environment from hazards associated with the use of fly ash to "reclaim" active and abandoned mines. See Attachment 1, Committee on Mine Placement of Coal Combustion Wastes, National Research Council, Managing Coal Combustion Residues in Mines (Mar. 2006).

Also, in 2007, the U.S. Environmental Protection Agency (USEPA) published a draft risk assessment that concluded that residents living near coal ash impoundments faced significantly higher cancer risks, due to the likely contamination of drinking water supplies by arsenic. See Attachment 2, USEPA, Human and Ecological Risk Assessment of Coal Combustion Wastes, Draft (Aug. 2007) (prepared by RTI International). The same study also predicted that leachate from coal ash disposal sites could expose aquatic organisms, birds, and wildlife to levels of boron and other toxic metals that are hundreds of times above levels known to be safe.

Lastly, also in 2007, the USEPA released a report containing a list of 67 proven and potential damage cases where pollutants from coal combustion waste storage or disposal facilities contaminated groundwater and/or surface water. See Attachment 3, USEPA, Coal Combustion Waste Damage Case Assessments (July 2007). In fact, this report describes several facilities with which Mr. McManus should be familiar, where coal ash at power plants owned by AEP caused damage to groundwater, reservoirs, and fish populations.

We have attached these documents for the record, as they were not included in the studies provided by Mr. McManus.

At most power plants, Clean Water Act permits do NOT limit discharges of arsenic, selenium, or other toxic metals.

The McManus letter sets forth various Clean Water Act requirements that supposedly limit the discharges of toxic metals from ash or scrubber sludge disposal or treatment systems. We think these legal restrictions have largely been ignored and have not routinely applied at most power plants.

1) As Mr. McManus pointed out, Clean Water Act is supposed to limit toxic discharges through "effluent limit guidelines" (ELGs) that are based on the best available technology. What Mr. McManus did not tell you is that the ELG that applies to coal-fired power plants (a) was written in 1982 and has not been revised in the last 27 years, and (b) does not apply at all to arsenic, boron, cadmium, lead, mercury, selenium, or *any* of the other toxic metals that are routinely discharged from ash or scrubber disposal or treatment systems. While the USEPA is currently in its fifth year of study to determine whether to revise the 27-year old guidelines, its preliminary 2006 assessment found that "control technologies and management practices capable of achieving significant pollutant reductions are technologically feasible." See Attachment 4, USEPA, Interim Detailed Study Report for the Steam Electric Power Generation Point Source Category, at 1-2 (Nov. 2006).

2) Where no effluent guidelines have been prescribed by the federal government, state permit writers are nevertheless required to set "best available technology" limits for toxic discharges when Clean Water Act permits are issued or renewed. We believe that, in the absence of effluent guidelines from the USEPA, setting technology-based limits in individual permits is an overwhelmingly difficult task for underfunded and overworked state agencies, as evidenced by the lack of any limits for arsenic, selenium or other toxic pollutants in most of the permits we have reviewed. While Mr. McManus may be able to identify isolated individual cases where technology-based limits have been set in individual permits, we encourage the Committee to ask the USEPA to analyze whether these requirements have actually been implemented at most power plants.

3) Mr. McManus argued that these extraordinarily high releases of highly toxic chemicals are the result of finely tuned permits that assure that human health and aquatic life are not affected by this pollution. State agencies are theoretically required to adjust permit limits to minimize the impact of discharges on water quality for waters that are listed as "impaired"— meaning they are unable, through usual end-of-pipe requirements alone, to meet designated water quality standards. But this approach is effective only where the USEPA or the state has consistent and current water quality monitoring data for the specific toxic metals in question at both the point of discharge and in receiving waters. For impaired waters, such data are supposed to be synthesized by establishing "Total Maximum Daily Loads" (TMDLs) that limit the overall amount of specific pollutants that can be discharged within a river or watershed, and provide the basis for apportioning specific discharge limits among those sources that contribute to the loading. However, many TMDLs have not been completed, and monitoring data for toxic metals in watersheds are sparse. Without regular monitoring of both plant discharges and receiving waters, combined with TMDLs that allocate permit limits based on maximum loads that have been scientifically established, so-called "water quality based" permitting will exist in name only.

Toxic pollutants in power plant discharges may be measured only once every five years, or even less often.

Mr. McManus took issue with our statement that discharges of toxic metals are not restricted or well monitored. Power plants do have to estimate "maximum" and average" values for discharges of arsenic, selenium, and other toxic pollutants once every five years when submitting a permit application renewal. But these values are frequently based on a single sample; *many Clean Water Act permits require no further monitoring at all – even on a quarterly basis – once the permit is issued.* Backlogs at some state agencies mean that many permits are not renewed within the five year timetable, and the law allows old permits to be "administratively extended" until the agency is able to catch up. In such cases, there may be a gap of seven, eight, or even ten years between the single samples used to estimate toxic pollutant concentrations. See Attachment 5, USEPA, Office of Inspector General, Efforts to Manage Backlog of Water Discharge Permits Needs to Be Accompanied by Greater Program Integration (June 2005) (citing thousands of expired NPDES permits needing renewal).

The absence of monitoring is not surprising, since the 1982 federal effluent guidelines for power plants establish no enforceable limits whatsoever for 12 of the 15 most common toxic pollutants, including arsenic, cadmium, lead, mercury, and selenium. The USEPA has identified the power industry as the second largest discharger of toxic metals to surface waters in the United States – we do not agree that federal regulations that establish no enforceable limits for the deadliest toxic pollutants, and require no monitoring other than single sample results submitted every five years (at most), can be characterized as a reasonable or protective program, as Mr. McManus tried so hard to do.

Dilution of toxic metals with other wastewater is not the solution.

We have acknowledged previously that at several plants, the arsenic or selenium levels from ash or scrubber effluents were likely to be significantly lower than we had estimated, due to mixing with other wastewaters before final discharge. But to the extent that Mr. McManus suggested that risks can be made acceptable by diluting concentrations of heavy metals to levels below the USEPA's criteria for toxicity, we disagree. More importantly, so does the USEPA, in a 2006 study assessing pollutant discharges from power plants:

> [T]he presence of some pollutants may be masked due to extreme dilution when low volume, high strength waste streams are combined with high-volume, low strength waste streams. This is especially important in the case of persistent and bioaccumulative pollutants, such as mercury, which can pose significant hazards to human health and the environment even at low concentrations. While effects of this dilution may appear to minimize their presence in the final effluent, the hazard associated with the discharge may be significant.

USEPA, Interim Detailed Study Report for the Steam Electric Power Generation Point Source Category, at 5-8 (Nov. 2006).

Response to Mr. McManus's Questions Regarding Our Data

While Mr. McManus responded to the invitation to belabor these examples, we first brought them to the attention of the Committee and do not believe several isolated errors undermine what the limited monitoring data that are publicly available clearly show: many power plants are discharging toxic metals at levels that exceed water quality criteria, in some cases by significant amounts. As our testimony made clear, these discharges do not necessarily indicate a violation of law, and toxic concentrations will be diluted when the effluent mixes with a river or lake. But toxic metals tend to accumulate in the environment, and the discharge of thousands of pounds of arsenic or selenium every year can seriously damage a watershed over time. We do not think it is unreasonable to ask why power companies continue to discharge these toxic metals at such high concentrations, especially after the USEPA has identified technically feasible methods of reducing or even eliminating these discharges.

Mr. McManus made much of our testimony's reference to arsenic drinking water standards, arguing that these have no relevance to water quality standards. But, as noted in our testimony, the State of Tennessee – site of the TVA Kingston ash spill – uses exactly the same standard (ten micrograms per liter) to determine whether the waters in its state are safe for recreational uses. See Attachment 6, Tenn. Comp. R. & Regs. 1200-4-3-.03(4)(j) (2008).

Also, water quality criteria are designed to protect human health, not just aquatic organisms. These health-based criteria recognize that toxic pollutants such as arsenic can bioaccumulate in fish tissue, as the pollutant concentrates at higher levels as it moves up the food chain. For example, the recommended USEPA criterion for protecting aquatic life from chronic exposure to arsenic is 150 micrograms per liter; but the agency has recommended a criterion of 0.14 micrograms per liter to avoid unsafe levels of arsenic in fish that humans eat. There is no evidence that this much more stringent water quality criterion is considered when evaluating arsenic discharges from power plants.

Mr. McManus was concerned that we have overestimated the maximum potential discharge of arsenic and selenium, citing one example in which he argues that a "massive storm event" inflated the maximum reported in one permit application. We do not understand this argument, since storm events do occur and ought to be taken into account when reporting "maximum" potential discharges. In addition, companies report both an average and a maximum concentration of a given pollutant, as well as an average and maximum flow rate. When estimating the maximum amount (pounds per day) of arsenic and selenium released, we multiplied the reported *average* concentrations of these pollutants times the maximum flow rate, which made our projections more conservative. Our methodology is very similar to that used by the USEPA in its 2006 attempt to quantify discharges of toxic pollutants from power plants.

Mr. McManus noted that the maximum flow rate of 77.09 million gallons per day (MGD) that our chart identified for outfall 19 at AEP's Cardinal plant was "clearly an error." Our data came from the USEPA's "ECHO" database, which in turn incorporates information from the "Permit Compliance System" (PCS) used to monitor permitted discharges at major sources like the Cardinal plant. As the attached document indicates, EPA's data indicate a maximum flow rate of 77.09 MGD in March of 2008. See Attachment 7, USEPA, PCS NPDES Effluent Charts for Permit ID OH0012581, AEP Cardinal Power Plant Environmental Services Division, Outfall 019 Flow Data (Mar. 2008). If AEP believes that information to be incorrect, it should contact the USEPA with the correct information.

Mr. McManus reported that AEP was unable to determine the source of our report that AEP's Mitchell plant had measured arsenic at 138 micrograms per liter. That value is based on a sample taken at the Mitchell plant in October of 2007 by the USEPA. Details may be found on pages 4-10 and A-21 of the USEPA's "Final Sampling Episode Report," for Mitchell. See Attachment 8, USEPA, Final Sampling Episode Report Ohio Power Company's Mitchell Plant, Moundsville, WV, Sampling Episode 6550, at 4-10, A-21 (Aug. 2008) (prepared by Eastern Research Group, Inc.).

We agree that the mean concentration of selenium for the Cumberland station should be 44 micrograms, as reported in TVA's permit application, and have corrected this information in our chart.

The findings of the DOE/USEPA Report do not indicate that the states are adequately regulating coal combustion waste.

Mr. McManus stated that the 2006 report, Coal Combustion Waste Management at Landfills and Surface Impoundments, 1994-2004 (DOE/USEPA Report), "documents the pronounced improvement in the management of coal combustion waste" and the "strengthened regulatory oversight of CCW disposal by state regulatory agencies." Specifically, Mr. McManus stated that this report found that "there has been a trend in recent years toward more stringent state requirements" and that "nearly all new CCW disposal units had installed liners." The accuracy of these statements is explored below in light of the specific findings of the DOE/USEPA Report. Furthermore, we wish to supplement the record with further findings from a second, more comprehensive USEPA report examining the stringency of state programs governing coal ash disposal. See Attachment 9, DPRA Inc., Estimation of Costs for Regulating Fossil Fuel Combustion Ash Management at Large Electric Utilities Under Part 258 (Nov. 30, 2005) (prepared for the Office of Solid Waste) (DPRA Report).

The DOE/USEPA Report examined 11 state programs governing coal combustion waste disposal in the following coal ash-producing states: Pennsylvania; Illinois; Indiana; Virginia; Wisconsin; Alabama; Florida; Georgia; Missouri; Ohio; and Texas. The report documents, however, that *none* of the 11 states examined by the report "tightened" regulatory controls on coal combustion waste landfill disposal between 1999 and 2004 to require critical safeguards pertaining to liners, groundwater monitoring, leachate collection, closure and post-closure, siting, or financial assurance.[1] *Id.* at 49–51. The report does document that some states "tightened" requirements from 1988 to 1999, but in 2000, USEPA found that state regulatory authority to impose controls on landfills and surface impoundments contained gaps that were "of environmental concern given the potential for risks posed by management of coal combustion wastes." See Attachment 10, USEPA, Regulatory Determination on Wastes from the Combustion of Fossil Fuels, 65 Fed.Reg. 32214, 32217 (May 22, 2000). Thus the absence of more stringent regulation in these state programs after 1999 pertaining to these critical safeguards reveals that the gap identified in 1999 by USEPA has indeed not been closed.

In fact, the DOE/USEPA Report points to key shortcomings in state regulatory programs. For example, the report found that a substantial percentage of large ash-producing states lacked one of the most basic mechanisms for regulating waste disposal, namely the authority to *permit* coal combustion waste disposal units. The report concluded that approximately 30% of the net disposable coal combustion waste generated in the United States, representing "about 30% of the total coal-fired electric generating capacity in the United States in 2004," is potentially *totally exempt* from solid waste permitting requirements. DOE/USEPA Report at 45–46.

Furthermore, the DOE/USEPA Report provides a detailed analysis of the strengths and deficiencies of the 11 state programs surveyed. The report found that a

[1] The report did not analyze the change in state regulations pertaining to surface impoundments, nor did it explain why it did not perform this analysis.

majority of the states surveyed *fail* to mandate the most basic safeguards for disposal of coal combustion waste in landfills and surface impoundments. These basic standards include requirements for solid waste permits, liners, groundwater monitoring, and leachate collection systems. For landfills, the 2006 DOE/USEPA Report found that:

> (i) *No* state surveyed requires a composite liner for all coal ash landfills. Five states (45% of states surveyed) have *no* liner requirements for coal ash monofills. Four states permit soil or clay liners on a case-by-case basis. *Id.* at A-28–33.
>
> (iii) 36% of the states surveyed do not have regulations requiring groundwater monitoring at landfills. *Id.* at A-45–47.
>
> (iv) *No* state surveyed had regulations requiring quarterly groundwater monitoring for the active life of the landfill. *Id.* at A-45–47.
>
> (v) 45% of the states surveyed do not have regulations requiring leachate collection systems at landfills. *Id.* at A-56–58.

For surface impoundments, the DOE/USEPA Report found that even more significant gaps existed. The report found the following deficiencies in state law pertaining to surface impoundments:

(i) 91% of the states surveyed do not have regulations requiring a solid waste permit for all coal ash surface impoundments. *Id.* at A-18.

(ii) Nine of the eleven states surveyed (82%) do not have regulations requiring liners at coal ash surface impoundments. Only one state requires a composite liner. *Id.* at A-28–33.[2]

(iii) Only *one* of the states surveyed has regulations requiring groundwater monitoring at surface impoundments. All of the remaining 10 states (90%) require monitoring only on a case-by-case basis. *Id.* at A-45–47.

(iv) Only *one* of the states surveyed has regulations requiring a leachate collection system at surface impoundments. All of the remaining 10 states (90%) require leachate detection systems only on a case-by-case basis. *Id.* at A-56–58.

(v) Only one state surveyed has regulations requiring corrective action (triggers for groundwater assessment and pollution abatement) for coal ash surface impoundments. *Id.* at A-69.

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[2] For example, Georgia does not require a liner for coal ash surface impoundments. According to GDNR Rule 391-3-6(14), liner requirements may be established on a case-specific basis to protect subsurface waters. However, the Georgia "Maximum Aquifer Contamination Levels" set an allowable level of arsenic at 0.05 mg/L (5 times the federal MCL) and an allowable level of lead at 0.05 mg/L (over 3 times the federal standard). *Id.* at A-38.

(vi) Only *one state* surveyed has regulations requiring financial assurance for surface impoundments, if the pond is regulated as a storage facility. *Id.* at A-78.

(vii) Only *two states* surveyed have siting restrictions for surface impoundments restricting their distance from public water supply wells, other potable water supplies, inhabited dwellings, floodways, wetlands and the groundwater table. *Id.* at A-72–73.

Lastly, while it is correct, as Mr. McManus indicates, that "nearly all new CCW disposal units had installed liners," the statement ignores the finding in the DOE/USEPA Report that documents the nature of the liners installed. The DOE/USEPA Report found that, at most, only 56% of the new or expanded landfills and 50% of the new or expanded surface impoundments installed composite liners. *Id.* at 33. According to the report, clay liners, single liners, or no liners were used at 44% of the landfills, and clay liners and single liners were used at 50% of the surface impoundments. *Id.* Thus the report found that a substantial percentage of *newly permitted* landfills and surface impoundments installed liners that may not sufficient to protect human health and the environment. According to EPA's 2007 <u>Human and Ecological Risk Assessment of Coal Combustion Waste</u>:

> Composite liners . . . effectively reduce risks from all pathways and constituents below the risk criteria (cancer and noncancer) for both landfills and surface impoundments. Risks from clay-lined units, as modeled, are about one-third to one-half the risks of unlined units, <u>but are still above the risk criteria used for this analysis.</u>

Id. at ES-2 (emphasis added).

Secondly, when examining the sufficiency of state programs, it is essential to look also at the more comprehensive analysis found in the 2005 DPRA Report. The DPRA Report examined state regulatory programs in 34 of the nation's largest coal ash-producing states.

> Insights on FFC waste management have been gained through a review of the top 34 states that utilize coal for producing electricity. These states account for over 98 percent of the quantity of FGD and ash managed on site and includes every state that manages over 500,000 tons in on-site management units. State regulations were reviewed for Alabama, Arizona, Colorado, Florida, Georgia, Iowa, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Missouri, New Mexico, Mississippi, Montana, New York, Nevada, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Utah, Virginia, West Virginia, Washington, Wisconsin and Wyoming.

Id. at 2.2.

The DPRA Report documented extensive deficiencies in basic safeguards pertaining to the regulation of coal combustion waste landfills and surface impoundments in the 34 states surveyed. Among the findings:

(i) 69% of the states do not require groundwater monitoring and leachate collection at all surface impoundments (new and existing). For example, 16 states fail to require any groundwater monitoring at all during the operating life of the waste unit, and seven states only require monitoring at surface impoundments constructed after a certain date.

(ii) 47% of the states do not require post-closure groundwater monitoring at coal ash surface impoundments.

(iii) Over 50% of the states do not require liners for surface impoundments.

(iv) Over 50% of the states have no requirement for financial assurance for surface impoundments.

(v) 38% of the states do not require groundwater monitoring at all landfills. For example, eleven states only require groundwater monitoring at landfills constructed after a certain date.

(vi) 29% of the states do not require fugitive dust controls at coal ash landfills.

(vii) 17% of the states do not require liners, leachate collection systems or financial assurance for coal ash landfills—even those newly constructed. Of the remaining 83% of states surveyed, 32% of those states only require liners and leachate collection at "new construction."

Id. at 2-12 to 2-21.

The 2005 DPRA Report also reviewed state regulations for the top 25 coal-consuming states to determine if state regulations prohibited coal ash disposal below the natural water table. It is a central tenet of safe coal ash disposal that construction of waste disposal units must occur *above* the natural water table. The report concluded that only 16% of the total volume of coal waste going to surface impoundments was being managed in states that prohibit such disposal below the natural water table. *Id.* at 2-34. Similarly, only 25% of the total volume of coal combustion waste going to landfills was being managed in states that prohibit such disposal below the natural water table. *Id.* Allowing such widespread placement of these wastes below the water table reflects an egregious gap in state regulatory protections that cannot be reconciled with the basic principles of RCRA.

The 2005 DPRA Report also reviewed state regulations for the top 25 coal-consuming states to determine if state regulations prohibited the siting of coal combustion waste disposal units in floodplains. Particularly for surface impoundments, the results were alarming. The percentage of the total coal combustion waste volume that is currently being regulated by states that prohibit the placement of surface impoundments in floodplains is only 35%. *Id.* at 2-35. The percentage of the total waste volume that is currently being regulated by states that restrict siting in floodplains for landfills is approximately 66%. *Id.* The fact that so many states allow the siting of coal ash landfills and surface impoundments within floodplains is further evidence that state regulation is fundamentally inadequate to protect health and the environment.

Thank you again for the opportunity to respond to Mr. McManus, and we respectfully request that our response and the attached materials be included in the hearing record. If you have additional questions or require further information, please do not hesitate to contact Eric Schaeffer at (202) 263-4440, or Lisa Evans at (781) 631-4119.

Sincerely,

Eric Schaeffer, Director
Environmental Integrity Project

Lisa Evans, Senior Attorney
Earthjustice

CC: John Boozman, Ranking Member
Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure
U.S. House of Representatives
111th Congress
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Enclosures

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Material and Attachments from Eric Schaeffer, Director, Environmental Integrity Project and Lisa Evans, Senior Attorney, Earthjustice, to Chairwoman Eddie Bernice Johnson, Subcommittee on Water Resources and Environment, Committee on Transportation and Infrastructure (June 22, 2009) (re: Follow-up Responses to Coal Combustion Waste Storage and Water Quality Hearing (April 30, 2009))

Documents Included:

Cover Letter: Schaeffer/Evans to Chairwoman Johnson (June 22, 2009)

Attachment 1: National Research Council, 2006. *Managing Coal Combustion Residues in Mines.* (Committee on Mine Placement of Coal Combustion Wastes) Executive Summary (1-12).

Attachment 2: US EPA, 2007. 'Human and Ecological Risk Assessment of Coal Combustion Wastes - Draft.' (prepared by RTI International) (Aug., 2007)

Attachment 3: US EPA, 2007. 'Coal Combustion Waste Damage Case Assessments.' (July, 2007)

Attachment 4: US EPA, 2006. 'Interim Detailed Study Report for the Steam Electric Power Generation Point Source Category.' (Nov., 2006)

Attachment 5: US EPA Office of Inspector General, 2005. *Efforts to Manage Backlog of Water Discharge Permits Needs to be Accompanied by Greater Program Integration.* (2005-P-00018) (June, 2005)

Attachment 6: State of Tennessee, Department of Environment and Conservation, Tennessee Water Quality Control Board, Division of Water Pollution Controlm 2008. Tenn. Comp. R. & Regs. 1200-4-3-.03(4)(j)

Attachment 7: US EPA, 2008. PCS NPDES Effluent Charts for Permit ID OH0012581, AEP Cardinal Power Plant Environmental Services Division, Outfall 019 Flow Data. (March, 2008)

Attachment 8: US EPA, 2008. Final Sampling Episode Report, Ohio Power Company's Mitchell Plant, Moundsville, WV, Sampling Episode 6550, at 4-10, A-21 (Aug. 2008) (prepared by Eastern Research Group, Inc.) (can be found at EPA-HQ-OW-2006-0771-1736 at www.regulations.gov)

Attachment 9: DPRA Inc., 2008. *Estimation of Costs for Regulating Fossil Fuel Combustion Ash Management at Large Electric Utilities Under Part 258.* (Nov. 30, 2005) (prepared for the EPA Office of Solid Waste) (DPRA Report) (can be found by searching for EPA-HQ-RCRA-2006-0796-0469 at www.regulations.gov)

Attachment 10: US EPA, 2000. Regulatory Determination on Wastes from the Combustion of Fossil Fuels. 65 Fed. Reg. 32214, 32217 (May 22, 2000).

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Testimony Regarding "Coal Combustion Waste Storage and Water Quality before the Subcommittee on Water Resources, Committee on Transportation and Infrastructure, U.S. House of Representatives

April 30, 2009
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My name is Dr. Conrad D. Volz, since 2004 I have been an Assistant Professor in the Department of Environmental and Occupational Health (EOH) at the Graduate School of Public Health (GSPH), University of Pittsburgh (UP) where I am also the Director of the Center for Healthy Environments and Communities (CHEC) and of the Environmental Health Risk Assessment Certificate Program. I also hold an appointment to the University of Pittsburgh, School of Law where I give technical and human and ecological toxicological guidance to the Environmental Law Clinic. I have over 30 years of experience in performing environmental health and human and aquatic risk assessment studies; working under contract or grants from the US Department of Defense and the Department of Energy, National Nuclear Security Agency (NNSA), in the USA and 24 countries, on 4 continents (See Attachment 1, Biography of Conrad Daniel Volz, DrPH, MPH and Attachment 2, CV of Conrad Daniel Volz, DrPH, MPH).

My current research is focused on using fish and other aquatic receptors as indicators of; industrial and municipal pollution sources; and as sentinels for human health effects from exposure to aquatic contaminants. This work is supported by the Centers for Disease Control and Prevention's (CDC), Environmental Public Health Tracking Network (EPHTN). At the GSPH I teach two (2) seminal courses related to; 1.) Transport processes of CCW and other toxic contaminants entry into surface water and groundwater and how these contaminants are cycled through other environmental media (air, soils and substrata, biota, sediments and foods); and 2.) The assessment and quantification of human and aquatic receptor exposure to environmental contaminants contained in these environmental media.

My testimony today before this Subcommittee on Water Resources and Environment concerns known and theoretical water quality impacts of coal combustion waste (CCW) storage including evidence; that CCW mixtures have direct ecotoxicological effects on aquatic animals and that these animals, once exposed to CCW can spread toxic trace elements to nearby uncontaminated terrestrial and aquatic environments; that trace toxic elements from CCW impoundments enter groundwater, especially during periods of low rainfall or draught, contaminating local drinking water wells, with a high probability of reentering surface water through freshwater seeps, springs, and movement of contaminated groundwater into surface water; that a toxic waste site with characteristics similar to unlined CCW impoundments, assessed by my group in June of 2008, is releasing significant levels of arsenic, lead and other metals and metalloids into groundwater and surface water and that this process is occurring under conditions of high alkalinity; that the predominant location of flyash piles and CCW surface impoundments near surface water-drinking water sources creates an unreasonable threat to public health and the environment because of rain water runoff and the demonstrated potential for catastrophic release of CCW into major river systems; and that placement of flyash piles and CCW impoundments constitutes a major environmental justice issue, in that these communities are generally located in areas with associated and other polluting sources, which are characterized by low socio-economic attainment, flight of residents that can afford to relocate, resulting in further erosion of municipal and school tax bases. Lastly, I will outline steps necessary to regulate and mitigate fly ash impoundments and storage facilities to protect human health and the environment.

Coal combustion waste (CCW) is a leachable mixture of carbon, sulfur compounds, nitrates/nitrites, toxic trace elements, radionuclides, and mutagenic polynuclear aromatic hydrocarbons. In 2005 coal-fired power plants (CFPP) produced 71.1 million tons of flyash, filling 44 million cubic yards of landfill space, in the forms of fly ash, bottom ash, boiler slag, and Flue Gas Desulfurization sludge. Studies show that masses of elements left in fly ash are much higher than in coal; Arsenic can have up to100 ppm in coal but 1,700 ppm in fly ash; Cadmium in coal isn't over .6 ppm but can reach 250 ppm in flyash; and alarmingly Manganese levels don't exceed 15.0 ppm in coal but can be as high as 4,400 ppm in fly ash. The Law of Conservation of Mass states that "matter cannot be created nor can it be destroyed." The burning of vast amounts of coal opens Pandora's Box and releases almost every element in the periodic table into the environment. This law also tells us that elements that don't go up the stack or into wastewater-stay in the fly ash. As air pollution control devices and wastewater treatment plant efficiency increases the amount of toxic elements in CCW. Overproduction of CCW has strained the holding capacity of many impoundment sites causing ecological and public health disasters, such as the recent Tennessee Valley Authority (TVA) spill, and the little known 2005 Forward

Township legacy flyash landslide. The staggering amounts of CCW sitting next to major source water bodies, dumped into landfills and pumped into impoundments creates a significant threat to environmental resources and a potential health hazard for communities, especially rural communities already impacted by coal mining and those already impacted by coal burning air pollution sources..

I. COAL COMBUSTION WASTE MIXTURES HAVE DIRECT ECOTOXICOLOGICAL EFFECTS ON AQUATIC ANIMALS AND THESE ANIMALS, ONCE EXPOSED TO CCW CAN SPREAD TOXIC TRACE ELEMENTS TO NEARBY UNCONTAMINATED TERRESTRIAL AND AQUATIC ENVIRONMENTS

Table 1, Studies Indicating Coal Combustion Waste (CCW) Effects on Animal Survival, Reproduction and Growth and Development (with an emphasis on aquatic organisms) lists 16 studies from the peer-reviewed academic literature that demonstrate that CCW has direct effects on aquatic animals and animals that spend part of their life-cycle in aquatic environments and species that feed on them. CCW effects in the southern toad (*Bufo terrestris*) have been extensively studied. CCW ash-exposed toads exhibited elevated levels of 11 of 18 metals measured. Increases ranged from 47.5% for lead to more than 5000% for arsenic (Ward et al., 2009). Toads exposed to CCW trace metal contamination gained significantly less mass (18.3 %) than control toads (31.3%) when food was limited and experienced significantly decreased Respiratory Quotient (RQ) after exercise (Ward et al., 2006). This study suggests that CCW trace metal exposure is associated with changes in the basal metabolic rate of these vertebrates and that decreased RQ after exercise suggests an inability to eliminate carbon dioxide and/or absorb oxygen due to trace metal exposure. Many of the metals in CCW are pulmonary toxicants even when the mode of exposure is through ingestion or skin absorption, just as in humans (Yoshida et al., 2004). In a study that assessed concentrations of As, Cd, Cu, Ni, Pb, Se, Sr, and Zn in whole bodies of larval, recently metamorphosed, and adult life stages in Bufo terrestris, after exposure to CCW, it was found that the elements As, Cd, Cu, Ni, Pb, Zn, concentrations were highest in larvae, but that Se and Sr concentrations remained elevated in later life stages (Roe et al, 2005). This study demonstrates that toads and frogs exposed to metals in CCW can transport trace elements from aquatic disposal basins to nearby uncontaminated terrestrial and aquatic habitats and additionally that, anurans utilizing naturally revegetated sites up to 30 years after CCW disposal ceases are exposed to elevated trace elements. A 1999 study of toads showed that initial circulating levels of corticosterone in toads captured at the CCW area were significantly higher than levels in toads from the reference site. Corticosterone levels in toads from the CCW site remained high even after 2 weeks of laboratory acclimation and injection with saline (Hopkins et al., 1999). This study demonstrates that CCW constituents display endocrine system disrupting effects that may be mediated through disruption of hepatic enzymes responsible for the metabolic clearance of steroid hormones.

Other studies using a fish- Lake chubsuckers, again fellow vertebrates with hormonal systems much the same as humans, found that chubsuckers grazing CCW sediments had significantly elevated body burdens of Se, Sr, and V. Selenium levels were particularly elevated, reaching mean whole body concentrations of 5.6 micrograms/gram dry mass by the end of experimental manipulations. Twenty-five percent of fish exposed to pollutants died during the study. All surviving fish exposed to ash exhibited substantial decreases in growth and severe fin erosion

(Hopkins et al., 2000). This study indicates that fish exposed to ash utilized more energy for daily activities and/or were less efficient at converting available energy to tissues for growth and storage.

In a study of the bird-common grackle feeding in CCW basins, selenium was found in significantly higher concentrations in ash basin eggs (x = 5.88 +/- 0.44 microg/g DW) than in reference eggs (x = 2.69 +/- 0.13 microg/g DW). Selenium concentrations in eggs from the ash basins were above background levels (Bryan et al., 2003). This study shows maternal transfer of selenium to eggs in birds living near CCW settling ponds. Se was also found to be transferred maternally to turtle hatchlings at relatively high levels after exposure to CCW. Hatchlings from polluted-site females exhibited reduced O2 consumption rates compared to hatchlings from reference sites. Since Se was transferred to hatchlings at high levels it may be responsible for the observed physiological impairments.

There are several concepts concerning the ecotoxicology of Se that must be stated.

Selenium contamination represents one of the few clear cases where environmental pollution has led to devastation of wildlife populations, most notably in agricultural drainage evaporation and power plant coal-fly ash receiving ponds (Fan et al, 2002). Elevated concentrations have degraded many freshwater ecosystems throughout the United States, and additional systems are expected to be affected as anthropogenic activities, including runoff and leaching of selenium from CCW deposits and impoundments, increasingly mobilize Se into aquatic systems. Se is a very toxic essential trace element. Toxic threshold concentrations in water, dietary items, and tissues, for aquatic organisms are only 2-5 times normal background concentrations. Selenium toxicity in freshwater ecosystems is the result of a complex series of bioaccumulation and biotransformation mechanisms, and cycling of Se in aquatic food chains (Maier and Knight, 1994). Organic selenium bioaccumulation and toxicity patterns in the freshwater bivalve sentinel species *Corbicula fluminea* have recently been demonstrated. Waterborne selenomethionine (SeMet) exposure was used to mimic dietary organo-Se uptake. Results of this study demonstrate that SeMet is accumulated to a relatively high extent with a concentration factor of 770 (wet weight basis). The higher uptake than depuration rates suggest that bivalves deal with high Se amounts using a strategy of detoxification based on Se sequestration that could involve granules, as shown by a strong increase of Se in the particulate subcellular fraction. Selenium is persistent in the cytosol of bivalves exposed to SeMet where it is found in proteins of a wide range of molecular mass, indicating a possible replacement of methionine by selenomethionine. A subsequent alteration of protein function might be one of the mechanisms of Se toxicity that could explain the histopathological damage observed in gills by using transmission electronic microscopy. Those analyses showed changes in gill filament ultrastructure and suggested mitochondria as the first target for SeMet cytotoxicity, with alterations of the outer membrane and of cristae morphology. Organo-Se would thus not only be toxic via indirect mechanisms of maternal transfer as it is suggested for fish and turtles but also directly (Adam-Guillermin et al., 2009).

Table 1 describes CCW effects on shrimp, salamanders, water snakes, green frogs and leopard frogs. Many of these effects are related to perceived problems in hormonal regulatory processes. Larval leopard frogs exposed to CCW have high corticosterone levels that may be associated with jaw abnormalities and decreased survival rates. And the high mortality of green frog larvae exposed to CCW with raised concentrations of As, Se, Sr, and V occurred when control larvae were entering metamorphosis.

II. TRACE TOXIC ELEMENTS FROM CCW IMPOUNDMENTS ENTER GROUNDWATER, ESPECIALLY DURING PERIODS OF LOW RAINFALL OR DRAUGHT, CONTAMINATING LOCAL DRINKING WATER WELLS, WITH A HIGH PROBABILITY OF REENTERING SURFACE WATER THROUGH FRESHWATER SEEPS, SPRINGS, AND MOVEMENT OF CONTAMINATED GROUNDWATER INTO SURFACE WATER

Waste products from coal combustion have the highest potential human risk among the fossil fuel alternatives, even higher than wastes from the nuclear energy process. The highest risk is caused by metals, and the fly ash represents the effluent stream giving the largest contribution to the potential human health risk from trace metal exposure (Christensen et al, 1992). It has been observed that as much as 8% (approximately 10 microg g(-1) in fly ash) of total chromium is converted to the Cr(VI) species during oxidative combustion of coal and remains in the resulting ash as a stable species, however, it is significantly mobile in water based leaching (Kingston et al, 2005). Approximately 1.23 +/- 0.01 microg g(-1) of Cr(VI) was found in the landfill leachate from permanent deposits of aged fly ash. Thus Cr (VI), a known human carcinogen can enter groundwater and can runoff of CCW sites in tributary streams. Additionally it has been observed that fly ash and sludge mixing and transport to waste lagoons releases significant portions of zinc, nickel and chromium and that arsenic and manganese are released continuously during this transport process. Adsorbed portions of calcium, magnesium and potassium are also leached during coal ash transport (Popovic et al., 2001). These elements are then available to interact with unconfined aquifer water that is in hydrological connection with water in lagoon basins and can contaminate local well water and runoff through groundwater seeps and overflows to surface water. There is no known safe level of exposure to Cr (VI) any increase in its concentration in water carries with it an increased risk of the development of cancer.

A laboratory leaching test was employed to predict the potential mobility of As, and Se in landfilled fly ash produced by coal combustion. These waste residues also formed the basis of a speciation study in which the valency states of As and Se were determined. Selenium displayed the greatest leachability in CCW, despite being present at relatively low concentrations in CCW. A substantial amount As was also leached from coal ash. Water-soluble extracts of coal fly ash contained As exclusively as As(V). Selenium was present largely as Se(IV) in aqueous extracts of fly ash (Wadge et al., 1987). This is direct evidence that both As and Se are present in the water soluble fractions of CCW lagoons and can enter groundwater as well as surface waters. Distance of CCW particles from their injection points has also been shown to affect the metal characteristics of CCW impoundments. It has been found that the presence of fine particles (< 50 microns) increased with increasing distance from the ash slurry inlet zone an the ash pond. Wide variations in the bulk density (800-980 kg m(-3)), porosity (45-57%) and water-holding capacity (57.5-75.7%) of CCRs were recorded. With increasing distance the pH of the CCRs decreased (from 9.0 to 8.2) and electrical conductivity increased (from 0.25 to 0.65 dS m(-3)). The presence of almost all the heavy metals in CCRs exhibited an increase with distance from the ash slurry discharge zone due to the increase in surface area (from 0.1038 to 2.3076 m2 g(-1)) of CCRs particles (Askosan et al., 2004). These results suggest that CCW impoundments do not have monolithic physical-chemical properties and that the further away from the slurry inlet that CCW moves the greater its ability to become water soluble and move into groundwater and

surface waters. The increase in conductance indicates that species of chemicals are going into solution as they move from injection sites.
Finally, the coal fired power plant institutional control technique of purchasing residential and institutional properties as the levels of CCW raise in impoundments and surface water backs up into hollows indicates that environmental control personnel are aware of the intimate connection between standing water in settling CCW ponds and its connection to contamination of unconfined aquifers. At Little Blue CCW impoundment in Shippingsport PA the responsible company has purchased many properties bordering the impoundment and capped their wells (Site Survey, 2009). My group is in possession of 2 reports, one from the PA DEP of well water from a property in hydrogeological connection with this CCW lagoon that has arsenic levels above the drinking water standard for arsenic of 10 ppb. We would not expect such high background levels in groundwater in this area because it was not glaciated in the last ice age nor are their granite or other rock formations present that might leach arsenic into groundwater.

III. ASSESSMENTS OF A TOXIC WASTE SITE WITH CHARACTERISTICS SIMILAR TO UNLINED CCW IMPOUNDMENTS, SAMPLED BY THE CENTER FOR HEALTHY ENVIRONMENTS AND COMMUNITIES (CHEC) IN JUNE OF 2008, IS RELEASING SIGNIFICANT LEVELS OF ARSENIC, LEAD AND OTHER METALS AND METALLOIDS INTO GROUNDWATER AND SURFACE WATER AND THAT THIS PROCESS IS OCCURRING UNDER CONDITIONS OF HIGH ALKALINITY

It is commonly assumed that trace element migration from CCW lagoons into groundwater is minimal because the pH of the lagoon waste is extremely alkaline. It is believed that that high pH hinders the mobility of toxic elements through the CCW matrix itself and also through underlying soils. In the summer of 2008 the CHEC performed a site assessment of a highly alkaline waste glass dump with characteristics very similar to CCW ponds. Our results indicate that contrary to prevailing engineering opinions we found greatly increased levels of the following elements in different environmental media:

- Arsenic (As) concentrations in all waterfall effluents and 3 of 4 hole water samples exceed the US EPA Drinking Water Standard.; As in hole sediments range from .6-1X and 1.6 to 2.9X the Canadian PEL and ISQW respectively.
- Mercury (Hg) in all waterfall effluents exceeds the US EPA Drinking Water Standard (range 1.4-4.9X). Hg in waterfall effluent is approximately 7X the CMC.
- Cadmium (Cd) in hole sediments ranges from 1.6 to 2.8 times the Canadian ISQG.
- Lead (Pb) in waterfall effluent exceeds the EPA Drinking Water Standard in all samples (range 2.0 to 8.8X) and the CMC in one sample by a factor of 2. Pb in hole sediment exceeds the ISQG in 3 of 4 samples.
- Copper (Cu) exceeds the Freshwater CMC in all samples, in one by a factor of 8. Cu in hole water exceeds the CMC in 2 of 4 holes.
- Manganese (Mn) exceeds the NSDWR secondary water standards in 2 of 3 waterfall effluent samples and in all hole water samples. The Mn level in hole sediments exceeds the Missouri PEL in all samples (range, 1.9-2.7X).

This finding is important to this discussion because the prevailing pH was between 10.9 and 12.0. We propose as a result of this work that the environmental impact of metals is directly related to its bioavailability and that increasing pH can actually help mobilize and increase transport of toxic elements such as arsenic. This is because arsenic predominately exists as an oxyanion species in soils and freshwater. Arsenite [As(III)] species predominate in anoxic and reducing conditions while arsenate [As(V)] species are more so found in oxidizing solutions (T. W. Frankenberger, 2002). Sorption of arsenate/arsenite is highly dependent on pH and decreases greatly with increasing pH, as hydroxide competition is significant. High silica (SiO_2) levels have shown to interfere with arsenic sorption onto iron oxides and hydroxides (Cullen & Reimer, 1989; Ferguson & Gavis, 1972). High silica (SiO_2) levels, as seen in flyash, have been shown to interfere with arsenic sorption onto iron oxides and have been a concern of utilities striving to improve arsenic removal. It is suggested by Korte, Fernando and Moore that higher concentrations of silica in solution, coupled with higher pH, could cause mobilization of arsenic from sediments and soil (Korte & Fernando, 1991; Moore, 1991) into groundwater and breakout into surface water. Result of our survey of this site seems to confirm these observations.

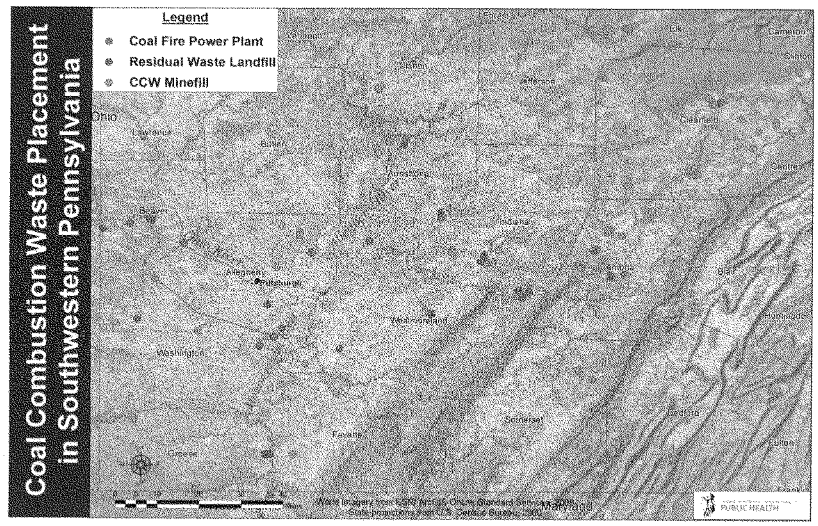
IV. THE PREDOMINANT LOCATION OF FLYASH PILES AND CCW SURFACE IMPOUNDMENTS NEAR SURFACE WATER-DRINKING WATER SOURCES CREATES AN UNREASONABLE THREAT TO PUBLIC HEALTH AND THE ENVIRONMENT; AND PLACEMENT OF FLYASH PILES AND CCW IMPOUNDMENTS CONSTITUTES A MAJOR ENVIRONMENTAL JUSTICE ISSUE, IN THAT THESE COMMUNITIES ARE GENERALLY LOCATED IN AREAS WITH ASSOCIATED AND OTHER POLLUTING SOURCES, WHICH ARE CHARACTERIZED BY LOW SOCIO-ECONOMIC ATTAINMENT, FLIGHT OF RESIDENTS THAT CAN AFFORD TO RELOCATE, RESULTING IN FURTHER EROSION OF MUNICIPAL AND SCHOOL TAX BASES.

The CHEC used ArcView 9.3.1 to create interpolative geographical representations of CCW storage areas in Southwestern Pennsylvania. Coal fired power plants (CFPP), landfills, ash piles and impoundments were added as point sources by latitude and longitude or geocoding of addresses. Figure 1, Locations of Coal Powered Electrical Generation Stations in Southwestern PA and Associated Residual Waste Landfills presents the location of CCW sites in the region. While this map is representative only of the Southwestern PA region, CFPP locations across the country are located similarly because of their need for freshwater sources for proper operations, cooling and wastewater discharge.

This map revels that CCW sites are located principally along major river systems, which also serve as the source water for downstream communities. Leaching of toxic elements and potential catastrophic release of CCW impoundments are a direct threat to environmental resources and to public health. It is estimated by the PA DEP that failure of the Little Blue CCW impoundment would directly impact the lives of over 50,000 residents of the Upper Ohio Valley.

Additionally the communities that are affected by CCW impoundments and waste piles tend to be in areas already severely degraded environmentally from legacy industries (iron and steel, zinc smelting, foundry operations and coal mining) and active industries, including air and wastewater pollution from CFPP in close proximity to CCW storage areas. This constitutes a major environmental justice issue because residents of these already environmentally degraded communities with sufficient economic resources simply move to areas more favorable to a healthy lifestyle and with better aesthetic value. As a result these communities have shown a shrinking municipal and school tax base, with resultant losses of municipal, educational, and social services. Federal and state tax dollars must therefore be directed to help stabilize these environmental justice areas; this necessary practice is an unrecognized subsidy to the coal fired electrical generation industry.

Figure 1, Locations of Coal Powered Electrical Generation Stations in Southwestern PA and Associated Residual Waste Landfills[1]



[1] Coal Fire Power Plants (CFPPs) are included in the list of impoundments because CFPPs have on-site temporary and permanent storage impoundments. This figure shows all forms of CCW at sites in the southwestern Pennsylvania region.

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Table 1, Studies Indicating Coal Combustion Waste (CCW) Effects on Animal Survival, Reproduction and Growth and Development (Emphasis on Aquatic Organisms)

Study Number	Species Name	Study Type	Results	Significance	Authors Affiliations	Citation
i	Southern toads (*Bufo terrestris*)	In situ exposure of toads to ash containing wastes over a 5 month period with sacrifice of animals throughout the study period.	Ash-exposed toads exhibited elevated levels of 11 of 18 metals measured. Increases ranged from 47.5% for lead to more than 5000% for arsenic. Ten of eighteen metals decreased in toads removed from ash, ranging from -25% for cobalt to -96% for thallium.	First report of field studies that examine the uptake of metals over time from vertebrates exposed to CCW. Additionally, this study showed the extent of recovery from long term exposure and excretion of trace metals.	C. Ward and M. Mendonca, at Department of Biological Sciences, Auburn University, Auburn, AL 36866, USA S. Hassan at Forest Utilization Laboratory, University of Georgia, Athens, GA 30602, USA	Ward C, Hassan S, Mendonca M., (2009). Accumulation and depuration of trace metals in southern toads, *Bufo terrestris*, exposed to coal combustion waste. Archives of Environmental Contamination and Toxicology 56:268–275.
ii	Southern toads (*Bufo terrestris*)	Experimental exposure of southern toads to metal-contaminated sediment and food; measured changes in standard and exercise metabolic rates as well as changes in body, liver and muscle mass, blood glucose, and corticosterone.	Toads exposed to trace metal contamination gained significantly less mass (18.3 %) than control toads (31.3%) when food was limited and experienced significantly decreased Respiratory Quotient after exercise.	Trace metal exposure is associated with changes in the basal metabolic rate of these vertebrates. Decreased RQ after exercise suggests an inability to eliminate carbon dioxide and/or absorb oxygen due to trace metal exposure.	Department of Biology, Auburn University, Montgomery, P.O. Box 244023, Montgomery, AL 36124-4023, USA. cward3@mail.a	Ward CK, Appel AG, and Mendonca MT (2006). Metabolic measures of male southern toads (*Bufo terrestris*) exposed to coal combustion waste. Comp Biochem Physiol A Mol Integr Physiol. ;143(3):353-

Study Number	Species Name	Study Type	Results	Significance	Authors Affiliations	Citation
					um.edu	60. Epub 2006 Jan 31.
iii	Southern toads (*Bufo terrestris*) and southern leopard frogs (*Rana sphenocephala*)	Assessed concentrations of As, Cd, Cu, Ni, Pb, Se, Sr, and Zn in whole bodies of larval, recently metamorphosed, and adult life stages in Bufo terrestris and *Rana sphenocephala* from a site that currently receives coal combustion waste (CCW) discharge, a site where CCW was formerly discharged that has undergone natural attenuation for 30 years, and a nearby reference site.	For elements As, Cd, Cu, Ni, Pb, Zn, concentrations were highest in larvae, but Se and Sr concentrations remained elevated in later life stages. Element concentrations were generally higher in B. terrestris than in R. sphenocephala. Concentrations of As, Se, and Sr were up to 11-35 times higher in metamorphs emigrating from CCW-polluted wetlands compared to unpolluted wetlands	The study suggests that toads and frogs exposed to metals in CCW can transport trace elements from aquatic disposal basins to nearby uncontaminated terrestrial and aquatic habitats. In addition, anurans utilizing naturally revegetated sites up to 30 years after CCW disposal ceases are exposed to elevated trace elements.	University of Georgia, Savannah River Ecology Laboratory, P.O. Drawer E, Aiken, SC 29802, USA.	Roe JH, Hopkins WA, Jackson BP. (2005). Species- and stage-specific differences in trace element tissue concentrations in amphibians: implications for the disposal of coal-combustion wastes. Environ Pollut.;136(2):353-63.
iv	Southern toads (*Bufo terrestris*)	In vivo study to assess the responsiveness of the interrenal axis to stress from adrenocorticotropic hormone (ACTH), as well as the vehicle alone (saline) in CCW exposed toads against those from control sites.	Initial circulating levels of corticosterone in toads captured at the CCW area were significantly higher than levels in toads from the reference site. Corticosterone levels in toads from the CCW site remained high even after 2 weeks of laboratory acclimation and injection with saline. Injection of toads from the	CCW constituents display endocrine system disrupting effects. This may be through disruption of hepatic enzymes responsible for the metabolic clearance of steroid hormones. Toads exposed to CCW wastes may be less efficient at responding to additional environmental stressors.	Hopkins WA, Mendonça MT, Congdon JD. Department of Zoology and Wildlife, Auburn University, AL 36849, USA. hopkins@srel.edu	Hopkins WA, Mendonça MT, Congdon JD (1999). Responsiveness of the hypothalamo-pituitary-interrenal axis in an amphibian (*Bufo terrestris*) exposed to coal combustion wastes. Comp Biochem Physiol C Pharmacol Toxicol

Study Number	Species Name	Study Type	Results	Significance	Authors Affiliations	Citation
			CCW site with ACTH had no effect on plasma corticosterone levels, whereas a similar treatment of toads from the reference site stimulated a marked increase in corticosterone.			Endocrinol.;122(2):191-6.
v	Southern toads (*Bufo terrestris*)	In situ experiment, which compared in phase 1, the circulating levels of corticosterone (B) and testosterone in male toads captured at CCW sites versus reference sites. In phase 2 of this study, male toads from reference sites were transplanted to enclosures at the polluted site or an uncontaminated site and B levels were checked up to 12 weeks following exposure in each group.	Free-ranging male toads captured at the CCW site exhibited significantly higher circulating levels of corticosterone (B) in both June/July and August than conspecifics captured at uncontaminated sites. Additionally, both calling and noncalling males from the polluted site had higher B levels than conspecifics engaged in the same behaviors at reference sites. Testosterone levels were elevated in toads from the polluted site, regardless of capture month or behavioral state. In phase 2 of this study toads held at the polluted site exhibited significant increases in B after 10 days of exposure compared to toads held at the reference site. B levels remained significantly elevated in	This study describes an interrenal stress response in adult toads after exposure to coal combustion waste (CCW). CCW exhibited endocrine-disrupting capabilities by increasing testosterone levels, which suggests altered androgen production, utilization, and/or clearance. CCW exposure also increased circulating levels of corticosterone.	Department of Zoology and Wildlife Science, Auburn University, 331 Funchess Hall, Auburn, Alabama, 36849, USA.	Hopkins WA, Mendonça MT, Congdon JD. (1997). Increased circulating levels of testosterone and corticosterone in southern toads, *Bufo terrestris*, exposed to coal combustion waste. Gen Comp Endocrinol.;108(2):237-46.

Study Number	Species Name	Study Type	Results	Significance	Authors Affiliations	Citation
			toads transplanted to the polluted site after 12 weeks.			
vi	Larval southern leopard frogs, (*Rana sphenocephala*)	CCW are documented to negatively impact oral morphology, growth, and development in larval amphibians. It is currently unclear what physiological mechanisms may mediate these effects. Corticosterone, a glucocorticoid hormone, is a likely mediator because when administered exogenously it, like CCRs, also negatively influences oral morphology, growth, and development in larval amphibians. In an attempt to identify if corticosterone mediates these effects, the authors raised larval Southern Leopard Frogs, *Rana sphenocephala*, on either sand or CCR substrate and documented effects of sediment type on whole body corticosterone,	CCW treated tadpoles contained significantly more corticosterone than controls throughout metamorphosis. However, significantly more oral abnormalities occurred early in metamorphosis when differences in corticosterone levels between treatments were minimal. Overall, CCR-treated tadpoles took significantly more time to transition between key stages and gained less mass between stages than controls, but these differences between treatments decreased during later stages when corticosterone differences between treatments were greatest.	CCW treatment has effects on corticosterone levels in tadpoles and exposed tadpoles took significantly more time between stages than controls and gained less mass between stages than controls. The mechanism for these effects may be more complex than once thought.	Department of Biological Sciences, Auburn University, Auburn, AL 36849, USA. peterj1@auburn.edu	Peterson JD, Peterson VA, and Mendonça MT. (2009). Exposure to coal combustion residues during metamorphosis elevates corticosterone content and adversely affects oral morphology, growth, and development in *Rana sphenocephala*. Comp Biochem Physiol C Toxicol Pharmacol.;149(1):36-9. Epub 2008 Jun 25.

Study Number	Species Name	Study Type	Results	Significance	Authors Affiliations	Citation
		oral morphology, and time to and mass at key metamorphic stages.				
vii	Green frogs (*Rana clamitans*)	In contaminated aquatic environments, a prolonged larval phase means prolonged exposure to pollutants and, potentially, more severe toxic effects. In the laboratory, the authors tested this hypothesis by exposing green frog larvae (*Rana clamitans*) to commercial clean sand (control), sediment from an abandoned surface mine (mine), or sediment contaminated with coal combustion waste (CCW). By collecting eggs late in the breeding season, they obligated larvae to overwinter and spend a protracted amount of time exposed to contaminated sediments. The experiment was continued until all larvae either successfully	Larvae exposed to CCW-contaminated sediment accumulated significant levels of As, Se, Sr, and V. Larvae exposed to CCW-contaminated sediment suffered greatly reduced survival (13%) compared to both control and mine treatments. Moreover, among larvae in the CCW treatment, the majority of mortality occurred during the latter part the overwintering period (after day 205), corresponding to the onset of metamorphosis in the controls.	Mortality in CCW exposed larvae corresponding with metamorphosis in control larvae suggests possible disruption of hormone signaling from exposure to CCW and/or constituent elements and/or chemicals.	Department of Biological Sciences, Towson University, Towson, Maryland 21252, USA. jsnodgrass@towson.edu	Snodgrass JW, Hopkins WA, Jackson BP, Baionno JA, and Broughton J. (2005). Influence of larval period on responses of overwintering green frog (*Rana clamitans*) larvae exposed to contaminated sediments. Environ Toxicol Chem. ;24(6):1508-14.

Study Number	Species Name	Study Type	Results	Significance	Authors Affiliations	Citation
		completed metamorphosis or died (301 d).				
viii	Lake chubsuckers (*Erimyzon sucetta*) FISH	Lake chubsuckers (*Erimyzon sucetta*) were exposed to coal ash-polluted sediments under conservative experimental conditions (filtered artificial soft water and abundant uncontaminated food). Four months after exposure fish were analyzed for incorporation of toxic elements, growth-survival and physical deformities, and total non-polar lipids.	Fish grazing the CCW sediments had significantly elevated body burdens of Se, Sr, and V. Selenium levels were particularly elevated, reaching mean whole body concentrations of 5.6 microg/g dry mass by the end of experimental manipulations. Twenty-five percent of fish exposed to pollutants died during the study. All surviving fish exposed to ash exhibited substantial decreases in growth and severe fin erosion. Total nonpolar lipids were two times higher in fish from the control treatment.	Fish exposed to ash utilized more energy for daily activities and/or were less efficient at converting available energy to tissues for growth and storage. Study implicates CCW and/or constituents as possible endocrine-disrupting agents.	Savannah River Ecology Laboratory, Aiken, South Carolina 29802, USA.	Hopkins WA, Snodgrass JW, Roe JH, Jackson BP, Gariboldi JC, and Congdon JD. (2000). Detrimental effects associated with trace element uptake in lake chubsuckers (*Erimyzon sucetta*) exposed to polluted sediments.Arch Environ Contam Toxicol. ;39(2):193-9.
ix	Juvenile lake chubsuckers (*Erimyzon sucetta*)	A controlled laboratory study evaluating the responses of individual fish to ash exposure and its effect on swimming performance. To test this hypothesis, the authors measured sprint speed and critical swimming speed (U(crit)) of juvenile lake	Fish exposed to ash for 90-100 days accumulated significant concentrations of As, Se, Sr, and V; exhibited severe fin erosion; and had reduced sprint speed and U(crit). Compared to controls, sprint speed of ash-exposed fish was reduced by 30% at 5 cm and the percent reduction was further	Ash exposed fish have changes in their ability to move effectively in their environment, making them less able to avoid predators and procure foods.	Savannah River Ecology Laboratory, Aiken, South Carolina 29802, USA.	Hopkins WA, Snodgrass JW, Staub BP, Jackson BP, and Congdon JD (2003). Altered swimming performance of a benthic fish (*Erimyzon sucetta*) exposed to contaminated sediments. Arch

Study Number	Species Name	Study Type	Results	Significance	Authors Affiliations	Citation
		chubsuckers (*Erimyzon sucetta*) exposed to ash in the laboratory versus control fish.	reduced to 104% at 20 cm. Critical swimming speed was approximately 50% lower in fish exposed to ash compared to controls. Additionally, the typical positive relationship between standard length and U(crit) was absent in fish exposed to ash.			Environ Contam Toxicol. ;44(3):383-9.
x	Lake chubsuckers (*Erimyzon sucetta*) FISH and benthic invertebrates	Because aquatic disposal of ash can also adversely affect food resources for benthic fish, the authors hypothesized that changes in resources might exacerbate the effects of ash on fish observed in laboratory studies. They exposed juvenile *E. sucetta* in outdoor microcosms to water, sediment, and benthic resources from an ash-contaminated site or a reference site for 45 days and compared findings to previous laboratory studies.	Benthic invertebrate biomass was nearly three times greater in controls compared to ash microcosms. Total organic content of control sediment (41%) was also greater than in ash sediments (17%), suggesting that additional benthic resources may have also been limited in ash microcosms. Benthic invertebrates isolated from the ash microcosms had trace element concentrations (As, Cd, Co, Cr, Cs, Se, Sr, and V) up to 18 times higher than in weathered ash used in laboratory studies. The concentrations of trace elements accumulated by fish reflected the high	This study combined with the results of the previous study suggest that ash discharge into aquatic systems is a more serious threat to the health of benthic fish than previously predicted based upon laboratory toxicity tests.	Savannah River Ecology Laboratory, University of Georgia, Drawer E, Aiken, SC 29802, USA. hopkins@srel.edu	Hopkins WA, Staub BP, Snodgrass JW, Taylor BE, DeBiase AE, Roe JH, Jackson BP, and Congdon JD. (2004).Responses of benthic fish exposed to contaminants in outdoor microcosms--examining the ecological relevance of previous laboratory toxicity tests. Aquatic Toxicology (Amsterdam, Netherlands),;v. 68 no. 1, pp. 1-12.

Study Number	Species Name	Study Type	Results	Significance	Authors Affiliations	Citation
			dietary concentrations encountered in the ash microcosms and were associated with reduced growth (final mass = 0.07 g) and survival (25%) compared to controls (0.37 g and 67%, respectively).			
xi	Common grackles (*Quiscalus quiscala*) BIRD	Tested hypothesis concerning aquatic disposal of CCW and effects in avian fauna. Individual eggs were collected from common grackles (*Quiscalus quiscala*) nesting in association with coal fly ash settling basins and a reference site to determine if females from the contaminated site transferred trace elements to their eggs. Whole clutches were also collected from both sites to examine inter- and intra-clutch variability of maternally transferred contaminants.	Selenium was found in significantly higher concentrations in ash basin eggs (x = 5.88 +/- 0.44 microg/g DW) than in reference eggs (x = 2.69 +/- 0.13 microg/g DW). Selenium concentrations in eggs from the ash basins were above background levels. Inter- and intra-clutch variation was higher for ash basin clutches than reference clutches.	This study shows maternal transfer of selenium to eggs in birds living near CCW settling ponds.	Savannah River Ecology Laboratory, University of Georgia, P. O. Drawer E, Aiken, South Carolina 29802, USA. bryan@srel.edu	Bryan AL Jr, Hopkins WA, Baionno JA, and Jackson BP. (2003) Maternal transfer of contaminants to eggs in common grackles (*Quiscalus quiscala*) nesting on coal fly ash basins. Arch Environ Contam Toxicol.;45(2):273-7.
xii	Slider turtles (*Trachemys scripta*)	The authors examined two potential pathways by which female *T.*	Incubation in contaminated soil was associated with reduced embryo	CCW contaminant constituents accumulated in female turtles. Se was	University of Georgia, Savannah River	Nagle RD, Rowe CL, and Congdon JD. (2001).

Study Number	Species Name	Study Type	Results	Significance	Authors Affiliations	Citation
		scripta may influence the survivorship and quality of their offspring in a contaminated habitat: (1) nesting in contaminated soil and (2) maternal transfer of pollutants. Eggs were collected from turtles captured in coal ash-polluted or unpolluted sites; individual clutches were incubated in both ash-contaminated and uncontaminated soil in outdoor, artificial nests.	survivorship. Adult females from the polluted site accumulated high levels of As, Cd, Cr, and Se in their tissues, yet Se was the only element transferred maternally to hatchlings at relatively high levels. Hatchlings from polluted-site females exhibited reduced O2 consumption rates compared to hatchlings from reference sites.	transferred to hatchlings at high levels and may be responsible for observed physiological impairments.	Ecology Laboratory, Aiken, South Carolina 29802, USA	Accumulation and selective maternal transfer of contaminants in the turtle *Trachemys scripta* associated with coal ash deposition. Arch Environ Contam Toxicol.;40(4):531-6.
xiii	Banded water snakes, (*Nerodia fasciata*) and prey	Trace element concentrations in banded water snakes, *Nerodia fasciata*, and representative prey items from a site polluted by coal combustion wastes were compared with concentrations in conspecifics from a nearby reference site.	Water snakes accumulated high concentrations of trace elements, especially arsenic (As) and selenium (Se), in the polluted habitat. In addition to being exposed to contaminants in water and sediments, snakes in the polluted site are exposed to contaminants by ingesting prey items that have elevated whole-body concentrations of trace elements, including As, cadmium (Cd), and Se. Snakes from the polluted site exhibited mean standard	CCW exposed snakes appear to have elevated allocation of energy to maintenance and theoretically should have less energy available for growth, reproduction, and storage. These findings are consistent with physiological responses recently documented in other organisms from the polluted site. The authors hypothesize that long-term exposure to coal ash–derived trace elements and the resultant	William A. Hopkins[1,2], Christopher L. Rowe[1,3], and Justin D. Congdon[1] 1. Savannah River Ecology Laboratory, Aiken, South Carolina 29802, USA, 2. Department of Zoology and Wildlife, Auburn University,	William A. Hopkins, Christopher L. Rowe, and Justin D. Congdon (1999). Elevated trace element concentrations and standard metabolic rate in banded water snakes (*nerodia fasciata*) exposed to coal combustion wastes. Environmental Toxicology and Chemistry . Volume 18, Issue 6

Study Number	Species Name	Study Type	Results	Significance	Authors Affiliations	Citation
			metabolic rates (SMR) 32% higher than snakes from the reference site.	accumulation of some elements are responsible for observed increases in SMR.	Auburn, Alabama 36849, USA, 3. Department of Biology, University of Puerto Rico, PO Box 23360, San Juan, Puerto Rico, 00931	Article: pp. 1258–1263.
xiv	Salamander (*Ambystoma talpoideum*)	The authors exposed the salamander *Ambystoma talpoideum* to coal-combustion wastes at low and high larval density throughout aquatic development in mesocosms simulating temporary wetlands.	CCW and high density reduced survival to metamorphosis by 57-77% and 85-92%, respectively, and the effects of these two factors together were additive. Reduced metamorphosis was due in part to larval mortality prior to initiation of pond drying, but CCW and high density also extended the larval period, causing mortality of larvae that were not ready to metamorphose before the pond dried. A. talpoideum metamorphs accumulated high concentrations of a suite of trace elements (As, Se, Sr, and V).	This was the first demonstration of a CCW pollutant-induced extension of larval period leading to reduction in amphibian recruitment.	Savannah River Ecology Laboratory, University of Georgia, Aiken, SC 29802, USA. roe@aerg.canberra.edu.au	Roe JH, Hopkins WA, Durant SE, and, Unrine JM. (2006). Effects of competition and coal-combustion wastes on recruitment and life history characteristics of salamanders in temporary wetlands. Aquat Toxicol.;79(2):176-84. Epub 2006 Jul 13.

Study Number	Species Name	Study Type	Results	Significance	Authors Affiliations	Citation
xv	Grass shrimp (*Palaemonetes pugio Holthius*)	Grass shrimp were exposed in the laboratory to CCW-enriched sediments and food over a full life cycle. Survival to metamorphosis was monitored. The COMET assay, a general but sensitive assay for genotoxicity, was used to quantify DNA single strand breaks (SSB) in adults. Total antioxidant potential was examined to assess the overall antioxidant scavenging capacity of CCW-exposed and non-exposed adult grass shrimp.	Survival to metamorphosis was significantly reduced in CCR-exposed larvae (17+/-4 versus 70+/-13% in the controls) but not in the juveniles or adults. Grass shrimp exposed to CCR significantly accumulated selenium and cadmium compared to unexposed shrimp. Chronic CCR exposure caused DNA SSB in hepatopancreas cells, as evidenced by the significantly increased percent tail DNA, tail moment, and tail length as compared to reference shrimp.	These findings suggest that genotoxicity may be an important mode of toxicity of CCR, and that DNA SSB may serve as a useful biomarker of exposure and effect of this very common, complex waste stream. This study also suggests that CCW exposure during a critical window of development may predispose larvae to not survive to metamorphosis.	University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory, 1, Williams Street, PO Box 38, Solomons, MD 20688, USA.	Kuzmick DM, Mitchelmore CL, Hopkins WA, and, Rowe CL. (2007). Effects of coal combustion residues on survival, antioxidant potential, and genotoxicity resulting from full-lifecycle exposure of grass shrimp (*Palaemonetes pugio Holthius*). Sci Total Environ. ;373(1):420-30. Epub 2006 Dec 19.
xvi	Paramecium protozoan (Mutagenic Assay)	The use of the established mutagenesis assay in Paramecium as a prescreen for hazardous environmental particles is described. Since these protozoans ingest particles of the size respired by animals and man, the biological effects of the respirable	Fly ash from coal combustion was utilized for these studies and was found to be mutagenic. The effects of physical and chemical treatment of the particle mutagenicity provided evidence for heat-stable, heat-labile and acid extractable mutagenic agents.	Flyash and/or specific constituents of fly ash are mutagenic in the Paramecium-protozoan assay. This finding implies genotoxic effects to both humans and animals from inhalation of repairable flyash particles. Genotoxic effects are associated with increased risk of cancer development and	Department of Biological and Exercise Sciences, Northeastern Illinois University, Chicago 60625-4699, USA.	Smith-Sonneborn J, Fisher GL, Palizzi RA, and Herr C. (1981). Mutagenicity of coal fly ash: a new bioassay for mutagenic potential in a particle feeding ciliate. Environ Mutagen.;3(3):239-52.

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PUBLIC HEALTH

Center for Healthy Environments and Communities, Department of Environmental and Occupational Health, Graduate School of Public Health, University of Pittsburgh http://www.chec.pitt.edu/ http://www.pitt.edu/~cdv5/

Study Number	Species Name	Study Type	Results	Significance	Authors Affiliations	Citation
		fraction of fly ash particles were monitored in particle-feeding eukaryotic cells. Fly ash from coal combustion was utilized for these studies.		teratogenic effects.		

Table compiled by Conrad Daniel Volz, DrPH, MPH Assistant Professor http://www.pitt.edu/~cdv5/
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Appendix 1, Biography-Testimony of Conrad Daniel Volz, DrPH, MPH

Dr. Volz is an Assistant Professor of Environmental and Occupational Health (EOH) at the Graduate School of Public Health (GSPH), University of Pittsburgh; he is also the Director for the Center for Healthy Environments and Communities at the Graduate School of Public Health (GSPH), University of Pittsburgh; and Director of the Environmental Health Risk Assessment Certificate Program. Dr. Volz's research interests are primarily focused on how industrial and municipal toxins and carcinogens move through the air, water, soil and groundwater to reach people and how to block this movement. He teaches both Exposure Assessment and Fate and Transport of Environmental Contaminants in the EOH, GSPH. Dr. Volz is the Principal Investigator for the Three Rivers Fish Consumption Project, which has found significant levels of estrogen-mimicking chemicals in area channel catfish, related to bioaccumulation of pharmaceutical estrogens and xenoestrogens principally from sewer overflows. This project has also discovered dangerous and elevated levels of heavy metals, including selenium and mercury, in fish in the Allegheny River and even Store-Bought Fish. He was Director of the 2004 Amchitka Expedition to determine radionuclide concentrations in marine biota from underground nuclear test shots fired in the Aleutian Islands. Dr. Volz is the PI for the Allegheny River Stewardship Project of 2008, a Heinz and Highmark (through UPCI-CEO) funded, community based participatory environmental research and outreach program that will test several hypothesis concerning identification of sources of pollution by sampling of fish, sediment and water in different locations of the Allegheny River. Dr. Volz is also the Co-Principal Investigator for a project with the Children's Institute of Pittsburgh to explore associations between Autism and Autism Exacerbations with exposure to coal fired plant emissions and wastes.

Dr. Volz has over 30 years experience in occupational-environmental health, he received his initial training in Public and Occupational Health in the Department of Occupational Health at the University of Pittsburgh's, Graduate School of Public Health (GSPH) on a fellowship from the U.S. National Institute for Occupational Safety and Health (NIOSH). Dr. Volz holds an MPH and Doctor of Public Health degree from GSPH. After holding progressively responsible posts in private industry (National Steel Corporation), government (California OSHA Consultation Service) and non-governmental agencies (Western Institute for Occupational and Environmental Health Sciences, Berkeley California), Dr. Volz started Volz Environmental Services, an environmental health consulting company in 1984. He has worked in 24 different countries on 5 continents performing radionuclide transport studies, occupational/environmental contaminant/toxin exposure pathway analysis, exposure assessments, environmental risk assessments and engineer and policymaker training for private industry, municipal, state and the federal governments and foreign manufacturers and governmental agencies. He joined the faculty of EOH-GSPH in May of 2004. Dr. Volz was elected to the Omicron Chapter, Delta Omega Honor Society, National Public Health Honor Society in 2006.Dr Volz is the recipient of the endowed Dr. James Craig Award for Teaching Excellence for GSPH faculty received at 2009 convocation ceremonies.

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CURRICULUM VITAE

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Graduate School of Public Health
Department of Environmental and Occupational Health
Bridgeside Point Building
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Phone: 412-444-6112

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Center for Healthy Environments and Communities:
http://www.chec.pitt.edu

EDUCATION AND TRAINING

1975	University of Pittsburgh Pittsburgh, PA College of Arts and Sciences	B.S. Biochemistry and Biophysics
1976	University of Pittsburgh Pittsburgh, PA Faculty of Arts and Sciences	Life Science Studies, Neurosciences- Graduate Research Assistant
1977	University of Pittsburgh	M.S. Hyg. Industrial Hygiene

	Pittsburgh, PA Graduate School of Public Health	Program, National Institute for Occupational Safety and Health Fellowship
1997	University of Pittsburgh Pittsburgh, PA Graduate School of Public Health	MPH Master of Public Health
2002	University of Pittsburgh Pittsburgh, PA Graduate School of Public Health	DrPH Doctor of Public Health

ADDITIONAL ENVIRONMENTAL / OCCUPATIONAL HEALTH PUBLIC HEALTH TRAINING

1977 Industrial Health Foundation, "New Concepts in Occupational Health under OSHA", Chicago, IL.

1979 American Welding Society, "The Welding Environment", Milwaukee, WI.

1979 "Social Issues in Industrial Hygiene", Chicago, American Industrial Hygiene Association.

1979 "NIOSH Respiratory Protection Course", Darryl Bevis and Associates, Berkeley, CA.

Sept. 1979 "New Concepts in Toxicology", Monterey, CA., Western Occupational Health Conference.

Oct. 1979 :Cal/OSHA, Industrial Relations Survey Course", San Francisco, CA.

Oct. 1979 "Cal/OSHA, Industrial Toxicology", San Francisco, CA.

Oct. 1979 "Cal/OSHA, Occupational Carcinogens", San Francisco, CA.

Mar. 1980 Berkeley, CA., University of California Labor Occupational Health Program, "Industrial Noise Control".

Jan. 1987 National Asbestos Council, National Convention, Chicago, IL.

Nov. 1989 Asbestos Abatement Design, Supervision, and Management program participant and attendee at a six (6) day course devised as complete design and supervision course for A/E firms involved in U.S. Army Corp of

Engineer Projects. Course is approved for AHERA Project Designer and Supervisor Certifications.

May 1990 Indoor Air Quality, University of Pittsburgh, School of Medicine Pittsburgh, PA, Certificate 5.5 Continuing Education Units.

Sept. 1990 National Asbestos Council (NAC) National Conference, Update Asbestos Regulation (NESHAP), Operations and Maintenance Plans (O&M) Workshops, Phoenix, Arizona.

Oct. 1990 Asbestos Regulations Update, Pennsylvania Chamber of Business and Industry, Harrisburg, PA.

Nov. 1990 OSHA Laboratory Standards, Pennsylvania Chamber of Business and Industry, Harrisburg, PA.

Nov. 1990 Pennsylvania Planning Association Meeting, Harrisburg, PA. Environmental Planning Issues.

Feb. 1999 The Future of Public Health, 50^{th} Anniversary of the University of Pittsburgh, Graduate School of Public Health, Pittsburgh, PA.

May 1999 Environmental Public Health Forum, Center for Public Health Practice, Allegheny County Health Department, Pittsburgh, PA.

Aug., 2008 Use of Laboratory Animals in Research and Education, University of Pittsburgh, Center for Continuing Education in the Health Sciences, Certificate ID; 89747

Nov. 2007 American Public Health Association, Training Program, Use of Geographic Information Programs in Public Health, 6 credit hours, APHA Learning Institute, Washington, D.C.

Nov. 2007 American Public Health Association, Training Program, Use of NHANES and other NIH/NIEHS Databases, 6 credit hours, APHA Learning Institute, Washington, D.C.

May, 2008 National Institutes of Health Web-based training course "Protecting Human Research Participants". NIH Office of Human Subjects Research, Certification Number: 31150

APPOINTMENTS AND POSITIONS

1975-1976	Life Sciences Program, Neurosciences Faculty of Arts and Sciences University of Pittsburgh Pittsburgh, PA	Teaching Assistant, Graduate Student Researcher
1976-1978	Industrial Health Foundation Pittsburgh, PA	Industrial Hygiene Researcher
1977-1978	National Institute for Occupational Safety and Health Graduate School of Public Health Department of Occupational Health Sciences, University of Pittsburgh Pittsburgh, PA	Fellow
1978-1979	National Steel Corporation Pittsburgh, PA	Corporate Industrial Hygienist
1979-1980	California Occupational Safety and Health Administration San Francisco, CA.	Consultant
1980-1982	Western Institute for Occupational/ Environmental Health Berkeley, CA.	Technical Consultant

(Carcinogen/Mutagen/Teratogen Demonstration Project Grantee, National Cancer Institute; EPA; United States Department of Labor, Occupational Safety and Health Administration (New Directions Grantee).

W.I.O.E.S. Occupational/Environmental Cancer Resource Center. Served as technical expert on industrial hygiene, and carcinogen and toxic substance control procedures for project serving industry, unions, citizens and government. Supported by the Department of Health and Human Services, National Institutes of Health, National Cancer Institute. Work involved all facets of toxic substance control. Work also included consultations regarding atomic veterans march to ground zero in the 1950's.

Shipyard Health Education Programs (SHEP)
Responsible for giving technical assistance to shipyard unions and management on occupational/environmental health evaluation and control for general shipbuilding, including nuclear operations. Developed a slide

show on occupational health engineering control techqniques for shipyards. Work sites included all in-country U.S. Navy shipbuilding and maintenance sites with significant time spent at Pearl Harbor, Authored "Radiation and Health, A Guide for Radiation Workers".

1982-1992 Volz Environmental Services, Inc. (Volz) President
Conrad Daniel Volz was Founder, President, and C.E.O. of Volz Environmental Services, Inc. (Volz), Occupational and Environmental Health Consulting and Risk Management Corporation located at the University of Pittsburgh Applied Research Center (UPARC), Pittsburgh, PA. Volz Environmental provided Environmental Health, Occupational Health and Safety, Asbestos, Indoor Air Quality, Hazardous Waste Management, and Environmental Assessment/Impact and Risk consulting services to State, County, and Municipal governments: worldwide.

Environmental Health and Safety Consultant
Bruin Lagoon Superfund Clean-up Site
Provided all occupational safety and health and environmental health services on clean-up of the EPA's 3rd most hazardous superfund site. Work included general environmental monitoring for benzene, toluene, xylene, chlorinated hydrocarbons and particulate sampling as well as specialty occupational and environmental real time sampling using portable OVM and gas chromatographs. Work also included interface with U.S. Army Corps of Engineers, U.S. Coast Guard and Environmental Protection Agency and state and county officials regarding emergency procedures for gas, vapor and/or particulate releases and explosives and fire protection. Interface with county officials included emergency drills and actual evacuation due to vapor release.

The Worldwide Asbestos Survey of the Department of Defense. Principal
Dependent Schools and Selected Base.
Responsibilities included development and delivery of professional training courses for foreign architects and engineers (Frankfurt, Germany and Seoul, South Korea) and a general informational program for administrators and maintenance workers, surveying all DOD bases for asbestos, laboratory analysis of all bulk and air samples, preparation of omnibus abatement specifications and oversight and air monitoring of all asbestos abatement. Services were delivered simultaneously on four continents and included 24 countries; work supervised by U.S. Army Corps of Engineers, Middle East, Africa Operations Group.

1992-1997 Volz Environmental Services, Inc. Board of Directors, Consultant

1997-2004 International Public Health and Environmental Health Consultant.

Investigator for a Structural, Implementation and Intermediate and Ultimate Outcome Evaluation of the American Cancer Society's, Teen Fresh Start Tobacco Cessation Program. **Principle**

Work included development of research questions and questionnaire pilot testing, sampling design, data analysis, report preparation and recommendations regarding program nationalization.

Community Collaboration in Public Health, A Workshop to Improve Health Promotion and Disease Prevention in Sakhalin-Sakhalin Island, The Russian Federation, 9/03-2/04, Sponsored by the U.S. Cultural Affairs, Office of Citizen Exchanges and Magee Department of State, Bureau of Educational and Womancare International. **Principle**

Work included development of environmental health priority setting models, community environmental health assessments and the development of curriculum focused on implementing environmental health programs with measurable outcomes.

Consortium for Risk Assessment with Stakeholder Participation (CRESP) Amchitka Science Plan **Project Manager**

Initial responsibilities included all logistical preparations, including general and radiation safety and health issues for a project to determine if there is radionuclide leakage from Amchitka Island in the Aleutian Chain into the marine environment. Amchitka is the site of three underground nuclear tests.

Summer 2004 on-island work included biota sampling, water and sediment sampling, oceanography, salinity gradient measurement, island movement studies and magnetotellurics. On-going work includes d development of laboratory OA/OC procedures for Actinide and Gamma Emitter Analysis, statistical analysis and final report. Work done via a grant from the Department of Energy, National Nuclear Security Agency (NNSA), Stakeholders include DOE, NNSA, the US Fish and Wildlife Service, the Aleut/Pribiloff Island Association (APIA) and the Alaska Department of Environmental Protection.

2004 – 2007	Department of Environmental and Occupational Health University of Pittsburgh Graduate School of Public Health Pittsburgh, PA	Visiting Assistant Professor of Public Health Practice in Environmental and Occupational Health

2005 – 2007	Center for Healthy Environments and Communities University of Pittsburgh Graduate School of Public Health Pittsburgh, PA	Scientific Director
2005 –2008	University of Pittsburgh Cancer Institute Center for Environmental Oncology Pittsburgh, PA	Co-Director, Environmental Assessment and Control
2007–Present	Department of Environmental and Occupational Health University of Pittsburgh Graduate School of Public Health Pittsburgh, PA	Assistant Professor of Public Health Practice in Environmental and Occupational Health
2008 –Present	Center for Healthy Environments and Communities University of Pittsburgh Graduate School of Public Health Pittsburgh, PA	Director
2008-Present	Environmental Health Risk Assessment Department of Environmental and Occupational Health Graduate School of Public Health Pittsburgh, PA	Director
2008-Present	University of Pittsburgh, School of Law	Assistant Professor of Law (Secondary Appointment)

MEMBERSHIP IN PROFESSIONAL AND SCIENTIFIC SOCIETIES

1978-1982 and 2007-presant	American Public Health Association
1978-1982	American Industrial Hygiene Association
1988-1992	National Asbestos Council Marketing Board Member
1988-1992	Pennsylvania Chapter, National Asbestos Council State Board Member
2004- Present	Community Campus Partnerships for Health

COMMITTEE AND PUBLIC APPOINTMENTS

Pennsylvania Chamber of Business and Industry
Past Environmental Committee Member

American Society for Testing and Materials (ASTM) Committee. E06.24, Building Renovation, Visual Inspection of Asbestos Abatement Programs

Pennsylvania Chapter, National Asbestos Council
Past Program and Membership Chairman
Past Member, Board of Directors

Stevens Publishing, Asbestos News
Past Editorial Board

Allegheny County Health Department
Original Asbestos Advisory Committee

Environmental Information Association
Past Marketing Committee

May 2008, The Heinz Awards
Environmental Juror

September 2008-present, Board of Directors, Adults and Children with Learning Disabilities, Tillotsen School

Honors

2006 Omicron Chapter, Delta Omega Honor Society, National Public Health Honor Society

PUBLICATIONS

Refereed Articles

1. Volz., C.D. OSHA Carcinogen Regulations. 1979. Science12; 203(4376):124.

2. Powers, C.W., Burger, J., Kosson, D., Gochfeld, M., Barnes, D., Bliss, L., Friedlander, B., Jewett, S., Johnson, M., Stabin, M., Unsworth, M., Volz, C., Vyas, V. and Weston, J. AMCHITKA INDEPENDENT SCIENCE ASSESSMENT: Biological and Geophysical Aspects of Potential Exposure in the Amchitka Marine Environment, CRESP, Department of Energy AI#DE_FCO1-95EW55084, August 1, 2005.

3. Burger, J., Gochfeld, M., Burke, S., Jeitner, C.W., Jewett, S., Snigaroff, D., Snigaroff, R., Stamm, T., Harper, S., Hoberg, M., Chenelot, H., Patrick, R., Volz, C.D., and Weston, J. Do Scientists and fishermen collect the same size fish? Possible implications for exposure assessment. Environ. Research. Sep. 17, 2005. PMID: 16174519.

4. Burger, J., Gochfeld, M., Kosson, D.S., Powers, C.W., Friedlander, B., Eichelberger, J., Barnes, D., Duffy, L.K., Jewett, S.C., Volz, C.D. Science, Policy, and stakeholders: developing a consensus science plan for Amchitka Island, Aleutians, Alaska. Environ Manage May:35(5):557-68, 2005. PMID: 15886955.

5. Greenberg, M., Burger, J., Gochfeld, M., Kosson, D., Lowrie, K., Mayer, H., Powers, C., Volz, D., and Vyas, V. End State Land Uses, Sustainable Protective Systems, and Risk Management:: A Challenge for Multi-Generational Stewards. Remediation Journal 16(1), 2005.

6. Volz, C., Powers, C., Burger, J., Kosson, D., Gochfeld, M., Friedlander, B., Barnes, D., Bliss, L., Jewett, S., Johnson, M., Stabin, M., Unsworth, M., Vyas, V., and Horsch, J. The CRESP Amchitka expedition: a model for multi-and interdisciplinary research into radionuclide contamination of the marine environment. In F. Linkov and R. LaPorte (Eds.), Scientific networking and the global health supercourse. NATO Security through Science Series D: Information and Communication Security-Vol. 5, Amsterdam, Netherlands: IOS Press, 2006.

7. Talshinsky, R., Azwebajan, R., Egypt: Adlas, R., Keders, U., Estonia: Bakanidze, L., Georgia: Linn, S., Israel: Rossodivita, A., Italy: Shishani, K., Jordan: Busmane M., Latvia: Grabauskas, V., Jankauskas, D., Mireckas, R., Obrikis, R., Sliaupa, S., Starkuviene, D., Vaitkaitis, D., Zukauskus, G., Lithuania: Galatchi, L., Romania: Puchkina, N., Shubnikov, E., Trufanov, A., Russia: Ghannem, H., Tunesia: Ozden, Yl., Onale, AE., Turkey: Gudzenko, N., Ledoshchuk, B., Vynograd, N., Ukraine: Dorman, J., LaPorte, R., Linkov, F., Noji, E., Powell, J., Rumm, P., Volz, C.D., USA. Constructing a NATO Supercourse. In: F. Linkov and R. LaPorte (Eds.). Scientific networking and theglobal health supercourse. NATO Security through Science Series D: Information and Communication Security-Vol. 5, Amsterdam, Netherlands: IOS Press.

8. Burger, J., Mayer, H., Greenburg, M., Powers, C., Volz, C., and Gochfeld, M. Ecological risk and conceptual site models where critical risk is offsite for ecological receptors: The case of the Department of Energy's Amchitka Island Nuclear Test Site. Journal of Toxicology and Environmental Health, Part A, 69:1217-1238, 2006.

9. Burger, J., Gochfeld, M., Kosson, D., Jewett, S., Friedlander, B.,Chenelelot, H., Volz, C.D., and Jeitner, C. Radionuclides in marine macroalgae from Amchitka

and Kiska Islands in the Aleutians: establishing a baseline for future biomonitoring.. Journal of Environmental Radioactivity, 91:1-2, 27-40, 2006.

10. Burger, J., Gochfeld, M., Jeitner, C., Stamm, T., Burke, S., Donio, M., Snigeroff, D., Snigeroff, R., and Volz, C.D. Heavy metal levels in Pacific cod (Gadus macrocephalus) from the Aleutians: location, age, size and risk effects. Journal of Toxicology and Environmental Health, A; 2007 Nov; 70(22):1897-911.

11. Burger, J., Gochfeld, M., Kosson, D., Powers, C., Friedlander, B., Stabin, M., Favret, D., Jewett, S., Snigaroff, D., Snigaroff, R., Stamm, T., Weston, J., Volz, C.D., and Jeitner, C. Radionuclides in marine fishes and birds from Amchitka and Kiska Islands in the Aleutians: Establishing a baseline. Accepted Health Physics, December 2006.

12. Gochfeld, M., Volz, C., Jewett, S., Powers, C., Friedlander, B. Developing a Health and Safety Plan for Hazardous Field Work in Remote Areas. Journal of Occupational and Environmental Hygiene, 3(12):671-83, Dec. 2006.

13. Burger, J., Gochfeld, M., Burke, S., Jeitner, C.W., Jewett, Snigaroff, D., Stamm, T., Volz, C., and James Weston. Do scientists and fishermen catch the same size fish: Implications for risk assessment. Environmental Research 101(1):34-41, 2006.

14. Burger, J., Mayer, H., Greenburg, M., Powers, C., Volz, C. and Gochfeld, M. Ecological risk and conceptual site models where critical risk is offsite for ecological receptors: The case of the Department of Energy's Amchitka Island nuclear test site. Journal of Toxicology and Environmental Health, Part A, 69:10-22, 2006.

15. Volz, C.D., and Christen, C. Why are river Recreationalists most at risk for development of waterborne infectious diseases; how can clinicians improve surveillance? Journal of Occupational and Environmental Medicine: 49(1): 104-105, January 2007. PMID: 17215719.

16. Volz, C.D. How do water, land management, ecological and contamination issues interact to produce tertiary public health, medical, social and economic problems? -Journal of Occupational and Environmental Medicine, 2007 Mar; 49(3):349-52.

17. Volz, C.D. A framework to understand the centrality of protection and restoration of ecosystem services to water management and preparedness: An all-hazards approach with implications for NATO plans and operations. In Maria Calpinskiene, MD, PhD, Curtis Cummings, MD, MPH, Nataliya Gudzenko, MD, PhD, Elin Gursky, ScD, Faina Linkov, PhD, Alessandra Rossodivita, MD, Eugene Shubnikov, MD, Elisaveta Stikova, MD, PhD, Andrey Trufanov, PhD, Conrad Volz, DrPH, MPH. Editors, Strengthening national public health preparedness and response for chemical, biological, and radiological agent

threats: Springer-NATO Advanced Science Institute Series. IOS Press – Nieuwe 6B, 1013 BG Amsterdam, Netherlands, June 2007.

18. Tomljanovic, C. and Volz, C.D. Modeling munitions and explosives of concern (MEC) CBRN Hazards: Novel tools and approaches for strengthening the conceptual site model for public health preparedness. In Maria Calpinskiene, MD, PhD, Curtis Cummings, MD, MPH, Nataliya Gudzenko, MD, PhD, Elin Gursky, ScD, Faina Linkov, PhD, Alessandra Rossodivita, MD, Eugene Shubnikov, MD, Elisaveta Stikova, MD, PhD, Andrey Trufanov, PhD, Conrad Volz, DrPH, MPH Editors, Strengthening national public health preparedness and response for chemical, biological, and radiological agent threats: Springer-NATO Advanced Science Institute Series, IOS Press – Nieuwe 6B, 1013 BG Amsterdam, Netherlands, June, 2007.

19. Volz, C.D. Water management in Southwestern Pennsylvania based on a social-economic-ecological model for the University of Pittsburgh, Institute of Politics, Regional Water Management Task Force Board, July 2007.

20. Burger, J., Gochfeld, M., Shukla, S., Stamm, T., Snigaroff, D., Snigaroff, R., and Volz, C.D. Heavy metals in Pacific Cod (Gadus macrocephalus) from the Aleutians: Location, age, size, and risk. 2007. Journal of Toxicology and Environmental Health, Part A, 70: 1-15.

21. Walters, M. and Volz, C.D. Municipal wastewater concentrations of pharmaceutical and xeno-estrogens: wildlife and human health implications. Proceedings of the 3rd National Conference on Environmental Science and Technology, Springer in press.

22. Volz, C.D., Houghton, F., Sussman, N., Lenzner, D., Davis, D., Donovan, M., Hefnawy, T., and Eagon, P. Channel catfish estrogenicity and sewer overflows; Implications for xenoestrogen exposure. Proceedings of the 3rd National Conference on Environmental Science and Technology, Springer in Press.

23. .Volz, C.D. Assessment of metals in down feathers of female common eiders and their eggs from the Aleutians: arsenic, cadmium, chromium, lead, manganese, mercury, and selenium. Environmental Monitoring and Assessment: 2008 Aug; 143(1-3):247-56.

24. Editors, Miller, T., Gorley, T., and Barron, B.; Author Volz, Conrad, D. Southwestern Pennsylvania's Water Quality Problems and How to Address Them Regionally, Issues, University of Pittsburgh, Institute of Politics, 60 pages, 2007.

25. Burger, J., Gochfeld, M., Jeitner, C., Burke, S., Volz, C.D., Snigaroff, D., Snigaroff, Ronald, Shukla, T., Shukla, S., 2008. Mercury and other metals in eggs

and feathers of glaucous-winged gulls (Larus glaucescens) in the Aleutians. Environmenental Monitoring and Assessment: 143: 247-256.

Whitepapers (Since Academic Appointment)

1. Vyas, V. and Powers, C. with Volz, C., Lioy, P., and Gochfeld, M. The role of exposure assessment in the design of sustainable protective systems for Department of Energy Legacy Waste Sites, White Paper for the Department of Energy under a grant to the Consortium for Risk Evaluation with Stakeholder Participation (CRESP), January, 2006.

2. Volz, C.D., and Liu, Y. Healthy Homes Resources, Environmental Asthma Project. US Department of Housing and Urban Development, Health Homes Initiative, January, 2006, 4th Quarter 2005 Evaluation.

3. Volz, C.D., and Liu, Y. Healthy Homes Resources, Environmental Asthma Project, US Department of Housing and Urban Development, Healthy Homes Initiative, May, 2006, 1st Quarter 2006 Evaluation.

4. Volz, C.D., and Liu, Y. Healthy Homes Resources, Environmental Asthma Project, US Department of Housing and Urban Development, Healthy Homes Initiative, July, 2006, 2nd Quarter 2006 Evaluation.

5. Volz, C.D. Water quality problems in Southwestern Pennsylvania in Miller, T., Editor, Regional water management in Southwestern Pennsylvania: Moving toward a solution, University of Pittsburgh, Institute of Politics, July, 2006.

6. Conrad Daniel Volz, DrPH, MPH, and Charles Christen, Graduate Student Researcher. Pathogen contamination and waterborne disease as a result of wet weather releases from combined and sanitary sewer overflows and stormwater runoff: The significance of continued high fecal coliform bacteria in Pittsburgh main stem rivers and tributaries as a public health problem for water recreationalists and municipal treatment facilities, for the University of Pittsburgh, Institute of Politic, Regional Water Management Task Force Board. Work also supported by the Heinz Endowment, September 8, 2006.

7. Volz, C.D. Regional water management in Southwestern Pennsylvania, Our environmental public health and economic challenge for the next 20 years; Definitions, scope, and a causation framework, for Weathering the Storm/Ivan Flood Symposium – University of Pittsburgh, Graduate School of Public Health, Center for Public Health Preparedness, September 15, 2006.

8. Volz, C.D., and Liu, Y. Healthy Homes Resources, Environmental Asthma Project. US Department of Housing and Urban Development, Healthy Homes Initiative, October, 2006, 3rd Quarter 2006 Evaluation.

9. Volz, C.D., and Liu, Y. Healthy Homes Resources, Environmental Asthma Project. US Department of Housing and Urban Development, Healthy Homes Initiative. January, 2007, 4th Quarter 2006 Evaluation.

10. Volz, C.D., and Liu, Y. Healthy Homes Resources, Environmental Asthma Project. US Department of Housing and Urban Development, Healthy Homes Initiative, 1st Quarter, May, 2007 Evaluation.

11. Volz, C.D., and Liu, Y. Healthy Homes Resources, Environmental Asthma Project. US Department of Housing and Urban Development, Healthy Homes Initiative, 2nd Quarter, July, 2007.

12. Volz, C.D., Dabney, B., Cohen, P., Cude, C., Dooly, I, Kyprianou, R., Malecki, K., Richter, W., Schulman, A., Shaw, S., Vanderslice, J,. Walters, M., and Vyas, V. Handling left censored water contaminant data for descriptive statistics and hypothesis tests. Submitted to the Centers for Disease Control and Prevention's (CDC), Environmental Public Health Tracking Network (EPHT) from the Water Working Group, Non-Detect Subgroup, September, 2007.

13. Volz, C.D., and Liu, Y. Healthy Homes Resources, Environmental Asthma Project. US Department of Housing and Urban Development, Healthy Homes Initiative, 3rd Quarter, October, 2007.

14. Volz, C.D. Final Quarterly Report, Healthy Home Resources-AT HOME Environmental Asthma Evaluation Report, Healthy Home Resources for the Department of Housing and Urban Development, 2007.

Selected Publications Before Academic Appointment

1. Known carcinogen regulations and industrial hygiene protection, American Cancer Society Training Book, 1980.

2. Carcinogen Testing, American Cancer Society Training Book, 1980.

3. Control of health hazards in the workplace, protective clothing, Western Institute for Occupational Environmental Services, Inc., Berkeley CA, 1980.

4. Work and health, here are some vital tips on handling the PCB problem, California AFL-CIO News, 1980.

5. Radiation and work, 25 page pamphlet, published by the Western Institute for Occupational and Environmental Health under EPA Carcinogen and OSHA New Directions Grant, Reviewed by Arthur Upton, M.D., Berkeley CA, 1982.

6. Managing asbestos makes public health and economic sense, Tri-State Real Estate Journal, Pittsburgh, PA, 1989.
7. Year End Outlook, Environmental Concerns, Tri-State Real Estate Journal, Pittsburgh, PA, 1989.
8. Asbestos floor tile/mastic removal methods, PACNAC Insider, Harrisburg PA, 1990.
9. Comparison of asbestos floor tile/mastic removal methods, Asbestos Abatement News, Stephens Publishing Company, Dallas , Texas, 1990.
10. Asbestos management, Buildings Magazine, Section sponsored by the National Asbestos Council, Chicago, Illinois, 1990.
11. Another call for Pennsylvania regulations concerning air monitoring technicians, PACNAC Insider, Harrisbur, PA 1990.
12. Recognition and management of occupational environmental health risks, Hospital News, Pittsburgh PA, 1990.
13. Occupational safety and health issues in hospitals, Hospital News, 1992.
14. Asbestos management, Bests Safety Directory, Pyramid Environmental Systems, 1992 Edition.

Professional Activities

1. Teaching

a) Courses Taught

EOH 2112 Co-Instructor
Fate and Transport of Environmental Contaminants
Four Hours Per week, Three Credits, Six Students
Winter; 2005 – 2006

EOH 2111 Course Director
Occupational Health Survey Course, Medical Residents
Summer; 2006 – 2007

EOH 2504 Course Director
Principals of Environmental Exposure
Three Hours Per Week, Three Credits, 15 Students
Fall; 2007 – 2008 and 2008-2009

EOH 2112	Course Director Fate and Transport of Environmental Contaminants Three Credits, 5 Students Winter; 2007 – 2008

EOH Environmental Law (Course to be taught in winter of 08-09) in conjunction with the School of Law-Environmental Law Clinic-Course Co-Director

<u>Lectures Given For Courses in Graduate School of Public Health</u>

BCHS 3004	Getting started with your dissertation-document. Lecture: BCHS; Integrative Seminar. 2004
EOH 2013	Intro Course-Barchowsky: Lecture, Occupational Health and Industrial Hygiene. 2005-2008
EOH 2112	Fate and Transport-Keller: Lecture, Radionuclide movement through media. 2005
EOH 2504	Exposure Assessment-Keller: Lecture, Conceptual site models 2005
EOH 2515	Preparedness Course-Schwerha: Lecture, Radiological catastrophic event evaluation studies. 2005
EOH 2108	Risk Assessment-Sussman: Lecture, Exposure assessment-conceptual site modeling in a risk assessment framework. 2005 – 2008.
EOH 2108	Risk Assessment-Sussman: Lecture, Risk assessment and exposure for the special case of Amchitka Island. 2005 – 2008
EOH 2013	Lecturer: Occupational Health and Radiation Health Lectures. 2006 – 2008
EOH 2013	Lecturer: Water Management Lecture. 2006 – 2008
EOH 2175	Lecturer: Principals of Toxicology; Ecotoxicology 2007-2008 and 2008-2009

EOH 2304	Lecturer: Biomarkers and Molecular Epidemiology. 2006 – 2007
EOH 2022	Proctor: Special Topics Credits (6) – Yan Liu. 2006 – 2007.
EOH 2022	Proctor: Special Topics Credits (6) – Maxine Walters. 2007 – 2008 and 2008-2009.
EOH 2022	Proctor: Special Topics Credits (3) – Drew Michanowicz 2007-2008.
EOH 2022	Proctor: Special Topics Credits (3) – Malcomb Murray 2007-2008.
EOH 2022	Proctor: Special Topics Credits (3) – Suzanne Mamrose 2007-2008.
EOH 2022	Proctor: Special Topics Credits (1) – Chuck Tomjanovic 2007-2008.
EOH 2022	Advisor: Special Studies Credits (3)- Christy Lawson (Epidemiology) Fall 2008-2009 (Exposure Assessment to coal Combustion Wastes in Southwestern Pennsylvania)
EOH 2022	Proctor: Special Topics Credits (3) – Drew Michanowicz Fall 2008-2009. (PPG Waste Site Research and Transport of Metals)
EOH 2022	Proctor: Special Topics Credits (3) – Malcomb Murray Fall 2008-2009. (River Mining Consequences in the Allegheny River)
EOH 2022	Proctor: Special Topics Credits (1) – Chuck Tomjanovic 2007-2008. (Underwater Hazards of Unexploded Ordinance in the Mid-Pacific Ocean)
EOH 2022	Proctor: Special Topics Credits (5), Special Topics in Fate and Transport of Chemical Contaminants – Kiel Ferrar, 2007-2008 and Fall 2008-2009.
Geology Environmental Sciences Program	Biomonitoring Water Using Fishes-Lecture, Winter 2007-2008; Course Director-Don Hopey of the Pittsburgh Post Gazette

b) Supervision

i) Graduate Studies
Advisor: EOH 2108, Environmental and Occupational Health Practicum. 2005 – 2008.

MPH Committee Member:
Awarded:

Susan Bealko, MPH in Environmental and Occupational Health, Spring 2007.
Topic; Evaluation of Noise Levels in Mine Trucks.

Diana Lenzner, MS in Biostatistics, Summer 2007.
Topic: Estrogenicity of Channel Catfish Tissue from the Three Rivers Near Pittsburgh, PA.

Katie Philp, MPH in BCHS, Spring 2008
Topic: Point of use water quality interventions in developing countries

In Progress:

Suphagaphan Ratanamaneechat, MD, MPH in Occupational Medicine
Topic: Advisor-Toxic metal, metalloid and element pollution associated with coal fired electrical generation: Analysis of waste streams from the Reliant Energy Plant in Springdale, PA
(Summer, 2009 Graduation).

Lara Hyler, MPH in Environmental and Occupational Health
Topic: An assessment of the protectiveness of Occupational Health Radiation limits.

MPH Major Advisor/Committee Head
Awarded:

Christine Lewis, University of Pittsburgh, Graduate School of Public Health, MPH, Awarded December, 2005.
Topic: Implementation Evaluation of the Healthy Homes Resources Environmental Asthma-AT HOME Project

Yan Liu, MPH in Environmental and Occupational Health, Awarded, Summer, 2007.
Topic: Mercury, Arsenic and Selenium Levels in Channel Catfish From Southwestern Pennsylvania; Implications for Coal Fired Power

Plants.

In Progress

Charles Tomjanovic, University of Pittsburgh, Graduate School of Public Health, November, 2005 – Present.
Topic: Conceptual site models of explosive ordinance.

Drew Michanowicz, MPH in Environmental and Occupational Health, Graduate School of Public Health.
Topic: Metal contamination in the Allegheny river as a result of glass production.
(Expected Graduation, April, 2009).

Malcomb Murray, MPH in Environmental and Occupational Health, Graduate School of Public Health.
Topic: Metal contamination in the Monongahela River from iron and steel production.
(Expected Graduation Date, April, 2009).

Suzanne Mamrose, MPH in Environmental and Occupational Health, Graduate School of Public Health.
Topic: An outcome evaluation of the healthy home resources AT HOME Asthma trigger remediation program.

Doctoral Committees

Member, Awarded:

Xiaohui Xu, University of Pittsburgh, Graduate School of Public Health Epidemiology.
Topic: Geographic information systems and environmental health and exposure mapping.
Awarded Ph.D. June, 2007.

Doctoral Dissertation Advisor

Maxine Walters (Admitted to Candidacy April 2008)
Topic: Xenoestrogens in water and bioaccumulation in fish: Implications for human health.
(Expected Graduation, Fall 2008 – 2009).

Graduate Student Field Placement

Christine Lewis, MPH, Environmental and Occupational Health
University of Pittsburgh, Graduate School of Public Health.

Topic: Healthy Homes Resources.
May 1, 2005 – June 30, 2005.

Yan Liu, MPH, Environmental and Occupational Health
University of Pittsburgh, Graduate School of Public Health.
Topic: Healthy home resources, Asthma Study, Summer, 2006.

Suzanne Mamrose, MPH, Environmental and Occupational Health
University of Pittsburgh, Graduate School of Public Health
Topic: Healthy Home Resources Asthma Study
Fall – Summer, 2007- 2008.

Drew Michanowicz, MPH, Environmental and Occupational Health
University of Pittsburgh, Graduate School of Public Health
Topic: PA Department of Environmental Protection
Spring-Summer, 2007- 2008.

Malcomb Murray, MPH in Environmental and Occupational Health,
Graduate School of Public Health.
Topic: Center for Healthy Environments and Communities
, Allegheny River Stewardship Project
Spring-Summer, 2007- 2008.

Suphagaphan Ratanamaneechat, MD, MPH in Occupational Medicine
Topic: Allegheny River Stewardship Project.
(Summer, 2009 Graduation).

Batsirai T. Mutetwa
MPH Candidate in Epidemiology
Global Health Certificate '08
Topic: Center for Healthy Environments and Communities
, Allegheny River Stewardship Project
Spring-Summer, 2007- 2008.

Undergraduate Internships-Allegheny River Stewardship Project

Andreal Bowser, Chatham University (4 Credits)
May Externship Semester Bio 498, May 2008 and
Advisor-Senior Project Tutorial Bio 499, 2008-2009,
Allegheny River Stewardship Project.

Sophia Good, University of Pittsburgh, Environmental Studies
, Department of Geology, Senior Internship, Allegheny River Stewardship Project, Summer 2008.

Benjamin Schultz, West Virginia University, Department of Forestry and Conservation, Environmental Studies Division, Allegheny River Stewardship Project, Summer 2008.

Andrea Glassmire, University of Pittsburgh, Department of Biology Senior Internship Requirement, Allegheny River Stewardship Project, Summer, 2008.

2. **Research**

A. Grants Received

1) Consortium for Risk Evaluation with Stakeholder Input (CRESP)-Department of Energy

Title: Amchitka Study and Analysis of DOE Legacy Waste
PI; Charles Powers, PhD, UMDNJ
Co-Investigator: Conrad D. Volz, DrPH, MPH
% of Effort: 90
Annual Direct Costs: $8,000,000
Period of Support: May 1, 2004- October 2004
Amchitka Science Plan-Initial responsibilities included all logistical preparations, including general and radiation safety and health issues for a project to determine if there is radionuclide leakage from Amchitka Island in the Aleutian Chain into the marine environment. Amchitka is the site of three underground nuclear tests. Summer 2004 on-island work included biota sampling, water and sediment sampling, oceanography, salinity gradient measurement, island movement studies and magnetotellurics. On-going work includes development of laboratory QA/QC procedures for Actinide and Gamma Emitter Analysis, statistical and analysis and final report writing. Work done via a Grant from the Department of Energy, National Nuclear Security Agency (NNSA), Stakeholders include DOE NNSA, the US Fish and Wildlife Service, the Aleut/Pribiloff Island Association (APIA) and the Alaska Department of Environmental Protection.

2) Heinz Endowments

Title: Center for Healthy Environments and Communities
Principal Investigator: Rabi Ali, MD
Scientific Director; Conrad Daniel Volz, DrPH
% of Effort: 50
Annual Direct Costs: $200,000
Period of Support: 2005 -2007

3) CRESP/DOE
Title: Sustainability of Radionuclide Closures, Department of Energy, National Nuclear Security Agency (NNSA)
Charles Powers, PhD, UMDNJ
Co-Investigator: Conrad D. Volz, DrPH, MPH
% of Effort: 90
Annual Direct Costs: $1,500,000
Period of Support: October 2004-September 2005

4) UPCI, DSF Charitable Trust / UPCI CEO
Title: Development of a Community Based Participatory Environmental Research Project: Focus Groups to Investigate Fish Consumption Patterns. A Screening Assessment for Metals and Estrogenicity in White Bass and Channel Catfish Caught in the Three Rivers Area of Pittsburgh, Pennsylvania
Principal Investigator: Conrad D. Volz, DrPH, MPH
% of Effort: Various-up to 30
Annual Direct Costs: $75,000
Period of Support: July 2005 – June 2007

5) Housing and Urban Development and Heinz Endowments
Title: Healthy Homes Resources Environmental Asthma Evaluation
Principal Investigator: Conrad D. Volz, DrPH, MPH
% of Effort: 10
Annual Direct Costs: $12,000
Period of Support: December 2004 – December 2007

6) Centers for Disease Control and Prevention
Title: Environmental Public Health Tracking
PI: Evelyn Talbott, DrPH
Co-Investigator: Conrad D. Volz, DrPH, MPH
% of Effort: 10
Annual Direct Costs: $250,000
Period of Support: January 2005 – Present

7) Allegheny River Stewardship Project
$150,000 from Heinz Endowments
Highmark and Alle-Kiski Health Foundation
Principal Investigator: Conrad D. Volz, DrPH, MPH
% of Effort:20 and Various
Annual Direct Costs: $150,000
Period of Support: June 2007 – November 2008

8. Heinz Endowments, Center for Healthy Environments and Communities
$200,000
Principle Investigator

% of Effort; 60%
Period of Support; July 1, 2008-June 30. 2009

9. Children's Institute
Autism and Heavy Metals Study
Co-Principal Investigator
% of Effort; 10%
Period of Support; July 1, 2008-June 30. 2009

C. Seminars

Burger, J., Gochfeld, M., Powers, C., Friedlander, B., Eichelberger, J., Barnes, D., Duffy, L., Jewett, S., and Volz, C. Science, Policy, Regulators and Stakeholders Developing a Consensus Science Plan for Amchitka Island, Aleutians, Alaska: presented at the University of Medicine and Dentistry of New Environmental and Occupational Health Sciences Institute, Environmental Session.
May 31, 2004.

Ecological Risk and Conceptual Site Models Where Critical Risk is Offsite for Ecological Receptors, especially birds: The Case of the Department of Energy's Amchitka Island Nuclear Test Site. American Ornithological Union Conference, Quebec City, Canada.
August 15, 2004.

Volz, C.D. Story Session and Conference Paper – Community Collaborations in Public Health: The Pittsburgh PA and Sakhalin, The Russian Republic Experience. A Partnership of Magee Women's International and the University of Pittsburgh's Graduate School of Public Health. Demonstration of an Environmental public health prioritization process International Conference of Community Campus. Partnerships for Health and the Network: Towards Unity for Health (World Health Organization), Atlanta, Georgia.
October 9, 2004,

Volz, C.D. The CRESP Amchitka Expedition: A Model for Multi- and Interdisciplinary Research into Radionuclide Contamination. NATO Conference on Containment of Natural and Manmade Disasters, Kaunas, Lithuania.
August 8 – 12, 2005.

Volz, C.D. Transport and Fate of Mercury in the Environment. Sierra Club Mercury Meeting, Pittsburgh, PA.
September 27, 2005.

Volz, C.D. Exposure Assessment of Pennsylvania Communities Contaminated by Legacy Iron and Steel (ISI) Waste. Collaborative on Health and the Environment for Pennsylvania and the Battle of Homestead Foundation, Homestead Pump House, Homestead, PA.
October 8, 2005.

Volz, C.D. Exposure Assessment as the Basis for Evaluating Alternative Land Use End States in Pennsylvania Communities Contaminated by Legacy Iron and Steel Industry Waste. Pennsylvania Public Health Association's 2005 Annual Conference.
October 24, 2005.

Volz, C.D., Lewis, C., Horsch, J.. An Implementation Analysis of a Pittsburgh Based Environmental Asthma Intervention. Pennsylvania Public Health Association's 2005 Annual Conference.
October 26, 2005.

Volz, C.D., Davis, D., Horsch, J., Domike, S., Ali, R. Use of Conceptual Site Models to Understand Human and Ecological Risk from Legacy Iron and Steel Industry Wastes in the Three Rivers Area of Pittsburgh. Pennsylvania Public Health Association's 2005 Annual Conference.
October 26, 2005.

Transport and Fate of Air Contaminants in the Monongahela Valley REACH Mon Valley and Clean Water Action.
November 5, 2005.

T5.5 Balancing worker risk and expedition benefit in a remote environment with uncharacterized hazards: Keeping expedition personnel safe in a risky environment. Gochfeld, M., Volz, D., Jewett,S., Burger, J. T5.3 What geophysical data can tell us about potential exposure pathways. Kosson, D., Unsworth, M., Johnson, M., Barnes, D., Vyas, V., Volz, D., Society for Risk Analysis, Annual Conference, Orlando, Florida.
December, 2005.

Burger, J., Gochfeld, M., Powers, C., Friedlander, B., Eichelberger, J., Barnes, D., Duffy, L., Jewett, S., and Volz, C. Science, policy, regulators and stakeholders developing a consensus science plan for Amchitka Island, Aleutians, Alaska. Presented at the University of Medicine and Dentistry of New Environmental and Occupational Health Sciences Institute, Environmental Session.
May 25, 2004.

Burger, J., Meyer, H., Greenburg, M., Gochfeld, M., Powers, C. and Volz, C.D. Ecological risk and conceptual site models where critical risk is offsite for ecological receptors, especially birds: The case of the Department of Energy's Amchitka Island Nuclear Test Site. American Ornithological Union Conference, Quebec City, Canada.
August 15, 2004.

Volz, C.D. Story session and conference paper – Community collaborations in public health: The Pittsburgh PA and Sakhalin, The Russian Republic Experience. A partnership of Magee Women's International and the University of Pittsburgh's Graduate School of Public Health. Demonstration of an environmental public health prioritization process international conference of community campus partnerships for health and the network: Towards unity for health (World Health Organization) Atlanta, Georgia.
October 9, 2004.

Volz, C.D. The CRESP Amchitka expedition: A model for multi- and interdisciplinary research into radionuclide contamination interdisciplinary research into radionuclide contamination. NATIO conference on containment of natural and manmade disasters, Kaunas, Lithuania.
August 8-12, 2005.

Volz, C.D. Transport and fate of mercury in the environment. Sierra Club Mercury Meeting, Pittsburgh, PA.
September 27, 2005.

Volz, C.D. Exposure assessment of Pennsylvania communities contaminated by Legacy Iron and Steel (ISI) waste. Collaborative on health and the environment for Pennsylvania and the battle of Homestead Foundation, Homestead Pump House, Homestead, PA.
October 8, 2005.

Volz, C.D. Exposure assessment as the basis for evaluating alternative land use end states in Pennsylvania communities contaminated by Legacy Iron and Steel industry waste. Pennsylvania Public Health Association's Annual Conference.
October 24, 2005.

Volz, C.D., Lewis, C., and Horsch, J. An implementation analysis of a Pittsburgh based environmental asthma intervention. Pennsylvania Public Health Association's Annual Conference.
October 26, 2005.

Volz, C.D., Davis, D., Horsch, J., Domike, S., and Ali, R. Use of conceptual site models to understand human and ecological risk from Legacy Iron and Steel industry wastes in the Three Rivers area of Pittsburgh. Pennsylvania Public Health Association's Annual Conference.
October 26, 2005.

Transport and fate of air contaminants in the Monongahela valley REACH Mon Valley and Clean Water Action.
November 5, 2005.

Volz, D., Gochfeld, M., Jewett, S., and Burger, J. T5.5 Balancing worker risk and expedition benefit in a remote environment with uncharacterized hazards: Keeping expedition personnel safe in a risky environment.
Kosson, D., Unsworth, M., Johnson, M., Barnes, D., Vyas, V., Volz, D. T5.3 What geophysical data can tell us about potential exposure pathways. Society for Risk Analysis, Annual Conference, Orlando, Florida.
December, 2005.

Skopje, Macedonia, NATO Advanced Science Institute. Conceptual models to assist in radionuclide, and toxic and carcinogenic chemical and metal exposure assessment, also Course Co-Director.
June, 2006.

Volz, C.D. The relationship of land and water management to flood risk and contaminant deposition for weathering the storm: Lessons from the floods, Wyndham Garden Hotel, Pittsburgh, PA.
September 15, 2006.

Global problems, global solutions, LaRoche College and the Graduate School of Public Health-Environment Presenter-Water Management: The most important public health challenge of the 21st Century.
October 7, 2006.

Volz, C.D. Results of the Pittsburgh fish consumption study of 2005, Water Quality Roundtable. Sponsored by the Heinz Endowments and the Pennsylvania Environmental Council, Pittsburgh, PA.
March 14, 2007.

Volz, C.D. Liu, Y., and Sussman, N. Dean's Day Student Presentations, First Prize Winner, Dean's Day – Graduate School of Public Health, Pittsburgh, PA.
March 16, 2007.

Houghton, F., Liu, Y., Price, C.J., Elm, M.S., Donovan, M., Davis, D., Volz, C.D., and Eagon, P. Estrogenicity of tissue extracts from white bass and channel catfish caught along the Three Rivers of Pittsburgh, Pennsylvania. American Association for Cancer Research (AACR), Los Angeles, California, full text.
April 17, 2007.

Volz, C.D., Houghton, F., Sussman, N., Lenzner, D., Liu, Y., Davis, D., Donovan, M. and Eagon, P. Pittsburgh Environmental Health Summit, Biomonitoring fishes for estrogenicity, and mercury levels in the Allegheny, Ohio and Monongahela Rivers. Sponsored by EPHT and GSPH, Holiday Inn, Campus, Pittsburgh, PA.
April 18, 2007.

Volz, C.D., Houghton, F., Sussman, N., Lenzner, D., El Hefnawy, T., Davis, D., Donovan, M., and Eagon, P. REACH: A new EU approach to chemical safety: Lessons for the United States? A conference on the European Union (EU) regulation providing for registration, evaluation, authorization and restriction of chemicals (REACH): The case of pharmaceutical estrogens and xenoestrogens in combined and sanitary sewer overflow waste streams and wastewater treatment effluent. Sponsored by the University of Pittsburgh European Studies Center and The University of Pittsburgh Graduate School of Public Health (GSPH).
June 9, 2007.

Volz, C.D., Houghton, F., Sussman, N., Lenzner, D., El Hefnawy, T., Davis, D., Donovan, M., and Eagon, P. University of Pittsburgh Cancer Institute, Center for Environmental Oncology, Research Meeting, Novel ways to assess estrogenicity in fish and the use of GIS methods to determine proximity to pollution sources. Hillman Cancer Center, Pittsburgh, PA.
June 12, 2007.

Volz, C.D., Houghton, F., Sussman, N., Lenzner, D., El Hefnawy, T., Davis, D., Donovan, M., and Eagon, P. University of Pittsburgh Cancer Institute (UPCI) Scientific Retreat, Estrogenicity of channel catfish fillet and dense concentrations of combined and sanitary sewer overflows. University of Pittsburgh, Greensburg.
June 15, 2007.

Volz, C.D., Singleton, K. and Rucekova, A. CESRA and the Wolf Creek Water Group. Use of a community based participatory research program in the Grove City area to understand patterns of disease and cancer mortality. Grove City, PA.
June 30, 2007.

Volz, C.D. Environmental Public Health Tracking Network, University of Pittsburgh Academic Center for Excellence (UPACE), Advisory Group Meeting. Biomonitoring fishes for exposure assessment and source location purposes: Examples for mercury, arsenic, selenium and estrogenicity. Graduate School of Public Health, Pittsburgh, PA.
August 8, 2007.

Volz, C.D. Environmental Public Health Tracking Network, Water Committee Task Force. Method to assess left censored or non-detect data. Centers for Disease Control and Prevention, Washington, DC, EPA Headquarters.
August 23-24, 2007.

Volz, C.D., Houghton, F., Sussman, N., Lenzner, D., Davis, D., Donovan, M., El Hafnawy, T., and Eagon, P. Third National Conference on Environmental Science and Technology, Catfish estrogenicity and its association with sewer overflows: Implications for human exposure. North Carolina A&T, Greensboro, NC.
September 13, 2007.

Walters, M., and Volz, C.D. Third National Conference on Environmental Science and Technology, Pharmaceutical estrogens and Xenoestrogens in wastewater treatment plant effluent: Implications for both human and wildlife effects. North Carolina A&T, Greensboro, NC.
September 14, 2007.

Volz, C.D. Lunch & Learn Series: Continuing Medical Education Program – Environmental links to cancer, University of Pittsburgh-Center for Environmental Oncology – Using area fish to aid in pollution source identification and assess human exposure to Xenoestrogens, Mercury and Arsenic. Herberman Auditorium, Hillman Cancer Center, Pittsburgh, PA.
September 17, 2007.

Volz, C.D. The Winchester Thurston School Honors Program, Combined sewer overflows in Pittsburgh, PA and associated water quality threats. The Winchester Thurston School, Pittsburgh, PA.
September 19, 2007.

Volz, C.D. Central Atlantic States Association, Food and Drug Officials: Toxic contaminants in commercial and river caught fish. Pittsburgh Conference, Pittsburgh, PA.
September 25, 2007.

Volz, C.D. Komen Foundation (Race for the Cure) and Heinz Endowments, Local and national water and the estrogenic properties affecting both men and women. Third Annual Health and the Environment Conference, Elk Regional Health System, Women's Health Initiative, St. Mary's, PA.
October 5, 2007.

Volz, C.D., Houghton, F., Sussman, N., Lenzner, D., Davis, D., Donovan, M., El Hafnawy, T., and Eagon, P. Estrogenicity of channel catfish tissue is associated with high densities of sewer overflows in Pittsburgh, PA; Implications for human population exposure to xenoestrogens from drinking water in the Greater Pittsburgh Metropolitan area, Alumni Hall, Pittsburgh, PA. Science 2007, University of Pittsburgh.
October 11, 2007.

Liu, Y., Volz, C.D., Sussman, N., and Sharma, R., Mercury, arsenic and selenium in channel catfish (Ictalarus punctatus): Implications for pollution source identification and food safety. Science 2007, University of Pittsburgh, Alumni Hall, Pittsburgh, PA.
October 11, 2007.

Volz, C.D. The Allegheny River Stewardship Project, Three Rivers Water Roundtable, Pennsylvania Environmental Council, Pittsburgh, PA.
October 24, 2007.

Volz, C.D. Community awareness presentation of the Allegheny River Stewardship Project, Alle-Kiski Health Foundation, Heinz Endowments and Highmark Foundation, Pittsburgh Mills Mall, Frazier Township, PA.
October 30, 2007.

Houghton, Frank, Ph.D., Volz, Conrad, DrPH, MPH, Liu, Yan BS Env. Eng., Price, Christopher, Elm, Mary, Davis, Devra Lee, PhD, MPH, Donovan, Maryann, MPH, PhD, and Eagon, Patricia, PhD. Accepted for oral presentation 5041.0: Use of a human breast cancer cell proliferation assay as an exposure assessment tool for total bioaccumulated xenoestrogens in channel catfish (Ictalurus punctatus) caught in various locations on the Allegheny, Monongahela and Ohio Rivers near Pittsburgh, PA: Implications for consumption of river-caught fish 2007. American Public Health Association Annual Meeting, Washington, DC. Full Text.
November 7, 2007.

Volz, Conrad, DrPH, MPH, Sussman, Nancy, PhD, Davis, Devra Lee, PhD, MPH, Donovan, Maryann, MPH, PhD, Liu, Yan, BS Env Eng, Brady, Sean, BS, MA, Gainey, Karen, and Zborowski, Jeanne, PhD, MS. Accepted oral presentation 5041.0: Mercury, arsenic and selenium in white bass fillet caught in the Allegheny and Monongahela Rivers near Pittsburgh, PA; Comparisons with

store-bought fish from Canadian Lake Erie. American Public Health Association Annual Meeting, Washington, DC. Full Text.
November 7, 2007.

Volz, Conrad, DrPH, MPH, Liu, Yan, BS Env Eng, Sussman, Nancy, PhD, Brady, Sean, BS, MA, Caruso, Paul, Green, Tiffany, BS, Arnowitt, Myron, BA, Peterson, Jim, PhD, Christen, Charles, Med, LPC, Donovan, Maryann, MPH, PhD, Davis, Devra Lee, PhD, MPH, Eagon, Patricia, PhD, McMahon, Kelly, MD, and Sharma Ravi K., PhD, Accepted for oral presentation, 5041.0: Mercury, arsenic and selenium in channel catfish from the Allegheny, Monongahela and Ohio Rivers near Pittsburgh, PA: Implications for metallotoxin source identification and fish consumption by local anglers. American Public Health Association Annual Meeting, Washington, DC. Full Text.
November 7, 2007.

Christen, C., Volz, C.D., Caruso, P., Arnowitt, M., Brady, S., Liu, Y., Davis, D.L., and Talbott, E.O. Accepted 5041.0: Results of semi-subsistence and recreational angler focus groups: Reports of combined sewer overflows, chemical releases and associated water-related illnesses in the Three Rivers area of Pittsburgh. Additionally the focus group method shows merit in reporting, often under-reported, gastrointestinal illnesses associated with recreational river water contact. American Public Health Association Annual Meeting, Washington, DC. Full Text.
November 7, 2007.

Volz, C.D. Accepted-Session Moderator, Contaminants in Freshwater Fish: Toxicity, sources and risk communication, 5041.0: Chemical contaminants in freshwater fish present potential health risks for subsistence fishers and recreational anglers. Many questions remain, however, about the sources and associated human health risks of those contaminants, their policy implications, and how to communicate risk information to culturally diverse fish-consuming populations. The first presentation in this session reports on the development and evaluation of a fish consumption advisory program, designed to be culturally sensitive for a Native American population. The following four presentations all originate from the comprehensive study in one geographic region, the Pittsburgh Fish Consumption Study. One presentation describes community based participatory research techniques used to understand patterns of fish consumption by semi-subsistence fishers and recreational anglers, and the discovery of unexpected results about the extent of pollution sources and under-reported gastrointestinal illnesses. The findings of fish tissue analyses for metal and xenoestrogen content are reported in the following presentations, with consideration of their broader implications, particularly source identification and health risks. American Public Health Association Annual Meeting, Washington, DC. Full Text.
November 7, 2007.

Lenzner, D., Stone, R., Wilson, J., and Volz, C.D. Novel statistical methodologies to determine if channel catfish estrogenicity is higher in areas with dense concentrations of sewer overflows. University of Pittsburgh Cancer Institute, Center for Environmental Oncology Scientific Research Group Meeting, Hillman Cancer Center.
January 15, 2008.

Volz, C.D. The Allegheny River Stewardship Project Community Meeting, Crooked Creek Environmental Center, Ford City, PA.
January 15, 2008.

Volz, C.D. Mercury concentrations in river and store-bought freshwater fish of the same species, Pennsylvania Fish and Boat Commission, Mount Pleasant, PA.
January 17, 2008.

Volz, C.D. Estrogenicity levels in Three Rivers fish are correlated with high densities of sewer overflows, Pennsylvania Department of Environmental Protection-Emerging Contaminants Forum, Harrisburg, PA.
January 24, 2008.

Volz, C.D. The tale of two area fish and what they tell us about water quality, Environmental and Occupational Health Departmental Presentation, GSPH-EOH.
February 7, 2008.

Volz, C.D. The Allegheny River Stewardship Project: How community and non-profit organizations can help, Water Quality Roundtable, Millvale, PA.
February 27, 2008.

Volz, C.D. Contamination in the Allegheny River Valley-What individuals can do to help, Café' Scientifique, Penn Brewery, Pittsburgh, PA.
March 3, 2008.

Volz, C.D. Contaminants emitted from electrical generating facilities in Southwestern Pennsylvania, Group Against Smog and Pollution, Rodef Shalom Temple, Pittsburgh, PA.
March 29, 2008.

Volz, C.D. Earth Day Celebrations, Slippery Rock University of Pennsylvania, Emerging Contaminants and Persistent Organic Pollutants in Southwestern, PA.
April 26, 2008.

Volz, C.D., 2008 Heinz Women's Health and the Environment Conference Bridging the False Divide Between Ecological and Human Health", Pittsburgh Convention Center, Pittsburgh, PA
September 25, 2008

Presentations Before Academic Appointment

Health Hazards in the Foundry Industry, Labor Occupational Health Program, Molders Union, University of California – Labor Occupational Health Program, Emeryville, CA.
September, 1979.

Industrial Hygiene Fundamentals, State Fund Insurance Company
San Francisco, CA.
October, 1979.

Industrial Hygiene Community Insights, KRE-KBLX Radio
Berkeley, CA.
January, 1980.

Asbestos Health Hazards, East Bay Municipal Utilities District
AFSCME AFL-CIO, Oakland, CA.
January, 1980.

Expert Testimony to the California State Senate Education Committee, Hearing on 5B 1900 Asbestos Removal in School Buildings.
April, 1980.

Shipyard Workers Health Education Program Series, Control of Health Hazards, East Coast Metal Trades Council, AFL-CIO, Langley Park, MD, Federal Employees Metal Trades Council of Long Beach and the Industrial Union of Marine and Shipbuilding Workers, Local 9, Wilmington, CA, Federal Employees Metal Trades Council of Pearl Harbor, Pearl Harbor, Hawaii. The Federal Employees Metal Trades Council of Mare Island, AFL-CIO, Valley, CA.
April 1980 to November, 1980.

Fetal Toxins and Mutagens, National Safety Council, Claremont Hotel, Berkeley, CA.
April, 1980.

Control of Asbestos Exposure, American Industrial Hygiene Association, Northern California Section, IH Forum, San Leandro, CA.
October, 1980.

Hospital Health Hazards, AFSCME AFL-CIO, Honolulu, Hawaii.
November, 1980.

Occupational Health Study Group, Advisory, Graduate School of Public Health, Berkeley, CA.

Winter, 1980.
Industrial Health Classes, Guest Lecturer, University of California, Berkeley, CA.
Winter, 1980.

Oil Mist and PCB Exposure, IBEW and IAM, Mare Island Naval Shipyard, Metal Trades, Vallejo, CA.
February, 1981.

Boilermakers Health Education Workshop, Industrial Hygiene and Environmental Health, Boilermakers and Blacksmiths Union, Oakland, CA.
March, 1981.

Recognizing Occupational Hazards, Teamsters Work and Health Conference, Martinez, CA.
May, 1981.

Asbestos Demolition Techniques, Engineering Control Procedures and Respiratory Protection; Asbestos Forum Basilone Theatre, San Francisco, CA. (Sponsored by the National Cancer Institute).
May, 1981.

Asbestos Removal Techniques, Industrial Hygiene and Construction, Cal Safe 82, The Annual California Safety and Equipment Show, Marin Civic Center, San Rafael, CA.
May, 1982.

Health Sciences Instructor, Industrial/Environmental Health Course, University of California, Berkeley, CA.
June, 1982.

Chemical Health Hazards/Toxic Substance Control, Butler County Emergency Management Agency, Butler, PA.
January, 1984.

Asbestos Management, American Institute of Architects (AIA) Annual Convention, Dallas, TX.
March, 1985.

Facility Asbestos Management, Butler Memorial Hospital Employees (for emergency), Butler, PA.
November, 1986.

An Industrial Hygiene Perspective, The Pennsylvania Worker and Community Right-To-Know Law, Pennsylvania School Business Officials.

March, 1987.

The Pennsylvania Community Right-To-Know Law, Southwestern Pennsylvania School Business Officials, Washington, PA.
November, 1987.

The Asbestos Hazard Emergency Response Act and EPA Certification Training, Allegheny County Building and Grounds Administrators, Pittsburgh, PA.
January, 1988.

The Asbestos Hazard Emergency Response Act (AHERA), Pennsylvania School Business Officials Convention, Seven Springs, PA.
March, 1988.

The Asbestos Abatement Project. A Project Management Perspective, Pennsylvania School Business Officials Convention, Hershey, PA.
March, 1989.

AHERA Asbestos Designer Certification course for overseas Architects and Engineers, Frankfurt, West Germany (Devised and presented new combination Supervisor/Designer/NIOSH 582 Training Course, sponsored by the U.S. Army Corps of Engineers, Middle East Africa Operations (MEAPO).
October, 1989.

AHERA Asbestos Designers Certification Course for overseas Architects and Engineers, Seoul, South Korea, sponsored by the U.S. Army Corps of Engineers and the Department of Defense Dependents Schools (DODDS).
February, 1990.

Facility Environmental Control for Architects. Burt Hill Kosar, Rittelmann Associates, Butler, PA; Williams Trebilcock Whitehead, Pittsburgh, PA.
Spring, 1990.

The History and Sociology of the Environmental Movement, History and Sociology of Public Health, University of Pittsburgh Medical School, Pittsburgh, PA.
April, 1999.

A Chain of Causation, Mexican Environmental Degradation to Mexican Social Problems to Social, Economic and Political Problems for the United States, GSPH, Dean's Day, Celebration of 50^{th}.
February, 1999.

D. Honors

Omicron Chapter, Delta Omega Honor Society, National Public Health Honor

Society, 2006.

3. **Service**

a. University/Institute of Higher Learning

Committees Served Within The University of Pittsburgh

GSPH Representative, American Schools of Public Health-Environmental Section (June, September, 2004)

Conference Contributor, Community Campus Partnerships for Health (2004)

GSPH Representative, Pennsylvania Coalition for Interdisciplinary Environmental Policy (PCIEP) (2005)

Disaster Network of Networks, Graduate School of Public Health, University of Pittsburgh, WHO Collaboration Center, Supercourse, Committee Member (2005)

Graduate School of Public Health, University of Pittsburgh, Planning Committee, Member for the Ivan Flood Symposium (2005)

Conference Organizer and Participant, European Union and North American Conference on Indoor Air Quality, Graduate School of Public Health and Graduate School of Public and International Affairs, University of Pittsburgh (2005)

May-Advisory Board, University of Pittsburgh, School of Law, Journal of Environmental Law and Policy (2005 – 2007)

January – Dean's Day Committee, Graduate School of Public Health, Committee Member (2005)

June – Institute of Politics, University of Pittsburgh, Environmental Committee, Committee Member (2005 – Present)

Institute of Politics, University of Pittsburgh, Sub-Committee on Water Quality in Southwestern Pennsylvania , Committee Member (2005 – Present)

Flood Symposium Planning, Primary Prevention Specialist – Development and Effect on Water Quality and Flood Risk, Center for Public Health Preparedness, Center for Public Health Practice, Graduate School of Public Health, University of Pittsburgh, Planning Committee, Member for the Ivan Flood Symposium (2006)

Conference Planning Committee/Organizer, Pennsylvania Asthma Summit CDC/PADOH, Graduate School of Public Health (August, 2004)

Graduate School of Public Health, New Students Plunge (August 2008)

Committees Served Outside The University of Pittsburgh

Advisory Board/Healthy Homes Resources, Asthma and Lead-Environmental Health Advisor (2004-Present)

May-Member and Environmental Sub-Section Member, Pennsylvania Public Health Association (2005)

Advisory Board Water Quality Management, Allegheny County Health Department, Environmental Capacity Building Workshop/CDC (May, 2005)

September-Chair, Nine Mile Run Watershed-Social/Ecological Evaluation Committee-Nine Mile Run Watershed Association, Supported by the Heinz Endowment (2005)

December-Scientific Advisory Chair, The Collaborative on Health and Environment Pennsylvania, CHE-Penn (2005)

February-May-Expert Review Panel, Heinz School-Department of Engineering and Public Policy, Capstone Project-Measurement of Environmental Justice Issues in Allegheny County (2006)

Conference Contributor, Community Campus, Partnerships for Health, Member (2004 – 2006)

Act 48 Planning Committee, Alle-Kiski Health Foundation, Natrona Heights, PA (2008-Present)

Other Services Outside the University of Pittsburgh

Testimony – Pennsylvania Scientists, Health Care Professionals Join Call for State Regulations on Toxic Mercury Pollution; for Penn Future in support of state-specific mercury pollution rule proposed by the State Department of Environmental Protection (DEP). Volz, C.D.
June 6, 2006.

b. Editorial Boards, Editorships

Journal Title	Position	Organization
Strengthening national public health preparedness and response for chemical, biological, and radiological agent threats: Springer-NATO Advanced Science Institute Series, IOS Press – Nieuwe 6B, 1013 BG Amsterdam, Netherlands, July 2007.	Editorial Board	North Atlantic Treaty Organization, Security Through Science

c. Manuscript and Other Document/Publication Review

Journal Title	Number of Manuscripts
Environmental Research 2007-2008	3
GENDER IN TOXICOLOGY SPECIAL ISSUE of Environmental Research. Editor Michael Gochfeld, MD, PhD. 2007	3
Book Title-Springer Publications, Proceedings of the 3rd Annual Conference on Environmental Science and Technology 2007-2008	3

d. Study Sections, Review Panels, and Related Advisory Boards

Environmental Public Health Tracking Network (EPHT) CDC, EPA-Water Working Group 2007-2008	Member
EPHT, CDC-EPA Water Group-Arsenic in Water Subgroup 2007-2008	Member
EPHT, CDC-EPA Water Group- Censored Data Analysis Group 2007-2008	Chair

e. Service to Governmental and Other Public Organizations

Testimony – Presented by Steffi Domike, Coordinator of the Collaborative on Health and the Environment in Pennsylvania (CHE-Penn) and Conrad D. Volz, DrPH, MPH, Testimony to EPA hearing on Particulate Pollution and Environmentally Induced Asthma. March 8, 2006.

Testimony of Shari T. Wilson
Secretary of the Maryland Department of the Environment
Committee on Transportation and Infrastructure
Subcommittee on Water Resources and Environment
Thursday, April 30, 2009

"Coal Combustion Waste Storage and Water Quality"

Chairman Johnson, and honorable members of the Committee, thank you for the opportunity to share Maryland's experience with coal combustion waste (CCW) with you and, more importantly, for your interest in this very important issue. Maryland's regulatory program for CCWs includes coal ash, slag scrubber sludge and other byproducts from coal combustion.

In 2007, the most recent year for which complete information is available from Maryland's Public Service Commission, coal generated 59.4% of the electricity generated in the State. In Maryland, most coal waste is generated by five companies at nine facilities. Approximately 2 million tons of coal ash (fly and bottom ash) is generated annually from these Maryland plants. Of that 2 million tons, approximately 1.6 million tons of coal ash is from the plants owned and operated by two companies, Constellation and Mirant.

In Maryland, the Maryland Healthy Air Act requires flue gas desulphurization equipment (known as "scrubbers") to be put in place by 2010 to reduce sulphur dioxide ($SO2$) emissions by 80%. A second phase of requirements in 2013 will reduce emissions by 85%. That equipment, while reducing $SO2$ emissions by over 200,000 tons, will also increase the volume of scrubber sludge produced by an estimated 2.5 million tons. By 2013, therefore, facilities in Maryland will generate 4.5 million tons of CCWs.

As you are aware, coal combustion waste is frequently reused. Currently, approximately 1 million tons, or one half of the CCWs produced annually, is beneficially used. For example, fly ash can be reused for concrete manufacturing and in building material. It has also been used as structural fill in roadway embankments and development projects. There are, however, many outstanding questions about ways it can be safely reused. For example, when used for structural fill, should liners be used; should there be defined distances between use of CCWs and potable water sources; should it be prohibited in shoreline areas such as the Chesapeake Bay Critical Area, source water protection areas, wetlands, or other areas of special concern. These are issues being examined as the State begins to develop a second phase of regulations to address the beneficial use of CCWs.

Historically, Maryland regulated CCW disposal through two means, mining and/or water discharge permitting authority (NPDES), but the State did not have regulations that were specific to the management and control of CCWs.

Over the last year few years Maryland discovered significant contamination issues at two sites. As a result, the Department of Environment took legal action to require cleanup of groundwater or surface water contamination. This contamination resulted from the placement of 4 million tons at one site and 5.5 million cu/yrds at a second site. The groundwater contamination at one site located in Anne Arundel County in Central Maryland affected residential drinking water wells. As a result, the Department required groundwater remediation, provision of a temporary water supply and eventually a connection for residences to a public water supply. The severity of the situation resulted in the third largest civil environmental penalty in state history, a fine of $1 million. At the second site in Southern Maryland, contaminants from one coal ash disposal facility impacted surrounding surface waters. The site is the focus of an enforcement action to ensure corrective measures are taken by the responsible party.

Prior to that action, the Department began to assess how it regulated the disposal of this material. The Department was concerned that the regulatory controls Maryland was using needed to be improved given the range of disposal sites and the varying geology and subsurface conditions in Maryland.

In 2007, the Department was aware that the Environmental Protection Agency (EPA) had been working on regulations since 2000 to institute additional controls on the management of CCWs but had not finalized a proposal. The lack of any federal standard combined with the immediate need to better control disposal prompted Maryland to develop new regulations to strengthen controls on the disposal of coal waste and their use in mine reclamation. In a very short timeframe, within eight months, Maryland proposed regulations for public review and comment at the end of 2007 and announced our intent to develop a second set of regulations dealing with the beneficial reuse of CCWs. On December 1, 2008, regulations on the disposal of coal waste and their use in mine reclamation took effect. The Department is working on a set of regulations to be proposed by the end of 2009 to define the safe beneficial use of CCWs. At least two local governments in Maryland have also begun considering the extent to which they should institute, through their land use planning and zoning authority, additional controls.

Developing and implementing regulations such as these also presents a new expense for the State. To address that issue, the Department proposed and the Maryland General Assembly passed legislation to establish a fee to be paid by a generator of CCWs based on a per ton rate of coal waste generated annually excluding coal waste that is beneficially reused. The bill will be signed into law next month and will take effect July 1, 2009. Regulations to implement the fee will be proposed in 2009. The revenues generated from the fee will be used solely for the implementation of our CCW regulatory program.

In February 2009, EPA requested that States express their preference concerning three possible options that the Administration was considering with respect to the development of coal waste regulations. The three options discussed may be summarized as:

1) Regulation under Resource Conservation and Recovery Act (RCRA) Subtitle D, as a non-hazardous industrial waste, with enforcement largely by the States and through citizen lawsuits, as EPA had originally decided to do in 2000;

2) Regulation under RCRA Subtitle C as hazardous waste, with flexible management requirements afforded under the authority of RCRA Section 3004(x); or

3) Regulation under an approach that establishes basic management standards and criteria under RCRA C, but "delists" those waste which are being handled in accordance with those criteria, but treating as hazardous waste those materials that are not handled appropriately. This has been described in discussions with other States as the "kiln dust" approach, due to its similarity to the manner in which EPA has proposed to address cement kiln dust in a proposal from 1999.

If Federal regulations are enacted, regulation of the material through industrial waste regulations promulgated under RCRA Subtitle D is Maryland's current preferred option. Maryland recognizes that CCWs have the potential to cause pollution of surface and groundwater and recently adopted protective regulations requiring liners, leachate collection, groundwater monitoring, capping, and closure caps. We believe that USEPA could implement similar rules under Subtitle D and afford States the opportunity to demonstrate that they can implement those standards much more quickly than regulation under Subtitle C. Protective mechanisms such as liners, leachate collection systems, caps, and monitoring already required under the existing Subtitle D regulations are sufficient to address the risks posed by CCWs to the environment. This approach also affords citizens the ability to participate through citizen suits authorized under RCRA Subtitle D.

It is also important to note that Maryland has an active coal mining regulatory program that allows for the utilization of alkaline ash, only, in the reclamation process. Approximately half of the coal combustion by-products generated in Maryland are disposed of or used in mine reclamation. There are 15 locations where these materials are disposed of or used in mine reclamation. Ash used in the reclamation of non-coal mine sites follows requirements similar to those found in RCRA Subtitle D standards for CCWs. Maryland's recently enacted regulations will require an applicant to develop and implement a sampling plan for the initial characterization of the coal waste. The plan is required to include a comprehensive list of parameters to be analyzed and the methods used in the analytical characterization. On-going ash characterization will be required as will site monitoring through post closure until MDE is satisfied that the site is stable and not contributing to adverse surface or groundwater impacts. The Department also plans to amend the existing regulations to clarify those deep mining operations will be subject to the same requirements as surface mines.

The Department also supports closer regulation of liquid slurry storage lagoons. Although Maryland does not have any liquid storage lagoons, there are storage lagoons directly across the Maryland line from two facilities that are linked to the lagoons by pipelines. One of these pipelines recently was found to be leaking, which caused a discharge of several thousand gallons of coal ash slurry directly into the Potomac River, a Maryland waterway.

Thank you for taking the initiative to inquire into this important issue and for the opportunity to share Maryland's perspective.

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

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May 15, 2009

The Honorable Eddie Bernice Johnson, Chair
U.S. House of Representatives
Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure
B-376 Rayburn House Office Building
Washington, DC 20515

SUBJECT: Beneficial Use and Disposal of Coal Combustion Byproducts in Wisconsin

Dear Representative Johnson:

I would like to thank you and the members of the House Subcommittee On Water Resources and Environment for the opportunity to provide information regarding our experience with the beneficial reuse and disposal of coal combustion byproducts (CCBs) in the State of Wisconsin. Please include these comments in the record for the hearing on Coal Combustion Waste Storage and Water Quality. I trust that these written comments will assist you in your deliberations on this important topic.

We have previously provided testimony regarding this issue to the House Subcommittee On Energy and Minerals on June 6, 2008. In addition, we have submitted related comments to the U.S. Environmental Protection Agency (EPA) in response to the Notice of Data Availability (NODA) for the Disposal of Coal Combustion Wastes on February 11, 2008 and presented a summary of our environmental data regarding coal ash disposal sites to the National Research Council (NRC) for inclusion in their March 1, 2006 report *Managing Coal Combustion Residues in Mines.*

Under Wisconsin statutes, CCBs are considered solid wastes and their use and disposal have been regulated by the state accordingly since the early 1970's. Current regulations limit land disposal to licensed, engineered disposal facilities under our NR 500 series of administrative rules. Since 1998, use of CCB material for productive geotechnical and civil engineering purposes has been governed by a new rule, ch. NR 538, Wis. Adm. Code, developed specifically to regulate the beneficial reuse of industrial byproducts.

We believe some level of regulation of these materials is necessary. Our administrative rules have grown out of our firsthand experience with numerous CCB disposal sites and the collection of decades of groundwater and other environmental data. We have observed that CCBs can cause significant adverse environmental impacts when improperly managed. Two of the most serious damage cases were profiled in detail in the NRC report; a number of other disposal sites in Wisconsin have caused significant environmental impacts as well. Documented impacts have included threats to human health and welfare due to contamination of aquifers providing water to private water supply wells, impacts to surface waters, and direct toxicity to plant life.

Although contaminants and concentrations have varied considerably from location to location due to differences in coal sources, combustion methods and disposal practices, we have identified boron and sulfate as the two most common CCB constituents exceeding Wisconsin's groundwater quality standards. Additional contaminants exceeding groundwater standards at or near CCB disposal sites have included arsenic, selenium, manganese and, to a lesser extent, molybdenum and lead. Other changes to groundwater quality caused by CCB constituents, such as increased hardness or alkalinity, can diminish the acceptable end uses of groundwater even if specific health-based standards are not exceeded.

Abundant evidence exists to show that CCB disposal has the potential to cause environmental harm if it is not properly managed. In Wisconsin, it is the older (closed), unlined CCB landfills and ash sluicing facilities (wet sluicing of fly ash was phased out at all Wisconsin power plants in the mid-1980s) that have been responsible for the documented adverse impacts. In a typical case documented further in the NRC report, CCB from a nearby power plant was disposed in an abandoned quarry with no engineering controls in the 1960s and 70s. By the early 1980s, documented boron toxicity of certain plant species downgradient of the landfill was documented by WDNR staff. To address the issue, the utility was required to retrofit and close the disposal site with an impermeable geomembrane cap that almost eliminated infiltration through the landfill. Groundwater monitoring downgradient of the disposal site documented a dramatic improvement in groundwater quality after installation of the engineered cap.

By contrast, substantial monitoring and performance data affirm that Wisconsin's current regulatory requirements for lined CCB landfills with leachate collection systems have been very effective in protecting groundwater and surface water resources. Wisconsin has an extensive groundwater monitoring database going back almost 30 years at some locations to support our current approach to the design and operation of CCB disposal sites.

Our monitoring data also documents that CCBs can be safely and effectively reused in a variety of different projects, especially as an active ingredient in cement manufacture and as geotechnical fill in highway embankments, airport runway improvements and other civil engineering applications. In fact, of the approximately 1,131,000 tons of CCBs produced in Wisconsin in 2006, over 974,000 tons were beneficially reused under our regulations. That is an effective recycling rate of 86 percent. One major utility was able to achieve a CCB recycling rate of over 100 percent by beneficially reusing not only virtually all of their CCB as it was generated, but also by reburning coal ash previously disposed of in a nearby landfill. The reuse of CCB materials in Wisconsin, subject to the design and monitoring standards we have implemented, has not caused discernible environmental impacts. The core of Wisconsin's program is based on completing a physical and chemical characterization of the materials, such as CCBs, to be reused, establishing standards and acceptable uses, public disclosure for larger projects and reporting on an annual basis. The standards and reuses of material are based on risk to human health and the environment. Where appropriate, additional monitoring may be necessary. Based on our experience, we are convinced that a responsible and environmentally protective regulatory framework can be developed that encourages the beneficial reuse of CCBs, and establishes sensible minimum criteria to safely store and dispose of CCB material if landfilling is unavoidable.

We agree that there should be minimum national standards promulgated by the EPA for the proper storage, management and disposal of CCB. However, we believe any broad national approach developed under the auspices of U.S. EPA for the proper management and monitoring of CCB disposal sites should reserve to the states the ability to regulate CCBs beyond the federal minimums in a manner they feel is most appropriate given their particular circumstances. The U.S. EPA should continue its efforts to work with the states and other stakeholders to find appropriate beneficial reuses for these materials, thereby minimizing the long-term environmental costs of maintaining landfills.

One way to establish such a framework might be through a federal/state effort to develop and actively disseminate CCB landfill and beneficial use design guidelines upon which specific state requirements could be superimposed. U.S. EPA could convene such an effort and also facilitate discussions on markets for beneficial reuse of these materials. Alternatively, the U.S. EPA could establish federal rules that set out certain minimum requirements for disposal and reuse. If federal rule making for CCB disposal is pursued, we suggest using as a model the existing municipal solid waste (MSW) landfill regulatory structure in Part 258 of Subtitle D of RCRA. This program includes setting basic rule contents in federal rules and having the EPA regions review and authorize state rules for adequacy. This would take advantage of the resources that the states have to offer and the procedures and precedent set by the Part 258 MSW landfill rules

We understand EPA's concerns that regulating CCBs under RCRA Subtitle D would not allow direct regulation or enforcement by the Agency. However, it should be pointed out that Conditionally Exempt Small Quantity Generator (CESQG) hazardous waste and household hazardous waste have been safely managed at Part 258 MSW landfills under State programs for over 20 years. We feel that regulating CCB material as a hazardous waste under RCRA Subtitle C is neither appropriate nor necessary. In our experience, CCBs do not exhibit characteristics or contaminant levels high enough to warrant their regulation as a hazardous waste. We are also very concerned that the additional regulatory restrictions and the negative stigma attached to designation CCB material as a hazardous waste will severely curtail their beneficial reuse opportunities.

Again, thank you for the opportunity to provide information to this Committee. We look forward to engaging in a cooperative effort on this important topic with the U.S. EPA and other states. We think we have a particularly effective program in place to manage and beneficially reuse CCBs and we would be glad to share further details of our experiences as well as our environmental data.

Sincerely,

Al Shea

Al Shea, Administrator
Air & Waste Division
Wisconsin Department of Natural Resources

cc: Ben Webster – via email
Jenna Tatum – via email
Margaret Guerriero – EPA Region 5
Gene Mitchell – WA/5

JANET L. SENA
VICE PRESIDENT–
FEDERAL AFFAIRS

May 8, 2009

The Honorable Eddie Bernice Johnson
Chairwoman
The Honorable John Boozman
Ranking Member
Subcommittee on Water Resources and the Environment
House Committee on Transportation and Infrastructure
U.S. House of Representatives
Washington, D.C. 20515

Dear Chairwoman Johnson and Ranking Member Boozman:

I respectfully request that you include the attached letter from Charles R. Black, President of Tampa Electric Company, in the official record of the April 30, 2009, hearing, "Coal Combustion Waste Storage and Water Quality."

Thank you for your consideration.

Sincerely,

Janet L. Sena

Janet L. Sena
Vice President, Federal Affairs

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TAMPA ELECTRIC

May 6, 2009

The Honorable Eddie Bernice Johnson, Chairwoman
Subcommittee on Water Resources and the Environment
House Committee on Transportation and Infrastructure
U. S. House of Representatives
Washington, D. C. 20515

Re: Coal Combustion Waste Storage and Water Quality Hearing, April 30, 2009

Dear Chairwoman Johnson:

In the April 30th Hearing on Coal Combustion Waste Storage and Water Quality, the testimony of Mr. Eric Schaeffer inaccurately portrayed Tampa Electric Company's Big Bend Power Plant (Big Bend) as being out of compliance with the Environmental Protection Agency's surface water quality standards for selenium. Big Bend, owned by Tampa Electric Company, is regulated by federal, state and local environmental agencies and remains in compliance with all applicable regulations and water quality standards, including the applicable selenium standard. The testimony incorrectly implies a selenium concentration of 2,799 micrograms per liter is discharged into "Waters of the State" (Tampa Bay). We would like to clarify, for the record, that the applicable water quality standard for discharge to Tampa Bay is 71 micrograms per liter and the actual concentration of selenium is less than 1 microgram per liter – approximately 150 times less than the water quality standard for selenium.

The testimony refers to the Big Bend Power Plant and suggests that Big Bend routinely discharges selenium far above allowable levels. This is not true. The 2,799 micrograms per liter selenium concentration reported in the testimony was not sampled at Big Bend's discharge to Tampa Bay but at an internal flue gas desulfurization waste stream not at the point of discharge to Tampa Bay. A sample taken at Big Bend's discharge to Tampa Bay would reveal selenium concentrations closer to 0.46 micrograms per liter or 6,000 times less than that reported in the above-referenced testimony far below the required levels for saltwater and in fact, meeting the standard for freshwater.

Tampa Electric Company takes our commitment to environmental stewardship very seriously. Our employees live and work and enjoy the Tampa Bay area. It is disconcerting that Mr. Schaeffer's public testimony misrepresents our efforts by implying non-compliance. We appreciate the opportunity to correct the inaccuracies and welcome any questions from the Subcommittee to further clarify the record.

Sincerely,

Charles R. Black
President

cc: Congressman John Boozman

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