THE TENNESSEE VALLEY AUTHORITY'S KINGSTON ASH SLIDE AND POTENTIAL WATER QUALITY IMPACTS OF COAL COMBUSTION WASTE STORAGE

(111–19)

HEARING

BEFORE THE

SUBCOMMITTEE ON
WATER RESOURCES AND ENVIRONMENT

OF THE

COMMITTEE ON
TRANSPORTATION AND
INFRASTRUCTURE
HOUSE OF REPRESENTATIVES

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March 27, 2009

SUMMARY OF SUBJECT MATTER

TO: Members of the Subcommittee on Water Resources and Environment

FROM: Subcommittee on Water Resources and Environment Staff

SUBJECT: Hearing on "The Tennessee Valley Authority's Kingston Ash Slide and Potential Water Quality Impacts of Coal Combustion Waste Storage"

PURPOSE OF HEARING

On Tuesday, March 31, 2009, at 2:00 p.m., in Room 2167 Rayburn House Office Building, the Subcommittee on Water Resources and Environment will receive testimony from representatives from the Tennessee Valley Authority (TVA), the United States Environmental Protection Agency (EPA), the Tennessee Department of Environment and Conservation, Duke University, and other interested parties. The purpose of this hearing is to investigate the potential causes of the coal ash spill at the TVA's Kingston Fossil Plant, the response and cleanup, as well as receive information on potential water quality implications from the ash spill.

This hearing is being conducted as one of several hearings that meet the oversight requirements under clauses 2(n), (o), and (p) of Rule XI of the Rules of the House of Representatives.

BACKGROUND

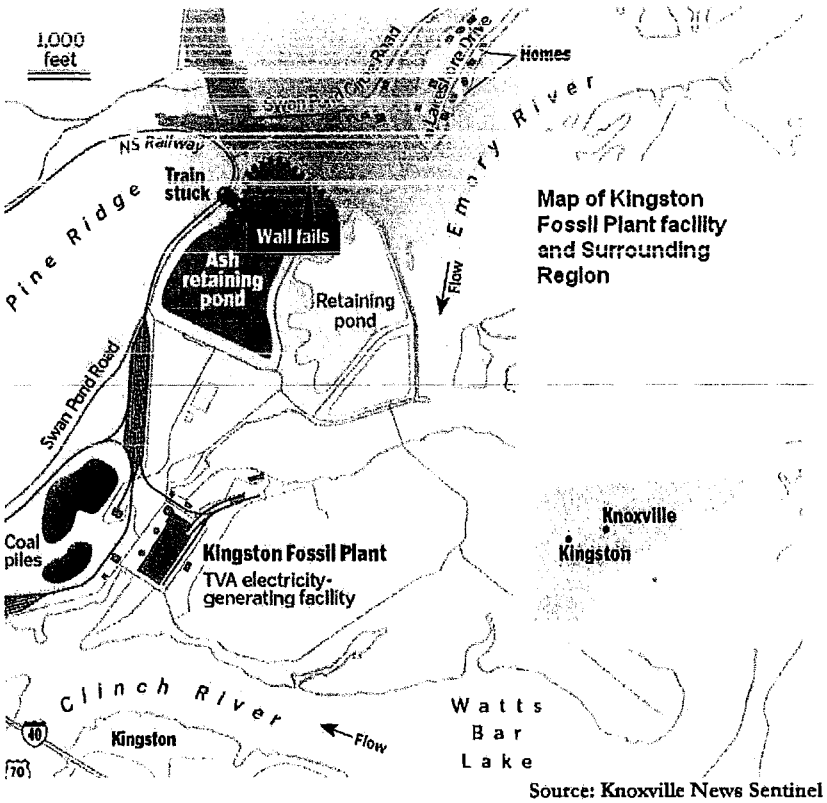
This memorandum summarizes the coal ash spill at TVA's Kingston Fossil Plant, the response and cleanup, and any potential water quality and public health implications.

The Kingston Fossil Plant is a coal-fired power plant located in Harriman, Tennessee, 40 miles west of Knoxville, Tennessee. It is owned and operated by TVA. The facility is located at the confluence of tributaries of the Tennessee River: the Clinch and Emory Rivers. It is one of TVA's larger fossil fuel-fired power plants and produces 10 billion kilowatts per year (enough to supply power for 670,000 households). At full power, the Kingston Fossil Plant burns about 14,000 tons

of coal every day. This results in about 1,000 tons of fly ash produced. The plant was completed in 1955.

Kingston Fossil Plant Ash Spill

At 1 a.m., on Monday, December 22, 2008, a retaining wall failed at a coal ash retention pond at TVA's Kingston Fossil Plant. The breach in the retaining wall resulted in the release of 5.4 million cubic yards of ash and 327 million gallons of water onto land adjacent to the plant, as well as into the nearby Clinch and Emory Rivers. In terms of actual coverage on the land, over 300 acres have been affected by sludge, at points up to six feet deep. According to the Tennessee Department of Environment and Conservation (TDEC), over 5,000,000 cubic yards of coal ash were deposited into the Emory River and Emory River embayments. The Swan Pond Embayment was largely filled with coal ash. Approximately 110,000 cubic yards were deposited on the ground surface.



Source: Knoxville News Sentinel

The EPA noted that the initial release of materials from the plant's retention pond "created a tidal wave of water and ash." While the ash spill rendered three homes uninhabitable and damaged the property of 42 property owners, most of the affected land area impacted by the spill is located on property managed by TVA. Immediately after the spill, a nearby community was evacuated. In addition, power to surrounding communities was disrupted, a major gas line and a water main were ruptured, and nearby transportation routes (rail and road) were covered with the ash. No serious injuries were reported.

Coal ash is a byproduct of burning coal to produce energy. Coal ash can consist of a number of different types of ash, and can be found in either a powder or granular form. Fly ash is collected by air pollution control equipment at the power plant, and bottom ash is collected from the plant's boiler. The ash is dusty and is often made wet to limit releases into the air. The composition of coal ash is a function of the feedstock coal, minerals, and limestone (if added for pollution control purposes) used. Based on these ingredients, the coal ash largely consists of different oxides of metals and minerals produced during the combustion process, including silica dioxide, aluminum oxide, iron oxide, calcium oxide, and magnesium oxide. As a result of the combustion process, coal ash also contains heavy metals that are often concentrated at higher levels than found in coal. Metals that may be found in coal ash include arsenic, beryllium, cadmium, chromium, lead, selenium, thallium, and vanadium. These substances are found in the natural environment and, depending on the levels present, can be benign. However, these substances can also be harmful to human health under certain conditions and through certain pathways, such as ingestion, inhalation, and, in some circumstances, on contact.

Coal ash is stored in either a wet or dry form. Wet coal ash is typically placed in coal ash impoundments (retention facilities for wet coal ash are interchangeably referred to as lagoons, surface impoundments, or retention ponds) that are meant to serve as holding areas for wet coal ash, until they are dried and capped. Coal ash impoundments can also be subsurface or above grade. In the latter, the coal ash is stored behind constructed retaining walls. The Kingston storage facility in question was a wet storage facility, often referred to as a surface impoundment. Dry coal ash is either disposed of in a retention facility or landfill, or is beneficially reused. Beneficial reuses can include being used for concrete or structural fill, among others. Coal ash retention sites may be lined or unlined. Unlined facilities may leach of materials, including toxic metals, from coal ash into the surrounding environment. The Kingston Fossil Plant retention pond that failed did not have an artificial liner at the time of failure.

The coal ash retention pond that failed is one of three at the Kingston power plant facility. Coal ash was taken from the power plant boilers, combined with water to make a slurry, and eventually deposited in the retention site. The Kingston surface impoundment was regulated by the State of Tennessee as a Class II Industrial Landfill. At the Kingston facility, water from the site was ultimately discharged into a nearby water body, pursuant to a Clean Water Act discharge permit.

At this point in time, the cause of the breach in the retaining wall is unclear. Soon after the event, TVA officials stated that recent heavy rains in combination with freezing temperatures may have played contributing roles. The source of the failure remains under investigation.

The ash storage facilities at the Kingston Fossil Plant were visually inspected by TVA personnel on a daily basis. Quarterly solid waste inspections were conducted by State of Tennessee personnel in accordance with State of Tennessee permitting requirements. In addition, inspections

were conducted on a quarterly basis by TVA staff to identify any seepage issues. The most recent quarterly inspection of the retention wall took place in October 2008. A 2003 TVA Status Update report for ash disposal at the Kingston facility states, "Fossil Engineering has determined that there are no dredge cell dike stability issues as long as seepage remains clear and flow does not increase."[1] A preliminary report from that inspection showed that a "wet spot" was found, indicating "a minor leaking issue." In 2005, following another breach in November, 2003, TVA considered lining the facility, but chose not to. According to the 2003 TVA Status Report, installation of a synthetic liner would have cost $5 million.

Response and Cleanup

Overview: TVA initially estimated the spill volume was 1.8 million cubic yards. However, following an aerial survey, that estimate was increased to 5.4 million cubic yards. At the time of the collapse the impoundment held about 9.4 million cubic yards of material. Prior to the release, the surface area of the impoundment was 84 acres. The failure of the retaining wall, or dike, resulted in 60 of these acres giving way.

Multiple federal, state, and local agencies are currently involved in recovery and cleanup operations. TVA is the lead federal agency involved in cleanup and long-term recovery. TDEC is overseeing cleanup and investigative activities at the site, and conducting independent environmental sampling. As part of the recovery efforts, TDEC has developed and implemented a sampling plan for surface water, drinking water, and soil and air monitoring. EPA is providing technical support to TVA and TDEC and is also overseeing the response. The Tennessee Department of Health is working with TDEC to evaluate environmental samples for adverse human health effects. The Tennessee Wildlife Resources Agency is conducting fish and wildlife surveys in the immediate area, including fish tissue monitoring. Roane County is also providing a variety of services for residents and for the cleanup.

TVA is currently working with individuals and families affected by the ash spill. TVA community liaisons have been assigned to individuals and families to address concerns.

EPA has provided notice to TVA that it considers the spill to be an unpermitted discharge of a pollutant in contravention of the Clean Water Act. TDEC, through its authority to run Tennessee's Clean Water Act program, issued an enforcement order against TVA on January 12, 2009. It is currently evaluating the issuance of a subsequent order that will address damages and natural resource damages as a result of the spill.

TVA estimates that near-term cleanup costs for the Kingston ash spill will range between $525 million to $825 million. According to TVA, the range of costs is driven by the method of ash disposal assumed. This estimated cost range does not include additional costs stemming from regulatory actions, litigation, or long-term environmental remediation.

Initial Response and Cleanup: TVA and the Roane County Office of Emergency Management and Homeland Security responded immediately after they were notified of the spill. By December

[1] Emphasis included in original.

23, 2008, a Unified Command consisting of federal, state, and local agencies was established in the nearby community of Harriman to begin recovery and cleanup operations.

TVA initially cleared ash sludge from rail and road transportation routes in the area. Removed material was stored at one of the intact retention ponds at the Kingston facility. TVA, working with the Army Corps of Engineers, has installed two weirs in the Emory River. These weirs are designed to contain the further movement of coal ash into and through the local water environment downstream, especially during rain events.

Short-term Cleanup: TDEC and EPA have recently approved TVA's Corrective Action Plan (CAP). The CAP contains short-term management actions that TVA will conduct to address the spill. Among these are: removing ash and debris from the main channel of the Emory River and the mouth of the Swan Pond Embayment; addressing scouring concerns of a dike supporting another coal ash retention pond; dewatering dredged ash; storing recovered ash temporarily; and managing surface water-run off and drainage from the coal ash spill.[2]

TVA recently began work on Phase 1 of its dredging plan to remove ash and debris from the main channel in order to reopen the Emory River channel for flow, to reduce potential flooding risks, to improve water quality, and to mitigate impacts to aquatic habitat and ecosystems. Future work will be addressed in Phase 2 of dredging to address water quality and sediment quality issues as well as return the channel to its original depths.

Long-term Cleanup: TVA is currently initiating plans to evaluate alternative long-term actions for final removal and disposition of the spilled ash that is not in the Emory River: i.e., the ash that spilled onto the surrounding land. In the CAP, TVA states that alternatives for ash removal include moving it to alternate locations on the Kingston Fossil Plant property, as well as finalizing and implementing the Closure Plan for the failed coal ash impoundment. TVA is currently searching for and evaluating long-term storage options for the ash from the ash spill. Options include disposing of it in existing landfills, creating new landfills, and disposing it in underground mines, or capping surface mine sites, among other uses.

TVA has committed to ceasing wet ash storage in the failed impoundment. The impoundment will be closed and capped. Because the root cause of the impoundment failure has not yet been identified, and subsurface investigations are ongoing, the closure plan is still conceptual. TVA is considering one option that would involve the construction of a dry ash landfill within the permitted footprint of the failed impoundment, subsequently capping the ash with soil and ultimately closing the dry ash storage landfill.

In the CAP, TVA states that the closure option would require a replacement for the failed dike as well as possible reinforcements for the remaining dikes, and caps for the entire footprint of the permitted impoundment.

TVA has not indicated how it plans to address the coal ash that spilled into, and largely filled the Swan Pond Embayment.

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[2] Changes in the river flow due to the new ash deposits, as well as the construction of one of the weirs, could result in the scouring and subsequent weakening of a dike at the base of one of the retaining walls for the one of the impoundments. TVA has indicated that initial engineering recommendations are to utilize riprap to reinforce the dike.

Future Management of Future Ash Production: Power generation at the Kingston Fossil Plant has continued since the December 22, 2008 coal ash spill. TVA is considering the installation of equipment that would enable the fly ash from Kingston to be collected dry. This would allow for more flexible marketing and disposal options, and would also reduce the size of ash retention structures. In the CAP, TVA states that if the decision is made to convert to dry collection, the time from project start to completion would be expected to take 18 to 24 months.

According to TVA, if the quality of the ash meets the Tennessee Department of Transportation's specifications, it could be used as a cement replacement for road projects. If it does not meet these specifications, reuse of the ash in concrete would only be possible with additional processing.

Other options for managing the fly ash would include placement in offsite landfills, use in offsite structural fill projects, permanent placement in mine reclamation projects, and use as cover material at other landfills.

Environmental Quality and Public Health Implications

The coal ash at the Kingston Fossil Plant site has the potential to cause a number of environmental and human health impacts. As noted earlier, coal ash contains a number of constituents that could be harmful to human health at certain exposure levels. Areas of water quality concern include contamination of private drinking water wells, and uptake of contaminated water into drinking water intakes located on the Clinch and Emory Rivers. Coal ash in the river water and in bottom sediments could result in aquatic ecosystem impacts. Surface water quality may be impaired due to the presence of the ash itself, as well as constituents contained within. Contact with, or ingestion of, ash or contaminated soil on the land could result in health effects. The spilled ash may also present an air quality concern. Upon drying, the coal ash could become airborne. Inhalation or exposure to this material could cause harm.

TVA, EPA and TDEC continue to sample water, air, soil, and ash quality. On March 5, 2009, the TDEC, the Tennessee Department of Health, and the EPA held a public meeting for the residents of Roane County. According to TVA, officials at the meeting reaffirmed that: public and private water supplies are not impacted by the ash; occasional exposure to the coal ash should not be a health hazard; and the amount of particulate matter and metals in air meet all standards and are below levels of health concern.

According to TVA, water-based recreation on the Clinch and Tennessee Rivers should continue as usual this season, without impact from the ash spill. However, TVA and the Tennessee Department of Health are warning the public from contact with the lower Emory River waters. Navigation, including the use of recreational boats, is limited on the Emory River, near the Kingston Fossil Plant. Boaters have been instructed to avoid this area.

EPA, TDEC, and TVA have conducted water quality sampling of public drinking water supplies, private wells, river water, water from nearby springs, as well as fish tissue sampling. Testing by these agencies has not found any drinking water standard exceedances treated drinking water or private wells. TDEC has detected aluminum, cadmium, copper, iron, and lead in river

water at levels that exceed Tennessee's water quality criteria for the protection of fish and aquatic life. As of March 5, 2009, TDEC detected arsenic in five samples in the Emory River at levels above Tennessee's standards for domestic water supplies. TDEC notes, however, that no drinking water intakes exist in the areas where these samples were taken. TDEC has also detected mercury in four samples at various locations (above and below the spill site) at levels above Tennessee's criteria for fish tissue for human consumption.

The Tennessee Wildlife Resources Agency has advised, until further notice, that fishing should be avoided in the lower section of the Emory River. Fish advisories are also in affect on parts of the Clinch River. Fish tissue samples have been collected to determine whether concentrations of metals associated with ash, such as selenium, mercury, cadmium and lead, have accumulated in the tissues. TDEC has not yet received results from the initial analyses. On the Clinch River, a fish consumption advisory has been issued that limits the consumption of particular fish species, including striped bass, catfish, and sauger. Fish tissue sampling will continue on a semi-annual basis.

EPA, TVA, and TDEC have tested soil and ash samples. The Tennessee Department of Health has indicated that, based on existing sampling results, there should not be adverse health effects from occasionally ingesting the ash. TDEC is currently encouraging the avoidance of contact with the spilled coal ash. TDEC also notes that occasional exposure for brief periods of time should not pose a threat. All three agencies have consistently reported no exceedances in the soil samples they have taken. TDEC and EPA have identified levels of arsenic in the ash that exceed actionable levels.[3] TVA's ash testing identified arsenic levels higher than the average concentrations found in Tennessee soil. TDEC also identified some radioactive materials in the ash, but does not believe that the levels are sufficient to adversely affect public health or the environment.

EPA, TVA, and TDEC have all conducted air sampling around the coal ash spill site. TDEC has instructed TVA to take action to prevent, to the extent possible, the ash from becoming airborne. TVA has responded by laying straw over the ash, seeding the ash in the hopes of growing grass or other ground-cover, applying an encrusting agent to the ash, spraying the ash with water, and washing the wheels of trucks leaving the site. TVA reports that more than 11,300 mobile air sample have been collected by various agencies. All sample results have been within EPA's standards for particulate matter.[4] While some metals have been detected at very low levels, the Tennessee Department of Health has indicated that these levels do not cause health concerns.

Timeline

The following is a timeline developed by Water Resources and Environment Subcommittee staff and includes significant events and milestones since the December 22, 2008 Kingston coal ash spill.

December 22, 2008: Kingston Fossil Plant coal ash storage surface impoundment fails.

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[3] EPA's testing of ash identified levels that exceed EPA's Removal Action Levels (RAL). Exceedance of RAL can require critical response actions. TDEC identified levels of arsenic in the 30-70 parts per million (ppm) range. The State of Tennessee's cleanup guidance criteria for arsenic is 20 ppm for residential soil, and 40 ppm for industrial soil.
[4] National Ambient Air Quality Standards for particulate matter (PM10) are applied.

December 22, 2008:	Recovery operations begin.
December 23, 2008:	Consisting of EPA Region 4, TVA, Roane County Emergency Management Agency, Tennessee Emergency Management Agency, TDEC, Tennessee Department of Health, and the U.S. Coast Guard, a Unified Command is established, and is intended to coordinate the federal, state, and local response to the coal ash spill.
January 1, 2009:	Joint Information and Operations Center (JIC) was established at the Roane County Emergency Management Agency (EMA) facility. The JIC coordinates and provides information from Roan County EMA, EPA, TVA, TDEC, and other Tennessee agencies.
January 11, 2009:	The JIC discontinued operations at the Roane County EMA facility. TVA's Outreach Center is planned to continue uninterrupted through the remainder of the cleanup to provide community outreach and address long-term, cleanup related concerns and issues.
January 11, 2009:	EPA formally transfers the Lead Federal Agency to TVA for cleanup.
January 12, 2009:	Commissioner of TDEC, James Fyke, orders TVA to prepare a Corrective Action Plan (CAP) in 45 days. The CAP is intended to detail the steps TVA will take to cleanup the site, and ensure safe operations in the future. The order formalized the state of Tennessee's oversight of cleanup activities, required information be provided on the cause of the release, as well as regarding the stability of other TVA sites in Tennessee. The order also required TVA's cooperation with the state in supporting independent assessments and inspections at Kingston and other TVA coal-waste sites around Tennessee.[5]
February 4, 2009:	TVA, in response to the Commissioner's January 12, 2009 Order, delivered required documents on: Annual Inspections, Ash Pond, Ash Stacks, Brown Book, Gypsum Pond, Rainfall Data, Storm water Permit, Use of Coal Combustion By-Product as Engineered Fills, and assorted engineering documents.
February 5, 2009:	TVA submitted initial proposed plans to TDEC for Emory River Dredging Phase I; Health and Safety Accident Prevention during dredging activity; and Coal Ash Processing and Temporary Storage Facility. TDEC reviews and advises TVA to submit revised plans.
February 23, 2009:	TVA submitted a revised Phase I Emory River Dredge Plan in response to comments on an earlier plan from TDEC, EPA, the U.S. Corps of Engineers, the U.S. Fish and Wildlife Service and the Tennessee Wildlife Resources Agency.

[5] TDEC has noted that, to date, TVA has met the deadlines for submitting information required by the order.

February 25, 2009:	TVA submitted a revised request to establish a temporary ash storage facility on site at the TVA Kingston Fossil Plant in response to comments on an earlier request from TDEC and the U.S. Army Corps of Engineers.
March 2, 2009:	TVA submitted CAP to address the ash slide at the TVA Kingston Fossil Plant site. TDEC receives CAP. TDEC approves interim plan for temporary ash storage facility.
March 2, 2009:	TVA submitted an interim plan to address drainage and storm water issues for the ash containing area around the TVA Kingston Fossil Plant site.
March 2, 2009:	TDEC approves revised interim plan for temporary ash storage facility.
March 2, 2009:	TDEC approves revised Phase I Dredge plan.
March 5, 2009:	Roane County Community meeting (presentations by TDEC, EPA, Tennessee Department of Health, and Agency for Toxic Substances and Disease Registry).

TVA has not provided a date when it expects cleanup operations to conclude.

WITNESSES

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HEARING ON THE TENNESSEE VALLEY AUTHORITY'S KINGSTON ASH SLIDE AND POTENTIAL WATER QUALITY IMPACTS OF COAL COMBUSTION WASTE STORAGE

Tuesday, March 31, 2009

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

The Subcommittee met, pursuant to call, at 2:00 p.m., in Room 2167, Rayburn House Office Building, the Honorable Eddie Bernice Johnson [Chairwoman of the Subcommittee] presiding.

Ms. JOHNSON. I would like to call the Subcommittee to order. This afternoon we will be holding a hearing on the Tennessee Valley Authority's Kingston Ash Slide: Potential Water Quality Impacts of Coal Combustion and Waste Storage.

We are aware that on December 22nd of last year a retaining wall collapsed at a coal ash storage facility at the Tennessee Valley Authority's Kingston Fossil Plant. The U.S. Environmental Protection Agency described what happened next as a "tidal wave of water and ash that crashed down on the local community and into nearby rivers."

Unfortunately, this description is really not an exaggeration. Over 5.4 million cubic yards of coal ash sludge were released. Over 100,000 cubic yards were deposited on the land, resulting in the destruction of three homes and damage to dozens of other properties. Sludge was spread across over 300 acres, at points over six feet deep. Over five million cubic yards ended up in the local river systems.

I have heard the concern that this oversight hearing on the Kingston ash spill is just a backhanded effort to discontinue the use of coal as a power source. I reject that out of hand. That is simply not true. This hearing is both about the impacts of over five million cubic yards of coal ash sludge being swept into a community and river, and an investigation about how this could ever have happened. It is also about the environmental practices put in place by a Federal entity and about what other Federal and State agencies did to ensure they were robust.

This Committee and Subcommittee have a constitutional obligation to oversee the agencies within their purview. I do not take lightly any suggestion that this hearing is a front for some other agenda. When your drinking water is threatened with leeching and poisoning, from both arsenic and mercury it is not a play situation.

It is important to note that scrutiny should fall not just on the TVA with regards to this ash spill. The U.S. Environmental Protection Agency and the State of Tennessee also have an obligation to be vigilant in protecting the environment. More importantly, they must show that they are overseeing the cleanup and response effectively. EPA, especially, has a duty to provide oversight of both the actions of TVA and the State of Tennessee.

The December 22nd coal ash spill really has had consequential impacts on the lives of nearby residents, as well as on the local environment. It also served as a wake up call to the Congress. It has raised questions not only about the storage of coal ash generally, but also about the Tennessee Valley Authority itself. This Subcommittee held a host of hearings on a wide variety of subjects last year, but we did not hold any on the Tennessee Valley Authority. We should have.

In fact, it has been nearly a decade since the Committee held hearings focused solely on the Tennessee Valley Authority. That oversight regarding oversight ends today. As a result, we might be having oversight hearings now every 30 to 60 days. This hearing is just a first in a series that will evaluate the Tennessee Valley Authority and various elements of its mission. I have full faith that both the board and the management of the Tennessee Valley Authority will join me in ensuring that from this point on TVA will become a model agency; both in terms of its mission to the Tennessee Valley region, and also in terms of environmental stewardship.

I thank you for attending this important hearing and I look forward to hearing our witnesses. I now recognize our Ranking Member, Congressman Boozman from Arkansas.

Mr. BOOZMAN. Thank you very much, Madam Chair. Today this Subcommittee begins its review of the potential water quality impacts of coal ash storage, specifically the December 22nd, 2008 incident at the Tennessee Valley Authority power generation facility in Kingston, Tennessee.

This hearing continues what is becoming an all too familiar refrain from the Committee on Transportation and Infrastructure regarding the declining state of our Nation's infrastructure. While public and private utilities have safely operated approximately 600 coal ash sites for decades with only a few documented failures, it is important to recognize that this spill directly impacted more than 40 property owners. Homes were rendered uninhabitable. Water mains and gas lines ruptured. Nearby neighborhoods had to be evacuated. Thankfully, no one was hurt and it is my sincere hope that what has occurred at the Kingston coal ash disposal site was an isolated incident.

Since the spill, it has become evident that the Tennessee Valley Authority and the Tennessee Department of Environment and Conservation must do a better job of inspecting coal ash storage facilities. Indications of small leaks at the Kingston facility were detected as far back as 2003, yet it is unclear what corrective actions took place to reinforce the dikes that impound the coal ash.

I would like to hear the witnesses elaborate on what steps were taken between 2003 and the date of the spill to strengthen the impoundment structure. In this case, an ounce of prevention may

have proven to be a pound of cure. Had the Tennessee Valley Authority and Tennessee Department of Environment and Conservation taken corrective action and made a minimal investment at that time of the initial leak then perhaps we would not have had almost an $850 million problem.

I believe the Tennessee Valley Authority has traditionally been a good steward of the environment and one of the more accountable Federal agencies. After all, most of its employees including CEO Tom Kilgore reside within the Tennessee Valley Authority and are all directly impacted by the actions taken by the agency.

It appears this spill is a failure of the Tennessee Valley Authority and the Tennessee Department of Environment and Conservation to adequately inspect the Kingston facility and take the appropriate corrective action. Additional laws or Federal regulations would probably not have prevented this terrible accident. New laws and regulations will not replace homes, family treasures, heirlooms, and other personal property lost as a result of the Kingston spill.

Even if coal ash were regulated under Subtitle C of the Resource Conservation and Recovery Act, it is unlikely this spill would have been prevented. In fact, the Environmental Council of the States recently reiterated its position that the States, not the Federal Government, should be responsible for the regulation of coal ash as a nonhazardous waste. The Clinton Administration in May 2000 determined that fossil fuel combustion waste should not be regulated as hazardous waste. In addition, in 2006, the EPA also determined that mercury is retained by the resulting coal combustion residues and is unlikely to be leeched at the levels of environmental concern.

When managed properly, coal combustion waste can be beneficially reused for construction materials used in our highways, bridges, buildings, and other infrastructure projects. This reuse has resulted in significant economic, social, and environmental benefits. However, this is little comfort for those property owners impacted by the Kingston spill who have sacrificed a great deal and in some cases have forfeited their homes and other irreplaceable memories to this accident.

I thank you, Madam Chairwoman, for holding this hearing and I look forward to the testimony of the witnesses. I yield back.

Ms. JOHNSON. Thank you very much. The Committee now recognizes a distinguished Member of this Full Committee and former Chair of this Subcommittee, Mr. James Duncan.

Mr. DUNCAN. Thank you very much, Madam Chairwoman. Thank you for calling this hearing. I am sorry I had another appointment and didn't get here in time to hear your opening statement. I did hear most of the statement by the Ranking Member, Mr. Boozman, and that was a fine statement. I want to welcome our former Member, my friend Lincoln Davis, who is such an outstanding Member. We worked together closely on many, many things.

This spill is not in my district but it was close enough that, like all people in east Tennessee, I had a lot of concerns about it. I did go down and take a helicopter tour and met with all of the officials who were working on it. I do understand that at one point it said

that TVA was spending over $1 million a day to take corrective action. I don't know how much they have spent since that first story came out but it does seem to me that TVA is doing everything possible to try to rectify this situation and make sure that it doesn't happen again. I do think that TVA has among the finest leadership that the agency has ever had, contrary to the impression I think some people have tried to leave. Certainly no one in TVA and particularly those at the top level wanted this to happen or intended for it to happen.

Everybody has been trying to, I think, treat the people who were affected as fairly as possible. In fact, I understand that 92 percent of those who were affected by this have accepted TVA's first offer. That, I think, shows that there has been a lot of fairness in this situation. Although, I have noticed that some people have dollar signs in their eyes over this and so there have been a lot of lawsuits filed. Of course, we had a New York law firm who came in and I suppose want to make a lot of money out of this. But we have got to be very careful there. We have also got to remember that 99.99 percent of the people in the Tennessee Valley would be hurt if we go ridiculously overboard or start having excessive judgements or recoveries.

Some people have tried to use this, they have been almost gleeful—some groups have—that this happened because they want to use it to promote a radical political agenda and particularly an anti-coal agenda. Coal produces over half of our energy in this country and about 60 percent of TVA's power. If we just basically do away with coal in this country, and I don't represent or have really any coal production in my district, but if we just do away with coal in this country you are going to see a doubling or tripling or quadrupling of utility bills. Who that is going to hurt, that is going to hurt the poor and the lower income and the working people most of all.

I hope that some of these groups in their glee that this has happened will stop and step back and think about how much they will hurt the poor and the lower income and the working people if we use this tragic event to promote this anti-coal agenda.

Now, having said that, I do want to make sure that everybody who is directly affected is treated as fairly as possible and is compensated for their loss. I am a little bit concerned that some people who are very far away from this spill may use this to make unjustified claims. I hope that doesn't happen.

But I am pleased that you are holding this hearing. This is a very, very unusual event and certainly has never been to this extent. I feel certain, based upon what I have been told by all the people involved, that everything possible is being done to make sure that an event like this never happens again. Thank you very much, Madam Chairwoman.

Ms. JOHNSON. Thank you very much. I would ask everyone that has opening statements to submit them for the record so that we can go right to our first panelist, Mr. Lincoln Davis of Tennessee. He represents the district where the coal ask spill occurred so we will value his insights on this issue. Consistent with Committee practice, this panel will be dismissed at the conclusion of Congressman Davis's testimony. Your full statement will be placed in the

record. If you can stay within five minutes, we would appreciate it. I know that is hard.

TESTIMONY OF LINCOLN DAVIS, MEMBER, FOURTH DISTRICT OF TENNESSEE, UNITED STATES CONGRESS

Mr. DAVIS. Let me say, it is good to be back in the Committee room where my first two terms were spent serving here on this Committee. I appreciate the great work that Chairman Oberstar and certainly Chairwoman Johnson are doing. I appreciate the opportunity to be here today to talk about the issues and the spill that occurred in the eastern part of my district. It is also a privilege to be here with Ranking Member Boozman from Arkansas and my good friend Jimmy Duncan. The area where our districts border is close to where this ash spill occurred.

Kingston, Tennessee, where the ash spill occurred, is on the eastern side of my Congressional district. I have the honor and pleasure of representing 10,000 of Tennessee's 40,000 square miles and have the fourth most rural residential Congressional district in America. I am blessed to live within some of the most beautiful mountains, overlooks, and waterways in our Nation. The valley I live in is a blessing that supports tourism and industry in Tennessee and is an inheritance that we are bound as good stewards to pass on to future generations.

On December 22nd last year when a dike at TVA's Kingston Fossil Plant broke and released over a billion gallons of coal ash into the surrounding areas, it was a major setback for landowners, for our environment, for the mission of TVA, and for the eight million rate payers who rely on the TVA for low cost electricity and service.

I have visited this site now on several occasions. Additionally, I have met with the CEO of TVA, administrators of the Environmental Protection Agency, and current Administration officials as well as local officials and constituents who are directly affected by what has occurred. In my discussions with those involved, I have come to three conclusions.

First, the cleanup will come slowly and at great cost. Second, the financial burden of setting this straight should not fall on those who have been harmed. Third, my constituents and the land they live on must be made whole again. Let me repeat that: My constituents and the land they live on must be made whole again.

When President Roosevelt established the TVA with his signature in 1933, he launched an independent agency that would help solve some of the southeast's most challenging problems. TVA reforested land, produced navigable waterways, developed fertilizer that would help reclaim eroded soil, and by 1949 delivered electricity to a million people. Today TVA serves eight times that number.

This history is well known to my constituents, as well as all across the Tennessee Valley. However, TVA's history, as with that of our Nation, is imperfect. Last December the public's trust was broken. But America's strength has never relied on an impossible standard of never making mistakes. Instead, it is our commitment to correct our failures and move forward with the promise to never

repeat our most egregious missteps that keeps America strong. This is precisely what I expect of TVA.

I have spoken with officials from this Administration and the EPA who have assured me they will stay on the ground to oversee this cleanup until it is completed to everyone's satisfaction. I have received a similar assurance from TVA that they have the means to make this right. I am pleased to hear from TVA that they have already purchased land and homes appraised at nearly $20 million. I expect that will continue.

I understand too that TVA is currently inspecting the containment dikes at its 10 other fossil plants and has hired an independent engineering company to perform an in-depth analysis of the root cause of this ash spill. I want these findings to be made public so that every rate payer and lawmaker alike can take part in our effort to ensure that this never happens again.

As a Congressman representing the spill zone, I expect two things of TVA. First, TVA must continue working closely with the Corps of Engineers, the EPA, the Tennessee Department of Environment and Conservation, and the local community to ensure that TVA is in compliance with all relevant laws. Second, they must act with complete transparency. TVA must do everything in their power to earn and regain the public's trust, including making their findings public and holding unscripted meetings with ratepayers so the voices of citizens in the spill zone can be heard.

If TVA cannot fulfill their duty to make my constituents whole, I am fully prepared as a Member of Congress to call upon our current Administration to name the EPA as the lead agency in charge of the cleanup and to appoint a czar that will hold TVA accountable. In the meantime, I take the EPA on their word that they will remain in place to see the job through. I thank them for the work they do and for being here today to speak on this important issue.

As a final note, I would like to point out that the charge we have before us first and foremost is to see Kingston cleaned up. Undoubtedly, and as we have already seen, there are those on both ends of the political spectrum who would use this spill to push their narrowly focused agenda for America's energy policy. Coal has been a part of America's economic engine for all of the years of our industrial might and will likely play a role alongside solar, wind, and other alternative energies as we work toward a cleaner world and freedom from foreign oil. To be sure, our economic and national security depend upon this. However, I would ask that as this worthwhile debate plays out we not let it distract from the pressing needs of the people in Kingston, Tennessee.

Again I want to thank the Members of Congress, Chairman Oberstar, and Chairwoman Johnson for allowing me to be here today. There is plenty of work yet undone to restore the site at Kingston and still more ahead to forge a clear path for a brighter new energy future for America. It is my sincere hope that we will continue to discuss these issues, as we are today. I have no doubt that with the efforts of committed men and women like those who have assembled here we can see these efforts come to light. Thank you for allowing me to be here today.

Mrs. NAPOLITANO. [Presiding] Thank you, Congressman Davis. A vote has been called so we are going to have to move on. But I

couldn't totally agree with you more on the cleanup issue. Thank you for taking the stance of making sure the cleanup is effected and that EPA sticks with it. I have a similar situation, so I know exactly what you may be going through. I think the PRPs, the potential responsible parties, ought to be commended if they are working with you and gone after if they are not.

Mr. DAVIS. I have had many visits in the area and met with folks. At this point in time there has been a good, open line of communication especially with our Congressional office. This is located almost on site in Rockwood, the neighboring town.

Mrs. NAPOLITANO. Well, thank you, sir for your diligence.

Mr. BOOZMAN. Madam Chair?

Mrs. NAPOLITANO. Yes, Mr. Boozman?

Mr. BOOZMAN. We would like to submit a whole bunch of written questions for you to respond to personally in your writing.

Mr. DAVIS. Could I critique some of those questions, to be sure? [Laughter.]

Mr. BOOZMAN. Well, thank you very much for being here.

Mrs. NAPOLITANO. Thank you. We will call up the next panel and begin with the first witness. Then we call a recess for the votes. We have 12 minutes left.

We have Sarah McCoin from Harriman, Tennessee; Renee Victoria Hoyos, Executive Director, Tennessee Clean Water Network in Knoxville, Tennessee; and Dr. Avner Vengosh, Professor of Earth and Ocean Studies at Duke University in Durham, North Carolina.

We will start with Ms. McCoin. You have five minutes and then we will recess. You may proceed.

TESTIMONY OF SARAH MCCOIN, TENNESSEE COAL ASH SURVIVORS NETWORK; RENEE VICTORIA HOYOS, EXECUTIVE DIRECTOR, TENNESSEE CLEAN WATER NETWORK; AND AVNER VENGOSH, PROFESSOR, EARTH AND OCEAN SCIENCES, DUKE UNIVERSITY

Ms. MCCOIN. Good afternoon, Chairwoman Johnson, Ranking Member Boozman, and distinguished Members of the Committee. Thank you for the opportunity to appear before this Committee and to discuss the TVA coal ash disaster in Harriman, Tennessee and Kingston, Tennessee, they were both affected communities, that occurred on December 22nd, 2008.

I personally am a seventh generation resident of Harriman, Tennessee. My relatives have lived at the Adkisson Farm since 1802. I am a member of the Tennessee Coal Ash Survivor Network and I am here to testify before you all today on behalf of my community, the diverse community of Harriman, Tennessee.

In this testimony, I want to express three main points. And I am approaching this Committee with a plea for your help. Firstly, TVA is not listening to us. It is as if they don't care. We need more information and increased communication. Secondly, many families fear that they are poisoning their children by remaining in their homes. They do not have the resources to pay for testing on those children. They need help; they need answers. We are hoping to obtain that. Thirdly, TVA must be held accountable for the damages they have caused.

Prior to the spill, we lived under a false sense of security. I drove past that ash pile day in and day out, never thinking anything about it, never assuming that it was dangerous. It was just a place to store coal ash. The spill changed that perspective and has left us scared and confused.

Since the coal ash spill, I have received only four documents from TVA about the status of the contamination and the cleanup efforts. The residents who were immediately impacted have been contacted by TVA about their losses and concerns. Other residents were instructed to file claims with the Outreach Center and the Property and Casualty Company. As of today, there has been little or no response to those claims.

Even more troubling is people who have not sought legal counsel from attorneys. They are just sitting and waiting. They are waiting for help and waiting for answers. TVA has held a series of public meetings but these meetings did not provide clear answers. For many, TVA has failed to adequately inform us about our property, their plans for cleanup, and the environmental risk.

TVA must rectify the disaster they created and pay for resulting damages. We agree that the coal ash must be removed from the Emory River but we fear that dredging the river will cause further leeching of toxic metals into the water and will cause more hazardous particulates to be released into the air. Further, there are inconsistencies between TVA's dredging reports and the independent testing regrading environmental risk. We cannot support this plan until the irregularities about the risk and hazards of the dredging of the river are resolved.

So far as we know, the current dredging plan is incomplete. As we understand it, the coal ash will be trucked to a temporary location where it will remain until a permanent site is identified and a facility can be built. Without Federal regulation, there are not consistent guidelines for coal ash storage and no guarantees that this time TVA will provide a permanent storage facility that will be properly lined, capped, sealed, and maintained.

Harriman, also Kingston, is now a toxic wasteland due to the lack of Federal regulation. We urge that guidelines and laws are in place so this never happens again.

There has been an influx of the number of work vehicles traveling throughout Roane County and it is expected that an additional 600 trucks plus will be traveling as part of the dredging effort. These trucks track coal ash from the loading site if they are not properly rinsed off. Then they release the ash into the air and track it into neighboring communities. We worry that this increased traffic will inevitably cause harm or death.

We are a community that hunts, fishes, and swims in the river. Harriman and Kingston residents need to be sure that it is safe for our families to recreate in and around the rivers. Several fish populations were decimated by the ash and estimates suggest that these species will not resume their original populations for at least 20 years.

Harriman is home to people who rely on the fish for their meals. This ash is in the water, in the air, and in the ground. It is consumed by the fish, the birds, the game, and the livestock. We question whether we are at risk for illness as the contamination wors-

ens as it moves up the food chain. Because of the significant lack of information from the authorities, many continue to eat the fish despite the contamination.

We have the right to know what pollutants are in our air and water, at what levels these pollutants are occurring, and at what point they have the potential for harm. However, each successive study contradicts the previous one. We need to know why these discrepancies exist. The community must be given full disclosure about what chemicals and heavy metals are in the air and in the water. We need to know how these contaminants can harm our environment.

I am trying to hurry here. I am almost done.

Coal ash inevitably entered the air prior to the spill but the problem since has increased. TVA initially promised to keep the coal ash wet to prevent air contamination. Instead they dropped sprouted rye grain and straw from helicopters in the middle of January when the temperature was around 15 degrees. There are reports that the TVA is now using Flex Terra to cover the ash but that is not enough. Too many residents are experiencing respiratory problems and other ailments which we believe are directly related to the contaminants.

Mrs. NAPOLITANO. Would you wrap it up, please, ma'am?

Ms. MCCOIN. Yes, ma'am, I will. Thank you. Let me just skip to this. We desperately need to have testing for our communities to find out whether or not our children are being poisoned. We need Federal regulation. And we need to make sure that this doesn't happen again. We have been neglected. There are people who have been satisfied but there are many who have not. Thank you.

Mrs. NAPOLITANO. Thank you for your testimony. I am sure there will be questions addressed to you when the Members return. With that I will recess for the votes. We have five minutes to get to the vote. Thank you.

[Recess.]

Ms. JOHNSON. [Presiding] The Committee will resume its hearing. We apologize for having to interrupt the testimony. It happens pretty frequently around here. We want to thank Ms. McCoin who finished her testimony and move right to Ms. Renee Victoria Hoyos.

Ms. HOYOS. Good afternoon, Chair Johnson, Ranking Member Boozman, and distinguished Members of the Committee. Thank you for this opportunity to speak to you today.

My name is Renee Victoria Hoyos. I am the Executive Director of the Tennessee Clean Water Network and the President of the Board of the National Clean Water Network. The Tennessee Clean Water Network's mission is to empower Tennesseans to claim their right to clean water and healthy communities by fostering civic engagement, building coalitions, and advancing water policy for a sustainable future. We are located in Knoxville, Tennessee.

I would like to speak with you today primarily on water quality concerns that the Network has. Primarily I would like to speak to you about selenium contamination. I do want to point out that originally when I saw the site I thought to myself that this site needs to be dredged immediately, that they need to get out that coal ash as fast as they can. But since then I have had the oppor-

tunity to speak with scientists that have worked on coal fly ash spills and have come to change my thinking about the dredging plan.

Our major concern is selenium. It is a trace nutrient for humans and mammals but at high levels it is extremely toxic. Dr. Bryce Payne who has worked on the coal fly ash at PPL, which discharged into the Delaware River, contacted me and had some concerns about the dredging that I would like to share with you.

Selenium, when it becomes oxidated, it goes through a number of oxidation changes. Two constituents of this are of concern. One is selenite, which is toxic but binds very readily to particles and goes into the sediments. However, if the sediments get disturbed, and we think they will by dredging, this form of selenium turns into selenate. Selenate is highly toxic. It does not bind to particles and we believe it can slip quite easily through the turbidity curtains that TVA has chosen to use as a measure to keep the sediments back.

One concern that we have is the fact that the fish that we are seeing in the river have been tested and have high levels of selenium in their reproductive organs. Selenium is taken up through the system by bioaccumulation. These tests were done January 8th and January 9th of 2009. It was too soon for these fish to receive high levels of selenium through the spill. Our concern is that they have been receiving selenium through the discharge of the wet storage pond for 50 years. The levels in these reproductive organs were so high that there is concern that the fishery may fail if there is another release of selenium.

Through the dredging process, it mixes oxygen into the coal fly ash. If it oxidates to selenate and slips through the turbidity curtain, it cannot be recovered. The State has been notified of this through conference calls and through written letters. Many of the agencies have been notified of this problem and they have chosen to continue monitoring. Though we are appreciative of continued monitoring, once the selenium goes into the system there is no way to get it back. What we will be monitoring is probably another big fish kill.

Another concern is that in the wet storage pond, the permit only required that TVA test for total suspended solids and for pH. They were never required to test for heavy metals. Because of this we think that whole area has probably been contaminated by heavy metals. This has been taken up by the fish and those fish are consumed by folks that live in the watershed. So we have some concerns about the legacy of heavy metal contaminants from the pond.

We feel the wet storage of coal combustion waste is inappropriate given the fact that there are a number of new technologies that have been in existence since the 1980s. We would urge the Committee to ask the EPA to phase out wet storage of coal combustion waste in favor of dry storage, which appears to be a lot safer. When you are storing coal combustion waste, when they take out the bottom ash from the plant, they run about 8.5 million gallons a day of water to process this into the wet storage ponds. This water comes in contact with almost 25 toxic metals that are known to be toxic to humans and wildlife at a certain dosage. So we really feel that wet storage is an inappropriate form of storage for this fly ash.

We would like specifically for the Committee to consider advising the EPA to apply the Superfund law at the disaster site. We feel that the communities' voice has not been well heard and that requiring a cleanup under CERCLA will ensure a more timely and complete cleanup. It also gives the public a venue through this Act to receive some funding to get an independent technical assistant as well as puts this on the hazardous ranking system to score the site to determine its eligibility for listing on the National Priorities List.

We would also like that the final four TVA board member positions that are vacant be filled with folks from the environmental and social justice communities so that those concerns can be heard at the board level. Again, I want to thank you for this opportunity to speak.

Ms. JOHNSON. Thank you very much. Dr. Avner Vengosh.

Mr. VENGOSH. Madam Chairman, thank you for inviting me to talk here today. My name is Avner Vengosh. I am a Professor of Geochemistry at Duke University. My research is on water quality. That is what I do and my expertise.

After the spill on December 22nd, we went to the field to conduct research, me and my group at Duke University. That is what I am going to talk about today. I am going to talk just about the results of what we have been doing, and focusing today on the water quality aspect. We have done several other studies.

But talking about the water quality, we went to the field. We collected water samples according to very strict protocol, the USGS and the EPA protocol, and then we measured trace metals using highly sophisticated instruments that we have. We are very proud of our analytical capability. We have a very high sensitivity and low detection limit. We measured different elements including arsenic and mercury in both the water and the sediment.

So this is a map of where we sampled. Basically, we sampled the area in which the ash covered the surface area, we call it the Cove, in the tributaries where we can see today the standing ash. I will show you a picture in a minute. Then we sampled in the upstream and downstream of the Emory and the Clinch Rivers. We went three times to the field and conducted comprehensive analyses. So this is an example of sampling at the Cove area where the ash is covering the area. Basically, as you can see, this is the area that was most impacted.

The result—I am not going into details in this table—is we found that the Cove area, the area in the tributaries, has high level of contaminants. This is an example of arsenic concentration. Arsenic, as selenium, is a highly bioaccumulative toxic element. We found that in the Cove and the tributaries the levels are up almost 100 parts per billion whereas in the downstream river water the levels are much lower. In fact, they are lower than the maximum contaminant level of the EPA.

Our results in this sense are consistent with TVA results. However, from a detailed analysis of the geochemistry we see that even the downstream river has a higher concentration of arsenic relative to the upstream water, meaning that there is some leeching of arsenic and other metals from the ash in the water. This will be important when we speak later about dredging.

Basically we also sampled sediments. Our results for mercury concentration in the sediments shows that the ash has a relatively higher concentration of mercury to the sediments of the river upstream for both the Emory and, according to new results, also relative to the Clinch River. The downstream content of mercury in the sediments of the river indicates mobilization and transport of ash into the river. So we are actually using this to detect how much ash is actually transported into the river.

So in conclusion, we found that in those areas in the Cove and the tributaries, we found very high levels of trace metals and of arsenic in particular. We can see that downstream of the river there is some leeching of those metals from the sediments into the river water. And we argue that during remediation and dredging of the Cove, of ash from the river, further leeching might become much more dominant.

So careful monitoring is really a must to make sure that remediation and taking out the ash from the river would not be associated with a massive contamination of the water. Also, the relatively high concentration of mercury in the sediments has implications for the ecological health of the river. In certain situations we can see that formation of metal mercury in the river sediments could affect the health of biological and ecological life. So therefore detailed monitoring during and after the remediation I think is essential to ensure that the quality of the river, the downstream river, will be maintained as clean as the upstream river. Thank you.

Ms. JOHNSON. Thank you very, very much. I guess that concludes the testimony of this panel. We will start with the questioning.

I guess I should ask Ms. McCoin this. Has EPA released health information that was received by the public, understood by the public, and effective in getting people to take the desired actions to reduce their potential health risks?

Ms. MCCOIN. Ma'am, it is my understanding that EPA has not satisfactorily satisfied the communication. What we have to remember is even though something may be available on a website, many of our residents may not have anything other than dial-up if they even have that and they don't use the computer. That is probably where a lot of this conflict in communication begins. The fact is that there is still quite a heavy emphasis on print copy as far as information distribution in our community. So to answer the question, I think that they have failed in that regard.

Ms. JOHNSON. Have there been any community meetings or information sessions for the surrounding area by any government entity or TVA?

Ms. MCCOIN. Yes, ma'am. What we found initially was that people were asking a lot of questions. We were running around not knowing what direction to go. Out of that were two efforts. Basically two community groups formed and just because of personalities tend to attract people to one group as opposed to the other. There is a lot of cross-flow between the two groups. Both community groups have had meetings trying to figure out which direction to head and to transfer information back and forth.

TVA, even as late as last night, did have an information sharing system. But it is my understanding only 72 people attended. So there has been some of that. Initially they were heavily attended.

But most people now are just like, okay, I am a victim so what am I going to do now? I guess this is the way it is going to be. And it is very, very, very sad.

Ms. JOHNSON. Are there any instructions to the people as to how best to protect themselves until they can get it cleaned up?

Ms. MCCOIN. What is interesting about that, and I am not sure if it was in my testimony, the Tennessee Department of Health left on my particular doorstep a bag of instructions. It said, don't worry about it—I am summarizing obviously—don't worry about it, it is not hazardous. But if you touch it, spray it off. Don't let your pets get near it. Don't touch it. Don't get near it. Run away from it. You know? But it is not hazardous. Get it off of you.

Then there was a meeting at the Methodist church, and I am sorry but I don't remember the date, in which two or three EPA people, Mr. Kilgore from TVA as well as the plant manager from TVA, and then some of our county officials attended. That particular meeting was jam-packed in that Methodist church. I specifically asked Mr. Kilgore at that meeting to please tell me about this stuff, what is it? He responded to me directly that it is nonhazardous. I said, well, then why are we having warnings like don't touch it, wash it off, don't get near it, don't let your pets climb on it, keep your kids away from it? So it is just a conflicting accumulation of data. But it is not hazardous, remember? And that is where we are so concerned.

Then from that are these subsequent health conditions with people who have a tendency to have asthma anyway, and there are a lot of people with asthma, their sense is they are very, very, very sick. And the mental condition of the community is even suffering more now because TVA has bought so many properties that it is looking like a ghost town.

So we have now another impact from TVA because of the purchase of all those properties. Those people are happy and they have moved on but the rest of us, like I plan on not leaving the area, you drive in and homes are all empty. It just is incredibly depressing to see your ponds and lakes gone, now with the beautiful new road, but you have ash all around you and then now all the homes are empty.

So it is a very difficult situation mentally and physically. So through, I think, a better print copy of communication we could serve our community much, much better.

Ms. JOHNSON. Thank you. It is hazardous. If it dries on the ground and it is breathed, it will cause respiratory problems. If it leeches, as it is doing now, it is ingested by aquatic life and the fish get contaminated. The last thing I want to do is try to interfere with a major business that is offering jobs, but they must operate safely. I am hoping that as we move through the testimony we will find that that is one of the things that they have emphasized.

The Tennessee Department of Health recently said that the inhalation of this coal ash dust would have the same health effects as breathing other types of dust-- except this is a more hazardous dust-- and that ingestion of the dust would not pose a hazard. Based on the sampling of the ash and your knowledge of these issues, would you agree that these are statements that you have heard?

Ms. McCOIN. Yes, ma'am. I agree that the ash is very hazardous. I have had guests come in out of town and within the first 24 hours, you know, I don't want people not to come visit me because of where I live, and without saying anything, because you don't want to talk about this all day long, without saying anything my guests have said, gosh, my eyes are itchy or my throat is scratchy and is it the pollen.

I fear because this is the only way into the community and out of the community. We have had a lot of rain to suppress the dust but the inside of my house, I can dust but my filters are filthy. And I am about a mile up from, though the wind blows that way, up from the actual ground zero site. So I worry. I worry seriously. I can't imagine if I was trying to raise children there. I would be sick, sick thinking that I was exposing them.

We have received this question and answer. I believe it is in part of my written testimony and if not we can make sure that you get this. This was again distributed by the Department of Health, left on my front porch. I think you would find it incredibly interesting. If you look at it, when you read it, at first you are like, oh, okay. But read it, and read each word, and you are going to be really surprised at what you see. It is very, very alarming.

I do want to address, if I could, about TVA being an important employer. TVA has been wonderful. Without TVA, we would be a very, very suppressed community. Our annual income in our community is only $23,000 a year. So if you took TVA away from us, we would be desperate. We realize the value of coal but we also realize that we can't start over. We can't let it pile up again. We have got to be protected.

Today's technology allows us things that technology back in the 1950s when the plant was established were not even thought of. They weren't considered and we didn't have them. We have got to be able to modify and make business better for TVA without the risk of losing TVA because we cannot lose TVA as an employer in our community.

Ms. JOHNSON. Dr. Vengosh, would you like to comment on that?

Mr. VENGOSH. Well, there are several issues here. I mean, if you are trying to separate them, there is the water quality and there is the air quality. In respect to the water quality, it is something we can see and something we can measure. So basically we do know and I think my results from my group are pretty consistent with what TVA were actually measuring themselves. There is not any major contradiction. So that is actual measurement and it is pretty consistent.

The only thing with regard to water is to know what is the potential of arsenic, mercury, and selenium to be a potential hazard for the ecology? This is again something that we are talking about, the potential hazard, something not already existing. So it is kind of more difficult for prediction.

With respect to the air, then we are in a grey zone. We have been looking with people from the Duke Medical School at what will be the potential of inhalation of this material, of ash. Obviously, that will definitely increase the health risk of people upon inhalation of this material.

However, given the relative climate condition as very wet, I know we have had a lot of rainfall in the south until now, there hasn't been formation of particular matter that would derive from the ash as yet. So current measurement of particulate matter in the air hasn't found high levels of particulate matter nor toxic elements. So for the current situation, we are saying there hasn't been formation of dust that could affect health. However, this could be changed very soon. And if, indeed, this dust does generate, there will be some health affects that my colleague just talked about.

Ms. JOHNSON. Thank you very much.

Mr. Boozman?

Mr. BOOZMAN. Thank you very much. First of all, I just want to say that I have great sympathy for the residents, you know, and what you are going through. I would like to ask just so we kind of can get a little bit more background, first of all, I would like to know if any of you are involved in litigation? If so, what kind of damages are you seeking?

Ms. MCCOIN. Should I answer that first?

Mr. BOOZMAN. Yes, ma'am.

Ms. MCCOIN. Thank you. Currently I am not engaged in any litigation, any action against TVA as I have been awaiting patiently for some communication to come back from Crawford and Crawford, the P&C company that I think is the adjudicator of the claim. I filed in January and received one letter back that said, oh, guess what, we got your claim. That is all we have heard. But I personally have not entered in any legal action against TVA at this point.

Mr. BOOZMAN. Good, thank you. Ms. Hoyos?

Ms. HOYOS. The Tennessee Clean Water Network has not initiated any litigation.

Mr. BOOZMAN. Good. I guess the two things that I am confused about are, first of all, if a determination is made not to dredge, how do you solve the problem? What is the alternative to dredging?

Ms. HOYOS. Dr. Bryce Payne has indicated that there are some technologies, they are not proven for a spill of this size, but there are some ways in which you can protect for the dissemination of these heavy metals while getting the ash out of the pond area. We were hoping that the dredging plan would be, we were actually hoping that the recovery plan would include other things, not just dredging.

There are some technologies that exist, I am sure, that we could look at. We could use the next couple of weeks or months trying out a couple of technologies to see if they would work before we get a number of heavy machinery into this pond, chopping it all up, injecting a lot of oxygen, and then watching a fish kill happen maybe months later.

Mr. BOOZMAN. But if we have, and again, I am not being argumentative, I am just trying to figure it out, if we have a situation where you really believe that we have a toxic waste sitting here. Ms. McCoin has testified that people come and visit and they have got all of these symptoms, she is concerned about her children, and things like that. It seems like hat we would move forward as quickly as possible.

Ms. HOYOS. Oh, absolutely. We don't think that they should not remove it. We are just wanting more protective recovery methods so that the removal doesn't create an even bigger problem that we won't be able to solve.

Mr. BOOZMAN. I understand. Again, it just seems like we should be doing that now rather than figuring it out.

Dr. Vengosh, we could dump any substance, not any substance but most substances, and if you had such great concentrations, we could pick something out of thin air, if you dump so much of it you would have fish kills and you would have problems. Do you consider this a hazardous waste by current definition as we normally think of hazardous waste?

Mr. VENGOSH. That is tough one. I think so.

Mr. BOOZMAN. So in small quantities?

Mr. VENGOSH. Yes.

Mr. BOOZMAN. You feel like this is a hazardous waste?

Mr. VENGOSH. The problem is the mass balance, basically. So if you take this amount and try to calculate, for example, the amount of arsenic in kilograms per square mile or per volume of the waste, you would get an enormous amount. The numbers would be great numbers. So basically I think the balance, when you take this amount of ash and put it in a very large river, the impact of the ash on the river will be negligible because of the dilution factor.

Mr. BOOZMAN. I don't mean to interrupt. I agree with that. But I am talking about in normal quantity. If I had a pile of it sitting right here, is that a hazardous waste? Not as we see in the picture, but I am just talking about a normal pile.

Mr. VENGOSH. It depends on the interaction between that material and the environment. That is, I think, the key to understand how this can affect the environment and health. Then I would define it by this as to whether it is a toxic waste. If this is isolated from the environment, if you find technology or isolation from the environment, then there is not any damage by itself.

Mr. BOOZMAN. Do you think it should be dredged or do you think that they should wait as we move forward to try and figure out some other procedure?

Mr. VENGOSH. I think it should be carefully dredged with a very systematic and very detailed monitoring, even more than they would. Because we don't know. Basically, it is kind of trial and error. So the monitoring, online monitoring, and with a very detailed selenium and arsenic resolution would be the key to see if this dredging is doing any harm. Also start to do it in small sections rather than all the river.

Mr. BOOZMAN. Okay. Thank all of you; that is very helpful.

Ms. JOHNSON. Thank you very much.

Congresswoman Napolitano?

Mrs. NAPOLITANO. Thank you, Madam Chair. I am very interested in several of the testimonies because I have a like scenario, not in my area but close to my area, with DDT in the ocean. You can dredge it, but in doing so you are going to spread it and then you are going to affect the sea life, in my instance, in our area. Yet they have yet to find a way to be able to do it so it doesn't cause harm anymore. This is a product of an outfall of the sanitation district. With regards to the Kingston spill, I am not sure what the

site is used for. What is the ash used for? What is the process that they have in that particular facility or site?

Ms. HOYOS. The pond contents where the bottom ash and the fly ash?

Mrs. NAPOLITANO. No, I am talking about the company that is producing this ash. What is it?

Ms. HOYOS. I believe it is burned in order to create electricity.

Mrs. NAPOLITANO. Oh, okay. So the ash is an aftermarket type of thing?

Ms. HOYOS. It is the waste, yes.

Mrs. NAPOLITANO. There are several concerns. One of them deals with the water that they use to be able to sludge it, if you will, and then either take it away or dump it into the pond or whatever. Is it clean? If it isn't, then it is going to hit your water tables and it may contaminate them. Some of those, if I am correct, some of those constituents do not get, how would I say, cleaned out in treatment. I don't know what they do with the water.

Ms. HOYOS. There is no treatment of the water. The permit that they had, the National Pollutant Discharge Elimination System permit only asked them to test for pH and turbidity.

Mrs. NAPOLITANO. Has the Health Department not done any follow up to be able to determine whether or not some of those constituents like selenium, mercury, radium, and arsenic are indeed a threat to the health of the community and especially to those that have immune systems lower than normal?

Ms. HOYOS. The Health Department conducted a health consultation in the weeks following the spill. It was sort of a questionnaire on, you know, how do you feel. They actually concluded that stress was a big motivator of some of the illnesses that were being described. While we agree that stress was probably a big problem out there, what they didn't do was come back and follow up on those studies.

We have asked the ATSDR, the Agency of Toxic Substance and Disease Registry has been asked on three occasions to do a full public health assessment, which we really think is necessary to figure out what is going on in that community. We feel like that agency is the best agency because they have the experience. This spill is huge and I believe it is taxing our State agencies. This was unexpected and it is just so enormous that we really need more Federal oversight of the cleanup and of the health assessments.

Mrs. NAPOLITANO. Well, Ms. Hoyos, is TVA doing anything to work towards asking the community if there are any after effects to report? Are they going out to the community and asking any follow up questions, to the residents?

Ms. MCCOIN. I believe that the follow up has occurred mainly with those who TVA felt that they needed to communicate with immediately or in other words, those properties that they wanted right away. That would probably be a question that would need to be asked of TVA.

However, if you could imagine where the coal ash spilled, it was a circle road that goes around that is full of probably about 160 homes, maybe. In that area, the coal ash spill—I am just going to illustrate—would be up here at the top. You would come in and you would have to take the circle and you would come back out. Well,

this whole area is blocked off and this would be where the coal ash is. Most of the people on that circle have not been personally communicated with in weeks. The Department of Health of the State of Tennessee, and I think this was probably an effort that was in concert with TVA, you know, were trying to get the word out.

Again, their hands were full because you cannot describe how large this ash spill is. It is unbelievable. In fact, the new road that they put in is beautiful. As I was describing, the top of the eagle's head up there on that emblem, that is where they have already knocked it down. That is going to be the side of the hill, I guess, by the road. That is left over. It is just huge.

But back to the Department of Health, this bag with this letter with questions about how in keeping with their mission they need to know if we have got any concerns and what can we do to protect ourselves. There was never any personal follow up on this and I can guarantee you that there are many people that could not understand this letter. I am not suggesting that people in my community cannot read or comprehend. I am just suggesting is this is a scary thing to read in the first place because we know our community has been forever changed. Then you are afraid. It talks about toxins and chemicals and it says call us.

Well, they have a hard time communicating over the telephone, describing. So they follow up, there were people who did respond and said they had headaches, bloody noses, couldn't breathe, dark circles under their eyes. I mean, the list is unbelievable. There are stress related illnesses. Children are missing school for weeks. But there are a lot of other people who are not responding. I could go down through the road and say that man has cancer, his sister is taking care of him, and she has emphysema. I can guarantee you they did not respond to this and they are really very close to ground zero. That story can be repeated over and over and over. Again, it is because we have relied so heavily on the internet as the communication piece when most people do not communicate via the internet.

Ms. JOHNSON. Thank you very much.

Mr. Duncan?

Mrs. NAPOLITANO. Thank you. Madam Chair, could I ask that be introduced into the record?

Ms. JOHNSON. Time has expired. Mr. Duncan?

Mr. DUNCAN. Thank you, Madam Chairwoman. I do apologize to Ms. Hoyos and Dr. Vengosh because I had previously scheduled appointments in my office. But I did read their testimonies. I did hear Ms. McCoin's testimony. I know some of her family and they are really fine people.

I will say again that I want to make sure that everybody who is directly affected is treated fairly, compensated, and made whole as much as possible. I will say once again, though, that I have also got to make sure that we are fair to the 99.99 percent of the people who weren't affected by this, that we try to handle this in such a way that their utility bills are not doubled or quadrupled or whatever.

I do know that there have been hundreds or maybe even several thousand people when you count the government employees, the TVA employees, the EPA, the Tennessee State employees and then

you add in the contractors and their employees, so it has to be many hundreds if not a few thousand who have been working to try to correct all of this mess up until now. And it is a mess. It is a very sad thing that this happened.

But what we need in this whole situation is a little balance and common sense and fairness. In these kinds of situations you can never satisfy the extremists. We have seen some of these things in the past where they have found, you know, sometimes you hear about these quack doctors that will come in and convince people that anything that happens to them from here on out is due to the coal ash. We just can't go along with the kooks and the extremists in these situations.

With that, I don't have any questions. Madam Chairwoman, I have some other appointments though I will stay as much as I can. We are going to have some votes, I understand, at 4:00 p.m. or 4:30 p.m. so I guess we need to move as fast as we can.

Ms. JOHNSON. Thank you very much.

Mr. DUNCAN. Thank you.

Ms. JOHNSON. Congresswoman Edwards?

Ms. EDWARDS. Thank you, Madam Chairwoman.

Thank you each for your testimonies. I want to focus, Ms. McCoin and Ms. Hoyos, on the aspects of your testimonies that deal with public participation. I would like for you to describe formal mechanisms that you believe or that TVA has told you apply to the participation of the public in determining the dredging plan, looking at health consequences, and all of the aspects of what is happening with the cleanup. Do you believe that there is a formal mechanism that is required for public participation?

Ms. HOYOS. I believe there is a more formal mechanism required under CERCLA. We would like to see that invoked. Currently it is our experience observing some of these public meetings that the community is being talked to and not talked with. There was one particular meeting on March 5th, it was a number of State agencies, and they had a number of booths that folks could mill around and ask questions.

The program then turned to talks from the different agencies on what they were doing and the community was given half an hour to have question and answer. The community was actually given cards and told to write their questions on the cards. The agencies would then group the cards into topics and select out the ones that they thought were most representative of the issue. We really took great offense to this method of public participation.

By the end, the agencies had over-used their time and so there was only enough time for a couple of questions. And though the agencies agreed to stay behind and answer questions, what this doesn't allow for is transparency. What people need in public participation is to have their concerns heard by the entire community. Speaking to people one on one is very private. So you can not receive the full benefit of hearing other people's concerns.

Ms. EDWARDS. So let me just interrupt you because I just have a limited amount of time. In your testimony you indicate that you would like to see the Superfund law applied to this site precisely because you believe that it would guarantee a more formal process

for public participation and exchange and place requirements on TVA in terms of its responsibility to the community?

Ms. HOYOS. That is correct. Currently there is no public participation process. It is just whatever the agencies feel that they need to communicate with the community.

Ms. EDWARDS. Ms. McCoin, if I could just ask you about the health data. Do you believe that TVA has a requirement to gather the health data, to analyze it, and report it back in any kind of formal way? Or is that just at their discretion?

Ms. MCCOIN. I believe it is at their discretion. If there is a formal process, I have not seen that implemented.

Ms. EDWARDS. So in terms of the bag that you describe that was left at your home, for the 6,000 or so residents, there has been no way really to gather the information, to analyze the information, and to look at both the short term health consequences and the long term epidemiology in terms of the effects of the coal ash ingestion?

Ms. MCCOIN. The bag that was left at my door was left, I assume, by the Department of Health and not TVA because that is the letterhead that it is on. If that was in concert with a request and effort of TVA, I am not aware of that. It may have been.

Ms. EDWARDS. But did anybody come back and get the bag?

Ms. MCCOIN. It was just a reference. If you have any questions or if you want to report something, call this number. There has never been a one on one consultation with me and I am right on the main road. I know several other families that have not been communicated with. It sure seems that there would be a list, a gathering of data, and is there any type of common complaint that we are seeing out of this.

To my knowledge, none of that is going on. That, again, is where some of the frustration comes in which has driven people. We were told to contact the Outreach Center, which was established right after the disaster. The people staffing the Outreach Center, I believe, initially were from out of town. They moved them out and then brought in——

Ms. EDWARDS. So there has been no direct sort of gathering of information, disseminating of information, or process for you to report health complaints, and then an analysis for the community of what those complaints would be?

Ms. MCCOIN. There has not been any analysis reporting that I have seen.

Ms. EDWARDS. Thank you very much, Madam Chair.

Ms. JOHNSON. Thank you. Mr. Griffith.

Mr. GRIFFITH. Thank you, Madam Chair.

Is your water safe? Have you been reassured by your mayor or your municipality or the State of Tennessee that your water is safe?

Ms. MCCOIN. My drinking water, I assume?

Mr. GRIFFITH. Yes, your drinking water.

Ms. MCCOIN. My drinking water comes from upstream approximately 10 miles. We have been reassured that that water is safe. The residents downstream, I am not sure. Renee may know where those water plants are better than I. It is kind of like, mine is safe so I am drinking it. But as the dredging begins, I know that there

is a lot of concern, not just in Harriman but in Rockwood and on down towards the Tennessee River wherever that water is processed.

Mr. GRIFFITH. I am the lowest point on the Tennessee River.

Ms. MCCOIN. Oh, you are?

Mr. GRIFFITH. Guntersville Dam, yes. That is my district so I just wanted to know how things were going in your area.

Ms. MCCOIN. There is a lot of concern. It almost seems that the people down on the Tennessee River weren't thinking much of it until they realized, wait a second, that stuff is going to go somewhere and it heads this way. So there is that concern.

Again, I think instead of this being a negative, take it as an opportunity to communicate in a public forum that people read versus on the internet. Explain what you are doing so they can understand it.

Mr. GRIFFITH. Well, I wanted to commend the panel for your attitude toward this. There are an awful lot of good, solid people at TVA that are environmentally conscious and concerned. Apparently, the design of their pond and the designs of other ponds not just in the TVA area need to be looked at and certainly improved. I think that this is a teaching moment for us because we have been with coal fired plants for many years, well over half a century, and they are close to our waterways.

Whether or not the concentration of selenium in reproductive glands is a significant fact or not, we don't know. We do know that reproductive glands have a tendency to concentrate heavy metals over the years because of their blood supply, et cetera, et cetera. But it does raise concerns. I am on the TVA system in Huntsville, Alabama, the Madison County area, and my whole district. The river runs through it.

So we are concerned and we communicate with the TVA. It is not an unusual problem for a large electrical company selling electricity not to be able to communicate. That is not their game. But they are getting better at it and I think you are going to help them get a lot better at it. So I appreciate each and every one of you being here. I think it is a teachable moment for America. We are going to run into this as we concentrate on balancing the protection of our rivers and streams with our desire for safe energy. So thank you all.

Ms. JOHNSON. Thank you very much. And thanks to the panel. We will now release you and go to the third panel. Thank you very much for your testimonies and for being here.

Thank you very much. We will acknowledge you as you are listed here: Mr. Tom Kilgore, President and Chief Executive Officer of the Tennessee Valley Authority in Knoxville, Tennessee; Mr. Stan Meiburg, the Acting Regional Administrator for Region Four of the United States Environmental Protection Agency in Atlanta, Georgia; and Mr. Paul Sloan, Deputy Commissioner of Tennessee Department of Environment and Conservation in Nashville, Tennessee. Mr. Kilgore, you may proceed.

TESTIMONY OF TOM KILGORE, PRESIDENT AND CHIEF EXECUTIVE OFFICER, TENNESSEE VALLEY AUTHORITY; STAN MEIBURG, ACTING REGIONAL ADMINISTRATOR, REGION FOUR, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY; AND PAUL SLOAN, DEPUTY COMMISSIONER, TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Mr. KILGORE. Thank you, Madam Chairwoman Johnson, Ranking Member Boozman, and Members of the Committee. Thank you for this opportunity to discuss the ash spill at TVA's Kingston Fossil Plant, the actions we are taking to clean it up, and what we are doing to monitor the environment and to protect the citizens and the environment.

First let me say on behalf of TVA that we deeply regret the impacts on our neighbors and the impacts to the environment. We are grateful that no one was seriously hurt. I have told the people of Roane County and our employees that we are committed to clean up this spill, protect the public health, safely restore the area, and wherever possible to make it better. We are proceeding under reviews and approvals from the Tennessee Department of Environment and Conservation and the EPA.

Our four primary objectives are to protect the health and safety of the public and our recovery personnel, to restore and protect environmentally sensitive areas, to keep the public and the stakeholders informed, and to restore conditions in the community and to rebuild trust in TVA. In my written testimony I have described the event and the actions that TVA is taking to ensure the public health and safety.

The spill occurred between 12:00 a.m. and 1:00 a.m. on December 22nd when a containment dike failed on the coal ash storage cell at Kingston, about 40 miles west of Knoxville. The failure did release about 5.4 million cubic yards of coal ash onto 300 acres. I was there within the hour and I have been there almost every week since then. The ash spilled onto land, adjacent waterways, and the Swan Pond Embayment including the Emory River, which flows into the Clinch River about two miles downstream. A root cause analysis is underway by a national engineering firm and we expect a report on their conclusions this summer.

On March 19th we reached a major milestone in the recovery with the start of the dredging to remove about two million cubic yards of ash material. The dredging plan was approved by the State and the EPA. Environmental monitoring and controls are in place. We are making progress but we have a long way to go.

In our efforts to protect the public health and safety we are working with State officials and the EPA in establishing an environmental monitoring network for sampling the air, the drinking water, and the soil. According to the Tennessee Department of Health, public and private drinking water supplies continue to meet State and Federal standards. Those results come from certified laboratories, not from TVA. More than 27,000 air samples taken by the State and TVA show that the average daily samples for particulates remain below the National Ambient Air Quality Standards set by EPA.

A plan is also being developed to respond to individual health concerns. Since there have been several questions about this, I will go into more detail. We are currently finalizing a contract with Oak Ridge Associated Universities, a consortium of a hundred research universities. This program will give people in the community access to medical and toxicological experts who have experience with the contaminants associated with ash.

On March 2nd, as a part of the order issued by the Tennessee Commissioner of Environment and Conservation, TVA submitted a formal corrective action plan to the State with a copy to the EPA. This document covers plans for environmental monitoring and testing, protecting the public and private water supplies, removing the ash from the public waterways, remediating and stabilizing the ash storage facility, and protecting the health and safety of the public and, again, the workers involved in the recovery. The plan includes the formation of an interagency working group consisting of Federal, State, and local agencies. We will work closely with them to move the recovery forward safely with a full attention to the environment.

Since the first day of the event, we have endeavored to keep the public informed and involved. Last night we held our latest meeting at Roane State Community College to keep the community informed. A community outreach center remains open in downtown Kingston to respond to the claims and concerns. More than 740 households have used that center.

I realize that the monitoring equipment and sampling results don't make the physical effects of the situation go away. But I hope that the results thus far and TVA's actions going forward will help reassure the public that we will be there until the job is done. Extensive information is posted on the TVA public website and we will continue to address the community concerns. As I said at the beginning, our intent is to do this job right. Thank you and I look forward to your questions later.

Ms. JOHNSON. Thank you very much.

Mr. Meiburg?

Mr. MEIBURG. Thank you very much, Madam Chairwoman, Ranking Member Boozman, and Members of the Subcommittee. I appreciate the opportunity to testify this afternoon. I am Stan Meiburg and I am the Acting Regional Administrator for EPA's Region Four office in Atlanta, Georgia. I would like to request that my written statement be entered into the record.

I would like to summarize EPA's actions in response to this release as well as our commitment to a cleanup that protects public health and the environment and is consistent with the law and sound science. We recognize our ongoing responsibility to inform and to involve the community in our activities and to keep the Committee informed as cleanup progresses.

As soon as we learned of the release on December 22nd, EPA Region Four joined TVA, the Tennessee Department of Environment and Conservation or TDEC, and other State and local agencies in a coordinated response. The EPA provided oversight and technical advice to TVA and conducted independent water sampling and air monitoring to evaluate public health and environmental threats. We also set up a Kingston task force in Region Four to coordinate

our continuing actions. The Chair of that task force, Tom Welborn, is here with me today.

There are more details about sampling results in my written testimony but in general we found that just after the release, samples of untreated river water showed elevated levels of suspended ash and heavy metals known to be associated with coal ash. We saw this again after a heavy rainfall on the night of January 6th, 2009. However, treated drinking water from the Kingston water treatment plant, which is located downstream of the release, has met all Federal standards since the ash release occurred.

TDEC is continuing a regular sampling program at that plant. Some residents near the site rely on private wells for drinking water. EPA and TDEC have identified and sampled potentially impacted residential wells in the immediate area. TDEC continues to handle well sampling requests from residences within four miles of the ash spill. Over 100 wells have been tested to date and all have met drinking water standards.

Wind blown ash poses a potential risk to public health. With EPA oversight, TVA began air monitoring for coarse and fine particles. EPA also conducted independent monitoring to validate TVA's findings. To date, all of the more than 25,000 air samples from this area have measured levels below the National Ambient Air Quality Standards for particles. Together with TDEC we will continue to oversee TVA's air monitoring throughout the cleanup as well as TVA's efforts to control dust at the site.

Sampling results for sediment, air, and water testing are available on the websites of the various agencies.

While protection of the public health and safety remains a primary concern, EPA and TDEC are also very concerned with the long term ecological health of the Emory and Clinch Rivers. We support efforts to minimize flooding and sheet flow over the ash spill area. We will be monitoring this work while it is underway and if we see elevated levels of compounds, we will ask TVA to stop dredging and investigate. We also endorse the requirement in the TDEC Commissioner's order for TVA to support a detailed ecological assessment to determine how to restore the functions of this aquatic system and its tributaries.

Our working relationship with the State of Tennessee is exceptional and we are committed to continuing that. Our common objectives will be to prevent further environmental damage, monitor the air and water quality, share information as we receive it, review cleanup plans as they become available, and make sure that the cleanup meets all Federal and State laws and standards.

Madam Chairwoman, this was a terrible event for the community. EPA recognizes that members of the community are dealing with very difficult changes in their daily lives, their homes, and their properties. We recognize that even under the best of circumstances, this cleanup, to be done right, will take time. EPA, along with TDEC, will be there to ensure that it is done right. Done right means that the cleanup is comprehensive; is based on sound scientific and ecological principles; moves as quickly as possible; is fully transparent to the public, especially to the local community; complies with or is better than all Federal and State environmental standards; and gives EPA, TDEC, and the public con-

fidence that we are doing everything we can to keep this from happening again here or at any other TVA site.

Thank you very much for the opportunity to testify today. I will be happy to answer any questions you may have.

Ms. JOHNSON. Thank you very much. Let me say to the witnesses that we have a vote. We have less than 10 minutes to get there, but we do want to finish with the testimony. We will gather the questions and submit them to you.

I ask unanimous consent to introduce to the record, to put in the record, a statement handed to us by Representative Napolitano. It is from the State of Tennessee Department of Health. Is there any objection? Hearing none, so ordered.

[Information follows:]

STATE OF TENNESSEE
DEPARTMENT OF HEALTH

The mission of the Tennessee Department of Health is to protect, promote and improve the health of people who live in, work in and visit Tennessee. It is our job to protect the health of the public both now and in the future.

In keeping with this mission, staff from the Department of Health will be talking with people living near the recent coal ash spill in Roane County. We want to make sure you have a safe yard, safe water to drink and safe air to breathe. We are going door-to-door in your neighborhood and are asking for your help to complete a routine health assessment. Our assessment asks questions about your experience with the coal ash.

Coming into contact with coal ash should not harm you. However, as a precaution, we suggest that you, your family and your pets avoid the coal ash. If you do come into contact with the coal ash, wash your hands, clothes and shoes. We also are encouraging homeowners with drinking water wells to get their water tested.

The Department of Health is working with the Tennessee Department of Environment and Conservation (TDEC), the federal Agency for Toxic Substances and Disease Registry (ATSDR), and the federal Environmental Protection Agency (EPA) to ensure the health and well being of people living near the coal ash spill.

If we missed you and you would like to participate in our health assessment, please contact a field team member of the East Tennessee local health department at 866-852-6710.

We also want to know about your health concerns. If you would like to talk with us, please call 1-800-404-3006, or send an e-mail to TN.Health@state.tn.us.

Tennessee Department of Health's telephone number: 1-800-404-3006

TVA's telephone number for public information: (865) 717-4006

Online Internet information: www.tennessee.gov/environment

www.tennessee.gov/health www.tva.gov

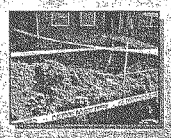
www.epa.gov/region4 www.roanegov.org

TENNESSEE HEALTH

Exposure

What is exposure?

Exposure means that you have come into contact with a chemical and it has gotten into your body. You may be exposed to a hazardous substance by breathing, touching, eating or drinking it. Many exposures happen quickly. Some happen over a long period of time.



How can exposure happen?

For chemical exposure to happen there has to be a place from where the chemical came. This place is called a source. Common sources can be a spill, drum, dump, landfill, pond, tanker or smokestack. Other sources may be car exhaust, cigarette smoke or cleaning products.

You could contact a chemical at its source, or the chemical could migrate from its source to another place where you could come in contact with it. Chemicals can move through air, surface water, groundwater, and soil.

Sometimes harmful chemicals can get in plants or animals. Exposure can happen from eating contaminated foods. For example, fish caught and eaten from a polluted pond can lead to chemical exposure.

How can a chemical get into your body?

If you come in contact with a chemical, there are three ways it can get into your body by:

1. ***Breathing* (inhalation) air that has a chemical in it.** Some chemicals come in the form of dusts, mists, or gases. Some of these chemicals may stay your the lungs and damage lung cells. Other chemicals may pass through your lungs and enter your bloodstream. These chemicals can affect other parts of your body.

2. ***Eating or drinking* (ingestion) something with a chemical in or on it.** Your stomach can absorb chemicals from the foods you eat or the liquids you drink. Chemicals can also be accidentally ingested by swallowing dust or soil. Some chemicals may pass from your stomach and enter your bloodstream.

3. ***Touching* (contact) a chemical or something that has the chemical in or on it.** Some chemicals can pass through your skin and enter your bloodstream. If these chemicals enter your bloodstream, they can affect other parts of your body.

The Environmental Epidemiology Program is funded through a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). ATSDR is the federal public health agency whose mission is to prevent exposure and adverse human health effects and diminished quality of life associated with exposure to hazardous substances from waste sites, unplanned releases, and other sources of pollution in the environment. ATSDR describes environmental public health topics on their Website (*www.ATSDR.cdc.gov*).

If you are exposed to a chemical, will you get sick?

Whether you will get sick depends on a number of factors about the exposure. It may depend on the way the chemical got into your body. It may also depend on how much of the chemical got into your body. Some chemicals are very harmful and just a small amount will make you sick. Other chemicals are less harmful, and it takes a lot of the chemical to make you sick.

Factors that play a part in whether you will get sick from a chemical exposure are:

- the **type** of chemical;
- the **toxicity** of the chemical (how harmful it is);
- the **amount** (how much of a chemical you were exposed to);
- the **duration** (how long the exposure was);
- the **frequency** (how many times you were exposed).

Also, people respond to chemicals in different ways. Some people may be exposed to a chemical and not get sick. Other people may be more sensitive to a chemical and get sick from an exposure. For example, children can be more sensitive to chemicals and may get sick more easily than adults. Some health effects only happen after exposure to a chemical on a regular basis for a long period of time. Many symptoms such as nausea or headache may go away when exposure stops.

If you are not
exposed
to a chemical,
it cannot make you sick.

How can I stop or reduce exposure to a hazardous substance?

Once exposure to a hazardous substance has been identified, several approaches can be used to reduce or stop the exposure. If a chemical is found in your water, then use a water filter or bottled water. If a chemical is in soil, then wash your hands after working in the soil and before eating. When near the contaminated soil, avoid putting your hands near your mouth or creating dust. Clothes and shoes should also be washed. If a chemical is in the air, then an air purifier or air filter may help to clean the air. The Department of Health provides advice for reducing or eliminating exposure at all sites we work on.

If you have any questions please contact:

Environmental Epidemiology Program
Tennessee Department of Health
Communicable and Environmental
Disease Services
1st Floor Cordell Hull Building
425 5th Avenue North
Nashville TN 37243

615-741-7247
or toll-free
1-800-404-3006
during normal business hours

On the Internet at:
http://health.state.tn.us

Department of Health.
Authorization No. 343984, 09/08
Website only

What can we do to protect ourselves?

It is understandable that affected residents and emergency responders may have questions as to how to best protect themselves from exposure to the TVA fly ash. It is widely known that coal combustion wastes, commonly known as fly ash, contain toxic metals like arsenic, mercury, lead, thallium, hexavalent chromium and more.

In January 2005 a small western Pennsylvania community in Forward Township experienced a fly ash landslide. As no one from the Pennsylvania Department of Environmental Protection (PA DEP) provided any safety guidelines, the residents sought guidance from public health officials from the University of Pittsburgh and the Agency for Toxic Substances and Disease Registry (ATSDR).

The residents of Forward Township were told to do the following to provide some level of protection for themselves, their families and their pets. **Please know these suggestions are not a cure for the problems you face, but they are some suggested safeguards to provide some common sense practices you can use in your homes to help reduce some of your exposures to the fly ash.**

1. **Leave all shoes, boots and exposed clothing outside.** Try not to take fly ash inside your homes on shoes or clothing.

2. **Wash pets' feet before they enter your home.**

3. **Wash your face and hands often – especially before eating.**

4. **Avoid parking cars/trucks with fly ash on tires in garages attached to your home.** Tracking fly ash into garages where people and pets can walk through it can bring the fly ash back inside your homes.

5. **NEVER SWEEP FLY ASH – risks to humans are greatest when the fly ash is airborne.**

6. **Don't let children play outside near fly ash.** Small children are at greatest risk due the fact that their hands frequently go in their mouths. If they have any fly ash on their hands they will then "ingest" the ash if they lick their fingers or a toy exposed to the ash.

6. **Keep all windows and doors closed as much as possible.**

7. **Use HEPA air cleaning filtration, if possible.** And change the filters once a week.

8. **If possible, use vacuum cleaners with HEPA filters on carpets and floors inside your home.**

9. When dusting use a damp cloth – <u>don't dry dust.</u>

10. **Never leave food uncovered** – fly ash will settle on all surfaces.

Contact Information for Health Teams talking with Community Members

TVA Outreach Office for
509 North Kentucky Street
Kingston TN 37763
Phone: 865-632-1700
Fax: 865-376-0442
Mon – Sat 7 – 7 & Sun 1 – 7

General phone number for public questions: 865-717-4006

State of Tennessee Department of Health's phone number 1-800-404-3006

Joint Information Center (media) phone number: 865-590-7001

Roane County Health Department: 865-354-1220

Roane County Executive's Office: 865-376-5578

TDEC phone number to get well water tested: 1-888-891-8332

Tennessee Poison Control Center: 1-800-222-1222

Ridgeview Harriman community mental-health center: 865-882-1164

Ridgeview Mental Health
Appts: 865-482-1076
Crisis Line: 800-870-5481

Mr. Sloan?

Mr. SLOAN. Thank you, Madam Chairwoman, Ranking Member Boozman, and Members of the Subcommittee. Thank you for the opportunity afforded me to testify this afternoon.

I am Paul Sloan, Deputy Commissioner of the Tennessee Department of Environment and Conservation and Director of its Bureau of Environment. By virtue of Tennessee's various enabling statutes, our Department implements the Federal Clean Water Act, the Federal Clean Air Act, and regulates solid waste management consistently with standards currently prescribed by the Federal Resource Conservation and Recovery Act or RCRA.

The catastrophic ash release at the TVA Kingston Fossil Plant in the early morning of December 22nd, 2008 inundated a 300 acre portion of the Emory River, its adjoining embayments, and riparian areas of the Watts Bar reservoir. The Department's immediate response was to fully participate as a team member with EPA, TVA, the Tennessee Emergency Management Agency, Tennessee Department of Health, and Roane County officials and first responders in the emergency response based at the facility's incident command center.

Given its enormous scale, we are thankful that remarkably the release resulted in no loss of life or critical injury. That being said, its impact on area residents and their supporting communities three days before Christmas was devastating, a fact that deepens our staff's resolve to assure that this cleanup and its environmental restoration be completed thoroughly and in full compliance with all applicable laws and regulations. Reflective of that resolve is the fact that by February 28th, more than 60 of our staff members have expended more than 10,000 hours working at various aspects of our response.

Our Department's five priorities have been to assure public safety as well as public access to information; to conduct extensive sampling in all media including water, land, and air; to establish an enforcement framework with a clear directive to TVA; to begin the removal of ash from the Emory River; and to make our decisions with the collaboration of a broad and supporting base of scientists.

Our initial sampling priority was to determine whether public drinking water supply was safe. Daily samples were taken and reported for the closest two public water treatment facilities serving Kingston and Rockwood. All sample results have fully met drinking water standards. In addition, we have sampled over 100 domestic wells within a four mile radius of the site. We have found no groundwater contamination associated with the ash in these wells. With respect to surface water, routine sampling has shown averages within water quality standards. However, maximum sample data have shown some exceedances particularly proximate to the released ash.

The Department has collected and analyzed coal ash samples. Although results are below the levels that would cause the ash to be characterized as a hazardous waste, its safe and appropriate removal and final disposition has been required by the Department in its own enforcement order issued shortly after the release.

The Department's sampling of air particles has also shown no exceedances of National Ambient Air Quality Standards. However, TVA's continued management of airborne particles is and will remain a high priority of our Department.

To assure that the public is kept fully informed, all sample results as well as TVA submittals to the Department are posted to our website. TVA and EPA also host websites on which their data is posted as well as other supporting material. Numerous community meetings have been held and will continue to be held.

On January 12th, the Department issued its enforcement order requiring among other things that TVA prepare a comprehensive corrective action plan. Further, on February 4th the Department joined EPA Region Four in directing TVA to provide all submittals simultaneously to both agencies for review and approval. TVA's proposed cap has been submitted and is under consideration. It is on our website for public review and comment.

Ms. JOHNSON. Thank you very much. You have submitted your statement to the record.

I have one question before we have to run. On March 9th, 2009, the Administrator of EPA sent a survey to TVA under Section 104(e) of the Superfund law requesting information on the condition of coal storage facilities under their control. Has TVA responded to that yet?

Mr. KILGORE. Yes, ma'am, we have.

Ms. JOHNSON. Okay. Apparently it has not been received. Nevertheless, let me just say in conclusion that it is clear that there is a problem for the public representatives and it is a problem for the people that live in this area. I would personally ask that all of you work together. I would ask that you clear this area just as quickly as possible.

We all know, if we admit it, that this is not a good situation for the consumers. We understand business will go on and accidents will happen but there is a strict responsibility to clear up the damage that the businesses have done just as soon as possible.

We will have another hearing soon. We will be sending out the notices. We thank you very much for being here today.

[Whereupon, at 4:12 p.m., the Subcommittee was adjourned.]

OPENING STATEMENT OF
THE HONORABLE RUSS CARNAHAN (MO-03)
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
U.S. HOUSE OF REPRESENTATIVES

Hearing on
The Tennessee Valley Authority's Kingston Ash Slide and Potential Water Quality Impacts of Coal Combustion Waste Storage

Tuesday, March 31, 2009
2:00 p.m.
2167 Rayburn House Office Building

Chairwoman Johnson, Ranking Member Boozman, thank you for calling this important hearing on "The Tennessee Valley Authority's Kingston Ash Slide and Potential Water Quality Impacts of Coal Combustion Waste Storage." I want to begin by thanking the witnesses, in particular my colleague, the Honorable Lincoln Davis of Tennessee, and Ms. McCoin of the Tennessee Coal Ash Survivors Network, for appearing before the subcommittee today. I commend the residents of the 4th District in Tennessee for your fortitude in the face of this crisis, and I wish to offer you my assistance and support during the recovery process.

Madame Chairwoman, the failure of the pond retention wall at the Kingston Fossil Plant in December raises serious questions about the short-term and long-term consequences of relying on coal for electricity generation.

In the short-term, I have three key concerns. First and foremost, we need to ensure the health and safety of the people living in the vicinity of the Kingston Plant. I applaud the efforts of local, state and federal emergency and environmental officials in coordinating their initial response to the crisis, and we must guarantee that the families displaced by this disaster receive the resources they need to rebuild their lives. Secondly, we need a full assessment of the ecological damage caused by the spill to the local water supply and aquatic populations. Finally, with the costs for cleanup estimated between $525 and $825 million, we need to hold the parties responsible for this incident to account.

The long-term questions raised by the Kingston Plant spill are equally important. Most importantly, we must ensure that other coal ash fills and impoundments are structurally sound. It is deeply troubling that a second TVA facility in Alabama reported a coal ash spill just a few weeks after the disaster in Tennessee. I am encouraged by the recent commitment of the EPA to issue a rule regulating the disposal of coal ash wastes by the end of the year, and I sincerely hope that it does not come too late to prevent other coal ash spills. Going forward, we need to develop a more sustainable alternative to disposing of coal ash in landfills and impoundments. With over 71 million tons of coal ash produced in the United States each year, it is essential that we develop alternative disposal methods, or, ideally, a better market for products containing recycled coal ash, such as concrete and other structural stabilizers.

Ultimately, this incident serves to demonstrate once again the inherent problems with relying on coal for our electricity needs. If there is a silver-lining to this grim episode, it is that it reinforces the imperative of transitioning to an economy powered by clean, renewable energy sources.

In closing, thank you again, Chairwoman Johnson, for calling this important hearing, and thank you to each of the witnesses for offering your testimony today.

STATEMENT OF
THE HONORABLE JERRY F. COSTELLO
SUBCOMMITTEE ON WATER RESOURCES
HEARING ON THE TENNESSEE VALLEY AUTHORITY'S KINGSTON ASH SLIDE AND POTENTIAL WATER QUALITY IMPACTS ON COAL COMBUSTION WASTE STORAGE
TUESDAY, MARCH 31, 2009
10:00AM 2167 RHOB

Thank you, Mr. Chairman, for holding today's hearing to investigate the potential causes of the coal ash spill at the Tennessee Valley Authority's (TVA) Kingston Fossil Plant. This is an important oversight hearing to examine TVA's response and cleanup and to understand if potential water quality implications exist from ash spill.

Before I begin, I would like to take a moment to say that my thoughts and prayers go out to the victims affected by the spill. Thankfully, no serious injuries were reported. However, I am concerned about the health and safety of those individuals and communities and would stress the importance of collaboration between federal, state, and local agencies as recovery efforts proceed.

Several questions still remain regarding how the spill happened and its impacts. I look forward to hearing from our witness panel on how the disaster will be cleaned up and how the area will be restored. The cleanup must be done right and address potential long-term threats to the families who live there. Further, we must also ensure that this type of disaster does

not happen again and it is essential that TVA remains committed to the short-term and long-term clean up management of the spill, as well as the public health implications of every individual affected by this tragedy.

I welcome the witnesses here today, and look forward to their testimony.

Congressman Lincoln Davis
Testimony: House Transportation SubCommittee on Water Resources and Environment
March 31, 2009

The Tennessee Valley Authority's Kingston Ash Slide: Potential Water Quality Impacts of Coal Combustion Waste Storage

Ladies and Gentlemen of the Committee, especially Chairman Oberstar and Chairwoman Johnson, I first want to thank you for holding an informational hearing on an issue that has had a tremendous impact on the District that I represent, and for allowing me to come before the Committee today.

Kingston, Tennessee, where the ash spill occurred is on the eastern side of my Congressional District. I have the honor and pleasure of representing 10,000 of Tennessee's 40,000 square miles, and the fourth most rural Congressional District in America. I am also blessed to live within some of the most beautiful mountains, overlooks and waterways in our nation. Our valley is a blessing that supports tourism and industry in Tennessee, and is an inheritance that we are bound as good stewards to pass on to future generations.

On December 22, 2008, when a dike at the Tennessee Valley Authority's (TVA) Kingston Fossil Plant broke and released over a billion gallons of coal ash into the surrounding areas, it was a major setback for landowners, for our environment, for the mission of TVA and for the 8 million ratepayers who rely on TVA for low-cost service.

I have visited the site of this accident now on two separate occasions. Additionally, I have met with the CEO of the Tennessee Valley Authority, administrators of the Environmental Protection Agency (EPA) and our current Administration, as well as local officials and constituents who are directly affected by what has occurred. In my discussions with those involved, I have come to three conclusions. First, that the cleanup will come slowly and at great cost. Second, that the financial burden of setting this right should not fall on those who have been harmed. And third, that my constituents and the land they live on must be made whole again.

Let me repeat that: my constituents, and the land they live on, must be made whole again. When President Roosevelt established the Tennessee Valley Authority with his signature in 1933, he launched an independent agency that would help solve some of the southeast's most challenging problems. TVA reforested land, produced navigable waterways, developed fertilizer that would help reclaim eroded soils and by 1949 delivered electricity to a million people. Today they serve eight times that number.

This history is well known to my constituents and all across the Tennessee Valley. However, TVA's history, as with that of our nation, is imperfect. Last December, the public's trust was broken, but America's strength has never relied on an impossible standard of making mistakes. Instead, it is our commitment to correct our failures and

move forward with a promise to never repeat our most egregious missteps that keeps America strong.

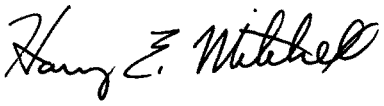
This is precisely what I expect of TVA. I have spoken with officials from the current Administration and from the EPA who have assured me that they will stay on the ground to oversee this cleanup until it is completed to everyone's satisfaction, and I have received a similar assurance from TVA that they have the means to make this right. I am pleased to hear from TVA that they have already purchased land and homes appraised at nearly $20 million, and I expect that this work will continue. I understand too that TVA is currently inspecting the containment dikes at its 10 other fossil plant and has hired an independent engineering company to perform an in-depth analysis of the root cause of the ash spill. I want these findings to be made public so that ratepayers and lawmakers alike can take part in our effort to ensure that this never happens again.

As the Congressman representing the spill zone, I expect two things of TVA. First, TVA must continue working closely with the Army Corps of Engineers, the EPA, the Tennessee Department of Environment and Conservation and the local community to ensure that they are in compliance with all relevant laws. Second, they must act with complete transparency. TVA must do everything in their power to earn and regain the public's trust, including making their findings public and holding unscripted meetings with ratepayers so the voices of citizens in the spill zone can be heard.

If TVA cannot fulfill their duty to make my constituents whole, I am fully prepared as a Member of Congress to call upon our current Administration to name the EPA as the lead agency in charge of the cleanup and appoint a czar that will hold TVA accountable. In the meantime, I take the EPA on their word that they will remain in place to see the job through, and thank them for the work they do and for being here today to speak on this important issue.

As a final note, I would like to point out that the charge we have before us, first and foremost, is to see Kingston cleaned up. Undoubtedly, and as we have already seen, there are those at both ends of the political spectrum who would use this spill to push their narrowly-focused agenda for America's energy policy. Coal has been a part of America's economic engine for all the years of our industrial might, and will likely play a role alongside solar, wind and other alternative energies as we work towards a cleaner world and freedom from foreign oil. To be sure, our economic and national security depend on this. However, I would ask that as this worthwhile debate plays out, that we not let it distract from the pressing needs of the people in Kingston.

Again, I want to thank the Members of this Committee, Chairman Oberstar and Chairwoman Johnson for allowing me to be here today. There is plenty of work yet undone to restore the site at Kingston, and still more to forge a clear path for a bright, new energy policy for America. It is my sincere hope that we will continue to discuss these issues as we are today. I have no doubt that with the efforts of committed men and women like those who have assembled here, we can see these efforts come to light.



Statement of Rep. Harry Mitchell
House Transportation and Infrastructure Committee
Subcommittee on Water Resources and Environment
3/31/09

--Thank you Madam Chair.

--As you know, this subcommittee has a responsibility to protect our nation's water resources.

--The coal ash spill at the Tennessee Valley Authority's (TVA) Kingston Fossil Plant put water resources at risk, and I believe it is appropriate for us to examine not only how and why this happened, but how we can avoid another such spill in the future.

--I look forward to hearing from today's witnesses.

--I yield back.

STATEMENT OF
THE HONORABLE JAMES L. OBERSTAR
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT
HEARING ON THE TENNESSEE VALLEY AUTHORITY'S KINGSTON ASH SLIDE: POTENTIAL WATER QUALITY IMPACTS OF COAL COMBUSTION WASTE STORAGE
MARCH 31, 2009

Chairwoman Johnson, thank you for holding today's hearing on the Tennessee Valley Authority's Kingston ash slide. Today, we have assembled an important group of witnesses that will provide us with important information regarding the ash slide, ongoing cleanup efforts, and potential water quality impacts. It is also my understanding that our distinguished colleague, Representative Lincoln Davis, will be giving a statement as well. I would like to welcome him back to the Transportation Committee and let him know that we appreciate the insight that he will bring to this hearing.

I would also like to extend a special welcome to an important witness. Ms. Sarah McCoin is a resident of the Kingston area and has seen her life dramatically altered by this disaster. Ms. McCoin, I want to thank you for being here with us today. It is awfully important to have you here to speak to the experience of the Kingston residents; I want to applaud you for your efforts and thank you again for being with us today.

The purpose of this hearing is twofold. First, we are here to examine potential causes of the coal ash spill at the Tennessee Valley Authority's Kingston Fossil Plant. Second, we are here to examine ongoing cleanup efforts and obtain information on potential water quality impacts related to the ash slide. Exerting our oversight responsibility is a necessary obligation and one that we do not take lightly. This unfortunate situation deserves our attention and I am glad that we are here today to examine where current cleanup efforts stand.

On December 22, 2008, a dike at the Tennessee Valley Authority's Kingston Fossil Plant coal ash retention pond failed. This failure caused the release of approximately 5.4 million cubic yards of fly ash into the surrounding area. According to the Tennessee Department of Environment and Conservation, over 5,000,000 cubic yards of ash were deposited into the Emory River and the creeks leading into it, while approximately 110,000 cubic yards of ash were released onto the surrounding ground area.

Do not be mistaken; this is no small amount of coal ash. In fact, US EPA has estimated that there was enough ash to cover more than 3,000 acres of land with up to one foot of ash. This is also the equivalent of filling the Capitol Dome 112 times

over with coal ash. More importantly, coal ash, depending on the geographic area where it originated, may contain many hazardous chemicals including arsenic, lead, mercury and selenium. Combining this substance with water only increases the likelihood that these hazardous chemicals will leach into the environment and negatively impact aquatic and human health.

Because of the size, magnitude, and location of this spill, it is incredibly important that it be cleaned up as quickly and effectively as possible. Some experts have said that this spill is nearly 30 times larger than the initial Exxon Valdez spill and that it will take years to clean.

Madam Chairwoman, our review of the facts surrounding the ash spill must not take place in a vacuum, but must be understood in the context of the history of this event, and at this site. It is my understanding that in 2003 and 2006, "excessive seepage" occurred at this very same retention pond. I have also been told that TVA officials dismissed some proposed remedies to address these failures because they were deemed too costly. To me, there could not be a more illustrative example of the importance for maintaining our existing infrastructure. Had these 'more costly' measures been implemented, we might not be here today.

In addition to the damage caused by this spill to the environment, initial estimates have said that the short-term cleanup could cost nearly $825 million. There will be addition long-term cleanup costs. The lesson to be learned here is that saving a dollar or two in the near term may prove to be very costly in the long run when it comes to our nation's infrastructure.

It is also my understanding that no less than three weeks after the Kingston incident, on January 9, 2009, a leak occurred at TVA's Widows Creek Facility located in Alabama. This leak took place at a gypsum holding pond and resulted in the discharge of an estimated 5,000 cubic yards of gypsum slurry into Widows' Creek. This spill and the much larger spill have gotten the attention of this body, and of the nation.

There is, however, a silver lining. The Kingston collapse has opened our eyes to the issue of coal combustion waste storage and highlighted the need for us to pay attention to it. The Administration has vowed to look into the matter and I can assure that the Congress will also be watching and that we will step in if more needs to be done. We have seen that there are risks associated with the storage of coal combustion waste. We will do what is needed to protect the public from the ill effects of improper and unplanned storage.

Last year, the Tennessee Valley Authority celebrated its 75th Anniversary. In fact, as part of the New Deal, President Franklin Delano Roosevelt signed legislation creating TVA on May 1, 1933 and helped our nation's economy rise from the depths of the Great Depression. TVA was a poster child. Hopefully TVA will use this occasion to renew their commitment to public service by developing a strong program of environmental stewardship.

I welcome our witnesses here today and am pleased that we are here to examine this incredibly important issue.

House Committee on Transportation and Infrastructure
Subcommittee of Water Resources and Environment Hearing
Testimony of Renée Victoria Hoyos
Executive Director
Tennessee Clean Water Network
March 31, 2009

Introduction

My name is Renée Victoria Hoyos, I am the executive director of the Tennessee Clean Water Network and the President of the Board of the national Clean Water Network. The Tennessee Clean Water Network's mission is to empower Tennesseans to claim their right to clean water and healthy communities by fostering civic engagement, building coalitions and advancing water policy for a sustainable future. We are located in Knoxville, Tennessee.

The Kingston Coal Fly Ash Disaster that occurred on December 22, 2008 is unprecedented in size and scope – 5.4 million cubic yards of coal fly ash spread over 300 acres of the Emory River and adjacent land. Although it is tempting to say that TVA is moving through uncharted territory, there have been other spills at coal ash ponds throughout the U.S. These spills have been considerably smaller. In 2005, Pennsylvania experienced a coal fly ash spill into the Delaware River and in 2002, Georgia experienced a spill into Euralee Creek. Immediately following TVA's December 22 disaster, a spill occurred at TVA's Widows Creek plant from a coal ash and gypsum pond. And just recently, on March 9, 2009, Maryland was visited with a coal ash spill that was creeping its way to Washington, D.C. before it was contained. Numerous other coal ash ponds have released their toxic contaminants, not through catastrophic spills, but slowly into underlying groundwater, such as at PPL's plant in Colstrip, Montana and at Duke's Gibson Generating Station in Indiana.

The disaster in Tennessee brings to light three substantial problems that the Network respectfully requests this Subcommittee to consider: (1) the urgent need for greater oversight of the TVA clean up in view of the substantial threat to health and the environment; (2) the need to prohibit the disposal of wet coal ash in waste ponds throughout the U.S.; and (3) the need to improve enforcement and strengthen regulations under the Clean Water Act (CWA) at coal-fired power plants.

Many lessons have been learned during these spills and releases, yet TVA has resisted assistance from experts from the field and held to the notion that getting into that river with hundreds of pieces of heavy dredging machinery is the best solution. We believe that this is an outdated and outmoded solution with known hazards that have been identified and ignored by both TVA and the agencies that regulate their activities. Current laws do not deal adequately with the potential and known hazards of coal fly ash. Enforcement is lax and permit writing relies too heavily on the applicant's concerns

outweighing the environmental objectives of the National Pollution Discharge Elimination System's (NPDES) goals.

Oversight and Regulation

Of great concern to the Network and its members is the lack of consistent regulatory oversight of the ponds and their discharges.

First, it is unclear if TVA is conducting this clean up under NEPA or the EPA's regulatory system. In order to fast track the dredging plan, TVA created an Environmental Assessment with a Finding of No Significant Impact. Frankly, there is significant impact to the river by dredging. TVA neither offered other solutions to dredging nor sought experts to assist them with issues that arose. We arranged for experts to advise both TVA and the agencies overseeing the clean up, but their services were rebuffed in favor of a dredging plan that is incomplete.

Current federal regulations have failed to address the hazardous nature of coal fly ash. By punting to the states, EPA has deferred responsibility for the regulation of coal fly ash. On at least two occasions, EPA has looked at this issue and each time chose not to further regulate coal fly ash. The Obama Administration will now consider regulating coal fly ash, which we heartily approve. However, EPA appears to have a hands off approach to TVA and is unwilling to call TVA to task for the spill, the inadequate response and the hastily constructed dredge plan.

The state agency, the Tennessee Department of Environment and Conservation (TDEC), fares no better in our estimation. The state NPDES permit was woeful in its lack of permit limits on the discharge from the dredge pond. TVA was only required to test for pH and total suspended solids. It is well known that heavy metals and radioactive material reside in coal fly ash[1], yet TVA was never required to test for them from their pond outfalls. Furthermore, the permit identified that a visual inspection of the pond dikes and toe areas be preformed quarterly by TVA and reports submitted annually to TDEC[2]. However, the permit does not indicate any action that TDEC was required to perform if it was known that there were problems with the dike. A report dated February 2008[3] indicated that there were problems with the pond walls. TDEC had a copy of this report in their files. The NPDES permit had expired in August of 2008. TVA was operating under the conditions of the expired permit in the absence of a new permit.

The lack of enforcement by state and federal agencies is disappointing and of great concern to the Network. The state's Commissioner's Order requested implementation of measures to prevent movement of ash into waters of the state, support for TDEC's review of all documents (we believe this to mean financial support), existing studies to explain how the dike failed, support (again, we believe this to mean financial support) and cooperation on an assessment of the impacts of the ash spill, a corrective action plan (CAP) that had no timelines, various requests for other documents and meetings all to be repeated until TDEC deemed no longer necessary. TVA could request a time extension for any deadline and have it granted based on good faith. TDEC requested a laundry list of items for which they would be reimbursed. There were no

[1] Radioactive Elements in Coal and Fly Ash: Abundance, Forms, and Environmental Significance, Fact Sheet FS-163-97, USGS Central Valley Region, October 1997.
[2] State of Tennessee NPDES permit, No. TN0005452, TVA- Kingston Fossil Fuel Plant, Expired August 31, 2008.
[3] Annual Ash Pond Dike Stability Inspection, 2008, Tennessee Valley Authority, prepared by Jamie Dobson, February 15, 2008.

financial penalties to TVA who has been in violation of their permit since December 22, 2008 while state law allows for a $10,000/day[4] for every day the violation occurs.

EPA has not issued any enforcement actions to our knowledge. EPA acknowledged that TVA violated the Clean Water Act, but it assessed no penalty for the massive release of pollutants to the Emory River.

Concerns regarding the TVA dredge plan, phase I

We think the current dredging plan has an inadequate method for dealing with contamination of heavy metals throughout the activities of Phase I. The plan does not take into account other technologies for ash removal, nor does it have adequate plans for contingencies.

We are concerned about heavy metal contamination. Our experts have stated to the agencies that a turbidity curtain will not keep toxic metals from escaping the site and drifting downstream. While the plan cites "turbidity curtains and/or other engineering controls", but does not specify what those controls are[5].

Phase I is only concerned with dredging: developing a dredging plan, develop dredging methods; dredging the Emory; describe best management practices to control the effects on water quality from dredging; and, provide guidance for sampling, monitoring and analysis of the dredging operations[6]. No where does the plan allow for the exploration of other recovery technologies.

Water quality monitoring specified in the phase I plan is inadequate giving the knowledge that heavy metals and radioactivity exist in coal fly ash. Only pH, turbidity, temperature, dissolved oxygen and conductivity[7] will be monitored. There is no mention of heavy metals and therefore no plan to deal with a toxic event should it occur. The only contingency in the plan is to increase testing further downstream should turbidity numbers rise above 20 ntus. While the plan states that they may add other constituents for testing, the only ones named are chlordane and PCBs[8].

The ash dewatering plan brings up a concern that sluicing operations will allow heavy metals to be reintroduced to the Emory River via the temporary storage dredged material in the Ball Field area located south of the plant. To our knowledge there is no permit for the discharge of the sluice water at this site nor are there plans to monitor for heavy metals. Monitoring these ponds, according to the plan, is reduced to "visual observations" for "objectionable turbidity". Unlike the monitoring regimen during the construction phase, there is no number of turbidity units that would trigger an action.[9]

Curiously, a table of heavy metals found in coal combustion waste appears in the phase I dredging plan[10]. There is a mention of data "assessed and compared to the TDEC Fish and Aquatic Life Use Classification". We're not sure what this means. Use Classification is a list of rivers and their subsequent uses. We think they might be

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[4] Tennessee Code Annotated section 69-3-115. Violations — Penalties — Judgment by consent.
[5] Phase I Emory Dredging Plan, Kingston Fossil Plant Ash Recovery Project. Tennessee Department of Conservation Commissioner's Order OCG09-001. Prepared by Shaw Environmental, Inc. 312 Director's Drive, Knoxville, TN 37923. Page 1-1.
[6] Ibid. page 1-2
[7] Ibid. page 4-3.
[8] Ibid. page 5-2.
[9] Ibid page 5-3
[10] Ibid page 5-5

referring to Fish and Aquatic Life Criteria, because they list the criteria in a following table. Yet, there is no indication of how or when they would test for these constituents.

In short, we find the dredge plant to be an oversimplified attempt to deal with the size of the dredging project. It does not entertain any other option but dredging. It ignores the effects of heavy metal contamination to the Emory, Clinch and possibly Tennessee Rivers. It contains no plan for ameliorating effects of heavy metals on the river systems. It simply gets the ash out fast.

The dredging of the Emory River commenced on March 20, 2009. It started a full week earlier than originally planned. The community was informed on March 20, 2009 at 2:00 pm that the dredging had started.

Flooding

One of the primary concerns that TDEC has articulated is the fear of flooding. This is perhaps why the dredging started one full week prior to the schedule dredging start date. While we are sympathetic to the concerns of flooding, there is no way that it can be avoided.

According to TVA, approximately half of the coal ash sludge released was deposited in the Emory River filling the channel to a depth of as much as 26 feet. TVA also partially dammed the Emory near its mouth by building a rock dam to prevent coal ash from being carried downstream by the current. Both the reduction in channel depth and the dam have created an increased risk of flooding upstream on the Emory River, which has no dams upstream to regulate flow. TVA acknowledged this by notifying riparian property owners upstream that the 100-year floodplain had been raised on their property (see attached).

The TVA coal ash release happened at a time when Watts Bar Reservoir, of which the lower Emory River is a part, was at its winter pool level, which is normally about 735 - 737 feet above sea level. Beginning in April TVA typically raises the level to summer pool levels, which are about 740 - 741 feet above sea level (http://www.tva.com/river/lakeinfo/op_guides/wattsbar.htm, accessed 3/27/09). This 4-to-5-foot increase in water level, together with the ash and the dam in the Emory River, has further increased concerns about flooding at a time when spring rains have started.

Furthermore, once the water levels increase, much of the coal ash along that is now above the water level along the shoreline of the Emory will be submerged and will be subject to transport with the current and further leaching of heavy metals. There is also a question of what is going to happen to the ash in the Swan Pond Embayment where a dam has been built once Watts Bar Reservoir is brought up to its summer pool level. Will all of this ash be submerged and subject to leaching of heavy metals?

Wet pond storage

The pond that failed was a wet storage pond. This method of storage of coal combustion waste is very risky. Of concern for the Network is the volume of water flowing through the sluice channels. For the sluicing of bottom ash alone, plants average almost 8.5 million gallons of water a day to process this waste. This water is exposed to

25 metals[11] all of which are toxic to humans and wildlife at certain doses. Aside from with the dangers of catastrophic failure of the structure, it is well known that these unlined, unregulated ponds contaminate ground water, pose human health risks and can irreparably harm wildlife as seen by the December 22nd disaster.

There are other technologies for handing coal combustion waste: chemical precipitation, aerobic and anaerobic biological treatment, constructed wetlands, zero-discharge technologies, all of which have been known and used throughout the United States since the 1980's. With these existing technologies, we no longer need wet storage of coal combustion wastes at any of our facilities. Certainly the amount of money needed to convert this and other TVA ponds to newer, less polluting technologies and thus preventing the disaster of December 22nd, seems minisculely low now that the clean up is underway at about $1M/day[12]. From January 1 – March 31, TVA has spent at least $90 million dollars. That's enough for almost three dry storage ponds or the purchase and installation of 18 pond liners[13]. Considering that the clean up may well last for years and is estimated to cost almost $1B, an investment in prevention may have prevented the disaster and been returned to the ratepayers within the year.

Water quality concerns

Currently, the Network's biggest water quality concern is the possibility that catastrophic selenium contamination that may occur if the current dredging plan moves forward. Selenium is a chemical element closely related to and often behaving like sulfur. In fact, most of its negative health impacts are due to excessive levels of selenium resulting in the substitution of selenium in place of sulfur in critical enzyme systems. When that substitution occurs, the enzyme systems do not function properly, and health is impaired.

Interestingly, selenium is an essential trace nutrient for humans and mammals. Its essential roles are subtle and the nutritional needs are low. Selenium is unusual in that the difference between the concentrations at which it is essential and at which it becomes toxic is very narrow. It is regarded as essential at levels of 55-70 micrograms per day (for adult humans), and becomes potentially toxic at levels only 5 to 10 times higher. The toxicology of selenium, like arsenic and antimony, is not well understood. It is apparently relatively easily removed from drinking water through relatively common water treatment practices.

Aquatic organisms are far more sensitive to environmental selenium exposures than land mammals. This is presumably due to the fact that they are in constant, intimate contact with water. Selenium accumulates in fish tissues through the food chain. Consequently, even if selenium at low levels is chronically present, it can accumulate to toxic levels in the tissues of fish and other aquatic organisms. There are numerous documented cases of lakes and streams that biologically collapsed due to chronic selenium exposure from coal ash.

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[11] Steam Electric Power Generating Point Source Category: 2007/2008 Detailed Study Report, US EPA, Engineering and Analysis Division, Office of Water, 1200 Pennsylvania Ave, Washington DC, 20460, August 2008. pps 3-46 – 3-59

[12] Barker, Scott. "TVA welcomes state's oversight of coal-ash cleanup." The Knoxville News Sentinel. January 13, 2009.

[13] Paine, Anne. "TVA rejected costly fixes." *The Tennessean*. January 1, 2009. http://www.tennessean.com/apps/pbcs.dll/article?AID=2009901040392.

Dr. Bryce Payne has put forward his concerns from 15 years of working on coal fly ash regarding Se contamination both to the local community and to agencies working on this spill (see letter to Bob Tanner attached). According to Dr. Payne, the perfect conditions exist for Se contamination that has the potential to kill aquatic life in the Emory River and far into the Tennessee River if steps are not taken to reduce oxidation of the ash that may be caused by dredging. TVA and the Tennessee Department of Environment and Conservation were presented with the letter, participated in a conference call with selenium experts from around the country, heard all the concerns and then discarded them in favor of the approved dredging plan.

Dr. Payne's major concern is that dredging introduces oxygen into the ash pile. By oxygenating Se, it becomes more toxic. It becomes selenite – which binds to particles and is taken out of solution. If it becomes selenate, it does not bind to particles and is small enough to slip through turbidity curtains. Once it gets away there is nothing that can be done to recover it. It can flow down the river with the current for miles severely damaging aquatic life. We want to make sure that this doesn't happen.

Other water quality problems were seen almost immediately following the disaster. Preliminary data collected on January 8-9, 2009 by researchers from Appalachian State University and the Upper Watauga Riverkeepers Alliance indicated that six of seventeen heavy metals were found at levels that exceeded water quality standards for aquatic life criteria, including arsenic, barium, cadmium, copper, lead and selenium. Elevated levels of copper were observed in both the Clinch and Emory rivers. With the exception of copper, samples collected upstream and downstream of the ash spill area did not exhibit water quality violations for heavy metals. Due to the geology of the area it is probably only a matter of time before heavy metal intrusion in drinking wells will be found.

At the site of the spill from data collected January 8-9, 2009, Appalachian State researchers observed numerous fish with clogged gills. Healthy fish gills will look feathery and display a dark red color, but the fish closest to the site had gills that were dark brown, clumped and filled with ash. Fish absorb oxygen directly from the water across their gills, so if the gills are bunched and coated with sediment or ash, the fish will suffocate. In addition, several fish were observed with scrapes and lost scales. Both are conditions that may be attributed to stress or degraded water quality. The gut, intestines and anal cavity of one channel catfish was filled with ash. Three dead fish were observed downstream of the spill, but mortality was not discerned due to their advanced state of decomposition[14].

Analyses of metals from gill, gonad, liver, spleen, muscle, gastric caeca, and stomachs of fish collected 2 weeks following the spill from the Emory River near the spill indicated substantial bioaccumulation of metals (especially lead and selenium)[6]. Of greatest concern, the levels of selenium in the fish gonads are at and beyond the known threshold of toxic impact for embryos. This indicates that either the fish had already taken up much of the selenium released to the ecosystem following the spill, or more likely, that they had accumulated it from the long-term release of selenium from the wet ash storage ponds at the TVA facility. Further release of selenium by the dredging of ash

[14] Draft Preliminary Summary Report from Water, Sediment and Fish samples collected at the TVA Ash Spill on January 8th and 9th, 2009 by Appalachian State University, Appalachian Voices, Tennessee Aquarium and Wake Forest University. Unpublished. 2009.

from the Emory River and subsequent uptake by the biota in the aquatic ecosystem could push the fish gonad concentrations of this metal to the point of complete reproductive failure[15].

Human health concerns

The Tennessee Department of Health (TDH) conducted a "health consultation" instead of a public health assessment in the area two weeks after the spill. They concluded after several more weeks that few people reported increased health problems and that some of the reported increases may be due to stress. TDH was slow to respond and appeared to not have an emergency contingency plan in place to respond to a crisis of this magnitude. While we do agree that stress was very high immediately following the spill and that a health consultation may be appropriate for short-term exposure, we are concerned that long-term effects of the spill are being ignored and feel that a full public health assessment is necessary to protect public health. There have been at least three requests of the Agency for Toxic Substances and Disease Registry (ATSDR) for a full public health assessment, which we feel is more appropriate given the scale of this event. (See Letter to ATSDR, March 9, 2009, attached.) To date, the ATSDR has not responded. ATSDR has the experience and the resources to conduct such an assessment, which is much needed. Furthermore, we have concerns that for many years prior to the spill people have been eating fish contaminated by heavy metals from discharge from the pond and may have health effects associated with long-term exposure to heavy metals.

One of the greatest health concerns the community has is breathing particulate matter from the spill site. Rapid drying and dusting can inundate the local community causing increases in respiratory problems such as asthma. Many residents complain of coughs that do not subside. There is little confidence that TVA can control for dust. The sheer size of the spill and increase in exposed surface area of the ash make dust control nearly impossible. Current attempts to seed and stabilize the site with straw have been futile with these materials carried downstream and built up on the banks of the river.

Testing of the coal ash at the disaster site reveals that a significant percentage of the ash (approximately 40 percent) contains particles smaller than 10 micrometers. It is well known that particles less than 10 micrometers in diameter pose a health concern because they can be inhaled into and accumulate in the respiratory system. Particles less than 2.5 micrometers in diameter are believed to pose the greatest health risks. Because of their small size (approximately 1/30th the average width of a human hair), fine particles can lodge deeply into the lungs. The tests of the Kingston ash reveal that 20 percent of the ash is comprised of such fine particles. We believe that the presence of these fine particles in the millions of tons of ash that sits in Swan Lake Embayment and along the shoreline on residential properties poses a grave hazard to human health, which will increase dramatically as the ash dries and temperatures increase. This risk has not been acknowledged by the Tennessee Department of Health. In fact, at the recent public meeting on March 5, 2009, the TDH declared erroneously that "[i]nhalation of the coal ash dust would have the same health affects as breathing other types of dust." (TDH's March 5, 2009 slide presentation is available at

[15] Draft Preliminary Summary Report from Water, Sediment and Fish samples collected at the TVA Ash Spill on January 8th and 9th, 2009 by Appalachian State University, Appalachian Voices, Tennessee Aquarium and Wake Forest University. Unpublished. 2009.

http://www.state.tn.us/environment/kingston/pdf/comm_guid/030509RoaneCoMtgHealth.pdf)

Further, at the March 5 meeting, the Tennessee Department of Health made another surprising and erroneous statement-- that the form of As found in the ash was not harmful and in fact could be ingested with no harm. We find this to be an outrageous, dangerous and unfounded claim. (See http://www.state.tn.us/environment/kingston/pdf/comm_guid/030509RoaneCoMtgHealth.pdf at 12.) Lastly, one TDEC employee volunteered to swim the Emory River this summer to indicate that the river was safe for recreation - yet another outrageous remark leading us to believe that the agencies in charge of this work lack the necessary skills to adequately address the community's concerns.

In view of the above, it is abundantly clear that immediate intervention and oversight by agencies with more experience with disasters of this magnitude, like the ATSDR and EPA, is essential to protecting public health.

Denial of meaningful public participation

At the March 5th meeting in Harriman, TN, put together by state and federal agencies, the community was not allowed to ask questions of the speakers directly. They were instructed to put their questions on 3x5 cards. They were told that the cards would be grouped by subject and that they would take questions from the cards. The agencies talked for so long that there was no time for a question-and-answer session. The agencies took four questions from the cards, sorting through them until they found a question that they wanted to answer. Though the agencies agreed to stay later to answer any and all questions, three hours had elapsed, and people grew weary and left without asking their questions. No follow-up meeting was scheduled.

Clearly the current process allows no way for the affected community to participate meaningfully in the decision making process or to have their voices effectively heard. Because the state and TVA are making up the process as they go along, the public is shut out. If this disaster was treated as a federal superfund site, TVA would be required to comply with the National Contingency Plan (NCP), which provides a very clear and important role for the affected community. Under the NCP, a Community Involvement Plan must be created, public information repositories are established in the affected community, public meetings are held at all critical decision points, and public comment is solicited and considered prior to all major decisions. In addition, under Superfund, communities have the right to request Technical Assistance Grants, whereby citizens can hire their own technical advisor to guide them through the clean up process and help them to participate meaningfully.

Our community needs to be heard and to participate in the decisions that so gravely threaten our health and environment. We do not believe that meaningful opportunity will be afforded to us outside the Superfund regulatory process. If TDEC and TVA are allowed to continue to address this major disaster site in a haphazard manner– cherry-picking mechanisms from NEPA, CERCLA and RCRA as they please, this multi-year, billion dollar cleanup will not have the benefit of valuable input from the community and it is guaranteed that their needs will not be adequately served.

The Network's vision is that Tennessee has environmental laws that are models for the nation, but those laws have a genesis in federal law. Without proper guidance from federal agencies such as the EPA, states are unable and unwilling to step past federal floors to create and enforce rules that are stricter than federal standards or strike their own paths towards greater environmental protection when EPA is silent. Our vision is for every Tennessean to know and exercise their rights to clean water and healthy communities. For these reasons, we respectfully ask that this committee 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 and to treat this disaster as a national superfund site with all the community benefits it affords. Specifically, we request the following from the committee:

1. *Advise EPA to regulate coal fly ash as hazardous waste so that disposal of fly ash can be done safely.*
   While we acknowledge that some of the fly ash can be recycled, the market is saturated and until there is a time when new markets open up for the reuse of fly ash it must be disposed in a properly sited landfill with a composite liner, leachate collection system, groundwater monitoring, post-closure care, and adequate financial assurance.

2. *Advise EPA to apply Superfund law at the disaster site*
   Requiring cleanup under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) will ensure a more timely and complete cleanup and would facilitate meaningful public participation. Under this law, communities may be eligible for EPA grants in order to hire technical experts to assist them. Knowledgeable communities can be advocates for new technologies and greater scientific scrutiny. TVA will also be required to pay for a third party independent technical expert of the community's choice. Requiring TVA to follow the National Contingency Plan under CERCLA will help to ensure that the cleanup is accomplished according to the most stringent environmental standards and with meaningful public participation in all major decisions. Lastly, EPA should employ the Hazard Ranking System to score the site to determine its eligibility for listing on the National Priorities List.

3. *Require the creation of an Interagency Task Force to oversee the disaster cleanup.*

4. *Require that the final four TVA board members that will be chosen to fill vacancies have environmental and social justice backgrounds.*
   Compel TVA to diligently and effectively perform its duties under its federal charter and mission to serve the public good and to support the well being and the development of the Tennessee Valley instead of working to expand and strengthen its own institutional interests.

   Here are a few excerpts from their values statement:
   - We value the safety of our employees and the public we serve.
   - We show our commitment to safety in our behavior, performance, leadership, and teamwork.
   - We are responsible for safety – our own, our teammates', and the public's.
   - We think about safety 24/7 – at home and at work.

- We intervene to stop unsafe behavior or conditions, and appreciate others intervening for us
- We work on the right things.
- We set high standards and goals based on external benchmarks.

TVA has strayed far from their mission and values.

5. *Require TVA to convert the Kingston Plant, as well as all of its 11 coal-fired power plants, to dry disposal of ash in engineered landfills*
   Storage of coal ash in wet ponds poses a substantial threat of catastrophic failure and of the migration of pollutants into underlying groundwater. Dry disposal of coal ash in engineered landfills greatly reduces these threats. TVA should be required to close all of its existing ponds by removing and disposing of the ash in landfills or demonstrating that the ponds pose no short or long-term threats to human health and the environment.

6. *Require EPA to adopt a "zero discharge" rule for coal combustion waste storage and disposal units at coal-fired power plants and require that Kingston's NPDES permit be revised to prevent further discharge of pollutants from the existing ponds;*
   Since it is well known that heavy metals and radioactive material exist in coal fly ash ponds this is a reasonable request that should be made to all ponds in the TVA watershed.

7. *Request that ATSDR conduct a public health assessment*
   A letter was sent on March 9, 2009 on behalf of citizens, scientists and environmental groupsto ATSDR to request a public health assessment, pursuant to section 104(i)(6)(B) of CERCLA. To date no health assessment from ATSDR, nor any response to the citizen petition, has been forthcoming

8. *Request that EPA enforce with fines and penalties on TVA for violating their permit and the Clean Water Act.*
   Enable and support competent, rigorous interpretation, application and enforcement of coal combustion waste and water quality protection laws and regulations.

9. *Require that TVA is liable for damages as a result of this unparalleled public health and environmental disaster.*
   Although the Tennessee Valley Authority Act makes it clear that TVA "may sue and be sued in its corporate name," 16 U.S.C. 831(c), TVA intends to claim that it is immune by virtue of sovereign immunity to being sued for damages for the coal ash disaster. The 4th Circuit Court of Appeals, however, recently held this language in the TVA Act is a "broad waiver of sovereign immunity" and that "it must be presumed that when Congress launched a governmental agency into the commercial world and endowed it with authority to 'sue or be sued,' that agency is not less amenable to judicial process than a private enterprise under like circumstances would be." *North Carolina v. TVA*, 515 F.3d 344, 348-49 (4th Cir. 2008). Congress exempted TVA from the Federal Tort Claims Act, 28 U.S.C. § 2680(l), which applies to federal agencies, because it intended that legal claims "be exercised against the Tennessee Valley Authority exactly as they could have been exercised against ... private utility companies." 79 Cong. Rec. 6563-64 (1946).

TVA has stated that it intends to claim that its release of over 5 million cubic yards of coal ash sludge into the Emory River and the surrounding community was a "discretionary function" in its role as a government agency dealing with matters of government policy. There is no "discretionary function" exemption in the TVA Act's "sue and be sued" language, as there is in the waiver of sovereign immunity in the Federal Tort Claims Act. 28 U.S.C. § 2680(a). Putting legal hairsplitting aside, this argument is an affront to property owners who have suffered for over three months with sludge on their property and coal ash blowing around their neighborhoods.

TVA has not addressed the health concerns of the community or the emotional toll of life in a disaster zone and has only purchased properties in the most immediate area of impact and without any apparent rationale as to which properties are being purchased and which are not. If TVA is not going to comprehensively address the impacts of this disaster on the community, their only resource is through the courts.

In conclusion, I'd like to thank Chairwoman Johnson and the members of this committee for holding these hearings and giving me the opportunity to testify today. I hope that this is the first of many steps we will take into the future to repair the damage caused by this disaster and implement the preventative measures needed to ensure that this never happens again to any community in the United States.

Sincerely,

Renée Victoria Hoyos
Executive Director
Tennessee Clean Water Network

Attachments:

TO: Robert Tanner (EPW)
FROM: Bryce Payne, PhD

SUBJECT: Response to your request for a non-technical summary of information on "the dangers of selenium" (relevant to the TVA Kingston coal fly ash spill and related coal fly ash issues).

Bob,

For the sake of time I have not spell checked or otherwise thoroughly edited this communication, so bear with any such needed corrections. For the same reason, I have not waited for review by my colleagues before sending this along to you. I am CCing it to them and if there are any comments or qualifications they would like to make they can direct them to you, or me and I will pass them on to you.

For informational purposes, if you have not already done so, you might also want to look at the EPA info page on selenium health implications at http://www.epa.gov/tin/atw/hlthef/selenium.html.

Selenium is a chemical element closely related to and often behaving like sulfur. In fact, most of its negative health impacts are due to excessive levels of selenium resulting in the substitution of selenium in place of sulfur in critical enzyme systems. When that substitution occurs, the enzyme systems do not function properly and health is impaired.

Interestingly, selenium is an essential trace nutrient for humans and mammals. Its essential roles are subtle and the nutritional needs are low. Selenium is unusual in that the difference between the concentrations at which it is essential and at which it becomes toxic is very narrow. It is regarded as essential at levels of 55-70 micrograms per day (for adult humans), and becomes potentially toxic at levels only 5 to 10 times higher. The toxicology of selenium, like arsenic and antimony, is not well understood. It is apparently relatively easily removed from drinking water through relatively common water treatment practices.

Aquatic organisms are more sensitive to environmental selenium exposures than land mammals. This is presumably due to the fact that they are in constant, intimate contact with water. Selenium accumulates in fish tissues. Consequently, even if selenium at relatively low levels is chronically present, it can accumulate to toxic levels in the tissues of fish and other aquatic organisms. There are numerous documented cases of lakes and streams that biologically collapsed due to chronic selenium exposure.

The environmental chemistry of selenium is complex, but constraining the discussion to selenium associated with coal fly ash (CFA) simplifies the discussion. There are only two forms of selenium typically associated with CFA, selenite and selenate.

In the coal furnace the selenium in coal is burned to the form of selenate, most of which is incorporated into the glass which very nearly all coal fly ash particles are made of. Some of the selenate formed in the furnace is not fused into the CFA glass and remains soluble. The soluble portion, perhaps 0.1 to 1% of the total selenium, is dissolved by the slurry water used to carry the ash from the power plant to the ash settling pond. When the ash settles in the pond, the slurry water carries that dissolved selenium into the water body receiving the effluent from the pond. This can be, and in the TVA Kingston case does appear to be, a substantial amount of selenium.

Once the ash has settled into the pond, normal mineral weathering of the CFA glass begins. This is a natural and unavoidable process (see SOME BASIC CHEMISTRY AND COAL FLY ASH below). During weathering the major elements, aluminum, iron, oxygen, and silicon, dissolve and recrystallize to form stable, crystalline compounds called secondary minerals. These secondary minerals form as extremely small particles, often apparent as accumulating deposits on the CFA glass particles. Because they are so small and mineralogically young, they may be relatively easily dislodged from the CFA particles surfaces if physical disturbance of the ash occurs.

Minor and trace elements, like selenium and arsenic, are also dissolved during the weathering process. These trace elements do not fit into the crystalline structure of the forming secondary minerals. So, they tend to remain in solution. Since there is limited or no movement of water in the ponded ash, these minor elements undergo their own changes in response to their new chemical environment. In the case of selenium, and mostly because of restricted oxygen supplies, the dominant selenium form changes from selenate to selenite.

As it turns out, the surfaces of the forming secondary minerals have a strong adsorptive affinity for selenite (and related forms of arsenic). Once present, the secondary minerals begin to adsorb all or nearly all the dissolved selenium in the ash pond. We now have, because of electron microscopy work by Shea Tuberty and colleagues at Appalachian State University on TVA spilled ash, direct measurements indicating that the secondary minerals may contain 250 or more times the concentration of arsenic in the original CFA particles. At this time we do not have such direct measurements for selenium due to its relatively lower concentrations and limited opportunities for data collection (only two electron microscopy efforts to date).

As long as the ash is not disturbed the selenium (and arsenic) remains fairly tightly bound to the secondary minerals attached to the ash particle surfaces. If, however, the ponded ash is disturbed so that either oxygen levels increase, or the small secondary mineral particles are dislodged and moved to areas with higher oxygen levels, the selenium stabilizing process is undone. The selenite converts back to selenate. The adsorptive affinity of the secondary minerals for selenate is about 10 times less than for selenite. So,

the selenium is no longer adsorbed by the secondary minerals, and dissolved selenium levels rise. How high and how fast depend on a number of factors, but the amount released can be considerable.

The danger now presented by the TVA spill dredging clean up plans can be appreciated in terms of selenium. Fish tissue samples taken and analyzed so far (again Appalachian State University data) suggest the fish in the Emory and probably Clinch Rivers already contain toxic levels of selenium. Inferences I have made from very limited data suggest the local sediments in the river might have contained substantial selenium before the ash spill, presumably from 50 years of discharging ash settling pond water into the river. The fish and similarly vulnerable biota in the Emory-Clinch river system simply will not be able to tolerate an additional selenium load.

The planned TVA conventional dredging operation will optimize conditions for selenium release. There will be intense mechanical disturbance of the ash deposits in the river by the dredge machinery. During that disturbance the secondary mineral particles will be dislodged and the ash will be intimately mixed with well oxygenated river water, raising the oxygen exposure of the selenite adsorbed on the secondary minerals. The transformation from selenite to selenate will begin shortly thereafter and continue as long as the oxygen levels remain elevated. There is nothing in the TVA dredge plan to indicate that the ash processing or temporary storage measures will do anything but further the increase to more oxygenated conditions and sustain the selenite-to-selenate conversion and consequent release of dissolved selenium. The plan even suggests that dissolved metals might be removed during processing of dredged ash through the ash settling pond. At least in the case of selenium, dissolved levels should be expected to increase.

To complicate the situation further, there is often a delay between the initial change to more oxygenated conditions and the actual appearance of increases in dissolved selenium. Experience suggests the delay under field conditions might be in the range of 1 to 2 months, perhaps less, perhaps more. The important point is that if there is such a delay before unacceptable increases in dissolved selenium levels are recognized, and even if dredging were halted entirely in response, nothing could be done to prevent the release of most of the selenium in the ash already dredged to that point. That is, as far as selenium goes, if there are toxic impacts, there is no backing up or undoing those impacts of a conventional dredging operation once it has moved any substantial amount of ash. In fact, because the selenium release rate will lag behind and be slow relative to the rate at which dredged ash will accumulate, it can be reasonably expected that once selenium levels start to rise, the rise will continue to get faster each day that dredging continues and for some time after it stops.

Still another complication is the dislodging of the very fine secondary mineral particles from the original ash particles. Field experience suggests that these particles are so fine that presence of substantial amounts may not be apparent to visual observation. They will likely either readily pass through or clog up silt curtains. They are too small to settle out of suspension and may drift downstream unobserved for unpredictable, and

potentially long distances. They can be expected to be substantially enriched with selenium and arsenic compared to the original ash particles. It is reasonable to expect that one or the other or both these toxic elements will become dissolved at some point along the released particles journey. At present we do not know how much of these very small secondary mineral particles there are, their toxic element contents or probable release rates if they escaped the dredge and ash processing confinement efforts.

Hope this helps. If you need anything further, let me know and I will do what I can to help.

When you would like to discuss alternatives to the planned dredging give me a call.

Regards,
Bryce Payne, PhD
Consulting Soil/Environmental Scientist
215 234-2580 cell 215 272-0124

SOME BASIC CHEMISTRY AND COAL FLY ASH
There are several aspects of the chemistry of coal fly ash (CFA) that you should consider. I will try to relate them in terms of the initial formation and subsequent transformations of CFA.

Elements are continuously forced to arrange themselves into compounds and forms that are stable in the environment in which they exist. Some compounds are unstable and when the environment changes the elements in them rapidly re-arrange themselves into compounds that are stable under the new conditions. A relevant example might be coal exposed to air. If the temperature rises to the flash point of coal, the carbon will suddenly burn, combining with oxygen in the air to form another compound, carbon dioxide. At high temperatures in air, carbon dioxide is the stable form of carbon instead of solid carbon in coal. Other compounds are more stable and the elements in them cannot re-arrange themselves so readily. A related example could be the carbon in diamond. The structure of the arrangement of carbon atoms in diamond is much more stable than in coal. Diamond will not burn at the same temperatures as coal, though it can if the temperature or pressure get high enough. So, even though a compound occurs in a form that has been around for a long time, say the mineral in a rock, if that rock is not under the same conditions in which it formed then it is changing. The elements in the rock are rearranging themselves into new compounds that are stable in the new environment. These changes are occurring all time, all around us.

CFA forms as elements and compounds when minerals vaporized from the burning coal condense in the rising flue gas. Though cooler than inside the furnace, temperatures are still high when the minerals condense. The elements condense as a hot, more or less random, liquid mixture of fused elements and compounds that were in vapor form at the location and time of condensation. That molten droplet of elements and compounds then cools quickly and solidifies to form a glass, a solid with no crystalline structure. We are all familiar with commercially produced glass, and that it is a chemically stable compound. In fact, glasses are only moderately stable. Just like everything else, once out of the hot environment in which it formed, the elements in glass try to re-arrange themselves into more stable arrangements. So, it is with CFA.

How fast the rearrangements will occur depends on how much active surface of the glass is actually exposed to the new environmental conditions. Take a pane of glass in a window as an example. Only a very small portion of the pane of glass is actually exposed to the surrounding chemical environment, probably air. The chemically exposed portion is only a very thin layer on the surface of the glass in the pane. Think about a square glass pane 1 foot by 1 foot by 1/4 inch thick. It will have a weight around 2 pounds while the two faces each expose 1 square foot of glass surface to the environment, or 2 square feet of total exposed surface areas. (To simplify I am ignoring the minor surfaces of the 1/4 inch wide edges.) Put another way we can say the glass in the pane has a surface area of 1 square foot per pound. Now if that same amount of glass were in the form of a cube, it would be about 3 1/3 inches on each face. The surface area of each face would be 3.3 inches x 3.3 inches, or close to 11 square inches. The total area of all six faces of the cube would be close to 66 square inches, or a little less than 1/2 a square foot. So the same amount of glass in the shape of a cube has only 1/4 the exposure to the environment that a 1/4-inch thick glass pane has.

Something very important happens to the amount of glass exposed to the environment when glass particles get smaller. CFA particles are glass spheres, but to make the illustration simpler let's use glass cubes and say a cubic foot of glass weighs 100 pounds. So, if we start with a 1-foot cube of glass it will weigh 100 pounds and have six faces, each with an area of 1 square foot for a total surface area of 6 square feet. That is, glass in a 1-foot cube has 6 square feet of surface for each 100 pounds. Now, if the same amount of the same glass were in the form of 1-inch glass cubes, then there would be 1728 of them. Each cube would have six 1-inch square faces and, so, a total exposed surface area of 6 square inches on each cube. All 1728 of them together would have 6 x 1728 or 10368 square inches which is 72 square feet. So, if we decrease the size of the 100 pounds of glass cubes from 1 foot to 1 inch, that is, make each side of each cube 12 times smaller, the glass surface exposed to the environment increases 12 times. This relationship is constant no matter how much smaller the cubes of glass get, and whether we talk about spheres or cubes.

Now consider the exposed surface area of CFA glass. A solid cubic foot of CFA glass will have a weight in the neighborhood of 120 pounds, and a surface area of 6 square feet. CFA glass, though, actually occurs as beads that are a few hundred to tens of thousands of times smaller than a cubic foot, or a window pane. That is, compared to say

window glass, the glass in CFA has thousands of times more surface exposed to the environment. Consequently, thousands of times more of the glass in CFA is trying to change into new forms and compounds more stable in its new environment. Glasses are pretty stable compounds, but when present in the form of very small particles, like CFA, glass can chemically change at rates faster than we perceive to be normal. On the interesting uses side, this means CFA can be mixed with common bonding agents and react quickly to form remarkably strong, concrete-like materials. I have myself prepared blends that become rock hard within a few minutes. In fact, the bonding can be so rapid that the mix is unworkable. CFA is blended into commercial concretes to improve workability and final strength.

Moving on, so we have lots of tiny glass beads with a large surface area that is probably reacting to form new, more stable compounds. What does that mean? Basically it means that the elements in CFA are constantly, though still relatively slowly, re-arranging themselves into new compounds. In soils this constant, slow change from one mineral form to another is known as weathering. If flowing water is not a prominent factor during weathering, then most of the new minerals will be crystalline because crystalline forms are usually more stable arrangements. Crystal arrangements, though, can only accommodate certain elements in their structure. Some elements in the glass simply will not fit into the forming crystalline structure. CFA glass is a more or less random collection of elements that were in the vicinity at the time the glass condensed, mostly silicon, aluminum, oxygen, and iron. These four elements have very stable crystalline mineral structures that they like to form. Other elements do not typically fit into those crystalline structures. Those elements are basically excluded as the minerals form, and have to find their own stable form in the new environment, which now includes the newly formed crystalline minerals. These phenomena are fundamentally important to understanding the potential for release of toxic elements from CFA and the behavior of selenium in and released from CFA.

TVA's Mission and Values.

TVA Mission: Serving the Valley Through Energy, Environment, and Economic Development

Our Values:

- Safety

We value the safety of our employees and the public we serve.
We show our commitment to safety in our behavior, performance, leadership, and teamwork.
We are responsible for safety – our own, our teammates', and the public's.
We think about safety 24/7 – at home and at work.
We intervene to stop unsafe behavior or conditions, and appreciate others intervening for us.

- Integrity & Respect

We treat each other with integrity and respect.
We do what we say we will do.
Our actions and words are consistent, honest, and ethical.
We work to earn each other's trust.
We value everyone and everyone's work.
We assume innocence.

- Honest Communication

We listen to understand. We speak to be understood.
We give and receive meaningful feedback.
We seek other opinions. We value different perspectives.

- Accountability

We work on the right things.
We are accountable for results.
We follow the rules. We use TVA resources wisely.

- Teamwork

We play on a bigger TVA team.
We value a diverse workforce.
We collaborate. We strive for engagement.

- Continuous Improvement

We set high standards and goals based on external benchmarks.
We are self-critical. We innovate and seek new ideas.
We investigate and solve problems. We learn from our mistakes.

- Flexibility

We welcome and adapt to change.
We respond quickly to customer needs.
March 9, 2009

Sent by email and/or fax

Sue Neurath, M.D.
Acting Administrator
Agency of Toxic Substances and Disease Registry (ATSDR)
4770 Buford Hwy NE
Atlanta, GA 30341

Re: Petition for Public Health Monitoring and Long-term Assessment of the Area Affected by the Kingston, Tennessee TVA Ash Disaster

On December 22, 2008, an impoundment for coal ash sludge failed at the TVA Kingston Fossil Fuel Plant in Roane County, Tennessee. As a result of this failure approximately 5.4 million cubic yards of coal ash sludge and contaminated water were released onto about 300 acres of land and into the Emory and Clinch rivers. The contaminated area of ground and river extends for a mile up and down the river. The majority of this waste remains in the rivers and on the land. The release continues to endanger the surrounding environment and the inhabitants of the area as well as potentially the inhabitants that live downstream and downwind of the site. The communities adjacent to the site are exposed to fly ash contamination on the ground, in the air, in their homes and along the river through numerous pathways including inhalation, ingestion, and direct contact.

Affected residents have previously submitted at least two petitions in January 2009 to the Agency for Toxic Substances and Disease Registry (ATSDR) for a health assessment. Pursuant to section 104(i)(6)(B) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA):

> The Administrator of ATSDR may perform health assessments for releases or facilities where individual persons or licensed physicians provide information that individuals have been exposed to a hazardous substance, for which the probable source of such exposure is a release. In addition to other methods (formal or informal) of providing such information, such individual persons or licensed physicians may submit a petition to the Administrator of ATSDR providing such information and requesting a health assessment. If such a petition is submitted and the Administrator of ATSDR does not initiate a health assessment, the Administrator of ATSDR shall provide a written explanation of why a health assessment is not appropriate.

42 U.S.C. § 9604(i)(6)(B). ATSDR has not yet provided a formal response to these petitions. Apparently, in response to these petitions, the Tennessee Department of Health (TDH), acting on behalf of ATSDR, has initiated a series of health consultations.

This response is clearly inadequate. TDH was slow to respond to the initial event and did not appear to have an emergency contingency plan of action in place to respond to a spill of this magnitude. Moreover, it also took them more than two weeks to enter the field to begin collecting survey information that should have been collected in a more timely fashion in the initial days following the event. Additionally, it took TDH several more weeks to release this vital information of the survey to the public. The report issued was narrow in scope and did not adequately address all the attendant health issues in question. For example, TDH has consistently underplayed the immediate and long-term risks that fly ash poses to the affected population. At this point in time, despite the assistance provided to them by the Centers for Disease Control and Prevention (CDC), it is questionable whether the TDH has the capacity and resources to undertake a thorough and lengthy health assessment that is required in a disaster of this magnitude.

Furthermore, a full "public health assessment" performed by ATSDR and not a "health consultation" by TDH is needed to find out if people are being exposed to hazardous substances and, if so, whether the exposure is harmful and should be stopped or reduced. The facts surrounding this disaster dictate that environmental and health scientists from ATSDR must take the lead in the investigation. The Agency's proven ability to properly assess a situation of this magnitude needs to be recognized. While a health consultation may be appropriate for short-term threats, the circumstances surrounding this site clearly indicate that a long-term, in-depth investigation along the lines of a full health assessment, performed by an experienced federal agency with sufficient resources, is the most prudent way to proceed.

Thus the undersigned groups and individuals once again petition ATSDR for a public health assessment that investigates the multiple pathways of exposure and assesses the long-term impact to the several hundred residents that live in close proximity to the site from the many hazardous constituents contained in the coal ash and contaminated water, soil and dust.

Data gathered by the Tennessee Valley Authority (TVA), nongovernmental organizations (NGOs) and university researchers reveal a wide disparity in the levels of contaminants found in surface water in the vicinity of the disaster. These conflicting data cause great uncertainty and concern about possible short and long-term health impacts. Data gathered by some indicate violations of both U.S. Primary Drinking Water Standards and Tennessee Water Quality Criteria for multiple parameters. While these exceedances were only found in surface water and not in drinking wells, they have generated concern about potential deleterious affects on the nearby population. Some water samples contained concentrations of arsenic, barium, cadmium, chromium, lead, mercury, nickel, and thallium that exceeded water standards.

Data generated by TVA, EPA, the Tennessee Department of Environmental Conservation (TDEC) and NGOs indicate that levels of hazardous constituents in the coal

ash deposited in the river and throughout residential areas are significantly above levels that are safe for residential soils. Contaminants of concern include arsenic, which is a potent carcinogen, and vanadium. Yet none of the agencies have addressed the threat that this ash poses to residents through inhalation, ingestion or direct contact.

According to a health survey conducted by TDH with the assistance of the CDC, nearly half the respondents reported fly ash present in their yards, and 33% reported that their shoes or clothing had been in contact with fly ash (February 5, 2009). While most respondents (62%) of the 324 households that were surveyed reported no change in health status, 33% reported a worsening of one or more symptoms that included headaches, wheezing, and shortness of breath (5% of the residents surveyed reported they "didn't know"). It should be noted that this survey was not conducted until 2-3 weeks after the event.

While the report concludes "most people living close to the spill did not report any change in health status at the time of the survey," the 33% of those who reported the above symptoms must not be dismissed. Moreover, there has been widespread reporting in the media of individuals living in the affected area who have reported similar symptoms as well as coughing, sore throat, fever, nausea, fatigue, and headaches. While the accuracy of these reports cannot be monitored scientifically, neither should such symptoms be ignored altogether. Such reports are suggestive of exposure to high pH fly ash that contains elevated levels of arsenic. Previous long-term studies of environmental disasters suggest that we sometimes ignore such self-reporting at the peril of public health. The continued downplaying by TDH of the potential, serious harmful effects of fly ash on the affected population from the early days of the spill up to the recent issuance of their health survey report serves to underscores their failure to recognize the potential, serious health threat of the presence of fly-ash to the general public.

The airborne contamination by fly ash remains a potential threat to the adjacent communities and those living downwind. The TVA responded to the event by dropping straw and seeds on the fly ash and spraying the area with a vinyl compound and then reassuring the affected population that these measures would protect them. Such measures and reassurances are an insult to the nearby households because the measures were taken during cold weather when seeds were unlikely to sprout and because the pH levels of the fly ash seriously deter seeds from sprouting. Additionally, the aerial spraying of the vinyl compound presented a drifting hazard to nearby residents and households.

In the short term, the presence of such a large amount of fly ash presents a health threat for many reasons including the fact that there have been reported and observed sharp gusts of wind on the site that has made the fly ash airborne and respirable. The TVA has asserted that such events were merely "fog," despite meteorological observations to the contrary. Finally, the TVA has reported that the site clean up will take several years, and thus the long-term threat of airborne exposure will persist far into the future. The TVA's and the TDH's assessments of only short-term exposure of fly ash fails to adequately acknowledge and address the reality of continued exposure that could

result in significant adverse health impacts. Testing has confirmed that a significant percentage of the coal ash contains particles that are respirable (below PM 2.5) and are capable of penetrating into sensitive regions of the respiratory tract. Thus the ash poses a significant and immediate health threat that has not been evaluated or addressed.

Other major health concerns to the community include the TVA's and TDEC's plan to institute dredging to remove ash and debris from the main channel of the Emory River. The plan has generated a number of concerns including the fact that this plan only addresses the main channel of the river and does not address the great majority of the fly ash deposition in the waterways including the sloughs and bays of the Emory River along Swan Pond Road and Swan Pond Circle Road where a vast number of residents live.

Moreover, some residents are concerned that the dredging operations, as proposed, could stir up the radioactive deposits in the river bed that are the result of radioactive contamination from the nearby Oak Ridge National Labs. The potential resuspension of the radioactive sediment is thought, by some, to potentially exacerbate the contamination of the Emory and Clinch Rivers. The Clinch River is of great concern since it is a major source of drinking water for municipalities down river.

An additional concern is the TVA's proposed plan to deposit recovered fly ash sludge in a temporary holding impoundment closely adjacent to the river, thereby generating concern over the possibility of another disastrous event and the continued contamination of the Emory River and surrounding area.

All of these concerns are further fueled by the perceived haste with which the dredging is to take place. Citizens and environmental groups want to ensure the safety of the proposed operations by the transparency of public comment and hearings. However the TVA and TDEC want to move forward in the immediate future under emergency orders and forgo these precautionary measures.

The TVA Kingston Ash disaster has arguably released more hazardous material than any other toxic waste spill in this nation's history. The unprecedented magnitude and severity of the event and the long-term presence of the fly ash sludge in the affected area warrant careful scrutiny and long-term monitoring by the ATSDR. There are still too many unknowns and potential harmful health and environmental effects to ignore the need to take the appropriate precautionary measures to insure the health and safety of populations at risk.

The unprecedented scope of this spill is of great national importance and should be studied closely to safeguard the nation from possible future related events. Without question, this disaster has important implications for national public health policy. We request that ATSDR closely monitor this situation and take appropriate measures where deemed necessary.

According to section 104(i)(6)(B) of CERCLA, if the Administrator of ATSDR does not initiate the requested health assessment following the receipt of

this petition, the Administrator of ATSDR shall provide a written explanation of why a health assessment is not appropriate.

We appreciate your consideration of this petition and look forward to your response.

Sincerely,

Dr. Gregory V. Button
Assistant Professor
Department of Anthropology
University of Tennessee, Knoxville
(For identification only)
Cell: 734.417.3371

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Cc: Phil Bredesen, Governor, State of Tennessee
Lamar Alexander, U.S. Senator
Barbara Boxer, U.S. Senator
Bob Corker, U.S. Senator

Harry Reid, U.S. Senator
Nancy Pelosi, Speaker of the U.S. House
Nancy Sutley, Chief Environmental Office to President Obama
Lisa Jackson, Administrator, U.S. EPA
Robert Tanner, Inspector, Senate Committee Environment and Public Works
Ben Webster, Ph.D., Subcommittee on Water Resources and Infrastructure
Zack Wamp, U.S. Congressman, Tennessee
Lincoln Davis, U.S. Congressman, Tennessee
Stanley Meiburg, Acting Administrator, U.S. EPA, Region IV
Dr. Richard Besser, Acting Director, CDC
Dr. Howie Frumkin, NCEH/ATSDR, Director
Karl V. Markiewicz, PhD, ATSDR
Paul Sloan, Deputy Commissioner Tennessee Department of Environment & Conservation
Susan R. Cooper, MSN, RN, Commissioner, Tennessee Department of Health
Ken Yager, Senator, Tennessee State Tennessee
Dewayne Bunch, State Senator
Dennis Ferguson, Tennessee State Representative
Eric Watson, Tennessee State Representative
Jim Cobb, Tennessee State Representative
Laura Conner, Director, Roane County Health Department,

February 5, 2009

Dear Waterfront Property Owner,

At TVA, we continue to work as safely and diligently as possible to clean up from the Kingston ash spill and want to thank you once again for the patience and courtesy you have shown our people.

As you know in the wake of the spill, TVA took immediate steps to minimize the ash from flowing downstream by constructing a temporary underwater weir in the river. As a consequence of this and the ash in the river, there is an increased risk of flooding for some waterfront properties. The likelihood of a large flood is slight before the ash removal process in the Emory River is complete, but we want to make you aware that there is an increased risk. These properties are located from the Kingston Plant to approximately 11 miles upstream through Harriman.

For this reason, TVA is contacting homeowners in the potentially affected areas to assure you that if a flood were to occur, TVA will be financially responsible for flood damage to your homes that would not have occurred under normal conditions, in the absence of the ash in the river and the temporary weir.

After our preliminary examination, your property may be among the approximately 100 properties that are potentially within the post-spill, 100-year floodplain. For any property located within the 100-year floodplain, there is a 1 percent (1 in 100) chance that this flood level would be reached or exceeded in any given year. Every property owner in this group is being directly contacted to inform them of the situation.

In the early aftermath of the spill, our first priority was to contain the ash in order to minimize it from moving downstream into the Clinch and Tennessee Rivers. TVA was aware that the combination of the ash in the river and the temporary weir was likely to alter the upstream flood elevations. We determined that the need for an immediate response to the spill was necessary to contain the ash, and the increased risk that might result from a change in the upstream elevations was a choice that needed to be made under the circumstances.

Data has been collected by the U.S. Army Corps of Engineers to develop post-spill flood profiles. From this, we estimated changes in the flood elevations in order to identify and contact potentially affected property owners.

Within the next several weeks, surveyors will be coming to your door and we would appreciate your cooperation. Their role is to perform home floor elevation surveys so we have specific information we would need in the unlikely event of a flood.

It is important to note that the change in flood elevation is only temporary until TVA removes the ash and underwater weir from the river. On Thursday, February 5, TVA presented Phase I of an ash recovery plan to officials with the Tennessee Department of Environment and Conservation, the Environmental Protection Agency and the U.S. Army Corps of Engineers. These agencies will grant final approval on the plan, and once we receive their approval on the Phase I Plan, we anticipate being able to begin removing the ash from the Emory River channel within about six weeks.

Once the ash and the underwater weir are removed, the Emory River will be returned to pre-spill conditions. Flood elevations will return to levels established before the spill, and TVA's financial responsibility related to flood damages will also end at this time. We will keep you informed of our progress through the many stages of ash removal and site restoration.

If you have more questions or concerns, or need additional information on the increased flood risk, please contact TVA River Operations at 865-632-6115. You may also call the TVA Outreach Center at (865) 632-1700, or visit the center at 509 North Kentucky Street in Kingston.

Sincerely,

Peyton T. Hairston, Jr.

Tom Kilgore, President and Chief Executive Officer

Tennessee Valley Authority

Before the

U.S. House Committee on Transportation and Infrastructure

Subcommittee on Water Resources and Environment

March 31, 2009

Testimony of
Tom Kilgore
President and Chief Executive Officer, Tennessee Valley Authority,
before the
U.S. House Committee on Transportation and Infrastructure
Subcommittee on Water Resources and Environment
March 31, 2009

Opening Statement

Chairwoman Johnson, Ranking Member Boozman, and members of the Committee. I appreciate this opportunity to discuss the coal ash spill at the Tennessee Valley Authority's (TVA) Kingston Fossil Plant, the actions taken in response to the event, and our progress and plans for remediation of the site and protection of the environment.

The incident being discussed today occurred at TVA's Kingston Fossil Plant in Roane County, Tennessee. On behalf of TVA, we deeply regret the failure of the ash storage facility dike, the damage to adjacent private property in the Swan Pond community, and the impact on the environment. We are extremely grateful that no one was seriously injured.

TVA is committed to cleaning up the spill, protecting the public health and safety, and restoring the area. In the process, we will look for opportunities, in concert with the leaders and people of Roane County, to make the area better than it was before the spill occurred. This commitment will stand because TVA is part of the Kingston community through our employees who live and work there, and through the partnership of our historic mission to work for the economic progress of the Tennessee Valley region.

We are also committed to sharing information and lessons-learned from this event and the recovery with those in regulatory and oversight roles, such as this committee, and with others in the utility industry.

Today marks the 99th day since the spill occurred. We have made steady progress in the initial recovery work, including development of a Corrective Action Plan that includes comprehensive monitoring of the air, water and soil. It is important to note that according to the Tennessee Department of Health, the environmental monitoring analyzed to date has not shown any adverse health threat to the immediate or surrounding community, including air quality or drinking water supplies. On March 19, we began the initial phase of dredging ash from the Emory River channel adjacent to the failed storage facility. This activity is being thoroughly monitored and precautions are in place to prevent or minimize environmental impacts during the dredging process. The dredging plan was approved by the Tennessee Department of Environment and Conservation (TDEC) and the U.S. Environmental Protection Agency (EPA).

An investigation by an outside engineering firm is under way to determine the root cause of the event. The results of the report are expected this summer. In the meantime, we are proceeding with the recovery work. We understand this is a difficult time for residents of the Kingston community, and we are working to make things right.

Our objectives are:

(1) To protect the health and safety of the public and recovery personnel.
(2) Protect and restore environmentally sensitive areas.
(3) Keep the public and stakeholders informed and involved in formulation of the response activities.
(4) Clean up the spill and improve the area wherever possible in coordination with the people of Roane County.

My comments today will cover three areas: what occurred; the response and initial recovery thus far; and TVA's plans going forward for full recovery and site remediation. Before discussing the Kingston event, I want to briefly describe TVA and its mission.

About TVA

TVA is a corporate agency and instrumentality of the United States government, is wholly owned by the United States, and is the nation's largest public power supplier. Under the TVA Act, TVA's hydroelectric dams and other power generation facilities are designed and operated as part of a multipurpose system to help improve navigation, control floods, meet national defense needs and promote the development of the Tennessee Valley region. Since 1959, in accordance with the direction of Congress, TVA has operated the power system to be financially self-supporting. Today, we use our power revenues to buy fuel, pay wages, service our debt, maintain assets, and fund our environmental stewardship and economic development activities.

In partnership with 158 local utilities, TVA provides reliable, affordable electricity to nine million people and 650,000 businesses in Tennessee and parts of six surrounding states. The 158 local utilities are our wholesale customers. The local utilities purchase TVA power for retail sale to their residential, commercial and industrial customers. TVA also sells power directly to about 60 large industrial customers and federal installations, such as Oak Ridge National Laboratory.

TVA has stewardship responsibilities for the Tennessee Valley region's natural resources, including the nation's fifth-largest river system. TVA's management of an integrated river systems and innovative watershed management are recognized as national and international models for government and community collaboration for improving and protecting water quality. TVA also is a catalyst for economic development and job creation throughout its 80,000-square-mile service area, working in partnership with local governments and economic development agencies.

Kingston Fossil Plant and Fly Ash Storage

The ash spill that is the subject of today's hearing occurred at Kingston Fossil Plant, which is about 40 miles west of Knoxville, Tennessee. Construction began on Kingston in 1951 and it was completed in 1955. The plant was built in accordance with congressional authorization, primarily to meet the defense needs of the nation – specifically, to provide power for the production of atomic defense materials at Oak Ridge, Tennessee.

Today, Kingston is part of a diverse mix of generating resources that TVA uses to supply electricity for nine million people in our service region in the Southeast. About half of our nation's electricity supply comes from coal, and TVA's supply is similar. While we are

working to increase the amount of carbon-free generation, about 60 percent of TVA electricity comes from coal. And like utilities nationwide, we must manage the ash that is a by-product of coal-fired power production.

At the Kingston plant, ash material that remains after the coal is burned is stored in a wet ash pond. Six of TVA's eleven fossil plants use wet fly ash storage cells. The other five plants use a dry fly ash storage method. All of TVA's ash disposal sites are engineered facilities governed by the permit requirements of the states where they are located. The storage cells are surrounded by dikes, and the facilities have engineered drainage systems and water runoff controls.

The storage areas at all TVA fossil plants undergo a formal inspection annually, and other inspections are conducted on a daily and quarterly basis. The storage cells at Kingston are visually checked daily by plant personnel. In addition, plant personnel inspect for seepage on a quarterly basis. Annually, TVA engineering staff members perform a comprehensive inspection and document their findings and recommendations. Kingston's most recent inspection was in October 2008, and the formal report was being compiled at the time of the event. The completed report is now posted on the TVA Web site. Nothing that would indicate a catastrophic failure was likely to occur was observed during the annual inspection.

History of the Event and Emergency Response

On Monday, December 22, 2008, between midnight and 1 a.m., a portion of the dike on the northwestern side of the Kingston storage cell failed, releasing about 5.4 million cubic yards of fly ash and bottom ash onto land and adjacent waterways, including the Emory River, which flows into the Clinch River near the plant. The Clinch then flows into the Tennessee River. The released ash covered about 300 acres of which eight acres were privately-owned lands, not owned or managed by TVA. TVA has now purchased all but one of those acres. The spilled material covered most of the Swan Pond Embayment and reservoir shorelines, along with parts of Swan Pond Road and Swan Pond Circle and portions of the rail line used for coal deliveries to the Kingston plant. Surveys done since the event show that ash was released from about 60 acres of the 84-acre storage facility, which is surrounded by dikes about 60-feet high.

I received a call notifying me about the failure shortly after 1 a.m. and arrived at the plant within the hour. The initial response by the Roane County Office of Emergency Management and Homeland Security personnel, along with the Tennessee Emergency Management Agency, was excellent; and we will always be grateful for their swift and professional response. Other agencies were notified, including the National Response Center.

Our first concern was for the safety of the neighbors near the plant. With the help of the Roane County response personnel, we learned about 5 a.m. that there was no loss of life and no injuries that required medical attention. We ordered visual inspections of the ash retention dikes at all of our other plants to detect any changes in conditions, and those inspections continue on a daily basis.

Our first priority was to help the people immediately impacted, especially the three families whose homes were severely damaged and deemed uninhabitable. We ensured they were safe and that they had temporary housing, meals, and other necessities. We established a team of TVA employees and retirees to provide a single point of

contact for each family impacted to ensure their needs were met and concerns addressed.

We set up a 1-800 number and opened a Community Outreach Center in Kingston that was open initially seven days a week to handle property damage claims and respond to residents' questions and concerns. Claims adjustors and field staff were provided by a national claims management company at the outreach center to conduct on-site damage assessments, and TVA Police supported local law enforcement in maintaining security for homes in the affected area. The Community Outreach Center is now open from 2 to 6 p.m. Monday through Friday. The center has been in touch with almost 750 households and received nearly 400 real estate-related claims and 241 health-related concerns.

In the early stages of the event, TVA followed its approved Agency Emergency Response Plan which provides an agency-wide response to emergencies or threats that require integrated agency action. The Senior Management Executive was responsible for directing the emergency response through the Agency Coordination Center. The U.S. Environmental Protection Agency (EPA) joined TVA, TDEC, and other agencies in a coordinated response and provided oversight and technical advice for the environmental response portion of TVA's activities. TVA transitioned its emergency response to a Unified Command Center as defined by the National Incident Management System. On January 11, EPA turned the lead federal role over to TVA, and the Unified Command structure was transitioned into an onsite recovery response organization, using TVA's Fossil Emergency Plan procedure (FPG.EP.14.000).

Initial results of all environmental sampling and updates on the response activities were communicated to the public through media briefings at the Joint Information Center that was established at the Roane County Rescue Squad headquarters building near Kingston. Other information and test results are posted on the TVA public Web site.

In addition to media briefings at the Joint Information Center, TVA hosted a public open-house with representatives from key state and federal agencies on January 15 at Roane State Community College where residents could pose questions to experts and obtain information. The latest open house was held last night (March 30) at the community college to bring residents up to date and answer their questions. TVA representatives attended several public meetings and other forums to provide information and answer questions. Information was made available in the form of Material Safety Data Sheets to help make residents aware of potential hazards and actions they could take to minimize any risk.

Within the first month, TVA began purchasing affected properties using appraisals by state certified residential and general appraisers. Offers were made based on the higher of two independent appraisals. The appraisals are based on property values on December 20, 2008, before the spill. In addition, an amount significantly above the fair market value is added to the appraised value to assist the property owner in re-establishing residence. Property owners who accept the offers also are given first right of refusal to re-purchase the property at market value if TVA decides to sell the property in the future. TVA has extended offers on 92 tracts in the area, including primary and secondary residences, vacant lots, and two businesses.

Environmental Efforts

A principal concern regarding air quality comes from airborne particulates in the form of dust blown from dry ash deposits that can irritate the respiratory system if breathed over long periods. We took immediate measures to keep the ash residue damp and monitor air quality in the area. The dust suppression measures were expanded during the first week to include aerial grass seeding and mulching with straw to provide a vegetative cover to minimize dust and erosion. The seeding measures covered about 213 acres. We also are conducting a continuous schedule of watering from pumping trucks and employing vacuum sweeper trucks on paved roads in the area. Three wheel-washing stations are installed for heavy trucks leaving the site to prevent the spread of ash onto roads. TVA has prepared and implemented plans for air monitoring and dust suppression activities. These TVA plans were developed with regulatory oversight by TDEC and EPA. The dust suppression plan is being updated to reflect additional suppression techniques. Both agencies have visited the site to monitor TVA's progress in implementing the plans.

The air monitoring results are a measure of the efficacy of dust suppression efforts. Air monitoring results to date indicate airborne particulate levels (PM10 and PM2.5) within daily National Ambient Air Quality Standards. Metals analysis of the airborne dust indicates levels in the range of normal background levels and not at a level of a health concern. TVA installed new PM2.5 air monitors (previous PM2.5 monitors were demobilized on February 3) and placed them into service on February 12. Air monitoring is done 24 hours a day at fixed stations located in residential areas near the plant and on the plant site.

Testing of offsite soil samples shows that metals are well below the limits for classification as a hazardous waste. They are 10 to 100 times below the limits for toxic metals. The trace concentrations of metals in the offsite material sampled are consistent with and generally lower than that of the historic sampling results from the storage cell. The data shows that the concentrations of most metals in the deposited ash are not significantly different from concentrations found in natural, non-agricultural soils in Tennessee, with the exception of arsenic. Total arsenic results were above the average that occurs naturally, but well below levels found in soils that are well-fertilized and significantly below the limits to be classified as a hazardous waste.

According to the Tennessee Department of Health, public drinking water supplies continue to meet state and federal drinking water standards, and private wells and springs tested within four miles of the site are not impacted by the coal ash release. TVA will continue to work with TDEC to monitor the water quality at private wells and springs in the vicinity of the ash release to ensure their protection. Periodic monitoring of private wells and springs located within approximately 0.25 mile of ash-impacted property bordering the Emory River and its tributaries will be performed. Some 47 land parcels having inferred well or spring water supplies are indicated within the designated monitoring region.

Early-warning groundwater monitoring wells are being installed, as needed, at selected locations to ensure protection of water supplies deemed by TDEC to be at potential risk. Sampling frequency will vary from quarterly to semiannually during the first year depending on proximity of each well or spring to ash deposits. The frequency and ultimate duration of sampling of off-site wells and springs will be re-evaluated annually

by TVA and TDEC based on monitoring results and perceived risks. Water samples will be analyzed for several constituents including radio-nuclides.

Air, water and soil sampling by TVA and TDEC includes: more than 27,000 air samples; more than 1,050 utility and surface water samples; more than 100 well and spring water samples taken from within a four-mile radius of the spill site; 81 ash samples; and 47 soil and sediment samples. The City of Kingston has also conducted more than 140 tests on utility drinking water. Each agency uses certified laboratories for testing. Sampling results have not indicated a heath concern, according to the Tennessee Department of Health.

I know that technical data and monitoring equipment do not make the physical effects of the situation go away. But I hope that the results of the environmental monitoring data during the past three months and the objectivity provided by multiple agencies and certified labs will help reassure the public. The information is available on the TVA Web site, along with other information, including the Corrective Action Plan.

TVA is developing a plan to respond to individual health concerns, including a process for determining whether there are health effects that may be related to the ash released from Kingston. We are in the process of contracting with Oak Ridge Associated Universities (ORAU) to provide community members and the local medical community with access to medical and toxicology experts who have experience and knowledge in the health effects related to the contaminants in the Kingston ash. ORAU has expertise in public health communication, design of medical monitoring programs, and independent verification of the clean-up of contaminated sites. ORAU is a consortium of 100 academic universities that collaborate to advance scientific research and education.

Recovery Actions

In addition to ensuring the health and safety of the public and our employees, TVA then moved quickly to stabilize, contain, and plan for recovery of the ash material.
In response to an order from the Tennessee Commissioner of Environment and Conservation, TVA prepared a Corrective Action Plan that was submitted to the State of Tennessee and the EPA.

The recovery work began with clearing more than 350,000 cubic yards of material from the areas around Swan Pond Road, Swan Pond Circle, the rail line, and nearby sloughs. The two roads are now open for use by construction vehicles involved in the recovery, and 2,100 feet of rail line was reconstructed and returned to service for coal deliveries to the plant. Reconstruction of the rail line within a month of the event avoided the potential use of local roads for coal deliveries and assured efficient use of the Kingston plant power output for the region's electricity supply.

About 5,800 feet of drainage trench has been installed in the Swan Pond Embayment, and 6,400 feet of drainage trench is installed around the roads and rail line. In addition, 11,000 feet of isolation barrier was installed in the affected areas to contain the ash.

To prevent migration of the ash from the Swan Pond Embayment and the Emory River channel a 615-foot-long underwater rock weir was constructed across a section of the Emory River, and a dike was constructed along the embayment.

TVA is also managing the flows of the Clinch and Tennessee Rivers in the Kingston area to minimize downstream movement of the ash and to maintain a positive flow downstream to protect the integrity of the Kingston water supply intake. The water intake is on the Tennessee River about one-half mile upstream from the confluence of the Clinch and Tennessee Rivers.

The Corrective Action Plan submitted under order to the Tennessee Department of Environment and Conservation and to EPA provides a framework for making future decisions about environment remediation, monitoring during cleanup activities, for protecting water supplies, protecting work and public health, and management of spilled ash and future ash produced at Kingston.

The plan proposes the formation of an Interagency Team consisting of personnel from all involved and interested federal, state and local agencies. We propose that the team be involved in all steps of the cleanup and recovery effort. We also plan to develop a Community Involvement Plan to provide a structure for public review and input into the recovery and remediation.

Recovery Effort Milestone - Dredging

The first major phase of the recovery was the start of dredging operations on March 19 in the Emory River channel adjacent to the failed storage cell. Construction of the dike and weir support the first phase of dredging, which serves as a pilot for future dredging operations. A plan for the first phase was developed for TVA by an environmental services contractor and has been approved by the state and the EPA. The plan is designed to remove an estimated 2 million cubic yards of ash material.

An Environmental Assessment, consistent with the National Environmental Policy Act, was developed for the dredging operations, and a comprehensive environmental sampling plan was submitted for review to state and federal regulators. The sampling plans include six floating hydro-labs to monitor key environmental criteria, such as dissolved oxygen and turbidity, during the dredging operations. Containment booms are also being installed on the water to prevent migration of any floating ash material.

Ash is being dredged from the Emory River channel, de-watered, and temporarily stored at a prepared site on the plant property until an approved process is in place for long-term disposal or storage. The de-watering area is sloped to drain into the plant's existing ash pond and drainage has been engineered at the site to contain the runoff. Groundwater wells have been drilled in the area for monitoring.

Plans call for dredging only to a depth that will restore flow to the original channel without disturbing existing "legacy" and native river sediments. Restoring original flow to the channel will lessen the possibility of flooding upstream on the Emory River in the event of unusually heavy rains. We have advised residents in the potential flooding areas about the situation and have assured them that TVA will assume responsibility for any damage to homes above the traditional flood stage.

While most of the fly ash deposited in the water sank, there was a lighter, inert part of the ash that floats. This hollow, sand-like material, called cenospheres, is collected and sold for use in a variety of products, including cosmetics and bowling balls. We have used more than 12,000 feet of boom skimmers to collect and dispose of more than 3.2

million gallons of slurry containing this material. The containment booms and other equipment will be used to collect this material released during dredging.

At this time, future plans call for proposing two more phases of dredging. The second phase would restore the river channel to its original depths, and the third phase would focus on removing ash deposits that are outside of the Emory River channel.

Going Forward

TVA has commissioned a comprehensive study of all its coal by-product storage facilities by an outside engineering firm. The study includes invasive testing of dike walls to evaluate their composition and structural integrity. We are also looking at the feasibility of converting to dry fly ash storage at all six of our plants where wet storage is used.

TVA has committed to ceasing wet ash storage in the failed cell at Kingston, and the cell must be closed and capped. This will be done once the conclusions of the root cause analysis are known and the site subsurface investigations are complete. In early January 2009, TVA retained a global engineering firm that possesses substantial experience in design, construction quality management, and forensic failure analyses of dikes, containment ponds, and landfills, to conduct an independent Root Cause Failure Analysis (RCA) of the Kingston dike failure.

Data from both the Root Cause Failure Analysis and the impoundment assessments are shared with TDEC, EPA and TVA's Office of Inspector General, who comprise a Structural Integrity Team.

We do not have a completed cost schedule for the recovery and remediation, but based on the dredging and other identified tasks ahead, we estimate that it will cost between $525 million to $825 million (not including litigation, penalties or settlements) depending on methods of disposal and other variables. We are evaluating several potential sources for funding the recovery. These include insurance, using a portion of a trust fund established for the retirement of non-nuclear assets, using debt for funding over a longer period, and recovering some of the costs through rates.

Widows Creek

The committee staff requested that I also provide information about the accidental spill of slurry from the Gypsum storage pond at TVA's Widows Creek Fossil Plant near Stevenson, Alabama, that occurred on January 9, 2009. The spill occurred when a cap dislodged on a 36-inch diameter drainage pipe that was no longer in use due to reconfiguring of the storage pond over the years.

The event allowed water from the gypsum pond to drain into an adjacent settling pond, filling it to capacity and causing it to overflow. Although most of the overflow was contained in the settling pond, some did drain into adjacent Widows Creek and into a slough on the Tennessee River. The event was discovered about 6 a.m. by plant workers who were conducting a routine inspection of the ponds.

The impoundment contains byproducts from the scrubbers that clean sulfur dioxide from the plant's coal-burning emissions. Scrubbers produce a number of byproducts while

cleaning the air, the primary one being calcium sulfate - commonly known as gypsum. Beneficial uses of gypsum are numerous and include drywall and cement manufacturing. Gypsum is also used as a soil amendment in place of lime in agricultural and construction activities.

We notified appropriate federal, state and local authorities, and water sampling was conducted that indicated there was no danger to water supplies in the area or downstream. TVA, the EPA and the Alabama Department of Environmental Management estimate that less than 5,000 cubic yards of material entered the waters.

A cleanup operation was begun, and repairs and improvements were made to the storage ponds, including pouring concrete into the abandoned drain pipe. An investigation showed that a major contributing factor was omission of the abandoned drainpipe on engineering drawings of the storage pond.

Continuing Commitment

As I stated earlier, TVA is an integral part of the Roane County community. About 300 TVA employees live and work in the area, and they care deeply about their community. We will continue to reach out to Roane County residents to keep them informed and ensure they have the information they need. We will continue working, as well, with federal, state, and local elected officials and agencies, and with you and other members of Congress.

We are committed to do a first-rate job of remediation of the problems caused by the spill and ensure the integrity of all of our coal by-product storage facilities across the TVA system. Thank you for the opportunity to discuss our recovery efforts.

I look forward to your questions.

# # #

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March 31, 2009

The Honorable Eddie Bernice Johnson
Subcommittee on Water Resources and the Environment
U.S. House of Representatives
2165 Rayburn House Office Building
Washington, DC 20515

Re: The Tennessee Valley Authority's Kingston Ash Slide: Potential Water Quality Impacts of Coal Combustion Waste Storage

Ms. Chairwoman Johnson, Ranking Member Boozman and distinguished members of the committee:
Thank you for the opportunity to appear before this Committee and discuss the Tennessee Valley Authority coal ash spill in Harriman, Tennessee that occurred on December 22, 2008.

I am a seventh generation resident of Harriman, Tennessee. My relatives have lived at Adkisson Farm, a 40-acre Emory riverfront property since 1802. I am also an active member of the Tennessee Coal Ash Survivors Network, a local community group that helps residents cope with this disaster and publicize the need for federal regulation to prevent similar disasters in the approximately 156 coal communities nationwide. Earlier this year, I came to Washington to speak with my congressional representatives and several House and Senate committees about the Tennessee Valley Authority (TVA) spill. I am pleased to testify before you today on behalf of the Harriman community.

In this testimony there are two main points I want to express to this committee with a plea for help. First, our concerns have fallen entirely on the deaf ears of the TVA. We need more information and communication from them and any other involved government agency. Secondly, TVA must be held accountable for the damage they have caused. They must create and make public a plan that will make our rivers safe again, while being considerate of the health, safety and daily lives of the community.

TVA has failed to effectively communicate with the community
Prior to December 22, 2008, we lived under a false sense of security. TVA is major employer and an integral aspect of our community. I drove past the retention impoundment almost daily and I never assumed that these facilities were dangerous. The spill changed that perspective and left my neighbors and me scared and confused. We have received little information from TVA and the discrepancies in recent studies leave us unaware of the risks to our health and homes.

Since the coal ash spill, I have received only four documents from TVA about the status of the contamination and the cleanup efforts. There is some email traffic from TVA, but many residents do not have email access. Immediately after the spill, residents could call the TVA Kingston Steam Plant to report problems related to the coal ash; however, this quickly became an answering machine and calls are never returned. Residents who were "immediately impacted" by the spill were contacted by TVA about their losses and concerns. Other residents were instructed to file claims with the Outreach Center and the P&C Company; as of today, there has been little or no response or follow up on these claims, forcing residents into legal avenues for help. Even more troubling are the residents who have not hired an attorney and silently wait for answers. TVA held a series of public meetings and one open house. Unfortunately, these meetings do not communicate clear answers and most of our information is drawn from second hand accounts or hearsay. Only TVA, themselves, seems to know about their cleanup plans and this is a problem for everyone involved. The communication between TVA and residents must improve; for the health and safety of the entire community we desperately need our concerns addressed.

Community perspective on the TVA dredging plan

TVA must rectify the disaster they have created and pay for the damages they caused. We agree that the coal ash must be removed from the Emory River, but we are concerned about several aspects of TVA's most recent dredging plan. We fear that dredging the river will cause more hazardous particulates from coal ash to be released into the air and significant leaching of toxic metals into the water. We expected that the community would have had an opportunity to express their opinions on the cleanup actions, but that has not been the case. Further, there are too many inconsistencies between the TVA dredging report, *Phase 1 Emory River Dredging Plan Kingston Fossil Plant Ash Recovery Project* released February 2009 and independent testing regarding predicted environmental risks caused by this cleanup plan. We cannot support this plan until the community is presented with facts, backed up by studies, about the risks and hazards of removing the sludge from the Emory River.

So far as we can tell, the current safety of the dredging is incomplete. The coal ash will be trucked from the river to a temporary location, where it will remain until a permanent site is identified and a facility can be built. Without federal regulation, there are not consistent guidelines for coal ash storage. We therefore have no guarantee that this time TVA will provide a facility that is truly designed for permanent storage of industrial hazardous waste and that such a facility will be properly lined, capped, sealed and maintained.

One of our biggest concerns is public safety. There has been an influx in the number of dump trucks and other work vehicles traveling throughout Roane County. Furthermore, it is expected that about 600 to 700 trucks will be necessary to remove the coal ash as part of the dredging efforts. These trucks track coal ash out from the loading site and if they are not rinsed off completely, the trucks will release coal ash into the air and track it into neighboring communities. Since the disaster, there have been minimal efforts to rinse coal ash off trucks. TVA built a one wheel washing station, which is not substantial enough to clean the hundreds of trucks currently in use.

Harriman is a small community with just over 6,000 residents. We are worried that this increased traffic is not just an inconvenience, but will inevitably cause injury or deaths. The additional

trucks will add to the continual degradation of local roads – roads our tax dollars pay to keep up. Already, just three months after the incident, many residents' automobiles are now needing new tires and requiring realignment due to the poor road conditions. TVA must be accountable for these damages and further costs to the community.

Environmental contamination and inconveniences to daily life
We are a community that hunts, fishes and swims in the rivers. We need the facts about the contamination to our natural places so that we can make personal determinations as to whether it is safe for our families to recreate in and around the rivers. Will dredging the river release more contaminates and heavy metals into the ecosystem? We fear bioaccumulation will put our health and that of our ecosystem at risk. The ash is in the water, in the air and on the ground. It is consumed by fish, birds, game and our livestock. As the birds eat the fish and the game eat the birds, toxins accumulate in these animals. We question whether we are at risk for illness as the contamination worsens as it moves up the food chain.

Several fish populations were decimated by the ash and estimates reveal that these species will not resume their original populations for at least 20 years. Harriman is home to residents who rely on fish they catch for their meals. Because of the significant lack of information from the authorities, many of these neighbors continue to eat fish from the Emory River despite the spill. We worry that the fish may not be safe for consumption.

TVA must respond to the community's concerns. We have the right to know what pollutants are in our air and water, at what level these pollutants are occurring and at what point they have the potential for harm. However, each successive study contradicts the previous one. We need to know why there are discrepancies and which reports are the most accurate. We don't know who to trust.

Numerous studies on samples taken from the Emory, Clinch and Tennessee Rivers since the disaster found high levels of toxic levels of heavy metals in coal ash. There are unsafe levels of heavy metals including: antimony, aluminum, arsenic, beryllium, boron, cadmium, iron, lead, manganese, radium, selenium, thallium and uranium. According to the Agency for Toxic substance and Disease Registry, there are many short-term and long-term effects caused by exposure to these heavy metals. Below are just some of the potential health risks:

- Studies on antimony found it to cause lung, liver, heart and kidney diseases when inhaled at high levels. Antimony can also cause eye irritation, hair loss and fertility problems.
- Breathing arsenic can lead to sore throats or lung irritation. Arsenic is also linked to nausea and vomiting, abnormal heart rhythm, damage to blood vessels and a "pins and needles" sensation in hands and feet. Exposure to high levels of arsenic can lead to death.
- Lead targets the nervous system in adults and especially in children. Exposure to high levels of lead results in brain and kidney damage, and can ultimately cause death. In pregnant women, exposure to lead may induce a miscarriage. High level exposure in men can damage sperm production. In children, exposure may result in blood anemia, severe stomachache, muscle weakness, brain damage and hinder physical growth. Unborn children can be exposed to lead through their mothers, causing premature births, smaller babies, decreased mental ability, learning difficulties, and reduced growth in young children.

- Boron exposure causes temporary irritation to the nose, throat, and eyes.
- Some people develop sensitivity to beryllium, which can result in an inflammatory reaction in the respiratory system. This condition is called chronic beryllium disease (CBD), and occurs years after exposure to elevated levels of beryllium. This disease causes weakness, exhaustion, and difficulty in breathing. It may also result in anorexia, weight loss, and heart disease and heart defects in advanced cases.

The community must be given full disclosure about exactly which chemicals and heavy metals are in the air and the water, and we need to know how these contaminates can harm us and our environment. TVA, and the Tennessee Department of Environment and Conservation must continue to monitor the waterways and provide residents with updates about the safety of our environment.

The coal ash has inevitably been in the air prior to the spill, but the problem has increased exponentially since then. TVA initially promised to distribute sprinklers to all residents and water the coal ash to keep it moist. Instead they dropped sprouted rye grains and straw from helicopters in the middle of January when the outside temperature was around 15 degrees. While TVA is now using Flex Terra to cover the ash, it is not enough. The human body is the most sensitive air monitoring system, and since the spill, too many residents have been experiencing similar respiratory symptoms and other ailments. We believe these health impacts are directly related to coal ash contaminated air. We are already aware that the states air monitoring only focused on larger particles and neglected the small particles which are known to cause serious respiratory illness. As spring approaches, drier weather puts us at risk for further inhalation and dust storms, similar to the one recorded on February 3, 2009. Many residents are already experiencing increased amounts of dust in their homes. We are greatly concerned about the air quality and what can be done once the fly ash is airborne.

Independent groups trying to assist us must be granted access to private properties, with the consent of the owner, to conduct air testing. It is inappropriate and unjustified for these groups to be harassed and in some cases detained for conducting air and water tests. Watchdog groups are the only ones looking out for the health and safety of my neighbors and me.

A significant portion of the Harriman population has experienced illness since the spill. While the median household income of Harriman is just over $23,000, barely half that of the rest of the country, TVA refuses to pay for medical testing these residents need. Residents living within a ten mile radius of the disaster site experience various health impacts including: upper respiratory impacts, asthma, sinus infections, nosebleeds, bleeding from the ear, ear infections, nausea, vomiting, skin rashes, blisters, fatigue, anxiety, and depression. Many sought medical attention from local doctors or hospitals. A number of doctors have written evacuation notices for their patients after documenting health impacts directly related to airborne coal ash. Other doctors are prescribing breathing machines, steroid inhalers, and strong antibiotics to combat these symptoms. Primarily, we are worried about our children. Our kids are sick with chronic illnesses that are passed off as merely asthma. Parents don't know where to go for answers and are struggling to pay for the medical bills they are acquiring.

For many community members, the worries about finances, property values, their health and their futures are more than they can bear. Many are realizing that TVA will never buy their

property because they live outside of the "immediately impacted" area according to the TVA lawyers. This disaster has caused the most intense stress most of us have ever dealt with and some are experiencing psychological affects as a result. These individuals need to see counselors for assistance coping with these tragedies and TVA should support these people through compensation for such medical attention.

We are very worried that TVA is not actively helping sick individuals and has not contacted us about the immediate or long term health risks of exposure to coal ash. We have a right to know why we're sick and what is making us ill. TVA has a responsibility to disclose this information. Neither the Tennessee Department of Health, TDEC nor the TVA has taken substantial steps to help relocate residents choosing instead to educate the local health practitioners about the safety of coal ash.

Fear and the lack of communication from TVA are causing our community to deteriorate. To date, TVA has purchased 46 residential properties affected by the spill. Several other residents have already left Harriman in fear of the health implications and other concerns. Neighborhoods are breaking down and the spill is slowly eroding away at our once close knit community.

We are concerned about the ability to sell our land without financial losses. Even if the coal ash did not intrude onto every property, many doubt they will find a buyer for their property, especially with the increased fly ash in the air. The spill also caused property values to decline drastically further than they had already declined under the current economy. Property taxes are expected to increase as a result of TVA' property ownership. TVA is not required to pay the same property taxes as individual citizens, thus real estate taxes will be raised to recoup the lost revenue. Add these increases to our cost of living the additional cost of the evacuation of Harriman.

TVA announced their plans to file for immunity in court on February 26, 2009 and they are planning to file a motion to dismiss all the lawsuits on this basis on April 17. We are outraged. The polluter must be held accountable for their wrongdoings. Congress has the ability to prevent this action by clarifying the purpose of the Tennessee Valley Authority Act and by pressuring TVA to refrain from raising immunity claims. The Tennessee Valley Authority Act is a broad waiver of governmental immunity, which says that TVA can sue and be sued. TVA is planning to claim that the release of over 5 million cubic yards of coal ash is a type of "discretionary function," which they can conduct with immunity as a governmental agency. We need Congress to intervene on the behalf of the Harriman community.

The spill has stolen our trust, our environment and recreational places, our health and our community. TVA must take action to restore our lives and compensate us for damages. We are now ground zero for the coal industry and I would never wish this experience on any other community. We simply must act now to ensure that a coal ash spill never takes another community by regulating coal ash containment and legally defining coal ash as a hazardous waste.

TESTIMONY OF STAN MEIBURG
ACTING REGIONAL ADMINISTRATOR, REGION 4
U.S. ENVIRONMENTAL PROTECTION AGENCY
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
SUBCOMMITTEE ON WATER RESOURCES AND THE ENVIRONMENT

March 31, 2009

Madam Chairwoman and members of the Subcommittee, thank you for the opportunity to provide testimony on the U.S. Environmental Protection Agency's (EPA's) role in the response and clean up of the release of coal ash from the Tennessee Valley Authority (TVA) Kingston Fossil Plant in Harriman, Roane County, Tennessee. I will discuss the actions EPA has taken as part of the response to this release, as well as our current and planned actions to ensure that the ash removal and disposal is conducted in a manner that protects public health and the environment.

Response to Kingston Coal Ash Release

On December 22, 2008, at 1:00 a.m., an ash disposal cell at the TVA Kingston Fossil Plant failed, causing the release of an estimated 5.4 million cubic yards of fly ash to the Emory and Clinch Rivers and surrounding areas. The release extended over approximately 300 acres outside the ash storage area. The failed cell was one of three cells at the facility used for settling the fly ash. The initial release of material created a wave of water and ash that destroyed three homes, disrupted electrical power, ruptured a natural gas line in a neighborhood located adjacent to the plant, covered a railway and roadways in the area, and necessitated the evacuation of a nearby neighborhood.

Shortly after learning of the release, EPA deployed an On-Scene Coordinator to the site of the TVA Kingston Fossil Plant coal ash release. EPA joined TVA, the Tennessee Department of Environment and Conservation (TDEC), the Roane County Emergency Management Agency, and the Tennessee Emergency Management Agency (TEMA) in a coordinated response (i.e., unified command in the National Incident Management System). EPA provided oversight, as well as technical advice, for the environmental response portion of TVA's activities. TVA has conducted extensive environmental sampling and shared results with EPA personnel. As discussed in more detail below, EPA staff and contractors have also conducted extensive independent sampling and monitoring to evaluate public health and environmental threats. In addition to providing information on environmental conditions at the site, EPA's data have also served as an independent verification of the validity of the TVA data.

EPA sampling has included: surface waters of the Clinch and Emory Rivers, municipal water supply intakes, finished water (distributed from the water treatment plant) from potentially impacted public water systems, soils, private drinking water wells, and coal ash. EPA also monitored airborne particulate levels in areas of ash deposition. The multimedia data are being used to determine appropriate response measures that are protective of the environment and human health.

In the aftermath of the incident, EPA sampled the coal ash and residential soil to determine if the release posed an immediate threat to human health. Sampling results for coal ash contaminated residential soil showed arsenic, cobalt, iron, and thallium levels above the residential Superfund soil screening values. Sampling results also showed average arsenic levels

For drinking water, concentrations measured on December 23, 2008, near the intake of the Kingston Water Treatment Plant (WTP) were below federal Maximum Contaminant Levels (MCLs) for drinking water with the exception of elevated thallium levels. Subsequent EPA testing on December 30, 2008, of samples at the same intake found that concentration levels for thallium had fallen below the MCL. On December 29, 2008, and again during the December 30, 2008, sampling event, EPA sampled the finished water at the Kingston WTP. These samples were below MCLs. Additional testing conducted during the December 30, 2008, sampling event confirmed that samples from the Cumberland and Rockwood WTPs did not exceed MCLs. A regular sampling program implemented by TDEC at the Kingston WTP is in place and continues in operation.

Some residents near the site rely on private wells as their source of drinking water. EPA identified and sampled several potentially impacted residential wells in the immediate area on December 30, 2008. No contaminants above MCLs were detected. In coordination with EPA testing, TDEC offered to sample all residential wells within a four-mile radius of the facility. As of March 26, 2008, TDEC has taken 112 water samples (both spring water and well water). To date, all of the samples have met the Drinking Water MCLs. Well sampling is a voluntary process that must be initiated by each resident, and TDEC continues to receive and accommodate sampling requests within four miles of the facility.

EPA and TDEC recognize that windblown ash poses a potential risk to public health. With EPA oversight, TVA commenced air monitoring for coarse (10 microns in size) and fine (2.5 microns in size) particulate matter (PM_{10} and $PM_{2.5}$, respectively). Concurrently, EPA and

TDEC commenced monitoring for PM_{10} and $PM_{2.5}$ to validate TVA's findings. To date, almost 26,000 air samples have been collected. Particulate levels in the air have measured below the National Ambient Air Quality Standards for these parameters. TVA has constructed five air monitoring stations in residential neighborhoods surrounding the site and developed a strategy for air monitoring throughout the duration of the clean up. TVA is also implementing a number of dust control measures, including water trucks, vehicle cleaning, and erosion control mulch.

TVA also obtained several air samples on TVA property to measure potential levels of specific contaminants of concern in the air. No constituents were detected with the exception of silica in a single sample. After consultation with the Agency for Toxic Substances and Disease Registry (ATSDR), the level of silica detected was determined not to pose an imminent threat to public health. Sampling results for sediment, air, and water testing are available on the TDEC, TVA, and EPA Region 4 websites.

While protection of public health and safety was the primary concern during the initial phase of emergency response, EPA's mission also calls for protection of the environment, in this case the long-term ecological health of the Emory and Clinch Rivers. As part of its response, TVA constructed an initial rock weir across the Emory River to minimize downstream sediment transport, and a second weir to contain ash which is located in Swan Pond Embayment adjacent to the Emory River. A detailed ecological assessment will determine appropriate future actions to restore the functions of this aquatic system and its tributaries. TVA has also constructed drainage channels across the ash in the Swan Pond Embayment to reduce the potential for flooding in the three tributary systems that feed the embayment and to reduce water flowing

through the ash. TVA has submitted a storm water construction permit for the embayment area, and this permit has been approved by TDEC. This permit involves the construction of two additional dikes at the upstream extent of the ash in the tributaries to reduce the mixing of stormwater flows with the ash, and a stormwater pond for treatment. The pond is presently being constructed adjacent to the second weir across Swan Pond Embayment.

Key Cleanup Activities

The ash disposal cell which failed had been permitted by TDEC as a Class II Solid Waste Landfill under State regulations, and TDEC remains the lead oversight agency for this clean up. On January 12, 2009, the Commissioner of TDEC issued an order to TVA that among other things required TVA to submit a Corrective Action Plan for addressing the clean up of the ash spill. In addition, on February 4, 2009, EPA Region 4 and TDEC sent a letter to TVA notifying TVA that, pursuant to Executive Order (EO) 12088, EPA considers the Kingston spill to be an unpermitted discharge of a pollutant under the Clean Water Act. EO 12088 specifies that when EPA finds an Executive agency in violation of a pollution control standard, upon notice from EPA, that agency shall provide to EPA a plan to achieve and maintain compliance with the applicable pollution control standard. In order to meet the requirements of both the TDEC Commissioner's Order and Executive Order 12088, and to ensure the most efficient and expeditious collaboration between the three agencies, the letter directs TVA to provide copies of all plans, reports, work proposals and other submittals to EPA and TDEC simultaneously. EPA and TDEC are coordinating reviews and approvals of the submittals within our respective authorities. EPA's overall objectives for our review and oversight are to ensure that the clean up protects public health, is in full compliance with all applicable Federal law, proceeds in

accordance with sound scientific principles, is done as quickly as possible, consistent with prudent management, and restores the ecosystem.

To facilitate coordination of internal activities, on January 21, 2009, EPA Region 4 formed a Kingston Ash Spill Task Force (Task Force). Senior staffers from the Region's air, water, waste, and laboratory programs are represented on the Task Force to ensure complete and adequate coverage of all issues. Draft plans, products and data produced by TVA and TDEC are reviewed by the Task Force and approval by the Region is coordinated through each of these programs. Members of the Task Force and their staff review data for quality control, participate in site visits and reviews, and have kept in close contact with TDEC and TVA during all phases of the recovery to date. Region 4 is also coordinating with EPA Headquarters. This coordination will continue until the site has been restored.

With respect to ash in Emory River, on February 5, 2009, TVA submitted to EPA and TDEC the draft Phase One Dredging Plan. The Phase One dredging plan was revised, and then approved by both TDEC and EPA on March 19, 2009, after final approval of the associated sampling plan and quality assurance plan for the Phase One dredging operations. Phase One dredging began on March 19, 2009, and involves using a hydraulic dredge and a mechanical dredge to remove the ash from the main channel of the Emory River down to a level of 710 feet above mean sea level. Removal of this material is critical to reopening the channel enough to reduce the potential for upstream flooding which could occur with seasonal high water discharges during the spring. TDEC and EPA have required TVA to develop an extensive monitoring and sampling plan to monitor any releases that might occur during the dredging

operation and prevent additional harm to human health or the environment. As the dredging is conducted, if any sampling indicates a release of any toxic substances or a turbidity problem, the agencies will order the dredging to stop until additional measures can be put in place.

Phase One dredging is expected to last for at least several months. Phase Two and Phase Three of the dredging will begin after completion of Phase One. Phase Two dredging will address any remaining ash in the Emory River channel down to the original substrate. Phase Three dredging will address ash in the Swan Pond Embayment and its tributaries. The dredging plans for these later phases have not yet been developed by TVA. EPA and TDEC, as well as other local, state and Federal agencies, will be involved as the plans are prepared. EPA and TDEC will also approve the plans before they are implemented.

EPA and TDEC are also reviewing the overall Corrective Action Plan (CAP) which TVA submitted, pursuant to the Commissioner's Order, on February 27, 2009. The CAP, as submitted, was an initial statement of short-term and long-term plans for recovery of the site and final disposal of the ash, and discussed TVA's initial plan for site assessment, environmental monitoring, protection of water supplies and options for ash disposal. Pursuant to the Commissioner's Order and EPA's authority, TVA's CAP, including any updates, will be reviewed and revised to ensure that the clean up provides continued protection of human health and the environment. As part of the review of the CAP, EPA and TDEC met with TVA on March 19, 2009, to begin revisions of the CAP and to discuss next steps for selection of final disposal sites for the ash, to be located off-site. Plan revisions will involve EPA, TDEC and other local, state and Federal agencies and must be approved by both EPA and TDEC.

EPA recognizes that there are ongoing community concerns regarding the impacts from the ash spill and related cleanup activities. To help facilitate communications, EPA, along with TDEC, ATSDR and the Tennessee Department of Health (DOH) participated in a March 5, 2009, public meeting in Harriman, Tennessee, in which TDEC provided sampling data to the community and residents were able to ask questions and express any concerns to agency representatives. TDEC expects to host additional public meetings while the cleanup process continues. We also understand that TVA has planned a public meeting for March 30, 2009, and we encourage TVA to continue efforts to reach out and involve the affected citizens of the surrounding community in the planning and conduct of the clean up.

Conclusion

EPA will use its authorities and expertise to continue oversight and technical assistance efforts to protect human health and the environment during the clean up of this incident and promote the restoration of the surrounding ecosystem. EPA will continue to work with other agencies to share information with the community, and will keep Subcommittee staff informed on progress related to the response. Again, we appreciate the opportunity to testify today and will be pleased to answer any questions you may have.

BEFORE
THE

U. S. HOUSE OF REPRESENTATIVES

COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT

MARCH 31, 2009

TESTIMONY
OF

DEPUTY COMMISSIONER PAUL SLOAN
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
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TVA KINGSTON COAL ASH RELEASE

Introduction

The Tennessee Valley Authority (TVA) operates a coal fired electrical generation plant in Kingston, Tennessee. The TVA Kingston Plant is located on the Emory River. Construction of this facility began in 1951. The plant began generating electricity in 1955. The coal ash produced is divided into two categories; bottom ash which is heavy and falls to the bottom of the burn chamber and fly ash which is light enough that it is transported with the flue gas vented to the stacks. Fly ash is removed using electrostatic precipitators to meet Air Pollution Control requirements. Of the total amount of coal ash generated at the TVA Kingston Plant, approximately 90% is fly ash and 10% bottom ash. The chemical composition of fly ash and bottom ash is very similar; the primary difference is the size of the ash particles.

TVA manages the coal ash generated at this plant using a "wet" ash handling process. Water from the Emory River is used to transport the coal ash from plant operations via a sluice to a surface impoundment. The coal ash settles to the bottom of the surface impoundment and is then removed using a dredge. The dredged ash is then disposed in an on-site landfill.

TVA Kingston Plant facts:

1. The plant uses 14,000 tons of coal/day when all nine units are operating;
2. The plant generates approximately 1,000 - 1,200 tons of coal ash/day when all nine units are operating;
3. The plant produced approximately 450,000 tons of coal ash in 2008;
4. The plant uses a "wet" ash handling process to collect coal ash for disposal;
5. To our knowledge; all coal ash generated at this plant has been disposed of in surface impoundments and landfills on the TVA Kingston Plant property;
6. The surface impoundment used to separate coal ash and process water has an National Pollutant Discharge Elimination System Permit (originally issued on April 30, 1976) allowing discharge to the Emory River;
7. The on-site landfill is a Class II Industrial Landfill permitted (with variances) by Tennessee Department of Environment and Conservation (TDEC) on September 26, 2000. The landfill is only permitted to accept coal ash;
8. Coal ash is regulated as a solid waste by the Tennessee Solid Waste Management Act (T.C.A. §68-211-101 et. seq.);
9. *Image 1* provides an aerial photograph of the Emory, Clinch and Tennessee Rivers after the release; and
10. *Image 2* provides an aerial photograph of the plant before the coal release.

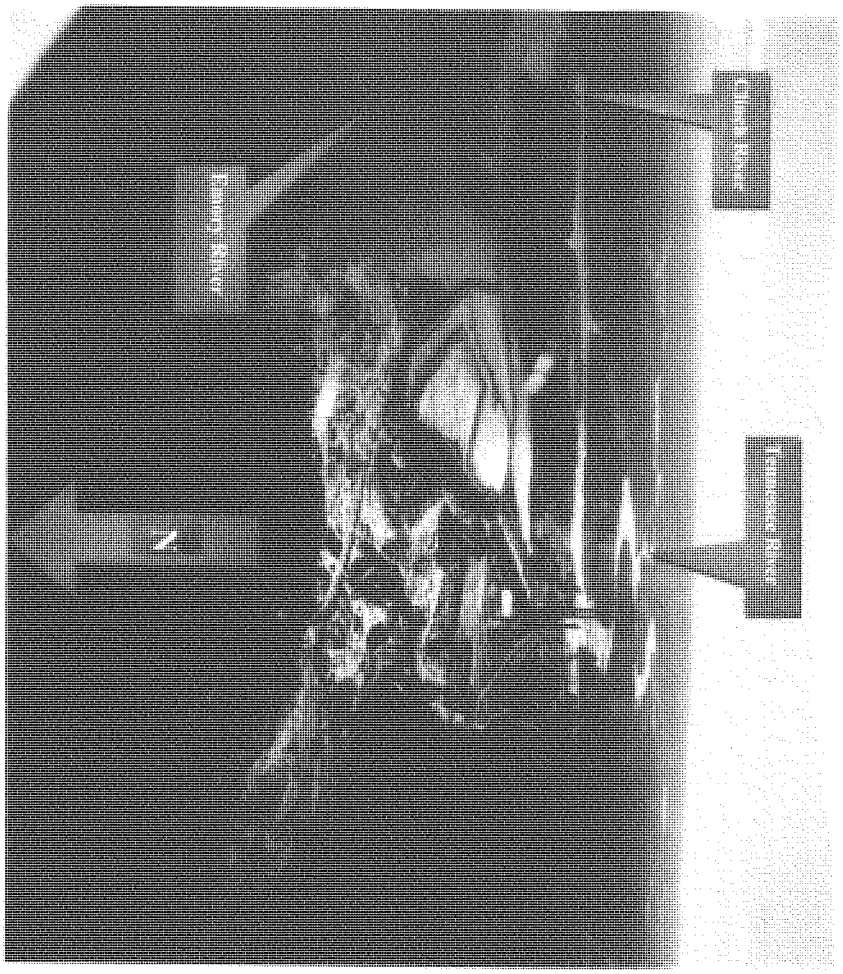


Image 1

Aerial Image of Kingston Ash Slide Pre-Event 2008

0 500 1,000 1,500 2,000 Feet

Tennessee Valley Authority
OE&R - ER&S
Geographic Information & Engineering

Image 2

Description of TVA Coal Ash Release

On December 22, 2008 at approximately 1:00 AM, the north side of the TVA Kingston coal ash landfill failed. The failure released approximately 5,400,000 cubic yards of coal ash into the local environment. The coal ash migrated north of the landfill into the Emory River embayment. two tributaries of the Emory River, across two peninsulas with local homes and into the navigable channel of the Emory River. The impacts of the coal ash release were:

1. Over 3,000,000 cubic yards of coal ash was discharged into a one mile stretch of the Emory River;
2. Over 2,000,000 cubic yards of coal ash was discharged into the Emory River Embayment and two tributaries of the Emory River. The Emory River Embayment is now filled with coal ash;
3. Over 110,000 cubic yards of coal ash remains on the ground surface;
4. The coal ash moved over 20 individual properties with three homes damaged structurally beyond repair;
5. Approximately 4,500 feet of Swan Pond Road was covered with coal ash;
6. Approximately 2,000 feet of railroad track was covered with coal ash; and
7. Interruption of a local public water line and a local natural gas line.

Image 3 provides an aerial photograph of the plant after the coal ash release.

Aerial Image of Kingston Ash Slide 12/23/2008

0 500 1,000 1,500 2,000 Feet

Tennessee Valley Authority
OE&R - ER&S
Geographic Information & Engineering

Image 3

Immediate Response to the TVA Kingston Coal Ash Release

The Tennessee Department of Environment and Conservation (TDEC), the Tennessee Valley Authority (TVA), the U.S. Environmental Protection Agency (EPA), the Tennessee Emergency Management Agency (TEMA), the Tennessee Department of Health (TDH) and Roane County Emergency Management (Roane County) responded to the release. An Incident Command Center was established. Local citizens whose homes were impacted were relocated temporarily and access to the release area was limited, and areas with significant hazard due to the presence of ash were posted. TDEC, TVA and EPA began sampling the Emory and Clinch Rivers downstream from the release to determine the impact on the environmental quality of the rivers and to determine if the coal ash had compromised the safety of the Kingston and Rockwood Public Water Systems.

TDEC issued a Commissioner's Order to TVA on January 13, 2009, found at http://www.state.tn.us/environment/kingston/pdf/orders/01_12_2009.pdf. The Order required TVA to:

1. Investigate and determine the full extent of the coal ash release;
2. Prepare and implement a Corrective Action Plan (CAP) to clean-up the coal ash and restore the environment impacted by the coal ash release (this includes the Emory River, the Emory River Embayment, affected tributaries and coal ash on the ground surface);
3. Investigate and determine the cause of the coal ash release from the Class II Industrial Landfill;
4. Prepare and implement a plan to permanently close the Class II Industrial Landfill at the TVA Kingston Plant;
5. Investigate and determine the structural integrity and stability of the surface impoundments and landfills at all other Tennessee TVA Fossil Plants and develop a management strategy to address any problems at these locations; and
6. Prepare a short-term and long-term strategy for managing coal ash at all Tennessee TVA Fossil Plants, including consideration of managing coal ash at all plants using the dry ash process.

WATER

Water Quality Implications of the Kingston Ash Spill

The ash spill at Kingston has resulted in hundreds of acres of the reservoir being smothered, fish and aquatic life killed, habit lost, and pollutants released into the water column. Ash blocks navigation on the Emory River and has been found to extend as far as three miles upstream from the release point. Ash particles have been found in fish gills and bellies, and chemical measurements have shown violations of water quality criteria.

Lakeside residents in the spill area are severely affected. Many of these properties have been sold to TVA since the release.

Public Water Supplies - Frequent sampling of raw and finished water at the closest downstream public water supplies, Kingston and Rockwood, has consistently shown those to be unaffected by the release. TVA began sampling immediately after the incident, and TDEC started independent sampling, analysis and reporting shortly after that. For three weeks, beginning at the end of December, TDEC did daily sampling for metals and indicator pollutants. These samples were transported to our Nashville lab and the results were reported the next day. Consistently low results during that period allowed us to reduce frequency to weekly for now. Kingston and Rockwood will continue to do their own monitoring of raw and finished water at their facilities.

Private Wells – To date, TDEC has sampled and analyzed water from over 100 private wells within an approximate four mile radius of the incident. That sampling has shown no impact and all results have been reported to those property owners. We have identified sentinel wells in the vicinity of the site that we will monitor on a quarterly basis until we are confident there are no ground water impacts from the spill or recovery.

Surface Water - Heavy metals are contained in fly ash and present the greatest potential for chemical contamination of waters from the incident. Metal levels were highest immediately following and in the area of the spill. On January 2, 2009, TDEC began bi-weekly sampling of multiple stations in the area. Specific metals that have violated Tennessee water quality criteria for protection of either human health or fish and aquatic life include thallium, arsenic, lead, aluminum, iron, copper, mercury and cadmium.

Most of the violations were in the Emory River near the ash spill. Arsenic was found in the Emory River near the spill site at levels above our criteria for domestic water supply, but other sites were lower. Mercury was occasionally detected above criteria for protection of fish tissue for human consumption. Criteria for waters that serve as a source of drinking water and from which fish are consumed have also been violated by some of our thallium samples from both the Tennessee and Emory River, although there were no violations of our thallium standard for drinking water only.

Now that dredging is underway, TDEC has been on the water to observe the operations and continue sampling. Following are the results for some of the parameters of concern at TDEC's three Emory River stations downstream of the ash pile on March 24, 2009 a day TVA dredges were in operation.

Emory River Water Quality During Dredging (3/24/2009)
(All metals data are in ug/L TSS is mg/L)

	ERM 2.1	ERM 1.7	ERM 0.1
Parameter			
TSS	20	<10	<10
Aluminum	420	130	130
Iron	330	140	150
Arsenic	4.0	<0.93	<0.93
Beryllium	<0.11	<0.11	<0.11
Cadmium	<0.41	<0.41	<0.41
Copper	1.2	2.1	1.5
Lead	0.59	0.23	0.28
Selenium	<1.3	<1.3	<1.3
Thallium	0.22	0.09	0.07
Vanadium	4.3	<3.4	<3.4
Zinc	3.7	2.8	3.5
Mercury	N/A	N/A	N/A

N/A – Mercury results are not yet available due to an instrument malfunction.

None of the values in the table above are water quality standards violations. (Note: the similarity of data from the stations at Emory River mile 1.7 and 0.1 suggests that Clinch River water is being pulled upstream on the Emory River.)

Selenium - This member of the family of heavy metals has recently been raised as an issue of particular importance because of concerns that it might be liberated into the water column as a result of chemical reactions during the dredging process. The selenium criterion for fish and aquatic life protection is 5 ug/L and for drinking water it is 50 ug/L. To date, we have not seen selenium problems in samples collected after the spill.

Specifically, on the Emory River, 68 of 82 samples were non-detectable at 1.3 ug/L with the highest single sample being 3.4 ug/L. On the Clinch River, the highest of 46 samples was 3.6 ug/L, with 30 being non-detectable at 1.3 ug/L. On the Tennessee River, of the 2 samples we have, both were non-detectable at 1.3 ug/L. As indicated on the previous table, selenium was at non-detectable levels on March 24, 2009 while dredges were in operation.

EPA has developed selenium criteria for protection of fish and aquatic life in terms of allowable concentration, not only in water but also in fish tissue. TDEC obtained eight fish from TVA that were collected on March 12, 2009 at mile 3.0 of the Emory River, at the edge of the upper extent of the ash pile. The four redear sunfish and four largemouth bass in the sample were delivered to the state laboratory and were analyzed by species as two composite samples. The selenium

results for the sunfish and largemouth bass were 1.1 and 0.97 mg/kg, respectively. Because the EPA criteria is based on dry weight rather than wet, the results were then converted from a wet weight basis to a dry weight by means of an EPA suggested conversion factor. These results were 5.1 and 4.5 mg/kg, respectively. These results indicate the possibility of selenium uptake by fish in the area, but are not at criteria levels suggested by EPA for protection of fish (7.91 mg/kg).

Because of the special concerns raised over potential selenium toxicity, TDEC has solicited advice from several scientists, including those who raised the issues and others who are advising TDEC on coal ash chemistry and toxicity. Based on all these much appreciated comments and recommendations, the monitoring plan has been amended to increase oversight of selenium at the dredge site and from the ash pond, the discharge from which will now be sampled five days per week.

**Map of TDEC's Surface Water Sa
Stations**

Image 4

Summary of TDEC's Surface Water Data (all values ug/L)

(Note: This table does not include other agency data.
Approximately 120 observations for each parameter.)

Metal	Lowest Criterion for Applicable Classified Uses	*Average Concentration (Detection Level)	Number of Criteria Violations	Maximum Concentration Observed
Thallium	0.24 (c)	0.17 (0.3)	23	1.50
Aluminum	750 (b)	538.6 (6.4)	10	15000
Lead	(d) 5.0 (a)	0.86 (0.1)	7	16.0
Arsenic	10 (a)	2.07 (0.93)	5	43.0
Iron	1,000 (b)	489.2 (2.9)	9	10000
Mercury	0.05 (c)	(0.13)	5	0.17
Copper	(d)	2.35 (0.38)	2	22.0
Cadmium	(d)	(0.41)	1	0.60
Selenium	5 (b)	0.90 (1.30)	0	3.60
Beryllium	4 (a)	0.12 (0.11)	0	1.60
Manganese	1000 (b)	46.1 (0.42)	0	330

* For purposes of calculating average concentrations, one-half of detection level was used for values below detection.

(a) Criterion for protection of domestic water supply [TDEC Rule 1200-4-03-.03(1)(j)];
(b) Criterion for protection of fish and aquatic life [TDEC Rule 1200-4-03-.03(3)(g), (h), or (i)]:
(c) Criterion for consumption of fish and drinking water from same body of water [TDEC Rule 1200-4-03-.03(4)(j)]; and
(d) Hardness-dependant fish and aquatic life dissolved criterion.

Recreation - Both TDEC and the TDH have stated that recreation in and on the water at locations other than the immediate area of the spill should be unaffected by the incident. Still, many who might use the lake for recreation are wary, and marinas and other local tourist businesses report cancelations. TDEC is committed to helping Roane County get the message out that recreation on and near Watts Bar Reservoir is safe.

Bacteriological and Radiological Impacts - The ash does not contain bacteria that might impact recreational use of the lower Emory River. It is possible for some metals such as iron to stimulate bacteria growth. These are not disease-causing bacteria, but might cause aesthetic problems. As water temperatures warm this spring, TDEC will watch to see if this occurs.

TDEC does not consider the ash to pose a threat to water quality due to radioactivity. However, there may be pockets of radioactive cesium in area sediment from historical activities at Oak Ridge. If any of these are found to be in the impact area, special plans will need to be made to avoid disturbing them.

Fishing – Fishing in the impacted area will remain unavailable until recovery is completed. Other than in the immediate spill area, fishing is safe and it is safe to eat most kinds of fish from Watts Bar. There has been a long-term advisory against consumption of catfish, striped bass and hybrid bass from Watts Bar because of polychlorinated biphenyl (PCB) contamination, and those advisories remain unchanged. There is also an existing advisory based on mercury in fish tissue for all fish species in the Emory River from mile 12.4 to mile 21.8. That is a 9.4 mile reach above the City of Harriman. TDEC is uncertain as to the source of mercury in fish collected in that location.

In partnership with TWRA, additional fish tissue samples have been collected. Those analytical results are not yet available. TWRA has announced that they will continue a semi-annual sampling schedule for fish tissue looking for metals associated with the ash, such as selenium, arsenic, mercury, cadmium and lead. TDEC will use those results to determine if the TDEC Watts Bar advisory needs to be changed.

TDEC's advisories for consumption of fish taken from Tennessee waters are in the second half of the document at:
http://www.tn.gov/environment/wpc/publications/advisories.pdf

TDEC's water sampling plan is available at:
http://www.state.tn.us/environment/kingston/pdf/monitor_plans/water_sampling_plan.pdf

A map showing the locations of our surface water sampling stations and the area where wells were tested is on the next page and may also be found at:
http://www.state.tn.us/environment/kingston/pdf/monitor_plans/KingstonMap.pdf

Results of TDEC's surface water monitoring are posted at:
http://www.state.tn.us/environment/kingston/surface_water.shtml

All of our public water supply monitoring data are on TDEC's site at:
http://www.state.tn.us/environment/kingston/wtp.shtml

Status of Clean-Up Activities

Ash Retention Structures – Within the first days of the incident, TVA proposed and TDEC and EPA approved installation of three weirs. Weir 1 was installed below water level across the Emory River channel to retain ash that was in the river and potentially moving along the river bottom. Weir 2 was installed on the west bank of the river to retain that portion of the spilled material that was not in the reservoir. Weir 3 was installed in a slough to divert drainage water from the spill site. Weirs 1 and 2 can be seen in Figure 7 of the dredging plan and Weir 3 is shown on the Overall Site Plan in the Interim Drainage Plan (see link below).

Site Drainage Controls – TVA has developed engineering plans for controlling runoff from the exposed ash in and adjoining the Emory River. This plan has been reviewed and approved by TDEC and EPA. It is posted on TDEC's web page at:
http://www.state.tn.us/environment/kingston/pdf/tva/ProposedInterimDrainagePlan030209.pdf

Dredging Operations – The Phase I Emory River Dredging Plan will remove ash from the river channel to a depth of 710 feet mean sea level. The approved plan calls for a pilot dredging program for the first 60 days, which began on March 19, 2009. It is anticipated that a sustainable pace will be determined based on initial operations. If three dredges are operating at an estimated 20 hours per day, they will be able to move approximately 9,000 cubic yards per day.

TDEC considers that it is critical to remove the massive amount of ash now in the Emory River as soon as it can be safely done. Presently, the ash presents a risk of flooding to upstream areas in the event of a significant rainfall and perhaps a greater risk of being washed downstream where recovery would be less efficient and further complicated by mixing with legacy contaminated sediments. TDEC sought and received comments from experts in the area of dredging, coal ash, toxicology, and protection of fish and aquatic life from EPA Region 4 in Atlanta, the Region 4 Science and Ecosystem Support Division Laboratory in Athens, the Corps of Engineers Nashville District Office, the Corps' Engineer Research and Development Center Environmental Laboratory at Vicksburg, the U.S. Fish and Wildlife Service, the Tennessee Wildlife Resources Agency, and Vanderbilt University.

These comments served as the basis for TVA's revisions to the dredge plan and accompanying monitoring plan. The approved dredge plan is available at:
http://www.state.tn.us/environment/kingston/pdf/tva/ProposedDredgePlanPhaseI_022309.pdf

AIR

Initially, the ash was in a mud-like state and stayed that way because of rainfall through most of January 2009. Predictably, that worked in favor of air quality and kept particulate levels well below the particulate National Ambient Air Quality Standards (NAAQS).

Toward the very end of January, extremely cold and dry polar air coupled with high wind speeds caused the ash to begin to dry and hampered watering of the roads because of icing issues. Attempts to straw and seed the area for a vegetative covering failed because of seed germination issues.

A new strategy to cover the area with a cellulosic binder erosion control material called Flex-Terra™ began on January 31, 2009, and thus far, the dust suppression effectiveness of the material is working. There are approximately 300 acres of surface area comprising the ash slide and as of March 23, 2009, enough material to cover 167 acres has been applied to the site. (Some of the acreage was retreated due to damage from traffic.)

TVA is applying this cover at the manufacturer recommended rate, and it should be effective at dust suppression for approximately 12 months. TDEC will monitor TVA's progress in covering the rest of the ash with this material and the continued dust suppressing effectiveness of the applied material over time.

Water trucks continually patrol the site haul roads and paved roads to minimize the dust from traffic. Additionally, street vacuum trucks clean paved roads and portable road sign style radar units help people to remember the 15 mph speed limit on the paved plant roads.

Track out of ash and ash bearing materials caked on the wheels and undercarriage of vehicles leaving the site onto public roadways are being addressed by the installation of three wheel/undercarriage wash racks at the site. Security personnel at the site have been instructed to turn any vehicle attempting to leave the site without undergoing decontamination back to the cleaning stations.

Air monitors ring the site to keep watch over clean-up related air exposure impacts to the public and the efficacy of dust suppression measures at the site. Both TDEC and TVA, with both TDEC and EPA auditing the TVA monitoring, operate monitors in the area.

Total Suspended Particulate monitoring is conducted to gauge the quantity of all sizes of particles that are suspended in the ambient air. In addition, the filters from these samplers are analyzed for metals found in the ash. TDEC is working with the TDH, EPA and Centers for Disease Control's Agency for Toxic Substances and Disease Registry Program to interpret the metals data in terms of public health protection.

Fractional particulate monitoring for both PM-10 (10 microns and down particles) and $PM_{2.5}$ (2.5 microns and down particles) is also conducted at the site and compared to the NAAQS for these

materials that have been established by EPA. A summary table and map of the air monitor types, sampling frequency and monitor locations are shown on *Images 5-9*.

TDEC is of the current belief that the air-monitoring network is credible and that the dust suppression procedures being used is effective. To date, no exceedances of the NAAQS for PM-10 and $PM_{2.5}$ have been measured in the vicinity of the coal ash spill in Kingston by either TDEC or TVA operated monitors. Additionally, the metals data available thus far has been reviewed by state and federal staff knowledgeable in environmental toxicology to ensure no adverse health effects develop from possible exposures. TDEC will not hesitate to modify our monitoring or dust suppression requirements as needed to address the new information going forward.

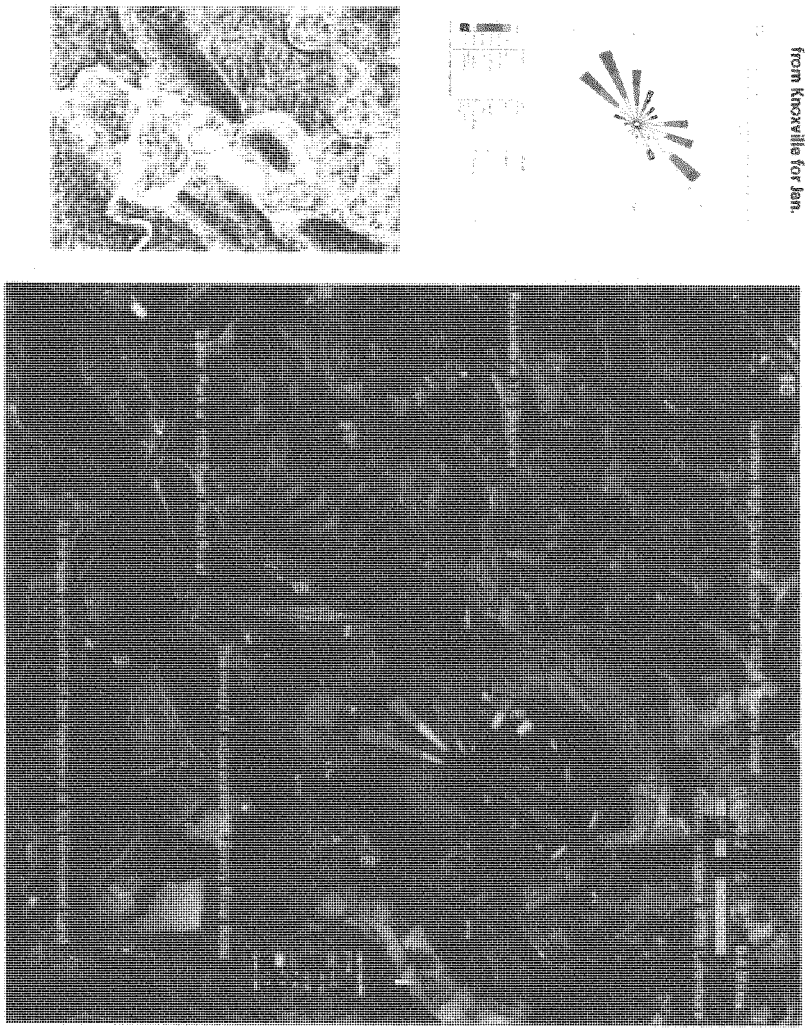
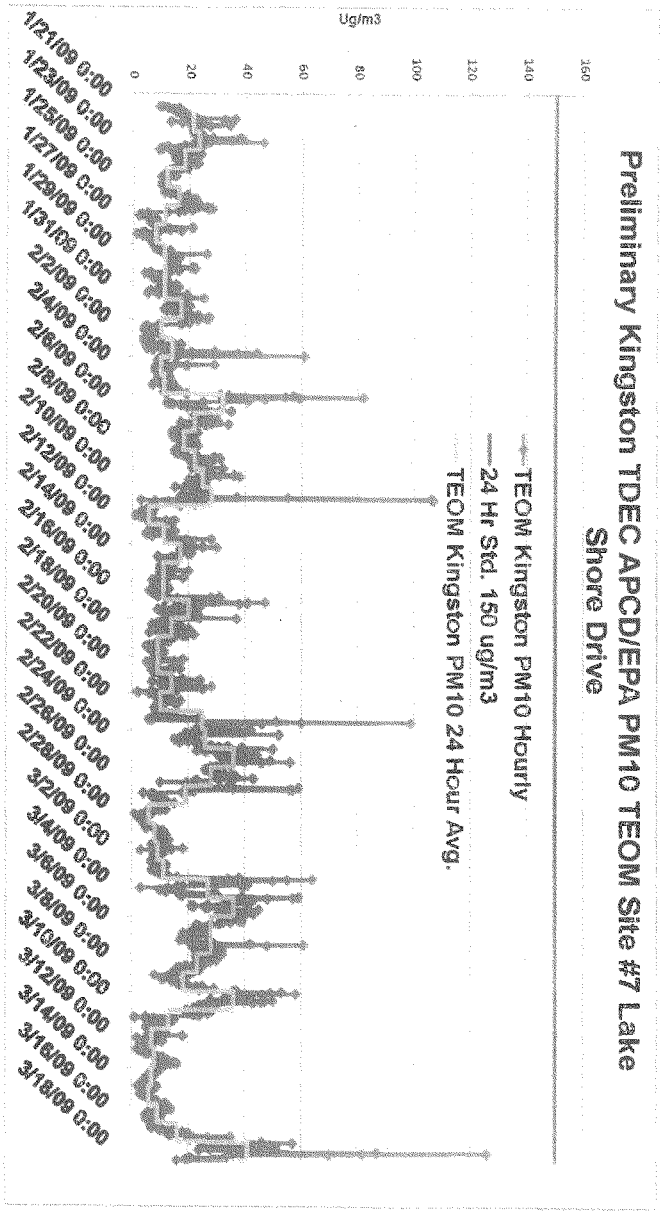

Previous 30 yr wind rose
from Knoxville for Jan.
Actual Site #7 Wind Rose Feb. 5 to Mar. 12, 2009

Image 5


Preliminary Kingston TDEC APCD/EPA PM10 TEOM Site #7 Lake Shore Drive
TEOM Kingston PM10 Hourly
24 Hr Std. 150 ug/m3
TEOM Kingston PM10 24 Hour Avg.
Ug/m3
160
140
120
100
80
60
40
20
0
1/21/09 0:00
1/23/09 0:00
1/25/09 0:00
1/27/09 0:00
1/29/09 0:00
1/31/09 0:00
2/2/09 0:00
2/4/09 0:00
2/6/09 0:00
2/8/09 0:00
2/10/09 0:00
2/12/09 0:00
2/14/09 0:00
2/16/09 0:00
2/18/09 0:00
2/20/09 0:00
2/22/09 0:00
2/24/09 0:00
2/26/09 0:00
2/28/09 0:00
3/2/09 0:00
3/4/09 0:00
3/6/09 0:00
3/8/09 0:00
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3/14/09 0:00
3/16/09 0:00
3/18/09 0:00

Image 6

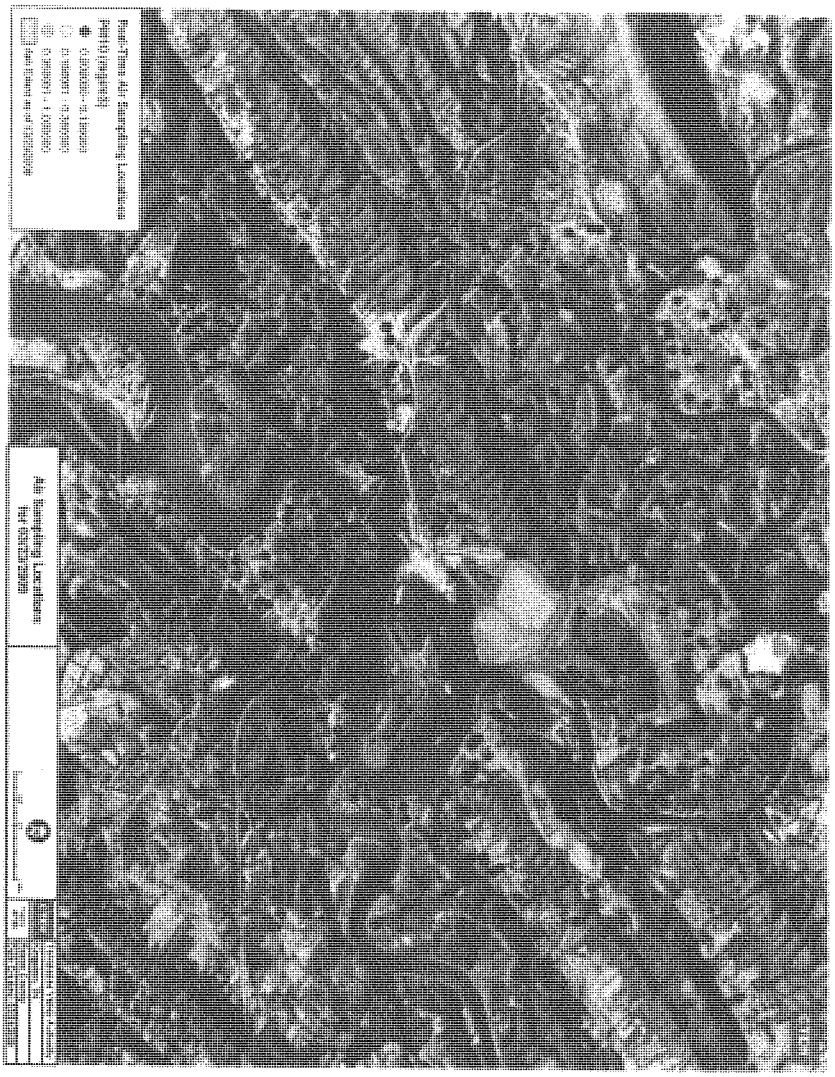

Forest Trees After Exploding Locations
Poll Employed
Air Exploding Locations
The Eastern Side
Forest Trees are Unbroken

Image 7

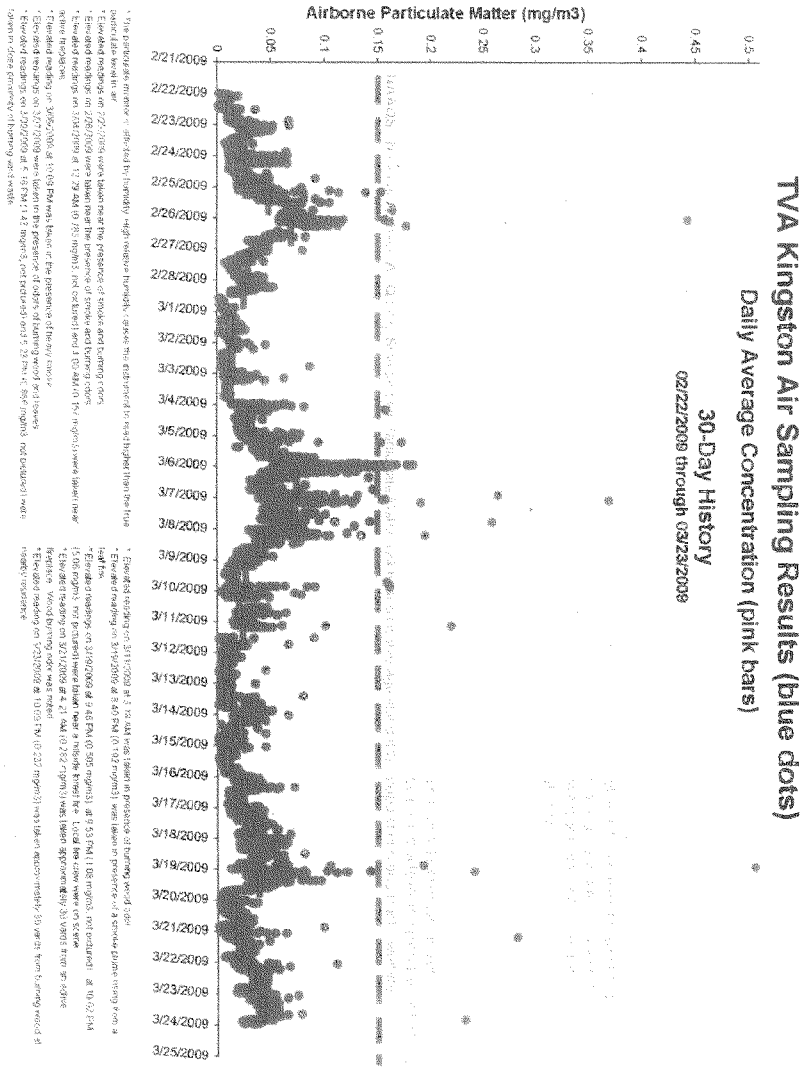

TVA Kingston Air Sampling Results (blue dots)
Daily Average Concentration (pink bars)
30-Day History
02/22/2009 through 03/23/2009
Airborne Particulate Matter (mg/m3)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
2/21/2009
2/22/2009
2/23/2009
2/24/2009
2/25/2009
2/26/2009
2/27/2009
2/28/2009
3/1/2009
3/2/2009
3/3/2009
3/4/2009
3/5/2009
3/6/2009
3/7/2009
3/8/2009
3/9/2009
3/10/2009
3/11/2009
3/12/2009
3/13/2009
3/14/2009
3/15/2009
3/16/2009
3/17/2009
3/18/2009
3/19/2009
3/20/2009
3/21/2009
3/22/2009
3/23/2009
3/24/2009
3/25/2009

Image 8

Particulate Monitoring Stations

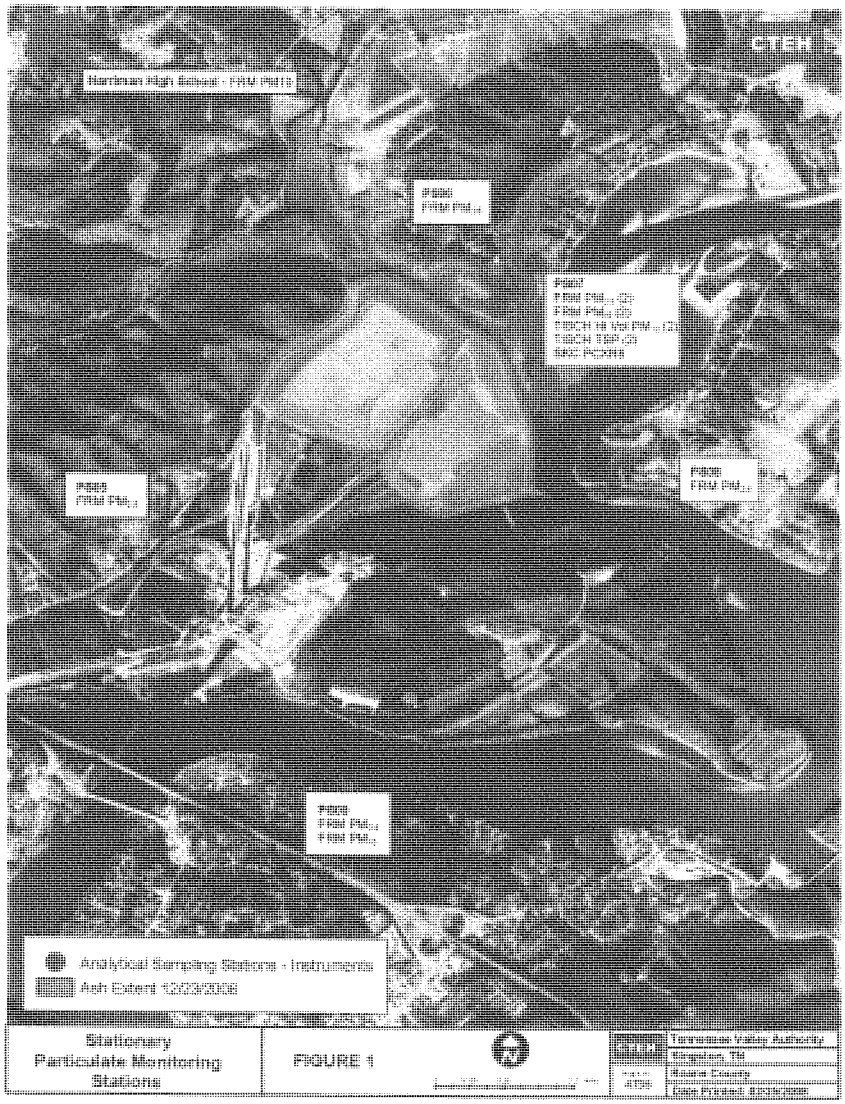


Image 9

LAND

TDEC has collected and analyzed coal ash samples from the release to determine the chemical characteristics. The analytical data produced is being used to determine its potential impact of the coal ash on local public health and the environment, and also to determine options for permanent disposal of the coal ash generated by its removal during clean-up. TDEC had coal ash samples analyzed for Total Metals, Toxicity Leaching Procedure (TCLP) Metals, radioactive materials, polynuclear aromatic hydrocarbons and organic solvents. TCLP is the laboratory procedure recognized by EPA to determine if a waste is a characteristic hazardous waste. The analytical results may be found at:
http://www.state.tn.us/environment/kingston/ash_history.shtml

The TDEC Ash and Soil Sampling Plan for the TVA Kingston Coal Ash Release may be viewed at:
http://www.state.tn.us/environment/kingston/pdf/monitor_plans/soil_ash_sampling_plan.pdf.

Neither polynuclear aromatic hydrocarbons nor volatile organic solvents were found in the coal ash. The levels of the radioactive material found do not pose an environmental or public health threat and were similar in amount to the levels typically found in coal ash across the country. A discussion of the radiation issue is presented by the Tennessee Division of Radiological Health at:
http://www.state.tn.us/environment/kingston/results_rad.shtml.

TCLP analysis of the coal ash samples did not find any metals approaching the levels that would classify the coal ash as a hazardous waste; acknowledging that coal ash is deferred from regulation as a hazardous waste by EPA per the Bevill Amendment. Coal ash samples were analyzed for all 8 TCLP metals and none of the results approached TCLP levels.

Analysis of the coal ash samples for Total Metals revealed that arsenic was present in concentrations great enough to present a threat to the local citizens only in a residential setting. Arsenic levels varied from 20 to 100 parts per million in the coal ash. Following clean-up criteria established by EPA and TDEC, corrective action may be required if the concentration of arsenic in surface soil exceeds 20 parts per million. The arsenic action level was developed assuming the rate ingestion of soil and dermal contact with soil for humans over a 30-year period in a residential setting. Limiting access to the coal ash on the ground surface (fencing, ground cover, etc.) eliminates this exposure hazard for the short-term. Physically removing the coal ash from the ground surface during clean-up eliminates the long-term hazard.

TVA submitted the Corrective Action Plan for the TVA Kingston Plant as required by the Commissioner's Order on March 2, 2009. The plan describes the processes TVA will follow to completely investigate the coal ash release and determine its extent; determine the effect of the coal ash on the local environment; to remove coal ash from the Emory River, the Emory River

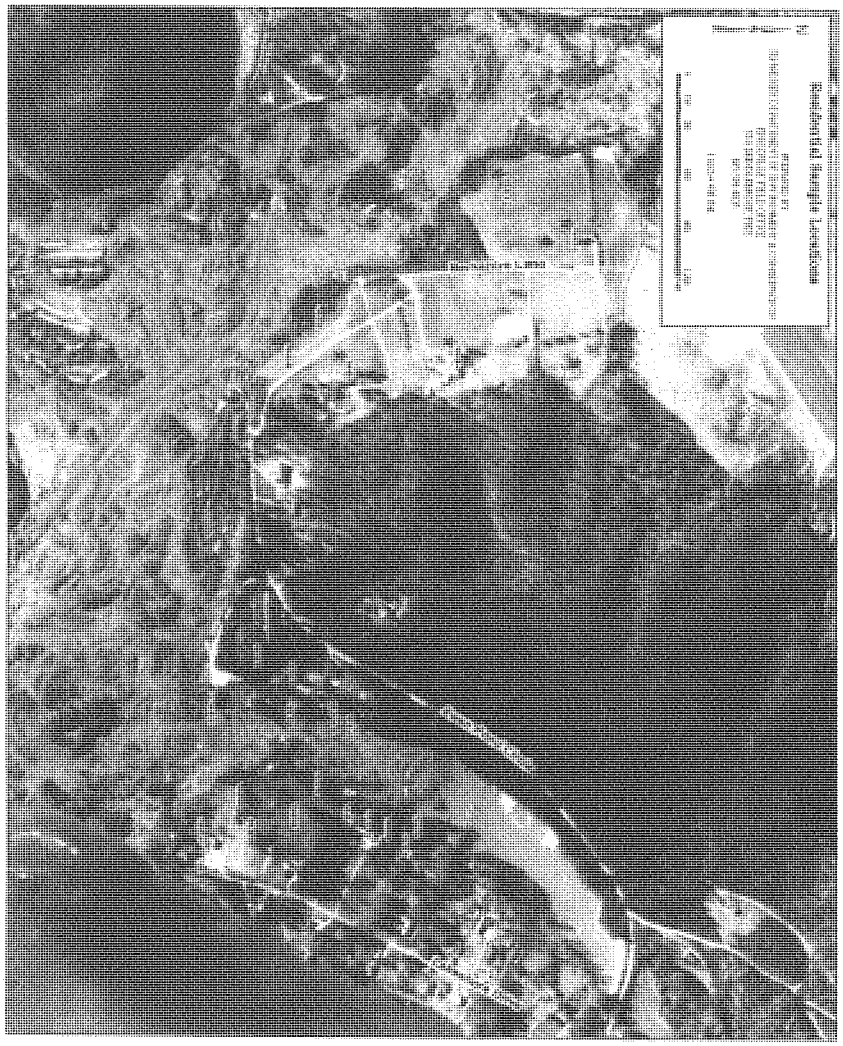
Embayment, local tributaries to the Emory River and from the ground surface; permanently close the existing Class II Industrial Landfill; and determine the Root Cause of Failure of the Class II Industrial Landfill; etc. The Corrective Action Plan can be viewed at: http://www.state.tn.us/environment/kingston/pdf/tva/KingstonCorrectiveActionPlan030209.pdf.

TDEC and EPA have approved TVA's plan to treat and temporarily store coal ash dredged from the Emory River. TVA has constructed a Coal Ash Processing facility adjacent to and south of the Class II Industrial Landfill to dewater the coal ash. Once the coal ash has been dewatered, initially TVA will dispose of the coal ash off-site at a Class I Municipal Landfill as a Special Waste. This is a short-term solution. TVA is working with TDEC and EPA to locate a property(ies) that can be developed under TDEC solid waste regulations for disposal of the coal ash for the long-term which may include the disposal of coal ash from current and future operation of the TVA Kingston Fossil Plant. The full Ash Management Plan is available at: http://www.state.tn.us/environment/kingston/pdf/tva/ProposedAshPlanTempStorage022509.pdf.

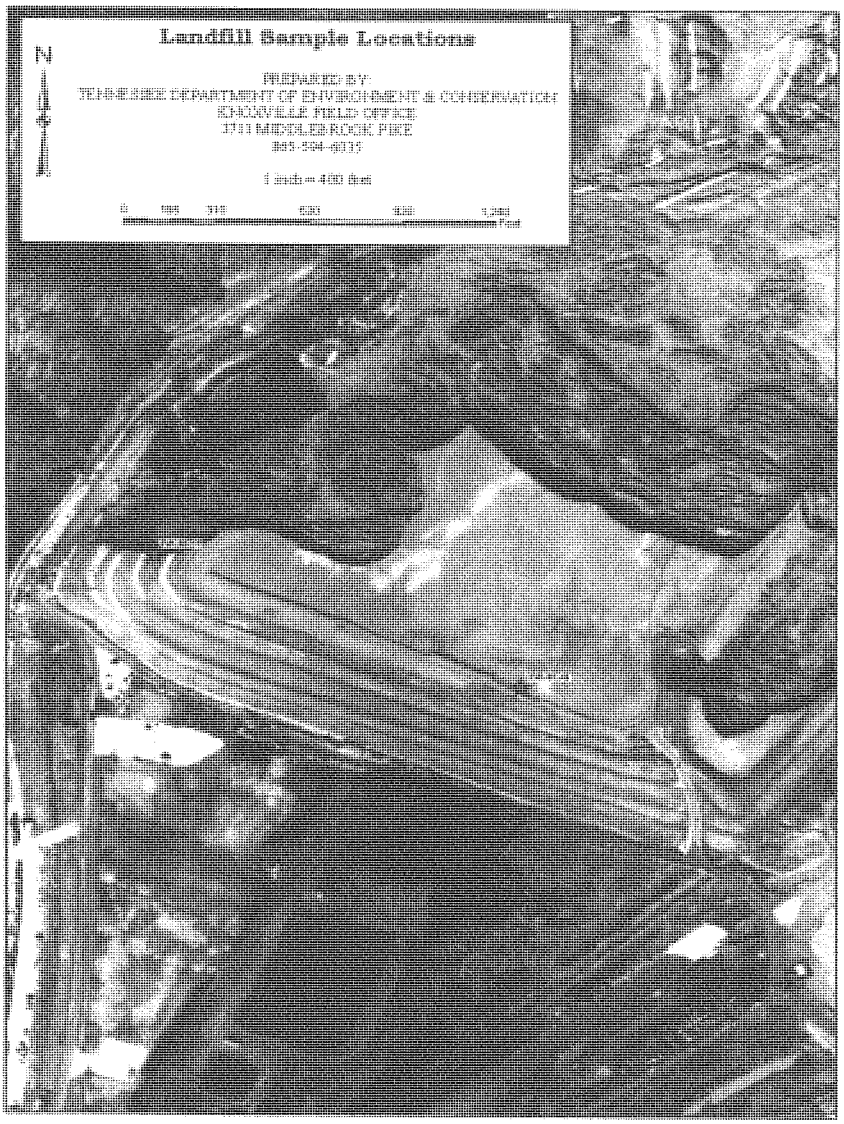
TDEC and EPA are working with TVA as it completes its analysis of the Root Cause of Failure for the TVA Kingston Coal Ash Landfill. The final report is due in June 2009. Along with TDEC, EPA and TVA, there are three professional geotechnical firms, representatives from the Army Corps of Engineers, the University of Tennessee and Vanderbilt University participating in this effort. A thorough review of the original landfill engineering design, additional soil borings, excavation of the remaining landfill cell from top to bottom, operational history, et al are included in this analysis.

Concurrent to the Root Cause of Failure Analysis effort, TDEC is utilizing the Root Cause of Failure Team to assess the structural stability and integrity of the surface impoundments and landfills at other Tennessee TVA fossil plants. This includes a physical survey of these facilities, and a review of the operational history and coal ash management practices, etc. The results of these analyses will be used to determine any actions needed at the other Tennessee TVA fossil plants to prevent any future coal ash releases.

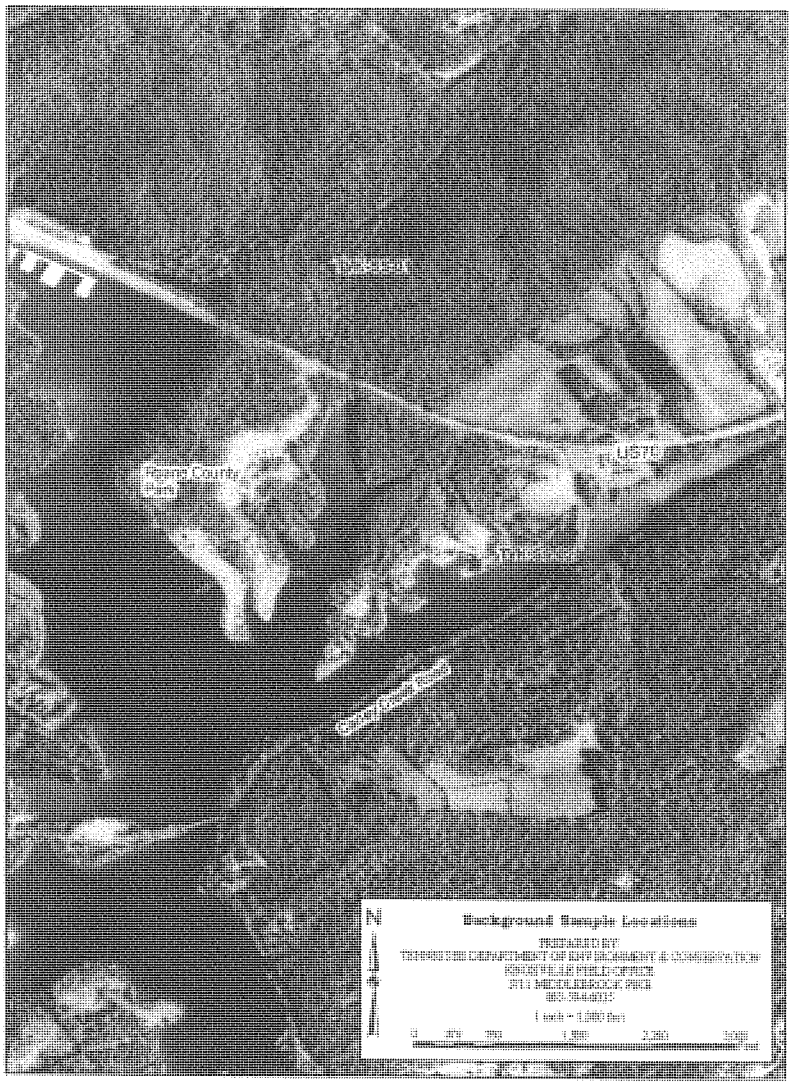
The coal ash generated by the TVA Kingston plant is regulated as a solid waste under Tennessee statute as is all coal ash in Tennessee. There are four options for coal ash disposal in our state; disposal at a Class I (Municipal Landfill) as a special waste, disposal at a Class II Industrial Landfill approved to accept coal ash, disposal at a Permit-by-Rule Coal Ash Structural Fill or beneficial reuse such as an additive to concrete or cement. The coal ash from the TVA Kingston Plant was disposed of in an on-site Class II Industrial Landfill permitted by TDEC. TDEC is reviewing the regulatory requirements for disposal of coal ash in Tennessee. As a part of TDEC's process, we are discussing the issue with EPA, other states, the Environmental Council of States and the Association of State and Territorial Solid Waste Management Officials.



Soil and Ash Sampling Locations North of TVA Kingston Class II Industrial Landfill
Image 9



Ash Sampling Locations at TVA Kingston Class II Industrial Landfill
Image 10



Location of Background Soil Samples for TVA Kingston Soil and Ash Sampling Event
Image 11

The Tennessee Valley Authority's Kingston Ash Slide: Potential Water Quality Impacts of Coal Combustion Waste Storage

A testimony to the Subcommittee on Water Resources and Environment, U.S. House of Representatives

by

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Durham, NC 27708

1. Introduction

On December 22, 2008, the retaining wall broke on a waste retention pond at the Tennessee Valley Authority (TVA) Kingston Fossil Plant, Tenn., and an estimated 4.1 million m^3 of coal ash slurry was spilled onto the land surface and into the adjacent Emory and Clinch Rivers (TVA , 2009). This was the largest coal ash spill in US history. The coal ash sludge spilled into tributaries that flow to the Emory River and directly into the Emory River itself (Fig. 1), which joins to the Clinch River and flows to the Tennessee River, a major drinking water source for downstream users. With funds provided by the Dean of the Nicholas School of the Environment of Duke University, in January 2009 our team began a preliminary investigation of the potential environmental and health effects of the spill. This preliminary work (Vengosh et al., 2009; Ruhl et al., in revision) has thus far revealed three major effects: (1) The surficial release of coal ash formed a sub-aerial deposit that contains high levels of toxic elements (arsenic concentration of 75 mg/kg; mercury concentration of 150 μg/kg; and radioactivity (radium-226 + radium-228) of 8 pCi/g). These pose a potential health risk to local communities as a possible source of airborne re-suspended fine particles (<10 μm). (2) Leaching of the coal ash sludge in the aquatic environments resulted in severe water contamination (e.g. high arsenic content) in areas of restricted water exchange such as the Cove area, in a tributary of the Emory River. Further downstream, in the Emory and Clinch rivers, much lower levels of metals were found due to river dilution, but with metals concentrations above the background upstream levels. (3) High concentrations of mercury in downstream sediments of the Emory and Clinch rivers indicate physical transport of coal ash in the rivers. The high concentration of mercury and sulfate in the downstream river sediments could impact the aquatic ecosystems by formation of methylmercury in anaerobic river sediments.

A recent survey of the amount of coal ash generation in the United States revealed that 500 power plants nationwide generate approximately 130 million tons of coal ash each year, 43 percent of which is recycled into other materials. The remaining 70 million tons are stored in 194 landfills and 161 ponds in 47 states (Lombardi, 2009). An EPA study (USEPA, 2007) identified 63 coal ash landfills and ponds in 23 states where the coal sludge is associated with contaminating groundwater and the local ecosystem. One

of the major potential hazards of coal ash storage in ponds is the continuous leaching of contaminants and their transport to the hydrological system. As such, the TVA coal ash spill provides a unique opportunity to evaluate the large-scale impact of coal ash leaching on the environment and water resources.

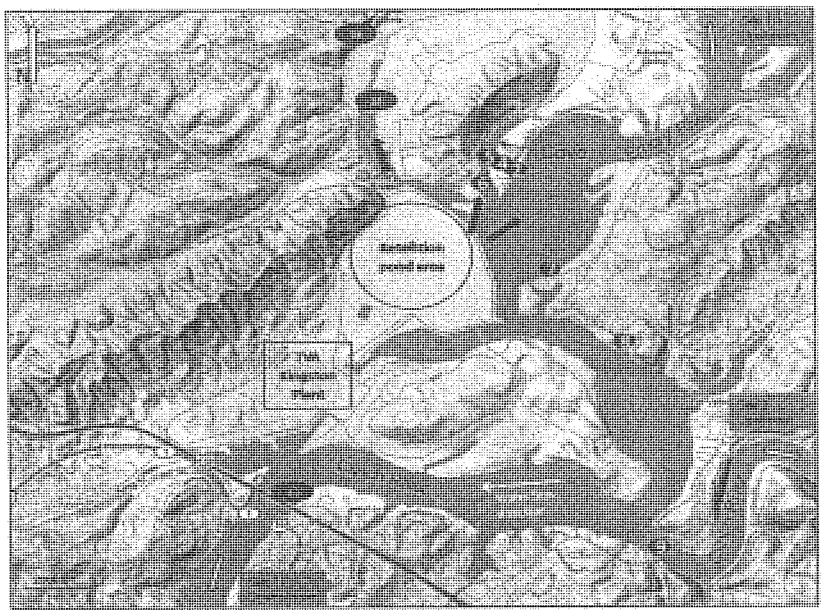

Figure 1: Map of the sampling sites of the TVA coal ash spill in Kingston, Tenn. From Ruhl et al. (in revision). Numbers refer to sampling sites in the vicinity of the TVA coal ash spill.

2. Fieldwork and analytical work

Coal ash sludge, sediments from the rivers, and water samples from tributaries, Emory and Clinch rivers, and springs near the spill area in Kingston and Harriman, Tenn., (Figure 1) were collected on two field trips on January 9-10 and February 6-7, 2009. Water sampling strictly followed the U.S. Geological Survey sampling protocol; trace metal and cation samples were filtered directly into new, high-purity acid-washed polyethylene bottles containing high-purity HNO_3 in the field for preservation using syringe-tip 0.45 μm filters. Trace metals in water were measured by inductively coupled plasma mass spectrometry (ICP-MS), mercury in sediments and coal ash by thermal decomposition, amalgamation, atomic absorption spectroscopy (Milestone DMA-80), and radium isotopes by gamma spectrometry at the Laboratory for Environmental Analysis of RadioNuclides (LEARN) at Duke University (http://www.nicholas.duke.edu/learn/).

3. Water contamination

The chemical data show that surface water in the tributary that was dammed by the coal ash spill and turned into a standing pond ("the Cove" in the area of Swan Pond Circle Road; Fig. 1) has relatively high levels of arsenic, calcium, magnesium, aluminum, strontium, manganese, lithium and boron. The concentration of arsenic was up to 86 μg/L in the Cove area (for reference, the EPA Maximum Contaminant Level in drinking water is 10 μg/L). The concentrations of these elements in springs that emerge into the Cove area are low, thus indicating that the shallow groundwater was not contaminated. We suggest that the non-contaminated groundwater discharges into the dammed tributary and causes leaching of metals from the sludge ash that was released from the TVA coal ash spill. Under restricted water exchange, the formation of standing water in the Cove resulted in contaminated surface water with high concentrations of arsenic, boron, strontium and other elements (Table 1).

Sample ID	Li	B	Al	Mn	Co	Ni	Cu	Zn	As	Se	Rb	Sr	Cr
The Cove													
TN1	13.24	431.89	-	846.9	2.11	3.98	1.54	16.54	69.59	2.44	15.57	578.4	1.88
TN1U	-	425.93	344.0	974.1	3.08	-	5.03	42.40	95.25	0.42	17.13	632.6	-
RC5	19.60	470.80	22	3014	6.96	8.97	1.57	47.16	85.56	3.75	23.76	1245	1.92
TN9	3.07	84.92	43.0	296.5	0.29	4.26	0.79	12.18	9.27	0.52	5.02	108.3	6.56
TN9U	-	112.89	197.0	331.8	1.15	-	3.48	24.86	12.60	-	6.25	120.1	-
RC8	7.39	229.63	40	556	1.89	1.67	2.77	36.64	20.70	1.83	6.35	456	0.47

U=unfiltered water

Table 1. Concentrations of trace metals (μg/L) in surface water from the Cove area (see location in Figure 1).

In contrast, surface waters from the Emory River and Emory-Clinch River downstream from the breached dam show low concentrations of these metals, and all river inorganic dissolved constituents concentrations are below the EPA-Maximum Contaminant Levels. In spite of the absolute low concentrations, the metal contents in the downstream river samples are higher relative to the upstream river samples. For example, the arsenic levels in the downstream river samples are up to 3 μg/L relative to <0.4 μg/L in upstream rivers (Figures 2 and 3). We are able to detect these small changes due to the high sensitivity of our analytical instrument (inductively coupled plasma mass spectrometry; ICP-MS). This indicates that leaching of these metals from the coal ash in the river sediment is taking place in the rivers, yet the massive dilution of the rivers reduces the content of these metals to below the MCL level. A report by TVA indicates that during storm events, remobilization of the coal ash resulted in short-term spikes of arsenic in the river (TVA, 2009). Remobilization of the river sediment by dredging could enhance metal leaching and contamination of the river water. Since dredging of the coal ash from the river bottom is an essential part of TVA restoration plan (TVA, 2009), it is essential to continue monitoring the water quality in order to evaluate the impact of dredging on the river water quality.

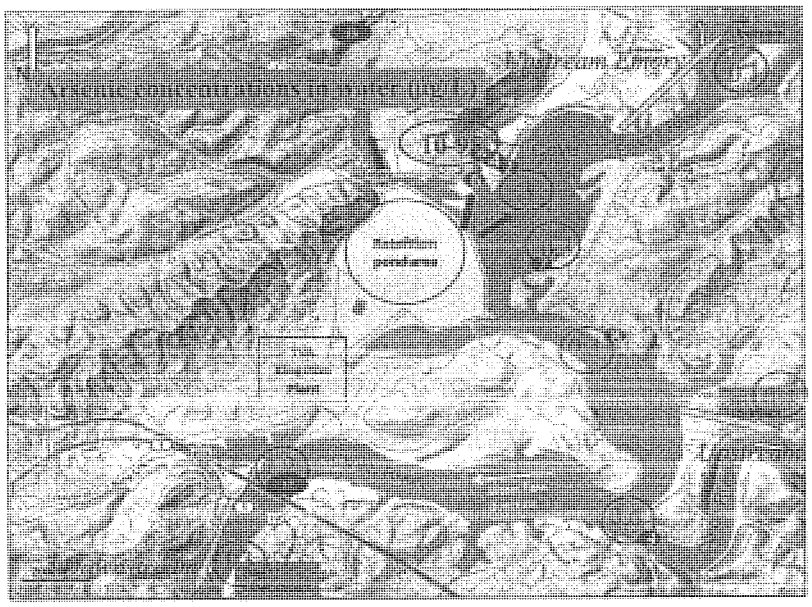

Figure 2: Map of the sampling sites of the TVA coal ash spill in Kingston, Tenn., with concentrations of arsenic (µg/L) in surface waters associated with the TVA coal ash spill.

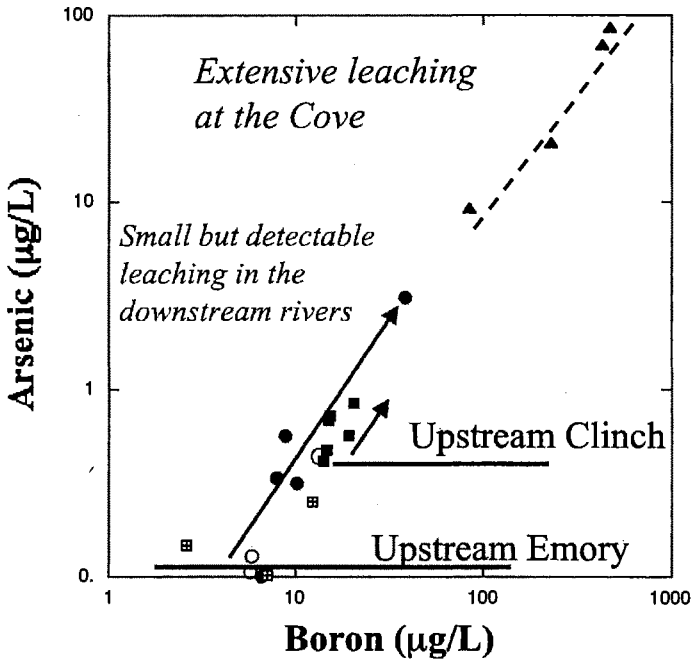

Figure 3: Concentrations of arsenic versus boron in Emory (blue) and Clinch (green) rivers and in groundwater (squares) in logarithmic scale. Note the relative enrichment of the downstream Emory and Clinch river samples relative to the respective upstream river samples.

4. River sediment contamination

The mercury concentration in the TVA coal ash sludge (an average of 151.3±15.9 μg/kg) is higher than background soil in Tennessee (45-50 μg/kg) (USGS survey data, 2004). These concentrations are consistent with mercury concentrations previously reported in fly ash (100 to 1500 μg/kg) (Sanchez et al., 2006). In the sediments of the Emory and Clinch rivers, the mercury concentration increases from 29.7-43.3 μg/kg in

upstream sediments, to 115-130 μg/kg in downstream sediments from the spill site (Figure 4). The mercury concentrations of the upstream sediments are consistent with previously reported Hg data for the lower Clinch River and for the overall Tennessee River (USGS survey data, 2004). However, the relatively high mercury concentrations in the downstream river sediments could indicate a significant transport of the coal ash in the river and deposition in the river sediments. We measured relatively high mercury in sediments at Site 10, downstream from the underwater bar that was built to prevent migration of the ash (Fig. 1). A simple mass balance between the mercury content of coal ash (150 μg/kg) and background soil (50 μg/kg) suggests that the downstream river sediment at Site 10 was composed of about 66 percent ash. The assumption that mercury in the river sediments is derived from only redistribution of coal ash needs to be confirmed by further research.

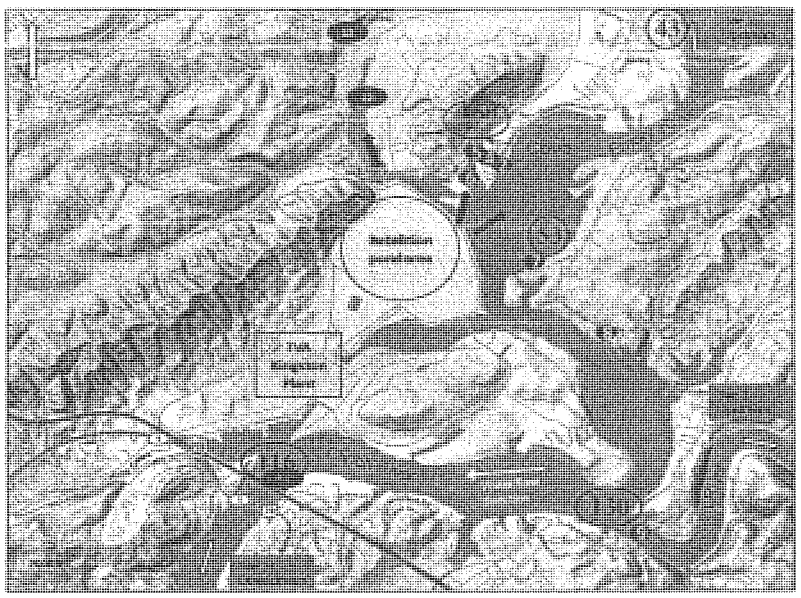

Figure 4: Map of the sampling sites of the TVA coal ash spill in Kingston, Tenn., with concentrations of mercury (μg/kg) in sediments (black) and coal ash (red) Data from Ruhl et al. (in revision).

The ecological impact of high mercury (and arsenic) in the river sediments has not been determined as yet. We hypothesize that accumulation of coal ash in the river sediments might generate transformation of elemental mercury to methylmercury by anaerobic bacteria in river sediments. Forming of methylmercury in river sediments is a concern because of bioaccumulation of methylmercury in food webs. In addition, accumulation of As-rich fly ash in bottom sediment and leaching of arsenic to pore water might cause fish poisoning via both food chains and decrease of benthic fauna that is a vital food source. These potential hazards should be monitored.

5. Conclusions

- Leaching of the coal ash sludge in the aquatic environments resulted in severe water contamination (e.g. high arsenic content) in areas of restricted water exchange - the Cove area.
- Further downstream in the Emory and Clinch rivers, much lower levels of these metals were found due to river dilution, but with metal concentrations above the background upstream levels.
- Remobilization of the river sediment by dredging could enhance metal leaching thus it is essential to continue monitoring the water quality in order to evaluate the impact of dredging on river water quality.
- High concentrations of mercury in downstream sediments of the Emory and Clinch rivers suggest physical transport of coal ash in the rivers.
- The high concentration of mercury in the downstream river sediments could impact the aquatic ecosystems by formation of methylmercury in anaerobic river sediments. Forming of methylmercury in river sediments is a concern because of bioaccumulation of methylmercury in food webs.
- Accumulation of As-rich ash in bottom sediment and leaching of arsenic to pore water might cause fish poisoning via both food chains and decrease of benthic fauna that is a vital food source.

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