

**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  
401 CHURCH STREET, 1<sup>ST</sup> FLOOR ANNEX  
NASHVILLE, TENNESSEE 37243  
(615) 532-0109**

## 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.

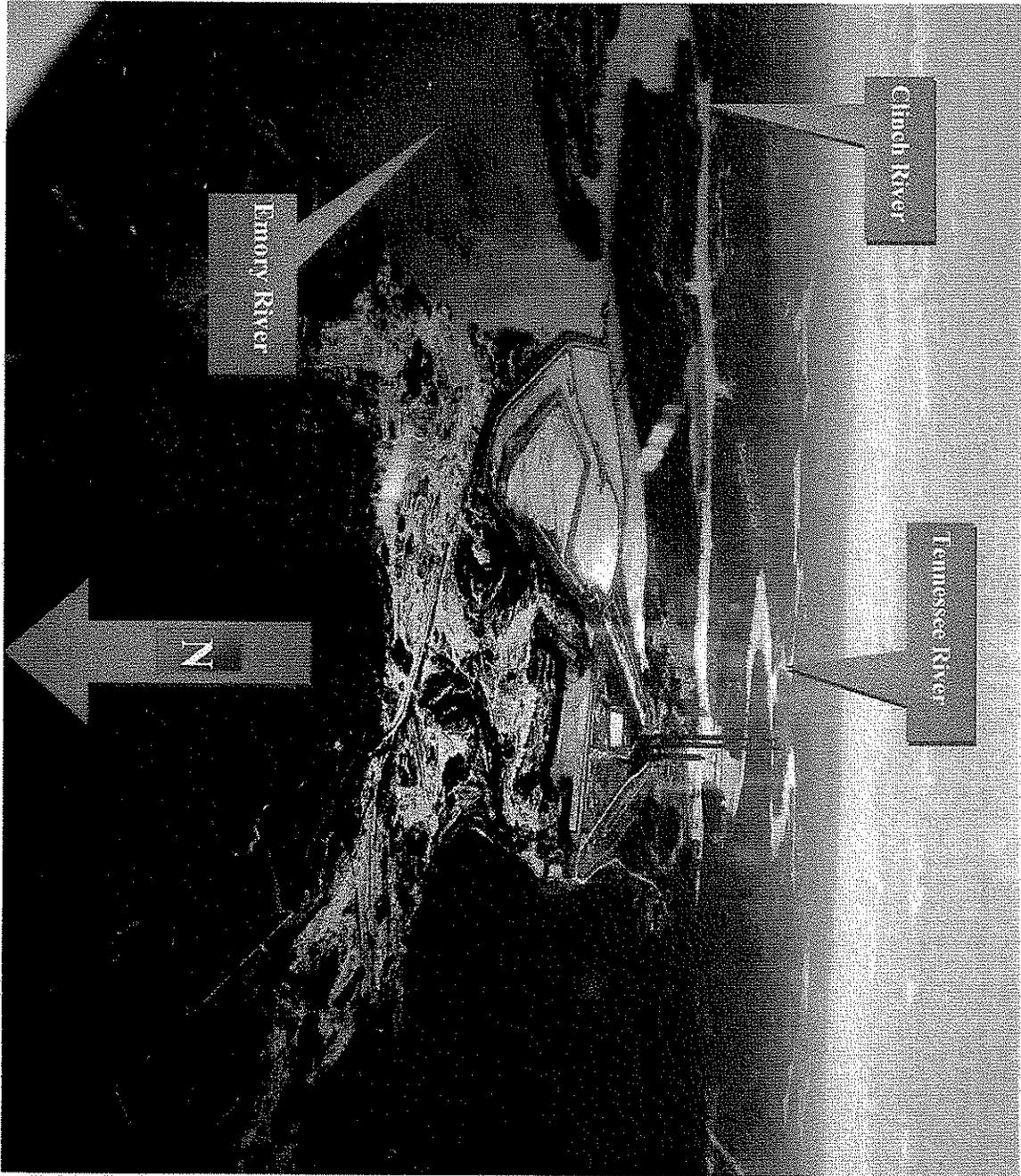


Image 1

**Aerial Image of Kingston Ash Slide Pre-Event 2008**



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

*Image 2*

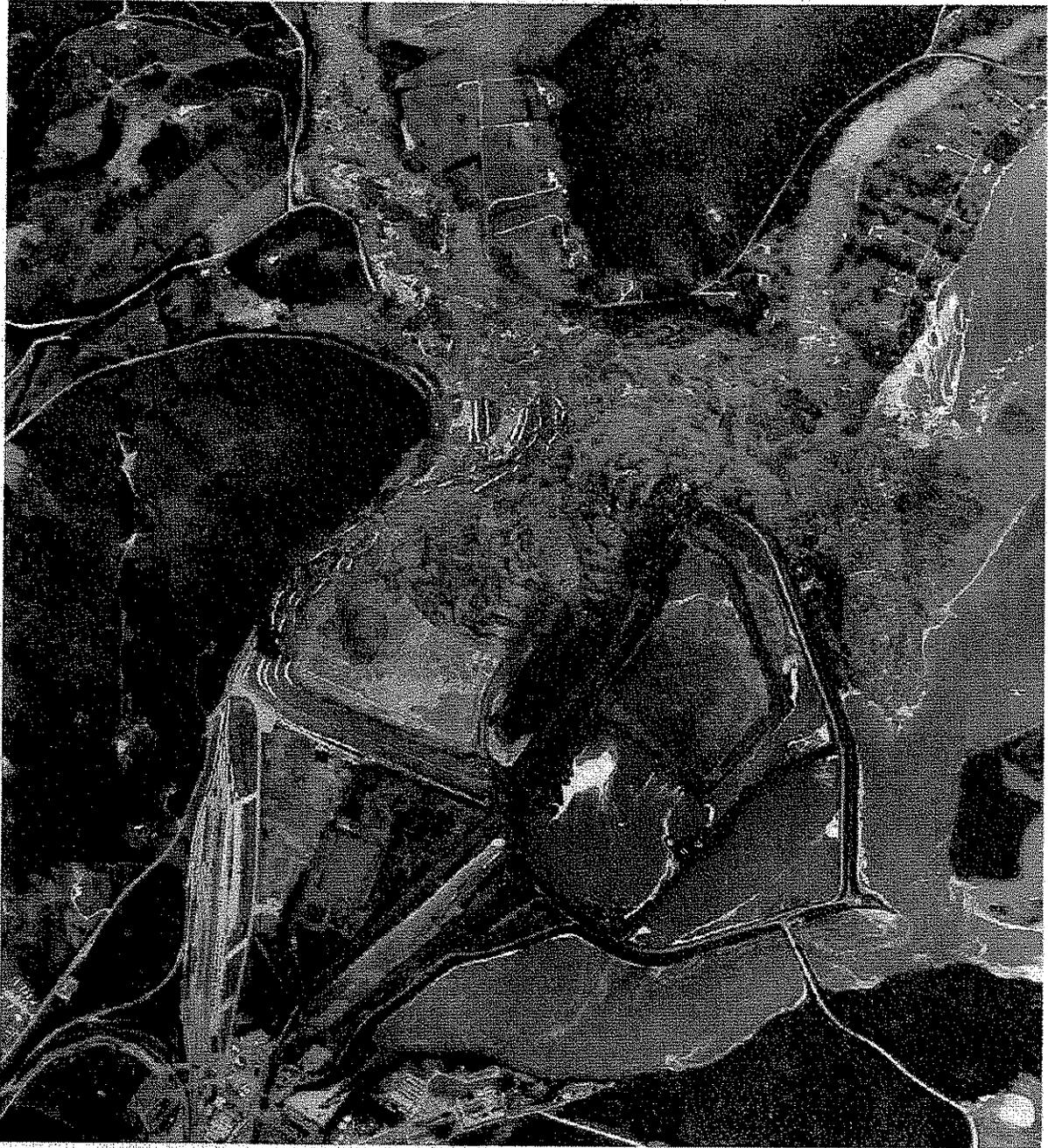
### **Description of TVA Coal Ash Release**

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  
CE&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](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, habitat 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 Sampling Stations

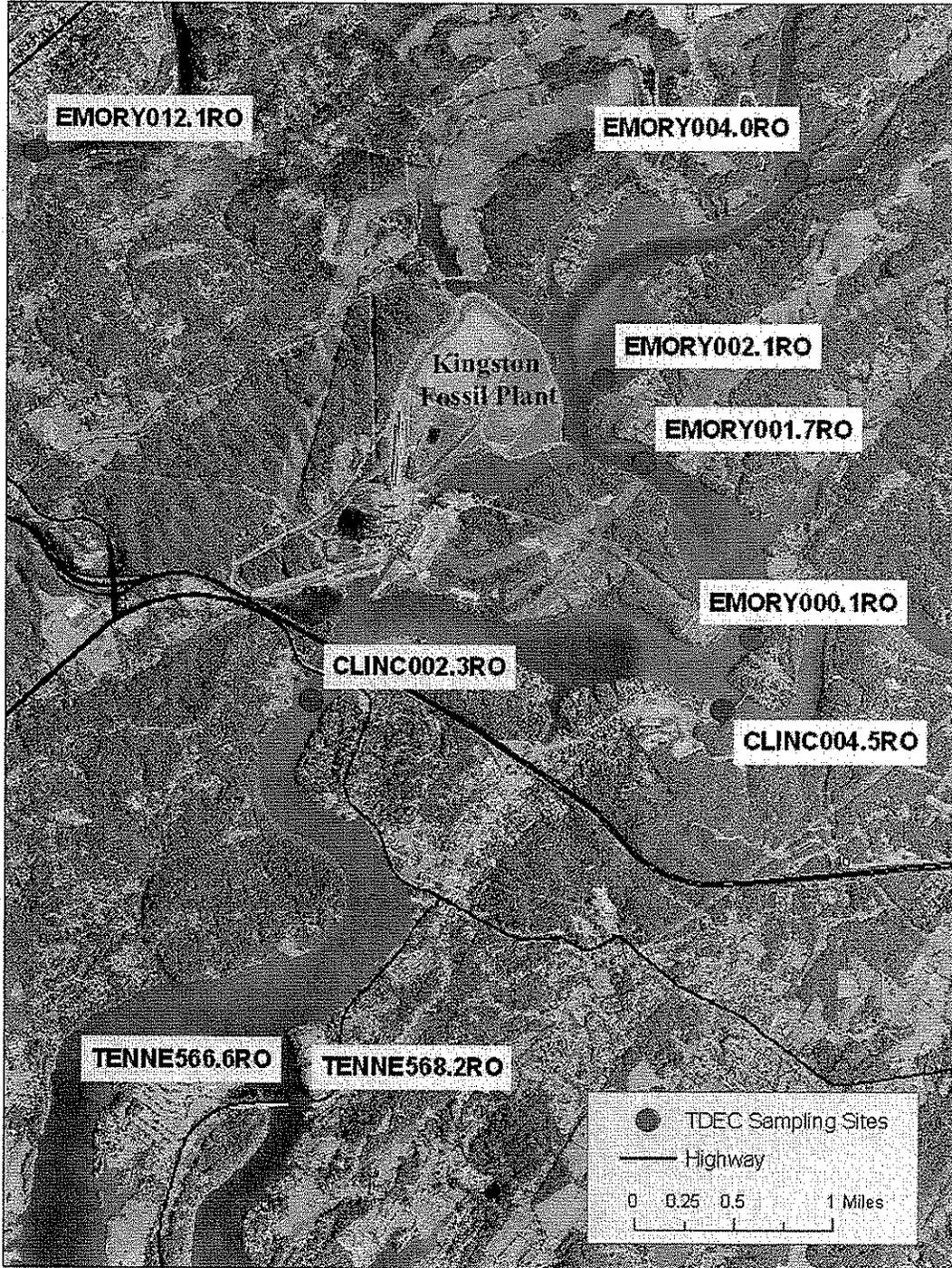


Image 4

**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)<br>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](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](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](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 1 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](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.

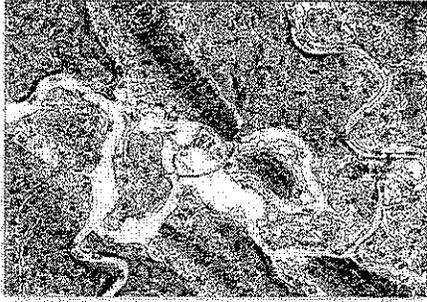
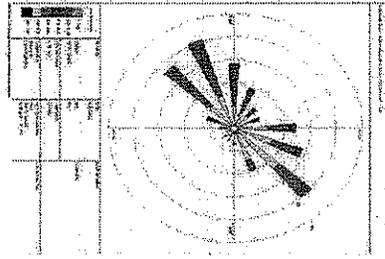
Total Suspended Particulate monitoring is conducted to gauge the quantity of all sizes of particles that are suspended in the ambient air. In addition, the filters from these samplers are analyzed for metals found in the ash. TDEC is working with the TDH, EPA and Centers for Disease Control's Agency 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<sub>2.5</sub> (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<sub>2.5</sub> 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

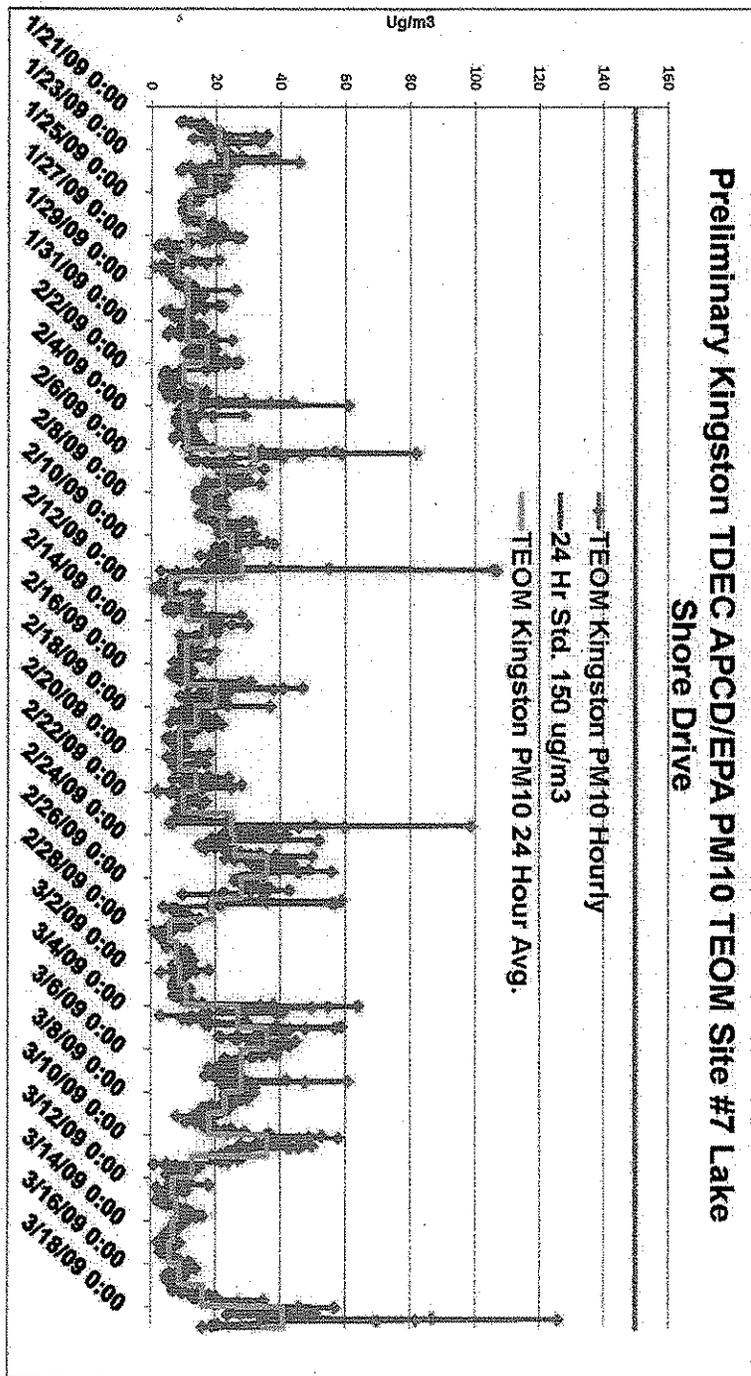


Image 6

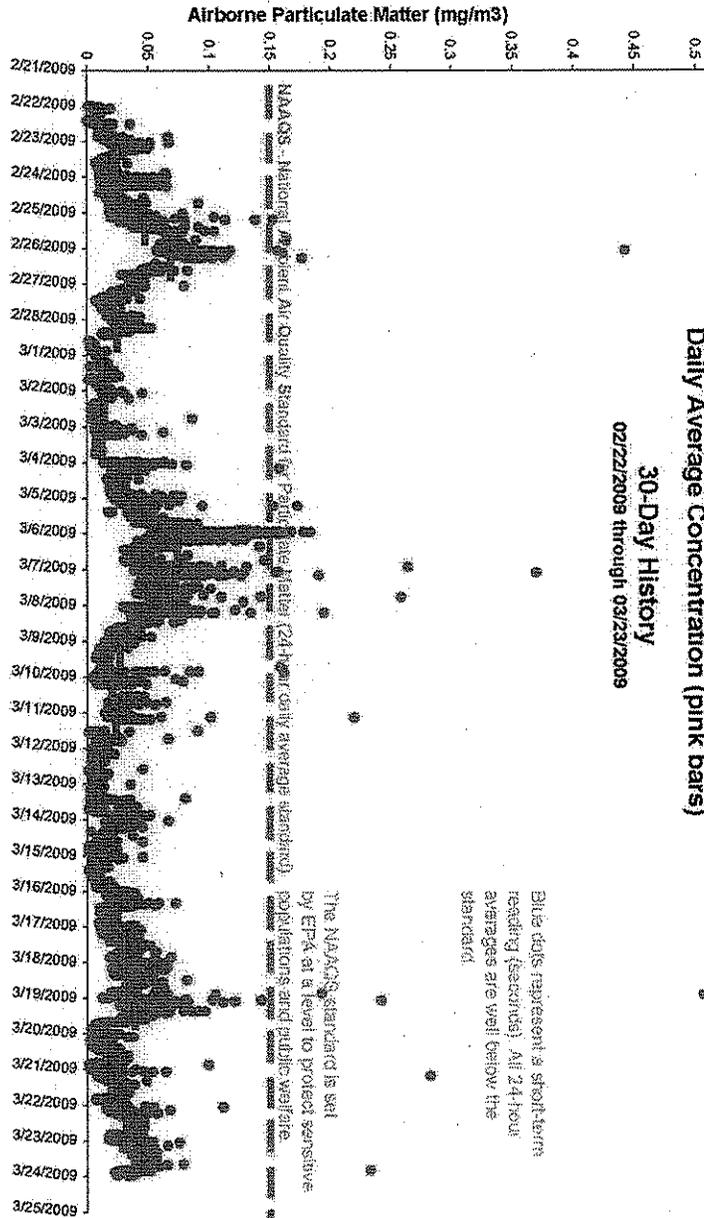


Image 7

# TVA Kingston Air Sampling Results (blue dots)

## Daily Average Concentration (pink bars)

30-Day History  
02/22/2009 through 03/23/2009



\* This particulate matter is created by normally high volume heating causes the particulate to reach higher than the true particulate level in air.

\* Elevated readings on 2/26/2009 were taken near the presence of smoke and burning offices.

\* Elevated readings on 2/28/2009 were taken near the presence of smoke and burning offices.

\* Elevated readings on 3/04/2009 at 12:30 PM (0.150 mg/m<sup>3</sup>, not adjusted) and 03/04/10 (0.1 mg/m<sup>3</sup>) were taken near active logpiles.

\* Elevated reading on 3/06/2009 at 10:09 PM was taken in the presence of heavy smoke.

\* Elevated readings on 3/07/2009 were taken in the presence of odors of burning wood and grasses.

\* Elevated readings on 3/08/2009 at 5:18 PM (1.43 mg/m<sup>3</sup>, not adjusted) and 5:25 PM (0.58 mg/m<sup>3</sup>, not adjusted) were taken in close proximity of burning yard waste.

\* Elevated reading on 3/11/2009 at 3:18 PM was taken in presence of burning wood odor.

\* Elevated reading on 3/19/2009 at 9:48 PM (0.182 mg/m<sup>3</sup>) was taken in presence of a smoke alarm ringing from a test fire.

\* Elevated reading on 3/20/2009 at 9:48 PM (0.182 mg/m<sup>3</sup>) was taken in presence of a smoke alarm ringing from a test fire.

\* Elevated reading on 3/21/2009 at 4:21 AM (0.283 mg/m<sup>3</sup>) was taken approximately 30 yards from an active logpile.

\* Elevated reading on 3/22/2009 at 4:21 AM (0.283 mg/m<sup>3</sup>) was taken approximately 30 yards from an active logpile.

\* Elevated reading on 3/23/2009 at 10:09 PM (0.232 mg/m<sup>3</sup>) was taken approximately 30 yards from burning woods at heavy residence.

Image 8

# Particulate Monitoring Stations

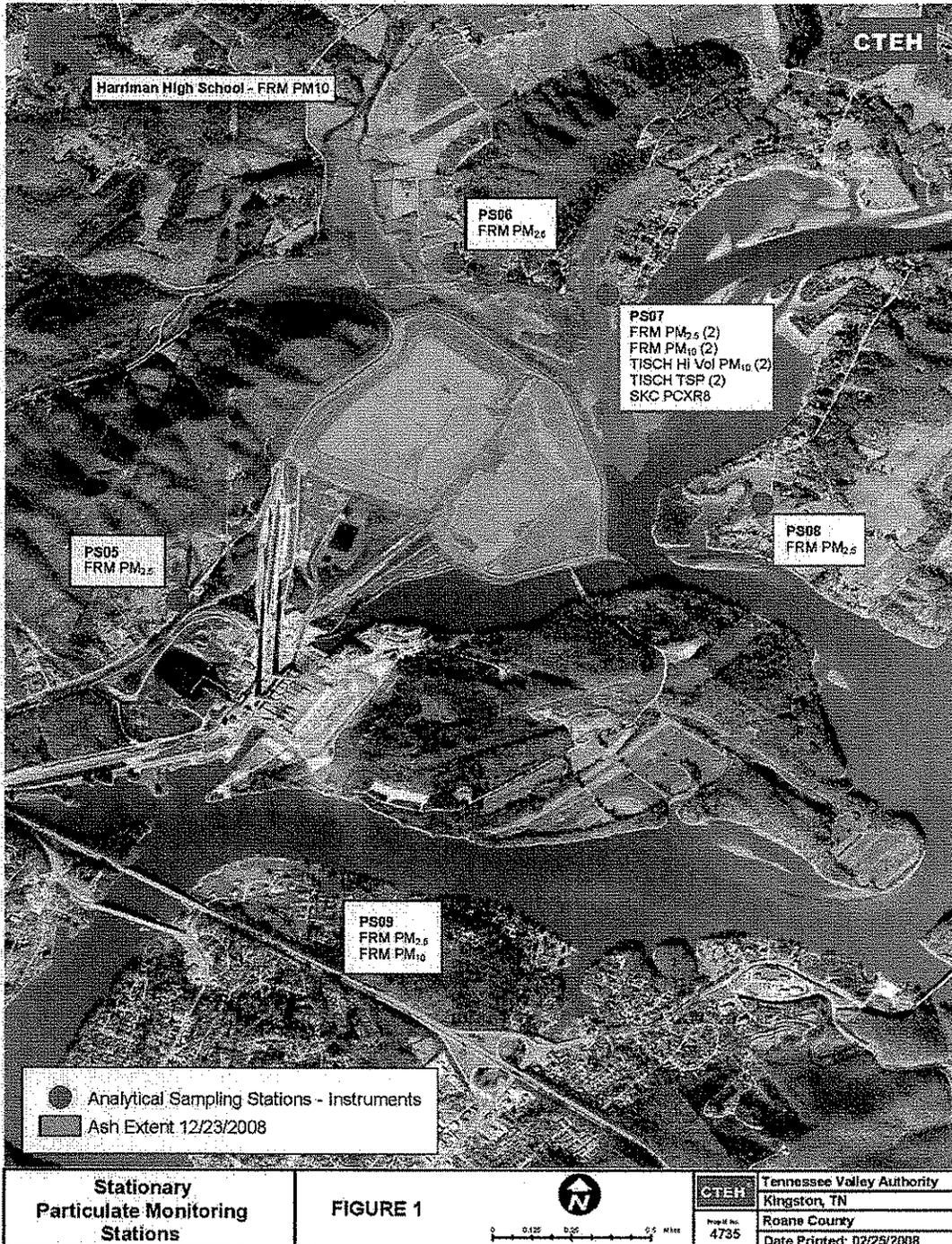


Image 9

## 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](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](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](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

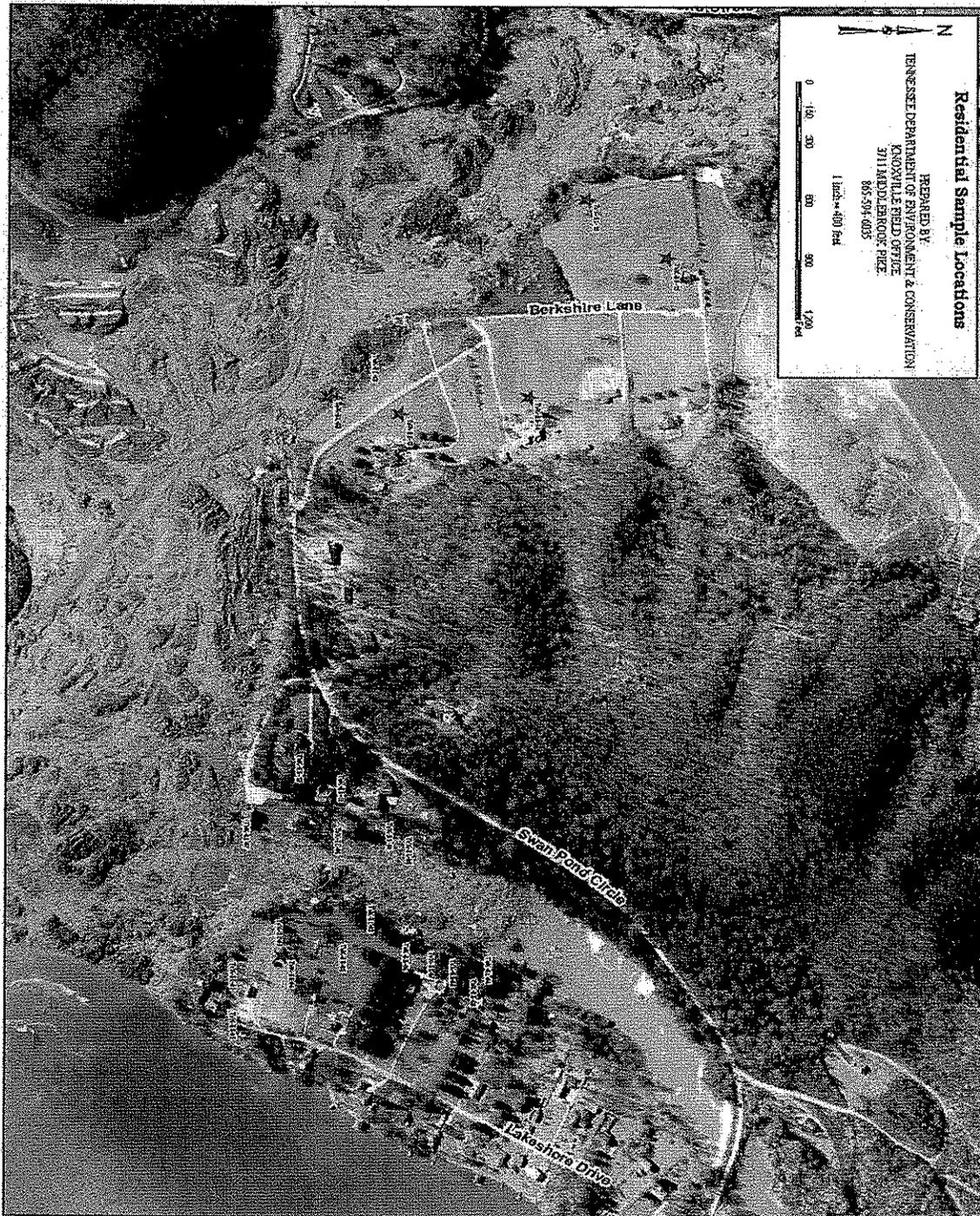
Embayment, local tributaries to the Emory River and from the ground surface; permanently close the existing Class II Industrial Landfill; and determine the Root Cause of Failure of the Class II Industrial Landfill; etc. The Corrective Action Plan can be viewed at:  
<http://www.state.tn.us/environment/kingston/pdf/tva/KingstonCorrectiveActionPlan030209.pdf>.

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>.

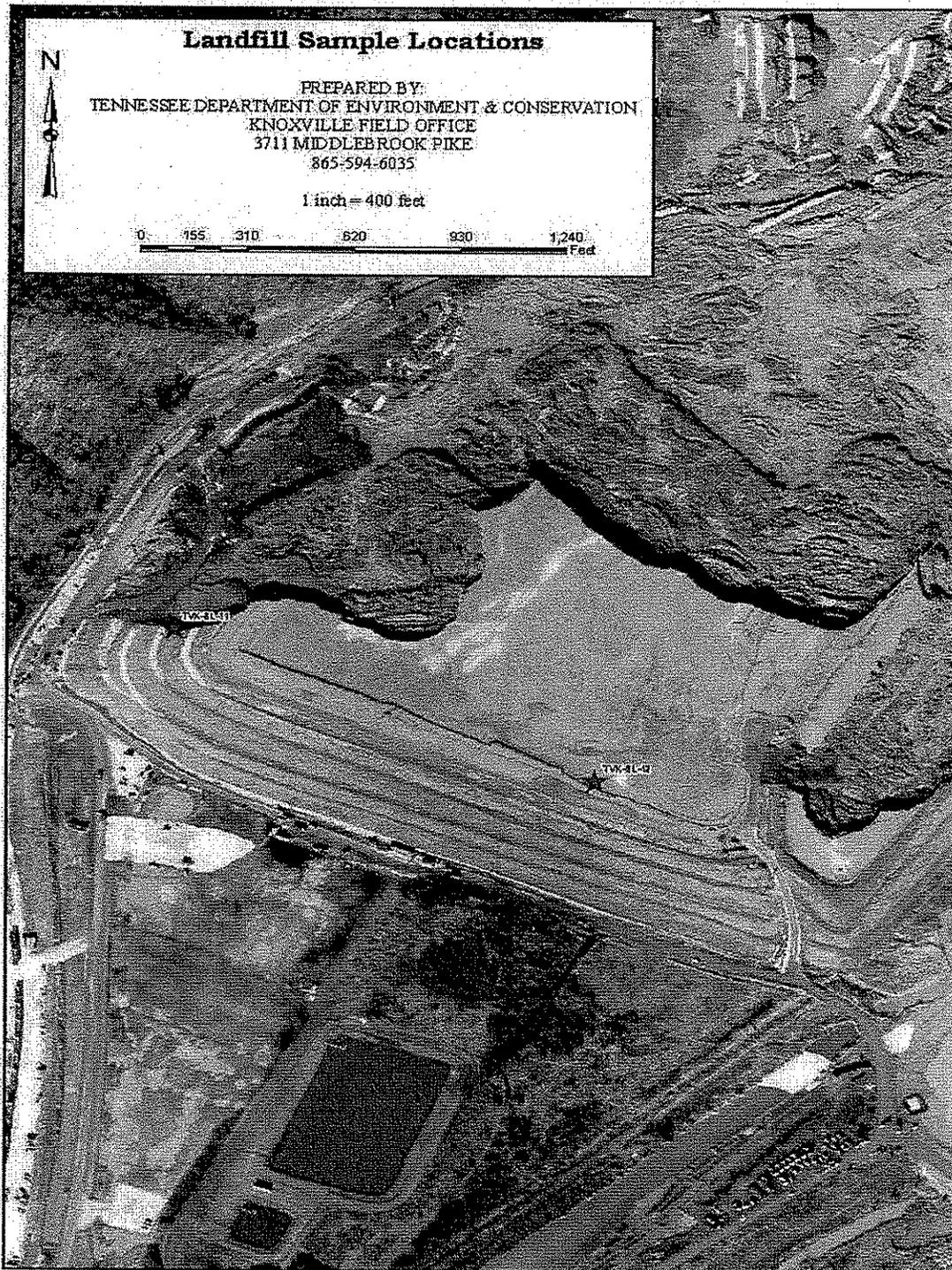
TDEC and EPA are working with TVA as it completes its analysis of the Root Cause of Failure for the TVA Kingston Coal Ash Landfill. The final report is due in June 2009. Along with TDEC, EPA and TVA, there are three professional geotechnical firms, representatives from the Army Corps of Engineers, the 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*