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ENVIRONMENTAL ASSESSMENT

INITIAL EMERGENCY RESPONSE ACTIONS FOR THE KINGSTON FOSSIL PLANT ASH DIKE FAILURE Roane County, Tennessee

PREPARED BY:
TENNESSEE VALLEY AUTHORITY

FEBRUARY 2009

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TENNESSEE VALLEY AUTHORITY

FEBRUARY 2009

The Proposed Decision and Need

Tennessee Valley Authority (TVA) has prepared this environmental assessment (EA) for the emergency actions that have been undertaken in response to the ash dike failure at TVA's Kingston Fossil Plant (KIF) in Roane County, Tennessee. Specific actions addressed in this EA include repair and restoration of railroad and roadway, installation of weirs, stabilization of the slide area, demolition of damaged homes, clean up of debris, and collection of cenospheres.

Other emergency actions, as well as the long-term restoration and remediation of the affected area, are being addressed in separate *National Environmental Policy Act* (NEPA) documents.

Background

KIF is located on the Emory River close to the confluence of the Clinch and Tennessee rivers near Kingston, Tennessee. Construction of the plant began in 1951 and was completed in 1955. Kingston generates 10 billion kilowatt-hours of electricity a year, enough to supply the needs of about 670,000 homes in the Tennessee Valley. The plant consumes approximately 14,000 tons of coal every day when operating at full power.

The Emory River at the KIF site is impounded by Watts Bar Dam. The normal summer and winter pool levels of Watts Bar Reservoir in the vicinity of KIF are 741 and 735 feet, respectively. The Emory River originates on the Cumberland Plateau and its inflows to Watts Bar Reservoir are not regulated. Flows in the nearby Clinch River arm of Watts Bar Reservoir are regulated by Melton Hill Dam.

Fly ash is a product of burning pulverized coal in generating plants such as KIF. KIF produces about 1,000 tons or approximately 1,200 cubic yards of fly ash a day when operating at full power. Fly ash is a fine powdery material that is removed from the plant's exhaust stream by electrostatic precipitators. The collected fly ash is then sluiced in a water-based slurry to a wet ash pond for settling. The ash is then dredged from the settling pond and piped to long-term storage ponds, also known as dredge cells. The three KIF dredge cells covered about 84 acres and stored about 9.4 million cubic yards of fly ash in mid-December 2008.

On Monday, December 22, 2008, a dike containing the KIF dredge cells collapsed, releasing about 5.4 million cubic yards of fly ash and bottom ash. Ash was released from about 60 acres of the 84-acre dredge cell complex. The spilled material now covers about 300 acres of adjacent parts of Watts Bar Reservoir, including most of Swan Pond Creek embayment, and reservoir shorelands. Figure 1 illustrates the area prior to the dike failure,

and Figure 2 shows the area on December 30, 2008, after the dike failure. No injuries occurred, but several residences were affected. Three houses were severely damaged and are now uninhabitable. Portions of the rail line serving KIF, Swan Pond Road, and Swan Pond Circle were covered with ash, and water, electrical, and gas services to the adjacent area were interrupted.

Emergency Response Actions

TVA and Roane County Office of Emergency Management and Homeland Security (EMHS) responded immediately, and response and recovery continue. TVA activated a Unified Incident Command System response organization to manage the recovery project. Members include TVA, U.S. Environmental Protection Agency (USEPA) Region 4, the Tennessee Department of Environment and Conservation (TDEC), the Roane County EMHS, Tennessee Emergency Management Agency, and Tennessee Department of Health.

In addition, TVA staff also contacted the office of the State Historic Preservation Officer and federally recognized tribes and informed them that there may have been impacts to known cultural resources. The U.S. Army Corps of Engineers (USACE) and TDEC have been coordinated with to allow the installation of temporary weirs to inhibit the movement of the fly ash further downstream (see Attachment A). The U.S. Fish and Wildlife Service has investigated the site with TVA staff members.

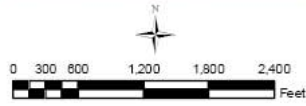
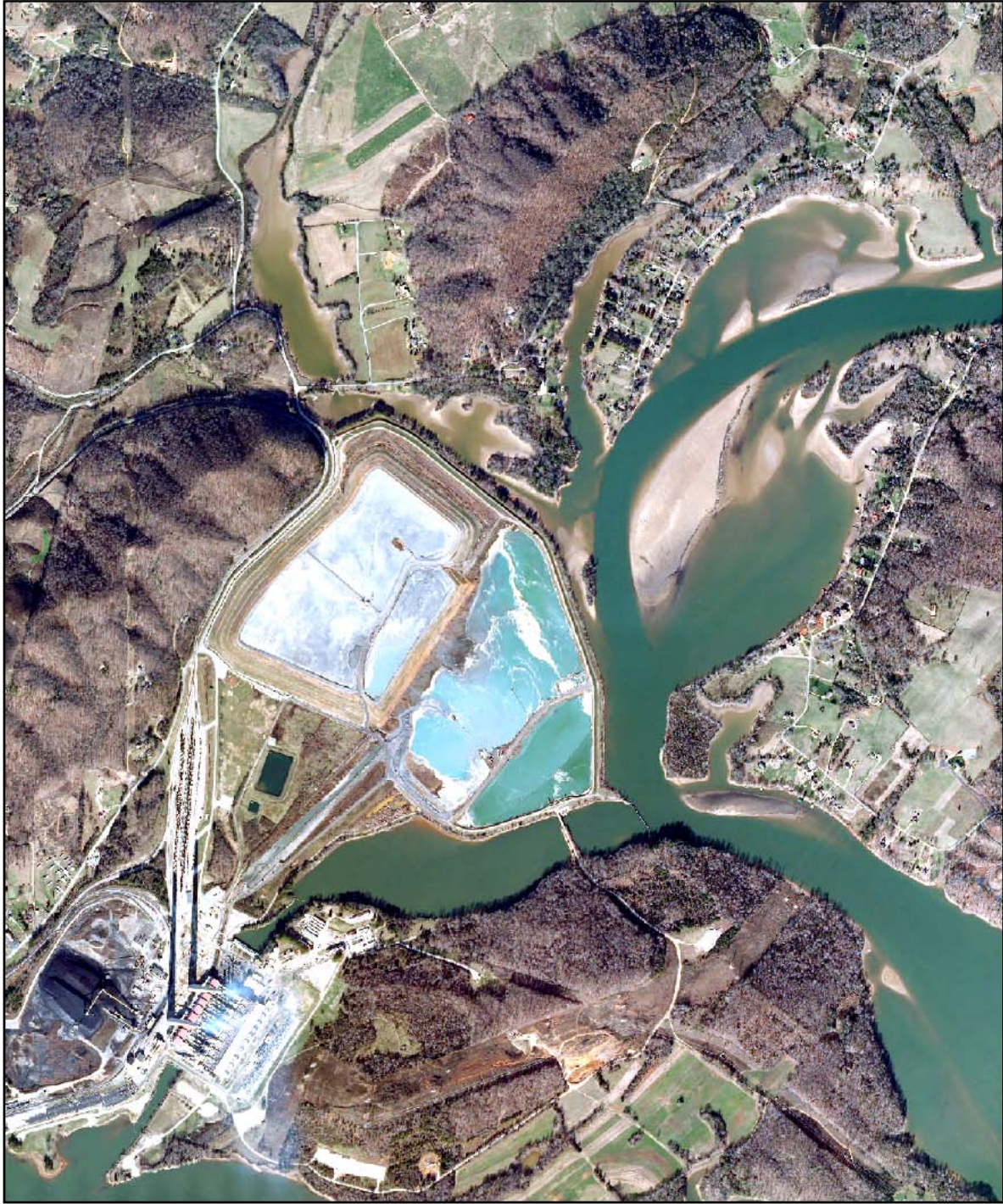
Community Outreach

TVA has established community outreach teams made up of plant employees and retirees to work with homeowners in the affected areas. TVA has activated a phone number, 800-257-2675, for property owners to call if they need an assessment of property damages. An Outreach Center (phone number 865-632-1700) has been opened at 509 North Kentucky Street in Kingston. TVA has also held several public meetings to discuss the ash spill and ongoing clean-up efforts.

Roadway and Railway Cleanup

Shortly after the ash spill, TVA began removing ash from the railroad and Swan Pond Road. The ash is being moved by heavy equipment and placed back on site at KIF until final disposition is established. Ash has been removed from the railroad, and the damaged 3,000-foot portion of the railroad has been rebuilt along the original alignment. It was reopened to rail traffic on January 15, 2009.

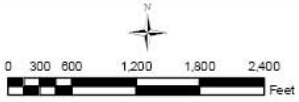
Much of the ash has been removed from Swan Pond Road and Swan Pond Circle. Because of the presence of heavy equipment, these roads remain closed to the public. Currently, there is no estimate for when the roads will reopen for public use.



Map Imagery from 2006
Map Version: 1.0

Tennessee Valley Authority
CEBR - ER&S
Geographic Information & Engineering

Figure 1. Kingston Fossil Plant Area Pre-Dike Failure



Map Imagery from 12/30/2008
Map Version: 1.0

Tennessee Valley Authority
GEMA - GIS/C
Geographic Information & Engineering

Figure 2. Kingston Fossil Plant Area Post-Dike Failure

Ash Dust - Erosion Control

Dry fly ash has the tendency to become airborne under the influence of wind, and TVA has taken measures to reduce this occurrence. The undisturbed portion of the ash cell has been treated with a water-soluble vinyl acrylic emulsion, a nontoxic liquid dust suppression agent that TVA has previously used at KIF and other fossil plants.

Exposed spilled ash has been planted by first spreading a mixture of grass seed and fertilizer, followed by straw, from a helicopter. The grass seed consisted of a mixture of winter rye applied at 25 pounds per acre and 12-24-24 fertilizer applied at 400 pounds per acre. Approximately 213 acres have been planted in this manner, and efforts were made to avoid drift of the seed/fertilizer mixture and straw into the reservoir. Areas that cannot be easily accessed by air are being treated by using an amphibious vehicle.

Dust at active work areas along Swan Pond Road and elsewhere on the site is being controlled by spraying with water, a method that has been used at KIF for years in the ash pond area. Vehicle wheels that have been exposed to the ash are being washed as they leave the construction area. The road is also being sprayed with water or cleaned with a vacuum sweeper to minimize dusting. Long-term stabilization and erosion-control methods will be addressed in the restoration and remediation plan that is currently being developed.

Construction of Rock Structures

The spilled ash has filled most of the Swan Pond Creek embayment to the north of the former ash pond area and an adjacent stretch of the Emory River. The Emory River was closed for the first 30 days to all boats not associated with the emergency response and restoration effort between Mile Marker 0 and Mile Marker 4, and the area was patrolled by U.S. Coast Guard (USCG) and TVA Police marine units. To prevent the downstream migration of fly ash and dike material, TVA is constructing three temporary rock structures (Figure 3).

The first rock structure, Weir #1, completed on January 5, 2009, is built across the Emory River, just north of the existing intake skimmer weir. The weir is about 630 feet long, and the top of the weir is approximately at elevation 731.8. There is a 50-foot notch in the weir at about elevation 727.3.

The second rock structure, Dike #2, would extend across the Swan Pond Creek embayment a short distance upstream of its mouth. Based on preliminary plans, the dike would be about 1,750 feet long. The top elevation of most of the dike would be 752.0 feet; a 300-foot-wide spillway section would have a top elevation of 745.0 feet. When complete, this dike will minimize the movement of ash from the embayment into the Emory River.

The third rock structure, Dike #3, would be constructed across the Swan Pond Creek embayment about 0.5 mile upstream of its mouth and just upstream of the spilled ash (Figure 3).

TVA is proposing to dredge the ash from the reservoir downstream of the second structure (Dike #2). The potential impacts of this action will be addressed in a separate NEPA document.

Aerial Image of Kingston Ash Slide 01/17/2009



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

Figure 3. Weir and Dike Locations

Swan Pond Creek Embayment Inflow Management

TVA proposes to manage the inflows into Swan Pond embayment through the development of a series of ditches and piping. Preliminary engineering designs are depicted in Figure 4. Some additional modifications within the footprint may be necessary to adequately manage flows. This action would preclude further movement of ash in the embayment, minimize Swan Pond embayment inflow contact with the ash, and help facilitate recovery of the area in the future.

River Flow Management

TVA is managing the flows of the Clinch and Tennessee rivers in the Kingston area by controlling the releases from Melton Hill, Fort Loudoun, and Watts Bar dams. This flow management is designed to minimize the downstream movement of spilled ash and to prevent backflow of potentially ash-laden water from the Clinch River into the lower Tennessee River. The City of Kingston municipal water supply intake is located on the Tennessee River about 0.5 mile upstream from its confluence with the Clinch River. This flow management is within the bounds of the reservoir operating policy established by TVA's *Reservoir Operations Study* (TVA 2004).

Environmental Monitoring

TVA, TDEC, and USEPA have established a comprehensive sampling and monitoring program for air quality, water quality, ash toxicity, and radioactivity. Sampling locations are shown in Figure 5. The results of this sampling indicate that the concentrations of sampled contaminants in reservoir water near KIF either meet or are below detection levels established by TDEC for fish and aquatic life. Similarly, results for 22 private groundwater wells showed that all are within safe drinking water standards. All air samples are within the National Ambient Air Quality Standards for particulate matter. The concentrations of most metals, as well as radioactive material, in the deposited ash are not dramatically different from concentrations found in natural, nonagricultural soils in Tennessee, with the exception of arsenic. Total arsenic results were above the average levels naturally occurring, but well below levels found in fertilized soils, and significantly below the limits to be classified as a hazardous waste. Detailed sampling results are available at TVA's Web site (<http://www.tva.com>).

Water Testing Results

As of January 25, TVA has taken more than 250 surface water samples from the Emory, Clinch, and Tennessee rivers. TDEC has taken more than 80 samples, and USEPA has taken at least 44 samples since the incident.

Sampling was initiated immediately afterward to determine if there was a threat to public health. All treated drinking water samples to date have met drinking water standards. Water samples are routinely tested for toxic metal compounds on both a dissolved and total basis, to account for material suspended in the water, like silt, organic particles, and fly ash.

The public water system is the first line of defense to reduce or eliminate contaminants from untreated river water. The *Safe Drinking Water Act* regulates these systems and develops standards for drinking water.

TDEC continues to sample local drinking water supplies on a daily basis, and TVA is continuing untreated river water sampling.

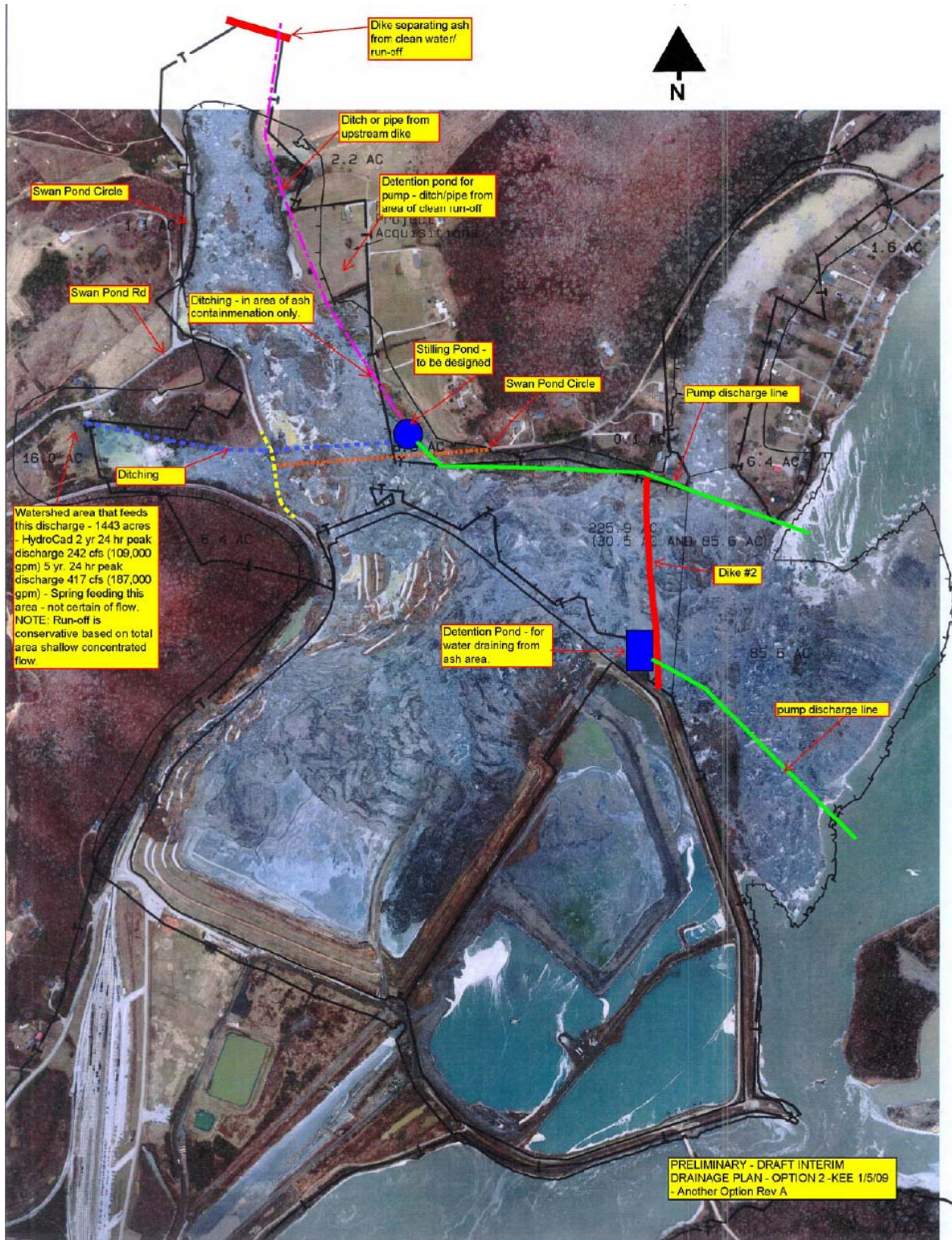
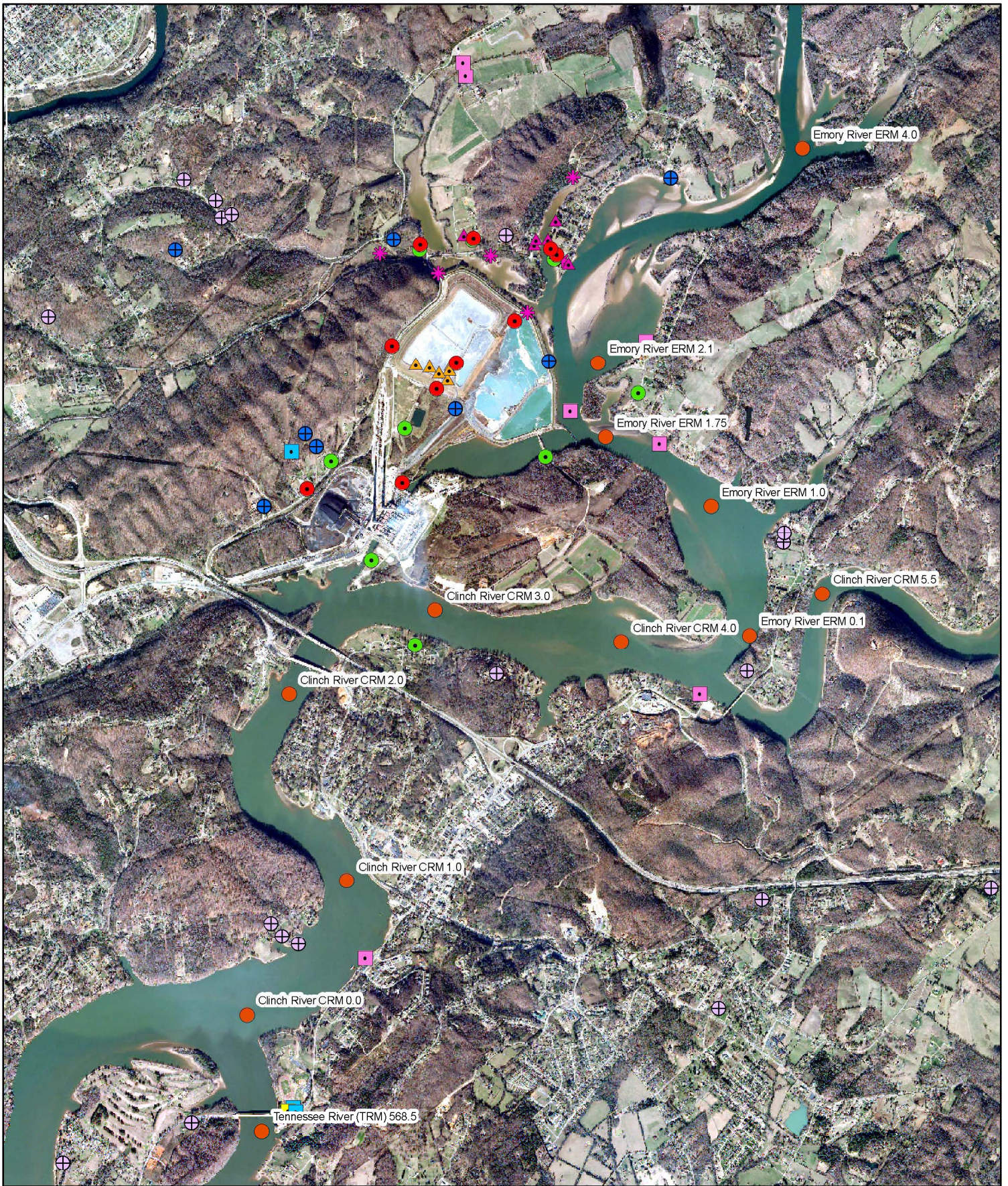


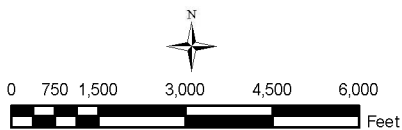
Figure 4. Trenching and Piping



- Legend (SLs = Sampling Locations; MLs = Monitoring Locations)
- | | |
|-----------------------------|---------------------|
| ▲ Dredge cell ash SLs | ■ Finished water |
| ▲ Ash and soil SLs | ■ Raw water |
| ✳ Radiological Analysis SLs | ■ Surface water |
| ● TVA River SLs | ● Well water |
| ● EPA Air MLs | ⊕ TDEC well samples |
| ● CTEH Stationary Air SLs | |

Samples acquired by all agencies are represented. (TVA, EPA, TDEC)

Map Imagery from 2006
Map Version: 1.0



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

Figure 5. Sampling Locations

In addition, TVA has taken more than 250 instream indicator readings of pH, dissolved oxygen, and conductivity. TDEC has also taken more than 25 such instream indicator readings.

Sampling results of untreated river water did show that some metals were elevated just after the incident, and again after a heavy rainfall on January 6, 2009. However, subsequent sampling events have demonstrated lower amounts of suspended ash, and test results show metals below safe drinking water limits.

Through January 15, TDEC has sampled more than 65 private groundwater wells within a 4-mile radius of the plant. All sample results were within safe drinking water standards.

Access to TVA water sample data is available through the TVA Web site at <http://www.tva.com>. Each day's data include a map of the sampling sites and the lab results for each of those sites.

Soil and Fly Ash Sampling

Preliminary testing of the off-site soil samples show that toxic metals are well below (on the order of 10-100 times) the limits for classification as a hazardous waste. The trace concentrations of toxic metals in the off-site material sampled are consistent with and generally lower than that of the historic sampling results from the ash dredge cell that collapsed. The data in Tables 1 and 2 illustrate that the concentrations of most metals in the deposited ash are not dramatically different from concentrations found in natural, nonagricultural soils in Tennessee, with the exception of arsenic. Total arsenic results were above the average levels naturally occurring, but well below levels found in soils that are well fertilized, and significantly below the limits to be classified as a hazardous waste. TVA, TDEC, and USEPA continue to work together to develop a long-range sampling plan for air, water, and soil.

Fly ash is a by-product of the combustion of coal. Coal contains both naturally occurring organic and inorganic components, a portion of which remains in the ash after burning the coal. The major compounds in fly ash are inert materials primarily composed of silica particles very similar to sand. Fly ash is a gray powdery residue and generally occurs as silt-sized material (10 to 100 μm [micrometers]). Trace amounts of arsenic, beryllium, mercury, selenium, cadmium, and thallium, which occur naturally in the coal, also carry over to the ash after coal combustion.

Fly ash is composed primarily of aluminosilicate glass with smaller percentages of iron, calcium, magnesium, sulfur, sodium, and potassium in their oxide forms as depicted in Table 3. In addition to the major components, fly ash also contains heavy metals concentrations in part per million and part per billion concentrations. These metals are bound in an amorphous glass structure of the fly ash particles and are considered insoluble except in strong acidic or basic solutions. The metals are not typically considered as being available to the food web without ingestion of the fly ash. As fly ash weathers because of its size and composition, it weathers to noncrystalline clay, and with the addition of water, this would form various hydrous aluminosilicates that are essentially the composition of all clays. Clays have a high cation exchange capacity and the ability to attenuate metals that may become soluble during the weathering process binding them in fashion that is not bio-available unless ingested.

Table 1. Kingston Ash vs. Soils in Tennessee for Arsenic, Chromium, Nickel, and Vanadium

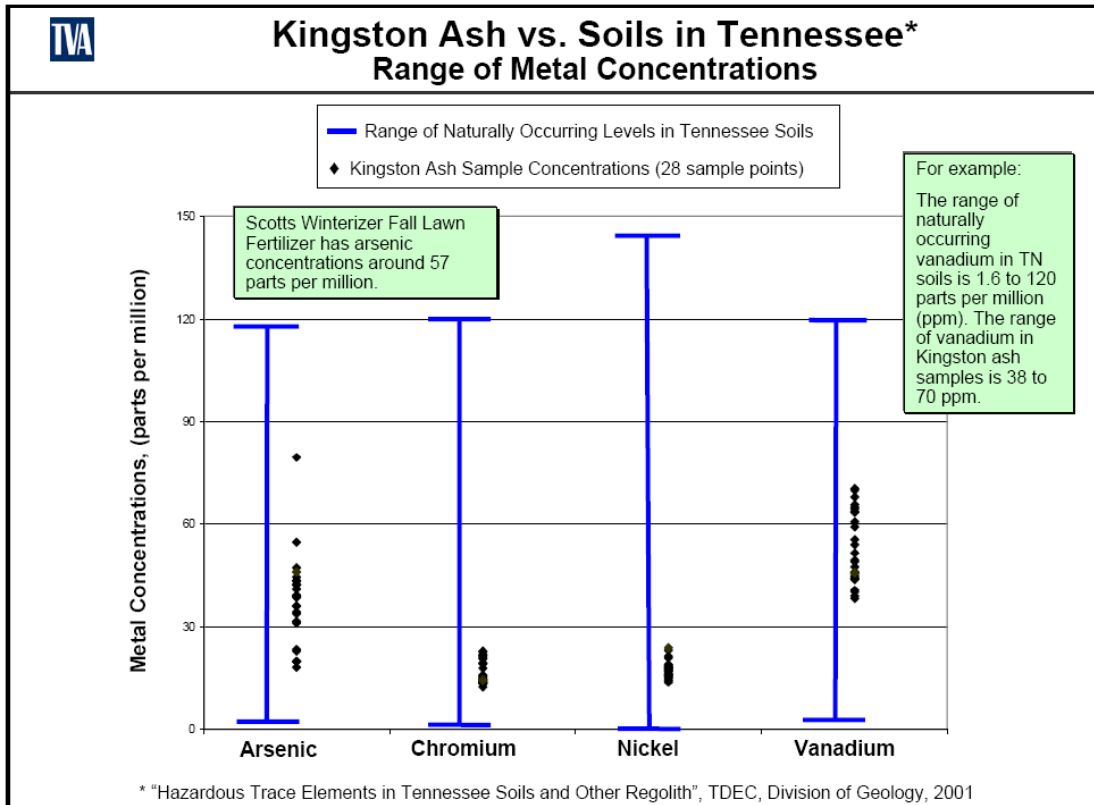


Table 2. Kingston Ash vs. Soils in Tennessee for Beryllium, Cadmium, Mercury, Silver, Selenium, and Thallium

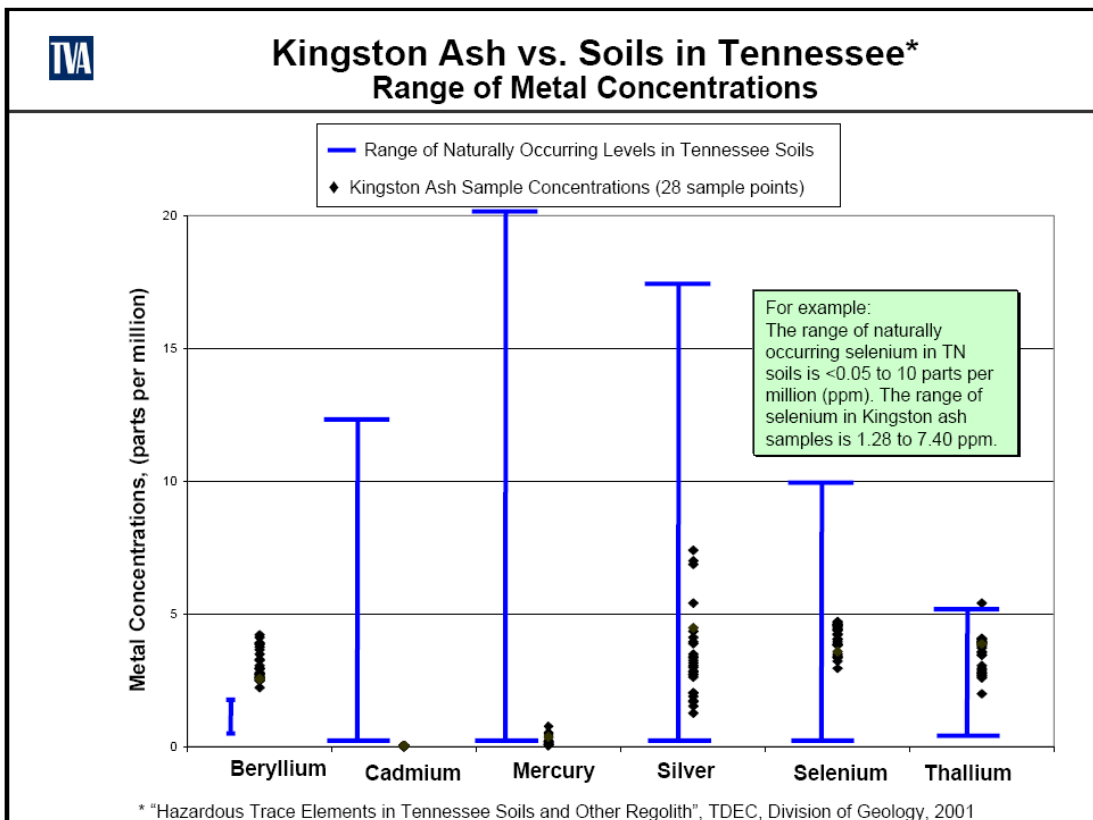


Table 3. Normal Range of Chemical Composition for Fly Ash Produced From Bituminous Coal (Expressed as Percent by Weight)

Component	Bituminous
SiO ₂	20-60
Al ₂ O ₃	5-35
Fe ₂ O ₃	10-40
CaO	1-12
MgO	0-5
SO ₃	0-4
Na ₂ O	0-4
K ₂ O	0-3

SiO₂ = Silica (or Silicon Dioxide)
 Al₂O₃ = Alumina (or Aluminum Oxide)
 Fe₂O₃ = Ferric Oxide
 CaO = Calcium Oxide
 MgO = Magnesium Oxide
 SO₃ = Sulfur Trioxide
 Na₂O = Sodium Monoxide
 K₂O = Potassium Oxide

USEPA was required by Congress in 1980 to determine if coal combustion wastes were hazardous. In 2000, USEPA published its decision that management of coal combustion wastes as hazardous wastes was not warranted (65 *Federal Register* 99 [22 May 2000]). This decision was made in part due to the low toxicity of the coal combustion wastes.

Cenosphere Containment and Removal

Cenospheres, a component of fly ash, consist of very small inert, hollow balls of sandlike material. They float on water and a large volume of cenospheres was transported by the river downstream of KIF. TVA has been managing the cenospheres by containing them with floating booms and then collecting them with vacuum trucks (often on a barge), backhoes, and hand tools. The collected cenospheres are then transported by truck to a holding area in the vicinity of the remaining KIF ash ponds.

Related TVA National Environmental Policy Act (NEPA) Documents

TVA used its Categorical Exclusion Checklist (CEC) to consider if the following activities would have an impact on the environment. The impacts of these actions were considered minor and insignificant.

- CEC 19820 Testing Use of Geo-Tubes With Polymers
- CEC 19825 Transportation of Bull Run Bottom Ash for Use in Restoration/Remediation at KIF
- CEC 19755 Aerial Seeding of Coal Combustion By-Product Areas
- CEC 19788 Soil Binder for Dust Suppression

Permits and Consultations

TDEC issued an emergency 401 Water Quality Certification/Aquatic Resource Alteration Permit (NRS08.318) to TVA on January 6, 2009. This permit authorizes the construction of

the three rock structures and the diversion of the streamflow across the spilled ash in Swan Pond Creek embayment. A copy of the permit approval can be viewed in Attachment A of this EA.

The USACE has given TVA verbal permission to install the rock structures and redirect surface water flows in the area of the spill. TVA has submitted a Section 404 permit application to USACE for these activities (Lindy Johnson, TVA, personal communication, January 2009).

Alternatives

The Action Alternative for this EA includes the construction of the three temporary rock structures (Weir #1, Dikes #2 and #3) and the Swan Pond Creek embayment stream inflow management as described above. Other emergency response activities described above qualify for Categorical Exclusions. The No Action Alternative consists of not taking these emergency response measures, which would result in the downstream migration of the spilled ash and increase the damage to natural, cultural, and economic resources.

Affected Environment and Evaluation of Impacts

Floodplains and Flood Risk

Affected Environment

The area of impact from the failure of the KIF ash pond extends from about Mile 1.5 to Mile 3.5 on the Emory River on Watts Bar Reservoir in Roane County, Tennessee. The 100-year floodplain for the Emory River is the area that would be inundated by the 100-year flood. Prior to the failure of the pond, the 100-year flood elevations for this reach of the Emory River varied from elevation 747.6-feet above mean sea level (msl) at Mile 1.5 to elevation 749.4-feet msl at Mile 3.5. The TVA Flood Risk Profile (FRP) elevations for this reach of the Emory River varied from elevation 749.9-feet above msl at Mile 1.5 to elevation 752.3-feet msl at Mile 3.5.

The FRP is used to control flood damageable development for TVA projects, and residential and commercial development on TVA lands. At this location, the FRP elevations are equal to the 500-year flood or "critical action" elevations. Roane County participates in the National Flood Insurance Program (NFIP). The NFIP regulates floodplain development and requires demonstration that a project within the floodway will not increase flood elevations by any amount. There is a published floodway on this portion of the Emory River.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, TVA would not remove or stabilize the spilled ash material in the Swan Pond Creek embayment and the Emory River. The ash in the Emory River would result in a temporary increase in the 100-year flood elevations in the vicinity of, and upstream of, the ash. The 100-year flood post-spill elevations would be about 6 feet higher than prespill elevations in the vicinity of the houses located along Emory River Road and Lakeshore Drive. The No Action Alternative would not restore 100-year flood elevations to the prespill levels.

Action Alternative

In order to restrict the movement of the spilled ash into and down the Emory River, TVA constructed one temporary underwater rock weir (Weir #1) on the Emory River. In addition a temporary rock dike is currently being constructed within the Swan Pond Creek embayment (Dike #2), and another temporary rock dike (Dike #3) is proposed for construction at the upstream end of a small embayment that feeds the Swan Pond Creek embayment. These dikes and weir are depicted in Figure 3. Dike #3 would prevent water from entering the area that is currently full of ash. The water would be diverted around the ash through a pipe or other nonerrodible means and discharged into the Emory River as depicted in Figure 4.

Temporary Weir #1 is located at about Emory River Mile (ERM) 1.9. For this reach of the Emory River, the USACE obtained underwater cross sectional data in 2007, prior to the dike breach. In addition, the USACE obtained underwater cross sectional data shortly after the breach to document the extent of the ash in the Emory River. TVA staff obtained these data from the USACE and input this information into HEC-RAS models of the Emory River to determine estimated potential upstream flood impacts resulting from construction of Weir #1 and the ash in the river. The 100-year flood post-spill elevations would be about 5 feet higher than prespill elevations immediately upstream of Weir #1 and about 8 feet higher than prespill elevations in the vicinity of the houses located along Emory River Road and Lakeshore Drive. The 100-year flood post-spill elevations would affect land and structures that TVA currently does not own. Until the ash and the weir are removed, there is an increased risk of flooding for some river-front properties in the event of a 100-year flood. TVA has performed post-spill flood-risk evaluations and determined that the 100-year flood post-spill elevations would be higher than prespill elevations all the way through Harriman, which is about 11 miles upstream. About 100 structures may be in the 100-year post-spill floodplain that were not previously within the 100-year floodplain. TVA will be performing individual home floor elevation surveys so TVA has the specific information needed in the unlikely event of a flood. TVA will be financially responsible for flood damages to homes that would not have occurred under normal conditions, in the absence of the ash in the river and the temporary weir. TVA is proposing to dredge the ash from the Emory River, remove Weir #1, and return the streambed of the Emory River to prespill conditions. Once this is completed, the Emory River flood elevations would be the same as those shown on the updated Roane County Flood Insurance Rate Maps. Because the increases in the flood elevations resulting from Weir #1 and the ash in the Emory River would be temporary, the long-term impacts on flood elevations would not be significant.

Temporary Dike #2 would be constructed at about Swan Pond Creek Mile 0.2. The purpose of Dike #2 is to prevent the ash from areas upstream of this weir (including the embayments) from flowing into the main Emory River channel. Dike #2 is not expected to affect flood elevations on the Emory River. TVA staff has made preliminary calculations on the volume of water that would pass over Dike #2 during normal flow and flood conditions and will continue to provide information as needed.

Temporary Dike #3 would be constructed at about Mile 0.5 on the small tributary that feeds the Swan Pond Creek embayment to prevent the water from entering the area that is currently full of ash. TVA would ensure the flood elevation resulting from the installation of this weir would not adversely affect structures with the collection of appropriate hydrologic and hydraulic data.

TVA is aware that the combination of the ash in the river and the temporary weir changes the upstream flood elevation. TVA determined that the increased risk resulting from any such change was necessary because of the need of an immediate response to the ash slide.

To ensure that Weir #1 and the ash in the Emory River would not adversely impact floodplains and flood control, TVA commits to the following:

- Removal of Weir #1 after removal of the ash in the Emory River and downstream east of Dike #2 such that flood elevations on the Emory River are returned to prespill conditions.
- TVA will perform individual home floor elevation surveys. TVA will be financially responsible for flood damages to homes that would not have occurred under normal conditions, in the absence of the ash in the river and the temporary weir until the ash and weir are removed. TVA's financial responsibility related to flood damages will also end at this time.

Navigation

Affected Environment

The Emory River at KIF is part of Watts Bar Reservoir. Commercially navigable portions of the reservoir include the Tennessee River, the Clinch River, and the Emory River to approximately Mile 12 at Harriman, Tennessee. Watts Bar Reservoir is part of the 800-mile, commercially navigable Tennessee River system, which links to the 10,000-mile national inland waterway.

The Emory River has seen little commercial navigation traffic in the last 20 years, as industries have closed in downtown Harriman. Currently, there is one commercial dock supporting a dock builder in Harriman. Other large vessels operating on the Emory River regularly include the USCG buoy tender *Ouachita*, which maintains the main channel navigation aids, and the TVA work vessel, *Sideview*, which maintains recreational channel navigation aids. Recreational boating is popular on the Emory River.

The ash spill from KIF flowed into the Emory River, between approximately Miles 1.5 and 3.5; the affected area includes the marked navigation channel. The USCG temporarily closed the Emory River for 30 days to all boat traffic (except those boats participating in cleanup and monitoring) from Mile 0 to Mile 4 to prevent accidents and groundings.

In addition, the ash flowed into the Swan Pond Creek embayment complex north of the fossil plant. Parts of this embayment are only navigable by recreational boats for part of the year.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, TVA would not stabilize the spilled ash and dike material in Swan Pond Creek embayment and the Emory River. The spilled ash would likely spread to a larger area of the Emory River and could result in the closure of a larger area to navigation. It would also complicate the eventual restoration of the area and could result in the affected areas remaining closed to navigation for a longer time than would occur under the Action Alternative.

Action Alternative

The environmental consequences to navigation (commercial and recreation) are primarily a result of the ash spill and the closure of the river for safety reasons by the USCG, rather than due to the construction of the proposed weirs. The USCG has issued an advisory that the river is not navigable until cleanup is complete on the main river. In addition, the structure on the main river, Weir #1, has a 50-foot-wide slot in it at a lower elevation to accommodate workboats, barges, monitoring, and law enforcement vessels.

Therefore, no additional impacts to navigation are expected to result from the proposed activities.

Visual Resources

Affected Environment

Visual resources are evaluated based on existing landscape character, distances of available views, sensitivity of viewing points, human perceptions of the landscape, and the degree of visual unity and wholeness of the natural landscape in the course of human alteration (scenic integrity).

The project area includes a stretch of the Emory River, the Swan Pond Creek embayment, Swan Pond and Swan Pond Circle roads, and nearby residences. Potential user groups that would likely have direct views of the proposed project area would include authorized employees, contractors, and residents northeast of the project area. Views of the project area would likely be up to distances in the foreground (0.5 mile to 4 miles) to the north and east. Scenic attractiveness of the proposed project area is minimal, and scenic integrity is very low as a result of the recent dike failure and ash release.

Environmental Consequences

Consequences of the impacts to visual resources are examined based on changes between the existing landscape and the landscape character after alteration, identifying changes in the landscape character based on commonly held perceptions of landscape beauty and the aesthetic sense of place.

No Action Alternative

Under the No Action Alternative, TVA would not stabilize the spilled ash and dike material in Swan Pond Creek embayment and the Emory River. Although some of the spilled ash would likely move downstream, this is not likely to result in additional adverse impacts to visual resources.

Action Alternative

Under the Action Alternative, TVA would proceed with the construction of the three temporary rock structures, construction of diversion ditches within the ash slide area, and installation of piping to divert the water from the ash slide area to facilitate dewatering. These measures are necessary to stabilize the spilled ash and minimize its downstream movement.

Much of Weir #1 across the Emory River is under water and is not visible. The east end of this weir would introduce a new element into the landscape. Dikes #2 and #3 in Swan Pond Creek would introduce broadly horizontal elements into the landscape. Visual impacts are unavoidable as a result of the proposed action and would be temporary until the ash has been removed and/or stabilized and the weir and dikes are deconstructed.

These dikes and weir, however, would be in an area where the scenery has already been adversely impacted by the spilled ash and would cause little additional adverse visual impact.

Repair of Swan Pond Road and the affected portion of the railroad would be visually beneficial. Construction of ditches and piping to remove water from the accumulated ash area in Swan Pond Creek embayment would be visually insignificant.

Aquatic Life

Affected Environment

The affected reach of Watts Bar Reservoir at KIF is in the impounded portions of the Clinch and Emory rivers. Overbank areas exist but are not extensive and are relatively shallow; likewise, embayment areas near the plant such as in the Swan Pond Creek are very shallow. The Emory River merges with the Clinch River on the right bank about 2 river miles upstream of the KIF condenser cooling water discharge. The cooling water intake is located about 2 miles upstream of the confluence with the Clinch. The reservoir pool extends up to and beyond Harriman, Tennessee (ERM 11).

Ash deposits in the most severely impacted portion of the reservoir range from deposits that are at least 5 feet deep to complete filling of the reservoir pool in the Swan Pond Creek embayment and the Emory River immediately adjacent to the mouth of Swan Pond Creek. Ash deposit depths decrease with increased distance upstream and downstream from the spill site, but results from studies to define deposition in some of these areas were not available at the time this document was prepared.

TVA and Tennessee Wildlife Resources Agency (TWRA) biologists conducted a survey of the spill area on December 23 and 24, 2008. No sightings of dead fish were made in the Clinch or Emory rivers, but approximately 300 dead fish were found stranded on shore along the banks of the Swan Pond embayment. The dead fish were present in a debris-line presumably formed during the initial surge of ash. Follow-up surveys in the area have not found any more dead fish. Bottom-dwelling animals (mussels, insects, crayfish, etc.) in areas where large amounts of ash were deposited were likely unable to escape the spill and would have physically been covered by deposits.

TVA has systematically monitored the ecological conditions of its reservoirs since 1990 as part of the Vital Signs Monitoring Program (<http://www.tva.gov/environment/ecohealth/index.htm>). Vital signs monitoring activities focus on (1) physical/chemical characteristics of waters; (2) physical/chemical characteristics of sediments; (3) benthic macroinvertebrate community sampling; and (4) fish assemblage sampling.

Several reservoir monitoring and evaluation tools were developed in the initial phase of the Vital Signs Monitoring Program, and those tools are often used in other TVA studies. Such is the case for KIF where TVA's fish assemblage monitoring tool (Reservoir Fish Assemblage Index) has been used in recent years at Clinch River Mile (CRM) 1.5, downstream of KIF, and CRM 4.4, upstream of KIF. The fish assemblage at these sites has consistently rated good, except for lower scores in 2007, a likely result of widespread drought conditions that continued into 2008. Watts Bar Reservoir rated at or above the Valleywide average in the quality of its sport fishery (<http://www.tva.gov/environment/water/sportfish.htm#29>).

The mussel fauna in the Emory River near KIF has been substantially altered by the impoundment of Watts Bar Reservoir and upstream impacts including mining and urbanization. Six mussel species (giant floater, fragile papershell, pistolgrip, pimpleback, wartyback, and threehorn wartyback) and a common aquatic snail (hornsnail) were found in a recent survey of this area (Yokley 2005). All of these species, except pistolgrip, are generally tolerant of reservoir conditions.

Environmental Consequences

No Action Alternative

As stated previously, the aquatic community was adversely affected by the initial ash spill. If no action were taken to contain spilled ash, additional ash would migrate downstream into the Emory River, the lower end of the Clinch River, and the Tennessee River (Watts Bar Reservoir). The Emory River watershed is not regulated by a dam, and any increase in its flow would carry ash to downstream areas.

Additional areas of aquatic habitat in Watts Bar Reservoir eventually would be buried under ash, and further impacts to aquatic life would occur from direct impacts of ash deposition. These impacts could include the smothering of organisms such as mussels, snails, and insects living in or on the bottom of the reservoir in areas currently unaffected (or minimally affected) by the spill. The smothering effect of spilled ash could alter the benthic macroinvertebrate community in portions of Watts Bar Reservoir that could, in turn, diminish the food base for fish species in these areas. Deposition of ash could also impact freshwater fish species by covering up areas necessary for spawning.

Action Alternative

The construction of the containment weir and dikes and the ash drainage structures would minimize the downstream movement of ash in Watts Bar Reservoir. Because construction would take place in areas that have been directly affected by the ash spill, few to no aquatic animals are likely to be present.

Weir #1 - Soundings conducted following the spill indicate that this entire area is under at least 20 feet of ash. No aquatic resources are present in this area. Therefore, no additional direct impacts to aquatic life (including listed species) occurred as a result of constructing this weir. This weir would prevent the majority of the ash lying upstream from migrating further downstream in the system. Any ash present downstream of the structure is still subject to movement due to current, and some impacts to downstream resources would continue to occur. However, these impacts would be greatly minimized when compared to the No Action Alternative.

Dike #2 - This area has been converted to an essentially upland area by the ash spill. No aquatic resources are present in this area. No direct impacts to aquatic resources would occur from construction of this dike. This dike would serve to contain the ash in Swan Pond Creek and prevent its entry into Watts Bar Reservoir.

Dike #3 - This dike and associated diversion structures would route water around the spill area in Swan Pond embayment. Diversion would minimize the amount of ash washed downstream and would minimize the leaching of any contaminants into Watts Bar Reservoir. Because the construction area is currently covered in ash, no aquatic life is present in the area, and no impacts would occur. Water routed to Watts Bar Reservoir would contain fewer contaminants than if it were allowed to flow through the ash spill.

Wetlands

Affected Environment

Wetlands are areas inundated by surface water or groundwater such that vegetation adapted to saturated soil conditions are prevalent. Wetlands generally include swamps, marshes, bogs, wet meadows, shoreline fringes, and similar areas.

Wetlands in the vicinity of KIF are typically associated with shoreline margins, in floodplains of tributary streams, small islands, and at the heads of reservoir coves. Additional small areas with wetland vegetation occur in ditches along the roadsides or railroad lines. These wetlands include a mix of forested, shrub, and/or herbaceous vegetation depending on the land use. National Wetland Inventory maps show narrow fringe wetlands along the shorelines and three small island wetlands in this area. Above the mouth of the Emory, there is one small forested, island wetland. Between the mouth of Swan Pond Creek embayment and Swan Pond Circle Road, there are narrow fringe wetlands and two small forested, island wetlands. Above Swan Pond Circle Road, there are narrow fringe wetlands along the shoreline, and wetlands occur in narrow patches along the margins of the southernmost ash cells.

Recent aerial photographs show that the ash slide eliminated all the wetlands (including three small island wetlands) in the spill area. The ash spill also affected wetlands in the ash pond area; some of these wetlands were heavily used by waterfowl and shorebirds.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, spilled ash would likely move downstream in Watts Bar Reservoir. This could impact some aquatic bed wetlands. Little additional impact to the already affected wetlands would occur.

Action Alternative

All of the wetlands at the sites of the proposed actions have already been eliminated by the ash spill. The proposed actions would not result in any additional impacts to wetlands in the spill area. The proposed actions would reduce the potential for additional impacts to wetlands resulting from the downstream movement of ash.

Terrestrial Ecology

Affected Environment

Plant and animal communities in the ash pond area have been greatly altered by KIF operations. The dominant plant communities consist of a variety of wetland species in and on the fringe of the lower settling ponds and at the outer base of the dikes. The collapsed dredge cells contained very little vegetation. The dikes were mostly vegetation with a mixture of common, weedy native and nonnative grasses and herbs. A band of riparian trees and shrubs, including sycamore, willow, boxelder, and alder occurred along much of the outer edge adjacent to the reservoir. Similar riparian vegetation occurred along other parts of the shoreline of Swan Pond Creek embayment and on the islands in the embayment. Other affected areas of the reservoir shoreline were landscaped, suburban lawns or oak-hickory forest.

The ash ponds were heavily used by shorebirds, waterfowl, amphibians, and reptiles. This wildlife was concentrated in the lower settling ponds, which remain relatively intact. The lower settling ponds, Swan Pond Creek embayment, and the adjacent Emory River were

heavily used by Canada geese, wood ducks, great blue and green herons, great egrets, belted kingfishers, and double-crested cormorants. A variety of songbirds, semiaquatic mammals, turtles, and water snakes were also abundant in the shoreline riparian vegetation along the shoreline of these rivers. Ospreys are common in the area, often nesting on natural and man-made structures on and around the KIF properties. Heron colonies also occur near the fossil plant; the closest is approximately 0.3 mile upstream and in direct line of sight of the affected area. A second colony including great blue herons and double-crested cormorants occurs just downstream of the junction of the Emory and Clinch rivers. The areas filled with spilled ash are no longer suitable for most of these species.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, TVA would not stabilize the spilled ash and dike material in Swan Pond Creek embayment and the Emory River. The downstream movement of ash would have adverse effects on waterfowl and other aquatic wildlife. It would not affect terrestrial vegetation.

Action Alternative

The Action Alternative would have no adverse effect on either terrestrial vegetation or wildlife and would minimize additional adverse effects on wildlife that could result from the downstream movement of ash. TVA has already undertaken some of the activities associated with the Action Alternative, and others would be completed in the near future, reducing the potential for impacting the breeding season of much of the wildlife in the area. The seed mix being used for planting spilled ash areas to control dust is composed of annual rye and fertilizer and is unlikely to introduce invasive plants to the area.

Endangered and Threatened Species

Affected Environment

Although several federally listed plants and animals are known from Roane County (Table 4), only one, the piping plover, is known to occur in the area affected by the ash spill. The piping plover has been reported from KIF ash ponds on five occasions between 1978 and 2002. The species is considered a casual migrant in Tennessee by the Tennessee Ornithological Society; most records at the plant include a single individual observed for a short period of time. It has not been found on systematic shorebird surveys at KIF conducted since 2004. Some suitable ash pond habitat for this casually occurring species has likely been adversely affected by the spill.

A second endangered species, the gray bat, likely forages along the Clinch and Emory rivers. The closest cave known to be occupied by gray bats is 16 miles from KIF. Suitable habitat for the other federally listed species does not occur in the vicinity of KIF.

Table 4. Federally Listed as Endangered and Threatened Species That Are Currently Present in Roane County, Tennessee

Common Name	Scientific Name	Federal Status
Plants		
American hart's-tongue fern	<i>Asplenium scolopendrium</i> var. <i>americanum</i>	Threatened
Cumberland rosemary	<i>Conradina verticillata</i>	Threatened
Virginia spiraea	<i>Spiraea virginiana</i>	Threatened
Mussel		
Pink mucket	<i>Lampsilis abrupta</i>	Endangered
Fish		
Spottfin chub	<i>Cyprinella monacha</i>	Threatened
Bird		
Piping plover	<i>Charadrius melodus</i>	Endangered
Mammal		
Gray bat	<i>Myotis grisescens</i>	Endangered

Several other plants and aquatic and terrestrial animals listed as endangered, threatened, or of special concern by the State of Tennessee have been reported from within a few miles of KIF. The only state-listed species known from the immediate vicinity of KIF are two plants. One is spreading false foxglove, *Aureolaria patula*, a species of special concern known to occur along the banks of the Melton Hill, Watts Bar, and Norris reservoirs. Closest known populations are found within 2 miles downstream of the spill in Sugar Grove and Rayburn Bridge Habitat Protection Areas. The second is fetterbush, *Leucothoe racemosa*, listed as threatened and known to occur from one population within the KIF reservation along the banks of the Clinch River approximately a mile from the ash spill site. This species is a common coastal plain plant with several disjunct populations in Tennessee.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, TVA would not take the proposed actions to contain the spilled ash, which would likely move downstream in Watts Bar Reservoir. The ash spill has already affected potential habitat for the piping plover, and the No Action Alternative would not result in any additional impacts to this listed as endangered species or any other listed species.

Action Alternative

Adoption of the Action Alternative would result in the stabilization of the spilled ash material and minimize its downstream movement. This would not affect any listed species.

Natural Areas

Affected Environment

KIF is the site of two natural areas and within 3 miles of five other natural areas. No Nationwide Rivers Inventory streams or Wild and Scenic Rivers are in the vicinity.

Both the Kingston Refuge and the KIF State Wildlife Observation Area (WOA) are on the KIF reservation. The Kingston Refuge is an 835-acre area that includes the KIF and the

KIF State WOA. These properties are owned by TVA, and the southeast peninsula of the tract is managed by the TWRA under a revocable land use permit. The refuge provides habitat for a variety of wildlife, and limited hunting is permitted. TWRA has reported low use of the area by hunters in recent years, and subsequently, limited wildlife management activities have occurred on the refuge. Although the land use permit to TWRA remains in place, no hunting was scheduled by TWRA at the Kingston Refuge for the 2008-09 hunting season. The KIF State WOA is a 200-acre area of the Kingston Refuge that includes KIF's ash settling ponds. It provides a temporary stopover base during migration for a wide variety of shorebirds, wading birds, and waterfowl and is regularly visited by birdwatchers. Because operations at KIF result in a continual flux of fill within the various ash ponds, the number of birds present varies greatly. Portions of both of these areas have been adversely affected by the ash spill, and they are closed to public access.

The other natural areas in the vicinity of KIF are the Rayburn Bridge TVA Habitat Protection Area (HPA), Stowe Bluff TVA HPA, Sugar Grove TVA HPA, Kingston City Park, and Southwest Point Park. None of these areas are in the immediate vicinity of the spilled ash, and none were directly impacted by the ash spill.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, TVA would not take the proposed actions to contain the spilled ash, which would likely move downstream in Watts Bar Reservoir. This is unlikely to result in any additional impacts to the two natural areas on the KIF site or impact the other natural areas in the vicinity.

Action Alternative

Adoption of the Action Alternative would result in the stabilization of the spilled ash material and minimize its downstream movement. This would not result in any additional impacts to the two natural areas on the KIF site or impact the other natural areas in the vicinity.

Recreation

Affected Environment

The Emory River section of Watts Bar Reservoir has traditionally received heavy recreational boating use especially during the summer months, and there are several public recreation facilities in the immediate vicinity that provide water access to the area.

These include:

1. Ladd Park, which includes picnic facilities, a fishing pier, and a boat launching ramp, is located near the mouth of the Emory River.
2. Sugar Tree Boat Launching Ramp is a TWRA ramp located on the left bank at ERM .75.
3. Little Emory Boat Launching Ramp is a TWRA ramp located on the left bank at ERM 5.25.
4. Harriman Waterfront Park provides a boat launching ramp, picnic facilities, and walking trails and is located on the left bank at ERM 12.

5. KIF Launching Ramp and the Fisherman's Parking Lot have been closed to the public because of the presence of heavy equipment associated with the spill response.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, TVA would not take the proposed actions to contain the spilled ash, which would likely move downstream in Watts Bar Reservoir. Recreational boating in the vicinity of KIF would continue to be restricted for some time, and the downstream movement of ash could reduce the quality of the recreational experience on other parts of Watts Bar Reservoir.

Action Alternative

Adoption of the Action Alternative would result in the stabilization of the spilled ash material and minimize its downstream movement. This would not result in any additional negative impacts on recreation in the KIF area and would reduce the potential for impacts to recreation downstream of KIF.

Cultural Resources

Affected Environment

For the undertaking addressed in this EA, the area of potential effect (APE) for historic properties is the locations of three rock structures for ash containment, ash removal at Swan Pond Road and railway, placement of the removed ash, any associated new drainage system (pipeline or ditches), new access roads, and equipment laydown areas. For historic architecture/sites, the APE is considered the project areas plus any areas containing historic resources from which the project areas would be visible. The size of the APE beyond the actual project area will depend on such factors as topography and vegetation (line of sight) or 0.5-mile-radius boundary; whichever is closer. The APE, as defined in 36 Code of Federal Regulations (CFR) Part 800.16(d), is "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist."

Historic Architecture/Sites/Resources

TVA staff contacted the Tennessee Historical Commission (THC) to determine if historic structures were within the direct line of site of the project area. THC confirmed that no historic architecture/sites/resources are recorded within a direct line of sight to the project area.

Archaeological Resources

Archaeological survey data for the debris area are limited to the shoreline and a proposed rail spur route (which was not constructed). There are four recorded archaeological resources that have been covered by the ash slide; one additional recorded site is adjacent to the debris area.

In 1941, one archaeological site (40RE46) was recorded at the mouth of Swan Pond Creek. The recorded location of 40RE46 was reinvestigated in 1986 (Cannon) and 2000 (Ahlmán et al.), and the site was not relocated, possibly due to permanent inundation or error in mapping. This site was recorded as a prehistoric artifact scatter, which had been affected by erosion. Since this site has not been reevaluated, it is unknown the precise location of 40RE46 or if it is eligible for listing in the National Register of Historic Places (NRHP).

In 2000, archaeological investigations for a proposed rail spur from KIF were conducted (Franklin and Frankenberg 2000). One archaeological site was recorded in proximity to the boundary of the debris area. Site 40RE335 is situated on a terrace of Swan Pond Creek and measures approximately 100 meters by 100 meters. This site contains a prehistoric component of undetermined cultural affiliation, a historic grave with headstone (Adkisson Cemetery), and a historic artifact scatter. The artifacts recovered were from the surface. The historic artifacts date from the mid- to late 19th century, and the prehistoric artifacts consist of a lithic scatter. Soil probes in the areas revealed that the original soils had been truncated, and only subsoil remained. One cemetery headstone was encountered in a small stand of trees and bears the surname Adkisson; the headstone appears to have been shifted slightly from its original location. Based on the lack of intact archaeological deposits, 40RE335 is considered ineligible for listing in the NRHP. However, avoidance of the cemetery was recommended.

In 2000 (Ahlman et. al), an archaeological survey was conducted on a segment of the shoreline between the winter and summer pool elevations of the Swan Pond area. Three sites were identified (40RE428, 40RE429, and 40RE430). The TVA land above summer pool elevation was not investigated for archaeological resources. No formal determination of the eligibility of these resources was conducted prior to the ash slide.

Site 40RE428 is a lithic scatter identified by systematic pedestrian survey of the beach on a small sandy peninsula just north of the ash disposal area for KIF. The site measured 25 meters by 25 meters. At the time of the survey, no features were observed on the beach surface, and no diagnostic artifacts were recovered. This site was being impacted by beach and shoreline erosion. Since the site was unlikely to yield information important to prehistory, it was considered by TVA to be ineligible for listing in the NRHP.

Site 40RE429 is a historic artifact scatter investigated by systematic pedestrian survey of the beach. It extended 20 meters just south of Swan Pond Circle Road west of the Emory River. No historic structures were depicted at this area on the 1940 TVA land acquisition map, but several large farmsteads and a county road lay in the general vicinity. The material appeared to date to the early 20th century. No features or concentrations were identified on the beach surface. This site was being impacted by beach and shoreline erosion. Based on this description, the site was considered by TVA to be ineligible for listing in the NRHP.

Site 40RE430 represented the remains of a large historic farmstead (approximately 120 meters by 100 meters) identified by systematic pedestrian survey of the beach on the left bank of Swan Pond Creek near its confluence with the Emory River. The 1940 TVA acquisition map depicts a farmstead in this location. Limestone footers from the barn were identified on the northern shoreline of the small peninsula, but they were the only structural remains observed at the site. A house and several outbuildings plotted on the TVA land acquisition map above the normal pool elevation on the interior of the peninsula suggested that there might have been intact archaeological deposits above the cut bank. Recovered artifacts date from the late 19th to early 20th centuries. This site was being impacted by beach and shoreline erosion. Based on this description, the site was previously considered by TVA to be potentially eligible for listing in the NRHP. However, the force of the ash slide likely has displaced the footers to the barn and impacting features, if any were present. It is now TVA Cultural Resources' opinion that the site is no longer eligible for listing in the NRHP.

Environmental Consequences

Pursuant to 36 CFR Part 800.12(d), this project is an emergency situation to conduct salvage operations to prevent the ash from spreading to downstream areas. The following paragraphs describe the potential impacts of the alternatives and efforts to minimize effects on historic properties.

No Action Alternative

It is probable that 40RE46 and 40RE430 have been affected by force of the ash slide. However, if the No Action Alternative were selected, no additional effects would occur to cultural resources.

Action Alternative

No historic architectural resources are recorded within the APE, and none would be affected by this action. Although there is a potential to affect historic properties, this proposal minimizes the likelihood. Based on the preservation of property, the Action Alternative of installing the dikes and weir is preferred.

Weir #1: No historic properties are recorded in the viewshed of this area. The construction of Weir #1 would have no effects on historic properties.

Dike #2: Only a portion of this area has been previously investigated for archaeological resources, and 40RE430 would be directly affected by the action. The ash slide has likely damaged the site above ground surface and slightly below. Most of this area has not been investigated for archaeological resources. Ground disturbance necessary for building the dike would be minimized to avoid impacting resources. However, the preservation of property by reducing the spread of ash further downstream will be the priority.

Dike #3: No historic properties are recorded in the viewshed of this area. The construction of Dike #3 would have no effects on historic properties.

Dewatering trenches and pipeline: Archaeological investigations have been conducted along the majority of this area. Sites 40RE428 and 40RE429 are recorded along this route. However, these sites are considered ineligible for listing in the NRHP. No historic properties have been recorded in this area. The utilization of this route minimizes potential effects to historic properties. During installation, considerations should be made of minimizing the ground disturbance along the section of the route that has not been previously surveyed. However, the preservation of property would be the priority.

Ash removal from Swan Pond Road and railway: No historic properties are recorded in the viewshed of this area. The road and railway have been previously impacted by construction activities. The ash would be relocated to a previously disturbed area. The removal of ash from these locations would have no effects on historic properties.

Access roads and equipment laydown areas: Cultural Resources will review all proposed new access road and equipment laydown areas to

supply comments on effects to historic properties. If these actions are necessary, the Adkisson Cemetery will be avoided.

Cumulative Impacts

As the proposed structures are temporary, no foreseeable cumulative impact to any resources is anticipated to result from the Action Alternative.

Commitment and Mitigation Measures

The purpose of the Action Alternative is to minimize the further downstream movement of spilled ash and thus mitigate the potential for additional impacts from the ash spill. TVA has not identified the need for additional mitigation measures beyond the use of routine best management practices and the measures listed above for avoidance of historic properties.

To ensure that Weir #1 and the ash in the Emory River would not adversely impact floodplains and flood control, TVA would commit to the following:

- Removals of Weir #1 after removal of the ash in the Emory River and east of Dike #2 such that flood elevations on the Emory River are returned to prespill conditions.
- TVA will perform individual home floor elevation surveys. TVA will be financially responsible for flood damages to homes that would not have occurred under normal conditions, in the absence of the ash in the river and the temporary weir until the ash and weir are removed. TVA's financial responsibility related to flood damages will also end at this time.
- Access roads and equipment laydown areas will be designed to avoid impacts to the Adkisson Cemetery.

Preferred Alternative

TVA's preferred alternative is the installation of the three temporary rock structures, the piping and ditching (Figure 4) to reroute surface water in Swan Pond Creek embayment, and repair and restoration of the rail line and roadway. This will minimize the downstream movement of spilled ash and facilitate the eventual long-term remediation effort.

TVA Preparers

John T. (Bo) Baxter, Aquatic Life
Patricia Cox, Terrestrial Ecology and Endangered and Threatened Species
Don Dycus, Aquatic Life
Jerry Fouse, Recreation
Hill Henry, Terrestrial Ecology
Eric Howard, Cultural
Carolyn Koroa, Navigation
Roger Milstead, Floodplains
Chett Peebles, Visual
Kim Pilarski-Brand, Wetlands
David Robinson, Document Preparation and NEPA Compliance

Jan Thomas, Natural Areas

Agencies and Others Consulted

The following agencies were notified of TVA's emergency actions:

Council on Environmental Quality
18 Federally Recognized Tribes
Tennessee State Historic Preservation Officer
Tennessee Department of Environment and Conservation
Tennessee Wildlife Resources Agency
U.S. Army Corps of Engineers
U.S. Coast Guard
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service

References

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- Franklin, Jay D., and Susan R. Frankenberg. 2000. *Archaeological Reconnaissance Survey and Limited Deep Testing of the Proposed Kingston Fossil Plant Rail Spur Corridor*. University of Tennessee. Submitted to TVA.
- . 2001. *Hazardous Trace Elements in Tennessee Soils and Other Regolith*. Report of Investigations No. 49. Author: Otto C. Kopp. Nashville, Tenn.: Tennessee Department of Environment and Conservation, Division of Geology.
- Tennessee Valley Authority. 2004. *Reservoir Operations Study Programmatic Environmental Impact Statement*. Prepared in cooperation with the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service.
- U.S. Environmental Protection Agency. 2000. "Regulatory Determination on Wastes From the Combustion of Fossil Fuels; Final Rule." 65 *Federal Register* 99:32214-32237 (22 May 2000) codified at 40 CFR Pt. 261.
- Yokley, P., Jr. 2005. *Freshwater Mussel Survey of Impounded Area of the Clinch River Adjacent to the Power Plant, TVA, Kingston, Tennessee*. A Report Submitted to TVA by Yokley Environmental Consulting Service, Florence, Alabama.

Attachment

- A. Information Regarding Emergency Aquatic Resource Alteration Permit #NRS08.318

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**ATTACHMENT A – INFORMATION REGARDING EMERGENCY AQUATIC RESOURCE
ALTERATION PERMIT #NRS08.318**

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STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER POLLUTION CONTROL
NATURAL RESOURCES SECTION
7TH FLOOR, L&C ANNEX
401 CHURCH STREET
NASHVILLE, TENNESSEE 37243-1534

January 14, 2009

Mr. Ron Hall
Plant Manager
TVA-Kingston Fossil Plant
714 Swan Pond Road
Harriman, Tennessee 37748

RE: 401 Water Quality Certification/Aquatic Resource Alteration Permit Applicant's Responsibility
for Public Notification for Emergency ARAP NRS08.318

Dear Mr. Hall:

The Division of Water Pollution Control issued an emergency 401 Water Quality Certification/ARAP permit (NRS08.318) to the TVA Kingston Fossil Plant on January 6, 2009. Pursuant to State Rule 1200-4-7-.04(4)(a)4, where the Commissioner determines an emergency situation exists, a permit for remedial action may be issued without prior public notice and participation.

The division intends to place the emergency permit in our next Public Notice. The Rules of the Water Quality Control Board, Chapter 1200-4-7-.04(4)(d) state:

1. *The Applicant shall distribute the approved Public Notice to the neighboring landowners by publishing in a local newspaper of general circulation.*
2. *The applicant shall provide certification to the Division of compliance with item 1 above.*

In order to comply with this section of our rules, please place the enclosed Public Notice in the Legal Notices section of a local newspaper of general circulation, one time. So that we may certify that this has been accomplished you must send us a copy of the complete page of the newspaper containing the notice and the date of publication.

Thank you for your cooperation on this matter. If you have any questions, please contact me at 615-532-0713, or hugh.hannah@state.tn.us.

Sincerely,

A handwritten signature in black ink that reads "Chip Hannah".

Chip Hannah
Division of Water Pollution Control
Natural Resources Section

PUBLIC NOTICE
OF
EMERGENCY PERMIT

PERMIT APPLICATION: NRS08.318

APPLICANT: Tennessee Valley Authority (TVA) Kingston Fossil Plant
Ron Hall, Plant Manager
714 Swan Pond Road
Harriman, Tennessee 37748
865-717-2501

LOCATION: Emory River segment of Watts Bar Reservoir at the TVA-Kingston Fossil Plant in Harriman, Roane County (Lat: 35.898°, Long: -84.503°). USGS, Topographic maps Elverton, TN (130-NW) and Harriman, TN (123-NE).

PROJECT DESCRIPTION: On December 22, 2008, containment structures surrounding portions of the Class II ash landfill at the TVA Kingston Fossil Plant failed. This resulted in a catastrophic release of coal ash sludge to the environment. The ash slide disrupted power, ruptured a gas line, caused one home to be knocked off its foundation and damaged others. Swan Pond Road and a local railroad track were covered and blocked by the ash flow. The ash inundated waters of the state including, but not limited to, two inlets of the Emory River.

In accordance with Rule 1200-4-7-.04(4)(a)4, the Commissioner has determined that the above referenced ash release caused an emergency situation to exist that required remedial action to be immediately undertaken without prior public notice and participation. The remedial activity includes the installation of three rock weir structures in the Emory River segment of Watts Bar Reservoir and the diversion of an unnamed tributary to the Emory River as emergency measures for ash containment associated with the TVA-Kingston Fossil Plant. The Division of Water Pollution Control issued an emergency 401 Water Quality Certification/ARAP permit (NRS08.318) to the permittee on January 6, 2009.

WATERSHED DESCRIPTION:

Watershed: Emory River segment of Watts Bar Reservoir

Hydrologic Unit Code: TN06010208001

Stream Name: Emory River segment of Watts Bar Reservoir

Stream Segment ID: TN06010208001_1000

Designated Use	Use Support
fish and aquatic life	fully supporting
recreation	not supporting
industrial water supply	fully supporting
irrigation	fully supporting
livestock watering and wildlife	fully supporting
domestic water supply	fully supporting

Ecoregion: 67f

PERMIT COORDINATOR: Chip Hannah

The Emory River segment of Watts Bar Reservoir is an impaired waterbody due to Chlordane and PCBs from Industrial Point Source and contaminated sediments.

In accordance with the Tennessee Antidegradation Statement (Rule 1200-4-3-.06), the division has determined that the emergency measures will result in a de-minimis impact to water quality.

This notice may be viewed online at: <http://www.state.tn.us/environment/wpc/ppo/>.

The purpose of this notice is to inform interested parties of this permit. The permit, application, and supporting documentation are available at the department's address for review and/or copying. The department's address is:

Tennessee Department of Environment & Conservation
Division of Water Pollution Control
Natural Resources Section
7th Floor, L & C Annex
401 Church Street
Nashville, TN 37243