



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

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December 4, 2009

SUMMARY OF SUBJECT MATTER

TO: Members of the Subcommittee on Water Resources and Environment

FROM: Subcommittee on Water Resources and Environment Staff

SUBJECT: Hearing on “The One-Year Anniversary of the Tennessee Valley Authority’s Kingston Ash Slide: Evaluating Current Cleanup Progress and Assessing Future Environmental Goals”

PURPOSE OF HEARING

The Subcommittee on Water Resources and Environment will meet on Wednesday, December 9, 2009, at 10:00 a.m., in room 2167 of the Rayburn House Office Building to receive testimony from representatives from the U.S. Environmental Protection Agency (EPA), the Tennessee Valley Authority (TVA), the TVA Office of Inspector General (OIG), Perry County, Alabama, and an engineering firm. The purpose of this hearing is to receive updates as to the status of the Kingston ash slide cleanup efforts, as well as disposal of reclaimed and dredged ash in Perry County, Alabama.

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

BACKGROUND

December 22, 2008 Ash Spill

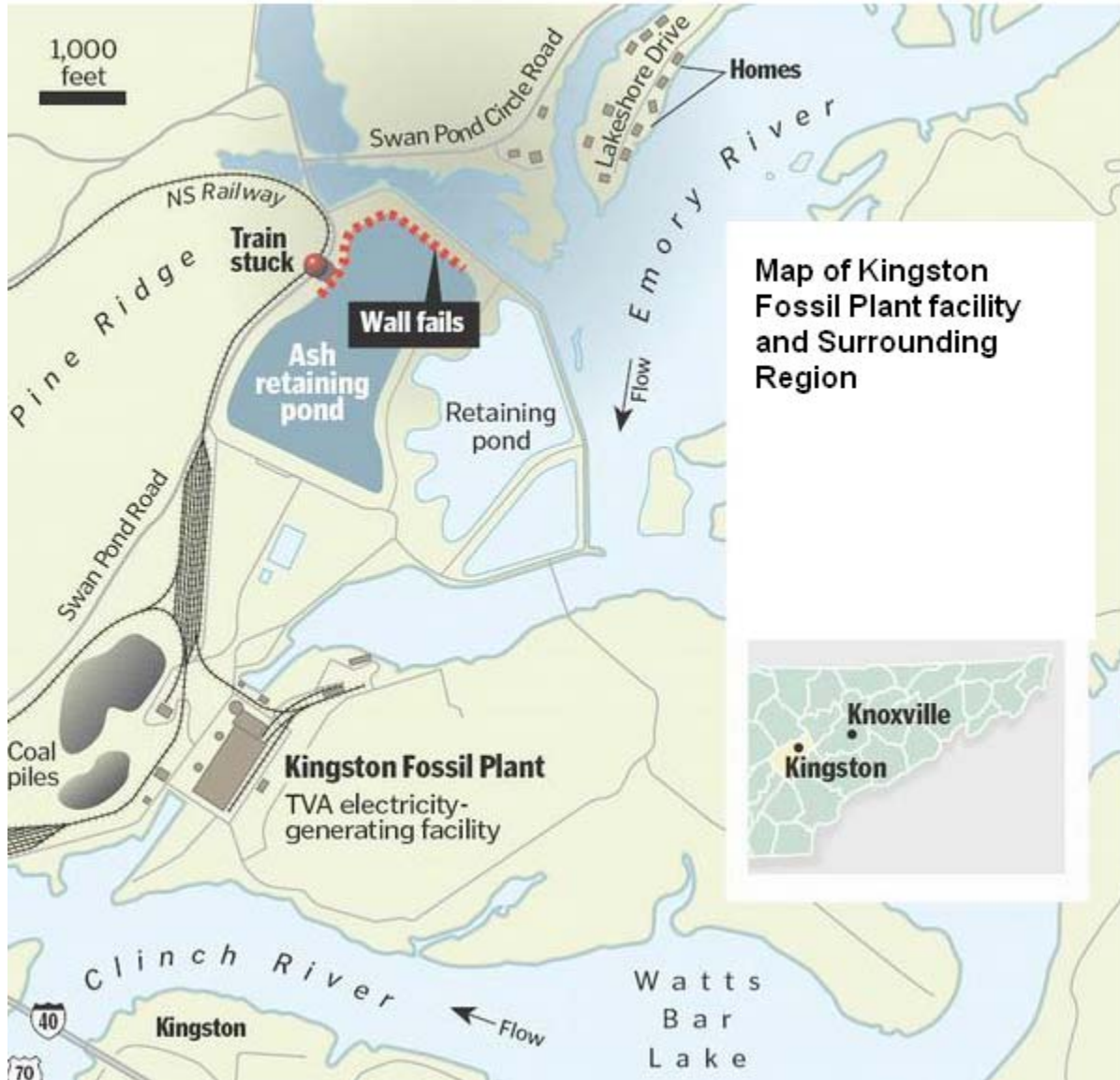
The Kingston Fossil Plant is a coal-fired power plant located in Harriman, Tennessee, 40 miles west of Knoxville, Tennessee. It is owned and operated by TVA. The facility is located at the confluence of tributaries of the Tennessee River: the Clinch and Emory Rivers. It is one of TVA’s

larger coal-fired power plants and produces 1,700 megawatts per day, or 10 billion kilowatts per year (enough to supply power for 670,000 households). At full power, the Kingston Fossil Plant burns about 14,000 tons of coal every day. This results in about 1,000 tons of fly ash produced per day. The plant was completed in 1955.

At 1:00 a.m., on Monday, December 22, 2008, a retaining wall failed at a coal ash retention pond at TVA's Kingston Fossil Plant. The breach in the retaining wall resulted in the release of 5.4 million cubic yards of ash and 327 million gallons of water onto land adjacent to the plant, as well as into the nearby Clinch and Emory Rivers. The surface impoundment in question was comprised of Dredge Cell 1, Dredge Cell 2, and the Phase 1 Cell. The northern edge of the impoundment was bounded by a 200 foot wide setback, and then a final dike, Dike C. The dikes were initially built of naturally silty clays, and then bottom ash and fly ash. On December 22, 2008, Dredge Cell 2 and the Phase 1 Cell collapsed, but, for the most part, Dredge Cell 1 remained intact.

In terms of actual coverage on the land, over 300 acres have been affected by sludge, at points up to six feet deep. According to the Tennessee Department of Environment and Conservation (TDEC), over 5,000,000 cubic yards of coal ash were deposited into the Emory River and Emory River embayments. The Swan Pond Embayment, an inlet directly north of the impoundment, was largely filled with coal ash. Approximately 110,000 cubic yards were deposited on the ground surface.

Figure 1: Map of Kingston Fossil Plant Facility and Surrounding Region



Source: Knoxville News Sentinel

The EPA noted that the initial release of materials from the plant’s retention facility “created a tidal wave of water and ash.” While the ash spill rendered three homes uninhabitable and damaged the property of 42 property owners, much of the affected land area impacted by the spill is located on property managed by TVA. Immediately after the spill, a nearby community was evacuated. In addition, power to surrounding communities was disrupted, a major gas line and water main were ruptured, and nearby transportation routes (rail and road) were covered with the ash. No serious injuries were reported as a result of the immediate spill, but one fatality occurred in July 2009 during the clean-up efforts.

The coal ash release resulted in a number of human health and environmental risks. According to EPA, the absence of proper controls to limit human exposure to the spill site could

result in “unacceptable risks to humans and the environment.”¹ Risks to humans include skin irritation from direct contact with the coal ash and irritation of the respiratory system from inhalation of airborne particulates. Spilled coal ash in the river can also smother aquatic life.

Current State of Clean-up Efforts

On May 11, 2009, EPA and TVA entered into an enforceable agreement (Administrative Order) whereby TVA is responsible for the comprehensive cleanup of coal ash from the Emory River and surrounding areas. EPA will oversee this cleanup process. This entails EPA reviewing and approving all TVA cleanup operations, in accordance with applicable Comprehensive Environmental Response, Compensation and Liability Act (Superfund) law. Upon removal of the ash, TVA is required to assess any residual contamination in order for a determination to be made about whether additional actions will be necessary.

Ash removal from the Emory River and surrounding areas is divided into two categories: Time-Critical Removal and Non-Time-Critical Removal.

Time-Critical Removal: As a result of the spill, the main channel of the Emory River became blocked. As a result, the river diverted around the blocked areas. Because the Emory River is a shipping channel, the blockage and subsequent diversion impacted navigation on the river. The Time-Critical Removal component of the clean-up includes the removal of ash from the Emory River. This consists of approximately three million cubic yards of spilled coal ash. Dredging of the river began on March 19, 2009. Priority 1 of the Time-Critical Removal consists of clearing the main channel to pre-spill levels to restore flow, minimize flooding, and prevent further migration of ash downstream. Priority 2 of the Time-Critical Removal consists of clearing the remaining substantive areas of ash from the Emory River. TVA and EPA estimate that Time-Critical Removal operations will be concluded in the spring of 2010.

Reclaimed, or dredged, ash from the river is stored in a series of holding areas to facilitate dewatering of the material. Having been dewatered to a desired level, the material is transported off-site for permanent disposal at a landfill in Perry County, Alabama (*see below*).

The speed at which the spilled ash is removed from the river is contingent on a number of conditions. These include dredging and discharge line capacities, water quality considerations, and ash processing capacity (i.e., dewatering). The ash processing area, known as the “ball field”, is also limited in size – constraining the amount of reclaimed ash that can be deposited there. Equipment and staffing capacity for the dredging operations allows dredging 24 hours a day, seven days a week, if necessary.

The target removal volume for dredged and excavated coal ash is 15,000 cubic yards per day. From the beginning of Emory River dredging in late March 2009 to May 11, 2009, TVA removed, on average, 2,596 cubic yards per day. From May 12, 2009 to August 8, 2009, an average of 7,252 cubic yards per day were removed. From August 9, 2009 to September 27, 2009, an average of

¹ EPA, “Questions and Answers on the Administrative Order on Consent for the Tennessee Valley Authority Kingston Fossil Fuel Plant Release,” at 4 ([http://www.epakingstontva.com/EPA%20Order/EPATVA%20Administrative%20Order%20and%20Agreement%20on%20Consent%20FAQs%20\(May%2011,%202009\).pdf](http://www.epakingstontva.com/EPA%20Order/EPATVA%20Administrative%20Order%20and%20Agreement%20on%20Consent%20FAQs%20(May%2011,%202009).pdf) (accessed November 27, 2009)).

13,971 cubic yards per day were removed. From September 28, 2009 to November 29, 2009, an average of 14,976 cubic yards per day were removed. From the beginning of dredging until late September, approximately a total of 1.2 million cubic yards had been removed as (810,000 cubic yards dredged; 390,000 cubic yards excavated). (*See Appendix for graphic representation of removed ash over time.*)

In November, however, dredging productivity decreased. EPA attributes this slow-down to weather conditions whereby prolonged rain was slowing the ash de-watering process. TVA had also been using only one train per day to move dewatered ash off-site. This necessitated a slow-down in dredging operations because of space constraints at the dewatering, or ash processing, site. As of early November 2009, EPA understood that TVA would begin using two train shipments a day to facilitate ash removal from the ash processing site.

Non-Time-Critical Removal: Non-Time-Critical Removal operations will remove spilled coal ash from areas other than the Emory River, including various embayments and sloughs. It will also remove any residual coal ash from the Emory River. This consists of approximately 2.5 million cubic yards of spilled material.

The May 11, 2009 Administrative Order required that TVA develop an engineering assessment and cost analysis workplan within 90 days of that date. TVA is expected to have workplans, assessments, and analyses in place so that the Non-Time-Critical Removal areas are ready for cleanup operations as soon as the Time-Critical Removal dredging operations are completed. This plan was submitted by TVA on July 10, 2009 and is now out for public comment. According to EPA, work on the Non-Time-Critical Removal is expected to begin in the spring of 2010 – at the completion of Time-Critical Removal dredging, as planned.

Under the Administrative Order, TVA is also required to comply with Section 404(b) of the Clean Water Act whereby it must: restore waters to functional levels of pre-spill conditions; assess and remove coal ash from embayments, sloughs, floodplains, and wetlands; and restore and mitigate any short- and long- term loss of natural resources as a result of the spill.

Coal Combustion Waste Disposal Site in Perry County, Alabama

The three million cubic yards of reclaimed coal ash from the Time-Critical Removal is, and will be, processed (de-watered) and temporarily stored at TVA's Kingston facility, before being shipped by train to the Arrowhead Landfill in Perry County, Alabama for permanent disposal. According to the provisions of the May 11, 2009 Administrative Order, the coal ash must be disposed of in accordance with the most stringent protective disposal standards for municipal solid waste landfills. EPA approved of TVA's application to use the Perry County site because EPA found that the Arrowhead Landfill meets and exceeds these standards.

According to the EPA:

“Arrowhead Landfill complies with all technical requirements specified by federal and state regulations. The landfill is permitted to accept waste materials such as coal ash and has the capacity to accommodate the anticipated volume of material. The landfill

features a compacted clay liner and a high density polyethylene liner; a leachate collection system that gathers liquids and pumps them to the surface for treatment; and a protective cover. The landfill staff conducts regular groundwater monitoring, and plans to conduct air monitoring to ensure worker safety.”²

EPA and the Alabama Department of Environmental Management will routinely monitor the site to ensure proper operations.

Prior to its approval of the Perry County site, EPA considered both community reactions to the proposal, as well as location choice. EPA met with local residents and community leaders to gauge responses to the proposal. Location of the landfill was also a factor of consideration. The Arrowhead Landfill is located over four miles from Uniontown, Alabama – the closest population center.

Reclaimed ash from the future Non-Time-Critical Removal operations may be disposed of in the Arrowhead Landfill. However, any decision to do so would be subsequent to a public comment process on proposed disposal actions.

Stantec Engineering Findings

In January, 1999, TVA hired an engineering firm, Stantec Consulting Services Inc. (Stantec) to inspect, perform testing, and make recommendations to TVA on the structural integrity, maintenance, and operations concerning TVA’s ash and gypsum disposal facilities at all of TVA’s coal-fired power plants. These evaluations include both active and closed disposal facilities.

Stantec’s evaluations consist of a number of phased stages:

1. Phase 1: Non-invasive review of the structural stability of all coal combustion waste impoundments. This includes visual inspections as well as document and archival reviews. Stantec’s Phase 1 findings were released on June 24, 2009.
2. Phase 2: Engineering evaluations of all TVA coal combustion waste impoundments. These evaluations will include geotechnical explorations, hydraulic and hydrologic evaluations, conceptual designs for improvements, and general engineering support. Phase 2 is estimated to be complete in the fall of 2010.
3. Phase 3: Engineering technical assistance including planning assistance for short- and long-term coal combustion waste management, final design of conceptual repairs, preparation of construction plans and specifications, cost estimates, and permitting assistance.

² EPA, “EPA Approves Plan for Disposal of Coal Ash from TVA Kingston Site at the Arrowhead Landfill in Perry County, Alabama” (<http://yosemite.epa.gov/opa/admpress.nsf/2ac652c59703a4738525735900400c2c/02cc745d4bba7547852575e700476a8f?OpenDocument> (accessed November 28, 2009)).

4. Phase 4: Assisting TVA with improvement of its dam safety program within the fossil power (coal) group, dam safety training for appropriate TVA staff, and annual facility inspections. This work was initiated in early 2009.

In its Phase 1 review, Stantec noted that some system-wide concerns exist across TVA's coal combustion waste impoundments in Tennessee, Alabama, and Kentucky. These findings include:

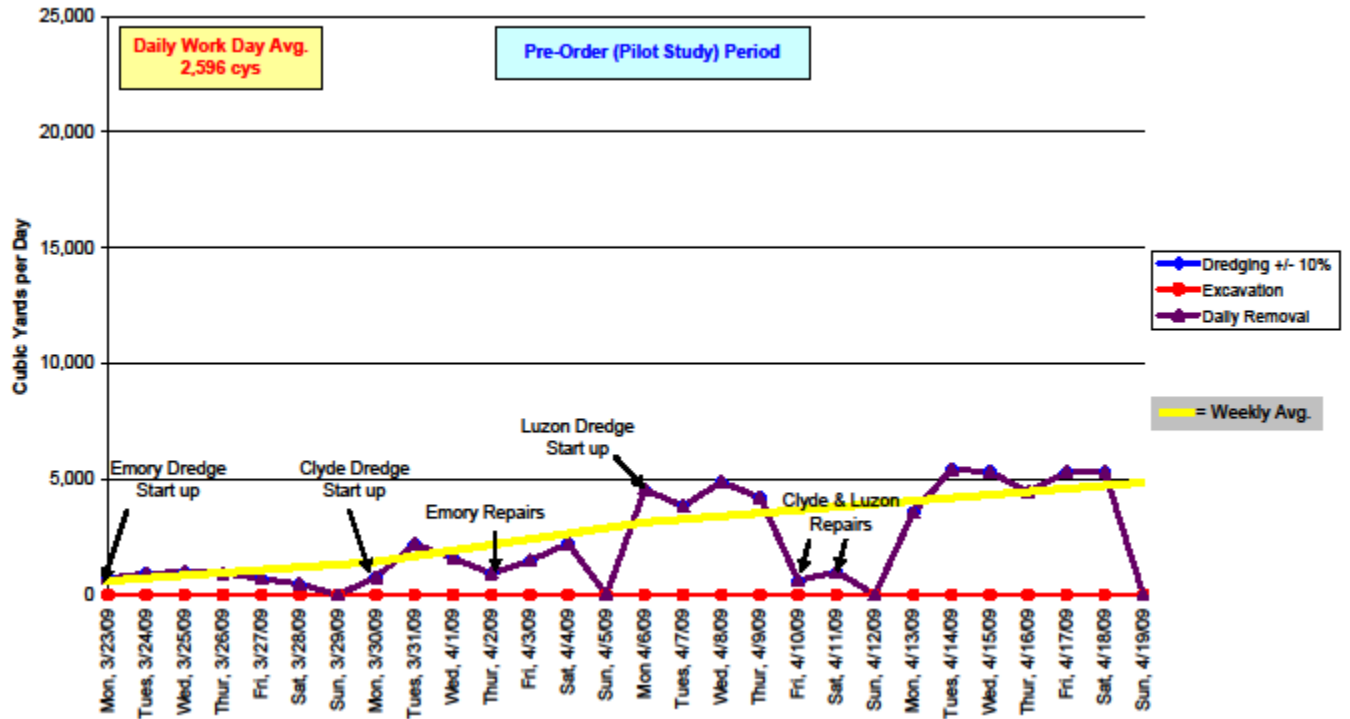
- Limited record drawings and construction testing and observation records: Stantec was unable to find many construction or construction testing records for coal combustion waste disposal facilities. These records can provide useful information including how the facilities were actually built, adjustments that may have been made, and compliance with the original plans.
- Construction of impoundments over ash ponds and the operation of fly ash dredge cells: Stantec notes that several impoundments were built over ash ponds, like the failed Kingston impoundment. This is significant because hydraulically-placed (or sluiced) fly ash in ponds and dredge cells generally has a soft consistency, and is loose in terms of density, porosity, and void ratio. As was demonstrated at Kingston, this condition can sometimes result in significant and sudden loss of shear strength within the sluiced ash, as a result of increased loadings (due to impoundment height). Stantec notes that this practice does represent a greater risk than constructing an impoundment over natural earth, but that the risk can be mitigated by ensuring that appropriate geotechnical analyses have been completed to support design and operation, and that operation includes instrumentation to monitor pore pressures, settlement, and slope movement. Stantec does not indicate the degree to which this monitoring or analyses were, or are being, done at TVA impoundments.
- Tall, unsupported weir structures: Weir structures in the TVA impoundments are usually vertical, push-together, concrete pipe or manhole sections. Stantec notes that a number of facilities have weir structures that are tall and unsupported.
- Conduit and weir abandonment procedures: As impoundments were raised to accommodate increased volumes of coal combustion waste, process water conduits and weirs were abandoned in place. This abandonment was not documented. Improper abandonment can lead to internal piping and loss of materials through joint separation in the conduits.
- Maintenance: Stantec noted that annual dike inspection reports were adequate in terms of identifying items for maintenance. However, Stantec identified a trend that TVA has not executed all of the maintenance recommendations provided in the reports. As a result, "In many instances, the same maintenance recommendations were made repeatedly in the annual reports from year to year."³
- Limited Operation and Maintenance Manuals and Emergency Action Plans: Stantec found relatively few Emergency Action Plans for TVA's impoundments. Stantec notes that these documents and processes are important for the safe operation of impoundments as well as for the protection of downstream communities and plant personnel.

³ Stantec, *Report of Phase 1 Facility Assessment: Coal Combustion Product Impoundments and Disposal Facilities, Various Locations, Tennessee*, at 8 (June 24, 2009).

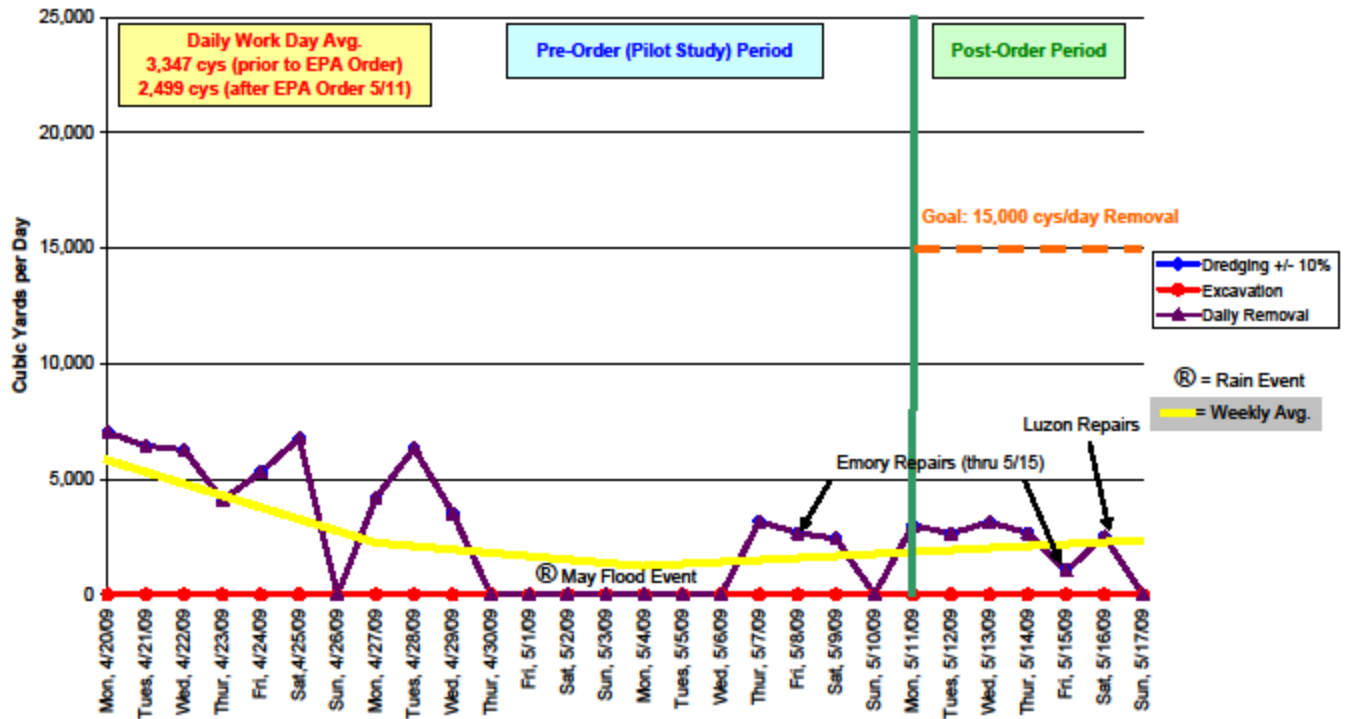
- Limited geotechnical instrumentation: Stantec found limited geotechnical instrumentation at a majority of facilities, as well as the absence of a program to routinely obtain measurements. This type of instrumentation program is part of a dam safety management program and is used to monitor performance of, and condition changes in, a facility. Instrumentation may consist of piezometers to monitor pore pressures within embankments and foundations, slope inclinometers and surface monuments to monitor movement, and plates for monitoring settlement.

APPENDIX

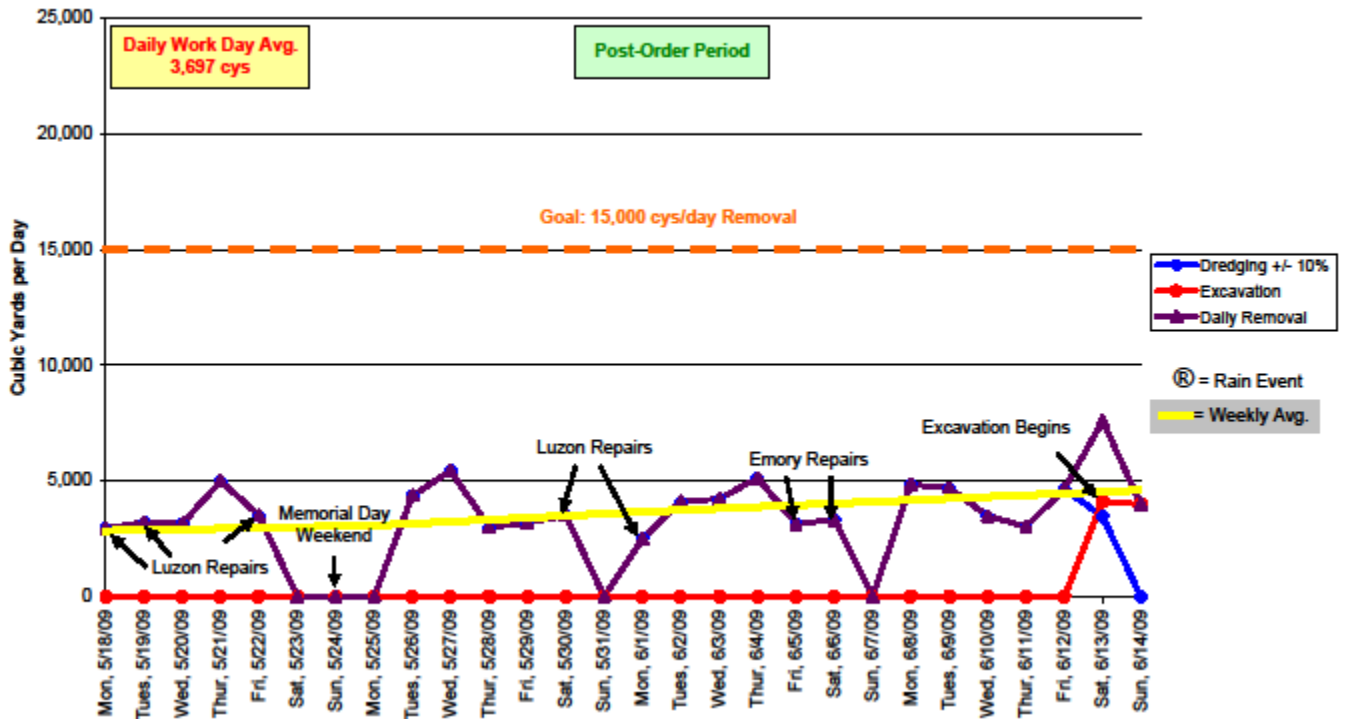
Daily Removal East of Dike 2



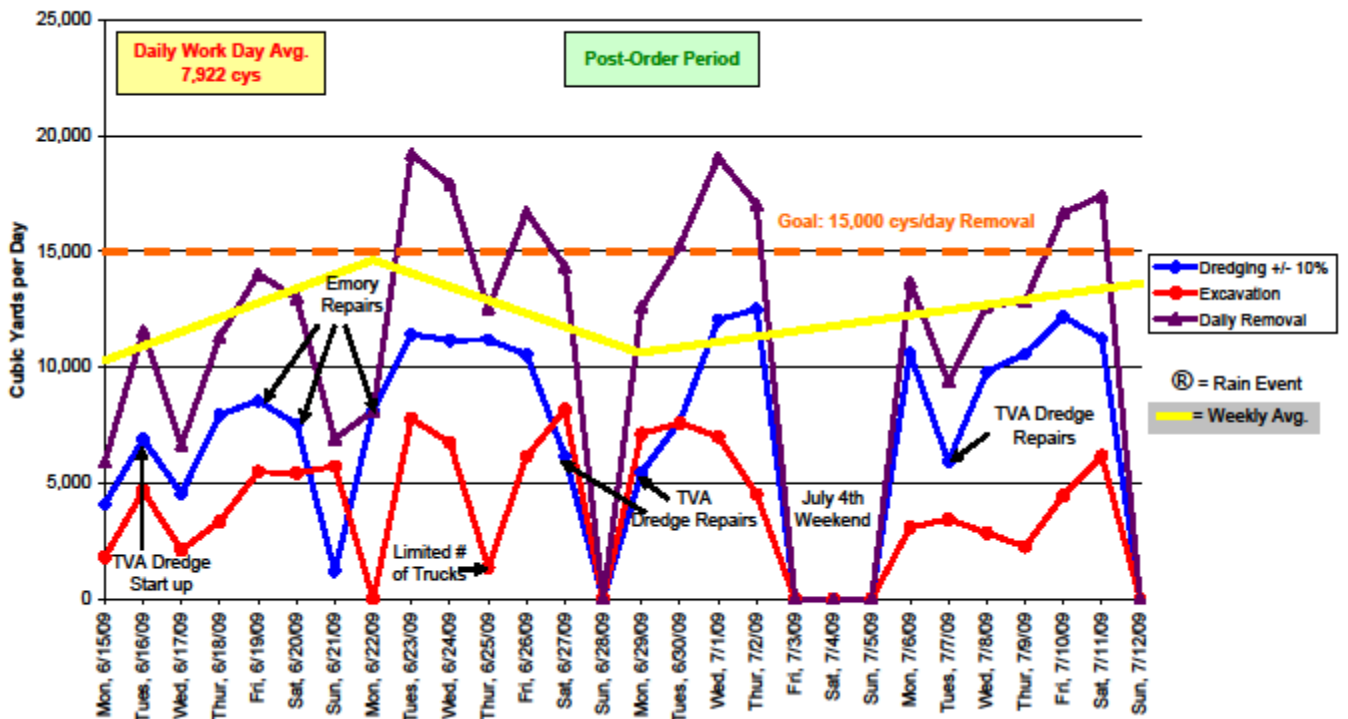
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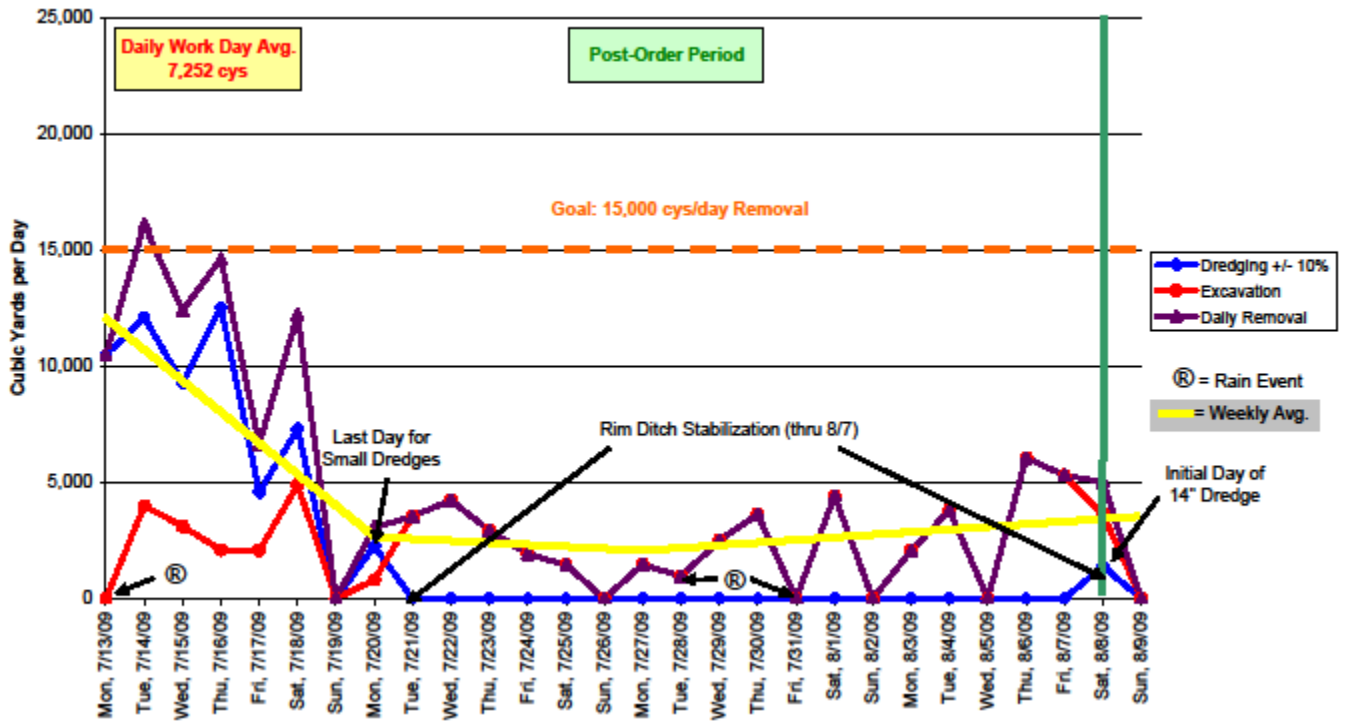
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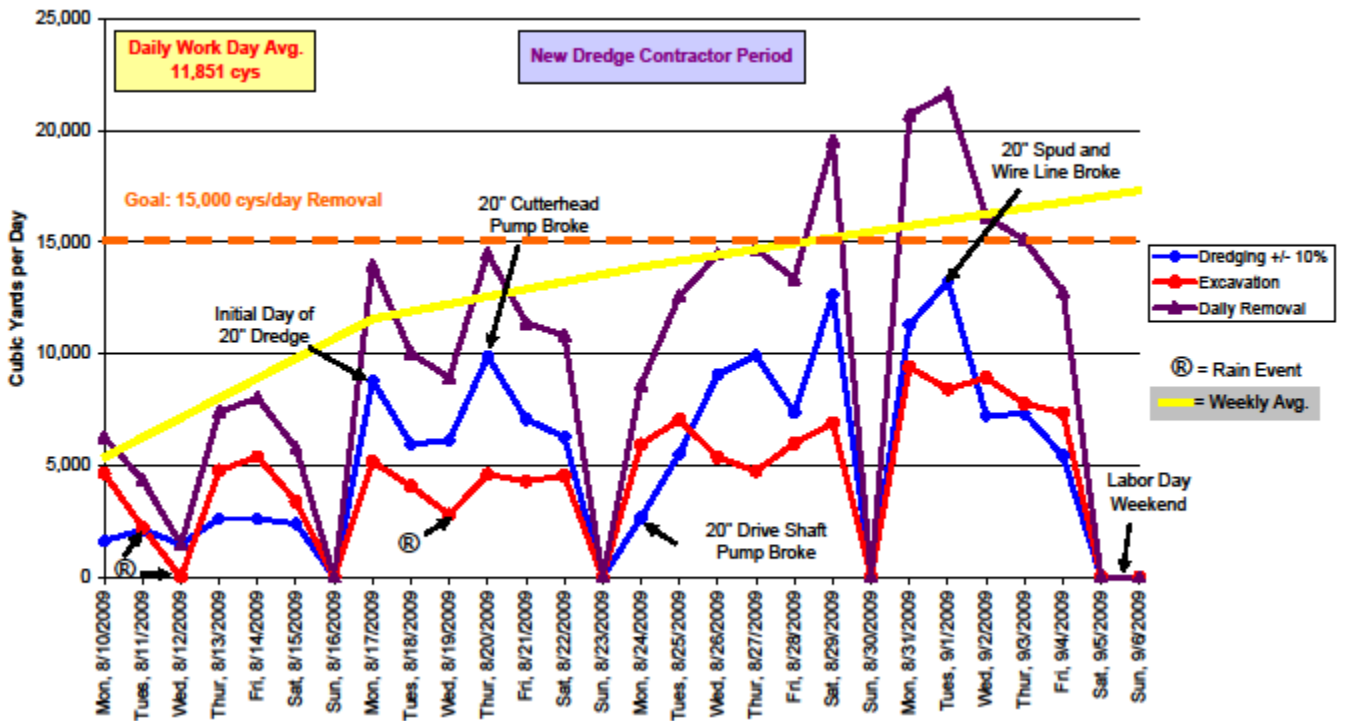
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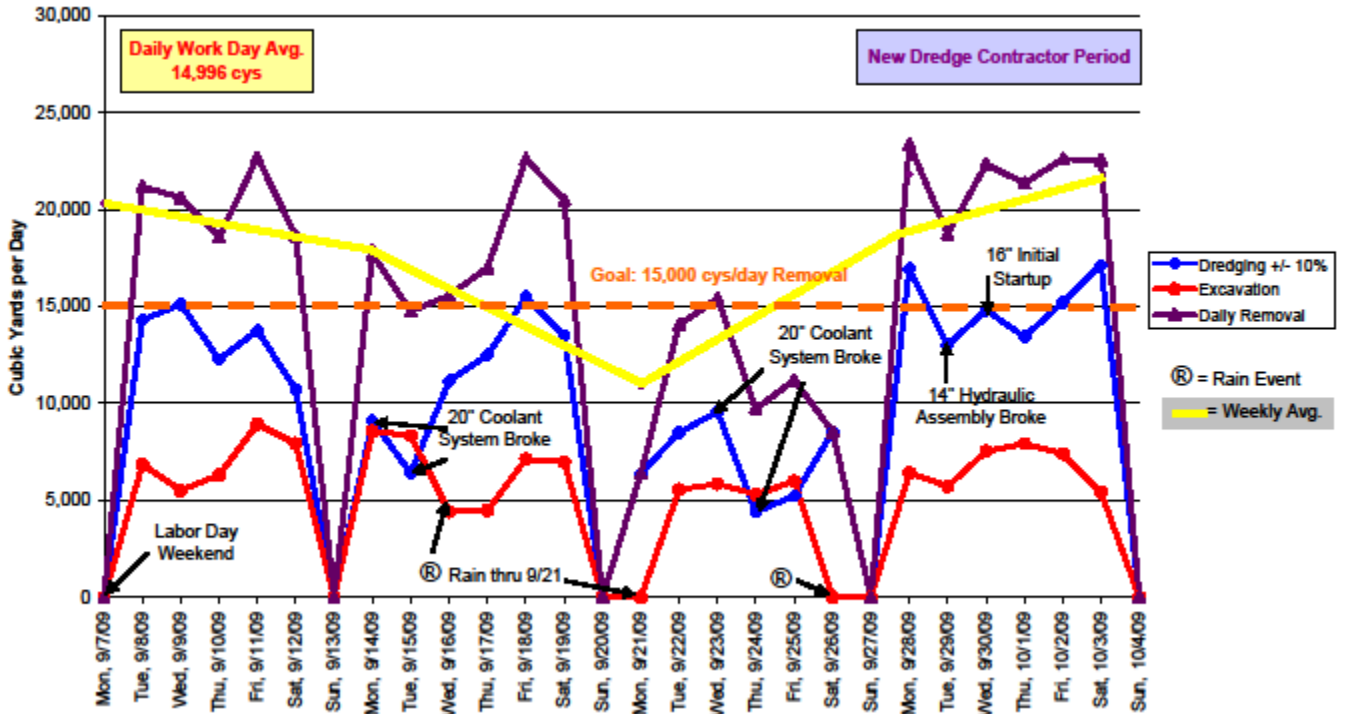
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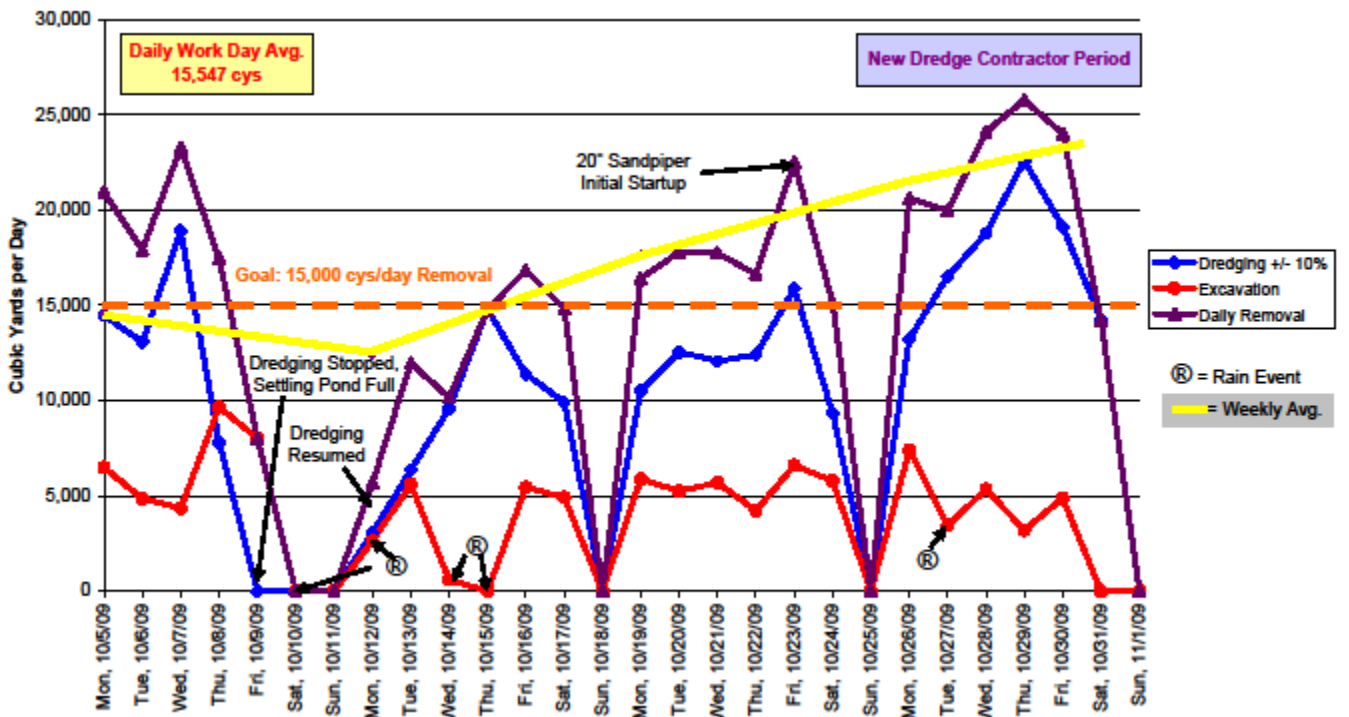
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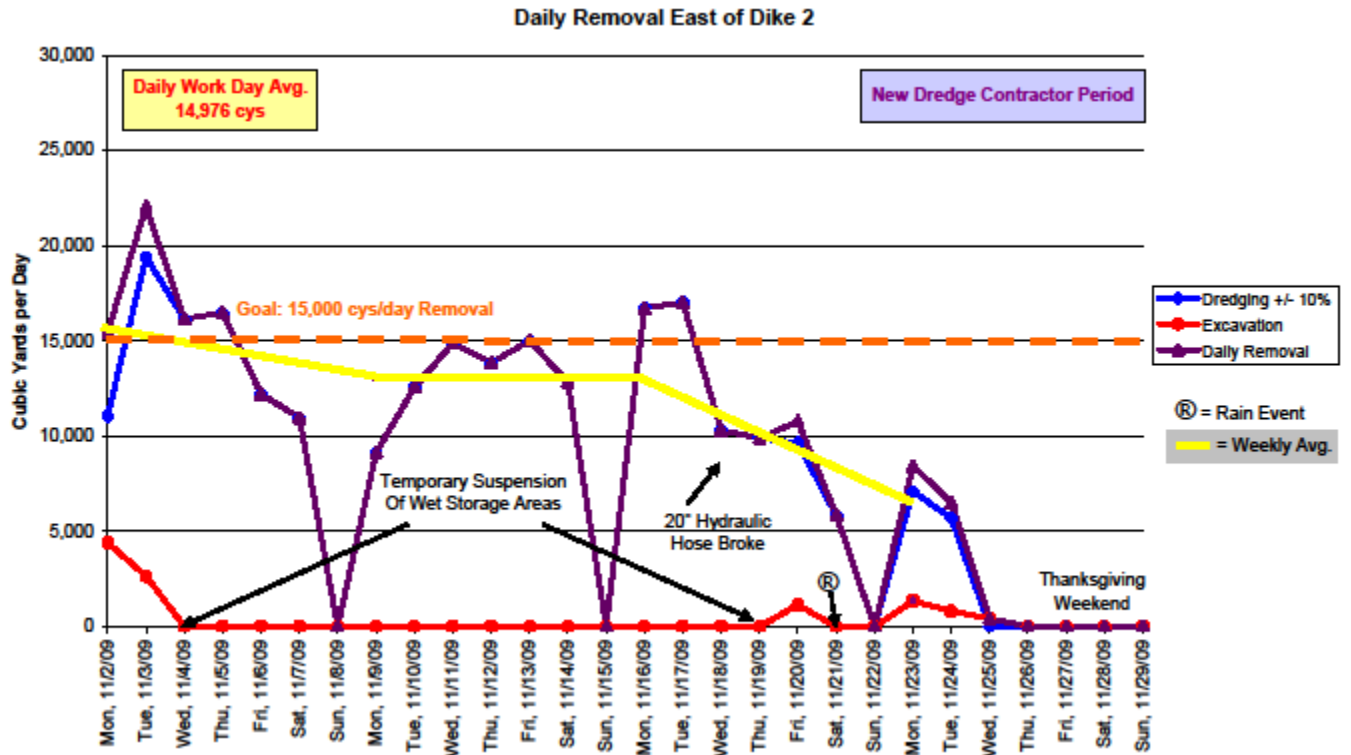


Daily Removal East of Dike 2



Daily Removal East of Dike 2





Source: EPA (<http://www.epakingstontva.com/productivity.aspx> (accessed December 3, 2009))

WITNESSES

The Honorable Tom Kilgore
President and Chief Executive Officer
Tennessee Valley Authority

The Honorable Richard Moore
Inspector General
Tennessee Valley Authority

Mr. Stan Meiburg
Acting Regional Administrator, Region 4
United States Environmental Protection Agency

Commissioner Albert Turner, Jr.
District 1 – Perry County
Perry County, Alabama

John Montgomery, P.E.
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Stantec Consulting Services Inc.

Mr. Michael Churchman
Executive Director
Alabama Environmental Council