Testimony of Stephen A. Smith, DVM
Executive Director
Southern Alliance for Clean Energy

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Chairman Boxer, Ranking Member and Members of the Committee:

My name is Stephen Smith. I am the Executive Director of the Southern Alliance for Clean Energy (SACE). Since 1985, SACE has worked on behalf of citizens in the Southeast to promote responsible energy choices that create global warming solutions and ensure clean, safe and healthy communities throughout the Southeast.

Thank you for holding this hearing to consider oversight of the Tennessee Valley Authority (TVA) and the federal government's role in regulating coal combustion waste (CCW). As you are certainly aware, on December 22, 2008 a surface impoundment at TVA's Kingston Fossil Plant (KFP) ruptured, releasing over a *billion* gallons of CCW-laden sludge into the Emory River and surrounding neighborhoods in Harriman, TN. While there are still a number of unknowns, it is clear that heavy metal contamination has occurred. Government agencies have identified higher than normal levels of arsenic, lead and thallium. In addition, independent samples have shown additional levels of these metals as well as cadmium, chromium, barium and nickel. These independent sampling results are attached as Appendix 1.

The surface impoundment breach in Harriman, TN is an environmental catastrophe that reveals not only the dangers of burning coal and mismanaging coal combustion waste, but also the need for federal regulation of this toxic substance. In addition, this incident highlights the outstanding need for greater oversight of the Tennessee Valley Authority to ensure that TVA lives up to its responsibilities and its promise of being a leader in how we produce and consume energy in this country. I hope that these hearings and subsequent federal action will initiate a process that results in proper management of coal combustion waste and repositions TVA as a national leader in making clean, safe and responsible energy choices.

In this testimony, I would like to address several points. First, I will review the circumstances surrounding the surface impoundment breach and describe TVA's response to this disaster, which we perceive to be wholly inadequate and somewhat irresponsible. Second, I will make the case for comprehensive federal regulation of coal combustion waste to protect human health and the environment. Finally, I would like to discuss several of TVA's shortcomings that must be addressed if TVA is to once again become a leader among our nation's utilities.

Review of TVA's Response to the Coal Ash Spill at the Kingston Fossil Plant on December 22, 2008 reveals severe deficiencies in its ability to protect the health and environment of the communities within TVA's service territory.

Shortly before 1:00 a.m. on Monday, December 22, 2008, an earthen wall holding a 40-acre surface impoundment failed at the Tennessee Valley Authority's (TVA) Kingston Fossil Plant (KFP) in Harriman, Tennessee. Public officials made an early estimate that 1.8 million cubic yards (more than 360 million gallons) of toxic fly ash spilled into nearby land and waterways, but the total amount was later determined to be 5.4 million cubic yards (more than 1 billion gallons). TVA reported that the spill covered approximately 300 acres, 3,000 feet of Swan Pond Road and 1,500 feet of Swan Pond Circle.[1] Roane County officials confirmed that 42 individual pieces of property experienced some form of damage, including 13 instances of damage to a residence.[2] Three of these residences were completely destroyed, and one was swept off of its foundation. TVA maintains that 80% of the spill was contained on its property.[3]

On the day of the incident, TVA President and CEO Tom Kilgore issued a statement describing TVA's primary concern as protecting human health and the environment. "Our intense effort to respond effectively will continue 24/7 for the foreseeable future with the safety of the public our top priority," the statement read.[4] The Red Cross established a shelter at the Roane State Community College gymnasium, where six individuals were housed before being relocated by TVA to the Holiday Inn Select.[5] TVA began providing a variety of services for the residents, including: connecting homeowners with insurance representatives and realty companies; providing storage units; and issuing Wal-Mart gift cards and gift cards for food.[6]

On December 23, 2008, the day following the incident, TVA held a press conference where Mr. Kilgore elaborated on the initial progress made in the recovery. Mr. Kilgore indicated that he was at the scene on the morning of December 22nd while TVA staff canvassed the affected neighborhood and attempted to reach unavailable residents. Although nearby residents lost power and some lost water, these services were restored the day after the spill. Officials notified the Environmental Protection Agency (EPA) shortly after the spill occurred and promptly began coordinating efforts to sample water downstream of the incident.

TVA initiated a variety of activities within the first few days designed to contain the spill and certify the safety of local water resources. This included mobilizing 30 pieces of heavy machinery and 90 workers to begin the recovery.[7] TVA also commenced aerial surveys of the affected area.[8]

TVA set up management stations for the recovery in the plant's conference center and at an emergency response center in Chattanooga, Tn. According to Mr. Kilgore, one of three senior officials was on site at all times.[9] Nearly a week after the incident, TVA, Roane County, EPA and Tennessee Department of Environment and Conservation (TDEC) established a "Unified Command" and designated TVA Vice President Tim Hope as the Incident Commander.[10] On December 28, 2008, the public received notice that these organizations had activated the Roane County Joint Information Center (JIC).[11]

Although it appears that TVA officials took several needed and appropriate steps in the wake of the incident at the KFP, several components of their response have been inadequate and irresponsible. TVA officials had prior knowledge of needed repairs to the ash containment pond at the facility, yet they failed to ensure the containment pond's stability. Immediately following the incident and for several days afterward, TVA downplayed the potential toxicity of the ash and the extent of damage to nearby property. Finally, TVA has consistently provided incomplete and unreliable information about water quality results, jeopardizing the safety of their constituents and nearby residents.

History of Noncompliance and Lack of Regulatory Oversight

Recent events, which have culminated in the coal waste disaster at the Kingston Fossil Plant, demonstrate that the Tennessee Valley Authority enjoys privileged treatment and deference from other government agencies, including those with the duty to exercise oversight.

No Tennessee state agency has the mandate to oversee the stability of coal ash impoundments. The Tennessee Safe Dams Act, Tenn. Code Ann. Sections 69-11-101, *et seq.*, exempts federal agencies, such as TVA. The definition of "person" regulated under the law "does not include the United States government nor any agency owned by the United States or any agency thereof, nor those who own a dam or reservoir leased to or operated by the United States or an agency thereof, nor those dams licensed by the federal power commission." Tennessee, unlike some states, regulates coal ash fills as solid waste disposal facilities, but TVA's KFP was not required to comply with requirements for liners and leachate collection systems for the ash fill that failed. Nor are there any requirements for dike stability evaluations.

A preliminary review of TVA's interactions with state regulatory agencies' shows that TVA regularly fails to comply with designated regulations, often with impunity. Furthermore, TVA, perhaps due to its status as a federal corporation, often receives shelter from even basic regulation, oversight and penalty.

For example, evaluating TDEC permits issued to TVA reveals that the utility is privy to uniquely lenient requirements for its major operations. The permit that TDEC issued to TVA on December 20, 2007 for the construction and operation of a Class II disposal facility was dulled with six variances and waivers. TDEC allowed TVA to construct the facility without a leachate migration control system, a gas migration control system, a random inspection program, daily or intermediate cover for the ash fill area or a geologic buffer. These requirements are basic and standard; they are rarely, if ever, waived.

Nevertheless, TVA's waste disposal processes were hardly subject to any inspection or oversight, granting TVA the regulatory version of a blank check. Even where standard regulations do exist, TVA freely neglects to comply without fear of cost or liability to its operations. In order for TVA to comply with its NPDES[12] permit, it must submit quarterly discharge monitoring reports. When SACE representatives recently attempted to obtain copies of TVA's discharge reports, a TDEC records clerk divulged that they had not received the report in 18 months. Surprised to learn that TVA had not filed the reports, the clerk revealed that the reports were not known to be missing.

Tennessee's Governor Bredesen commented on this apparent lack of regulatory oversight, indicating that he suspected TVA received too lenient treatment. Governor Bredesen said, "'I strongly suspect that over the years there may have been exaggerated deference given to them as a federal agency. We need to take a fresh look at that. We will be looking at all aspects of that. We need to tighten those up.'"[13]

My organization's preliminary investigation revealed that this is not an isolated or localized incident. Rather it is a symptom of the lack of oversight and regulation being exercised with regard to TVA. Another example of this lax regulatory oversight occurred in March 2008, when the TVA Office of the Inspector General (IG) reported that two significant flue gas ductwork (FGD) leaks occurred at the Widows Creek Fossil Plant (WCF) in Alabama without being reported externally to the appropriate regulatory agencies for years.

The IG's report revealed that TVA officials knew about the leak for years without reporting it to the relevant authorities and sought to wait years before making repairs. The investigation also revealed that TVA officials were not concerned that the leak might result in a permit violation or that they had an ethical obligation to notify the public of the leak.

The Alabama Department of Environmental Management (ADEM) and EPA ultimately issued TVA a Notice of Violation (NOV). TVA initially disputed the agencies' claims but acquiesced to an ADEM consent order obligating the power company to a $100,000 civil penalty. However, as of April 2008, the EPA's NOV had not been resolved.

According to ADEM, **"TVA did not exhibit a standard of care commensurate with applicable regulatory requirements, specifically operating and maintaining control equipment in a manner so as to minimize emissions."** TVA management emphasized efforts to contain the leaks while keeping the plant operating until the next scheduled shutdown. Under TVA's Winning Performance scorecard program, the WCF management team "had a financial incentive to keep the plant operating," clearly subordinating public health and environmental quality to profits.

The TVA Office of the Inspector General recommended, "TVA has a responsibility from an ethics and compliance standpoint to report issues that may be of concern. We believe TVA…should err on the side of reporting such issues in order to avoid the appearance of ignoring or hiding any such matters."[14] Still TVA is not required to make any changes. Without an obligation to reform, TVA simply continues to operate without consideration for its regulatory and ethical obligations.

Also in 2008 the KFP conducted an Annual Ash Pond Dike Stability Inspection. This report showed chronic maintenance issues affecting the Kingston Fossil Plant's fly ash impoundment. Specifically, the inspection notes that TVA officials had been aware of seepage at the impoundment since 1980.[15] Subsequent reports also illustrate TVA's failure to address ongoing problems at this facility.

Local residents report that the surface impoundment chronically experienced "'baby blowouts'" in addition to "'gushing this gray ooze'" and spilling materials similar to those visible after the recent breach.[16] Indeed, in 2003 "a leak in the toe of the dike slope for Cells 2 and 3" required that the workers cease dredging in the cells while repairs were made. Repairs to the slope were not finalized until late 2005, nearly two years after the dike failure.[17]

However, a subsequent failure occurred near the 2003 failure in November 2006. Nearly nine months after the first major breach, the dike inspection determined that the second failure was "caused by excessive seepage resulting from a combination of issues: inadequate internal drainage (addressed in 2005) and infiltration of surface waters on the existing dike benches." A number of repairs were made in 2006, including the installation of dewatering wells; construction of a riprap buttress; and installation of spring boxes for drainage. KFP personnel later located an area of seepage on the northeastern dike of Cell 2.[18]

Despite the appearance of erosion and seepage, TVA's dike inspectors stated that the dike slopes appeared to be in "sound condition" in the report dated February 15, 2008.[19] Experienced engineers questioned the veracity of that claim, based on the information provided in the dike inspection report. Mr. Bruce Tschantz, dam safety consultant and first U.S. chief of federal dam safety for the Federal Emergency Management Agency, reviewed the report after the breach on December 22, 2008 and said, "'Obviously, it failed because of slope instability…I don't really see that being addressed.'" Mr. Tschantz also described the report as "perplexing…because it contained information about seeps, erosion and other issues, but no information to back up the claim that the dike was indeed stable."[20]

TVA reviewed options for addressing the previous dike failures, but senior officials rejected higher-quality options that they deemed to be too costly. For example, the KFP could have switched to a dry ash collection system, which would have cost $25 million. Alternatively, installing a liner would have cost $5 million, but that option was also denied. Instead, TVA opted for the cheapest option: installing another dredge cell for $480,000. In addition to balking at high costs, TVA officials also rejected some options, like installing a liner, because they would set precedence for other dredge cells. Rather than demonstrating leadership, TVA shirked away from an opportunity to ensure long-lasting solutions. Dismissing an option that would set precedence undermines TVA's claims that they "set high standards and goals" as well as "innovate and seek new ideas."[21]

That TVA rejected better options for a cheaper solution suggests that the KFP dike breach could have been prevented. The catastrophe that occurred on December 22, 2008 is an example of how cutting corners for immediate savings can prove costly in the long run. Indeed, the Alabama example and the prior failures at the KFP impoundment show that TVA prioritizes short-term profits over long-term viability.

Downplaying the Damage

From the beginning of the recovery process, TVA officials failed to live up to their responsibility to divulge information about potential hazards and permit violations and to observe an ethical

obligation to report issues that might cause concern. Instead, TVA deemphasized the potential toxicity of the ash, the potential affect to water quality and the extent of the damage caused.

For example, on the day after the incident, Mr. Kilgore characterized the situation and the pollutants as "safe" before samples had been taken and test results were available. Mr. Kilgore said, "chemicals in the ash are of concern, but the situation is probably safe." He also said, "we don't think there's anything immediate of danger…" However, at the time those statements were made, "the amount of poisons in TVA's ashy wastes…could not be determined….Workers sampled river water…but didn't sample the dune-like drifts of muddy ash."[22]

TVA spokesman Gilbert Francis, Jr. subsequently stated that the material "does have some heavy metals within it, but it's not toxic or anything," leading the *New York Times* to report that TVA "played down the risks."[23] Only days after the incident, TVA officials categorically denied the possibility that the ash was toxic, but they did not complete analysis of the ash itself until after January 1, 2009.[24]

Displaying an egregious disregard for the safety of nearby residents, TVA Senior Vice President for Environmental Policy Anda Ray spoke euphemistically about the incident. Mrs. Ray "refused to call the spill an environmental disaster," maintaining that the coal waste is "inert." Rather, Mrs. Ray chose to characterize the incident as "a challenging event to restore the community back to normalcy."[25] In personal correspondence with me, Mrs. Ray disputed my own observations that the waste was mobilized and spreading downstream, describing the floating pollutants as "inert floating sand," and supporting her claim only by saying, "I am reassured of the public health by the preliminary [water quality] results I've seen."

Instead of prudently employing the precautionary principle, TVA assumed the contamination was benign before they had the results to prove it. Compounding the danger created when TVA characterized the contaminants as safe and nontoxic, the power company declined to issue warnings about the contents of the toxic CCW-laden sludge to nearby residents. TVA officials released only a basic fact sheet about the ash in the days immediately following the incident.[26] Five days after the incident, TVA released generic safety information about the material.

The JIC finally released comprehensive safety information on December 29, 2008, the day after EPA released a letter indicating that their water quality tests showed elevated heavy metal concentrations, particularly of arsenic. However, on December 26, 2008, TVA reported finding elevated levels of lead and thallium near the incident site. TVA spokesman Terry Johnson stated that those metals were not considered to be a threat to public health because of the likelihood that they would settle to the riverbed before moving downstream.[27] Still, TVA issued no warnings about water quality or the ash until a week after the incident, other than telling residents to wash their hands and avoid the contaminated area.[28]

TVA later revealed that the company's annual waste production includes 45,000 pounds of arsenic; 49,000 pounds of lead; 1.4 million pounds of barium; 91,000 pounds of chromium; and 140,000 pounds of manganese. The *New York Times* reports that the ruptured impoundment held "many decades' worth of these deposits."[29]

Although they made early efforts to assist affected residents and commence the recovery, TVA exhibited little urgency in describing the contents of the spill to their constituents and affected residents. TVA did have individual conversations with affected residents, but they did not host a public meeting, other than press briefings, until December 30, 2008.[30] Two days prior, the Kingston City Council convened a public meeting that attracted more than 300 community members.[31]

Since millions of pounds of waste were deposited into the impoundment, it is reasonable to conclude that toxicity is at least a possibility, if not nearly certain. TVA should have taken basic steps to inform the public and residents of the potential for toxicity and what steps people should take if they come into contact with the effluent. Instead, TVA denied even a possibility that the discharge was toxic and neglected to issue warnings about the material.

Lack of Reliability

In addition to trivializing the danger associated with the ash spill, TVA also provided unreliable and misleading information regarding the safety of water quality and the extent of the damage.

On numerous occasions, TVA officials promised to restore the river and the residents' lives to their original condition. Saying, "'We are going to clean it up right…We're going to make it whole.'"[32] Although TVA initially estimated that the recovery would take "weeks," it no longer will speculate as to the duration of the recovery. Describing the damage done to nearby property, TVA representative Mr. Francis stated, "We're going to make it right….We're going to restore these folks to where they were prior to this incident."[33] At the public hearing convened by the Kingston City Council, Mr. Kilgore said, "TVA plans to work until the water is as pure as it was before the spill."[34]

Scientists and public officials have disputed the possibility of returning the river and the surrounding ecosystem to its condition before the spill. TDEC Deputy Commissioner Paul Sloan said, "the long term cleanup is going to take years, and in some instances the impact of it can't be cleaned up."[35] Furthermore, Dr. Carol Babyak, Chemistry professor at Appalachian State University, emphasized that some of the heavy metal compounds will likely never leave the river: "Once a metal enters the environment, it's always going to be there. It doesn't decompose or change into anything else."[36] Mr. Kilgore has since qualified his statements, acknowledging that the scenery where the Emory and Clinch Rivers merge will never be the same.[37]

Nevertheless, TVA officials have a responsibility to put forth their best effort to take care of affected residents and Tennessee's natural heritage.

Furthermore, early reports from TVA drastically underestimated the extent of damage that the ash spill caused. TVA initially estimated that that the rupture spilled 1.8 million cubic yards of waste, but radar analysis showed the amount to be 5.4 million cubic yards.[38] It is not evident that TVA intentionally understated the amount of waste spilled into the local area, but the gross miscalculation suggests that TVA had little information regarding the amount of ash stored at the facility.

Plant manager Ronald Hall defended the hasty error: "In the urgency of the event we had, we had to reach out and make sure the community was safe….Folks wanted to know. We sent somebody to make an estimate. There was no science behind it."[39]

Downplaying the spill's impact, TVA prematurely declared the river water and drinking water to be safe.[40] However, the original claim pertained only to water treated at up to four water treatment plants and not private wells in the affected area. TVA failed to stipulate that their claims of safe drinking water did not include water from private wells. In fact, TVA did not announce that they would begin testing well water until after making these claims.[41]

As TVA began to collect water samples from private residences and private wells, some local residents reported that TVA took several days to come to their property. According to Sandy Gupton, a local registered nurse, TVA waited five days to respond to her request for water quality testing at her property.[42] Additionally, some residents reported that TVA employees sought to take water samples only from clearer water and not the water that was visibly soiled. [43] TDEC ultimately sampled water from 40 wells in a four-mile radius from the incident site, but they did not finish sampling until January 2, 2008.[44] On January 5, 2009, the EPA released results from three wells containing safe drinking water.[45]

On December 28, 2008, EPA provided information questioning the safety of the area's water quality. EPA reported their water samples showed "several heavy metals are present in water slightly above drinking water standards," but below levels considered harmful to humans. "The one exception maybe arsenic," according to the EPA. Their test results so far had yielded an arsenic sample with concentrations characterized as "very high."[46] The EPA later released water quality samples showing arsenic 149 times the normal limit.[47]

The EPA's arsenic results contrast with what TVA called "'barely detectable" levels of arsenic.[48] Water quality samples analyzed by Appalachian State University professors Dr. Shea Tuberty and Dr. Carol Babyak on behalf of Appalachian Voices also showed drastically abnormal levels of several heavy metals. Their analysis, which was conducted according to EPA specifications, demonstrated arsenic levels between 25 to 300 times the allowable limit; cadmium levels two and a half times the allowable limit for drinking water and four to seven times higher than the maximum level for aquatic wildlife; lead level two to 21 times the allow able limit and nearly 60 times the maximum level appropriate for aquatic biota.[49]

Drastic differences in the water quality results reported by TVA and other independent observers further undermine the veracity of the power company's claims. As of January 02, 2009, TVA had not released the full results of their water quality samples. When questioned about this information, TVA spokesman Jim Allen could not explain why the results had not been made available.[50]

So far my organization and our allies have observed an inadequate and irresponsible reaction to this preventable disaster. Repudiating reasonable assertions that the waste and contaminated water contained elevated toxic materials, TVA mischaracterized the state of affairs in its announcements to the public. TVA's actions are rooted in a demonstrated history of neglecting its responsibility as a steward of the Tennessee Valley.

TVA must clean up this mess. TVA has a responsibility as a steward of the Tennessee Valley. When the national spotlight wanes from this disaster, citizens in the Tennessee Valley will hold TVA accountable. We fully expect TVA to adhere to its commitments to return this area to a healthy state and as close as possible to it's pre-disaster condition.

Recommendations:

1. **TVA should be held accountable for its response to this disaster.**

2. **Independent researchers should fully analyze and characterize both human health conditions and environmental impacts.**

3. **Citizens should be fairly compensated for all reasonable claims of property loss and personal injury.**

4. **TVA should complete a full review of its emergency response procedures and processes for providing information that may impacts public health and make recommendations for their improvement.**

Federal regulation of coal combustion waste (CCW) is necessary to ensure responsible storage and disposal that protects surrounding communities and the environment from the suite of toxic heavy metals that CCW contains.[51]

Burning coal is a dirty business. From cradle to grave, coal creates devastating impacts at every step. Destructive mining practices such as mountain-top removal, devastate mining communities. As it's burned, coal emits myriad pollutants, including NOx, SO_2, hazardous air pollutants and mercury. As recent events have certainly demonstrated, even after it has been burned, coal waste can devastate a community. Using coal as a primary fuel source for electric power generation leads to significant impacts, endangering human health and environmental quality. A growing body of evidence shows that the carbon dioxide emissions from coal combustion are a significant cause of global warming and a threat to the stability of our global climactic systems.

This spill highlights the little-known risks of dealing with post-combustion solid waste. SACE advocates that no new coal-fired power plants be permitted unless they can address all of these issues, including the full capture and storage of carbon dioxide emissions. We also believe there needs to be a thoughtful discussion on how to replace or retire existing coal-fired generation in a way that prevents further build up of global warming pollution in Earth's atmosphere.

It is unfortunate that the tragedy that occurred in Harriman, TN returns this issue to national attention. Simply stated, it has been apparent for nearly a decade that CCW is a hazardous substance that requires responsible federal regulations to ensure proper storage and disposal of these waste materials. While the Harriman catastrophe highlights, in no uncertain terms, the potential dangers of storing CCW in surface impoundments, this is not a localized issue. Across the United States, voluntary and/or state regulations have not done an adequate job of preventing severe contamination of land and water in the areas surrounding CCW disposal sites, whether in surface impoundments, landfills or mines.

The Environmental Protection Agency (EPA) has dropped the ball on this issue. In a March 5, 2000 report entitled *Regulatory Determination on Wastes from the Combustion of Fossil Fuels*, the EPA concluded that regulation as a contingent hazardous waste under Subtitle C of RCRA is warranted for CCW. While this determination is no longer available through the EPA database, a copy is provided as Appendix 2 to this testimony. This determination states, "EPA has determined that regulation under Subtitle C of the Resource Conservation and Recovery Act (RCRA) is warranted for the following wastes when they are land disposed (e.g. managed in landfills or surface impoundments) or when used to fill surface or underground mines. . . Large-volume coal combustion wastes generated at electric utility and independent power producing facilities. . . "[52] This determination resulted in the decision to develop national management standards that include a contingent hazardous waste listing under Subtitle C of RCRA.[53] Under this approach, EPA would establish standards to ensure management of these wastes to protect human health and environment and the wastes would remain non-hazardous provided that they are managed properly.[54] The contingent hazardous waste listing would have allowed EPA to develop a program tailored to the risks posed by coal combustion wastes while minimizing compliance costs.

The March 5, 2000 determination explained the rational for the contingent hazardous waste

listing of CCW. The EPA determined such listing was necessary:

> because: (a) the composition of these wastes has the potential to present danger to human health and environment and 'potential' damages cases identified by EPA and commenters, while not definitively demonstrating damage form coal combustion wastes, lend support to our concern that these wastes have the potential to pose such dangers; (b) we have identified eleven documented cases of proven damages to human health and the environment by improper management of these wastes in landfills and surface impoundments; (c) present disposal practices are such that these wastes are currently being managed in a significant number of landfills and surface impoundments without proper controls in place, particularly in the area of groundwater monitoring; and (d) while there have been substantive improvements in state regulatory programs, we have also identified significant gaps either in states' regulatory authority or in their exercising existing authorities. Also, we believe the costs of complying with regulations that specifically address these problems, while large in absolute terms, are a small percentage of industry revenues.[55]

Unfortunately, this determination was reversed, with no new findings or data, just weeks later in a May 22, 2000 *Regulatory Determination on Wastes from the Combustion of Fossil Fuels*.[56] Even in that determination, however, EPA still concluded that federal standards for the disposal of coal combustion waste under RCRA and/or the Surface Mining Control and Reclamation Act (SMCRA) are required to protect health and the environment. This determination extended to coal ash disposed in landfills, surface impoundments and mines. Yet eight years later, comprehensive federal regulation of this hazardous substance remains absent.

The failure to fulfill this commitment is wholly unjustified, particularly in light of the substantial research that has already been completed by both EPA and the National Academies of Science (NAS). Preceding EPA's 2000 determination, EPA complied with a congressional mandate under RCRA to study the risks posed by coal combustion waste, solicit public comment, hold a public hearing, and publish a Report to Congress.[57] As a result, there is a robust record documenting the risks posed by coal ash and the damage that has occurred throughout the country as a result of its mismanagement.

Multiple publications since the 2000 EPA determination have confirmed the potential risks of irresponsible disposal of CCW. In 2004, the National Academy of Sciences published a report, *Managing Coal Combustion Residues in Mines,* that recommended federal standards be established under RCRA, SMCRA, or a combination of both statutes to protect ecological and human health from the potential effects of CCW disposal. Further supplementing the record, EPA published a Notice of Data Availability in August 2007 that included additional documentation of the risks posed by coal combustion waste including a draft *Human Health and Ecological Risk Assessment* and a *Coal Combustion Waste Damage Case Assessment.* Lastly, EPA's Office of Research and Development has published a series of documents detailing the

increasing toxicity of coal combustion waste, including *Characterization of Mercury-Enriched Coal Combustion Residues from Electric Utilities Using Enhanced Sorbents for Mercury Control* and *Characterization of Coal Combustion Residues from Electric Utilities Using Wet Scrubbers for Multi-Pollutant Control*.

It is now two years since the publication of the NAS report, 8-plus years after EPA's final regulatory determination, 28 years since Congress first asked EPA to study the question, and 16 days since the catastrophe in Harriman, TN. While the federal agencies have failed to act, the need to resolve this question has become increasingly urgent. As evidenced by the Harriman catastrophe and the numerous incidents of pollution resulting from CCW disposal practices across the country, inadequate state laws offer scant protection. What is required is comprehensive federal regulation that protects human health and environment nationwide from the risks posed by mismanagement of coal combustion waste.

Coal combustion waste represents a significant threat to human health and environment from improper storage and disposal.

Several factors make federal regulation of CCW necessary to protect human health and environment. These factors were previously identified by Lisa Evans, Project Attorney for Earthjustice in her June 10, 2008 testimony before the U.S. House of Representative's Subcommittee on Energy and Mineral Resources, Committee on Natural Resources.

1. *CCW Causes Documented Damage to Human Health and the Environment*

The absence of national disposal standards has resulted in environmental damage at disposal sites throughout the country. In fact, scientists have documented such damage for decades. Impacts include the leaching of toxic substances into soil, drinking water, lakes and streams; damage to plant and animal communities; and accumulation of toxins in the food chain.[58], [59] In 2007, EPA published a draft *Human Health and Ecological Risk Assessment* that found extremely high risks to human health from the disposal of coal ash in waste ponds and landfills. According to EPA, the excess cancer risk for children drinking groundwater contaminated with arsenic from CCW disposal in unlined ash ponds is estimated to be as high as nine in a thousand - 900 times higher than EPA's own goal of reducing cancer risks to less than one-in-one hundred thousand individuals. Figure 3 compares EPA's findings on the cancer risk from arsenic in coal ash disposed in waste ponds to several other cancer risks, along with the highest level of cancer risk that EPA finds acceptable under current regulatory goals.

Further, EPA's *Damage Case Assessment for Coal Combustion Waste,* also published in 2007, identifies 24 proven damage cases and 42 potential damage cases as a result of CCW-caused contamination in 23. Further, this is likely a low estimate because the report also concludes that most CCW disposal sites are not adequately monitored.

Documented damage from CCW includes:

- Public and private drinking water contaminated by CCW in at least 8 states, including Wisconsin, Illinois, Indiana, New Mexico, Pennsylvania, North Dakota, Georgia and Maryland.[60]

- Hundreds of cattle and sheep killed and many families sickened in northern New Mexico by ingesting water poisoned by CCW.[61]

- Entire fish populations destroyed and fish consumption advisories issued in Texas and North Carolina for water bodies contaminated with selenium from CCW disposal sites.[62], [63]

- Documented developmental, physiological, metabolic, and behavioral abnormalities and infertility in nearly 25 species of amphibians and reptiles inhabiting wetlands contaminated by CCW in South Carolina.[64]

In addition, new CCW-contaminated sites are being uncovered with disturbing frequency. One need only pick up the *Washington Post*, *Baltimore Sun* or *Virginian-Pilot* over the last year to grasp the national crisis. Evidence of poisoned water has recently surfaced in Baltimore, Charles County, Virginia Beach, and across the country in Illinois, Indiana and Montana.

The following sites are illustrative:

- **Gambrills Fly Ash Site, Anne Arundel County, Maryland** where 3.8 million tons of ash were dumped in unlined gravel pits contaminating drinking water wells with arsenic, lead, cadmium, nickel, radium and thallium as high as 4 times the drinking water standard.

- **Faulkner Landfill, Charles County, Maryland** where leaching coal ash is contaminating a wetland with selenium and cadmium at levels high enough to kill any animal life, The Smithsonian Institution has called the affected wetlands, Zekiah Swamp, one of the most ecologically important areas on the East Coast.

- **Battlefield Golf Course, Chesapeake, Virginia** where developers used 1.5 million tons of fly ash to build a golf course over a shallow aquifer. Although the course was just completed last winter, wells in close vicinity to the unlined, uncapped site are already starting to show elevated lead, arsenic, chromium, and boron.

- **PPL Montana Power Plant, Colstrip, Montana,** the second largest coal-fired power plant west of the Mississippi, where leaking unlined coal ash ponds contaminated residential wells with high levels of metals, boron and sulfate. Five companies agreed in May 2008 to pay $25 million to settle a groundwater contamination lawsuit brought by residents.

- **Gibson Generating Station, Gibson County, Indiana** where enormous ash ponds are exposing threatened species to dangerous levels of selenium and where the power company supplies residents with bottled water because their wells are contaminated with boron.

2. *States Fail to Provide Adequate Regulation of CCW Disposal*

With no minimum federal standards, state regulation of CCW disposal has been inconsistent and inadequate. The lack of federal regulation is glaring in comparison to its decision to regulate less toxic substances. For example, if one compares how EPA regulates the disposal of ordinary household trash with its hands-off approach to CCW, the results defy logic. While newspapers, soda cans and banana peels under no circumstances qualify as RCRA hazardous waste, EPA has established detailed federal disposal standards for the landfills that contain them.[65] EPA has regulations governing all aspects of the disposal of household trash in landfills including performance standards, siting restrictions, monitoring, closure requirements, bonding, and post-closure care.[66] These regulations, promulgated under subtitle D of RCRA, are enforceable by states and citizens against any owner or operator of a landfill in violation of the standards. Furthermore, RCRA requires that state solid waste programs promulgate equivalent (or more stringent) regulations in order to maintain authorization.[67] So, while EPA has found it necessary to regulate the disposal of non-hazardous municipal waste, EPA has no such regulations for the disposal of toxic CCW whose leachate exceeds *hazardous waste* levels for toxic metals.

The utility industry, as well as some states, erroneously claims that the states are doing a good job of regulating coal ash despite the absence of federal standards. The fact that EPA admits at least 67 sites in 23 states have been contaminated by CCW indicates that this is not true. A survey of state laws governing CCW disposal in landfills and surface impoundments shows that state regulations fall short of requiring measures that would adequately protect human health and the environment. Earthjustice, along with several other environmental organizations, submitted analyses of the laws and regulations of 20 states in response to EPA's Notice of Data Availability in February 2008. This analysis shows definitively that state solid waste programs do not provide consistent and adequate safeguards sufficient to protect human health and the environment from CCW. In fact, most states failed to require even the basic safeguards essential for waste management, including liners, leachate collection systems, groundwater monitoring, bonding, corrective action (cleanup), closure and post-closure care.

According to this study, among the top 15 CCW generating states, which represent 74% of U.S. CCW generation, *only one state* requires all CCW surface impoundments to be lined and *only one state* requires all CCW lagoons to monitor groundwater for migrating pollutants. *Only three states* out of those 15 require CCW landfills to be lined. It is not surprising, therefore, that EPA reported in 2000 that only 57 percent of CCW landfills and only 26% of CCW surface impoundments were lined and that only 65% of landfills and 38% of surface impoundments conducted groundwater monitoring.[68]

In addition, in 2005, a report prepared for EPA's Office of Solid Waste, entitled *Estimation of Costs for Regulating Fossil Fuel Combustion Ash Management at Large Electric Utilities Under Part 258*, included a survey on state disposal regulations that verified that states fail to prohibit the most dangerous CCW disposal practices. The report examined the top 25 coal-consuming states to determine how much CCW is prohibited from disposal below the natural water table. Since isolation of ash from water is critical to preventing toxic leachate, it is axiomatic that disposal of ash must occur *above* the water table. Yet the report found that only 16% of the total waste volume being regulated by these 25 states is prohibited from disposal in water when waste is disposed in surface impoundments. For landfills, the total waste volume that is prohibited from disposal in water is only 25%. Thus, in these states, 84% of the total volume of CCW

disposed in surface impoundments and 75% of the total volume disposed in landfills is allowed to be disposed into the water table.[69]

A 2005 report published jointly by EPA and the U.S. Department of Energy (DOE), entitled *Coal Combustion Waste Management at Landfills and Surface Impoundments, 1994-2004*, attempted to show that certain industry practices have improved since EPA's regulatory determination. This report is deeply flawed, beginning with the fact that the report was based primarily on data voluntarily submitted by the utility industry. The report surveyed 56 permitted landfills and surface impoundments built between 1994 and 2004. The report cited the presence of "liners" at all newly permitted surface impoundments and landfills and concluded "[t]he use of liners has become essentially ubiquitous." This conclusion, however, is grossly misleading because while more liners appear to be installed on disposal units built in the last 14 years, the type of liners is insufficient to protect health and the environment. In fact, the same DOE/EPA Report reveals that only 39% of the units, at best, installed composite liners. According to EPA's 2007 draft *Human and Ecological Risk Assessment*, landfills and surface impoundments with clay liners do <u>not</u> provide adequate protection of health and the environment.[70]

The *Risk Assessment* further states that *composite liners* effectively reduce risks from all constituents to below the risk criteria for both landfills and surface impoundments. A composite liner is defined as a high-density polyethylene (HDPE) membrane combined with either geosynthetic or natural clays. Yet the DOE/EPA Report reveals that clay liners were used at 25% of the permitted units. Single liners, also deemed inadequate, were used at 18% of the surveyed units. Unless the liner is of a sufficient quality to prevent the migration of contaminants, its use is largely irrelevant. The DOE/EPA Report's updated survey of state-permitted disposal units does not show that adequate protections are in place. Conversely, it reveals that the absence of a federal rule requiring composite liners has produced a whole new generation of waste units in at least a dozen states that pose serious threats to human health and the environment.

Furthermore, the 2005 DOE/EPA Report documents that nearly a third of the net disposable CCW generated in the U.S. are potentially *totally exempt* from solid waste permitting requirements.[71] The DOE/EPA Report explains this fact in great detail:

> [t]he six States that have solid waste permitting exemptions for certain on-site CCW landfills generated a total of approximately 17 million tons of net disposable CCWs in 2004, which is 20% of the total net disposable CCWs generated for all States. The one State that excludes CCW from all solid waste regulations, Alabama, generated a total of approximately 2.7 million tons of net disposable CCWs in 2004, which is about 3.3% of the total net disposable CCWs generated in all States. Ohio, which excludes "nontoxic" fly ash, bottom ash, and boiler slag from solid waste regulations, generated a total of 5.9 million tons of these wastes and 1.1 million tons of FGD wastes (about 7 million tons total) in 2004. Of these amounts, about 1.3 million tons of "nontoxic" fly ash, bottom ash, and boiler slag are beneficially used and about 1 million tons of FGD sludge are beneficially used. Hence, the net disposable CCWs that were potentially exempt from solid waste permitting requirements in Ohio in 2004 …. amount to about 4.6 million tons. …. Thus the amount of net disposable CCWs in Ohio that is

> potentially exempt from solid waste permitting requirements represents about 5.4% of the total net disposable CCWs generated for all States. **Overall, the portion of the net disposable CCWs that is potentially exempt from solid waste permitting requirements is approximately 24 million tons, which corresponds to 29% of the total net disposable CCWs generated in the United States during 2004**.[72]

(Emphasis added).

The report also explains that this exempted CCW represents almost a third of the US coal-fired generating capacity:

> In terms of electric generating capacity, the six States that have solid waste permitting exemptions for certain on-site CCW landfills generated a total of approximately 66,000 MW, which is approximately 20% of the total coal-fired electric generating capacity in the United States in 2004. The one State the excluded CCWs from all solid waste regulations, Alabama, generated a total of approximately 12,000 MW in 2004, which is about 3.7% of the total. Ohio which excludes "nontoxic" fly ash, bottom ash and boiler slag from solid waste regulations, generated a total of about 24,000 MW in 2004. This represents about 7.2% of the total coal-fired electric generating capacity in the United States. **Overall, the portion of the coal-fired electric generating capacity in the States that potentially exempt CCW landfills from solid waste permitting requirements and that exclude certain CCWs from all solid waste regulation is approximately 102,000 MW, which corresponds to about 30% of the total coal-fired electric generating capacity in the United States in 2004.**[73]

(Emphasis added.) Thus the DOE/EPA Report demonstrates that a significant portion of the CCW generated in the U.S. is potentially not subject to *any* solid waste permitting. This is another wholly unacceptable gap in regulation of CCW that is likely to have significant negative impact on health and the environment.

Finally, some 23 states have "no more stringent" provisions in their statutes that prohibit the states from enacting stricter standards than are found in federal law. Thus for those states, without federal regulation, *there can be no regulation of CCW beyond what few safeguards there are now*.[74] Among states with "no more stringent provisions" are Colorado, Kentucky, Montana, New Mexico, Tennessee and Texas.

Under these circumstances, it is ridiculous to continue relying on state regulations for proper oversight of the storage and disposal of CCW.

3. *The Volume of Chemical Waste Resulting from Coal Combustion is Immense*

Burning coal produces over 129 million tons *each year* of coal combustion waste in the U.S. This is the equivalent of a train of boxcars stretching from Washington, D.C. to Melbourne, Australia.[75] CCW is largely made up of ash and other unburned materials that remain after coal

is burned in a power plant to generate electricity. These industrial wastes include the particles captured by pollution control devices installed to prevent air emissions of particulate matter (soot) and other gaseous pollutants from the smokestack. Further adding to the toxicity of CCW is that in addition to burning coal, some power plants mix coal with other fuels and wastes, including a wide range of toxic or otherwise hazardous chemicals, such as the residue from shredded cars (a potential source of PCBs), oil combustion waste (often high in vanadium), railroad ties, plastics, tire-derived fuel and other materials.[76]

What results from these processes is a waste product that is significantly more toxic than coal itself. As coal is burned, its volume is reduced by two thirds to four fifths, concentrating metals and other minerals that remain in the ash. Elements such as chlorine, zinc, copper, arsenic, selenium, mercury, and numerous other dangerously toxic contaminants are found in much higher concentrations on a per volume basis in the ash compared to the coal. In fact, the thousands of tons of chemicals disposed of in CCW by placement in unlined surface impoundments, landfills, or mines each year dwarf other industrial waste streams. (See Figure 2 at the end of this section) Table 1 below indicates some of the contaminants commonly found in CCW and their human health effects.

Table 1: Human Health Effects of Coal Combustion Waste Pollutants

Aluminum	Lung disease, developmental problems
Antimony	Eye irritation, heart damage, lung problems
Arsenic	Multiple types of cancer, darkening of skin, hand warts
Barium	Gastrointestinal problems, muscle weakness, heart problems
Beryllium	Lung cancer, pneumonia, respiratory problems
Boron	Reproductive problems, gastrointestinal illness
Cadmium	Lung disease, kidney disease, cancer
Chromium	Cancer, ulcers and other stomach problems
Chlorine	Respiratory distress
Cobalt	Lung/heart/liver/kidney problems, dermatitis
Lead	Decreases in IQ, nervous system, developmental and behavioral problems
Manganese	Nervous system, muscle problems, mental problems
Mercury	Cognitive deficits, developmental delays, behavioral problems
Molybdenum	Mineral imbalance, anemia, developmental problems
Nickel	Cancer, lung problems, allergic reactions
Selenium	Birth defects, impaired bone growth in children
Thallium	Birth defects, nervous system/reproductive problems
Vanadium	Birth defects, lung/throat/eye problems
Zinc	Gastrointestinal effects, reproductive problems

Source: ATSDR ToxFAQs, available at www.atsdr.cdc.gov/toxfaq.html

4. *Better Air Pollution Controls Will Make CCW More Toxic*

As air pollution control regulations are implemented under the Clean Air Act, more particulates and metals are captured in the ash instead of being emitted from the smokestack. In a 2006 report on CCW, EPA found that when activated carbon injection was added to a coal-fired boiler to capture mercury, the resulting waste leached selenium and arsenic at levels sufficient to classify the waste as "hazardous" under RCRA.[77] Specifically, EPA found that arsenic leached (dissolved) from the CCW at levels as high as 100 times its maximum contaminant level (MCL) for drinking water, and selenium leached at levels up to 200 times its MCL.[78]

In a follow-up study that is currently underway by EPA's Office of Research and Development, EPA tested the leaching characteristics of CCW from a power plant employing both mercury controls and a wet scrubber for sulfur dioxide control. EPA found that CCW from a plant with a wet scrubber leached numerous additional toxic metals at levels significantly higher than their MCLs.[79] EPA found that the CCW leached arsenic, thallium, boron, and barium above RCRA's hazardous waste threshold (100 times the MCL). The CCW also leached levels of antimony, cadmium, chromium, lead, mercury, molybdenum and selenium in quantities sufficient to contaminate drinking water and harm aquatic life.

This is the hidden catch that clean-coal advocates would prefer to keep secret. While clean coal technologies will reduce air emissions, the widespread adoption of these technologies will also lead to massive increases in the production of CCW that contains higher levels of contamination. Unfortunately current technology is not capable of simply making these pollutants disappear, and when the burning of coal does not result in the emission of pollutants from smokestacks, it is the responsibility of the regulatory authority to ask where, if not in the air, are they going. In the case of "clean coal," the answer to that question is onto our land and into our ground and surface waters.

As new technologies are mandated to filter air pollutants from power plants, cleaning the air we breathe of smog, soot and other harmful pollution, the quantity of pollutants and dangerous chemicals in the ash increases. Without adequate safeguards, the chemicals that have harmed human health for years as air pollutants- mercury, arsenic, lead and thallium- will now reach us through drinking water supplies and other sources of environmental contamination. Given the documented tendency of CCW to leach metals at highly toxic levels, there is clearly the need for federal regulations to ensure proper storage and disposal of CCW to protect human health and environment.

5. *Voluntary Industry Agreements are not a Solution*

It is not viable to allow the utility industry to police itself. The proliferation of contaminated sites demonstrates that industry is not voluntarily ensuring safe disposal. A voluntary agreement recently signed by some utilities and presented to EPA as a substitute for enforceable regulations is unacceptable.[80] Its shortcomings are too numerous to describe here in detail, but suffice it to say that the utilities are proposing substantially less protection for their toxic ash than is required by law for the garbage from their cafeterias.

The voluntary industry agreement is designed to allow the electric utility industry to continue avoiding the cost of safe disposal of its voluminous waste. The plan intentionally fails to require monitoring that would detect pollution escaping CCW surface impoundments and landfills or to require any specific response should pollution be detected. The plan fails to require the most basic of safeguards, composite liners, and it fails to prohibit the placement of CCW directly into groundwater and nothing in the plan applies to disposal of CCW in mines. In view of continuing damage from coal ash, the hundreds of disposal units operated by industry today without safeguards, and the comprehensive body of evidence showing CCW's toxic characteristics, it is untenable for any federal agency to entertain an unenforceable, voluntary proposal.

6. *Federal regulations are necessary to protect human health and environment from the damages of contamination from CCW.*

The goal of RCRA is to ensure the safe disposal of solid and hazardous waste and to encourage the safe reuse of waste in order to protect human health and the environment and conserve the nation's natural resources.[81] By failing to make good on its promise to promulgate minimum federal standards, EPA has failed in both respects. The disposal of CCW without safeguards has resulted in the creation of "open dumps," as they are defined in 40 C.F.R. Part 257, which is specifically prohibited by the statute.[82] Furthermore, because disposal of CCW in unlined, unmonitored pits so frequently presents the threat of an imminent and substantial endangerment to health or the environment, these disposal units violate RCRA's core statutory mandate that disposal of solid waste avoid the potential for substantial damage, as set forth in section 7003 of RCRA. Finally, Section 1008 of RCRA requires EPA to "develop and publish suggested guidelines" for solid waste management under subtitle D, as necessary to ensure protection of public health and the environment. Thus EPA has failed with regard to CCW, not only to abide by its own regulatory determination, but also to comply with the mandates of RCRA.

The solution is straightforward. EPA, or in the case of CCW disposal in mines, OSM, *in conjunction with EPA*, must phase out the use of surface impoundments for CCW disposal and provide minimum federal enforceable safeguards for the disposal of CCW in mines and landfills. In the case of mines, this includes site characterization, isolation from groundwater, effective monitoring, site-specific management plans, adequate bonding, public participation in permitting, and site-specific cleanup standards. For landfills, it is a simple matter to require the basics that are currently required for municipal solid waste disposal: placement above the water table, composite liners, groundwater monitoring, daily cover of the waste, cleanup standards if contamination is discovered, construction of a cap upon closure, financial assurance, and post-closure care. These are not new concepts; they are well-established practices for protecting human health and environment from the effects of toxic exposure.

Further, by failing to impose disposal standards, EPA fails to encourage CCW reuse. When cheap dumping is no longer available, power plants will have far greater incentive to recycle their ash. Reuse of ash as a component of asphalt, concrete, and gypsum board are legitimate and safe reuses that should be encouraged. In addition, recycling ash in concrete can result in a large reduction of greenhouse gases. Approximately one ton of CO_2 is released for every ton of Portland cement produced, but certain classifications of CCW can replace up to 50% by mass of Portland cement.[83] Further, since cement kilns are one of the largest emitters of mercury in the nation, the reduction of Portland cement production will reduce mercury emissions.

In Wisconsin, for example, adequate regulation of CCW has raised recycling rates significantly. Wisconsin CCW regulations are probably the most comprehensive in the nation. As a result, the recycling rate in Wisconsin for CCW is 85%, more than double the average recycling rate for all other CCW-producing states (36%).[84] It stands to reason that if the true cost of disposal were borne by electric utilities, there would be far greater incentive to find beneficial uses for the ash.

However, the EPA should proceed cautiously in analyzing industry claims of the beneficial uses of CCW. While the scientific research indicates that certain grades of CCW can replace Portland Cement in the manufacturing of concrete by acting as a binder to the concrete and thereby binding many of the heavy metals for several years, this should not be confused with another common practice: re-burning CCW in the cement manufacturing process. The re-burning of coal combustion waste to fire cement kilns further concentrates the pollutants present in the waste and mercury emission levels from these facilities have been found to be significantly higher than those emitted during the first burning of the coal.

In all, a comprehensive regulatory approach to the storage and disposal of coal combustion waste is not only necessary to protect human health and environment, but would enhance the incentive to find beneficial uses for CCW. The time to mandate federal regulation of CCW has long passed. However, with the current catastrophe in Harriman, TN failure of the EPA to quickly enact responsible regulation to ensure that human health and environment are protected, as is mandated by RCRA, would be an egregious failure of duty and would doubtlessly lead to further health effects and environmental damage from CCW waste.

Recommendations:

The catastrophe in Harriman, TN has left families homeless, hundreds of acres of land contaminated, and resulted in yet-to-be-determined levels of contamination to surface and groundwater resources. It will take years, if not decades for the area to return to its natural condition. However, the breach represents merely a symptom to a much larger problem: the complete inadequacy of regulations that protect human health and the environment from the devastating effects of irresponsible CCW storage and disposal. Research and analysis conducted by EPA, the Science Advisory Board, and the National Academies of Science clearly indicates a high and unacceptable risk from CCW when the waste is disposed without safeguards. The threat is not theoretical. According to EPA's own data an increasing number of injuries to health and the environment has resulted from unsafe disposal of CCW.

In light of this well-documented and severe deficiency in federal regulation, please allow this testimony to serve as a request that Chairman Boxer and the Committee to direct EPA to begin the promulgation of regulations that will provide minimum requirements for the storage and disposal of coal combustion waste by the end of this calendar year. Specifically, we request the following actions:

1. *A specific timetable for establishing federal regulations.*

EPA must immediately begin to formulate adequate minimum waste management requirements that will be required at all surface impoundments, landfills and, in cooperation with OSM, at all

mines and must promulgate these requirements by 2010. In view of EPA's longstanding failure to abide by its 2000 commitment to promulgate regulations and the harm that is currently occurring because of EPA's failure to act, it is necessary to ensure that the agency is indeed moving forward to establish federal standards. Further action by this Committee to conduct additional hearings and support legislation to set a deadline for federal action would help ensure that the destruction caused by CCW does not continue any longer than absolutely necessary.

2. *EPA should conduct a timely review to determine the extent of the risk posed by dangerous CCW storage and disposal, including inspection of all CCW impoundments to ensure that they are not constructed of coal ash.*

A lack of federal regulation has resulted in an absence of even the most basic data regarding the storage and disposal of this hazardous substance. EPA's own risk assessment was based on voluntary responses to a survey distributed to industry members and estimates on the number of facilities and the widespread adoption of proper handling practices can vary significantly. A look at the EPA website reveals that in the past year, several reports have been published on the beneficial uses of CCW, while no further research has been accomplished on the potential risks associated with improper storage and disposal. In other words, the EPA is expending far more resources studying the potential of CCW to generate income for industry than it is expending to understand the risks CCW poses to the general public.

A nationwide, mandatory reporting of CCW storage and disposal facilities, both operating and closed, including their size, the estimated amount of CCW, and a detailed explanation of any protective or remedial measures implemented would allow for the creation of a proper regulatory framework for addressing the risks to human health and environment. Without at least a basic understanding of the scope of the problem, EPA will be at a significant disadvantage in their efforts to protect the public from the potential harms of CCW. The electric utility has been generating CCW for over half a century. The public has a right to know where and how this toxic waste has been disposed, and EPA has an obligation under RCRA and CERCLA to find out.

Critical to this review, all surface impoundments must be inspected to ensure that their berms and dams are not constructed of fly ash or bottom ash. If impoundments are found that are constructed of ash, they must be rebuilt or emptied to guard against another catastrophic failure. The TVA berm that failed was a berm constructed of compacted fly ash or bottom ash. The berms are described by TVA as being constructed of "earthen materials." But "earthen materials" is an inaccurate and misleading characterization of coal ash.

True earthen materials (clay, silt, sand, etc.) can be compacted to densities and strengths than can be measured and relied upon for physical containment, using standard engineering practices and procedures. These materials are virtually non-reactive in the surface environment, because they are in equilibrium with it. It will last indefinitely, so long as the load behind it doesn't exceed its strength.

Coal ash is not, however, in equilibrium with the environment. It is known, and should be expected, to react (weather) in the environment. With the weathering, ash mass, density, and strength typically decline, ash chemistry changes, and ash permeability typically increases. Observations consistent with each of these changes are described in the TVA inspection reports.

Coal ash progressively loses strength over time. Instead, the berm would have a functional life, and would last only until the load behind it exceeds its declining strength. At Kingston, that apparently occurred December 22, 2008.

3. *Surface impoundments must be phased out at existing coal-fired plants and the construction of surface impoundments at new plants must be prohibited.*

EPA should prohibit construction of surface impoundments at all new coal-fired plants and require a phasing-out of surface impoundments at existing plants. Wet storage or disposal, as was practiced in the failed surface impoundment at TVA's Kingston plant in Harriman, TN, is the most damaging option for the storage and disposal of CCW. Even in the absence of the risk of catastrophic failure, the presence of water facilitates the dissolution and migration of pollutants, particularly when the ash pond is unlined or lined with only soil or clay. The dozens of cases of contamination from the leaching of arsenic and other pollutants from surface impoundments across the U.S. is testament to the danger of wet disposal. As described in this testimony, EPA's 2007 draft *Human and Ecological Risk Assessment of Coal Combustion Wastes* identifies exceedingly high risks of groundwater contamination from CCW surface impoundments and finds that the risk from surface impoundments is considerably higher than the risk from CCW landfills. In the absence of comprehensive federal regulation of coal combustion waste, industry has consistently ignored basic common sense safeguard of isolating toxic waste from surface and ground water sources, risking catastrophic failure as happened in Harriman, TN and severe contamination of drinking water and surface waters due to infiltration and leaching.

TVA's own claim that the failure of the Kingston surface impoundment was unpredictable supports the conclusion that these facilities must be phased out. Certainly the federal government would step in and ban the storage of explosives that had the potential to spontaneously detonate, leaving hundreds of acres destroyed, families displaced and water resources contaminated. Why then would that same government continue to allow the use of surface impoundments for toxic waste when the next catastrophic failure is neither predictable nor preventable? In such circumstances, it is the role of the federal government to promulgate regulations that prevent such happenings.

Electric utilities have a choice of producing dry or wet waste, and given risk of severe pollution events and the evidence of gradual damage to human health and the environment from disposal of slurried (wet) ash in waste ponds, an essential and important step to improve waste management over the long term is to require utilities to move toward dry disposal of CCW. Isolation of CCW from water is unquestionably the safest way to dispose of ash. A prohibition on new surface impoundments would greatly reduce the risk of new cases of poisoning and would ensure that waste management practices at new coal plants coming on line reflect our scientific knowledge. Communities living near coal-fired power plants deserve protection from this wholly avoidable threat to their health and environment.

For existing plants with currently operating or retired surface impoundments, EPA should establish stringent regulations for the installation of composite liners, leachate collection systems, and groundwater monitoring. Further, bonding, corrective action (cleanup), closure and post-closure care should be required for all active and retired CCW surface impoundments.

These stringent requirements are necessary because of the historical lack of precautions that have been taken by operators of these facilities to ensure the safety of surrounding communities and the environment.

Currently, the majority of the estimated 300 or more surface impoundments used for the storage of coal combustion waste in the U.S. are not lined to prevent leakage to ground and surface waters, are not properly monitored to detect potential problems, and are not adequately backed by financial assurances in the event of environmental damage. These basic requirements are either not required by state laws, or are not enforced in the states that do have such requirements on their books. Often times, the NPDES permit issued for a surface impoundment does not even cover monitoring, let alone set limits on, many of the heavy-metal pollutants that are so toxic to our environment, and that now threaten the Tennessee River system. Further, once closed, the coal combustion waste in these so-called "storage" facilities is rarely, if ever, removed to a proper disposal facility. Therefore, they continue to threaten ground and surface waters and risk catastrophic failure as happened in Harriman, TN. These inadequacies can only be remedied quickly by comprehensive federal regulation that requires the installation of basic safeguards and the monitoring of facilities to allow for quick detection and remediation of environmental degradation.

4. *EPA must require the use of engineered landfills for CCW disposal.*

CCW must be either recycled in a way that avoids the release of the hazardous substances contained in CCW, or must be disposed or stored in a properly designed and monitored dry-storage landfill. Disposal in sand and gravel pits, or in mines without adequate study and pollution controls is irresponsible and unnecessarily increases the risk to human health and environment due to CCW contamination.

A great number of communities in the U.S. are concerned about this issue. OSM's *Advanced Notice of Proposed Rulemaking on the Placement of Coal Combustion Byproducts in Active and Abandoned Coal Mines* drew over 4,000 comments from citizens last June, and over 10,000 individuals responded to EPA's *Notice of Data Availability on Coal Combustion Wastes* in February 2008. Communities threatened by the disposal of coal ash are requesting that minimum standards be put in place as soon as possible. It is the duty of the federal government and the EPA to heed these calls for regulation because it is now clearly evident that CCW poses a significant risk to human health and environment due to its toxic nature.

Minimum standards for the disposal of CCW require a dry landfill equipped with a double liner, including an impermeable composite liner. In addition, the landfill must be sufficiently isolated from water sources and have a leachate collection system. Location restrictions must prohibit the siting of landfills in wetlands, earthquake zones, and floodplains. Adequate groundwater monitoring and bonding must be required for the life of the landfill and 30 years after the closure of the facility. Finally, regulations should ensure the implementation of timely corrective action if contamination is detected. Only by requiring these basic safeguards, the same safeguards that regulate non-hazardous municipal solid waste, can the EPA say with any confidence that they are obeying the charges of RCRA to protect the human health and environment from the hazardous contamination associated with coal combustion waste. Maintenance of the status quo ensures that

further damage will occur.

Claims by industry that these requirements will be too costly to implement should be regarded with the same skepticism as their claims that CCW is an inert substance. In its final both its March 5th and May 22nd 2000 *Regulatory Determination on Wastes from the Combustion of Fossil Fuels*, EPA determined that the cost to industry of compliance with tailored hazardous waste regulations would be "only a small percentage of industry revenues."[85] EPA estimated this cost to be "less than 0.4 percent of industry sales."[86] Regulating CCW under solid waste authority, as opposed to subtitle C requirements of RCRA would be even less expensive. Therefore, the cost of safe disposal is *not* burdensome to industry, although it has proved, at site after site, to be catastrophic to the public and the environment.

Figure 1: [87]

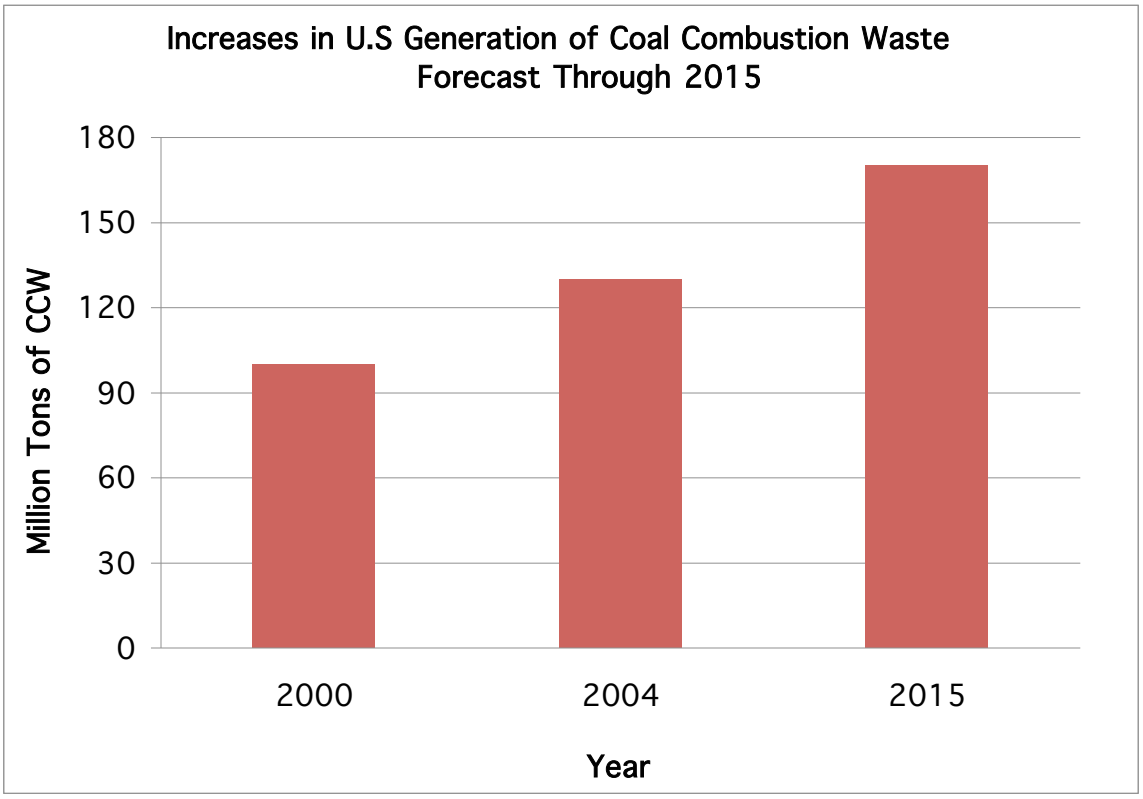
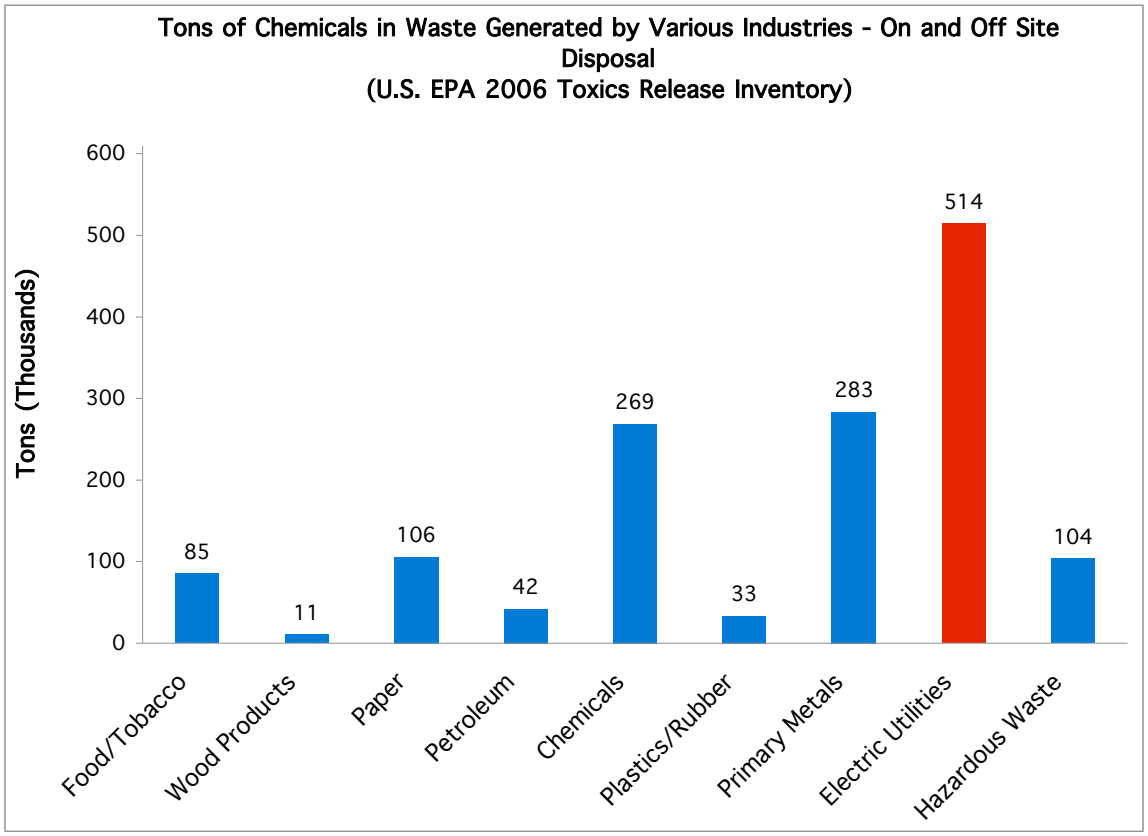
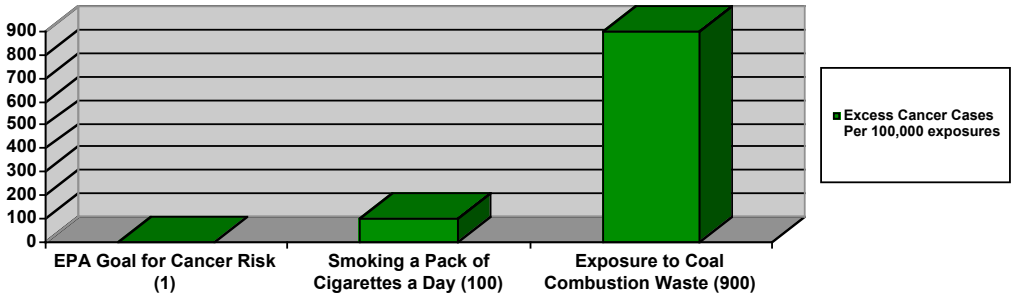

Increases in U.S Generation of Coal Combustion Waste
Forecast Through 2015
180
150
120
90
60
30
0
Million Tons of CCW
2000
2004
2015
Year

Figure 2:[88] Electric utilities generate significantly more tons of chemicals that other industries.



Source: U.S. EPA 2006 Toxic Release Inventory

Figure 3: [89] The cancer risk associated with exposure to CCW is 900 times greater than the EPA goal for cancer risk.



The TVA needs increased congressional oversight, skilled leadership and sound planning to once again make it a leader in energy innovation and responsibility.

Given TVA's role in providing electricity to almost nine million people in seven southern states, it is imperative that TVA has diligent oversight, sound leadership and comprehensive planning procedures. I have tremendous respect and admiration for the original vision that established TVA and I believe if properly configured and directed, TVA has an important role in the 21st century that could surpass its accomplishment of the past 75 years. Unfortunately, I believe that there are still fundamental flaws in the governance and oversight of the agency that have the potential to undermine the agency's success in the future.

As a federally owned corporation and the largest public electricity provider in the nation, TVA is in a unique position to provide leadership in adapting our nations electricity generation and distribution systems to modern innovations and environmental standards. While TVA has aggressively and successfully pursued its initial goals of providing electricity and fostering economic development in the Southeastern U.S., more recently, TVA has been ineffective on energy efficiency and renewable energy development, making TVA one of the leading contributors to global warming pollution in the nation and placing the Southeastern United States at a competitive disadvantage in the growing clean-energy markets.

Southeastern states within the TVA service area now consistently rank at the bottom of the barrel in terms of both energy efficiency and renewable energy development. At the same time, TVA's coal-fired power plants rank among the dirtiest in the nation, emitting more than 107 million tons of carbon dioxide annually.[90] In response to these shortcomings, TVA's primary solution is to once again focus solely on nuclear power development by attempting to finish construction on several unfinished nuclear reactors and planning to build two new nuclear reactors of unproven design, all at an unknown cost to consumers. The Table below shows that TVA already receives 30% of its generating capacity from nuclear generation. If these projects are completed as planned, TVA's generation mix will likely exceed 50% from nuclear generation. This one-dimensional approach increased economic, environmental, and reliability risks to the TVA system.

At the same time, TVA is ignoring the Southeast's renewable energy potential and making, at best, half-hearted attempts at conservation and efficiency. The table below shows TVA's generation mix from 2005 to 2007. While the ratio of electricity generated from coal and nuclear has risen steadily, the amount of power generated by renewable energy resources other than hydropower has steadily declined, reaching a paltry 0.017% in 2007. The table below is a sad statement of the fact that the nation's largest public power utility has non-hydro renewable generation at a fraction of one percent.

Power Supply from TVA-Owned Generation Facilities

	2007		2006		2005	
Year	Generation (in million kWh)	% of mix	Generation (in million kWh)	% of mix	Generation (in million kWh)	% of mix
Coal-fired	100,169	64%	99,598	64%	98,381	62%
Nuclear	46,441	30%	45,313	29%	45,156	28%
Hydroelectric	9,047	6%	9,961	6%	15,723	10%
Renewables	**27**	**0.017%**	**36**	**0.023%**	**47**	**0.029%**
Total	156,389	100%	155,521	100%	159,882	100%

Source: TVA's 2007 Form 10-K report, filed with the SEC on 12/12/07 for the period ending 09/30/07.

Recommendations:

1. *President-elect Obama should appoint, and this Committee should approve, TVA Board members who are proactive about establishing TVA as a national leader in the nation's energy future.*

TVA's governance went largely unchanged for over 70 years until, as part of the Consolidated Appropriations Act of 2005, Congress enacted amendments to the TVA Act that mandated fundamental changes in TVA's governance structure. In March 2006, TVA made the transition from a 3-member, full time board, to a 9-member part-time board of directors. Also under the authority of the 2005 amendments to the TVA Act, the new Board appointed the federal corporation's first chief executive officer in its 73-year history. Under TVA's management structure, the Board is responsible for providing strategic guidance and policy direction, while the CEO is responsible for the day-to-day management of TVA's operations.

These changes have largely been welcomed for providing expanded representation of TVA's service territory and I am not here to attack the current board members. However, I do wish to showcase an emerging opportunity for this Committee to have a significant and positive impact on TVA operations almost immediately. There are currently two vacant seats on the TVA Board and two more seats will become available for appointment in May 2009. Therefore, four Board appointments can be made within the next 6 months.

Because of TVA's prominent role in the nation's energy community it is critically important that Board appointments be individuals who committed to safeguarding the natural resources of the Southeastern U.S. and are willing and able to take advantage of TVA's potential to be a leader in energy efficiency and renewable energy development. The long history of ambivalence towards environmental safety documented in the press and reviewed in previous sections of this testimony highlights the need for strong leadership within TVA.

TVA is administered by a board of nine part-time members appointed by the President of the United States with the advice and consent of the Senate.[91] A Board member serves for

renewable, 5-year terms. The TVA Board currently consists of seven members and two outstanding seats. The table below lists the current members, their ages, home states, and terms of office. A biography of each Board member, as well as current President and CEO Tom Kilgore, is provided in Figure 4.

Board member	Home state	Year appointed	Term expires
William Sansom (Chairman)	Tn	2006	2009
William Graves	Tn	2007	2012
Dennis Bottorff	Tn	2006	2011
Donald DePriest	Ms	2006	2009
Mike Duncan	Ky	2006	2011
Tom Gilliland	Ga	2008	2011
Howard Thrailkill	Al	2006	2010
Vacant seat	?	?	2013
Vacant seat	?	?	2013

The TVA Act provides that at least 7 of the 9 Board members must be legal residents of TVA's service area.[92] To be appointed a member of the Board, an individual:

> (1) shall be a citizen of the U.S.;
> (2) shall have management expertise relative to a large for-profit or nonprofit corporate, government, or academic structure;
> (3) shall not be an employee of the Corporation;
> (4) shall make full disclosure to Congress of any investment or other financial interest that the individual holds in the energy industry; and
> (5) shall affirm support for the objectives and missions, of the Corporation, including being a national leader in technological innovation, low-cost power, and environmental stewardship.[93]

The TVA Act instructs the President, in appointing Board members, to "consider recommendations from such public officials as: (A) the Governors of the States in the service area; (B) individual citizens; (C) business, industrial, labor, electric power distribution, environmental, civic, and service organizations; and (D) the congressional delegations of the States in the service area."[94] The Act also directs the President to "seek qualified members from among persons who reflect the diversity, including the geographic diversity, and needs of the service area of the Corporation."[95]

Once appointed, the removal of board members is extremely rare. Only once, in 1938, has a Board member been removed from his position. However, it led to the 1940 Federal Appeals Court holding in *Morgan v. TVA*, where the court held that a Board member, having duties predominantly executive, could be removed by the President without cause.[96] Board members may also be removed by joint resolution of both houses of the U.S. Congress.[97]

Once Board members are selected, the agency is free to act with little oversight in choosing the course of the Southeastern States' energy future. While we are now calling for increased congressional oversight of TVA operations, some will warn against "micro-managing" the

agency. I believe that the current situation is far from any sort of "micro-management" and has lead to the situation that we have witnessed in the past weeks. In this situation, it is critical that the Board of Directors be staffed with members who have the skill and vision to reposition TVA as leader in this nation's energy future.

2. *TVA should be required to undertake integrated resource planning at regular intervals so that all energy options, including energy efficiency and renewable energy resources are considered on a level playing field.*

In spite of mounting research showing the benefits of integrated resource planning to both utilities and customers, TVA has repeatedly denied requests to undertake a comprehensive planning process that includes all resource options to meet future electricity demand. This process, called integrated resource planning, is in use throughout the nation and is mandated by many states that recognize the benefits associated with proper planning and assessment of all resource options to meet future demand.

In detail, integrated resource planning (IRP) is a planning process for electric utilities that evaluates many different options for meeting future electricity demands and selects the optimal mix of resources that minimizes the cost of electricity supply while meeting reliability needs, environmental requirements, and other objectives. With traditional utility planning, supply side options, (those that supply more power), are typically considered the only way to meet future demand. IRP, however, also includes the consideration of demand-side options – those options that reduce electricity demand, thereby avoiding the costs of new generation facilities. IRP strives to:

1. Evaluate all options, from both the supply and demand sides, in a consistent manner.
2. Minimize costs to all stakeholders (and not just costs to the utility).
3. Create a flexible plan that allows for uncertainty and permits adjustment in response to changed circumstances.
4. Allow for open decision-making processes that and involvement of all stakeholders.

The result of this process is the achievement of lower overall costs than might result from considering only supply-side options. Furthermore, the inclusion of demand-side options and non-traditional supply-side options such as cogeneration and renewable energy sources, presents more possibilities for saving fuel and reducing negative environmental impacts than might be possible if only supply-side options were considered.

Integrated resource planning usually consists of a number of steps that make intuitive sense when planning for the provision of electricity to nearly 9 million people in the current situation where a complex regulatory system is in place and fuel and construction costs are highly variable. These steps generally include:

1. Identifying the objectives of the plan (e.g. reliable service, meeting peak demand at least cost, etc.) and the appropriate time horizon.
2. Collecting data needed for the planning process.
3. Developing one or more demand forecasts.

4. Identifying resource options including demand-side and supply-side resources.
5. Consistently evaluating all resources including calculating avoided costs, conducting benefit-cost analyses, and considering environmental externalities.
6. Selecting the most promising options to create an integrated, effective, and responsive plan.
7. Conducting uncertainty or scenario analyses for different economic, environmental, and social circumstances.
8. Based on these uncertainty or scenario analyses, developing a plan that best addresses the most likely contingencies while providing flexibility in case one of the less likely scenarios comes to pass.
9. Developing an action plan.
10. Implementing the action plan.
11. Monitoring and evaluating implementation of the plan and revising the plan as necessary.
12. An open planning process and Stakeholder input and review of plans and proposed amendments.

The benefits of IRP are generally recognized and supported by a growing body of scientific research. Several states nationally have now mandated IRP to their electric utilities, including several southern states that neighbor TVA. In North Carolina, integrated resource planning is required along with yearly reviews to reevaluate utilities' strategic plans and amend them to changing circumstances. Additionally, Kentucky and Georgia require IRP with review and amendment every three years. Florida also has integrated resource planning requirements that require a 10-year plan be submitted every year for review and approval by the utilities commission.

In contrast to the integrated resource planning and regular review and amendment that is occurring throughout the nation, TVA's1995 Integrated Resource Plan, (also referred to as Energy Vision 2020) continues to guide decision-making regarding the TVA system. I participated in the 1995 TVA IRP review process. I can promise you that the technology and the utility environment have changed considerably since then. The simple fact is that relying on a 14-year old resource plan in today's constantly changing electricity markets is irresponsible. As recently as 2007, TVA has wed itself to this outdated plan for meeting future energy needs. TVA's 2007 Strategic Mission, approved by the TVA Board of Directors on May 31, 2007, states that the "goals in the Strategic Plan are consistent with those in the 1995 IRP . . . At this time, no change to the IRP is necessary as a result of the content or direction provided by the strategic plan."[98]

Congressional requirement of integrated resource planning has precedent in that it is required of the Northwest Power and Conservation Council, created by Congress in 1980 through enactment of the Northwest Power Act. Sections 839b(d) through (g) of the Northwest Power Act requires the Council to prepare, adopt and review not less than once every five years a regional conservation and electric power plan.[99] The Act also requires public input into the plan creation and amendment process and mandates the priorities for the Council, prioritizing conservation, renewable resources and waste heat recovery or high fuel conversion efficiency over all other resources. Further requirements of the Act ensure that the Council's plan is adequately detailed

and that it goes through a lengthy stakeholder review process. Such an integrated resource plan mandated by Congress would provide the framework necessary for proper decision-making within the TVA.
The IRP process and subsequent review and amendment is critical to TVA's ability to develop strategies that fits into a carbon constrained world, advanced energy efficiency and develop cost-effective renewable energy resources. Since TVA is unwilling to undertake a transparent integrated resource planning process, Congress must mandate it upon TVA to ensure that TVA remains competitive in the 21st century utility community. This process must be transparent and have independent stakeholder review.

3. *TVA should begin the process of updating its generation facilities and distribution grid to position itself to become a leader in energy innovations in the 21st century.*

The disaster that occurred at the Kingston Plant can be directly attributed to the use of outdated and dangerous facilities that do not adhere to current scientific knowledge. In fact, however, many of TVA's shortcoming, to some degree, are derived from the fact that TVA's generation, transmission and distribution system is severely outdated and in need of significant improvements. A concerted effort to begin what will be the long process of updating TVA's generation, transmission and distribution system must be mandated in order to position TVA to take a leadership role in this nation's energy future. Examples of TVA's aging assets include:

- Fifty-nine coal-fired generation units with an average age of about 50 years.
- Forty-eight combustion turbines with an average age of about 35 years.
- Twenty-nine power producing dams with an average age of about 65 years.
- A transmission system that in 1998 had 24% of its substation transformers over 50 years old, 39% of its plant transformers over 50 years old, 39% of its circuit breakers over 40 years old, and 21% of its protective relays over 40 years old.[100]

Exacerbating this problem is the fact that, similar to many of the nation's largest utilities, TVA is faced with maintaining and, in some cases, modernizing or rehabilitating its aging infrastructure in an environment which includes:

- Increasing demands on the transmission system from new merchant plants, open access requirements, and transmission wheeling;
- Increasing power demand, especially during peak seasons
- The need to maintain system reliability
- Changing environmental requirements and legislation
- The pressure to keep power rates low.

Modernizing TVA's generation, transmission and distribution system is a large and daunting task, spreading over seven states and 80,000 square miles. However, it is necessary not only to maintain reliable electricity service to the 8.8 million people that TVA serves, but also to position TVA to move successfully into the 21st century energy environment. Further, at a time when economic crisis grips the nation, such a large-scale project could significantly improve the economic situation of millions of people in the TVA region, allow for the rapid development of

renewable energy sources, and greatly increase the energy efficiency of a significant portion of the United States.

However, it is unlikely that the modernization of TVA's generation and distribution system will occur without a Congressional commitment of some sorts. As we're sure you are aware, TVA is self funded through the sale of its electricity and has received no federal funding since 1998. Also, TVA is charged with maintaining the lowest rates possible, thereby severely restricting it's ability to take proactive measures in this regard. Given the challenges of global warming and the need for greater innovation in the electric utilities sector, I believe it may be appropriate to reconsider direct federal funding to TVA for limited research and development and deployment of energy efficiency, smart grid, and renewable energy technologies.

4. *TVA should aggressively develop all cost-effective energy efficiency programs and renewable energy resources within their region.*

TVA needs to set strong goals on renewable energy development, and create a plan to reach those goals. Energy efficiency and renewable energy development will ensure that the electricity supply for TVA is less dependent on large power plants that use imported fossil and nuclear fuels, will result in significantly lower emissions of global warming pollution and will support grid strength. Further, renewable energy development is associated with more local jobs than power generation that relies on imported fuels.

These green jobs are a major economic development activity. For example, Tennessee, Alabama and Georgia are among the top 20 states in the country with potential to add wind generation related manufacturing jobs.[101] Tennessee and Alabama alone could add over 21,000 manufacturing jobs if the U.S. pursued an aggressive national renewable energy program.[102] Tennessee also has a burgeoning solar manufacturing industry that would benefit from programs that encouraged the widespread adoption of these technologies, thereby creating further job opportunities.

Claims that the TVA region is not rich in renewable energy resources are false. According to recent estimates, today's biomass, wind, and solar technologies has the potential to achieve 20% of TVA's demand.[103] However, TVA has consistently challenged these study results by denigrating valid resource potential studies, overestimating the potential cost of developing renewable energy resources and ignoring the price trends of these technologies. The fact is that while the costs of constructing new nuclear and coal-powered generation continue to rise sharply, the costs of developing solar, wind, and other renewable resources have generally declined. These price trends raise the question of why TVA would commit to spending a now estimated $17 billion on constructing new nuclear power generation when by the time these facilities come on line (most likely in 7 to 10 years) the cost of developing solar and wind resources could be far less expensive per unit of electricity generated.

TVA's efforts to implement effective energy efficiency programs has also been lackluster. If the TVA adopted energy efficiency programs with a goal of being a national leader (as stated in TVA's recent strategic plan), it could use energy efficiency to meet a significant percentage of its projected annual growth. In contrast to this potential, in 2005-06, the Tennessee Valley Authority

and its distributors achieved energy savings of 0.04% of annual sales. Compared to peer utilities, the TVA is at the "back of the pack." Leading utilities are achieving energy savings of 0.4% to well in excess of 1% of annual sales. Figure 5 shows how TVA compares with other utilities in energy efficiency savings.

Among the leaders are utilities from different regions of the United States, public and investor-owned utilities, utilities with high load growth and negative load growth, utilities with high rates and utilities with low rates. There is ample proof that motivated utilities can achieve high levels of energy savings using energy efficiency programs on a reliable and consistent basis.

The TVA's recent commitment to invest $99 million in energy efficiency is a good step forward in developing effective energy efficiency programs. However, the development of programs that actually reduce electricity consumption requires more than just committing monetary resources. It requires the development of programs that are specifically tailored to reduce energy consumption on both a per capita basis and overall. Also, TVA has been highly secretive of the programs they are developing and I am relatively certain that a large proportion of this money will be spent on reducing demand during peak periods, thereby not reducing overall electricity consumption, but simply shifting consumption patterns to times when demand is historically lower.

In all, TVA has not been a leader in any sense of the word with regards to either the development of renewable energy resources or effective energy efficiency programs. While enormous potential exists to reduce electricity demand through energy efficiency and to develop clean, renewable energy resources, TVA has continued with the business-as-usual approach: building more and more potentially harmful generation facilities while ignoring the opportunities that efficiency and renewable energy provide. This lack of vision and desire has the potential to severely hamper the nation's efforts to increase productivity in a carbon-constrained world.

To once again put TVA on a course towards being a leader in energy innovation, Congress must either provide specific legislative goals for the development of renewable energy and energy efficiency in the TVA service territory or include TVA in any future renewable energy or energy efficiency legislation. It is entirely possible for TVA to achieve a 1% reduction in energy demand through energy efficiency measures each year and to receive 20% of its generation capacity from new renewable resources by 2025. This Committee should ensure that TVA, at a minimum, meets these goals.

Finally, a simple change to the TVA Act will send a proper signal to TVA to include energy efficiency and renewable energy in their electricity portfolio mix. Currently, the TVA Act charges TVA with ensuring that consumer *rates* remain as low as possible. However, the proper goal should be to ensure that consumer *costs* remain as low as possible. This simple change would have a significant impact on the operations of TVA. For example, if electricity costs 10 cents/kWh and a resident uses 1000 kW per month, then that resident's electricity charges are $100 month. However, if TVA enacts energy efficiency programs that raise the price of electricity to 12 cents/kWh, but the consumer only uses 800 kW/month, then while the rates have risen, the consumer's monthly costs have decreased to $96 per month while simultaneously reducing stress to the system and greenhouse gas emissions. While this is a simplified example,

it serves to illustrate the point that TVA should not be pursuing the lowest rates possible. Instead, TVA should be pursuing energy efficiency programs that reduce the overall costs to consumers.

In all, energy efficiency and renewable energy must be significant components of any utility's future energy portfolio. States are rapidly adopting legislation to require not only integrated resource planning but also minimum investments in energy efficiency and renewable energy. Further, the push for federal legislation has increased in momentum in recent years. In light of these societal changes, coupled with the growing renewable energy and energy efficiency markets, TVA must either aggressively pursue these resources, or continue to lag behind the rest of the nation.

5. *Congress should address the conflicts of interest in the TVA Act that result in TVA acting as both regulator of, and party to contract with distributors of TVA-generated electricity.*

TVA's simultaneous position as regulator and a party to contracts with wholesale distributors of TVA-generated electricity creates a conflict of interest that prohibits the proper regulation of distributors. Typically, an independent public utility commission that approves rate charges regulates a utility or electricity distributor. However, in the case of the TVA, the regulatory authority is coupled with contractual arrangements between TVA and its distributors for the sale and distribution of TVA-generated electricity. This places the organization in an inherent conflict of interest by attempting to maintain good relations with its customers while at the same time being tasked with regulating then to keep rates low and ensure proper service.

In 2006, the Office of Inspector General completed *Review of TVA's Role as a Rate Regulator.*[104] That report concluded: "We believe there is an increasing inherent conflict in TVA serving as a regulator while working to ensure good customer relations."[105] The report further notes that there are no formalized guidelines or specific criteria related to when rate adjustments should be disallowed.

Further, in a September 2008 report by the TVA Office of Inspector General, the issue was once again raised of the conflict of interest between TVA's customer service relations and its role as a regulator:[106]

> The TVA act places the organization in a situation of inherent conflict attempting to maintain good relations with its customers while at the same time being tasked with regulating them to keep rates as low as feasible. . . The fact that it took TVA over two years to respond to our [2006] report suggest that magnitude of the problem. The TVA act gives the Board authority to include terms and conditions in power contracts as needed to carry out the purposes of the Act, which include keeping rates as low as feasible. Pursuant to this authority, most power contracts include, in addition to a required nondiscriminatory provision, terms and conditions related to resale rates, use of revenues, and financial and accounting requirements. It remains to be seen as to whether or not TVA can manage this increasing conflict. When Congress enacted the TVA Act creating TVA, it could not have foreseen the current circumstances that

> compromise TVA's integrity as a regulator. It is likely that the increasing demands of distributors upon TVA will increase the conflict for TVA.[107]

The report further notes the likelihood of the problem growing worse in the future.

> In recent years, distributors have begun to see options to purchase power from companies other than TVA. The restrictions on TVA selling power outside the Valley, however, remain unchanged. Because TVA cannot obtain new customers outside the valley, TVA has a strong incentive to take steps to ensure it retains its current customers. As competition becomes more and more a reality, this incentive grows. This compounds the difficulty for TVA being an objective regulator of these customers.[108]

Congress must address this conflict of interest to allow for proper regulations of distributors and effective contractual agreements between distributors and TVA. Otherwise, as competition between TVA and outside generators of electricity grows, TVA will grow more and more at the mercy of the distributors for which it is charged with regulating.

Conclusions:

I would like to thank Chairman Boxer and Members of the Committee for holding these hearings. It is a critical first step towards greater environmental protections for us and future generation of Americans, as well as the beginning of a process that I sincerely hope will result in the Tennessee Valley Authority becoming this nation's living laboratory, leading the way towards a clean and sustainable energy future. I am deeply committed to working towards the success of both of these goals and am happy to answer any questions that you may have now or in the future.

Thank you.

Stephen A. Smith, DVM
Executive Director
Southern Alliance for Clean Energy

Figure 4: TVA Board Members and CEO:
Source: TVA website at: http://www.tva.com/abouttva/board/members.htm

Chairman William B. Sansom of Knoxville, Tenn., is chairman and chief executive officer of The H.T. Hackney Co. and has held that position since 1983. Hackney is a diversified company involved in wholesale grocery, gas and oil, and furniture manufacturing. His term expires May 18, 2009.

Dennis Bottorff of Nashville, Tenn., serves as chairman and partner of Council Ventures, a venture capital firm. He was chairman of AmSouth Bancorporation in Nashville until his retirement in 2001 and previously was chief executive officer of First American Bank. His term expires May 18, 2011.

Don DePriest of Columbus, Miss., is chairman of a venture capital firm headquartered in Alexandria, Va. The firm has founded or invested in such companies as American Telecasting, now merged with Sprint; his Charisma Communications Corp. was a pioneer in the cellular phone business. He previously chaired the Columbus, Mississippi, Utilities Commission. His term expires May 18, 2009.

Mike Duncan of Inez, Ky., is chairman, chief executive officer, and director of Community Holding Co.; chairman, CEO, and director of Inez Deposit Bank; and Chairman of the Republican National Committee. He is a director of the regional Center for Rural Development. His term expires May 18, 2011.

Tom Gilliland, of Blairsville, Ga., recently retired as executive vice president, general counsel and secretary of United Community Banks Inc. He is a former chief of staff to Georgia Lt. Gov. Pierre Howard and served as chairman of the Stone Mountain Authority under Georgia Govs. Roy Barnes and Sonny Perdue. His term expires May 18, 2011.

William Graves of Memphis is presiding Bishop of the Christian Methodist Episcopal Church. He was previously pastor of the Phillips Temple CME Church of Los Angeles, Calif. He is the immediate Past President of the Board of the National Congress of Black Churches and a former member of the board of Memphis Light, Gas & Water. His term expires on May 18, 2012.

Howard Thrailkill of Huntsville, Ala., recently retired as president and chief operating officer of Adtran, Inc., in Huntsville, which supplies equipment for telecommunications service providers and corporate end-users. Previously, he was president and chief executive officer of the firm Floating Point Systems. His term expires May 18, 2010.

President and CEO Tom Kilgore previously served as President and CEO of Progress Energy Ventures, a subsidiary of Progress Energy Company, and as Senior Vice President of Power Operations for Carolina Power & Light (which became Progress Energy).

Figure 5: TVA ranks near the bottom in terms of energy efficiency savings compared with utilities from across the nation.

Utility		Savings	Sales		Growth
(1)	Massachusetts Electric	1.60%	12,990,328	(27)	-15%
(2)	PG&E	1.32%	76,817,131	(8)	7%
(3)	Edison International	1.31%	78,863,143	(7)	6%
(4)	Connecticut Light & Power	1.09%	22,109,070	(19)	-7%
(5)	Puget Energy	0.81%	21,091,533	(20)	4%
(6)	Sacramento Municipal Utility	0.75%	10,799,230	(30)	4%
(7)	Alliant Energy	0.72%	26,605,902	(15)	0%
(8)	MidAmerican Energy	0.60%	23,389,319	(18)	5%
(9)	Sierra Pacific Resources	0.51%	29,827,109	(13)	3%
(10)	Long Island Power Authority	0.46%	18,353,670	(22)	-4%
(11)	IDACORP	0.41%	13,939,314	(25)	5%
(12)	Xcel Energy	0.41%	86,584,655	(5)	2%
(13)	PacifiCorp	0.34%	51,797,336	(9)	5%
(14)	Hawaiian Electric Industries	0.30%	10,115,832	(31)	1%
(15)	PSE&G	0.21%	34,354,438	(10)	-2%
(16)	FP&L	0.19%	103,652,914	(4)	2%
(17)	FirstEnergy	0.15%	31,711,206	(11)	-1%
(18)	TECO Energy	0.14%	19,025,064	(21)	1%
(19)	Salt River Project	0.12%	26,249,636	(16)	7%
(20)	Wisconsin Energy	0.12%	28,855,158	(14)	-2%
(21)	Consolidated Edison	0.09%	26,100,714	(17)	-11%
(22)	New York Power Authority	0.07%	14,887,670	(23)	-1%
(23)	E.ON	0.05%	30,661,216	(12)	-2%
(24)	Progress Energy	0.04%	82,723,457	(6)	-1%
(25)	**Tennessee Valley Authority**	**0.04%**	**163,587,097**	**(1)**	**1%**
(26)	UniSource Energy Corp	0.02%	10,812,839	(29)	4%
(27)	AES	0.02%	14,715,841	(24)	-3%
(28)	Santee Cooper	0.01%	11,616,626	(28)	1%
(29)	Southern Company	0.01%	161,333,527	(2)	4%
(30)	Pennsylvania Electric	0.01%	13,577,726	(26)	2%
(31)	Duke Energy	0.01%	125,416,094	(3)	0%

Source: Data collected from the Energy Information Administration Form 861, 2005-2006.

APPENDIX 1:

Independent Sampling Results for Heavy Metal Concentrations at Sites in Proximity t the December 22, 2008 TVA Coal Ash Spill

Appendix 2:

EPA's March 5, 2000 Regulatory Determination on Wastes from Combustion of Fossil Fuels

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