Tennessee Valley Authority
Regulatory Submittal for Kingston Fossil Plant

Documents submitted:
Time Critical Ash Removal East of Dike 2
(Revised)
Date submitted
6/ 30/ 2009

Submitted to whom
Leo Francendese, EPA

Concurrence

Received	Not Applicable	TVA
☒	☐	Anda Ray
☒	☐	Mike Scott
☐	☒	Kathryn Copeland
☐	☒	Cynthia Anderson
☐	☒	Dennis Yankee
☐	☒	David Stephenson
☐	☐	_____
☐	☐	_____
☐	☐	_____

Received	Not Applicable	Jacobs
☐	☒	John Moebes
☒	☐	Julie Pfeffer
☐	☒	Jack Howard
☐	☒	Donna Cueroni
☐	☒	Paul Clay
☐	☐	_____

Approvals

TVA Michael T. Scott Date 6/30/09

EPA Leo Francendese Date 7/1/09

Consulted w/ Glen Pugh and Paul Davis TDEC

cc:

- ☒ Anda Ray, TVA
- ☒ Barbara Scott, TDEC
- ☒ Leo Francendese, EPA
- ☒ Mike Scott, TVA
- ☒ Dennis Yankee, TVA
- ☒ Kathryn Copeland, TVA
- ☒ Cynthia Anderson, TVA
- ☐ John Moebes, Jacobs
- ☒ EDM
- ☒ Julie Pfeffer, Jacobs
- ☒ David Stephenson, TVA
- ☒ Michelle Cagley, TVA
- ☒ Greg Signer, TVA
- ☒ KIF Incident Document Control
- ☒ Katie Kline, TVA
- ☒ Gretchen Wahl, Jacobs
- ☒ Barbara Scott, TDEC
- ☒ Dannena Bowman, EPA
- ☒ Jeff Gary, Jacobs

Time Critical Land-Based Ash Removal East of Dike #2 Work Plan

1.0 Purpose

There are two work plans in place for moving ash east of Dike #2. The first allowed transportation and disposal in the ash processing area ash generated as part of the installation of the interim drainage system or other activities in the area. The second addressed removing all remaining ash from the area east of Dike #2 that can be handled with land-based equipment. Primarily this second effort was confined to removing ash from land masses or immediately adjacent to land masses such as the narrow East Embayment. This work plan ties all of these work plans together and allows for removal of ash in the area using water-based equipment, ash from the area next to Dike C, and staging ash west of Dike #2. This action supports the time-critical removal action to remove all ash from the land and the river east of Dike #2.

Figure 1 illustrates the area being addressed by this work plan.

It is anticipated that an amendment to this work plan will be generated to specifically address the final ash excavation immediately adjacent to the dikes. Ash excavation next to Dike C necessary to install a truck loading area is included in this work plan.

2.0 Design

Part of this work plan includes the use of temporary staging areas west of Dike 2 for ash material. Figure 2 illustrates the locations of areas that can be used for staging. These areas would be used to allow a buffer for either capacity or traffic issues in the ash loading area. Some material may remain west of the dike for up to a year if the capacity in the ash loading area is limited for that long.

Initially, approximately 10 acres of the area will be prepared by grading the area. This area will be contoured in a manner to control runoff. Runoff will be routed through a series of drains and ditches to the adjacent settling ponds. Future expansions to the entire area indicated on the figure will include similar grading and runoff controls.

The situation of placing ash on ash in the embayment is different than placing ash on ash in the ash processing area or in the dredge cell. First, there is no historic ash deposition in the area of the embayment where the storage will occur. The ash in Area 1 is on the embayment bottom and varies from 4 to 46 feet in depth (in a very small area) with 9% of the area greater than 30 feet in depth of ash and 68% of the area is less than 20 feet in depth of ash. The ash was released and came to rest when the energy dissipated during the cell failure. There should be no stored energy in the underlying ash. The most likely underlying ash failure mode, if one exists at all in this storage area would occur at the bottom layer where ash is in contact with original embayment sediment on the original embayment area. However, this portion of the proposed storage area is bounded by

natural existing ground on one and half sides of the three sides and the dredge cell on the third side, which prohibits failure along the bottom. This area of the embayment is essentially a bowl as shown on Figure 3, a cross section through the western portion of the area (location of cross section shown on Figure 2). Similar conditions exist in the eastern portion of the area too. The remaining area has a small passage to Dike 2. Any movement in this area would be stopped by settlement ponds and Dike 2. Currently the ash in the storage areas is not being held back by the dike, even though Dike 2 was originally built to hold back some ash. Most of the ash next to the dike has been removed to construct the clean water ditch and the settling basins. There is no pressure on the dike from ash. Ash in Area 2 is confined by ash in Area 1.

A potential failure mode for the newly placed ash would come as a result of sloughing. As evidence around the site suggest, even with good sloping and compaction, ash can slough from a pile. Large portions of piled ash have not failed to date. Although the entire pile is unlikely to fail at once, portions can move onto surrounding areas. As the plan illustrates, ash could move onto adjacent ash or into the settling basins or the dirty water ditches, but not beyond Dike 2. The most likely scenario is small losses of ash that are identified quickly and repaired or further placement of ash is suspended. Repairs of any sloughing could be repaired within one working day. A major failure could result in filling the settling basins but the chance of this happening all at once is very slim. If it were to occur, the ash can be removed within a week.

If the ash were to fail, after an evaluation of the safety of the area and the location of the ash, a rock retention structure would be installed, if appropriate, to control future migration of the ash. If rock cannot be obtained within the time frame necessary for the ash to stabilize and the safety condition to be assessed, a rock stockpile will be provided ahead of time to allow for a quick response.

The temporary ash stacking area is basically an embankment that will be constructed by the controlled placement of ash in vertical lifts. The operational placement is constructed to maintain adequate surface drainage on the top surface while maintaining control of erosion on the stack side slopes. Ash will be stacked in a manner that minimizes the infiltration of run-off from the uncovered portion of the fill area. The height of the stack will increase with the incremental placement of ash. The considerations for providing sufficient pile stability are as follows:

- Ash being relocated will be of a consistency suitable for transporting and stacking.
- Ash will be transported by tractor-scraper "pans" or dump trucks to the temporary storage area.
- The ash will be spread with pans and/or bulldozers in 1 to 2 feet lifts.
- The ash will be compacted with equipment (i.e. rubber tired equipment, track hoe, dozers, etc.) to achieve the stability necessary to make the work area safe.
- The ash will be graded to provide approximately a 3-percent minimum slope at the end of each working day to provide drainage sufficient to prevent ponding and excess surface infiltration. No daily cover will be required.

- A bench offset of 12-15 feet will be used and a maximum height of 30 ft is planned.
- The stack side-slopes will be constructed at 3H:1V with intermediate benches every 15' for erosion control and surface water drainage.
- Dust is controlled during operation by the conditioning of the ash prior to transport to the stack and by utilizing a water tank truck as required on the haul road and stack.

The condition of the piles will be evaluated after every significant rain event (more than 0.5 in in 24-hr) as well as before any loading or unloading operation begins. The SPCC plan for KIF Ash Recovery will be followed.

A plan for installing a loading ramp is attached as Figure 4. This ramp will be located off of Dike C and will allow for the material adjacent to the dike to be retrieved. Ash will be removed in the area (carefully near the dike to avoid disturbing the dike), then a 2 ft layer of 57 stone will be placed to act as a seepage layer followed by shot rock as the base. All organic material will be removed from the dike face prior to placing the ramp. This design has been coordinated with the geotechnical engineering staff and no issues with dike stability were identified.

3.0 Construction

The primary field work activity described in this work plan is the removal of ash in the East Embayment and the area east of Dike #2. The ash will be moved and shaped using bulldozers, backhoes, and amphibious equipment and loaded onto articulating trucks by front end loaders and backhoes. In general, land-based equipment will reach as far into the surrounding water as possible to pull ash into piles. Those piles will be allowed to dry and then the trucks will be loaded from the piles. The ash will be transported by articulating trucks to either the ash processing area or to temporary staging areas west of Dike 2 (see Figure 2) with roughly space for 250,000 cy. Once the material that can be removed with land-based equipment is gone, water-based mechanical dredging equipment will be used to remove the plug and other easily retrievable ash. In some areas, the barge-based equipment can cast the ash directly onto the shoreline. In other areas, an ash barge will be needed and offloaded on shore, prior to transportation. The mechanical dredge will also be used in the area from the water side to begin removing ash to the extent that the offloading area has the capacity to accept the ash. In no way will the water removal effort impact the ability to remove debris from the river. If necessary, additional barge offloading facilities may be built as ash on the land is removed and areas are freed up.

If offsite disposal is approved in a separate trucking/disposal work plan, this dry ash may be placed directly in dump trucks to a final offsite disposal location.

There are three areas of ash to be removed (see Figure 1):

1) East Embayment,

2) Ash on, or immediately adjacent to land between Dike 2 and the river (mid-area of Embayment), and
3) Ash adjacent to Dike C (around island).

1) East Embayment *(already approved in second work plan)* – the plan is to physically remove the ash using earth moving equipment and transport the ash to the storage or staging areas or to the dredge cell embankment test area. Amphibious equipment may be used since the conditions are wetter in this area. Water management may be necessary to control the upstream embayment water from impacting the excavation area. This could include bypass channels or pumping to the river. This water, while fairly stagnant, is water that normally discharged into the river directly. During the summer months, water management may be less of an issue. Final ash removal may be necessary using a hydraulic or mechanical dredge.

If some of the ash has a high enough water content to cause it to adhere to transport trucks or have excessive free liquids that could spill during site transport, some air drying will be conducted first. If the material is directly trucked offsite for disposal, all appropriate waste characteristics will be met as directed under that work plan.

The estimated in-place quantity of ash to be moved from the East Embayment is approximately 190,000 cubic yards. All visible ash will be removed.

2) ***Ash directly adjacent to Dike #2*** *(land-based ash addressed previously approved in second work plan)* – this material will be moved with earth moving equipment and with the mechanical dredges. Much of this material has already been stockpiled as a result of being moved during other activities in the area. The material will be loaded into articulating dump trucks and taken to either the ash processing area, the ash staging area west of Dike 2, or to the dredge cell where it will be used for the ash stability testing in the dredge cell. This could be modified to accommodate hauling directly off-site if an off-site ash disposal plan by truck is approved. While all visible ash will be removed from the land, some depth of ash will remain in the water bodies, retrievable in the future, if needed, by hydraulic dredging. Care will be taken to not excavate beneath the ash in the river.

The estimated quantity of ash to be moved from the area adjacent to Dike #2 is harder to quantify as the line between the ash in the river to be retrieved by mechanical or hydraulic dredging and that retrieved under this work plan will be determined in the field. Up to approximately 195,000 in place cubic yards may be removed.

Ash adjacent to Dike C – a loading platform will be built in the ash area after removal to clay with room for an excavator and trucks. Ramps from Dike C to the loading platform will be built. Small trees in the way of the ramps will be cut at ground surface with the root balls left in place. The ash will be pulled to this area by amphibious equipment and other land-based equipment. Small trees in the area may be destroyed although effort will be taken to minimize the number of trees removed on the island. The rookery will be disturbed by the presence of heavy equipment and the noise, but nesting season is over.

The habitat will remain by saving the large trees on the island. A plug of ash will be left to allow some dewatering of the area. Once the ash has been removed from inside the plug, the plug will be removed by mechanical dredging along with any other ash that was not retrievable. Care will be taken to not excavate beneath the ash. Some volume of ash will remain on the river bottom for future hydraulic dredging. The access roadway will be removed once the ash removal has been completed.

The estimated in place quantity of ash to be moved adjacent to Dike C is approximately 240,000 cubic yards but likewise, some of this volume may be removed by the dredging project.

Access modifications *(already approved under the second work plan)* – Modifications to the area including installation of temporary access roads and maybe improving the road on Dike 2 may be needed to allow for sufficient productivity to remove most of this ash during the dry months. This may include making the dike road a two way road. Any significant modifications to the dike will be done through the current geotechnical engineering firm. At this time, the only plan is to slightly widen the road in spots to allow for two-way traffic.

Erosion controls – Silt fences, hay bales, temporary berms, flexterra, and other dust and erosion control practices will be used while moving the ash. Special attention will be paid to controlling runoff directly to the river. This area is protected by the silt curtains being installed to support an increase in mechanical debris removal from the river.

4.0 Schedule

This work will commence immediately upon approval of this plan. The land-based ash removal and access control modifications have already begun. A work-off curve for approximately 500,000 cy is included in this plan (Figure 5). Between 500,000 and 650,000 in place cy may be removed but as discussed before, some of the volume will actually be removed by dredging and will be tracked under those curves. Full productivity will be reached once any necessary access improvements are made. Less productivity will be realized when only the mechanical dredge is operating at the end of the effort. It is anticipated that the ash will be removed from east of Dike #2 by the end of January 2010.

5.0 Waste Management

Ash is the waste generated and its handling is addressed in Section 3.0. Miscellaneous debris that may be excavated will be handled with the ash if sufficiently small or will be set aside if large. Vegetative debris will be handled along with the trees removed under the dredging plan (moved to a debris staging area and eventually shredded and used as onsite mulch).

6.0 Health and Safety

The activities in this work plan will follow the site-wide health and safety plan. Of primary concern will be dust generation which will be controlled through use of water trucks and Flexterra as discussed in the Site Dust Control Plan. Personal hygiene efforts will be used also to control exposure to ash. Vehicles will follow clean protocol utilizing wash stations located on TVA property.

Unauthorized personnel will not be allowed into the area. Foot traffic and small vehicular traffic will be kept to those required to conduct work in the area (flagging, inspections, etc.). If evidence of sloughing is present, a site engineer will assess the stability before work continues in that area.

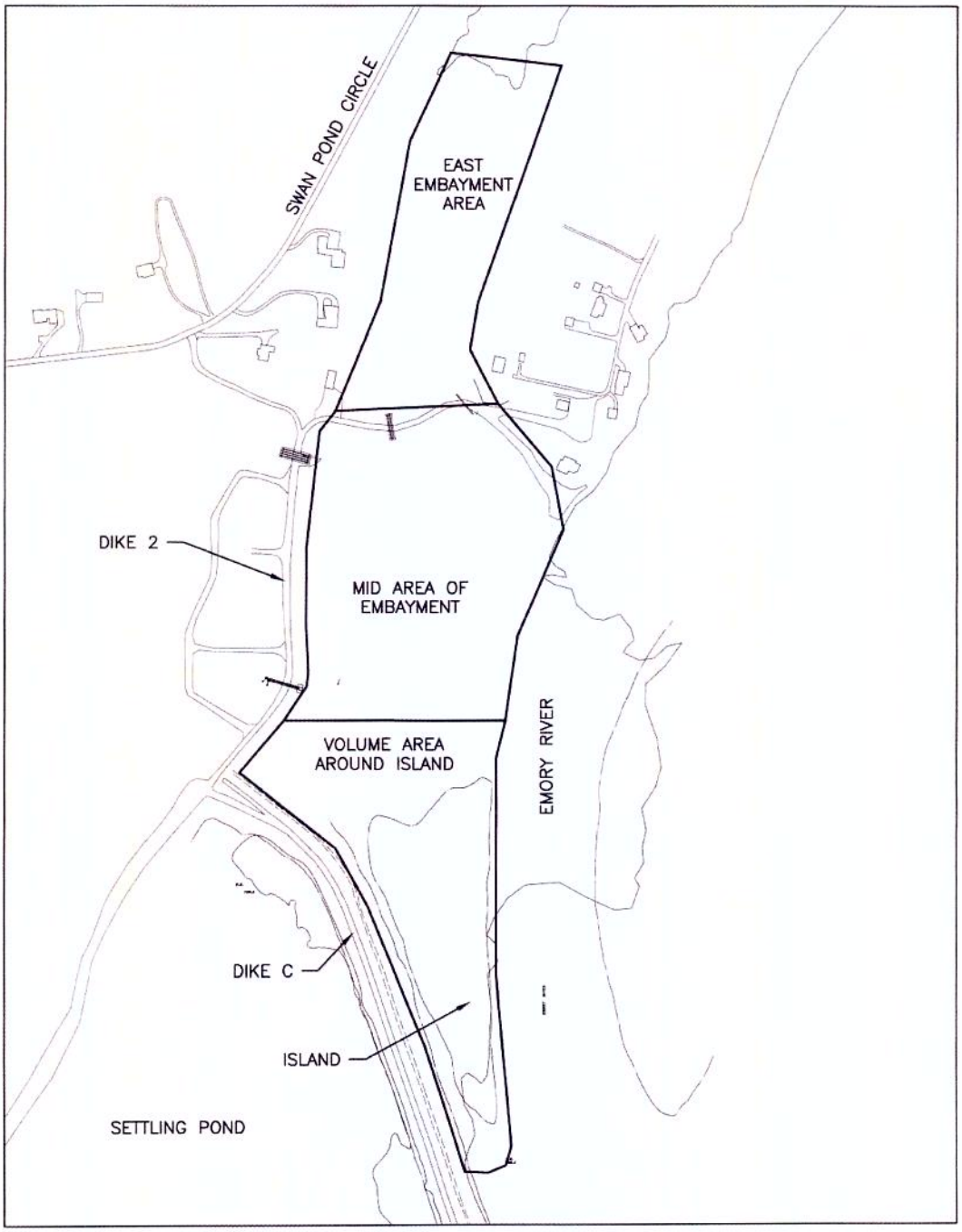

Figure 1: Ash removal areas east of Dike 2

Figure 2: Temporary ash storage area west of Dike 2

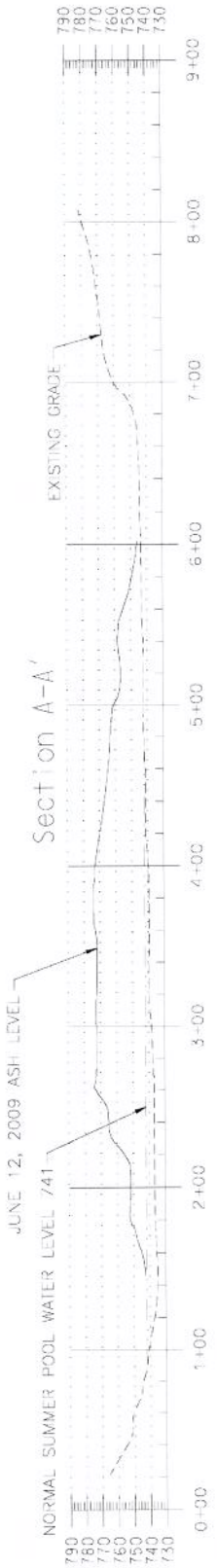

Figure 3. Cross Section of Storage Area

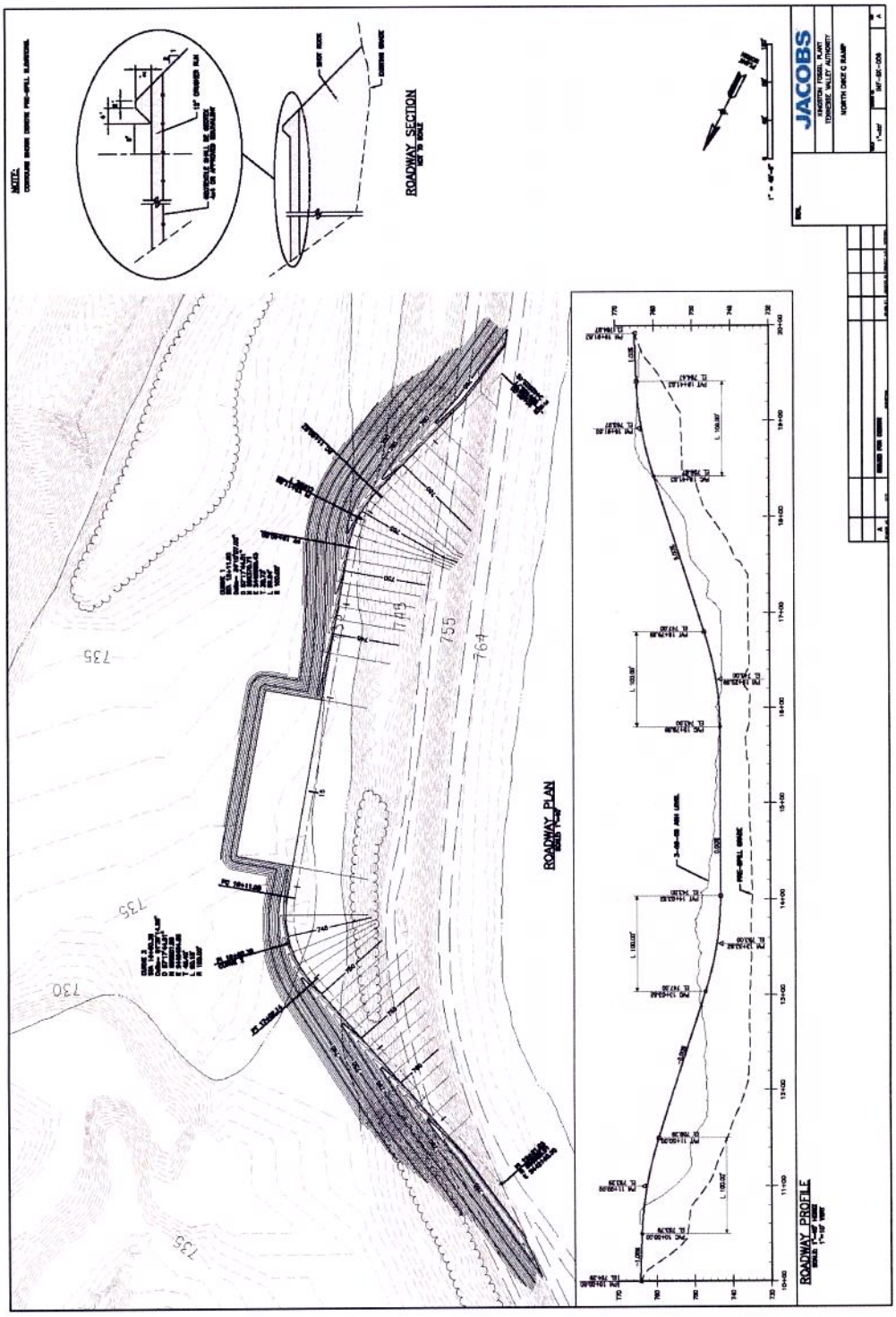

Figure 4. Ash loading ramp

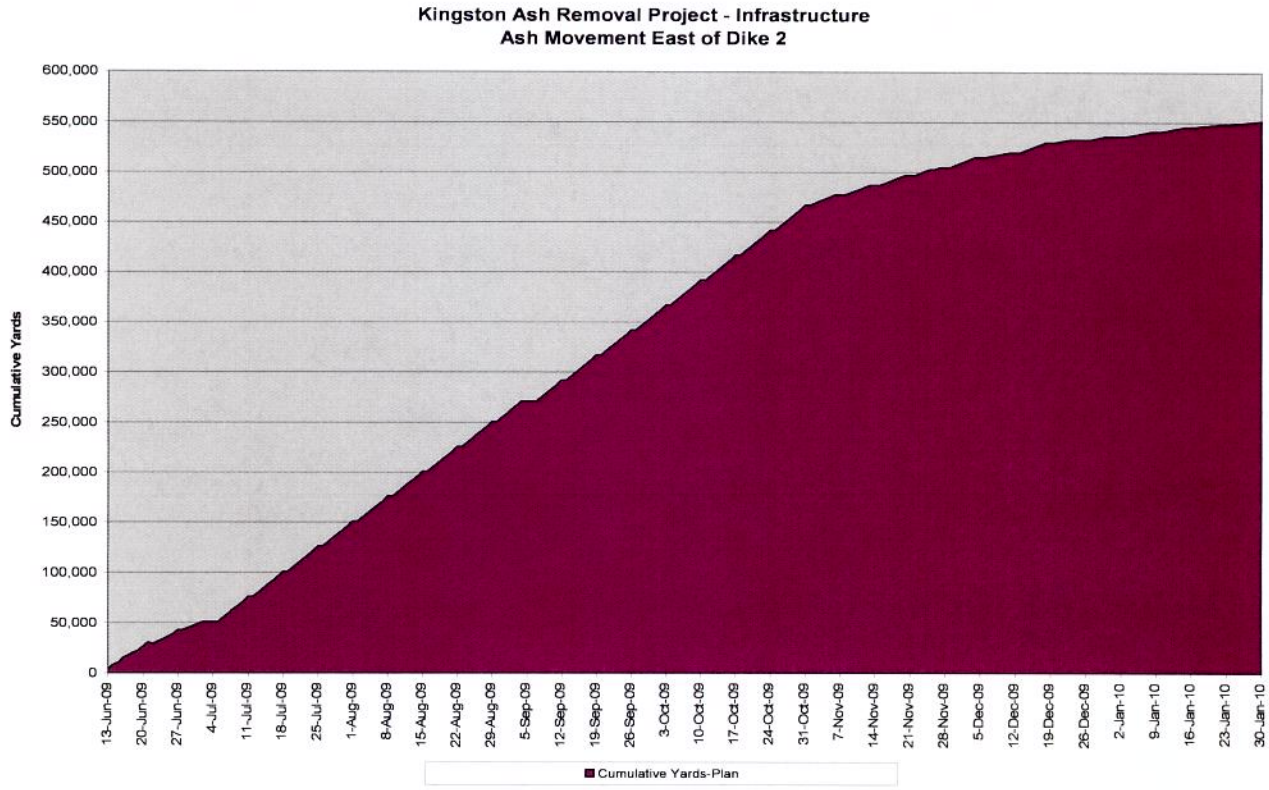

Figure 5. Ash work-off curve