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

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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

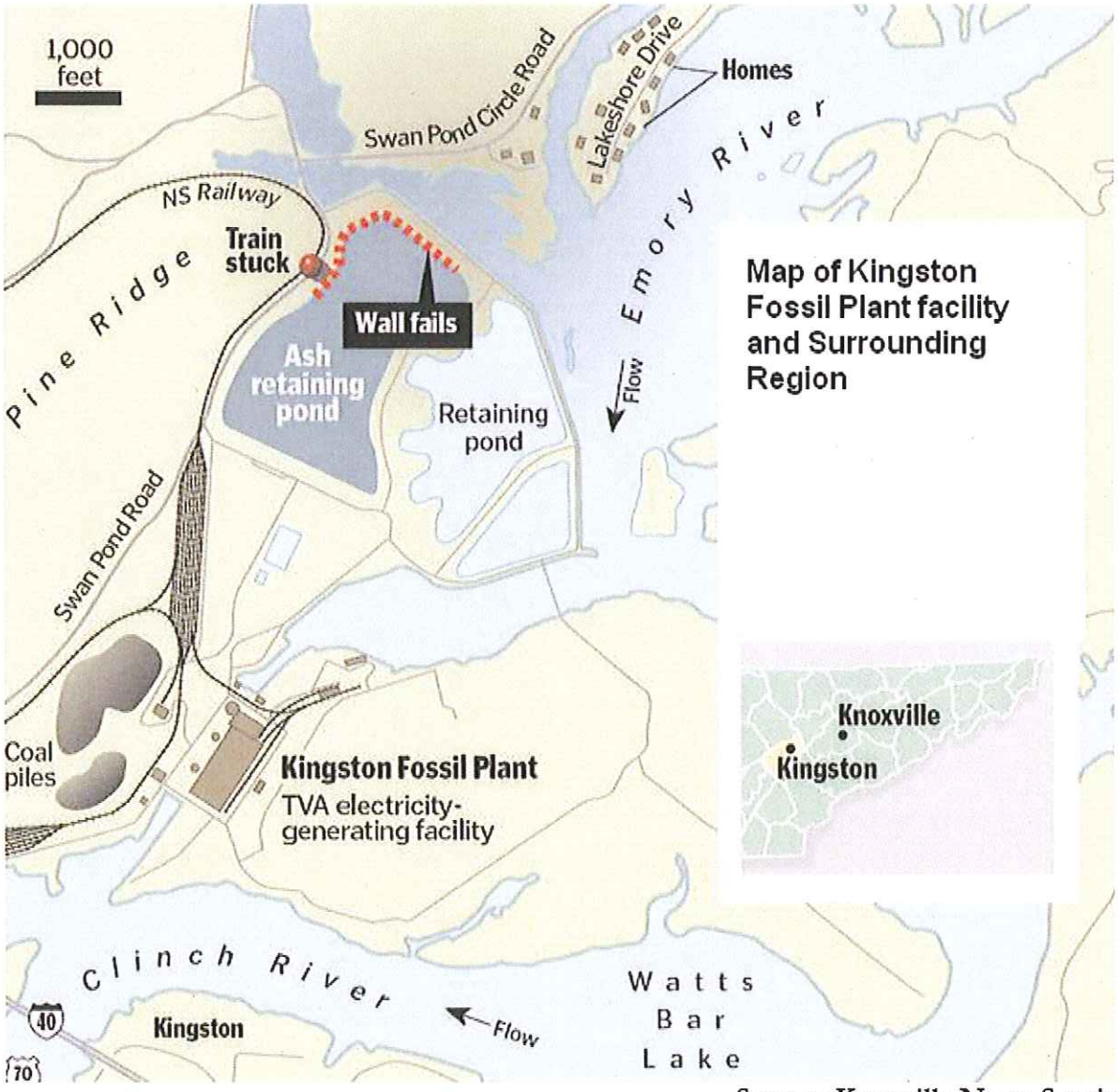
This memorandum summarizes the coal ash spill at TVA's Kingston Fossil Plant, the response and cleanup, and any potential water quality and public health implications.

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.

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[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

PANEL I

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